PART

1 of

Petition

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APPENDICES

APPENDIX A STIPULATIONS

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NEW YORK STATE
BOARD ON ELECTRIC GENERATION
SITING AND THE ENVIRONMENT

IN THE MATTER

of the

Case 00-F-1256

Application by Calpine Construction Finance Company, L.P.for a Certificate of Environmental Compatibility and Public Need to construct and operate a nominal 540-megawatt natural gas-fired combined-cycle combustion turbine electric generating plant in the Town of Wawayanda, Orange County

THE PARTIES HERETO stipulate and agree as follows:

1. The Wawayanda Energy Center (Project) is discussed in an Article X Preliminary Scoping Statement submitted to the Chairman of the New York State Board on Electric Generation Siting and the Environment on July 27, 2000 by Calpine Construction Finance Company, L.P. (Calpine). The term "Project" as used herein includes the energy facility and all improvements, including buildings, structures, fixtures and other improvements associated with the energy facility, as well as the interconnections subject to the Siting Board's jurisdiction. The term "interconnections" as used herein is understood to have the following specific meaning:

> Any area to be disturbed for roadway infrastructure, structures or conduits conveying water to and wastewater from the Project, structures or conduits conveying natural gas to the Project, or structures or conduits conveying the electrical output of the Project, but shall not include areas to be disturbed for structures or conduits conveying natural gas to the Project under the jurisdiction of the Federal Energy Regulatory Commission (FERC).

The extent to which the natural gas pipeline shall be addressed in the Application is discussed in Stipulation No. 4 (Gas Transmission Facilities). Calpine will perform or has performed the studies, evaluations, and analyses set forth in these stipulations to satisfy the application requirements of Article X of the Public Service Law. These stipulations are governed by Section 163 of the Public Service Law.

2. Parties hereto may limit their concurrence to one or more of the fifteen specific subject area stipulations by so indicating in a notation next to their signature. A signature without any such notation shall indicate concurrence in all fifteen of the specific subject area stipulations.

3. Those signing these stipulations agree that, as of the date hereof, the studies outlined herein constitute all the necessary studies concerning the subject matter of these stipulations that Calpine must provide to satisfy Section 164 of the Public Service Law. Except as provided herein, the signatories agree not to request Calpine to provide additional studies concerning the subject matter of these stipulations in connection with the Article X proceeding.

4. Under any of the following circumstances, Calpine agrees to perform additional studies, evaluations or analyses:

   (a) A new statute, regulation or final, non-reviewable judicial or federal administrative regulation, ruling or order is adopted subsequent to the date of these stipulations which necessitates such additional studies, evaluations, or analyses;
   (b) Calpine proposes a change in the Project or other inputs to the stipulated studies, evaluations or analyses that will affect the results of the studies, evaluations or analyses;
   (c) New information is discovered during the conduct, or as a result of the stipulated studies, evaluations or analyses that affects the results thereof or updated methodologies, standards or definitions as referenced in these stipulations;
   (d) The Chairman of the Siting Board, the Siting Board or Presiding Examiner, whose ruling will be appealable to the Siting Board, requires an additional study, evaluation, or analysis; or
   (e) The Department of Environmental Conservation determines that the Prevention of Significant Deterioration (PSD), Subpart 201-6 preconstruction permit and certificate to operate, and/or, if required, individual State Pollution Discharge Elimination System (SPDES) permit application is incomplete pursuant to Uniform Procedures Regulations (6 NYCRR Part 621).

5. After the Chairman of the Siting Board determines that the application complies with Section 164 of the Public Service Law, if the signatories, in any of the circumstances listed above, reach agreement as to the implementation of any additional studies, evaluations or analyses, such agreement shall be set forth in a new stipulation, which shall include the agreement of Calpine to extend the statutory deadline for completion of the certification proceeding, but only if and only to the extent necessary to provide sufficient time to permit any such studies, evaluations or analyses to be conducted and reviewed. Any of the signatories, in the circumstances listed in paragraph 4, who do not reach such agreement, shall be free to submit the matter to the presiding examiner for resolution and shall not be restricted from pleading that Calpine must provide additional studies, evaluations or analyses related thereto during the Article X proceeding regarding the subject matter of these stipulations. If the Chairman of the Siting Board, the Siting

Board, or the Presiding Examiner requires an additional study, evaluation, or analysis, the statutory deadline for completion of the certification proceeding will be extended to provide sufficient time as specified in such decision to permit such study, evaluation, or analysis to be conducted and reviewed, unless (in the case of a ruling by the Presiding Examiner) Calpine seeks interlocutory review.

6. The Orange Recycling and Ethanol Production Facility sponsored by the Masada Resource Group, LLC, proposed to be located in the city of Middletown, is referred to in this document as "the Masada Project."

7. In the Article X Application, Calpine will set forth proposed terms and conditions that it believes to be appropriate for imposition in any Certificate granted by the Siting Board.

STIPULATION NO. 1: AIR QUALITY & METEOROLOGY

The Application will examine the impacts of criteria pollutants and other NYSDEC regulated pollutants (Study) and non-criteria pollutants (Non-Criteria Pollutant Study) from the Project on air quality. The components of the Study will include identification of climate and air quality conditions, an inventory of Calpine's proposed emission sources, and an assessment of Project technology and design, emissions, impacts, and cumulative impacts. The components of the Non-Criteria Pollutant Study will include identification of emissions constituents and an assessment of Project impacts. If necessary, the non-criteria pollutant study also will include an assessment of cumulative impacts and a multipathway risk assessment.

1. To the extent consistent with the following paragraphs contained in this stipulation, the methodologies, standards, and definitions for assessing air quality will follow procedures outlined, and use data contained, in the following documents:

For performing air quality dispersion modeling:

New York State Department of Environmental Conservation (NYSDEC), Air Guide-26, NYSDEC Guidelines on Modeling Procedures for Source Impact Analyses (December 1996).

NYSDEC, Air Guide-36, Emission Inventory Development for Cumulative Air Quality Impacts Analysis (June 1995), if necessary.

Air Modeling Protocol to be established to the satisfaction of NYSDEC and DPS Staff specifically for this case (hereinafter Air Modeling Protocol), and once approved, to be appended hereto as Attachment I.

USEPA, Draft New Source Review Workshop Manual (October 1990).

NYSDEC, Air Guide-12, Review of Major Sources.

USEPA, Guidelines on Air Quality Models, Appendix W of 40 CFR Part 51.

For determining stack height:

USEPA, Guidelines for Determination of Good Engineering Practice Stack Height (EPA Technical Support Document for the Stack Height Regulations), Document Number EPA-450/4-80-023R (June 1995).

For impacts on soils and vegetation:

USEPA, A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals, Document Number EPA-450/2-81-078 (1981).

For quantification and assessment of the Project's contribution to the New York State total deposition of sulfates and nitrates, in accordance with the State Acid Deposition Control Act:

Memorandum from Leon Sedefian to IAM Staff (March 4, 1993).

For performing visibility modeling:

USEPA, Workbook for Plume Visual Impact Screening and Analysis. Document Number EPA-454/R-92-023 (October 1992).

For non-criteria pollutant ambient air limitations and benchmarks:

NYSDEC.DAR-1.AGC/SGC Tables. Division of Air Resources, Bureau of Stationary Sources, July 12, 2000.

USEPA's On- Line Integrated Risk Information System (IRIS) Database.

USEPA's Annual Health Effects Assessment Summary Tables (HEAST).

USEPA's National Center for Environmental Assessment (NCEA).

US Department of Health and Human Services, Agency for Toxic Substances and Disease Registry (ATSDR).

Risk-based ambient air criteria developed by the New York State Department of Health (DOH) or other recognized organizations, such as the World Health Organization.

CRITERIA POLLUTANTS

2. The air quality Study will include:

(a) An assessment of existing climate data (average and extreme conditions) for the region surrounding the Project obtained from local climatological summaries, meteorological data sets from nearby stations, and/or other sources, as described in the Air Modeling Protocol, required to determine the normals and extremes of wind speed, temperature, and precipitation. Calpine shall obtain DEC approval for the meteorological data to be used in the Prevention of Significant Deterioration (PSD) application. The data and their use will be described in the Modeling Protocol.

(b) An assessment of existing air quality levels and air quality trends for criteria pollutants in the region surrounding the Project, including air quality levels and trends taken from regional air quality summaries and air quality trend reports, as described in the Air Modeling Protocol. Monitors in both Orange County and adjacent counties will be used to determine background ambient air pollutant levels. Calpine shall submit a request for a waiver approval for PSD pre-

construction monitoring, which will be issued by EPA. PSD application shall be submitted upon waiver approval.

(c) An assessment of the impacts from quantifiable criteria pollutant emissions, including those generated during construction of the Project.

(d) A control technology assessment for pollutants subject to Prevention of Significant Deterioration (PSD) review and Nonattainment New Source Review (NNSR) promulgated under 40 CFR 52.21 and 6 NYCRR 231, respectively, to determine the best available control technology (BACT) and lowest achievable emission rate (LAER) for the applicable pollutants. NO_X BACT will include an analysis of Selective Catalytic Reduction (SCR) and $SCONO_X$. New stationary combustion turbines are subject to 40 CFR part 63 Subpart B – Requirements for the Control Technology Determinations for Major Sources in Accordance with Clean Air Act Sections 112(g) and 112(j). This regulation requires a case-by case determination of the Maximum Achievable Control Technology (MACT) for major sources, which exceed the annual emission thresholds of 10 tons per year for an individual Hazardous Air Pollutant (HAP) or 25 tons per year for total HAP emissions. If the Project HAP emissions exceed the regulatory thresholds, an analysis will be conducted to determine an emission limit or control technology associated with the best controlled similar source. Calpine will also provide estimated HAP emission rates with and without an oxidation catalyst. Alternative sites and control techniques analysis per Part 231-2 in addition to the "top down" BACT per PSD rule will be provided.

(e) Pursuant to Air Guide 26, an assessment of an optimal stack height taking into consideration Good Engineering Practice (GEP) stack height for the Project and air quality related values, visual impacts, and other considerations.

(f) An assessment of stack emissions of criteria pollutants, stack emissions being provided in hourly and annual estimates based on manufacturer's data, available emission factors, design control efficiencies, and other data or regulatory specifications related to the design of the Project.

(g) A calculation of the number of NO_x and VOC emission offsets to be obtained at a 1.15 to 1.0 ratio and how those offsets will be obtained in accordance with 6 NYCRR 231. Also, a discussion of the applicability and requirements of the "cap and trade" program pursuant to the proposed 6 NYCRR 227-3 and the federal Title IV acid rain program. An acid rain permit application will be submitted to NYSDEC and will be provided.

(h) An assessment of the potential impacts to ambient air quality that may result from criteria pollutant emissions from the Project, the modeling to be done in accordance with the Air Modeling Protocol, and a computer file output of the dispersion modeling results shall to be provided to NYSDEC and DPS Staff and to Town of Wawayanda.

(i) An assessment of visibility impacts from stationary combustion turbine emissions of NO_x and PM_{10} from the Project, as described in the Air Modeling Protocol.

(j) An assessment of the impacts to soils and vegetation that may result from criteria pollutant emissions of the Project using EPA screening criteria (see also Stipulation No. 9 entitled "Terrestrial Ecology" regarding air impacts on wildlife).

(k) An assessment of the impacts of any economic growth that may result from development of the Project in accordance with the Air Modeling Protocol.

(l) An assessment of the predicted air quality impacts from the dispersion modeling analyses to the Significant Impact Levels and Prevention of Significant Deterioration (PSD) increments and air quality standards.

(m) In accordance with the State Acid Deposition Control Act, an assessment of the Project's contribution to the New York State total deposition of sulfates and nitrates at defined sensitive receptors as identified in the Air Modeling Protocol.

(n) A cumulative source impact analysis for any criteria pollutant for which the Project has impacts above Significant Impact Levels. The additional sources to be analyzed to determine whether the Project, in conjunction with existing and proposed major sources, will cause or contribute to exceedances of applicable national or state ambient air quality standards (NAAQS and NYAQS) or PSD increments, will include those identified as "nearby" existing sources, as defined in the EPA Modeling Guidelines and NSR Workshop Manual, and by the Air Guide 26 procedures. Nearby sources to be included in these procedures will include the following facilities: Masada, Revere Smelting and Refining, Balchem, O&R, Reynolds, Genpak, Orange County Landfill, Hudson Superior Landfill, Dutchess Quarry and Supply Corp., County Metal Yard, Middletown Water Pollution Control Plant, and Elvree Farm. The proposed inventory sources also will include all other proposed major electric generating facilities in New York State for which applications have been filed with the Siting Board and will be limited to those located within a circular area defined by the Significant Impact Area (SIA) of the proposed Project, plus 50 kilometers, at the time of NYSDEC approval of the Project's cumulative source inventory per Air Guide 36 requirements. The inventory of existing major sources shall be developed using data obtained from the NYSDEC and New Jersey and Pennsylvania. The inventory, if necessary, shall be included as an appendix to the PSD application and verified by the source state or per Air Guide 36 requirements and the Air Modeling Protocol. The PSD application will be submitted only after the inventory is approved by NYSDEC. All information submitted in support of the inventory of nearby sources, including verification worksheets per Air Guide 36 requirements will become public information. Following approval of the major source inventory, no further sources subsequently proposed or modified shall be added.

(o) An offsite consequence analysis for ammonia that will be stored onsite for use in the proposed selective catalytic reduction (SCR) system, including an analysis of an accidental release scenario for ammonia performed to meet the requirements of USEPA's regulations implementing section 112 (r) of the Clean Air Act.

(p) An Environmental Justice (EJ) Analysis will be performed as part of the PSD application. The EJ analysis will be based on requirements of Presidential Order 12,898 and on guidelines described in an April 3, 2000 letter from Mr. Steven Riva of USEPA Region II to Mr. Leon Sedefian of NYSDEC, per the methodology presented in Air Modeling Protocol.

(q) The Article X Application will also include (in addition to the cumulative source impact analysis for any criteria pollutant for which the Project has impacts above

Significant Impact Levels as described in paragraph n herein) a study of the cumulative air impacts of the Project and the Masada Project using the information provided in the SEQRA DEIS, FEIS, the Statement of Findings, permit conditions and regulatory approvals for the Masada Project.

NON-CRITERIA POLLUTANTS

3. The Non-Criteria Pollutant Study will include:

(a) A review of pertinent available data on non-criteria pollutants that are emitted by combustion sources at the Project, including formaldehyde, ammonia, and any other non-criteria pollutants with emission factors such as those published by USEPA that may be identified after review of available emissions data. The specific source, including publication date, of each emission factor will be clearly identified and referenced in the Application.

(b) An assessment of the emission rates for non-criteria pollutants that may be emitted from sources at the Project.

(c) An estimation of the maximum potential ground level and elevated receptor air concentrations (short-term and annual averages) of non-criteria pollutants for (1) the Project and (2) the Project and the Masada Project, quantified using the models and approach as discussed in the Air Modeling Protocol. Calpine will rely on the SEQRA DEIS, FEIS, the Statement of Findings, permit conditions and regulatory approvals for the Masada Project analysis.

(d) A comparison of the maximum predicted air concentrations to benchmark air concentrations for both short-term and long-term exposures. These benchmark air concentrations will include the most recent: 1) NYSDEC Short-term and Annual Guideline Concentrations (SGCs and AGCs); and 2) Health risk-based criteria, to include Reference Concentrations (RfCs) for noncancer effects and air concentrations associated with an incremental lifetime risk of one-in-one million for cancer, obtained or derived from USEPA or other well-recognized organizations as summarized in item 1 of this stipulation.

(e) If the maximum modeled air concentration of a non-criteria pollutant from the Project exceeds 10% of the corresponding health risk-based benchmark air concentration for non-cancer effects or is equal to or exceeds the corresponding benchmark air concentration for cancer risk, Calpine will consult with the NYSDOH to determine if a cumulative air quality analysis is needed in the Application. If such an analysis is required, Calpine will consult with the NYSDOH and NYSDEC to develop an acceptable approach for performing the analysis.

(f) The Application will include an evaluation of the need for a multipathway risk assessment if (1) the maximum modeled air concentration for any non-criteria pollutant from the Project exceeds 10% of the corresponding health risk-based benchmark air concentration, or (2) the maximum modeled air concentration for any persistent, bioaccumulative and toxic non-criteria pollutant exceeds 1% of the corresponding health risk-based benchmark air concentration, and the modeled plume could impact beef or dairy farms, or an area that could reasonable support

such farms. The Application will include a multipathway risk assessment for any pollutant that meets either of the above criteria, is persistent in the environment, has the potential to accumulate in soil, water, fish, homegrown vegetables, or beef and dairy products, and, based on the information available in the source identified above in this stipulation, is of significant toxicological concern via the ingestion pathway relative to the inhalation pathway of exposure.

OTHER ANALYSES

4. The Application will provide a stack plume visibility analysis to assess the predicted extent and frequency of any visible water vapor plumes created by the Project in accordance with procedures set forth in the Air Modeling Protocol. The results of this analysis will be used for the visibility assessment discussed in Stipulation No. 11 entitled "Aesthetics and Visual Resources."

5. The Application will include an assessment based on publicly available information of the global warming (global climate change) issue associated with the emission of carbon dioxide and other global warming gases. The assessment will include: 1) a summary of the emission reduction goals of the Kyoto Protocols; 2) an estimate of the proposed facility's annual and life cycle emissions of carbon dioxide and/or other significant global warming gases; 3) a comparison of projected facility emissions with New York State, national and/or global emissions; and 4) a conclusory statement as to the probable importance of the proposed facility's emissions relevant to parts 1-3 above.

6. Calpine will provide a detailed description of the methods of ammonia transfer from truck to tank, protective equipment used, and qualitative description of ammonia vaporization impact potential, if any, during this process.

7. An analysis of the prevalence of asthma in the community, based on NYS Department of Health data or local health departments' data, if available; and provide a description of how ambient air quality standards protect the population.

8. An evaluation of the potential for pathogen emissions including fate and transport.

COORDINATING WITH NYSDEC PERMITTING REQUIREMENTS

9. At least 60 days in advance of submitting an Application pursuant to Article X of the Public Service Law, Calpine shall submit its application for a PSD permit (40 CFR Part 52) and an application to construct and operate a new major stationary source (6 NYCRR Part 201) to NYSDEC. The information provided in the foregoing permit applications (NYSDEC Air Permit Applications) shall be substantially the same as the information to be included in the Article X Application relating to this Stipulation (Air Quality and Meteorology). The PSD Application must contain sufficient information and materials to comply with all applicable permitting requirements. At the time the NYSDEC Air Permit Applications are submitted to NYSDEC, Calpine shall also serve copies on Calpine's Article X distribution list. The purpose of this paragraph is to coordinate NYSDEC's air

permitting review with the Article X process. Within 60 days Calpine files the NYSDEC Air Permit Applications, NYSDEC will advise Calpine whether the application is sufficient for further review or whether additional information is necessary to both further the NYSDEC's technical review and make a completeness determination. Within 60 days of submission of the Article X Application, or no less than 120 days after Calpine files the NYSDEC Air Permit Applications, NYSDEC shall make a determination of completeness or incompleteness with respect to the applications, and, if a completeness determination is made, issue a draft permit for the Project. Calpine understands that the Chairman of the Siting Board will not make a determination that the Application complies with PSL Section 164 until advised by a NYSDEC attorney of NYSDEC's legal determination that the Application complies with PSL Section 164(1)(f).

STIPULATION NO. 2: CULTURAL RESOURCES

The Application will include a study of the impacts on cultural resources of the construction and operation of the Project (Study). To the extent consistent with the following paragraphs contained in this stipulation, the methodology for assessing the potential impacts on cultural resources will be in accordance with standards and methods contained in the following documents:

New York Archaeological Council, Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State (1994).

Stipulation No. 11 entitled "Aesthetics and Visual Resources" (established in this proceeding), which sets forth the procedures for assessing visual impacts, including impacts to cultural resources.

The Application will include a summary of the nature of the probable environmental impact on any historic and cultural resources identified and address how those impacts are avoided or minimized. The OPRHP Project Coordinator will be consulted throughout the investigation and DPS Staff, Wawayanda Town Historian, and Orange County Historian will be informed of the status and results of the investigations.

ARCHAEOLOGICAL RESOURCES

1. The Study will include:

   (a) Phase IA studies and Phase IB studies, as determined in consultation with The New York State Office of Parks, Recreation and Historic Preservation (OPRHP) for the Area of Potential Effect (APE) for the Project site and any areas to be used for interconnections, including a description of the methodology used for such studies.

   (b) For interconnections where Phase IA and IB studies were already completed as part of another project, neither a Phase IA nor a Phase IB study is required; previous studies will be provided to OPRHP and DPS staff.

   (c) Where warranted based on Phase I study results, Phase II intensive archaeological field investigations will be conducted to assess the boundaries, integrity and significance of cultural resources identified in Phase I studies. Phase II will be designed to obtain detailed information on the integrity, limits, structure, function, and cultural/historic context of an archaeological site, as feasible, sufficient to evaluate its potential National Register eligibility. The need for and scope of work for such investigations will be determined by the Project archaeologists in consultation with OPRHP and DPS Staff.

2. All archaeological materials recovered during the Project cultural resources investigation will be cleaned, catalogued, inventoried and curated according to New York Archaeological Council standards. To the extent possible, recovered artifacts will be

identified as to material, temporal or cultural/chronological associations, style and function. The Project archaeologists will provide temporary storage for artifacts until a permanent curatorial facility is identified.

3 The Application will include an Unanticipated Discovery Plan that will identify the actions to be taken in the unexpected event that resources of cultural, historical, or archaeological importance are encountered during the excavation process. This plan will include a provision for work stoppage upon the discovery of possible archaeological or human remains. In addition, the plan will specify that the methodology used to assess any discoveries will follow the most recent Standards for Cultural Resource Investigations and Curation of Archaeological Collections in New York State. Such an assessment, if warranted, will be conducted by a professional archaeologist, qualified according to the standards of the New York State Archaeological Council and the National Park Service [36 CFR 61].

HISTORIC RESOURCES

4. The analysis of potential impacts to Historic Resources shall include:

(a) Field inspections and consultation with local historic preservation groups to identify sites or structures listed or eligible for listing on the State or National Register of Historic Places within the Project Viewshed and within a 5-mile radius of the Project site. Photographs taken of standing structures within the viewshed, which appear to be at least 50 years old and potentially eligible for listing in the State or National Register of Historic Places, based on an assessment by an architectural historian;

(b) An OPRHP Building Structure Inventory Form will be completed for each potentially eligible (as described in paragraph 4(a)) or listed property and submitted to OPRHP and DPS Staff for review; Calpine will submit its documentation regarding listed and potentially eligible structures within the viewshed to OPRHP and DPS for review prior to completing the visual resources study; and

(c) Potential visual impacts to significant historic structures within the Project Viewshed that are listed, or, in the judgment of an architectural historian, are potentially eligible for listing on the State or National Register of Historic Places, will be characterized as part of the visual resources study, as described in Stipulation No. 11, entitled "Aesthetics and Visual Resources."

STIPULATION NO. 3: ELECTRIC TRANSMISSION FACILITIES

1. The methodology of the studies made to support the Application, which are discussed herein, requires that they either be performed by, or under the auspices of, the New York Independent System Operator (NYISO), or be approved by the NYISO Staff.

2. The Application will include an Interconnection Study (Interconnection Study), consisting generally of a design study and system reliability impact study. The Interconnection Study will include the necessary technical analyses (Thermal, Voltage, Short Circuit and Stability) to evaluate the impact of the interconnection of the Project on the system being connected to the New York Independent System Operator (NYISO) system, the New England Independent System Operator (ISO-NE) system and Pennsylvania-Jersey-Maryland (PJM-ISO) systems. Both peak (summer and winter) and off-peak load conditions will be investigated and extreme contingency scenarios will be evaluated at various load levels in accordance with the Northeast Power Coordinating Council (NPCC) "NPCC Basic Criteria for the Design and Operation of Interconnected Power System," the NYISO Transmission Expansion and Interconnection Manual and the interconnection criteria and planning criteria of the Transmission Owner (TO) with whose system the Project will interconnect. The analysis will include the currently available data regarding the requirements of these systems, and the study will be done in consultation with Central Hudson Gas & Electric Corporation (CHG&E), Consolidated Edison Company of New York, Inc. (ConEd), Long Island Power Authority (LIPA), New York Power Authority (NYPA), New York State Electric and Gas Corporation (NYSEG), Niagara Mohawk Power Corporation (NMPC) Orange and Rockland Utilities, Inc. (O&R), Rochester Gas & Electric Corporation (RG&E), ISO-NE, and PJM. The Interconnection Study will also include: the new Facilities to be installed as part of the Project providing circuit connection between the Project site and the substation, as well as any other system upgrades required. The Application will include a tabulation showing compliance/non-compliance with the criteria of the following entities that are affected: CHG&E, ConEd, LIPA, NMPC, NYPA, NYSEG, O&R, RG&E, NYISO, PJM, ISO-NE, NPCC, and the North American Electric Reliability Council (NERC).

3. Thermal Analysis: The Applicant will calculate transfer limits for the base year (2003) system for the following interfaces: LIPA, ConEd cable system, Upstate New York (UPNY)-Con Ed, UPNY-Southeast New York (SENY), Central East, Total East, PJM-NY, and NE-NY. The Applicant will evaluate the thermal performance of all pertinent system components affected by the Project, such as transmission cables, transmission lines, and transformers during normal and emergency conditions established in accordance with the criteria listed in paragraph 2 above, to ensure that these components operate within their rated load capabilities.

4. Voltage Analysis: The Applicant will evaluate the voltage performance of the system during normal and emergency conditions to ensure that established voltage limits are maintained at all pertinent system buses. Winter and summer peak and off-peak system load conditions will be analyzed. Emergency conditions examined will include the most severe contingencies established in accordance with the criteria listed in paragraph 2

above. The voltage conditions will be evaluated prior to and following those contingencies.

5. Stability Analysis: The Applicant will evaluate the transient stability performance of the Project with the interconnected system during and after the most severe system disturbances established in accordance with the criteria listed in paragraph 2 above. Summer and winter peak and off-peak system load conditions will be demonstrated for the following contingencies including but not limited to:

(a) A permanent three phase fault on any generator, transmission circuit, or bus section, with normal clearing;
(b) Permanent phase to ground fault on any generator, transmission circuit, transformer or bus section, with delayed fault clearing;
(c) Loss of any element without a fault;
(d) Permanent phase to ground fault on a circuit breaker, with normal fault clearing; and
(e) Loss of a double circuit tower.

In addition, system stability during and after the following extreme contingencies (which exceed in severity the contingencies (a) through (e) above) will be analyzed to determine that there are no effects that may cause widespread system disturbance including but not limited to:

(f) Loss of the entire capability of a generating station;
(g) Loss of all lines emanating from a generating station, switching station or substation;
(h) A permanent three phase fault on any generator, transmission circuit, transformer or bus section, with delayed fault clearing; and
(i) The sudden loss of a large load or major load center.

6. Short Circuit Analysis: The Applicant will evaluate the effect of interconnecting the Project on the fault duty levels of individual breakers at all 34.5 kV, 46 kV, 69 kV, 115 kV, 138 kV, 230 kV and 345 kV substations for CHG&E, ConEd, LIPA, NYPA, NMPC, NYSEG, O&R, RG&E, PJM and ISO-NE. The analysis will be performed in accordance with the criteria listed in paragraph 2 above. Fault duties will be expressed in symmetrical interrupting values, and will include simulations for three types of faults:

(a) Three phase-to-ground fault;
(b) Two phase-to-ground fault; and
(c) Single phase-to-ground fault.

Where the ratings of the existing breakers are not adequate to interrupt the fault duties determined, alternate measures will be determined or those breakers will be designated to be upgraded to adequate interrupting ratings.

7. Evaluation of Protective Relays: The applicant will evaluate any protective relay changes that may be necessary and provide such proposed changes to CHG&E, ConEd, LIPA, NYPA, NMPC, NYSEG, O&R, RG&E, NYISO, PJM, and ISO-NE or provide a document reflecting the agreement with the affected TOs that such a document is not necessary at this time, and state when it will be provided.

8. Auto-Reclosing: If auto-reclosing is applicable to the proposed facility and the interconnection to the transmission system, the Applicant shall demonstrate the machines to be used will withstand high speed automatic reclosing (HSAR) and submit a report demonstrating the ability.

9. Based on the aforementioned Interconnection Study, the Application will include:

   (a) An evaluation of the potential significant impacts of the Project and its interconnection to the New York State transmission system reliability at a level of detail that reflects the magnitude of the impacts. This evaluation shall include transmission systems under the control of the NYISO, PJM-ISO, ISO-NE and transmission systems under the control of the local utility;

   (b) An analysis of the impacts of the Project and associated Interconnection facilities on voltage stability, thermal limitations, short circuit and transmission interface capabilities as prescribed in the NYISO or the New York State Reliability Council (NYSRC) and NPCC (as applicable) planning and operating standards;

   (c) Discussion of the benefits and detriments of the Project on ancillary services and the electric transmission system, including impacts associated with reinforcements and new construction necessary as a result of the Project;

   (d) An analysis of any reasonable alternatives that would mitigate adverse reliability impacts, if any, of the Project on the New York State transmission system; and maintain voltage, stability, thermal limitations, and short circuit capability at levels consistent with standards promulgated by NERC, NYISO, PJM-ISO and ISO-NE, or the NYSRC, as applicable; and

   (e) An estimate of the increase or decrease in the total transfer capacity across each affected interface. If a forecasted reduction in transfer capability across affected interfaces violates reliability requirements, an evaluation of reasonable corrective measures that could be employed to mitigate or eliminate said reduction will be included.

PRE-APPLICATION PROCESS

10. The draft scope of the Interconnection Study will be provided to system protection and system planning engineers of DPS Staff, NYISO Staff, CHG&E, ConEd, LIPA, NYPA, NYSEG, NMPC, O&R, RG&E, PJM-ISO and ISO-NE for comments and review. Comments received within four weeks of the provision of the draft scope will be incorporated into the scope and a copy of the comments will be provided to DPS staff.

11. Upon finalization, the scope of Interconnection Study will be provided to DPS Staff, NYISO Staff, CHG&E, ConEd, LIPA, NYPA, NYSEG, NMPC, O&R, RG&E, PJM-ISO and ISO-NE. A copy of the transmittal will be provided to Staff.

12. The applicant will keep DPS Staff, NYISO Staff, PJM-ISO, ISO-NE, ConEd, CHG&E, LIPA, NYPA, NYSEG, NMPC, O&R and RG&E advised of the Interconnection Study as it progresses.

13. DPS Staff may request technical conferences with the NYISO or its designee and the applicant, together, from time to time to discuss the Interconnection Study as it progresses.

14. All updates and draft reports will be provided concurrently to DPS Staff, New York TOs, and NYISO Staff (including computer input data and output cases that are used in performing the analysis).

COMPLIANCE DETERMINATION REQUIREMENT

15. Upon completion, the draft Interconnection Study will be provided to system protection and system planning engineers of DPS Staff, NYISO Staff, CHG&E, ConEd, LIPA, NYPA, NYSEG, NMPC, O&R, RG&E, PJM-ISO, and ISO-NE for comments and review; the Applicant will arrange a technical conference to explain the scope, inputs, assumptions, change cases, and other relevant parameters of the Interconnection Study. Comments received within six weeks of the provision of the draft study will be incorporated into the final study and a copy of all the comments will be provided to DPS Staff.

CONSULTATION PROCESS

16. Upon receipt, the Applicant will immediately provide to DPS Staff any response to the Interconnection Study.

17. The applicant agrees to provide documentation demonstrating that the Project meets the New York TOs requirements and is proceeding through the NYISO Staff approval process, the Project has consulted with the ISO-NE and the PJM-ISO and that all the necessary studies have been completed. Copies of such studies will be attached to the Article X application.

18. The Applicant agrees to immediately notify, or have NYISO notify, the PJM-ISO and ISO-NE about the Project and work cooperatively with those ISOs on any joint studies that are required.

19. The Applicant agrees to provide concurrently to DPS Staff copies of any draft or final studies submitted to those ISOs as well as any computer input data and output data. Comments provided by those ISOs will be provided to DPS Staff as they are received by the Applicant.

CONFIDENTIALITY

20. If trade secret protection is requested, DPS Staff will have access to the allegedly confidential information either by receiving possession pursuant to 16 NYCRR Section 6-1.3 c (2) or pursuant to a protective order made by the Presiding Examiner. The Applicant agrees to cooperate in seeking any necessary protective order so that DPS Staff may have such information without delay.

ELECTRIC AND MAGNETIC FIELDS

21. The Application to be submitted will include an analysis with all input and output data showing that operation of the proposed interconnection to the electric grid under summer normal, winter normal, and short term emergency (STE) loading conditions will comply with (a) the Public Service Commission's applicable electric field strength standards, as set forth in Opinion 78-13, and (b) the applicable provisions of the Commission's Interim Policy Statement on Magnetic Fields, dated September 11, 1990. "Input data" means a tabular listing of all the input parameters necessary to model the EMF levels in computer simulations. "Output data" means all the printed graphs and tabular data produced as a result of performing computer simulations in support of the Application.

STIPULATION NO. 4: GAS TRANSMISSION FACILITIES

The Application to be submitted will describe the natural gas pipeline proposed for the Project.

1. The Application to be submitted will include a study of gas supply, capacity, and a system impact (Study). The Study will include:

   (a) A detailed description of the proposed gas pipeline, including interconnecting facilities, pipeline route, size, operating pressure, volume of gas required to serve the Project, the need for new on-site compression, and identifying who will construct, own and operate the pipeline facilities;
   (b) An analysis demonstrating that there will be sufficient gas supply and gas transmission capacity to support the requirements of the Project;
   (c) An estimate of the peak hour, peak day, seasonal and annual natural gas requirements of the Project;
   (d) An identification of the nature and extent of the natural gas capacity and transportation service as firm, interruptible, or both; and
   (e) An evaluation of the potential impacts of the Project on the gas distribution system of the Local Distribution Company (LDC).

2. The Application shall include a letter or other documentation from the owner or developer of the natural gas pipeline to be constructed to convey natural gas to the Project, indicating that it will seek FERC approval for the pipeline.

3. Notwithstanding the exclusion of areas to be disturbed for structures or conduits conveying natural gas to the Project under the jurisdiction of FERC from the definition of interconnections (see Preamble, paragraph 1), Calpine shall provide a map-level and literature review assessment of the probable environmental impacts and proposed mitigation to wildlife habitat, wetlands, waterbodies, water resources, groundwater, soils, vegetation, cultural resources and land use along the proposed gas pipeline corridor.

STIPULATION NO. 5: LAND USES AND LOCAL LAWS

LAND USES

1. The Application will include a study of the land uses in the vicinity of the Project (Study). The Study will include:

   (a) A map of existing land uses within a 2-mile radius of the Project site and a map of all properties within 1000 feet of the Project site that shows the current land use, tax parcel number and owner of record of each property and any proposed land use plans for any of these parcels.
   (b) A map(s) of existing zoning districts, Agricultural Districts, Wild, Scenic and Recreation Corridors, flood-prone areas, critical environmental areas, watershed protection districts, public fire, school, sewer and water districts, and proposed zoning districts within a 2-mile radius of the Project site, including a description of the permitted/prohibited uses within each zone.
   (c) A map of all publicly known proposed land uses within a 1-mile radius of the Project site, gleaned from interviews with state and local planning officials, from Calpine's public involvement process, or from other sources.
   (d) A qualitative assessment of the compatibility of the Project, including off-site staging and storage areas, with existing, potential and proposed land uses, and local and regional land use plans, within a 1-mile radius of the Project site. The qualitative assessment shall include an evaluation of the short- and long-term effects of Project-generated noise, odor, traffic and visual impacts on the use and enjoyment of those areas for the current and planned uses. Long-term effects will include any growth expected to be induced by the Project.
   (e) A qualitative assessment of the compatibility of above-ground interconnections with existing, potential and proposed land uses within a 1-mile radius of such improvements and within 300 feet from the centerline of such interconnections that are constructed underground.
   (f) A map of present and proposed Wawayanda and Middletown water districts.

2. In accordance with Section 1001.7(b)(2)&(3) of the Rules of the Siting Board, the Application to be submitted will include a description of the financial resources available to restore any disturbed areas of the Project site in the event the Project is abandoned, cannot be completed, or is decommissioned. These Rules also require Calpine to submit a plan for the decommissioning of the Project site. The Application to be submitted will include:

   (a) A statement of the performance criteria proposed for site restoration or decommissioning;
   (b) A discussion of why these performance criteria are appropriate;

(c) A demonstration that the financial resources available for restoration or decommissioning are adequate to restore the site to the condition specified in the performance criteria; and

(d) A description of any security fund or insurance in place or to be obtained, and the financial resources available to Calpine in the event that either the Project cannot be completed, or that the Project must be decommissioned.

3. The Application will include a summary of Calpine's ASTM Phase I Environmental Site Assessment for the Project site.

RECREATION

4. After consultation with appropriate state and local agencies, the Application shall include an identification and analysis of the recreational land uses in the vicinity of the site, county parks and nature preserves, fishing areas, and town parks that might be affected by the sight or sound of the construction or operation of the Project and interconnections, including a summary describing the nature of the probable environmental impact on recreational uses and identification of how the impact is minimized.

LOCAL LAWS

5. The Application to be submitted will identify and analyze all substantive provisions of local law applicable to the Project. The Application will include:

(a) After consultation with Town of Wawayanda, Orange County, and DPS Staff, an identification of all substantive local laws, ordinances, regulations and rules of Town of Wawayanda and Orange County applicable to the construction or operation of the Project and interconnections. As part of the consultation, the applicable local laws, ordinances and regulations shall be forwarded to DPS Staff. Prior to the consultation, Calpine shall provide an initial analysis and summary of zoning local law compliance.

(b) An identification of all substantive provisions identified above which Calpine deems to be unreasonably restrictive in view of the existing technology.

(c) For any substantive provisions which Calpine deems to be unreasonably restrictive in view of the existing technology, an explanation of the basis for asserting that the provision is unreasonably restrictive, including a review and analysis of reasonably related local precedent regarding the granting of variances or exceptions.

(d) For the substantive provisions that Calpine does not deem to be unreasonably restrictive, a demonstration of compliance with the substantive provisions identified above. A summary comparison table in two columns listing the provisions in the first column and the degree of compliance in the second column

(e) Copies of all correspondence with the Planning Boards of Town of Wawayanda and City of Middletown with respect to zoning shall be incorporated into the application.

6. The Application to be submitted will identify all municipal approvals, consents, permits, certificates, or other conditions that would be required for the construction or operation of the proposed facility absent section 172 of the Public Service Law. For each approval, consent, permit certificate, or condition, the Application will include:

(i) An identification of the state agency, municipality or agency thereof that typically exercises jurisdiction over such matter;

(ii) A request that the Siting Board either (a) exercise its jurisdiction over such matter, or (b) authorize the appropriate state agency, municipality or agency thereof to exercise jurisdiction over such matter pursuant to Section 172(1) of the Public Service Law; and

(iii) An indication of the reason for each request made pursuant to paragraph 6(ii)(b) above

MULTIPLE FACILITIES

7. The Application will include a study of the cumulative associated multiple facility land use impacts of the proposed Project and the Masada Project. Calpine will rely on the information provided in the SEQRA DEIS, FEIS, the Statement of Findings, permit conditions and regulatory approvals for the Masada Project.

STIPULATION NO. 6: NOISE

The Application to be submitted will include a study of the noise impacts of the construction and operation of the Project, as described and detailed in Attachment 1, the Noise Impact Assessment Protocol, which is a part of this Stipulation.

Regarding noise impacts, Calpine will provide:

1. A map showing the location of the nearest sound receptors in relation to the Project site, including the nearest residential, school, and public open space receptor locations;

2. An evaluation of ambient pre-construction baseline noise conditions, including pure tones, at the nearest noise receptors, using actual measurement data recorded for 20 minute durations as a function of time and frequency using a Type 1 precision sound level meter (SLM) and octave band frequency spectrum analyzer;

3. A description of the noise standards applicable to the Project and the noise design goals for the Project at the nearest noise receptors, including the nearest residential, school, and public open space receptor locations. The noise design goals shall include dBA levels;

4. An evaluation of the impact of construction noise, at the nearest residential, school, and public open space receptor locations;

5. An identification and evaluation of reasonable noise abatement measures for normal as well as significant noise-producing construction activities;

6. An estimate of facility sound levels at the nearest receptors during operation of the Project;

7. An identification and evaluation of reasonable noise abatement measures, including the use of alternative technologies, for the final design and operation of the Project during all operating scenarios;

8. An evaluation of the following potential noise impacts: hearing damage; sleep interference; indoor and outdoor speech interference; use of public open space; low frequency noise annoyance, as well as community complaint potential; and the potential for structural damage due to vibration or infrasound;

9. A ranking for the operation phase, using the Modified Composite Noise Rating ("CNR") method, at the nearest residential, school, and public open space receptor locations. At a minimum, the application will include an assessment of achieving a CNR rating of "C";

10. A description of post-construction noise evaluation studies that will be performed to establish conformance with operational noise design goals; and

11. The Application will include an evaluation of the cumulative associated multiple facility noise impacts of the proposed Project and the Masada Project.

Attachment 1 to Stipulation Number 6:
NOISE IMPACT ASSESSMENT PROTOCOL

1. Introduction

This protocol documents the procedures and methods being used to perform a noise impact assessment for the proposed Project. The assessment consists of determining the existing noise environment, through a community noise monitoring program, and computer noise modeling of the construction and operation of the facility noise sources.

2. Noise Sensitive Areas in the Community

Topographic and other maps/aerial photography were reviewed in order to identify representative noise receptors based on land uses in the area surrounding the proposed Project. Particular attention was given to identification of representative noise sensitive receptors (e.g., residences, public open spaces, and schools) in order to assure these locations are addressed in the noise assessment. A site reconnaissance of the area was performed on June 20, 2000 in order to verify the map/aerial photography survey. Based on these efforts, the following locations were identified as appropriate to obtain a spatial representation of the ambient noise environment at nearby noise sensitive receptors in the area:

- Dolsontown Road – The nearest residential locations to the southern boundary of the Project site. (Warm weather monitoring was conducted at the E-Z Loader facility).
- 1081 Dolsontown Road – This area is located on a bluff overlooking the proposed Project site, approximately 700 feet to the southwest.
- Ruth Court – This residential area is located approximately 3000 feet north of the proposed Project site.
- Country View Manor Apartments – This large apartment complex is located approximately 1600 feet north of the proposed Project site.
- 280 Genung Street – A few residences are located in this area, approximately 3000 feet to the northeast of the Project site.

3. Noise Monitoring Program

The noise monitoring program quantifies and characterizes pre-construction background environmental sound at the nearest noise sensitive receptors, as identified above. Measurements have been performed during both warm weather (leaf-on and insect noise) and cold weather (leaf-off and no insect noise) months. The warm weather measurement survey was conducted in June 2000. The cold weather measurement survey was conducted in December 2000. During that time, the measurement locations previously

selected were reaffirmed as the best available for representing the acoustic environment of nearby noise-sensitive receptors.

Measurements include both attended interval measurements (20-minute samples performed during daytime, evening and early morning periods) and unattended, continuous long term monitoring (1-hour periods for a minimum of 24 consecutive hours). Warm-weather intermittent measurements were conducted at the five (5) receptor locations identified in Section 2 of this Protocol. Warm-weather continuous monitoring was performed in the vicinity of the nearest residences located north, east, and south of the Project site. The continuous, unattended measurements were collected to ensure that the attended measurements were taken at the quietest times. If the attended measurements were not taken at the quietest times, they will be adjusted based upon the unattended continuous data collected.

All warm- and cold-weather measurements included a statistical analysis of the A-weighted sound levels during the measurement periods. The measured A-weighted parameters included the energy average sound level (L_{eq}); and percentile sound levels (L_{max}, L_{min}, L_1, L_{10}, L_{50}, and L_{90}). Attended measurements also included octave band and one-third octave band analyses to identify existing pure tone components and to establish appropriate background sound spectra. Attended monitoring was conducted during meteorological conditions that included wind speeds of less than 15 miles per hour and no precipitation..

All attended sound level measurement equipment meets applicable standards for Type 1 precision instrumentation and was acoustically field-calibrated before and after each measurement period. In addition, the equipment has been qualified within the preceding 12-month period by a calibration laboratory or by the manufacturer, using reference standards traceable to the National Institute of Standards and Technology (NIST). All unattended sound level measurement equipment meets applicable standards for either Type I or Type II precision instrumentation.

4. Noise Standards

Calpine will evaluate the Project's compliance with local law, as applicable, and with DPS requirements, as set forth in paragraphs 4.1 and 4.2.

4.1 Local Noise Laws

The Code of the Town of Wawayanda, 195-55 Performance standards in nonresidential districts contains the following noise ordinance.

> *"No non-residential use shall be permitted in any district that does not conform to the following standards of use, occupancy and operation, which standards are hereby established as the minimum requirements to be maintained. A. Noise. Noise shall not exceed an intensity, as measured 100 feet from the boundaries of the lot where such use is situated, of the average intensity, occurrence and duration of the noise of street traffic at adjoining streets."*

4.2 New York State Department of Public Service

In accordance with NYSDPS requirements, the modified Composite Noise Rating Method (CNR) is used to assess potential noise impacts. This methodology takes into account many factors including the expected sound levels from the plant, the existing sound levels, character of the noise (*e.g.*, tonal, impulsive), duration, time of day and year, and subjective factors such as community attitude and history of previous exposure. The Application will contain an assessment of achieving a rating of "C", corresponding to "no reaction although noise is noticeable" and a rating of "D", corresponding to "sporadic complaint." An incremental cost analysis for achieving these ratings will also be included.

5. Computer Noise Modeling

5.1 Construction Noise Impact Assessment

The impact assessment will include an evaluation of environmental sound associated with facility construction at the nearest noise sensitive receptors. Estimates of the energy average sound levels (L_{eq}) and the maximum sound levels (L_{max}) for each major phase of the construction Project will be calculated, and the results will be summarized in tabular form. Receptor sound levels will be estimated using a computer model that accounts for noise produced by all significant construction equipment operating at the site. The model will calculate receptor sound levels based on the typical numbers of construction machines present at the site, the typical usage factor for each type of machine, and the A-weighted sound emissions for each type of machine. Adjustments for geometric spreading (hemispherical free field), acoustic shielding from barriers (natural, and man-made), atmospheric absorption and ground effect will be applied.

The evaluation will include a direct comparison of pre-construction sound levels (L_{eq}) with estimated construction sound levels (L_{eq}) for each major construction phase of the Project, and an assessment of the potential for community complaint. For areas where estimated construction sounds levels are expected to exceed the existing background sound level by more than 10 dBA, the report will also include an evaluation of the potential for indoor and outdoor speech interference, and sleep interference.

The assessment will also include an evaluation of reasonable noise abatement measures for normal as well as significant noise-producing construction activities. These will include the use of muffler systems on its construction equipment and construction schedules developed with an aim toward minimizing community noise impacts.

5.2 Operational Noise Impact Assessment

The impact assessment will include an evaluation of environmental sound associated with the operation of the facility at the nearest noise sensitive receptors. Estimates of facility operational sound levels (L_{eq}) in octave bands will be calculated using a computer model (*SoundPlan Version 5.0)*. The model will account for the noise emissions from each significant sound source located at the Project site. Adjustments for geometric spreading (hemispherical free field), source directivity, atmospheric absorption, ground effect, on-site structural barrier effects, and effects of prominent terrain features will be included

in the model. The results of the calculations will be presented in tabular form and a graphical presentation of estimated isopleths of facility A-weighted sound levels in the surrounding community will be included in the report. The model will account for the noise emissions from each source in each octave band that propagates to specified receptor points, identifying the source and value of all data inputs used.

The basis for impact assessment will be the modified Composite Noise Rating (CNR) method. Calculated estimates of facility octave band sound levels at each noise sensitive receptor will be compared to the CNR Noise Level Rank Curves, and a noise level rank at each receptor will be derived. Noise level rankings will include adjustments for pre-existing background sound levels, temporal and seasonal factors, character of the sound, and previous community exposure.

The assessment will also include an evaluation of the following potential noise impacts: hearing damage; sleep interference; indoor and outdoor speech interference; use of public open space; low frequency noise annoyance; community complaint potential; and the potential for structural damage due to vibration or infrasound.

The assessment will also include an identification and evaluation of reasonable noise abatement measures, including the use of alternative technologies, for the final design and operation of the Project.

5.3 Comparison to Local Activities

The Application will include a noise level comparison between the plant and local activities. The following noise levels will be compared.

- Project construction (L_{eq} basis)
- Project operation (L_{eq} basis)
- Middletown Racetrack during summer months (if available; otherwise a comparable assessment based on available literature)
- Fireworks display (local display if available; otherwise a comparable assessment based on available literature).
- National Guard C5A Airplanes (local flyover if available; otherwise a comparable assessment based on available literature).

5.4 Multiple Facility Impact Assessment

The Application will include an evaluation of the cumulative associated multiple facility noise impacts of the proposed Project and the Masada Project. Calpine will rely on the SEQRA DEIS, FEIS, the Statement of Findings, permit conditions and regulatory approvals for the Masada Project in conducting the analysis.

a. Analysis of the cumulative construction noise impacts assuming the construction of both the Project and the Masada Project occur simultaneously; (unless demonstrated that the construction of both the Project and the Masada Project will not occur simultaneously).

b. Analysis of the cumulative operational noise impacts from the operational phase of both the Project and the Masada Project.

5.5 Post-Construction Noise Evaluation

The Application will include a description of post-construction noise evaluation studies that will be performed to establish conformance with operational noise design goals.

6. References

To the extent consistent with Stipulation No. 6: Noise, the methodology for assessing the potential impacts from noise will follow the procedures and use predictive data provided in the following documents:

Empire State Electric Energy Research Corporation, *Power Plant Construction Noise Guide*, Bolt, Beranek and Newman, Inc., Report No. 3321 (1977).

Edison Electric Institute, *Electric Power Plant Environmental Noise Guide*, Volume 1, 2nd Edition (1984).

United States Environmental Protection Agency, *Model Community Noise Control Ordinance*, USEPA Report EPA 550/9-76-003 (September 1975).

United States Environmental Protection Agency, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances*, EPA Document NTID300.1 (December 1971)

SoundPlan® Version 5.0, Baunstein + Berndt, GmbH, *Acoustical Modeling Software.*

Noise source input data for the computer models referenced herein will be a combination of data acquired from the equipment suppliers, data based on actual measurements of similar equipment at other facilities, and computations from published empirical equipment noise equations.

STIPULATION NO. 7: SOCIAL AND ECONOMIC IMPLICATIONS

Calpine will submit a study of the socioeconomic impacts of the construction and operation of the Project. Regarding socioeconomic impacts, Calpine will provide:

1. Calpine will describe and map, as appropriate, for each census tract whose geographic center is within a 2 mile radius of the Project, the following parameters: population, age distribution, sex, marital status, percent minority vs. percent non-hispanic white, household type and size, tenure of housing units, and persons per occupied housing unit. The latest available 100% census count will be used, augmented with the most recent available Orange County Planning Department data. Also, the following will be mapped on the basis of the latest available sample counts: place of work, educational attainment, and household income (as a distribution and median).

2. Estimates of: (a) the total jobs created during construction; (b) the average construction work force, by discipline, for each quarter, during the period of construction; and (c) the peak construction employment level.

3. An estimate of the annual secondary employment and economic activity likely to be generated in the vicinity of the Project by the construction of the plant. This analysis should state the basis of any economic multiplier factor or other assumption used and should include an order of magnitude comparison of the employment and economic activity likely to be generated in the town of Wawayanda and Orange County with recent levels of employment and economic activity.

4. An estimate of the number of jobs and the on-site payroll, by discipline, during a typical year once the plant is in operation, and an estimate of other expenditures likely to be made in the vicinity of the Project during a typical year of operation.

5. An estimate of the annual secondary employment and economic activity likely to be generated in the vicinity of the Project by its operation.

6. A comparison of the anticipated construction work force, by trade, with the construction work force available within commuting distance, assuming a continuation of recent construction work force employment levels, with the exception that the labor force demands of any unusually large project which has been publicly announced for construction in the vicinity of the Project site during construction of the Project shall be addressed in the analysis. This analysis will also estimate the total number of construction jobs expected to be filled by Orange County residents.

7. An estimate of the extent and duration of temporary construction worker in-migration.

8. An identification of the amount and location of housing expected to be used by any in-migrating construction workers.

9. An estimate of incremental school operating and infrastructure costs that are expected to be incurred by each of the affected school districts during the construction phase of the Project, this estimate to be made after consultation with the affected school districts.

10. An estimate of incremental school operating and infrastructure costs that are expected to be incurred by each of the affected school districts due to the permanent operation of the Project, this estimate to be made after consultation with the affected school districts.

11. An estimate of incremental municipal, public authority, or utility operating and infrastructure costs that will be incurred by the town of Wawayanda, Orange County, and any other affected municipality, public authority, or utility for police, fire, emergency, water, sewer, solid waste disposal and other municipal, public authority, or utility services during the construction phase of the Project (this estimate to be made after consultation with the affected municipalities, public authorities, and utilities).

12. An estimate of incremental municipal, public authority, or utility operating and infrastructure costs that will be incurred by the town of Wawayanda, Orange County, and any other affected municipality, public authority, or utility for police, fire, emergency, water, sewer, solid waste disposal and other municipal, public authority or utility services due to the permanent operation of the Project (this estimate to be made after consultation with the affected municipalities, public authorities, or utilities).

13. An identification of all jurisdictions (including benefit assessment districts) that levy real property taxes or benefit assessments upon the Project site, its improvements and appurtenances.

14. For each taxing jurisdiction, an identification of the most recent tax rate (or benefit assessment charge), and total tax levy for the jurisdiction.

15. For each taxing jurisdiction, an identification of the most recent assessed value (or benefit formula) assigned to the Project site, its improvements and appurtenances.

16. For each taxing jurisdiction, an identification of the amount of the most recent annual taxes (or benefit charges) levied against the Project site, its improvements and appurtenances.

17. A description of all on-site equipment and systems to be provided to prevent or handle fire emergencies and hazardous substance incidents.

18. In consultation with the Local Emergency Planning Committee, a description of all contingency plans to be implemented in response to the occurrence of a fire emergency or a hazardous substance incident and whether such emergency services can be fulfilled by existing local emergency response capacity.

STIPULATION NO. 8: GEOLOGY, SEISMOLOGY, AND SOILS

Calpine will include a study of the geology, seismology, and soils impacts of the Project (Study). The components of the Study will include identification and mapping of existing conditions, impact analysis, and proposed mitigation.

1. To the extent consistent with the following paragraphs contained in this stipulation, the methodology for assessing potential impacts related to geology, seismology, and soils will follow the appropriate procedures described, or will use data provided, in the following documents:

American Society for Testing and Materials (ASTM) testing methods and standards.

Isachsen, Y.W. et al, editors. Geology of New York: A Simplified Account, New York State Museum/Geological Survey (1991).

Jacob, Klaus. Seismic Vulnerability of New York State: Code Implications for Buildings, Bridges and Municipal Landfill Facilities, National Center for Earthquake Engineering Research (NCEER), Buffalo, New York (April, 1993).

National Earthquake Information Center. Preliminary Determination of Epicenters, Monthly Listing, USGS.

New York State Geological Survey, Damaging Earthquakes in New York State 1737-1989 (1989).

New York State Geological Survey and New York State Museum. New York State Geologic Highway Map (1990).

Nottis, Gary N., editor. Epicenters of Northeastern United States and Southeastern Canada, Onshore and Offshore: Time Period 1534-1980, New York State Museum Map and Chart Series Number 38 (1983).

Orange County Groundwater Study, prepared by Leggette Brashears & Graham, Inc. (1995).

United States Department of Agriculture, Soil Conservation Service, Soil Survey of Orange County, New York (1975).

2. Regarding geology, seismology, and soils the Study will include:

GEOLOGY

(a) A map delineating existing slopes (0-3%, 3-8%, 8-15%, 15-25%, 25-35%, 35% and over) on the Project site and interconnections.

(b) A proposed site plan showing existing and proposed contours at two-foot intervals, for the Project site and interconnections, at a scale sufficient to show all proposed buildings, structures, paved and vegetative areas, and construction areas, including a description of the maintenance of steep slopes.

(c) A preliminary calculation of the quantity of cut and fill necessary to construct the Project.

(d) A description and preliminary calculation of the amount of fill material to be brought in to the Project site and interconnections.

(e) A description and preliminary calculation of the amount of cut material or spoil to be removed from the Project site and interconnections.

(f) A delineation of temporary cut or fill storage areas to be employed.

(g) A description of foundation support techniques to be employed.

(h) A geotechnical investigation, as described in the PSS, with results included in the application.

BLASTING

Note: Based on preliminary studies, Calpine believes that no blasting will be necessary for any construction at the Project site, and any area to be disturbed for roadways to be constructed, if any, and all electric, water, wastewater, or other types of off-site interconnections or improvements required to serve the Project. The Application will either include sufficient site-specific geotechnical evidence to demonstrate that no blasting will be necessary under any circumstances, or the three paragraphs that follow regarding blasting information to be provided in the Application will be operable.

(i) A preliminary plan describing all blasting operations including location, blasting contractor qualifications, charge sizes and limits, quantity of discrete blasts, hours of blasting operations, estimates of amounts of rock to be blasted, warning measures, measures to ensure safe transportation, storage and handling of explosives, use of blasting mats, a plan for a pre-blasting videotape condition survey of nearby buildings and improvements, and coordination with local safety officials.

(j) An assessment of potential impacts of blasting to environmental features, above-ground structures and below-ground structures such as pipelines.

(k) An identification and evaluation of reasonable mitigation measures regarding blasting impacts, including the use of alternative technologies

and/or location of structures, pre- and post-blasting assessment of potentially affected areas, notification procedures, a plan for repairing any damage, securing compensation for damages that may occur due to blasting, coordination with any other ongoing blasting activities within the projected blasting impact zone, and provisions for independent review of the blasting program.

SEISMOLOGY

(l) A description of the regional geology, tectonic setting and seismology of the Project vicinity.

(m) An analysis of the expected impacts of construction and operation of the Project with respect to regional geology, if such can be determined.

(n) An analysis of the impacts of typical seismic activity experienced in the Project area on the operation of the Project.

SOILS

(o) A map delineating soil types on the Project site and interconnections.

(p) A description of the characteristics and suitability for construction purposes of each soil type identified above, including a description of the recharge/infiltration capacity of each soil type and a discussion of any dewatering that may be necessary during construction and whether the Project will contain any facilities below grade that would require continuous dewatering.

(q) A map delineating existing topography showing contours at two-foot intervals on the Project site and interconnections.

(r) A map delineating depth to bedrock on the Project site, and any area to be disturbed for roadways to be constructed, if any, and all off-site interconnections required to serve the Project.

(s) A map delineating underlying bedrock types on the Project site, and any area to be disturbed for roadways to be constructed, if any, and all off-site interconnections required to serve the Project, including an evaluation for potential impacts due to Project construction and operation, based on information to be obtained from available published maps and scientific literature, review of technical studies conducted on and in the vicinity of the Project, and on-site field observations, test pits and/or borings.

STIPULATION NO. 9: TERRESTRIAL ECOLOGY

Calpine will include a study of the terrestrial resource impacts of the construction and operation of the Project. Calpine will provide:

VEGETATION

Due to the altered nature of the site associated with its agricultural use, a detailed characterization of on-site terrestrial ecology is not proposed. However, the ecological characteristics of off-site interconnection routes will be reviewed as follows:

1. To the extent consistent with the following paragraphs contained in this stipulation, the ecological communities will be described according to Reschke, Ecological Communities of New York State (1990);

2. A characterization of the type of plant communities present, the structure of these communities and the species composition of each community, based on spring and summer reconnaissance or systematic surveys;

3. A list of the species of flowering plants, ferns, and fern relatives and the relative abundance of each;

4. A delineation of the vegetative communities or cover type present on the basis of recent aerial photography and field observations, mapped at a scale of not more than 100 feet per inch (for the site) and 500 feet per inch (for interconnections), including an identification and delineation of any unusual habitats or natural communities which could support listed species or species of special concern;

5. Documentation of the structure of these communities (canopy, understory, and ground cover) by visual observations of either representative sample plots or sampling transects; identifying the structure and composition of the plant communities identified based on dominant species, but all species observed being recorded for the purpose of site inventory;

6. An estimate of the species and number of all trees 12 inches or greater in diameter at breast height, if any;

7. An analysis of the impact of the construction and operation of the interconnections on the vegetation identified, including a delineation of the vegetation areas to be removed or disturbed, mapped at a scale of not more than 100 feet per inch (for the site) and 500 feet per inch (for interconnections); and

8. An identification and evaluation of reasonable mitigation measures, including the use of alternative technologies, regarding vegetation impacts identified. Calpine will work with the appropriate agencies to determine the most appropriate site conditions for the undisturbed portions of the Project site.

WILDLIFE

9. A characterization of the Project site and interconnections as to the wildlife (including mammals, birds, amphibians, and reptiles) and wildlife habitats, that occur in, on, or in the vicinity of the Project site and interconnections, based on spring and summer reconnaissance or systematic surveys, supplemented by available data from the New York State (NYS) Amphibian and Reptile Atlas Project, the NYS Breeding Bird Atlas and range maps, and other similar reference sources, including an identification and delineation of any unusual habitats or natural communities which could support listed species or species of special concern;

10. A list of the species of mammals, birds, amphibians, and reptiles reasonably likely to occur in, on, or in the vicinity of the Project site based on site observations and supplemented by publicly available sources;

11. An analysis of the impact of the construction and operation, including air emissions, of the Project and interconnections on the wildlife, wildlife habitats, and wildlife travel corridors identified pursuant to paragraphs 9 and 10 above; and

12. An identification and evaluation of reasonable mitigation measures, including the use of alternative technologies, regarding wildlife impacts identified pursuant to paragraph 11 above.

13. An analysis of various stack lighting methods that might mitigate bird collision mortality.

STIPULATION NO. 10: TRAFFIC AND TRANSPORTATION

The Application to be submitted will include a study of the traffic and transportation impacts of the construction and operation of the Project ("Study"). To the extent consistent with the following paragraphs contained in this stipulation, the methodology for assessing the potential traffic and transportation impacts from traffic generated by the construction and operation of the Project will follow the instructions provided in Transportation Research Board, National Research Council, Highway Capacity Manual, Special Report 209, Third Edition 1998.

1. The Study will include a description of the pre-construction characteristics of the roadways in the vicinity of the Project, to include Dolsontown Road, McVeigh Road, Route 17M and Route 6. The description will include:

   (a) A review of existing data on vehicle traffic, use levels and accidents obtained from the New York State Department of Transportation, Orange County and/or the town of Wawayanda;

   (b) The results of peak turning movement counts for a weekday morning and weekday afternoon during a non-holiday period when school is in session, to be conducted by Calpine at the following intersections:

      (1) Dolsontown Road and Route 17M;
      (2) Dolsontown Road and McVeigh Road;
      (3) Route 17M and Route 6;
      (4) East Main Street and Schutt Road; and
      (5) Dolsontown/Genung/Schutt/Airport roads.

      Weekend analyses will also be included unless traffic counts empirically demonstrate that weekday peaks are greater than weekend peaks (see Paragraph 1(c)).

   (c) The results of weekday and weekend twenty-four hour traffic volume counts to be conducted by Calpine, including a calculation of average daily traffic (ADT) along Dolsontown Road;

   (d) For each intersection listed in paragraph 1(b) above, documentation of intersection geometry and traffic control devices by approaches, and sight distances;

   (e) A calculation of the Level of Service (LOS) for each intersection listed above, giving detail for each turning movement; and

   (f) An estimate of the annual rate of traffic growth in the vicinity of the Project incorporating general growth and growth from planned land use changes, but not including projected traffic for the Project, including the source and manner of calculation of the estimate.

2. The Study will include an estimate of the trip generation characteristics of the Project during both construction and operation. The estimate will include:

(a) A description of the major phases of construction, including duration of construction, daily shift periods and Project totals;
(b) For the major phases of construction, an estimate of the number and frequency of vehicle trips, including time of day and day of week arrival and departure distribution, by size and type of vehicle;
(c) An identification of approach and departure routes to and from the Project site for vehicles carrying chemicals or hazardous materials for construction of the Project;
(d) For cut activity (spoil removal from the Project site), a separate estimate of the number and frequency of vehicle trips, including time of day and day of week arrival and departure distribution, and including a delineation of approach and departure routes, by type of vehicle;
(e) For fill activity (deposition at the Project site), a separate estimate of the number and frequency of vehicle trips, including time of day and day of week arrival and departure distribution, and including a delineation of approach and departure routes, by type of vehicle;
(f) An estimate of the number of employees per shift for the major phase of construction;
(g) A description of the operation of the Project, including the number of employees per shift, operating shift periods and seasonal and annual totals;
(h) An estimate of the number and frequency of vehicle trips generated during operation of the Project, including time of day and day of week arrival and departure distribution, by size and type of vehicle; and
(i) An identification of approach and departure routes to and from the Project site for vehicles carrying chemicals or hazardous materials for operation of the Project.

3. The Study will include a conceptual site plan, drawn at an appropriate scale, depicting all Project site driveway intersections with Dolsontown Road, showing horizontal and vertical geometry, the number of approach lanes, the lane widths, shoulder widths, traffic control devices by approaches, and sight distances.

4. The Study will include an analysis and evaluation of the traffic and transportation impacts of the Project, including:

(a) A comparison of projected future traffic conditions with and without the proposed Project, including a calculation and comparison of the LOS for each intersection listed in paragraph 1(b) above, giving detail for each turning movement, the analysis to be conducted separately for the peak construction impacts of the Project and for the typical operations of the completed Project;
(b) An evaluation of the adequacy of the road system to accommodate the projected traffic, the analysis to be conducted separately for the peak construction impacts of the Project and for the typical operations of the completed Project; and

(c) An identification and evaluation of reasonable mitigation measures regarding traffic and transportation impacts, including the use of alternative technologies, the construction of physical roadway improvements, and the installation of new traffic control devices.

5. The Application will include an analysis of the cumulative associated multiple facility traffic impacts of the proposed Project and the Masada Project. Calpine will rely on the information provided in the SEQRA DEIS, FEIS, the Statement of Findings, permit conditions and regulatory approvals for the Masada Project to perform this analysis. The analysis shall be consistent with the above stipulations and will include the following:

(a) Analysis of the cumulative traffic impacts assuming the simultaneous construction of the Project and the Masada Project; and

(b) Analysis of the cumulative traffic impacts from the operational phase of both the Project and the Masada Project.

STIPULATION NO. 11: AESTHETICS AND VISUAL RESOURCES

The Application will include a visual impact assessment (VIA) to determine the extent and assess the significance of Project visibility. The components of the VIA will include identification of visually sensitive resources, viewshed mapping, confirmatory visual assessment fieldwork, visual simulations (photographic overlays), cumulative visual impact analysis, and proposed visual impact mitigation.

To the extent consistent with the following paragraphs contained in this stipulation, the application will include a visual impact analysis for the Project in accordance with the following documents:

The New York State Department of Environmental Conservation, *Assessing and Mitigating Visual Impacts*, Policy Memorandum DEP-00-2, dated July 31, 2000

Smardon, R.C., et al., *Visual Resources Assessment Procedure for US Army Corps of Engineers, Instruction Report EL-88-1*, prepared by State University of New York, Syracuse, for US Army Engineer Waterways Experiments Station, Vicksburg, MS, 1988

2. The VIA will address the following issues:

(a) The character and visual quality of the existing landscape.
(b) Visibility of the Project, including visibility of Project operational characteristics, such as visible plumes from the exhaust stacks.
(c) Visibility of all above-ground interconnections.
(d) Appearance of the Project upon completion, including facade colors and texture.
(e) Lighting and similar features, including an iso-lumen lighting plan.
(f) Representative views (photographic overlays) of the Project, including front, side and rear views, indicating approximate elevations.
(g) Nature and degree of visual change resulting from construction of the Project and above-ground interconnections.
(h) Nature and degree of visual change resulting from operation of the Project.
(i) Proposed mitigation and mitigation alternatives, including landscaping, architectural design, facility color and design, cooling system alternatives, lighting options for work areas and safety requirements, and lighting options for stack lighting as required by the FAA.

STIPULATION NO. 12: WATER RESOURCES

The Application to be submitted will include a study of the water resource impacts of the construction and operation of the Project. Regarding water resource impacts, Calpine will provide:

WATER SUPPLY

1. An estimate of the hourly and daily peak and the hourly and daily average water supply needs and consumptive water losses of the Project, in gallons, for each day of a typical year, broken down by power production and domestic uses, with daily, monthly and annual totals;

2. An estimate of the daily peak, daily average, and fire suppression peak and average flow rate needs of the Project in gallons per minute;

3. A description of the methodology used (i.e., estimate, comparison, data, calculation) to prepare the water supply needs and minimum and maximum flow rate estimates stating all factors used;

4. A description of the water chemistry requirements for water to be supplied to the Project, indicating any requirements that are more stringent than NYS standards for potable water, and describing any additional water treatment that will be necessary to obtain the desired chemistry;

5. An identification of the water supply source or sources to be used by the Project, including:

   (a) Studies to assess the available capacity of the water supply source in terms of quantity, quality, and pressure;
   (b) A cumulative analysis of the impacts of such usage during both normal and drought periods on other users (existing and known to be proposed) of the same water supply source, and an analysis of such impacts on surface water and groundwater;
   (c) An identification of all infrastructure requirements necessary to serve the Project including treatment requirements;
   (d) The impact of the Project on excess infrastructure capacity, including distribution piping, mains, pumps, storage, or additional supply;
   (e) A qualitative analysis of the water balance and an assessment of the impacts of the removal of the maximum daily withdrawal for the Project, particularly during drought periods, on stream flows and the ecological balance of these waterbodies; and
   (f) An identification and description of any Project water treatment facilities and intake structures including a demonstration that each facility represents Best Technology Available (BTA).

If water for the Project is to be supplied by the city of Middletown, the Application shall identify the following:

(g) The city's efforts to improve the system since the preparation of the Middletown Water Supply Selected Actions to Increase Long Term Water Supply Yields and Water Quality and the Department's response letter to the city, dated June 28, 2000; and

(h) Proposed measures by the city to increase the safe yield of the system as a direct result of the agreement with Calpine to supply water for the Project. The estimated increase in the safe yield shall be identified for each measure proposed.

6. An analysis of local effort to develop additional public and/or private water supplies that would affect the Project including, but not limited to:

(a) Documentation whether there are any other existing users of the 200,000 gpd allocated water supply from the city of Middletown, including users associated with developments approved for use by the Town of Wawayanda at least 30 days prior to the date of this application;

(b) An update on the city of Middletown's actions to increase its water supply yields;

(c) Documentation of the current status of the former Wawayanda Development Corporation well field (Wawayanda Groundwater Well);

(d) An explanation of the present water supply agreement between the Town of Wawayanda and the City of Middletown; and available documentation regarding the water service plan referred to as "Wawayanda Water Loop 1," including the potential for diminished service to existing residential and commercial customers identified in this plan and the impact to future users identified in such plan; and

(e) Documentation of the Echo Lake well field.

7. A description of the status of negotiations, and a copy of agreements that have been executed, with municipalities, public authorities, companies or individuals for providing water to the Project, including permitting implications/modification requirements;

8. An identification and evaluation of other reasonable mitigation measures, including the use of potential alternative supply sources including on-site sub-surface wells, water storage, and off-setting water conservation, regarding water supply impact, and including a contingency plan for periods of drought or water emergency describing thresholds for water use curtailment;

9. The Application will include a detailed analysis for the potential water supply options for the water supply for the Project. The analysis will include effluent

3. The viewshed analysis component of the VIA will be conducted as follows:

(a) A viewshed map of the Project study area will be prepared and presented on a 1:24,000 scale recent edition topographic base map. The viewshed study area is defined as the area within a 3-mile radius of the center of the Project site. Beyond 3 miles, viewshed locations will be selected on the basis of areas that have high elevation or that are characterized by land features that appear to afford distant views. The 3-mile radius viewshed map(s) will provide an indication of areas of potential visibility based on topography and vegetation and the top of the Project stacks. The potential screening effects of vegetation will also be shown. Visually-sensitive sites, cultural and historical resources, representative viewpoints, photograph locations, and public vantage points within the viewshed study area will be included on the map(s).

(b) The VIA will include a detailed description of the methodology used to develop the viewshed maps, including software, baseline information, and sources of data.

(c) The viewshed mapping will be used to determine the sensitive viewing areas and locations of viewer groups in the Project vicinity. These will include recreational areas, residences, businesses, historic sites (listed or eligible), and travelers (interstate and other highway users). The aesthetic resources survey will include the additional resources listed in the DEC's policy.

(d) Calpine will confer with DPS Staff, NYSDEC, and OPRHP in its selection of viewpoints. Viewpoint selection is based upon the following criteria:

- Representative or typical views from unobstructed or direct line-of-sight views;
- Significance of viewpoints, especially historic sites, high public use areas, parks and scenic outlooks;
- Level of viewer exposure, i.e., frequency of viewers or relative numbers, including residential areas, or high volume roadways;
- Proposed land uses;
- Input from local public sources (i.e. Wawayanda municipal officials, Wawayanda Citizens Advisory Group); and
- Degree of potential visibility.

4. Leaf-off simulations (photographic overlays) of the Project and interconnections will be prepared from the representative viewpoints established pursuant to paragraph 3(d) herein to demonstrate the post-construction appearance of the Project. Representative viewpoints will be established in consultation with NYSDEC, DPS Staff and OPRHP for this assessment based on the information described in paragraph 3(d) herein. The photographic overlays from each of the viewpoints selected pursuant to paragraph 3(d) herein will be limited to the Project as it would appear under typical operating conditions. In addition, a photographic overlay will be prepared showing a visible water vapor plume that could occur from the combustion turbine generator stacks under limited operating

conditions. The overlay will show a visible water vapor plume representative of average January daytime temperature and humidity conditions, as it may appear from a location established in consultation with the NYSDEC and DPS Staff. The depiction of a water vapor plume may be based on visible water vapor plumes from other comparable plants operating under similar conditions or applicable engineering estimates.

5. Additional revised simulations illustrating mitigation will be prepared for those observation points for which mitigation is proposed in the Application.

6. Each set of existing and simulated views of the Project will be compared and the change, if any, in visual character will be identified. Based upon the likely viewers, and their likely visual sensitivity, the potential impact will be discussed. Where visual impacts from the proposed facility are identified, potential mitigation measures will be outlined, and the extent to which they effectively minimize such impact will be discussed.

7. An overlay of a USGS map showing the photographic view locations and the results of computer visibility potential modeling will be provided. The overlay will show the area of potential visibility, as determined through terrain and vegetation modeling, and the viewpoints from which it has been determined that the Project will be visible.

8. The Application will include a study of the cumulative associated multiple facility aesthetic and visual impacts of the proposed Project and the Masada Project. Calpine will rely on the information provided in the SEQRA DEIS, FEIS, the Statement of Findings, permit conditions and regulatory approvals for the Masada Project to perform this analysis.

9. The Application will include a summary of the nature of the probable impact on aesthetic, scenic, historic, and recreational resources due to the Project, and a description of the mitigation to minimize adverse impacts on those resources.

from the Middletown WPCP. The preferred water supply will be identified and discussed, including any permitting implications; and

10. The Application will include a study of the cumulative associated multiple facility water supply impacts of the proposed Project and the Masada Project. Calpine will rely on the SEQRA DEIS, FEIS, the Statement of Findings, permit conditions and regulatory approvals for the Masada Project to perform this analysis. The analysis shall be based on the stipulations above and include the following information:

    (a) Hourly and daily peak and hourly and daily average water supply demands of the Masada Project for both production/operation and domestic uses, with daily, monthly and annual totals;
    (b) Identification of the water supply source for the Masada Project including the preferred source and all alternative sources; and
    (c) A qualitative analysis of the water balance and an assessment of the impacts of the removal of the maximum daily withdrawal for both projects, particularly during drought periods, on stream flows and the ecological balance of these waterbodies, using the preferred water supply for each project. If either project has identified an alternative water source that is the preferred water source for the other project, a worst case scenario shall be provided in the Application.

WASTEWATER

11. A separate water balance diagram for hourly and daily peak and hourly and daily average water use operating conditions for the Project that shows in detail all water sources, plant water uses, water treatment facilities, wastewater treatment facilities, wastewater discharges and which effluents will be discharged to the Middletown POTW and which effluents will be discharged to receiving waters. Calpine will provide information on the characteristics (e.g. volume, temperature, constituent concentrations) of each water withdrawal and discharge under all operating conditions;

12. An identification and evaluation of reasonable mitigation measures, e.g. the use of on-site subsurface disposal, regarding wastewater generation and disposal impacts;

13. An identification and description of all preferred disposal methods for wastewater generated from the Project, including a review of all options explored for process wastewater disposal, including discharging to municipal sewer systems, aquifer recharge areas, in-ground discharges, including, as applicable, an analysis of the impacts on water quality and quantity in affected groundwater and surface water resources, and an analysis of the impacts of any out-of-basin transfers;

14. An identification and description, including conceptual plans and locations, for all wastewater sewer mains or other improvements, structures or means of interconnection with the Project site for the purposes of wastewater disposal, including a description of available capacity and any limitations on wastewater disposal capacity;

15. A description of the status of negotiations, or a copy of agreements that have been executed, with municipalities, companies or individuals for receiving wastewater from the Project including any restrictions on Project wastewater disposal;

16. A demonstration that for each discharge, that all of New York's water quality standards will be complied with during construction and operation. If a new outfall to the Wallkill River is the preferred option for discharge of wastewater, a discussion of how the discharge will meet the temperature limit in the SPDES permit. If discharge to the city of Middletown sewage treatment plant is the preferred option, this will include a demonstration that the wastewater would not result in an exceedance of the limits for discharge to the POTW;

17. An identification and description of any Project wastewater treatment facilities and discharge structures including a demonstration that each facility is capable of meeting all applicable effluent limitations and represents Best Technology Available (BTA);

18. The Application will include a study of the cumulative associated multiple facility wastewater impacts of the proposed Project and the Masada Project. Calpine will rely on the SEQRA DEIS, FEIS, the Statement of Findings, permit conditions and regulatory approvals for the Masada Project to perform this analysis. The study shall include the following:

    (a) Identification and description of any process waters generated from the Masada Project including the hourly and daily peak and hourly and daily average volumes and effluent characteristics;
    (b) Wastewater disposal method for the Masada Project; and
    (c) A combined impact analysis of the water quality on surface water or groundwater identified as potential receiving waters from the discharges of both the Project and the Masada Project.

19. An evaluation as to whether a SPDES Permit is required for any aspect of the Project, except for stormwater (addressed below); and

20. If a SPDES Permit is required, except for stormwater (addressed below), a completed application for the SPDES Permit and a demonstration the discharge complies with Section 316(a) of the FWPCA (see paragraph 16 above).

GROUNDWATER

21. A map of the Project site showing the depth to seasonal high groundwater table in the following increments: zero to 1 foot, 1 to 5 feet, 5-foot increments thereafter;

22. A map based on publicly available information showing all areas within a 1 mile radius of the Project site delineating all groundwater aquifers and groundwater recharge areas, and identifying groundwater flow direction, groundwater quality, and the location, depth, yield and use of all public and private groundwater wells or other points of extraction of groundwater, and including delineation of well water and aquifer protection zones;

23. A map showing the areal extent of the aquifer, which the Project proposes to use for its water supply, will be provided. All public water supplies that use or propose to use this same aquifer as a water source will be identified and a description of each will be included in the Application. Similar information will be provided for the private wells of record.

24. An analysis and evaluation of potential impacts from the construction and/or operation of the Project on drinking water supplies, groundwater quality and quantity in the Project area, including potential impacts on public and private water supplies, especially on neighboring properties, and wellhead and aquifer protection zones during normal and drought conditions;

25. An identification and evaluation of reasonable mitigation measures, including the use of water storage, and offsetting water conservation, regarding groundwater impacts;

SURFACE WATERS

26. A description of the water quality, flow and other characteristics of surface water features, including intermittent streams, on or adjacent to the Project site or interconnections;

27. An identification of the extent of all Waters of the State of New York and the United States, within the Project site or interconnections;

28. A description of the characteristics of all Waters of the State of New York and the United States, identified above; in the event the Project construction requires dredging, a description of any impacts that might occur from dredging;

29. An analysis of the impact of the construction and operation of the Project and interconnections on the surface waters identified above;

30. If a new surface water intake structure is proposed for the Project, an identification of the water body, intake design and an analysis of the aquatic ecology of the water body and all impacts and a demonstration of compliance with Section 316(b) of the Federal Water Pollution Control Act (FWPCA);

31. An identification and evaluation of reasonable mitigation measures regarding impacts on Waters of the State of New York and the United States and the other surface waters identified above; including the precautions that will be taken to minimize dredging impacts (if any) and assure compliance with water quality standards; and

32. An identification of any nearby surface water drinking-water supply intakes that could potentially be impacted by the Project.

AQUATIC

33. A description of the aquatic resource characteristics of surface water features identified in paragraph 26, if any;

34. An analysis of the impact of the construction and operation of the Project and interconnections on the aquatic resources identified above; and

35. An identification and evaluation of reasonable mitigation measures, including the use of alternative technologies, regarding aquatic resource impacts.

WETLANDS

To the extent consistent with the following paragraphs contained in this stipulation, the methodology for assessing the potential impacts to wetlands will follow the procedures and use predictive data provided in the following documents:

For identifying the appropriate vegetation, hydrology, and soils criteria which would define federal-jurisdictional wetlands, the US Army Corps of Engineers Wetlands Delineation Manual (1987); and

For identifying the appropriate vegetation, hydrology, and soils criteria which would define State-jurisdictional wetlands, the NYSDEC Freshwater Wetlands Delineation Manual (July 1995).

36. An identification of the extent of all federal and state regulated wetlands within the Project site and an identification of all wetland impacts from the Project;

37. An identification of the extent of all federal and state regulated wetlands along all interconnections;

38. A description of the characteristics of all federal and state regulated wetlands identified above, including a description of the vegetation, soils, and hydrology data collected for each of wetland sites identified, based on actual on-site wetland observations;

39. An on-site identification and delineation of all federal and state regulated wetlands identified above;

40. A survey or coordinate map of the location of all on-site federal and state regulated wetland boundaries identified above;

41. An analysis of all wetlands within 200 feet of the Project site and the wetlands identified above, observed in the field where accessible to determine their general characteristics and relationship, if any, to wetlands identified in paragraph 36 above;

42. An identification and evaluation of reasonable mitigation measures, including the use of alternative technologies and control of potential deicing salt, phosphorus and nitrogen sources from the Project, regarding potential wetlands impacts (if any);

43. Communications with the affected agencies, including the State of New York Department of Agriculture and Markets to determine the most appropriate use of the undisturbed farmed wetlands remaining on the site; and

44. An identification of all wetlands impacts and any avoidance, minimization, and mitigation measures, including an analysis of means of assuring water recharge of any onsite wetland adequate to assure maintenance of biological integrity.

CONSTRUCTION/OPERATION STORMWATER RUNOFF

45. A description of all techniques that will be used to prevent stormwater and spill contamination, and a conceptual site plan showing all intended structures and improvements to prevent stormwater contamination, including chemicals, fuel oil or other contaminants from storage facilities, product delivery, plant operation, plant maintenance, waste handling activities, and vehicles in parking lots or other areas;

46. An evaluation as to whether a SPDES Permit is required for stormwater discharges from the Project;

47. If a SPDES Permit is required for stormwater discharges, a completed application for the SPDES Permit;

48. An identification and evaluation of reasonable mitigation measures, including the use of alternative technologies, regarding stormwater quality impacts; and

49. The development of a Pollution Prevention Plan with erosion and sediment controls designed in accordance with the New York Guideline for Urban Erosion and Sediment Control.

EROSION CONTROL

50. A preliminary plan for the collection and treatment of stormwater runoff from the site during construction and operation, including delineation of watershed boundaries and subbasins, existing flowpaths and proposed flow path relocations, the location, type, and size of all existing and proposed storm drainage facilities, stormwater outfall and/or subsurface disposal locations and conditions, design flows and outfall velocities, proposed method of stabilizing outfall channels, the location, size and type of nearest upstream and downstream bridge or culvert affected by the Project, location, size and structural details of stormwater detention facilities, preliminary hydraulic calculations for the 2, 10, 25, 50 and 100 year storm frequencies for both existing and proposed conditions, delineation of affected floodways and flood hazard areas, a description of techniques that will be used to prevent or control soil erosion, runoff and subsequent sedimentation in areas that have been cleared and graded, both during construction and operation, an analysis of related impacts, and an identification and evaluation of reasonable mitigation measures regarding related impacts, including the use of alternative technologies and subsurface disposal.

SPILL PREVENTION AND CONTROL PLAN

51. A description of the spill prevention and control measures to be in place for ammonia storage and other hazardous substances stored on site.

STIPULATION NO. 13: RELIABILITY AND ALTERNATIVES

The Application will contain the following assessments:

1. The Application will explain the basis for the selection of the power block and will contain an assessment, with supporting details, of the reliability and feasibility of the preferred source(s) of power. As part of the supporting details, reliability data for the major generation components including the gas turbine, heat recovery steam generator, steam turbine, and air-cooled condenser; and collectively for the entire power block will be provided and would include: capacity factor; availability; equivalent availability; forced outage rate; equivalent forced outage rate; and starting reliability, if available. If the equipment does not have an operating history, estimates of operating reliability with the rationale, including back-up information from tests and experience with individual equipment components will be provided.

2. The Application will include an explanation of the basis for the chosen emission control systems and alternatives, including the LAER and BACT analyses, as required by the PSD air permit application guidelines.

3. The Application will include an evaluation and assessment of alternative cooling technologies and provide sufficient information to support Calpine's conclusions that air cooling is preferred and why other options are not considered reasonable alternatives. The analysis will also qualitatively consider siding or skirts around the air-cooled condenser as well as relocation of the air-cooled condenser with respect to noise, operations/economics, and aesthetic impact.

4. The Application will include a presentation and analysis of options for stack plume mitigation. Included will be the reduction in the frequency and extent of stack plume visibility achieved by each option under worst case and average temperature and climate conditions for when stack plume would be visible. Also included for each option will be incremental costs for capital and operations and maintenance based on life-cycle costs, in tabular summary, together with the underlying assumptions with work papers. Any impact on plant efficiency and plant output (gross and net) will be provided in detail.

5. The Application will include alternate routes for the electrical interconnection, including: a) exiting the Project site to the northeast and thence to the southeast adjacent to the O&R ROW, and b) exiting the Project site to the northeast adjacent to the O&R ROW and thence southeast along the north side of the abandoned Erie & Lackawana rail road bed. A qualitative environmental comparison of both will be provided, including minimization of visual, EMF, terrestrial ecology/wetlands, and land use impacts.

STIPULATION NO. 14: SYSTEM PRODUCTION MODELING

1. The Application will include the following analysis of statewide emissions and production cost impacts, which will be developed using MAPS, PROMOD or a similar computer modeling tool:

   (a) Case 1 (without the Wawayanda facility)
   - Estimated statewide levels of SO_2, NO_x and CO_2 emissions; and
   - Estimated minimum, maximum, and average annual spot prices (based on variable production costs) in New York State and in Areas A, G and K of the New York Control Area

   (b) Case 2 (with the Wawayanda facility)
   - Estimated statewide levels of SO_2, NO_x and CO_2 emissions;
   - Estimated minimum, maximum, and average annual spot prices (based on variable production costs) in New York State and in Areas A, G and K of the New York Control Area and
   - Estimated capacity factor for Wawayanda.

2. The analyses in Cases 1 and 2 will assume that, subject to publicly announced in-service and retirement dates, the following power plants are in service: all existing electric generation facilities, the New York Power Authority's proposed in-city gas turbines and those electric generation facilities that have received notification that their application is in compliance with Article X 30 days prior to the date of this application. Notwithstanding the foregoing, Cases 1 and 2 shall not include any power plants that are listed as "on hold" on the DPS Article X case list.

3. Calpine will consult with DPS Staff with the goal of agreeing to a mutually acceptable input data set, including modeling for Calpine's proposed facility, to be used in the above-discussed analyses. The default data set will be that which was used in the preparation of the most recent New York State Energy Plan, with updates to the data base to reflect significant changes that have occurred since the data set was developed and reasonable assumptions about the other new facilities identified in paragraph 2 herein.

STIPULATION NO. 15: COMBINED IMPACTS FROM MULTIPLE FACILITES

1. The Application will include (in addition to the study of cumulative effects of air emissions from the proposed Project and existing facilities and the potential for significant deterioration in local air quality in severe non-attainment areas, as described in Stipulation No. 1 and in addition to the system production modeling, as described in Stipulation No. 14), a study of the cumulative associated multiple facility impacts of the proposed Project and Torne Valley LLC's Torne Valley Station (Case 98-F-1885) and Ramapo Energy LP's Ramapo Energy Project (Case 98-F-1968).

2. Except with respect to air quality impacts (see Stipulation No. 1) and system production modeling (see Stipulation No. 14), the study of these multiple facilities' impacts under paragraph 1 herein will focus on those related to all the subject matter areas discussed in these stipulations. The study will be qualitative in character.

3. The Application will also include (in addition to the study of cumulative source impact analysis for any criteria pollutant for which the Project has impact above SILs as described in Stipulation No. 1 and the system production modeling, as described in Stipulation No. 14), a study of the cumulative associated multiple facility impacts of the proposed Project and the Masada Project. The impact analysis will include traffic (see Stipulation No. 5), water resources (see Stipulation No. 12), wastewater (see Stipulation No. 12), noise (see Stipulation No. 6), aesthetics and visual (see Stipulation No. 11), and land use (see Stipulation No. 5).

Accepted and Agreed:

Date:

Robert L. Alff

Mr. Robert Alff
Senior Vice President
Calpine Construction Finance Company, L.P.

Accepted and Agreed:

Date: February 8, 2001

Mr. Steven Blow, Esq., Assistant Counsel
Staff of the New York State
Department of Public Service

The New York State Department of Environmental Conservation acknowledges and signs this Stipulation with respect to the studies to be conducted pursuant to the preamble to the Stipulation and Stipulations No. 1, 4, 6, 9, 11, 12, 14 and 15 for the Wawayanda Energy Center project. The Department of Environmental Conservation takes no position as to the appropriateness, relevance, scope or methodology of the studies set forth in the remaining Stipulations for the purpose of this proceeding; nor by executing this stipulation does the Department accept or concur in reservations made or undertaken by any other signatories hereto.

Accepted and Agreed:

Dated: February 13, 2001

Mr. William G. Little, Esq.
Associate Attorney
For: The New York State
Department of Environmental Conservation

Accepted and Agreed: The Department of Health executes this agreement solely with respect to the studies to be conducted pursuant to Stipulation No. 1 (Air Quality and Meterology) and Stipulation No. 12 (Water Resources).

Date:

Mr. Frank DeCotis
Staff of the New York State
Department of Health

Accepted and Agreed:

Date:

Mr. Thomas J. DeBlock, Supervisor
Town of Wawayanda

Accepted and Agreed:

Date: February 5, 2001

Deborah Marie Glover

Ms. Deborah Marie Glover, Chairperson
Wawayanda Citizens Advisory Group
Interim Chairperson - WCAG, on behalf of the WCAG, and on behalf of each member of the WCAG who has executed a resolution authorizing such, dated January 31, 2001.

The WCAG limits its agreement to STIPULATION NO. 1: AIR QUALITY & METEOROLOGY by reserving all rights to require Calpine to perform analysis of PM 2.5 impacts from the project if a methodology is developed for performing such for stationary sources in a proceeding, by regulatory action or scientific advisory body, including, but not limited to, the following circumstances: USEPA's adoption of a guidance/methodology; USEPA's acceptance of a methodology in a proceeding in which it is the regulatory agency or party; a methodology be accepted in any NYSDEC or Article X proceeding; a methodology be accepted in a proceeding or regulatory action in an another state; or a methodology is adopted or published by a non-governmental, scientific advisory body,

APPENDIX B PRE-FILED TESTIMONY

Case: 00 F 1256

WAWAYANDA ENERGY CENTER

DIRECT TESTIMONY

OF

STEPHAN SOLZHENITSYN

THOMAS DEEDY

DONALD NEAL

Q. Please state your names, titles, affiliations and business addresses.

A. My name is Stephan Solzhenitsyn, and I am a Senior Project Manager with TRC's Energy Group. My business address is Boot Mills South, Foot of John Street, Lowell, Massachusetts 01852.

A. My name is Thomas Deedy, and I am a Senior Project Engineer for Calpine Corporation ("Calpine"). My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

A. My name is Donald Neal, and I am an Environmental Manager for Calpine. My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

Q. Mr. Solzhenitsyn, what are your duties of employment and your role in the Wawayanda Energy Center Project ("Project")?

A. As a Senior Project Manager, my duties include preparing environmental impact assessments, siting studies and siting applications in the Northeast, Mid-Atlantic and Southern United States. For this Project, I am the project manager at TRC. In that capacity, I have overseen the preparation of various environmental studies, with particular emphasis on land use, cultural resources and alternatives evaluations.

Q. How are you qualified to perform your employment duties?

A. I have a Bachelor of Arts degree in Visual and Environmental Studies from Harvard University and I have a Master of City Planning from Massachusetts Institute of Technology.

Q. Does your curriculum vitae, which is attached as Exhibit 16, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Deedy, what are your duties of employment?

A. I work closely with the Regional Development Managers in the development of new power plant projects. I organize and lead the initial engineering and technical review efforts in the design of combined-cycle power plants. I determine the preliminary conceptual design, using standard design guidelines, as well as run the up-front project heat balances. I also coordinate the initial engineering effort with a selected A/E firm and arrange interface with utilities, steam hosts, gas suppliers, permitting agencies, consultants and other organizations involved with the development of power projects.

Q. How are you qualified to perform your employment duties?

A. I received a Bachelor of Science in Marine Engineering from Massachusetts Maritime Academy and I have over 14 years of professional experience related to my employment duties.

Q. Does your curriculum vitae, which is attached as Exhibit 3, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Deedy, please describe your role in the Project.

A. I am the engineering manager of the Project, with primary responsibility for facility design, interaction with turbine and balance-of-plant vendors and provide technical support for all aspects of the facility.

Q. Mr. Neal, what are your duties of employment?

A. I serve as project manager and technical analyst for environmental permitting and assessment of electric generating facilities and programs, representing Calpine before

regulatory agencies and in public forums. In this capacity, I have managed and prepared siting studies, environmental impact statements, and applications for wastewater, wetlands and air permits. I have also led environmental, health and safety audits and due diligence investigations. I am experienced with methods of air emissions source testing and continuous emissions monitoring system design, certification and implementation.

Q. How are you qualified to perform your employment duties?

A. I received both a B.S. and an M.S. in Biology from the University of Massachusetts and I have over 18 years of experience related to my employment duties.

Q. Does your curriculum vitae, which is attached as Exhibit 14, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Neal, please describe your role in the Project.

A. I am the environmental manager for the Project, with primary responsibility for all aspects of the Article X application being submitted with this testimony. My areas of expertise on the Project have included supervision of air and water quality studies, ecological investigations, acoustical studies and land use and aesthetics issues.

Q. Gentlemen, what section of the Application does your testimony support?

A. Sections 1, 2, 3, 5, and 18. Section 2 provides a summary of the impacts that are already discussed in other panels of testimony. Therefore, it is not explicitly addressed here.

Q. Please briefly describe the type, size, and proposed use of the Project.

A. The Project is a 540 MW (nominal) natural gas-fired combined-cycle electric generating facility. It will supply electricity to the regional grid as an exempt wholesale generator as defined by federal regulations. The Project will participate in the new wholesale

electricity market, selling at market-determined prices, thereby providing competitively-priced electrical energy to New York State's consumers. The Project will be a merchant facility developed, constructed, and operated by Calpine using private funding sources.

The Project will include two 180 MW General Electric (GE) 7251-FB (7FB) combustion turbines (CTs) and associated heat recovery steam generators (HRSGs). The CTs will be equipped with dry low nitrogen oxide (NO_x) combustors and have a combined generating capacity of 360 MW (net). The HRSGs will be connected to a 180 MW steam turbine generator, which will utilize the waste heat from the CTs. The configuration of two gas turbines and one steam turbine is commonly referred to as a "2 on 1" combined-cycle configuration. By utilizing the otherwise wasted heat from the CTs, the combined-cycle facility will be more efficient than simple-cycle CTs and existing steam-cycle power plants. The facility will only be fired with natural gas.

The majority of the power generation equipment will be housed within a building containing the gas turbines and their associated subsystems and equipment, the steam turbine and its associated systems, a control complex which includes the control room, water sampling lab, electrical switchgear and electrical distribution systems. There will be a separate water treatment building. The plant will also include an air-cooled condenser (ACC), which will be used to condense the steam turbine exhaust so that it may be recycled back to the HRSGs. The ACC will minimize the impact on local water resources.

Q. Please address the approved procurement process.

A. New York State's Article X process requires the Siting Board to evaluate whether or not the Project complies with state and local laws and whether or not environmental impacts

have been adequately mitigated and public health and safety protected. The bulk of this Application addresses those requirements.

The Application also supports two additional necessary findings: that the Project was selected pursuant to an approved procurement process; and that the Project is in the public interest.

The Article X statute and the Siting Board regulations require that Calpine demonstrate the Project is reasonably consistent with the policies and long-range energy planning contained in the most recent New York State Energy Plan *or* that the Project has been "selected pursuant to an approved procurement process." PSL §168.2(a) and 16 NYCRR 1001.5. If the Project meets the latter standard, Calpine will not be required to present certain types of alternatives (for example, detailed cost analyses). The Article X statute also requires a demonstration that the Project is "in the public interest." PSL §168.2(e).

Q. Please describe long-range energy planning and objectives.

A. The New York State Energy Planning Board releases and periodically updates the New York State Energy Plan (SEP) in order to provide strategic direction and policy guidance for energy-related decisions to be made in the public and private sectors. The most recent version of the SEP was published in November 1998. The objective of the plan is to provide the policy framework to assist state agencies and other energy-related organizations in making energy decisions that will contribute to a growing economy in an environmentally sound manner. The year 2000 Annual Report on the SEP does not recommend any revisions to the present SEP (1998 SEP). Refer to Appendix V.

The 1998 SEP provides "broad energy policy direction" and identifies specific

policy goals that "are designed to support efficient and effective competition in energy industries and to ensure the benefits of competition and consumer choice are available to all New Yorkers." (1998 SEP, page 1-2; See Appendix V-1). The 1998 SEP adopts "competition as a long-range energy planning objective and strategy" (1998 SEP, page 2-52), indicating that siting of major electric facilities under Article X may be premised on a determination that the proposed generating facilities would promote or contribute to a competitive market for wholesale or retail provision of electricity.

The Project is fully compatible with the 1998 SEP's goals of promoting competition in New York State. As a merchant plant, it will only be able to market its output if it is competitive with the offered prices of other electricity suppliers. The Project must operate on a competitive basis, vying with other electricity suppliers. The Project will contribute to increased price competition among suppliers. This outcome is fully consistent with the 1998 SEP because the Project will "support efficient and effective competition in energy industries," thereby helping "to ensure [that] the benefits of competition and consumer choice are available to all New Yorkers" (1998 SEP, page 1-2).

Additionally, an energy policy objective of the 1998 SEP is to encourage market-based strategies as a means to meet environmental requirements (1998 SEP, page 1-15). The 1998 SEP recognizes that "competitive markets provide the best means for allocating and pricing energy resources" and recommends that, as part of the effort to promote competition, the State should "[s]upport market initiatives to develop new electric-generating facilities and encourage competitive procurement of energy supplies and services by regulated load-serving entities, mindful of short- and longer-term

economic and environmental considerations." (1998 SEP, page 1-16).

The Project also meets the 1998 SEP's environmental goals and objectives. First, the Project will be subject to and will comply with applicable environmental regulations, including the Clean Air Act and the Clean Water Act. Second, its participation in the competitive power market will also help ensure that New York State's air emissions decrease from the power sector overall. The dispatch of the Project, is expected to cause older, less efficient and less environmentally desirable plants to reduce output. This result will provide net benefits to the air quality of New York. The Public Service Commission has already acknowledged this benefit, stating that "under current air regulations (particularly the emissions offset policy of NO_X) construction of new generating facilities tends to *improve air quality*."

Q. Has the Project been selected pursuant to an approved procurement process?

A. Yes. Pursuant to PSL 164(1)(e)(ii) and 16 NYCRR 1001.5, Calpine states that it will operate as a merchant plant in the competitive electric markets and is fully consistent with the 1998 State Energy Plan. Therefore, the Project has been selected pursuant to an approved procurement process.

Article X makes a distinction between facilities that have been selected pursuant to an approved procurement process and those that have not. In order to protect consumers, applicants that seek an Article X Certificate for a facility under cost of service regulation are required, as part of their Application, to submit information relating to project cost, provide an evaluation of alternative energy supplies, or demonstrate that the facility will satisfy additional electricity needs. PSL §164(b), (d) and (e). However, a facility that has been selected pursuant to an approved procurement process is not

required to provide this information because any risk associated with the construction and operation of the facility is borne by the applicant alone.

In response to a petition filed by another Article X applicant, the Ramapo Energy Limited Partnership, for a ruling on whether competition is an approved procurement process within the meaning of Article X, the NYS Public Service Commission ruled that "competition in the electricity supply market is an approved procurement process because it is an electric capacity procurement process approved as reasonably consistent with 1998 State Energy Plan." (Case 99-E-0089, Ramapo Energy Limited Partnership, Declaratory Ruling Concerning Approved Procurement Process, at 4, Public Service Commission, Issued and Effective August 25, 1999). However, the PSC further ruled that:

> *it is inappropriate for the [PSC] to usurp the authority of case-specific Siting Boards to determine whether particular major electric generating facilities are selected pursuant to an approved procurement process that is part of the emerging competitive electricity generation market.* Id.

Thus, the Siting Board must determine whether a particular facility has been selected pursuant to an approved procurement process by contributing to competition in the electricity supply market. Such determination must be based on a statement by the applicant, under PSL §164(1)(e)(ii), that its proposed facility was selected pursuant to an approved procurement process. (Case 98-E-0096, Athens Generating Company, L.P., Declaratory Ruling Concerning Approved Procurement Process, at 7, Public Service Commission. In opining on this issue in its review of the Article X application of Athens

Generating Company, the Siting Board's Presiding Examiner ruled, that because the Athens application indicated that that project was a merchant plant selected by the competitive process for electric generation, it was selected pursuant to an approved procurement process (Case 97-F-1563, Athens Generating Company, L.L.P., Order Concerning Interlocutory Appeals, at 4, Siting Board, Issued and Effective January 28, 1999). The Siting Board upheld the Presiding Examiner's decision on appeal.

Calpine attests here that the Project will operate as a merchant plant and compete with other suppliers to sell its electrical output into the emerging competitive electricity generation market (see Section 1.2.4). Calpine will not seek to recover any costs from ratepayers under the Public Service Law, nor will it operate as a qualifying facility and seek a contract under the Public Utility Regulatory Policies Act of 1978. Calpine will bear the financial, construction and operating risks related to the Project, and plans to sell its power in the wholesale bilateral markets and/or spot electricity markets administered by the New York Independent System Operator (NYISO). Therefore, retail ratepayers will bear no financial risks associated with the construction and operation of the Project. Thus, as a merchant plant that will operate in the emerging electricity generation market, the Project has been selected pursuant to an approved procurement process. By motion filed concurrently herewith, Calpine requests that a preliminary finding be made that Calpine has made a *prima facie* showing that the proposed facility has been selected pursuant to an approved procurement process.

Q. Please describe dispatch of the plant by the NYISO.

A. The Project is consistent with the 1998 SEP's policy on the NYISO and system reliability. The Project will be offering to sell its electricity in the competitive electric

market. Therefore, its economic success will be directly dependent upon how efficiently it can operate and how effectively it can compete. The Project's output will be offered to the New York market and dispatched by the NYISO (or any successor agency to it, if it merges its functions with other independent system operators in the Northeast) under tariffs approved by FERC. The NYISO will ensure that the operating criteria and standards for system reliability will be met. The NYISO is designed to be an independent entity that will coordinate the safe and reliable flow of electricity throughout New York and operate the state's spot markets in an economically efficient manner. It will also ensure that all market participants have open, non-discriminatory access to utility transmission systems. The NYISO will dispatch generating units in New York to assure reliable operation of the transmission system at the lowest total bid cost to the state, subject to transmission constraints and other reliability considerations. The Project will be chosen to run only if it is providing a net economic benefit to New York's power system over the available alternatives. The NYISO will determine the operating schedule for the power plants that provide the most benefit to New York State consumers, consistent with the safe and reliable operation of the transmission system.

In summary, the Project will enhance the supply portfolio from which the NYISO may select competitive energy supplies and services in order to minimize the total cost of electricity generation to New York State. The Project therefore will expand the choices of load-serving entities to obtain electricity, help minimize system costs, and will operate under rules that will assure system reliability.

Q. Please describe the Project Site.

A. The Project site consists of approximately 53 acres, bounded to the south by Dolsontown Road, to the east by an abandoned railroad easement, to the west by several residences and open land generally extending to Route 17, and to the north by electric transmission lines, the 36 MW Shoemaker combustion turbine, an electrical substation, City of Middletown sewer easements and the Middletown publicly owned treatment works (POTW). The site is near the Interstate 84 (I-84)/Route 17M interchange, providing convenient access from I-84 to the site via Route 17M and Dolsontown Road. The Project's access drive will extend off of Dolsontown Road. The site lies entirely within the town boundaries of Wawayanda, approximately 0.1 miles south of the boundary with Middletown. The site, temporary construction laydown area to its south, and electric, water, and sewer interconnections are shown in Figure 3-1.

The Project site is predominantly undeveloped and has been used for agriculture. Site elevations are highest to the west, with elevations ranging from 500 to 520 feet above mean sea level (msl). Just off-site to the west, the land continues to rise in elevation. The site has a gradual downward slope from west to east, with elevations in the eastern portion of the site at about 460 feet msl.

A portion of the site includes hydric soils and other evidence of wetland characteristics and is, therefore, considered a wetland under the U.S. Army Corps of Engineers (ACOE) definition. No state-mapped wetlands exist on the site, temporary laydown areas east and south of the main Project footprint area (on both sides of Dolsontown Road), or at any interconnection, nor are any of these lands located within a mapped floodplain. The site includes a small ponded area and a drainage ditch that is an unnamed tributary to the Monhagen Brook.

Q. Please describe the environmental setting of the Project site.

A. The Project site lies on the northern edge of Wawayanda in Orange County, approximately 60 miles to the north-northwest of New York City and just south of Middletown and Wallkill. Wawayanda has an area of 33.6 square miles and is bordered by the towns of Greenville and Minisink to the west, Warwick to the south, and Goshen to the east. Wawayanda has large tracts of vacant or agricultural land. The southeast section of Wawayanda is referred to as the "black dirt area" for its dark fertile soils and is zoned specifically for agriculture.

Figure 3-2 presents the land use context of the Project site. Interstate-84 runs west to east through Wawayanda. Monhagen Brook is situated about half a mile to the south of the site and flows eastward where it joins the northward-flowing Wallkill River at the border of Wawayanda and Goshen. The terrain in the region is generally hilly. A high pressure gas pipeline owned by Tennessee Gas Pipeline is 20 miles away and Columbia Gas' proposed Millennium pipeline right-of-way is 10 miles away. The site is adjacent to high voltage transmission lines operated by Con Edison subsidiary Orange and Rockland (O&R) and the New York Power Authority (NYPA).

Q. Please describe any changes that have occurred since the Preliminary Scoping Statement and application for air permits.

A. The Project's Preliminary Scoping Statement (PSS) was submitted in July 2000. The Project's application for a Prevention of Significant Deterioration (PSD) and an Air Quality Permit to Construct and Operate a Major Stationary Source (pursuant to 6 NYCRR 201-6 and 231) were submitted in May 2001. The following changes regarding the Project have occurred since the PSS.

1. Duct firing for peaking capability up to 180 MW has been eliminated.

2. Pending completion of a supply agreement, Calpine has selected the Middletown POTW as its exclusive supplier of process water. The use of treated effluent will require additional water treatment equipment to clarify, filter, and further disinfect the process water. Although this application assumes that this equipment will be located on the Project site, some of this equipment may be located at the Middletown POTW.

3. Calpine has selected the Middletown POTW for sanitary and industrial wastewater disposal. The effluent supply and wastewater disposal lines to the POTW will be forced mains located in a single right-of-way (see Figure 3-3).

4. Additional parcels of land north of Dolsontown Road are being optioned as part of the Project site to provide additional buffer between the Project and nearby land owners, and to optimize the plant layout.

5. Additional land is being leased south of Dolsontown Road for temporary construction laydown. All relevant site-specific analyses for the laydown area as well as interconnections (e.g., archaeological resource study) have been included in the environmental studies presented in this Application.

6. The site plan has been altered in order to reduce wetlands impacts from approximately 2 acres to 0.2 acres, and in order to increase buffer distance between plant buildings and Dolsontown Road from approximately 240 feet to 300 feet.

7. The New York Power Authority conducted Calpine's electric interconnection study, and dictated a loop interconnection design. Following an investigation of

alternatives, Calpine has selected an overhead line route to the Marcy South transmission line corridor south of Dolsontown Road.

Q. Please describe the project's general layout and appearance.

A. The Project design and layout was carefully planned to minimize its impact to the surrounding community and the environment. The Project will consist of the power generation building, containing the administration areas, control room, gas turbines, steam turbine, HRSGs, water sampling lab, and electrical switchgear; two exhaust stacks exiting the power generation building; an ACC; ammonia storage; water treatment buildings and tanks; a stormwater management system; access roadways; a security fence around the facility; interconnections to the electric transmission system and water and wastewater systems; and a gas metering station with gas infrastructure internal to the site, to be supplied by an interstate natural gas pipeline. See Figure 3-3, Site Plan with Interconnections, Figure 3-5, Power Block Plan, Figure 3-6, Exterior Elevations, and Figure 3-7, Computer Rendering.

The most prominent structures associated with the Project are the ACC, 120 feet high; the generation building, 106 feet high; and the exhaust stacks, 225 feet high (with a narrower auxiliary boiler stack 180 feet high). The ACC and water treatment infrastructure is located at the rear (northern portion) of the site. The switchyard, and the generation building are situated closer to the front (southern portion of the site). A landscaped berm will separate the Project facilities and Dolsontown Road. The berm will provide partial screening and a visual buffer for the Project. Aboveground electric transmission lines (up to approximately 100 feet tall) will cross Dolsontown Road from the Project site south to the NYPA Marcy South transmission corridor.

Q. Please describe the Project's general components.

A. The facility will be comprised of the following five main areas: main process area, water treatment systems, wastewater collection systems, electrical switchyard and staff facilities. A listing of each proposed area, with the main structures that will be constructed for those areas and a brief description of their function is provided in Section 3.2.4.

Q. Please describe the Project's process of generation.

A. Figure 3-4 is a process diagram showing how the Project generates electricity. At the heart of the combined cycle generation process are the Project's two CTs and one steam turbine. Each turbine is attached to a generator and step-up transformer. CTs are powered by natural gas. Air is drawn into the unit, compressed, and then sent to the combustion chamber and mixed with pipeline quality natural gas and combusted. The combustion chambers feature dry low NO_x (DLN) combustors to reduce formation of nitrogen oxides. The expanded exhaust gas then passes through a 3-stage turbine, which powers both the compressor and the attached generator.

Waste heat from each CT is routed to a HRSG. The HRSG has multiple pressure zones to maximize the recovery of waste heat to generate steam. While in the HRSG the exhaust gas passes through an oxidation catalyst and through the selective catalytic reduction (SCR) system to reduce air emissions. Exhaust gases are then vented to the atmosphere through 225-foot tall stacks.

Steam generated in the HRSG is routed to the steam turbine to generate additional electricity. At the outlet of the steam turbine, the remaining low-pressure steam is routed through a main steam duct to the ACC, where it is cooled and condensed within a closed

loop system. The ACC consists of a number of modules, each with tube bundles in an A-shape. The steam distribution manifold is located at the top of the A-frame. The steam is condensed inside the finned tube bundles using ambient air as the cooling medium. The cooling air flow for each module is provided by a dedicated large-diameter fan. Condensate is collected in the condensate tank, and then pumped back to the HRSG feed water system. The fans and tube bundles will be surrounded by siding to reduce visual impacts.

Q. How would you characterize the Project's air emission control systems?

A. The Project will be one of the most efficient and cleanest combined-cycle power plants in the world. The facility will be designed to meet lowest achievable emission rate (LAER) and best available control technology (BACT) standards, as applicable, for emissions control. Emissions of sulfur dioxide (SO_2) will be limited by using natural gas as the sole fuel. Emissions of particulate matter (PM), carbon monoxide (CO), and volatile organic compounds (VOC) will be limited through proper combustion controls. An oxidation catalyst to further control CO, and possibly some VOC, will be installed.

The GE 7FB combustion turbine is based on the latest technology offered by GE. The 7FB achieves superior NO_X emission levels as a result of its DLN sequential combustion system working in conjunction with SCR, a post combustion flue gas control. SCR is a commercially available, proven technology to remove NO_X from the exhaust gases in the HRSGs. The SCR process involves injecting ammonia into the flue gas stream and then passing the flue gas stream through a catalyst bed that converts NO_X to benign nitrogen (N_2) and oxygen (O_2) gases.

Q. Please describe the Project's expected water usage.

A. The Project will employ an ACC to minimize water consumption. Under annual average conditions, the Project's average water supply requirements are expected to be approximately 244,000 gallons per day (gpd), with 98% of the flow coming from the Middletown POTW and 2% from potable water supplies. (All flows are rounded to nearest thousand gallons value.) Thus, Middletown POTW water is used not only to satisfy process water needs, but also accounts for most of the plant's service water needs (except potable uses). In all, an average of 175,700 gpd will be lost through evaporation (consumptive use), while 69,000 gpd will be returned to the Middletown POTW. On a peak day, water use will be approximately 435,000 gpd (99% of it from the Middletown POTW), with consumptive losses of 308,000 gpd and a wastewater return of 126,000 gpd. For detailed descriptions of the water flows, see the water balance diagrams (Figure 17-1 through 17-5) and the water use discussion in Section 17.1. A summary of the process is provided here.

After Middletown POTW water is treated in a clarifier, some of it is used for WSAC makeup and quenching water for HRSG blowdown and the remainder is sent to the filtration system, then to the filtered water storage tank. From there the water is used for fire protection, plant service needs, or sent to the demineralization system, where highly purified water is produced for inlet air cooling and HRSGs makeup. HRSG makeup is necessary to offset miscellaneous losses and "blowdown". Blowdown reduces the concentration of dissolved solids in the water which can buildup and damage HRSG and the steam turbine. The HRSG blowdown is quenched with the filtered water to a temperature at which it can be pumped. HRSG blowdown water is then recycled in the WSAC.

The WSAC is utilized for heat rejection from a closed cycle auxiliary cooling system for equipment components such as generators and lube oil sumps. The heat from these equipment components is removed by the closed cycle auxiliary cooling system and transported to tube bundles in the WSAC, which sprays water over the tube bundles to reject the heat to the atmosphere. The water is recycled but some is lost through evaporation. The water recycled in this cooler will also increase the concentration of dissolved solids (since water evaporates and solids do not), thus requiring some blowdown to reduce these concentrations. Clarified water and HRSG blowdown are used to make-up for the evaporation and blowdown losses.

Water is also consumed in the plant to cool the incoming air to the CTs during hot weather operation. This cooling is performed by evaporating the water into the intake air stream, which, by the process of evaporation, absorbs heat from the air and thus reduces its temperature. This allows the CTs to operate more efficiently during hot weather periods.

Middletown POTW water is used for all plant systems except sanitary and safety. Potable water needed for sanitary and safety systems such as emergency eyewash stations (<5,000 gpd) will be provided by the Town of Wawayanda.

Q. What type of utility interconnections are planned?

A. Four utility interconnection corridors are planned: a 0.3-mile electric transmission line south to the NYPA transmission corridor; a potable water line extension for 0.2 miles along Dolsontown Road; and an effluent supply/wastewater line joint corridor that is 0.1 miles long between the Project site and the Middletown POTW property. In addition, the will site contain a gas metering station, which will be the termination point of a pipeline

to be licensed under the Federal Energy Regulatory Commission (FERC) interstate pipeline permitting process pursuant to the Natural Gas Act. Environmental impacts associated with the pipeline are studied in Section 9 of this Application.

An assessment of gas supply and transportation reliability is found in Section 9. Calpine intends to have fuel supply and permitting arrangements such that the Project is able to operate at all times, 365 days per year. A discussion of the electric interconnection and the transmission System Reliability Impact Study (SRIS) is found in Section 8. Upgrades to the NYPA 345 kV Coopers Corners – Rock Tavern line will not be required. An assessment of the availability of water and sewer service is in Section 17. The Middletown POTW typically discharges 4-5 million gallons per day (mgd), with a capacity to treat 6 mgd. The Project would withdraw only a small portion of the POTW discharge, and would return an even smaller amount to the POTW as wastewater.

Q. What type of control system will be used to monitor plant processes?

A. A sophisticated control system will be used to monitor and control the various plant processes. A central control room will be staffed at all times with operators maintaining full plant control. The control system will be programmed to automatically control and/or monitor plant functions and notify the operators of abnormal conditions. A continuous emissions monitoring system (CEMS) will be used to monitor exhaust stack emissions. Local control systems will be provided for equipment that is operated manually.

Q. How will generation and disposal of solid and hazardous wastes be handled?

A. The Project will generate relatively little solid waste, as well as small amounts of wastes that are classified as hazardous and subject to the Resource Conservation and Recovery

Act of 1976 (RCRA), Environmental Conservation Law §27, and the New York Hazardous Waste Regulations (6 NYCRR 370 *et seq.*). Consistent with the requirements of PSL §164.1(c)(i) and 16 NYCRR 1001.3(b) 1(v), information is provided relative to solid and hazardous waste generation and disposal. A Certificate for the Project requires a finding that the Project will "control the disposal of any hazardous waste." PSL §168.2(c)(vi).

Solid waste will be generated during Project operations. Office and other facility wastes will be recycled to the extent feasible. A private contractor will dispose of non-recyclable materials. Normal Project maintenance will generate small quantities of solid waste on a periodic basis. Depleted SCR and oxidation catalysts will be sent for reprocessing to the original manufacturer or to a licensed facility for recovery or disposal.

The Project will implement a pollution prevention and solid waste management program and evaluate recycling opportunities. Recycling will be encouraged and supported through the on-site placement of appropriate containers. Solid waste and debris that cannot be recycled, reused or salvaged, will be stored in on-site dumpsters or similar containers for off-site disposal.

Based on experience at facilities presently being constructed and operated by Calpine about 5 to 10 cubic yards of waste will be generated weekly during operation. Approximately 50 to 100 cubic yards will be generated weekly during construction. This is equivalent to approximately 400 cubic yards of solid waste per month for the short-term construction period, some of which will be recycled. Also note that solid waste generation during construction varies depending on the phase of construction.

Potentially hazardous wastes will be separated from normal waste through

segregation of storage areas and proper labeling of containers. All hazardous waste will be removed from the site by licensed contractors in accordance with applicable regulatory requirements and disposed at either local or regional approved facilities. During Project construction and pre-operational cleaning, some solvents and flushing materials may be used. Such materials will be provided by the construction contractor, and will be removed by the contractor for appropriate off-site management.

The Project will be a generator of hazardous waste, but not a hazardous waste treatment, storage and disposal facility under the meaning of 6 NYCRR 373, and thus will not require a RCRA permit. To fall below the RCRA threshold, Calpine will not exceed the quantities and/or timeframes allowed for satellite accumulation or temporary accumulation of hazardous waste. In addition, the Project will fulfill certain statutory and regulatory requirements as part of its hazardous waste management protocol, as outlined in Section 3.2.9. These measures support a finding that the Project will "control the disposal of any hazardous waste" pursuant to PSL §168.2(c)(vi).

If hazardous waste generation is above the "waste reduction plan" threshold of 25 tons per year (see ECL §27-0908), a waste reduction plan will be submitted to NYSDEC. If hazardous waste generation is below the threshold, waste reduction will only be documented in the Project's annual report to NYSDEC, and not as part of a regulatory document.

The use of treated effluent from the Middletown POTW will result in the generation of additional sludge from the clarifier. Based on 100 ppm of total suspended solids in the Middletown POTW effluent, a 30 ppm coagulent addition and 5 ppm clarifier discharge, the estimated range of sludge production is 250 to 450 lb/day. If the

clarifier is built within the Project site, Calpine will be responsible for managing this waste stream.

Calpine will test the material at a frequency required by the waste management contractor and contract for recycling and/or disposal at a licensed solid waste management facility. To show a worst-case scenario, all water treatment infrastructure has been shown on the site plan submitted in this Application as being on-site. However, Calpine and the City of Middletown may imminently come to an agreement whereby the physical location of the clarifier and certain other water treatment is on POTW property, and the clarifier sludge production will be only an increase in the existing sludge generation that occurs at the POTW site.

Q. What requirements will be applicable to the Project with regard to on-site storage and handling of hazardous materials?

A. On-site storage of hazardous materials is regulated by NYSDEC through the Hazardous Substances Bulk Storage Act (ECL §40). The relevant state regulations are found in 6 NYCRR 596 through 599. Petroleum storage regulations are in 6 NYCRR 612 through 614. New York requirements are described, and the hazardous material storage protocol is provided.

During the construction phase of the Project there will be potential requirements for on-site storage of various hazardous materials, waste lube oils, and other lubricants, in addition to the bulk storage of chemicals. During operations, a similar need will exist to store limited amounts of hazardous materials. The Project will not install underground storage tanks (USTs).

Q. What measures will be implemented with regard to chemical storage?

A. State-regulated chemicals include those stored in aboveground tanks of 185 gallons or more. A regulated facility must maintain a spill prevention report for preventing and responding to spills, releases and accidents at the facility. Calpine will use the required practices and technology described in Section 3.2.10.2, or, if requested and approved by NYSDEC during detailed design, equivalent technology.

Q. Please describe any petroleum storage that will take place.

A. The only fuel oil storage at the Project will be small aboveground tanks associated with emergency diesel equipment: a backup diesel fire pump (to be operated in case power from the grid to the firewater pumping system is not available during a firefighting event) and an emergency diesel generator (which is designed to operate only in order to ensure safe shutdown of the plant in case power from the grid is not available; and during testing). Petroleum fuel oil storage will include secondary containment in the form of 110% containment for both the emergency diesel generator and the fire pump storage tanks. Total on-site storage (not counting lubricating or insulating oil contained within machinery) will be less than the registration threshold of 1,100 gallons, but to provide for flexibility to also store lubricating oils, Calpine will register the facility pursuant to the bulk petroleum storage regulations. The regulations were promulgated pursuant to ECL §17-1009, and are found in 6 NYCRR 612 through 614. Key provisions of these statutes and regulations are as outlined in Section 3.2.10.3.

Q. Please describe the Project's spill prevention and control design.

A. Consistent with the state regulations, as well with federal regulations under the Oil Pollution Act of 1990, Calpine will implement a spill prevention, control, and countermeasures (SPCC) plan, which will consist of the following design and operational

components, describing each in greater detail. The SPCC Plan for the Project cannot be finalized until facility design is completed. For this reason, a sample SPCC Plan is provided in Appendix E, whereas Project-specific control descriptions are provided here.

Outdoor Chemical Storage Tanks. Spill prevention and control measures will include containment around the ammonia, acid and caustic tanks. The dikes will be sized to contain 110% of the volume of the tank. A normally closed and locked drain valve will prevent rainwater from being released without proper observation and testing, as necessary.

Boiler Chemicals. Curbed enclosures will be provided for boiler feedwater treatment chemicals and water pretreatment chemicals (including hypochlorite), which will be stored in their delivery containers.

Oil Reserves. Curbs will also be provided around the STG lube and hydraulic (EHC) oil mechanical package reservoirs to provide secondary containment.

Oil-Filled Transformers. Each oil-filled transformer will be in a sump, although some transformers may share a common excavation. The sumps will be connected via pipes located below the drain connection so that normally these pipes will be water filled to provide a seal to prevent an oil leak from one transformer migrating to a second sump. Rainwater that collects in the sumps will drain to a common corner sump with a normally closed and locked valve. The plant operator will be able to check the accumulated rainwater for oil contamination, and if the water is clean, open the valve to drain it to the storm water system. The sump will be sized to contain the total oil volume of the transformer(s) plus 10 minutes of fire deluge system operation.

Liquid Fuels/Chemicals. Spill containment control measures will also include

containment around liquid fuel tanks, fuel/oil transfer equipment, and chemical unloading areas.

Q. Will safety be taken into account in Project design?

A. Yes. The Project will be designed, constructed and operated to ensure maximum safety for employees and the surrounding community. Design, construction and operation of equipment for the proposed Project will be in accordance with applicable federal, state, and local regulations, and will comply with the latest regulations and standards of applicable governmental agencies and engineering associations. These organizations include the National Electrical Manufacturing Association, Department of Transportation, the American Society of Mechanical Engineers, the American National Standards Institute, and the National Fire Protection Association.

Q. Will any guidance be followed in designing fire protection for the Project?

A. Yes. NFPA 850, *Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Converter* Stations is a recommended practice that has become the standard for power plant design. Insurers will require that the Project complies with NFPA 850. Fire prevention and protection for the facility, including all drawings, calculations, and related system details, will be reviewed and must receive approval from the local Fire Marshall and Calpine's insurance representative.

Automatic and manual fire protection systems employing detection and extinguishing equipment will be provided at all locations having potential fire hazards due to the presence of combustible materials or where major property damage could result. Yard hydrants, interior fire hose stations (with 1-inch diameter hose), and portable extinguishers will provide additional incipient fire extinguishing capability and overall

protection throughout the plant site. The fire protection water supply will be from the filtered water storage tank via a centrifugal electric driven fire pump. A second fire pump will be diesel driven and also draw water from the fire/service water tank. The tank will be designed with a standpipe to reserve 240,000 gallons of fire protection water supply. The main underground fire header will serve strategically placed yard hydrants and supply water to fire sprinkler/spray systems for plant equipment and structures. Hose houses will not be installed around the yard since plant operating personnel will only be trained to extinguish incipient fires and local fire department personnel will only use their own hoses. Each fire pump will supply maximum water demand for any automatic sprinkler system plus water for fire hydrants and hose stations.

A jockey pump will maintain water pressure in the firewater distribution headers. During fire conditions, the primary (electric driven) fire pump will start automatically when pressure in the firewater distribution header drops below the predetermined set point. If the system header pressure drops below the second set point, or in the event of an electric power failure, the back-up full-flow diesel driven fire water pump will start. Once started, the diesel pump will continue to run until stopped manually. Discharge from the pump will be connected to the underground yard loop. The fire pumps will be installed in accordance with NFPA 20.

The firewater distribution system will incorporate sectionalizing valves so that a failure in any part of the system can be isolated while allowing the remainder of the system to function properly. Sectionalizing valves will be posted to indicate valve assembly (PIVA) type as manufactured by Mueller or an approved equal, and will not isolate more than 5 fire suppression supplies or hydrants. Curb box type valves will only

be permitted on hydrant supply line. Riser piping will be located outside of the area it is intended to protect.

The water supply for the permanent fire protection installation will be based on the largest fixed suppression system demand plus 500 gpm for hose stream demand for a 2-hour duration. Additional details as per NFPA 850, Chapter 4.

First aid kits, eyewash stations, and safety showers will be provided at appropriate Project locations. In addition, a personal protective equipment program will be implemented for employees, contractors and visitors to minimize occupational hazards.

Calpine will work with local and regional emergency service providers to ensure contingency plans are in place to respond to any emergency situation.

Q. What components would the fire protection system include?

A. At a minimum, the fire protection system will include components listed in Table 3-1 of their functional equivalent.

Q. Please describe the fire detection system.

A. The fire detection system is panel will be provided in the control room and will include the elements listed in Section 3.2.11.3.

Q. When is construction at the Project site expected to occur?

A. Construction at the Project site is expected to commence in 2002, with peak construction occurring in 2004. The peak construction work force on-site is estimated to be about 425 workers per day. The construction schedule is 24 months.

Q. Please describe the construction sequence.

A. The construction sequence proceeds in a series of overlapping phases. It begins with site preparation. This will include clearing, grubbing, and grading of the site and access road.

Site preparation also includes excavation of the storm water detention and infiltration basins, and formation of drainage swales if required. These tasks will be conducted early in the construction schedule. The offsite laydown areas to the south of Dolsontown Road and east of the Project footprint area will also be cleared and prepared.

As site preparation progresses, the delivery and installation of temporary buildings to house offices and worker lockers occurs. An on-site area will be set aside for temporary laydown and storage of facility materials and equipment. A gravel parking area will be constructed to serve workers and park construction vehicles when not in use. Temporary electric and phone utilities will be installed.

The next major step in the construction sequence will be excavation and compaction for foundations for the plant buildings, and excavation for and placement/backfilling of underground pipes and conduits. Excavated materials will be stored on-site and reused as fill and topsoil material in final grading to the extent possible.

Immediately following excavation, the building foundations will be formed, rebar and conduit will be installed, and concrete will be placed. At this juncture, approximately six months of the construction period will have elapsed. During this period, an intense level of site activity is anticipated. Since this could occur during summer months, dust from construction activities will be controlled by measures such as wetting of exposed soils on a regular basis and stabilizing storage piles by wetting and/or seeding. These measures will be implemented as standard practice for the construction effort.

Following site preparation and installation of foundations, erection of structural

steel will begin. Concurrently, major equipment – the CTs, steam turbine, generators and HRSGs – will be delivered and set in place. Field-erected tanks and vessels will be constructed. Then the labor-intensive process of installing a complex array of interconnecting piping, electrical and instrument wiring and ductwork will begin. This is when the peak labor force will be required.

As the erection of building walls, finish work and final connections of piping and wiring is nearing completion, the process of checking the electrical and control systems, starting up major equipment, cleaning pipelines, and testing all systems will begin.

The culmination of Project construction will be the firing and initial synchronization of the CTs and generators, followed by the production of steam, free blow of steam lines, and initial synchronization of the steam turbine. Finally, integrated combined-cycle operation will commence, and enter a rigorous test and shakedown period. The Project will then enter commercial service.

All Project financing will be through private capital.

Q. Please provide a general description of project operation.

A. The Project will be designed to operate continuously (24 hours per day, 7 days per week) to provide baseload power. The operational labor force will consist of approximately 25 full-time employees, with about half working the normal day shift. The remaining employees will perform shift work to maintain 24-hour operation.

Plant workers will be trained and qualified in accordance with industry standards and state requirements. Project personnel will be trained in the areas of environmental compliance, safety and emergency response. Calpine will also train local fire and police

in the layout and operation of the plant, including safety systems, to facilitate local emergency response.

Q. Please describe section 5 of the Application.

A. In accordance with the requirements of the Public Service Law, the Siting Board regulations, and Stipulation 13, this section presents a discussion of reasonable project alternatives that are being or have been considered. PSL §163.1(e) and 16 NYCRR 1000.4(c) 2(v). The Siting Board regulations elaborate on the alternatives evaluation. 16 NYCRR 1001.2. The Application needs to provide an alternatives analysis in "sufficient detail," so that the Siting Board can make its required findings. This analysis should account for the "objectives and capabilities" of Calpine. Also, the "range of alternatives must include the no-action alternative." 16 NYCRR 1001.2(c).

Q. Please discuss the "no action" alternative.

A. 16 NYCRR 1001.2(c) requires that the "no-action" alternative be considered, and furthermore that "[t]he no-action alternative discussion should evaluate the adverse or beneficial site changes that are likely to occur in the reasonably foreseeable future, in the absence of the proposed facility."

If the Project is not built, the site would be available for sale, as it was before Calpine obtained site control. The site is zoned light industrial/office/research (LOR), and is in the process of being rezoned to industrial/office/research/business (IORB). It could accommodate an industrial building covering up to 40% of the site, or a maximum of about 900,000 s.f. A building of several hundred thousand s.f., or some other industrial development, is very likely to occur on the site in the reasonably foreseeable future. The adverse or beneficial site changes that would occur under such development

could be of the same type as are proposed to occur with the Project, depending upon the specific proposal. Either way, the site would be put to a more productive economic use. There would be an impact from clearing vegetation and partial conversion to impervious surface; water use and wastewater disposal; solid waste generation, possible noise impacts, etc. There would also be traffic generation. Because of the characteristics of power plants, the Project's traffic generation is anticipated to be much less than that of a prospective industrial development on the Project site.

If the site is not developed at all, it will continue as either vacant or agricultural land; however, this scenario is unlikely given the site's existing/proposed zoning and proximity to existing industrial development and available infrastructure.

In summary, impacts to the site are likely to be reasonably similar under a no-action alternative to the impacts that would occur if the Project is built. The analysis of the no-action alternative therefore proceeds along energy policy and commercial lines.

From an energy policy and commercial perspective, Calpine believes that the "no action" alternative is not reasonable.

First, the no-action alternative assumes that the Project will not be constructed, while Calpine has stated that it believes the Project to be in the public interest. The market-driven aspects of the deregulated environment have provided Calpine with a commercial opportunity that will afford both it and local municipalities and districts a chance for economic benefit through sound and environmentally responsible development.

Second, the Project is consistent with the 1998 State Energy Plan initiatives for New York to encourage competition in the wholesale electricity market.

Third, the development of modern power production facilities have potentially positive air quality benefits including: 1) the purchase of NO_X offsets necessary under current air quality regulations increases the market demand for such offsets, which are generated by the shut-down or modernization of existing sources of NO_X emissions; and 2) the displacement of older, less efficient electric generation by modern, efficient units such as this Project. In short, the modernization of the power industry is beneficial from both an economic and environmental perspective.

Fourth, the no-action alternative would be in direct contradiction to the objectives of Calpine, which must also be considered. 16 NYCRR 1001.2(c).

The "no action" alternative would be inconsistent with the competitive market economics and environmental objectives of New York State. It is also inconsistent with the objectives of the New York State legislature, as embodied in Article X of the Public Service Law, and executive policy, as embodied in the State Energy Plan. Therefore, no-action is not considered to be a reasonable alternative.

Q. Please explain the basis for the selection of the power block.

A. Calpine's selection of General Electric as a vendor is based upon internal allocation of turbine units based on availability. Calpine has purchased approximately 200 "F-Class" turbines from General Electric and Siemens Westinghouse in order to support Calpine's stated objective to its shareholders to attain 70,000 MW of capacity by 2005. These turbines have defined delivery dates and the allocation of turbines to specific sites and projects depends on the probable construction schedules and commercial operation dates.

The Project schedule is such that Calpine has assigned two GE 7FB gas turbines. The 7FB is the next generation F-Class machine from GE, succeeding the 7FA model.

The GE 7FB represents an improvement in power and performance over the 7FA but is not a significant design change. Although there are currently no GE 7FBs in commercial operation, there are no reasons to believe that this model will be significantly different from the GE 7FA, which is operating at several existing Calpine facilities.

Commercial and technical benefits of the GE 7FB turbine package include:

- The GE 7FB is based upon a standardized plant design concept that offers construction and operational efficiencies.
- GE offers highly competitive turbine pricing and commercial terms.
- The GE 7FB-based combined-cycle plant can achieve very low emission levels, coupled with selective catalytic reduction (SCR) and an oxidation catalyst.
- The GE 7FB is very efficient; the heat rate will be about 40% below existing gas and oil-fired steam boilers that are expected to set marginal pricing for a majority of the time in this region.
- Beneficial heat rates and low emission rates are maintained even at part load operation.
- The GE 7FB offers flexibility in operation down to 50% of turbine output.

In summary, GE 7FB technology provides significant commercial and technical benefits to the Project.

Q. Please explain the basis for selection of the chosen emission control system.

A. Calpine has undertaken a detailed alternative emission control system analysis, which is detailed in Section 6.3. Proper combustion control and use of natural gas as the exclusive fuel will minimize emissions of all criteria pollutants. In addition, the plant will utilize an oxidation catalyst to control carbon monoxide (CO) and selective catalytic reduction

to control nitrogen oxides (NO_X).

Q. Was an assessment of reliability and feasibility of the preferred power source done?

A. Yes. 16 NYCRR 1001.1(b) and Stipulation 13, Clause 1, require an assessment, with supporting details, of the reliability and feasibility of the preferred source(s) of power. As part of the supporting details, reliability data for the power block is to be provided to the extent publicly available, and would include: capacity factor, availability, equivalent availability, forced outage rate, equivalent forced outage rate, and starting reliability. If the equipment does not have an operating history, estimates of operating reliability with the rationale are to be provided.

Because the Project will be a merchant plant, bidding into a competitive market, its expected capacity factor will be largely controlled by commercial considerations, and GE 7FA availability becomes a much better measure of the plant's quality of service. System production modeling presented in Section 1.2.5 predicts a 75% capacity factor in 2004. Combustion turbine based generation generally has demonstrated very high availability, very low forced outage rates, and very high starting reliability. Because combined-cycle systems are so intrinsically efficient, and the steam turbine system relatively modest in size, they generally do not have the lengthy and complex starting cycles associated with some very large, high efficiency baseload steam turbines.

The GE 7FB is the successor to the GE 7FA, which is in commercial operation at a number of power plants. Because the GE 7FB is very similar to the GE 7FA, operational data for the GE 7FA will be used to characterize the GE 7FB performance.

Based on 3 operating Calpine facilities equipped with GE7FA turbines, start reliability is in the high 90 percentile for the year, availability is in the mid 90 percentile

for the year, and the unplanned outage factor for the year is less than 4%.

Q. What type of production process was chosen for the Project, and what alternatives were considered?

A. The purpose of the Project is power generation using natural gas. Natural gas is preferred because it is the cleanest fossil fuel available today. Non-combustion alternative energy sources are not practical for the Project because of limited land availability and the need to produce large amounts of power that can respond to market conditions on a continuous basis. Alternative methods of natural gas power generation, other than the proposed combined cycle generation method, include conventional boilers or simple cycle peaking turbines. Conventional boilers are less efficient and have higher emissions per unit of electric energy produced than turbine-based generation either for baseload or peaking power production. Simple cycle turbines are not competitive with combined cycle plants for purposes of baseload or intermediate load generation, which is the anticipated duty of the Project, but can be part of a competitive portfolio because of their ability to start faster than a combined cycle project. Duct firing was considered for the project or its alternatives, but was rejected (alternative sizes discussion). Hence, no production processes other than combined cycle or peaking generation utilizing natural gas combustion turbines are reasonable alternatives. Given feasibility, combined cycle generation is preferable to simple cycle generation for reasons of economic competitiveness.

Q. What choices did Calpine make in regard to the size of the plant?

A. A two-unit plant is proposed. A two-unit plant at this site is viewed as garnering economies of scale not available to a one-unit plant while allowing the Project to minimize its effects on the existing infrastructure system.

Calpine's engineering and finance groups have determined that combined cycle projects must be of a certain minimum size to realize the required cost benefits and operational efficiencies. For F-Class turbines that minimum size consists of two combustion turbines and one steam turbine (two on one), producing a nominal electric output of 540 MW. The vast majority of Calpine's currently proposed combined cycle merchant power plants have this minimum size. Where possible, Calpine incorporates a configuration of three combustion turbines to one steam turbine configuration; however, Calpine decided that such a project would not be appropriate for the Wawayanda site.

In addition to basic size configurations, Calpine also incorporates supplemental firing into many of its projects. Supplemental firing involves installing burners (duct burners) into the heat recovery steam generator, thereby increasing the steam output of the facility and therefore the amount of electricity generated by the steam turbine. Depending on the number and size of the duct burners, the nominal output of a two-on-one facility could be increased from 540 MW to 760 MW. Supplemental firing significantly increases the cooling needs of a facility since the additional electric output derives from the steam system. For a wet-cooled project duct firing can increase the water requirements from about 3.5 million gallons per day (MGD) to over 6 MGD. For a dry-cooled project similar to that proposed for Wawayanda, duct firing would significantly increase the size of the air-cooled condenser. Calpine decided that a duct fired facility would not be appropriate for the Wawayanda site, primarily due to the space

considerations that would be necessary to significantly increase the size of the air-cooled condenser.

Q. Please describe Calpine's choices of timing and use.

A. Regarding timing, Calpine is proposing the Project in order to enter the competitive electric generation marketplace. Delay would only hinder this goal, and thus is not a reasonable alternative with respect to timing.

Regarding use, the Project is being designed as a combined cycle plant capable of baseload or intermediate duty. In the Preliminary Scoping Statement, the use of duct burners to achieve additional output from the steam turbine was proposed in order to provide for peaking capacity during periods of high electricity demand. However, for reasons described in Section 5.5.2, Calpine has decided against the use of duct firing for the Project.

Q. Are there any preferable alternative sites?

A. The Project site is the only site in New York over which Wawayanda Energy Center, LLC (Calpine) has any control. However, its corporate parent, Calpine Corporation, or other subsidiaries and affiliates of Calpine Corporation, have control over a number of other sites in New York State.

The Project site contains a number of features that make it ideal for hosting a combined-cycle power plant including those listed in Section 5.5.4.

Calpine controls three sites in downstate New York associated with operating facilities on Long Island at John F. Kennedy International Airport, Stony Brook, and Bethpage. Calpine evaluated the potential for these sites to host an electric generation facility and concluded that one of the sites had insufficient acreage available for any

plant, while two had sufficient room for a peaking plant. The Project requires at least 15 acres of available land. A one-unit plant (GE 7FB) requires approximately 10 acres. A small peaking plant (GE LM6000 at 45 MW) requires less than 1 acre.

The Calpine facility at John F. Kennedy International Airport consists of approximately 7 acres and is located within a major airport facility. The site lacks the requisite 15 acres to host the Project or 10 acres to host a single-unit combined-cycle plant. However, Calpine has determined that construction of additional peaking capacity at the site is feasible without repowering the existing facility. A 45 MW expansion project has in fact been announced and is under development. The site is already serving its function as an alternative to the Project to the maximum extent practicable.

The Calpine facility at Stony Brook consists of approximately 2 acres and is located within a college campus. The site cannot accommodate additional generation, whether it be peaking, single-unit combined cycle, or two-unit combined cycle. To construct a new peaking plant at the site, the present facility would need to be dismantled or repowered, or significantly altered, as there is no excess space. This is not possible given its continuing obligation to provide steam to the host university. Therefore, Calpine does not consider this a viable alternative site.

The Calpine facility at Bethpage consists of approximately 2.5 acres. It is feasible to install a 45 MW expansion project. The site cannot accommodate a single-unit combined cycle or two-unit combined cycle project. Therefore, Calpine did not investigate this option further.

There are no suitable alternate sites under Calpine's control, except those where maximum development is already taking place, and therefore it is concluded that no alternative is preferable for the Project.

Q. Please describe any alternative cooling technologies which were considered.

A. Two cooling technologies are potentially feasible for the Project: an air-cooled condenser (dry system), and a closed wet evaporative cooling tower system. Hybrid wet/dry cooling systems can also be proposed as a mitigation measure for evaporative cooling tower systems.

An air-cooled condenser (ACC) relies only on ambient air as a direct heat sink for the steam cycle. Steam from the steam turbine exhaust flows through a main steam duct to the air-cooled condenser. The condenser consists of a number of modules with finned tube bundles. Steam turbine exhaust is passed through these finned tubes while an air stream passes over the outer tube surface. The cooling air flow for each module is provided by a dedicated large-diameter fan. Condensate is collected in the condensate tank, and then pumped back to the HRSG feed water system.

A wet evaporative cooling system, also commonly known as a cooling tower system, would use the heat rejecting characteristic of evaporating water as the means to reject waste heat. It is a recirculating system designed to reuse water to the fullest extent feasible. Water, warmed by the steam condensing in the surface condenser, is conveyed to the cooling tower where it is sprayed and allowed to cascade down over a high efficiency fill that puts it in contact with ambient air being drawn up through the fill by the cooling tower fans. This contact promotes the evaporation that cools the circulating water. Cooled water returns from the tower and passes again through the steam surface

condensers. A constant supply of water is required in order to make up for cooling tower evaporation and blowdown losses.

Q. Which technology has Calpine chosen to pursue?

A. Air cooling.

Q. Please explain the difference in average water use for the two technologies.

A. Water use would be significantly higher with evaporative cooling towers, as shown in Table 5-1. The amount of water necessary would vary with the season (with peak demand in the summer), but the approximate average demand would be 3.6 million gallons per day (mgd) or approximately 150,000 gph. Of the daily average total, approximately 2.8 mgd would be evaporated for heat rejection, while the remaining 0.7 mgd would be cooling tower blowdown. Depending on water quality, the rate of blowdown can be reduced, but the evaporation requirements (consumptive water use) would not. On an annual basis, up to approximately 1,314 million gallons would be expected to be used for cooling. Air cooling therefore represents a 93% reduction in water use during baseline conditions.

Q. Is there a difference in cost and efficiency?

A. Yes. Because air-to-air heat transfer of an air-cooled condenser is less efficient than an air to water heat transfer of an evaporative cooling tower, the air-cooled condenser is considerably larger than a water-cooled condenser and thus quite a bit more expensive. Air-cooling also requires installation of more expensive equipment (i.e., wet surface air cooler) to provide cooling to miscellaneous other heat loads in the plant such as turbine lube oil systems and generators. An air-cooled condenser adds over $10 million to the capital cost of the Project.

There are two performance/efficiency impacts caused by air-cooling: higher Project auxiliary average day and a hot day for a facility similar to the Project.

In summary, dry cooling results in effectively about 14.5 MW of lost output on a hot day compared to wet cooling.

Q. What land requirements would the cooler have?

A. An analysis performed by Calpine indicated that a condenser for a facility similar in size to the Project would require about 0.5 acres for water cooling and about 1 acre for air cooling.

Q. Please describe the aesthetic considerations.

A. An air-cooled condenser is taller than an evaporative cooling tower. The Project's air-cooled condenser will be approximately 120 feet tall, while a cooling tower would be about half as tall. On the other hand, cooling towers release water vapor plumes the size and direction of which vary considerably depending upon atmospheric conditions. Such plumes can rise to well above stack height during cold, as well cool and humid, conditions. If sited such that they are not prominently visible to sensitive receptors, air cooled condensers can have very limited aesthetic impact. Evaporative cooling towers, on the other hand, are more difficult to site with as low a level of aesthetic impact, because of the vapor plume issue.

Q. What effect on icing and fogging will this technology have?

A. With wet cooling, conditions in the atmosphere can cause water vapor plumes to condense, resulting in ground-level fogging or icing. Hybrid cooling systems can reduce the frequency of this occurrence. Air cooling does not cause icing or fogging.

Q. How will this impact noise on the site?

A. Both evaporative cooling towers and air-cooled condensers can be designed to meet the Project's noise level design goal. However, it can be more costly to abate the noise from air-cooled condensers because of their larger size.

Q. Has the option of installing siding around the air-cooled condenser been considered?

A. Yes. Calpine has analyzed the option of installing additional siding or skirts around the air-cooled condenser with respect to noise, operations/economics, and aesthetic impact. The current design of the air-cooled condenser incorporates solid wall siding around the fan structures and steam piping. This siding covers about one-third of the vertical structures of the ACC, and all the moving parts. The lower portion of the ACC is typically left uncovered to efficiently allow for unimpeded flow of the air into the fans.

The current plan for reducing the visual impact of the metal latticework that makes up the air-cooled condenser's lower section is to paint the metal a neutral color and ensure that the metal is non-reflective, as further described in Section 16.6. In addition, Calpine has considered the placement of louvered siding as well as netting that allows partial air flow while making the side of the air-cooled condenser appear more uniform and obscuring views of metal latticework.

Q. Please describe the operational and economic analyses that were done.

A. Both louvers and netting have been considered. Vendor interviews were conducted to gauge the experience and operating penalties associated with the application of siding or netting on ACCs. According to one vendor, only 1% of ACCs have been installed with any kind of special aesthetic features and those have been limited to smaller 6-8 cell units for which the cost and effect are much less significant.

Adding louvers that from certain angles can block the view of metal latticework is

significantly more expensive from a capital cost standpoint, because the ACC would need to be much taller (approximately 160 feet instead of 120) in order to accommodate the air flow that would exist without the louvers. It is also possible that the number and size of the ACC cells would be increased to account for the reduced air flow. Alternatively, capital cost could be controlled by keeping the ACC size as proposed, but then severe operating penalties would result: louvers would reduce the inlet air flow by 40-50%.

Netting is typically only used as a wind control measure at desert sites where high velocity winds could adversely affect ACC fan operation. Adding netting that obstructs the metal latticework would be ineffective unless that netting were of sufficiently low porosity. Thus, netting presents a similar trade-off between a much larger ACC and severe operating penalties. Netting, by design, would be a lot more susceptible to the build-up of snow, leaves, and dirt or dust. As such, the performance of the equipment will decrease, causing the plant power generation capacity to decrease further. In addition, netting presents maintenance problems. As a cloth or thread-type material, it will be a lot more susceptible to damage due to weathering from sun, wind, and precipitation. It will therefore need to be replaced every 2-3 years. One vendor reports that manufacturers of netting will only warranty the lifetime of the material for 12 months because of the risk involved.

Q. Please describe the aesthetic considerations.

A. Louvers would be installed at an angle and spacing such that, when viewed from the ground, a uniform appearance to the ACC's lower section would result. The siding would be painted a color that is designed to match the plant color and/or be compatible with the surrounding environment. Netting would be attached to the structure of the

ACC, and could also be colored in a manner compatible the surrounding environment. On the basis of the more uniform appearance of louvers or netting, as opposed to the more industrial appearance of exposed metal latticework, the louvers or netting are considered to be no worse or better than the standard design. However, because the air-cooled condenser would be much greater in size, visual impacts would be much greater with louvers or netting. This is especially true because the air-cooled condenser is situated at the rear of the Project site, as further discussed in Section 5.7.2. With the addition of landscaping and berms, as described in Section 16, the visual impact of the ACC will be further reduced without enclosing.

Q. What measures are proposed to address noise?

A. To achieve MCNR C, the Project proposes using the lowest-noise ACC available from one vendor. The design uses large-diameter, slow-turning fans and low-noise gearboxes and drive motors. In addition, solid wall siding is erected around the fan structure and steam piping. The condenser proposed is balanced with respect to noise emissions and thermal performance. As such, any reduction in noise results in loss of thermal performance and any increase in thermal performance results in higher noise levels. So although adding louvers to the lower portion of the air-cooled condenser might reduce noise levels in one direction, the number of fans or fan speed per cell would need to be increased to provide similar thermal performance. As a result, noise for other directions would increase.

Q. What conclusions, then, would you draw regarding ACC siding or skirts?

A. Calpine's conclusions regarding air-cooled condenser siding are as follows:

- It would cause visual impacts to be greater, by forcing the ACC to be 40 feet

(33%) taller.

- It would not make the ACC quieter overall.
- It would introduce operational inefficiencies that would reduce net plant output and efficiency.

Calpine believes that the proposed low-noise ACC, coupled with aesthetic treatments including non-reflective finishing, solid wall siding, and landscaping, is the most efficient and least environmentally intrusive alternative.

Q. Was relocation of the air-cooled condenser analyzed?

A. Yes. Calpine has qualitatively analyzed relocation of the ACC with respect to noise, operations/economics, and aesthetic impact. It should be noted at the outset that the current site layout places the ACC as close as possible to the site's rear interior. This helps both to block view of the ACC, and places it at maximum distance from the nearest residences.

Potentially feasible locations for the ACC are only those outside of wetland areas. Locations in wetlands are not considered feasible because they would fail to meet a threshold requirement of the ASACE programs implementing Section 404 of the Clean Water Act – namely, that wetland impacts be avoided and minimized. Since the proposed design minimizes wetland impacts, only alternative locations that have equivalent or less wetland impact are viable alternatives.

Because this analysis is limited to the location within the site of the ACC, potentially feasible relocations must exclude relocations of the principal facility structures – the generation building, stacks, and switchyard. Thus, potential relocations are as follows:

- Relocation toward the east, switching locations with the water storage/treatment area.
- Relocation toward the north, switching locations with gas metering area
- Relocation toward the west, closer to the site boundary.

Q. What operational and economic effects does siting of the condenser have?

A. In the proposed layout, the air-cooled condenser is sited in a way that (a) minimizes the length of ductwork between the generation building and the ACC, and (b) permits access to all buildings and work areas without crossing this ductwork. Both are sound operational and maintenance principles in terms of cost, management, and safety, while allowing as compact a site layout as reasonably practicable. Locating the ACC further from the generation building lengthens the piping run and therefore decreases Project efficiency. Conversely, moving the ACC closer to the generation building decreases air flow, thereby also decreasing efficiency.

If the ACC is relocated to the east, switching places with the water treatment area, ductwork would not be greatly increased, but traffic access to the generation building and its adjoining warehouse/administration building would need to be from the northwest, at the opposite end of the generation building compared to the proposed layout. The change in traffic pattern would increase the distance and internal turning movements of delivery vehicles accessing the water treatment building and the warehouse. In terms of Project cost, no significant difference is expected.

If the ACC is relocated to the west, it would greatly increase the length of ductwork necessary – both because of the move westward and because of the likely move of the ACC to a higher terrain point so as to ensure air flow. In terms of land used within

the site, this alternative would bring about significantly higher impacts, requiring additional regrading, probably with the installation of retaining walls. This option would add to the Project cost because additional piping and site grading would be necessary. The additional piping would slightly decrease Project efficiency.

If the ACC is relocated to the north, ductwork would again be greatly increased. The gas metering would be relocated to the south. The site perimeter drive would need to be lengthened, so as to continue in its circumferential path around the facility. This option would add to the Project cost because additional piping and site grading would be necessary. The additional piping would slightly decrease Project efficiency.

Q. Please describe the aesthetic considerations.

A. If relocated toward the east, the ACC would be more visible as one approached the plant from the east along Dolsontown Road, and other vantage points of that direction. It would be marginally less visible as one approached from the west. The primary aesthetic advantage would be in the view directly from the south, wherein the ACC would be situated directly behind the generation building. No significant difference is expected in the view from the north.

If relocated toward the north, the ACC would be slightly more isolated (and thus more visible) from nearby east, south, and west vantage points, but would also be somewhat more distant (thus, reduced in scale). No significant difference is expected in the view from the north.

If relocated toward the west, the ACC would need to be elevated due to terrain to ensure air flow from all sides, and hence would be more prominently visible from all directions.

In conclusion, the alternative options carry similar or greater visual impacts.

Q. Please discuss noise considerations.

A. As shown in Table 5-3, the ACC is approximately 1,300 feet to 3,100 feet from the nearest residences to the Project site. Feasible changes in condenser relocation are not greater than approximately 300 feet. Assuming the condenser is shifted by this amount towards the east, west and north, the table provides the expected change in condenser noise levels for each receiver.

As shown, overall changes in receiver noise levels are approximately 2 dBA (not including shielding effects). The nearest western residence is the critical receptor in meeting MCNR C, and it will not be possible to achieve this rating if the air-cooled condenser is shifted west, due to a 2-decibel rise in receiver noise level. Similarly, it will not be possible to achieve MCNR C at the nearest southern residence if the tower is shifted east, since the air-cooled condenser will no longer by significantly shielded by the generation building.

Relocation towards the north would reduce condenser noise levels for the southern residence moderately; slightly increase levels for residences north of the Project site; and not result in any significant change in noise levels at eastern and western receivers.

Q. What conclusions do you then draw?

A. As shown in Table 5-4, Calpine selected the location of the ACC in order to maximize Project efficiency, reduce cost, and minimize visual and noise impacts. The three possible alternative locations compare less favorably than the proposed location as summarized. Relocating the air-cooled condenser offers no identifiable benefits. The

proposed ACC layout within the site reflects the optimal positioning of the ACC with respect to noise, operations/economics, and aesthetics.

Q. What creates a stack plume?

A. One of the primary byproducts of fossil fuel combustion is water vapor. During very cold days, when the air is unable to easily absorb water even at low relative humidity, the water vapor will condense shortly after breaching the stack, forming a visible emission similar in appearance to a cloud. A colder and relatively more humid atmosphere results in long dissipation time and thus a higher or longer water vapor plume.

Q. How does this affect the Project?

A. The proposed Project will be among the most efficient fossil fuel fired power plant in the United States. In order to maximize fuel efficiency, the waste heat from each combustion turbine is reclaimed in an HRSG, and additional power is generated in the steam turbine. By designing the HRSG with multiple steam loops and an economizer to preheat the boiler feed water, a substantial amount of energy can be recovered that would normally be wasted. The turbine exhaust gas at 1100 to 1200°F is reduced as it exits the HRSG, typically down to 200°F at 100% load (with temperatures as low as 180°F, generally occurring at 60% load). The design goal to optimize overall cycle efficiency is to extract as much heat from the exhaust gas as is possible, while ensuring that the temperature is above the sulfuric acid dew point. Since the Project will use only natural gas, the acid dew point is much lower than a comparable fuel oil fired facility.

There are generally two methods for heating the exhaust gas and thereby mitigating the formation of water vapor plumes – either degrading the performance of the HRSG to allow less steam to be created, or to heat the exhaust gas after its passes through

the HRSG. In both of these cases, more fuel (natural gas) will be required to maintain a high exhaust temperature. Mitigating the water vapor plumes will reduce Project efficiency, waste fuel, and increase air emissions per unit of electricity produced. Output not produced by the Project will be produced by the least efficient available unit in the marketplace, causing a secondary increase in air emissions. In addition, the Project will itself create greater emissions through combusting additional natural gas for plume heating.

Q. Was an evaluation of stack plume visibility done for the Project?

A. Yes. As described in Section 6.13, the Project was conservatively assessed to determine the possibility for visible water vapor plumes. The analysis concludes that the exhaust from the combustion turbines may result in a visible plume, but only during the colder months. The plumes will most likely occur during the morning hours (around dawn), and will be light and wispy in character, and are not expected to be visually intrusive. Section 16.5 contains an analysis of plume visibility impacts on annual basis. The analysis tailors the analysis to the requirements of Stipulation 13, Clause 4 (relating to plume mitigation), as well as Stipulation 11, Clause 4 (relating to plume visibility photographic renderings).

The analysis required in Stipulation 13, Clause 4 calls for a reevaluation of water vapor plume frequency and extent "under worst case and average temperature and climate conditions for when stack plume would be visible." Stipulation 11, Clause 4 requires a photographic rendering "representative of average January daytime temperature and humidity conditions." Because the data sets from Stewart and Orange County airports did not include wet bulb temperature, an alternate conservative database was used – LaGuardia Airport, which is adjacent to Long Island Sound and its more

humid maritime influences. As specified in the stipulations, the month of January was analyzed because it is the likeliest month during which water vapor plumes would be visible. A combustion turbine load of 100% was modeled, indicative of typical winter operating conditions.

During average January daytime conditions, no plume would appear. The average temperature and climate condition in January during which a plume would appear is 16°F with 70% relative humidity (an 8°F dewpoint). During this average condition, visible water vapor is predicted to rise up to about 100 m above ground (330 feet above ground or a 110-foot plume rise) and to dissipate about 125 m (410 feet) downwind. The worst-case temperature and climate condition is 19°F with 96% relative humidity (a 18°F dewpoint). During this worst-case condition, the water vapor plume is predicted to rise up to about 400 m above ground (1,300 feet above ground or an 1,100-foot plume rise) and to dissipate about 50 m (150 feet) downwind. It should be noted, however, that such "worst-case" weather conditions are likely to occur shortly before or after a winter precipitation event, when cloud cover is thick and the plume has little visual contrast with the sky.

The modeling was then repeated for several exhaust temperatures presented in Table 5-5. The modeling shows that a hotter exhaust temperature would lead to fewer hours with visible water vapor plumes. However, the height and length of the remaining plumes would increase. Calculations of efficiency losses at each temperature were also made, and are presented in Table 5-5 relative to plant output. Work papers supporting these calculations are presented in Appendix U. In order to evaluate the relative costs associated with mitigating the water vapor plumes, the incremental loss in MW was

calculated from the base case by reducing the heat recovery in the low-pressure economizer section of the HRSG. Table 5-7 presents the incremental power losses relative to heat of the exhaust flow. Figure 5-1 illustrates power output losses and heat rate increases (efficiency losses) indexed to output for ease of comparison.

Q. What conclusions would you draw from the modeling?

A. There will be minimal capital cost associated with the plume reduction program but significant wasted energy – enough to heat between 200 and 650 homes in the wintertime, depending upon which mitigation option is used. Based on the far right column in Table 5-5, for every individual hour that a water vapor plume is eliminated in January through bypassing the economics, approximately 5 to 8 homes could be heated for the month. Alternatively, if the Project conducted full heat recovery and then reheated the exhaust flow, incremental air emissions would result. Based on the applicable AP-42 emission factors for small gas heaters and the heat inputs required to achieve each exhaust temperature downstream of the HRSG, additional incremental emissions were calculated for NO_X and PM_{10}, as shown in Table 5-6. Based on this calculation, for every individual hour that a stack visible plume is eliminated in January due to reheating, between 20 and 40 pounds of NO_X and between 30 and 60 pounds of PM-10 would be emitted, depending upon the exhaust temperature chosen. This results in substantial air emission increases, as shown in Table 5-6.

In addition to those impacts that are directly quantifiable as a result of plume reduction, there are also two additional impacts. First, to the extent that more expensive generating units are called on to replace the power that the Project would have produced, there will also be costs incurred by consumers of electricity in New York when wholesale

market prices increase due to the in-availability of Calpine's incremental generation. Second, at those times when the generating unit called upon to replace generation that would have been produced by the Project is fueled by residual fuel oil or coal, emissions of NO_X and SO_2 will increase when compared to the Project's extremely low emission rates.

The calculations and modeling presented in Table 5-5 indicate that a reduction in the frequency and size of visible water vapor plumes is possible through reduced heat recovery. However, as shown in Table 5-6, this would be a permanent waste of energy or cause greater air emissions, balanced against a rare and temporary visual effect. There is no public health or safety-related reason to reduce water vapor plume formation (such as may be the case with plume abatement for cooling towers to prevent ground-level fogging or icing), while there are sound public policy reasons – energy efficiency and air pollution control – not to install such mitigation. It should be remembered that water vapor plumes are a phenomenon caused simply by the chemistry of combustion, which releases water into the atmosphere, and atmospheric conditions in winter. Based on this evaluation, mitigation for water vapor plumes is not warranted.

Q. Please describe the study of alternative interconnection possibilities.

A. As shown in Figure 5-2, the proposed Project is within 1,500 feet of the existing Coopers Corners to Rock Tavern right-of-way (the Marcy South corridor), and the existing Middletown Substation to Shoemaker Substation right-of-way (the Middletown Tap). Marcy South is owned and operated by the New York Power Authority (NYPA), and the Middletown Tap by Orange & Rockland Utilities (O&R), a unit of Consolidated Edison. Marcy South is south and east of the Project site. It consists of Line 34 and Line 42 –

345 kV transmission lines within a common 265-foot-wide right-of-way. The Middletown Tap right-of-way, which is east of the proposed Project, is 230 feet wide and contains a newly installed double circuit 138 kV transmission line and a 69 kV transmission line. The Project's interconnection to the NYPA system, rather than the O&R system, is based on the carrying capacity of the Marcy South lines. The Project's interconnection with the NYPA system has been approved by the New York Independent System Operator (NYISO).

The approved interconnection study defined certain reliability-based parameters for which there are no alternatives – first, that the interconnection must be made to Line 42; second, that it must be at 345 kV; and third, that the interconnection must include two electrically independent circuits from the interconnection point to the proposed Project, commonly known as a loop. This last requirement also precluded a loop configuration that uses one structure to carry both circuits of the loop. The interconnection study is summarized in Section 8 and presented in full as Appendix W.

To ensure that the alternatives study be as broad as reasonably possible, several types of *technology* alternatives were evaluated. These technology alternatives are described in Section 5.9.2.

Then, in compliance with the stipulation, certain *geographic* alternatives were identified. The routing alternatives are described in Section 5.9.3.

Q. What types of overhead lines have been considered for use?

A. There are two types of commonly found 345 kV overhead systems: single circuit structures and double circuit structures. Double-circuit structures to the Project site are not permitted per New York State Reliability Council (NYSRC) criteria, but can

potentially be permitted if the less stringent Northeast Power Coordinating Council (NPCC) standard were applied, whereby up to five double-circuit transmission poles could, by petition, be allowed. For the analysis to be as broad as reasonably possible, double-circuit structures have therefore been considered.

The two types of structures are shown in Figure 5-3. Each single circuit structure consists of two self-supporting steel poles in an H-Frame configuration, supported on concrete caisson foundations. The three phases are arranged in a horizontal configuration to minimize overall height. There are two conductors per phase, and two overhead shield wires at the top of the structure to provide lightning protection. Typical structure height is up to 100 feet, and typical right-of-way width is 250 feet. A double circuit structure consists of a single-shaft steel pole on a concrete caisson foundation. The 345 kV circuits are arranged in a vertical configuration, with one circuit on each side of the structure to minimize right-of-way width. The steel poles are either galvanized, painted, or fabricated of weathering steel to provide corrosion protection. Typical structure height is up to 150 feet, and typical right-of-way width is 150 feet.

Q. Please describe underground cable systems.

A. Two 345 kV underground systems could be applied: high-pressure fluid filled (HPFF) cables and cross-linked polyethylene (XLPE) solid dielectric cables. HPFF cables were considered because they have been used extensively at 345 kV. However, there are environmental considerations, because the cables would be surrounded by oil. There are no 345 kV XLPE cables installed in the United States; they are normally manufactured and installed in Europe. Cross-sections of the two underground configurations are shown in Figure 5-4.

Each HPFF cable circuit consists of three single-phase insulated cables placed inside an 8 to 10 inch diameter mild steel pipe, filled with dielectric oil at a pressure of 200 psi, and buried approximately 4 to 5 feet below grade. The outside of the pipe is coated for corrosion protection and supplemented with cathodic protection. For the Project, a single circuit HPFF pipe (with 3 cables) is insufficient to carry the electrical load, and therefore 3 such pipes (9 cables in all) would be required for each circuit. Thus, 6 pipes (18 cables) would be required in all. As shown in Figure 5-4, the multiple pipes are arranged in a horizontal configuration, separated by 5 feet. A 70-foot-wide right-of-way is required.

Each XLPE cable circuit consists of three single-phase dielectric cables, approximately 5 to 6 inches in diameter. The cables are insulated with cross-linked polyethylene, and covered with a copper sheath and an outer jacket of polyethylene. The cables are arranged in a horizontal configuration, separated by approximately 2 feet from each other, and buried approximately 4 to 5 feet below grade. For mechanical protection and thermal reasons the cables are backfilled with approximately 2 to 3 feet of weak mix concrete. For the Project, 3 XLPE cables (one circuit) are insufficient to carry the electrical load, and therefore 9 cables would be required for each circuit. Thus, 18 cables would be required in all, within a 100-foot-wide right-of-way.

Q. What is required for the operation of these underground cables?

A. To operate 345 kV underground cables, transition stations are necessary at both terminals of the interconnection. A transition station occupies a 70-foot by 100-foot pad, containing cable terminations and associated support structures, disconnect switches, lightning arresters and trifurcating assemblies. For the HPFF configuration, it also

contains an oil pumping plant. Each transition station requires a buried ground mat and a permanent gravel access road for maintenance. In addition to the transition stations, underground manholes are required at cable splice locations.

Q. Please compare overhead and underground cables.

A. The following comparisons of overhead and underground cables can be drawn:

- Overhead systems are more visible than underground systems.
- The underground cable in service in the US (HPFF) requires oil pumping.
- Overhead transmission is much less expensive and less time-consuming to build, and also less expensive to maintain.
- Underground cables require extensive trenching along the right-of-way while overhead cables only require isolated disturbance near the pole sites.
- In terms of electric and magnetic fields (EMF), the following can be said generally. Electric fields are blocked with underground cables, whereas electric fields from aboveground cables would be below applicable state guidelines. Magnetic fields are generally comparable between HPFF cables and overhead wires at the right-of-way edge, depending upon the specific design and given the narrower width of underground rights-of-way. Direct-buried cables (such as XPLE technology) exhibit EMF levels up to approximately 100 times as high at the right-of-way center line as HPFF cables. EMF policy standards in New York are applied at right-of-way edge, and these can be met under either configuration.
- Both require a permanent right-of-way kept clear of large trees.

Based on these facts, Calpine concluded that an overhead cable system was the most appropriate for the Project.

Q. What are the comparative advantages of single-circuit and double circuit lines?

A. Single-circuit lines have a significant reliability advantage because a contingency event that takes one circuit out of service sill permits power to flow on the other circuit. As reported in Section 8.3.3.2, a contingency event under a single-circuit configuration would only reduce the Project's ability to transmit power toward the demand load by 7%, versus 100% with a double-circuit structure. For this reasons, NYSRC do not permit double-circuit structures, although the less stringent NPCC criteria permit up to five, by petition.

In terms of cost and schedule, neither type of structure carries significant advantages over the other.

In terms of electric and magnetic fields (EMF), no generic conclusion can be drawn because designing to minimize EMFs is highly specific to a particular circuit. However, EMF policy standards in New York are applied at right-of-way edge, and these can be met under either configuration.

In terms of ecological and wetland impacts, single-circuit lines require wider rights-of-way clearance, which can lead to a greater area where a vegetation type is converted from woods to maintained grass/shrub. Direct wetland impacts can generally be avoided by placing foundations outside wetlands.

Finally, in terms of visual impact, there exists a trade-off between the lower elevation and somewhat more familiar appearance of H-frame single-circuit structures, and the double-circuit structures' narrower right-of-way and fewer poles. Single-circuit structures are typically up to 100 feet tall, whereas double structures are up to 150 feet tall. However, double-circuit corridor right-of-way width is only 150 feet, whereas

single-circuit corridor width would be 250 feet. At road crossings, where visibility of the transmission lines is greatest, the same number of conductors spans the roadway under both configurations. Under a double-circuit design, these conductors are spaced closer together, whereas under a single-circuit design, they are spaced more evenly.

Both single circuit and double circuit systems were evaluated further for each of the candidate interconnect routes in Sections 5.9.3 and 5.9.4.

Q. Please describe any alternative interconnection points.

A. As shown in Figure 5-5, most of the transmission structures along Line #42 near the Project site aligned, without a change in direction. There are also two angle points, labeled Angle Point A and Angle Point B. These two angle points have significant advantages of all other points in reasonable proximity for interconnecting the Project because:

- Only these two angle points presently have steel pole structures. For reliability reasons, the interconnection with Marcy South should use steel pole structures. Thus, only an interconnection at one of these points would avoid the need to replace existing structures on the Marcy South line itself.
- Only these two angle points have strain insulators. Only strain insulators can easily accommodate angles in the line. Suspension insulators cannot. Therefore, strain insulators are also better equipped to handle a redirection of the angle.
- Interconnecting at these two angle points minimizes outage time. Both angle points have jumper loops, removal of which more easily accommodates an outage. Without jumper loops, additional steps to open the line would need to be taken in order to comply with safety and reliability standards. Also, the structures

at the angle points are taller than the structures in between the angle points, which more easily permits interconnection and thus minimizes outage time.

The two angle points do not have a significant advantage or disadvantage in terms of ecological and wetland impacts. Both are located immediately adjacent to the Monhagen Brook, and some wetland impacts are therefore unavoidable at both. However, wetland impacts would also be unavoidable at three of the five non-angle transmission poles that are located between the two angle points, and likely at the two others.

On the basis of the foregoing analysis, routes were analyzed toward Angle Points A and B.

Q. Please describe these alternative routes.

A. Three alternative routes were selected between the interconnection points and the proposed Project. They are shown in Figure 5-5, labeled as Alternative Route A (to Angle Point A), Alternative Route B (to Angle Point B), and Alternative Route C (also to Angle Point B). Alternative Route A was selected because it represents the shortest distance to the proposed Project. Alternative Route B was selected because it parallels an existing utility right-of-way. Alternative Route C was selected because it parallels an abandoned railroad ROW. Alternative routes B and C were also required for study pursuant to Stipulation 13, Clause 5.

Alternative Route A begins at Angle Point A and crosses approximately 100 feet of wetland. Route A traverses mostly grassland, a small wetland, and crosses Dolsontown Road. The route is approximately 1,800 feet to the switchyard for the proposed Project.

Alternative Route B begins at Angle Point B, east of McVeigh Road and north of

the Monhagen Brook. It proceeds toward the northeast for approximately 200 feet toward the existing Middletown Tap right-of-way. The route parallels the Middletown Tap for approximately 3,500 feet, then turns south to the Project switchyard. Route B traverses open areas, crosses Dolsontown Road, a wetland, and residential buildings in close proximity to the Middletown Tap. Removal of two residences within the Route B right-of-way would be necessary.

Alternative Route C begins at Angle Point B, east of McVeigh Road and north of the Monhagen Brook. It proceeds southwest for approximately 200 feet to the old Erie & Lackawanna Railroad bed. The route follows within the former railroad right-of-way for approximately 3,300 feet, then turns south to the Project switchyard. This route traverses wooded areas, crosses Dolsontown Road where the road bridges the old railroad bed, crosses wetlands, and may require the removal of one residence because it is partially located within the Route C right-of-way.

Q. Please compare these alternative routes.

A. Detailed environmental and technical comparison is presented in Section 5.9.4, with supporting data in Appendix U. However, it can qualitatively be said that Route A is superior to Routes B and C for several environmental and technical reasons. Figure 5-5 accompanies this comparison.

Routes B and C are more than twice as long as Route A. Thus, Route A has a significant advantage in terms of reliability. Route A is also less expensive to build and operate. With respect to EMF, all routes would be designed to meet the Public Service Commission's policy standards.

From a land use perspective, routes that are co-located with existing corridors are

generally held to be advantageous. Despite this, Routes B and C are not more compatible than Route A because both routes would require the displacement of residences or businesses, whereas Route A would not. The open space within the Project's southern construction laydown area permits Route A to be designed in a way that avoids other land uses to the maximum extent possible. Route B must displace two existing active land uses, and Route C would likely displace one, a residence. If relocated not to displace that residence, Route C would occupy significant portions of two private residential properties, one to the east and one to the west of the railroad bed. In addition, Routes B and C would clear swaths of forested area, removing trees that provide shade and visual screening for residential land uses adjacent to them. Route C would likely preclude the reuse of the railroad bed as a recreational or transportation corridor.

From an ecological and wetlands perspective, Route A is preferred because it results in only approximately 1.3 (double circuit) to 1.4 (single circuit) acres of tree clearing, and permits most of the present cover type to remain. The loss of wetlands is minimal – 0.002 acres, with approximately 300 linear feet of wetlands spanned. Routes B, on the other hand, would require the conversion of 2.3 to 4.1 acres of forested area into grass/shrub lands. Routes C would require the conversion of 3.8 to 11.4 acres of forested area into grass/shrub lands. Loss of wetlands for Route B would span about 900 linear feet of wetlands. Route C – 100 to 500 feet, with the latter being far more likely because double-circuit towers do not meet NYSRC criteria.

From a visual perspective, Route A is also preferred. The primary visibility of Route A will be along Dolstontown Road, where the conductors would cross, and from Dolsontown Road toward the Marcy South lines. The berm on the south side of the

Project site will mitigate views along the northern section of the electric interconnection. Under Route A, the visibility of the electrical interconnection would be closely associated with the plant itself. The Project's visual resources study identified no viewpoints from which the Route A interconnection would be visible while the plant would not. Routes B and C, on the other hand, would create a largely separate visual impact for the transmission line crossing Dolsontown Road. Furthermore, single-circuit transmission pole heights would be about 20 feet *higher* on Route B and C due to greater variation in terrain. Figure 5-6 contains a photographic rendering showing visibility of Routes B and C from the east. Both Route B and Route C would open up a new visual corridor visible from McVeigh Road at Dolsontown Road toward the northwest. Both would also be prominently visible along McVeigh Road south of Dolsontown Road. In addition, Route C would eliminate vegetation the presently visually separates the area west of the railroad and the area east of the railroad. Thus, by following Route C, the Project's own visibility would be increased.

Q. Based on all of the considered options, what conclusions do you draw?

A. On the basis of all alternative options, 11 possible configurations of cabling and routing identified: two overhead and two underground options along Route A; a hybrid overhead/underground option along Route A; and two overhead and one underground option each along Routes B and C. Routes B and C can only accommodate one underground option instead of two because of space constraints at Angle Point A, which does not permit an oil pumping station at that location necessary for the HPFF lines. Table 5-7 presents the detailed comparison. Supporting data for this comparison are in Appendix U.

This alternatives evaluation leads to the following conclusions regarding the 11 configurations studied:

- Each specific overhead configuration is preferable to any underground routes as discussed in Section 5.9.2.4.
- Double-circuit options are preferable at Routes B and C because they reduce ecological, land use and visual impacts; however, double-circuit poles are not allowed under New York State Reliability Council (NYSRC) reliability criteria. For example, Route C with single-circuit towers would open unscreened views of the Project from Dolsontown Road east of the railroad, whereas a double-circuit tower, while more prominent, would only result in a thinning of vegetation.
- A single-circuit option is preferable at Route A. Because of the relative proximity of the Project switchyard to Dolsontown Road, conductors spanning Dolsontown Road at Route A would resemble a single-circuit configuration in terms of the overall corridor width, thereby eliminating an advantage of double-circuit structures. In addition, single-circuit structures at Route A would be visually more consistent with the already-visible Marcy South lines, which are also single-circuit. The additional right-of-way area covered by the single-circuit corridor is minimal due to the brevity of the line. The single-circuit towers would also be shorter than the double-circuit towers by at least 20 feet and as much as 50 feet.
- Route A overhead (labeled as Configuration A-1 in Table 5-7 and Appendix U) is preferable to Route B or C overhead (Configurations B-2 and C-2), respectively.

A single-circuit overhead corridor along Route A is the preferred alternative considering visual, EMF, terrestrial ecology/wetlands, land use, and system reliability impacts. Hence, it is the proposed electrical interconnection for the Project.

Q. Please describe Section 18 of the Application.

A. This section addresses Stipulation 15, relating to an analysis of cumulative impacts with the Torne Valley Station and Ramapo Energy Project, both located in western Rockland County. Clause 1 of this stipulation requires the application to perform cumulative analyses for all studies except air quality and system production modeling, which accounted for these two facilities under separate protocols outlined in Stipulations 1 and 14, respectively. Torne Valley Station's Article X application was filed under docket no. 98-F-1885. Ramapo Energy Project's application was filed under docket no. 98-F-1968. Torne Valley has not been deemed compliant with the administrative completeness requirements of Article X. Ramapo Energy received its compliance determination in January 2001. In the following analysis, they are referred to individually as "Torne Valley" and "Ramapo Energy," and together as "the Ramapo stations."

In order to complete a study of the cumulative associated multiple facility impacts of the proposed Project, the proximity of Torne Valley Station and the Ramapo Energy Project must be related to the Project site. Both the Torne Valley Station and Ramapo Energy sites are located in Ramapo, New York, just to the east of Interstate 87. Ramapo is located approximately 22 miles to the southeast of the Project in the Hudson Highlands that contain steep valleys and high hills. It should be noted that all of the analysis related to the Ramapo stations is based on information provided in the Article X applications for those projects, consistent with Stipulation 15.

Q. Was a survey of cultural resources that might be impacted by the Project done?

A. Yes. Stipulation 2, Clauses 1-3, requires a Phase 1A and 1B survey of archaeological resources. As documented in Section 7, the Project is expected to have no impacts on archaeological resources. The distance between the Project and the Ramapo stations precludes the possibility of contiguous archaeological resources. No associated multiple facility impacts are expected on the Project as far as archaeological findings.

Stipulation 2, Clause 4 requires the identification of sites listed or eligible for listing on the State or National Register of Historic Places within the Project viewshed and within a 5-mile radius study area. The Project's impacts on such properties are documented in Section 7 and 16. Because of the distance between the Project and the Ramapo stations, the outer radius of either 5-mile study area boundary would be about 12 miles apart. No potentially eligible historical structure would coincide. Thus, combined multiple facility impacts would be no greater than individual facility impacts.

Q. Was a study of the electrical system done?

A. Yes. Stipulation 3 requires a thorough study of the electrical system to insure the safety and system reliability of the Project's interconnection. These studies follow a system whereby proposed generators must take not only existing generators but also other proposed generators into account. As reported in Section 8 of this Application, the NYPA System Reliability Impact Study determined that the Project will not have a significant adverse impact on the bulk power system. This study accounted for over 3,900 MW of new generation in the Ramapo area, including Ramapo Energy and Torne Valley Station. Hence, in each of the studies required by Stipulation 3 and by Calpine's NYISO Interconnection Study scope – thermal constraints, power transfer limits, voltage,

normal and extreme electrical contingencies, short-circuit analysis, system stability analysis – the Ramapo stations were included. Thus, the cumulative study requirements for these projects have been satisfied.

Stipulation 3 also requires a study of electric and magnetic fields along the interconnection. All three projects are required to comply with the PSC guidelines on electric and magnetic fields at the right-of-way boundary. Since the interconnections for the Project and the Ramapo stations are quite distant, cumulative analysis would lead to conclusions that are no different from the individual studies that have been undertaken.

Q. Was a study of natural gas systems done?

A. Yes. Stipulation 4 relates to the study of natural gas system capacity as well as the environmental study of the natural gas pipeline to the Project site.

With respect to the Ramapo stations, they are proposed to draw natural gas from the Alongquin system, which is proximate to their proposed sites. The Project, on the other hand, does not propose an interconnection with Algonquin. Rather, Tennessee Gas Pipeline is expected to transport fuel on a firm basis to the Project site, with a combination of firm and interruptible services upstream of Tennessee. Thus, Tennessee Gas is sizing its pipeline to supply gas to the Project without compromising any of its other gas transportation obligations.

As a question of gas supply, the Project and the Ramapo stations would together consume a theoretical peak day volume of 409,000 dekatherms (Dth), on the basis of Section 9 of this Application and the cumulative analyses presented in the applications of the Ramapo stations (94,000 Dth for the Project, 190,000 Dth for Ramapo Energy and 125,000 Dth for Torne Valley Station). As documented in Section 9.4 of this

Application, gas supply in North America and gas transportation on major pipelines in the Northeast is expected to be sufficient for the overall market demand. The Project and the Ramapo stations do not alter, but rather fulfill, regional market projections.

Finally, with respect to the environmental impacts of proposed natural gas pipeline interconnection facilities, the Project and the Ramapo stations propose substantially different projects at different locations. The Ramapo stations would be served by a pipeline interconnection within the Town of Ramapo. The gas pipeline to the Project will be built miles away, in New Jersey and in Orange County.

Q. What type of analyses of land use are required for the project?

A. Stipulation 5 addresses land uses and local laws. In particular, Clauses 1(a) through 1(e) require a study of the land uses in the vicinity of the Project. The land uses are to be within a 2-mile radius of the Project site and include existing zoning districts, Agricultural Districts, Wild, Scenic and Recreation Corridors, flood-prone areas, critical environmental areas, watershed protection districts, public fire, school, and sewer and water districts. Due to the 22-mile distance between the Ramapo stations and the Project, impacts to land uses by both the Project and one or both Ramapo stations are not expected. Furthermore, no direct combined cumulative impacts are expected with respect to noise, traffic, and visibility, including visibility from recreational areas.

Stipulation 5, Clause 2 requires a description of the availability of financial resources for restoration of any disturbed areas of the Project if there is an episode of abandonment or decommissioning. Because the Ramapo stations are distant from the Project and being developed by Calpine's competing independent power producers, site decommissioning and restoration arrangements would be completely separate, thus

avoiding any cumulative impacts.

Stipulation 5, Clause 3 calls for a summary of the Phase I Environmental Site Assessment (ESA) for the Project. Because ESAs are site-specific, and given the distance between the Project and the Ramapo stations, no cumulative impacts from any recognized environmental conditions are expected. It should furthermore be noted that the Project site has no recognized environmental conditions.

Stipulation 5, Clause 4 requires analysis of the recreational land uses in the vicinity of the site, and Project impacts on these. These are described in Section 10. Due to the fact that the Ramapo stations are 22 miles away from the Project site, the Ramapo stations will not be visible or within hearing distance of any recreational land areas surrounding the Project. In addition, the interconnections will only be used by the Project itself. Therefore, the Project will not contribute to any multiple facility impacts with respect to recreational land uses.

Stipulation 5, Clauses 5 and 6 require compliance with land uses and local laws. For the Project, the applicable local laws are from the codes of the Town of Wawayanda, the City of Middletown, and Orange County. For the Ramapo stations, the applicable local laws are from the codes of the Town of Ramapo and Rockland County. Subsequently, the local laws, permits, certificates, and other conditions will be different and precedent related to either of the Ramapo stations will not affect the Project, or vice versa. Local law cumulative impacts are therefore not anticipated.

Q. Has any analysis of noise impacts been done?

A. Yes. Stipulation 6 relates to a study of the noise impacts of the construction and operation of the Project. Clauses 1-5 require evaluation of "noise-producing

construction activities" at the closest identified receptor locations. Clauses 6-10 require evaluation of sound levels at the nearest receptors due to the Project. Hence, a similar approach was used with the Ramapo stations.

Sound power levels for the Ramapo stations were developed based on noise levels provided in the Article X applications for each station. Sound power levels were adjusted using only hemispherical divergence and atmospheric absorption, to conservatively estimate the contribution of noise at the nearest sensitive areas surrounding the Project. Since the Ramapo stations are located approximately 22 miles from the Project, the contribution of noise from the former facilities is predicted to be less than 10 dBA, and therefore imperceptible. An analysis of construction noise produced similar results.

Q. Was any analysis of socioeconomic impacts done?

A. Yes. Stipulation 7 requires Calpine to study the Project's economic impacts, its job requirements and the availability of qualified local labor, incremental costs to taxpayer or ratepayer funded organizations and districts, and coordination with respect to safety and emergency planning.

The total number of estimated jobs created during construction of the Project is 509, and the peak level over the 24-month construction period is 425. Secondary impacts associated with the Project will have a positive economic impact in Orange County, but due to the Project's central location in that county, and the county's industrialized nature, no additional impact specific to other counties has been identified. The total number of estimated jobs created during construction of the Torne Valley Station is 549, and the peak level over the 28-month construction period is 329. Secondary impacts associated with the Project will have a positive economic impact on the study area, which includes a

seven-county area in New York and New Jersey. The total number of estimated jobs created during construction of the Ramapo Energy Project is 1025, and the peak level over the 28-month construction period is 836. Secondary impacts associated with the Project will have a positive economic impact on the study area, which includes the Mid-Hudson region (seven counties). Cumulatively, over 2,000 temporary jobs would be created. Additional economic data are included in Table 18-1. It should be noted that differences in methodologies, study areas, and cost estimates make the cumulative socioeconomic impact analysis approximate, but nonetheless indicative in terms of order of magnitude.

From Table 18-1, it can be estimated that total construction workforce for the three projects, if built simultaneously, would constitute on the order of 2-4% of the construction work force in the region. Any shortfalls in individual trades would be caused by simultaneous peak demands and would be only temporary in nature. Because all counties in the study areas of the three projects are heavily developed and industrialized, with a mix of available labor, it is expected that all work would be performed by individuals coming within commuting distance. Some relocation of management personnel is also assumed for all projects. As demonstrated in Section 12 for the Project, these relocations will have minimal effect on local expenditures. Furthermore, no municipal, public utility, school, fire, solid waste, water, wastewater, or other types of services are expected to be shared by the Project and either or both of the Ramapo stations.

The stipulation also requires identification of all jurisdictions that levy real property taxes or benefit assessments upon the Project site, the tax rates and levies for

those jurisdictions, and the assessed value for the Project site. The land parcels that are contained within the Project property are in the jurisdictions that are taxed. Since Torne Valley and Ramapo Energy do not overlap with these land parcels, they cannot be associated with these taxing jurisdictions. Thus, no cumulative impact considerations arise.

As part of the socioeconomic stipulation, Calpine is required to provide a description of emergency (fire and hazardous substance incident) on-site management systems, and an analysis of local emergency response capacity with respect to the same. Being in different counties and different fire districts and Local Emergency Planning Committee areas, no cumulative considerations arise from the siting of the Project relative to the Ramapo stations. Emergency response officials in Rockland County would not be expected to respond to emergencies at the Project, and emergency response officials in Orange County would not be expected to respond to emergencies at one or both Ramapo stations.

Q. What kind of analysis of soil and geology was done?

A. Analyses were done in accordance with Stipulation 8, which relates to a study of the geology, seismology, and soil impacts.

The geology and soils clauses of the stipulation include a description of existing slopes and contours before and after Project construction, the quantity of cut and fill necessary, and an identification of soils. The existing topographic slope of the Project site is a gently rolling field, as opposed to hilly, mountainous topography with narrow valleys at the Ramapo stations' sites. The flatter terrain at the Project site permit less impact related to earthwork (for example, avoiding retaining walls), and a neutral cut/fill

balance. Cumulative impacts are not expected.

The stipulation also calls for an analysis of the need for blasting operations and their impacts on environmental features as well as structures above and below ground. Although blasting is intended for Torne Valley and Ramapo Energy, it will be controlled blasting. During controlled blasting, explosives are detonated in their respective boreholes and only affect a cone shaped area right within the vicinity of the blast. All of the vibration created from the blast dissipates quickly and will not affect pipelines, wells, or landfills. Calpine does not anticipate but cannot preclude blasting, and thus a controlled blasting plan also exists for the Project (see Section 13), wherein vibration from blasts will dissipate quickly. Because blasting will be designed to safeguard the *nearest* structures, cumulative effects, even from simultaneous blasting at the Project and one or both Ramapo stations, are not predicted.

The stipulation also identifies research into seismological activity within the Project vicinity. Seismological activity for the last 300 years in the area of each of the three projects indicates minimal potential impacts provided proper design codes are followed for buildings and underground structures and utilities. No cumulative effects are expected.

Q. Please describe the terrestrial ecology impacts due to the Project.

A. The three facilities are located on sites with different ecological characteristics. Using the *Reschke* classification system, the Project site is a successional old field, the Ramapo Energy site is primarily an oak-tulip tree forest, and the Torne Valley Station site is primarily a hemlock-northern hardwood forest. Threatened or endangered plant species on the Project site do not exist, based on background research and field surveys.

Threatened and endangered plant species examined for the Ramapo stations included the small-flowered crowfoot, last seen in that area in 1890. However, examples of this species were not found at either Ramapo station site.

The 22-mile distance and numerous roadway corridors and development between the Project site and the Ramapo stations serves to limit, although not preclude, the possibility of cumulative habitat impacts. Thus, a comparison of potential wildlife habitat impacts for the Project and the Ramapo stations was made. The impacts to threatened and endangered species do not overlap. For the Project site, there are no threatened or endangered species potentially occurring on the site. For the Ramapo stations, the potential threatened and endangered species are the timber rattlesnake (confirmed), Allegheny woodrat (thought to be extirpated from New York State), and red-shouldered hawk (confirmed as nesting in the general area). Thus, no cumulative wildlife species impacts are predicted.

With respect to a study undertaken on bird mortality due to tower lighting, research shows that this is a concern for towers several times higher than the Project stacks. Since the Ramapo stations' stacks are of comparable height, the same conclusion could be reached, and thus cumulative impacts avoided.

Q. What cumulative impacts is the Project likely to have on traffic?

A. Increased traffic volume from the Project has been studied at those intersections most likely to be affected – including those both west and east of the site. None of these intersections are expected to be affected by traffic associated with either of the Ramapo stations, as they are located adjacent to I-87 (NYS Thruway), whereas the Project site is located adjacent to I-84. Likewise, none of the study intersections for the Ramapo

stations are expected to receive any impacts from Project traffic, for the same reason. Thus, even in the event that all the projects are constructed simultaneously, no cumulative impacts should occur.

Q. What cumulative impact on visual resources will the Project have?

A. Mountainous terrain, vegetation, and distance separate the viewshed of the Project site from the Ramapo stations' sites. On the basis of available mapping, it is doubtful that any high vantage points exist from which the Project and either of the Ramapo stations could be visible. If such a point were to exist, it would be located at great distance from the Project site, such that the principal notable features are those of the landscape, and the Project's contribution is minimal. Thus, no cumulative impacts are anticipated.

Q. What cumulative impact on water resources is the Project likely to have?

A. The Middletown POTW will be the main source of water for the Project. The rest of the water, about one percent, will come from a potable water supply. The Middletown POTW discharges water to the Wallkill River, a tributary of the Hudson. On the other hand, the Ramapo stations' water will be supplied by United Water New York, a private water company that owns and operates wells along the Ramapo River. If needed, additional water sources would come from the Ramapo River and/or its tributary, Torne Brook. The Ramapo River is part of the Hackensack River basin. Because the Ramapo stations and the Project all use air-cooling, greatly minimizing water consumption, and because the Project is situated in a different watershed than the Ramapo stations, cumulative adverse effects on water supply are not expected.

All wastewater from the Project will be transported by sewer to the Middletown POTW, which discharges treated effluent into the Wallkill River. Wastewater from the

Torne Valley station is proposed to be transported to Rockland County Sewer District No. 1, which currently discharges to the Hudson River. Ramapo Energy recently proposed to incorporate a zero liquid discharge system into its project design, which will eliminate process wastewater discharge. Ramapo Energy's sanitary waste will be trucked away and discharged to a sewer. Because the Ramapo stations and the Project all use air-cooling, greatly minimizing wastewater generation, because they use different sewer treatment plants, and because the Project is situated in a different watershed than the Ramapo stations, cumulative adverse effects related to wastewater treatment and disposal are not expected.

The Project will not include direct or indirect groundwater withdrawals, as the source of its potable water is the Town of Wawayanda Water and Sewer District no. 1, via its allocation from Middletown, which uses surface water supplies northwest of the city. Cumulative impacts related to groundwater quantity are thus precluded. (The Ramapo stations, through UWNY's water supply, would involve groundwater withdrawals from wells within on the western side of the Ramapo River.) With respect to aquifer protection, the Ramapo stations propose no significant oil storage or use. The Project also proposes no significant oil storage. There are no proposed end-of-pipe discharges of industrial wastewater or stormwater into groundwater infiltration basins at any of the three facilities. No cumulative impacts on groundwater quality are expected.

These surface waters include Monhagen Brook and, because of the location of wastewater discharge from the Middletown POTW, the Wallkill River. The surface waters on or adjacent to Torne Valley and Ramapo are Torne Brook, Candle Brook, and the Ramapo River. All surface waters and wetlands affected by the Project are in a

different watershed than those affected by the Ramapo stations. Stormwater management systems will each discharge to the nearest waters, which are in different watersheds. All three plants incorporate best management practices (BMPs) for stormwater management and erosion control. For these reasons, no cumulative impacts are expected.

Q. Please describe the cumulative impacts of the reliability of the generation technology.

A. Torne Valley Station, like the Project, proposes GE 7FB technology. Ramapo Energy proposes Alstom Power GT-24 technology. Both types of turbines are designed from prototypes with proven reliability firing natural gas. For details regarding the reliability of GE 7FB technology, see Section 5. The fact that there is some diversity among the turbines selected for the three projects potentially has a beneficial effect on overall reliability.

With respect to key design alternatives, all three projects propose to use air-cooling, minimizing water demand, and all three projects propose to use only natural gas to fuel the combustion turbines. These decisions are generally held to decrease impacts to natural resources. All three projects have, to the extent of these key project alternatives, minimized environmental impacts.

Q. Will there be any economic benefits to Wawayanda and Orange County.

A. Yes. The proposed Project will benefit Wawayanda, Orange County, and New York State by increasing local employment opportunities and expanding the local economy during both its construction and operation phases, and it will do so with hardly an increase in demand on local services. The direct and indirect economic impacts of the Project over the construction period and first 20 years of operation is estimated to be $545 million. It is estimated that operation of the Project will increase sales in Orange

County by $10.5 million, individual income by $6.8 million, and permanent employment by 171 jobs in Orange County. Refer to Section 12 for a more detailed analysis. The Project will also contribute revenues to the Town of Wawayanda, City of Middletown, Orange County, and various public school/service districts in the vicinity of the Project.

Given New York's difficult experiences with the burden of utility stranded costs, it is important to stress that the Project cannot become a stranded cost recoverable through electric rates. As a merchant plant investment, Wawayanda's investors – not utility ratepayers – bear the financial risks associated with the Project. If after some period of time the Project is not competitive, it would be either decommissioned (again, at the cost of the owner, not customers) or upgraded in order to once again be competitive with future technologies. Furthermore, lower electric prices paid by businesses will reduce their operating costs, translating into higher efficiencies, higher productivity, and indirectly into lower consumer prices and potentially more jobs.

The construction labor force will be comprised of local workers to the fullest extent possible. A variety of skilled workers will be employed during various phases of Project construction, including laborers, carpenters, crane operators, teamsters, tile layers, cement masons, electricians, ironworkers, sheetmetal workers, boilermakers, pipefitters, millwrights, painters and insulators. Local trade and service establishments will realize increased business. Local goods and services will also be purchased whenever possible. Local retail and commercial establishments can expect increased business during construction. Economic impact data are presented in detail in Section 12.

Due to the available infrastructure around the Project site, no significant demand on local services is anticipated. All interconnections to the Project (a transmission line,

water main along Dolsontown Road; and a water/sewer line to Middletown POTW) will be paid for by Calpine and not by electric, water, or sewer ratepayers. The gas pipeline to the Project will also be independently financed. Because the construction work will occur over a relatively limited time period and is expected to draw upon the existing regional workforce, demand on local school districts and other service districts is not expected to increase significantly. Orange County has industrialized areas with an ample available workforce representing a large variety of trades.

Once in operation, the Project will continue to provide economic benefits to the region. The Project will become a significant contributor of revenues while hardly drawing upon other municipal or school resources. On-site fire protection equipment will be available, and conceptual emergency plans will be, developed through a consultation process with local emergency service personnel in order to ensure that appropriate staff and equipment will be available to respond effectively to emergencies. The emergency response plan for Calpine's Stony Brook facility is included as Appendix O, and provides an example of what will be developed for this Project.

Q. In your opinion, is the Project in the public interest?

A. Yes. One of the findings that the Siting Board must make prior to issuing a Certificate, pursuant to PSL §168.2(e), is that "the construction and operation of the facility is in the public interest, considering the environmental impacts of the facility" and an evaluation of alternatives to the extent required by PSL §164.1(b). Thus, the finding as to whether a project is in the public interest includes the necessary evaluation of the impacts of a specific facility's construction and operation. It is also based on the premise that the proposed Project would promote or contribute to a competitive market for wholesale or retail provision of

electricity. The construction and operation of the Project will be in the public interest for the reasons listed.

The proposed Project will be a merchant facility and will compete with other independent energy producers to supply power to the wholesale electric power market. Competition with other wholesale electricity suppliers allows the competitive retail market to reflect these cost savings to their customer base, including industrial, commercial, institutional and residential users. An estimate of the cost savings due to the Project was provided in Section 1.2.5.

The proposed Project, consistent with the objectives of the 1998 SEP, will promote continued economic growth and the development of energy and related industries in New York, through both the construction and operation phases. The Project's direct economic investment in the local area, as well as its secondary effects on the local economy, are summarized in Section 1.2.6, and detailed in Section 12 (Socioeconomics).

From the perspective of air emissions, water use and environmental protection, the proposed Project will be among the most environmentally efficient in the world. Gas-fired combined-cycle plants are clean-burning and reliable. Operation of the newer, modern power plants will displace operation of older, less efficient plants with higher operating costs. Because the Project's expected bid price will be lower than that of less efficient plants, it will be dispatched by the NYISO ahead of these other plants. Since the Project's emission rates per megawatt-hour are so much lower than those of the plants it displaces, overall net emissions will go down. An estimate of anticipated air pollutant emission reductions (not accounting for additional emission offsets that Calpine will

purchase) was provided in Section 1.2.5.

In accordance with 16 NYCRR 1001.2(d) 2 and 16 NYCRR 1000.2(o), an analysis of alternative locations is required of private applicants (those who have no power of eminent domain) in cases when such applicants control more than one site in New York State. This analysis is detailed in Section 5.5.4 of this Application. The conclusion is that only the proposed Project site permits Calpine to meet its objective of installing a combined cycle power plant in New York State.

Analyses of alternative energy supply sources and demand-side measures, which are outlined in PSL §164.1(b), do not apply to the Project for the following reasons. In accordance with PSL §164.1(b), evaluation of energy supply source alternatives is not required because the Project is being developed pursuant to an approved procurement process. Also, in accordance with PSL §164.1(b), 16 NYCRR 1001.2(d) 2 and 16 NYCRR 1000.2(o), evaluation of demand-side alternatives is not required both because the Project is being developed pursuant to an approved procurement process and because Calpine is a private applicant.

Q. Does the Application comply with the Stipulations?

A. Yes. Table 1-3 provides specific information with regard to where each stipulation is addressed.

Q. Does this conclude your testimony at this time?

A. Yes.

Case: 00 F 1256

WAWAYANDA ENERGY CENTER

DIRECT TESTIMONY

OF

JOHN FLUMERFELT

DAVID DEVINE

Q. Please state your names, titles, affiliations and business addresses.

A. My name is John Flumerfelt, and I am the Director of Public Relations for Calpine Corporation's ("Calpine") Eastern Regional Office. My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

A. My name is David Devine and I am a Project Development Manager for Calpine. My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

Q. Mr. Flumerfelt, what are your duties of employment and your role in the Wawayanda Energy Center ("Project")?

A. My primary responsibilities include support for Calpine's growing portfolio of operating and proposed natural gas combine-cycle generating facilities, focusing on public outreach, communications and government and public affairs. I am the public outreach manager for the Project. I hold the primary responsibility for managing the Project's public involvement program and ensuring that ample notification, outreach and education has occurred and will continue to occur with respect to this proposed development.

Q. How are you qualified to perform your employment duties?

A. I received a Bachelor of Arts in History from Hobart and William Smith Colleges. I have over twenty years of experience related to my employment duties.

Q. Does your curriculum vitae, which is attached as Exhibit 8, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Devine, what are your duties of employment and how are you qualified to perform these duties.

A. I have been involved in the power industry for 25 years. As a Project Development Manager, I most often work at developing natural gas fired combined-cycle Projects in New York State. I have experience in the development, construction, operations and maintenance of many power Projects.

Q. What is your role in the Wawayanda Energy Center ("Project")?

A. For this Project, I am the development manager, with primary responsibility for real estate control, interaction with local officials and the procurement of necessary contracts such as water supply and wastewater disposal. I have extensively participated in formal and informal community outreach during the pre-application phase of the Project.

Q. Does your curriculum vitae, which is attached as Exhibit 5, fairly and accurately represent your experience?

A. Yes.

Q. What portion of the Application does your testimony support?

A. Section 4.

Q. Please describe Section 4 of the Application.

A. This section demonstrates Calpine's compliance with the requirements of 16 NYCRR 1000.3, relating to the Public Involvement Program (PIP). According to the regulations, the PIP "provides a variety of meaningful participation opportunities by which public concern can be identified as early as possible in (and throughout) the various stages of the decision-making process, establishes communications between stakeholders and an applicant, and results in education of the public as to the specific Project and Article X process."

In developing the Wawayanda Energy Center, Calpine has placed a strong

emphasis on community relations and public involvement and has engaged in a variety of communications efforts and activities since it first acquired the development rights to the Project, consistent with Article X requirements. This has been done to ensure that interested stakeholders understand and have an opportunity to provide comments on the Project. Public participation has been actively sought during the planning, pre-application and application preparation phases of the Project. Agencies, municipal representatives, stakeholders and interested citizens have been informed about the Project and consulted for their comments and ideas. The PIP will continue during the certification, compliance and implementation phases of the Project. This section describes the PIP activities that have occurred to date, and Calpine's plans for continuing community involvement.

Q. Has Calpine complied with the applicable state guidance on this issue?

A. Yes. The New York State Department of Public Service (DPS) has issued a guidance memorandum entitled *Summary of Article X Public Involvement Program Activities* to be used by Article X applicants. Table 4-1 is a summary of Calpine's compliance with that guidance memorandum. The table and Section 4 follow the format used in the memorandum in order to facilitate agency review.

Q. Please give a general summary of Calpine's overall public involvement activities.

A. Calpine initiated its PIP for the Project in early 2000, well before filing its Preliminary Scoping Statement. Calpine's efforts began with initial meetings with local community officials followed quickly by a formal Project announcement. Throughout the pre-application phase of this proceeding, Calpine has used a wide variety of methods to identify and communicate with stakeholders, including the methods outlined in Section

4.2.

Q. Please describe Calpine's initial stakeholder identification and information efforts.

A. Calpine formally announced its intent to develop the Project in a news release dated March 23, 2000, which was distributed to local and national media outlets. A copy of the news release is included as Appendix D-1. A copy of a local news story that appeared in the Middletown *Times Herald Record* on March 24 is included as Appendix D-2. A follow up story was published in the same newspaper on March 25 and is included as Appendix D-3.

During the early planning phases of the Project, Calpine consulted with a variety of stakeholders to provide general Project information and to obtain input into various aspects of the Project. The meetings were generally very constructive in terms of providing Calpine with recommendations for additional stakeholder outreach and in terms of specific issues that might arise during the course of the regulatory review. A list of early stakeholder contacts is provided as Appendix D-4. Additional stakeholder identification and outreach continued throughout the course of the pre-application phase and during the development of the Stipulations.

Shortly after the March 23 announcement, Calpine arranged to appear before regularly scheduled meetings of Middletown and Wawayanda officials, and subsequently scheduled a well-advertised public information meeting. On April 4, 2000, Calpine made a formal presentation about the Project to the Middletown City Council and answered questions. A copy of a news story reporting on the meeting is included as Appendix D-5. On April 6, Calpine provided a similar presentation during a regularly scheduled meeting of the Wawayanda Town Council. A news article concerning that meeting is included as

Appendix D-6. During those meetings, Project representatives announced their intention to participate in a broad-based public involvement program and announced the establishment of a toll-free Project inquiry telephone number and a Project-specific website (www.wawayanda-energy.com), which went on-line in late April, 2000. Calpine also hosted a public information meeting on April 26 to introduce the Project and identify additional stakeholders.

Q. What measures has Calpine taken to encourage stakeholder participation?

A. Calpine has encouraged stakeholder participation at every phase of the Project. Notable examples include the formation of a Citizens Advisory Group (CAG) and the development of Stipulations that included comprehensive participation by CAG and the Town of Wawayanda. Each of those parties subsequently became official signatories to the Stipulations.

Calpine consistently responded to stakeholder input into the proposed design of the Project wherever possible. Significant examples of changes made to the Project that were influenced by public input include Calpine's decision to use an air-cooled condenser instead of a mechanical draft cooling tower and the use of treated wastewater effluent instead of groundwater. Calpine also paid careful attention to key issues of local concern that were expressed during early Project meetings, most notably including issues related to water usage and gas pipeline routing. Calpine responded in writing to all written comments that were received during the pre application phase. Copies of these comments and Calpine's responses are included as Appendix D-45.

Q. Did Calpine engage in any direct mail notification?

A. Yes. On April 17, Calpine mailed a letter to 25 abutters informing them about the Project

(Appendix D-7). The letter included a brief overview of the Project as well as providing Project contact information, in addition to providing information about an upcoming public meeting scheduled for April 26. A copy of the fact sheet referenced in the letter is included as Appendix D-8. The list of Project abutters was provided by the Town of Wawayanda Assessor's Office and was based on local tax map data (Appendix D-9), based on Calpine's request that the list be generally inclusive and not restricted to direct abutters of the proposed site. Additional direct mail notifications were used to announce subsequent public meetings and other Project events.

Q. What methods were used to invite the public to attend meetings and hearings?

A. Calpine held an initial public information meeting on April 26, 2000, as quickly as possible after the initial public announcement. For this public meeting, and all subsequent formal public meetings, Calpine used a variety of methods to inform and invite and public to attend. These methods were also used for the Department of Public Service Process Forum and Article X Workshop, and included paid newspaper display advertising, direct mail notification, flyers posted on local bulletin boards, notices on local CATV and the Project website and news articles. Calpine chose to use paid display advertising instead of publication in the Legal Notices section in order to maximize the effectiveness of its outreach efforts.

A copy of the initial advertisement for the April 26 public meeting is included as Appendix D-10. All newspaper advertisements used were at least one-quarter page in size and were run in at least two editions of the Middletown *Times Herald Record*, which is the newspaper with the largest daily circulation in the Project area. Ads ran both on a weekday and a weekend edition prior to the meetings in order to maximize effectiveness.

In addition, Calpine used direct mail to notify all Wawayanda residents about important meetings, filings and comment periods on the Preliminary Scoping Statement and the Stipulations. An initial mailing list of approximately 2,000 was developed based on local voter registration data acquired from Orange County. The mailing list has been continually updated as interested parties have asked to be added to it, and based on input from the Citizens Advisory Group. Every public meeting included sign in sheets to allow interested parties to be part of the Project's mailing list.

Q. Were any additional public notices given?

A. Yes. These are described in Section 4.2.4.1.

Q. How many public meetings were held?

A. A total of five formal public informational meetings were held during the early planning and pre-application phases of the Project. Calpine sponsored two of these, two were sponsored by the DPS, and one was sponsored by the WCAG. These meetings are summarized in Section 4.2.5. In addition to the formal meetings, Calpine attended numerous public meetings, such as CAG meetings and Town Council and Planning Board meetings to provide information and discuss issues related to the Project, as required.

Q. Was information about the interconnections discussed at these meetings?

A. Yes. All of the public meetings included information concerning the anticipated interconnections associated with the Project. At all times, Calpine discussed the need to develop an electrical interconnection into the Marcy South transmission line. Recently, the Project informaiton was revised to integrate water/wastewater interconnection to the Middletown publicly owned treatment works ("POTW").

In addition to Project interconnections as defined in the Stipulations, Calpine has included the proposed natural gas transmission pipeline that is subject to FERC jurisdiction and a separate public participation program per FERC requirements. Calpine solicited public comments on the pipeline route and made some routing changes in response to comments.

Q. Is it your opinion, then, that Calpine has engaged in appropriate efforts to obtain public participation?

A. Yes. Calpine has made every effort to engage in a meaningful public involvement effort during the pre-application phase of the Project and will continue to do so as the process moves forward. Calpine has used every reasonable opportunity to identify and implement proactive methods to communicate, increase public awareness and provide stakeholders with meaningful opportunities to participate in the process.

Calpine believes that it has clearly met or exceeded the statutory requirements for public participation during the early phases of the Article X process, as evidenced by numerous, well advertised public meetings, the formation of a Citizens Advisory Group, the use of advance intervener funding to enhance local participation in the development of the Stipulations and by Calpine's demonstrated willingness to communicate openly about the Project and address issues of concern by incorporating design changes into the proposed facility. In addition, the numerous local news articles concerning the Project that are provided in the appendices provide additional evidence that there is a high level of local awareness of and participation in the development of the Project.

Q. Please describe any early consultation with the stakeholders.

A. Calpine began the stakeholder consultation process prior to the initial Project

announcement and well before the filing of the Preliminary Scoping Statement. A chronological list of early stakeholder contacts is provided in Appendix D-4.

Q. Please describe the Citizens Advisory Group.

A Calpine accepted the DPS recommendation to form a Citizens Advisory Group to help implement and evaluate the Public Involvement Program. During the early public meetings held in April and May, 2000 Calpine announced its intent to form a CAG and invited interested parties to use sign in sheets to express their interest in participating on the CAG. Calpine also invited officials from the Town of Wawayanda, the City of Middletown and the Town of Wallkill to participate on the CAG, as well as a local environmental group, Orange Environment (Appendix D-25). Copies of letters sent to interested parties that signed up for the CAG at the April 26 meeting are included as Appendix D-26.

The first meeting of the CAG occurred on August 1, 2000. A copy of the meeting agenda is included as Appendix D-27. A copy of the Minutes of the meeting is included as Appendix D-28.

A second meeting of the CAG occurred on September 20, 2000. A copy of the meeting agenda is included as Appendix D-29. A copy of the Minutes of the meeting is included as Appendix D-30. A copy of an August 12, 2000 memo from Calpine Project Manager Dave Devine to the CAG, responding to a number to technical questions raised at the August 1 meeting, is included as Appendix D-31. Dianne Cooper of the DPS attended the meeting and led a discussion on the availability and procedures regarding intervener funding.

After the September 20 meeting, it was agreed that the next CAG meeting would

take place at an operating Calpine power plant in order to give CAG members a better sense of what to expect in Wawayanda. A visit to Calpine's Tiverton, Rhode Island facility was tentatively scheduled for November 30, 2000 (Appendix D-32), but was subsequently postponed due to an unexpected maintenance issue at the plant. However, the site visit did occur on March 26, 2001. A copy of a news story reporting on the visit is included as Appendix D-33. A "thank you" note from one of the CAG members to Tiverton Plant Manager Bob O'Brien is included as Appendix D-34.

Although it was Calpine's initial intent to form a CAG that would help implement and evaluate Calpine's ongoing PIP efforts, the CAG subsequently chose to become an independent entity. By letter dated November 6, 2000 the CAG informed Calpine that it would be participating with consultants in a review of the PSS and Stipulations, that it would become an official party to the Article X process, including applying for intervener funding, and that it was requesting that Calpine provide advance intervener funding to assist with its participation in the PSS and Stipulations process. Additionally, the CAG noted that it recognized "Calpine's extensive initial public involvement initiatives with respect to the PIP," but also stated that it would occasionally have meetings without Calpine being present. A copy of the November 6 letter from the CAG is included as Appendix D-35.

Calpine responded to the CAG by letter dated November 14, 2000, agreeing to provide $15,000 in advance intervener funding to support the CAG's consultants. A copy of Calpine's letter to the CAG is included as Appendix D-36. (The Town of Wawayanda subsequently requested a similar amount of advance intervener funding to assist with their participation in the development of the Stipulations. Calpine agreed to

that request as well.)

After the November 6 letter, the CAG renamed itself the Wawayanda Citizens Advisory Group (WCAG) to reflect its independence from Calpine. It also established its own website (located at www.geocities.com/serials_rule/) and email address (wcag1@hotmail.com). The WCAG used its advance intervener funding to participate fully in the development of the final Stipulations, with assistance from its consultants, and became a formal signatory to the Stipulations, which were filed with the DPS on February 22, 2001. The WCAG also promoted and managed the March 19, 2001 public informational meeting, which included participation by Calpine, DPS, DEC, the Town of Wawayanda and the WCAG consultants.

Calpine did not object initially to the CAG's evolving role, and felt that the group's participation in the development of the Stipulations was both constructive and consistent with the goal of implementing a successful Public Involvement Program. The CAG (and subsequently, the WCAG) also significantly enhanced the Project's overall success with stakeholder identification due to the fact that the group became highly engaged in the process and reached out to multiple third parties on its own. At the same time, however, Calpine did not believe that the WCAG could simultaneously be a neutral advisor to the Project as well as an active independent party in the Article X proceeding, and stated its views in a June 13, 2001 letter to the WCAG (Appendix D-37). A copy of a local news article discussing the relationship between Calpine and the WCAG is included as Appendix D-38.

Q. Please describe Calpine's public information plan.

A. Calpine's public information plan included use of all available communications tools,

including direct mail to neighbors and other stakeholders, regular contact with local news media, including editorial board visits and numerous paid display advertisements. These efforts are documented throughout the Appendices to this section.

Q. Please describe any public educational and presentation materials that were developed as a part of the plan.

A. Calpine developed a range of educational and presentation materials as an integral part of the PIP. Materials were updated as necessary to reflect changes in Project characteristics (for example: change from Siemens-Westinghouse to General Electric combustion turbines, change from wet cooled to dry cooled design). In total, Calpine has distributed approximately 4,000 Project brochures in the Middletown and Wawayanda area, to date. Brochures have been available at all public meetings and at the Wawayanda Town Office, as well as being available as a downloadable file on the Project website. A copy of the PowerPoint presentation used for initial Project meetings and the April 26 public informational meeting is included as Appendix D-39. A copy of the initial printed Project brochure is included as Appendix D-40. A copy of a revised printed Project brochure reflecting a number of updates is included as Appendix D-41. Copies of informational posters used at various public meetings are included as Appendix D-42. A copy of an updated PowerPoint presentation that is currently being used in various public meetings is included as Appendix D-43. A copy of the August 2001 Project newsletter is included as Appendix D-44.

Q. What means for direct communication has Calpine implemented?

A. Since the early planning phase of the Project, Calpine has actively maintained a variety of ways to maintain direct communications with interested parties, including a toll-free

Project inquiry telephone line (877-281-9957) and a Project website (www.wawyanda-energy.com). Calpine's educational and presentation materials also included a mailing address and email address (davidde@calpine.com). Calpine opened a local field office in leased space at 1191 Dolsontown Road in July 2001, and will use it as a resource center during the Article X review process. The field office is one property to the east of the Project site. Calpine initiated publication of a Project newsletter in early August 2001.

Q. Did Calpine cooperate with any local agencies during the development and implementation of the PIP?

A. Yes. Calpine cooperated with local agencies during the development and implementation of the PIP. These local agencies included the Wawayanda Town Board and Planning Board, the Orange County Planning Department, the Orange County LEPC, the New Hampton Fire Department, and the Middletown Department of Public Works, for example.

Q. Please provide a general description of the pre-application phase of public involvement.

A. Calpine filed its Preliminary Scoping Statement on July 27, 2000. The filing was announced to the public via local news stories, paid display advertising and direct mail notification (See Appendices D-12 through D-17, for example). Calpine held a second public information meeting on September 13 to help inform the public about the contents of the PSS and the proposed Stipulations. Both the Town of Wawayanda and the Wawayanda Citizens Advisory Group were actively involved in and became signatories to the Stipulations, which were filed on February 22, 2001. In addition to Calpine's ongoing stakeholder involvement efforts during this phase of the Project, the CAG (and subsequently the WCAG) independently engaged in wide variety of communications

with potential Project stakeholders.

Q. How will this involvement continue during the compliance and implementation phase of the Project?

A. Calpine will continue to involve stakeholders during the compliance and implementation phase of the Project, especially with regard to construction activities. It is Calpine's general practice to locate a construction Project Manager at the site at least a month or more prior to the actual commencement of construction. Calpine will schedule a variety of local meetings and outreach opportunities with local stakeholders once this occurs, to ensure a smooth transition from the development stage into the construction stage of the Project. Key issues frequently include construction traffic, noise, and construction hours.

Similarly, Calpine typically locates a Plant Manager on site shortly after construction has begun. The Plant Manager will be the senior Calpine representative in the community once construction is complete and plant operations have commenced. In Calpine's experience, having the Plant Manager on site prior to actual commercial operation has proven to be an excellent tool in terms of providing a smooth transition from the construction phase into commercial operations, especially with respect to community relations as well as technical design and plant operations.

During the construction, commissioning and operation of the Project, Calpine will continue to maintain relationships established with regulatory agency staffs, local government officials, emergency responders, stakeholders, and interested parties and citizens. Agency consultations and updates will continue throughout the life of the Project. During construction and commissioning, there will be meetings and filings with agencies to document compliance, the completion of mitigation efforts and certification

of equipment. Agency visits and inspections will be welcome.

During construction and commissioning, Project representatives will be available to attend meetings, give presentations, and answer questions whenever requested. Ongoing relationships will be established with local emergency service organizations to ensure familiarity with the facility. Public information meetings will be scheduled, as necessary. Calpine will continue to participate in the local community and maintain the appropriate standards of any good corporate citizen.

Q. How did Calpine commence its PIP?

A. Calpine commenced its PIP with numerous meetings with stakeholders, as presented in Appendix D-4. Its list of Project contacts is detailed in Section 4.6.2.

Q. What kinds of issues did the stakeholders raise during the development process?

A. Stakeholders raised a variety of issues during the initial development of the Project. During initial meetings with officials from the Town of Wawayanda, Calpine was informed that the routing of the natural gas pipeline interconnect was an important issue to be resolved. Calpine subsequently hired an independent engineering firm and worked with the Town to identify potential areas of sensitivity along the route. Calpine has communicated these concerns to Tennessee Gas Pipeline (TGP), the natural gas company that will develop the pipeline lateral.

The issues raised during the April 26 public information meeting and the May 24, 2000 DPS Process Forum are addressed in Section 4.6.3.

Q. How have the issues raised been dealt with in Project development?

A. Calpine has been able to address a number of the types of issues raised in the development of the Project. For example, in addition to the other items described in

Section 4.6.4, Calpine has selected dry cooling technology to reduce water consumption far below what would have been required for a wet-cooled facility.

Q. Please describe Calpine's plans for the compliance and implementation phase.

A. Calpine will continue to engage in proactive communication and public involvement efforts during the compliance and implementation phase of the Project. Public involvement is especially important as the Project nears the construction phase, in order to mitigate unwanted and avoidable construction-related impacts to the local community. During operations, Calpine's Plant Manager and local personnel will remain responsive to local concerns, in order to earn a reputation as a good corporate neighbor, consistent with Calpine's record at other plant locations.

Q. Describe Calpine's efforts with regard to document availability.

A. Calpine ensured that interested parties have had access to all relevant Project documents, including the Preliminary Scoping Statement, proposed Stipulations and Final Stipulations and Air Permit Applications. Document repositories include: Wawayanda Municipal Building; Wallkill Town Hall; Middletown City Hall; Middletown Thrall Library; and Goshen Public Library.

In addition, all of the documents have been made available over the internet through the Project website (www.wawayanda-energy.com).

Calpine will continue to use these methods to make documents available to the public, as well as using its new Project field office on Dolsontown Road, near the Project site.

Q. Have all required public notices been made?

A. Yes. All required public notices have been made and filed, through counsel, with the

Department of Public Service. See also Appendix D-17.

Q. What contact has Calpine had with DPS staff?

A. Calpine has stayed in regular contact with the DPS staff during the development of the Project, beginning with a formal meeting to discuss PIP requirements on March 14, 2000. DPS staff attended both Calpine public meetings, the Process Forum and Article X workshop, and the March 16, 2001 public meeting, in addition to a CAG meeting. Calpine has provided ongoing updates and copies of press clippings.

Q. Did Calpine hold a process forum?

A. Yes. After discussions with DPS, Calpine agreed to hold a "pilot" Process Forum, the first Process Forum that was held in advance of the filing of the Preliminary Scoping Statement. The meeting was held on May 24, 2000. However, due to ongoing questions about the Article X process raised by the CAG, the DPS agreed to hold a follow up process forum, billed as a "workshop," on December 4, 2000. In effect, the DPS held two Process Forums prior to the commencement of the comment period on the proposed Stipulations.

Q. Is it your opinion, then, that Calpine has complied with all applicable requirements for public involvement?

A. Yes.

Q. Does this conclude your testimony at this time?

A. Yes.

Case: 00 F 1256

WAWAYANDA ENERGY CENTER

DIRECT TESTIMONY

OF

DONALD NEAL

ROBERT HOWARD

MICHAEL TYRRELL

DAVID DEVINE

Q. Please state your names, titles, affiliations and business addresses.

A. My name is Donald Neal, and I am an Environmental Manager for Calpine Corporation ("Calpine"). My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

A. My name is Robert Howard, I am a Manager of Fuels Acquisition for Calpine's eastern region. My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

A. My name is Michael Tyrrell and I work at TRC. My business address is Boot Mills South, Foot of John Street, Lowell, Massachusetts 01852.

A. My name is David Devine and I am a Project Development Manager for Calpine. My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

Q. Mr. Neal, what are your duties of employment?

A. I serve as project manager and technical analyst for environmental permitting and assessment of electric generating facilities and programs, representing Calpine before regulatory agencies and in public forums. In this capacity, I have managed and prepared siting studies, environmental impact statements, and applications for wastewater, wetlands and air permits. I have also led environmental, health and safety audits and due diligence investigations. I am experienced with methods of air emissions source testing and continuous emissions monitoring system design, certification and implementation.

Q. How are you qualified to perform your employment duties?

A. I received both a B.S. and an M.S. in Biology from the University of Massachusetts and I have over 18 years of experience related to my employment duties.

Q. Does your curriculum vitae, which is attached as Exhibit 14, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Neal, please describe your role in the Project.

A. For the Project, I supervised all aspects of the Article X application and I am responsible for project compliance with environmental requirements.

Q. Mr. Howard, what are your duties of employment?

A. I am responsible for developing business strategies and fuel supply plans for the eastern region power plants, negotiating and managing natural gas and fuel oil agreements and analyzing energy markets to support power plant development.

Q. How are you qualified to perform your employment duties?

A. I have a Bachelor's degree in electrical engineering from Worcester Polytechnic Institute and a Master of Business Administration degree from Northeastern University.

Q. Does your curriculum vitae, which is attached as Exhibit 11, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Howard, please describe your role in the Project.

A. I am the fuel procurement manager for the Project. I am primarily responsible for acquiring a portfolio of natural fuel supplies to ensure that the Project can operate with a high degree of reliability.

Q. Mr. Tyrrell, what are your duties of employment?

A. I am responsible for the licensing and permitting of energy related projects. I coordinate and manage all aspects of environmental permitting and field studies for a wide range of

projects. My normal activities entail project scoping, regulatory agency interface and coordination, corridor selection, environmental assessment and EIS preparation, mitigation planning, public participation and preparing permit applications.

Q. How are you qualified to perform your employment duties?

A. I have a B.S. in Natural Resources Science from the University of Rhode Island and I am a Certified Professional Wetlands Scientist.

Q. Does your curriculum vitae, which is attached as Exhibit 19, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Tyrrell, please describe your role in the Project.

A. I have overseen comprehensively broad, map-level environmental and cultural analyses of a proposed natural gas pipeline, which is not an interconnection to the Project per the signed Stipulations, but will be licensed pursuant to a Federal Energy Regulatory Commission process.

Q. Mr. Devine, what are your duties of employment and how are you qualified to perform these duties.

A. I have been involved in the power industry for 25 years. As a Project Development Manager, I most often work at developing natural gas fired combined-cycle projects in New York State. I have experience in the development, construction, operations and maintenance of many power projects.

Q. Please describe your role in the Project.

A. I am the development manager for the Project. As such, the fuel facility interconnection has been part of my responsibility.

Q. Does your curriculum vitae, which is attached as Exhibit 5, fairly and accurately represent your experience?

A. Yes.

Q. Gentlemen, what portion of the Application does your testimony support?

A. Section 9.

Q. Please describe Section 9 of the Application.

A. This Section addresses Stipulation 4, which requires a detailed description of the proposed gas pipeline interconnection.

Q. Please describe approval under the FERC licensing process.

A. Paragraph 1 of the Preamble to the Stipulations excludes structures or conduits conveying natural gas under the jurisdiction of the Federal Energy Regulatory Commission (FERC) from the definition of the "Project" subject to review under Article X. Paragraph 1 also states: "The extent to which the natural gas pipeline shall be addressed in the Application is discussed in Stipulation No. 4 (Gas Transmission Facilities)." This section provides the information required under Stipulation No. 4.

Most of the route selected for analysis under Stipulation 4 was previously licensed by FERC as the "Wallkill Pipeline Project," (Docket No. CP93-548-000). The Wallkill Pipeline Project was not built. The route presented in this section deviates from the original Wallkill Pipeline Project route by avoiding certain residential areas in Wawayanda.

It is important to note that the proposed pipeline route presented in this section is not yet approved by FERC. Such approval would occur only after completion of the FERC licensing process, which involves extensive environmental impact analysis and

public involvement. As such, the pipeline route presented in this section may not be the route that is ultimately licensed by FERC for supplying natural gas to the Wawayanda Energy Center and the surrounding area. However, the pipeline route presented in this section is a viable pipeline route that demonstrates it is feasible to license a pipeline to bring natural gas to the Project.

Stipulation 4, Clause 2 requires that Calpine furnish the Siting Board with a letter or other documentation from the owner or developer of the natural gas pipeline to be constructed to convey natural gas to the Project, indicating that it will seek FERC approval for the pipeline. Tennessee Gas Pipeline (TGP) has provided such a letter. Refer to Appendix G.

Q. Please generally describe the interconnection facilities.

A. The proposed pipeline lateral is approximately 20 miles long and will begin at the discharge piping at TGP Compressor Station 325 on the 300 Line in Sussex County, New Jersey. The pipeline lateral will terminate at a meter station to be located at the proposed Project site. Approximately 6 miles of the pipeline will be in New Jersey and 14 miles in New York. The maximum allowable operating pressure (MAOP) of TGP's 300 Line and the new pipeline lateral, taking into account currently proposed expansion projects, will be 1170 pounds per square inch (psi). Columbia Gas and the proposed Millennium pipeline cross the proposed lateral approximately 10 miles from the site. The Project anticipates a connection to these pipelines in addition to the 300 Line.

A meter station will be constructed at the inlet piping to the Project. It will be sized to meet the maximum gas requirement of the plant, approximately 100 million cubic feet per day (MMcfd). The meter station will include meter skid with building,

electronic gas measurement facilities, communications, chromatograph, filter separator, and flow controls.

The TGP system and the associated Project pipeline should have sufficient pressure such that new on-site compression will not be required.

Q. Please describe the Pipeline Route.

A. Figure 9-1 shows the proposed pipeline route. More detailed mapping of the proposed pipeline lateral is included in Appendix G. The pipeline route begins at the existing TGP Compressor Station 325 and terminates at the proposed Project site. The routing is generally along existing road and abandoned railroad rights-of-way in order to minimize landowner impacts. The proposed route is based on field reconnaissance by pipeline construction specialists and coincides primarily with the route selected in the Wallkill Pipeline Project, which was approved by FERC in Docket No. CP93-548-000.

Q. What is the size and operating pressure?

A. The pipeline, as designed, involves approximately 20 miles of 16-inch pipe for delivery of 100 MMcfd. The maximum allowable operating pressure (MAOP) of the lateral will be 1170 psi. This is based on the future maximum MAOP of the 300 Line resulting from the proposed Tennessee upgrade. The current MAOP of the 300 Line at the tie-in point is 975 psi. The maximum flow rate through the pipeline will be approximately 100 MMcfd.

Q. What are the natural gas requirements of the Project?

A. The Project will be able to operate efficiently in various output configurations, thereby allowing for increases or decreases in generation output and required gas consumption. The volume of gas required will range from approximately 28 MMcfd if the plant is operating at 150 MW and up to 94 MMcfd if the plant is operating at 590 MW. The

Project's peak hour requirements will be 3,900 MMBtu, and peak day requirements will be 93,600 MMBtu. On a seasonal basis, 8,541,000 MMBtu will be consumed, and annually, the consumption will be about 34,164,000 MMBtu.

Q. Who will construct, own and operate the pipeline facilities?

A. The Project pipeline will either be an extension the TGP system or a new FERC certified pipeline constructed and operated by TGP in accordance with industry standards, all applicable federal and state guidelines and regulations, and the specific requirements of permit conditions. The Project pipeline will be owned by TGP or by a joint venture partnership established between TGP and Calpine.

Calpine and TGP have developed a preliminary schedule for receipt of FERC approvals, engineering, and constructions as summarized in Table 9-1.

Q. What is the nature and extent of transportation?

A. Calpine intends to use a combination of firm and interruptible capacity and transportation in order to minimize gas costs and maximize the operating flexibility and economic generation of electric power. The Project is expected to utilize firm transportation on the new pipeline and a portfolio of primary firm, secondary firm, and interruptible supply of and transportation on the upstream pipelines.

Calpine intends to use TGP and other interstate pipelines, such as Columbia or Millennium, that are capable of delivering gas to TGP or the lateral pipeline to the Project. The transportation services will include firm and interruptible transportation, displacement, and exchange services to increase the overall deliverability to the Project. Transportation services may also use storage, released capacity, or bundled supplies as available from marketers. In addition, Millennium is proceeding to obtain regulatory

approval, while TGP has announced expansion plans for storage facilities in Pennsylvania and downstream 300 Line pipeline capacity increases. Both of these projects would increase transportation services, capacity, and supply options for the Project.

Q. Will there be sufficient gas supply to support the requirements of the Project at the time of commercial operation?

A. Yes. An analysis of information related to gas supply availability for the nation and the Northeast concludes that adequate supplies of gas will be available to meet forecast demands for high, medium, and low growth scenarios. For example, the New York State Energy Plan (SEP) projects a range of annual natural gas demand growth from 1.3% to 3.2% with the outlook (most likely) case at 1.5% (refer to Appendix V). In the high demand growth case, all new electric generation capacity needs within the planning horizon to the year 2016 are assumed to be met through new natural gas-fired generation units located in New York. The SEP states that natural gas supplies are expected to be adequate to meet this range of demand in the planning period. *See, e.g. New York State Energy Plan and Final Environmental Impact Statement* (November 1998) at Section 3.2.

Sections 9.4.1.1 – 9.4.1.2 summarize the national gas supply, consumption, and demand supporting the conclusion that adequate gas supplies will be available to support the requirements of the Project.

Q. Will the Project have access to sufficient natural gas pipeline capacity?

A. Yes. The Project will have access to sufficient natural gas pipeline capacity based on the significant amount of existing pipeline capacity into the Northeast and New York, the availability of this capacity during most of the year, the expected amount of new and

expansion pipeline capacity, and the increasingly liquid market for short-term natural gas pipeline capacity through the capacity release market. The four primary pipeline corridors into the Northeast are the Western Canadian Corridor, Scotian Shelf Corridor, Appalachian Corridor and Gulf Coast Corridor. Total pipeline capacity into the Northeast on all of these corridors is approximately 12 Bcf/d. Section 9.4.2 presents a detailed description of the corridors and our analysis.

Q. What are the impacts upon the local distribution company (LDC)?

A. The Project will receive gas from a new, high-pressure open access pipeline which will have no adverse impact on the distribution reliability, pressure, or service adequacy of the LDC. The Project will also have no impact on the firm contractual arrangements of the LDC. During periods of off-peak gas demand, the Project could have a positive impact by providing a market for any excess gas supply and transportation that may be available from the LDC. The new pipeline could also provide additional supply capacity to the LDC if needed in the future.

Q. What are the pipeline construction procedures?

A. The proposed gas pipeline will be constructed in compliance with applicable federal and state regulations and guidelines, and the specific requirements of permit conditions. Key federal requirements and guidelines to which the pipeline company will adhere are summarized in Section 9.6.1. Sections 9.6.1.1 – 9.6.1.15 describe the typical construction procedures for routine pipeline construction, as well as the specific construction techniques that may be utilized in environmentally sensitive areas for the project. These include: clearing, grading, trenching (blasting, if required), stringing, bending, welding, radiography, weld repair, coating inspection and repair, lowering-in,

tie-ins, backfilling, cleaning, hydrostatic testing and restoration and revegetation.

Q. Please describe the topography where the pipeline right of way (ROW) will be cut.

A. The pipeline will cross-rolling topography with predominantly 0–15 percent slopes. In some areas, particularly in New Jersey, slopes can range up to 25–45 percent and will require trench breakers and trench plugs. Permanent trench breakers, consisting of sandbags, will be installed in trenches over and around the pipe in areas of slope with the potential for erosion. Temporary trench plugs, usually composed of sandbags or other suitable low-permeable material, will be used to isolate waterbodies and wetland areas to minimize channeling of groundwater along the trench line.

During grading, the upslope side of the pipeline ROW will be cut. The material removed from the cut will be used to fill the downslope edge of the ROW in order to provide a safe and level surface from which to operate the heavy equipment. Side hills may require additional temporary workspace upslope and downslope in order to accommodate the construction activities. During grade restoration, the cut material is placed back in the cut area and compacted. Any springs or seeps found in the cut would be carried downslope through PVC pipe and/or gravel French drains installed as part of the cut restoration.

Q. What kind of care will be taken in residential areas?

A. As fully described in Section 9.6.3, special care will be taken in residential areas to minimize neighborhood and traffic disruptions and to control noise and dust to the extent practicable.

Q. What about agricultural areas?

A. Based on field assessments of a variety of agricultural lands, terrain, soils, and drainage along the proposed ROW, New York State Department of Agriculture and Markets (NYSDAM) has proposed the use of two methods in crossing agricultural areas – double ditching and full width top soil stripping (Lacey 1994). These methods are to be applied to site-specific conditions as described in Section 9.6.4.

Q. How will road crossings be handled?

A. The proposed project will cross 24 roadways including state Route 23 (New Jersey), state Route 284 (New York), U.S. Route 6 (New York), state Route 17M (New York), and I-84 (New York). Constructing the pipeline across public and private roadways will require the development of specific construction plans for each roadway crossing. Roadway opening permits will be obtained from applicable state and local agencies. Permit conditions will ultimately dictate the day-to-day construction activities at road crossings.

Prior to construction, the "Dig Safe" system, and state or local Department of Public-Works, will be contacted and all utilities marked along the pipeline area roadways. Where there is a question as to the location of existing underground utilities such as water, cable, gas, and sewer lines, they will be located by field instrumentation and test pits.

Construction will be scheduled for work within roadways and specific crossings so as to avoid commuter traffic and schedules for school buses to the greatest extent possible. Appropriate traffic management and signage will be set up and necessary safety measures will be developed in compliance with state and local permits for work in the public roadway. Arrangements will be made with local officials to have traffic safety

personnel on hand during periods of construction. Provisions will be made for detours or otherwise to permit traffic flow.

Construction within roadways will generally occur using one of the methods outlined in Section 9.6.5. Crossings of individual driveways and private roadways will be coordinated with residents to minimize access impacts. In those areas where the excavation of a longer length of trench will not pose a safety problem, the pipeline will be installed using the standard open trench method. Trenches will either be fenced or covered with steel plates during all non-working hours. Steel plates will be kept on site at each crossing so that a temporary platform can be made across the trench as required (e.g., emergency vehicles).

Q. How will rock removal and blasting proceed?

A. Based on field reconnaissance and review of soils and geologic maps of the pipeline route, shallow bedrock (less than 5 feet from the surface) is expected to be encountered along various locations on the project alignment. Rock encountered during trenching will be removed using one of the techniques outlined in Section 9.6.6.

All blasting activity will be performed by licensed professionals according to strict guidelines designed to control energy release. Proper safeguards will be taken to protect personnel and property in the area. Charges will be kept to the minimum required to break up the rock. Where appropriate, mats made of heavy steel mesh or other comparable material or trench spoil (under no condition will topsoil be used for this) will be utilized to prevent the scattering of rock and debris. These activities will strictly adhere to all local, state, and federal regulations applying to controlled blasting and blast vibration limits in regard to structures and underground utilities. Blasting in the vicinity

of nearby utilities will be coordinated with the owner, as necessary.

Large rock not suitable for use as backfill material will: either be windrowed along the edge of the ROW, used to construct all terrain vehicle barriers across the ROW, or buried. Surplus rock will be hauled off-site and disposed of in an appropriate manner.

Q. What about construction in wetlands?

A. Construction across wetlands will be performed in accordance with the FERC Procedures (FERC 1994B). Construction methods will minimize the extent and time that construction equipment is used in wetland areas, as described in Section 9.6.7.

Q. How will construction proceed across waterbodies?

A. To minimize potential impacts, crossings of waterbodies will be expedited as quickly as possible. Adherence to specific waterbody construction procedures will ensure stream flow will be maintained throughout construction. Most stream crossings will be completed using conventional backhoe type equipment, as more fully described in Section 9.6.8.

Q. Will there be environmental training for construction?

A. Yes. FERC guidelines require environmental training for personnel whose activities may impact the environment during pipeline construction. The level of training will be commensurate with the type of duties of the personnel. All construction personnel from the chief inspector, environmental inspector, craft inspectors, contractor job superintendent to loggers, welders, equipment operators, and laborers will have environmental training. The training will be given prior to the start of construction and throughout the construction process. The training program will cover the FERC requirements, job-specific permit conditions, company policies, cultural resource

procedures, SPCC Plan, National Pollutant Discharge Elimination System (NPDES) Stormwater Pollution Prevention Plan, and any other pertinent information related to the job. In addition to the environmental inspectors, all other construction personnel are expected to play an important role in maintaining strict compliance with all permit conditions to protect the environment during construction.

Q. How will the pipeline be operated and maintained?

A. The pipeline will be patrolled on a routine basis and personnel well qualified to perform both emergency and routine maintenance on interstate pipeline facilities will handle emergencies and maintenance. Operation and maintenance will conform to United States Department of Transportation (U.S. DOT) specifications. Maintenance typically involves vegetation control, cathodic surveys, walkovers, and aerial surveys.

Sections 9.6.10.1 – 9.6.10.3 provide specific detail on standard operating and maintenance procedures for cleared areas, erosion control and periodic pipeline and ROW patrols.

Q. Were environmental impacts determined and mitigation efforts made?

A. Yes. A map-level and literature review assessment were performed of the probable environmental impacts and proposed mitigation to wildlife habitat, wetlands, waterbodies, water resources, groundwater, soils, vegetation, cultural resources and land use along the proposed gas pipeline corridor. Sections 9.7.1.1 – 9.7.1.3 describe the environmental permits and other regulatory requirements that are applicable to the pipeline. These sections address only the regulatory requirements applicable to the pipeline route.

Q. Was an assessment of the existing vegetation along the pipeline route conducted?

A. Yes. Sections 9.7.2.2 – 9.7.2.4 summarize the methodology used to assess and the existing vegetation and wildlife in areas that would be affected by the proposed gas pipeline route. They also addresses potential impacts from pipeline construction and presents mitigation measures that will be implemented to protect existing terrestrial, wetland and aquatic resources. The natural resources evaluated in this section include terrestrial vegetation and wildlife, wetlands, aquatic ecology, and rare species and critical habitats. Section 9.7.2.3 describes the existing cover types. Both terrestrial and palustrine ecosystems are represented in the cover type description. Some cover types such as residential and commercial areas are defined primarily by land use, as vegetation is highly variable or absent within these areas. Each cover type corresponds to the classification scheme used by Reschke, 1990. Refer to the vegetation cover types along the proposed gas pipeline route (Appendix G). Table 9-5 (found in Section 9.7.2.6) presents a summary of the distance and area of each cover type impacted by the proposed gas pipeline route.

Section 9.7.2.4 addresses the wildlife species records for the pipeline route. The New York State Breeding Bird Atlas and the New York State Amphibian and Reptile Atlas contains records of species occurrence for areas across the state. This information was researched in order to provide additional information on likely wildlife species that occur along the proposed gas pipeline route. The New York State Breeding Bird Atlas is the result of surveys of breeding birds conducted from 1980–1985. The surveyed areas are broken down into quadrangles (Figure 9-2). The New York State Amphibian and Reptile Atlas provides information gathered during a 1990–1998 survey project. The Amphibian and Reptile Atlas is broken down into USGS Quadrangles Maps. Table 9-2

and Table 9-3 list the species known to occur in surveyed blocks along the route.

Section 9.7.2.5 addresses protected species and habitats. Specifically, this section describes consultation meetings with Federal, New York and New Jersey wildlife protection agencies. The New York Natural Heritage Program (NYNHP) stated that the Program does not have any records of known occurrences of rare or state-listed animals or plants, significant natural comminutes, or other significant habitat on or in the immediate vicinity of the proposed gas pipeline route. The New Jersey Natural Heritage Program (NJNHP) provided a report of rare or state-listed animal and plants, significant natural communities, and other significant habitats which occur or may occur on the pipeline route or in the immediate vicinity, as shown on Table 9-4. The Federal consultation is detailed in Section 9.7.2.5.

Q. What are the potential construction and operation impacts?

A. This section summarizes the proposed pipeline's potential impacts to the vegetative cover types. Potential impacts to associated upland wildlife species are also addressed. Potential construction and operation impacts to wetlands, other water bodies, and aquatic wildlife are described in Section 9.7.3.

The proposed pipeline has three types of direct impacts to vegetation/habitat cover types. The first type is the permanent loss of vegetation/habitat cover type that will occur as a result of construction of the new facilities. The second category of impact represents a temporary loss of vegetation/habitat cover type. The third category includes activities that would alter existing vegetation/habitat cover types.

The proposed gas pipeline route will result in some temporary disturbance to terrestrial resources, primarily during construction. Since the proposed gas pipeline route

will be located along existing ROW to the extent feasible, potentially widening of these corridors is not expected to have significant long-term impacts to terrestrial resources.

Installation of the proposed gas pipeline route will result in the temporary removal of vegetation within a nominal 75-foot wide construction ROW and additional temporary workspace (ATWS). A large portion of the proposed gas pipeline route is located parallel to the abandoned Middletown and New Jersey and Erie Lackawanna Railroad ROWs. Other portions of the proposed gas pipeline route run parallel to existing roadways and existing utility corridors.

To the extent possible, the proposed gas pipeline route will be installed within or overlapping existing ROW to reduce the need to remove trees. The 75-foot construction ROW and ATWS will be cleared of vegetation and graded during construction. Following installation of the pipeline, the construction ROW will be returned to preconstruction grade, restored, and stabilized using approved seed protocol. Of the 75-foot construction ROW, 50 feet will be permanently maintained in a successional old-field or successional shrubland cover type. The remaining 25 feet and any ATWS will be allowed to return to preconstruction conditions. Table 9-5 lists the anticipated impacts, assuming a typical 75-foot wide construction ROW.

The proposed pipeline construction ROW will impact approximately 75.38 acres of forest cover type. Acreages of forested area impacted include the Appalachian oak-hickory forest, hemlock-northern hardwood forest, successional northern hardwoods, and red maple-hardwood swamp cover types. This estimate is based on an interpretation of project aerial photographs and ground confirmation where access has been available. Of this total, it is estimated that 2.08 acres are forested wetlands and 73.30 acres are

upland forest. This calculation is based on a typical 75-foot ROW configuration.

Post-construction operation of the proposed pipeline will necessitate the permanent conversion of approximately 50.27 acres of forested area to successional old-field or successional shrubland in upland areas, and marsh, shrub swamp or wet meadow in wetland areas. These conversions are the result of periodic maintenance of the 50-foot permanent ROW necessary to ensure pipeline integrity and to maintain access to the pipeline. Of the 50.27 acres of total permanent forested area impacted, approximately 1.39 acres consist of forested wetland. The remaining acres of disturbance associated with the 25-foot temporary construction ROW will be allowed to revert to pre-construction conditions.

Construction and operation of the pipeline will result in temporary and permanent alteration of wildlife habitat, as well as direct impact on wildlife such as disturbance, displacement, and mortality. However, the pipeline has been primarily sited to not affect undisturbed areas. It is hoped that this will decrease any impacts to wildlife species. The clearing of ROW vegetation would reduce cover, nesting, and foraging habitat for some wildlife. During construction of the proposed pipeline, the more mobile species would be temporarily displaced from the construction ROW and surrounding areas to similar habitats nearby. Some wildlife displaced by construction would return to the newly disturbed area and adjacent, undisturbed habitats soon after completion of construction. Less mobile species, such as small mammals, reptiles, and amphibians, as well as bird nests located in the proposed ROW, could be destroyed by construction activities. Routine maintenance activities on the permanent ROW would have similar, but less extensive effects on wildlife species in the area, depending on the time of year. However,

the overall impact to general wildlife would not be significant because of the short duration of the disturbance.

In forested areas (75.38 acres), the principal impact on wildlife from the construction ROW would be a change in species using the ROW from those favoring forest habitats (e.g., downy woodpecker [*Picoides pubescens*], barred owl [*Strix varia*], southern flying squirrel [*Glaucomys rolans*]) to those using edge habitats and more open areas (e.g., white-tailed deer [*Odocoileus virginianus*], American kestrel [*Falco sparverius*], white-footed mouse [*Peromyscus leucopus*]). Many species adapt well to this habitat reversal and take advantage of the increased population of small mammals that prefer open areas. Predatory species such as red-tailed hawk and coyote commonly use utility ROW for hunting.

Although the proposed pipeline may be advantageous for some species, it would create new cleared ROW or widen existing cleared ROW, which may affect some forest species, or species that prefer large tracts of unbroken forest. The breeding success of some forest interior bird species (e.g., warblers and thrushes) has been shown to be limited by the size of available unbroken forest tracts (Robbins 1979; Robbins et al., 1989). For these species, additional loss of forest habitat in tracts of already marginal size could further reduce breeding success. The potential for this type of impact would be where the pipeline would traverse smaller, isolated woodlots (Galli et al., 1976). The loss of forest habitat and the creation of open early successional and induced edge habitats in these woodlots would decrease the quality of habitat for forest interior species for distances up to 100–300 feet from the ROW (Anderson, et al. 1977; Temple 1986). This may reduce the density and diversity of forest interior species in a corridor much

wider than the actual cleared ROW. However, it is not likely that a permanent 50-foot wide ROW would impede the movement or breeding of most forest interior species. In addition, the proposed route would be within or adjacent to existing ROW for about 63 percent of its total length, resulting in minimal impact related to forest fragmentation.

Non-forested habitats that would be affected by construction and operation of the proposed pipeline include agricultural areas, mowed lawn, maintained roadside/ ROW, ponds, commercial, residential, non-forested wetlands, and open water. The impact of the proposed pipeline on these habitats and associated wildlife species would be relatively minor and short-term. The temporary alteration of these areas would not have a significant or permanent impact on their habitat values.

To minimize the potential impact on migratory bird species that may use the permanent ROW for nesting, routine vegetation maintenance will be schedule to avoid key nesting periods.

Q. What are the potential indirect impacts from construction and mitigation measures?

A. Erosion and sedimentation will be controlled by practical construction techniques and control measures. Proper installation and maintenance of siltation barriers and other control measures will minimize indirect impacts from erosion and sedimentation.

Fugitive dust may be generated if conditions are dry; however, most of the dust will be deposited within a few hundred feet of the construction area. The amount of deposition will decrease at greater distances from the construction area. Depending upon the location of dust deposition, there may be some effect on wetlands. Any such impact from fugitive dust would be similar to that resulting from erosion and sedimentation associated with surface water runoff. A temporary increase in water turbidity and

subsequent sedimentation could occur. Because impacts will be temporary, fugitive dust is not anticipated to significantly impact wetland vegetation.

Mitigation measures will be utilized, as necessary, to control construction dust. Such measures may include the wetting of soils, use of temporary stabilization methods, and minimizing work areas to the extent possible. With such measures in place, significant impacts to botanical resources associated with fugitive dust are not anticipated.

Impacts to wildlife due to construction-related noise should be relatively minor. Several factors will influence the nature of any impact resulting from construction noise. Various types of construction activities result in different noise levels. Thus, as construction progresses from one phase to the next, the level and nature of associated noise will also change.

Another factor that will influence the effect of noise on wildlife is the seasonal timing of construction. This effect will probably be most important with regard to breeding birds, especially those nesting within a few hundred feet of construction activities. Some nest abandonment may occur for species nesting immediately adjacent to those construction areas.

Little impact is expected to wildlife from construction vehicles. The primary potential for traffic to affect wildlife is due to collisions with animals crossing roadways. Most car/wildlife accidents occur at night, with peak occurrences typically within the first 2 hours after sunset. Since the projected increase in traffic will occur mostly during daylight hours there is limited potential for any significant impact on wildlife as a result of pipeline construction.

Q. Please describe the water resources in the construction area.

A. Section 9.7.3 discusses water resources. The applicable water quality classifications for New York and New Jersey are discussed in Section 9.7.3.1. Intermittent and perennial stream crossings were determined and discussed in section 9.7.3.2. Earth Tech reviewed USGS maps, NWI maps, and aerial photographs to identify streams crossed by the proposed pipeline route. Eighteen perennial and three intermittent stream crossings associated with the proposed pipeline route were identified. Table 9-6 is a summary of these crossings that includes each location by county and milepost, water quality classifications, and water identification number where applicable. Watershed areas and aquifers are described in Section 9.7.3.3. Water supply is described in Section. 9.7.3.4. Aquatic ecology and fisheries resources are discussed in Section 9.7.3.6.

Wetlands along the proposed gas pipeline route were identified by using NWI maps, New York State Freshwater Wetlands maps, Sussex and Orange County Soil Surveys, aerial photographs, aerial video and windshield surveys conducted along road crossings of the proposed gas pipeline route. NWI and New York State Freshwater Wetland map information for the proposed pipeline route is as shown on Figure 9-3 (4 sheets).

Section 9.7.2.3 describes the predominant vegetation community cover types and associated wildlife along the gas pipeline route. The windshield surveys of road crossings identified several small, federal jurisdictional wetlands associated with roadway drainage ditches. According to the NWI classification system, these small wetlands consisted primarily of palustrine emergent marshes and supported plant species characteristic of these systems including cattail (*Typha latifolia*), purple loosestrife (*Lythrum salicaria*),

and sensitive fern (*Onoclea sensibilis*).

Most of the wetlands along the proposed pipeline route are associated with the perennial and intermittent streams previously shown on Table 9-6. A listing, by milepost, of all identified NWI wetland crossings is provided in Table 9-7.

New York State Freshwater Wetlands Act applies to wetlands that are 12.4 acres or greater in size, or smaller wetlands of unusual local importance. The Act requires NYSDEC and the Adirondack Park Agency (for areas in the Adirondack Park) to map all those freshwater wetlands that are subject to jurisdiction of the law. The law requires that NYS freshwater maps show the approximate location of the actual wetland boundary. One state-designated wetland was identified along the proposed gas pipeline route (Table 9-8). Table 9-9 is a summary of the wetland crossings showing the amount of impacts in acres to each wetland type.

Q. What are the environmental impacts to water resources and the proposed mitigation?

A. The impacts and mitigation are described in Section 9.7.3.7 and are as follows:

Stream Crossing Impacts and Mitigation

The proposed pipeline-interconnect route crosses 18 perennial and three intermittent streams along the approximate 20-mile route in New Jersey and New York. Potential adverse impacts to streams crossed during pipeline construction may include increased sediment load and turbidity, substrate removal, fisheries habitat modification, direct mortality of aquatic organisms and accidental release of hazardous materials (e.g., oil, fuel).

The number of stream crossings has been minimized through careful route selection. Every effort will be made to schedule construction at waterbodies during low-

flow conditions. Construction will be scheduled to avoid trout stocking. Implementing appropriate erosion and sedimentation control techniques will further minimize impacts.

More detailed pipeline construction methods and sequencing are described in Section 9.6.8 and are designed to minimize potential adverse impacts to the aquatic resources. Specific construction techniques for each water crossing will be determined in conjunction with permitting agencies. The mitigation measures will protect water uses and quality, as well as the aquatic ecosystem of the streams. With the use of these mitigation measures, impacts to aquatic resources, including stocked fish populations, are minimized.

Short-term minor impacts to streams will occur during the pipeline construction. Once construction is complete, the pipeline will have no long-term impact on the waterbodies crossed. Implementation of mitigation measures during the planning and design phases also will help to minimize potential impacts on the waterbodies crossed.

As an interstate pipeline transmission facility, the proposed gas pipeline route is regulated by FERC under the requirements of the Federal Natural Gas Act (15 U.S.C. 717 *et. seq.*) and the National Environmental Policy Act. As a result, all construction, mitigation, and restoration associated with the gas pipeline will be subject to the FERC Plan and Procedures (12/2/94 Versions), and New York and New Jersey Best Management Practices.

Wetland Crossing Impacts and Mitigation

Construction of the pipeline route will temporarily impact wetlands. Avoidance methods include routing along existing ROWs and pursuing practicable alternatives to wetland crossings. Attempts to minimize wetland impacts will be made during the final evaluation

of the route. Wetlands along the pipeline route will be field delineated to accurately define the limits of the jurisdictional wetland boundaries. Once this is complete, a more thorough evaluation of the route can be made. In many cases, the route will be altered slightly to avoid wetlands or sensitive natural resources.

Unavoidable impacts to wetlands will be minimized by narrowing the construction ROW, minimizing clearing and construction traffic, using best management practices, and implementing measures to retain the existing natural wetland hydrology and characteristics. In addition, coordination with the regulatory agencies will be initiated prior to construction to confirm the construction schedule and review permit conditions with the construction personnel, as necessary.

Wetland impact mitigation is primarily implemented during construction of the gas pipeline. Standard mitigation measures for pipeline construction in wetlands will include the methods detailed in the Application.

Groundwater Impacts

The proposed pipeline route does not cross any protected aquifers or any significant groundwater wells (ENSR 1993 and Orange County Water Authority 2000). The locations of any private wells near the route will be determined prior to pipeline construction, to ensure that no adverse effects to private wells occur.

Temporary impacts to water supply wells and surface water supply sources will be mitigated through minor line adjustments and specialized construction techniques where the pipeline is in proximity to such areas. Impacts, if any, would occur only during the construction phase, and once construction is complete, the pipeline will have no direct physical impact on wells and groundwater.

Public Water Supply

The proposed pipeline route crosses the public water transmission main of the Sussex Borough Water Department. The water transmission runs along Route 23 in Sussex Borough. This area is between MP 1.40 and MP 1.60. The gas pipeline will need to be designed to ensure that there will be no effect on the water supply (Dietz, 2001).

Hydrostatic Testing

Before any segment of new pipeline is placed in service, it will be hydrostatically tested in accordance with U.S. DOT specifications. Upon completion of more detailed engineering analysis, specific withdrawal and discharge sites will be identified and presented to the FERC for future review.

The hydrostatic testing program will be designed such that the impacts of withdrawing hydrostatic test water upon the water sources will be negligible, and will not lead to any long-term, cumulative impacts to surface water resources. Water quality will not be affected by discharge from hydrostatic testing since the proposed pipeline will consist of new pipe and no chemical treatment will be required. The testing water will be discharged back to the source or filtered through hay/straw bales with silt fencing. Filtration will remove any suspended sediment or other debris.

Q. For purposes of analysis of visual resources and aesthetics, what is the character and visual quality of the existing landscape?

A. The proposed route begins at TGP's 300 line at an existing compression station in Sussex County, New Jersey. The proposed route travels in a general northeast direction aligned adjacent to or within existing utility ROW or transportation corridors, as much as possible. These ROW include natural gas pipeline, abandoned railroad, electric

transmission line, and roadway. The proposed route will terminate at a pressure regulating station on the Wawayanda Energy Center site in Orange County, New York.

The proposed route falls within the Hudson Mohawk Lowland, characterizing the central portion of Orange County, New York and extending south into Sussex County, New Jersey. The proposed route primarily consists of a rolling topography with slopes of 0–15 percent. Steep areas, ranging in slope up to 25–45 percent, occur along the proposed route, primarily in New Jersey. Elevations along the proposed route range from 460–850 feet above mean sea level (msl), generally rising from north to south.

Land uses crossed along the proposed route include forest/woodland (upland and wetland), open land, agricultural, residential, and commercial/industrial. There are 24 wetland areas, 21 minor (those less than 10 feet' wide), and no major waterbodies that are crossed along the pipeline route, as discussed in Section 9.7.3.2. Approximately 3.58 miles of active agricultural fields will be crossed. The proposed route will cross 24 roadways including State Route 23 (New Jersey), State Route 284 (New York), U.S. Route 6 (New York), State Route 17M (New York), and I-84.

Q. What are the relevant aesthetic resources?

A. Published lists and maps of federal, state, and local scenic resource categories have been reviewed. These resource categories are noted in Section 9.7.4.3.

Q. What are the nature and degree of visual change and the mitigation measures?

A. The proposed route will primarily lie along or adjacent to existing ROW (i.e. utility, railroad, and/or roadway). A route following existing ROW greatly reduces the need to alter existing land uses and minimizes a change in the visual resources in the area.

Impacts to visual resources will occur during construction. However, that portion

of the ROW across agricultural areas, open spaces, and along existing ROWs will not be visible since, in these areas, the ROW will revert to pre-construction conditions.

Pipeline construction within forest, which comprises approximately 44 percent of the route, will disrupt existing woodland patterns and will result in the creation of open space. However, 25 feet of the 75-foot construction ROW and all other ATWS areas will be allowed to revert back to pre-construction conditions. The maintenance of the remaining 50-foot permanent ROW will constitute a long term impact, but this impact will be minor due to the topographic nature of the area, i.e., hilly, precluding a clear view except from the air.

Construction across and adjacent to existing roadways and ROWs will be performed in accordance with state and federal road opening regulations, permit, and easement requirements. Construction across heavily traveled roadways, such as I-84 (New York), will be bored or tunneled. Exact locations of underground utilities will be determined in the field and construction through these areas will be relatively minor, short term, and will not appreciably change the visual nature of these areas.

A primary factor in determining the location of the proposed above ground facilities will be the selection of sites that are currently under similar land use and have adequate buffer to allow screening of the facilities.

No structures will be required to be removed as part of the project development. Residential land uses within the permanent ROW will be restricted to lawns, gardens, access roads, and driveways and therefore, the nature of residential areas will be preserved, thus minimizing the aesthetic impacts to the extent possible.

Construction of the pipeline across the Appalachian Trail will result in minor

localized impacts. The short-term impact relates to the construction within Unionville Road. During construction, recreational users of the Appalachian Trail will be detoured to avoid construction activity. However, these impacts will be short lived. Construction within Unionville Road will follow the same requirements for road crossings. Therefore, the impacts to the Appalachian Trail will be very short lived and the recreational, visual, and aesthetic values unchanged following construction.

Thus, visual or aesthetic resource impacts will be minor, given the limited change that will occur along the proposed route. There will be no impacts to National Wildlife Refuges, Wild and Scenic Rivers, Scenic Roads, Scenic Areas, State Parks and Conservation Areas, Historic Places, or local parks and recreational areas. Construction will occur, primarily, along or adjacent to existing ROW and this will minimize changes in the visual resources in the area. The one visual change that will be long term will be the conversion of forested ROW to open space.

Q. Was an analysis regarding soils, geology and seismology undertaken?

A. Yes. We analyzed the existing characteristics of soils and geology along the proposed natural gas pipeline route, reviewed potential geologic hazards, and outline the potential impacts and mitigation measures. In addition, this section outlines general measures to be taken in the event that blasting is required.

Q. What are the existing conditions?

A. The existing conditions are discussed in Section 9.7.5.2. The application addresses soil analysis. Figure 9-4 (4 sheets) presents Soil Associations along the proposed natural gas pipeline route that will be crossed. Table 9-10 presents the soil mapping units along the proposed natural gas pipeline route that will be crossed, while Table 9-11 presents

selected characteristics associated with each soil type on the proposed route. The application also addresses geologic setting. Figure 9-5 presents Bedrock Geology along the proposed natural gas pipeline route that will be crossed. Figure 9-6 (4 sheets) presents slopes along the proposed natural gas pipeline route that will be crossed.

Q. Will blasting be required?

A. Rock excavation, by blasting, may be required for project construction. It is anticipated that the blasting depth will be 5 feet or less, and that a blasting control program will be developed. Using modern blasting techniques, rock excavation by blasting can be completed without vibration damage to adjacent structures. According to the soil survey information noted in Table 9-12 there are a number of locations in which soils are shallow to bedrock (i.e., < 5 feet below the soils surface). Approximately 24 percent (3.20 miles) of the entire route will cross shallow bedrock areas, the majority (62.5%) being in New Jersey. Table 9-12 lists, by milepost, the locations that have shallow bedrock. Figure 9-7 (4 sheets) presents shallow bedrock locations along the proposed natural gas pipeline route that will be crossed. Blasting procedures are detailed in the Application.

Q. What geologic hazards were assessed?

A. Geologic hazards are assessed in Section 9.7.5.4 of the Application and accompanying Tables. The following are addressed: earthquakes, active faults, soil liquefaction, landslides, ground subsistence, tsunami, flash flooding, volcanism, and seismic rock.

Q. Please summarize the potential impacts to soils and geological resources.

A. No unique or unusual geologic resources exist along the pipeline route, as previously discussed. Thus, construction of the pipeline will not affect any such resources.

Although a number of earthquakes have occurred in New York and New Jersey since 1737 only 17 of significance (magnitude 4.0–6.0) have been noted (Table 9-13). Of these 17, only four (New York City, Rockaway Beach-New York City, Tarrytown, and White Plains) occurred within 30 miles of the pipeline route. Of these four, only the earthquakes at New York City in 1737 and 1884 have exceeded a magnitude of 5.0. The low number of significant earthquakes in New Jersey & New York since 1737, and the fact that no earthquakes have been recorded as occurring closer than 30 miles to the pipeline route, indicate minimal risk associated with seismic activity. However, pipeline construction will provide for structural resiliency for the unlikely event of an earthquake in the area.

The seismic risk for this area was determined to be Zone C with an effective peak acceleration determined to be 0.15g. Exceedence of this value had a likelyhood of 1-in-10 probability in 100 years exposure time. Thus, seismic risk is not likely to be a hazard for this pipeline. The potential for soil liquefaction is expected to be minimal. Appropriate seismic design factors and current seismic codes and design procedures will be incorporated into the construction of the pipeline.

There are no faults or karst features that will be crossed by the pipeline. The incidence of a tsunami or volcanic activity in the area is unlikely. Flooding is possible at stream crossings, but design of the proposed pipeline will incorporate proper sediment and erosion control.

Bedrock is anticipated along the proposed pipeline route. Blasting will likely be required for construction. Blasting will adhere to all local, state, and federal requirements. Precautions will be taken during pre-construction, construction, and post-

construction activities to ensure stability of slopes, trenches, and excavations and minimize soil erosion. Appropriate erosion and sedimentation controls will be installed and maintained to ensure that water (surface and/or ground) and wetlands are adequately protected.

Q. Were land use impacts assessed?

A. Yes. Section 9.7.6 describes the existing land use types crossed by the proposed gas pipeline route, the land use area to be impacted as a result of construction and operation of the proposed gas pipeline route, and mitigation measures that will be implemented to minimize potential qualitative land use impacts. All land use categories are described in Section 9.7.6.1.

Q. What are the land area requirements, impacts and mitigation measures?

A. Construction and operation of the proposed natural gas pipeline will temporarily alter existing land use types, as discussed in Section 9.7.6.2. The Pipeline ROW is discussed in detail in that section.

The anticipated impacts from construction activities are described by land use category along with the proposed methods that will be used to minimize impacts. The acreage calculations for the land use impacts are calculated based upon a 50-foot permanent ROW and a 25-foot temporary ROW.

Forest/Woodland

The proposed gas pipeline will cross approximately 8.76 linear miles of forest/woodland, or approximately 44 percent of the total route length. A variety of forest/woodland land use types occur along the route, including large undeveloped areas and small isolated tracts between roads or agricultural areas.

A total of approximately 75.4 acres of forested area will be impacted. Based on a standard 50-foot wide, permanent, maintained ROW, approximately 50.3 acres will be permanently converted to open land and the remaining 25.1 acres will be temporarily disturbed and allowed to return to a natural state.

To the extent possible, the proposed gas pipeline route has been routed along existing roads, utility ROW corridors, and an abandoned railroad grade. A route following existing ROW corridors greatly reduces the need to remove mature trees. Where avoidance of forested/woodland area is not feasible, tree removal will be limited to the construction ROW.

Open Land

The proposed gas pipeline will cross approximately 6.87 linear miles of open land, or approximately 3 percent of the total route length. A total of approximately 62.3 acres of open land will be temporarily impacted during construction. No permanent impacts to open land are anticipated. After construction, the entire 75-foot ROW will be allowed to return to open land.

Agricultural Land

The proposed gas pipeline route will cross approximately 3.58 linear miles of active agricultural land during construction. A total of approximately 35.2 acres of agricultural land will be temporarily disturbed. No permanent impacts will occur to these areas as impacts will be limited to construction activities and topsoil will be replaced upon construction completion.

The Orange County Agriculture and Farmland Protection Board oversees the two agricultural districts that have been created in Orange County. These two districts are

designated as District No. 1 and District No. 2. These districts are separated by Route 17 with District No.1 northeast of Route 17 and District No. 2 southwest of Route 17. The towns of Wawayanda and Minisink fall entirely within District No. 2 (Figure 9-8). According to the latest report on District No. 2 (Orange County 1996), Orange County agriculture ranks 10th in New York with regard to gross sales and development pressure has continued to fragment farms, which accelerates abandonment. Any non-agricultural impacts will require a notice of intent submitted to the Commissioner of NYSDAM and the county agricultural and farmland protection board.

Approximately 13.57 miles of the proposed 19.88-mile pipeline will cross Agricultural District No. 2, as shown on Figure 9-8. The remaining approximately 6.31 miles of the proposed pipeline route crosses Sussex County, New Jersey. According to the Sussex County Soil and Water Conservation District district conservation officer, there are no Agricultural Districts in Sussex County, New Jersey.

On May 11, 1994, NYSDAM submitted comments on the Wallkill Pipeline Project Environmental Assessment. The Wallkill Pipeline Project was a proposal to build a natural gas pipeline along virtually the same route as the currently proposed pipeline and the comments of NYSDAM apply equally to the currently proposed pipeline project as they did for the Wallkill Pipeline Project, according to NYSDAM officials. The 1994 comments are provided in Appendix G.

A field assessment was conducted by NYSDAM of a variety of agricultural lands, terrain, soils, and drainage along the proposed right-of-way. The NYSDAM supported the use of two proposed methods for agricultural topsoil protection (i.e., narrow right-of-way double ditching and full width topsoil stripping). Their recommended methods are

detailed in the Application.

The NYSDAM also indicated their support for all other specified standards for construction and restoration in agricultural lands, as explained in the 1994 Environmental Assessment for the Wallkill Pipeline Project.

During pipeline construction in agricultural areas, topsoil will be stripped and piled separately from subsoil during grading. Equipment traffic will be strictly controlled within the agricultural area to minimize rutting and compaction. After the pipe has been lowered into the ditch, subsoil will be used for backfilling and topsoil will then be spread across the graded ROW.

Any impacts to agricultural lands resulting from the proposed pipeline project will be temporary in nature and there will be no irreversible conversion of farmlands.

Mitigation measures for the temporary impact to agricultural land will follow those guidelines as outlined in the FERC "Upland Erosion Control, Revegetation, and Maintenance Plan" (December 2, 1994 Version).

Residential Areas

Approximately 0.14 linear miles of the proposed gas pipeline route will be located within residential areas. Of the entire route, less than one percent consists of residential areas. A total of approximately 1.9 acres of residential area will be temporarily disturbed. Residential areas are generally defined as areas where single or several homes exist within close proximity to the 75-foot construction ROW. This land use category typically consists of open space dominated by residential structures, lawn, driveways, landscaped areas, and other uses associated with residential development.

Special construction methods will be used at site-specific locations to minimize

neighborhood disruptions and to reduce impacts during construction. For example, crossings of private driveways will be managed in such a way as to ensure that access to residential homes and businesses is maintained at all times.

In residential areas, the newly installed pipe will be backfilled or the open trench will be covered with steel plates or timber mats at the end of each day. Either the stovepipe method or the drag section technique, as defined in Section 9.6.3, will be utilized where normal pipeline construction techniques are deemed too disruptive to a residential area.

Industrial/Commercial Areas

The proposed route crosses approximately 0.05 linear miles of land currently used for commercial or industrial purposes. This represents less than 1 percent of the entire length of the proposed route. Approximately 0.4 acres of land in this category will be temporarily disturbed during construction. Construction methods such as stovepipe or drag sections will be used in these areas and will be managed in such a way as to ensure that access to local businesses is maintained at all times.

Crossing of private driveways will be coordinated with business owners so as to minimize impacts. Steel plates and/or wood mats will be kept on-hand at all times so that a temporary platform can be made across the trench should the need arise. All road surfaces will be quickly restored so that normal access to area businesses can resume.

For the purposes of this report, areas within roadway ROW were included in estimates of commercial land uses. Most of road crossings will be completed in one day of construction to minimize potential disruptions to traffic. The crossing and restoration method will comply with state and local requirements.

Extra Work Space and Staging Areas

At certain locations along the proposed gas pipeline route, additional space will be required to store materials or allow safe passage of construction vehicles. The location and dimensions of the extra workspace and staging areas will be established as part of the FERC proceeding. Following are brief descriptions of the areas where extra workspace will be required and estimated size requirements for each area.

Stream Crossings and Wetland Areas

Typically up to 250-foot wide by 50-foot wide staging areas will be required upstream and downstream of each wetland crossed by the route to facilitate pipeline-crossing activities. These staging areas are in addition to the typical permanent and temporary construction ROW and will be used for the assembly and fabrication of pipe sections.

To facilitate pipeline construction across streams, additional staging areas will typically be needed adjacent to and on both sides of the proposed crossings. These additional staging areas are needed to facilitate assembly and fabrication of the pipes necessary to complete the appropriate crossing methods. This work area is in addition to the typical permanent and temporary construction ROW.

The work area will be limited in size to the minimum area necessary to safely complete the stream crossing and accommodate stockpiled material excavated during crossing activities and the prefabricated pipeline crossing section.

Road Crossings

The proposed gas pipeline will cross or utilize portions of 24 roads. Where the proposed gas pipeline route encounters roads, additional workspaces, typically 50 feet

wide by 250 feet long, will be required on both the upstream and downstream sides of the road for four-lane roads, and 50 feet by 100 feet for two-lane roads.

These areas are required either for spoil storage off the roadway surface or to accommodate boring equipment, construction vehicles, and pipe fabrication if the roadway is to be bored.

Shallow Bedrock Areas

In areas of shallow bedrock additional temporary or permanent ROW may be required for storage of the blast rock. Blast rock cannot be used as backfill around the pipe due to its potential for damaging the pipe coating and welded surfaces. The blast rock may be buried, hauled off site, or stored along the edge of the permanent ROW. Temporary or permanent storage or burial of blast rock adjacent to the permanent ROW will require an additional 10–15 feet of width for the construction ROW depending on construction conditions.

Agricultural Area

An additional 10–20 feet of temporary workspace will be required for the working side within agricultural areas. This additional temporary workspace area is necessary for topsoil segregation.

Access Roads

Where possible, access to the construction ROW will be gained by way of existing public roads. Additional access roads may be necessary in areas where access by way of existing roads is not possible.

Pipe and Contractor Yards

At this time, a pipe and contractor yard has not been identified. Possible pipe and

contractor yards will be determined through an examination of existing vacant level land in close proximity and with easy access to the proposed gas pipeline route.

A pipe and contractor yard will be necessary for storage of construction materials and equipment, fuel, temporary office trailers for coordination of construction activities, and other project related activities. Strategic location of this facility will allow for an efficient construction process minimizing the duration of construction activities and disruptions at any given location along the route.

Areas identified as possible pipe and contractor yards will be reviewed for potential impacts to resources such as threatened and/or endangered species, wetlands, floodplains and areas of historical or cultural significance. The site boundaries of the pipe and contractor yard will be delineated and marked to prevent disturbance outside of the yard, to ensure site safety, and to prevent trespassing.

Aboveground Facilities

The proposed gas pipeline route will require mainline valves, metering and regulating facilities, and a cathodic protection system. The locations and specifics for these ancillary facilities have not yet been determined.

Q. Was an assessment of cultural resources performed?

A. Yes. A literature and records search was conducted at the New York Office of Parks, Recreation, and Historic Preservation, the New York State Museum (NYSM), the New Jersey Historic Preservation Office, and the Bureau of Archaeology and Ethnology, New Jersey State Museum. The purpose of the records search was to identify previously recorded archaeological sites and historic structures within the study area, including properties listed on the National Register of Historic Places (NRHP). For purposes of this

application, a 0.5-mile study corridor was examined, although historic properties located within 1 mile of the proposed centerline also were recorded.

For the New York portion of the corridor, 11 archaeological sites and 2 historic structures were identified within the 0.5-mile study corridor. The two historic structures are referenced in OPRHP files but not listed on the National or State Register databases. These resources are presented in Table 9-15. Most of archaeological sites listed in this table were recorded by the Orange County Chapter of the New York State Archaeological Association. In addition to those archaeological sites on record at the NYSM, additional cultural material was encountered during a Phase IB archaeological survey within the study corridor, conducted for the Wallkill Pipeline Project (Oberon and Emery 1994a). No site designations were provided in the report, and the locational information from the survey report is not found on the maps on file at the NYSM.

Records searches in New Jersey identified one previously recorded historic resource within the 0.5-mile study corridor. This resource is the Elias Van Bunschooten House. It is located in Wantage Township, Sussex County, New Jersey (survey file no. R64). The Van Bunschooten House was listed on the New Jersey State Register and the NRHP in 1974, and consists of a ca. 1792 Federal style house associated with the Reverend Elias Van Bunschooten.

No archaeological sites were identified within the study corridor, nor were any identified during a Phase IB survey undertaken in 1993 for the proposed Wallkill Pipeline Project, which closely follows the proposed centerline for the current proposal (Oberon and Emery 1994b).

Q. Will the fuel facilities comply with all applicable regulatory requirements?

A. Yes.

Q. In your opinion, will the pipeline adversely affect the environment?

A. No.

Q. Does this conclude your testimony at this time?

A. Yes.

Case: 00 F 1256

WAWAYANDA ENERGY CENTER

DIRECT TESTIMONY

OF

WILLIAM BAILEY

DONALD NEAL

RICHARD FELAK

DAVID DEVINE

J. DUNCAN GLOVER

Q. Please state your names, titles, affiliations and business address.

A. My name is William Bailey and I am a Principal Scientist and Manager of the Health Practice Scientists for Exponent. My business address is 420 Lexington Avenue, Suite 408, New York, NY 10170.

A. My name is Donald Neal, and I am an Environmental Manager for Calpine Corporation ("Calpine"). My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

A. My name is Richard Felak and I am a senior Associate Consultant with R.J. Rudden Associates, Inc. My business address is 27 Norwood Way, Schenectady, NY 12309.

A. My name is David Devine and I am a Project Development Manager for Calpine. My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

A. My name is J. Duncan Glover and I am a Principal Engineer for Exponent Failure Analysis Associates. My business address is 21 Strathmore Road, Natick, MA 01760.

Q. Mr. Bailey, what are your duties of employment?

A. I perform laboratory and epidemiological research, health risk assessments and comprehensive exposure analysis. Specifically, I perform research on potential health effects of electromagnetic fields and I am also active in setting IEEE standards for human exposure to electromagnetic fields. I use advanced analytical and statistical methods in the design and analysis of both experimental studies and epidemiology and survey research studies.

Q. How are you qualified to perform your employment duties?

A. I received a Bachelor of Arts degree from Dartmouth College, an MBA from the

University of Chicago and a Ph.D. in Neuropsychology from the City University of New York.

Q. Please describe your role in the Project.

A. I am responsible for a study of electric and magnetic fields associated with the proposed electrical interconnection of the Project.

Q. Does your curriculum vitae, which is attached as Exhibit 1, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Neal, what are your duties of employment?

A. I serve as project manager and technical analyst for environmental permitting and assessment of electric generating facilities and programs, representing Calpine before regulatory agencies and in public forums. In this capacity, I have managed and prepared siting studies, environmental impact statements, and applications for wastewater, wetlands and air permits. I have also led environmental, health and safety audits and due diligence investigations. I am experienced with methods of air emissions source testing and continuous emissions monitoring system design, certification and implementation.

Q. How are you qualified to perform your employment duties?

A. I received both a B.S. and an M.S. in Biology from the University of Massachusetts and I have over 18 years of experience related to my employment duties.

Q. Does your curriculum vitae, which is attached as Exhibit 14, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Neal, please describe your role in the Project.

A. I supervised all aspects of the Article X application and I am responsible for project compliance with environmental requirements.

Q. Mr. Felak, what are your duties of employment?

A. I specialize in the technical, cost, performance, business and financial and regulatory aspects of integrated electric power systems. I model, analyze, plan and develop utility generation, transmission and distribution projects and their components. I have participated in many state, commission proceedings, including New York, involving transmission access, retail wheeling, resource bidding and competitive industry transitions.

Q. How are you qualified to perform your employment duties?

A. I have a B.S.E.E. and M.S.E.E. in Electric Power Systems Engineering from Rensselaer Polytechnic Institute. I am also a registered Professional Engineer.

Q. Does your curriculum vitae, which is attached as Exhibit 7, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Felak, what is your role in the Project?

A. I have been responsible for the system reliability interconnection study for the Project. I have overseen studies performed pursuant to the New York Independent System Operator ("NYISO") and NYSDPS requirements for safe electrical interconnection of the new generator. I have been the primary point of contact with the interconnecting utility, the Power Authority of the State of New York.

Q. Mr. Devine, what are your duties of employment and how are you qualified to perform these duties.

A. I have been involved in the power industry for 25 years. As a Project Development Manager, I most often work at developing natural gas fired combined-cycle projects in New York State. I have experience in the development, construction, operations and maintenance of many power projects.

Q. Mr. Devine, what is your role in the Project?

A. I am the development manager for the Project. As such, the electrical interconnection has been part of my responsibility.

Q. Does your curriculum vitae, which is attached as Exhibit 5, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Glover, what are your duties of employment?

A. I analyze elements such as control systems, power electronics, motor drives, inverters, rectifiers, rotating electric machinery, switchgear and transformers. These analyses are applicable to issues pertaining to electrical engineering, particularly as they are related to failure analysis of electrical systems, subsystems and components, including causes of electrical fires.

Q. How are you qualified to perform your employment duties?

A. I have a B.S. in Electrical Engineering from the University of Massachusetts. I also have a M.S. and a Ph.D. in Electrical Engineering from Massachusetts Institute of Technology. I am a Registered Professional Engineer.

Q. Please describe your role in the Project.

A. I conducted a study of predicted changes in electric and magnetic fields related to the Wawayanda Energy Center.

Q. Does your curriculum vitae, which is attached as Exhibit 9, fairly and accurately represent your experience?

A. Yes.

Q. What portion of the Application does your testimony support?

A. Section 8.

Q. Please describe Section 8 of the Application.

A. Calpine is proposing an interconnection with the New York Power Authority (NYPA) 345 kilovolt (kV) "Marcy South" transmission line near Middletown, New York. The Project interconnection will be specifically adjoined into the part of the line that runs between the Coopers Corners and Rock Tavern electric substations in Wawayanda. Figure 8-1 is a one-line diagram of the proposed interconnection. The environmental impacts of the interconnection are considered together with the Project and other interconnections in Sections 6 through 17. An operational and environmental comparison of alternative routes is presented in Section 5.9. This section describes the steps that have been taken to determine if the electric interconnection has unacceptable impacts on the electric transmission system and what, if any, mitigation would be required.

With respect to the Project's potential impacts on the transmission system, Section 1001.1(c) of the Article X regulations requires Calpine to discuss "the benefits and detriments of the proposed facility on ancillary services and the electric transmission system, including impacts associated with reinforcements and new construction." Therefore, this section describes the proposed interconnection to the transmission grid and provides the results of an interconnection study as required in Stipulation 3, Clause 2.

Q. What kinds of consultations were performed regarding scope?

A. In accordance with Stipulation 3, Clause 10, the draft scope of the Interconnection Study was sent for comment and review on October 26, 2000, to system protection and system planning engineers of the following entities: DPS Staff, New York Power Authority (NYPA), Orange and Rockland Utilities, Inc. (O&R), Central Hudson Gas & Electric Corporation (CHG&E), Keyspan Energy (operators for Long Island Power Authority or LIPA), LIPA, Consolidated Edison Company of New York, Inc. (ConEd), New York State Electric and Gas Corporation (NYSEG), Niagara Mohawk Power Corporation (NMPC), Rochester Gas & Electric Corporation (RG&E), New England Independent System Operator (NE-ISO), Pennsylvania-Jersey-Maryland Independent System Operator (PJM-ISO), and the New York Independent System Operator (NY-ISO). Additionally, the draft scope was sent to Public Service Electric and Gas Company (PSE&G) and PowerGEM for comment and review.

By letter, dated November 16, 2000, Mr. Richard B. Wright, Electric Planning Engineer of CHG&E, provided comments to the draft scope of study. Those comments were incorporated into the final scope. No other comments were received. A copy of this comment letter was provided to DPS staff and all New York State TOs and northeastern ISOs, as an attachment to a letter dated December 13, 2000. In accordance with the Stipulation 3, Clause 11, the final scope was provided to DPS staff and all New York State TOs and northeastern ISOs by the same correspondence dated December 13, 2000.

Q. Please describe the pre-application consultation process.

A. Calpine representatives kept in regular contact with DPS Staff and all New York State TOs and the NYISO. For example, Con Edison representatives asked via email for

detailed analysis of the short circuit effects on five additional nearby substations that were outside the submitted scope. ISO-New England stated on December 28, 2000, that it had no comments to offer. PJM also offered no comments. DPS Staff did not request technical conferences to discuss the Interconnection Study as it progressed because all concerned parties were present at NYISO TPAS meetings, which fulfilled the function of the technical conference.

Prior to the release of the draft Interconnection Study, two earlier draft versions were released. The second release was required due to an error in the input data. The third release was required in order to review Con Edison's request for additional short circuit analysis.

The draft Interconnection Study was completed on April 29, 2001. By correspondence dated April 30, 2001, the draft report was sent to system protection and system planning engineers at DPS staff, New York State TOs, and northeastern ISOs for review and comment. A series of technical conferences regarding the draft study were held as part of regularly scheduled TPAS meetings. No written comments were received on the draft study within six weeks of issuance (that is, by June 8, 2001), or thereafter.

Q. Was there any consultation regarding the final report?

A. Yes. No written comment or response to the Interconnection Study was received. A demonstration of compliance with transmission system requirements is described in Sections 8.3 and 8.4 and detailed in Appendix W. The initial draft Interconnection Study was forwarded to NYISO in April 2001. The final study was submitted and recommended for approval at the June 28, 2001 meeting of the Transmission Planning Advisory Subcommittee, which includes representatives of DPS staff and other TOs. On

July 18, 2001, the study was unanimously approved by the NYISO Operating Committee, constituting formal approval by NYISO.

Q. Please describe any consultation that has been conducted outside New York.

A. Neither PJM-ISO nor NE-ISO commented on the draft study that was provided to them. By letter dated December 28, 2000, NE-ISO reiterated that its concerns were limited to the NY-NE interface, whereas the Project's impacts are localized. No joint studies with adjacent ISOs were required as a result of the study or any comments on it.

Q. Has any trade secret status been requested?

A. No. To date, no such protection has been requested, and it is not anticipated to be needed.

Q. Please briefly describe the interconnection study.

A. The Project's Interconnection Study is included in Appendix W. It is issued by NYPA and was performed under the auspices of NYISO

The electric transmission system impact analysis was based upon criteria and technical engineering studies specified by the DPS and in the NYISO generator interconnection process. The Interconnection Study was performed using the applicable criteria established by the NYISO and NYPA, including the Northeast Power Coordinating Council (NPCC) "NPCC Basic Criteria for the Design and Operation of Interconnected Systems" (Basic Criteria) and the "Standards for Planning and Operating the New York Power Pool Bulk Power System."

The thermal, voltage, stability, and short circuit effects on the transmission system were all studied relative to these criteria. *Thermal* impacts result from the flow of excessive current on the lines. If the current at any location exceeds a line's capacity, it

may overheat, leading to excessive sag or even failure of the line or other associated equipment. *Voltage* analysis is concerned with establishing that voltages occurring at certain points on the transmission system are within acceptable bounds, especially after a contingency event occurs. The *stability* analysis examines the effects on system components from a contingency event (such as, for example, the unexpected failure of some generating units, or lightning striking transmission lines), to determine whether the components are self-damping. The *short circuit* analysis examines the loading in various system components, especially circuit breakers, to ensure that during a short circuit event, the protective equipment will be able to open, thereby shutting off the flow of current and protecting the rest of the system from damage.

The analysis was based on currently available data regarding the requirements of adjacent transmission systems. The effects of the Project on other major transmission lines and groups of lines designated by the NYISO as important interfaces were studied. Important interfaces included Total East (i.e., the group of lines carrying power basically to and from the entire eastern part of New York), Central East (i.e., the group of lines carrying power between central and eastern New York), UPNY-SENY (those between Upstate New York and SouthEast New York), UPNY-ConEd, NY-NE (New York-New England), and NY-PJM (New York-Pennsylvania, Jersey, Maryland). Through this process, different power system operating scenarios were examined with the goal of identifying transmission system changes that might be needed in order to maintain reliability.

Q. What was the study period?

A. The study period ran from 2003 through 2008, which is the end of the current NYISO

planning period. Both summer and winter peak and light load conditions were examined in detail. Initial analysis was conducted using the base case data designed to represent forecasts of power system conditions in 2003 obtained from the Federal Energy Regulatory Commission (FERC) Form 715 Filing, a public document wherein the NYISO, and the utilities that own the transmission systems in New York State, provide details on the makeup of those transmission systems and technical information on their performance. Analysis of the remainder of the planning period is not required by the NYISO at this time, but will be performed at a later date as part of the New York Comprehensive Transmission Review.

Q. What was the study area?

A. The Interconnected Bulk Power System of Northeastern North America was represented and analyzed as appropriate in the study according to NYISO practice. The study focused on the area of the bulk power system most likely to be impacted by the Project. This included the New York system east and south of Utica, including the NY-NE and NY-PJM interconnections. Special attention was given to the Middletown area in Orange County, NY. In addition, on the request of the CHG&E special attention was given to the Rock Tavern and Sugarloaf electric transmission areas, and monitoring of the transmission system between CHG&E and O&R (for example, the Rock Tavern 345/115 kV transformer, and 115 kV Rock Tavern to Sugarloaf line) as well as the underlying O&R sub-transmission system. Additional requests by ConEd were also fulfilled by providing further detailed analysis of the short circuit effects on five additional nearby substations, and the stability effects at the substations on the same line as the Project.

Q. How many cases were studied?

A. Two cases were evaluated – with and without the Project. The base case without the Project was adjusted to include the following additional generation and transmission facilities: PG&E Athens, PSEG Bethlehem, ANP Ramapo, Sithe Torne-Valley, Keyspan Ravenswood Cogen, Grassy Point, Marcy STATCOM and shunt capacitors, Middletown Tap, and Ontario Hydro-Michigan Phase Shifter additions.

Q. Describe the transfer location assumptions.

A. In order to determine power transfer limits, it was necessary to vary the power flow across the interface(s) under study by increasing generation at one or more locations on one side of the interface, and decreasing generation by a like amount at one or more locations on the other side of the interface. The assumed locations for increasing and decreasing generation for evaluating transfer limits of the various interfaces are shown in Table 8-1. The conditions were chosen based on historical trends plus forecasts of likely future conditions.

Q. What are the phase angle regulator assumptions?

A. In general, phase angle regulator transformers (PARs) were modeled as regulating (holding scheduled power flow at the base case level) pre-contingency, and free-flowing (up to their physical limits) post-contingency. Those PAR modeling assumptions were applied throughout the study.

Q. Please summarize the interconnection study results.

A. The NYPA analyses found that minimal changes to the existing power system would be required. As an integral part of the Project, a 345kV substation will be constructed and configured in a five-breaker ring bus arrangement to accept the three individual generator step-up transformer leads from the Project. In addition, two transmission line terminals

created by looping the existing NYPA 345kV circuit in and out of the substation will be built. Appropriate power system protection (e.g., relays and switches) for the existing and new facilities will also be furnished. Calpine will construct such improvements for its interconnection and other TOs, as necessary, may install their own relays and switches. No other construction, reconstruction, or reconductoring of transmission lines, substations or switching stations is necessary.

In addition, the study also confirmed the benefits of locating the Project at the proposed site. For example, as discussed in Section 8.4, the effect on power transfer limits is relatively minor, in large part through avoiding locations where power transmission bottlenecks are more prevalent.

The full text of the results of the Interconnection Study are in a detailed report that was prepared following the outline specified in the NYISO Transmission Planning Guideline no. 1.0. Appendix W contains this report.

Q. Were thermal and transfer limit analyses conducted?

A. Yes. An estimate of the increase or decrease in the total transfer capacity across each affected interface was performed. Thermal, as well as voltage and stability, analyses were conducted to assess the performance of the bulk power system with and without the proposed Project in-service. A full description of this analysis is located in Section 8.3.1.

Q. What were the results of the power transfer limit analysis?

A. The results of the normal power transfer limit analysis for the NYISO area show that for the recommended interconnection plan the Total East (TE) transfer limit would be reduced by only 149 MW with the Project in-service (4545 MW vs. 4396 MW). The UPNY-SENY closed interface would also be reduced by only 149 MW with the Project

in-service (4107 MW vs. 3958 MW). The UPNY-ConEd closed interface would be reduced by 589 MW with the Project in-service (5760 MW vs. 5171 MW).

The impact of the Project on emergency power transfer limits within the NYISO was also evaluated. The Total East transfer limit would be again just slightly reduced (by 149 MW) with the Project in-service (5196 MW vs. 5047 MW). The UPNY-SENY closed interface would be reduced by only 148 MW with the Project in-service (4756 MW vs. 4608 MW). The UPNY-ConEd closed interface would be reduced by 741 MW with the Project in-service (8606 MW vs. 7865 MW). This is based on the worst-case criteria of the Millwood-Buchanan North circuit #1 reaching its short-term emergency loading (1902 MW) for the loss of the Millwood-Buchanan South circuit #2, plus the simultaneous hypothetical possibility of one Millwood 345/138kV transformer being out of service at the same time. The results for all of the foregoing are shown in Tables 1 and 3 of the detailed report in Appendix W.

For power flows outside of the NYISO area, the results of the normal thermal transfer limit analysis show that the Project has no significant impact on inter-area interfaces in either direction. Similarly, the results of the emergency thermal transfer limit analysis show that the Project has no significant impact on inter-area interfaces in either direction. Those results are shown in Tables 2 and 4 of the NYPA report provided as Appendix W.

No forecasted reduction in transfer capability across affected interfaces violates reliability requirements.

Q. Was a voltage analysis completed?

A. Yes. Detailed steady state and contingency voltage analysis was performed with and

without the Project in place. The analysis examined the impact on NYISO intra-area interfaces (Total East, Central East, UPNY-SENY, UPNY-ConEd). The results show slight reductions for Total East (5648 MW vs. 5069 MW), Central East (2912 MW vs. 2673 MW), UPNY-SENY (5173 MW vs. 4603 MW), but a favorable increase for UPNY-ConEd (6940 MW vs. 7166 MW). In all cases the limits are based on a pre-contingency low limit at the Pleasant Valley 345 kV bus. However, since the thermal limits previously identified and discussed are more restrictive than these voltage limits in any case, the voltage performance of the bulk power system is not degraded by the Project. The voltage study is detailed in Table 6 of the NYPA report found in Appendix W.

Q. Please describe the stability analysis.

A. Power system transient stability simulations (both normal and extreme contingencies) were performed with and without the Project for all the scenarios described in Clause 5 and required under Section 7.0 of the NPCC Basic Criteria for the Design and Operation of the Interconnected Power System. An additional contingency assessment, including the required sensitivity analysis for winter peak and light load conditions was also performed. Normal contingencies, extreme contingencies, and the additional contingency analysis are addressed in Section 8.3.3 of the Application.

Q. What were the results of the stability analysis?

A. A list of all the contingencies simulated, and the results, are shown in Table 7 and 8 of the NYPA report in Appendix W. Graphical stability plots are also included in Appendix C of the NYPA report. These results show that the transient stability performance of the bulk power system is not degraded by the addition of the Project.

The results of all the supplemental stability simulations indicate that the interconnected bulk power system remains intact even after the occurrence of these hypothetical severe extreme contingencies. None of the simulations result in violation of NYISO criteria for extreme contingencies.

Q. Please describe the short circuit analysis.

A. A short circuit analysis was conducted to evaluate the impact of the Project on the adequacy of circuit breakers and related equipment at nearby substations that might be significantly impacted by the Project as described in Section 8.3.4.

Q. What were the results of this study?

A. The results show that the highest contribution attributable to the Project is about 3.50 kA (3500 amps) at the Rock Tavern 345 kV bus for a three-phase-to-ground fault. The total symmetrical current at this breaker is 27.1 kA without the Project, and 30.6 kA with the Project. The interrupting capability of the existing circuit breakers at Rock Tavern range from 38 kA to 50 kA. All the other similarly rated breakers show fault currents well below 30 kA. Thus, no significant impact due to the Project was found. A table detailing these results is shown in section 4.3 of the NYPA report in Appendix W.

Q. Are any protective relays required?

A. Yes. Protective relay requirements are limited to installing new equipment at the Project switchyard interconnecting the Project to the existing adjacent 345 kV NYPA circuits and changes to accommodate the new interconnection at the substations that interconnect directly with those circuits, as detailed in Section 8.3.5.

Q. Please describe any applicable auto-reclosing.

A. NYPA concluded that automatic reclosing is not applicable to the Project and its

interconnection. Line 42 is currently equipped with delayed auto-reclosing at 9 & 18 seconds, precluding the need for a "shaft-torque" study. However, stability simulations were conducted for those auto-reclosing sequences at the Project, Coopers Corners, and Rock Tavern. The results show stable and well-damped system operation for all simulations. (Refer to Appendix W, Executive Summary, page i).

Q. Is the project compliant with the system reliability criteria of affected entities?

A. The Project's interconnection is compliant with the New York State Reliability Council (NYSRC) Reliability Standards, which are more stringent than NPCC and NERC criteria. The NYSRC criteria are also used by NYPA. Table 8-2 provides a compliance tabulation.

The NPCC criteria are virtually identical to the NYSRC requirements with one exception. The NPCC criteria are more liberal in that they allow two lines to be on the same tower for 5 or fewer towers exiting the station without requiring evaluation of the loss of both lines. NYSRC criteria require that under such an arrangement the loss of both lines be tested. Compliance with NYSRC criteria therefore assures compliance with NPCC criteria.

The North American Reliability Council (NERC) has approved *Planning Standards*, which are detailed in Section 8.3.7.

Since the NYSRC criteria are more stringent than the NERC criteria, by complying with the NYSRC criteria the Project is by definition in compliance with the NERC criteria.

Finally, since the Study has shown that other NY Transmission Owners, as well as PJM and ISO-NE are not affected by the addition of the Project, detailed analysis of

their reliability criteria is not needed.

Q. Please describe the Project's potential significant impacts on the New York State transmission system reliability.

A. As discussed in Section 8.3 and detailed in the Interconnection Study (Appendix W), the Project will not overload the thermal capacity of the lines in the region or the transfer capability across interfaces. It will not cause violations in the standards relating to the voltage of the system, stability, or short circuits. Furthermore, data provided in Sections 5 and 9 of the Application demonstrate that the proposed generating equipment and the proposed fuel source are extremely reliable. Thus operation of the Project will improve the general reliability of the electricity supply. As the Project will not result in a reduction in reliability, a discussion of options to mitigate losses to reliability is not necessary.

Q. Is it your opinion, then, that the Project will not adversely impact the reliability of electricity supply?

A. Yes. The NYPA System Reliability Impact Study determined that the Project will not have a significant adverse impact on the bulk power system, provided that the recommended interconnection plan is implemented. There are also a number of benefits from the Project as detailed in Section 8.4.2 of the Application.

Q. Were electric and magnetic field studies done?

A. Yes. The cumulative effect of the Project and its 345 kV interconnection to the 345 kV NYPA Line 42 on levels of 60-hertz electric and magnetic fields was estimated by measurements and calculations. The analysis, input data and output data are provided in Appendix M. The analysis considered summer normal, winter normal, and short-term

emergency (STE) ratings.

As stated in Appendix M, the criteria for evaluating potential Project impacts are edge of right-of-way standards for fields at the edge of high voltage transmission rights-of-way. The electric field standard is 1.6 kV per meter (kV/m) (PSC, Opinion 78-3) and the interim magnetic field standard is 200 milligauss (mG) (PSC *Statement of Interim Policy on Magnetic Fields of Major Electric Transmission Facilities*, September 11, 1990).

Q. Is it your opinion that the Project will not adversely increase electric or magnetic field levels?

A. Yes. The conclusion of the studies in Appendix M is that Project operation will not increase either electric or magnetic fields levels above the limits set by the PSC for new transmission line rights-of-way.

Q. Does this conclude your testimony at this time?

A. Yes.

Case: 00 F 1256

WAWAYANDA ENERGY CENTER

DIRECT TESTIMONY

OF

DONALD NEAL

MICHAEL THERIAULT

Q. Please state your names, titles, affiliations and business addresses.

A. My name is Donald Neal, and I am an Environmental Manager for Calpine Corporation ("Calpine"). My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

A. My name is Michael Theriault, and I am President and Principal Consultant for Michael Theriault Acoustics, Inc. My business address is 15 Worcester Square, Suite 4, Boston, MA 02118.

Q. Mr. Neal, what are your duties of employment?

A. I serve as project manager and technical analyst for environmental permitting and assessment of electric generating facilities and programs, representing Calpine before regulatory agencies and in public forums. In this capacity, I have managed and prepared siting studies, environmental impact statements, and applications for wastewater, wetlands and air permits. I have also led environmental, health and safety audits and due diligence investigations. I am experienced with methods of air emissions source testing and continuous emissions monitoring system design, certification and implementation.

Q. How are you qualified to perform your employment duties?

A. I received both a B.S. and an M.S. in Biology from the University of Massachusetts and I have over 18 years of experience related to my employment duties.

Q. Does your curriculum vitae, which is attached as Exhibit 14, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Neal, please describe your role in the Project.

A. For the Project, I supervised all aspects of the Article X application and I am responsible for project compliance with environmental requirements.

Q. Mr. Theriault, what are your duties of employment?

A. I specialize in noise control and environmental noise impact assessment for combustion turbine power projects. I prepare environmental noise impact licensing applications, design and implement noise control programs, conduct plant noise level performance testing and perform noise control due diligence reviews.

Q. How are you qualified to perform your employment duties?

A. I have a B.S. in Electrical Engineering from the University of Maine, with a concentration in electro-acoustics and environmental noise control. I have over fifteen years of experience related to my duties.

Q. Does your curriculum vitae, which is attached as Exhibit 17, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Theriault, please describe your role in the Project.

A. I have overseen a complete acoustical analysis of the Project. This includes an assessment of baseline noise, the completion of a noise impact assessment during construction and operation, a cumulative impact assessment and a mitigation proposal.

Q. Gentlemen, what section of the Application does your testimony support?

A. Section 11.

Q. Please describe Section 11.

A. Section 11 addresses the issues raised in Stipulation 6. All new power plants in New York State are required to quantify expected noise impacts and to minimize them.

Generally, the emphasis of environmental noise regulation is toward noise-sensitive receptors, such as residences, near a facility that produces noise. Specifically in the Project proceeding, Stipulation 6 (Clauses 1 through 11) and a "Noise Impact Assessment Protocol" (attached to the stipulation) address noise issues. The stipulation and protocol require documentation of the existing and proposed noise levels around the Project site, an impact assessment during construction and operation, and mitigation of noise levels to achieve compliance with applicable noise standards.

Appendix N provides a complete noise assessment report. Section 11 provides a summary of that report.

Q. Where were field measurements taken from in order to ascertain the ambient baseline noise conditions?

A. In accordance with Stipulation 6, Figure 11-1 provides the residential and property-line noise measurement locations for the noise study. These locations are: Monhagen Brook (the nearest public open space to the Project); the Moon School (the nearest public school); Dolsontown Road East (the nearest residences east of the Project site); Dolsontown Road West (the nearest western residences); Dolsontown Road South (the nearest residence south of the Project site); Genung Street; Country View Manor Apartments; and Ruth Court.

Q. Please describe the ambient noise survey measurements.

A. Measurements included both attended, short-term (i.e., 20-minute samples performed during daytime/evening and early morning hours) and unattended, long term monitoring (i.e., one-hour periods for a minimum of 24 consecutive hours). Warm-weather, long-term monitoring was conducted in the vicinity of residences located north and east of the

Project site. Cold weather long-term monitoring was conducted adjacent to the nearest southern residence, as well as near Country View Manor.

All warm and cold-weather measurements included percentile sound levels (L_{MAX}, L_1, L_5, L_{10}, L_{50}, L_{90}, and L_{MIN}) as well as energy average levels (L_{EQ}). One-third ($1/3^{rd}$) octave band readings were also collected during attended measurements to identify existing pure tones. Pure tones occur when sound is concentrated in a narrow band of frequencies, typically perceived as hum, buzz or whistle-like, in character.

Q. What were the results of the ambient baseline survey?

A. The background L_{90} noise levels at each location are summarized in Table 11-1 of the Application. These figures are based on nighttime/early morning measurements shown in Tables 11-2 and 11-3. Detailed results of the ambient noise measurements are provided in Appendix N.

Q. What are the local noise standards applicable in the Project area?

A. The applicable Noise standards are described in Section 11.3 of the application and Section 5 of Appendix N. Generally, noise and noise assessment methods are regulated by the Wawayanda Noise Code and DPS. Additionally, the U.S. Department of Housing and Urban Development and the USEPA have also established guidelines, which were referenced during the assessment.

Q. How was the construction noise modeling completed?

A. An acoustical model of construction operations and equipment was developed using SoundPLAN® Version 5.0 and industry standard algorithms to predict noise levels at the nearest receptors. Energy equivalent sound levels (L_{EQ}) as well as maximum sound levels (L_{MAX}) were estimated for each of five major construction phases, including 1)

grading and excavation, 2) concrete pouring, 3) steel erection, 4) equipment installation and 5) finishing. Adjustments for geometrical spreading (hemispherical divergence); atmospheric absorption and ground effect were included.

In accordance with the requirements of the Noise Impact Assessment Protocol, for periods when construction noise levels are predicted to exceed existing L_{EQ} levels by more than 10 decibels, an evaluation of the potential for indoor and outdoor speech interference, and for sleep interference has been conducted.

Q. What were the results of the construction noise impact assessment?

A. As shown in Table 11-4, L_{EQ} levels are predicted to range from the mid-30s to high-60s (A-weighted) at the nearest receptors. Modeling results showed that during the grading and excavation phase and the steel erection phase, construction noise levels may exceed existing equivalent sound levels by more than ten (10) decibels at the nearest southern residence only. For all other locations and construction phases, noise levels are expected to be less than 10-decibels above existing levels. Thus, the required analyses for the grading/excavating and steel erection phases were conducted at the nearest southern residence. With respect to speech interference, it is shown in Table 11-4 that construction noise levels at the nearest southern residence are predicted to be no higher than 68 dBA, and therefore normal conversation (i.e., 95% sentence intelligibility) is expected outdoors as well as indoors.

Although construction noise levels may be higher than typically recommended to avoid sleep disturbance at the nearest southern residence, most construction activities will take place during daytime hours when acceptance towards noise is higher, and the risk of sleep disturbance and interference with relaxation activities is lower. Given that normal

speech intelligibility will be maintained both indoors and outdoors; and that the risk of sleep disturbance is low during daytime periods; and that average individuals are usually tolerant of construction noise given its temporary nature, the potential for community complaint is small.

Nighttime construction activities will likely be similar to the "finishing phase" of construction, which is typically 10 decibels quieter than for other phases. Also, the size of the nighttime work force would be significantly smaller than during daytime hours, further reducing sound levels. Finally, since the majority of work (e.g., electrical, piping, craft work etc.) will probably take place within the generation building, noise due to construction operations and activities should be significantly attenuated compared to modeled conditions.

Q. Please describe the noise abatement measures for construction activities.

A. Construction noise is difficult to control because of the mobile nature of its sources and the flexibility of schedule inherent in most construction work. However, construction is also temporary in nature. In order to mitigate the possible effect of noise caused during the temporary construction period, Calpine will implement all reasonable noise abatement measures for normal as well as significant noise-producing construction activities. This may include the strategies described in Section 11.4.2 of the Application.

Q. What are the operational noise design goals?

A. In accordance with DPS requirements, the MCNR method was used to assess potential noise impacts associated with facility operation. While the DPS has historically accepted a rating of "D," corresponding to a response of "sporadic complaints," it is currently requesting for new projects that a more stringent rating of "C," corresponding to "no

reaction although noise is noticeable," be achieved. The Project has evaluated both a rating of "D," which corresponds to a sound level of about 51 dBA at the nearest residence, and a rating of "C", which corresponds to about 46 dBA at the nearest residence, as listed in Table 11-5. Note that the rating "C" is more stringent than either the HUD or EPA guidelines described in Section 11.3.3.

Q. Please describe the operational noise modeling.

A. Three-dimensional acoustical models of the Project were developed using SoundPLAN® Version 5.0, to determine conceptual noise controls required to achieve both Composite Noise Ratings of C and D at nearby receivers. Sound levels were adjusted for: the reduction of sound with distance (*geometrical spreading*); the molecular absorption of sound by air (*air absorption*); the absorption and reflection of sound by the ground (*ground effect*); and changes in source levels with direction (*source directivity*). Sound levels were further adjusted for the transmission loss of buildings, as appropriate; and for the shielding effects of buildings, tanks, and site topography to estimate far-field Project noise levels.

Q. What were the results of the operational noise impact assessment?

A. As shown in Table 11-6, Project noise levels at the nearest homes are expected to range from about 31 to 46 dBA, when using equipment necessary to achieve a Composite Noise Rating of C. Similarly, A-weighted levels are predicted to range from about 35 to 50 dBA, when using equipment necessary to achieve a Composite Noise Rating of D.

Section 4 of the Noise Impact Assessment Protocol requires that the predicted noise levels be compared to the Wawayanda Code and New York State DPS standards described in Section 11.3. Noise levels generated during operation of the Project will

comply with the proposed Wawayanda Zoning Code amendment, which states that noise may not exceed an intensity of 65 dBA as measured 100 feet from the boundaries of the lot where such use is situated. In comparison with the DPS standards, the Project has a noise design goal rating of C at the nearest impact assessment location. As shown in Table 12 of Appendix N, the rating at all locations except the nearest residence to the south and to the west is expected to be A or B.

Q. Were any specific noise impacts analyzed?

A. Yes, the following potential noise impacts were evaluated: hearing damage; sleep interference; indoor and outdoor speech interference; low frequency noise annoyance; potential for community complaint; and the potential for structural damage due to vibration or infrasound. An analysis of all of these potential effects was carried out as part of the Noise Impact Evaluation, the full text of which is attached in Section 10 of Appendix N. Section 11.7 of the Application summarizes this analysis.

Q. Please describe the noise abatement measures for Project Operation.

A. Major noise-producing equipment and reasonable mitigation measures are discussed in Section 11.6.2 of the Application. Specifically, this section addresses mitigation of noise produced by the: air cooled condenser, combustion turbine/HRSG exhaust stack, power block buildings, CTG compartment ventilation system, gas metering station, building ventilation systems, balance of plant equipment, and start-up & shutdown. Section 11.6.2 also provides conceptual noise control costs. Table 8 of Appendix N provides incremental noise control costs to achieve Composite Noise Ratings of C and D at nearby receivers. It is estimated that to achieve a rating of C, noise controls will cost approximately $1.8 million dollars, or $900,000 more than achieving a rating of D.

Calpine is committed to establishing a noise level design goal of MCNR C for the Project. The design goal is not considered to be a guaranteed noise level for the Project, since it may not be possible to purchase equipment sufficiently mitigated such that a three (3) decibel design margin is maintained in all octave bands, including tolerances, at all receiver locations, for the case of MCNR C.

Q. Please describe post-construction noise monitoring that will occur at the Project site.

A. The post-construction noise assessment protocol is presented in Section 11 of Appendix N. The results of the post-construction monitoring will be a compliance assessment report that will include the elements describe in Section 11.8 of the Application.

Q. Were any cumulative noise impact assessments undertaken?

A. A Cumulative impact assessment was undertaken to determine the combined impacts of the Project with the Orange County Recycling and Ethanol Production Facility (the Masada project).

Q. Please describe these cumulative construction impacts.

A. The Masada project FEIS and DEIS, Statement of Findings, Permit Conditions and regulatory approvals did not contain an analysis of construction noise for the Masada project. Therefore, an estimate of effects was conducted presuming construction noise produced by the Masada project would be equivalent to construction noise for the Wawayanda Energy Center. Given this, changes in noise level at receiver locations (relative to the contribution expected from the Wawayanda Energy Center only) ranged from one (1) to nine (9) dBA, as shown in Table 11-7.

Q. Please describe the cumulative operation impacts.

A. Operational sound power levels for the Masada project were developed based on stationary and non-stationary equipment noise levels provided in the Final Environmental Impact Statement. Sound power levels were adjusted using only hemispherical divergence and atmospheric absorption, to conservatively estimate the noise contribution at the nearest sensitive receptors surrounding the Wawayanda Energy Center. As shown in Table 11-8, the change in noise level at sensitive receiver locations (relative to the contribution expected from the Wawayanda Energy Center alone) ranged from one to four decibels.

Q. Was a comparison to local activities made?

A. Yes. The comparison of activities is presented in Section 13 of Appendix N. The three local activities for comparison are the Orange County Speedway, fireworks displays, and National Guard C5A airplane flyovers. The Project will be quieter than the Orange County Speedway even at residences south of the site. At receptor points north of the site (closer to the Speedway), motor sport noise will be 14 to 21 decibels louder than the Project. The Project will be approximately 35 to 40 decibels quieter than a conservative noise level estimate of fireworks displays. The Project will be in the range of 24 to 39 decibels (depending upon receptor) quieter than the estimate of aircraft flyovers presented in Appendix N.

Q. Does the noise assessment appropriately characterize the nature of the Project's probable noise impact?

A. Yes.

Q. In your opinion would the noise generated by Project construction or operation cause a significant adverse impact to the surrounding area?

A. No. The results of the studies show that Project construction and operation will not significantly impact sound levels at sensitive receptors and that the construction of the Project will only temporarily increase noise levels.

Q. Will the construction and operation of the Project comply with all federal, state and local laws relevant to noise?

A. Yes.

Q. Does this conclude your testimony at this time?

A. Yes.

CASE: 00 F 1256

WAWAYANDA ENERGY CENTER

DIRECT TESTIMONY

OF

STEPHAN SOLZHENITSYN

DONALD NEAL

RICHARD HOLMES

CRAIG WOLFGANG

Q. Please state your names, titles, affiliations and business addresses.

A. My name is Stephan Solzhenitsyn and I am a Senior Project Manager with TRC's Energy Group. My business address is Boot Mills South, Foot of John Street, Lowell, Massachusetts 01852.

A. My name is Donald Neal, and I am an Environmental Manager for the Calpine Corporation ("Calpine"). My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

A. My name is Richard Holmes and I am a Project Manager for cultural resource management projects for TRC. My business address is 4221-A Balloon Park Road NE, Albuquerque, NM 87109.

A. My name is Craig Wolfgang. I work for TRC. My business address is 1200 Wall Street West, Lyndhurst, NJ 07071.

Q. Mr. Solzhenitsyn, what are your duties of employment and your role in the Wawayanda Energy Center Project ("Project")?

A. As a Senior Project Manager, my duties include preparing environmental impact assessments, siting studies and siting applications in the Northeast, Mid-Atlantic and Southern United States. For this Project, I am the project manager at TRC. In that capacity, I have overseen the preparation of various environmental studies, with particular emphasis on land use, cultural resources and alternatives evaluations.

Q. How are you qualified to perform your employment duties?

A. I have a Bachelor of Arts degree in Visual and Environmental Studies from Harvard

University and I have a Master of City Planning from Massachusetts Institute of Technology.

Q. Does your curriculum vitae, which is attached as Exhibit 16, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Neal, what are your duties of employment?

A. I serve as project manager and technical analyst for environmental permitting and assessment of electric generating facilities and programs, representing Calpine before regulatory agencies and in public forums. In this capacity, I have managed and prepared siting studies, environmental impact statements, and applications for wastewater, wetlands and air permits. I have also led environmental, health and safety audits and due diligence investigations. I am experienced with methods of air emissions source testing and continuous emissions monitoring system design, certification and implementation.

Q. How are you qualified to perform your employment duties?

A. I received both a B.S. and an M.S. in Biology from the University of Massachusetts and I have over 18 years of experience related to my employment duties.

Q. Does your curriculum vitae, which is attached as Exhibit 14, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Neal, please describe your role in the Project.

A. I supervised all aspects of the Article X application and I am responsible for project compliance with environmental requirements.

Q. Mr. Holmes, what are your duties of employment?

A. My duties include developing proposals, preparing budgets and schedules, planning and conducting research, writing reports and working with clients to provide useful products. I regularly work with laboratory, archival and field personnel to improve the quality of their performance and assure that particular research needs of a project are met. I perform extensive research in the historic period of the Northeast. I perform cultural resource management plans, data recovery excavations, test excavations and site inventories.

Q. How are you qualified to perform your employment duties?

A. I have a B.A. in History from Amherst College, and a M.A. and Ph.D. in Anthropology from the University of Massachusetts. I am also a Registered Professional Archaeologist.

Q. Does your curriculum vitae, which is attached as Exhibit 10, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Holmes, please describe your role in the Project.

A. I have overseen the performance of an archaeological Phase IA and IB investigation of the Wawayanda Energy Center site, laydown area and interconnection corridors.

Q. Mr. Wolfgang, what are your duties of employment?

A. I am experienced at a variety of environmental assessment and public participation techniques and I manage complex and controversial projects, providing the interface between clients, multidisciplinary technical staff, regulatory approval agencies and the affected public. I have been a project manager, I have assessed NEPA compliance and I

have performed land use and aesthetic impact assessment.

Q. How are you qualified to perform your employment duties?

A. I have a B.S. in Natural Resource Conservation from the University of Connecticut and an M.C.P. in City Planning from the Georgia Institute of Technology.

Q. Does your curriculum vitae, which is attached as Exhibit 21, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Wolfgang, please describe your role in the Project.

A. I conducted a visual resources assessment for the Wawayanda Energy Center. This assessment has included characterizing the visual quality of the landscape under existing conditions, assessing impacts through prescribed analytical methods and proposing mitigation for visual impacts.

Q. What Sections of the Application does all of your testimony support?

A. Sections 7 and 16.

Q. Please briefly describe Section 7 of the Application.

A. This Section describes the cultural resources on and in the vicinity of the Project site. Cultural resources refer to both archaeologically and historically sensitive places. In accordance with Stipulation No. 2, Section 7 reports the results of the Archaeological Resources Study and the Historical-Architectural Resources Study. It also details the Unanticipated Discovery Plan.

Q. Please describe the applicable regulatory requirements addressed by Section 7.

A. Cultural resources refer to both historic and archaeologically sensitive places.

Section 106 of the National Historic Preservation Act of 1966 regulates construction in areas of cultural significance. The federal legislation requires that any federal action (including granting of permits) with the potential to cause impacts to cultural resources (those listed in or eligible for listing in the National Register of Historic Places) be reviewed by the Advisory Council on Historic Preservation. The New York State Office of Parks, Recreation and Historic Preservation (OPRHP) is the agency delegated to implement this federal review process in New York State, both on its own behalf and to recommend actions to the Advisory Council. This office is also the state agency responsible for the coordination of New York State's historic preservation programs under Section 14 of the Parks, Recreation, and Historic Preservation Law. When the federal Section 106 process does not apply, the state Section 14.09 process can be used to judge impacts to properties listed or eligible for the State Register of Historic Places (which is essentially the same as the National Register). A similar process is required in the case of an Article X project. For Article X projects, the Public Service Law requires the Siting Board to issue a Certificate only if it finds that the Project "minimizes adverse environmental impacts, considering... the interest of the state with respect to... preservation of historic sites." PSL §168.2(c)(i). The Siting Board regulations explicitly require applicants to list local cultural resources, specifically the "identified historic, community and archaeological resources listed, or eligible to be listed, in the National or State Registers of Historic Places." 16 NYCRR 1001.3(b)1(iv). Calpine has consulted with OPRHP and conducted studies to determine whether any such potential impact is likely to occur.

Q. Was an archaeological resources study done?

A. Yes, a Phase I study was done. Sections 7.2.1 through 7.2.3 address the requirements of Stipulation 2, Clauses 1(a), 1(b), 1(c) and 2. Clause 1(a) requires that Phase IA and IB studies be conducted for the area of potential effect (APE) on the Project site as well as any areas to be used for interconnections, including a description of the methodology used for such studies. Clause 1(b) allows that no such studies are required for previously studied interconnections. No such studies had been conducted previously for the Project site (including eastern laydown area), southern laydown area, or the interconnections. Clause 1(c) calls for Phase II investigations where warranted. The Phase I studies summarized in this section concluded that Phase II investigations are not warranted. Clause 2 requires that all archaeological materials recovered during the cultural resources investigation will be cleaned, catalogued, inventoried and curated according to New York Archaeological Council standards.

A Phase IA and IB survey of the site and areas to be used for interconnections and laydown was conducted, in order to determine whether there is the likelihood of impact to any archaeological resources by the construction or operation of the proposed Project. Appendix I contains the Phase IA and IB study report. A copy of the Phase I report was provided to OPRHP as part of a Section 106/Section 14.09 consultation. By precedent established in Siting Board Case no. 00-F-0566, OPRHP's response is expected to be made following from the Department of Public Service.

Q. How was the study area divided for the purpose of these studies?

A. For the purposes of this study, the study area was divided into three separate areas – the

Northern Portion, the Southern Portion and the Water Line Route. All three are depicted in Figure 7-1. The Northern Portion consists of the Project site (including its eastern laydown area) located on the north side of Dolsontown Road and the Southern Portion consists of the laydown/parking areas located on the south side of Dolsontown Road, which includes the electric interconnect route. The Water Line Route (for the wastewater discharge and effluent supply lines) runs from the site to the Middletown publicly owned treatment works (POTW). Detailed descriptions of each of these areas are provided in the Phase I Report (Appendix I). The off-site potable water line for the Project will be located entirely within the previously disturbed roadbed of Dolsontown Road from the Project site toward the west.

Q. What did the Phase IA survey consist of?

A. The Phase IA reconnaissance survey included a pedestrian inspection of the entire property, a site file and literature search, and a review of historical maps.

The pedestrian inspection consisted of a 100 percent survey over the study area, except for delineated wetlands. The systematic walkover was performed at 15-meter (approximately 50 foot) intervals. Surface visibility was about 80 percent during the first session, but less than 50 percent during the second. One artifact, an ironstone plate fragment was found. No features were observed, except for an earthen ramp that leads up to the abandoned railroad grade from the Northern Portion. Stone walls are present along portions of the Project site boundary.

Background research consisted of a site files and literature search at the Field Services Bureau of the OPRHP at Peebles Island State Park. Information reviewed

included site forms and portions of previous research reports. Additional information was acquired at the Thrall Public Library in Middletown and from previous research conducted for the Preliminary Scoping Statement submitted as part of the permitting process under Article X.

The historic maps and other materials that were reviewed indicate that the Project site was used as farmland from the late nineteenth century to the present. A map from 1875 indicates that the Project site was rural at that time, although the adjacent railroad grade was already in existence.

Q. Had previous studies been conducted in the Project area?

A. Several previous cultural resource surveys have been conducted in the vicinity of the Project site. These are detailed in Section 7.2.2.1. No further research was recommended by these studies.

Q. Please describe any recorded archaeological sites in the Project area.

A. No archaeological sites have been recorded within the Project site, laydown areas, or interconnections. Within 1.6 km (1 mile) of the study area are several sites recorded in the OPRHP site files, including: A07119.0008, A07119.0015, A07119.0016, A07119.0017, A07119.0018, A07119.0021, and A07119.0083. Most of these sites were recorded by the Orange County Chapter of the New York State Archaeological Association, but there is minimal information on the nature of the finds and the cultural affiliation. Site A07119.0008 was revisited by a later survey (Lenik et al. 1990); a chert flake and a chert core were recovered from a shovel test pit (STP).

Hartgen Archaeological Associates, Inc., recorded A07119.00083. It is also

known as the Simon site (23-131-13). This site contained a transitional Late Archaic/Early Woodland projectile point and projectile point base, a bifacially worked chert blade, a roughly flaked bifacial tool, chert cores, chert flakes, and a water-worn block flake scraper. (See Appendix I for more background on a more detailed description.) This site was found during a survey of the Marcy-South 345 kV Transmission Line near Dolsontown Road (Hartgen Archaeological Associates, Inc. 1985). This site is in an environmental setting very different from the Project site.

There are several archaeological sites within 8 km (5 miles) of the Project site. In addition, two New York State Museum (NYSM) site numbers are listed within 1.6 km (1 mile) of the Project site. They are NYSM 6169, a cemetery, and NYSM 6170, a site whose location is the only information on file.

Q. Please describe the Phase IB study.

A. Phase IB subsurface investigations of the study area were undertaken during the weeks of October 16-20, 2000, and June 11-17, 2001. Shovel test pits were excavated at 15-m (approximately 50-foot) intervals along transects 15 m (approximately 50 feet) apart across all of the study area, except for delineated wetlands, areas that were covered with water at the time of fieldwork, on steep slopes, or in areas of evident ground disturbance. The STPs were 0.3–0.5 m in diameter and hand excavated in 0.1 m levels. Soil was screened through ¼-inch mesh. Stratigraphic information was recorded, and a typical soil profile was described with a Munsell Color Chart. A typical soil profile revealed a plow zone (typically 10YR 4/1 dark gray) of generally silty soils with high organic content for approximately 0.20+ m over a B horizon (typically 10YR 6/2 light brownish

gray) silt loams. Soils were hard packed or stony below 0.35–0.40+ m.

A total of 563 shovel test pits were excavated in the Northern Portion. An additional 135 shovel test pits in the Southern Portion, and 25 shovel test pits along the Water Line Route were excavated during the second field session (June 11-17, 2001). A single fragment of ironstone ceramic was found during the pedestrian inspection. No artifacts or subsurface features were found in any of the shovel test pits excavated. No prehistoric subsurface features were found.

Q. Was a Phase II study done?

A. No. Stipulation 2, Clause 1(c) requires Calpine to conduct Phase II studies where warranted. Based on the findings of the Phase I survey, no cultural material suggesting that the study area contains archaeological sites eligible for inclusion in the State or National Registers of Historic Places were found. Therefore, no intensive (Phase II) cultural resource investigation of the property was recommended. The Phase I report has been sent to OPRHP and DPS Staff.

Q. Is any mitigation necessary?

A. No. Since it is not expected that the Project will have any impact on archaeological resources, no mitigation is necessary. However, it is prudent to have plans in place for the unanticipated event of cultural resource discovery during the course of Project construction. For this reason (and as required in the stipulations) an Unanticipated Discovery Plan has been prepared.

Q. Please describe the Unanticipated Discovery Plan.

A. Stipulation 2, Clause 3 requires that an Unanticipated Discovery Plan be included in the

Application, identifying the actions to be taken in the unexpected event that resources of cultural, historical, or archaeological importance are encountered during the excavation process.

In the unexpected event that resources of cultural, historical or archaeological importance are encountered in the excavation process, procedures outlined in the Unanticipated Discovery Plan (the Plan) presented in Appendix I will be activated. As detailed in the Plan, construction related work in the vicinity of the discovery would cease upon encountering possible archaeological or human remains. OPRHP, the County Medical Examiner, and the State Police, if appropriate, will be notified. The methodology used to assess any such discoveries will follow the most recent *Standards for Cultural Resource Investigations and Curation of Archaeological Collections in New York State.* Such an assessment will be conducted by a professional archaeologist meeting qualification standards of the New York State Archaeological Council and the National Park Service. The OPRHP coordinator will be consulted throughout the investigation, as outlined in the Plan, and DPS Staff will be informed of the status and results of the investigations, removal, and curation of the resource(s).

Q. Were sites or structures listed or eligible for listing on the State or National Registers of Historic Places identified?

A. Yes. The identification of properties on the State or National Register of Historic Places was conducted through file searches at the OPRHP.

Within a five-mile radius of the Project site, ten properties are currently listed on the State or National Register of Historic Places. These properties are described, and

their locations are illustrated in Figure 7-2, irrespective of the Project Viewshed.

The *Oliver Avenue Bridge* in Middletown was constructed in 1895 and was listed in the NRHP in July 1984. This bridge was part of the Goshen Trolley Line and was one of only two surviving bridges in New York built by the Havana Bridge Works. It was recently dismantled due to safety concerns.

The *Hillside Cemetery* in Middletown was designed by Calvert Vaux, a co-designer of Central Park in New York City. The cemetery was constructed in 1861 and registered in September 1994.

The *Webb Horton House* (also known as Morrison Hall) was the home of Webb Horton, a tanner from Pennsylvania, and his family. The 40-room mansion was built between 1902 and 1906. It is currently owned and occupied by the Orange County Community College.

The *First Baptist (Primitive) Church of Bloomfield* was built in 1792 and was listed on the NRHP in November of 1976.

The *District School No. 9, "Old Stone Schoolhouse"* was listed on the NRHP in 1988. It is located on Route 17A in Goshen.

The *U.S. Post Office on Grand Street in Goshen* was listed on the NRHP in 1989 along with many other New York State Post Offices.

The *1841 Goshen Courthouse* was listed on the NRHP in March 1975.

The *Church Park Historic District* is partially located within 5 miles of the Project site.

The *Dutchess Quarry Cave Site* is a Paleoindian site. The location is restricted.

Two sites are potentially eligible for the National Register, but listed presently on the State Register. They are: the Middletown Psychiatric Historic District, Middletown, and the Mid-Hudson Psychiatric Center Historic District, New Hampton (Wawayanda)

In addition to these sites, several properties in this area have already been recognized as eligible for listing on the State or National Register of Historic Places. They are: 94 Maples Road, Wallkill; 105 Maples Road, Wallkill; 220 Maples Road, Wallkill; Holmes Bookstaver House, Crotty Road, Wallkill; Frank Post House, Crotty Road, Wallkill; Joseph Slaughter/Alanson Slaughter House, Goshen Turnpike, Wallkill; 11 Webster Avenue, Village of Goshen; Bennett House, 29 Cart Lane, Village of Goshen; County Trust Bank, West Main Street, Village of Goshen; Gavin Building, Greenwich Avenue, Village of Goshen; Goshen Town Hall, 15 Webster Avenue, Village of Goshen; Johnic Pharmacy, 62 West Main Street, Village of Goshen; Norstar Bank, 54 West Main Street, Village of Goshen; Houston House, NY 17A, Goshen; John Wells Homestead, 6½ Station Road, Goshen.

Several other sites whose location is restricted are also recognized as being eligible.

One of the currently listed or eligible National Register properties, only the Webb Horton House (Morrison Hall), is noted to lie within the Project viewshed based on computer modeling. The other listed and eligible structures noted are screened from potential view of the Project, based on field visits to the structures and/or the nearest publicly accessible viewpoints in the vicinity of these structures. The location of the Webb Horton House is shown in both Figures 7-2, within the context of a five-mile

radius and Figure 7-3, showing all structures within the Project viewshed that are listed, recognized as eligible, or were found to be potentially eligible for listing on the National or State Register of Historic Places.

Q. Was a study done of potentially eligible structures?

A. Yes. Stipulation 2, Clause 4(a), requires, in part, field inspections and consultation with local historic preservation groups regarding structures that are potentially eligible for listing in the State or National Registers of Historic Places, and photographs of standing structures within the viewshed that appear to be at least 50 years old and potentially eligible for listing in the State or National Registers of Historic Places, based on an assessment by an architectural historian.

Q. Please describe how the study that was done.

A. The goal of the study was to observe all structures within a five-mile radius that meet the minimal National Register of Historic Places age eligibility criterion (50 years or older), have maintained their architectural integrity, and lie within the Project viewshed. As an initial step to the investigation, the standing structures on all roads within the five-mile radius were observed, and the buildings meeting the criteria were identified. A preliminary viewshed analysis was used to identify which areas likely to be subject to visual impact. This viewshed reconnaissance included portions of the Town of Wawayanda west and south of the Project site, the Town of Wallkill northeast of the Project site, the Town of Goshen south-southeast of the Project site, and the City of Middletown north of the Project site. The viewshed analysis included both the computer line-of-sight-based methodology described in Section 16, and a field survey wherein each

of the properties meeting the age eligibility criterion were visited during leaf-off conditions.

After more precisely defining the extent of the Project viewshed through the mapping and field survey exercise, structures that appear to be more than 50 years old and, are potentially eligible for the National or State Register, and were still considered as having reasonable potential of a view of the proposed Project were photo-documented, reevaluated, and inventoried. Building-Structure Inventory Forms of the subject structures are included in Appendix I. The structures are mapped in Figure 7-3. Photographs of each are presented in Figure 7-4 through 7-11. Assessment of the viewshed was conservative in that if direct views from a potentially eligible structure were not available but there were views in the vicinity of the potentially eligible structures, then that structure was considered to be subject to potential visual impact.

Q. Have any local designations of historic structures been made?

A. No. The Historical Society of Middletown and the Wallkill Precinct indicated that they have not formally designated any local structures as having historical or architectural significance. No historic designations have been made by the Town of Wawayanda Historian. No formal local designations have been made by citizen-led groups in the Village or Town of Goshen or by the Orange County Historical Society.

Q. Please describe any structures that were identified as being potentially eligible for listing on the State or National Register of Historic Places.

A. The structures identified as potentially eligible for listing on the State or National Register of Historic Places represent a range of vernacular constructions dating from the

immediate post-Revolutionary War era through the early decades of the twentieth century. The location of each potentially eligible structure is marked in Figure 7-3. Each is described, in turn, in Section 7.3.2.3.

Q. Was any agency consultation done?

A. Yes. Stipulation 2, Clause 4(b), requires that OPRHP building Structure Inventory Forms be completed for each potentially eligible or listed property and submitted to OPRHP and DPS staff for review prior to completing the visual resources study. The section also addresses Clause 4(c), which requires that Potential visual impacts to significant historic structures within the Project Viewshed that are listed or potentially eligible for listing on the State or National Registers of Historic Places be characterized as part of the visual resources study.

Per the requirements of these clauses, an OPRHP Building Structure Inventory Form was completed for each of the potentially eligible or listed properties identified. These forms were submitted to OPRHP and DPS Staff for review, prior to Calpine's completion of its visual resources study for this Article X application. The visual impact analysis is presented in Section 16.

Q. What will the impact be on the properties listed in the National Register?

A. Impacts of the Project on places of historical significance will be minimal. Based on the studies presented in Section 16, the Project will not be visible from most of the National Register listed properties. Table 7-1 is an analysis of the potential impacts of the Project on listed properties.

Q. Will the Project be visible from any of the properties eligible for listing on the National

Register?

A. No. Based on the studies presented in Section 16, the Project will not be visible from any of the properties that are National Register eligible. Table 7-2 is an analysis of the potential impacts of the Project on these eligible properties.

Q. Will the Project be visible from any of the potentially eligible properties?

A. Yes. Based on the studies presented in Section 16, the Project will be visible from some of the properties that are potentially eligible for State or National Register. Table 7-3 is an analysis of the predicted impacts of the Project on these potentially eligible properties.

Q. Will any of the discussed properties be subject to direct impacts from the Project?

A. Yes. One structure, a residence dating from the turn of the twentieth century located at 1128 Dolsontown Road, is subject to direct Project impact, as it is within the Project site and will be razed to make way for Project facilities. The structure is a hipped-roof four-square farmhouse executed in vernacular Colonial Revival style, flanked by ornamental shrubs and trees. There is an oval driveway to the west of the house and a barn located on the south side of Dolsontown Road that appears to be contemporary with the residence. This is the only building of this type on Dolsontown Road, but the style is well represented in the Middletown area.

Twentieth century modifications of the structure, including the construction of a one-story addition to the northeast corner, the replacement of windows, the addition of aluminum siding throughout, and the construction of outbuildings to the north and west, have reduced the architectural integrity of the property. Based on these changes to the buildings, this structure is considered unlikely to meet State and National Register of

Historic Places criteria for significance.

Q. Please describe section 16 of the Application.

A. Design and placement of the Project has included significant consideration of visual impact. On-site structures will be limited in height to the minimum necessary to ensure safe and efficient Project operation. The Project's exhaust stacks have been lowered from the allowable maximum of 267 (per FAA requirements) to 225 feet for this reason. The setting of the Project site, with existing industrial uses to the north, nearby vertical elements (transmission lines, as well as a communication tower), and a significant amount of terrain and vegetation screening will limit the Project's visual impact on the community. Visual impact mitigation will include a comprehensive landscaping plan, neutral color scheme, and reduced-height, shielded lighting.

This section provides a discussion of the detailed visual assessment performed for the Project. Identification of potential vantage points, viewshed analyses, impact analyses, and mitigation analyses are provided for each representative location. In addition, analyses are provided for water vapor plume visibility during cold weather and for cumulative visibility effects with the Masada project.

Q. What regulatory requirements are applicable to the Project with regard to visual assessment?

A. Consideration of Project aesthetics is part of the environmental review process under the Public Service Law, which requires the Siting Board to issue a Certificate only if it finds that the Project "minimizes adverse environmental impacts, considering the interest of the State with respect to aesthetics." PSL §168.2(c)(i). The Siting Board regulations

explicitly require an analysis of visual resources. 16 NYCRR 1001.3(b)1(iii). NYSDEC also issued a policy memorandum in July 2000 entitled *Assessing and Mitigating Visual Impacts*. Stipulation 11, entered into by Calpine, NYSDEC and DPS Staff, specifies the analyses of visual resources and aesthetics to be conducted for the Project. This section responds to that stipulation.

Consistent with Stipulation No. 11, Clause 1, the visual impact assessment relies, as appropriate, upon definitions and procedures outlined in:

Smardon, R. C., et al., *Visual Resources Assessment Procedure for US Army Corps of Engineers, Instruction Report EL-88-1*, prepared by State University of New York, Syracuse, for US Army Engineer Waterways Experiment Station, Vicksburg, MS, 1988 ("VRAP"); and

NYSDEC Program Policy: *Assessing and Mitigating Visual Impacts*, DEP-00-2, July 31, 2000.

Consistent with the procedures set forth in Stipulation No. 11, visual impact is assessed in terms of the anticipated change in visual resource, including whether there will be a change in character or quality of the view. The Visual Resource Assessment Procedure (VRAP) focuses first on establishing the visual quality of the existing landscape and establishing similarity zones, known as the Management Classification System (MCS); second, on choosing representative locations; and third, assessing impacts on the basis of the representative locations, known as the Visual Impact Assessment (VIA). The NYSDEC visual resources policy complements this procedure by establishing what areas in New York State may be significant aesthetic resources; and

presenting a broad range of mitigation alternatives for each affected resource. For example, a location that is pristine and visited by recreational users for visual enjoyment is held to a higher standard than a location utilized for other purposes.

Q. Did the visual impact assessment address the character and visual quality of the existing landscape?

A. Yes.

Q. Please describe this character.

A. The Project site is in Wawayanda, at an approximate elevation of 460 to 490 feet above mean sea level (msl). The central and most developed area of Middletown ranges from 500 to 600 feet msl. Ridges are located in the vicinity to the north and northwest, with peaks as high as 1,000 feet msl. The topography slopes downward south and east of the site (across I-84) where elevations range from 400 to 600 feet msl.

Two residences and an office building are adjacent to the southeast corner of the property near the intersection of Dolsontown Road and McVeigh Road. A trailer manufacturing facility is directly across Dolsontown Road. An additional residence abuts the property along Dolsontown Road approximately 0.3 miles west of McVeigh Road. The proposed development of the site appears to be compatible with the visual character of the adjacent land to the north. This includes a wastewater treatment facility, an electric substation, a vacant area proposed for use as a trash to ethanol facility and an existing 36 MW electric generating facility.

In general, areas to the south and east of the Project site appear relatively undeveloped and consist of woods and fields, some of which is farmland, although the

two Marcy South 345 kV transmission line circuits are prominently visible in many locations. Areas to the north and west of the site are more developed than those to the south and east (consisting of mixed commercial, manufacturing, institutional and residential areas), yet are also largely vegetated with shrubs and trees.

Other notable features are: I-84, which runs west-east a half-mile south of the Project site; the Wallkill River, east and south of the Project site; Randall Airport, approximately one mile east of the Project site; and an old railroad grade northeast of the Project site.

Q. How was the Project area classified?

A. The Management Classification System (MCS) methodology for identifying regional landscapes relies on existing data regarding large-scale physical domains, which, together with man-made alterations, form the overall visual quality of the surrounding landscape. Landscape character is largely determined by the topography, land use, vegetation and water features that define and contribute to the available vistas and views.

Using the classification system developed by Bailey, Southeastern New York is located within the Humid Temperate Domain, which encompasses almost the entire United States. Within that domain are several types of *divisions*, which are based primarily on climatic conditions. The area of Wawayanda is within the Hot Continental Division, with typical average temperatures of approximately 10°C (59°F) and annual precipitation ranging between 40 and 100 mm (15 and 40 inches); but of course subject to variation on a smaller regional level. The division encompasses 104,500 square miles, or 2.9% of the U.S. land area. Each division is further broken down into *sections*.

Wawayanda is within the Hudson Valley section, an area encompassing most of New York's Hudson River Valley.

Topography in the region is relatively flat, ranging from 460 to 600 feet surrounding the center of Middletown, and 700 to 1,000 feet among the small elevated hills west and northwest of the city. The Shawangunk Mountains are about 10 miles to the west of the Project area. A series of small lakes are to the northwest of the site area, including Monhagen Lake, Highland Lake, Shawangunk Lake and Lake Pocatello. The Monhagen Brook is west and south of the Project site, flowing in a generally southerly and then easterly direction. An unnamed tributary of the Monhagen Brook bisects the eastern portion of the site. In addition, several former railroad lines are found in the vicinity of the Project site, with one abutting the site on the northeast.

The average annual precipitation for the area is approximately 40 inches per year, and the annual average temperature range is from 45° to 50° F (USDA 1981). The surface soils in the area range from fair to very poor for trees, crops, and herbaceous plants. In addition the capability to sustain shallow water plants and wetlands ranges from good to very poor depending on exact location.

Q. What study area was used for the assessment?

A. The study area for the proposed Project is based upon Stipulation 11, Clause 3(a), which calls for a 3-mile radius, but has been expanded to be consistent with NYSDEC's policy guidance – namely, that a 5-mile radius be used around a facility.

Q. Please describe the study area.

A. The surrounding landscape consists of rolling hills, and gradually rises from the north and

west of the Project site toward higher elevations in the west. The nearest major topographic feature is the 1,017-foot peak of Sayers Hill approximately 2.6 miles west of the site. A 200-foot Orange and Rockland Utilities communications tower lies approximately 2,000 feet north of the site. This tower is visible at multiple viewpoints around the Project site.

An area of note is the Hillside Cemetery in Middletown, which is on the National Register of Historic Places and is approximately 1.2 miles north of the site. This cemetery is located at a higher elevation than the Project site. However, existing vegetation and commercial structures limit visibility toward the proposed Project.

Generally, rural agriculture dominates the south of the study area, whereas rural forest areas are found on the west, north and south outskirts of the 5-mile study area. The heart of the study area contains suburban residential areas; urban centers; highway corridors such as Interstate 84, which traverses the study area in an east-west direction; major local roadways; and some mixed industrial and commercial tracts.

Q. Was the study area divided in any way in order to facilitate the study?

A. Yes. In order to systematically analyze the study area -- some 80 square miles -- discrete landscape similarity zones were identified using the MCS methodology, as shown in Figure 16-1. These zones were determined based on a review of landform, ecosystem, water resources, land use, and its intensity.

Landform refers to the relief of topography, which helps to determine the spatial enclosure of a view-shed. Most of the study area is flat to relatively moderate in slope. Higher, as well as more undulating, terrain is to be found in the north and west of the

study area. Landforms are identified as "flat," "moderate," or "steep", although this is a relative scale. The highest elevation inside the entire study area is 1,017 feet above msl.

Ecosystem identification, for purposes of this classification system, depends primarily on the presence or absence of canopy and/or screening due to forested areas. The forested areas within the study area are relatively homogenous in that the various ecological communities form what is loosely known as a mixed deciduous forest ecosystem. The other type of ecosystem that helped to define landscape similarity is agricultural lands, which may include smaller woodlots and hedgerows. More intensely developed areas typically include landscaped areas with ornamental trees and shrubs.

Land use refers to the present or announced uses within each zone. For visual assessment purposes, large commercial and industrial facilities, typically with large paved or highly disturbed open areas, are considered similar, as opposed to smaller commercial establishments typical of highway commercial zones or, as a variant, in urban/village areas. (In this sense, the form-based land use analysis in the MCS differs from function-based land use analysis presented in Section 10 of the Application.) Small recreational areas in a residential context are grouped with the residential area for landscape similarity analysis, but recreational areas that can act as a destination from outside the immediate vicinity are identified as a separate land use. The land use types are "industrial/commercial," "highway development," "residential," "public development," "agricultural," "recreational" and "vacant." Land use *intensity* applies to the first four of these land uses (since the others are considered undeveloped). It is identified as "urban/village", "suburban", and "rural."

Water resources in the region include the Wallkill River, smaller tributaries to the Wallkill River, and small, isolated lakes such as Lake Pocatello, Monhagen Lake and Highland Lake to the west of Middletown.

Q. Please describe the landscape similarity zones that were identified.

A. Six landscape similarity zones have been identified for the area within a 5-mile radius of the Project site. A map of the landscape similarity zones is provided as Figure 16-1. The zones are summarized in Table 16-1 and are described in Section 16.2.2.2.

Q. How were these similarity zones assessed?

A. As described in Section 16.2.2.3, the MCS uses an "assessment framework" on a regional landscape level.

Table 16-2 provides the "assessment framework" developed in order to be able to systematically analyze the regional landscape surrounding the Project. This framework also helped to define the pre-application consultation process with respect to viewpoint selection, and was provided to the NYSDPS, NYSDEC, and other state and local stakeholders.

Q. After development of this framework, what is the next step taken?

A. In accordance with the MCS, each landscape similarity zone is assessed on the basis of its visual composition, and the presence of its distinct, average and minimal characteristics (see Table 15-2). From that assessment, a management classification is derived. Landscapes can be classified under "preservation," "retention," "partial retention," "modification," and "rehabilitation," depending upon their "management class value" score using an 18-point system. (VRAP Form 4 is filled out for each landscape similarity

zone, and Form 5 for the entire study area, as a summary. These are attached in Appendix K.) The basic descriptors for each zone, its final classification and related score are outlined in Section 16.2.2.4.

Q. Was a visual resource inventory completed?

A. Yes. Stipulation 11, Clause 3(c), requires that selection of impact assessment viewpoints take into account visual resources identified through the NYSDEC Visual Resources Policy. In this policy, NYSDEC asserts that the state's interest with respect to aesthetic resources is to protect those resources whose scenic character has been recognized through national or state designations. This section is based on the designated lists from which aesthetic resources of statewide significance within the study area can be identified.

Q. How was this inventory used in the study?

A. The inventory of visual resources is used in two ways in this study. First, viewpoints representing the inventory (if identified within the viewshed area) were included as part of the viewshed analysis (Section 16.4.2). Second, the presence of these areas is accorded due weight in the classification ranking for the landscape zones in which they are located.

Q. Does this policy include consideration of any other factors?

A. Yes. The NYSDEC policy includes consideration of any property on or eligible for inclusion in the National or State Register of Historic Places (16 U.S.C. § 470a et seq., Parks, Recreation and Historic Preservation Law Section 14.07). Within the study area there are ten properties on the National and State Registers – three within 2 miles and

seven more within 5 miles, as addressed in more detail earlier in the testimony and in Section 16.2.3.1.

Q. Are there any state parks in the study area.

A. No. There are no state parks within the study area. The nearest is Highland Lakes State Park, located approximately 6 miles east of the Project site.

Q. Are there any state forest lands in the Project area?

A. No. The state forest preserve is limited to the Adirondack and Catskill Parks, and some portions of the counties where these two parks are located. No such lands are within the Project area.

Q. Are there any wildlife or game refuges in the Project area?

A. No. There are no National Wildlife Refuges or State Game Refuges within the Project area.

Q. Are there any National Natural Landmarks in the area?

A. No. There are no National Natural Landmarks within the study area.

Q. Are there any National Park lands in the area?

A. No. Based on the National Park System web site and USGS topographic mapping, there are no National Park lands within the study area.

Q. Are there any rivers that have been designated as wild, scenic, or recreational in the area?

A. The nearest Wild, Scenic or Recreational river segments are the Shawangunk Kill, beginning at the confluence of Orange and Ulster counties (approximately 11 miles north of the site) and the Delaware River at Port Jervis (approximately 15 miles west of the site). The third closest WSR segment is on the Ramapo River, more than 20 miles to the

southeast.

Q. Are there any designated scenic byways or parkways in the area?

A. No. Areas subject to Article 49 designation include Scenic Byways (now under the purview of the New York State Department of Transportation), parkways designated by the Office of Parks, Recreation and Historic Preservation, and other areas designated by NYSDEC. According to NYSDOT, there are no designated scenic byways or scenic roads in the study area.

Q. Are there any Scenic Areas of Statewide Significance in the area?

A. No. There are no Scenic Areas of Statewide Significance (SASS) within the study area. The six designated SASS areas in New York State are associated with the Hudson Valley. There are no SASS areas near Wawayanda.

Q. Are there any designated or proposed intercounty or interstate foot trails in the area?

A. No. There are no National Scenic or National Historic Trails within the project area.

Q. Are there any Adirondack Park scenic vistas in the area?

A. No. This category is not applicable because Adirondack Park is located in northeastern New York State.

Q. Are there any state nature and historic preserve areas in the vicinity?

A. Under ECL §45-0117, there is one such State preserve program operating within the study area, the Greenway Conservancy for the Hudson River Valley. This organization is a public benefit corporation created by the New York State Legislature. Under the guidance of the Greenway Conservancy is an organization called the Hudson River Valley Greenway Trail Program, whose purpose is preservation of trails. This program

supports efforts to establish a trails system that joins parks, historic sites, preserves and recreational waterways. Many of the designated trails are within Orange County, but primarily near the Hudson River. There are no specially designated Greenway Trails within the study area.

Q. Are any portions of the Palisades Park in the Project area?

A. No. New York State's portion of the Palisades Park is located primarily in Rockland County, well outside the study area.

Q. Are there any Bond Act properties purchased under the exceptional scenic beauty category in the area?

A. No. According to the NYSDEC Division of Forests and Lands, there are no such properties within the study area.

Q. Were any additional visual resources identified?

A. Yes. The Siting Board regulations require a similar visual resource inventory as that described in the NYSDEC policy. 16 NYCCR 1001.3(b)(1)(iii) lists (in addition to criteria that overlap with the NYSDEC policy) "areas covered by scenic easements, public parks and recreation areas, and scenic overlooks." Also, the Siting Board regulations are more inclusive of locally designated resources than the NYSDEC policy. These types of resources were identified in the Preliminary Scoping Statement for the Project. After that filing, additional local public input was sought. Additions to the inventory on this basis are included here.

A number of local and county parks and recreation areas were identified on the USGS Quadrangle map and field reconnaissance. Figure 16-1 shows parks, and other

recreation areas, which may have a view of the proposed Project. The parks and other recreation areas that were identified are listed in Section 16.2.4.

Q. Does the study address Project design, appearance and general mitigation?

A. Yes, in Section 16.3.

Q. Please describe the visual characteristics of the Project.

A. The most prominent structures associated with the Project are the exhaust stacks, air-cooled condenser, generation building, and HRSGs. The tallest structures will be the two 225-foot-tall HRSG exhaust stacks. Each HRSG exhaust stack will be approximately 19 feet in diameter. The tallest structures on the site other than the HRSG exhaust stacks will be the air-cooled condenser at approximately 120 feet, and the combustion and steam turbine building at 106 feet. The Project's water tanks will be up to 45 feet tall. Ancillary facilities, such as miscellaneous buildings, will be smaller and less prominent than the main structures. In addition, tall structures that lack the bulk of the aforementioned buildings and tanks will be as follows: an emergency diesel generator stack at 35 feet, two gas pre-heater stacks at 35 feet, and an auxiliary boiler stack at 180 feet. A rendering indicating color and scale is provided in Figure 16-2. Elevation views were presented in Figure 3-6.

The 345 kV electrical interconnection is the only aboveground interconnection associated with the Project. From the Project switchyard located adjacent to the turbine building, separate take-off structures will support the three conductors associated with each half of the one-circuit loop. To minimize potential visibility, the new transmission structures will be low-profile, H-frame type steel pole structures with a typical overall

height of approximately 100 feet, similar to other existing transmission structures in the Project vicinity. From the on-site switchyard, the two transmission lines will be routed to the south for approximately 1,500 feet, spanning Dolsontown Road and tying into one of the nearby Marcy South 345 kV transmission circuits at an existing multi-pole angle structure. These two new lines will require only four new structures (two for each line) in addition to the take-off structures at the switchyard.

Q. Please describe the site and layout of the Project.

A. The site for the Project was chosen in part because of the proximity of existing infrastructure and other industrial facilities. Visibility was projected to be very limited for views beyond approximately 1 mile to the north, approximately 1.5 miles to the west, and approximately 1 mile to the east. Visibility from the south was projected to be limited to approximately 1.5 miles. Surveys of the vicinity showed that residences and other sensitive receptors in the area tend to have good vegetation screening even during leaf-off conditions, mitigating the Project's visual impact. Most of the nearby, open views of the Project site include the Orange & Rockland communication tower, the existing Marcy South 345 kV transmission lines and/or the Orange & Rockland substations and transmission lines. In summary, the site was deemed appropriate from an aesthetics point-of-view.

The layout of the Project is oriented along the existing contours of the site and places the stacks at a base elevation nearly 60 feet below the higher elevations at the western site boundary. This orientation takes advantage of the site contours and existing vegetation to minimize potential views of the Project from the west. In addition, views

from the east and the south tend to show the Project back dropped by higher topography and vegetation.

Q. Would any alternative technologies affect the visual impact of the Project?

A. Yes. For a combined cycle plant, cooling technology can affect visual impact. The two principal cooling methods for a combined cycle project are evaporative cooling and air-cooling. These are described in detail in Section 5.6. Air-cooling was selected for the Project for a number of reasons, primarily to reduce water supply needs but also for the ancillary benefits with respect to eliminating potential cooling tower plumes. An air-cooled condenser (ACC) is a larger cooling structure than an evaporative tower, and it has a greater visual presence when viewed from nearby locations. An ACC for a project of this type, given design parameters and terrain, must be approximately 120 feet high to maintain proper airflow. The ACC is similar in scale to the generation building.

Calpine has designed the plant to provide for full enclosure of not only the combustion turbines, but also each HRSG and the steam turbine. Enclosure of this equipment carries several advantages. First, it allows for a single façade and blocks views of industrial processes. Second, this equipment would require nighttime lighting, which under the proposed design will not be visible outdoors. Third, it is better from a technical standpoint for space heating purposes. Lastly, it is consistent with the requirements of Wawayanda zoning, described in Section 10.4. However, it also causes the overall structure to have greater bulk.

Q. What steps have been taken to reduce the profile of the Project?

A. The tallest structures will be the two 225-foot-tall HRSG exhaust stacks. Optimum stack

height was determined based on air quality impact modeling, impacts to air navigation within the jurisdiction of the FAA, and potential visual impacts. This was done early in the design process to ensure that each stack would lower than the GEP formula height of 267 feet.

As noted previously, the new 345 kV electric transmission line will use low-profile, steel-pole H-frame type structures in order to minimize potential visibility. A detailed analysis of the differences in visual impact between H-frame and single shaft structures was provided in Section 5.9. Lower-profile H-frames are more consistent with existing visible Marcy South transmission lines, and are a better design especially for short routes, such as the Project's electrical interconnection, as explained in Section 5.9. In that analysis, Calpine also considered underground electrical interconnection, assessing it from an environmental, visual, and technical standpoint. All underground options, along any route, had a more significant environmental impact and were more problematic from a technical standpoint than overhead options.

Q. Please describe any landscaping that has been planned to reduce the visual impact of the Project.

A. Preliminary landscaping plans have been prepared for the Project to restore the disturbed areas on-site following construction and to enhance the aesthetics of the facility as viewed from nearby and more distant locations. These plans include several earthen berms and deciduous and evergreen plantings. The final landscaping plans for the entire site will be prepared in cooperation with the Wawayanda Planning Board.

The landscaping at the site will be designed using a combination of large

deciduous and evergreen trees. Some of these trees will be planted on naturalistic, manmade landforms to screen views into the site from surrounding roads and properties. Wherever possible, soil will be molded to create naturalistic terrain that is higher than the surrounding land, in some cases as high as 10 feet above surrounding grades. Landforms will be curving and rounded to replicate landforms found naturally in the surrounding environment. Tops of landforms will be wide and somewhat flat, and the sides will be smoothed to resemble the effect of erosion over time. In some cases, tops of the landforms will be depressed to allow percolation of rainwater. These landforms will be created along Dolsontown Road and between the Project footprint and the adjacent wetlands. The landscaping plan is included on three full-size sheets included in the plan roll accompanying the Application.

A forest of evergreen and deciduous trees will be planted on the tops and sides of the new landforms. When the trees mature, they will be 60 to 80 feet tall, and with the landform, the total screening height will be approximately 70 to 90 feet tall, thereby screening almost all of the buildings except the exhaust stacks. Along the sides of the landforms visible from outside the site, smaller understory trees will be planted along with groups of shrubs to resemble the layering found in nature. The landscaping will provide short-term partial screening and potentially long-term full screening. One day, assuming the trees grow as expected, people driving along Dolsontown Road and I-84 will view forests and landforms and will not see the buildings beyond except at the entrance to the site and possibly, the exhaust stacks. During the expected useful life of the facility (a period generally believed to be not more than 40 years), the trees will be in

high-growth stage, although their fullest effect will be seen over a longer period, giving the site excellent screening for any potential future land use.

The landscape plan also considers and takes advantage of the natural topography of the Project site. Almost all land along the property lines to the west and north is significantly higher than the base elevations of the generation building and stacks. A forest of tall evergreen and deciduous trees will be planted to take advantage of the height gained by the elevation of the land. Understory trees and shrubs shall be planted along outside edges of the forest of large deciduous and evergreen trees. For example, on the eastern side of the site, the property line is approximately 25 feet higher than the switchyard and 40 feet higher than the ACC. Planting trees that grow approximately 70 feet tall will screen the switchyard and partially screen the ACC and turbine building from adjacent roadways.

Trees that are tough and hardy in the regional climate will be selected for the landscape design. Several species of trees will be chosen and monoculture planting will be avoided, so that if problems develop with one particular species, others will remain to provide partial screening. Plants shall be selected to resemble the local natural environment with the exception of evergreens, which are not as prevalent in the surrounding area. Evergreen forests will be created to allow year-round screening of the Project site even though they are not normally found in this area. For ground covers, native indigenous wildflowers and grasses will be planted on steep slopes to reduce the maintenance requirements of lawn. Native grasses and wildflowers will be planted wherever possible instead of the traditional high maintenance lawn that excludes wildlife

and other natural processes.

Q. Please describe the color, texture, and camouflage, if any, of the Project.

A. The Project will have distinctive visual characteristics established by the large, rectilinear buildings, the tall, vertical stacks, and the visually complex ACC, with its exposed ductwork and steel supports. Camouflage or disguise is not considered a feasible mitigation tool because of the bulk and complexity of the proposed facility. However, the Project will be surfaced with smooth, painted, non-specular metal panels, typical of modern industrial buildings. The turbine buildings will be painted a neutral color to mitigate visibility – light tan, and gray colors are presently being considered. For the stacks, which are constructed of steel sections, forest green and gray colors are under consideration, and are presented in the photosimulations in Section 16.5. The ACC solid wall siding around the fan structures and steam piping is proposed to be a gray or light tan color. Transmission lines are expected to be light gray, consistent with other transmission lines in the area. However, in contrast to some of the existing infrastructure in the area, it is proposed, and will be made part of the engineering scope for the Project to the degree acceptable to the transmission line owner (New York Power Authority), that non-reflective coating be used for all switchyard and transmission line structures. Non-reflective coating will be used for all plant structures, as well.

Q. How will the site be maintained?

A. The site will be professionally maintained and kept clean. The landscaping at the Project site will be maintained with equal care. Calpine will implement a preventive maintenance program to ensure that painted surfaces are repainted as necessary.

Q. How will the visual impact be addressed upon decommissioning?

A. Section 10.5 describes the decommissioning plan. In summary, that section describes how Calpine expects to decommission the Project. The base case is for returning the site to a greenfield condition, meaning the removal of stacks and structures and the orderly re-vegetation of areas previously used for the Project.

Q. How will the lighting design affect the visual impact of the Project?

A. The Project's lighting design incorporates the minimal lighting possible to minimize off-site impacts but sufficient enough to ensure worker safety during routine operations and maintenance. The site lighting will be designed according to the latest edition of the Illuminating Engineering Society (IES) Lighting Handbook. The oversize plan roll accompanying this Application includes an iso-lumen lighting plan.

Roadway lighting will consist of 250W High-Pressure Sodium (HPS) Cobra Head style fixtures (Holophane Mongoose or equivalent) mounted not more than 30 feet above grade, consistent with Town of Wawayanda requirements. These fixtures will include cut-off optics to reduce unwanted glare and fugitive light. The fixtures will be oriented such that the emitted light is directed inwards toward the plant and be controlled by photovoltaic cells.

Entry door and truck access doorway lighting will consist of 70W HPS and 100W HPS wall lighting fixtures, respectively. These fixtures will also include cut-off optics to reduce unwanted glare and fugitive light. The doorway fixtures will be located above the doors and directed downward. Photovoltaic cells will control these fixtures.

Platform lighting typically consists of 70W, 100W and/or 150W HPS heavy-duty,

stanchion mounted, area lights. The term "platform lighting" shall include the top of the ACC and associated access stairs, stack CEMS equipment access platforms and any other equipment related platforms. Typically the stairway fixtures are provided with photovoltaic cell control and the actual platform area lighting is controlled from locally mounted switches. This allows for the reduction of nighttime fugitive light. The fixtures typically are mounted 8 feet above the platform elevation.

The exterior lighting will be designed to meet an average minimum illumination level of one foot-candle at interior site roadways, two foot-candles at platforms in general areas, and five foot-candles at entrance and exit doorways, maintenance area platforms, the switchyard, and the control panel and transformer area. This lighting plan ensures that the requirement of a maximum of 2.0 foot-candles at the property line is met at all locations, including the Project driveway near Dolsontown Road.

Q. Will the Project comply with FAA requirements?

A. Yes. A Notification of Proposed Construction or Alteration for the proposed Project was submitted to the FAA, and the FAA issued a Determination of No Hazard to Air Navigation dated April 16, 2001. As a condition to this determination, the FAA specified that the Project stacks should be marked and/or lighted in accordance with FAA Advisory Circular 70/7460-1K Change 1. To comply with this condition to the FAA determination, the stacks at the Project are proposed to be marked with a dual lighting system consisting of red lights for nighttime and medium intensity flashing white lights for daytime and twilight. FAA requirements dictate that a single level consisting of three lights be provided.

In Section 14.7, lighting options to mitigate bird mortality were investigated. It was concluded that flashing red lights are preferable to high-intensity flashing white lights. However, slower duration times for the flashing cycle are recommended. Specifications for the stack lighting will be reviewed with the FAA prior to construction to ensure their acceptability.

Q. Was a visibility analysis of the Project done?

A. Yes. A detailed visibility analysis has been conducted to determine the potential visibility of the Project from specific viewpoints within the study area. This analysis incorporates features like viewshed mapping, viewpoint selection, and viewer identification. The visibility analysis is a necessary precursor to determining and assessing the nature and degree of visual change resulting from the Project.

Q. Please describe the methodology used to develop viewshed mapping.

A. A viewshed analysis was conducted for the study area to assess the potential visual impacts associated with locating the Project at this site. As described in Section 16.4.1.1, computerized methods were used to identify areas from which the stack or other elements of the facility might be visible.

Q. What types of viewshed maps were generated through this process?

A. Figure 16-4 is a 1:24,000 scale map (in the plan roll accompanying the Application) showing the results of the visibility modeling analysis. A reduced version is provided with the figures following Section 16. All 94 viewpoint candidate locations and all selected visual impact assessment locations (per the VRAP methodology) are identified. As can be seen from that figure, locations with viewing potential are largely determined

by visual corridors. Where vegetation is absent, views are generally available. Where vegetation is present, views are generally not available. Within the study area, terrain accounts for many of the views obstructed toward the east and southeast of the study area, and has an even greater influence in the north of the study area. In addition to computer modeling, the visual study included field observations during balloon demonstrations held on April 20, 2001 and May 1, 2001. Numerous viewpoints were visited, especially throughout the area beyond 3 miles and it was confirmed that no distant views toward the Project site exist at these locations.

Figure 16-1 (landscape similarity zone map) and/or Figure 16-4 (viewshed map) show all of sensitive viewing areas and locations of view groups in the Project vicinity, as described in the Application.

Q. Were viewer groups identified?

A. Yes. This section responds to Stipulation 11, Clause 3(c), requiring, in part, an identification of the locations of viewer groups in the Project vicinity. Identifying viewer groups is important because the visual impact is intrinsically tied to the sensitivity of each group. Viewer groups were identified based on the frequency and duration of exposure to views of the Project, the viewer's position in the landscape, and the viewer's activity and presumed sensitivity to alteration of the visual landscape. The viewer groups are listed in Section 16.4.1.3.

Q. How were viewpoints selected?

A. Viewpoint selection was based on the criteria listed in Section 16.4.2. Based on these criteria, a total of 94 viewpoints were proposed. Table 16-3 lists the proposed viewpoints,

identified by landscape similarity zone(s), scenic resource (if any), viewer group, and extent of potential stack visibility. The viewpoints represented in Table 16-3 were chosen after analysis of local topography, landscape characteristics and coordination with NYSDEC, DPS staff and local organizations and agencies. All landscape similarity zones are represented in the viewpoint assessment, and scenic resources identified pursuant to NYSDEC policy, Siting Board regulations, and local priorities are also included.

Figures 16-5a through 16-5k provide the photographs from each of the 22 viewpoints selected for either the USACE VRAP methodology or qualitative impact assessment for other resources. These viewpoints are described in Section 16.4.4.

Q. What did you use the selected viewpoints to address?

A. We studied the visibility of the Project, its above-ground interconnections, and operational characteristics.

Q. Was any photographic rendering done?

A. Yes. A photographic overlay showing leaf-off simulations (photographic overlays) to demonstrate the post-construction appearance of the Project was prepared. It includes representative views (photographic overlays) of the Project, including front, side and rear views, indicating approximate elevations. These overlays were prepared as described in Section 16.5.1. Figure 16-3 shows the methodology used for the photosimulations.

Forms related to the procedure were filled out by two Project personnel and are included as part of Appendix K. The results of the assessment are summarized in Table 16-4. Additional analyses (plume visibility and cumulative impact with Masada project)

are shown in Figures 16-7a to 16-7h.

Q. Please compare the existing and simulated views of the Project, and discuss the nature and degree of visual change that will result from operation of the Project.

A. Table 16-4 summarizes the nature and degree of visual change that will result from operation of the Project. The expected viewpoint changes are:

Viewpoint 3: From Maple Hill Park. This park is located in the suburban residential landscape similarity zone at the edge of the rural/forest zone northwest of the Project site. While this park and playground are relatively open, the adjacent area is vegetated with mature deciduous forest, which effectively screens the view toward the Project site. Accordingly, the Project will not be visible from this location. The USACE Basic Procedure was not conducted for this viewpoint due to the lack of potential Project visibility.

Viewpoint 9: From Orange County Golf Club. This viewpoint is located in the rural/agriculture landscape similarity zone to the northeast of the Project site. Mature deciduous forest provides an effective buffer between the golf course and the adjacent I-84 corridor, and effectively screens the view toward the Project site Accordingly, the Project will not be visible from this location. The USACE Basic Procedure was not conducted for this viewpoint due to the lack of potential Project visibility.

Viewpoint 10: From Belmont Avenue Park. This park, located in the suburban residential landscape similarity zone, is a relatively isolated neighborhood park including a ball field and a small impoundment with a perimeter walking path. The view toward the Project site is blocked by mature deciduous trees that line the brook below the

impoundment. Since the Project will not be visible from this location, the USACE Basic Procedure was not conducted for this viewpoint.

Viewpoint 21: From Orange County Community College, near the Bio-Science Building. This viewpoint, located in the urban center landscape similarity zone, is located adjacent to Morrison Hall (Viewpoint 29), a National Register site. The view from Morrison Hall toward the Project site is blocked by the Commons Building located across the street. This viewpoint was suggested by the WCAG as an alternative location from which the Project could be visible. As shown in the photo presented in Figure 16-5b, views from the Bio-Science Building toward the Project site are similarly block by various maintenance buildings and taller trees beyond those buildings. Landscaping at the Bio-Science Building effectively limit potential views from higher locations on the steps. Considering the lack of potential visibility, the USACE Basic Procedure was not conducted for this viewpoint.

Viewpoint 39: From Interstate 84 Westbound. This vantage point affords direct, panoramic views of the Project for motorists traveling on I-84 in the westbound direction (see Figure 16-6a). This particular viewpoint is representative of the intermittent views available along an approximately one-mile segment of I-84 westbound from approximately the Airport Road overpass to the interchange with Route 17M. During periods when a water vapor plume is visible the visibility of the Project will be increased, as shown in the plume simulation presented in Figure 16-7a. Views to the north for westbound motorists are intermittently screened by roadside vegetation and include open views of the new Orange & Rockland substation and the Marcy South transmission line.

Potential visual impacts from the proposed Project are also minimized by the fact that motorists on I-84 are typically focused on the task of driving. However, the Project will introduce an industrial element in a landscape that is currently viewed from this vantage point as rural agricultural. Accordingly, the incremental visual impact of the Project at this viewpoint is reflected by a visual impact assessment value of "-2."

Viewpoint 40: From Interstate 84 Eastbound. This vantage point affords a view of the Project site for motorists traveling on I-84 in the eastbound direction (see Figure 16-6b). This viewpoint is representative of the views available along an approximately 4,000-foot segment of I-84 eastbound from the interchange with Route 17M to a point just east of the entrance ramp from Route 17M. Beyond this point, motorists would have to look back over their shoulder to view the Project. From points west of the interchange, views from I-84 eastbound are limited by vegetation, topography (i.e., Pinehill Cemetery) and overpasses (Route 6 and Route 17M). The views from I-84 eastbound are to the north across the median and westbound lanes of I-84, and include the Marcy South transmission line (see Figure 16-5c), and will include the Project's proposed electrical interconnection as well (see Figure 16-6b). Potential visual impacts from the proposed Project are also minimized by the fact that motorists on I-84 are typically focused on the task of driving. The USACE Basic Procedure was not conducted for this viewpoint in accordance with the viewpoint selection process.

Viewpoint 41: From Playtogs Plaza Parking lot on Route 17M. This viewpoint is representative of the commercial corridor along Route 17M between I-84 and the center of Middletown. The upper portion of the exhaust stacks for the Project will be visible

from various points within the parking lots of the commercial centers along this corridor (see Figure 16-6c). Most of these views will include existing commercial buildings, parking lots and traffic along Route 17M. Considering the visual context of this viewpoint, the similar vertical forms in the landscape (i.e., the light poles, utility poles and the old stack associated with the former incinerator near the wastewater treatment facility) and the extent of Project visibility, this visual impact from the Project at this viewpoint will not be significant. This viewpoint represents one of the few locations from which both the proposed Masada project and the Project would potentially be visible, as described in Section 16.5.4 (cumulative impacts). The USACE Basic Procedure was not conducted for this viewpoint in accordance with the viewpoint selection process.

Viewpoint 48: From Route 17M near Bates-Gates Road. This viewpoint, located on Route 17M south of the interchange with I-84, is also representative of the commercial corridor. The Project will be visible from this location, although mature deciduous trees along the 17M corridor and throughout the middleground area provide intermittent screening. From this distance, the visual impact is lessened by the similarity in scale between the stack and the mature vegetation in the middleground, as shown in the simulation presented in Figure 16-6d. During periods when a water vapor plume is visible the visibility of the Project will be increased, as shown in the plume simulation presented in Figure 16-7b. The USACE Basic Procedure was not conducted for this viewpoint in accordance with the viewpoint selection process.

Viewpoint 71: From David Moore Heights Apartments. This viewpoint is representative of the suburban residential landscape similarity zone and the multi-family

developments of David Moore Heights and Country View Manor apartments. The Corporation Counsel for the City of Middletown suggested this viewpoint. This viewpoint (the playground at David Moore Heights) affords a direct view of the Project site to the south, but the topography and vegetation in the northern portion of the Project site combine to screen the lower portion of the Project buildings, as shown in the simulation presented in Figure 16-6e. During periods when a water vapor plume is visible the visibility of the Project will be increased, as shown in the plume simulation presented in Figure 16-7c. The visual impact is reflected in the USACE Basic Procedure summary with a visual impact assessment value of "-2.5".

Viewpoint 72: From Horton Hospital. This viewpoint is representative of the urban center landscape zone and offers a superior view to the south, given that the hospital is at a higher elevation than the Project site. Views from the ground level are partially obstructed by mature deciduous vegetation, but unobstructed views of Middletown and areas of Wawayanda are likely available from the higher stories of this multi-story building. Views of the facility will be back-dropped by existing landscape, but the top portion of stack may be viewed against the horizon. A simulation of the proposed Project with a visible water vapor plume is shown in Figure 16-7d. The visual impact is reflected in the USACE Basic Procedure summary with a visual impact assessment value of "-1".

Viewpoint 74: From Mountain Avenue. This viewpoint is representative of the suburban residential zone and was suggested by the Corporation Counsel for the City of Middletown. Limited breaks in the landscaping behind the residences along this

residential street afford views of the upper portion of the exhaust stacks, back-dropped by higher terrain and vegetation in the existing landscape. During periods when a water vapor plume is visible the visibility of the Project will be increased, as shown in the plume simulation presented in Figure 16-7d. USACE Basic Procedure was not conducted for this viewpoint in accordance with the viewpoint selection process.

Viewpoint 75: From Beers Drive. This viewpoint is representative of the suburban residential zone and was suggested by the Corporation Counsel for the City of Middletown. Select locations within this residential subdivision afford extended views to the southeast. The Project will not be visible from this location due to intervening houses and mature vegetation. The USACE Basic Procedure was not conducted for this viewpoint due to the lack of potential Project visibility.

Viewpoint 76: From Heidt Avenue. This viewpoint is representative of the suburban residential zone and was suggested by the Corporation Counsel for the City of Middletown. Heidt Avenue is oriented directly towards the Project site, and the Project exhaust stacks will be visible to motorists and residents, as shown in the simulation presented in Figure 16-6f. During periods when a water vapor plume is visible the visibility of the Project will be increased, as shown in the plume simulation presented in Figure 16-7e. While the Project will be partially visible from this vantage point, it will be viewed within the context of other infrastructure such as utility poles and transmission lines. Accordingly, the visual impact of the Project from this location is considered minor. USACE Basic Procedure was not conducted for this viewpoint in accordance with the viewpoint selection process.

Viewpoint 80: From Dogwood Drive. This viewpoint is representative of the suburban residential zone and was suggested by the Corporation Counsel for the City of Middletown. While this residential street offers a superior location relative to the Project site, potential views of the Project will be limited to the upper portion of the exhaust stacks. Potential visual impacts from this location are minimal considering the intermittent screening provided by houses and vegetation, the distance to the Project site, and the backdrop formed by higher terrain and vegetation beyond the Project site. USACE Basic Procedure was not conducted for this viewpoint in accordance with the viewpoint selection process.

Viewpoint 83: From Pinehill Cemetery. This viewpoint is located at the edge of the Route 6/Route 17M commercial corridor and is representative of that landscape zone. Views to the east from Pinehill Cemetery will include the upper portions of the exhaust stacks, seen above the mature deciduous vegetation located on the rise immediately adjacent to the Project site. The Project stacks will be a new landscape feature but will be similar in terms of scale and form to the transmission line structures and utility poles visible in the foreground and middleground from this viewpoint, thereby minimizing the potential visual impact. USACE Basic Procedure was not conducted for this viewpoint in accordance with the viewpoint selection process.

Viewpoint 84: From Dolsontown Road looking northeast. Motorists traveling on Dolsontown Road will be afforded full foreground views of the Project buildings and stacks. This viewpoint represents the view for motorists traveling east on Dolsontown Road. From this vantage point, viewers will glimpse the air-cooled condenser and project

switchyard, back dropped by the taller turbine building. The electric transmission line conductors and structures will also be clearly visible across Dolsontown Road. The Project will represent a new feature in this local, agricultural landscape and will provide a contrast with surrounding landscape features in terms of color, scale, and form. The nearby existing electrical substation and transmission lines will also be viewed in the context of the Project. A simulation of the Project from this viewpoint is provided in Figure 16-6g. Since this is one of the few locations that will afford a foreground view of the Project, an additional simulation illustrating the mitigation provided by the planned landscaping is shown in Figure 16-8a.

Viewpoint 85: From Dolsontown Road looking northwest. This viewpoint represents the view for motorists traveling west on Dolsontown Road. From this vantage point, viewers will see the Project stacks in front of the turbine building with a glimpse of the air-cooled condenser. The switchyard will be screened by the taller turbine building, but the electric transmission line conductors and the structures to the south of Dolsontown Road will be clearly visible. The Project will represent a new feature in this local, agricultural landscape and will provide a contrast with surrounding landscape features in terms of color, scale, and form. A simulation of the Project from this viewpoint is provided in Figure 16-6h. Since this is one of the few locations that will afford a foreground view of the Project, an additional simulation illustrating the mitigation provided by the planned landscaping is shown in Figure 16-8b.

Viewpoint 86: From Greeves Road. Greeves Road occupies an area of higher terrain in the rural/agricultural zone, and some of the residences along the northern side

of the road have extended views to the north toward Middletown. The Project may be intermittently visible at some of these residences, but will be unnoticeable to casual observers and motorists due to the distance and the intervening vegetation in the foreground and middleground areas. The residence at 169 Greeves Road was determined potentially eligible for the National Register of Historic Places, but field surveys showed that visibility from that particular residence in the direction of the Project site is screened by vegetation. Considering the lack of potential visibility, the USACE Basic Procedure was not conducted for this viewpoint.

Viewpoint 87: From Route 6 near Gonzalez Drive. This residence is located in the rural/agricultural zone and was also determined potentially eligible for the National Register. As shown in the photo provided in Figure 16-5j, this residence is screened on the north and east sides by mature vegetation, which effectively block any potential views of the Project. Considering the lack of potential visibility, the USACE Basic Procedure was not conducted for this viewpoint.

Viewpoint 92: From the South East Towers in Middletown. This viewpoint is a high-rise senior citizens residence located in the urban center zone. This viewpoint was suggested by the WCAG due to the potential views of the Project directly to the south. Field survey revealed, however, that views from the ground level parking lot and the front entrance are well-screened by mature landscaping and other middleground vegetation. Apartments on the higher floors will likely have middleground views of the Project stacks, but inquiries to the residents indicated a lack of any common areas on the upper floors. Considering the lack of potential visibility for all but a small percentage of

the residents, the USACE Basic Procedure was not conducted for this viewpoint.

Viewpoint 93: From Overlook Apartments. This viewpoint is representative of the commercial corridor zone and was suggested by the WCAG due to the superior view afforded from this elevated vantage point. The Overlook Apartments are located above and behind the commercial developments on Route 17M, just south of Playtogs Plaza (Viewpoint 41). As shown in the simulation presented in Figure 16-6i, even from this elevated vantage point (a small playground within the apartment complex), only the uppermost portion of the Project stacks would be visible above the mature vegetation beyond the commercial corridor to the east. This viewpoint was utilized for a plume visibility analysis, see Figure 16-7f. The limited potential view of the Project and the minimal landscape features in this commercial corridor is reflected in the USACE Basic Procedure summary with a visual impact assessment value of "0".

Viewpoint 94: From Genung Street. This viewpoint is representative of the rural/agricultural zone that surrounds the Project site. A view of the upper portion of the Project stacks will be afforded from this vantage point, introducing an industrial element in a rural landscape (see Figure 16-6j). The impact is somewhat minimized by the frequent views of existing transmission lines and utility poles in this area. The visual impact is reflected in the USACE Basic Procedure summary with a visual impact assessment value of "-1".

Q. Was an analysis of the impact of visible water vapor plumes done?

A. Yes. A photographic overlay was prepared showing a visible water vapor plume that could occur from the combustion turbine generator stacks under limited operating

conditions. The overlay shows a visible water vapor plume representative of average January daytime temperature and humidity conditions, as it may appear from a representative location. Stipulation 11 permits that the depiction of a water vapor plume may be based on visible water vapor plumes from other comparable plants operating under similar conditions or applicable engineering estimates.

Any visible water vapor plume from the Project would be the result of water vapor condensation in the exhaust gas as it exits the stacks, similar to a person's visible breath on a cold winter morning. Like a visible breath, the water vapor plume would be more prevalent during humid conditions and during the cooler seasons (late fall, winter, and early spring), when atmospheric conditions are conducive to condensation of the water vapor entrained in the exhaust. Air modeling was conducted to assess frequency of visible plume formation. Refer to Section 6.13.

In addition, an alternatives analysis of plume mitigation and its energy impact was conducted. Refer to Section 5.8. To comply with Stipulation 11, Clause 4, as well as Stipulation 13, Clause 4, a further analysis was conducted, in part to determine average January daytime conditions. Average plume height, as reported in Section 5.8.2, is 100 m above ground (330 feet above ground or a 110-foot plume rise), with a dissipation in the horizontal direction of 125 m (410 feet downwind). These dimensions are indicative of an average January daytime condition of 16°F with 70% relative humidity (an 8°F dewpoint).

Figures 16-7a through 16-7f show photosimulations with visible water vapor plumes under the average January daytime conditions presented. Vapor plumes from

combustion turbine exhaust are typically wispy and translucent. Note that all plume simulations assume that the wind direction is perpendicular to the view, for maximum obstruction of sky. For the same reason, where more sky is visible in one direction than another, the more obstructing direction was chosen. The visual impact from these plumes is temporary. When plumes occur, their impact may be judged qualitatively by several qualitative criteria -- form, texture, and size. While the plumes are visible, this impact does not qualitatively change the view that would otherwise be present with the Project but without the plume. Hence, the impact is considered to be negligible.

Q. Was a cumulative impact assessment done of the Project and the Masada project?

A. Yes. A cumulative impact assessment of the two projects was done, including a photographic rendering of the proposed facilities as viewed from the Dolsontown Road project area and Route 17M commercial corridor. This assessment was based on information in the Draft Environmental Impact Statement for the Masada project.

Q. Please describe the findings of this assessment.

A. The Orange County Recycling and Ethanol Production Facility proposed by Masada is located approximately 400 feet northwest of the Project property. There are numerous buildings and structures included in the Masada project all with varying heights. The most predominant structures include the main Beer Column (94 feet), a Rectifying Column (81 feet), a Gasifier Building (70 feet), a Digester (58 feet), a 57 foot tall Materials Recovery Facility (MRF) Building (57 feet), and a Combination Stack (100 feet). Ancillary facilities, such as miscellaneous buildings, will be smaller and less prominent than the main structures. Along with these is the Process Building,

Administrative Building, Maintenance and Receiving Buildings, Control Room Building, CO_2 building, Reverse Osmosis and Fermentation Building, Boiler Building, Package Boiler Building, Effluent Treatment Control Room, and Truck Scales Houses, all of which will be 50 feet tall or less. Most of the facility (Process Building and MRF) will be placed at a ground level of 500 feet above MSL. A fence will encircle the property with access gates at the western end of the site along the access road.

The Masada project's landscaping and screening consists of an existing wooded area along the north and western borders of the property. The existing vegetative buffer will remain untouched, especially along the property boundaries, to minimize the visual impacts. To the east of the site is a small wooded area that borders the Project property and the City of Middletown Wastewater Treatment Plant to the south.

The impact of the Project with the Masada facility has been assessed from Playtogs Plaza (Viewpoint 41) and Genung Street (Viewpoint 94). There is partial visibility of both projects from Playtogs Plaza, but the Masada project is not visible from Genung Street, as shown in the simulations presented in Figures 16-7g and 16-7h.

From the commercial corridor represented by the viewpoint from Playtogs Plaza, stacks of both buildings will be partially visible above the vegetation beyond the commercial corridor. From this location, the Project is located to the right of the Masada site and about 2,000 feet beyond. From Genung Street, a western view of only the upper portion of the Project stacks will be visible. A dense wooded area will block the visibility of any of the buildings and the entire Masada project site.

The impact of the two projects is essentially the same as the impact from one

project, because the mature vegetation blocks any substantial views of either site. It should be noted that although the Project's stacks will be significantly taller than any structure from the Masada project, it is set at least 2,000 beyond where the Masada project is located relative to Playtogs Plaza.

Q. What will be the nature and degree of visual change resulting from the construction of the Project and its aboveground interconnections?

A. Construction of the Project and aboveground interconnections will take place over an approximately 24-month period. Potential visibility of construction sites will be limited to the ground level until structural erection occurs. Within the site, which includes both the Project and its only aboveground interconnection (electric) the only view toward the construction areas will be via the Dolsontown Road. The maximum visibility at that point will come from a crane or cranes on the site.

Q. How, then, would you characterize the overall visual impact of the Project?

A. For most points in the study area, surrounding vegetation at more distant locations will eliminate almost all distant view of the Project. In Middletown, extensive screening is provided by existing buildings and vegetation. The Project will be prominently visible from locations along Dolsontown Road immediately adjacent to the Project site. Visibility of the electrical interconnection will be limited to the most proximate locations. From representative locations in the are that will have view of the Project, the impact is moderate. This is evidenced in part by applying the VRAP methodology, described and presented earlier. Impacts from plumes are considered negligible relative to the Project itself. Cumulative impacts from Masada are essentially the same as the impact from one

project.

Q. Is any mitigation proposed?

A. Yes. The following mitigation parameters are proposed: design and siting; alternative cooling technologies; changes to the profile or size of the facility; screening and landscaping; color and texture of materials; use of non-reflective surfaces and materials; disguise or camouflage of structures or equipment; maintenance during operation; a plan for decommissioning once the facility has exhausted its useful life; lighting options for work areas and safety requirements; and lighting options for stack lighting as required by the FAA.

Q. What other types of mitigation are necessary?

A. Certain other types of mitigation may be warranted for specific viewpoints if the potential impacts are determined to be severe. This additional mitigation includes off-site landscaping (i.e., landscaping at the viewpoint location as compared to landscaping at the Project site) and visual offsets (e.g. the elimination of existing "eyesores" to offset the visual impact of the proposed Project).

Q. Was any off-site landscaping analyzed?

A. Yes. Of the 22 viewpoints selected for analysis, 8 viewpoints will not afford any views of the Project due to intervening topography, structures and/or mature vegetation. Off-site landscaping is obviously not warranted at these viewpoints. Off-site landscaping was analyzed at the remaining sites.

Viewpoints 39 and 40: From I-84 westbound and eastbound. The segment of I-84 between the Route 17M interchange and Airport Road overpass near Randall Airport will

afford motorists short-term views of the Project. Additional landscaping within the highway right-of-way would further limit these potential views, but U.S. Department of Transportation design and safety standards restrict landscaping in proximity to interstate highways, and these restrictions may limit the effectiveness of off-site landscaping for these viewpoints. On-site landscaping will effectively screen all but the Project stacks from these viewpoints.

Viewpoint 41: From Playtogs Plaza. As shown in the simulation provided as Figure 16-6c, only the uppermost portion of the Project stacks will be visible from this viewpoint, and this potential visual impact, even combined with the potential view of the Masada project, will not severely diminish the visual or aesthetic characteristics of this viewpoint. In addition, landscaping opportunities are limited in the parking lots and along the roadway in this corridor. Accordingly, off-site landscaping is not warranted at this viewpoint.

Viewpoint 48: From Route 17M (near Bates-Gates Road). The potential view of the Project from this commercial corridor, as shown in the simulation provided as Figure 16-6d, includes other commercial structures in the foreground, and the potential visual impact of the Project will not severely diminish the visual or aesthetic characteristics of this viewpoint. On-site landscaping will effectively screen all but the Project stacks from this viewpoint; accordingly, off-site landscaping is not warranted at this viewpoint.

Viewpoint 71: From David Moore Heights. As shown in the simulation provided as Figure 16-6e, the Project stacks will be visible from this viewpoint, but the turbine buildings and other Project components will be screened by the adjacent apartment

buildings and intervening vegetation. The planting of deciduous trees with a mature height of 50 to 60 feet in the area between David Moore Heights apartments and the Country View Manor apartments would further mitigate the potential visual impact of the Project for residents of David Moore Heights. These additional plantings will be evaluated and presented in a Compliance Filing subsequent to the issuance of the Certificate.

Viewpoint 72: From Horton Hospital. As shown in the simulation provided as Figure 16-7d, only the uppermost portion of the Project stacks will be visible from this viewpoint. Considering the distance to the Project and the limited visibility due to the intervening vegetation, off-site landscaping is not warranted at this viewpoint.

Viewpoint 74: From Mountain Avenue. The residences along Mountain Avenue already have extensive landscaping in the rear yards and down-slope from these properties, as shown in the photograph provided in Figure 16-5f. Considering the extent of existing vegetation and the limited visual impact from the Project, off-site landscaping is not warranted at this viewpoint.

Viewpoint 76: From Heidt Avenue. Most of the residences along Heidt Avenue have mature landscaping in the front and rear yards, and potential views of the Project will be limited from this viewpoint, as shown in the simulations provided as Figures 16-6f and 16-7e. Considering the distance to the Project and the limited visibility due to the intervening vegetation, off-site landscaping is not warranted at this viewpoint.

Viewpoint 80: Dogwood Drive. Potential views of the Project from this viewpoint will be limited by intervening vegetation and structures. Accordingly, off-site

landscaping is not warranted at this viewpoint.

Viewpoint 83: Pinehill Cemetery. The view from Pinehill Cemetery toward the Project includes commercial buildings along the Route 17M corridor and existing electric transmission towers (see Figure 16-5h). Considering the limited visual impact resulting from the Project at this viewpoint, off-site landscaping is not warranted at this viewpoint.

Viewpoints 84 and 85: From Dolsontown Road. Motorists traveling along Dolsontown Road will be afforded the most extensive views of the Project, including the turbine buildings, switchyard, air-cooled condenser and stacks. A comprehensive on-site landscaping plan has been developed to provide screening and to soften the industrial appearance of these foreground views of the Project. The landscaping plan, described in greater detail in Section 16.3.5, is depicted in the simulations provided as Figures 16-8a and 16-8b. Considering the effectiveness of the on-site landscaping, particularly for these close-in viewpoints, off-site landscaping is not warranted along Dolsontown Road.

Viewpoint 93: From Overlook Apartments. As shown in the simulation provided as Figure 16-6i, only the uppermost portion of the Project stacks will be visible from this viewpoint, and this potential visual impact will not severely diminish the visual or aesthetic characteristics of this viewpoint. Accordingly, off-site landscaping is not warranted at this viewpoint.

Viewpoint 94: From Genung Street. The view of the Project from this viewpoint, shown in the simulation provided as Figure 16-6j, represents a motorist's view and not the view from a specific residence, residential complex or public gathering place.

Considering the limited Project visibility due to the existing mature vegetation, off-site landscaping is not warranted at this viewpoint.

Q. Are visual offsets required?

A. No. Only the close-in viewpoints along Dolsontown Road and at David Moore Heights would experience visual impacts that warrant site-specific mitigation. Calpine has proposed on-site and off-site landscaping to mitigate impacts at these viewpoints. From other viewpoints, the visual impacts are limited by distance, intervening topography, vegetation and structures, and the existing visual context at the viewpoints. For these locations, offsets are not warranted.

Q. Is it your opinion, then, that the Project minimizes impacts on visual resources?

A. Yes. The Project minimizes impacts on aesthetic, historic and recreation resources, as follows: keeping the height of electric transmission structures, turbine buildings and stacks as low as possible; avoiding stack marking (alternating painted bands) by using daytime lighting as an alternative; using an air-cooled condenser to avoid water vapor plumes from conventional evaporative cooling towers; using neutral colors for the Project's stacks to allow the Project to blend into the surrounding landscape; preserving existing vegetation and natural topography around the site's perimeter; implementing an extensive landscaping plan combining landforms (i.e., berms and mounds) and mixed vegetation to provide year-round screening; a planned maintenance program for landscaping, buildings, grounds and other project components to ensure viability of plantings and maintain Project appearance; and off-site landscaping at David Moore Heights to minimize intrusion of industrial features into a residential setting.

Q. Does this conclude your testimony at this time?

A. Yes.

Case: 00 F 1256

WAWAYANDA ENERGY CENTER

DIRECT TESTIMONY

OF

STEPHAN SOLZHENITSYN

DONALD NEAL

DAVID DEVINE

Q. Please state your names, titles, affiliations and business addresses.

A. My name is Donald Neal, and I am an Environmental Manager for Calpine Corporation ("Calpine"). My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, Massachusetts 02110.

A. My name is Stephan Solzhenitsyn, and I am a Senior Project Manager with TRC's Energy Group. My business address is Boot Mills South, Foot of John Street, Lowell, Massachusetts 01852.

A. My name is David Devine and I am a Project Development Manager for Calpine. My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

Q. Mr. Solzhenitsyn, what are your duties of employment?

A. As a Senior Project Manager, my duties include preparing environmental impact assessments, siting studies and siting applications in the Northeast, Mid-Atlantic and Southern United States. Projects include multidisciplinary permitting efforts for power generation facilities and interconnection corridors; siting studies for electric generating facilities; environmental due diligence associated with the purchase of existing facilities and brownfield development opportunities; and post-permitting support for permit compliance during financial close and project construction.

Q. How are you qualified to perform your employment duties?

A. I have a Bachelor of Arts degree in Visual and Environmental Studies from Harvard University and I have a Master of City Planning from Massachusetts Institute of Technology.

Q. Does your curriculum vitae, which is attached as Exhibit 16, fairly and accurately

represent your experience?

A. Yes.

Q. Mr. Solzhenitsyn, please describe your role in the Wawayanda Energy Center Project ("Project").

A. I am the TRC project manager. In that capacity, I have overseen the preparation of various environmental studies, with particular emphasis on land use.

Q. Mr. Neal, what are your duties of employment?

A. I serve as project manager and technical analyst for environmental permitting and assessment of electric generating facilities and programs, representing Calpine before regulatory agencies and in public forums. In this capacity, I have managed and prepared siting studies, environmental impact statements, and applications for wastewater, wetlands and air permits. I have also led environmental, health and safety audits and due diligence investigations. I am experienced with methods of air emissions source testing and continuous emissions monitoring system design, certification and implementation.

Q. How are you qualified to perform your employment duties?

A. I received both a B.S. and an M.S. in Biology from the University of Massachusetts and I have over 18 years of experience related to my employment duties.

Q. Does your curriculum vitae, which is attached as Exhibit 14, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Neal, please describe your role in the Project.

A. For the Project, I supervised all aspects of the Article X application and I am responsible for project compliance with environmental requirements.

Q. Mr. Devine, what are your duties of employment and how are you qualified to perform these duties.

A. I have been involved in the power industry for 25 years. As a Project Development Manager, I most often work at developing natural gas fired combined-cycle projects in New York State. I have experience in the development, construction, operations and maintenance of many power projects.

Q. Please describe your role in the Project.

A. I am the development manager for the Project. As such, obtaining the land use approvals has been part of my responsibility.

Q. Does your curriculum vitae, which is attached as Exhibit 5, fairly and accurately represent your experience?

A. Yes.

Q. Gentlemen, what sections of the Application does your testimony support?

A. Sections 10 and 12.

Q. Please briefly describe Section 10 of the Application.

A. This section addresses Stipulation 5, which encompasses the Project's compatibility with local laws, existing land uses, zoning, and land use planning. Land use analysis is the study of the patterns of local human settlement and life. Land use compatibility is generally assessed by comparing the proposed development to other existing and proposed land uses within the immediately surrounding area and the impacts the development is expected to have on those activities. In addition, land use compatibility is assessed through an analysis of conformance with local zoning and other laws established as community planning tools. The Siting Board regulations explicitly require an analysis

of land uses and zoning districts. 16 NYCRR 1001.3(b)1(i). In addition, the stipulations as well as the Siting Board Rules at 16 NYCRR 1001.7(b)(1) require the Application to include a description of any security fund and any insurance in place or to be obtained for decommissioning.

An analysis of local laws is included in this section because most local laws are generally related to land use. The Public Service Law requires that the Siting Board issue a Certificate only if it finds that the Project "is designed to operate in compliance with applicable state and local laws and regulations." PSL §168.2(d). However, it should be noted that in the case of local requirements, the Siting Board has discretion to grant relief from such provisions if it finds that they are "unreasonably restrictive in view of the existing technology." Project must demonstrate compliance with local laws not deemed "unreasonably restrictive."

Q. What are the on-site land use characteristics?

A. The proposed site is predominantly used for agricultural and residential purposes. The only structures on the property are a house and shed located at 1128 Dolsontown Road, which will be dismantled as part of the Project construction effort. The majority of the site (west, north, and east of the lone residential property) consists of a mixture of agricultural land in production and open fields. A deciduous forest, abandoned railroad easement, and electric utility right-of-way are found along the northeastern border of the site, and there is a small ponded area near the eastern border. The eastern half of the site contains a drainage ditch that is a tributary to the Monhagen Brook. Research indicates the property has only been used for farming, with no previous development.

Q. Was an environmental site assessment conducted?

A. Yes. The Environmental Site Assessment (ESA) was performed in conformance with the scope and limitations of the American Society for Testing and Materials (ASTM) Practice E1527-00 for the property. An updated ESA was performed when the Project site was expanded with the addition of a residential lot (1128 Dolsontown Road – Section 6, Block 1, Lot 3.1) and an undeveloped parcel owned by the Church of Christian Fellowship (Lot 3.2). Both are part of the Project site. The objective of the ESA was to assess the property for the potential presence of recognized environmental conditions (RECs). In order to meet this objective, the activities outlined in Section 10.2.1.2 were undertaken.

Q. What were the results of the ESA?

A. On the basis of site reconnaissance observations and information obtained and reviewed during site research performed at local municipal offices, the assessment did not reveal evidence of any recognized environmental conditions associated with the Project site.

The ESA identified the potential for the existence of a fuel oil UST and building materials constructed of asbestos-containing materials in conjunction with the private residence on Lot 3.1. An abandoned automobile and empty one- and two-gallon gasoline containers were also observed alongside the garage. All of these issues are standard items with residential properties and not considered to be significant environmental concerns. Nonetheless, the ESA recommended a follow-up asbestos inspection, comprehensive survey of the building interiors to document potential storage of containers, and survey to confirm the presence or absence of an UST. These tasks will be performed, and appropriate corrective actions taken, prior to razing the house.

Q. Was a land use survey conducted?

A. Yes. The Application includes a map and survey of existing land uses within a 2-mile radius of the Project site. In order to compile the required map and identify existing land uses within a 2-mile radius of the Project site, a land use inventory was prepared. The data collection effort included a windshield survey where general land use characteristics were assigned and annotated on an USGS-based map of the study area. Characterization of backland area (area beyond the view from the roadway) was based on aerial photography.

In general, land use is more rural and agricultural south and east of the site in Wawayanda and more thickly settled and commercial north of the site in Middletown. West of the site, land use is mixed, consisting of a large commercial area around Route 17M and an assortment of commercial, residential, and vacant areas west of Route 17M (refer to Figure 10-1).

The categories used to describe land uses within the 2-mile radius are defined in Table 10-1. Figure 10-2 provides a land use map. Section 10.2.1.3 describes the land uses surrounding the project by the following categories: west of the site, north of the site, east of the site and south of the site.

Q. Did you identify recreational land uses that might be affected by the sight or sound of the Project?

A. Yes. We identified and analyzed the recreational land uses in the vicinity of the site, including county parks and nature preserves, fishing areas, and town parks that might be affected by the sight or sound of the construction or operation of the Project and interconnections. Locations of recreational areas are presented in Figure 10-6 and are described in detail in Section 10.2.1.4 of the Application.

Q. Is the Project compatible with these recreational land uses?

A. Yes. As thoroughly described in Section 10.3.2, the Project will not affect recreational land uses in the area, which are further away from the Project site than nearby residential land uses. Thus, impacts to recreational areas are minimized through the same methods by which impacts are minimized to residential areas. Examples of these methods include extensive noise controls, building and equipment color and texture treatments that are unobtrusive, minimization of scale and height consistent with engineering and environmental quality requirements, and visual screening and landscaping. A conservative analysis of the noise, traffic, and visual impacts from the Project on nearby recreational areas is shown in Table 10-4.

Q. Did you map zoning and other designated districts within a 2-mile radius of the Project site?

A. Yes. We mapped existing zoning districts; Agricultural Districts; Wild, Scenic and Recreational corridors; flood-prone areas; critical environmental areas; watershed protection districts; public fire, school, sewer and water districts, and proposed zoning districts within a 2-mile radius of the Project site. The Application also includes a description of the permitted/prohibited uses within each zone.

Q. Please describe the zoning regulations.

A. Section 10.2.2.1 of the Application summarizes the existing zoning within a 2-mile radius of the Project. This includes a brief description of the zoning and the permitted uses for the Town of Wawayanda, the City of Middletown, and the Town of Wallkill. Additionally, there are certain planned zoning district changes in the Town of Wawayanda. These are detailed in Section 10.2.2.2 of the Application.

Q. Please describe the other surveyed districts.

A. Agricultural districts are addressed in Section 10.2.2.3 and are shown in Figure 10-10. There are no wild, scenic and recreational corridors within a 2-mile radius of the Project site, as detailed in Section 10.2.2.4 of the Application. The nearest 100-year and 500-year floodplain, according to Federal Emergency Management Agency (FEMA) mapping, surrounds Monhagen Brook west of the Project site, as shown on Figure 10-11 and detailed in Section 10.2.2.5 of the Application. Critical environmental areas in Orange County are Greenwood Lake, Chadwick Lake Reservoir, and all lands in the Town of Wawayanda higher than 600 feet msl. All such areas within 2 miles of the Project site are mapped in Figure 10-11 and described in Section 10.2.2.6. Watershed Protection Districts are detailed in Section 10.2.2.7 of the Application. Figure 10-12 shows where portions of the Project site will occur within a watershed protection overlay district under Wawayanda's proposed zoning changes. The nearest fire districts are the Slate Hill, New Hampton, and Middletown districts, as shown in Figure 10-13. The Project site is within the New Hampton Fire District. The nearest school districts are the Minisink Valley, Middletown, and Goshen districts, as shown in Figure 10-13. The Project site is within the Middletown School District. Finally, the following water and sewer districts are within 2 miles of the Project Site: Wawayanda Water and Sewer District no. 1, as well as certain private service areas that are shown as "centralized water service area" as depicted in Figure 10-14; Wallkill– the Consolidated Water District, which uses six independent water supply wells along the Wallkill River, as well as a water and sewer district, as shown in Figure 10-11; and Middletown is fully serviced by its public water and sewer systems, and is not subdivided into different water or sewer

districts (shown in Figure 10-14 as a water and sewer serviced area).

Q. Was a survey of all proposed land uses within a 1-mile radius of the Project completed?

A. Yes. With respect to planned land uses, Calpine identified through interviews with local and state planning officials publically announced developments within a one-mile radius of the Project site. These include, the proposed Orange County Recycling and Ethanol Production Facility ("Masada project") north of the site in Middletown, the Middletown Islamic Center off McVeigh Road, and a 25-house subdivision called Swan Village, approximately one mile west of the Project site off Peach Hills Drive in Middletown (refer to Figure 10-15).

Q. Was a map of all properties within 1000 feet of the Project site prepared?

A. Yes. We created a map of all properties within 1000 feet of the Project site that shows the current land use, tax parcel number and owner of record of each property and any proposed land use plans for any of these parcels. The map is shown in Figure 10-16. Table 10-2 provides ownership and land use information.

Q. Did you assess the Project's compatibility with existing and proposed land uses?

A. Yes. We assessed the land use compatibility of the Project, staging areas, and interconnections with regard to existing, potential, and proposed land uses within 1 mile of the Project site (300 feet from underground interconnections). This includes an assessment of Project-related noise, odor, traffic, and visual effects on the existing and proposed land uses. We also determined the cumulative land use impacts of the proposed Project and the Masada project.

As described in Section 3, the Project includes all construction at the Project site, the aboveground electric interconnection that extends to the south of Dolsontown Road,

the staging areas located south of Dolsontown Road, and two underground interconnections: a water/sewer corridor to the Middletown publicly owned treatment works (POTW) and a water main along Dolsontown Road to Route 17M. Per the stipulations, the gas pipeline that will supply the Project is being licensed under a separate proceeding, and Calpine's description and assessment of that pipeline, based on map level studies, can be found exclusively in Section 9 of this Application.

Q. Will the Project be consistent with existing land uses within the 1-mile study area?

A. Yes. The Project is compatible with the existing land uses within the 1-mile study area. In order to be considered compatible with the existing land uses, the Project must avoid, minimize, or mitigate impacts to that land use, including noise, traffic, odors, and visual effects. The effects in terms of land, noise, traffic, odor and visual effects will not have a significant impact on the use and enjoyment of current and planned land uses. An analysis of each of these elements is presented in Section 10.3.1 of the Application.

Q. Is the Project compatible with proposed development?

A. Yes. The proposed land uses closest to the site are commercial and industrial. The Masada project north of the Wawayanda Energy Center site and the newly built Orange & Rockland substation southeast of the site (the Middletown Tap) will contribute to the industrial and commercial use of the area and thus would be compatible with the Project. The Middletown Islamic Center is a proposed mosque just southeast of the site on McVeigh Road. A proposed residential development, a 25-house subdivision called Swan Village, is about one mile from the site. These developments will be minimally affected by the Project.

Table 10-5 presents a conservative analysis of the noise, traffic, and visual

impacts from the Project on nearby proposed developments, based on predicted impacts at more proximate assessment points. The 1-mile radius study area is mixed. It presently contains industrial, commercial, residential, infrastructure, agricultural, recreational and vacant uses. The mix of proposed land uses in the study area is consistent with the mix of uses. The Project, too, contributes to this diversity, and is not expected to influence the viability of the proposed land uses in the area.

The Project will be visible and audible at the Masada project site. Some Project traffic will use Route 17M past the Masada access drive. However, both are industrial facilities and would not be incompatible with each other. Impacts by the two projects cumulatively are analyzed in several sections of this Application. The Middletown Islamic Center would be minimally affected by view the Project (stacks only), as it is proposed on the opposite side of I-84. Visual effects are represented by viewpoint 82, as analyzed in Section 16. Noise impacts would be much less than for Dolsontown Road East residences, the nearest impact assessment point. Swan Village would also be minimally affected, with potential views of stacks only. Visual effects are represented by viewpoints 73 and 4, as analyzed in Section 16. With a mile distance between the residences and the Project site, noise is not expected to be an issue at this location.

Related to long-term growth due to the Project, the Project will have a positive net impact on the local economy, as described in Section 12. However, this will primarily be manifested through spending by employees and miscellaneous local equipment purchases. The types of economic growth generated through such additional spending are disparate, and are not expected to result in specific kinds of land use developments (as would be the case, for example, with a cogenerator drawing a steam host or an

employment center inducing nearby commercial development). Similarly, long-term economic growth resulting from lower energy prices would be disparate, regional, and indirect. In summary, no identifiable impacts from long-term secondary growth are anticipated in the Project vicinity.

Q. Other than zoning, did you determine all of the standards found in local laws and the Project's degree of compliance with each?

A. Yes. Calpine conducted a pre-application local consultation pursuant to Stipulation 5, Clause 5(a) with the Town of Wawayanda, City of Middletown, Orange County, and Department of Public Service. Calpine submitted memoranda to each municipality outlining its understanding of their local laws, and conducted follow-up consultation with all municipal parties and DPS. Section 10.4 and Table 10-6 of the Application, contain and describe all the local provisions that apply to the proposed Project in any specific sense. These materials also contain a compliance statement or explanation. In Section 1.6 as well as in Section 10.4, Calpine states which permits Calpine requests be issued directly by the local authority rather than by the Siting Board, as envisioned in Public Service Law Section 172.

Q. And does the Project comply with local laws?

A. The Project complies with all local laws except for Wawayanda <u>proposed</u> law 195-19(k). The proposed section provides that all industrial uses, processing and storage shall be within fully enclosed structures. The major processes at the Plant include air intakes, fuel delivery/compression, combustion, heat recovery to generate steam, power generation by both combustion and steam turbines, steam cycle and turbine cooling, water demineralization, and bulk liquid storage (water, wastewater, and ammonia) in

aboveground tanks. All of the activities that are reasonably placed indoors have been so placed – fuel delivery/compression, combustion, heat recovery to generate steam, power generation by both combustion and steam turbines, and water demineralization. The following activities, however, are properly placed outdoors: air intakes, steam cycle and turbine cooling, and bulk liquid storage in aboveground tanks.

Not only the building façade, but all outdoor structures such as tanks will be designed to fit appropriately with adjacent industrial and non-industrial uses. Issues related to color and texture are detailed in Section 16 of the Application. As described in Section 10.3, the Project is compatible with uses allowed in the IORB District, and will not unreasonably interfere with existing nearby uses. See Section 10.3.

In light of the technological requirement that certain processes cannot be located in fully enclosed buildings, Calpine asserts that this provision is unreasonably restrictive with respect to those specific technologies, and seeks a waiver under PSL Section 168(2)(d).

Q. Was a plan for decommissioning and restoration prepared?

A. Yes. We prepared a description of the financial resources available to restore any disturbed areas of the Project site in the event the Project is abandoned, cannot be completed, or is decommissioned and a plan for the decommissioning of the Project site. The components of the decommissioning plan are described in Section 10.5.

Q. Please describe the performance criteria and why they are appropriate.

A. The performance criteria are specifically described in Section 10.5.1 of the Application. The decision to cease operations permanently and decommission the Project will be solely at the discretion of Calpine or any succeeding owner of the Project. The criterion

for reaching such a decision will be commercial: if the Project is not economically viable, it will be decommissioned.

The purpose behind establishing specific performance criteria is to match the decommissioning plan to prudent future land use. New greenfield industrial facilities such as the Project, adhering to environmental regulations passed during the last several decades, will at the end of their useful life offer the benefits of brownfield redevelopment with much less liability risk than is inherent in brownfield redevelopment today. Consequently, it is appropriate that sites used for such industrial facilities be reused by the industries of the future or by other land developments. At the same time, because land use patterns change over time, it is important that Project decommissioning allow future developers and decision makers flexibility as to which specific type of land development is appropriate at a particular site. The performance criteria proposed in Section 10.5 seek to advance these policy goals.

Q. Please describe the phases of decommissioning/restoration.

A. There are four major phases to the decommissioning plan: removal of specialized equipment; removal of basic structures; removal of foundations, piping, and utilities (to the extent necessary); and site restoration.

For removal of specialized installations, electrical equipment will be de-energized and all hazardous materials associated with or housed in that equipment will be removed. The equipment will be either taken off-site in its entirety, if reusable elsewhere, or dismantled in place. Equipment can be a source of scrap metal.

For removal of basic structures, dismantling will first occur. Roofs, wall sidings, beams, the condenser structure, and tanks will be taken apart. Much of this material will

be sold as scrap metal.

For removal of foundations, piping, and utilities, excavation would be necessary. The first part of this phase would be removal of aboveground piping, followed by excavation and removal of foundations (with appropriate disposal of the concrete and steel girders), and excavation and piecemeal removal of underground piping. Finally, excavated areas would be backfilled.

For site restoration, all pavement will first be removed (with appropriate disposal). Then, the areas will be appropriately reseeded.

Q. Please describe how it will be demonstrated that the financial resources available for restoration or decommissioning will be adequate to restore the site to the condition specified in the performance criteria.

A. It is expected that the aboveground portion of the Project will be offered for sale, for at least its scrap value. If there is no market for purchasing the Project, the scrap value of the equipment, buildings, and structures on the Project site is more than sufficient to offset the complete demolition of the facility.

Calpine will be responsible for the removal of the foundations, backfilling, and seeding/landscaping. For the purposes of this analysis, it is conservatively assumed that only some of these costs can be recovered through sale of scrap materials. It is also conservatively assumed that the Project would have no other resale value. Under current economic conditions, these tasks are estimated to cost $0.6 million, as estimated in Table 10-7.

Q. Will Calpine provide a surety to insure that adequate financial resources are available to restore the site to the condition specified in the performance criteria?

A. Yes. Calpine will provide surety in the form of a letter of credit during construction and decommissioning fund during operation. Commencing with the construction of the Project, Calpine will post, or cause to be posted, a letter of credit in favor of the overseeing authorities (*e.g.*, Town of Wawayanda) in the amount of $600,000. The letter of credit will expire upon the commencement of commercial operation of the Project.

For decommissioning following the operations period, Calpine proposes to establish a decommissioning fund, which will be funded on an annual basis during the life of the Project. Calpine will deposit $15,000 into the account each year. Assuming a five percent (5%) interest rate, the funds available for restoration/decommissioning are projected as follows: $ 520,789 after 20 years; $1,046,412, after 30 years; and $1,902,596 after 40 years.

The expectation is that the Project will have a 40-year life (although the decommissioning fund will run for the entire life cycle of the Project). Assuming an average annual escalation rate of 2.5%, the cost in 40 years will be $1.6 million. Thus the $1.9 million accrued in the Decommissioning Account over that period of time will be more than adequate to ensure that the property is restored. If the average annual escalation rate is higher than 2.5%, it is reasonable to expect that the interest rate on the decommissioning fund will also increase to keep pace. Unexpected though it is, any shortfall will be the responsibility of Calpine or any succeeding owner.

Q. Please describe Section 12 of the Application.

A. This section addresses Stipulation No. 7, Clauses 1 – 18. In accordance with that Stipulation, the construction and operation of the Project were assessed to determine the net social and economic effects of the Project. This section also provides economic,

demographic, and safety information. The Project will be a major source of investment in the local economy, especially local labor markets – an activity that also yields secondary beneficial economic effects. At the same time, the locally available labor pool is extensive. Therefore, specialized construction and operational labor should be available in the area. The economic effects of the Project quantified in this section are in addition to the beneficial effects of electricity price decreases for the overall economy.

Safety and emergency response issues are also addressed with respect to local capacities. Safety of the proposed Project is of fundamental importance both to Calpine and the community.

Q. Was an analysis of population data prepared?

A. Yes. Calpine described and mapped, as appropriate, each census tract whose geographic center is within a 2-mile radius of the Project for the following parameters: population, age distribution, sex, marital status, percent minority vs. percent non-Hispanic white, household type and size, tenure of housing units, and persons per occupied housing unit. The latest available 100% census counts were used. The latest available 100% counts are from the 2000 Census, and thus these data are presented. Also, place of work, educational attainment, and household income (as a distribution and median) are presented on the basis of the latest available sample counts. The latest available sample counts, as of August 2001, are from the 1990 Census.

Q. What were the results of this analysis?

A. Section 12.2 and the accompanying Tables and Figures provide a thorough review of our analysis. Figure 12-1 shows the census tracts for which the required population and income data are presented. The total population in the area analyzed is 27,266 persons.

Table 12-1 presents demographic data by census tract. Figures 12-2 through 12-14 are graphs of the data required by Clause 1. Changes in the population and racial composition of Orange County are presented in Table 12-2, which is based on Census Bureau information.

Q. What are the estimates of the number of temporary construction jobs that will be created by Project construction?

A. It is expected that the Project will generate a total of approximately 524 construction jobs over the anticipated 24-month construction period. A breakdown of the various disciplines to be employed during the construction period is provided in Table 12-3.

Q. What is the average construction workforce and what will be the peak of construction employment?

A. The 24 months construction will proceed in the following phases. Phase 1 (approximately months 1 to 4) will include establishing soil erosion and sediment control, site preparation, installation of temporary buildings and parking, and underground utilities (up to about 125 workers). Phase 2 (approximately months 3 to 8) will include soil excavation and foundation pouring (up to more than 200 workers). Phase 3 (approximately months 7 to 13) will include erection of structural steel and delivery of major equipment (up to about 365 workers). Phase 4 (approximately months 11 to 21) will include installation of equipment followed by labor-intensive installation of piping, wiring, and ductwork (up to the peak of about 416 workers). Phase 5 – commissioning – will take place in the final months (ending with about 60 workers). Commercial operation is expected to commence 24 months after notice to proceed. The number and types of construction workers required during each month is summarized in Table 12-4.

Q. Please estimate the annual secondary employment and economic activity likely to be generated in the vicinity of the Project by the construction of the plant.

A. Section 12.3.3 of the Application presents a thorough discussion of Calpine's estimates of secondary employment and economic activity. Table 12-5 presents an order of magnitude comparison of the Project's contribution relative to the entire local economy. Local tax payments are not included in this table.

The Project's economic impact assessment was conducted as an independent analysis by Calypso Research (January 2001). This analysis is presented as Appendix R The "IMPLAN" input-output model (available from the Minnesota IMPLAN Group, Inc.) was used in this analysis to calculate economic impacts. The model estimated that Calpine's local investment of $125 million would increase overall regional output by $259 million, over the two-year construction period. The IMPLAN model predicted a secondary employment impact during construction of 235 *indirectly* created jobs during the construction period on average, and up to 371 jobs during the peak quarter. The total (direct and indirect) job creation is predicted to be 434 on average and 685 in the peak quarter.

Q. Please estimate the number of jobs and other expenditures during a typical operation year.

A. The Project will provide about 25 permanent power plant operator jobs during a typical operations year, as summarized in Table 12-6. As reported in Appendix R, local labor expenditures should range from $7 million to $13 million per year (including inflation). Non-labor local expenditures should to range from $4 million to $7 million per year.

These increases in investment during Project operation will in turn lead to additional purchases and investment in the local economy by businesses and individuals (including Project employees). This economic activity will result in growth and the creation of new jobs. IMPLAN was applied to predict these economic impacts. The model predicts that operation of the Project will have the following annual impacts in Orange County *in addition* to direct investment by Calpine: an increase in sales of $10.5 million; an increase in earnings of $6.8 million; and an increase in employment of 171 jobs.

Q. Please compare the anticipated construction work force with the construction work force available within commuting distance.

A. In addition to workers from Orange County, the Project site is within commuting distance (approximately a 30-mile radius) of several other industrialized counties including: Dutchess County, NY; Putnam County, NY; Rockland County, NY and Ulster County, NY. The union labor organizations, by specific trade relative to the Project have been contacted to confirm membership and availability to staff the Project's construction needs, assuming recent construction work for employment levels. The results of these consultations are shown in Table 12-7, which compares maximum staffing needs to labor supply availability. The trade union representatives indicated that sufficient local construction labor is available for the Project. Union representatives believe that other future construction projects would not adversely affect their ability to staff the Wawayanda Energy Center. The nearby Orange County Recycling and Ethanol Production Facility (the Masada project) is also considered in this analysis, as an announced project with its own construction work force needs. In the unlikely event that

the two projects' construction schedules coincided exactly with each other, the labor supply would still be sufficient. Hence, in-migration of construction trade workers is not anticipated.

Q. Please further explain the estimation made of the extent and duration of temporary construction worker in-migration.

A. Expected in-migration of workers is limited to a small number of construction managers and certain operations employees, as shown in Table 12-3 and explained in Section 12.5.1 of the Application. Maximum total in-migration during construction or operation is expected to be limited to 20 individuals (some with households), while the permanent in-migration would be not more than 10 households.

Q. How many of the construction jobs will be filled by Orange County residents?

A. As seen in Table 12-5, Orange County residents fill approximately 90% of jobs in Orange County. On that basis, it is estimated that 373 construction jobs would be filled by Orange County residents (90% of 414 trade jobs).

Q. Please identify the amount and location of housing expected to be used by any construction workers in-migrating temporarily.

A. As previously described, worker in-migration is not expected due to the large labor pool within commuting distance of the Project site. Nevertheless, if there is an unanticipated need for a limited number of specialized workers to move to the area, the County has a large amount of housing available. According to information from the 2000 Census, there are a total of 7,966 vacant housing units in Orange County out of a total of 122,754 housing units. Of these units, 85% are available for rent or short-term use, and 15% are for sale only. Within a two-mile radius, there are 696 vacant units, of which 597 are

available for rent or short-term use. In addition, there are over 2,800 hotel/motel rooms in Orange County. The local available housing stock available for temporary occupancy is several times greater than anticipated Project in-migration.

Q. Was an estimate of incremental school operating and infrastructure costs that will be incurred by any affected school district during the construction and operation phases of the Project prepared?

A. Yes. Section 12.6.1 presents Calpine's estimation of incremental school operating and infrastructure costs that will be incurred by any affected school district during the construction and operation phases of the Project. Approximately 10 pupils would be expected to relocate during construction and during operation. This estimate is derived by comparing age groups in Table 12-1. Even if all ten children were to relocate to a single district, the relocations would not result in any significant incremental school operating or infrastructure costs.

Q. Please estimate the incremental municipal operating and infrastructure costs that will be incurred by municipalities for police services during the construction and operation phases of the Project.

A. The Project will not significantly increase the incremental cost to police services. Police protection for the Project site is provided by the State Police (Troop F). During construction, police details may be required periodically to assist with traffic flow when large equipment is transported to the site. The Project will have private security during construction and an in-plant security system during operation, requiring no police services. A population increase of 10 households (up to 20 during construction) would

constitute a miniscule increase relative to the overall population of the county, and the increased demand for police services is thus expected to be negligible.

Q. Please estimate the incremental municipal operating and infrastructure costs that will be incurred for fire/emergency services during the construction and operation phases of the Project.

A. Fire protection for the Project site will be provided by the New Hampton Fire District, with adjacent reciprocal services provided by the Middletown Fire District, which has three departments. Orange County also has centralized hazardous materials response and emergency services, which are centered at the New Hampton Fire Department. As explained in Section 12.6.2.2 of the Application, no incremental infrastructure costs are expected to be necessary.

Q. Was an estimate prepared of the incremental public authority operating and infrastructure costs that will be incurred by orange and Rockland for electrical services during the construction and operation of the Project?

A. Any infrastructure and operating costs incurred by Orange and Rockland for low-voltage service to the Project site would be paid by Calpine. Most electrical needs for the completed Project would be met through parasitic load when the Project is operating. When it is not operating, Project electricity demand will be met through a power purchase agreement. Similarly, any infrastructure and operating costs associated with worker in-migration will be recovered through the retail consumer electric system.

Q. What are the incremental costs to water, sewer and solid waste services?

A. As thoroughly explained in Section 12.6.2.4 of the Application, Calpine will pay Wawayanda Water and Sewer District No. 1 for all potable water as a regular customer.

Such consumption will be limited to not more than 5,000 gallons per day. Process water will be obtained from the City of Middletown publicly owned treatment works (POTW). Calpine will directly reimburse the City of Middletown for the infrastructure connections between the Middletown POTW and the Project site, per the terms of a Service Agreement that is under negotiation between the two parties. It is expected that there will be no incremental costs realized by the City.

As for solid waste services at the site, Calpine will contract with private waste haulers to remove solid waste resulting from the Project both during construction and operation, thus not causing any incremental costs to the public services.

Q. What are the incremental costs to private utilities?

A. Private utilities servicing the site are expected to be limited to an interstate natural gas pipeline and telephone/communications service. Direct interconnections from such pipelines to an end use such as the Project are not part of the gas utility rate base and therefore do not affect gas rates. Telecommunications companies operate under tariffs that ensure cost recovery for local telephone service, and the industry has been increasingly deregulated. Private utilities servicing any in-migrating workers may include Orange and Rockland Utilities, Inc. for natural gas. All such costs will be recovered by the utilities through customer charges.

Q. Please identify all jurisdictions that levy real property taxes or benefit assessments upon the Project Site and the most recent assessed value for the Project site.

A. The Project site is located within the following tax jurisdictions, on the basis of local property tax bills: Orange County, Town of Wawayanda, its Highway Department, Middletown School District, and the New Hampton Fire District. The total property

values (full and assessed) are presented in Table 12-8. The Project site consists of approximately 53.20 acres of vacant land located on portions (or all) of tax map parcels 52.1, 3.1 and 3.2. The average assessed value of vacant land on these tax parcels is $3,256 per acre. In future fiscal years, Wawayanda will use full value for assessment, but the most recent available information uses the old system. Table 12-9 summarizes tax rates and total levies for taxing jurisdictions associated with the Project. The rates are for the most recent fiscal year (January 1, 2001 through December 31, 2001). The most recent (2001) annual taxes for the Project site would be the combined tax rate multiplied by the assessed value for each parcel of land. Because the tax rates are per $1,000 of assessed value, the resultant taxes for the year would be $12,721.20 (173.2 times 77.587). This figure will increase considerably as a result of the Project.

Q. Please describe the safety and emergency response plans that have been prepared for the Project.

A. As discussed in Section 12.8 of the Application, Calpine consulted with the New Hampton Fire Department, Town of Wawayanda safety officials, and Orange County Local Emergency Planning Committee (LEPC) representatives in July and August 2001. The Calpine Stony Brook (Long Island) Emergency Response Plan was provided to the attendees prior to the meeting. It and minutes of the consultation are provided in Appendix O. Emergency response plans for the site will be based on this and other similar plans successfully implemented at other Calpine plants, modified and amended as required by the plant technology and environmental permits. The Wawayanda LEPC representative indicated that there were probably sufficient personnel and equipment to respond to a plant emergency, but that site-specific training of emergency response

personnel would be necessary.

Q. In your opinion will Project have any adverse socioeconomic impacts?

A. No.

Q. Does this conclude your testimony at this time?

A. Yes.

Case: 00 F 1256

WAWAYANDA ENERGY CENTER

DIRECT TESTIMONY

OF

BRIAN DEMPSEY

THOMAS DEEDY

Q. Please state your names, titles, affiliations and business addresses.

A. My name is Brian Dempsey, and I work for TRC. My business address is 7 Skyline Drive, Hawthorne, NY 10532.

A. My name is Thomas Deedy, and I am a Senior Project Engineer for Calpine Corporation ("Calpine"). My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

Q. Mr. Dempsey, what are your duties of employment?

A. I perform traffic engineering and planning studies, parking studies, environmental impact statements and traffic demand management.

Q. How are you qualified to perform your employment duties?

A. I have a B.C.E., concentrating on civil engineering from Villanova and an M.B.A. from Fordham University. I have over 15 years of experience related to my employment duties.

Q. Does your curriculum vitae, which is attached as Exhibit 4, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Dempsey, please describe your role in the Wawayanda Energy Center Project ("Project").

A. I have overseen the performance of a comprehensive traffic study for the Project. This study included an assessment of baseline conditions, an evaluation of adjacent roadways and impact analysis for both construction and operation.

Q. Mr. Deedy, what are your duties of employment?

A. I work closely with the Regional Development Managers in the development of new power plant projects. I organize and lead the initial engineering and technical review efforts in the design of combined-cycle power plants. I determine the preliminary conceptual design, using standard design guidelines, as well as run the up-front project heat balances. I also coordinate the initial engineering effort with a selected A/E firm and arrange interface with utilities, steam hosts, gas suppliers, permitting agencies, consultants and other organizations involved with the development of power projects.

Q. How are you qualified to perform your employment duties?

A. I received a Bachelor of Science in Marine Engineering from Massachusetts Maritime Academy and I have over 14 years of professional experience related to my employment duties.

Q. Does your curriculum vitae, which is attached as Exhibit 3, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Deedy, please describe your role in the Project.

A. I am the engineering manager of the Project, with primary responsibility for facility design, interaction with turbine and balance-of-plant vendors and provide technical support for all aspects of the facility.

Q. Gentlemen, what section of the Application does your testimony support?

A. Section 15, which addresses the traffic and transportation impacts related to the Project.

Q. Please briefly describe Section 15.

A. This section addresses Stipulation 10, Clauses 1-5. It includes an assessment of the traffic to be generated by the construction and operation of the Project and an estimate of

the potential impacts this additional traffic may have on the surrounding roadway network. Traffic conditions are typically assessed according to potential changes in operational service level or safety. The Project will comply with state, federal, and local traffic laws and ordinances as applicable. Supporting data regarding traffic conditions and impacts are presented as Appendix T.

A map showing the Project site and all study intersections identified in Stipulation 10, Clause 1(b) is provided in Figure 15-1. For each of these intersections, field observations were conducted and analyses performed to determine the existing base traffic conditions in the vicinity of the Project and to predict future traffic conditions resulting from the construction and operation of the Project. Operation of the Project will not generate a large number of daily vehicle trips and will not have a significant impact on the roadway network. Under future operating conditions, total employment at the Project will be approximately 25 employees. The Project will operate on two 12-hour shifts with 15 employees working the day shift and 2 employees working the night shift. On the weekends, 2 employees will work two 12-hour shifts. The study concludes that the traffic generated by the proposed Project will have a minimal impact on the overall level of service at the study area intersections during peak construction and long-term operation.

Q. Did you determine the existing traffic conditions surrounding the Project site?

A. Yes. In order to determine the existing conditions, we evaluated local routes, intersections, and project site access We also performed traffic counts and field observations. Finally, we determined existing levels of service.

Q. What are the existing local route conditions?

A. The Project will be located on Dolsontown Road east of Route 17M and northwest of the intersection of Dolsontown Road and McVeigh Road. Roadways within the Project area include Dolsontown Road, McVeigh Road, Sunrise Drive, Schutt Road, Schutt Road Extension, Route 6, County Highway 108, Route 17M, East Main Street Extension, Genung Street, and Airport Road. Each of these roadways are described in the application.

The NYSDOT was contacted to obtain the most recent available accident data pertinent to Stipulation 10, clause 1(a). The NYSDOT Safety Information Management System data on the section of Route 17M from north of Dolsontown Road to the I-84 Interchange, Dolsontown Road from Route 17M to Genung Street/Airport Road, and Schutt Road from Genung Street/Airport Road to East Main Street Extension was analyzed. The accidents are summarized into categories including year of the accident, probable cause, and number of injuries in Appendix T. A summary of accident data from the last five years is listed in Table 15-1. The analysis concludes that none of these roadway segments or intersections show abnormally high accident rates.

Q. What intersections did you study?

A. The study intersections are those stipulated in Clause 1(b). Each intersection is identified and described in Section 15.2.2. For each study intersection, documentation of intersection geometry and traffic control devices by approaches and sight distances.

Q. Please describe the Project site access.

A. This site access will be via a three-way intersection, with Dolsontown Road forming the eastbound and westbound approaches and the Project Driveway forming the southbound approach. The eastbound approach will consist of a shared left/through lane and the

westbound approach will consist of a shared through/right lane. The Project Driveway will consist of a shared left/right lane and be under STOP control.

This access is detailed in a conceptual site plan, drawn at an appropriate scale, depicting all Project site driveway intersections with Dolsontown Road, showing horizontal and vertical geometry, the number of approach lanes, the lane widths, shoulder widths, traffic control devices by approaches, and sight distances.

The Application includes a site plan showing geometry and a sight distance analysis for the proposed intersection of Dolsontown Road and the Project Driveway. Figure 15-2 shows the site plan attributes. Minimum sight distance requirements are listed in Table 15-2. As shown by the Table, appropriate sight distance has been designed for vehicles exiting and entering the Project driveway.

Q. Please describe the traffic counts and field observations.

A. We conducted peak hour turning movement counts and 24-hour average daily traffic counts. In conjunction with the manual traffic counts, automatic traffic recorder (ATR) machine traffic counts were conducted along Dolsontown Road. In addition to the traffic counts, data collected during field observations included roadway geometrics, traffic control devices, and traffic flow characteristics.

The existing peak hour traffic volumes are shown on Figures 15-3, 15-4 and 15-5. ATR counts were conducted along Dolsontown Road to obtain twenty-four hour traffic volumes for a typical weekday and Saturday. The results of the ATR counts indicate that approximately 6,200 vehicles travel on Dolsontown Road on a weekday and approximately 8,100 vehicles on a Saturday.

Q. What are the existing levels of service?

A. We determined levels of service (LOS) using capacity analyses. As fully described in Section 15.2.5, capacity analyses were performed at the key intersections for existing traffic conditions to determine the extent of delay encountered at each location.

A detailed description of LOS is provided in Appendix T, along with the capacity analysis.

Table 15-3 summarizes the results of the capacity analyses for the 2001 Existing Traffic condition in accordance with Stipulation 10, Clause 1(e). Signalized intersections are indicated in uppercase letters and unsignalized intersections are represented in lowercase letters.

All of the intersections operate at an acceptable Level of Service with the exception of the Route 17M and Dolsontown Road intersection. While the intersection operates at an overall acceptable Level of Service "D", significant delays are currently experienced on the Dolsontown Road westbound approach during the Peak PM Hour. With a traffic signal timing modification to provide more green time to this approach, the Dolsontown Road approach will operate with less delay.

Q. Did you prepare an analysis of future conditions?

A. Yes. To determine whether the local roadway network can accommodate the anticipated traffic volumes from the Project, the peak hour traffic volumes were compared to roadway capacities. In order to make this comparison, the hourly traffic volumes related to the Project were added to the projected future traffic volumes (without the Project) for each peak hour. This analysis addresses impacts from both the construction and the operation of the Project. Construction impacts result from the additional vehicle trips generated by the peak construction workforce, as well as delivery of equipment and

material to the Project site (peak construction condition). Operation impacts result from additional vehicle trips generated by the plant operation employees (condition with Project). The future traffic conditions during Project operation were determined based on background growth projections for the area.

Future (2004) traffic volumes were determined in accordance with the methodology described in Section 15.3.1. The resulting 2004 future traffic volumes, not including any impacts associated with the Project, are set forth in Figures 15-6, 15-7 and 15-8, 2004 No-Build peak traffic volumes.

Using these traffic volumes, as set forth in Figures 15-6, 15-7 and 15-8, capacity analyses were conducted for the "2004 Condition Without Project Construction" for the study area intersections. The results of the capacity analyses are summarized in Table 15-4. Signalized intersections are indicated in uppercase letters and intersections without traffic signals are represented in lowercase letters. All intersections will operate at an overall acceptable LOS.

"2004 Condition With Project" is described in Section 15.3.3, which describes the trip generation characteristics of each major phase of construction, including duration of construction, daily shift periods and Project totals. The construction schedule is detailed in Section 15.3.3.1. Construction-related trip generation is described in Section 15.3.3.2. Table 15-5 contains a summary of employees per shift by month, which is more accurate than presenting each phase due to overlapping phases. Project-generated traffic volumes during the 2004 peak construction period are presented in Table 15-6. Project-generated traffic volumes during the peak construction period were distributed to the roadway network in accordance with the construction arrival and departure distributions shown in

Figures 15-9 and 15-10. The resultant construction-generated traffic volumes are set forth in Figures 15-11, 15-12 and 15-13. The Project Site-generated traffic volumes were added to the 2004 future no-build traffic volumes to determine the 2004 peak construction traffic volumes as shown in Figures 15-14, 15-15 and 15-16.

Q. How do projected future traffic conditions with construction compare to those without construction?

A. Capacity analyses were conducted for all the key study locations for the 2004 Peak Construction Condition. Table 15-7 presents the results. This is a "worst-case" analysis because it includes 50 percent of the construction worker trips within the peak hours. Based on experience with other Calpine projects the majority of construction traffic will arrive and depart before the respective AM and PM peak roadway hours.

As indicated in Table 15-7, all of the intersections will continue to operate at appropriate LOS. Construction of the Project will not have a significant impact on the roadway network. Table 15-8 is a comparative listing of only those turning movements where any degradation in LOS is expected. The impacts shown in Table 15-8 are minor and acceptable because: all intersections will have appropriate LOS; no intersection will degrade by more than one level of service; this modest degradation is a conservative worst case and will occur only for a period of 3-5 months; and all construction impacts will be limited to about 24 months.

Q. Did you project traffic volumes to any other year?

A. Yes. We projected traffic volumes both with and without the project to 2005.

Q. What are the 2005 conditions without the project?

A. We assessed the 2005 conditions without the project as described in Section 15.3.4. The

resulting 2005 future traffic volumes, not including any impacts associated with the Project, are set forth in Figures 15-17, 15-18 and 15-19.

Capacity analyses for the 2005 No-Build Condition traffic volumes were conducted for all key study locations. Table 15-9 provides the results of these analyses. It demonstrates that all intersections operate at overall acceptable LOS.

Q. What about the "2005 Condition with Project Operation"?

A. We also performed this analysis as described in Section 15.3.5. As described in Section 15.3.5.1, we estimated the number and frequency of vehicle trips generated during operation of the Project. The Project-generated traffic volumes in Table 15-10 were assigned to the roadway network in accordance with the arrival/departure distributions (Figures 15-9 and 15-10) resulting in the 2005 site-generated traffic volumes illustrated on Figures 15-20, 15-21 and 15-22. The site-generated traffic volumes were combined with the 2005 No-build traffic volumes, resulting in the 2005 condition with the Project traffic volumes that are illustrated on Figures 15-23, 15-24 and 15-25.

We then performed a comparison of projected future traffic conditions with and without operation of the Project, as detailed in Section 15.3.5.2. Capacity analyses for the 2005 Condition with Project operation were conducted for all the key study locations. Table 15-11 illustrates the results of these analyses. Project operation-generated traffic volumes were added to the peak roadway hour traffic volumes. To be conservative, this analysis cumulatively analyzed Project operation with Masada operation. By demonstrating no adverse impact under that scenario, any need to analyze Project operation *without* Masada operation is rendered moot. Nor is it required by Stipulation 10.

Table 15-11 demonstrates that all intersections continue to operate at acceptable LOS. Furthermore, there is no degradation in the LOS of any of the study intersections *or* in any individual turning movements, as summarized in Table 15-12. Thus, the operation of the Project, whether alone or cumulatively with Masada, will not have a significant impact on the adjacent roadway network.

Q. Did you perform an analysis of cumulative impacts with respect to traffic assuming simultaneous construction of the Project with the Masada project?

A. Yes. A study of cumulative traffic and transportation impacts for the Wawayanda Energy Center and the Masada project was performed assuming both facilities' peak construction periods coincided. Since the Masada project Draft or Final EIS did not evaluate construction period traffic, Project-generated traffic volumes were doubled to account for the construction traffic. These volumes were incorporated into the 2004 No-Build and Project construction-generated volumes to form the 2004 cumulative construction condition, which are illustrated on Figures 15-26, 15-27, and 15-28.

Capacity analyses for the 2004 cumulative construction condition traffic volumes were conducted for all key study locations. Table 15-13 illustrates the results of these analyses. As can be seen in the table, all intersections will operate at appropriate LOS, even with the combined construction of the Wawayanda Energy Center and the Masada project.

The cumulative analysis shows that there is no incremental degradation in the LOS of any of the study intersections *or* in any individual turning movements if the Masada project construction occurs at the same time as the Project construction (refer to

Table 15-14). Thus, the construction of the Project, whether alone or cumulatively with Masada, will not have a significant impact on the adjacent roadway network.

Q. Please describe the adequacy of the road system.

A. Section 15.4 presents an evaluation of the adequacy of the road system to accommodate the projected traffic during both construction and operations. The adequacy comparison consists of LOS analyses, physical infrastructure analysis, mitigation alternatives, and a concluding statement.

Q. Please summarize the LOS comparisons.

A. To summarize whether or not the construction of the Project and combined construction of the Project and the Masada project will cause significant impacts on the surrounding road network, Table 15-15 reprises (for each intersection but without turning movement detail) the 2004 No-Build, the 2004 Build-Project, and the 2004 Build-Cumulative (Project and Masada) construction conditions. It shows that all intersections will operate at acceptable LOS Service. Degradations in LOS occur at only two intersections, and only at the LOS breakpoint: delay at Dolsontown/McVeigh PM peak hour increases from 24.4 seconds to 25.9 seconds (LOS c to d), while delay at the Routes 6/17M intersection on Saturday peaks increases from 19.9 seconds to 20.9 seconds (LOS B to C). It should be noted that this is all a temporary condition, and that the analysis was made conservative in that 50 percent of the Project construction traffic was applied to the peak roadway hours even though most of the Project construction traffic will arrive and depart during off-peak roadway hours.

To identify whether or not the operation of the Project and combined operation of the Project and the Masada project will cause significant impacts on the surrounding road

network, Tables 15-16 reprises (for each intersection but without turning movement detail) the 2001 existing, the 2005 No-Build, and the 2005 Build-Cumulative (Project and Masada) operation conditions. It shows that all intersections will operate at acceptable LOS Service and will have no degradation in levels of service between the No-Build and Build-Cumulative conditions, thus also establishing that the Build-Project (without Masada) condition will likewise result in no LOS degradation on a permanent basis. It should also be noted that traffic is projected to function better, on the whole, than it does today, even under the Build conditions.

Q. How will Calpine handle delivery of oversized equipment?

A. During delivery of oversize equipment Calpine will coordinate closely with the local county and state traffic authorities and schedule deliveries to avoid peak traffic periods. Calpine will work closely with the Town to continuously evaluate construction traffic flow and take appropriate corrective action as necessary. For example, Calpine could hire police details to ensure efficient traffic flow.

Q. Please describe any mitigation that is needed or any alternatives that may be utilized.

A. We assessed alternative technologies, physical roadway improvements, and new traffic control devices.

Alternative technologies that can affect traffic include the choice of fuel and choice of cooling. With respect to fuel, natural gas offers the advantage of being transported by pipeline and eliminating any need for fuel trucks. With respect to cooling, there is no appreciable difference in construction or operation traffic between the Project and a similar plant using evaporative cooling, except that an air cooled plant will not require delivery of cooling tower water treatment chemicals. Alternative technologies are

not needed to mitigate construction or operation traffic.

Regarding physical roadway improvements, an improvement of the Dolsontown Road bridge over Monhagen Brook has already been completed. Further roadway improvements are not warranted. Physical roadway improvements could be warranted when an intersection fails either in terms of delay (level of service) or safety. None of the study intersections is expected to have such problems, whether due to the Project and Masada cumulatively, due to the Project alone, or in the future no-build scenario. Roadway improvements may also be warranted if a bridge or culvert has lower weight constraints than the remainder of the infrastructure along a given roadway. However, there are no anticipated adverse impacts regarding structural soundness of any roadway infrastructure.

New traffic control devices could be warranted when an intersection fails either in terms of delay (level of service) or safety. None of the study intersections is expected to have such problems, whether due to the Project and Masada cumulatively, due to the Project alone, or in the future no-build scenario. Thus, traffic control devices are not warranted. The Project will work with NYSDOT to change the signal timing at the Dolsontown Road/17M intersection, as described in Section 15.2.5.

Q. How will chemicals or hazardous materials be carried to and from the Project?

A. Project vehicles arriving or departing with chemicals or hazardous materials will travel on the main roadway access to the Project site – via Interstate 84, Route 17M, and Dolsontown Road to the site entrance. All transporters will be required by contract to maintain applicable licenses and to comply with applicable safety regulations. Deliveries are generally expected to occur outside the AM and PM peak hours.

Q. Is it your opinion that the road system can accommodate the projected traffic during both construction and operations and that the Project will not have a significant adverse impact on traffic conditions in the Project Area?

A. Yes. Neither peak construction traffic nor traffic resulting from the operation of the Project will have significant impacts upon traffic or roadways in the area. All intersections operate at an acceptable LOS even with the addition of the site traffic generated from the proposed Project and the Masada project. Traffic on the adjacent roadway network will continue to flow in a safe and efficient manner. Therefore, there are no recommended roadway improvements or mitigation for the study locations.

Q. Does this conclude your testimony at this time?

A. Yes

Case: 00 F 1256

WAWAYANDA ENERGY CENTER

DIRECT TESTIMONY

OF

DONALD NEAL

JOSEPH MCMULLEN

Q. Please state your name, title, affiliations and business addresses.

A. My name is Donald Neal, and I am an Environmental Manager for Calpine Corporation ("Calpine"). My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

A. My name is Joseph McMullen and I am a Principal Environmental Scientist at Terrestrial Environmental Specialists, Inc. My business address is 26 County Route 6, Suite A, Phoenix, NY 13135.

Q. Mr. Neal, what are your duties of employment?

A. I serve as project manager and technical analyst for environmental permitting and assessment of electric generating facilities and programs, representing Calpine before regulatory agencies and in public forums. In this capacity, I have managed and prepared siting studies, environmental impact statements, and applications for wastewater, wetlands and air permits. I have also led environmental, health and safety audits and due diligence investigations. I am experienced with methods of air emissions source testing and continuous emissions monitoring system design, certification and implementation.

Q. How are you qualified to perform your employment duties?

A. I received both a B.S. and an M.S. in Biology from the University of Massachusetts and I have over 18 years of experience related to my employment duties.

Q. Does your curriculum vitae, which is attached as Exhibit 14, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Neal, please describe your role in the Project.

A. I supervised all aspects of the Article X application and I am responsible for project compliance with environmental requirements.

Q. Mr. McMullen, what are your duties of employment?

A. I focus upon wetland study and environmental consulting. I provide aerial photograph interpretation, wetland delineations, wetland vegetation cover type mapping, state and federal permitting, wetland creation planning, wetland construction monitoring and post-construction monitoring of created and restored wetlands.

Q. How are you qualified to perform your employment duties?

A. I have a B.S. in Biology, with a concentration in botany, from Saint Francis College and an M.S. in Biology from West Virginia University. I have over 25 years of experience in environmental consulting and 20 years of experience in wetland study.

Q. Does your curriculum vitae, which is attached as Exhibit 13, fairly and accurately represent your experience?

A. Yes.

Q. Mr. McMullen, please describe your role in the Project.

A. I have overseen an ecological, wetlands and surface water assessment on the Project site. This assessment included a survey of vegetation species, wildlife habitat, wetland delineation, and surface water characterization of the site, laydown areas and interconnections.

Q. Gentlemen, what section of the Application does your testimony support?

A. Section 14, which deals with terrestrial ecology and wetlands.

Q. Please describe Section 14 of the Application.

A. This section addresses Stipulation No. 9, which relates to terrestrial ecological resources, as well as Stipulation 12, Clauses 36 through 44, which address wetlands. Ecological and wetland resources for the Project site, laydown area and electric, water, and wastewater interconnections are addressed in this section.

Q. Did you determine what regulatory requirements regarding terrestrial resources are applicable to the Project?

A. Yes. Protection of terrestrial resources, including wetland resources, is codified in federal, state and local law and is also referenced explicitly in the Siting Board Regulations. Each of these requirements is described in detail in Section 14.1 of the Application.

Q. Were surveys of the vegetation communities on the site conducted?

A. Yes. As fully discussed in Section 14.2.1, vegetation communities on the site were surveyed by Terrestrial Environmental Specialists, Inc. (TES). Site visits were conducted in June, September, October, and November 2000, and May and June 2001. A complete copy of TES' report is presented in Appendix P.

Quantitative vegetation data on wetlands and adjacent uplands were collected in plots during the wetland surveys. These data, which include species composition and percent cover, are presented in the wetland delineation reports prepared for the Project site and laydown area included in Appendix Q.

Figure 14-2, included in reduced scale (with a full size copy in the plan roll accompanying this Application), presents a map of the vegetation community types found

at the site. Per the stipulations, the map shows the Project site, laydown area, and electric and water interconnection corridors at 100 feet per inch. These vegetation coverages were determined by aerial photography (1991) and field inspections.

Q. What habitat types are present on the site and the laydown area?

A. The habitat types on the site and lay down areas are thoroughly discussed in Section 14.2.2.1 of the Application. A variety of vegetation and land use cover types occupy the site and laydown area, as indicated on Figure 14-2.

The site itself is primarily agricultural land with a residence located on a portion of the site. Topography of the site is moderately sloping in the northern and southeastern portions, with a broad flat in the center. Much of the site is agricultural land, with a pond and wetlands located in the eastern portion. Drainage on the site is generally to the south. An unnamed tributary to Monhagen Brook enters the site via a culvert under the railroad grade and flows across the eastern portion of the site from north to south before flowing under Dolsontown Road via a second culvert.

The approximately 35-acre laydown area for the Project, across which the proposed electric interconnect route runs, is located directly across Dolsontown Road from the Project site. Topography in this area is moderately sloping in the western portion, with a broad flat in the center and along the southern edge. A New York Power Authority (NYPA) overhead electric transmission right-of-way (ROW) is located along the southern edge of this area. The land is primarily agricultural with wetlands located in the southern portion along Monhagen Brook, which flows to the east along the southern edge of the NYPA ROW. Drainage on the laydown area is also generally to the south.

Two small areas (2.4 acres or 2.8%) of the site/laydown area are developed/residential (Table 14-1 and Figure 14-2). About 65.9% (57.7 acres) of the site/laydown area consists of agricultural cropland (Table 14-1). Open fields occur on-site and in the laydown area in areas abandoned from agricultural use and in uplands under the transmission line right-of-way. They cover 6.5 acres or 7.4% of the site/laydown area (Table 14-1 and Figure 14-2). The deciduous forest is considered a chestnut-oak association and covers 3.2 acres or about 3.6% of the site/laydown area (Table 14-1 and Figure 14-2). Total wetland area on the site is 17.8 acres or about 20% of the site/laydown area (Table 14-1). Areas of open water/deep emergent marsh only cover 0.8 acre or 0.9% of the site/laydown area (Table 14-1). Farmed wetlands occupy 3.1 acres or 3.5% of the site/laydown area (Table 14-1). Wet meadow covers 7.6 acres or 8.7% of the site/laydown area (Table 14-1). Emergent wetlands cover 4.6 acres or 5.2% of the site/laydown area (Table 14-1). Scrub-shrub wetlands cover 1.7 acres or 2.0% of the site/laydown area (Table 14-1).

Q. Please describe the habitats present along the interconnections.

A. As described in Section 14.2.2, the proposed electric interconnection for the Project exits the southwestern portion of the site, crosses Dolsontown Road and traverses the proposed laydown area located on the south side of Dolsontown Road to reach the existing NYPA transmission lines in the southern portion of the laydown area. As such, all habitats along the electric interconnect are part of either the Project site or laydown area located to the south of Dolsontown Road and are previously described.

Two water line connections will service the facility, a line for potable water and a

line for process water. In addition, a wastewater line will deliver facility wastewaters to the Middletown publicly owned treatment works (POTW) located to the west of the Project site.

Because the potable water line will be within the roadbed, there are no vegetation, wetlands, aquatic, or wildlife resources associated with this corridor. The process water supply line and the wastewater line enter a joint pipeline corridor between the POTW and the northwest corner of the Project site. From the Project site, this water line corridor crosses and open field community associated with the agricultural fields and an existing transmission line ROW. No wetland communities were identified in the vicinity of the water line routes.

Q. What type of communities are present on the Project site?

A. The community types found on the Project site consist primarily of agricultural cropland. Additional community types include open field; wetlands, including farmed wetlands, wet meadow, emergent wetlands, and scrub-shrub wetland; open water; deciduous forest upland, and developed/residential. Forested areas account for only a small portion of the overall area and are within hedgerows. The herbaceous layer is predominant over the majority of the area. Species composition and structure are addressed in the previous section. The existing site habitat quantities are listed in Table 14-1. Figure 14-2 shows a delineation map of these communities, overlain onto 1991 aerial photography.

Q. Have any protected vegetation species been identified on the site?

A. No. As reported in the Preliminary Scoping Statement for the Project, Calpine undertook to document whether there are any federal and/or state listed plant or wildlife species in

the vicinity of the Project. This effort is pursuant to the federal Endangered Species Act and state law, as described in Section 14.1. Calpine contacted the USFWS and the New York Natural Heritage Program within NYSDEC for information on the presence of any documented occurrences of federal and/or state listed plant and wildlife species on the Project site.

The USFWS indicated as follows: "Except for occasional transient individuals, no federally listed or proposed endangered or threatened species under our jurisdiction are known to exist in the Project impact area." NYSDEC responded that they had "no records of known occurrences of rare or state-listed animals or plants, significant natural communities, or other significant habitats, on or in the immediate vicinity of your site."

The most recently updated plant list published by the NYNHP (Young 2000) lists approximately 94 endangered, threatened, or rare plant species as being recorded in Orange County. Based on the field searches during the summer, fall and spring seasons, and the disturbed nature of the site, none of these species were found or would be expected to occur on the site or laydown areas. Several of these species are tidal, salt marsh or wetland species that would not occur on the site. Another group of species are found in dry, sandy areas and would also not occur on the site.

Q. Please describe any unique trees or silviculture present on the site.

A. Based on the recent list of the NYSDEC, there are no trees listed on the New York State Big Tree Register from Orange County. Of note on the site was a very large (53.3 inches in diameter) swamp white oak in the central portion of the site just south of the pond. The champion New York swamp white oak is from Livingston County and is

approximately 69 inches in diameter. The Project site and laydown area is not classified as a tree farm, nor is it managed for timber production. The site and laydown area does not contain a stand of sugar maple or a sugarbush.

Q. Please describe the species and number of trees 12 inches or greater in diameter at breast height, if any, within the Project site.

A. Only a small portion of the site and laydown area contains trees. They are mostly located along hedgerows, along the railroad grade, and bordering the residential area on the north side of Dolsontown Road. There are about 90 trees on-site. Most of the trees are deciduous, commonly ranging from 13 to 22 inches in diameter and 50 to 70 feet in height. About 70% of the trees were pin oak, black cherry, and swamp white oak. In much smaller numbers were: green ash, eastern cottonwood (*Populus deltoides*), apple (*Malus pumila*), shagbark hickory (*Carya ovata*), swamp white oak, white ash, basswood (*Tilia americana*), American elm, willow, white pine, scotch pine (*Pinus sylvestris*), and sugar maple.

The Town of Wawayanda regulates the preservation of trees indirectly through its subdivision and zoning ordinances. In general these ordinances specify that, where possible, consistent with the reasonable use of the land, existing trees and vegetation shall be preserved. Most of the trees found on the site and laydown areas are located within hedgrows and along the abandoned railroad grade. For the most part, these areas will remain undisturbed. In particular, the 53-inch swamp white oak will not be disturbed. Calpine has designed the Project to protect as many of these areas as reasonably possible, consistent with site development objectives for the proposed use.

Q. Did you identify and delineate any wetlands present on the site?

A. Yes. Wetlands were identified and delineated in accordance with the standards described in Application Sections 14.2.3.1 and 14.2.3.2. Prior to the field investigation at the property, various maps and other sources of background information were reviewed. Then, data on vegetation, soils, and hydrology were collected on June 27, 2000 on the Project site (which includes the eastern laydown area) and on November 2, 2000, on the southern laydown area, in plots along transects located perpendicular to the wetland boundaries. As described in the Application, eighteen plots were sampled on the site and twenty-two plots were sampled on the laydown area. Their locations are depicted in the Wetland Delineation Reports for the site and laydown area presented in Appendix Q.

The presence of wetland vegetation was determined when more than 50 percent of the dominant species in a sample plot had an indicator status of obligate (OBL), facultative-wet (FACW), or facultative (FAC+, FAC), excluding FAC-.

Additionally, detailed flagging and data collection of the wetland boundaries on the site (including eastern laydown area) were performed on June 14 and 27, 2000, and on the southern laydown area on October 30 and 31 and November 2, 2000. The flagged wetland boundaries were surveyed and are presented on Figure 14-5. Photographs of the wetlands and plot data are presented in the two Wetland Delineation Reports included in Appendix Q.

Q. What wetlands were found?

A. Three wetlands (Wetlands A, B, and C) were identified and delineated on the Project site (which includes the eastern laydown area). The three wetland areas total 8.89 acres and

are located in the eastern portion of the Project site, generally along the tributary to Monhagen Brook. In addition, five wetland areas were found on the southern laydown area. These wetlands are labeled Wetlands F, G, H, I, and J. They total 8.88 acres and primarily occur in the southern portion of the property along Monhagen Brook. All of these wetlands are thoroughly described in Section 14.2.3.2 of the Application and are illustrated in Figure 14-5.

As described in Section 14.2.3.1, the NYSDEC Freshwater Wetlands map (Figure 14-1) does not show any regulated wetlands on the site. Appendix P contains letters from NYSDEC confirming that this agency will not assert jurisdiction over the wetlands delineated on the site and from USACE regarding jurisdictional waters of the United States. Wetland A identified in the TES report (refer to Appendix Q) was determined by the USACE to be isolated and, therefore, not jurisdictional. A jurisdictional determination regarding the presence of jurisdiction wetlands on the laydown area to the south of Dolsontown Road is pending. Section 14.2.3.1 also describes soil types on the site (see Figure 14-4) and drainage patterns.

The wetland study also addressed wetlands within 200 feet of the Project site, where accessible. Such areas were observed in the field to determine their general characteristics and relationship to the wetlands that will be affected by the Project. No Project-related impacts to these areas will occur. Finally, there are no NYSDEC mapped freshwater wetlands in the vicinity of the water lines (Figure 14-1).

Q. Please describe the species composition of each affected vegetation community.

A. Table 14-2 presents a list of both upland and wetland vegetation observed on the Project

site, construction laydown areas, and interconnections. This list was prepared in accordance with the methodology described in Section 14.2.4, which also fully describes the vegetation observed. The relative abundance of flowering plants, ferns, and fern relatives is identified in Table 14-2 for each species.

Q. How would you characterize the wildlife resources of the site area?

A. Most wildlife species found in such areas are tolerant of human activity and disturbance. The species present on site are likely to be relatively common agricultural area, suburban, and forest edge species, with little potential for forest interior and/or "sensitive" species.

Q. Was a wildlife survey conducted?

A. Yes. The survey methodology is described in detail in Section 14.3.1 of the Application. Site visits were conducted in June, September, October and November 2000, and May and June 2001. We surveyed for tadpoles or fish, amphibians and reptiles, birds, and mammals.

Q. Please describe the amphibian and reptile species at the site.

A. Table 14-3 and Section 14.3.2 present information on the species of amphibians and reptiles recorded during the Herp Atlas Project in the topographic quad in which the site is found, or in at least one of the eight adjacent topographic quads. The table provides a list of species likely to be found in the vicinity of the site. The "Possible" column in Table 14-3 indicates those species that could possibly occur on-site or on the laydown area, based on the habitats and their configuration.

Q. Please describe the bird species at the site.

A. Table 14-4 and Section 14.3.3.3 provides a list of bird species that were recorded during

the 1980 to 1985 New York Breeding Bird Atlas Project in the 5 km by 5 km "block" in which the site is found. Several other species on the list were observed on-site during field surveys, but were not recorded as breeding during the Atlas project. Atlas data provide a degree of confidence in breeding status, with most of the listed species being confirmed breeders in the block.

Breeding bird species on the site include species that use open field and agricultural lands, such as savannah sparrow, bobolink, and red-winged blackbird. The small ponds near croplands and fields provide breeding habitat for Canada geese and mallards, while the adjacent emergent wetlands and wet meadows are inhabited by swamp sparrows, and red-winged blackbirds. Areas containing shrubs provide nesting areas for willow flycatchers, common yellowthroats, yellow warblers, and gray catbirds. Species associated with residential areas, farms, buildings, and driveways such as those on-site include: killdeer, barn swallow, American robin, common grackle, European starling, and house sparrow.

There is some on-site breeding potential for species that nest in trees that are not necessarily within a large tract of forest. The wildlife species observed using the cover types in the water line corridor are common.

Q. Please describe the mammal species at the site.

A. Table 14-5 and Section 14.3.4 list and describe the species of mammals that are likely to be present on the site and indicates the vegetation cover type for those that were observed. The habitats found on the Project site/laydown area are expected to support a number of mammal species. Rodents, such as the white-footed mouse and meadow vole,

and other small mammals, such as shrews and moles, have small home ranges likely to be entirely on the properties. Medium-sized mammals, such as the raccoon, skunk, and opossum, and larger species, such as the red fox and white-tailed deer, range farther, and the site/laydown area is likely to constitute only part of their home ranges.

Several species listed in Table 14-5, including meadow jumping mouse and meadow vole, are characteristic of open habitats such as open fields, hay fields, and wet meadows. Star-nosed moles are often associated with moist habitats such as wet meadows, and muskrats are always associated with open waterbodies and adjacent emergent wetlands for food. Short-tailed shrews are not restricted to a particular vegetation cover type and can be found virtually anywhere, including in residential areas. The eastern gray squirrel and the white-footed mouse are usually associated with forested areas, although the hedgerows with large, old trees (especially oaks) can provide suitable habitat. Species generally associated with large tracts of forest, such as the porcupine and some bats, are not likely inhabitants of the site.

Q. Please describe any unusual habitats or natural communities which could support listed species or species of special concern.

A. No endangered, threatened, or special concern wildlife species were observed on the site, laydown area or interconnect routes. Regarding amphibians and reptiles, the Herp Atlas records show a number of listed species that have been recorded either in the topographic quad in which the site is located or in an adjacent quad. Of these eleven listed species, only two turtle species (wood turtle and eastern box turtle) are considered possible inhabitants of the site, and neither of these species was found.

The wood turtle, although widely distributed in New York, is listed as a Special Concern species. A specific search for the species in May 2001 resulted in no observations of the species.

The eastern box turtle is also listed as a Special Concern species in New York, and was recorded in the topographic quad in which the site is found. No box turtles were observed during any of the field surveys.

Two species of birds (golden-winged warbler and grasshopper sparrow), state-listed as Special Concern, were confirmed breeders during the Breeding Bird Atlas Project in the block in which the site is found. These species were considered to be potential breeding species on the site/laydown areas. The May 2001 survey did not reveal the presence of this species anywhere on the site or laydown area.

Grasshopper sparrows breed in open grasslands, primarily grain croplands and pastureland. In successional old fields, favored plant species include orchard grass, alfalfa, red clover, lespedeza, and poverty grass. Some of these plant species were observed in the various open (especially agricultural cropland) cover types on the site. The complex of agricultural land (fields planted in oats, and hay fields) in which crops are rotated, provides a large enough area on the site/laydown area to provide habitat for grasshopper sparrows. The specific survey for this species in May, 2001 did not find the species to be present on the site or laydown area. No grasshopper sparrows were seen or heard.

No protected species of mammals were found on the site/laydown area or interconnect routes and none are reasonably likely to inhabit these areas.

Q. What amount of vegetation will be cleared?

A. A total of approximately 36.2 acres of vegetation will be removed from the Project site to allow for the proposed development. As fully described in Section 14.4.1, a total of 29.8 acres will remain undisturbed within the overall approximately 88-acre project site and construction laydown areas, and a total of 21.8 acres will be revegetated. This represents approximately 34% preservation of vegetation and approximately 25% revegetation.

Q. Please describe the specific areas that will be affected.

A. The overall Project development will impact primarily the agricultural cropland and developed/residential habitats on the site, with the Project's power block, air-cooled condenser, switchyard and water tank areas, and storm water management basin located almost entirely within these habitats. The permanent Project roadway and associated grading will impact a limited amount of wetland area, including farmed wetland and emergent wetland areas on the site. The construction laydown area proposed for the eastern portion of the Project site will similarly impact agricultural cropland and open field. A construction road will be developed along the dirt farm road from the laydown area on the Project site to the Project roadway. The edge of this roadway will impact a limited amount of wetland area. Wildlife species which nest, feed or take cover within these habitats will be affected. Although local impacts are expected, similar habitat exists elsewhere on the site and in the general area. Regional impacts are expected to be negligible.

Land to be cleared for the southern construction laydown and parking area consists of agricultural cropland, open field, deciduous forested upland, and

developed/residential habitat areas. Following construction, this area will be graded and revegetated (for example, with hydroseed) or otherwise stabilized to landowner specifications. In addition, a limited amount of wetland (wet meadow) will be permanently impacted by placement of the transmission pole foundations at the electric tie-in point. The electric interconnect corridor will be maintained as open field of scrub-shrub habitat throughout the life of the facility.

Q. What are the potential impacts to vegetation types as a result of construction?

A. Potential types of direct impacts to vegetation/habitat cover types as a result of construction of the Project are the permanent loss of vegetation, a temporary loss of vegetation, and the alteration of vegetation.

Construction of the proposed Project, including loop road, storm water features and site grading will require an area of approximately 27.1 acres to be permanently cleared from the 53.2-acre site. This includes those areas to be covered by impervious surfaces, gravel and/or dirt, and non-fertilizer dependent vegetation. Additional laydown and construction parking and construction road areas within the site will require temporary disturbance of 9.1 acres. Thus a total of 36.2 acres within the site will be disturbed during construction. The additional laydown area planned south of Dolsontown Road will result in disturbance to approximately 21.5 acres. This laydown area will be cleared of vegetation during construction. Following construction, the off-site laydown areas, with the exception of the electric interconnect easement, will be restored and stabilized as specified by the landowner. The disturbed areas within the site will be allowed to naturally revegetate to Open Field. Certain areas (such as between plant

buildings), may be revegetated with shrub plantings. The electric interconnect corridor will be allowed to revegetate. However, trees will be prevented from becoming established through regular maintenance of the easement.

A description of the acreage of impact for each of the vegetation communities is presented in Table 14-6 and 14-7. Per Stipulation 9, Clause 7, Figure 14-6 (in the plan roll accompanying the Application) indicates the proposed construction disturbance areas overlain on a 1991 aerial photograph. Per the stipulations, the map shows the Project site, laydown areas, and electric and water interconnection corridors at 100 feet per inch. These vegetative coverages were determined by aerial photography (1991) and field inspections.

Q. Please describe any potential habitat loss.

A. The extent to which land clearing will affect the wildlife species identified in Section 14.3 depends upon the use each species makes of the areas to be impacted and, to some extent, on the size and characteristics of the home range of each species. Similar habitat is available in abundance in the immediate vicinity. Considering the abundance of agricultural habitat in the area, the permanent loss of 49.6 acres of agricultural area in Orange County represents a negligible reduction. Furthermore, no rare, threatened, or endangered species occurs on the Project site. For these reasons, none of the species listed as being reasonably likely to be on the site would be significantly and adversely affected regionally by the proposed land clearing.

Q. What impacts to habitat may occur as a result of erosion and sedimentation?

A. The habitat adjacent to any major construction project can be diminished as a result of the

effects of erosion and sedimentation. The deposition of material in vegetated areas first affects herbaceous species by covering the base of plants, resulting in the depletion of oxygen from the root zone and the death of the plant. Woody species, including trees, can also be affected in this manner, although the species involved and the extent, duration, and nature of the deposited material influence the severity of the impact. In addition, the deposited material from erosion is usually heavier subsoils or fine clays and silts, which makes it difficult for natural reclamation to take place.

A loss of vegetation as a result of erosion and sedimentation can also affect wildlife species. A reduction in the quantity and quality of wildlife food and cover within the area of actual construction is the inevitable result of any construction project. Typically, small mammals, reptiles, amphibians, and birds that feed or nest on the ground are affected. Examples of wildlife species that could be impacted in this manner include the spring peeper, garter snake, meadow vole, short-tailed shrew, savannah sparrow and killdeer. Since most of the area surrounding the construction zone is similar habitat to that which will be impacted, however, it is expected that overall impacts to these species will be minimal and limited to the immediate construction area.

Erosion and sedimentation will be controlled by practical construction techniques and control measures, as discussed in Section 17.5. With the proper installation and maintenance of erosion control barriers and other control measures, the extent of any indirect impacts from erosion and sedimentation should be minor to non-existent. During Project operation, the storm water management system, coupled with the landscaping program, will ensure that erosion and sedimentation does not occur.

Q. What impacts to vegetation or wildlife resources are expected from combustion source emissions?

A. Emissions from the proposed Project will have no measurable impact on vegetation or wildlife resources. Pollutant emissions will be dispersed over a large area, with the resulting deposition at any one point on the ground being limited in magnitude. Given the very low predicted levels of pollutant emissions from the Project and the dispersion of these pollutants over a large area, plant or animal species will not be adversely affected. As discussed in Section 6.14.3, maximum potential concentrations of pollutants expected to occur, including existing background levels, are below vegetation sensitivity thresholds and animal dietary screening values. Furthermore, the secondary National Ambient Air Quality Standards (NAAQS) are protective of the environment and ecological resources, including wildlife. In Section 6, the Project's compliance with all NAAQS (primary and secondary) is demonstrated.

Q. How will fugitive dust be handled?

A. Fugitive dust will be controlled by measures such as wetting of exposed soils on a regular basis and stabilizing storage piles by wetting and/or seeding. These measures will be implemented as standard practice for the construction effort. Fugitive dust impacts to vegetation and wildlife are not expected.

Q. What impacts from vehicle emissions are expected?

A. As is the case with fugitive dust, the potential impact of vehicle emissions on vegetation will be temporary, and minor in nature. (The vicinity of the site already includes I-84.) Short-term exposure to emissions from construction vehicles is unlikely to have any

noticeable impact on vegetation or wildlife resources.

Q. What impacts from noise are expected?

A. Background noise data presented in Section 11 indicate that traffic noise from I-84, Dolsontown Road, McVeigh Road and Route 17M contributes to the ambient noise levels on the Project site and interconnections. With the exception of some wilderness species, most wildlife species have a high tolerance for noise resulting from human activity after a certain amount of exposure. Given the proximity of the interstate highway and surrounding roadways, all wildlife reasonably expected to occur on the Project site and interconnections would properly be assumed to be noise tolerant. Depending on the season, it is possible that some nest abandonment may occur for individuals nesting immediately adjacent to construction areas. It is also possible that some wildlife species will avoid the construction area. Construction noise is described in Section 11.5.

No additional impacts to wildlife would be anticipated as a result of noise generated during operation. In fact, since the noise during operation will tend to be constant and predictable, many wildlife species will acclimate to the noise.

Q. What impacts due to construction vehicle traffic are expected?

A. No impacts to vegetation are expected as a result of construction vehicle traffic. Section 15 summarizes anticipated construction vehicle traffic. The primary potential for traffic to affect wildlife is due to collisions with animals crossing roadways. Most car/wildlife accidents, especially those involving deer, occur at night, while the projected increase in traffic will occur mostly during daylight hours. On-site construction traffic, particularly near the pond, could impact turtles. Female turtles leave ponds (often during

daylight hours) to nest, usually in June. Accidental vehicle/turtle collisions will be infrequent and will slightly reduce the local turtle populations. Since the incremental change in construction traffic is modest, the added potential for any significant impact on wildlife as a result of Project construction is also modest. Similarly, the incremental traffic change during operation is minimal, and any potential for significant impacts is therefore minimal.

Q. Are any impacts to protected species expected?

A. No. As indicated in Sections 14.2.2.5 and 14.3.6, no federal or state rare, threatened, or endangered species (plant or animal) have been found on the Project site. Coordination with USFWS and NYSDEC's Natural Heritage Program reveals no known presence of such species. Therefore, no impact to such species is expected.

Q. Will the impacts to wetlands be significant?

A. No. The loss of less than ¼ acre of wetlands on-site and at the electric tie-in point will be insignificant. Most of the loss will occur in the farmed wetland areas on the Project site which are of relatively low habitat value.

Q. What loss of wetland vegetation is expected?

A. As shown in Tables 14-6 and 14-7, the overall permanent impacts to wetland vegetation will be less than ¼ acre out of almost 18 acres of wetlands identified. The majority of the wetland areas to be impacted are farmed wetlands and emergent wetland dominated by common reed grass, which have little wetland vegetation value. Impacts to the higher quality wetlands located along the NYPA ROW at the electric tie-in point are limited to 0.002 acres, an insignificant amount. Therefore, the overall loss of 0.222 acres of

wetland vegetation is considered an insignificant loss.

Q. Is any loss in habitat function expected?

A. No. While various wildlife species have been identified as using the wetland areas to be impacted, due to the limited magnitude of impact to the areas, no overall loss in habitat function is expected.

Q. What impacts to hydrology and nutrient retention are expected?

A. The Project will slightly change existing hydrological patterns on-site. Impervious Project surfaces will drain to the storm water management system and discharge to a new detention pond that will subsequently discharge to the on-site wetlands. Pervious surfaces will continue to drain toward the on-site tributary to Monhagen Brook and surrounding wetlands. Nutrient retention will not be significantly affected because the Project will reduce the amount of nutrified runoff attributable to agricultural cropland. Thus, the on-site wetlands and downstream waterbodies will experience reduction in nitrogen and phosphate.

Q. What impacts to flood attenuation function are expected?

A. The storm water management system for the Project is designed such that discharge rates under major storm events will not exceed pre-development rates (see Section 17.5). As required under the General SPDES permit guidelines, the first-flush will also be detained for the required 24-hour period. Further, discharge from the storm water management system will be directed to the remaining undisturbed wetland areas on the site, where storm water currently discharges. Thus, drainage patterns will be maintained. Based on the maintenance of overall site drainage to these remaining areas, and the limited

magnitude of impacts to these areas, overall flood attenuation function for the wetland areas on the Project site and laydown areas is not expected to be impacted.

Q. Has any mitigation been employed in making facility siting decisions?

A. Yes. In order to reduce the amount of permanent loss of vegetation, the Project has been located proximate to water infrastructure and electric transmission rights-of-way. The facility layout has been developed in a manner to avoid where possible and minimize impacts to wetland areas. The facility has been located as far to the west as reasonable considering the site topography. Facility components, access roads, storm water management features and laydown areas have been designed to avoid wetland areas, with the exception of limited impacts to low-quality wetland areas associated with site drainage ditches. The electric tie-in point has been selected and designed in a manner to minimize wetland impacts as well. Further avoidance of impacts to wetlands are not considered to be reasonable or warranted.

Q. Describe any mitigation measures that will be taken in regard to erosion and sedimentation.

A. Best management practices, as outlined in Section 17.5, will be utilized in order to prevent any adverse impacts to vegetation or wildlife as a result of potential erosion or sedimentation during Project construction. Following construction, surfaces will be appropriately graded, stabilized and vegetated to minimize erosion and sedimentation potential.

Q. Describe any mitigation measures that will be taken in regard to air emissions.

A. The Project includes extensive air pollution control equipment to ensure that it is

protective of human health with as comfortable a margin as possible. It has been demonstrated that there will be no significant impacts to vegetation or wildlife from air emissions. Also, fugitive dust will be controlled by measures such as wetting of exposed soils on a regular basis and stabilizing storage piles by wetting and/or seeding. Because it is unlikely that any plant or wildlife species will be negatively affected by pollutant emissions from the Project, no further mitigation is needed.

Q. Describe any mitigation measures that will be taken in regard to noise.

A. As demonstrated in Section 14.4, construction and operation noise is not expected to adversely affect wildlife in any significant way. Therefore, no further mitigation beyond the noise abatement measures described in Section 11 is proposed.

Q. Describe any mitigation measures that will be taken in regard to vehicle traffic.

A. As demonstrated in Section 14.4, construction and operation vehicle traffic is not expected to impact either vegetation or wildlife on a regional scale. Since projected increases in traffic will occur mostly during daylight hours there is limited potential for impact on most wildlife species. During construction, the short-term risk of impacts to nesting turtles can be mitigated by the placement of barriers adjacent to the construction access road.

Q. Describe any alternative technologies that will be use to minimize impacts on vegetation and wildlife.

A. Of the alternative technologies outlined in Section 5, the only one that is potentially relevant to minimizing impacts on vegetation (upland only) and wildlife is the choice of cooling technology. Using an alternative technology – evaporative cooling – could

marginally decrease the required clearing of vegetation and habitat areas. As discussed in Section 5, evaporative cooling is not feasible for the Project due primarily to a lack of sufficient water supply. Thus, use of evaporative cooling is not recommended as a strategy to avoid, minimize, or mitigate impacts to upland Agricultural Cropland habitat.

Q. Describe any mitigation that will be used in regard to salt, phosphates, and nitrates.

A. Nitrogen has been identified as a source of contamination primarily from sanitary discharge and nitrogen and phosphorus typically can be associated with fertilizers. As discussed in Section 14.5.3, the Project will likely reduce nitrogen and phosphorous loadings to receiving waters. The Project intends to minimize the use of any landscaping requiring fertilizer application on the ground by minimizing the area of fertilizer-dependent vegetation. The Project will discharge sanitary wastes via connection with sanitary sewers and remove from service the septic system associated with the existing residence on-site. Therefore, the Project will not result in adverse effects to groundwater quality. Salt is typically introduced into the environment through roadway de-icing treatment. No salt will be used by the Project to control icing on roads. Very limited amounts of salt may be used on walkways to reduce the potential of human injury. Based on the listed mitigation measures, the potential sources of phosphorus, salt and nitrogen to groundwater are minimized.

Q. Describe any wetland replacement that will be done.

A. Wetland replacement or compensation is a strategy that can be used when wetland impacts occur. While the Project will result in less the ¼ acre of permanent wetland impact, in compliance with USACE Nationwide Permit No. 39, the Project will propose

development of a wetland mitigation area to achieve a minimum ratio of 1:1 wetland replacement. At this time it is anticipated that the proposed mitigation area will be located immediately adjacent to the existing Farmed Wetland area on the Project site (Wetland Area C), between the facility loop road and the existing wetland boundary. Finalization of the wetland compensation plan will be conducted in consultation with the USACE and submitted to DPS as a Compliance Filing.

Q. Describe any land preservation that will be done.

A. A total of 3.08 acres of farmed wetland currently exist on the Project site. Of this area, less than 0.1 acre will be impacted by the Project, leaving about 3 acres of farmed wetland remaining. Most of this area will revert to its owner, along with the laydown area located in the eastern portion of the Project site. It is not expected that this land, or the adjacent upland, will be used for agriculture. Calpine has communicated with the Department of Agriculture and Markets regarding the future use of the remaining undisturbed farmed wetlands on the Project site. It is generally not the policy of the Department of Agriculture and Markets to object to transactions by a willing landowner that result in the loss of land used in agriculture.

Q. Describe any mitigation that will be done with regard to potential bird collision mortality.

A. As described in Section 14.7 of the application, bird collisions with man-made structures are primarily a concern with communications towers, typically ones much taller than the proposed 225-foot stacks for the Project. While it has been concluded that a significant risk to bird populations does not exist from the Project stacks, in whatever way they may be lit, Section 14.7 presents an analysis of the causes and potential mitigation strategies

associated with stack lighting.

The best possible lighting scenario from a bird mortality perspective, if a significant risk were shown to exist, would be white lighting with the maximum allowable "off" duration. However, because the stacks are much shorter than the structures that are of primary concern relative to bird mortality, it is concluded that red aeronautical lights would not be worse than white lights from a bird mortality perspective. Steady lights or flashing lights with maximum allowable off duration, would be preferable to flashing lights with shorter allowable "off" duration.

The FAA issued a Determination of No Hazard to Air Navigation to the Project on April 16, 2001 (Refer to Appendix F). FAA requires the stacks to be marked and lighted in accordance with FAA Advisory Circular 70/7460-1K Change 1, "Obstruction Marking and Sighting," Chapters 3 (marked), 4, 5 (Red), and 12. The Project will be equipped with red lights at nighttime and white lights in daytime that conform with the FAA advisory circular.

Q. Do the wildlife, vegetation and wetlands assessments done for the Project appropriately characterize the nature of the Project's probable impacts on wetlands, vegetation, and wildlife both threatened and endangered species?

A. Yes.

Q. In your opinion, will the impacts of the Project on wetlands, vegetation and wildlife be minimized, considering available technology and other relevant consideration?

A. Yes.

Q. In your opinion, will the construction and operation of the Project comply with applicable state and federal laws relating to wetlands, water resources and wildlife?

A. Yes.

Q. Does this conclude your testimony at this time?

A. Yes.

Case: 00 F 1256

WAWAYANDA ENERGY CENTER

DIRECT TESTIMONY

OF

DAVID ERALI

DONALD NEAL

DAVID DEVINE

Q. Please state your names, titles, affiliations and business addresses.

A. My name is David Erali, and I am a Project Manager for Parsons Energy & Chemicals Group, Inc. My business address is 2675 Morgantown Road, Reading, PA 19607.

A. My name is Donald Neal, and I am an Environmental Manager for Calpine Corporation ("Calpine"). My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

A. My name is David Devine and I am a Project Development Manager for Calpine. My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

Q. Mr. Erali, what are your duties of employment?

A. As a Project Manager, I am responsible for site development and permitting support for power plant projects. I design, research and supervise the construction of industrial facilities, nuclear and fossil-fueled power generating stations and waste disposal facilities.

Q. How are you qualified to perform your employment duties?

A. I have a B.S. in Civil Engineering and a M.S. in Soil Mechanics and Foundation Engineering from the University of Massachusetts. I am also a Registered Professional Engineer. I have over 29 years of experience in geo-technical and civil engineering.

Q. Does your curriculum vitae, which is attached as Exhibit 6, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Erali, please describe your role in the Project.

A. I am the Parsons project manager for the Wawayanda Energy Center ("Project"). In that capacity, I have overseen the preparation of site plans, water and wastewater balances and various other types of engineering support for the Project.

Q. Mr. Neal, what are your duties of employment?

A. I serve as project manager and technical analyst for environmental permitting and assessment of electric generating facilities and programs, representing Calpine before regulatory agencies and in public forums. In this capacity, I have managed and prepared siting studies, environmental impact statements, and applications for wastewater, wetlands and air permits. I have also led environmental, health and safety audits and due diligence investigations. I am experienced with methods of air emissions source testing and continuous emissions monitoring system design, certification and implementation.

Q. How are you qualified to perform your employment duties?

A. I received both a B.S. and an M.S. in Biology from the University of Massachusetts and I have over 18 years of experience related to my employment duties.

Q. Does your curriculum vitae, which is attached as Exhibit 14, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Neal, please describe your role in the Project.

A. For the Project, I supervised all aspects of the Article X application and I am responsible for project compliance with environmental requirements.

Q. Mr. Devine, what are your duties of employment and how are you qualified to perform these duties.

A. I have been involved in the power industry for 25 years. As a Project Development Manager, I most often work at developing natural gas fired combined-cycle projects in New York State. I have experience in the development, construction, operations and maintenance of many power projects.

Q. Does your curriculum vitae, which is attached as Exhibit 5, fairly and accurately represent your experience?

A. Yes.

Q. What is your role in the Project?

A. I am the development manager for the Project. As such, I had primary responsibility for the procurement of necessary water supply and wastewater disposal contracts.

Q. Gentlemen, what Sections of the Application does your testimony support?

A. Section 17.

Q. Please describe Section 17 of the Application.

A. From an overall water use and wastewater disposal perspective, the Project represents one of the most water-efficient combined cycle steam electric generation facilities statewide. It will draw less than 5,000 gallons of potable water per day. This is primarily attributable to selection of an air-cooled condenser for steam cycle cooling and the use of treated effluent to satisfy the Project's process water needs. To further minimize water consumption and wastewater discharge requirements, the Project will recycle blowdown water from the heat recovery steam generators (HRSGs) to the wet surface air cooler (WSAC). The reduction in water withdrawal through this internal recycle/reuse is estimated at approximately 64,000 gallons per day (gpd) under average annual operating

conditions.

Process makeup water for the Project will be obtained from Middletown's publicly owned treatment works (POTW) located less than 1,500 feet to the west of the Project site. The POTW treats about 5.2 million gallons of sewage per day (annual average) with a minimum flow over 3 years of 1.5 mgd. The maximum Project water demand will be 435,000 gallons per day (process and potable water), with an average demand of approximately 244,000 gpd. Potable water (<5,000 gpd) will be supplied by the City of Middletown system via Wawayanda Water and Sewer District no. 1. All process sanitary and industrial wastewater will be directed back to the Middletown POTW, which at 6 million gallons per day (mgd) has adequate treatment plant capacity to meet the Project's wastewater discharge requirements.

Q. Are there any regulatory requirements applicable to the Project?

A. Yes. Under PSL §164.1(a), an Article X applicant must present information on available water supplies, as part of the overall description of the Project's water program. Chapter 189 of the Wawayanda Code also regulates the installation of water supply systems within the Town of Wawayanda, as described in Section 10.4.1.

Q. Did you prepare a characterization of the Project's water supply needs?

A. Yes we did. First, we estimated hourly, daily, monthly and annual average water supply needs and consumptive water losses of the Project. We also determined instantaneous water demand. Finally, we assessed the water chemistry requirements for water to be supplied to the Project.

Q. What methodology did you use to prepare the water supply needs?

A. All data regarding water supply needs have been developed by Parsons Energy and Chemical Group, on the basis of recent experience with similar plants and characteristics of the Middletown POTW treated effluent. The quality of the incoming water affects the amount of treatment necessary and the amount of recycling possible. The Project will be capable of operating as a baseload facility and, therefore, constant 100 percent combustion turbine load was assumed for all plant operations.

Water supply needs, which are closely related to machinery loads and ambient conditions, will remain relatively constant. Since the Project does not have any peaking capacity such as HRSG duct firing and combustion turbine power augmentation systems, the HRSG heat recovery to the steam cycle will vary, predictably, with ambient dry bulb temperatures. Furthermore, the variations in the steam cycle output that would normally occur during hot ambient conditions will be mitigated by operating the inlet air cooling system.

The other variable affecting water use is the number of cycles of concentration maintained in the WSAC spray water system. Air emissions criteria for the WSAC drift limit the dissolved minerals content (total dissolved solids, or TDS) in the WSAC spray water to 2,500 ppm. Maximum design values for TDS in the Middletown POTW effluent indicate that the WSAC will be operated at approximately 3 cycles of concentration to limit TDS to 2,500ppm. This is a worst case condition that results in maximum water use and WSAC blowdown. The WSAC Total Dissolved Solids concentration will be maintained relatively stable and below 2,500 ppm by modulating the WSAC blowdown flow according to TDS levels in the WSAC spray water. Based on an evaluation of the data available on

the POTW effluent, an operation between 3 to 5 cycles of concentration is expected.

Due to the predictable and relatively stable combustion turbine and steam cycle plant operation, four water balances were created to represent the spectrum of water supply needs for each day of a typical year. The four water balances are entitled Maximum Summer, Average Summer, Average Annual and Minimum Winter. The assumptions used to calculate them are further described below.

Data in the Maximum Summer water balance are based on summer design ambient conditions of 90°F dry bulb and 72°F wet bulb. An upset HRSG blowdown rate of 2% was used. The WSAC evaporation rate was provided by the vendor, and three cycles of concentration were assumed. An inlet air cooling system demand flow rate of 50 gpm per combustion turbine was used. Data in the Minimum Winter water balance are based on winter design ambient conditions of 20°F dry bulb with 60% RH. An average HRSG Blowdown rate of 1% was used. The WSAC evaporation rate were estimated at 50% of design based on vendor recommendations. Inlet air cooling was not operated during the wintertime. Five cycles of concentration were used. In all cases, 30% of the HRSG blowdown was assumed to flash to atmosphere in the blowdown tank while the quench flow was caluclated to cool the blowdown temperature to 110°F.

The Average Annual and Average Summer water balances were interpolated from the data in the Maximum Summer and Minimum Winter water balances based on the following ambient and operating assumptions. Average Annual water balance is based on 51°F dry bulb at 60% RH with the inlet air cooling system operating 50% of the time and 4 cycles of concentration; and Average Summer Water Balance is based on 71°F dry

bulb at 60% RH with the inlet air cooling system operating 100% of the time and 3 cycles of concentration.

Q. What did you determine the Project's water demands and consumptive water losses to be?

A. The Project's annual daily average demand will be approximately 244,000 gpd under normal baseload operating conditions, of which 98% will be supplied by the Middletown POTW. The maximum water use would be approximately 435,000 gpd, 99% of which will be supplied by the Middletown POTW and the remainder from municipal potable supplies.

Table 17-1 provides hourly and daily peak and the hourly and daily average water supply needs and consumptive water losses of the Project, in gallons, for each day of a typical year, broken down by power production and domestic uses. "Each day of a typical year" can be determined by assuming the number of cycles of concentration at which the WSAC is operated and the frequency of inlet air cooling use. The average condition is assumed to represent "each day of a typical year." It assumes the WSAC is operated at 4 cycles of concentration and inlet air cooling is used 50% of the time.

Figures 17-1 through 17-5 are water balance diagrams showing Annual Average, Summer Average, Minimum Winter day and Maximum Summer day scenarios, along with a summary diagram showing flows for all four scenarios in gallons per minute. Tables 17-1 through 17-5 provide the data required under Clause 1, including daily, monthly, and annual totals.

All peak flow data were taken from the Maximum water balance. All average flow

data was taken from the Average Annual water balance. The hourly water usage (Table 17-2) for power production and domestic use is assumed to be the daily average usage based on the water balances divided by 24 hours. Monthly water use totals (listed in Table 17-4) are assumed to be the daily average consumption based on the Average Annual, Average Summer and Minimum Winter water balances multipled by 30 days. The annual water use totals (listed in Table 17-5) are assumed to be the daily average consumption based on the Annual Average water balance mulitplied by 365 days.

Q. Did you prepare an estimate of the daily peak and daily average flow rates for the Project?

A. Yes.

Q. What are those estimates?

A. Table 17-1 includes the daily peak and daily average flow rates for the Project in gallons per minute. Overall, the Project's non-potable water needs are 167 gpm on average and 299 gpm on the peak summer day. Potable water needs will be about 3 gpm for both average and peak conditions. In addition, the Project will be equipped for fire suppression, to be fed out of the filtered water/fire suppression water storage tank. This tank will have a capacity of 750,000 gallons, of which 240,000 gallons will be reserved for the fire water use only. This will provide sufficient capacity to fight a fire in accordance with NFPA 850 standards, which require that the water supply for the permanent fire protection installation be based on the largest fixed suppression system demand plus 500 gpm for hose stream demand for a 2-hour duration. It is anticipated that the overall fire suppression demand at peak withdrawal will be 2,000 gpm. Thus, a two-

hour fire event can be supported entirely through on-site storage. There are no fire suppression average flow rates for typical operation. The system will only be used during emergencies and during required periodic testing. The median daily (as well as instantaneous) fire suppression flow rate will be zero.

Q. What are the water chemistry requirements for the Project?

A. The Middletown POTW is permitted for a flow of 6.0 mgd under NY SPDES Permit No. 0026328 (scheduled to expire March 1, 2002). The receiving body for the wastewater treatment facility is the Wallkill River, a NYSDEC class B stream. This POTW serves a population of approximately 30,000 people and was originally built in 1929.

The POTW includes a barminutor, grit classifier, primary clarifier, high rate trickling filter, oxidation ditch, secondary clarifier, rapid sand filtration system and UV disinfection. In a previous upgrade the former primary clarifiers were converted into side stream surge tanks to reduce the peak flow during wet weather events. Disinfection is seasonal based on the recreational uses of the Wallkill River. The POTW routinely monitors its effluent for the parameters listed in Tables 17-9 through 17-11, as well as some others.

Project water quality requirements are more stringent than the current permitted SPDES standards for the POTW discharge into the Wallkill River yet may not always be more stringent than NYS standards for potable water. Project water quality needs vary depending on the specific process water stream. For example, highly purified water is necessary for HRSG makeup, but WSAC makeup water quality requirements are less

stringent. Acidity/alkalinity (pH), TDS, hardness, iron and manganese, ionic compounds (calcium, magnesium, nitrates, phosphates, etc.), and heavy metals are the water supply parameters that dictate the water pretreatment requirements and recycling limitations.

Table 17-6 lists process water uses at the Project, the required level of treatment relative to potable water quality standards, and the treatment method. Appendix E-4 contains additional indicative information on water treatment chemicals, their typical daily usage and on-site storage. The two basic levels of treatment for Project water flows will be a clarifier-filter system for all treated effluent, and a demineralization system for a portion of the filtered water. Potable water will require no additional treatment.

High purity demineralized water is required for HRSG (steam cycle) makeup, combustion turbine inlet air cooling, and compressor wash water. high purity demineralized water is necessary in the steam turbine and combustion turbine compressors to limit scale formation and minimize corrosion of internal system components. Demineralization will be performed using cation/anion exchange technology. Water from the filtered water storage tank will first pass through dual bed cation and anion exchange units and will then be routed to a mixed bed polishing unit. The mixed bed polishing unit will contain ion exchange resins designed to remove the residual cations and anions. Demineralized water from the ion exchange treatment train will be routed to the HRSG, inlet air cooler, or compressor. Demineralizer regeneration wastewater will be neutralized and routed to the POTW.

Q. Does the Application propose a water supply source and accompanying infrastructure?

A. Yes. Section 17.1.3 addresses proposed water supply and infrastructure. It discusses the available capacity of the water supply source in terms of quantity, quality and pressure. It also provides and identification of infrastructure requirements necessary to serve the Project and an analysis of the impact of the Project on excess water supply infrastructure capacity. Finally, the Section discusses all water treatment facilities for the Project and water supply agreements.

Q. In terms of quantity, quality and pressure, what is the available capacity of the water supply source for the Project?

A. The Project proposes to draw upon the Middletown POTW for 98% to 99% of its overall water requirements. The POTW treats approximately 5.2 million gallons of sewage per day on average with a minimum daily flow of 3.0 mgd (seasonal basis) and 1.5 mgd (minimum day over 3-year period). From the standpoint of quantity, there is adequate supply currently available to satisfy the maximum Project water demand of 430,000 gallons per day of non-potable water. On an average day at both the POTW and the Project, the fraction of the POTW discharge flow that would be diverted is 5% (240,000 gpd / 5,200,000 gpd). On the worst-case peak day (POTW one-day, ten-year low flow with Project peak demand), the fraction of the POTW discharge flow that would be diverted is 28% (420,000 gpd / 1,500,000 gpd). Thus, from the perspective of quantity, the water supply source is adequate.

In terms of quality, it is expected that the Middletown POTW discharge will require additional treatment prior to use at the Project. Because Calpine will provide the necessary additional treatment, described in Section 17.1.2.4, Middletown POTW water

will meet Project water quality requirements. Thus, from the perspective of quality, the proposed water supply source is adequate and, according to the City, available to the Project.

With respect to pressure, the Middletown POTW treated effluent will be supplied through a dedicated line to the Project site. The dedicated line will be equipped with a pumping system to ensure adequate pressure.

A small quantity of potable water (less than 5,000 gpd) will be supplied from Middletown's public water supply system via the proposed Wawayanda Water and Sewer District no. 1, which has been approved by NYSDOH and NYSDEC (refer to Appendix E-1). This amount constitutes less than 3% of the district's allocation of 200,000 gpd. Since there are presently no other known entities or large water users requesting a connection to District no. 1, no significant impact to this water system is anticipated. The watershed for the city of Middletown's water supply system encompasses approximately 1,500 acres, primarily northwest of the city at the base of the Shawangunk Mountains. Potable water is supplied to 6,688 customers (317 of which are located in the town of Wallkill) with an estimated population of 25,000. The city of Middletown's water supply originates from four surface water reservoirs and auxiliary sources, as detailed in Table 17-7.

Highland Lake and Monhagen Lake are located in the southwestern corner of the Town of Wallkill. Shawangunk Lake is situated east of Highland Lake and is partially within Wallkill and Mount Hope while the Diversion Reservoir is located solely in Mount Hope. The Middletown Water Filtration Plant, which was built around 1900, is

separated into the Monhagen low pressure system and Highland high pressure system, which serves nearly one-third of the system's customers. The Monhagen system is treated by lake inversion/oxygenation, pre-chlorination, addition of aluminum silicate (control flocculation and sedimentation), filtration (i.e., gravity sand beds), post chlorination, and the addition of sodium hydroxide (used for pH adjustment). Treatment of the Highland system is the same except that filtration is accomplished using horizontal pressure type rapid sand filters instead of gravity sand.

During normal conditions, the Middletown water system has been adequate over the last 100 years. The water filtration plant is permitted to produce 6.0 million gallons per day (mgd) and is rated for a peak flow of 8 mgd, under optimum conditions. The average daily production and maximum daily production for the Middletown water supply system is 4.74 million gallons (MG) and 6.22 MG, respectively (OCDH, Period: November 1997 to March 1999). The average daily consumption is 4.5 mgd (CPA, 1999). A withdrawal of 5,000 gpd constitutes approximately 0.1% of the average daily water system withdrawal. Thus, from the perspective of quantity, this potable water supply source is adequate and, according to the Town, available to the Project. A discussion of drought measures is included in Section 17.1.4.2.

In terms of quality, the water will be supplied to the Wawayanda Water and Sewer District no. 1 at potable standards, and thus this water supply source is adequate in terms of quality.

With respect to pressure, the Engineering Report for Water Main Extension to Serve Town of Wawayanda Water District, prepared by Tectonic Engineering

Consultants, P.C. (May 12, 1999), states that the normal working static pressures available throughout the District will vary from 73 to 98 psi. This is sufficient for the Project's potable supply needs.

Q. What infrastructure requirements are necessary to serve the Project?

A. The Project will require two water supply mains. The process water supply requires pumping and treatment infrastructure. The necessary process water supply infrastructure consists of the following.

Pump Station(s) – The pump station(s) will be designed to power both the delivery of treated effluent to the Project and a force main return. A POTW effluent supply pump station will pump treated effluent from the Middletown POTW to the Project. It is expected the pumps will be located in the existing clearwell after the POTW's tertiary filters and discharge, in a fairly straight line, uphill to the site. Other pump stations, installed in the General Waste Sump and sanitary waste sump(s), will pump the low volume and sanitary wastewater into the wastewater collection system before combining with the WSAC blowdown in the wastewater discharge line. The Project will work with the City of Middletown to ensure the pump station designs and configurations are acceptable to all parties.

Clarification System – The clarifier system is designed to meet the appropriate requirements for the make-up water supply to the WSAC and will include the following: chemical pre-treatment with a biocide and coagulants; clarifier designed to precipitate the suspended solids; chemical post-treatment with acid if the pH of the clarifier effluent needs to be adjusted; side stream sludge filter/thickener designed to remove the

precipitated solids from the bottom of the clarifier and filter out the solids; and sludge filter press designed to dewater the filter backwash by approximately 50%, resulting in a sludge cake that is collected and trucked off site for disposal. The filter output (filtrate) is returned to the clarifier. The filter backwash is forwarded to the sludge filter press. Water from the filter press is returned to the clarifier.

Multi-media pressure filtering system – This filter is designed to further reduce the total suspended solids out of the clarifier prior to being stored in the filtered water storage tank for use in the plant service water, fire protection and demineralization systems.

Filtered water storage tank – designed to provide storage of filtered water for the following systems: plant service water, fire protection and demineralizers. The filtered water storage tank is designed as a 750,000 gallon tank. The bottom 240,000 gallons will be reserved for the fire protection systems. All other systems will draw though a standpipe to maintain this reserve volume.

Q. Will the Project adversely impact excess water supply infrastructure capacity?

A. No. The City has allocated for Wawayanda Water and Sewer District no. 1 a flow of 200,000 gallons per day, of which the Project will use less than 5,000 gallons (2.5% of the allocation and 0.1% of the overall system withdrawal). The Project will not require the addition of infrastructure, other than that already planned as part of Wawayanda Water and Sewer District No. 1, to obtain its potable water needs. Letters from NYSDOH and NYSDEC documenting the approval of this water district and its infrastructure are included in Appendix E-1. The only Project-related construction is the

tap at the southwest corner of the Project site on Dolsontown Road and the connection into the Project site.

Infrastructure requirements for Project process water from the Middletown POTW will not require infrastructure upgrades except for the interconnection itself. Specific components of the infrastructure system are described in Section 17.1.3.3 of the Application.

Q. What are the Project water treatment facilities and intake structures?

A. There will be no treatment of potable water. Process water from the Middletown POTW will be routed through a raw water clarifier. From the clarifier some water will be directed to the WSAC makeup system and the HRSG blowdown quenching system, and the remainder will be routed through the filtration system and into the filtered water storage tank. Sludge from the clarifier will be processed through a thickener then a filter press. Some of the water in the filtered water storage tank will be sent to the demineralizer system, which consists of a dual demineralizer and a mixed bed demineralizer. Demineralized water will be stored in a tank.

The Project proposes no new surface water intakes. Potable water from the Wawayanda Water and Sewer District no. 1 will originate within the Middletown high-pressure distribution system, and will be supplied through mains. For treated effluent supply, the withdrawal point will be prior to the outlet of the treated effluent discharge from the Middletown POTW to the Wallkill River. Because there are no intakes, Best Technology Available and other requirements of Section 316(b) of the Federal Water Pollution Control Act are not relevant.

Q. Has Calpine selected a source for its primary water supply?

A. Yes. It has selected the Middletown POTW.

Q. Has Calpine entered into an agreement with the Middletown POTW?

A. Presently, Calpine and the City of Middletown are negotiating the terms of a joint water supply and wastewater disposal contract. This contract will outline the payment schedules, infrastructure to be installed, ownership and operation provisions. It is expected that this agreement will be signed by Calpine and the City in later summer or early autumn 2001. With respect to potable supply, the Project is within Wawayanda Water and Sewer District no. 1. Calpine has signed an agreement with this water district to limit its water withdrawal to 5,000 gpd. This agreement is included in Appendix E-1.

Q. Did you prepare an assessment of impacts on existing water supplies?

A. Yes. We assessed impacts on other system users, we analyzed impacts on surface and groundwater, stream flows and other waterbodies and we studied how the Project would affect the City of Middletown Water Supply.

Q. Please describe your study of the impacts on other system users.

A. Two systems are analyzed pursuant to this clause – the Middletown POTW as a water supplier and the Middletown potable water system. The Middletown POTW presently has no treated effluent reuse customers. The Project could be the first actual user. One other user – the Masada project – has proposed to use Middletown POTW treated effluent. Masada's water use, cumulatively with the Project, is analyzed in Section 17.1.8, where it is demonstrated that the two projects could both withdraw POTW effluent with minimal impacts to system users and the environment. The 3-year average

monthly flow for the POTW is 5.2 mgd, while the minimum daily flow did not go below 1.5 mgd during the same time period. The Project's water supply demand is estimated to be 0.24 mgd on an average basis and 0.43 mgd on a peak hourly basis. The existing flow from the POTW is of sufficient quantity to meet Project water quantity requirements. A graphical illustration of the monthly average flows and the daily minimum flows at the Middletown POTW is provided in Figure 17-6.

It should be noted that the Project's use of treated effluent will *decrease* total daily loading of suspended solids to the Wallkill River, thus helping to improve the amount of dissolved oxygen in the river, a benefit to aquatic ecology. TSS loading prevented from reaching the river is on the order of 0.1 tons per day (more than 30 tons per year), as shown in Table 17-9. Furthermore, the Project will not increase the loading of any constituent into the Wallkill River. In terms of flow, as detailed in Section 17.1.4.3, the Project's consumptive water use from the Middletown POTW will constitute about 2 percent of the 7-day, 10 year (7Q10) drought condition flow of the Wallkill River. Therefore, it is unlikely that the Project will have a significant impact on stream flows and ecological balance of waterbodies during drought conditions. In all, downstream users of the Wallkill River will benefit by the reduction in TSS loading. Biological oxygen demand (BOD) loading is also expected to be reduced to the extent that the suspended solids component of BOD is removed at the Project.

With respect to current users of potable water, the Project will have no measurable effects. Since it will not withdraw from groundwater, drawdown at local private wells is not an issue. With respect to surface water users, the proposed

withdrawal constitutes only a 0.1% increase over the average Middletown system withdrawal of 4.74 mgd. Approximately 400 times as much water (2 mgd) is lost by the system through leaks and other means, without reaching the end consumer. The City is reducing these losses aggressively, such that the new withdrawal will be more than overcome by increases in the system's safe yield.

Neither the potable water nor the reuse of Middletown POTW effluent would affect groundwater supplies, as neither system is groundwater-based.

Q. Will the Project be affected by drought conditions?

A. The Project will not compete with domestic, commercial, or industrial users of potable water since the Project will obtain water from the Middletown POTW for process needs. Therefore, the process water supply will not be affected by droughts. This will allow the Project to continue to generate electricity during drought conditions as well as during contingencies when the municipal system becomes inoperable.

Current estimates of the projected safe yield capacity for the City's raw water supplies during drought conditions is 3.6 mgd. Due to concerns about the viability of the water supply system (during drought periods especially), the capacity of the existing water supply system was improved in 1982, and further improvements are planned in the near future. (Refer to Section 17.1.4.4.)

If a drought condition causes water withdrawal limitations to be imposed, Calpine will abide by the same requirements as all other industrial users, and it will not formulate its own thresholds in contravention of municipal requirements. The potable water supply at the Project is small enough that in the worst-case emergency it can be fully supplied by

approximately one tanker truck per day. By taking these steps, Calpine is able to ensure that the plant can operate indefinitely and cost-effectively even during drought conditions without in any way exacerbating the water emergency.

Q. Describe the assessment water withdrawal for the Project on stream flows and waterbodies.

A. The waterbodies of concern are the Wallkill River, for effluent supply, and the reservoirs of the Middletown potable system.

The 7-day, 10-year low flow (7Q10) of the Wallkill River is 22 cfs at the Phillipsburg, New York USGS station. Based on the minimum average daily flow from the POTW of 1.5 mgd (or 2.33 cfs), the POTW contributes approximately 10.6% of the 7Q10 flow of the Wallkill River. The peak reduction of flow in the Wallkill River will be approximately 0.31 mgd (0.48 cfs). This reduction in flow is approximately 2.0% of the 7Q10 of the Wallkill River. Under non-drought conditions, the Wallkill River flows are much higher, and the consumptive withdrawal will constitute a proportionally lower share of the flow. While slightly reducing flow, the Project will also reduce suspended solids discharges to the Wallkill River. This will serve to increase dissolved oxygen levels, which will enhance the ecological habitat potential of the Wallkill River. In summary, the effect that the maximum consumptive diversion by the Project from the POTW discharge will have on the flow characteristics of the river will be negligible, while the reduction of suspended solids will benefit the Wallkill River.

With respect to potable supply, the Project's withdrawal will be less than 5,000 gallons per day, only about 0.1% of the overall Middletown system.

Q. Does the Application discuss the City's efforts and proposals to improve its water supply system.

A. Yes, a detailed description is included in Section 17.1.4.4. The Project does not intend to use City of Middletown water except for potable water needs. Therefore, these requirements are not applicable to 98% of the Project's proposed water withdrawal. With respect to potable water, the Project's incremental withdrawal is only 0.2% of the system, and is only 2.5% of the 200,000 gpd allocation of water to the Wawayanda Water and Sewer District no. 1. No increases in the safe yield of the system are made necessary as a result of the Project. Increases in safe yield are part of an ongoing effort by the City to bring its water use in line with system requirements under drought conditions. A description of these efforts is provided in Section 17.1.4.4. These steps, however, were not adequate to meet the higher water supply demands during drought periods and require further evaluation of available surface water and groundwater supply. Thus, intermediate and long range plans were considered to increase the capacity of the water supply for the city of Middletown. Increase of surface water supply yield has been contemplated by increasing overall reservoir storage or attempting to collect an increased volume of run-off. Based on the review of the Annual Water Supply statement for the Calendar Year 1999 and 2000, the City of Middletown has implemented several improvements during the last several years to increase its water supply yields. These improvements are discussed in Secion 17.1.4.4.

Q. Did you identify any further development of additional public and private water supplies?

A. Yes. First, we determined if there are any other existing users of the allocated water

supply from the City of Middletown. We also investigated City of Middletown actions to increase safe yield. Finally, the Application explains the present water supply agreement between the Town of Wawayanda and the City of Middletown.

Q. Are there any other allocations within Wawayanda?

A. Yes. Approximately 40,000 gpd have been allocated to date, per the estimation of the Town Engineer. This allocation is made primarily to previously existing residences and businesses, including gas stations and car dealerships. As stated in Section 17.1.8, the Masada project would increase demand by another 10,000 gpd, and the Project by another 5,000 gpd (maximum). Therefore, approximately three-quarters of the allocation will remain to serve future industries and other uses relocating to the area.

Q. Has the City of Middletown taken any actions to increase safe yield?

A. Short term actions were undertaken in 1982 to improve the capacity of the existing water supply system, develop supplemental water supply sources and implement conservation and leak detection programs. Additional surface and groundwater water supply development plans are under consideration by the City to ensure that during drought condition water supplies will be adequate. Actions since 1982 – and including the most recent update through the present – are detailed in Section 17.1.4.4.

Q. Please describe the water supply agreement between Middletown and Wawayanda?

A. The water supply agreement between the Town of Wawayanda and the City of Middletown requires that the City of Middletown allocate on a permanent basis to the Town of Wawayanda, 200,000 gallons per day of water and sewer service in exchange for the annexation of a portion of Wawayanda to the City of Middletown. "Wawayanda

Water Loop 1" is the first phase of implementing Wawayanda Water and Sewer District no. 1, an approved water and sewer district that will enable the Town of Wawayanda to utilize the referenced water and sewer capacity allocation. (Approval letters issued in October 2000 by NYSDOH and NYSDEC are included in Appendix E-1.) The district boundary would begin along Route 17M at the City of Middletown/Town of Wawayanda municipal boundary line approximately 500 feet north of Dolsontown Road and continue south along Route 17M and terminate north of the I-84 bridge crossing. The boundary will also extend east along Dolsontown Road approximately 2,300 feet and west on Route 6 approximately 1,000 feet. Both phases of the district are mapped in Figure 10-14. All improvements will be constructed within existing Town and State rights-of-way with the exception of 2,700 feet of sewer main/force main, which will require easements across private lands to the Middletown POTW. This water line construction will enable the Project to tap into a main at Dolsontown Road in order to deliver the 5,000 gallons per day of potable water that the Project requires.

The Project's use of 4,320 gpd on average (and not more than 5,000 gpd) is not expected to bring about diminished service to existing residential and commercial customers or future users. Water and Sewer District no. 1 will potentially be able to host several industrial parcels with its allocation of 200,000 gpd. A fifth of the allocation either has been requested by existing land uses, and approximately three quarters would still remain after the construction of both the Project and the Masada project (analyzed in Section 17.1.8). If industries use on average 10,000 gpd (as much as Masada and twice as much as the Project), an additional 14 industrial developments could still be built in

the water and sewer district, or a proportional amount of new residential or commercial development. Given the limited area of the district and the Project's minimization of potable water use, no diminished service on account of the Project is expected.

Q. Did you identify mitigation measures to avoid or minimize impacts to water supplies?

A. Yes. The primary mitigation measure used by the Project has been air cooling, which saves millions of gallons of water per day relative to evaporative cooling. The Project also incorporates a system to recycle HRSG blowdown through the WSAC makeup water system, which reduces water withdrawal by 64,000 gpd.

Alternative water supply sources are described and evaluated in detail in Section 17.1.7. As a result of Calpine's evaluation of water supplies, potential impacts to water supplies have been greatly minimized. By selecting Middletown POTW effluent as its process water source, Calpine has reduced the Project's potable water withdrawals by 98-99%.

Offsetting water conservation measures are called for when significant impacts to water-poor areas are predicted. These measures are presently being undertaken by the Middletown water system to address drought impacts, and Calpine's payments for potable water and treated effluent supply will be available for use in such programs or other types of programs as determined by the Wawayanda Water and Sewer District no. 1 and the City of Middletown, respectively. However, since the Project's own impact is minimal, constituting only 2.5% of previously allocated water to the district and a fraction of the total City of Middletown capacity, additional water conservation programs are not necessary to offset the Project.

Q. Did you identify and analyze alternative water supplies?

A. Yes.

Q. How did you perform this analysis?

A. In evaluating its water supply options, Calpine established several criteria in order to satisfy Project requirements and streamline permitting and construction of the Project as much as possible. We searched for a source with demonstrated, dependable water quantity, thus minimizing impacts on water users. The source had to be of predictable water quality. Use of this source had to be cost-effective. Finally, there needed to be a willingness and ability on the part of the owner(s) to enter into a water supply contract in a timely manner. The water supply options were each judged against these criteria.

Q. What alternatives did you analyze?

A. We looked at Wawayanda Development Corporation wells, Wallkill groundwater wells, onsite groundwater, public water supplies and Middletown POTW effluent reuse. Each of these sources is described in Sections 17.1.7.1—17.1.7.5.

Q. What did you determine about each of these alternatives?

A. Regarding the Wawayanda Development Corporation wells, because there has been no operational history at this location, water quantity is not considered sufficiently dependable while avoiding impacts. For example, maximum well field withdrawal has the potential to affect flows in Monhagen Brook. Because the wells were completed in bedrock, water quality was deemed to be less predictable than that of wells in unconsolidated aquifers. In addition, several private residential wells, set in bedrock, are contaminated from road salt (NYS DOT/I-84), or exhibit elevated hydrogen sulfide

levels. These circumstances made it unfavorable to pursue this option further, and attempts to contract for this water were not made. Neither do the Wallkill groundwater wells appear to be a viable option. This well field does not have an operating history. Predictability of water quality is somewhat compromised by the presence of an adjacent inactive hazardous waste site, although no impacts have been detected. While the system owner has shown a willingness to sell water rights, there are overriding cost and permitting disadvantages to this water supply system. These include the cost of water transport to the Project site and intermunicipal agreements that would be required to ensure this transport. Echo Lake well field is owned by the Town of Wallkill, while piping would be directed through Goshen and Wawayanda, as well as beneath I-84. Regarding on-site groundwater, the overall quantity on-site is insufficient to support average Project needs. Bedrock water quality, as described in Section 17.3, is of generally high quality. While cost and timing were strong advantages for this option, Calpine concluded that it would be better to obtain process water from the Middletown POTW.

Calpine considered the use of Wawayanda Water and Sewer District no. 1 as well as direct purchase from the City of Middletown. The allocation to the Wawayanda district is 200,000 gpd. To withdraw this amount is insufficient to satisfy Project requirements and detrimental to the purpose of the water district – attracting other economic development. The only potentially desirable public water supply option, therefore, would a direct purchase from Middletown. It is examined here.

The city of Middletown's water supply originates from surface water sources

northwest of the city. During normal conditions, the Middletown water system has been adequate over the last 100 years. The water filtration plant is permitted to produce peak flows of 6.0 mgd and is rated for a peak capacity of 8.0 mgd under optimum conditions. The average daily withdrawal is 4.74 mgd. Thus, the Project, if it were to use public supplies for process water, would cause a 5% increase in potable water demand. However, this accommodation cannot easily be made during drought conditions. While attempts to alleviate drought condition impacts are being undertaken (refer to Section 17.1.5.2), future changes in water withdrawals by other users could render the quantity undependable. With respect to predictability of water quality and cost, this option would be the best one for the Project – water is delivered at consistent, potable levels, and could be brought to the site from existing mains approximately 0.2 miles west of the Project site. However, lack of demonstrated dependable water quantity is a threshold criterion that has not been met. Accordingly, the Project has chosen not to use the City of Middletown public water supply for process water.

Calpine has evaluated and chosen the option of diverting treated effluent from the Middletown POTW to satisfy 98-99% of the Project water needs. None of the disadvantages of this option are insurmountable, and there are considerable environmental advantages. In terms of water quantity, the treatment plant has a steady, demonstrated supply, even in the driest conditions. Its minimum monthly flow over the years 1998 and 1999 (relatively dry years) was 3.0 mgd on average. Over the last 3 years, the minimum daily flow was 1.5 mgd – more than three times the Project's maximum withdrawal and more than six times its average withdrawal. While the water

quality of POTW effluent is known to be insufficient, it is fairly predictable. The water discharged into the system originated as potable water and has been used in domestic and certain industrial applications. The plant has been required to monitor several important parameters, and samples of other parameters have been obtained as well. Thus, there is an adequate degree of predictability of the water quality. There are certain capital costs related to the installation of treatment infrastructure, but these are partly financed by the less expensive operating cost to obtain treated effluent relative to potable water. Effluent reuse was also considered beneficial from a public policy perspective. Finally, the City of Middletown has expressed willingness to enter into a contract to supply water to the Project from the Middletown POTW. Consequently, this option has been chosen, pending an agreement with the City of Middletown.

Q. Did you analyze the cumulative impacts of the Project and the Masada project with respect to water supply?

A. Yes. Section 17.1.8 .1 describes the Masada water supply requirements. The cumulative impacts are described in Section 17.1.8.2.

Both projects have identified the same preferred sources – Middletown POTW effluent for process water and municipal supplies for potable water, except that the Masada project proposes to obtain potable water directly from its host city, Middletown, whereas the Wawayanda Energy Center proposes to be a customer of Wawayanda Water and Sewer District no. 1 for its potable water needs. Hence, the worst-case scenario envisioned by Clause 10(c) is the only applicable scenario. The waterbodies of concern are the Wallkill River, for effluent supply, and the reservoirs of the Middletown potable

system.

The Project's maximum case withdrawal is 0.43 mgd. The Masada project's withdrawal is 0.3 mgd. The Middletown POTW minimum flow on any single day over the past three years is approximately 1.5 mgd. Hence, even under the worst-case conditions, the Middletown POTW maintains sufficient flow to supply both Projects.

The 7-day, 10-year low flow (7Q10) of the Wallkill River was reported to be 22 cfs at the Phillipsburg, New York USGS station. Based on the minimum average daily flow from the POTW of 1.5 mgd (or 2.33 cfs), the POTW contributes approximately 10.6% of the 7Q10 flow of the Wallkill River. The peak reduction of flow in the Wallkill River will be approximately 0.31 mgd (0.48 cfs). This reduction in flow is approximately 2% of the 7Q10 of the Wallkill River. Under non-drought conditions, the Wallkill River flows are much higher, and the consumptive withdrawal will constitute a proportionally lower share of the flow. While slightly reducing flow, both the Project and Masada (per FEIS, p. 25) will also reduce BOD loading to the Wallkill River. This will serve to increase dissolved oxygen levels, which will enhance the ecological habitat potential of the Wallkill River. In summary, the Wallkill River is able to absorb flow reductions from both projects, while the removal of BOD and suspended solids will be beneficial to the Wallkill River.

With respect to potable supply, the Project's withdrawal is minimal. Furthermore, Middletown surface reservoirs are protected by a minimum flow requirement, such that the system is proposed to be augmented by methods other than greater reservoir drawdown, as described in Section 17.1.4.4. The protection of the ecological habitat potential of the three reservoirs is thus ensured.

Q. Moving on to wastewater. How will the Project disposed of its industrial and sanitary wastewater?

A. The Project will discharge industrial and sanitary wastewater to a dedicated discharge line from the site to the Middletown POTW, which has adequate capacity to accept the discharge. The analysis that follows addresses the quantity, quality, and infrastructure issues associated with the proposed wastewater disposal.

Q. Did you determine the regulatory requirements that are applicable to the Project.

A. Yes. These are described in Section 17.2.1 of the Application.

Q. Does the Application identify wastewater streams and describe the Project's wastewater treatment facilities?

A. Yes. These concepts are addressed in Section 17.2.2.1.

Table 17-8 identifies all wastewater sources and the quantity of flow under various conditions. *All* of the wastewater streams shown in that table are proposed to be discharged to the Middletown POTW. The only discharge directly into the environment will be storm water. Therefore, a SPDES permit for the Project (other than for storm water as discussed in Section 17.5) is not required. No thermal discharge into surface water will take place, and no demonstration pursuant to Section 316(a) of the Clean Water Act is required. No structures will be placed in any surface water, and no Best Technology Available demonstration pursuant to Section 316(b) of the Clean Water Act is applicable to the Project.

All waste streams are fully described in Section 17.2.2.1. Calpine will install the following treatment mechanisms, which are also described in the Application: clarifier,

thickener and filter press; neutralization tank; and oil/water separator.

Q. Please describe the wastewater characterization.

A. Wastewater characterization has been based on samples from the Middletown POTW, engineering specifications for demineralized water, water uses on-site, wastewater pre-treatment on-site, and disposal processes. There are no constituents in the Project wastewater whose concentration will be higher than the Federal Performance Standards for New Sources or the Middletown sewer use limits. Ammonia, certain metals, acidity/alkalinity, and suspended solids are addressed in Table 17-9 through 17-11 for all relevant operating conditions – the average case, a maximum discharge case (highest potential flow and loading), and a minimum discharge case (highest potential concentrations). Plant wastewater constituents are compared to applicable sewer use limits and Middletown POTW SPDES permit limits.

Q. What are the applicable constituents?

A. Section 17.2.2.2 contains a qualitative analysis of applicable constituents, including pH, oil and grease, polychlorinated biphenyl compounds, fly ash transport water, copper, chromium, zinc, temperature, biological oxygen demand, settleable solids, and residual chlorine. These analyses demonstrate that no discharge would be in contravention of state water quality standards as a result of the Project's discharge, as required by PSL §168.2(c)3.

The Project's effluent to the POTW will be lower than the POTW's own SPDES permit limits for all parameters except those introduced by sanitary waste or, in the case of residual chlorine, are consumed by sanitary waste. Hence, the Project will ensure

continued compliance with the POTW SPDES permit, and will not exacerbate any conditions of non-compliance.

Q. Did you identify and evaluate mitigation measures with regard to wastewater disposal?

A. Yes. This analysis is presented in Section 17.2.3. The primary form of wastewater mitigation has been the choice of air cooling, which lowers wastewater generation by an order of magnitude. In addition, impacts on the wastewater system are mitigated financially in that Calpine will finance all Project-related installations. Several additional mitigation and alternative wastewater treatment disposal mechanisms have been examined. The first of these is wastewater minimization through internal recycling. Others included on-site subsurface disposal under a new SPDES permit; treatment and surface water release under a new SPDES permit; and a zero liquid discharge system. Trucking wastewater under a hold-and-haul system was considered, as was, of course, municipal sewer system discharge.

Q. What is internal recycling?

A. One way to further limit wastewater generation from the Project is to find a reuse or recycling scenario, whereby the steam cycle blowdown is reused in the plant process. For this reason, Calpine is proposing a to reuse water from the HRSG blowdown tank into the WSAC makeup system. Overall wastewater discharge because of blowdown reuse would decrease from approximately 131,500 gpd to 67,500 gpd – a 49% reduction. This type of mitigation measure does not require expensive additional infrastructure. Because the proposed water source would normally be discharged to surface water, the mitigation measure has no impact on groundwater quality or quantity. It has no impact

on surface water consumptive use. From a water quality perspective, loading to POTW influent would not change, although dilution would yield lower concentrations. At the same time, flow to the POTW is reduced – an overriding environmental benefit. For these reasons, this option has been adopted.

The Project also will reduce wastewater generation by maximizing the cycles of concentration in the WSAC. Depending on incoming water quality it may be possible to cycle the WSAC up to 5 times the incoming water characteristics without exceeding pretreatment standards or causing operational impacts.

Q. Please describe on-site subsurface disposal.

A. On-site subsurface disposal is not a viable option for process and sanitary wastewater disposal. Regarding deep injection wells, the geology at the site consists of confining layers and relative shallow bedrock, as opposed to highly permeable soils characteristic of an unconsolidated aquifer. The water thus disposed would not efficiently recharge bedrock layers. It is presently EPA policy to eliminate Class V injection wells and Calpine is not aware of any deepwater injection of power plant wastewater in the state. Regarding environmental impacts of deep well injection, surface water quality would not be significantly affected. Surface water quantity would be slightly reduced relative to the proposed discharge. Groundwater quantity would be enhanced, but only if a sufficient infiltration system can be designed. Groundwater quality could be protected through additional treatment. Based on the geotechnical investigation, site soils would not be ideal for a shallow septic system for sanitary wastewater. Superior treatment and therefore less environmental impact would be provided by the Middletown POTW.

Because of the regulatory uncertainties and the availability of a POTW, Calpine concluded that a subsurface disposal system would not be as effective as the current wastewater disposal plan.

Q. What about surface water disposal?

A. Surface water disposal would require new wastewater line corridors (either to Monhagen Brook or to the Wallkill River). The discharge would need to comply with thermal and other surface water quality criteria. From an economic perspective, the system would be more expensive than the proposed wastewater disposal system for the Project since disinfection may be necessary to treat sanitary wastes prior to discharge. Groundwater quality and quantity would be unaffected under this option. Surface water quantity would be unaffected relative to the proposed design. Surface water quality would be protected pursuant to the Project's own SPDES permit, but the Middletown POTW would have a better system for Project wastewater treatment than the Project would have. Based on wastewater quality described in Tables 17-9 through 17-11, the Project could discharge to a surface water body (e.g., the Wallkill River) without significant additional treatment. However, the proposed plan to discharge to the POTW provides better wastewater treatment than the direct discharge option. Thus, this option is inferior to the preferred option.

Q. Describe a zero liquid discharge system.

A. A zero liquid discharge system is sometimes used when other wastewater discharge options are not feasible. A zero liquid discharge system consists of several processes that, in combination, concentrate constituents in process wastewater through evaporation. A zero

liquid discharge system would generate brine or salt-based solid waste streams requiring off-site disposal. No sewer infrastructure would need to be constructed under a zero liquid discharge design, as long as a septic system were installed to manage domestic/sanitary wastewater. However, there are significant additional capital costs (i.e., evaporator/crystallizer/brine holding tank) and operating costs (i.e., parasitic energy consumption, monitoring and maintenance, solid waste management) associated with a zero liquid discharge system. While such a system would not affect groundwater quality or quantity, it would require less water and therefore increase the discharge to the Wallkill River because the 67,500 gpd average annual Project wastewater discharge would be evaporated instead of treated at the Middletown POTW and discharged to the Wallkill River. Surface water quality will not be significantly affected. Because there is a locally available wastewater treatment plant that can accommodate the Project's discharge, a zero liquid discharge system is not warranted because the economic impact would be significant and the environmental benefits would not be significant compared to the preferred option.

Q. What did you determine regarding removing water by truck?

A. Removing water by truck for treatment at the Middletown POTW or another wastewater treatment facility provides no advantages over the preferred option. This option would require significant on-site wastewater storage and result in additional truck traffic on local roadways (about 25 tanker trucks per day would be necessary during maximum discharge days). Both the preferred option and this option provides for treatment in a POTW or equivalent facility but the preferred option has the advantage of a direct

connection to the treatment system. The preferred option is superior to this option in all aspects. Calpine has concluded that there is no reason to use a wastewater trucking system or warrant its cost.

Q. What is the Project's preferred disposal method?

A. The Project's preferred disposal method is to discharge its process water to the Middletown POTW. The plant has the capacity to treat 6 million gallons per day on average. The plant's capacity is more than sufficient to address the Project's proposed discharge volume of up to 125,000 gpd (67,500 gpd on average). The use of the wastewater treatment plant would require the construction of a 0.2 mile long sewer force main that would not interfere with any other property owners. Discharge to the POTW would allow for a single location to treat wastewater discharges from the Project and other land uses. Groundwater and surface water quantity and quality are protected as described elsewhere in Section 17 of this Application. Finally, infrastructure and transaction costs are further minimized because the POTW is already the source of 98-99% of the Project's water needs. For these reasons, Calpine has chosen this discharge method as its preferred option.

Q. What wastewater infrastructure is proposed?

A. The effluent supply and wastewater disposal interconnection lines, clarifier-thickener-filter system, water and wastewater tanks, and water/wastewater treatment building are shown in Figures 3-3 and 3-5. In the proposed site plan, all of these are shown, in the more conservative case, within the Project site. During detailed design, it may be feasible to place them on Middletown POTW property, which in the absence of other

considerations is a preferred option. Final placement of this equipment will be negotiated as part of the agreement between Calpine and the City of Middletown.

Q. What is Middletown POTW's permitted capacity?

A. The Middletown POTW (NPDES ID NY0026328) has a permitted capacity of 6.0 mgd, and the City plans to expand the facility to treat 9 to 10 mgd to meet anticipated needs within upcoming years. Current flows are 5.2 mgd on average (based on 1998-2000 data). Maximum Project discharge is 0.125 mgd. There are no physical capacity constraints for the volume of wastewater that the Project would discharge. The City of Middletown is expected shortly to confirm this availability by entering into an agreement with Calpine that sets for the terms of Calpine's purchase of POTW effluent, discharge of Project effluent, and the allocation of responsibilities and physical infrastructure related to the same.

Q. What wastewater agreements have been formed?

A. Presently, Calpine and the City of Middletown are negotiating the terms of a joint water supply and wastewater disposal contract. This contract will outline the payment schedules, infrastructure to be installed, ownership and operation provisions, etc. It is expected that this agreement will be signed by Calpine and the City in later summer or early autumn 2001.

Q. Did you analyze the cumulative impacts on wastewater disposal of the Project and the Masada project?

A. Yes. Section 17.2.6.1 describes Masada's wastewater requirements. We also performed a combined impact analysis of the water quality on surface water and groundwater identified as potential receiving waters from the discharges of both projects.

The only potential receiving water for both projects is the Wallkill River, by way of indirect discharge through the Middletown POTW. Thus, to protect the surface water quality of the Wallkill River, effluent standards in the Middletown POTW SPDES permit must be maintained, to ensure which Middletown POTW pre-treatment limits must be met.

In terms of quantity, the combined maximum wastewater flow from the two projects to the POTW will be 0.36 mgd (0.235 from Masada and 0.125 from the Project). Hence, no physical capacity constraints exist for the volume of wastewater that the Project and Masada would discharge.

No other information is provided. Nothing in the available information on Masada supports a conclusion that the cumulative impact of the two projects would lead to or exacerbate any violation of the Middletown POTW SPDES permit.

Q. In your opinion, will the Project adversely impact water supplies in the Project area?

A. No.

Q. In your opinion, will wastewater from the Project create adverse impacts.

A. No.

Q. Does this conclude your testimony at this time?

A. Yes.

Case: 00 F 1256

WAWAYANDA ENERGY CENTER

DIRECT TESTIMONY

OF

THOMAS DEEDY

DONALD NEAL

MARK WILLIAMS

DAVID ERALI

Q. Please state your names, titles, affiliations and business addresses.

A. My name is Thomas Deedy, and I am a Senior Project Engineer for Calpine Corporation ("Calpine"). My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

A. My name is Donald Neal, and I am an Environmental Manager for Calpine. My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

A. My name is Mark Williams and I am an Environmental Geologist for Earth Tech Corporation. My business address is 12 Metro Park Road, Albany, NY 12205.

A. My name is David Erali and I am a Project Manager for Parsons Energy & Chemicals Group, Inc. My business address is 2675 Morgantown Road, Reading, PA 19607.

Q. Mr. Deedy, what are your duties of employment?

A. I work closely with the Regional Development Managers in the development of new power plant projects. I organize and lead the initial engineering and technical review efforts in the design of combined-cycle power plants. I determine the preliminary conceptual design, using standard design guidelines, as well as run the up-front project heat balances. I also coordinate the initial engineering effort with a selected A/E firm and arrange interface with utilities, steam hosts, gas suppliers, permitting agencies, consultants and other organizations involved with the development of power projects.

Q. How are you qualified to perform your employment duties?

A. I received a Bachelor of Science in Marine Engineering from Massachusetts Maritime Academy and I have over 14 years of professional experience related to my employment

duties.

Q. Does your curriculum vitae, which is attached as Exhibit 3, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Deedy, please describe your role in the Project.

A. I am the engineering manager of the Project, with primary responsibility for facility design, interaction with turbine and balance-of-plant vendors and to provide technical support for all aspects of the facility.

Q. Mr. Neal, what are your duties of employment?

A. I serve as project manager and technical analyst for environmental permitting and assessment of electric generating facilities and programs, representing Calpine before regulatory agencies and in public forums. In this capacity, I have managed and prepared siting studies, environmental impact statements, and applications for wastewater, wetlands and air permits. I have also led environmental, health and safety audits and due diligence investigations. I am experienced with methods of air emissions source testing and continuous emissions monitoring system design, certification and implementation.

Q. How are you qualified to perform your employment duties?

A. I received both a B.S. and an M.S. in Biology from the University of Massachusetts and I have over 18 years of experience related to my employment duties.

Q. Does your curriculum vitae, which is attached as Exhibit 14, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Neal, please describe your role in the Project.

A. I am the environmental manager for the Project, with primary responsibility for all aspects of the Article X application being submitted with this testimony. My areas of expertise on the Project have included supervision of air and water quality studies, ecological investigations, acoustical studies and land use and aesthetics issues.

Q. Mr. Williams what are your duties of employment?

A. My areas of expertise are environmental assessments and site characterization, regulatory permitting and compliance and remedial investigations/feasibility studies. I specialize in subsurface investigations, including the characterization and analysis of suspected or confirmed contaminated sites. I utilize a wide variety of subsurface investigative techniques, including all types of drilling sampling procedures, aquifer testing and analysis, hydrogeologic and geochemical data interpretation, sampling protocols and quality assurance/quality control procedures. I have also designed groundwater monitoring programs, characterized groundwater and contaminant movement, designed and implemented soil and groundwater remedial plans and assessed public health and environmental risks.

Q. How are you qualified to perform your employment duties?

A. I received a B.S. in Geology from East Carolina University and I have taken M.S. coursework in Environmental Science at SUNY-ESF.

Q. Does your curriculum vitae, which is attached as Exhibit 20, fairly and accurately represent your experience?

A. Yes

Q. Mr. Williams, please describe your role in the Project.

A. I have primary responsibility for groundwater resource investigations for the Project. I have intimate knowledge of subsurface conditions at and around the Project site.

Q. Mr. Erali, what are your duties of employment?

A. As a Project Manager, I am responsible for site development and permitting support for power plant projects. I design, research and supervise the construction of industrial facilities, nuclear and fossil-fueled power generating stations and waste disposal facilities.

Q. How are you qualified to perform your employment duties?

A. I have a B.S. in Civil Engineering and a M.S. in Soil Mechanics and Foundation Engineering from the University of Massachusetts. I am also a Registered Professional Engineer.

Q. Does your curriculum vitae, which is attached as Exhibit 6, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Erali, please describe your role in the Wawayanda Energy Center

A. I am the Parsons project manager for the Wawayanda Energy Center ("Project"). In that capacity, I have overseen the preparation of site plans, water and wastewater balances and various other types of engineering support for the Project.

Q. Gentlemen, what section of the Application does your testimony support?

A. Section 13, which concerns soil, geology and seismology and the parts of Section 17 that address surface and groundwater protection and stormwater management.

Q. Please describe Section 13 of the Application.

A. This section describes the existing characteristics of soils and geology, and reviews the potential impacts and design considerations associated with the Project. In addition, this section outlines specific measures to be taken in the event that blasting is required, and addresses the potential for regional seismology to affect the Project. Because there are few regulatory standards specific to earth resources, the significance of such impacts are assessed according to the needs of facility design and engineering, and any resulting impacts on the environment. A preliminary on-site geotechnical investigation has been conducted by Schnabel Engineering (see Appendix S), and this summary is based in part on that study. The Siting Board regulations also explicitly require an evaluation of geology and seismology. 16 NYCRR 1001.3(b)1(v). Furthermore, the Public Service Law requires that an Application contain, "as appropriate, geological... tsunami, [and] seismic" data. PSL §164.1(a). Therefore, a description of the potential for active seismological faults and earthquakes that could cause ground motion, liquefaction, slope instability and deformation is also addressed in this section.

Q. Please describe the topography of the Project site and interconnections.

A. The site, laydown, and interconnection topography is shown in Figure 13-1, with identification as to the range of slopes. Topographically, the Project site is nearly level to gently sloping (3%) in the eastern portion of the site, where wetlands and a drainage ditch that serves as a tributary to Monhegan Brook are located. In the western portion of the site, the topography is gently to moderately sloping with slopes ranging from 5 to 16 percent. The building footprint is proposed to be centrally located so as to avoid the

steeper western portion of the site to the extent practical and to minimize impacts to wetlands in the east.

Q. Has a preliminary geotechnical investigation been completed?

A. Yes. A preliminary geotechnical engineering report has been completed by Schnabel Engineering and is included in Appendix S. The report includes soil borings and evaluations, water table considerations, general earthwork and excavation recommendations, and an evaluation of several alternative foundation types.

The report concludes that the dense to very dense gray glacial till on the site is suitable for shallow foundation techniques such as mat foundations and shallow spread footings. Mat foundations use a heavily reinforced concrete slab that extends under the entire building and distributes the total building load over the entire site. Spread footings are enlargements at the bottom of a column or bearing wall (that is, where concentrated load occurs). Deep foundations are only discussed as a contingency measure wherever soil is too deep to permit cost-effective shallow foundations. However, the glacial till is found at depths ranging from 7 to 20 feet. Thus, shallow foundations are expected to be used. Mat foundations may be designed for distributed contact pressures of 3,000 to 4,000 pounds per square foot (psf). Shallow spread footings may be sized for a net allowable soil bearing pressure of 6,000 psf on glacial till or 3,000 psf on structural fill. This would allow for a factor of safety of at least three against general shear failure. It is also anticipated that a shallow ring wall foundation (essentially a concrete circular wall underground) will be used for storage tanks.

Q. Please describe the proposed site plan.

A. Figure 13-2 shows both existing and proposed contours for the main Project building area. Contours for the temporary laydown area in the eastern portion of the site and to the south of the site are included in Figures 13-3 and 13-4, respectively. Contours for the process water and wastewater line corridor are expected to remain as shown in Figure 13-1. Steep slopes within the site and interconnections will be maintained through proper grading, mulching, and planting practices.

Q. Please describe any cut and fill that will be necessary for construction of the Project and the handling of such cut and fill.

A. The topography of the site is generally sloping toward the center. Based on the site slopes, cutting and filling within the site will be necessary. Within the main portion of the Project site (west of the wetlands that bisect it), an excess of approximately 110 thousand cubic yards (CY) of fill soil and 11 thousand cubic yards of topsoil are estimated. This material will be used to fill the parking/laydown areas south and east of the Project site, satisfying all fill requirements in that area. The grading of the laydown area has been adjusted to ensure that no additional fill is necessary, and therefore no fill will be imported or exported for the Project. Any changes in the landscaping plan that could occur due to public or agency input after the filing of this Application are not expected to cause a net increase in cut or fill because laydown area contours can be adjusted accordingly. Other than haulage across or along Dolsontown Road (to laydown areas located south and east of the main building area), only the materials detailed in Section 13.24 are expected to be delivered to the site.

Excavation of soil in cut areas is expected to be completed using conventional

earthmoving equipment. The soil will be moved to the fill areas and deposited in lifts, with each lift compacted using bulldozers and heavy compaction equipment. The Project site will be used for temporary storage of any excavated material that cannot be immediately used as fill. Topsoil for use in final grading will be stored on-site until needed. Proposed cut/fill storage areas are labeled in Figures 13-3 and 13-4, and are located in the northern portion of the east parking and laydown area and the southern portion of the south parking and laydown area.

For the Project's underground utility corridor to the Middletown POTW, the total soil excavation is estimated to be about 3300 CY. Depending upon the pipe sizes and bedding materials specified, up to 1100 CY of excess soil will result after backfilling the trenches. This excess soil will be incorporated into the main site grading or landscaping operations. For the electric interconnection, the only excavation will be for pole foundations, and it is expected that excavated soils will be used as fill in the southern laydown area.

Q. Will blasting be required?

A. Based on the preliminary geotechnical investigation, bedrock is well below the depths to which the Project will excavate, and blasting should not be required. However, in the event shallow bedrock is discovered during Project construction, Calpine has developed a blasting plan, as required by Stipulation 8, Clauses 2(i), 2(j), and 2(k).

Based on previously available information, bedrock beneath the site area was believed to be greater than 100 feet below the surface. During the geotechnical study, borings were drilled at the site to assess the hardpan and till and to confirm that the depth

to bedrock will not be a concern. At least one boring was drilled to the deepest proposed excavation. Numerous cobbles and boulders were encountered, but it is the conclusion of the geotechnical report (Appendix S) that "based on subsurface explorations completed at the site, auger and sampler refusal is not indicative of massive bedrock, but rather is caused by boulders or cobbles within the glacial till." In two locations, however, bedrock was encountered: B-3, where gray shale was encountered at 36 feet below ground level (456 feet msl), and B-8, where gray shale was encountered 49 feet below the surface (409 feet msl). Note that the deepest excavations will be on the order of only 20 feet below the surface.

Using modern blasting techniques, rock excavation by blasting can be completed without vibration damage to structures, including adjacent ones. Blasting is specialized work, and only pre-qualified contractors would be allowed to bid the work. The blasting contractor would be provided with a technical specification covering the blasting work that details allowable vibration levels at the nearest structures. It would be the blasting contractor's responsibility, based on the specifications, to develop a formal plan and individual shot plans for excavating the rock without causing damage to nearby structures. This plan would be submitted to the DPS and the Town as a Compliance Filing. Only after the proposed plan is approved would blasting work commence.

Q. Please describe the blasting plan.

A. The following summarizes Calpine's blasting plan. Before blasting starts, the blasting contractor will be required to submit a detailed conceptual blasting plan for approval by the General Contractor. The conceptual blasting plan will include types and amounts of

explosives, hours of operation, warning system information, methods for transportation and handling of explosives, pre-blast survey, compliance with local, state and federal laws, coordination with local safety officials, and safety measures.

Blasting will be limited to normal working hours, 8:00 AM to 5:00 PM, Monday through Friday. No explosives will be stored on-site, and the handling of explosives will be coordinated with local safety officials. A pre-blast survey of structures within the potential impact area of blasting, as determined by the blasting contractor and an independent third party, will be completed, and the inspection will be videotaped. The independent third party will be selected in consultation with the Town of Wawayanda and DPS.

The most likely blasting method will use non-electric delays or electric delays with a sequential timer to start the blast. The delay controls when each hole detonates. With these methods, it is possible to fire several holes at one time. This allows the blasting contractor to achieve a reasonable production rate without causing vibration damage to nearby structures. Before each blast, an individual shot plan will be submitted to the General Contractor for approval. Each individual shot plan will specify the amounts and types of explosives per hole and per delay, the quantity to be excavated, the number and diameter of blast holes, distances to the nearest structures, seismograph locations, and whether blasting mats will be used. The General Contractor and the independent third party will review individual shot plans to ensure that they comply with the approved blasting plan.

Location. Blasting would only occur at points within the Project site where rock

that can not be excavated by conventional techniques is found. Based on existing data, this is not expected to occur. Each element of the Plan is discussed, in turn, in Section 13.3.1.

Q. Please describe the potential impacts of any blasting that might occur.

A. It is not anticipated that blasting will be required. However, should blasting become necessary, controlled blasting techniques will be used to ensure that nearby structures are not damaged by blasting vibrations. The vibrations resulting from a blast are related to the amount of explosives detonated at any one time and the distance from the blast to the structure. Controlled blasting techniques include limiting the amount of explosives detonated at any one time to ensure that excessive vibrations are not created.

All the explosives in a blast do not detonate at one time. A blast is actually a series of discrete, smaller explosions timed far enough apart to ensure the vibrations created by a single explosion have a chance to dissipate before the next explosion begins. By detonating a series of smaller explosions instead of one large one, vibrations are greatly reduced. The time between detonations is called a "delay." By controlling the pounds of explosives per delay, the level of vibrations created by a blast can be minimized.

Researchers from the Bureau of Mines have studied the vibrations from blasting and have developed equations to predict vibrations at a distance from the blast based on the amount of explosives in a delay. At the start of the blasting work, the amount of explosives detonated per delay will be limited to amounts known to produce low vibration levels for any site. The equations that predict the amount of vibration are

conservative and will over-predict the actual vibrations. As the actual dissipation characteristics of the site are confirmed during blasting efforts, the amount of explosives per delay may be increased to optimize production without causing vibration damage.

The vibrations felt from a blast at points away from the blast are a function of the amount of explosives detonating at one time and the distance. The transient vibrations created by blasting dissipate quickly away from the blast. By controlling the amount of explosives detonating at one time, the vibrations created by the blast at points away from the blast can be predicted and controlled. At the Project site, controlled blasting will be used to ensure that vibrations created by blasting dissipate to acceptable levels at the site boundary. Since the vibrations dissipate rapidly, structures further away will experience much lower vibrations and will be protected from vibration damage.

Through thousands of case studies of blasts that did and did not cause damage, the Bureau of Mines and other researchers have determined levels of vibration that will cause damage. Residential construction can withstand vibrations equivalent to a peak particle velocity of 2 inches per second (ips), and concrete structures can withstand vibrations equivalent to a peak particle velocity of at least 4 ips without damage. Plaster walls are brittle and readily susceptible to vibration damage. Vibrations with a peak particle velocity of 2 ips will not crack a plaster wall. Therefore, the 2 ips value is the industry standard for preventing damage. Most below grade structures have been found to be safe under peak particle velocities of 4 ips or less.

For any blasting associated with Project rock excavation, the peak particle velocity will be limited to 2 ips at the site boundary. Thus, no impacts are anticipated to

environmental features, aboveground structures, or below ground structures such as pipelines.

Q. Please describe any mitigation measures that will be taken if blasting is required.

A. The following mitigation measures will be employed in the event that blasting is required:

Seismographs. To ensure that excessive vibrations are not created by blasting, seismographs will be placed between existing structures and the blast. The seismographs will be used to document vibration levels created by the blasts. Controlled blasting techniques will be used to ensure that vibrations are reduced to acceptable values and nearby structures are not damaged by blasting vibrations.

Blasting plan implementation. The blasting plan is designed to ensure that impacts are minimized. In particular, coordination with local officials and neighbors, as well as limiting blasting to daytime hours, are basic methods to mitigate potential blasting impacts. Sufficient matting as well as time-delay charges will be used to minimize the possibility of flyrock leaving the construction work area.

Compensation for damages. The blasting plan would ensure that the nearest sensitive receptors would not be damaged. Part of the plan includes a pre-blast and post-blast survey in order to be able to demonstrate this in practice. Insurance requirements will be established as a part of the contract with the selected blasting contractor. This insurance will provide for compensation in the unlikely event that impacts to off-site structures were to occur as a result of on-site blasting. The pre-blast survey by an independent third party will allow for documentation of conditions before

and after blasting, as warranted. If damage occurs, the blasting contractor will file a claim with the insurance company and take appropriate corrective action in consultation with the independent third party reviewer.

Use of alternative technologies. In subsurface conditions where bedrock and excessively large boulders are absent, blasting is not necessary. However, where bedrock or large boulders are encountered, there are no cost-effective alternative methods to excavate significant amounts of rock. Alternative methods such as chipping with a hoe-ram take longer and produce continuous noise.

Location of structures. At some sites, location of structures could help to avoid blasting. At the Project site, bedrock is below all areas of proposed excavation, while the distribution and size of boulders does not appear to present significant problems. Since blasting should not be necessary per the current site plan, relocation would not affect the need for blasting.

Q. Please provide a description of the regional geology, tectonic setting, and seismology of the Project vicinity.

A. The regional geology, tectonic setting, and seismology of the Project vicinity is fully described in Section 13.4.1. The site area is located in the central part of Orange County, which is within the Hudson Mohawk Lowland. The topography of this area is gently rolling and has several large areas of glacial lake deposits that are almost flat. The central part of Orange County is underlain by the Trenton Group of shales and the western edge of the county is dominated by the Shawangunk Formation sandstones and conglomerates. The bedrock underlying the site is the Normanskill foundation of shale,

siltstone, and argillite. Figures 13-5 and 13-6 show the surficial and bedrock geology in the Project vicinity.

This region has been glaciated. The overburden material at the site is glacial till, which contains many cobbles and boulders. At the site, there are boulders up to four feet in diameter on the ground surface. Soils encountered during the geotechnical investigation are further described in Section 13.5.

Earthquake data was obtained from the New York State Geological Survey via its web-site, including an article entitled "Significant Historical Earthquakes in New York State." According to the New York State Geological Survey, damaging earthquakes have occurred in New York State on average once every 20 years, and earthquakes of up to magnitude 6.0-6.5 are possible anywhere in New York.

Q. Describe the expected impacts, if any, of the construction and operation of the project with respect to regional geology.

A. No unique or unusual geologic resources exist on the Project site, as discussed in Section 13.4.1. Furthermore, the preliminary geotechnical investigation indicates that the soils at the site are competent to support the loads associated with the Project without the need for bedrock support. Bedrock is found below the deepest excavations, and blasting is not anticipated. Therefore, the Project will not affect any such resources. It also is noted that the use of bedrock to support foundation loads would have no measureable effect on the bedrock or geology of the area.

Q. Please describe the impacts of typical seismic activity experienced in the Project area on the operation of the Project.

A. Although a number of earthquakes have occurred in New York State since 1737, only 17 of significance (in the range of 4.0-6.0) have been noted (see Table 13-2). Of these, only the earthquake at Massena in 1944 exceeded a magnitude of 6.0. Of the 17 earthquakes noted in Table 13-2, only the Tarrytown, White Plains, and Rockaway Beach earthquakes are within 75 miles of Wawayanda.

For the area surrounding the Project site, the National Seismic Hazard Mapping Project of the United States Geological Survey has estimated a 2% probability of exceedance in 50 years of a peak ground acceleration at 0.15g, and a 0.2 sec. spectral acceleration at 0.30g. Peak acceleration is a measure of the maximum force experienced by a small mass located at the surface of the earth during an earthquake.

The Project will be designed to withstand the vibrations that can reasonably be expected in the surrounding area. The plant will also be designed for safe shutdown during any emergency, including a seismic event. Underground natural gas pipelines are equipped with mechanisms that shut off the flow of natural gas automatically in a seismic event. The standard pipeline practice with respect to shutoffs is expected to be employed by the pipeline to the Project site.

Radbruch-Hall et al. (1982) developed a land constraints map focusing on areas of relative incidence and susceptibility to landslides. The susceptibility of an area to landsliding was considered the probable response to natural or artificial cutting or loading of slopes or abnormally high precipitation. Three categories of incidence and susceptibility were defined by Radbruch-Hall et al. (1982), as shown on Table 13-3: low, moderate, and high. The Project site is characterized by low incidence and low

susceptibility.

A tsunami is a series of waves generated by an undersea disturbance such as an earthquake. Landslides, volcanic eruptions, and even meteorites can also generate a tsunami. Throughout recorded history, tsunamis have impacted primarily coastal communities. Recent tsunami events have occurred principally in the Pacific Ocean region. A survey of great tsunamis dating back to 1929 shows most tsunamis have occurred in the Pacific Ocean region . One rare Atlantic Ocean tsunami occurred off the coast of Grand Banks, Newfoundland, triggered by a sub-marine landslide and earthquake of a magnitude of 7.2 (Richter Scale). However, the Project site is located well inland, and there is no potential for a tsunami to affect the site.

Q. Please describe the soil types on the Project site and interconnections.

A. Information related to soils was obtained through a preliminary geotechnical investigation conducted in November 2000. Test borings were drilled to depths of 26.5 to 61.5 feet. Test boring logs are included in Appendix S. Boring locations were based on the location of proposed Project structures, and are shown in Figure 13-7. At seven of nine borings, cobbles and boulders were encountered, though the number varied throughout the site. In two of nine borings, bedrock was found.

The preliminary geotechnical investigation characterized the site in four general strata below the topsoil. Near wetland areas, an alluvial stratum occurs, ranging from surface to depths of 14 to 15 feet. It consists of sandy silt, silty sand, and clayey silty sand; contains gravel and organic matter; and has medium to compact density and very stiff consistency. Weathered glacial till is found below the alluvial stratum (where one

exists) or below the topsoil, extending to depths of 7 to 20 feet. This layer was found in all but two borings. The weathered glacial till consists of fine to coarse silty sand, silty clayey sand, clayey sand, sandy clayey silt, and silt; contains gravel, cobbles and boulders; and has medium to very compact density and very stiff to hard consistency. Below this layer is a stratum of glacial till, which consists of fine to coarse clayey sand, sandy clayey silt, silty clayey sand, silty sand, and silt; contains gravel, cobbles and boulders; and has dense to very density and very still to hard consistency. The glacial till is found in all borings except two, and ranges in depth from 26.5 feet to 61.5 feet. The deepest layer is bedrock – the Normanskill Formation, consisting of fresh, gray shale, moderately hard, and moderately fractured. It was encountered in two of the nine borings.

The Orange County Soil Survey provides supplemental information for surficial soils (top three feet). Figure 13-1 depicts soils in the vicinity of the Project site and interconnections. Table 13-4 summarizes soil characteristics on the basis of the soil survey.

The western half of the site, the electric transmission corridor south of the site, and the interconnection corridor to the Middletown POTW (west of the site) is shown in the survey as consisting of Mardin soil. This soil is a gravelly silt loam. The soil is typically deep (greater than 5 feet thick) and has a dense fragipan in the subsoil. Permeability is moderate in the surface and upper part of the soil and is slow in the fragipan and substratum. The water table in this soil is perched above the fragipan in the early spring and in other excessively wet periods. Seasonal wetness and slow

permeability in the fragipan limit the uses of the Mardin soil.

The eastern half of the site is shown in the survey as consisting of Wayland and Erie silt loam and the Hoosic gravelly sandy loam. The majority of the eastern half consists of the Wayland silt loam, which is a deep, poorly drained soil. The Wayland soil is commonly subject to flooding in the springtime and the water table is at or near the surface for prolonged periods unless the soil is drained. The on-site drainage ditch, which serves as a tributary of the Monhagen Brook, and the on-site wetlands, are located within Wayland soil. The Hoosic soil is located to the west of the Wayland soil and comprises approximately one quarter of the eastern half of the site. The Hoosic soil is a deep, well-drained soil with a high sand and gravel content.

The site soils were derived from glacial till, glacial outwash deposits and/or alluvial deposits that underlie the site. The Mardin soil, where the building footprint is proposed to be located, was formed from till deposits derived from sandstone, shale and/or slate. This glacial till has a variable texture (e.g., clay, silt-clay, boulder clay) and variable thickness ranging from 3 to 150 feet. The eastern portion of the site (or just to the east of the site) is underlain by lacustrine silt and clay that was deposited in proglacial lakes. This silt/clay is laminated and has a variable thickness ranging up to 300 feet.

In addition to the soils described, the water/wastewater lines pass through Dumps and Udorthents. Dumps consist mostly of excavations that have been filled with trash. Slopes are highly variable. Udorthents are excessively drained to moderately well drained soils that are formed in manmade cut and fill areas, generally near industrial sites, urban developments, or other construction sites. Slopes are highly variable. Depth to

bedrock and soil texture are also highly variable.

Q. Describe the characteristics and suitability for construction purposes of each soil type identified.

A. The soils on-site exhibit moderate permeability and relatively low infiltration rates. Consolidated glacial till acts as a confining layer, resulting in layers of perched groundwater. Water table depth varies seasonably with precipitation and site soils are subject to seasonal wetness. Based on the topography, groundwater beneath the site flows toward the center of the drainage ditch, which is an unnamed tributary to Monhagen Brook. The site contains both a perched and static groundwater table. Perched groundwater has been encountered at some borings. The borings near the maximum expected foundation depths are labeled B-4, B-5, B-7 and B-8 (see Appendix S). Borings B-4 and B-5 were dry to a depth of 36 feet and 51 feet below grade, respectively. Perched groundwater at less than 10-foot depths was encountered at B-7 and B-8.

Construction will require excavations below the perched (but not the static) groundwater table. Thus, temporary dewatering during excavation will be necessary. The preliminary geotechnical investigation concludes that "dewatering within the excavation with sump pumps is likely to be effective." However, artesian conditions would only be encountered if excavations extended to bedrock, which is not necessary and not expected. Continuous dewatering is not expected. The water table is sufficiently deep that permanent dewatering of Project buildings will not be necessary.

Q. Please describe the bedrock at the site.

A. The bedrock underlying the site is the Normanskill Formation of the Ordovician Age Trenton Group, which consists of shale, siltstone, and argillite (a massive rock derived from shale or mudstone). Figure 13-8 shows bedrock elevation above sea level on the Project site, based on field studies related to groundwater resources (Section 17.3). Figure 13-7 and charts in Appendix S show the results of soil borings. In cases where bedrock was not encountered (seven out of nine borings), the bedrock is identified as being deeper than the bottom of the boring. Neither the interconnections, the laydown area, nor any construction on the Project site are expected to be as deep as the bedrock in the vicinity. Therefore, it is concluded that no impacts associated with the construction of the Project relative to the location of bedrock are expected.

Q. What is the depth of the bedrock at the site?

A. Depth to bedrock is approximately 1500-1600 feet in the area, and the CPT tests showed no evidence of bedrock to depths of 150 feet, according to the Project's geotechnical report (Appendix S). Note that laydown area and all underground interconnections (gas, water, sewer) will be located in close proximity of the Project site or through the north portion of the site, and thus any variability in depth to bedrock is not expected to have any impact on the laydown area or interconnections.

Q. Is it your opinion that the Project design will minimize the impacts to soils and geology in the Project area?

A. Yes.

Q. Please provide a general description of the groundwater aquifers present in the vicinity of the Project site.

A. No primary or principal unconfined aquifers were mapped within the Project site (Bugliosi, 1987). Because of the yield potential of the Monhagen Valley aquifer or Wallkill River Valley aquifer, which is in the vicinity of the Project site, groundwater protection and availability is a consideration throughout the vicinity. No aquifer protection zones or wellhead protection zones are within a 1-mile radius of the Project site, but the eastern construction laydown area within the Project site, as well as the southern temporary construction laydown area partly intersect locally-designated Watershed Protection Overlay Zones. The Project will not withdraw groundwater resources for its water supply requirements.

Q. What is the depth of the groundwater beneath the Project site?

A. Perched groundwater is found at shallow layers beneath the Project site. Seasonal high water conditions are during the early spring. The seasonal high groundwater elevations are summarized in tabular form in Appendix E-5. Figure 17-7 shows depth to the seasonal high water table using five-foot contours. Based on the review of available literature, topography, and drainage patterns, on-site groundwater flows to the southeast with the shallow groundwater exhibiting a minor radial pattern. The seasonal high water table for the shallow aquifer system is greater than six feet in the western portion of the site and typically within one to two feet of the ground surface along the lower-lying eastern end of the Project site. This shallow groundwater is likely perched on a glacially-derived soil with lower permeability that lies above the deeper aquifer system. Local production wells near the Project site have been installed beneath the constraining soil

layer, approximately 200 feet deep into the bedrock aquifer system, and not in the perched groundwater layer.

Q. Was a map delineating groundwater aquifers and groundwater recharge areas created?

A. Yes. The map required by Clause 22 is shown as Figure 17-8, Aquifer Map. The map required by Clause 23 is shown as Figure 17-9, Water Well Survey Map. However, it should be noted that since the filing of the Preliminary Scoping Statement and the signing of stipulations, Calpine has chosen a water supply option that avoids the withdrawal of any groundwater. Therefore, the map required by Clause 23 and the analysis of all other existing or proposed aquifer users are no longer relevant. However, studies conducted for the purpose of obtaining groundwater withdrawal were adapted to characterize the aquifers beneath the Project site and groundwater quality. Figure 17-10 shows the locations of drive point, geotechnical borings, piezometers, and bedrock wells established at the Project site in late 2000 and the spring of 2001. The total depth for each on-site boring and the stratigraphy encountered on-site are summarized in Appendix E-5. The preliminary geotechnical investigation had been performed by Schnabel Engineering in November 2000 (refer to Appendix S) and was focused on the western half of the Project site – the main plant building area. The water resources evaluation was performed by Earth Tech between October 2000 and March 2001. Logs prepared for this investigation are provided in Appendix E-5. This on-site information was used to refine the conceptual geologic and hydrogeologic setting previously defined from the review of geologic references, mapping, and the Schanbel Engineering study.

Q. Please describe the unconsolidated aquifer present at the site.

A. The northwestern and western portions of the Project site contain glacial till at surface. Glacial till consists of a poorly sorted diamict of clay, silt, sand and gravel and typically exhibits a moderate to moderately low permeability in this region. In the region, the glacial till is thick, ranging from 100 feet to 120 feet below ground surface until shale bedrock is encountered. Based on the review of stratigraphy encountered in nine on-site geotechnical borings (3 of which were converted into deep overburden piezometers (B-1) or deep overburden/upper bedrock piezometers (B-3 and B-8)), three observation wells (one screened in glaciofluvial deposits (OBW-1S)), two that are established at the base of the unweathered glacial till (OBW-2D and OBW-3D), and three bedrock wells (BRW-1, BRW-2, and BRW-3). A summary of stratigraphy encountered during various site investigations is provided in Appendix E-5. Thickness for the glacial till ranges from 12.5 feet at bedrock well BRW-1 (located in the eastern portion of the Project site) to 66 feet at bedrock well BRW-2 (located in the mid-northern portion of the Project site). Based on geotechnical data collected on-site, thickness of on-site soils is greatest along the mid-northern and western portion of the Project site.

Groundwater in the glacial sediments occupies the minute and interconnected spaces between the individual grains and occurs most abundantly in deposits of well-sorted sand and gravel. However, the study area is dominated by glaciolacustrine clay, silt, and fine sand and glacial till. These sediments, due to their low hydraulic conductivity, yield only very small volumes of water to conventionally constructed well designs. The glaciolacustrine, glaciofluvial (which is thin and discontinuous), and glacial

till units are not typically used for water supply, even for domestic purposes, due to their low to moderate transmissivity.

The southeastern portion of the Project site may contain a patch of stratified surficial sand and gravel deposits with an unknown saturated thickness and yield potential. Mapping references confirm the presence of this "aquifer of unknown potential" in the southeastern portion of the Project site. Aquifers of unknown potential do not typically represent significant yielding unconsolidated aquifers because of their limited size, overall transmissivity, recharge characteristics and limited induced infiltration potential. An estimated yield capacity of 0.1 mgd has been made for this apparent on-site aquifer of unknown potential.

A patch of stratified sand and gravel deposits at the land surface and above the water table (unconfined aquifer conditions) is mapped to be approximately 450 feet southwest of the Project site. A larger area of stratified sand and gravel deposits (part of Monhagen Valley Aquifer) at the land surface and below the water table (unconfined aquifer conditions) is mapped to be approximately 800 to 850 feet southwest of the southwestern corner of the Project site. This potential unconsolidated aquifer coincides with a portion of the Monhagen Brook and may be part of the significant sand and gravel aquifers within the Monhagen Brook Valley. No groundwater supply wells have been developed in this part of the unconsolidated aquifer, although it is anticipated that the well yields would be significantly less than those Town of Wallkill wells along the Wallkill River.

Q. Please describe the bedrock aquifer at the site.

A. As one would expect in glaciated terrain, the depth to bedrock is variable, as shown in Appendix E-5. As detailed in Figure 17-11, the elevation of the bedrock surface is highest (455.5 feet at boring B-3) and lowest (376.8 feet at observation well OBW-2D) along the northwestern perimeter and mid-northern portion of the Project site, respectively. The bedrock surface, which serves as the controlling factor for groundwater flow patterns in the overburden, appears to slope from the northwest to the southeast along the western portion of the Project site and north to south with radial habit observed in the central and mid-northern portion of the Project site. It is expected that groundwater flow within the bedrock regime is somewhat linear but is generally to the southeast.

The bedrock geology underlying the study area is comprised of the Normanskill Formation of Ordovician Age Trenton Group, which in the area of the Project site is commonly referred to as the Martinsburg Formation. Black shale, siltstone, sandstone and graywacke of middle Ordovician Age comprise this formation. Based on logging of core at the Project site, the Martinsburg Formation consists of fresh black shale with occasional seams of mudstone, limestone, and sandstone with depth. Three bedrock wells were established in the central and mid-northern portion at depths ranging from 423 feet to 460 feet below land surface of the Project site.

Q. Was the on-site groundwater quality sampled?

A. Yes. On-site groundwater was sampled in February 2001 as part of a study to determine the feasibility of groundwater withdrawal for process water, which was subsequently eliminated from Project design. Groundwater samples were collected from one shallow observation well (OBW-1S), one deep overburden well (B-1), two bedrock interface

piezometers (B-3 and B-8), and two open hole bedrock wells (BRW-1 and BRW-3). One surface water sample (SG-1) was also collected from the southerly flowing tributary of the Monhagen Brook, which bisects the Project site.

Each water sample was submitted for the analysis of volatile organic compounds (plus tentatively identified compounds (TICs)), semi-volatile organic compounds (plus TICs), Target Analyte List (TAL) Metals, and chlorides. Volatile organic compounds and semi-volatile organic compounds were not detected at or above the Practical Quantitation Limit (PQL) for the four overburden groundwater samples (OBW-1S, B-1, B-3, and B-8), two bedrock wells (BRW-1 and BRW-3), and one surface water sample (SG-1).

Results for the remaining parameters are provided in Appendix E for samples collected from the unconsolidated aquifer/surface water and the bedrock aquifer. The overburden groundwater samples only exceeded groundwater standards for iron (1,090 µg/l at shallow overburden piezometer OBW-1S, and piezometers B-1 (19,200 µg/l), B-3 (6,340 µg/l), and B-8 (10,600 µg/l)). The NYSDEC groundwater standard for iron is 300 µg/l while the total for iron and manganese may not exceed 500 µg/l. Manganese was only exceeded (individually) in the deeper piezometers B-1 (5,160 µg/l), B-3 (967 µg/l) and B-8 (2,930 µg/l). These levels of iron and manganese are typical for wells screened in glacial till or glacial till/upper bedrock in this region. Sodium levels were elevated in the results obtained from B-3 (52,600 µg/l) and B-8 (34,100 µg/l). The NYSDEC groundwater standard for sodium is 20,000 µg/l.

The quality of groundwater from the local bedrock aquifer was good to excellent. The concentration of calcium and sodium appeared to be related to natural conditions and is not likely to be a factor of road salt contamination observed adjacent to the I-84/Route 17M interchange (Exit 3). If road salt had been the cause, then the chloride concentration would be much higher than either of the other two elements because chlorides a major component of road salt. In fact, the concentration of chlorides was not elevated, ranging from 6.25 mg/l (BRW-3) to 14 mg/L (BRW-1) from on-site bedrock groundwater.

Q. What kind of impacts will the Project have on drinking water supplies and groundwater quality and quantity in the area?

A. By not withdrawing any groundwater, the Project has obviated the possibility of impacts related to drawdown affecting local private or public wells. Furthermore, any dewatering at the Project site would only affect the shallow perched groundwater stratum, whereas nearby private wells serving nearby Wawayanda residents withdraw groundwater resources from bedrock, with casings that are 50 to 100 feet deep. The soils and groundwater at the site are not contaminated, and therefore dewatering discharges are not expected to contain elevated levels of pollutants or require treatment. Groundwater quality is further protected through the Project's design, including secondary containment for oil and chemical storage areas, and through the protective practices of plant personnel. The Project will implement a detailed Spill Prevention, Control, and Countermeasures Plan, similar to the one presented in Appendix E-3. In conclusion, potential impacts to groundwater have been avoided to the fullest extent possible.

Q. Are any mitigation measures necessary to avoid possible impacts to groundwater quantity and quality?

A. No. By not withdrawing any groundwater, the Project has obviated the possibility of impacts related to drawdown affecting local private or public wells. Hence, mitigation such as water storage or offsetting water conservation is not necessary. Therefore, primary attention in terms of protecting groundwater resources lies with the control of oil, chemicals, and hazardous substances through secondary containment, regular inspections, and other environmental, health and safety procedures. Refer to Section 3.2.10. Implementation of spill prevention and control measures requires the development of a Spill Prevention, Control, and Countermeasures (SPCC) Plan. An example of such a plan at a Calpine facility in Newark, New Jersey is included in Appendix E-3. Because the potential for impacts both to quantity and quality of groundwater has been minimized, no further mitigation related to groundwater is warranted.

Q. What surface waters are present in the Project area that might be impacted?

A. The nearest surface waters to the Project site and interconnections are Monhagen Brook and its unnamed tributary, which bisects the Project site, separating the main plant building area from the temporary construction laydown area to the east. The Project will consume treated wastewater that would otherwise be discharged to the Wallkill River. Impacts and benefits to the Wallkill River are presented in Sections 17.1 and 17.2 above. In this section, the potential impacts to surface waters on and near the site from construction and operation are examined.

Q. Please describe the water quality and any classifications of the surface waters in the area.

A. Physical and chemical data were collected at six stream locations (five in the tributary and one in Monhagen Brook) on or near the site (Figure 17-12). Stream width, depth, velocity, water temperature, pH, dissolved oxygen, and conductivity data were collected. Observations of substrate characteristics, canopy cover, and adjacent habitats were also recorded. Data were collected on September 27 and November 9, 2000. The results of samples are presented in Table 17-12.

The unnamed tributary to Monhagen Brook that flows in a southerly direction through the site and east laydown area is classified as a Class D stream with D standards by NYSDEC. Monhagen Brook in this area has the same classification. The tributary flows from NYSDEC freshwater wetland MD-19 northeast of the site, under the abandoned railroad grade that forms the northeast site boundary. The tributary flows south through a 5-foot culvert under Dolsontown Road, just east of the southern portion of the site, and into Monhagen Brook, which in turn flows easterly into the Wallkill River. Descriptions of sampling locations from upstream to downstream are presented below.

Starting upstream on the tributary, sampling location C is just downstream from where the tributary flows through a culvert in the abandoned railroad bed that forms the northeast corner of the site. At this point the tributary was fairly narrow (7 feet wide), shallow (0.8 feet), with a relatively swift current (0.68 ft./sec.). The gravelly, open channel was bordered by stream banks vegetated primarily with reed canary grass and purple loosestrife.

Sampling location B is a narrow (5.5 feet wide) constriction located just below a culvert under a farm road. Below this sampling location, the tributary widens into a small pond with a silt substrate. The velocity was somewhat lower (0.50 ft./sec.) and the depth (1.3 ft.) was greater than upstream. Streamside vegetation consisted primarily of purple loosestrife and swamp smartweed, and there was some open water in the small pond.

Sampling location A is just upstream from the culvert under Dolsontown Road. Water velocity was quite low (0.10 ft/sec) and the channel width was relatively wide (19 ft) at this location. Here the tributary resembled a weed-choked ditch, vegetated with swamp smartweed, purple loosestrife, and reed canary grass. As indicated on the aerial photograph in Figure 17-12, the tributary between sampling locations A and C has been channelized in straight-line segments.

At sampling location D, just south of Dolsontown Road, the tributary was relatively narrow (8 ft.) and slow-moving (0.05 ft./sec.). The substrate was silty with embedded rocks. Purple loosestrife and reed canary grass dominated the east side of the tributary, whereas the west side was bordered by a small stand of maple saplings.

Sampling location E is at a bend in the tributary. Here, the stream channel was wide (22 feet) with a silty, mucky substrate with very slow-moving water (0.03 ft/sec). The instream cover is nearly 100% swamp smartweed, and both banks are dominated by purple loosestrife and reed canary grass.

The temperature, dissolved oxygen, pH, and conductivity measurements obtained at the sampling locations on this tributary were all within normal ranges, considering the dates of sampling, physical characteristics of the tributary, and surrounding land uses.

Sampling location F is on Monhagen Brook upstream of its intersection with the unnamed tributary. At this location, the creek had 6-foot-high vertical banks, and a sand and gravel bottom, approximately 40% of which was vegetated with waterweed (*Elodea* sp.). There was no canopy cover over the stream. Velocity of the water was relatively high (0.47 ft./sec.). Adjacent to the creek are emergent wetlands dominated by purple loosestrife, and open field vegetation types.

Q. What kind of aquatic ecology is supported by these surface waters?

A. The on-site tributary to Monhagen Brook is a small, slow-moving drainageway with a silty substrate. Its value as an aquatic resource is largely due to its associated wetlands and their functions and values. The tributary, because of the mucky substrate and minimal water flow, probably does not support a significant macroinvertebrate or fish community.

Monhagen Brook is likely to provide habitat to small species of fish and some macroinvertebrates, although none were seen during the field sampling. The limited amount of in-stream cover in the form of boulders, cobbles, or vegetation and the lack of vegetation cover over the stream limits its value to fish and macroinvertebrates. Monhagen Brook, in the vicinity of the site, is deeply incised into the surrounding fields, indicating that during spring runoff or major rain events, the brook is flashy. These hydrologic characteristics may also limit the instream fauna of the brook.

Perhaps the most productive aquatic resources on the site are the small farm ponds. These ponds are permanent, and provide habitat for turtles and frogs. The ponds are especially important to the population of redbelly turtles, and as a breeding location for green frogs.

Q. What will the extent of the impacts to these surface waters be?

A. Monhagen Brook will not be disturbed during Project construction or operation. NYPA transmission lines, to which the Project will interconnect, are situated along the banks of the Monhagen Brook south of the Project site. However, through the erosion control measures and best management practices (BMPs) described in Section 17.5 below, impacts to Monhagen Brook (whether through disturbance or erosion and sedimentation) will be avoided. Thus, impacts to the aquatic ecology of Monhagen Brook will also be avoided, and mitigation specifically for aquatic life is not necessary.

The on-site ponds will be undisturbed during construction and protected by erosion controls. The unnamed tributary to Monhagen Brook will be preserved and undisturbed except to the degree necessary to improve the roadway between the east laydown area and the Project site. A construction road will be built atop the existing dirt road by laying coarse aggregate covered with a geotextile fabric. This will permit access by construction and operation vehicles between the east laydown area and the main portion of the Project site. Because the tributary is a Class D water with Class D standards, no permit pursuant to Article 15, Protection of Waters, is required. By avoiding discharges into the tributary, or erosion and sedimentation in the tributary, the water quality of the tributary will be protected. Thus, impacts to the aquatic ecology of

Monhagen Brook will also be avoided, and mitigation specifically for aquatic life is not necessary.

Q. Will there be any impacts to surface water drinking supply intakes?

A. No. The nearest surface water supply system intakes are those of the City of Middletown system. No infrastructure associated with the Project will affect the reservoirs northwest of the city where these intakes are located. In addition, there are no surface water supplies on the Wallkill River downstream of the Middletown POTW discharge point, so that impacts due to incremental flow reduction in the Wallkill River will not occur.

Q. What regulatory requirements are applicable to the Project with regard to stormwater runoff and erosion control?

A. Developments of a certain type (*e.g.*, disturbances of 5 acres or more, and specifically steam electric generating facilities) are subject to federal storm water regulations under the National Pollutant Discharge Elimination System (NPDES) program. NYSDEC has been fully delegated by the EPA to implement this program in New York State pursuant to the Clean Water Act as the State Pollutant Discharge Elimination System (SPDES) program. The SPDES permit program regulates point-source and non-point source discharges into waters of the State of New York, which includes groundwater.

The Project's only discharge into surface water or groundwater is storm runoff from the site during construction and operation. The Project is eligible to obtain authority to discharge storm water during construction under NYSDEC's SPDES General Permit for Storm Water Discharges from Construction Activities (permit no. GP-93-06), and during operation under NYSDEC's SPDES General Permit for Industrial Activity

except Construction Activity (permit no. GP-98-03). This type of discharge is allowed under the aforementioned SPDES General Permits provided a Notice of Intent (NOI) and a Storm Water Pollution Prevention Plan (SWPPP) are filed. Therefore, no individual SPDES permit is required.

The construction SWPPP is included with this Application in Appendix E. It complies with the *New York Guidelines for Urban Erosion and Sediment Control.* During construction, permittees are required to develop and implement a monitoring and maintenance program. Records must be retained for a period of at least 3 years after construction is completed. The General Permit prohibits the discharge of materials other than storm water and all discharges which contain a hazardous substance in excess of reportable quantities established by 40 CFR 117.3 or 40 CFR 302.4, unless a separate permit has been issued to regulate those discharges. A permit for storm water discharges associated with construction activity must also meet all applicable provisions of Sections 301 and 402 of the Clean Water Act. In addition, no discharge can contribute to a violation of water quality standards as contained in 6 NYCRR 700 though 705.

Q. Has a preliminary plan for the collection and treatment of stormwater runoff from the site during construction and operation been designed?

A. Yes. This plan addresses delineation of watershed boundaries and subbasins, existing flowpaths and proposed flow path relocations, the location, type, and size of all existing and proposed storm drainage facilities, storm water outfall and/or subsurface disposal locations and conditions, design flows and outfall velocities, proposed method of stabilizing outfall channels, the location, size and type of nearest upstream and

downstream bridge or culvert affected by the Project, location, size and structural details of storm water detention facilities, preliminary hydraulic calculations for the 2, 10, 25, 50 and 100 year storm frequencies for both existing and proposed conditions, delineation of affected floodways and flood hazard areas, a description of techniques that will be used to prevent or control storm water-related soil erosion, runoff and subsequent sedimentation in areas that have been cleared and graded, both during construction and operation, an analysis of related impacts, and an identification and evaluation of reasonable mitigation measures to avoid or minimize storm water impacts, including the use of alternative technologies and subsurface disposal.

Q. Please describe the effects on watershed boundaries and subbasins.

A. Site grading of approximately 22 acres will be required. This will improve site drainage by diverting storm water first through a new system of catch basins and then into a storm water detention pond. All of the new drainage areas and flow paths for the construction and post-development conditions are shown in Figures 17-14 and 17-15.

Q. Please describe the flow paths and relocations that will result from Project implementation.

A. Currently, all runoff from the site enters an above ground drainage ditch. The new drainage areas will alter these flow paths after the Project is completed. The soil grade was designed to divert nearly all rainfall within the site into a storm water detention pond.

Q. Please describe the stormwater drainage facilities that will be implemented.

A. Rainfall runoff will be diverted using a new system of catch basins and smooth-lined polyethylene (SLPE) storm water pipes. Due to layout changes that were implemented to

avoid wetlands, much of the runoff will require pipes in order to flow from the eastern perimeter of the site back toward its center before entering the detention pond. This detention basin will use extended detention as a method of 'first flush' treatment. The system is designed to convey the entire flow from a 100-year storm. Locations of the permanent drainage channels are shown in Figure 17-15.

Q. Were hydraulic calculations done while designing the drainage facilities?

A. Yes. Hydraulic calculations were made to determine the adequate size of infiltration basins. The 2-year, 10-year, 25-year, 50-year, and 100-year 24-hour storm events (corresponding to 3.5, 4.5, 5.5, 6.5, 7.0, and 7.5 inches respectively) were considered. The calculations, summarized in Table 17-13, demonstrate that post-development peak runoff rates will be lower than predevelopment conditions.

Q. Will the discharge system affect any bridges and culverts?

A. No. The storm water discharge system does not make use of, and will not affect, bridges and culverts.

Q. How will the Project affect any floodways or flood hazard areas?

A. No portion of the site, laydown areas, or interconnections is within a 100-year floodplain, as shown in Figure 17-12.

Q. Please describe any erosion control techniques and mitigation measures that will be taken to avoid or minimize storm water quality impacts.

A. During construction, the Project will employ several temporary methods to provide erosion and sediment control during construction. These will include silt fencing, storm water inlet protection, swales and waterways, temporary and permanent seeding and

mulching, construction entrances, riprap erosion protection, and a sediment pond. Erosion and sediment control features were designed using *Reducing the Impacts of Stormwater Runoff from New Development* and in accordance with the NYGUESC. An evaluation of each type of erosion control technique and mitigation practice is found in the construction SWPPP in Appendix E.

Q. What type of impacts to storm water will result from Project implementation?

A. The storm water for the site will be emptied into the Monhagen Brook via its unnamed tributary. Impervious surfaces, such as asphalt and roofs, may store large quantities of heat. This heat can be transferred to storm water runoff through conduction. Additional heat contained in storm water runoff can then elevate temperatures within nearby streams. The only runoff from the impervious portion of the site that will remain untreated will be from parts of the existing road and the proposed plant roadway. The extended residence time in the detention pond will eliminate or minimize any thermal impacts to the Monhegan Brook. This pond will attenuate peak flows during the 2, 10, 25, 50 and 100-year storms to pre-development levels. Contamination of the Monhagen Brook will be prevented as described in Section 17.5.5.

Q. Please describe any alternative technologies or subsurface disposal that have been evaluated for minimization of storm water quality impacts.

A. On-site subsurface disposal is not a viable option for process and sanitary wastewater disposal. Regarding deep injection wells, the geology at the site consists of confining layers and relative shallow bedrock, as opposed to highly permeable soils characteristic of an unconsolidated aquifer. The water thus disposed would not efficiently recharge

bedrock layers. Alternative technologies can be installed whereby fewer pipes are used and stormwater flow is allowed to recharge directly to wetland areas. However, this is a wetland impact that is not permitted by Section 404 of the Clean Water Act if it can be avoided. Thus, a system more heavily reliant on pipes has been used.

Q. What techniques will be used to prevent storm water contamination?

A. Section 3.2.10 addresses the chemical and oil storage issues and requirements for the proposed Project. Any areas with outdoor chemical or oil storage will be equipped with secondary containment, and will only be drained after visual inspection. An example spill prevention and control plan is included in Appendix E. Solid waste disposal facilities on-site will be limited to several dumpsters, as described in Section 3.2.9. There are no solid waste disposal facilities on the Project site. Thus, the Project complies with the leachate runoff provision of Article X.

Q. Is it your opinion, then, that appropriate measures to minimize the impacts to groundwater, surface waters, and storm water will be taken in Project construction and operation?

A. Yes.

Q. Does this conclude your testimony at this time?

A. Yes.

Case: 00 F 1256

WAWAYANDA ENERGY CENTER

DIRECT TESTIMONY

OF

DAVID SHOTTS

THEODORE MAIN

DONALD NEAL

Q. Please state your names, titles, affiliations and business addresses.

A. My name is David Shotts, and I am a Manager of Air Quality Engineering with TRC's Mid-Atlantic Office, which is located at 1200 Wall Street West, Lyndhurst, New Jersey 07071.

A. My name is Theodore Main, and I supervise preparation of air permits for TRC. My business address is 1200 Wall Street West, Lyndhurst, NJ 07071.

A. My name is Donald Neal, and I am an Environmental Manager for Calpine Corporation ("Calpine"). My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

Q. Mr. Shotts, what are your duties of employment?

A. I perform New Source Review, PSD and Non-attainment air permitting. I provide Title V Operating Permit and Inventory Assistance, and perform air pollution engineering and BACT/LAER Analysis as well as fugitive dust and regulatory compliance analyses.

Q. How are you qualified to perform your employment duties?

A. I have a B.S. in mechanical engineering from Virginia Polytechnic Institute and State University. I also have 18 years of experience related to my employment duties.

Q. Does your curriculum vitae, which is attached as Exhibit 15, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Shotts, please describe your role in the Wawayanda Energy Center project ("Project").

A. I am the New York licensed engineer under whose stamp the Project air quality applications have been filed. I am responsible for the Project's air emissions controls analyses and permit filings.

Q. Mr. Main, what are your duties of employment?

A. I supervise the preparation of air quality permits, Prevention of Significant Deterioration applications, new Source Review Assessments and Title V Operating Permits. I prepare and supervise air quality, meteorological and environmental impact studies. I develop, adapt and operate computer programs for environmental analysis, I perform specification and installation of meteorological and air quality monitoring equipment and I prepare and supervise the preparation of licensing documents for electric generating facilities.

Q. How are you qualified to perform your employment duties?

A. I have a B.S. in Meteorology from Pennsylvania State University and I have over 12 years of experience related to my employment duties.

Q. Does your curriculum vitae, which is attached as Exhibit 12, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Main, please describe your role in the Project.

A. I am the certified consulting meteorologist who has overseen the criteria pollutant and non-criteria pollutant modeling for the project. The modeling efforts were conducted to satisfy NYSDEC, NYSDPS and NYSDOH criteria.

Q. Mr. Neal, what are your duties of employment?

A. I serve as project manager and technical analyst for environmental permitting and assessment of electric generating facilities and programs, representing Calpine before

regulatory agencies and in public forums. In this capacity, I have managed and prepared siting studies, environmental impact statements, and applications for wastewater, wetlands and air permits. I have also led environmental, health and safety audits and due diligence investigations. I am experienced with methods of air emissions source testing and continuous emissions monitoring system design, certification and implementation.

Q. How are you qualified to perform your employment duties?

A. I received both a B.S. and an M.S. in Biology from the University of Massachusetts and I have over 18 years of experience related to my employment duties.

Q. Does your curriculum vitae, which is attached as Exhibit 14, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Neal, please describe your role in the Project.

A. I supervised all aspects of the Article X application and I am responsible for project compliance with environmental requirements.

Q. Gentlemen, what section of the Application does your testimony support?

A. Section 6, which addresses the air quality and meteorology impacts related to the Project.

Q. Please describe Section 6 of the Application.

A. This Section addresses Stipulation 1, Clauses 1 through 9. Accordingly, this section documents the findings of the air quality and meteorology studies conducted for the Project, including analyses of air pollution control technologies, impacts of criteria and non-criteria air pollutants, emission offsets, visibility impairment, soils and vegetation effects, sulfate and nitrate deposition, and other studies of potential impacts. An application pursuant to the Prevention of Significant Deterioration (PSD) Program is

concurrently provided as Appendix X to the forthcoming Article X Application. The PSD application and the NYSDEC Part 201 application for a Permit to Construct and Operate a New Major Stationary Source are marked as Appendices X and Y respectively.

Q. Please describe the regulatory requirements applicable to this Project.

A. Sections 6.2.1 through 6.2.7 of the Application contain a complete and thorough description of all of the Regulations applicable to the Project. These regulations include: (1) National Ambient Air Quality Standards (NAAQS) and New York Air Quality Standards (NYAQS) (the state and federal ambient air quality standards, including both short- and long-term standards and Significant Impact Levels (SILs) for NO_2, SO_2, CO and PM/PM-10, are listed in Table 6-1); (2) New Source Review (NSR) requirements for major sources and modifications, including PSD review and Non-attainment New Source Review (NNSR) (the applicable Class II PSD increments are presented in Table 6-1, Table 6-2 presents the potential annual emissions from the Project compared to PSD/NNSR applicability criteria and the potential pollutant emissions, associated condition, and supporting emissions calculations for each regulated pollutant are presented in Appendix Y-2); (3) New Source Performance Standards (NSPS); and (4) Acid Rain Program (a complete Acid Rain Permit Application is included in Appendix Y-3). The NYSDEC administers these programs through delegation by the U.S. Environmental Protection Agency (EPA) or under regulations promulgated under Title 6 of the New York Code of Rules and Regulations (6 NYCRR).

Additionally, the NO_X Budget Program requirements are detailed in Section 6.2.8. Because the Project will not commence commercial operation until 2004, the trading program under 6 NYCRR 227-3 will no longer be applicable. However, the Project will

continue to be subject to the NO_x emission allowance and trading program pursuant to 6 NYCRR Part 204.

The Accidental Release Prevention Program requirements are addressed in Section 6.2.9. The storage and handling of chemicals identified as extremely hazardous substances are governed by the Accidental Release Program required under Section 112(r) of the 1990 Clean Air Act Amendments.

All applicable NYSDEC air regulations are described in Section 6.2.10. The Project is a major source and is therefore required to obtain a Title V permit. The Title V permit application is located in Appendix Y-3. The New York Air Toxics Program requirements that are applicable to the Project are discussed in Section 6.2.10.2. Finally, the Project will be subject to the state's Acid Deposition Control Act as discussed in Section 6.2.10.3.

Q. What is the existing climate data for the region surrounding the Project?

A. As discussed in Section 6.3, we assessed all climate data for the Project area and its region. As shown in Table 6-3 and Section 6.3.1.1, average precipitation amounts range from a low of 3.17 inches in April to a maximum of 5.04 inches in July. Section 6.3.1.2 and Table 6-4 provides monthly averages of maximum, mean, and minimum temperatures. Section 6.3.1.3 describes wind speed and direction. Data from two surface observation stations were used to create the five years of hourly meteorological conditions: Orange County Airport (the closest meteorological monitoring station to the Project site, approximately 15 kilometers (9.3 miles) to the northeast) and Stewart Airport (approximately 27 kilometers (16.8 miles) east-northeast of the Project Site). Appendix Y-4 shows the frequency distribution of wind speed and direction for Orange County

Airport and Stewart Airport. Upper air data came from Albany Airport (Albany is the closest representative upper air-observing site to the Project site, being approximately 100 miles to the north). Figure 6-1 shows the relationship of these airports to the Project Site. The composite data set was set forth in the Air Modeling Protocol and was approved for air quality dispersion modeling by NYSDEC on March 29, 2001 (see correspondence in Appendix Y-5).

Q. Please describe air quality levels and trends for criteria pollutants in the region surrounding the Project.

A. Ambient air quality data (ambient pollutant concentrations) collected from NYSDEC monitoring stations most representative of the Project site have been used to characterize existing local air quality conditions. The most representative stations will be near the site or in similar airsheds with respect to topography, climate and land use. The monitoring stations used for each pollutant are summarized in Table 6-5. The latest 3 years of data available for each of these sites from NYSDEC's Air Quality Reports (1997 through 1999) are presented in Table 6-5.

Proposed facilities subject to PSD review may have to perform up to one year of preconstruction ambient air quality monitoring for those pollutants emitted in amounts exceeding the major facility size threshold emission rates shown in Table 6-2, unless granted an exemption by the U.S. EPA. The U.S. EPA can grant an exemption from monitoring if the proposed source demonstrates that it will have maximum impacts below the pollutant specific significant monitoring concentrations, which are presented in Table 6-6. The Project prepared a request for exemption from air quality pre-construction monitoring. The exemption from pre-construction monitoring has been approved by the

U.S. EPA and is found in Appendix Y-5.

Q. Please describe the control technology (BACT/LAER) analysis for the Project.

A. This analysis is presented in Section 6.4 of the Application. Preconstruction review for new major stationary sources or major modifications to existing sources involves an evaluation of best available control technology (BACT) (Sections 6.4.3 and 6.4.5) and/or lowest achievable emission rate (LAER) (Sections 6.4.2, 6.4.4 and 6.4.5).

Section 6.4.6 presents an evaluation of LAER for NO_x and BACT for NO_2. Sections 6.4.7, 6.4.8 and 6.4.10 present BACT determinations for CO, PM, PM-10, and H_2SO_4 respectively. Table 6-7 presents a summary of the proposed emission limits and control technologies for the project combustion turbines, WSAC, gas pre-heaters, auxiliary boiler and emergency diesel sources.

Q. What are the PSD Pollutants subject to BACT?

A. BACT is defined as an emission limitation based on the maximum degree of reduction, on a case-by-case basis, taking into account energy, environmental and economic impacts. Based upon the regulatory applicability analysis in Section 6.2, the Project is considered a "major" source for PSD purposes since potential emissions exceed the 100 ton per year major source threshold. Therefore, individual regulated pollutants are subject to BACT requirements unless potential emissions are below the significant emission rates shown in Table 6-2 (page 6-5). The following pollutants are subject to BACT requirements: CO, NO_2, PM/PM-10, and H_2SO_4.

Q. What are the non-attainment pollutants subject to LAER?

A. The Project area is classified as a moderate ozone non-attainment area. Ozone is regulated through the precursors NO_x and VOC. Emissions of pollutants subject to

NNSR must be limited to LAER levels. LAER is defined in the Clean Air Act Amendments (CAAA) Section 171(3), as either (1) the most stringent emission limitation contained in a state implementation plan (SIP), unless that limit is demonstrated to not be achievable, or (2) the most stringent emission limitation which is achieved in practice by the class or category of source, whichever of the two is more stringent. LAER for the Project must be based upon the lowest permitted emission rates that are verified as being achieved, or can reasonably be expected to occur in practice. A new source is subject to LAER if potential emissions of individual pollutants exceed major source emission levels as defined in 6 NYCRR 231 (100 tons per year of NO_x and 50 tons per year of VOC in areas treated as moderate ozone non-attainment). The Project has the potential to emit greater than 100 tons per year of NO_x and is therefore subject to LAER for NO_x. Potential emissions of VOC will be less than 50 tons per year, and therefore LAER does not apply for VOC.

Q. What approaches were used in the LAER and BACT analyses?

A. The approach used for BACT is outlined in Section 6.4.5. In a BACT analysis, the energy, environmental, and economic factors associated with each technically feasible control technology are evaluated. The BACT analyses presented here consist of up to four steps for each pollutant, as outlined in the following subsections and in accordance with the U.S. EPA New Source Review Workshop Manual. The four steps are: identification of technically feasible control options, an economic analysis, an energy impact analysis and an environmental impact analysis.

The approach used for LAER is described in Section 6.4.4. The LAER analysis follows a "top-down" approach similar to the BACT approach, with identification of the

most effective technologies. In the case of LAER, however, more effective control technologies cannot be eliminated on the basis of economics. A LAER analysis is provided for NO_x emissions, and the most stringent emission limitation has been selected for the Project.

Q. What was your approach to analyzing nitrogen oxides?

A. As thoroughly described in Section 6.4.6, we made a LAER determination for NO_x and a BACT determination for NO_2 (hereafter expressed as NO_x) by reviewing add-on controls for NO_x emissions and existing permit limits as well as NSPS. We performed a review of the NO_x RACT/BACT/LAER Clearing house (RBLC) database. The results of that search are presented in Appendix Y-6. We also evaluated NO_x emission levels reported to be "demonstrated in practice" at gas turbine combined-cycle generating facilities, the results, of which, are identified in Appendix Y-6 and Section 6.4.6.1.1. A similar search was performed for gas pre-heaters and auxiliary boilers (Section 6.4.6.1.2), and emergency diesel engines (6.4.6.1.3).

Q. Did you identify the control options and technical feasibility for NO_x control in combustion turbines?

A. Yes. This analysis is presented in Section 6.4.6.2.1. We reviewed the following control options: XONON (since this is not commercially available and has not been proven on combustion turbines of the size proposed by the Project, this is not a viable alternative); lean burn combustion (DLN combustors); selective catalytic reduction (SCR); and $SCONO_x$.

In addition to DLN combustors, the Project proposes SCR in the HRSG. NO_x emissions from the combustion turbines will be controlled by the DLN/SCR system to

2.0 ppm over a 3-hour averaging period, which is lower than any emission rate demonstrated in practice for a unit of this size; therefore, it clearly satisfies LAER. This is equivalent to the final NO_x limit approved for the Athens and Heritage Projects and lower or equal to the limits approved for all recently permitted natural gas-fired combined-cycle plants in the Northeast. SCR is the most advanced control technology currently available that has been demonstrated in practice to control NO_x emissions from combined-cycle gas turbines greater than 25 MW in capacity.

Q. What combustion control techniques for boilers did you review?

A. We reviewed the two most prevalent combustion control techniques to reduce NO_x emissions from natural gas-fired boilers: flue gas recirculation (FGR) and low NO_x burners. We also studied SCR and selective noncatalytic reduction (SNCR). As outlined in Section 6.4.6.2.3, SNCR is not considered a technically feasible control technology for the auxiliary boiler. Although SCR technology has achieved a NO_x emission rate comparable to those considered LAER at other facilities, it is not considered so for this Project because the boilers at the facilities identified in Section 6.4.6.1.2 are utility boilers that are used to supply all the steam required by the facilities for heating, cooling and process needs.

Q. Please describe the control technology in the emergency diesel engines.

A. U.S. EPA's ACT Document for reciprocating engines lists add-on techniques such as SCR, as well as combustion control techniques such as ignition retard, for NO_x control from diesel engines. The ACT concludes that add-on controls are not cost effective for emergency diesel engines that operate less than 500 hours/year. Although cost is not a factor for LAER, since the diesel engines will run for not more than one hour at a time

the SCR would never reach the operating temperature required to remove any NO_x emissions and thus would provide no benefit. Therefore, neither add-on nor combustion controls represent NO_x LAER for the emergency diesel generator or the diesel firewater pump.

Q. Please summarize the determinations of LAER for NO_x.

A. As described in Section 6.4.6.3, for combustion turbines, the Project proposes DLN and SCR to achieve the LAER limits for the Project, as shown in Table 6-7. The 2 ppm emission rate (3-hour average) proposed for the Project is equivalent to or less than any emission rate permitted for a turbine of this size, and further analysis is not required. For gas pre-heaters and the auxiliary boiler, the Project is proposing an emission limit of 0.05 lb/MMBtu for the gas pre-heaters and 0.034 lb/MMBtu for the auxiliary boiler. Only clean-burning natural gas will be fired in both the gas pre-heaters and auxiliary boiler. The Project proposes a NO_x emission limit for the emergency diesel generator of 2.30 lb/MMBtu (HHV); and for the firewater pump, 2.70 lb/MMBtu (HHV).

Q. What about NSPS?

A. The Project is subject to NSPS Subpart GG "Standards of Performance for Stationary Gas Turbines." Project NO_x emissions of 2 ppmvd at 15 percent O_2 will be well below the nominal NSPS limit of 75 ppmvd.

Q. Are there any RACT limitations?

A. NO_x emissions from natural gas-fired combined-cycle combustion turbines are also limited to 42 ppmvd at 15 percent O_2 under 6 NYCRR Subpart 227-2 (NO_x RACT). Additionally, NO_x emissions must be continuously monitored with an approved CEMS. The Project is subject to LAER controls for NO_x emissions because it is in an area that is

treated as moderate ozone non-attainment and will have potential emissions greater than 100 tpy. The proposed LAER NO_x emission rate for the Project is 2 ppmvd at 15 percent O_2, well below the NYSDEC NO_x RACT limit. The Project will install and operate a NO_x CEMS that complies with 6 NYCRR Subpart 227-2.6.

NO_x emissions from the auxiliary boiler have to be controlled using low-NO_x burners or be limited to less than 0.1 lb/MMBtu under 6 NYCRR Subpart 227-2.4(c). The boiler will be fitted with low-NO_x burners and the proposed emission rate of 0.034 lb/MMBtu is well below the NYSDEC RACT limit.

Q. Was a BACT analysis performed for carbon monoxide?

A. Yes. The combined-cycle units, auxiliary boiler, gas pre-heaters, emergency diesel generator, and diesel firewater pump are all sources of CO emissions at the proposed Project. Since potential emissions from the Project exceed the PSD "significance" threshold, CO emissions from the all the units must incorporate BACT. As fully described in Section 6.4.7, we reviewed the CO BACT database, identified CO control options and technical feasibility, studied the economic impact of an oxidation catalyst for the auxiliary boiler and determined the BACT for CO.

Q. What is the BACT for CO?

A. For combustion turbines, the Project is proposing to install an oxidation catalyst designed to reduce CO emissions to 2 ppmvd at all loads. The most stringent emission control available has been chosen, and therefore further analysis is not required. Good combustion controls, exclusive use of natural gas as fuel and a CO emission rate of 0.098 lb/MMBtu constitute BACT for the auxiliary boiler.

Although the gas pre-heaters are combustion units, only one will be operating at

any time and, other than good combustion control, there are no feasible control technologies to reduce CO emissions further. Potential emissions from the heaters are less than 1.2 tons per year. BACT for CO is proposed as 0.0840 lb/MMBtu for the gas pre-heaters. BACT for CO emissions from the emergency generator is proposed as 0.52 lb/MMBtu; and for the firewater pump BACT is proposed to be 0.635 lb/MMBtu based on the application of good combustion practices. Due to the limited operation, any add-on control device would result in a very high economic impact per ton of CO controlled.

Q. Did you perform a BACT analysis for particulate matter (PM).

A. Yes. This is fully detailed in Section 6.4.8. The combined-cycle units, WSAC, auxiliary boiler, gas pre-heaters, emergency diesel generator, and diesel firewater pump are all sources of PM emissions. Since potential emissions from the Project exceed the PSD "significance" threshold, PM emissions from all the units must achieve BACT emission rates.

We reviewed the PM/BACT database and identified PM control options and technical feasibility.

Q. What is BACT for PM?

A. For the combustion turbines, since the Project will fire only natural gas in the turbines, this is considered to be the only feasible control and hence BACT for PM emissions. Based on the highest emissions of the operating cases, the proposed BACT emission limit for PM is 0.0128 lb/MMBtu from the combined-cycle units while firing natural gas.

The circulating water in the WSAC will have a TDS concentration of 2,500 ppm and a drift rate of 0.0005%. Therefore, the proposed BACT emission limit for PM for the

WSAC is 0.038 lb/hr.

For the gas pre-heaters and auxiliary boiler, the Project proposes the use of only clean-burning natural gas in conjunction with good combustion practices as BACT. The proposed PM limit for the gas pre-heaters are 0.0076 lb/MMBtu. For the auxiliary boiler, the proposed BACT limit is 0.0051 lb/MMBtu.

For the emergency diesel generator and the firewater pump, the Project proposes to use low-sulfur fuel oil, employ good combustion practices, and limit operating hours as BACT. The PM emission rate from the emergency diesel generator will be 0.086 lb/MMBtu. The PM emission rate from the firewater pump will be 0.047 lb/MMBtu.

Q. Did you perform a BACT analysis for PM-10?

A. Yes. The combined-cycle units, WSAC, auxiliary boiler, gas pre-heaters, emergency diesel generator, and diesel firewater pump are all sources of PM-10 emissions. Since potential emissions from the Project exceed the PSD "significance" threshold, PM-10 emissions from all the units must achieve BACT emission rates.

We reviewed the PM-10 BACT database and identified PM-10 control options and technical feasibility, as discussed in Section 6.4.9.

Q. What is BACT for PM-10?

A. Since the Project will fire only natural gas in the turbines, this is considered to be the only feasible control and hence BACT for PM-10 emissions. Based on the highest emissions of the operating cases, the proposed BACT emission limit for PM-10 is 0.0128 lb/MMBtu from the combined-cycle units while firing natural gas.

The circulating water in the WSAC will have a TDS concentration of 2,500 ppm and a drift rate of 0.0005%. Therefore, the proposed BACT emission limit for PM-10 for

the WSAC is 0.038 lb/hr.

For the gas pre-heaters and auxiliary boiler, the Project proposes the use of only clean-burning natural gas in conjunction with good combustion practices as BACT. The proposed PM-10 limit for the gas pre-heaters are 0.0076 lb/MMBtu. For the auxiliary boiler, the proposed BACT limit is 0.0051 lb/MMBtu.

For the emergency diesel generator and firewater pump, the Project proposes to use low-sulfur fuel oil, employ good combustion practices, and limit operating hours as BACT. The PM-10 emission rate from the emergency diesel generator will be 0.086 lb/MMBtu. The PM-10 emission rate from the firewater pump will be 0.047 lb/MMBtu.

Q. Was a BACT analysis for sulfuric acid mist performed?

A. Yes. Sulfuric acid is produced when SO_2 is converted to SO_3 in the presence of a catalyst and is then further combined with water (and ammonia) to form H_2SO_4 (sulfuric acid) and ammonium sulfate salts. During the combustion process, most of the sulfur is converted to SO_2. Fifteen percent of the SO_2 is assumed to be converted to SO_3 and eventually to H_2SO_4 and/or ammonium sulfate salts.

As described in Section 6.4.10, we reviewed the sulfuric acid BACT database and determine control options and technical feasibility for that parameter.

Q. What is BACT for sulfuric acid?

A. For the combustion turbines, since the amount of sulfuric acid mist formation is directly proportional to the amount of fuel sulfur present, the Project is proposing to fire low-sulfur natural gas exclusively to meet BACT for sulfuric acid mist emissions. The proposed BACT emission limit for sulfuric acid mist is 0.0005 lb/MMBtu.

For the gas pre-heaters and auxiliary boiler, the Project proposes to fire low-sulfur

natural gas exclusively to meet BACT for sulfuric acid mist emissions. The proposed BACT emission limit for both the gas pre-heaters and auxiliary boiler is 0.0002 lb/MMBtu.

For the emergency diesel generator and firewater pump, the use of low-sulfur diesel is proposed as BACT for the control of sulfuric acid mist emissions. The proposed BACT emission limit for both the emergency diesel generator and firewater pump is 0.004 lb/MMBtu.

Q. Was a BACT analysis of any other pollutants conducted?

A. The criteria pollutants include additional federal and certain additional state-designated pollutants (6 NYCRR 257). Federally designated additional pollutants include lead, hydrogen sulfide, total reduced sulfur and reduced sulfur compounds. The additional New York State-designated pollutants are fluorides, hydrogen sulfide, and beryllium. None of the listed pollutants will be emitted from a gas turbine combined-cycle plant burning natural gas, gas pre-heaters or gas-fired auxiliary boiler. Only minimal amounts of the federal and state designated pollutants will be emitted from the emergency diesel engines. The use of clean burning natural gas and low-sulfur distillate oil are considered BACT for these pollutants.

Q. Please provide a summary of the emission controls and performance.

A. Appendix Y-2 includes spreadsheets that present detailed information on emissions and operating data for the Project for the range of possible load conditions and ambient temperatures. A summary of the emission controls and performance for various stack emission parameters for the combined cycle units is contained in Section 6.5.1.

Q. Please summarize the emissions of criteria pollutants.

A. Tables 6-8 and 6-9 provide criteria pollutant emission rates and stack parameters for the full range of normal operating loads for the combustion turbines and the ancillary equipment. Table 6-10 summarizes stack characteristics for the proposed combustion turbines, gas pre-heaters, auxiliary boiler, emergency diesel generator, and firewater pump. The criteria pollutants include federal and additional state-designated pollutants (6 NYCRR 257). In addition to the criteria pollutants, New York State has established ambient air quality standards for fluorides, hydrogen sulfide, and beryllium. Based on U.S. EPA data (AP-42 emission factors), none of these pollutants will be emitted from the Project.

Q. What non-attainment area requirements are applicable to the Project?

A. The non-attainment area requirements are summarized in Section 6.6.

Q. What is the compliance status of Calpine New York facilities?

A. Calpine Corporation is one of the nation's leading independent power producers. In addition to the Project, Calpine has 97 electric generation projects either in commercial operation (46), under construction (24), or announced development (27) in 28 states throughout the U.S., in addition to one project under construction in Alberta, Canada. In total, these projects represent more than 36,000 MW of electric generating capacity.

Calpine currently has ownership interests in 225 MW of New York power-generating assets located in Stony Brook, Bethpage, at John F. Kennedy International Airport on Long Island, and at Lockport in western New York State.

Table 6-11 provides a list of those facilities currently owned and operated by Calpine in New York State. Table 6-11 includes the information necessary to track or verify the compliance status of each facility, specifically, facility name, address

(including county and municipality), telephone number, and relationship to applicant. At the present time, all facilities owned, operated by or affiliated with Calpine in New York State are operating in full compliance with Title III (Environmental Conservation).

Q. Will NO_X Emission Reduction Credits be required?

A. Yes. As described in Section 6.6.2, the Project is in an area that is classified as a moderate nonattainment area for ozone because it is part of the Ozone Transport Region. As shown in Table 6-2, the maximum annual potential NO_x emissions from the Project subject it to regulation under 6 NYCRR Part 231, *New Source Review in Nonattainment Areas and Ozone Transport Regions*. VOC emissions are below the 50-tpy threshold. Therefore, VOC emissions are not subject to Part 231.

Q. Was an analysis of alternatives performed?

A. Yes, as described in Section 6.6.3, we assessed possible alternative: production processes (no production processes other than combined cycle or peaking generation utilizing natural gas combustion turbines are reasonable alternatives); sizes (for F-Class turbines that minimum size consists of two combustion turbines and one steam turbine (two on one), producing a nominal electric output of 540 MW); sites (since there are no suitable alternate sites under Calpine's control, it is concluded that no alternative is preferable for the Project); environmental considerations (the Project has been designed to meet the objective of providing environmentally safe electricity and will be among the cleanest fossil fuel fired power plants in the world); and public policy concerns (use of combined cycle technology to convert natural gas to electrical energy represents an important contribution to the region's current and future energy needs).

Q. What are the benefits of the Project?

A. As described in Section 6.6.3.6, the purpose of the proposed 540 MW (nominal) Wawayanda Energy Center is to provide economical, reliable, efficient and environmentally safe electricity to residents of southeastern New York and the surrounding region. According to documents published by the NYSDPS, New Yorkers have been paying electric prices well above the national average. In addition to higher residential rates, it has been suggested that high electric rates have been a factor hindering economic development, causing businesses to leave the state, or not to locate or expand in New York, potentially resulting in the loss of jobs.

In addition to the energy cost savings and resulting economic stimulus to New York State, the Project will bring a number of economic benefits to the residents of Orange County and the State of New York.

Q. What are the expected costs of the proposed project to the public?

A. Project-related costs to municipalities, public authorities, utilities, and school districts have been estimated. Two kinds of potential costs are assessed – direct Project-related costs, and costs associated with worker in-migration. These are both assessed in detail in Section 6.6.3.7.

The types of economic impacts are typically reimbursed directly by the Project or by in-migrating workers (if any). Costs not directly reimbursed are minimal, measured on the order of magnitude of tens of thousands of dollars per year, whereas local benefits are measured in million of dollars per year.

Based upon the economic, environmental, and public policy arguments previously presented, the net public gain far exceeds anticipated impacts associated with the construction and operation of the Wawayanda Energy Center.

Q. Is it your opinion, then, that the benefits of the Project outweigh its costs?

A. Yes. Based upon the economic, environmental, and public policy arguments, the net public gain far exceeds anticipated impacts associated with the construction and operation of the Wawayanda Energy Center.

Q. Does the Application address good engineering practice (GEP) for stack height?

A. Yes, in Section 6.7. We assessed optimal stack height taking into consideration GEP stack height for the Project and air quality related values, visual impacts, and other considerations, consistent with NYSDEC Air Guide 26.

A detailed plot plan of the proposed facility was provided in Figure 2-2 of the PSD application. A GEP stack height analysis using the U.S. EPA approved Building Profile Input Program - BPIP (Version 95086) determined the directionally dependent building dimensions based on the building information provided in Table 6-12. The air quality modeling analysis was based on non-GEP stacks (for the turbine/HRSG stacks and the ancillary equipment) with the directional dependent building dimensions as calculated using BPIP. The BPIP input and output files are included on a supporting modeling data CD-ROM in the NYSDPS, NYSDEC, and NYSDOH copies of Appendix Y-10.

Q. In what situations will stacks lower than GEP be permitted?

A. It is NYSDEC policy, as stated in *Air Guide 26,* that new or modified projects should "ensure that the associated stack be designed according to formula GEP height specifications. If such a stack height is not feasible, documented justification for the proposed stack height must be presented in the permit application. Such justification includes aesthetic, FAA, engineering or local zoning restrictions, and should not be based

solely on acceptable ambient impact determinations." Furthermore, NYSDEC policy is that "GEP stack height be minimized in order to reduce the impact on the area's aesthetics. This can be accomplished by lowering the height of any new nearby structures."

Q. What stack heights are proposed for the Project?

A. The Project proposes stacks lower than GEP stacks.

Q. Please explain.

A. The Project's justification for *lower* than GEP stacks rests not only on ensuring that maximum air quality impacts are below Significant Impact Levels (SILs), but also on proximity to an airport, aesthetics, engineering considerations, and community dialogue.

It is incumbent on the Project to select a stack height that supports protection of human health and the environment. Among the various thresholds that are described in this application, the most restrictive are the SILs for criteria pollutants. By restricting stack height such that ambient air quality analysis impacts remain below the SILs, the Project ensures its compliance with ambient air quality standards (NAAQS and NYAQS). As shown in Section 6.8, the Project impact concentrations are, in fact, below the SILs for all applicable pollutants with a 225-foot stack height. Preliminary modeling indicated that lower stack heights would yield concentrations above the SILs, and for that reason, stack heights lower than 225 feet were not practical.

The Project is approximately 1 mile from Randall Airport, and this is an additional reason to lower the stack height to below 300 feet. FAA airspace surface regulations call for no structures to be built penetrating specified horizontal, approach, and transition surfaces. Lower stack height, along with appropriate lighting, helps to

increase the margin of safety for aircraft making operations into and out of Randall Airport. FAA notified Calpine that the maximum stack height for the Project would not exceed their obstruction standards and would be 264 feet (724 feet above mean sea level).

In terms of aesthetics and community input, Wawayanda citizens have expressed concern over stack height, and have asked in numerous public meetings that the stacks be as short as possible. This is also consistent with objective aesthetics analysis because a lower stack will either be visible from fewer locations or would have less impact for those locations from which the stacks are visible.

NYSDEC does not require that ancillary emergency equipment stacks be built to GEP formula height.

Q. Was a criteria pollutant impact assessment performed?

A. Yes. Criteria pollutant construction impacts are addressed in Section 6.8. Results of the air quality analysis indicate that the Project will have insignificant impacts on the surrounding air quality (that is, the maximum ground level concentrations are below the SILs). Hence, the National Ambient Air Quality Standards (NAAQS) and PSD Class II increment levels will not be exceeded by the proposed Project, and further modeling analyses are not necessary.

Q. Please describe the stack configuration and emission parameters.

A. Each of the two combustion turbine/HRSG (combined cycle) units will be vented through a separate stack. Each stack will be 225 feet above grade level (AGL). The base elevation of the proposed facility will be 460 feet above mean sea level.

Ancillary equipment and exhaust characteristics are described in Section 6.8.1. Exhaust characteristics of the turbine/heat recovery steam generator stacks are provided

in Table 6-13. Table 6-14 presents exhaust and emissions from the ancillary equipment.

Q. What regulatory requirements for air quality impact studies are applicable to the project?

A. The regulatory requirements are described in Section 6.8.2. The proposed location of the Project is an area currently designated as attainment for SO_2, NO_2, CO, and PM-10. Because the Project will be a major source of at least one PSD pollutant, it is required to demonstrate compliance with the NAAQS and NYAQS for all criteria pollutants.

In addition to assessing impacts on NAAQS and NYAQS, facilities subject to PSD review must demonstrate compliance with the PSD increments established for SO_2, NO_2 and PM-10. The proposed Project site is located in a PSD Class II area. U.S. EPA and NYSDEC have also established Significant Impact Levels (SILs) as a threshold that is much more stringent than the NAAQS. According to U.S. EPA and NYSDEC, air emission sources that demonstrate compliance with the SILs do not require separate compliance demonstrations for the NAAQS or NYAQS, and do not affect PSD increments. NAAQS, NYAQS, PSD increments, and SILs were presented in Table 6-1 (page 6-4).

Q. Are any additional impact analyses required?

A. Yes. The major source status of the Project means that certain additional analyses are required as part of the modeling assessment. These include modeling to assess potential for impacts to soils and vegetation, and visibility in the area surrounding the proposed plant and at any Class I areas within 100 kilometers. The Project is located approximately 200 kilometers from the nearest Class I area, and thus an analysis of regional haze and air quality related values (AQRVs) is not required.

Q. Is preconstruction ambient monitoring required for the Project?

A. No. As discussed previously, PSD regulations require an applicant to perform an air quality analysis for those pollutants emitted in quantities exceeding the Significant Emission Rates shown in Table 6-2 (page 6-5). This analysis can include the collection of up to one year of ambient air quality monitoring data. Pursuant to the PSD regulations, U.S. EPA may exempt a proposed PSD source that is otherwise subject to the one-year pre-construction ambient monitoring requirement if the source can demonstrate, through dispersion modeling, that air quality impacts from the proposed facility will be below the significant monitoring concentrations established by U.S. EPA and included in the regulations (see Table 6-6). A preconstruction monitoring air quality modeling analysis to determine if the Project will have maximum concentrations below the monitoring significance levels was performed and submitted to U.S. EPA Region II. The results of this significance modeling analysis indicated that the maximum-modeled concentrations are well below the monitoring concentrations. Therefore, preconstruction ambient monitoring is not required for the Project. Calpine requested a waiver from ambient air quality monitoring, which was granted by U.S. EPA (see Appendix Y-5).

Q. What modeling methodology was used?

A. The methodology is described in Section 6.8.3. A CD-ROM containing all modeling input and output files used to support this permit application is enclosed in Appendix Y-10 of the NYDEC, NYDOH and NYDPS copies of the application. Section 6.8.3.1 address the dispersion parameters. Section 6.8.3.2 describes the dispersion models that were used to assess impacts from the Project. Terrain screening modeling was performed as described in Section 6.8.3.3. The receptor grid is detailed in 6.8.3.4. The background ambient air quality is described in Section 6.8.3.5. Table 6-5 presented the highest

second highest short-term and maximum annual concentrations recorded at the air quality monitoring stations for the specific criteria pollutants, which are proposed as a representative background for the Project site. The combined Project emission conditions are completely assessed in Section 6.8.3.6. The Project cycles that were used for modeling were startup/shutdown (Section 6.8.3.7). Table 6-14A presents the modeling emissions and parameters used to assess the air quality impact during startup and shutdown.

Q. What impacts are expected during startup and shutdown?

A. The maximum air quality concentrations were determined using one unit at full (worst-case) load, with one turbine in a startup mode. The highest concentrations based on this analysis indicated that the Wawayanda Energy Center emissions under normal operation and during startup of the facility would not result in significant air quality concentrations. Table 6-14B presents the maximum concentrations in both simple and elevated terrain from the Wawayanda Energy Center during startup or shutdown of the facility turbines.

Q. How was the impact analysis done?

A. We performed a simple terrain analysis, a complex terrain analysis and a cumulative source analysis.

Q. Please describe the simple terrain analysis.

A. Simple terrain modeling was performed to determine if the Project emissions resulted in significant air quality impacts. ISCST3 was used to model the Project with five years of meteorological data as previously discussed and approved by NYSDEC. The highest concentrations at each receptor for all five years were determined, taking into account all criteria pollutant emission sources, and are presented in Table 6-15. This summary table

demonstrates that the Project will not result in air quality concentrations above the recognized significant impact levels (SILs) for all pollutants and averaging periods. Therefore, compliance with the NAAQS and NYAQS is demonstrated. Detailed model results are provided in Appendix Y-10.

Q. Please describe the complex terrain analysis.

A. CTSCREEN is the U.S. EPA recommended screening model for complex terrain in the absence of on-site data. CTSCREEN was used to calculate the Project concentrations at the elevated terrain to the west of the proposed site. Table 6-16 provides a summary of the maximum ground level concentrations in complex terrain, taking into account all criteria pollutant emission sources. As shown on this table, the proposed Project will not result in any concentrations above the SILs for all pollutants and averaging periods. Therefore, compliance with the NAAQS and NYAQS is demonstrated.

Q. Please describe the cumulative source impact analysis.

A. Stipulation 1, Clause 2(n), requires a cumulative source impact analysis for any air pollutant for which the Project has impacts above significance levels. The additional sources to be analyzed to determine whether the Project, in conjunction with existing and proposed major sources, will cause or contribute to exceedances of applicable national or state ambient air quality standards (NAAQS and NYAQS) or PSD increments, are to include those identified as "nearby" existing sources, as defined in the U.S. EPA Modeling Guidelines and NSR Workshop Manual, and by the Air Guide 26 procedures. Nearby sources include the following facilities: the Masada Project, Revere Smelting and Refining, Balchem, O&R, Reynolds, Genpak, Orange County Landfill, Hudson Superior Landfill, Dutchess Quarry and Supply Corp., County Metal Yard, Middletown Water

Pollution Control Plant, and Elvree Farm. The proposed inventory sources also will include all other proposed major electric generating facilities in New York State for which applications have been filed with the Siting Board and will be limited to those located within a circular area defined by the Significant Impact Area (SIA) of the proposed Project, plus 50 kilometers, at the time of NYSDEC approval of the Project's cumulative source inventory per Air Guide 36 requirements.

Because Project maximum impacts are below SILs, the analysis described in the preceding paragraph does not apply; nor is the Project required to prepare an interactive source inventory pursuant to Air Guide 36. The requirements of Clause 2(n) have been satisfied through the air quality impact demonstration.

Q. Has a study of the cumulative air impacts of the Project and the proposed Orange County Recycling and Ethanol Production Facility (the Masada project) been done?

A. Yes. This analysis relies on data provided in permitting documents for the Masada Project. Tables 6-17 and 6-18 summarize the Masada Project stack parameters and criteria pollutant emission rates, respectively.

The Masada Project was modeled individually and collectively with the Wawayanda Energy Center using both ISCST3 and CTSCREEN. The maximum-modeled concentrations from the two facilities were summed, irrespective of time and location, to provide an overall maximum worst-case concentration. Tables 6-19 and 6-20 show that the cumulative impacts of the two facilities do not cause a contravention of the NAAQS or NYAQS, even when the background concentrations are added.

Q. Was a non-criteria pollutant impact analysis done?

A. Yes. Pursuant to Stipulation 3, the Project is required to assess the impact of non-criteria

pollutants from the proposed sources: two combined-cycle turbine stacks, one gas pre-heater stack, one auxiliary boiler stack, one emergency diesel generator stack, one firewater pump stack, and one wet surface air cooler (WSAC). This evaluation was completed in two steps. First, the non-criteria pollutants potentially emitted from these sources and their benchmark air concentrations were identified. Second, the modeled Project non-criteria pollutant impacts were compared to their respective benchmark air concentrations. The evaluation was performed for both the 1-hour and annual averaging periods for comparison to the applicable NYSDEC Short-Term Guideline Concentration (SGC), Annual Guideline Concentration (AGC), and annual non-cancer and cancer benchmark air concentrations.

Q. Was a review performed of pertinent available data on non-criteria pollutants that are emitted by the Project, including formaldehyde, ammonia, and any other non-criteria pollutants with emission factors such as those published by U.S. EPA that may be identified after review of available emissions data?

A. Yes. As discussed in Section 6.9.1, for any non-criteria pollutant potentially emitted from the Project, a corresponding risk-based air concentration was established as a benchmark air concentration.

Table 6-21 shows the non-criteria pollutants potentially emitted from the combustion turbines and ancillary equipment sources along with the NYSDEC SGCs and AGCs and the annual non-cancer and cancer benchmark air concentrations.

Q. What requirements are applicable to the project with regard to assessment of emission rates of non-criteria pollution?

A. Section 6.9.2 assesses the emission rates for non-criteria pollutants from the Project and

estimates HAP emissions with and without an oxidation catalyst. Results of the on-site bedrock well water sampling program and the estimated potential WSAC emissions are presented in Table 6-25.

Q. Please describe the modeling for non-criteria pollutant impacts.

A. The modeling analyses and results are described in Sections 6.9.3. Two separate modeling analyses were conducted: simple terrain analysis and complex terrain analysis.

Tables 6-26 and 6-27 present the results of the simple terrain and complex terrain modeling analyses, respectively: including each sources maximum modeled 1-hour and annual concentrations for each non-criteria pollutant.

Q. What were the results of the modeling?

A. Section 6.9.4 compares the modeled non-criteria pollutant impacts presented in Tables 6-26 and 6-27 to the SGCs, AGCs, and benchmark concentrations shown in Table 6-21.

Since maximum-modeled concentrations for the facility are less than the SGCs and AGCs, non-criteria pollutant emissions from the Project will not threaten public health or the environment.

Additionally, there are no pollutants that have modeled annual concentrations that exceed 10 percent of their respective non-cancer benchmark air concentrations or their respective cancer benchmark air concentrations. Therefore, no cumulative non-criteria pollutant impact assessment is required beyond the consideration of cumulative impacts with the proposed Masada project, discussed in Section 6.9.6.

Q. Is a multipathway risk assessment needed?

A. No. The Project is required to evaluate the need for a multipathway risk assessment for potential emissions of arsenic, cadmium, hexavalent chromium, formaldehyde, and

manganese from the Project. The maximum modeled annual concentrations of arsenic, cadmium, and hexavalent chromium were greater than 1 percent of their respective annual cancer benchmark air concentrations and the maximum modeled annual manganese is greater than 1 percent of its annual non-cancer benchmark air concentration, while the maximum modeled annual concentration of formaldehyde was greater than 10 percent of its annual cancer benchmark air concentration.

A June 10, 1993 NYSDEC Guidance Memorandum (Implementation of Subparts 219-3 and 219-4 Regulated Medical Waste (RMW) Incineration Facilities and Crematories/Pathological Incinerators) from Mr. Tom Allen to the Regional Air Pollutant Control Engineer (RAPCE) provides a suggested approach for determining if a multipathway risk assessment is required. The NYSDEC approach uses beef or dairy farm area (i.e., if beef or dairy farms could be located in the area) screening factors based on a percentage of the benchmark air concentrations to determine if a multipathway risk assessment is necessary. If the modeled concentration is greater than the screening factor for a pollutant, then the need for a multipathway risk assessment must be further considered for that pollutant. The beef or dairy farm area screening factors for arsenic, cadmium, hexavalent chromium, formaldehyde, and manganese are 1 percent, 100 percent, 100 percent, 100 percent, and 100 percent, respectively, of their cancer benchmark air concentrations.

The maximum-modeled concentrations of cadmium, hexavalent chromium, formaldehyde, and manganese are well below their respective beef or dairy farm screening factors; therefore, multipathway risk assessments for these pollutants were not required. However, the maximum-modeled arsenic concentration exceeds 1 percent of

the cancer benchmark air concentration (the beef or dairy farm area screening factor) at a total of 5 receptor points immediately adjacent to the proposed Project.

The locations of the arsenic modeled concentrations greater than 1 percent were analyzed to determine if beef or dairy farms could possibly be located in these areas. These concentrations were all located along the proposed Project fenceline. Out of 46 fenceline receptors, the 1% threshold was exceeded at only 4 receptors. In addition, the 1% threshold was exceeded at only one off-site receptor point. The receptor is located approximately 150 feet east of the Project site, between the site and Orange & Rockland electric transmission right-of-way. No beef or dairy farms could be located within this area. Therefore, the non-beef or dairy farms screening factor for arsenic was used. This factor is 64 percent, as provided in the 1993 NYSDEC memorandum. Because the maximum-modeled arsenic concentration is 2.5 percent of the cancer benchmark air concentration, no multipathway risk assessment is required for arsenic.

Based on the evaluation conducted for the Project, a multipathway risk assessment has been determined to be not necessary, as the proposed Project will not exceed any of the thresholds that trigger the need for a multipathway risk assessment.

Q. Was a cumulative assessment with the Masada Facility conducted?

A. Yes. Only those non-criteria pollutants emitted in common with the Calpine Project were modeled from the Masada Project. The pollutants common to both projects consisted of arsenic, barium, cadmium, hexavalent chromium, lead, mercury, selenium, and silver. Potential emission rates of these pollutants and appropriate stack parameters for the sources at the Masada Project were obtained from the SEQRA DEIS. Table 6-28 presents the stack parameters and pollutant-specific emission rates modeled for the

Masada Project.

The Masada Project was modeled with the Calpine Project using the same methodology used in the PSD modeling analyses and non-criteria pollutant modeling analyses for the Project, except that all sources at both facilities were modeled simultaneously for each pollutant (instead of summing the maximum impacts from each source). Maximum-modeled simple terrain impacts due to both projects are presented in Table 6-29, while Table 6-30 shows the maximum modeled complex terrain impacts.

Tables 6-29 and 6-30 show that no additional non-criteria pollutant thresholds are exceeded when the two projects are considered simultaneously.

Q. Please quantify the Project's contribution to the New York State total deposition of sulfates and nitrates in accordance with the New York State Acid Deposition Control Act (ECL 19-1901).

A. As discussed in Section 6.10, NYSDEC has performed modeling to simulate the NO_x/nitrate emission-deposition relationship and the SO_2/sulfate emission-deposition relationship.

The results of the analysis are presented in Table 6-31. The reference source used in the analysis was Orange County. New source emissions were scaled and percent contribution of total values were determined. The Project contributions to the New York State total at each of the eighteen receptors are all below 0.1%. Thus, the Project will have an insignificant impact on acid deposition. Furthermore, system production modeling (to be presented in the Article X application) will demonstrate that the Project will result in significant reductions in statewide SO_2 and NO_x emissions.

Q. Does the Application address ammonia transfer.

A. Yes. The method of ammonia transfer is summarized in Section 6.11.1.

Q. What type of safety procedures will be used?

A. Safety procedures are summarized in Section 6.11.2. Workers will undergo annual hazardous materials safety training and emergency response training, as well as regular emergency drills. Calpine will develop and adhere to a Project-specific Safety and Health Plan that will comply with applicable occupational health and safety requirements.

A detailed Spill Contingency Plan (SP) will be prepared for the plant to describe the methods and procedures necessary to prevent the release of potentially harmful substances into the environment.

Eye protection (chemical goggles) will be worn to prevent potential for eye contact. Eye flushing equipment will be immediately available.

Appropriate protective clothing and chemical resistant gloves will be worn to prevent skin contact. A safety shower will be available in the unlikely event that any skin contact occurs.

Aqueous ammonia will be stored and handled in accordance with EPA's requirements, as described in Section 6.12. Additionally, accidental release modeling was performed in order to assess the potential for off-site impacts resulting from a worst-case release scenario, as described in Section 6.12.2.

Q. What were the results of the accidental release modeling?

A. To summarize, to predict the potential worst-case impact distance, the U.S. EPA-approved *Areal Locations of Hazardous Atmospheres* (ALOHA) model was used. This accidental release model was developed by NOAA (National Oceanic and Atmospheric Administration) and is routinely utilized by first responders in predicting impact areas

associated with hazardous material releases.

For neutrally buoyant aqueous ammonia vapors, and assuming a 10-minute release duration and rural conditions, the ALOHA results indicate that ground level concentrations never exceed the ERPG-2 concentration of 200 ppm. Predicted property boundary concentrations of ammonia at the closest distance of approximately 420 feet are 14.7 ppm. Therefore, the defined worst-case accidental release scenario (30,000 gallons consisting of 19.0 percent aqueous ammonia solution in an impervious, diked area) will not result in an exceedance of the ERPG-2 guideline (200 ppm) for ammonia beyond the property boundary.

Q. Was a plume visibility analysis done?

A. Yes. This analysis included an assessment of the predicted length and frequency of any visible water vapor plumes created by the Project in accordance with procedures set forth in the Air Modeling Protocol. The modeling methodology for plume analyses was submitted to and approved by staff of NYSDPS and is described in Section 6.13.

Q. Please describe the plume visibility model.

A. TRC's plume visibility model is a post processor used with output results from the widely recognized U.S. EPA ISCST3 atmospheric dispersion model and is fully described in Section 6.13 of the Application.

Q. Please describe the modeling methodology.

A. The visible plume modeling analysis examined the water vapor emissions during all conditions when the turbine will operate. The Project will be equipped with an inlet air chiller to cool the combustion air and increase the power output of the turbine during high ambient temperature conditions. The chiller increases the total quantity of water

vapor emitted by the turbine. This also adds to the total water vapor emitted from the turbine. The plume visibility model assumed that the inlet air chiller would operate at temperatures above 51°F. Other sources of water (carrier water for the aqueous ammonia solution for NO_x control, and the water formed by the ammonia reaction) are also included, although these sources of water are relatively minor compared to the total water emission rate (less than 0.5%). Tables 6-33 and 6-34 present the combustion plume water emissions and the modeling parameters for the nine operating cases assessed.

Q. Please describe the results of the analysis.

A. The analysis examined 16,874 hourly observations of meteorological conditions. All nine operating cases were processed using the appropriate subset of meteorology, since the operating cases represent specific ambient inlet temperature conditions, which do not occur for the entire year. The dividing ambient temperature between the -10°F and 51°F cases was 25°F. Within all of the cases examined, the highest ambient temperature resulting in a visible condensed plume was 60°F. Cases 7, 8 and 9 represent the 90°F operating mode and were eliminated from further consideration since the Project turbines will not result in visible plumes when operating during these conditions. Table 6-35 presents a summary of the percentage of hours per year of condensed plume formation for the remaining six operating cases. The combination of Cases 3 and 6 represent the worst case of 592 hours of plume visibility per year.

Table 6-36 shows the distribution of average annual visible plumes by month and by hour of the day. The combination of Cases 3 and 6, being the most conservative, was chosen for this frequency distribution analysis. The visible plume modeling input and output files, which contain additional detailed information regarding the number of

condensed visible plumes is included on the data CDROM in Appendix Y-10, as provided to the NYSDEC, NYSDPS, and NYSDOH.

Visible plumes are confined almost exclusively to the winter months, with most plumes occurring around dawn (5 AM to 8 AM). The majority of visible plumes occur during the morning hours, with less than 20% occurring during the afternoon.

The Project was conservatively assessed to determine the possibility for visible plumes from the operation of the combustion gas turbines. The analytical model predicted visible condensed water vapor to occur only 3% to 7% of the time, as shown in Table 6-35. The vast majority of plumes that do occur are dissipated within a 200 m distance. In conclusion, the exhaust from the combustion turbines may result in a visible plume, but only during the colder months. The plumes will most likely occur during the morning hours (around dawn), and will be light and wispy in character, and are not expected to be visually intrusive.

Q. What other analyses are necessary under the PSD regulations?

A. The PSD regulations require that additional impact analyses be conducted to consider the affects on visibility (6.14.1), soils and vegetation (6.14.3), and the potential for and impact of secondary growth (6.14.2). Regarding visibility, the VISCREEN results indicate that the maximum contrast coefficients will all be less than the respective criteria thresholds, indicating that the visibility in the surrounding region will not be affected. Consequently, the project NO_2, TSP/PM-10 and sulfate emissions will not cause adverse or significant visibility impairment. Results of the visibility analysis are presented in Table 6-37. Electronic output files from the VISCREEN model have been provided on the modeling files CDROM included in Appendix Y-10 of the NYSDEC, NYSDOH, and

NYSDPS copies of the application.

The economic growth analysis indicates that the Project will have a positive net impact on the local economy. The proposed Project is not anticipated to result in adverse effects to vegetation. Similarly, the soils within the study area will be insignificantly affected by the emissions from the Project

Q. Was an assessment of global warming done?

A. Yes. Section 6.15 describes this assessment. Table 6-39 summarizes greenhouse gas emissions from coal, oil and natural gas from United States electric utilities. Table 6-40 demonstrates the relative carbon emission rates between the primary fuels used in electrical generation. This section has demonstrated the importance of the combination of high-efficiency combined-cycle technology and the lower carbon content of natural gas relative to both coal and oil, with respect to the Project's impact on greenhouse gas emissions. This Project, and others like it, will play an important role in meeting the State of New York's goal under national greenhouse gas reduction targets, when and if instituted in conjunction with the Kyoto Protocol or similar programs.

Q. Has an environmental justice analysis been done?

A. Yes. Such an analysis has been performed and may be found in Section 8 of the Project's PSD Permit Application (concurrently being provided as Appendix X to the forthcoming of the Article X Application). The reference community is Orange County. The analysis identifies the census tracts and block groups in which maximum concentrations of all criteria pollutants during all averaging times (and in both simple and complex terrain) are found. The analysis demonstrates that the air quality impacts for those tracts are neither adverse nor disproportionate when compared to Orange County as a whole. Thus, the

Project has no significant impact in terms of environmental justice.

Q. Please describe the expected Project related air quality impacts during construction.

A. As fully described in Section 6.16, project related air quality impacts during the two-year construction schedule are expected to include fugitive dust emissions and vehicle emissions from ground excavation, cut-and-fill operations, removal of debris, concrete pouring and equipment erection. However, because the construction period is limited and activities change during the construction phases, these emissions are only temporary and vary throughout this period.

Q. Was an analysis of ambient air quality standards and asthma in the community performed?

A. Yes. Section 6.18 and the accompanying Tables provide information regarding and analyze the prevalence of asthma in the community (based on NYS Department of Health data or local health departments' data, if available) and describe how ambient air quality standards protect the population.

Q. Was an evaluation for pathogen emissions, including fate and transport, conducted?

A. Yes. As described in Section 6.19. The Project is consistent with the approaches endorsed by Cooling Technology Institute (CTI). First, in terms of siting and design, the WSAC is not proposed to be located near fresh air intakes or windows. The system will have no areas where water will stagnate. Chemicals will be used to prevent corrosion and control biological fouling. High-efficiency drift eliminators will also be installed. Therefore, the potential for increased pathogen formation in the WSAC circulating water flow is minimal.

Q. Do you conclude that the Project as proposed will not emit any pollutants to the air in contravention of applicable air emission control requirements and that it is compatible with the public heath and safety?

A. Yes.

Q. Do you conclude that the Project's air pollution control technology minimizes adverse environmental impacts, considering the state of available technology and the nature and economics of reasonable alternative mitigation strategies?

A. Yes.

Q. Does this conclude your testimony at this time?

A. Yes

Case: 00 F 1256

WAWAYANDA ENERGY CENTER

DIRECT TESTIMONY

OF

DONALD NEAL

SUSAN TIERNEY

JOSEPH CAVICCHI

Q. Please state your names, titles, affiliations and business addresses.

A. My name is Donald Neal, and I am an Environmental Manager for Calpine Corporation ("Calpine"). My business address is The Pilot House, 2nd Floor, Lewis Wharf, Boston, MA 02110.

A. My name is Susan Tierney and I am a Senior Consultant with Lexecon Inc. My business address is One Mifflin Place, Cambridge, Massachusetts 02138.

A. My name is Joseph Cavicchi and I am a Senior Consultant with Lexecon Inc. My business address is One Mifflin Place, Cambridge, Massachusetts 02138.

Q. Mr. Neal, what are your duties of employment?

A. I serve as project manager and technical analyst for environmental permitting and assessment of electric generating facilities and programs, representing Calpine before regulatory agencies and in public forums. In this capacity, I have managed and prepared siting studies, environmental impact statements, and applications for wastewater, wetlands and air permits. I have also led environmental, health and safety audits and due diligence investigations. I am experienced with methods of air emissions source testing and continuous emissions monitoring system design, certification and implementation.

Q. How are you qualified to perform your employment duties?

A. I received both a B.S. and an M.S. in Biology from the University of Massachusetts and I have over 18 years of experience related to my employment duties.

Q. Does your curriculum vitae, which is attached as Exhibit 14, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Neal, please describe your role in the Project.

A. I supervised all aspects of the Article X application and I am responsible for project compliance with environmental requirements.

Q. Ms. Tierney, what are your duties of employment?

A. I am a consultant to business, government policy makers and other organizations on energy markets, economic and environmental regulation, environmental strategy and electric facility projects. I perform economic and policy analyses, give strategic advice and consulting and provide regulatory assistance and litigation support to supplier, user and government clients in the electric, natural gas and telecommunications industries.

Q. How are you qualified to perform your employment duties?

A. I received a B.A. in art history from Scripps College and a Ph.D. in public policy analysis and planning from the Department of City and Regional Planning at Cornell University.

Q. Please describe your role in the Project.

A. Together with Joseph Cavicchi, I have overseen a system production modeling study that demonstrates energy cost savings, carbon dioxide emission reductions, sulfur dioxide emission reductions and nitrogen oxides emissions reductions that will result from the operation of the Wawayanda Energy Center.

Q. Does your curriculum vitae, which is attached as Exhibit 18, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Cavicchi, what are your duties of employment?

A. I provide energy and environmental policy and market analysis pertaining to the restructuring of the U.S. electricity industry. This work focuses on regional market

development and the interaction necessary among consumers, producers, regulators and system operators to ensure economically efficient operation of the electricity system.

Q. How are you qualified to perform your employment duties?

A. I have a B.S. in Mechanical Engineering from the University of Connecticut. I have a S.M. in Environmental Engineering from Tufts University and I have a S.M. in Technology Policy from Massachusetts Institute of Technology.

Q. Does your curriculum vitae, which is attached as Exhibit 2, fairly and accurately represent your experience?

A. Yes.

Q. Mr. Cavicchi, what is your role in the Project?

A. Together with Susan Tierney, I have overseen a system production modeling study that demonstrates energy cost savings, carbon dioxide emission reductions, sulfur dioxide emission reductions and nitrogen oxides emissions reductions that will result from the operation of the Wawayanda Energy Center

Q. What portion of the Application does your testimony support?

A. Section 1, regarding system production modeling.

Q. Please describe this part of Section 1.

A. This section addresses how Calpine's production cost modeling analysis satisfies the requirements of Stipulation 14, which requires Calpine to conduct an analysis of system production modeling. Calpine contracted with an independent economic consulting company, Lexecon Inc., to provide this analysis.

Q. What does production modeling analysis estimate?

A. The production modeling analysis estimates the output of individual power plants dispatched to meet New York demand, the emissions associated with output at these particular generating facilities, and the resulting wholesale spot market prices for different geographic parts of the New York market. The analysis examines the change in output, emissions and prices that occur as a result of the Project's operation as part of New York's power mix. The analysis takes into consideration the relative bid price and performance factors for the Project and all of the other power plants in New York State and the Pennsylvania-New Jersey-Maryland (PJM) regions. A detailed report with supporting data is provided as Appendix C.

Q. What methodology was used to perform the modeling?

A. The model includes, as "generation in service," all of the following resources: existing electric generation facilities, the New York Power Authority's New York City and Long Island gas turbines (built primarily between January and June 2001), and all electric generation facilities that have received notification of compliance with the administrative completeness requirements of Article X 30 days prior to the filing of this Application. Calpine consulted with DPS Staff to obtain mutual agreement on the model input data set.

The General Electric (GE) Market Assessment and Portfolio Strategies (MAPS) production simulation model was used. MAPS is a planning model that dispatches units to operate in a manner that provides a reasonable representation of how the NYISO will dispatch units in actual operation. Both MAPS and the NYISO dispatch units based upon minimizing total system operational costs (based on generating units' bids) while meeting all reliability requirements. MAPS models every hour of the year sequentially, capturing

the impact of random forced outages and maintenance outages, as well as transmission constraints. Because MAPS requires an estimate of the hourly bid price for which generators are willing to sell electric power in the energy spot market, the MAPS analysis performed by Lexecon uses estimates of the operating costs of the various units (i.e., variable fuel, emissions and operations and maintenance costs) as a proxy for these bid prices. This is consistent with the incentives provided by the NYISO coordinated energy spot market.

The MAPS model was recently used for the 1998 SEP, and it is regularly used by the New York State DPS. After consultation with DPS Staff, Lexecon based its modeling on the latest database used by the state agencies in the state energy planning process. Lexecon modeled the year 2004, since this is expected to be the first year of operation of the Project. See Appendix C for a list of the proposed plants included in Lexecon's MAPS modeling, as well as other relevant data generated by the modeling effort.

Q. Will the Project result in air pollution reductions?

A. Yes. We estimated statewide power-sector emission levels of sulfur dioxide (SO_2, relating to acid rain), nitrogen oxide (NO_X, relating to smog) and carbon dioxide (CO_2, relating to global warming), both with and without the Project.

The Project's operation is expected to result in significant reductions in statewide air pollutant emissions because, as Table 1-1 shows, the dispatch of the Project will mean that older, less efficient and higher polluting power plants will produce less electric energy, resulting in a reduction in total emissions. As a result of the expected Project operation, total NO_X emissions in New York State are projected to be reduced by 2,056 tons in the year 2004. Additionally, sulfur dioxide (SO_2) emissions are expected to

be reduced by 6,304 tons and carbon dioxide (CO_2) emissions by 221,960 tons. In the Mid-Hudson region, NO_X emissions are projected to fall by 769 tons in the year 2004 – a 24% reduction. SO_2 emissions are expected to be reduced by 1,676 tons, or 27%. CO_2 emissions are projected to increase by 1,059,463 tons (28%), even though on statewide level they would be slightly reduced.

Q. How will the Project effect estimated marginal prices?

A. We have prepare and analysis of the estimated minimum, maximum and average wholesale energy spot prices representative of subregions "A", "G" and "K" of the New York Control Area, both with and without the Project. These correspond to the Niagara region, the Orange County region, and Long Island, respectively. This section also addresses the estimated capacity factor for the Project pursuant to Clause 1(b).

Calpine's MAPS analysis indicates that the dispatch of the Project will produce lower marginal and average spot energy prices in New York State, as shown in Table 1-2. The Project's estimated capacity factor is 75%. Though prices in some sub-state transmission areas (those areas located furthest from Wawayanda) would experience a de minimis increase in *minimum* prices due to the operation of the Project, the areas nearest Wawayanda will see a decrease in the average and maximum price of energy. The minor minimum price increase (1 cent/MWh) in areas close to Wawayanda is the result of variations in unit commitments; on average, the Project's operation results in substantially lower prices during the majority of hours during the year. On a statewide basis, because the price decreases are larger than the increases, the net impact of the price changes results in estimated savings of $60 million dollars for consumers in 2004.

Q. Is it your opinion that the Project will benefit New York and the surrounding region?

A. Yes. It will result in air pollution reductions and savings to consumers.

Q. Does this conclude your testimony at this time?

A. Yes.

Wawayanda Energy Center Exhibits List

Exhibit 1. William H. Bailey, Ph.D

Exhibit 2. Joseph Cavicchi

Exhibit 3. Thomas Deedy

Exhibit 4. Brian E. Dempsey, P.E., P.T.O.E.

Exhibit 5. David A. Devine

Exhibit 6. David R. Erali, P.E.

Exhibit 7. Richard P. Felak, P.E.

Exhibit 8. John Molyneux Flumerfelt, Jr.

Exhibit 9. J. Duncan Glover, Ph.D., P.E.

Exhibit 10. Richard D. Holmes, Ph.D., R.P.A.

Exhibit 11. Robert A. Howard

Exhibit 12. Theodore Main

Exhibit 13. Joseph M. McMullen

Exhibit 14. Donald R. Neal, Jr.

Exhibit 15. David J. Shotts, P.E.

Exhibit 16. Stephan Solzhenitsyn, AICP

Exhibit 17. Michael D. Theriault

Exhibit 18. Susan F. Tierney

Exhibit 19. Michael Tyrrell

Exhibit 20. Mark A. Williams, P.G.

Exhibit 21. Craig H. Wolfgang, AICP

William H. Bailey, Ph.D.
Principal Scientist

Professional Profile

Dr. William H. Bailey is a Principal Scientist and manages the Health practice scientists in the firm's New York office. Before joining Exponent, Dr. Bailey was President of Bailey Research Associates, Inc., the oldest research and consulting firm with specialized expertise in electromagnetic fields and health. Dr. Bailey specializes in applying state-of-the-art assessment methods to environmental health and impact issues. His 30 years of training and experience include laboratory and epidemiologic research, health risk assessment, and comprehensive exposure analysis. Dr. Bailey is particularly well known for his research on potential health effects of electromagnetic fields and is active in setting IEEE standards for human exposure to electromagnetic fields. He uses advanced analytical and statistical methods in the design and analysis of both experimental studies and epidemiology and survey research studies. Such methods include Monte Carlo and other probabilistic methods to characterize uncertainties pertaining to exposure impacts and the determination of "safe" environmental exposures.

In addition to his training and experience in health risk assessment, Dr. Bailey's postgraduate training in the social, economic, and behavioral sciences is helpful in assessing the important effects of social, economic, and community factors on health risks and vulnerability to environmental impacts in health and environmental justice research. He is a member of a working group that advises a committee of the World Health Organization on risk assessment, perception, and communication. Dr. Bailey is also a visiting scientist at the Cornell University Medical College and has lectured at Rutgers University, the University of Texas (San Antonio), and the Harvard School of Public Health. He was formerly Head of the Laboratory of Neuropharmacology and Environmental Toxicology at the New York State Institute for Basic Research, Staten Island, New York, and an Assistant Professor and NIH postdoctoral fellow in Neurochemistry at The Rockefeller University in New York.

Credentials and Professional Honors

Ph.D., Neuropsychology, City University of New York, 1975
M.B.A., University of Chicago, 1969
B.A., Dartmouth College, 1966

Sigma Xi; The Institute of Electrical and Electronics Engineers/Standards Coordinating Committee 28 (Subcommitee 3, Safety Levels with Respect to Human Exposure to Fields (0-3kHz) and Subcommitte 4, Safety Levels with Respect to Human Exposure to Radiofrequency Filds (3 kHz–3 GHz); Elected member of the Committee on Man and Radiation (COMAR) of the IEEE Engineering in Medicine and Biology Society (1998–present); Invited Speaker, First Institute of Neurological Sciences Symposium in Neurobiology, University of Pennsylvania (1980); Invited Speaker, National Heart and Lung Institute (1977)

Publications

Kavet R, Stuchly MA, Bailey WH, Bracken TD. Evaluation of Biological Effects, Dosimetric Models, and Exposure Assessment Related to ELF Electric- and Magnetic-field Guidelines. Applied Occupational and Environmental Hygiene (in press).

Bailey WH. ICNIRP recommendation for limiting public exposure to 4 Hz–1 kHz electric and magnetic fields. Health Phys 1999; 77:97–98.

Bailey WH. Principles of risk assessment with application to current EMF risk communication issues. In: EMF Risk Perception and Communication, Repacholi MH, Muc, AM (eds.), World Health Organization, Geneva, 1999.

De Santo RS, Bailey, WH. Environmental justice tools and assessment practices. Proc. 1999 American Public Transit Association, 1999.

Bailey WH, Su SH, Bracken TD. Probabilistic approach to ranking sources of uncertainty in ELF magnetic field exposure limits. Health Phys 1999; 77:282–290.

Bailey WH. Field parameters. Proc. EMF Engineering Review Symposium, Status and Summary of EMF Engineering Research, Bracken TD, Montgomery JH (eds.), Oak Ridge National Laboratory, Oak Ridge, TN, April 28–29, 1998.

Bailey WH. Policy implications. Proc. EMF Engineering Review Symposium, Status and Summary of EMF Engineering Research, Bracken TD, Montgomery JH (eds.), Oak Ridge National Laboratory, Oak Ridge, TN, April 28–29, 1998.

Bailey WH. Probabilistic approaches to deriving risk-based exposure guidelines: application to extremely low frequency magnetic fields. In: Non-Ionising Radiation, Dennis JA and Stather JW (eds.), Special Issue of Radiation Protection Dosimetry 1997; 72:327–336.

Bailey WH, Su SH, Bracken TD, Kavet R. Summary and evaluation of guidelines for occupational exposure to power frequency electric and magnetic fields. Health Phys 1997; 73:433–453.

Bracken TD, Senior RS, Rankin RF, Bailey WH, Kavet R. Magnetic field exposures in the electric utility industry relevant to occupational guideline levels. Appl Occupat Environ Hyg 1997; 12:756–768.

Blondin J-P, Nguyen D-H, Sbeghen J, Goulet D, Cardinal C, Maruvada P-S, Plante M, and Bailey WH. Human perception of electric fields and ion currents associated with high voltage DC transmission lines. Bioelectromagnetics 1996; 17:230–241.

Bailey WH, Charry JM. Acute exposure of rats to air ions: effects on the regional concentration and utilization of serotonin in brain. Bioelectromagnetics 1987; 8:173–181.

Bailey WH, Charry JM. Measurement of neurotransmitter release and utilization in selected brain regions of rats exposed to dc electric fields and atmospheric space charge. Proc. Twenty-

Third Hanford Life Sciences Symposium, Interaction of Biological Systems with Static and ELF Electric and Magnetic Fields, 1987.

Pavildes C, Aoki C, Chen J-S, Bailey WH, Winson J. Differential glucose utilization in the parafascicular region during slow-wave sleep, the still-alert state and locomotion. Brain Res 1987; 423:399–402.

Bailey WH, Charry JM. Behavioral monitoring of rats during exposure to air ions and DC electric fields. Bioelectromagnetics 1986; 7:329–339.

Charry JM, Shapiro MH, Bailey WH, Weiss JM. Ion-exposure chambers for small animals. Bioelectromagnetics 1986; 7:1–11.

Charry JM, Bailey WH. Regional turnover of norepinephrine and dopamine in rat brain following acute exposure to air ions. Bioelectromagnetics 1985; 6:415–425.

Bracken TD, Bailey WH, Charry JM. Evaluation of the DC electrical environment in proximity to VDTs. J Environ Sci Health Part A 1985; 20:745–780.

Gross SS, Levi R, Bailey WH, Chenouda AA. Histamine modulation of cardiac sympathetic responses: a physiological role. Fed Proc 1984; 43:458.

Gross SS, Guo ZG, Levi R, Bailey WH, Chenouda AA. 1984. Release of histamine by sympathetic nerve stimulation in the guinea pig heart and modulation of adrenergic responses. Circulation Res 1984; 54:516–526.

Dahl D, Bailey WH, Winson J. Effect of norepinephrine depletion of hippocampus on neuronal transmission from perforant pathway through dentate gyrus. J Neurophysiol 1983; 49:123–135.

Guo ZG, Gross SS, Levi R, Bailey WH. Histamine: modulation of norepinephrine release from sympathetic nerves in guinea pig heart. Fed Proc 1983; 42:907.

Bailey WH. Biological effects of air ions on serotonin metabolism: fact and fancy. In: Conference on Environmental Ions and Related Biological Effects, pp. 90–120, Charry JM (ed.), American Institute of Medical Climatology, Philadelphia, PA, 1982.

Weiss JM, Goodman PA, Losito BG, Corrigan S, Charry JM, Bailey WH. Behavioral depression produced by an uncontrollable stressor: relationship to norepinephrine, dopamine, and serotonin levels in various regions of rat brain. Brain Res Rev 1981; 3:167–205.

Bailey WH. Ion-exchange chromatography of creatine kinase isoenzymes: a method with improved specificity and sensitivity. Biochem Med 1980; 24:300–313.

Bailey WH, Weiss JM. Evaluation of a 'memory deficit' in vasopressin-deficient rats. Brain Res 1979; 162:174–178.

Bailey WH, Weiss JM. Effect of ACTH 4-10 on passive avoidance of rats lacking vasopressin (Brattleboro strain). Hormones and Behavior 1978; 10:22–29.

Pohorecky LA, Newman B, Sun J, Bailey WH. Acute and chronic ethanol injection and serotonin metabolism in rat brain. J Pharmacol Exper Therap 1978; 204:424–432.

Koh SD, Vernon M, Bailey WH. Free-recall learning of word lists by prelingual deaf subjects. J Verbal Learning and Verbal Behavior 1971; 10:542–574.

Book Chapters

Bailey WH. Principles of risk assessment and their limitations. In: Risk Perception, Risk Communication and Its Application to EMF Exposure, Matthes R, Bernhardt JH, Repacholi MH (eds.), International Commission on Non-Ionizing Radiation Protection, Oberschleißheim, Germany, 1998.

Bailey, WH. Biological responses to air ions: is there a role for serotonin? In: Air Ions: Physical and Biological Aspects, pp. 151–160, Charry JM, Kavet R (eds.), CRC Press, Boca Raton, FL, 1987.

Weiss JM, Bailey WH, Goodman PA, Hoffman LJ, Ambrose MJ, Salman S, Charry JM. A model for neurochemical study of depression. In: Behavioral Models and the Analysis of Drug Action, pp. 195–223, Spiegelstein MY, Levy A (eds.), Elsevier Scientific, Amsterdam, 1982.

Bailey WH. Mnemonic significance of neurohypophyseal peptides. In: Changing Concepts of the Nervous System, pp. 787–804, Morrison AR, Strick PL (eds.), Academic Press, New York, NY, 1981.

Bailey WH, Weiss, JM. Avoidance conditioning and endocrine function in Brattleboro rats. In: Endogenous Peptides and Learning and Memory Process, pp. 371–395, Martinez JL, Jensen RA, Messing RB, Rigter H, McGaugh JL (eds.); Academic Press, New York, NY, 1981.

Weiss JM, Glazer H, Pohorecky LA, Bailey WH, Schneider L. Coping behavior and stress-induced behavioral depression: studies of the role of brain catecholamines. In: The Psychobiology of the Depressive Disorders: Implications for the Effects of Stress, pp. 125–160, Depue R (ed.), Academic Press, New York, NY, 1979.

Reports

Bailey WH. Probabilistic approach to ranking sources of uncertainty in ELF magnetic-field exposure limits. In: Evaluation of Occupational Magnetic Exposure Guidelines, Interim Report, EPRI Report TR-111501, 1998.

Bailey WH, Weil DE, Stewart JR. HVDC Power Transmission Environmental Issues Review. Oak Ridge National Laboratory, Oak Ridge, TN, 1997.

Bailey, WH. Melatonin responses to EMF. In: Proc. Health Implications of EMF Neural Effects Workshop, Report TR-104327s, Electric Power Research Institute, 1994.

Bailey, WH. Recent neurobiological and behavioral research: overview of the New York State powerlines project. In: Power-Frequency Electric and Magnetic Field Research, Electric Power Research Institute, 1989.

Bailey WH, Bissell M, Dorn CR, Hoppel WA, Sheppard AR, Stebbings, JH. Comments of the MEQB Science Advisors on Electrical Environment Outside the Right of Way of CU-TR-1, Report 5. Science Advisor Reports to the Minnesota Environmental Quality Board, 1986.

Bailey WH, Bissell M, Brambl RM, Dorn CR, Hoppel WA, Sheppard AR, Stebbings JH. A Health and Safety Evaluation of the +/- 400 KV Powerline. Science Advisor's Report to the Minnesota Environmental Quality Board, 1982.

Charry JM, Bailey WH, Weiss JM. Critical Annotated Bibliographical Review of Air Ion Effects on Biology and Behavior. Rockefeller University, New York, NY, 1982.

Bailey WH Avoidance Behavior in Rats with Hereditary Hypothalamic Diabetes Insipidus. Dissertation, City University of New York, 1975.

Presentations

Bailey WH. Applications to enhance safety: research to understand and control potential risks. Human Factors and Safety Research, Volpe National Transportation Systems Center/Dutch Ministry of Transport, Cambridge, MA, November 2000.

Bailey WH. EMF health effects review. EMF Exposure Guideline Workshop, Brussels Belgium, June 2000.

Bailey WH. Dealing with uncertainty when formulating guidelines. EMF Exposure Guideline Workshop, Brussels Belgium, June 2000.

Bailey WH. Field parameters: policy implications. EMF Engineering Review Symposium, Status and Summary of EMF Engineering Research, Charleston, SC, April 1998.

Bailey WH. Principles of risk assessment: application to current issues. Symposium on EMF Risk Perception and Communication, World Health Organization, Ottawa, Canada, August 1998.

Erdreich L, Klauenberg BJ, Bailey WH, Murphy MR. Comparing radiofrequency standards around the world. Health Physics Society 43rd Annual Meeting, Minneapolis, MN, July 1998.

Bailey WH. Current guidelines for occupational exposure to power frequency magnetic fields. EPRI EMF Seminar, New Research Horizons, March 1997.

Bailey WH. Methods to assess potential health risks of cell telephone electromagnetic fields. IBC Conference—Cell Telephones: Is there a Health Risk? Washington, DC, June 1997.

Bailey WH. Principles of risk assessment and their limitations. Symposium on Risk Perception, Risk Communication and its Application to EMF Exposure, International Commission on Non-Ionizing Radiation Protection, Vienna, Austria, October 1997.

Bailey WH. Probabilistic approach for setting guidelines to limit induction effects. IEEE Standards Coordinating Committee 28: Non-Ionizing Radiation, Subcommittee 3 (0–3 kHz), June 1997.

Bracken TD, Senior RS, Rankin RF, Bailey WH, Kavet R. Relevance of occupational guidelines to utility worker magnetic-field exposures. Second World Congress for Electricity and Magnetism in Biology and Medicine, Bologna, Italy, June 1997.

Bailey WH. Epidemiology and experimental studies. American Industrial Hygiene Conference, Washington, DC, May 1996.

Bailey WH. Power frequency field exposure guidelines. IEEE Standards Coordinating Committee 28: Non-Ionizing Radiation, Subcommittee 3 (0–3 kHz), June 1996.

Weil DE, Erdreich LS, Bailey WH. Are 60-Hz magnetic fields cancer causing agents? Mechanisms and Prevention of Environmentally Caused Cancers, The Lovelace Institutes 1995 Annual Symposium, La Fonda, Santa Fe, NM, October 1995.

Bailey WH. Neurobiological research on extremely-low-frequency electric and magnetic fields: a review to guide future research. Sixteenth Annual Meeting of the Bioelectromagnetics Society, Copenhagen, Denmark, June 1994.

Blondin J-P, Nguyen D-H, Sbeghen J, Maruvada PS, Plante M, Bailey WH, Goulet D. The perception of DC electric fields and ion currents in human observers. Annual Meeting of the Canadian Psychological Association, Penticton, British Columbia, Canada, June 1994.

Erdreich LS, Bailey WH, Weil DE. Science, standards and public policy challenges for ELF fields. American Public Health Association 122nd Annual Meeting, Washington, DC, October 1994.

Bailey WH. Review of 60 Hz epidemiology studies. EMF Workshop, Canadian Radiation Protection Association, Ontario, Canada, June 1993.

Bailey WH. Biological and health research on electric and magnetic fields. American Industrial Hygiene Association, Fredrickton, New Brunswick, Canada, October 1992.

Bailey WH. Electromagnetic fields and health. Institute of Electrical and Electronics Engineers; Bethlehem, PA, January 1992.

Bailey WH, Charry JM. Particle deposition on simulated VDT operators: influence of DC electric fields. Tenth Annual Meeting of the Bioelectromagnetics Society, June 1988.

Charry JM, Bailey WH. Contribution of charge on VDTs and simulated VDT operators to DC electric fields at facial surfaces. Tenth Annual Meeting of the Bioelectromagnetics Society, June 1988.

Bailey WH, Charry, JM. Dosimetric response of rats to small air ions: importance of relative humidity. EPRI/DOE Contractors Review, November 1986.

Charry JM, Bailey WH, Bracken TD. DC electric fields, air ions and respirable particulate levels in proximity to VDTs. International Conference on VDTs and Health, Stockholm, Sweden, June 12–15 1986.

Charry JM, Bailey WH. Air ion and DC field strengths at 10^4 ions/cm^3 in the Rockefeller University Small Animal Exposure Chambers. EPRI/DOE Contractors Review, November 1985.

Charry JM, Bailey WH. DC Electrical environment in proximity to VDTs. Seventh Annual Meeting of the Bioelectromagnetics Society, June 1985.

Bailey WH, Collins RL, Lahita RG. Cerebral lateralization: association with serum antibodies to DNA in selected bred mouse lines. Society for Neuroscience, 1985.

Kavet R, Bailey WH, Charry JM. Respiratory neuroendocrine cells: a plausible site for air ion effects. Seventh Annual Meeting of The Bioelectromagnetics Society, June 1985.

Bailey WH, Charry JM. Measurement of neurotransmitter release and utilization in selected brain regions of rats exposed to DC electric fields and atmospheric space charge. Twenty-third Hanford Life Sciences Symposium, Richland, WA, October 1984.

Bailey WH, Charry JM, Weiss JM, Cardle K, Shapiro M. Regional analysis of biogenic amine turnover in rat brain after exposure to electrically charged air molecules (air ions). Society for Neuroscience, 1983.

Bailey WH. Biological effects of air ions: fact and fancy. American Institute of Medical Climatology Conference on Environmental Ions and Related Biological Effects, October 1982.

Goodman PA, Weiss JM, Hoffman LJ, Ambrose MJ, Bailey WH, Charry, JM. Reversal of behavioral depression by infusion of an A2 adrenergic agonist into the locus coeruleus. Society for Neuroscience, November 1982.

Charry JM, Bailey WH. Biochemical and behavioral effects of small air ions. Electric Power Research Institute Workshop, April 1981.

Bailey WH, Alsonso DR, Weiss JM, Chin S. Predictability: a psychologic/ behavioral variable affecting stress-induced myocardial pathology in the rat. Society for Neuroscience, November 1980.

Salman SL, Weiss JM, Bailey WH, Joh TH. Relationship between endogenous brain tyrosine hydroxylase and social behavior of rats. Society of Neuroscience, November 1980.

Bailey WH, Maclusky S. Appearance of creatine kinase isoenzymes in rat plasma following myocardial injury produced by isoproterenol. Fed Assoc Soc Exp Biol, April 1978.

Bailey WH, Maclusky S. Appearance of creatine kinase isoenzymes in rat plasma following myocardial injury by isoproterenol. Fed Proc 1978; 37:889.

Bailey WH, Weiss JM. Psychological factors in experimental heart pathology. Visiting Scholar Presentation, National Heart Lung and Blood Institute, March 1977.

Bailey WH, Weiss JM. Effect of ACTH 4-10 on passive avoidance of rats lacking vasopressin (Brattleboro strain). Eastern Psychological Association, April 1976.

Research Appointments

- Visiting Fellow, Department of Pharmacology, Cornell University Medical College, New York, NY (1986–present)
- Visiting Scientist, The Jackson Laboratory, Bar Harbor, ME (1984–1985)
- Head, Laboratory of Neuropharmacology and Environmental Toxicology, NYS Institute for Basic Research in Developmental Disabilities, Staten Island, NY (1983–1987)
- Assistant Professor, The Rockefeller University, New York, NY (1976–1983)
- Postdoctoral Fellow, Neurochemistry, The Rockefeller University, New York, NY (1974–1976)
- Dissertation Research, The Rockefeller University, New York, NY (1972–1974)
- CUNY Research Fellow, Dept. of Psychology, Queens College, City University of New York, Flushing, NY (1969–1971)
- Clinical Research Assistant, Department of Psychiatry, University of Chicago; Psychiatric Psychosomatic Inst., Michael Reese Hospital, and Illinois State Psychiatric Inst, Chicago, IL (1968–1969)

Teaching Appointments

- Lecturer, University of Texas Health Science Center, Center for Environmental Radiation Toxicology, San Antonio, TX (1998)
- Lecturer, Harvard School of Public Health, Office of Continuing Education, Boston, MA (1995, 1997)
- Lecturer, Rutgers University, Office of Continuing Education, New Brunswick, NJ (1991–1995)

- Adjunct Assistant Professor, Queens College, CUNY, Flushing, NY (1978)
- Lecturer, Queens College, CUNY, Flushing, NY (1969–1974)

Advisory Positions

- Working Group on Non-Ionizing Radiation, Static and Extremely Low-Frequency Electromagnetic Fields, International Agency for Research on Cancer (2000 – present)
- Working Group, EMF Risk Perception and Communication, World Health Organization (1998–present)
- Associate Editor, Non-Ionizing Radiation, Health Physics (1996–present)
- Member, Standards Coordinating Committee 28 Non-Ionizing Radiation, Subcommittee 3 Safety Levels with Respect to Human Exposure (0–3 kHz) and Subcommitee 4 Safety Levels with Respect to Human Exposure (3kHz-3GHz) Institute of Electrical and Electronics Engineers (IEEE) (1996–present)
- Invited participant, National Institute of Environmental Health Sciences EMF Science Review Symposium: Clinical and *In Vivo* Laboratory Findings (1998)
- Working Group, EMF Risk Perception and Communication, International Commission on Non-Ionizing Radiation Protection (1997)
- U.S. Department of Energy, RAPID EMF Engineering Review (1997)
- Oak Ridge National Laboratory (1996)
- American Arbitration Association International Center for Dispute Resolution (1995–1996)
- U.S. Department of Energy (1995)
- National Institute for Occupational Safety and Health (1994–1995)
- Federal Rail Administration (1993–1996)
- U.S. Forest Service (1993)
- New York State Department of Environmental Conservation (1993)
- National Science Foundation
- National Institutes of Health, Special Study Section—Electromagnetics (1991–1993)

- Maryland Public Service Commission and Maryland Department of Natural Resources, Scientific Advisor on health issues pertaining to HVAC Transmission Lines (1988–1989)
- Scientific advisor on biological aspects of electromagnetic fields, Electric Power Research Institute, Palo Alto, CA (1985–1989)
- U.S. Public Health Service, NIMH: Psychopharmacology and Neuropsychology Review Committee (1984)
- Consultant on biochemical analysis, Colgan Institute of Nutritional Science, Carlsbad, CA (1982–1983)
- Behavioral Medicine Abstracts, Editor, animal behavior and physiology (1981–1983)
- Consultant on biological and behavioral effects of high-voltage DC transmission lines, Vermont Department of Public Service, Montpelier, VT (1981–1982)
- Scientific advisory committee on health and safety effects of a high-voltage DC transmission line, Minnesota Environmental Quality Board, St. Paul, MN (1981–1982)
- Consultant on biochemical diagnostics, Biokinetix Corp., Stamford, CT (1978–1980)

Professional Affiliations

- The Health Physics Society (Affiliate of the International Radiation Protection Society)
- Society for Risk Analysis
- New York Academy of Sciences
- American Association for the Advancement of Science
- Air and Waste Management Association
- Society for Neuroscience/International Brain Research Organization
- Bioelectromagnetics Society
- The Institute of Electrical and Electronics Engineers/Engineering in Medicine and Biology Society

JOSEPH CAVICCHI

Lexecon Inc.
One Mifflin Place
Cambridge, MA 02138
(617) 520-0200
(617) 520-0251 (direct)

PROFESSIONAL EXPERIENCE

Lexecon Inc., Cambridge, MA
(formerly The Economics Resource Group, Inc.)
Senior Consultant, 1999 - present
Consultant, 1997 - 1999

Provides energy and environmental policy and market analysis pertaining to the restructuring of the U.S. electricity industry. Focuses on regional market development and the interaction necessary among consumers, producers, regulators, and system operators to ensure economically efficient operation of the electricity system.

Tufts University, Medford, MA
Adjunct Instructor, Summer 2000

Taught graduate level environmental economics.

Massachusetts Institute of Technology, Cambridge, MA
Research Engineer, 1997
Research Assistant, 1995-1997

Performed an analysis of water and electricity resources in Mendoza, Argentina. Developed a computer simulation model to support analysis and permit the display of results to a diverse group of stakeholders. Traveled frequently to Mendoza to interact with government officials and relevant institutions in an effort to establish water and electricity policy.

Project Manager/Staff Mechanical Engineer, 1989-1995

Managed the development, engineering, and construction of a $40 million, 20 MW gas turbine-based Cogeneration Facility at the Cambridge campus. Directed all attributes of the project for its three-year duration. Involved extensively in energy conservation programs with emphasis on building and utility plant optimization through innovative engineering applications.

Carrier Building Systems and Services, Waltham, MA
Project Engineer, 1987-1988

Engineered and managed the installation of Energy Management Systems used exclusively for demand-side management. Interfaced direct digital control systems to mechanical equipment associated with thermal systems of industrial, commercial, and educational buildings.

EDUCATION

Massachusetts Institute of Technology, Cambridge, MA
S.M. in Technology Policy, 1997
Thesis: A Multi-Attribute Tradeoff Analysis for Water Resource Planning: A Case Study of the Mendoza River

Tufts University, Medford, MA
S.M. in Environmental Engineering, 1992

University of Connecticut, Storrs, CT
B.S. Mechanical Engineering, 1987

SELECTED CONSULTING EXPERIENCE: BUSINESS STRATEGY

Electricity Distribution Companies

Provides extensive strategic advice and analytical support to electricity distribution companies that are required to assess new wholesale marketplaces in order to fulfill their regulatory commitments as providers of last resort or default electricity service. In most instances these companies require assistance with the development and issuance of requests for proposals as well as rapid evaluation of commodity bids. The assignments combine extensive knowledge of wholesale market operations with general economic theory of contracting and electricity generation plant dispatch in order to provide companies with an approach to commodity procurement that agrees with their risk profile. In most cases there are numerous business and regulatory concerns that are incorporated into the procurement strategies. Additionally, each assignment typically requires extensive analysis of customer demand patterns and wholesale market prices in order to develop market-based customer service cost forecasts. Ongoing.

Electricity Generation Facility Developers

Oversees the development and implementation of transmission-constrained dispatch modeling for proposed electricity generation units locating in the Northeastern United States. Analyses typically focus on determining likely facility capacity factors and impacts on local and regional air pollutant emissions as well as on wholesale electricity prices. In addition, these analyses provide detailed knowledge of new facilities' impacts on the operation of the electricity transmission system that are critical to assessing the ability of a generating unit to deliver its power in a wide geographical area. Ongoing.

Large Industrial and Commercial Electricity Consumers

Provides advice to large electricity consumers focused on the development of strategies that identify opportunities and options that companies can employ to lower electrical energy expenditures. These assignments emphasize finding the best approach to obtaining power supplies from the competitive market, or in some instances use events such as mergers and acquisitions to pressure an electricity supplier to institute better pricing. These projects typically require extensive quantitative and qualitative research that is combined to identify the most beneficial options. Ongoing.

PPL Global

Co-authored report (with Susan F. Tierney) on "Air Pollution Reductions Resulting from the Kings Park Energy Project," January 24, 2001. Provides ongoing regulatory and analytical support as necessary. Ongoing.

Internet-Based Retail Electricity Provider

Analyzed and identified key elements of a strategy for an internet-based company that is entering the retail market as a supplier of fossil fuel and electricity. This effort required extensive research on U.S. states' implementation of regulatory systems that allow customer choice of electricity supplier. 2000.

Independent Power Producer

Provides advice and quantitative analysis to the non-regulated subsidiary of a major Mid-Atlantic electric utility on wholesale electric market strategies ranging from asset acquisitions and plant development to pricing for energy and capacity. This wide-ranging assignment includes significant dispatch modelling for three NERC regions in the U.S. and the assessment of target markets for direct sales to industrial users as well as sales into power pools. 1998.

Major Pipeline Company

Co-author of a special client study providing an assessment of a major pipeline company's ability to exercise market power in its origin and destination markets. The study also used the information gathered in the market power study to provide a vivid picture of the company's current and prospective competitive environment. The study analyzed how changes inside and outside the relevant markets were likely to affect the pipeline over the next few years. 1998.

High Efficiency Fluorescent Lighting Ballast Developer

Investigated the impact of state and federal energy conservation programs on the high efficiency fluorescent light ballast market. Focussed particularly on how electric industry restructuring will affect state and federal demand-side management and energy conservation policies. 1998.

Major Nationwide Electricity Consumer

Analyzed electricity purchasing options and strategies in a restructured electricity industry for one of the country's largest multi-state electricity consumers. Analysis included a detailed examination of the elements of current state and federal regulatory approaches, ongoing regulatory developments and changes, and how a large consumer

should respond and position its organization to capitalize on the restructured industry. 1997.

Union Pacific Resources, Inc.

Analyzed gas and oil assets and developed a discounted cash flow analysis to support the financial valuation of a moderately sized, vertically integrated oil and gas company. 1997.

Pennsylvania Power & Light Company

Employed an electricity market dispatch model to analyze the impact of nitrogen dioxide and sulfur dioxide emissions on existing power plants' future hourly dispatch in a competitive market. 1998.

SELECTED CONSULTING EXPERIENCE: FEDERAL AND STATE REGULATORY FILINGS

FirstEnergy

Managed the development of a model to estimate the value of the FirstEnergy generation facilities. The analysis required an extensive investigation of the future dispatch pattern of generation resources in the Midwest as well as a careful review of pending and future environmental regulation in the Midwestern and Northeastern United States. The analytical results were used to support oral and written testimony provided to the Ohio Public Utility Commission in support of FirstEnergy's stranded cost proceeding. 1999-2000.

Reading Municipal Light Department

Managed the development of an economic analysis of the viability of a proposed natural gas pipeline dedicated to an existing electricity generation facility located in New England. The analysis was subsequently submitted with written and oral testimony at a state regulatory proceeding that reviewed the proposed pipeline. 1998-2000.

Natural Resources Canada

Co-authored a white paper that investigated the implications for Canadian electricity system reliability as result of recent changes in U.S. electricity markets and policy. Managed all aspects of the research underlying the report. 1999

WPS Power Development, Inc.

United States of America, Before the Federal Energy Regulatory Commission, Sunbury Generation, LLC, Docket No. ER99-3420-000, prepared market power analysis and managed the development of direct testimony submitted in support of PDI's newly-acquired Sunbury generation facility's application for authority to charge wholesale and retail market-based rates in and outside of PJM. June 30, 1999.

Penobscot Hydro, LLC

United States of America, Before the Federal Energy Regulatory Commission, Penobscot Hydro, LLC, Docket No. ER99-1940-000, prepared market power analysis and managed the development of direct testimony submitted in support of Penobscot's application for

authority to sell energy, capacity, and ancillary services at market-based rates. February 25, 1999.

Pennsylvania Power & Light Company, PFG Gas, Inc., North Penn Gas Company

Managed the economic analysis and market power determination in support of the application of Pennsylvania Power & Light Company, PFG Gas, Inc., and North Penn Gas Company for approval of a proposed merger. 1997-98.

Pennsylvania Power & Light Company

Applied economic theory and regulatory policy principles to support the evaluation of a stranded cost dispute arising between PP&L, Inc., and UGI Utilities, Inc. 1997.

PRESENTATIONS

"Power Plant Technologies and Characteristics," The Harvard Institute for International Development's Third Annual Program on Climate Change and Development, June 19, 2000.

"Transmission Planning & Investment in the RTO Era" (with John Farr and Susan F. Tierney), workshop at Infocast Conference on Transmission Pricing, Chicago, IL, May 1, 2000.

"The U.S. Market for Merchant Plants—Outlooks, Opportunities and Impediments," CBI's 4th annual Profit from Merchant Plants Conference, January 31, 2000.

"Projecting Electricity Prices for a Restructured Electricity Industry," EXNET Merchant Power Plant Conference, Washington, DC, June 3, 1999.

"Transmission Planning and Competitive Generation Markets: The New England Case," EUCI conference on Transmission Restructuring for Retail Competition, Denver, CO, March 25, 1999.

"Key Issues in Ancillary Service Markets," IBC conference on Pricing and Selling Ancillary Services in a Competitive Market Conference, San Francisco, CA, March 11, 1999.

"Successfully Forecasting the Price of Energy and Other Products," workshop presented at IBC's conference on Successful Load Profiling, San Francisco, CA, December 2, 1998.

"International Perspective: Lessons from the U.S. Deregulation Experience," Nordic Power '98, Stockholm, Sweden, October 7, 1998.

"Successfully Forecasting the Price of Energy and Other Products in a Restructured Electric Power Industry," workshop presented at IBC's 3rd Strategic Forum on Market P rice Forecasting, Baltimore, MD, August 24, 1998.

"Managing Market Share Loss with the Opening of Retail Markets to Competition," Electric Utility Business Environment Conference, Denver, CO, June 24, 1998.

"Multi-Attribute Trade-Off Analysis for Water and Electricity Policy Development," presented in Mendoza, Argentina, July 1996 and April 1997.

"The Basics of Cogeneration," presented at the Tufts University Forum on Energy Conservation, December 1993.

"Implications and History of the MIT Cogeneration Project," presented to the Massachusetts Society of Professional Engineers, November 1993.

OTHER PROFESSIONAL ACTIVITIES

Registered Professional Engineer, Commonwealth of Massachusetts
Fluent in Spanish

Thomas Deedy
P.O. Box 7804
Warwick, RI 02887

Summary

An experienced engineering professional with a record of accomplishment in all phases of power facility management including; design, performance, environmental compliance, predictive maintenance and operation. Thorough understanding of engineering principles as they relate to maximizing plant performance and availability with a commitment to achieving continuous improvements while emphasizing safety. A complete understanding of the importance of and procedures to comply with environmental rules and regulations.

Professional Experience

Calpine
Senior Project Engineer – 2001-Present
Work closely with the Regional Development Managers in the development of new power plant projects. Organize and lead the initial engineering and technical review efforts in the design of combined-cycle power plants. Determine the preliminary conceptual design, using standard design guidelines, as well as run the up-front project heat balances. Interface with utilities, steam hosts, gas suppliers, permitting agencies, consultants and other organizations involved with the development of power projects. Coordinate the initial engineering effort with a selected A/E firm.

Operations Manager – Calpine Tiverton Power 2000
Responsible for day to day operation of a 265 MW Combined Cycle Gas Turbine Generating Station.
Manage a staff of 10 operators and assume the duties of the Plant Manager in his absence.
Directly responsible for the facilities' Predictive Maintenance and Performance Monitoring Programs.

Energy Management Inc.

Plant Engineer – Tiverton Power Associates 1999-2000
Provided on site construction oversight support for a 265 MW Combined Cycle Gas Turbine Generating Station.
Along with the Plant Manager I interviewed, evaluated and hired entire plant staff.
Set up and oversaw operation's staff training and set up Predictive Maintenance, Preventative Maintenance and Lock Out Tag Out Programs.
As one of a three member management team I supervised start up and commissioning of the facility.
My post start up responsibilities included Control Room Supervisor, Predictive Maintenance, Plant Performance Monitoring and Environmental Compliance.

Facilities Engineer 1997-1999
Reporting directly to the VP of Engineering - comprehensive involvement in more than $300 million in new gas turbine combined cycle development and permitting, progressing to construction and start up. My ongoing involvement at the Dighton, Tiverton and Rumford Power Associates projects included minimum design criteria input, engineering design review/contract management; on-site follow-up with EPC contractors and support to construction management; also responsible for RFP's, equipment procurement, leasing and continuous vendor performance evaluations. Support of the Dartmouth/ Pawtucket operating facilities in plant engineering, vibration diagnostics and emissions reporting.

Performance and Compliance Engineer 1993- 1997
Responsibilities include environmental compliance, predictive maintenance, performance monitoring and oversight of the chemical treatment program at two gas turbine combined cycle power plants.
Environmental compliance consisted of air, water and hazardous waste management and reporting. The predictive maintenance program primarily utilized vibration analysis with Bentley Nevada and CSI hardware and software.

Ebasco Plant Services (contract bought out by E.M.I.) 1993
Performance and Compliance Engineer

Drew Industrial Division, Div. Ashland Chemical 1988-93
Boontown, NJ
Field Representative
Responsible for serving territory in Connecticut, Rhode Island and Southeastern Massachusetts

Bridgeport Resco Company 1988
Bridgeport, CT
Utility Operator
Assisted in the operation of the refuse recovery plant through start up and commissioning. The facility consisted of a 900 lb steam system and a 67megawatt generator

SunTransport Company 1987
Aston, PA
3rd Assistant Engineer, SS. America Sun
Responsible for the operation of a 900 lb steam plant with an operating main engine of 25,000shp

Education
BS. Marine Engineering, Mass Maritime Academy, Buzzards Bay, MA, 1987

Licenses
USCG 3rd Assistant Engineer's License

Additional Skills/Training
Computer proficiency with IBM, Windows, Excel, Word, Pi, Maximo, Plant View, PowerLog, Bailey and L&N Distributed Control Systems, Cisco Emissions Monitoring and Bently Nevada and CSI software packages
Massachusetts Wastewater Operator
Hazardous Waste First Responder
CPR/First Aid
Bently Nevada Vibration Analysis for Power Plants

William H. Bailey, Ph.D.
Principal Scientist

Professional Profile

Dr. William H. Bailey is a Principal Scientist and manages the Health practice scientists in the firm's New York office. Before joining Exponent, Dr. Bailey was President of Bailey Research Associates, Inc., the oldest research and consulting firm with specialized expertise in electromagnetic fields and health. Dr. Bailey specializes in applying state-of-the-art assessment methods to environmental health and impact issues. His 30 years of training and experience include laboratory and epidemiologic research, health risk assessment, and comprehensive exposure analysis. Dr. Bailey is particularly well known for his research on potential health effects of electromagnetic fields and is active in setting IEEE standards for human exposure to electromagnetic fields. He uses advanced analytical and statistical methods in the design and analysis of both experimental studies and epidemiology and survey research studies. Such methods include Monte Carlo and other probabilistic methods to characterize uncertainties pertaining to exposure impacts and the determination of "safe" environmental exposures.

In addition to his training and experience in health risk assessment, Dr. Bailey's postgraduate training in the social, economic, and behavioral sciences is helpful in assessing the important effects of social, economic, and community factors on health risks and vulnerability to environmental impacts in health and environmental justice research. He is a member of a working group that advises a committee of the World Health Organization on risk assessment, perception, and communication. Dr. Bailey is also a visiting scientist at the Cornell University Medical College and has lectured at Rutgers University, the University of Texas (San Antonio), and the Harvard School of Public Health. He was formerly Head of the Laboratory of Neuropharmacology and Environmental Toxicology at the New York State Institute for Basic Research, Staten Island, New York, and an Assistant Professor and NIH postdoctoral fellow in Neurochemistry at The Rockefeller University in New York.

Credentials and Professional Honors

Ph.D., Neuropsychology, City University of New York, 1975
M.B.A., University of Chicago, 1969
B.A., Dartmouth College, 1966

Sigma Xi; The Institute of Electrical and Electronics Engineers/Standards Coordinating Committee 28 (Subcommitee 3, Safety Levels with Respect to Human Exposure to Fields (0-3kHz) and Subcommitte 4, Safety Levels with Respect to Human Exposure to Radiofrequency Filds (3 kHz–3 GHz); Elected member of the Committee on Man and Radiation (COMAR) of the IEEE Engineering in Medicine and Biology Society (1998–present); Invited Speaker, First Institute of Neurological Sciences Symposium in Neurobiology, University of Pennsylvania (1980); Invited Speaker, National Heart and Lung Institute (1977)

PROFESSIONAL RESUME

BRIAN E. DEMPSEY, P.E., P.T.O.E.

EDUCATION

B.C.E., Villanova University, Civil Engineering, 1986
M.B.A., Fordham University, Finance, 1992

PROFESSIONAL REGISTRATION

Professional Engineer:

States of New York, New Jersey, Delaware, Pennsylvania and Connecticut
Certified Professional Traffic Operations Engineer

TECHNICAL SPECIALITIES

Mr. Dempsey has 15 years experience encompassing:

- Traffic Engineering Studies
- Traffic Planning Studies
- Parking Studies
- Environmental Impact Statements
- Traffic Demand Management

REPRESENTATIVE EXPERIENCE

Traffic Engineering Studies

Bowline Power Plant, Haverstraw, New York – Mr. Dempsey was the Project Manager of Traffic Engineering for the preparation of an Article X Application for Unit 3 of the Bowline Site. Traffic studies included traffic counting surveys, volume projections, and detailed analysis at various intersections. Existing conditions were studied and expanded to provide probable impact and solutions for construction and operation projections. Mr. Dempsey has also been the Project Manager of Traffic Engineering for additional Power Plants in New York, as well as in Connecticut, Massachusetts, New Hampshire, and California.

Pace University, Pleasantville, New York – Mr. Dempsey was the Project Manager of Traffic Engineering for the preparation of a Generic Environmental Impact Statement for the Pace University Pleasantville Campus. Traffic studies included counting surveys at over 20 locations, including license plate, zip code and special event analysis. Existing conditions were studied and expanded to provide probable impact and solutions for near-term and long-term projections.

New Rochelle Center, New Rochelle, New York - Mr. Dempsey was the Project Manager of Traffic Engineering for the development of the 500,000 s.f. New Rochelle Center Complex. Services included preparation of studies for entire complex and its development of plans for specific Highway Improvements required to mitigate the impacts of the project on the surrounding roadway network. All projections and analysis prepared in accordance with NYSDOT requirements.

Garden State Plaza, Paramus, New Jersey - Mr. Dempsey was the Project Manager of Traffic Engineering Services for the addition of 600,000 s.f. to an existing regional shopping center, for a total of 2.0 million s.f. with 7 department stores. Services included preparation of studies for entire complex and its various stages, and development of plans for specific Highway Improvements required to mitigate the impacts of the project on the surrounding roadway network. All projections and analysis prepared in accordance with NJDOT requirements.

Nassau Park, West Windsor, New Jersey - Mr. Dempsey was Project Manager of Traffic Engineering Services for a 610,000 s.f. regional shopping center. Services included preparation of studies for entire complex and its various stages, and development of plans for specific Highway Improvements required to mitigate the impacts of the project on the surrounding roadway network. All projections and analysis prepared in accordance with NJDOT requirements.

Jersey Gardens, Elizabeth, New Jersey - Mr. Dempsey was Project Manager of Traffic Engineering Services for a 1.4 million s.f. regional shopping center. Services included preparation of studies for entire complex and its various stages, and development of plans for specific Highway Improvements required to mitigate the impacts of the project on the surrounding roadway network. All projections and analysis prepared in accordance with NJDOT requirements.

Beaverbrook, Clinton, New Jersey - Mr. Dempsey was the Project Manager of Traffic Engineering Services for a 1200-acre site for 756 residential units and a 300-room hotel adjacent to a golf course. Services included preparation of studies for entire complex and its various stages, and development of plans for specific Highway Improvements required to mitigate the impacts of the project on the surrounding roadway network. All projections and analysis prepared in accordance with NJDOT requirements.

Hebrew Hospital, Town of Greenburgh, New York - Mr. Dempsey was Project Manager of Traffic Engineering Services for a 160 bed nursing home and 80 residential unit healthcare facility. Services included preparation of studies for entire complex and its various stages, and development of plans for specific Highway Improvements required to mitigate the impacts of the project on the surrounding roadway network. All projections and analysis prepared in accordance with NYSDOT requirements.

Ryland Inn Office Park, Readington Township, New Jersey - Mr. Dempsey was Project Manager of Traffic Engineering Services for an office park of 300,000 s.f . Services included preparation of studies for entire complex and its various stages, and development of plans for specific Highway Improvements required to mitigate the impacts of the project on the surrounding roadway network. All projections and analysis prepared in accordance with NJDOT requirements.

Rutland Regional Shopping Center, Rutland, Vermont - Mr. Dempsey was Project Manager of Traffic Engineering Services for a 410,000 s.f. regional shopping center. Services included preparation of studies for entire complex and its various stages, and development of plans for specific Highway Improvements required to mitigate the impacts of the project on the surrounding roadway network. All projections and analysis prepared in accordance with Vermont DOT requirements.

Trammell Crow Residential, Lawrence Township, New Jersey - Mr. Dempsey was the Project Manager of Traffic Engineering Services for a 313-acre site for 812 mixed residential units and 125,000 s.f. retail/office space. Services included preparation of studies for entire complex and its various stages, and development of plans for specific Highway Improvements required to mitigate the impacts of the project on the surrounding roadway network. All projections and analysis prepared in accordance with NJDOT requirements.

Haymarket Square, Des Moines, Iowa - Mr. Dempsey was the Project Manager of Traffic Planning Studies for a 270,000 s.f. regional shopping center. Services included preparation of studies for entire complex and its various stages, and development of plans for specific Highway Improvements required to mitigate the impacts of the project on the surrounding roadway network. All projections and analysis prepared in accordance with Iowa DOT requirements.

Traffic Planning Studies

Friendswood Development, Clinton Township, NJ - Mr. Dempsey was the Project Manger of Traffic Planning Studies for a 705-acre Mixed Use project, to comprise over 6.0 million s.f. of Office, Research, Commercial and Residential use. Services included preparation of studies for entire complex and its various stages as well adjacent developments of equal size in close proximity, using County demographics and traffic planning patterns. Development of plans for Conceptual Highway Improvements required to mitigate the impacts of the project on the surrounding roadway network. All projections and analysis prepared in accordance with NJDOT requirements.

Perryville Corporate Park, Union Township, NJ - Mr. Dempsey was the Project Manager of Traffic Planning Studies for an Office Park to be comprised of 6-buildings of 300,000 s.f. each. Services included preparation of studies for entire complex and its various stages, and development of plans for specific Highway Improvements required to mitigate the impacts of the project on the surrounding roadway network. All projections and analysis prepared in accordance with NJDOT standards and Hunterdon County Planning Guidelines.

Meadowlands Town Center/Meadowlands Mills, Hackensack Meadowlands, NJ - Mr. Dempsey was the Project Manager of Traffic Planning Studies for Mixed Use project to consist of 1.4 million s.f. Retail, 3.0 million s.f. Office, 6,000 residential units and related uses such as Hotel, Transit Center and amenities. Site in close proximity to the Meadowlands Sports Authority including Giants Stadium and Byrne Arena. Services included preparation of studies for entire complex and its various stages, and development of Conceptual Plans for Highway Improvements required to mitigate the impacts of the project on the surrounding roadway network. All projections and analysis prepared in accordance with NJDOT standards.

Interchange Commerce Center, Towns of Woodbury/Harriman, NY - Mr. Dempsey was the Project Manager of Traffic Planning Studies for a 300-acre Mixed Use project, to contain a market-driven mix of Office, Industrial and Commercial uses. Services included preparation of studies for entire complex and its various stages and compositions, as well adjacent developments in close proximity, using State demographics and traffic planning patterns. Development of a "traffic budget" to allow certain levels of development based on specific Highway Improvements required to mitigate the impacts of each level on the surrounding roadway network. Consideration given for alternatives of "State improvements vs.

no State improvements". All projections and analysis prepared in accordance with NYSDOT requirements.

Nationwide Studies for Shopping Center Characteristics - Mr. Dempsey was the Project Manager of studies done for the International Council of Shopping Centers and the Institute of Traffic Engineers relative to determining Trip Generation Rates and Pass-By Rates at shopping centers throughout the United States.

Parking Studies

Manhattan College, Riverdale, New York - Mr. Dempsey was the Project Manager of a study of existing Parking Facilities to quantify existing shortfall at 10 scattered parking lots. Services included projection of needs for 5 years and site studies for feasibility of required parking structure.

Haymarket Square, Des Moines, Iowa - Mr. Dempsey was the Project Manager of a study of Parking Facilities for a 270,000 s.f. regional shopping center. Services included projection of parking needs for the various portions of the center and layout of parking facilities.

Environmental Impact Studies

Mr. Dempsey has been involved in the preparation of several Environmental Impact Studies including, but not limited to, the following:

Windwood-on-Hudson, South Nyack, New York - Mr. Dempsey compiled information for the Environmental Impact Statement of this 30-lot subdivision located along Route 9A in South Nyack.

Hebrew Hospital, Greenburgh, New York - Mr. Dempsey helped prepare the Environmental Impact Statement for this 164-bed health care facility and 80 residential unit congregate care facility in the Town of Greenburgh, New York.

Hunters Knoll, Mount Kisco, New York - Mr. Dempsey helped prepared an Environmental Impact Study for this 86-lot subdivision located in Mount Kisco, New York.

PROFESSIONAL AFFILIATIONS
Institute of Transportation Engineers - Member

VOLUNTEER TRAFFIC SERVICES
City of Rye (NY) Traffic and Transportation Committee
City of Rye (NY) Parking Committee
Town of Greenwich (CT) S.P.O.R.T.S. Traffic Committee
Institute of Transportation Engineers Trip Generation Committee

WORK HISTORY

Engineer to Project Manager
TRC Raymond Keyes Associates
1986 to Present

Civil Engineering Intern
Westchester County Department of Public Works
1984 to 1985

Exhibit 5. David A. Devine

David A. Devine
22 Bradford Green Way
Bradford, MA 01835

David A. Devine serves as a Project Development Manager for Calpine Eastern, developing natural gas fired combined cycle projects in New York State. Mr. Devine has been involved in the Power industry for 25 years, and has experience in the development, construction, operations and maintenance of many power projects domestically. Mr. Devine also has experience with international construction projects.

RESUME

SUMMARY

Over twenty-nine years of experience in geotechnical and civil engineering, design, research, and supervision related to marine and waterfront structures, industrial facilities, nuclear and fossil-fueled power generating stations, and waste disposal facilities. Has served as the lead civil engineer for numerous power generation projects both in the United States and in several foreign countries, and as a Project Manager for site development and permitting for several power projects. These projects included siting studies, foundation investigations, environmental compliance documents and designs, permitting, construction plans and specification, and civil and geotechnical engineering. Many projects have included the design of ash disposal facilities for fossil power plants. Administrative responsibilities have included supervision of a group of over twenty technical specialists, engineers, and designers associated with civil and geotechnical engineering.

EXPERIENCE DETAIL

Project Manager, 2000-Present, Parsons

Responsible for site development and permitting support for the following power projects:

- Glenville Energy Park - 500 MW, 2 x 1 combined cycle
- Endless Mountains - 800 MW, 3 x 1 combined cycle
- Wawyanda Energy Center – 500 MW, 2 x 1 combined cycle
- Lawrence Energy Center – 1100 MW, 3 x 1 combined cycle
- DePere Energy Center – 300 MW, 1 x 1 combined cycle
- Bayou Verret Energy Center - 500 MW, combined cycle

Senior Geotechnical Engineering Consultant, 1994-2000, Parsons

Perform specialized consulting in geotechnical and geo-environmental areas. Responsible for foundation studies and recommendations for large and complex projects, including permitting for land development, soil erosion, Army Corps of Engineers, and pipeline right-of-way occupancy. Recent representative projects are as follows:

- Lead Civil Engineer responsible for foundation studies and recommendations; construction plans and specifications; and civil engineering for several gas turbine power projects in both the U.S. and abroad.

- POSEC (POSCO Engineering & Construction Co., Ltd.). Responsible for foundation studies and recommendations, environmental requirements, construction plans and specifications, and civil engineering for the 300 MW combined cycle power project in Pohang, Korea.

- Hanjung (Korea Heavy Industries & Construction Co., Ltd.). Responsible for foundation studies and recommendations, environmental requirements, construction plans and specifications, and civil engineering for the 330 MW combined cycle power project in Bhander, India.

- Westinghouse Electric Corporation. Responsible for foundation studies and recommendations, environmental requirements, construction plans and specifications, and civil engineering for the 240 MW Termocentro simple cycle power project in Puerto Olaya, Colombia. This work included ten trips to Colombia to interface with the Owner, Owner's Engineer, and contractor).

- L. S. Power Corporation. Lead Civil Engineer responsible for foundation studies and recommendations, construction plans and specifications and permit documents for two 240 MW combined cycle cogeneration projects in Whitewater, Wisconsin, and Cottage Grove, Minnesota.

- York County Energy Partners. Lead Geotechnical Engineer responsible for coordination of geotechnical studies for a 200 MW cogeneration project in Spring Grove, Pennsylvania.

- Westinghouse Electric Corporation. Lead Geotechnical Engineer responsible for coordination of geotechnical studies for cogeneration projects in Korea and Argentina.

- Freehold Cogeneration Associates. Lead Geotechnical Engineer responsible for foundation studies and recommendations for a 120 MW cogeneration project in Freehold, New Jersey.

- Panda Energy Corporation. Lead Civil Engineer responsible for review civil and geotechnical work (owner's representative) for a 230 MW cogeneration facility in Brandywine, Maryland.

Manager, Civil/Geotechnical Engineering , Gilbert/Commonwealth
Maintain required range of skills and level of personnel; ensure work production and quality levels; develop and monitor budgets and schedules; maintain department revenue and reimbursable goals; pursue new business; and develop markets for all civil, geotechnical, and hydraulic personnel. Supervised the following projects:

- Tennessee Valley Authority. Responsible for the engineering design and environmental resolution of various tasks relating to soil and

groundwater contamination, waste remediation and waste disposal facilities. Projects have included design, specifications and contract management for bioremediation of hydrocarbon contaminated soils, quality control management for ash disposal, design of above ground storage task systems, and site studies for ash disposal facilities.

- Santee Cooper, Cross Generating Station - Unit 1. Responsible for the civil and geotechnical design for a 500 MW fossil generating station. Work includes expansion of the existing solid waste (FGD scrubber sludge and flyash) disposal site, and expansion of the existing bottom ash and to accommodate an additional 35 years of storage for two units. Responsible for preparation of construction documents for main plant excavation, main plant caisson foundations, cooling tower, thickener and transformer foundations, and bottom ash pond expansion.

- Metropolitan Edison Company:

  - Beagle Club Ash Disposal Site (Titus Station) - Prepared conceptual and final designs for expansion of existing ash disposal site including all environmental permitting, design of impervious liner and leachate collection systems, stormwater management facilities, and construction specifications. This project saved the client over $2 million by not having to develop a new site.
  - Coal Pile Runoff Basins (Titus Station) - Prepared drawings, specifications, and environmental permitting for reconstruction of two coal pile runoff basins. Work included design of impervious liners, underdrains, and discharge structures to ensure that the basins were in conformance with present environmental regulations. Construction inspection and soil testing also were provided.
  - Precipitator Addition (Portland Station) - Performed subsurface investigation and provided foundation recommendations for two new precipitators. Critical features of the design and construction inspection included vibration monitoring of existing facilities during pile driving, and analysis and monitoring of a 30 feet deep sheet pile wall during construction loading.
  - Ash Disposal Site Study (Portland Station) - Performed screening study of several potential sites including environmental and geologic study. Prepared cost estimates and conceptual design for the preferred site. Also assisted in preparation and presentation of a public participation program to the local community.

- New York State Electric & Gas Corporation:

- FGD System (Milliken Station) - Responsible for all civil and geotechnical design for a $100 million flue gas desulfurization system addition to an existing fossil generating station. Work includes subsurface investigations, permitting assistance, and construction drawings and specifications for the FGD facility and limestone storage areas.
- Coal Pile Liner (Goudey Station) - Performed subsurface investigation, environmental permitting, conceptual and final design, cost estimates, and construction specifications for lining of an existing coal pile. Work included design of a double synthetic liner with leachate collection and leak detection systems, stormwater management facilities, and discharge structures. The construction was performed in two phases to allow the station to operate during construction.
- Coal and Ash System Upgrade (Goudey Station) - Performed subsurface investigation and provided foundation recommendations for new coal and ash handling systems. Other features included new waste treatment facilities and an area for the temporary onsite storage of ash during the winter. Associated work included stormwater management facilities, and preparation of specifications for the alternative use of cement stabilized fly ash as structural fill.

■ Environmental Power Corporation:

- Sunnyside Cogeneration Facility (Utah) - Performed subsurface investigation and provided foundation recommendations and civil site design for an 80 MW cogeneration plant. Work also included ash disposal site studies and preparation of environmental permits. Of particular note was the use of Intergraph Engineering Site Package software for the design and drafting effort.

1980 - 1984 **Supervising Geotechnical Engineer,** Gilbert/Commonwealth, Inc.
Responsible for group supervision in the performance of the geotechnical design effort and conceptual studies for all GAI projects including power plants, industrial facilities, solid waste disposal sites, and liquid waste retention ponds.

1979 **Project Engineer,** Dravo Van Houten Inc.
Bintulu Deepwater Port in Sarawak, Malaysia. Developed foundation recommendations. Of particular note was the foundation design for the 800-meter-long outer breakwater which included the underwater excavation of 3.5 million cubic meters of unsuitable soils and replacement with granular backfill. This backfill was densified by the vibro replacement technique to prevent liquefaction during loading from earthquakes or storm waves.

Project Engineer, Dravo Van Houten Inc.
Supervised soils group in the performance of design effort and conceptual studies primarily concerned with marine and waterfront structures. Clients served included Union Carbide, Alcoa, Guam Oil and Refining Company, EXXON, Aramco, Dravo Corporation, Caltex, Inc., Electro-coal Transfer Corporation, and the Government of Maylasia.

1972 - 1978 **Soils Engineer,** Stone & Webster Engineering Corporation
Responsibilities included planning and supervision of subsurface investigations and preparation of foundation recommendations for several power generation and industrial facilities. Work included significant field time for the inspection of borings, pile load testing, pile driving, earthwork, and the instrumentation and monitoring (settlement, heave, tilting and lateral displacement) of numerous structures.

1971 - 1972 **Graduate Research Assistant,** University of Massachusetts
1969 - 1971 **Research Assistant,** University of Massachusetts
Research involved testing vertical pullout capacity of marine anchors in sand and clay. Duties included fabrication and maintenance of test equipment and recording data.

1970 Summer **Inspector,** Jersey Testing Lab
Responsible for soils and concrete inspection, including testing of undisturbed soils.

EDUCATION

- B.S., Civil Engineering, University of Massachusetts, Amherst, Massachusetts, 1971
- M.S., Soil Mechanics and Foundation Engineering, University of Massachusetts, Amherst, Massachusetts, 1972

REGISTRATIONS/AFFILIATIONS

- Professional Engineer - Pennsylvania (1989), South Carolina (1991)
- American Society of Civil Engineers, Member

PUBLICATIONS

- Co-author with Erali, D.R. and Skicki, A.M., "The Lined Expansion of the Titus Generating Station Beagle Club Ash Disposal Site," American Power Conference, Chicago, Illinois, 1993
- Dunlop, P., Sandiford, R.E. and Erali, D.R., "Instrumented Load Test on a Bent Pile," Third International Conference on Case Histories in Geotechnical Engineering, University of Missouri-Rolla, 1993

- Christian, J.T., Taylor, P.K., Yen, J.K.C. and Erali, D.R., "Large Diameter Underwater Pipeline for Nuclear Power Plant Designed Against Soil Liquefaction," Offshore Technology Conference, Dallas, Texas, 1974.
- "A Study to Develop New Road Surface Courses from Natural and Waste Products Available in the Connecticut River Valley," M.S. Thesis, University of Massachusetts, 1972.

Richard P. Felak, P.E.
27 Norwood Way
Schenectady, NY 12309-4856

(518) 374-3855

Richard P. Felak, P.E., specializes in the technical, cost, performance, business, financial and regulatory aspects of integrated electric power systems. He has over thirty years experience with the modeling, analysis, planning, application, development, marketing and operation of utility and non-utility generation, transmission, and distribution projects, systems, and their components -- including working for the Public Service Electric & Gas Company, Niagara Mohawk Power Corporation, and over twenty years at the General Electric Company.

As a consultant, Mr. Felak has participated in the transmission access, retail wheeling, resource bidding, and competitive industry transition proceedings at the New York, California, Texas, Illinois, Florida, New Hampshire and Massachusetts commissions. He was an active participant and facilitator in the design and implementation process of the ISOs in New England, New York, and California -- including membership on task forces and working groups concerned with pricing and transmission access, RTO formation, membership, governance, the unbundling of costs, and financing. Recently, he contributed to the analysis of the integration of MAPP and MISO, as well as studies of the Alliance RTO. As a part of such work, he has studied other ISOs and RTOs nationwide.

Additionally, Rich has performed power marketing, and transmission grid integration assignments for merchant projects, a nationwide analysis of wheeling costs and ancillary service agreements for the EEI, authored and sponsored FERC and state commission testimony for several utility merger cases in the Midwest and West concerning transmission system impacts, and did studies of transmission opportunity costs, as well as comparisons of ancillary service constituents and charges. He also contributed to due-diligence reviews for QF refinancings, conducted national market research concerning electricity derivatives for the CBOT, and worked on the privatization of the power systems in Egypt, the Czech and Slovak Federal Republics, and Taiwan.

When at GE, Rich helped form, and then managed, their nationwide IPP development group -- including specifying and obtaining complete plant contractual, financing, permitting, project management, construction, operating, and maintenance packages. During that time, his personal responsibilities also included power sales, transmission interconnections, wheeling/ancillary services contracts and studies, and regulatory intelligence and interface functions. Other technical and managerial positions he held at GE included those covering the definition, development and application of distribution, transmission and generation planning and operations software such as multi-area production cost (MAPS) and security-constrained optimal power flow models for use by power pools, utilities, and end users.

Rich's consulting experience in the Southeast region includes studies and filing support concerning the regulatory approval of new plant construction. Previously, at GE he worked on the initial Florida Broker System, and the first Florida Coordinating Group Central Dispatch Study, as well as numerous system planning studies for utilities throughout the former SERC and its neighbors including multi-area transmission-constrained production cost, reliability, and optimal power flow modeling.

He was GE's representative on the California Public Utility Commission's working group concerned with the modeling and implications of system dispatch and transmission constraints on the allowed amounts, and operating flexibility, of generating units in California, including Reliability-Must-Run considerations. As a part of that effort, he conducted production cost and load flow studies to identify the projects' power markets, operating constraints, and economic viability. He also participated in the California Energy Commission's work on intra and interstate power exchange economics and constraints. In addition, Rich was responsible for working with the utilities in California to specify and execute all of the project interconnection studies, and resultant system modification contracts, for numerous plants and lines.

Rich was also responsible for conducting generation and transmission system expansion planning and operations analyses for NEPOOL, NYPP, PJM, and ECAR, and many of their member companies. This included numerous load flow, stability, and fault cases, as well as "integrated least-cost" studies. As a part of the economic evaluation work, he was involved with the incorporation of their "split-savings" rules and transaction reconciliation accounting into production cost calculations for use at control centers.

He helped developed the procedures and data for mimicking those pools' security-constrained operating rules. Other applications included the NYPP/PJM phase-shifting transformer tap-setting studies. He also applied many security-constrained Optimal Power Flow (OPF) cases of the pools and their members -- including the explicit representation of transmission interface limits, and generating unit commitment and dispatch constraints. More recently, using numerous models and approaches, Rich has performed analyses designed to uncover what may occur in previously regulated power systems when a fully competitive regime emerges.

Most recently, as an independent consulting member of various working groups for the "Competitive Opportunities" deregulation proceeding at the New York Public Service Commission, he contributed to the initial work on ISO formation and load pocket analysis. He also actively participated in the detailed modeling and analytical studies for the predecessor generic wheeling cost methodology proceeding. That work involved in-depth examination of the pool's system with a variety of non-traditional wheeling transactions and ground rules -- using full scale data sets, and testing alternative modeling and pricing philosophies for current and future years. In addition to his involvements at the NYPSC, he did a project for the former NY State Energy Office to advise them on the available models and features to use for their analysis of the NYPP system. The result was used in their work on the state energy plan.

Rich has advised generation owners on auction strategy, asset valuation, and power sales. He is currently an independent member of the New York teams for ISO implementation, and an authorized accessor of the NY ISO market information system as an administrator for market trials and testing. Concerning power plant competitiveness, at GE he was responsible for worldwide market development and planning of their gas and steam turbine upgrading and life extension activities – including parts retrofits, control system enhancements, and short and long term O&M packages. Recently, as a consultant, Rich has been assisting owners with the development and application of neural networks for improving power sales and cycle efficiency, reducing emissions, and enhancing reliability under conditions of deterioration due to overall aging and wear, increased load cycling and unexpected ramp rates.

As the designated representative of a FERC-registered power marketer, he participated hands-on in the restructuring activities of the New England Power Pool and its ISO and RTO working groups, as well as the Inter-regional Transmission Coordination Forum (ITCF) and its development of the General Agreement on Parallel Paths (GAPP) -- which covered NYPP, PJM, NEPOOL, ECAR, and beyond. During that period, he also worked "on the ground" in New Hampshire -- arranging deals and selling power in the nation's first retail wheeling trial that involved all classes of end-users.

Mr. Felak is a registered Professional Engineer, a member of the American Arbitration Association, a Senior Member of the IEEE, a co-founder of their Task Force on Transmission Access and Non-Utility Generation, and the author of 40 publications and presentations. He holds a B.S.E.E., and M.S.E.E., in Electric Power Systems Engineering from Rensselaer Polytechnic Institute.

PUBLICATIONS/PRESENTATIONS

"The Theory and Practice of Differentiated Transmission and Ancillary Services Pricing." Power Generation and Transmission Pricing and Asset Valuation Conference, December 1996.

"Implementing RTGs and ISOs: Not Just a Technicality." The Electricity Journal, June 1996.

"IEEE Glossary of Terms and Definitions Concerning Electric Power Transmission System Access and Wheeling." Publication Number 96 TP 110-0. Institute of Electrical and Electronics Engineers, Power Engineering Society, January 1996.

"Bridging the Gap Between Theory and Practice of Transmission Pricing." Chapter in Electricity Transmission Pricing and Technology. Electric Power Research Institute. Kluwer Academic Publishers, 1996.

"Service, Shmervice: The Differentiation of Delivered Electric Power Qualities." The Electricity Journal, August/September 1995.

"Building a System That Works." McGraw Hill's Making Retail Wheeling Work Conference, June 1995.

"Implementing Transmission Access: Getting the Genie Out of the Bottle(neck)." Public Utilities Fortnightly, May 1, 1995.

"Implementing Transmission Access: NOT Just a Technicality." Transmission and Distribution Magazine's National Conference and Summit Meeting on Transmission Access, Wheeling, and Deregulation of Utilities, May 1994.

"The Four W's" (Incurred and Avoided Costs of Transmission Access). Public Utilities Fortnightly, April 1, 1994.

"Why It Pays to Understand FERC's New Requirements." Electrical World, January 1994.

"Flow Duration Curves are a New Tool in Analyzing Wheeling Capabilities." Transmission & Distribution, November 1993.

"Expansion Planning and Forecasting: Ministry of Electricity and Energy, Egyptian Electricity Authority". Chapter in Policy Reform and Institutional Development Assessment for Competitive Market Adaption of the Egyptian Power Sector. Office of Energy and Infrastructure, Bureau for Research and Development and Cairo Mission, United States Agency for International Development, June 7, 1993.

"How Flow Duration Curves Define Transmission Usage." Electrical World, June 1993.

"Reliability and Transmission Access." Public Utilities Fortnightly, July 15, 1992.

"Electric Power System Least-Cost Development Study: Terms of Reference, Czech and Slovak Federal Republic, Federal Ministry of Economy". The World Bank, May 9, 1991.

"Prepared Direct Testimony before the Federal Energy Regulatory Commission, and the Kansas Corporation Commission (concerning the transmission system transfer limit effects of the merger of The Kansas Power & Light Company, and the Kansas Gas & Electric Company)." Docket No. EC91-2-000, 1991.

"Getting the Power Out of the Plant." IPP Contracts and Agreements Conference, June 1990.

"Wheeling Impact Analyzed for Northeast Utilities." GE Systems Innovations, October 1989.

"Analysis of Wheeling Costs Shows Impact on System." Transmission & Distribution, March 1989.

"Achieving Least-Cost Planning and Operations Through Optimal Power Flows." GE Systems Innovations, May 1988.

"The Integrated Effect of Wheeling on Total System Production Costs." NARUC Biennial Regulatory Information Conference, 1988.

"The Integrated Effect of Phase Angle Regulators on Production Costs of Two Pools." Pennsylvania Electric Association System Planning Conference, 1988.

"Cutting Fuel Costs with Optimal Power Flows -- An Integral Part of Least-Cost Planning and Operations." Public Utilities Fortnightly, February 18, 1988.

"Cost-Effective Life Extension Requires Systemwide Analysis." Electrical World, October 1987.

"The Economics of Systemwide Power Plant Upgrades." American Power Conference, 1987.

"Electric Utility and Regulatory Considerations." Chapter in Cogeneration: Why, When, and How to Assess and Implement a Project. Marcel Dekker, Inc., 1986.

"Utility and Regulatory Factors Affecting Cogeneration and Independent Power Plant Design and Operation." Industrial Energy Technology Conference, 1985.

"The Application of Optimized Generation Planning to Worldwide Energy Issues." National Regulatory Research Institute Conference on Electric Generation System Expansion Analysis, 1981.

"The Practical Approach to Generation Planning." Edison Electric Institute Computer Forum, 1978.

"Optimized Generation Planning." GE brochure, 1978.

"Integrating Financial Analysis with Generation Planning." Pennsylvania Electric Association System Planning Conference, 1978.

"The Necessity of Including Financial Simulation in Long Range Generation Planning." American Power Conference, 1978.

"The Effect of Load Growth Uncertainty on Generation System Expansion Planning and Financial Analysis." American Power Conference, 1978.

"Optimized Generation Planning Handbook." GE Electric Utility Systems Engineering, 1977.

"Adding Financial Simulation to Long Range Generation Planning." American Power Conference, 1977.

"The Effect of Load Factor on Generation Mix and Financial Planning." Frontiers of Power Technology Conference, 1976.

"STAG Combined Cycle Power Systems." GE brochure, 1974.

"Operation and Maintenance Costs for Fossil-Fired Steam Turbine-Generator Units." GE Power Generation Report, 1971.

"The Effect of Load Forecasting Deviation on Loss-of-Load Probability." GE Power Generation Report, 1968.

Exhibit 8. John Molyneux Flumerfelt, Jr.

John Molyneux Flumerfelt, Jr.
14 Phillips Road
Falmouth, Maine 04105

Employment History

Director – Public Relations, Eastern Regional Office, Calpine Corporation, January 2001 to present:

Manage all public, community and media relations efforts related to Calpine's operating and proposed power generation facilities in power markets throughout the East Coast.

Partner – Barton & Gingold, Portland, Maine, April 1999 to December 2000:

Served as Partner with full service consulting firm specializing in Public Relations, Communications, Marketing, Management Consulting, Strategic Planning and Executive Search. Individual practice focuses on energy- and transportation-related project development and communications, assisting clients with issues related community relations, marketing, graphic design (including print and web-based products), media relations, and government relations. Practice includes facilitation, media and communications training and formal communications planning.

Vice President – Granite State Gas Transmission, Inc. (pipeline subsidiary of Bay State Gas Company), Westborough, Massachusetts, 1992-1999:

Helped manage company project development and expansion efforts. Coordinated all government and public affairs efforts for development of Portland Natural Gas Transmission System and proposed Wells LNG project, as well as ongoing community relations and other communications activities in support of day-to-day operations. Provided support for various corporate initiatives including market expansion analysis for Bay State Gas subsidiary Northern Utilities, Inc. Participated in numerous regulatory proceedings and served as company witness before Maine Public Utilities Commission and Canada National Energy Board.

Director of Energy Policy and Planning – Maine State Planning Office, Augusta, Maine, 1989-1992:

Served in state Executive Department as senior state energy official. Provided analytical support for various administrative and legislative initiatives and was responsible for state energy emergency planning efforts. Coordinated process for state Commission on Comprehensive Energy Planning leading to publication of 1992 state energy plan.

Assistant Director – National Independent Energy Producers, Washington, D.C., 1988-1989

Director, Congressional Relations – National Association of Regulatory Utility Commissioners, Washington, D.C., 1987-1988

Senior Legal Assistant – Crowell & Moring, Washington, D.C., 1985-1987

Education

B.A., History, Hobart and William Smith Colleges, Geneva, New York, 1979

Exponent
Failure Analysis Associates

J. Duncan Glover, Ph.D., P.E.
Principal Engineer

Professional Profile

Dr. J. Duncan Glover is a Principal Engineer based in Exponent's Boston, Massachusetts, office. Dr. Glover specializes in issues pertaining to electrical engineering, particularly as they relate to failure analysis of electrical systems, subsystems, and components, including causes of electrical fires. His expertise covers electric power systems, generation, transmission, distribution, power system planning, extra high voltage design, power system dynamics assessment, and computer-aided design. Dr. Glover is experienced in analyzing such elements as control systems, power electronics, motor drives, inverters, rectifiers, rotating electric machinery, switchgear, and transformers, as well as residential and commercial appliances.

Prior to joining Exponent, Dr. Glover was an Associate Professor in the Electrical and Computer Engineering Department of Northeastern University and also held several engineering positions with companies that include the International Engineering Company, Commonwealth Associates, Inc., and American Electric Power Service Corporation.

Credentials and Professional Honors

Ph.D., Electrical Engineering, Massachusetts Institute of Technology, 1971
M.S., Electrical Engineering, Massachusetts Institute of Technology, 1968
B.S., Electrical Engineering, University of Massachusetts, 1966

Registered Professional Electrical Engineer, Massachusetts, #30136

Tau Beta Pi; Eta Kappa Nu; Phi Eta Sigma

Institute of Electrical and Electronics Engineers (senior member); Rotating Machinery Committee, Institute of Electrical and Electronics Engineers (member)

Publications

"Computer-Aided Design of PM Stepper Motor Drives," Proceedings, 23rd Annual Incremental Motion Control Systems and Devices Symposium, San Jose, CA, June 1994 (with E. Voiculescu and A. Laszlo).

"Computer-Aided Design of a Stepper Motor Driver," Proceedings, 22nd Annual Incremental Motion Control Systems and Devices Symposium, San Jose, CA, June 1993 (with E. Voiculescu and A. Laszlo).

"State Estimators with Forecasting Capability," Proceedings, 11th Power Systems Computation Conference, Avignon, France, August 1993 (with M.B. Coutto Filho and A.M. Leite da Silva).

"A Zoom Feature for a Dynamic Programming Solution to Economic Dispatch Including Transmission Losses," Transactions on Power Systems, Institute of Electrical and Electronics Engineers, Vol. 7(2), pp. 544–551, May 1992 (with Z.X. Liang).

"Improved Cost Functions for Economic Dispatch," Transactions on Power Systems, Institute of Electrical and Electronics Engineers, Vol. 6(2), pp. 821–829, May 1991 (with Z.X. Liang).

"The Personal Computer in Electrical Engineering," *Electrosoft*, special issue on Software for Electrical Engineering Education, pp. 3–5, March 1991.

"Student Design Projects in Power Engineering," Transactions on Power Systems, Institute of Electrical and Electronics Engineers, Vol. 5(4), pp. 1390–1400, November 1990 (with L. Dow).

"A Personal Computer Software Package for Power Engineering Education," Transactions on Power Systems, Institute of Electrical and Electronics Engineers, Vol. 3(4), pp. 1864–1872, November 1989.

"Train Voltage Analysis for AC Railroad Electrification," Transactions on Industry and Applications, Institute of Electrical and Electronics Engineers, Vol. IA-20(4), pp. 925–934, July/August 1984 (with A. Kusko and S. Peeran).

"State Estimation of Interconnected HVDC/AC Systems," Transactions on Power Apparatus and Systems, Institute of Electrical and Electronics Engineers, Vol. PAS-102(6), pp. 1805–1811, June 1983 (with M. Sheikholeslami).

"Batteries and Fuel Cells - Alternative Traction Power for Locomotives and Self-Powered Railcars," Transportation Systems Center Report DOT-TSC-TR, March 1983 (with F.L. Raposa).

"Identifiability of Unknown Covariance Matrices for Some Special Cases of a Linear, Time-Invariant, Discrete-Time Dynamic System," Transactions on Automatic Control, Institute of Electrical and Electronics Engineers, Vol. AC-26(4), pp. 970–974, August 1981 (with W. Tsang and R. Bach).

"Grounding Practices for Electric People Mover Vehicles," Proceedings, Institute of Electrical and Electronics Engineers Industrial Applications Society, Cincinnati, OH, September/October 1980 (with A. Kusko and J. LaMarca).

"Advanced Load Frequency Control," Transactions on Power Apparatus and Systems, Institute of Electrical and Electronics Engineers, Vol. PAS-91(5), pp. 2095–2104, September/October 1972 (with F. Schweppe).

"Control of Linear Dynamic Systems with Set Constrained Disturbances," Transactions on Automatic Control, Institute of Electrical and Electronics Engineers, Vol. AC-16(5), pp. 411-423, October 1971 (with F. Schweppe).

"The Linear Estimation of Completely Unknown Signals," Transactions on Automatic Control, Institute of Electrical and Electronics Engineers, Vol. AC-14(6), p. 766, December 1969.

Presentations and Published Abstracts

"Impact of Power Harmonics on Electric Power System Equipment," Institute of Electrical and Electronics Engineers Power Engineering Society (Boston Chapter) Seminar, Power Quality in the Electric Utility Industry, Watertown, MA, May 1994 (with A. Kusko).

"Effect of Geomagnetic-Induced-Current on Power Grids and Communications Networks," North American Power Symposium, Auburn, AL, October 1990 (with M. Sarma and J. Kolawole).

"Energy and Public Policy, a Liberal Arts Course for Power Engineering and Political Science Students," 1980 American Society of Engineering Educators Conference, Amherst, MA, June 1980 (with P. Hopper).

"Load Frequency Control of Electric Power Systems," Electric Power Systems Engineering Laboratory, School of Engineering, Massachusetts Institute of Technology, February 1971.

"Modeling of Hydroelectric Power Systems," Bonneville Power Administration, Portland, Oregon, January 1970.

Books

"Power System Analysis and Design with Personal Computer Applications," 2nd edition, PWS Publishers, Boston, MA, 1994 (with M. Sarma).

"Power System Analysis and Design Software," 2nd edition, PWS Publishers, Boston, MA, 1994 (with G. Digby).

Book Chapters

"Failure Analysis of Printed Wiring Assemblies"(with R. Blanchard et al.), " Switches and Relays"(with P. Martin et al.), "Failure Analysis of Components" (with D. Galler et al.), In: *Electronic Failure Analysis Handbook*, McGraw Hill Publishing Company, 1999.

"Encyclopedia of Energy Technology and The Environment," In: Electric Power Distribution, John Wiley & Sons, New York, NY, 1995.

"Transmission Planning," In: The Electrical Engineering Handbook, Section 58.8, CRC Press, Boca Raton, FL, 1993.

RICHARD D. HOLMES, Ph.D., R.P.A.

EDUCATION

Ph.D., Anthropology, University of Massachusetts, Amherst 1988
M.A., Anthropology, University of Massachusetts, Amherst 1981
B.A., History, Amherst College, Amherst, Massachusetts 1973
Certificate in Museum Studies, Harvard University, Cambridge, Massachusetts 1993
30 graduate credit hours, History, University of Massachusetts, Amherst

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS

Dr. Holmes is a Registered Professional Archaeologist (R.P.A.) and meets the Secretary of the Interior's Professional Guidelines for Prehistoric Archaeologist, Historic Archaeologist, and Historian. He has worked in more than twelve states and is certified as a Supervisory Archaeologist and Ethnographer by the Navajo Nation.

TECHNICAL SPECIALTIES

Dr. Holmes has 24 years of experience, the last six of these with TRC.

- Cultural Resource Management: Anthropology (163), Archaeology (164)
- Data Recovery Excavations
- Test Excavations
- Site Inventory
- Historical Investigations (179)
- Ethnographic and Oral History Investigations
- Preparation of Data Recovery Plans and Research Designs
- Preparation of Cultural Resource Management Plans
- Planning of Museum Exhibits and Working in Collections
- Preparation of Popular Documents

EXPERIENCE

Cultural Resource Management

Dr. Holmes serves as a project manager cultural resource management projects for TRC. He conducted research in New Mexico, Texas, Louisiana, Tennessee, Alabama, New Jersey, New York, Massachusetts, Pennsylvania, New Hampshire, and Vermont. He regularly works with laboratory, archival, and field personnel to improve the quality of their performance and assures that the particular research needs of a project are met. Among his experience is extensive research in the historic period of the Northeast, as well as in the Southwest. His duties include developing proposals, preparing budgets and schedules, planning and conducting research, writing reports, and working with clients to provide useful products.

Data Recovery Excavations

Data Recovery at Sampson's Tavern Historic Site, Lakeville, Massachusetts. While employed at the University of Massachusetts Archaeological Services, he directed a multi-phase study of a complex site including an Archaic lithic workshop and a large historic structure. His work included coordination with several field archaeologists, consultants, and analysts.

Data Recovery for the San Pedro Creek Estates Powerline, Bernalillo County, New Mexico. Dr. Holmes participated in a limited data recovery operation at a prehistoric site near a famous ruin excavated by Bandelier. There was also an historic component to this project.

Test Excavations

Historic Site Testing at McGuire Air Force Base, Burlington County, New Jersey. Dr. Holmes conducted site testing programs at this military facility approximately 35 miles east of Philadelphia. The sites date from the early nineteenth to the middle of the twentieth centuries.

Site Testing of Six Historic Sites, Kirtland Air Force Base, New Mexico. This project was part of a multi-year study of Kirtland Air Force Base performed for the National Park Service. The sites include Anglo and Hispanic homesteads from the early twentieth century, as well as an abandoned sheep camp.

Site Testing of Eight Historic Sites, Barksdale Air Force Base, Bossier Parish, Louisiana. The project area included a plantation house site and several dependent properties that housed tenants or sharecroppers. As with other historic site testing programs, this project involved researching the land records in local repositories.

Site Inventory

Historic Archaeological Site Assessment, Proposed Annex to the Runnels Federal Building, Las Cruces, New Mexico. Dr. Holmes did an assessment of the potential of a parcel for historic properties. He also conducted research on the development of the area and coordinated with an architectural historian on the impacts from the proposed undertaking.

Cultural Resource Assessment, Defense Distribution Depot, Memphis, Tennessee. As part of a team composed of a prehistoric archaeologist, an historic archaeologist, and an architectural historian, Dr. Holmes prepared an assessment for a military facility from World War II scheduled for closure and redevelopment.

Archaeological Reconnaissance Survey for the Connecticut River Erosion Control Study, Vermont, New Hampshire, and Massachusetts. Dr. Holmes directed field and background research, locating prehistoric and historic sites endangered by erosion related to operation of a hydroelectric plant. Many sites were identified, and ties to individual collectors were established. One reviewer for a state agency described the report as an excellent regional study.

Archaeological Investigations for the Northeast Settlement and Niagara Settlement Projects, Tennessee Gas Pipeline Company, New York and Massachusetts. For several field seasons, Dr. Holmes researched background material on prehistoric and historic sites along the pipeline corridor. He directed field research including site reconnaissances and locational surveys. Among the sites were eighteenth century habitations, an early nineteenth century canal, and a mid-nineteenth century mill complex.

Archaeological Site Locational Survey for Pioneer Properties, Westminster, Massachusetts. This was an archaeological survey of an eighteenth and nineteenth century residence complex. A site preservation restriction was granted to protect the site on the basis of this survey. This project was one of may surveys Dr. Holmes was a part of in southern New England.

Historical Investigations

Historic Contexts and Historic Sites Study, Cape Cod National Seashore, Barnstable County, Massachusetts. Dr. Holmes directed the study of historic contexts and historic archaeological site information for the National Park Service. He was the principal author of a handbook that provides essential background for the study of the Historic period in the region and for interpretation of historic archaeological sites. For this project he also conducted four field surveys of historic sites including a potential seventeenth century farm, early nineteenth century saltworks, and Civil War gun batteries.

Historical Background Research on the Quaker Burying Ground, Norwell, Massachusetts. This project required historical research on the individuals buried in an eighteenth century cemetery, using various demographic records and other sources. Dr. Holmes identified the potential location of this lost burying ground, coordinating historical research with geophysical data and field observations.

Historical Background Research on Greylock Glen, Adams, Massachusetts. For this project, Dr. Holmes researched the background of a rural area selected for development of a resort. Extensive historic map work was completed.

Ethnographic and Oral History Investigations

Cultural Resources Inventories for Projects in the Red Rock and Thoreau Chapters, Navajo Reservation. In 1996 Dr. Holmes conducted interviews and field inspections for culturally significant structures and places for utility line projects.

Study of Native Christianity on the Navajo Reservation. For several field seasons in the early 1980s, Dr. Holmes conducted original ethnographic research on a community in Arizona composed of fundamentalist Christian Navajos. He began work in graduate school and continued research for this study of acculturation and the place of values in a society.

Study of the Nipmuck of Central New England. While in graduate school, Dr. Holmes conducted interviews and ethnohistorical research on a highly-acculturated group in an urban

setting. This project required great sensitivity to the historical experience of a group seeking tribal recognition.

Data Recovery Plans and Research Designs

Data Recovery Plan for LA 14238, LA 14241, and LA 106239. With several colleagues, Dr. Holmes prepared the data recovery plan for three prehistoric sites near the ruins of Paa-ko in New Mexico.

Research Design for Kirtland Air Force Base. One of Dr. Holmes' first assignments at TRC was the preparation of the historic archaeological research design for Kirtland Air Force Base in Albuquerque. This document sets out the research domains of significance for historical archaeologists working at this facility.

Cultural Resource Management Plans

Cultural Resource Management Plan, Redstone Arsenal, Alabama. Dr. Holmes prepared portions of this CRMP. His contributions were to the cultural overview and an assessment of the cultural resources present. Part of every CRMP are recommendations for the future and standard operating procedures for the facility's staff. Among the other CRMPs Dr. Holmes has worked on are those for ***Fort Monmouth, New Jersey***, and *Falcon Reservoir, Zapata and Starr Counties, Texas.*

Museum Exhibit Planning and Collections Work

Albuquerque International Sunport Archaeology Exhibit. Dr. Holmes managed project to completion. His work included writing a text for a permanent exhibit and brochure, and planning an exhibit on the prehistory of the Rio Grande Valley. This exhibit was nominated for a New Mexico state historic preservation award by Albuquerque's Historic Preservation Planner.

Historical Atlas of Albuquerque. Currently, he is managing a project and conducting reseaerch to produce an historical atlas that will be produced in hard copy and digital formats, with projected use as a museum interactive exhibit.

Ethnographic Exhibit Planning for the Springfield Massachusetts Science Museum's Native American Hall. As part of a planning team, Dr. Holmes wrote the ethnographic portion of the exhibit plan for a new hall of Native American people.

Native American Grave Protection and Repatriation Act Research on Southwestern Collections from the Peabody Museum, Harvard University. As part of the Museum Studies Program at Harvard, Dr. Holmes conducted research in the museum's catalog and other archival material to determine the origins of anthropological material that may possibly be burial associated.

Popular Documents

Kirtland Air Force Base: Its Environmental, Prehistoric, Ethnographic, and Historic Background. This report was prepared for the base and the National Park Service. It summarizes the background information available and the results of recent research by TRC at Kirtland AFB.

Archaeology of the Jemez Mountains. Dr. Holmes prepared the text of a report on the results of a mulit-year archaeological investigation of the OLE Transmission Line in the Jemez Mountains of New Mexico for the Public Service Company of New Mexico.

SPECIALIZED TRAINING/QUALIFICATIONS/LANGUAGES

Dr. Holmes has completed many training courses, including Introduction to Historic Preservation Law and Federal Projects. In addition to the experience detailed above, he has taught anthropology at the university-level. He has a reading knowledge of French and Spanish.

REGULATORY EXPERIENCE

Major environmental regulations with which Dr. Holmes has experience include the following:

National Environmental Policy Act of 1969 (NEPA), as amended (42 USC 4321 et seq.)
Antiquities Act of 1906, as amended (16 USC 431 et seq.)
Archeological Resources Protection Act of 1979 (ARPA), as amended (16 USC 470aa et seq.)
Historic Sites Act of 1935, as amended (16 USC 461 et seq.)
National Historic Preservation Act of 1966 (NHPA), as amended (16 USC 470 et seq.)
Native American Granves Protection and Repatriation Act of 1990 (NAGPRA), as amended (25 USC 3001-3013)
Archeological and Historic Preservation Act of 1974 (AHPA), as amended (16 USC 469-469c-2)
EO 11593 Protection and Enhancement of the Cultural Environment, May 13, 1971
American Indian Religious Freedom Act of 1974 (AIRFA), as amended (42 USC 1996 est seq.)
Archeological and Historical Resources Management (DOD Directive 4710.1)
Army Regulation 420-40 Historic Preservation
Massachusetts General Laws Chapter 9, Sections 26-27C
Massachusetts Environmental Policy Act (Massachusetts General Laws, Chapter 30)
New Mexico Cultural Properties Act
New Jersey Pinelands Commission Guidelines
New York Public Utilities Act
Antiquities Code of Texas

TECHNICAL REPORTS

Dr. Holmes is the author or co-author of over 120 cultural resource reports that have been accepted by Federal and State reviewers and regulators.

Unless otherwise stated, the following reports were produced by TRC:

Holmes, R. D.
In progress *Archaeological Site Testing of the Proposed Yarbrough Drive Extension Project, El Paso, Texas.*

Holmes, R.D. and N. Morphew, with contributions by T. Marshall, T. Goar, G. Duncan, and R.Reycraft
2001 Phase I Archaeological Survey of the Proposed Wawanda Energy Center, Orange County, New York.

Holmes, R. D., and R. M. Reycraft
2000 *Phase IA Cultural Resources Survey of the Proposed Bowline Unit 3 Project, Haverstraw, Rockland County, New York.*

Holmes, R. D., and R. M. Reycraft
2000 *Phase IA Cultural Resources Survey of the Proposed Southern Energy Bowline, L.L.C., Natural Gas Pipeline and 345 kV Line, Haverstraw and Clarkstown, Rockland County, New York.*

Holmes, R. D., M. Sechrist, and B. Morgan
2000 *Archeological Investigation of the William Beaumont Army Hospital Complex, Fort Bliss, Texas.*

Holmes, R. D., R. M. Reycraft, and T. R. Goar
1999 *Phase I Archaeological Survey of the Proposed Fiber Optic Cable, Berkshire Connector, Albany and Rensselaer Counties, New York.*

Holmes, R. D., T. R. Goar, R. M. Reycraft, and V. Provencio
1999 *Archaeological Survey of the Proposed Yarbrough Drive Extension, El Paso International Airport, El Paso County, Texas.*

Holmes, R. D., T. R. Goar, T. Binzen, and R. M. Reycraft
1999 *Reconnaissance Survey of the ESI-New Bedford LLC Project Parcel and Site Examination of the Missio Site (19-BR-338), New Bedford, Bristol County, Massachusetts.*

Holmes, R. D., C. F. Caraveo, D. Scurlock, M. T. Sechrist, and T. R. Goar
1999 *Archeological Investigations of Five Historic Localities, Fort Bliss, Texas.*

Sechrist, M. T., C. F. Caraveo, T. G. Baugh, G. D. Smith, R. D. Holmes, and M. Yduarte
1999 *Archeological Testing of Nine Prehistoric Sites Within the Proposed New Landfill at Fort Bliss, Texas.*

Holmes, R. D., and D. Scurlock
1999 *Archeological Investigations of Historic Localities Within the Cantonment, Fort Bliss, Texas*

Holmes, R. D.
1998 Albuquerque-Area Archaeology, Prepared for the City of Albuquerque Planning Department.

Holmes, R. D.
1998 Historic Cultural Land Use Study of Lower Cape Cod, a Study of the Historical Archeology and History of the Cape Cod National Seashore and the Surrounding Region. Prepared by the University of Massachusetts Archaeological Services for the Archeology Branch, Cultural Resources Center Northeast Region, National Park Service, Lowell, Massachusetts.

Holmes, R. D., C. F. Caraveo, D. Scurlock, and M. T. Sechrist
1998 *Archaeological Investigations of Five Historic Localities, Fort Bliss, Texas.*

Sechrist, M. T., C. F. Caraveo, T. G. Baugh, G. D. Smith, R. D. Holmes, and M. Yduarte
1998 *Archeological Testing of Nine Sites Within the Proposed New Landfill at Fort Bliss, Texas.*

Holmes, Richard D., and Dan Scurlock
1998 *Archeological Investigations of Historic Localities Within the Cantonment, Fort Bliss, Texas.*

Simpson, Sean, Scott Wilcox, Richard D. Holmes, and John C. Acklen
1998 *Cultural Resource Inventory of the Washita 3-D Seismic Project, Roger Mills County, Oklahoma.*

Donta Christopher L., Thomas L. Arcuti, Carolyn D. Hertz, and Richard D. Holmes
1998 *Archaeological Site Reconnaissance and Locational Surveys for the Proposed Falulah and Regional Water Filtration Facilities, Westminster and Fitchburg, Massachusetts*. Prepared by the University of Massachusetts Archaeological Services, Amherst.

Donta Christopher L., Thomas L. Arcuti, Carolyn D. Hertz, Richard D. Holmes and Mitchell T. Mulholland
1998 *A Site Examination and Archaeological Survey of a Small Historic Site for the Montachusett Industrial Park Expansion Project, Fitchburg, Massachusetts*. Prepared by the University of Massachusetts Archaeological Services, Amherst.

Holmes, Richard D., and Toni R. Goar
1997 *Site Testing of Four Historic Sites, McGuire Air Force Base, New Jersey.*

Holmes, Richard D., and Toni R. Goar
1997 *Site Testing of Six Historic Sites, Kirtland Air Force Base, New Mexico.*

Holmes, Richard D., Toni R. Goar, and Katherine J. Roxlau
1997 *Archaeological Survey of Areas 4100 and 4200, McGuire Air Force Base, New Jersey.*

Holmes, Richard D., and Toni R. Goar
1997 *Phase 2 Site Testing of Eight Historic Sites, Barksdale Air Force Base, Bossier Parish, Louisiana.*

Trierweiler, W. Nicholas, Richard D. Holmes, and Ruth D. Nichols
1996 *Cultural Resource Management Plan, Redstone Arsenal, Huntsville, Alabama.*

Holmes, Richard D., W. Nicholas Trierweiler, and Ruth D. Nichols
1996 *Cultural Resources Assessment, Defense Depot Memphis, Tennessee.*

Trierweiler, W. Nicholas, Richard D. Holmes, and Ruth D. Nichols
1996 *Cultural Resource Management Plan, Fort Monmouth, New Jersey.*

Holmes, Richard D.
1996 *Kirtland Air Force Base: Its Environmental, Prehistoric, Ethnographic, and Historic Background.*

Staley, David P., Richard D. Holmes, and David V. Hill
1996 *Data Recovery at LA 109097, Bernalillo County, New Mexico.*

Staley, David P., Richard D. Holmes, and John C. Acklen
1996 *Programmatic Treatment Plan for Proposed Mining Wastewater Treatment Facility at the Historic Townsite of Dolores (LA 83571), Santa Fe County, New Mexico.*

Carrillo, Charles M., Kurt F. Anschuetz, and Richard D. Holmes
1996 Historic Overview. In *Data Recovery for Ojo Transmission Line*, edited by J.C. Acklen, pp.1-28.

Hill, David V., Richard D. Holmes, and John C. Acklen
1996 *Data Recovery for the San Pedro Creek Estates Powerline, Bernalillo County, New Mexico.*

Holmes, Richard D.
1996 *Oral History of Kirtland Air Force Base, New Mexico.* Interviews conducted by Dan Scurlock.

Holmes, Richard D.
1996 *Native American Historic Land Use at Kirtland Air Force Base, New Mexico.*

Holmes, Richard D.
1996 *Cultural Resources Inventory of a Proposed Telephone Equipment and Electric Easement Near Thoreau, New Mexico, Thoreau Chapter, McKinley County, New Mexico.*

Holmes, Richard D.
1996 *Cultural Resources Inventory of a Telephone and Electric Easement, Red Rock Chapter, McKinley County, New Mexico.*

Roxlau, R. Blake, and Richard D. Holmes
1996 *A Cultural Resource Survey of Proposed Transmission Lines and Interchange, Gray County, Texas.*

Holmes, Richard D.
1996 *Phase 2 Site Testing of Eight Historic Sites, McGuire Air Force Base, New Jersey.*

Roxlau, R. Blake, and Richard D. Holmes
1995 *A Cultural Resource Survey for the Proposed Powerline, Dallam County, Texas.*

Holmes, Richard D., and Karen Lewis
1995 *Cultural Resource Assessment of the Runnels Federal Building Annex, Las Cruces, Dona Ana County, New Mexico.*

Acklen, John C., Richard D. Holmes, David V. Hill, Phil D. LeTourneau, Chris A. Turnbow, John A. Evaskovich, Dorothy L. Larson, and William B. Hudspeth
1995 *Data Recovery at LA 100419 AND LA 100420, Bernalillo County, New Mexico.*

Acklen, John C., Richard D. Holmes, Dorothy L. Larson, and Douglas G. Campbell
1995 *Limited Data Recovery Plan for LA 14238, LA 14241, and LA 106239, New Mexico.*

Acklen, John C., Richard D. Holmes, William B. Hudspeth, John A. Evaskovich, and M. J. Dilley
1995 *Data Recovery at Site LA 80847 on Truck A Loop Pipeline, San Juan County, New Mexico.*

Acklen, John C., Kathleen A. Adams, and Richard D. Holmes
1995 *Cultural Resource Survey of 160 Acres, Santa Fe County, New Mexico.*

Acklen, John C., Kathleen A. Adams, and Richard D. Holmes
1995 *Cultural Resource Survey of 9.89 Acres, City of Santa Fe, New Mexico.*

Turnbow, Christopher A., and Richard D. Holmes
1995 *Prehistoric and Historic Period Properties at Falcon Reservoir.* Portion of cultural resource management plan for International Boundary and Water Commission, United States Section.

Larson, Dorothy L, and Richard D. Holmes
1995 *Interim Research Design for Kirtland Air Force Base.*

Holmes, Richard D.
1995 *Archaeological Site Locational Survey of Highland Light Parking Areas, Truro, Massachusetts.*

Holmes, Richard D., Carolyn D. Hertz, Frederick T. Barker, and Mitchell T. Mulholland
1995 *Archaeological Reconnaissance Survey of Long Point, Provincetown, Massachusetts.*

Holmes, Richard D., Carolyn D. Hertz, and Mitchell T. Mulholland
1995 *Archaeological Reconnaissance Survey of the Atwood-Higgins Complex, Wellfleet, Massachusetts.*

Holmes, Richard D., Carolyn D. Hertz, and Mitchell T. Mulholland
1995 *Archaeological Reconnaissance Survey of Fort Hill, Eastham, Massachusetts.*

Holmes, Richard D., Carolyn D. Hertz, and Mitchell T. Mulholland
1995 *Archaeological Reconnaissance Survey of Higgins Hollow, Truro, Massachusetts.*

Donta, Christopher L., Richard D. Holmes, and Carolyn D. Hertz
1995 *Archaeological Surveys of the Burning Tree Subdivision, Great Barrington, Massachusetts.*

Donta, Christopher L., Richard D. Holmes, Frederick T. Barker, and Carolyn D. Hertz
1995 *Archaeological Site Locational Survey, Water Facility at Gravelly Pond, Hamilton Massachusetts.*

Donta, Christopher L., Richard D. Holmes, and Mitchell T. Mulholland
1995 *Archaeological Site Locational Survey, Cranberry Meadow Road Bridge, Spencer, Massachusetts.*

Donta, Christopher L., Richard D. Holmes, Carolyn D. Hertz, and Thomas L. Arcuti
1995 *Archaeological Site Locational Survey, I-290 Ramp, Marlborough and Northborough, Massachusetts.*

Holmes, Richard D., Carolyn D. Hertz, Joannah L. Whitney, and Mitchell T. Mulholland
1994 *Archaeological Site Locational Survey for Washington and King Street Reconstruction Project, Franklin, Massachusetts*

Holmes, Richard D., Carolyn D. Hertz, Christopher L. Donta, and Eric S. Johnson
1994 *Archaeological Site Locational Survey for the Southbridge Water Distribution Extension, Charlton, Massachusetts.*

Donta, Christopher L., Richard D. Holmes, and Mitchell T. Mulholland
1994 *Archaeological Site Locational Survey for the Proposed Walmart Site, Orange, Massachusetts.*

Holmes, Richard D., and Carolyn D. Hertz

1994 *Archaeological Site Locational Survey for the Electrical Distribution Line, Podick Station to the University of Massachusetts, Amherst, Massachusetts.*

Holmes, Richard D., Carolyn D. Hertz, and Joannah L. Whitney
1994 *Archaeological Site Locational Survey of Wetland Replication Areas, Agawam and Southwick, Massachusetts.*

Holmes, Richard D., Carolyn D. Hertz, and Mitchell T. Mulholland
1994 *Archaeological Site Locational Survey of the Proposed Bayview Corporate Park, Quincy, Norfolk County, Massachusetts.*

Mangan, Patricia, Richard D. Holmes, and Ann-Marie Mires
1994 *Archaeological Investigation of the Worcester Common Burying Ground, Massachusetts.*

Donta, Christopher L., and Richard D. Holmes
1993 *Archaeological Site Locational Survey of Mill Hill, Edgartown, Massachusetts.*

Holmes, Richard D., Christopher L. Donta, and Mitchell T. Mulholland
1993 *Archaeological Site Locational Survey of Proposed Water Facilities, Plymouth, Massachusetts.*

Holmes, Richard D., Carolyn D. Hertz, and Mitchell T. Mulholland
1993 *Archaeological Site Locational Survey for Pioneer Properties, Westminster, Massachusetts.*

Mulholland, Mitchell T., Richard D. Holmes, and Sharon A. Swihart
1993 *Archaeological Data Recovery on the Southern Portion of Yukl Pond Site, Gill, Massachusetts.*

Holmes, Richard D., Carolyn D. Hertz, and Mitchell T. Mulholland
1993 *Archaeological Site Locational Survey and Site Examination of One Historic and Two Prehistoric Sites, Lakeville, Massachusetts.*

Holmes, Richard D., Carolyn D. Hertz, and Mitchell T. Mulholland
1993 *Archaeological Site Locational Survey of Picadilly Mill, Westborough, Massachusetts.*

Holmes, Richard D., and Carolyn D. Hertz
1992 *Archaeological Site Locational Survey for Route 7/20, Lenox, Massachusetts.*

Holmes, Richard D., and Mitchell T. Mulholland
1992 *Archaeological Site Locational Survey of the "Massachusett" Hill Prehistoric Quarry, Milton, Massachusetts.*

Holmes, Richard D., Carolyn D. Hertz, J. Edward Hood, and Susan Denault
1992 *Archaeological Site Locational Survey for the Wastewater Plant, North Adams, Massachusetts.*

Holmes, Richard D.

1992 *Archaeological Site Examination of the Pipeline Crossing of the Blackstone Canal, Northbridge, Massachusetts.*

Holmes, Richard D., Carolyn D. Hertz, and Mitchell T. Mulholland
1992 *Archaeological Site Examination of Two Historic Sites in Segment 7, Northeast Settlement Project, Richmond and Stockbridge, Massachusetts.*

Holmes, Richard D., Carolyn D. Hertz, and Mitchell T. Mulholland
1992 *Archaeological Site Examination of Five Sites in Segment 8, Northeast Settlement Project, Worcester County, Massachusetts.*

Stillson, George H., and Richard D. Holmes
1992 *Archaeological Site Locational Survey for the Quashnet Woods Project, Mashpee, Massachusetts.*

Mulholland, Mitchell T., Richard D. Holmes, and David J. Bernstein
1991 *Archaeological Site Locational Survey of Segment 12, Northeast Settlement Project, Haverhill and Methuen, Massachusetts.*

Holmes, Richard D., David Bernstein, and Mitchell T. Mulholland
1991 *Archaeological Site Examination of Six Prehistoric Sites in Segment 7, Northeast Settlement Project, Berkshire County, Massachusetts, and Columbia County, New York.*

Holmes, Richard D., and Mitchell T. Mulholland
1991 *Archaeological Site Examination of the West Road Prehistoric Site, Niagara Settlement Project, Longmeadow, Massachusetts.*

Holmes, Richard D., Carolyn D. Hertz, and Mitchell T. Mulholland
1991 *Archaeological Reconnaissance Survey for the Connecticut River Erosion Control Study, Vermont, New Hampshire, and Massachusetts.*

Holmes, Richard D., Mitchell T. Mulholland, and David J. Bernstein
1991 *Archaeological Site Locational Survey of Segment 7, Northeast Settlement Project, Columbia County, New York, and Berkshire County, Massachusetts.*

Holmes, Richard D., and Mitchell T. Mulholland
1991 *Archaeological Site Examination of Two Prehistoric Sites on Longmeadow Brook, Niagara Settlement Project, Longmeadow, Massachusetts.*

Mulholland, Mitchell T., Richard D. Holmes, David J. Bernstein, and Elena Filios
1991 *Archaeological Site Locational Survey of Segment 10S, Northeast Settlement Project, Worcester County, Massachusetts.*

Stilson, George H., and Richard D. Holmes

1990 *Archaeological Site Locational Survey of Baxter Neck, Barnstable, Massachusetts.*

Holmes, Richard D., Carolyn D. Hertz, and Mitchell T. Mulholland
1990 *Archaeological Site Locational Survey and Examination at Helol Brook, Gill, Massachusetts.*

Holmes, Richard D., Mitchell T. Mulholland, Carolyn D. Hertz, and Ellen-Rose Savulis
1990 *Archaeological Survey of Alternative IV, Route 57, Agawam and Southwick, Massachusetts.*

Holmes, Richard D., Mitchell T. Mulholland, David J. Bernstein, and Carolyn D. Hertz
1990 *Archaeological Site Locational Survey of Segments 7 and 8, Niagara Settlement Project.*

Holmes, Richard D., Mitchell T. Mulholland, and Carolyn D. Hertz
1990 *Archaeological Survey of Proposed River Bank Stabilization, Flagg Farm, Gill, Massachusetts.*
Mulholland, Mitchell T., Richard D. Holmes, Alan Strauss, and Ellen-Rose Savulis
1990 *Archaeological Site Locational Survey in South Natick, Dover, and Wellesley, Massachusetts.*

Curran, Mary-Lou, Mitchell T. Mulholland, and Richard D. Holmes
1989 *Archaeological Site Examination of the Fishkin-Wrighson Site, Wellesley, Massachusetts.*

Holmes, Richard D., and Carolyn D. Hertz
1989 *Archaeological Survey at Arbor Way and Hedgerow Lane, Amherst, Massachusetts.*

Mulholland, Mitchell T., Richard D. Holmes, and Carolyn D. Hertz
1989 *Archaeological Reconnaissance Survey for the Proposed Pipeline, Northeast Settlement Project, Massachusetts and New York.*

Mulholland, Mitchell T., Ellen-Rose Savulis, and Richard D. Holmes
1989 *Archaeological Reconnaissance Survey, Niagara Settlement Project, Central Massachusetts.*

Nasaney, Michael, Richard D. Holmes, and Carolyn D. Hertz
1989 *Archaeological Survey for the Proposed Deerfield Technology Park, Deerfield, Massachusetts.*

Hasenstab, Robert, and Richard D. Holmes
1989 *Archaeological Investigations at 19-HD-109, Westfield, Massachusetts.*

Hasenstab, Robert, and Richard D. Holmes
1989 *Archaeological Site Locational Survey, Randall Woods Housing, Montague, Massachusetts.*

Holmes, Richard D., and Mitchell T. Mulholland
1989 *Archaeological Site Locational Survey, College Highway Apartments, Easthampton, Massachusetts.*

Holmes, Richard D., Carolyn D. Hertz, and Mitchell T. Mulholland
1989 *Archaeological Site Locational Survey, Route 57, Agawam and Southwick, Massachusetts.*

Holmes, Richard D., and Mitchell T. Mulholland
1989 *Archaeological Site Locational Survey, West Cemetery and Porter Swamp Brook, Granby, Massachusetts.*

Holmes, Richard D., and D. Richard Gumaer
1989 *Historic and Geophysical Research at a Quaker Burying Ground, Norwell, Massachusetts.*

Strauss, Alan, and Richard D. Holmes
1989 *Archaeological Reconnaissance Survey of Conservatory Hill Park, Hingham, Massachusetts.*

Bernstein, David J., and Richard D. Holmes
1989 *Archaeological Survey of the Turners Falls Water Pipeline, Turners Falls, Massachusetts.*

Carlson, Catherine C., and Richard D. Holmes
1988 *Archaeological Site Locational Survey for Erving Industrial Park, Erving, Massachusetts.*

Holmes, Richard D., and Mitchell T. Mulholland
1988 *Archaeological Site Locational Survey, Route 143, Chesterfield and Worthington, Massachusetts.*

Holmes, Richard D., and Mitchell T. Mulholland
1988 *Archaeological Site Locational Survey of the Proposed State Correctional Facility, New Braintree, Massachusetts.*

Mulholland, Mitchell T., and Richard D. Holmes
1988 *Archaeological Site Locational Survey of the Radiobeacon System, Hatfield, Massachusetts.*

Halpern, Joel M., and Richard D. Holmes (editors)
1988 *Perspectives on Inuit Culture, Proceedings and Catalog. Produced for the Five College Symposium and Art Exhibit on Inuit Culture, University of Massachusetts, Amherst.*

Johnson, Ronald W., Richard D. Holmes, and Alan McArdle
1986 *Archaeological Site Locational Survey of Greylock Glen, Adams, Massachusetts.*

Johnson, Ronald W., and Richard D. Holmes
1986 *Archaeological Site Locational Survey, Fifth Massachusetts Turnpike, Fitchburg, Massachusetts.*

Gumaer, D. Richard, and Richard D. Holmes
1985 *Archaeological Site Locational Survey of the Proposed Raytheon Missile System Division Headquarters Building, Bedford, Massachusetts.*

Johnson, Ronald W., Rita Reinke, David M. Lacey, and Richard D. Holmes
1984 *Archaeological Site Locational Survey of the Proposed Water Treatment Plant, Charlemont, Massachusetts.*

Mulholland, Mitchell T., David M. Lacy, Ronald W. Johnson, and Richard D. Holmes
1983 *Archaeological Site Locational Survey of Greenfield Industrial Park, Greenfield, Massachusetts.*

Holmes, Richard D. (contributor)
1971 *Geology of Tobago, Volume II.* National Science Foundation and Amherst College.

PRESENTATIONS AND OTHER PROFESSIONAL ACCOMPLISHMENTS

1997 "A Reconsideration of Navajo Native Christianity," Navajo Studies Conference, Albuquerque.

1996 "Public Exhibitions: An Added Bonus of Cultural Resource Management Projects," International Petroleum Environmental Conference, Albuquerque.

1995 "The Relationship of the Plains and the Rio Grande Valley in the Historic Period: Issues for Historical Anthropology," Plains Anthropological Conference, Laramie, Wyoming.

1994 "The Historical Archaeology of Fort Hill, Eastham, Cape Cod," Archaeology Lecture Series, Cape Cod Museum of Natural History, Brewster, Massachusetts.

1994 "Historical Archaeology on Cape Cod," Northeastern Anthropological Association Meeting.

1993 "Public Involvement and Cultural Resource Management," Massachusetts Archaeological Society, Greenfield, Massachusetts.

1993 "Teaching Anthropology in Prison," Northeastern Anthropology Association Meeting.

1990 "American Indians and Museums of American Indians," Northeastern Anthropological Association Meeting.

1989 "Historical Ethnography: Studying People Discovering their Own Past," Northeastern Anthropological Association Meeting.

1988 "The Southwestern Pottery Collection at the Springfield Science Museum," Northeastern Anthropological Association Meeting.

1987 "Healing, and Navajo Native Christianity," Northeastern Anthropological Association Meeting.

1987 "The Other People in Deerfield: Exhibits on American Indians -- Redoing Anthropology in and Old New England Museum," Northeastern Anthropological Association Meeting.

1985 "Navajo Native Christianity," Conference of Native American Studies, Oklahoma State University.

1980 "Pollen Analysis of the Shea Site, Belchertown, Massachusetts," Northeastern Anthropological Association Meeting.

WORK HISTORY

Project Manager
TRC Mariah Associates, Inc.
1995 to present

Project Archaeologist and Historian
University of Massachusetts Archaeological Services
1988 - 1995

Instructor and Visiting Lecturer
Division of Continuing Education, University of Massachusetts
1981 - 1993

Historical Researcher
University of Massachusetts Archaeological Services
1983 - 1987

Visiting Lecturer
University of Massachusetts
1989

Visiting Assistant Professor
Mount Holyoke College
1989

Teaching Associate and Teaching Assistant
University of Massachusetts
1982 - 1987

Field Crew Member
Institute for Man and the Environment, University of Massachusetts
1978

Field Crew Member
Institute for Conservation Archaeology, Peabody Museum, Harvard University

CALPINE CORPORATION BIOGRAPHIES

ROBERT A HOWARD

Manager – Fuels Acquisition

Robert Howard serves as the manager of fuel acquisition for Calpine Corporation's eastern region, a position he has held since joining the company in October 2000. He is responsible for developing business strategies and fuel supply plans for the eastern region power plants, negotiating and managing natural gas and fuel oil agreements and analyzing energy markets to support power plant development. He has experience in all aspects of fuel supply management and the relationship to the profitable generation of electric power.

Prior to joining Calpine, Mr. Howard served as a senior consultant with Supply Planning Associates providing energy consulting services and competitive market intelligence for various clients.

Mr. Howard served for over twenty years in a number of managerial and energy related positions at Boston Edison Company (now NSTAR Corporation), the last as manager of contracts and performance within the asset management organization. Other positions within NSTAR included managing the fuel contracts division and corporate purchasing.

He is a graduate of Worchester Polytechnic Institute with a bachelor's degree, cum laude, in electrical engineering and he earned his master of business administration degree from Northeastern University. He is a registered professional engineer and member of the International Association of Energy Economists.

TRC Environmental Corporation

THEODORE MAIN

EDUCATION

B.S., Meteorology, Pennsylvania State University, 1978

REPRESENTATIVE EXPERIENCE

Overview

Mr. Main supervises preparation of air quality permits, Prevention of Significant Deterioration (PSD) Applications and New Source Review Assessments and Title V Operating Permit Applications.

Mr. Main has extensive experience in preparing and supervising the preparation of air quality, meteorological and environmental impact studies performing air quality diffusion modeling, and additional environmental analyses. Mr. Main has also provided expert testimony regarding air quality issues in support of permit applications. His experience includes development, adaptation and operation of computer programs for environmental analyses; specification and installation of meteorological and air quality monitoring equipment; preparation and supervision of preparation of licensing documents and fugitive particulate studies performed for cogeneration facilities, fossil-fuel steam electric generating facilities, steam heating plants, industrial process boilers, and municipal incinerators.

A brief summary of some of the New Jersey/New York Metropolitan Area projects in which Mr. Main has been involved include the following :

Air Quality Modeling

Air Quality Modeling Study, Bayway Refining Company, New Jersey
Mr. Main served as the project manager for a modeling study to support a NJ State ACO for Bayway. The project included development of a detailed air quality modeling protocols, calculations of emissions from numerous operating scenarios, discussions with the agency air quality evaluation department, and responses to comments by the agency on the proposed modeling procedures. The modeling effort included analysis of numerous major sources in both the New Jersey and New York air regions. Due to the time sensitivity of the compliance order, the project was required to meet stringent deadlines for each phase of the facilities.

Air Permitting/Impact Analysis, Squibb Central Utility Building, Lawrence Township, New Jersey
Prepared an air quality impact analysis to support a NJDEPE Application to Construct for two new 70,000 pound per hour steam boilers for the Squibb Pharmaceutical facility located in Lawrence Township, New Jersey. The analysis required special attention to cavity effects due to constraints on stack height.

Air Permitting/Impact Analysis, Schering-Plough Corporation, Kenilworth, New Jersey
Mr. Main was tasked to perform an iterative stack height modeling analysis to determine the optimum boiler stack increase necessary to reduce ground level impacts to levels acceptable to allow simultaneous operation of an onsite cogeneration facility and at least two boilers at full load. This analysis included preparation of a detailed modeling analysis report, documenting the modeling results with conclusions and recommendations.

The project became increasingly more complex due to PSD issues, which required addressing. The

culmination of the project involved a multiple source modeling analysis to determine PSD increment consumption of the modified boiler stacks with existing PSD sources and minor sources constructed after the PSD baseline dates.

Air Permitting/Impact Analysis, O'Brien Energy Systems, New Jersey
Prepared air quality analysis and applications to construct a 46 MW combined cycle cogeneration facility located in Newark, New Jersey and a 97 MW combined cycle cogeneration facility located in Parlin, New Jersey.

Air Permitting/Air Toxics, Squibb Pathological Incinerator, Lawrence Township, New Jersey
Prepared a NJDEPE air quality application for a new pathological incinerator for the Squibb Lawrence Township facility. Project involved air quality impact analysis for criteria pollutants with a health risk assessment for heavy metals emissions.

Air Quality Permitting

PSD Permitting, Cogen Technologies, Linden Cogeneration Facility, Linden, New Jersey
Served as lead air permitting manager to support the licensing effort for a 600 MW gas/butane fired cogeneration facility consisting of six General Electric Frame 7-EA turbines. Performed an initial conceptual evaluation to assess the licensing feasibility of a large combustion source in a heavy industrial area. Once this analysis indicated that the facility could be licensed within specific design constraints, initiated a rapid PSD permitting schedule. The facility was able to obtain an approved PSD permit within 14 months, which was an excellent turnaround time for a PSD permit for a facility of this size.

PSD Permitting, CNG Energy Lakewood Cogeneration Facility, Lakewood, New Jersey
Prepared a PSD Permit Application for a 240 MW combined cycle cogeneration facility located in Lakewood, New Jersey. The project involved air quality modeling, cooling tower analysis, and a visibility analysis. The project required considerable interaction with the New Jersey Department of Environmental Protection (NJDEPE).

Air Permitting, Cogen Technologies, Camden Cogeneration Facility, Camden, New Jersey
Technical Manager for the preparation of a state air permit application for a 150 MW combined cycle cogeneration facility. Assessed air impacts and the development of the permit application for a facility with a General Electric Frame 7 and a Frame 6 gas turbine. Additional analyses included impacts on nearby bridges connecting Camden with Philadelphia, and the effects of cooling tower impacts on nearby elevated roadways.

Air Permitting, EEA, Inc., New Jersey
Technical manager for the air quality licensing of three 150 MW combined cycle cogeneration facilities in New Jersey. Prepared the air quality permit application with detailed dispersion modeling. Considerable client and regulatory agency interfacing was required.

Air Permitting, Hunterdon Cogeneration Facility, New Jersey
Prepared a NJDEPE air permit application for a 25 MW cogeneration facility located in Hunterdon County, New Jersey. Permit preparation involved air modeling studies with special attention to elevated terrain impact.

PSD Permitting, Prime Energy Limited Partnership Cogeneration Facility, New Jersey
Performed air quality impact analysis and prepared a PSD permit application for a 65 MW cogeneration project. The analysis used current EPA urban dispersion models and involved continuous interfacing with the NJDEP. This project was the first large cogeneration facility to have a PSD permit in New Jersey.

Air Feasibility Study, Brooklyn Navy Yard Cogeneration Project, New York
Provided technical support to determine licensing feasibility for a proposed cogeneration and steam generating facility. The project required extensive interfacing with the City of New York to ascertain environmental constraints and concerns.

Air Permitting, Sandoz Pharmaceuticals Small Scale Incinerator, New Jersey
Prepared a New Jersey air permit application for a 750 lb/hr incinerator at the Sandoz Headquarters facility located in East Hanover, New Jersey. The project involved preparation of a detailed modeling protocol, atmospheric dispersion modeling analysis, and health risk assessment, as well as supervising preparation of a state-of-the-art-review and preparing the entire permit application document.

JOSEPH M. MCMULLEN

Principal Environmental Scientist

Mr. McMullen holds a M.S. degree in biology with a concentration in botany. He has 25 years' experience in environmental consulting, with over 20 years active experience in wetland study. His specific expertise in wetlands studies includes: aerial photograph interpretation; wetland delineations; wetland vegetation cover type mapping; state and federal permitting; wetland creation planning; wetland construction monitoring; post-construction monitoring of created and restored wetlands; and expert testimony. He holds all available wetland delineation certifications. Mr. McMullen has been involved in hundreds of wetland studies in New York, and has made numerous presentations on various aspects of wetland permitting and study. He has also performed numerous vegetation surveys, including endangered and threatened plant surveys, vegetation/habitat cover mapping, and descriptions of plant communities. Mr. McMullen has considerable mapping experience using CIR, true color, and black and white imagery. He has performed wildlife habitat studies and fisheries work on various projects. His experience includes work in Alaska, Florida, Puerto Rico, and all the northeastern states from Michigan to Virginia to Maine.

Education

M.S. Biology/West Virginia University/1974.
B.S. Biology/Saint Francis College/1971.

Project Experience

Government Projects

- Provided a vegetation/habitat cover map, a vegetation description, and an assessment of rare and endangered plant species for a unique swamp forest in New Jersey.
- Prepared a vegetation cover map and flora survey for a 4,300-acre naval base in Virginia.
- Mapped wetlands and listed dominant plant species for a village in central New York.
- Mapped and described environmentally sensitive areas (wetlands, floodplains, steep slopes, and prime farmland) for a village in central New York.
- Worked with the New Jersey Department of Environmental Protection to develop a state-wide system of wildlife habitat classification.
- Prepared the vegetation and forestry sections of a forest, fish, and wildlife management plan for a Corps of Engineers facility in Pennsylvania.
- Performed a vegetation study of a 2,500-acre bald cypress slough in Lee County, Florida, for the U.S. Army Corps of Engineers.
- Mapped and described wetlands for a town in Broome County, New York.
- Developed and implemented a wetland creation plan for a Consent Order to resolve a Corps wetland violation for a town in central New York.
- Developed and implemented a study to assess the restoration of aquatic vegetation at a nature center in central New York.

Commercial and Industrial Development Projects

- Used Habitat Evaluation Procedures (HEP) to evaluate the wildlife habitat and the projected impact of a development project on a 400-acre wetland in New Jersey.
- Prepared a DEIS under SEQR guidelines for a shopping center in central New York; main issues were drainage, wetlands, traffic, and zoning.
- Provided a detailed wetland evaluation in support of a DEC and Corp of Engineers wetland permit application for an office complex site.
- Prepared reports, wetland permit applications, and developed a wetland mitigation plan for a major retail development in Boardman Township, Ohio.
- Assessed wetlands on several potential development sites in the Akron-Canton area of Ohio.
- Prepared information on SEQR and wetland permits for two cemeteries in central New York.
- Provided input into a wetland mitigation plan and responses to agency comments for a distribution center in the Town of Wilton, New York.
- Performed a wetland delineation and report for a large parcel in the City of Saratoga Springs, New York.
- Prepared a 5-acre wetland creation plan and negotiated a resolution of a DEC wetland violation for an area near Syracuse, New York.
- Acquired state and federal wetland permits and prepared DEIS sections under SEQR for a large glass manufacturing facility in Geneva, New York.
- Prepared SEQR material for a mall expansion site and a mixed commercial site near Watertown, New York.
- Acquired wetland and stream disturbance permits for a railroad station in Middletown, New York.
- Delineated wetlands for a large manufacturing facility in Canandaigua, New York.
- Assessed habitat areas and mapped wetlands for a development in the Town of Ithaca, New York.
- Mapped wetlands for a proposed semi-conductor manufacturing facility site in central New York.
- Coordinated archeological surveys and performed wetlands delineations for a trucking center in central New York.

Electric Power Generation Projects (fossil-fueled & nuclear)

- Prepared vegetation cover type maps for 12,000 acres of mixed communities for sites proposed for coal-fired facilities.
- Prepared written testimony and interrogatory responses concerning plant communities and related impacts of power plant construction.
- Collected, analyzed and interpreted data for plant ecology studies on the primary and secondary sites for a proposed major electric generating station.
- Designed and supervised the data collection and report preparation for an intensive study of vegetation and designed a 5-year monitoring program to assess the impacts of the construction of a nuclear power plant in New Jersey.
- Designed and implemented a vegetation study including cover type mapping, an endangered and threatened species survey, and quantitative sampling for two potential power plant sites in southeastern Michigan.

- Prepared several sections of a DEIS under SEQR, and prepared wetland delineations for a DEC and Corps of Engineers wetland permit for a 1000-MW cogeneration facility in central New York.
- Used color infra-red aerial photographs to map vegetation stress over several years in a 50-square-mile area near Pittsburgh, Pennsylvania.
- Mapped wetlands using color infra-red aerial photographs in two areas totaling 62 square miles in east-central Pennsylvania.

Hydroelectric Projects

- Prepared sections on soils and vegetation for an environmental report on the renovation of an existing, non-operating hydroelectric generating facility.
- Prepared a report on the status of endangered plant species in the vicinity of a proposed hydroelectric facility.
- Prepared a vegetation description and provided input on impacts for a potential hydroelectric pump-storage facility in West Virginia.
- Served as Group Leader in charge of coordinating subcontractors conducting Phase I vegetation studies for the Susitna Hydroelectric Project, a major hydroelectric development project in Alaska.
- Served as Project Manger for a feasibility study on a hydroelectric project on the Lehigh River in northeastern Pennsylvania.
- Assisted in a water quality and fisheries sampling program at a proposed hydroelectric site on the Ohio River.
- Performed a vegetation survey (species list, community descriptions, and endangered and threatened species) for hydroelectric project areas in Piscataquis and Hancock counties, Maine.
- Collected data to assess the impacts upon wetlands due to proposed changes in pool levels at a hydroelectric facility on the Hudson River.
- Prepared a detailed report on the botanical resources, with emphasis on wetland conditions and possible changes due to proposed water level alterations, along a 7-mile reach of the Kennebec River, Maine, and for another project on the Sebasticook River, Maine.
- Described the botanical resources and searched for endangered, threatened or rare plant species for a hydroelectric facility on the upper Hudson River, New York.
- Prepared the botanical resources section of a FERC license application for a major, new dam on the Black River, New York.
- Acted as Project Manager and performed wetlands and fisheries studies for two hydroelectric projects on the LaChute River, Essex Co., New York.

Electric Transmission Projects

- Provided input for an environmental assessment and routing analysis for a 138 kV transmission line in Pennsylvania.
- Participated in an environmental assessment and routing analysis for a 115 kV transmission line in northern New York.
- Performed field inventories of vegetation and land use for 400 miles of 345 kV, 230 kV, and 765 kV transmission line rights-of-way across New York.
- Performed field inventories of vegetation and land use on 300 miles of rights-of-way for 230 and 765 kV transmission lines in northern New York.

- Performed studies necessary for the preparation of several sections of an Article VII application for a 30-mile 345 kV transmission line and prepared all necessary wetland studies and reports for state and federal permitting.
- Mapped wetlands and assessed regulated streams for a wetland and stream disturbance permit application for a 17-mile overhead electric distribution/transmission line in Otsego County, New York.

Hazardous and Solid Waste Management Projects

- Supervised the preparation and authored various sections of a comprehensive draft environmental impact statement prepared under the guidelines of the New York State Environmental Quality Review Act for a proposed county sanitary landfill.
- Prepared the vegetation description of a potential landfill site in central New York.
- Assessed three potential landfill sites in Broward County, Florida, for various environmental conflicts.
- Performed a wetland survey, vegetation cover mapping, and rare plant species survey on a proposed resource recovery site in central Massachusetts.
- Utilizing the concepts of Pennsylvania Modified (PAM) HEP, assisted in the ecological evaluation of five sites in eastern Pennsylvania for potential use as ash disposal areas.
- Participated in an ecological inventory of three candidate sites for a resource recovery facility in Broome County, New York.
- On a waste-to-energy facility, devised a salt marsh restoration and creation plan for a coastal wetland in eastern Massachusetts and supervised its implementation.
- Performed fisheries sampling, wetlands mapping, and rare species surveys for a hazardous waste site in northern New York.
- Performed vegetation surveys, endangered plant searches, and wetland studies for a 1,500-acre county landfill in northern New York.
- Developed a wetland restoration plan and implemented vegetation plantings for a hazardous waste clean-up site in central New York.
- Provided input into a wetland restoration plan for a hazardous waste site in Franklin County, New York.
- Developed a wetland restoration plan for a sanitary landfill in northern New York.

Mine Projects

- Evaluated proposed gravel mine and quarry sites in eastern New York for protected plants and environmental conflicts.
- Assessed several quarry sites in eastern New York and the lower Hudson region for wetlands and endangered plant species.
- Provided expert testimony in defense of a restoration plan for a quarry site in eastern New York.
- Developed a wetland restoration plan for an aggregate mine in central New York.

Pipeline and Fiber Optic Cable Projects

- Prepared several sections of a DEIS for an 11-mile sewer line near Watertown, New York.

- Performed wetlands permitting for a 30-mile natural gas pipeline in central New York.
- Designed and implemented multi-year research projects involving the restoration of wetlands following the construction of natural gas pipelines.
- Performed wetland and stream surveys and organized stream disturbance and wetland permits for a water and sewer line project in Chenango County, New York.
- Designated wetlands along a 12-mile municipal water line in western New York.
- Delineated wetlands along several fiber optic cable lines in eastern New York.

Residential Development Projects

- Performed wetland surveys and state and federal wetland permitting for numerous subdivisions in central New York.
- Developed environmental assessment forms and SEQR material for several residential subdivisions in New York.
- Assessed wetland boundaries and class ranking and provided vegetation descriptions for areas in central New York tentatively mapped under the Freshwater Wetlands Act.
- Assessed a wetland in the Pine Barrens of Long Island for rare plant species.
- Performed multiple searches for endangered plant species on a 4500-acre area proposed for residential development in the Pine Barrens area of Ocean County, New Jersey.

Awards and Certifications

Grant-in-aid of Research from The Society of Sigma Xi, 1972.
U.S. Fish and Wildlife Service Habitat Evaluation Procedures Certification Program, 1981.
Provisional Certified Wetland Delineator, Baltimore District, U.S. Army Corps of Engineers, 1993.
Professional Wetland Scientist, Society of Wetland Scientists, 1995.

Memberships

New England Botanical Club
New York Flora Association
New York State Wetlands Forum, Inc. (Board of Directors)
Society of Wetlands Scientists
Southern Appalachian Botanical Club
The Wildlife Society (New York Chapter)

DONALD R. NEAL — ENVIRONMENTAL MANAGER

EDUCATION

M.S., Biology, University of Massachusetts, Boston, Massachusetts, 1983 (Thesis: Detecting Pollution-Induced Changes in Marine Benthic Communities: A Comparison Between Lynn-Saugus Harbor and Essex Bay.)
B.S., Biology, University of Massachusetts, Boston, Massachusetts, 1980

PROFESSIONAL SUMMARY

Mr. Neal has over 18 years of experience as an environmental consultant to public agencies and private corporations. He serves as project manager and technical analyst for environmental permitting and assessment of electric generating facilities and programs, representing Calpine before regulatory agencies and in public forums. Mr. Neal is also a biologist and has provided technical guidance in matters related to wetland science, aquatic ecology, rare species and population biology. He is experienced with methods of air emissions source testing and continuous emissions monitoring system (CEMS) design, certification, and implementation. Mr. Neal has received formal training in ES&H auditing as well as OSHA 40-hour HAZWOPER. He has an inactive Q Clearance from the U.S. Department of Energy.

Mr. Neal has served as project manager or environmental scientist for assignments in the following industries: electric power, waste management, pulp and paper, natural gas storage and transmission, oil and gas exploration and production, petroleum refining, government programs, and metals. He has managed and prepared siting studies, environmental impact statements, applications for wastewater, wetlands and air permits. Mr. Neal has also led environmental, health, and safety (EHS) audits, due diligence investigations, and EHS management consulting projects.

PROFESSIONAL EXPERIENCE

Electric Power

- **Calpine Lone Oak Energy Center.** Environmental Manager for proposed 700-MW combined cycle power plant in Lowndes County, Mississippi. Project consists of three F Class combustion turbines, supplementary-fired heat recovery steam generators, and a mechanical-draft wet cooling tower. Process water obtained primarily through a cooling water intake structure on Yellow Creek and supplemented during low-flow periods by ground water.

- **Calpine Lawrence Energy Center.** Environmental Manager for proposed 2,200-MW combined cycle power plant in Lawrence County, Ohio. Project consists of two phases each consisting of three F Class combustion turbines, supplementary-fired heat recovery steam generators, and two mechanical-draft cooling towers. Process water obtained primarily through a cooling water intake structure on the Ohio River.

- **Calpine Osprey Energy Center.** Environmental Manager for proposed 540-MW combined cycle power plant in Auburndale, Florida. Project consists of two F Class combustion turbines, supplementary-fired heat recovery steam generators, and a mechanical-draft cooling tower. Process water obtained from publicly owned treatment works and ground water.

- **Calpine Hillabee Energy Center.** Environmental Manager for proposed 750-MW combined cycle power plant in Hillabee County, Alabama. Project consists of two G Class combustion turbines, supplementary-fired heat recovery steam generators, and a mechanical-draft wet cooling

tower. Process water obtained from a municipal source via an increase in their surface water withdrawal. Project site contains extensive archaeological and historic resources.

- **Calpine Wawayanda Energy Center.** Environmental Manager for proposed 520-MW combined cycle power plant in Wawawanda, New York. Project consists of two F Class combustion turbines, heat recovery steam generators, and an air-cooled condenser. Process water will be supplied by either on-site wells or publicly owned treatment works treated effluent. Facility subject to rigorous Article X review process.

- **Calpine Towantic Energy Center.** Environmental Manager for proposed 520-MW combined cycle power plant in Oxford, Connecticut. Project consists of two F Class combustion turbines, heat recovery steam generators, and an air-cooled condenser. Project water will be supplied by local water district. Project has experienced intense opposition and all permits have or will be appealed.

- **Calpine Fremont Energy Center.** Environmental Manager for proposed 700-MW combined cycle power plant in Fremont, Ohio. Project consists of two F Class combustion turbines, supplementary-fired heat recovery steam generators, and a mechanical-draft cooling tower. Process water obtained from the Sandusky River via the local water utility through an expanded intake structure. Project currently under review by Ohio Power Plant Siting Board and Ohio EPA.

- **Calpine Energy Center, Virginia.** Environmental Manager for proposed 2200-MW combined cycle power plant in Virginia (confidential project). Project will consist of two phases each including three F Class combustion turbines, supplementary-fired heat recovery steam generators, and a mechanical-draft cooling tower. Cooling water will be saline and withdrawn from a tidal river and process water will be provided from ground water sources.

- **Calpine Energy Center, New Jersey.** Environmental Manager for proposed 700-MW combined cycle power plant in New Jersey (confidential project). Project will consist of two F Class combustion turbines, supplementary-fired heat recovery steam generators, and a mechanical-draft cooling tower. Cooling water will be saline and withdrawn from a tidal river, and process water will be provided from publicly owned treatment works treated effluent or municipal sources.

- **Calpine Energy Center, Pennsylvania.** Environmental Manager for proposed 700-MW combined cycle power plant in Pennsylvania (confidential project). Project will consist of three F Class combustion turbines, supplementary-fired heat recovery steam generators, and a mechanical-draft cooling tower. Process water will be withdrawn from the Susquehanna River.

- **Calpine Due Diligence, Various States.** Environmental Manager for due diligence supporting acquisition of existing power generation assets. Duties include evaluation of environmental compliance; identification of potential environmental upgrades to air, water supply, and wastewater discharge systems; and site contamination review.

- **Sithe New England, Mystic Station Redevelopment Project.** Project Manager for proposed 1,550-MW combined cycle power plant at the site of the existing 1,000-MW Mystic Station in Everett Massachusetts. Required permits include MEPA Certification, Siting Board approval, Air Plans approval, wetlands permits, wastewater and stormwater discharge permits, tank permits, and coastal zone management permits. Project under construction.

- **Calpine Eastern, Ontelaunee**. Project Manager for 520-MW combined cycle power plant in Ontelaunee Township, Berks County, Pennsylvania. Project consists of two F Class turbines, heat recovery steam generators, and a mechanical-draft cooling tower. Obtained approval from the Delaware River Basin Commission to allow withdrawal of cooling water from Lake Ontelaunee through modifications to the Reading Area Water Authority supply system. Project under construction.

- **Confidential Client, Consolidated Edison Divestiture.** Project Manager for environmental evaluation of Consolidated Edison divestiture. Divestiture included three bundles of ranging in size from 1,500 to 2,200 MW: Astoria Generating Station and the Gowanus and Narrows Gas Turbine Sites; Arthur Kill Station and the Astoria Gas Turbine Site; and Ravenswood Station and Ravenswood Gas Turbine Site. For each bundle directed the development of environmental cost estimates and provided pro forma inputs to support the overall bid, including air pollution control and cooling water intake structure upgrades.

- **Confidential Client, Conectiv Divestiture**. Project Manager for environmental evaluation of Conectiv assets, consisting of coal, oil and gas-fired facilities in New Jersey, Pennsylvania, Delaware and Maryland. Responsible for developing estimates of future environmental costs as part of the pro forma inputs supporting the bid, including air pollution control and cooling water intake structure upgrades. In addition, evaluated potential future liabilities associated with ongoing and projected EPA enforcement initiatives.

- **Confidential Client, Duquesne Light Divestiture**. Project Manager for environmental evaluation of Duquesne Light assets in Pennsylvania and Ohio. Evaluated potential future costs and liabilities associated with five coal-fired and one oil-fired facility, including air pollution control and cooling water intake structure upgrades. Issues of interest included air licensing implications of reactivating certain semi-retired units and costs of compliance with sulfur dioxide and nitrogen oxide regulatory programs.

- **Confidential Client, GPU Divestiture.** Principal Investigator for environmental evaluation of GPU assets in Pennsylvania and New Jersey. Developed projected environmental costs and environmental liabilities for 20 power plants ranging from large coal-fired facilities to small peaking turbines, including air pollution control and cooling water intake structure upgrades..

- **TransAlta Utilities, Wabamun Generating Station – Compliance Assessment.** Managed a team of eight environmental, safety and health specialists in a comprehensive evaluation of the coal-fired, mine-mouth, 420-MW Wabamun Generating Station outside of Edmonton, Alberta. Key issues included operations management related to continuous emissions monitoring, and temperature and other water quality parameters associated with discharges of cooling and process waters to Wabamun Lake, a recreational fishery. Provided recommendations for corrective action as part of program.

- **Confidential Client – Evaluation of Coal-Fired Steam Plant.** Performed an evaluation of environmental performance of a coal-fired steam plant supporting a metals manufacturing complex in Ohio for a Fortune 500 company. Evaluated current air pollution control systems and water management methods and determined likely future expenditures necessary to comply with future emissions limits.

- **New England Power, Manchester Street Station – NPDES Permitting.** Managed the original design and implementation of the sampling and analysis program necessary to modify the NPDES permit of Manchester Street Station in Providence, Rhode Island through a revised

316(a) and (b) demonstration. NEP proposed to change the existing temperature characteristics of the once-through cooling water discharge to the river.

- **AES Brasil, Ltd. – EHS Evaluations for Overseas Private Investment Corporation.** Managed preparation of an Initial Environmental Audit and Environmental Management and Monitoring Plan required by OPIC as a precondition for providing risk insurance. AES was a partner in the acquisition of Light Servicos de Eletricidade of Rio de Janeiro, a 3,800 MW integrated utility that serves about 11 million people that provides generation, transmission, and distribution services. Devised an audit plan of limited sampling and convinced OPIC to allow AES to use the EMMP as a tool in it's overall EHS management system development.

- **Medical Area Total Energy Plant, Boston, Massachusetts – Air Diagnostics.** Designed a continuous emissions monitoring system and developed and implemented a test program to perform diagnostic testing of various oil spray nozzles. The CEM provided real-time trending and analysis of data related to priority pollutants (CO, SO_2, NO_x) and diluent gases (CO_2, O_2).

- **U.S. Department of Energy, Morgantown Energy Technology Center.** Managed preparation of the environmental impact volume for an 8-MW, clean-coal power project. The engine was designed to fire coal-water slurry that would later be converted to diesel firing following clean coal testing.

- **Confidential Client, Alaska**. Managed air pollution and water management compliance assessments of three gas-fired power plants (120 MW, 40 MW, 24 MW) employing General Electric Frame five turbines. Critically examined: environmental risk and compliance resulting from changes in operating efficiency (and emissions) resulting from severe low-temperature duty; fuel gas measurements; operation and maintenance; permit implementation; and Title V compliance issues.

- **Riverside Cogeneration Project.** Assistant project manager for preparing environmental impact documentation for a 34-MW coal-fired power plant in Holyoke, Massachusetts proposed by the Wilson Group. He coordinated field-work activities associated with environmental data collection and prepared the draft environmental impact report.

- **Uruguaiana Thermal Electric Power Plant, Brazil.** Providing permit support in the areas of air quality and risk for a 600-MW natural gas combined cycle power plant. Provided arguments to Brazil regulatory agency regarding proposed emission limits on supplemental fuel (oil) and worked with project engineering firm to site pipeline to minimize potential off-site impacts.

- **Ocean State Power, Burrillville, Rhode Island.** Project manager of a residuals management implementation plan for the 500 MW gas-fired power plant of Ocean State Power. Responsible for assessment of short- and long-term residuals management alternatives relative to regulatory, environmental and operational considerations. Prepared a detailed sampling and analysis plan for residuals characterization.

- **Trigen Energy Corporation, Hempstead, New York**. Lead ecologist for obtaining approvals to expand the Central Utility Plant by adding 40 MW of cogeneration capacity. He successfully negotiated with local and national conservation groups to allow the project to proceed adjacent to the rare Hempstead Plains, the largest remaining tract of coastal plains on Long Island.

Waste-to-Energy

- **Integrated Waste Management Project, East Bridgewater, Massachusetts.** Project Manager for environmental permitting of the East Bridgewater (Massachusetts) Integrated Waste Disposal System, proposed by American Ref-Fuel Company and BFI Waste Systems, Inc. The project consisted of a materials recovery facility, waste-to-energy facility, an ash landfill and power transmission lines. Required permits included EIR Certificate, Site Assignment, Solid Waste Management Facility Permit, wetland, water withdrawal, NPDES, and PSD permits. Managed a permitting budget of over $1.5 million and developed strategies to allow the project to comply with the recycling and disposal capacity goals of the state solid waste master plan.

- **Town of Hempstead, New York – Consulting Engineer Support.** Supervised environmental acceptance testing of the Hempstead Resource Recovery Facility. Testing required to demonstrate that facility could achieve environmental performance guarantees prior to full-scale commercial operation. Responsible for air source testing, CEM certification, and ash testing.

- **The Chubb Group – RDF Facility Environmental Assessment**. Performed an evaluation of environmental performance and environmental monitoring systems at the Pigeon Point Resource Recovery Facility in Delaware. Evaluation included reliability and replacement cost of the continuous emissions monitoring system, implications of regulatory enforcement orders, and potential for future non-compliance.

- **Detroit Resource Recovery Facility – Environmental Assessment.** For a prominent investment firm, served as environmental task manager for the refinancing of the Greater Detroit Resource Recovery Facility. For this project he was required to assess the potential for contamination of off-site populations from previous site uses and continued facility operation. He was also responsible for providing the investors with an assessment of facility environmental performance, including the recently-initiated retrofit of the plant's air pollution control equipment. Of particular concern was the selection of mercury control technologies.

- **Confidential Client – Huntington Resource Recovery Facility.** Provided an investment company with an independent engineering evaluation of the expected regulatory compliance, air emissions, and ash residue disposal of the Huntington Resource Recovery Facility (New York), which had yet to begin startup. For this assignment he evaluated the environmental performance of Ogden Martin facilities and assessed ash quality issues as they related to specific state and federal regulations.

- **Resource Control Inc., Barre, Massachusetts.** Managed an environmental assessment/critical flaw analysis of proposed resource recovery facility, including discipline coordination, document production and client interaction for Resource Control, Inc., Barre, Massachusetts. Major concerns addressed by report included air quality impacts. impacts to drinking water, and zoning. Project was a first step designed to satisfy local public health board regarding site assignment, highlight potential problem areas, and form the basis for MEPA-related activities.

- **Wallingford Resource Recovery Facility.** For the Connecticut Resources Recovery Authority, managed environmental technical support for post-construction acceptance testing for environmental compliance for the Wallingford, Connecticut, 420-TPD cogeneration facility. He prepared portions of Consulting Engineer Certification Report pertaining to environmental compliance.

- **Atlantic County Public Utilities Authority – Resource Recovery Facility.** Project manager for a Level 3 visibility impact assessment of the proposed Atlantic County (New Jersey) Resource Recovery Facility. The proposed facility site was less than 10 kilometers from the Brigantine Wilderness Area. Negotiated a study protocol with the National Park Service, supervised the

detailed modeling, and authored the report submitted to NPS on behalf of the Atlantic County Utilities Authority.

- **Orange County Department of Public Utilities – Resource Recovery Facility.** Prepared an Environmental Assessment of proposed 2,250-TPD waste-to-energy facility for the Orange County, Florida, Refuse Disposal Facilities Plan. Prepared an environmental permitting strategy, including data requirements, level of effort, and schedule and presented the results before the county Citizens' Advisory Committee.

- **Legeis Development Corporation – Montachusetts Resource Recovery Project.** For Legeis Development Corporation (Shirley, Massachusetts, Resource Recovery Facility) he prepared an environmental impact report for a 243-TPD resource recovery facility. Responsible for the analysis in all disciplines other than air quality.

- **Wheelabrator Environmental Systems – Alabama Waste-To-Energy Facility.** Managed the preliminary studies to support Wheelabrator's decision to pursue the project. Prepared the waste supply study used to make the internal decision to proceed, and developed and implemented a methodology to select the preferred sites in the town that could withstand regulatory evaluation and public scrutiny.

- **Signal Environmental Systems – Ecological Evaluation.** Performed wetlands delineation, using U.S. Army Corps of Engineers guidelines, on the site of a proposed resource recovery facility in Gloucester County, New Jersey. Project biologist associated with 316(a) and (b) demonstration for cooling water intake and discharge structures on the Delaware River. Conducted soils and vegetative stress analysis for S02, HCl and H2SO4 under normal operating conditions and during periods of pollution control device outage. Client received necessary permits.

- **Palm Beach County (Florida) Solid Waste Authority – Consulting Engineer Support.** Supervised certification of continuous emissions monitoring system and assisted with post construction acceptance testing of the Palm Beach County Resource Recovery Facility. Responsible for monitoring operation of the facility, acquiring performance data, and evaluating results.

- **Hudson County Resource Recovery Facility.** Prepared the ecology section for final environmental and health impact statement for the proposed Hudson County Resource Recovery Facility in New Jersey. Conducted field investigation of on-site and off-site biological resources, including wetlands delineation. The proposed site was contaminated with hazardous waste and hosted stressed wetland species. Other considerations included wetlands mitigation, vegetative stress analysis, and assessment of facility impacts to on-site pheasant population.

Waste Management

- **Catrel Refuse Derived Fuel Facility.** Prepared the Environmental Assessment Form (EAF) and portions of the Solid Waste Management Facility permit application (Part 360) for a project in the Bronx Borough of New York City. The project involved processing 600-tons-per-day of municipal solid waste into pellets that could be used as fuel in industrial or utility boilers. Other project features include recovery of recyclable materials; rail transport of finished product; landfill disposal of process residue and bypass waste; as well as environmental impacts to air quality, traffic, noise, and water resources.

- **Sicowa – Recycled Building Product Feasibility.** Performed an analysis of the impact current and future solid waste regulations on the market for recycled building materials. This analysis was included in a larger market study to determine if Sicowa could penetrate selected U.S. markets and market flue gas desulfurization byproducts and fly ash to U.S. building product manufacturers.

- **Barton and Loguidice, P.C. – Waste Management Facilities Siting Study.** Managed studies associated with evaluating potential landfill and waste-to-energy facility sites. Responsible for ranking 15 candidate sites for suitability with regard to ecology, cultural resources, visual resources, and wetlands.

- **Oneida-Herkimer Solid Waste Management Authority.** Performed a market evaluation of solid waste disposal in central New York. The study predicted current and future market conditions provided the client with information to decide whether to permit and construct an in-county landfill or arrange for short- and/or long-term contract disposal.

- **Confidential Client – Battery Disposal Implications.** Conducted an evaluation of the effects of battery recycling on air emissions from waste-to-energy facilities in the United States. Elemental data from batteries was used in conjunction with emission tests from waste-to-energy facilities to construct a theoretical mass balance for metals of concern. The mass balance model could then be used to simulate air emission changes for a variety of battery recycling and manufacturing scenarios.

- **Western New York Integrated Waste Projects.** Project Manager of environmental permitting for two integrated (recycling, composting, and landfilling) solid waste projects in Western New York for Concord Resources Group. Prepared siting study resulting in the selection of suitable project sites. Coordinated agency meetings and was responsible for the preparation of applications for Conceptual Review, a permitting methodology developed by the New York State Department of Environmental Conservation to facilitate the siting process under SEQR.

- **Town of Hempstead, New York – Solid Waste Management Plan.** Project manager and principal author of a 20-Year Solid Waste Management Plan (SWMP) required by the New York State Department of Environmental Conservation. The town has a population of over 700,000. Key issues included technical, environmental and economic implications of an expansion of the existing recycling program; construction of a materials recovery facility; technology selection and siting of a large yard waste composting facility; ash disposal for the Hempstead Resource Recovery Facility; and local adoption of SWMP. Also prepared the accompanying Environmental Assessment Form (EAF) for SWMP, as required by State Environmental Quality Review Act (SEQR). The SWMP received a Negative Declaration, exempting the project from more detailed EIS requirements.

Oil and Gas Projects

- **CNG Transmission Corporation Line TL-460.** Project Manager for the Environmental Management and Construction Plan (EM&CP) for Line TL-460 in Onondaga and Oswego Counties, New York. Plan was required by the New York Public Service Commission and is a comprehensive, site-specific document for use during pipeline construction. Contains mitigation plans and procedures used in environmental mitigation of the 33-mile pipeline and associated facilities.

- **CNG Transmission Corporation – St. Lawrence Pipeline Project.** Project Manager for NEPA Environmental Assessment of St. Lawrence Pipeline Project, which consisted of 82 miles of 24-inch pipeline in Oswego and Jefferson Counties and associated compressor stations. Served as Project Manager for subsequent FERC/NEPA data requests required under Open Season for natural gas projects.

- **Confidential Client, Alaska.** Managed environmental evaluations of production wells, gathering and transmission pipelines, and processing facilities for three oil fields on the North Slope of Alaska. Evaluation included spill prevention and control, erosion and sedimentation mitigation, deep well injection, and air emissions from vents and processing facilities.

- **National Fuel Gas Supply Corporation – Canadian Natural Gas Project.** Prepared NEPA Environmental Assessments of proposed Canadian Natural Gas Project, which consisted of three segments of pipeline totaling 69.5 miles, through New York and Pennsylvania, and two compressor stations. Identified vegetative associations, species and sensitive environmental areas. Assessed impacts in terms of disturbed acreage within each community type and effects of right-of-way maintenance on bordering ecosystems. Project involved coordination with New York State Department of Environmental Conservation and Pennsylvania Fish Commission and Pennsylvania Game Commission.

- **CNG Transmission Corporation – Greenlick, Sharon, and Leidy Pools.** Prepared two NEPA Environmental Assessments and follow-up data requests for storage/injection well projects in Pennsylvania. Projects involved drilling new wells, reconditioning old wells, and installing or replacing well lines and main lines. Conducted fieldwork and report preparation within 4 weeks of project initiation. Key environmental issues were stream crossings and state forest encroachment.

- **CNG Transmission Corporation – Virginia Pipeline.** Project Manager for NEPA Environmental Assessment of 20-mile natural gas pipeline in northern Virginia. Major issue involved proposed routing through Manassas National Battlefield Park. Negotiated with U.S. Park Service to mitigate project impact and define potential alternate routes.

- **Champlain Pipeline Company – Champlain Pipeline.** Task Manager for New Hampshire and Massachusetts portions of proposed 150-mile pipeline. Managed preparation of NEPA Environmental Assessment and arranged and conducted meetings with regulatory agencies. Significant issues included proximity of dense residential areas, high-quality streams, and wetlands crossings.

- **National Fuel Gas Supply Corporation – Wetland Permits.** Prepared joint application for wetlands crossings associated with 12.4 miles of natural gas pipeline. Conducted wetlands delineation with NYSDEC biologist on regulated wetlands and other wetlands along pipeline right-of-way. Responsible for interaction with U.S. Army Corps of Engineers including preapplication conference and Section 404 permit application submittal. Successfully argued against proposed requirement of double-ditching through wetland areas.

- **Hunt Refining, Tuscaloosa, Alabama.** Analyzed the regulatory implications of the closure of two surface impoundments containing petroleum-refining wastes that were subject to the RCRA land disposal restrictions. Evaluated the implications of several remediation strategies including in situ stabilization, and excavation and processing in an on-site coker.

- **Kirkpatrick and Lockhart - Oil Spill Natural Resources Damage Assessment.** Served as Team Leader for water and sediment quality fieldwork following a major oil spill in the Pittsburgh, Pennsylvania area. Study design followed EPA's guidelines for Natural Resources Damage Assessments. Responsible for execution of sampling program under harsh field conditions, team management, technical guidance, data synthesis and report preparation.

- **Confidential Client – Environmental Management Systems Development.** For a client in the petroleum refining industry managed the development and implementation of environmental management systems necessary to increase compliance assurance at three refineries. Implemented a corrective action program and directed development of programs for waste management, VOC leak detection programs, tank and pipeline management, training, spill prevention and control, and preventive maintenance.

Metals

- **RSR Corporation - Secondary Lead Smelter Siting and Permitting.** For a client in the secondary lead smelting industry Mr. Neal was principle investigator for an evaluation of candidate sites in the southeastern United States to host a new facility. The evaluation required meeting with state and local regulatory authorities to determine conditions under which such a project could be approved. The report resulted in the client proceeding with development at a specific site based on our suitability assessments. Subsequently initiated RCRA Part B permitting and local permitting before the client abandoned the project.

- **Confidential Client – Battery Recycling.** Project Manager for an ES&H assessment and compliance program for a company engaged in secondary lead smelting. Scheduled and executed both announced and unannounced ES&H assessments for three secondary lead smelters, recommended and scheduled corrective actions for findings, developed ES&H compliance manuals to help ensure future compliance, and assisted legal counsel with investigations into improper environmental management at one of the plants.

- **Confidential Client, Alabama.** Performed a due diligence review of a four-plant aluminum smelting and finishing complex. For this assignment he assessed compliance with existing permits and regulations and provided estimates of capital costs associated with short- and long-term required upgrades to emission control systems, as well as potential costs associated with the upcoming secondary aluminum MACT regulations.

- **Confidential Client, New York.** Led an Environmental, Health and Safety due diligence review of a steel mini mill. The assessment identified potential expenditures and liabilities exceeding $50,000, including air pollution control system upgrades, remedial actions for contamination, wastewater treatment plant improvements, and process equipment modifications necessary to ensure worker safety.

Other Industrial/Commercial

- **International Falls Paper Mill Modifications.** Managed the preparation of an environmental assessment of a proposed $1 Billion expansion of Boise Cascade's International Falls, Minnesota paper mill. This submittal was sufficient to enable the Minnesota Pollution Control Agency to

waive the requirement of preparing an Environmental Impact Statement, saving the client valuable time and money. The expansion project involved major modification to the existing pulping operations to reduce dioxin emissions, addition of a high-speed paper machine, and revision of an NPDES permit, including process water intake and discharge modifications.

- **Avenor - Environmental Audit of Ponderay Newsprint Company**. Led a 5-person, one-week environmental audit of a recycled newspaper mill. Scope included air pollution control, hazardous waste management, and wastewater management.

- **Novacor Plastics – RCRA Closure Plan.** Prepared a RCRA closure plan for a plastics manufacturing operation. The closure plan included hazardous waste satellite accumulation areas, 90-day tank and container accumulation areas, and a Boiler and Industrial Furnace (BIF) that burned styrene and ethylbenzene. It was the first BIF closure plan approved by EPA Region I.

- **Black and Veatch – Crump Creek Reservoir.** Project Manager for wetlands replication plan for the 300 acres of palustrine wetlands displaced by the development of the 960-acre Crump Creek Reservoir. Identified suitable sites, designed and implemented site scoring criteria and provided conceptual design of replication program to Hanover County, Virginia. Coordinated with representatives from EPA, Division of Marine Fisheries and Fish and Wildlife Service.

- **Finard & Company – Commercial Development.** Provided wetlands delineation and environmental assessment of 63-acre property in Massachusetts. Site was located on the fringe of a forested wetland of over 4,000 acres containing a number of state rare species. Interpreted state and federal wetlands laws relative to development of the site and provided conceptual design of on-site and off-site wetlands mitigation/creation for 45 acres of forested wetlands.

- **New York State Department of Environmental Conservation – Kensico Road.** Conducted ecological investigation included in EIS for proposed improvements to Kensico Road. Project involved increasing road width threefold and adding extensive culvert for flood control. Performed electrofishing survey of stream adjacent to road to quantity extent of ecological impact of culvert, which will destroy over 50 percent of streambed. Also conducted wetlands delineation and environmental characterization. Key environmental concerns are impacts to stream from culvert, impacts to connected water bodies due to increased in road runoff and salt, and effects on green areas, including wetlands.

- **Olin Corporation**. Led comprehensive environmental, safety, and health audits of various chemical and ammunition plants. Issues included waste management, wastewater management and air quality. Identified several operating issues with a RCRA Part B permitted incinerator used to destroy unexploded ordinance.

- **Confidential Client**. Performed Clean Water Act compliance assessment of rail yard per an EPA Consent Order. Evaluated performance of 5 wastewater treatment facilities and spill prevention and control practices of a major railroad company.

- **Hueck Foils – Project USA.** For a Europe-based manufacturer of packaging materials, Mr. Neal was principle investigator for siting and permitting a new facility in South Carolina. He developed technical and regulatory criteria that resulted in selection of the preferred site, then worked with local agencies and developers to secure approval. Construction commenced in 1996.

- **Smith Realty – Commercial Development.** Conducted a field delineation of state-regulated wetlands in Hyde Park, New York. Project involved condominium complex situated in a 78-acre parcel under SEQR review. Topographically complex site resulted in significant wetland pockets between a series of bedrock ridges. Wetland fill of about 7 acres as required for proposed development. Worked with NYSDEC to establish wetlands boundaries, wetlands community types and mitigation requirements.

- **Milton Conservation Commission – Wetlands Permits.** As Chairman of the Milton Conservation Commission reviews industrial, commercial and residential projects. Issues Enforcement Orders and Orders of Conditions for complex projects including paper mill wastewater treatment, landfill closures, and gas, water, and wastewater pipelines. Presides over public hearings sometimes attended by over 150 concerned citizens.

Government

- **Massachusetts Water Resources Authority – Siting Study.** Responsible for field program, analyses of ecology and wetlands, and data management for a site screening analysis for the Massachusetts Water Resources Authority (MWRA) residuals management facilities plan. The plan evaluated reuse, composting, transfer and disposal options for residuals generated by the new and existing wastewater treatment facilities as part of the Boston Harbor cleanup. The study involved preliminary screening of over 300 candidate sites for suitability regarding ecological and wetlands issues. Coordinated field survey activities, database management, and data collection, and was responsible for ecological investigation program.

- **U.S. Department of Energy – Y-12 Plant Environmental Audit.** Led a team of 6 environmental auditors on a 2-week evaluation of environmental compliance at a uranium processing and storage facility. The evaluation considered air, water, hazardous materials management, environmental radiation, waste management and remedial actions for selected processing and support buildings, including a large coal-fired steam plant.

- **U.S. Department of Energy – Tiger Team Assessments.** Waste management specialist for the Tiger Team Assessment of DOE's Oak Ridge K-25 Site, Ames Laboratory, National Institute for Petroleum and Energy Research, and the Naval Petroleum and Oil Shale Reserves. Responsible for assessment of hazardous and mixed waste treatment and storage facilities including hazardous and mixed waste incinerator and wastewater treatment facilities. Conducted programmatic assessments of waste characterization, minimization, and operations at these sites.

- **Batelle Pacific Northwest Laboratory – Compliance Management.** For the Hanford Tank Farms Assistance Program (mentoring program), worked with an EH mentor to provide technical assistance to the Westinghouse Hanford Corporation (WHC) Tank Waste Remediation System (TWRS). Developed and conducted a workshop for the TWRS Environmental Compliance Officer (ECO) organization on prioritizing environmental risks and activities when budgets are limited. Worked with the ECO to develop strategies to incorporate environmental requirements into day to day operations within the high level radioactive waste tank farms and associated facilities. Improved implementation of required inspections of the 242-A Evaporator and the East and West Tank Farms.

- **U.S. Department of Energy – Assessment Guidelines.** Project Manager for development of the ES&H Assessment Performance Objectives and Criteria (POCs) for EH-22, the Office of ES&H Evaluations. He authored the section on waste management and provided programmatic direction for development of all environmental and occupational safety and health (including

radiological protection) disciplines as well as most of the ES&H management disciplines. The POCs form the current basis for ES&H evaluations within DOE Headquarters.

- **U.S. Department of Energy – Compliance Assessments.** Waste management specialist for the EH-22 Safety Management Evaluations of the Rocky Flats Environmental Technology Site, Idaho National Engineering Laboratory, Savannah River Site, Hanford Site, and Fernald Environmental Management Project. For each assignment, assessed waste management systems and was primary author of the facility specific reports that assessed ES&H performance, including environmental protection, occupational safety and health, and authorization basis.

- **U.S. Department of Energy – Environmental Assessments.** For the DOE Office of Environmental Audit (EH-24) served as contractor assessment manager for environmental management system assessments of Lawrence Livermore National Laboratory, Lawrence Berkeley Laboratory, Stanford Linear Accelerator Center, and Savannah River Ecology Laboratory. For these assignments he interfaced with the DOE assessment manager, wrote assessment plans, managed 8-12 person assessment teams, and was primary author of the assessment report.

- **U.S. Department of Energy – Environmental Progress Assessments.** For the DOE Office of Special Projects (EH-5) served was a member of the DOE Tiger Team Progress Assessments, a multi-disciplinary ES&H review, for Lawrence Livermore National Laboratory, Savannah River Site, and the Rocky Flats Plant. Performed management systems reviews of waste characterization and inspection programs to assess progress since the Tiger Team Assessments. Provided vertical cuts of programs to support management specialists.

PROFESSIONAL AFFILIATIONS

Air and Waste Management Association
Chairman, Milton Conservation Commission

PREVIOUS EMPLOYERS

ENSR Consulting and Engineering
Arthur D. Little, Inc.
CSI Resource Systems, Inc.
ENSR Consulting and Engineering
GCA/Technology Division

DAVID J. SHOTTS, P.E.

EDUCATION

B.S., Mechanical Engineering, Virginia Polytechnic Institute and State University, 1984

PROFESSIONAL REGISTRATIONS

Professional Engineer, State of New York, 1991

TECHNICAL SPECIALTIES

Mr. Shotts has 18 years of experience encompassing:

- New Source Review (PSD and Non-Attainment) Air Permitting
- Title V Operating Permit and Inventory Assistance
- Air Pollution Engineering and BACT/LAER Analysis
- Fugitive Dust Analysis
- Regulatory Compliance Analysis
- Environmental Liability Due Diligence Review
- Monitoring Analysis

REPRESENTATIVE EXPERIENCE

Overview

Mr. Shotts is the Manager of Air Quality Engineering in TRC's Mid-Atlantic Office located in Lyndhurst, New Jersey. He is a registered Professional Engineer in the State of New York with 17 years of experience in the fields of air pollution control, engineering, permitting and regulatory analysis. His experience ranges from the preparation of environmental impact analyses, air permit applications and facility audits for Virginia Power to air quality project management and BACT/LAER analyses. Mr. Shotts has extensive experience in air emissions permitting and engineering and specializes in studies for the power, cogeneration and pharmaceutical industries.

Air Emissions Permitting

Mr. Shotts has managed or been involved with a wide variety of air quality permitting projects throughout the northeastern and southeastern United States. He has prepared operating permits and Prevention of Significant Deterioration (PSD) permits for utilities, cogeneration facilities, government projects, and pharmaceutical companies. Mr. Shotts has participated in many aspects of air permitting including the quantification and calculation of emissions, control technology analysis and the development of emissions inventories.

Air Permitting, FPL Energy Marcus Hook Cogeneration Facility, Pennsylvania. Provided PSD/Non-Attainment air permitting for a 750 MW combined cycle cogeneration facility to be

located at the Sunoco refinery in Marcus Hook, Pennsylvania. The project consists of three natural gas fired GE 7FA combustion turbines in combined cycle mode, equipped with duct burner that may burn natural gas or refinery gas. Four auxiliary boilers may also burn natural gas or refinery gas. The project is located in a severe ozone non-attainment region and the area is currently designated as moderate non-attainment for CO as well. A netting analysis involved reductions associated with shutdown of existing boilers at the refinery. Services also included participation in meetings and negotiations with PaDEP and US EPA.

Air Permitting, Reliant Energy Hunterstown Combined Cycle Project, Hunterstown, Pennsylvania. Provided PSD/Non-Attainment air permitting for a 1600 MW combined cycle power generation facility in central Pennsylvania. The project initially consisted of four natural gas fired Mitsubishi Heavy Industries 501G combustion turbines in combined cycle mode, with duct burners for supplementary firing of the HRSG, but was revised to a 900 MW project consisting of the first three GE 7FB combustion turbine units. An application was prepared for each version of the project, which is located in the ozone transport region and is subject to non-attainment review. The permit will allow an initial period of simple cycle testing for the 7FB prototype unit. Services included participation in negotiations and meetings with PaDEP and US EPA, and public hearing support.

Air Permitting, Sithe Energies Seward Refuse Coal CFB, Seward, Pennsylvania. Providing PSD/Non-Attainment air permitting for two 250 MW circulating fluidized bed boilers that will burn refuse coal and raw coal in southwest Pennsylvania. Existing coal-fired units at the site will be retired, resulting in net emission reductions for sulfur dioxide and nitrogen oxides. The project will involve analysis of fugitive dust emissions associated with coal, limestone and ash handling and storage.

PSD / Non-Attainment Air Permit Application, ConEd Development Ocean Peaking Power, Lakewood, NJ. Air permitting for a 500 MW power plant to be located at the site of an existing cogeneration facility in Lakewood, New Jersey, consisting of three General Electric 7FA combustion turbines in simple cycle mode. The application is based on gas-fired dry low-NOx technology design with three co-located stacks and no add-on control technology. The application includes a LAER determination for NO_x, including review of high-temperature SCR, a BACT analysis for CO and other PSD pollutants, and justification for a simple cycle project to operate at a 12% capacity factor.

PSD / Non-Attainment Air Permit Application, AES Red Oak. Air permitting for a 700 MW power plant to be located at a new site in Sayreville, New Jersey, consisting of three Siemens-Westinghouse 501F combustion turbines in combined cycle mode. The application was initially based upon a worst-case envelope of emissions and exhaust characteristics from four different turbine models from different vendors, then revised based upon a gas-only 501F design, including selective catalytic reduction and oxidation catalyst control technology. The application includes LAER determinations for NO_x and VOC, with emissions levels negotiated with NJDEP.

Article X and Air Permitting, Mirant Bowline Unit 3, West Haverstraw, New York. Provided PSD/Non-Attainment air permitting for a 750 MW combined cycle power generation facility in West Haverstraw, New York. The project consists of three natural gas and oil fired GE 7FA combustion

turbines in combined cycle mode, with duct burners for supplementary firing of the HRSG. The project is located in a severe ozone non-attainment region and is subject to non-attainment review. Services included negotiations with Article X participants and support for settlement conferences and public hearing.

Air Permitting, MEGA Pierce Power, Fredrickson, Washington. Air permitting for a temporary simple cycle power plant to consist of seven GE TM2500 aeroderivative combustion turbines, equipped with SCR and oxidation catalysts, to be located in Fredrickson, Washington. The project is being permitted as a synthetic minor source, incorporating annual emission caps. CEM, stack testing and fuel usage monitoring will be employed, with emissions to be calculated on a monthly basis in order to demonstrate compliance with the caps.

Article X and Air Permitting, NYPA Poletti Combined Cycle Project, Queens, New York. Provided PSD/Non-Attainment air permitting for a 500 MW combined cycle power generation facility in New York City. The project consists of two natural gas and oil fired GE 7FA combustion turbines in combined cycle mode. The project is located in a severe ozone non-attainment region and the area is currently designated as moderate non-attainment for CO as well.

Article X and Air Permitting, KeySpan Ravenswood Combined Cycle Project, Queens, New York. Provided PSD/Non-Attainment air permitting for a 250 MW combined cycle power generation facility in New York City. The project consists of a natural gas and oil fired GE 7FA combustion turbine in combined cycle mode, with duct burner for supplementary firing of the HRSG. The project is located in a severe ozone non-attainment region and the area is currently designated as moderate non-attainment for CO as well.

PSD / Non-Attainment Air Permit Application, Columbia Energy Liberty Electric Combined Cycle Plant. Air permitting for a 500 MW power plant to be located at a brown field site in Eddystone, Pennsylvania, consisting of two General Electric 7FA combustion turbines in combined cycle mode. The application is based on gas-fired dry low-NOx technology design with gas-fired duct burners with selective catalytic reduction NOx control technology. The application BACT/LAER analysis and subsequent negotiations with PaDEP and USEPA in early 2000 resulted in a finding that an oxidation catalyst would not be required as BACT for CO or LAER for VOC.

PSD / Non-Attainment Plan Approval (Air Permit) Application, AES Ironwood. Air permitting for a 700 MW combined cycle power plant to be located at a green field site in Lebanon, Pennsylvania, based upon two Westinghouse 501G turbines. Development of the application required development of annual emissions caps to take into account higher combustion turbine emissions during part-load operation and start-ups, LAER determinations for NO_x and VOC and a BACT cost analysis for CO.

Air Permitting, Reliant Energy Erie West Combined Cycle Project, Erie West, Pennsylvania. Provided PSD/Non-Attainment air permitting for a 900 MW combined cycle power generation facility in northwest Pennsylvania. The project was to consist of three natural gas fired GE 7FB combustion turbines in combined cycle mode, with duct burners for supplementary firing of the HRSG. The project was to be located in the ozone transport region subject to non-attainment review.

Air Permitting, Trigen Energy Washington Convention Center, Washington, D.C. Provided air permitting assistance for installation of two gas/oil boilers and five diesel engines to provide heat and electricity to the new Washington, D.C. Convention Center. Prepared emissions estimates and developed synthetic minor strategy to avoid PSD and non-attainment new source review. Prepared application for submittal to Washington DOH and assisted in meetings and permit negotiations.

Air Permitting, Trigen-Cinergy Sweetheart Cup Owings Mills Cogeneration Project. Air permitting for a internal combustion engine cogeneration plant to be located in Owings Mills Maryland at Sweetheart Cup's existing manufacturing facility. Assistance included development of operating restrictions order to avoid PSD and non-attainment new source review and participation in agency meetings including the public hearing.

Air Permitting, Trigen-Cinergy University of Maryland Cogeneration Project, College Park, Maryland. Air permitting for a combined cycle cogeneration plant to be located in College Park, Maryland at the University of Maryland's exiting steam plant. Assistance included a netting analysis involving shutdown of existing boilers in order to avoid PSD review and participation in agency meetings including the public hearing.

Air Permitting, Trigen-Cinergy Millennium Inorganic Chemicals Ashtabula Cogeneration Project, Ashtabula, Ohio. Air permitting for a combined cycle cogeneration plant to be located in Baltimore Maryland at Millennium Inorganic Chemicals' existing plant. Assistance included a netting analysis in order to avoid PSD review and participation in agency meetings including the public hearing.

Air Permitting, Trigen-Cinergy Millennium Inorganic Chemicals Hawkins Point Cogeneration Project, Hawkins point, Maryland. Air permitting for a combined cycle cogeneration plant to be located in Ashtabula, Ohio at Millennium Inorganic Chemicals' existing plant. Assistance included development of minor source strategy, including a netting analysis involving shutdown of existing boilers in order to avoid PSD review.

Air Permitting, Delaware Clean Energy Project, Delaware City, Delaware. Air permitting for a project that would utilize Texaco gasification technology to convert 2350 tons per day of petroleum coke to syngas to be burned in a new 190 MW GE Frame 7F combustion turbine combined cycle unit and two existing boilers. Emission reductions from conversion of existing boilers at the Delaware City site from coke firing were being used to net out of Federal new source review requirements in order to expedite permitting. Requirements for "opt-in" to acid rain SO_2 allowance trading program are being investigated. The client is a partnership of Texaco Syngas, Star Enterprise, and Mission Energy. The project would provide steam and electricity to the existing Star Enterprise refinery and electricity to Delmarva Power & Light.

Air Permitting, Freehold Cogeneration Associates Facility, Constellation Energy, Freehold, New Jersey. Provided air permitting for the Freehold Cogeneration Associates facility, a 125 MW combined cycle cogeneration facility in central New Jersey. Submitted a complete application under

the deadline to avoid non-attainment review requirements, and provided support at agency meetings and public hearings.

PSD Permit Application, Florida Power & Light Martin CGCC Plant, Martin County, Florida. Prepared a PSD permit application for a 1600 MW utility coal gasification and combined cycle facility to be located in Martin County, Florida.

PSD Permit Application, Energy Initiatives, Inc., Virginia. Prepared a PSD air permit application for the Bermuda Hundred Energy L.P. cogeneration project, a 292 MW combined cycle facility to be located in central Virginia. The project consists of two GE Frame 7EA combustion turbines with quiet combustors, duct burners for supplementary firing, and two package boilers burning natural gas and low-sulfur distillate oil. The application includes a top-down Best Available Control Technology (BACT) analysis for the turbines, burners, and boilers, prepared in accordance with Virginia DAPC and USEPA Region III guidance.

Air Permitting, Consolidated Power Company, Dunkirk, New York. Provided air permitting for the Dunkirk Cogeneration Company project, a 48 MW steam-injected gas turbine cogeneration unit. The unit would be equipped with selective catalytic reduction, and would be located in western New York State.

Air Permitting, Department of Energy, Savannah River, South Carolina. Provided air permitting support for the proposed heavy water reactor facility for Department of Energy's New Production Reactor at the Savannah River site in South Carolina. Developed licensing strategies and emissions estimates for combustion units (emergency diesel generators, etc.) and participated in meetings with the client and South Carolina Department of Health and Environmental Control.

Air Permitting, Sandoz Pharmaceuticals Corporation, East Hanover, New Jersey. Coordinated preparation of an air permit application for a trash-fired boiler located in northern New Jersey. The project involved the addition of acid gas and particulate matter control equipment to an existing 780 lb/hr incinerator with a heat recovery boiler. The application included a state-of-the-art review for pollution control, air quality modeling, and a health risk assessment.

Air Permitting, Confidential Pharmaceutical Client, New Jersey. Prepared an air permit application for a medical waste incinerator in Lafayette, New Jersey research facility. Prepared emission estimates based upon a combination of NJDEPE guidelines, published data, and stack test results for a similar facility.

PSD Permit Application, New Fossil Power Station Site Study, Virginia and North Carolina. Assembled complete PSD permit applications for three potential sites for a 3400 MW coal-fired power station. Interpreted regulations and met with state and federal agencies to determine required analyses. Directed preparation of documents, including pollution control technology reviews. Calculated all air emissions including those from stacks, cooling towers, and fugitive dust due to coal, FGD reagent, and waste handling.

Air Quality Licensing, Chesterfield Power Station Units 7 and 8, Virginia. Coordinated air quality licensing for Chesterfield Units 7 and 8, a 420 MW combined cycle addition utilizing the first General Electric model 7F advanced gas turbine. Led preparation of a PSD/non-attainment air permit application and environmental analyses supporting testimony for the State Corporation Commission and a petition for a Fuel Use Act exemption from the U.S. Department of Energy. Participated in contract negotiations with the vendor, and negotiations on pollution control requirements and permit limits with the Virginia Department of Air Pollution Control and the USEPA. Contributed to successful arguments against catalytic controls in response to the USEPA top-down policy for determining BACT.

Site Evaluation and Permitting Strategy, Gravel Neck and Darbytown Combustion Turbine Stations, Virginia. Devised and implemented a site evaluation methodology and permitting strategy for two 340 MW gas turbine peaking facilities. Prepared the air permit applications and noise analyses, and served as the company representative on air quality and noise at state and local public hearings and meetings.

Title V Operating Permit and Inventory Assistance

Mr. Shotts has managed or been involved in Title V program evaluation and permitting projects for a variety of clients throughout the United States. He has prepared emission inventories, compliance reviews and operating permit applications for utilities, cogeneration facilities, and chemical, automobile and food and beverage manufacturers. Mr. Shotts has participated in many aspects of air permitting including the quantification and calculation of emissions, control technology analysis and the development of emissions inventories.

Operating Permit Assistance, Union Carbide Bound Brook and Weston Canal Facilities. Provided assistance in Title V permitting for Union Carbide research and development and production operations at its Bound Brook, NJ facility, including guidance with respect to application filing strategy, inventory preparation and identification of applicable requirements. Also completed an applicability checklist for the Weston Canal, NJ research and development facility to confirm and document its synthetic minor source status. Prepared permit application revisions to obtain new permits for existing boilers at the Weston Canal facility.

Operating Permit Assistance, Vineland Municipal Electric Utility. Developed emission estimates for all VMEU operations for inclusion in New Jersey operating permit applications. Estimates were developed for coal/oil boilers, combustion turbine, diesel generator, coal and ash handling, cooling towers, storage tanks, etc. Combustion HAP's emissions factors were chosen based upon an extensive review of published factors and fuel analyses, as well as site-specific stack testing and fuel analysis.

Operating Permit Preparation, General Motors Manufacturing Facilities. Project manager of overall Title V effort for eight GM manufacturing facilities and two proving grounds. The manufacturing facilities include engine plants and metal fabrication plants, and the proving grounds involve drive testing and testing related to safety, noise and emissions. Tasks include detailed

emissions inventory, compliance review, record keeping plan and permit applications. Facilities are located in Michigan, Ohio, Indiana, Pennsylvania and Arizona.

Operating Permit Assistance, Planters LifeSavers Brooklyn Plant. Conducted emissions inventory and developed synthetic minor source strategy for hard candy manufacturing plant in New York City. Emission estimates included boilers, storage tanks, fugitives and process VOC emissions associated with flavorings.

Operating Permit Assistance, Public Service Electric and Gas (PSE&G), New Jersey. Assisted in obtaining operating permits for 13 generating stations as required for compliance with the Clean Air Act Amendments. Developed plant-specific and system-wide schedules and manpower requirements, prepared comments on NJDEPE's proposed Subchapter 22 rules, and estimated and modeled fugitive dust emissions. Provided assistance in NO_x Reasonably Achievable Control Technology (RACT) compliance planning.

Operating Permit Emissions Inventory, Centerior Energy, Ohio. Emission inventory development for four coal-fired generating stations, including planning the inventory approach, leading the on-site data development effort, developing the emission calculation approach and supervising the performance of all emission calculations.

Operating Permit Preparation, Procter and Gamble, Sundor Brands, New Jersey. Responsible for overall Title V permitting effort including onsite data gathering, emission calculations, identification of applicable federal and state requirements and preparation of permit application package.

Air Pollution Engineering and RACT/BACT/LAER Analysis

Mr. Shotts has performed numerous control technology reviews, including Reasonable Available Control Technology, Best Available Control Technology and Lowest Achievable Emission Rate (RACT/BACT/LAER) analyses for major utilities and private industry. These analyses included extensive clearinghouse searches, cost studies, equipment appraisals and professional testimonies.

BACT/LAER Analyses, Destec Energy, Harriman, New York. Prepared air permit applications for the Destec Northway Cogeneration Project, a 57 MW combined cycle unit. The final application included BACT and LAER control technology reviews and a verification package for a multi-source modeling inventory.

Control Technology Review for BACT and HAPs, PG&E National Energy Group Salem Harbor Repowering Project, Salem Harbor, Massachusetts. Prepared BACT analysis, including RACT/BACT/LAER Clearinghouse review for a repowering project consisting of two new pulverized coal boilers at an existing coal-fired boiler site. Existing units are to be shut down such that the project will net out of PSD and non-attainment new source review, but is subject to Massachusetts BACT requirements. Provided analysis of alternative control technology schemes, including assessment of differences in performance on trace metal hazardous air pollutants. Conducted search for most appropriate HAP emission factors for the coals and control schemes

under consideration. Identified HAPs having the greatest potential to exceed Massachusetts DEP ambient air quality guideline thresholds.

BACT/LAER Analysis, CPV Terrapin Project, Savannah, Georgia. Provided air permitting for the Competitive Power Ventures Terrapin Project, an 831 MW combined cycle facility to be located near Savannah, Georgia. The facility would consist of three natural gas and oil-fired GE 7FA turbines in combined cycle mode equipped with selective catalytic reduction for NOx control. The BACT/LAER analysis includes a RACT/BACT/LAER Clearinghouse search and a cost-effectiveness analysis for control of carbon monoxide by an oxidation catalyst.

BACT Analysis, CPV Gulf Coast Project, Florida. Provided air permitting for the Competitive Power Ventures Gulf Coast Project, an 250 MW combined cycle facility to be located in Manatee County, Florida. The facility would consist of one natural gas and oil-fired GE 7FA turbine with an unfired HRSG in combined cycle mode equipped with selective catalytic reduction for NOx control. The BACT/LAER analysis includes a RACT/BACT/LAER Clearinghouse search and a cost-effectiveness analysis for control of carbon monoxide by an oxidation catalyst.

BACT/LAER Analysis, CPV Cunningham Creek, Palmyra, Virginia. Provided air permitting for the Competitive Power Ventures Cunningham Creek Project, a 500 MW combined cycle facility to be located in Fluvannah County, Virginia. The facility would consist of two natural gas and oil-fired GE 7FA turbines in combined cycle mode with duct burners and equipped with selective catalytic reduction for NOx control. The BACT/LAER analysis includes a RACT/BACT/LAER Clearinghouse search and a cost-effectiveness analysis for control of carbon monoxide by an oxidation catalyst. Subsequently the project design was revised to incorporate an oxidation catalyst.

BACT/State-of-the-Art Analyses, Hydra-Co/CNG Energy, Lakewood, New Jersey. Provided air permitting for the Lakewood Cogeneration Project, a 210 MW combined cycle facility to be located in central New Jersey. The project involved control technology proposals for both aeroderivative and frame-type combustion turbines subject to dispatchable operation. Selective catalytic reduction will be used to control emissions of nitrogen oxides.

BACT/LAER Analyses, Destec Energy, Harriman, New York. Prepared air permit applications for the Destec Northway Cogeneration Project, a 57 MW combined cycle unit. The final application included BACT and LAER control technology reviews and a verification package for a multi-source modeling inventory.

BACT Support, Dayton Power & Light, Dayton, Ohio. Provided technical support for a BACT proposal for the Tait Peaking facility, consisting of seven 83 MW simple cycle combustion turbines. Conducted a comprehensive BACT/LAER clearinghouse search, summarized cost impacts, prepared expert testimony and participated in internal and agency meetings.

RACT Analyses, Hoffmann-LaRoche, Inc., Nutley and Belvidere, New Jersey. Prepared an application for an "alternative maximum allowable emission rate," under NJDEP NO_x RACT (Subchapter 19) facility-specific NO_x emission limit provisions, for three combined cycle cogeneration units at the Nutley facility. Identified NO_x control options with a feasibility/cost

analysis for combustion turbines that cannot be equipped with water injection or dry low-NO_x controls. Prepared RACT analysis for an interim RACT proposal as part of a delayed compliance filing associated with a repowering project at the Belvidere facility.

Control Technology Options Analyses, Public Service Electric & Gas, Burlington, New Jersey. Conducted a study of air permitting/engineering options for repowering Unit 10 at PSE&G's Burlington Generating Station with eight Turbo Power & Marine FT-8 turbines. Netting strategies included controls on existing boiler and turbines.

Fugitive Dust Analysis

Mr. Shotts has estimated fugitive dust emissions and proposed control technologies to obtain permits for clients in industry as well as for utility companies.

Fugitive Dust Analysis, PSE&G Hudson and Mercer Coal Power Stations, New Jersey. Prepared Title V inventories and source characterization for modeling of fugitive dust emissions from coal and ash handling systems at two utility coal boiler facilities. Subsequently, developed spreadsheets to enable updating of emissions estimates for the purpose of NJDEP annual emissions statements.

Fugitive Dust Analysis, Chesterfield Temporary Coal Barge Unloading Facility, Virginia. Prepared the air permit application, including fugitive dust emissions calculations and a review of control technologies, for a temporary coal barge unloading facility.

Fugitive Dust Emissions, Inter-Power of New York, Halfmoon, New York. Developed estimates of fugitive dust emissions from the construction phase of the Halfmoon FBC cogeneration facility, including dust generated by the operation of various trucks, dozers, scrapers, and loaders, and from areas of disturbed earth.

Fugitive Dust Studies, Virginia Power, Virginia and West Virginia. Observed operating sources of fugitive dust emissions including rail car, truck, and barge coal unloading and stocking out, storage pile reclaim by bulldozing, dry ash disposal and vehicle traffic in order to evaluate compliance. Developed emissions estimates and control technology evaluations for new and existing dust sources associated with the New Fossil Station site study, the Chesterfield Temporary Coal Barge Unloading Facility and others.

Regulatory Compliance Analysis

Mr. Shotts has performed regulatory analysis for several air and non-air related projects. His duties have included regulatory reviews, impact assessment, environmental auditing, and air quality coordination.

Air Quality Compliance Audit, Mirant New York and Mid-Atlantic Generating Facilities. Conducted air quality component of internal environmental and safety audits for Mirant's coal-fired generating stations in Maryland and New York State. Tasks included site visits, interviewing

operations staff and preparation of audit report sections identifying exceptional practices, deficiencies and recommendations.

Clean Air Act Amendments Regulatory Analysis, National Aeronautics & Space Administration Space Centers. Identified requirements and costs associated with compliance with Clean Air Act Amendments, including Title V operating permits, at 13 NASA space centers.

Environmental Impact Statement, Federal Energy Regulatory Commission, Summit, Ohio. Prepared an air quality impact assessment for the Summit (Ohio) Pumped Storage Hydroelectric Project as a part of the FERC Environmental Impact Statement. Characterized air quality affects for construction and operation phases and compared to alternative peaking capacity additions for the region.

Air Quality Compliance Activities, Possum Point Power Station, Dumfries, Virginia. Coordinated air quality compliance activities for the Possum Point Power Station, including notification, reporting, and compliance inspections and audits. The 1400 MW station consists of two coal-fired boilers, three oil-fired boilers, and six combustion turbines. Duties included observing visible emissions and electrostatic precipitator operation, and reporting and inspecting extensive asbestos removal work.

Radioactive Waste Processing Compliance Evaluation, North Anna and Surry Radwaste Facilities, Virginia. Evaluated aspects of radioactive waste processing and disposal options relevant to air quality. Coordinated preparation of submittals to air agencies resulting in exemptions for low-level waste processing facilities at the North Anna and Surry Nuclear Power Stations.

Air Quality Impacts and Licensing Evaluation, Virginia Power Coal Gasification Studies, Virginia. Evaluated air quality impacts and licensing issues associated with various coal gasification technologies. Analyzed environmental impacts of BGC/Lurgi technology in support of a proposal to USDOE's Synfuels Program. Prepared a licensability study for the Shell gasification process under EPRI's Site-Specific Coal Gasification Combined Cycle Studies program.

Air Quality Compliance Coordinator, Virginia Power Possum Point Ash Pond Expansion, Virginia. Served as air quality coordinator for construction of a new coal ash disposal area, which required relocation of an inactive refuse landfill. Obtained a burning permit, conducted compliance inspections, and oversaw landfill excavation to identify hazardous materials for segregation.

Environmental Liability Due Diligence Review

Mr. Shotts has managed and been involved due diligence assessments for acquisitions of utility assets including generating stations nationwide. He has participated in management presentations, site visits and data room searches on behalf of bidders, and directed teams in gathering of baseline data, identifying current and potential regulatory issues and estimating associated costs. Air quality cost assessments included allowance shortfall projections and purchases, as well as air pollution control cost estimates. Preliminary "ballpark" assessments are subsequently refined with rigorous documentation in the form of issues matrices and 20-year unit-specific and issue-specific cost projection spreadsheets.

Due Diligence Air Quality Issues Assessment, PECO Energy Bid for Sithe Energies Assets. Directed assessment of air quality issues and costs for 21 fossil generating station sites in seven states as input to PECO Energy's evaluation of Sithe Energies assets in a joint PECO/NRG bid plan. Tasks included data room file searches, agency visits to obtain permit and application files and compliance records, and detailed cost estimates for each unit. Cost estimates included boiler NOx control options and acid rain and NOx budget program allowances, as well as offsets required for projects under development.

Due Diligence Environmental Issues Assessment, KeySpan Energy Bid for Duquesne Power Assets. Directed assessment air quality issues and costs for seven fossil generating station sites in Pennsylvania and Ohio as input to PECO Energy's evaluation of Sithe Energies assets in a joint PECO/NRG bid plan. Tasks included participation in management presentation and site visits, review of CD-ROM documents, and 20-year detailed cost estimate projections for each unit and issue. Cost estimates included estimation of low-sulfur coal cost differentials and coal boiler SO2 and NOx control options, as well as acid rain and NOx budget program allowances and increases in annual Title V emission fees.

Monitoring Analysis

Mr. Shotts has performed monitoring studies for several projects including air emissions, meteorological data, and noise. He has also participated in the maintenance, auditing and evaluation of these data collection activities.

Noise Impact Studies, Virginia Power, Virginia. Conducted noise monitoring to determine noise levels at existing facilities and background levels at sites for proposed facilities. Predicted noise impacts and recommended controls for new facilities and modifications. Negotiated noise level guarantees in new equipment contracts and served as a noise expert at public hearings.

Emissions Monitoring and Stack Testing, Virginia Power, Virginia. Participated in maintenance, audits, and studies of opacity and sulfur dioxide continuous emissions monitors. Participated in a field performance comparison study of various SO_2 continuous emissions monitors, EPA Methods 6 and 6B, and coal sampling and analysis. Coordinated compliance stack testing to ensure that agency procedures were being followed and that facilities were operating in compliance during testing.

Ambient Air Quality Monitoring Support, Virginia Power, Virginia. Assisted in installation and routine maintenance and calibration of ambient air quality and meteorological monitoring stations. Analyzed particulate matter samples to determine ambient concentrations of particulate matter, sulfates, and nitrates.

PROFESSIONAL AFFILIATIONS

AWMA Old Dominion Chapter, Secretary-Treasurer
EPRI Gas Turbine NO_x Control Committee
UARG PSD/Nonattainment Committee

WORK HISTORY

Senior Engineer
TRC Environmental Corporation
1994 - present

Senior Engineer
Enserch Environmental Corporation (formerly Ebasco Environmental)
1989 - 1994

Engineer
Virginia Power, Air Quality Department
1981 - 1989

TRC Environmental Corporation

STEPHAN SOLZHENITSYN, AICP

Senior Project Manager

EDUCATION

Massachusetts Institute of Technology, Master of City Planning, 1997
Harvard University, A.B., Visual and Environmental Studies, 1995

PROFESSIONAL SUMMARY

Mr. Solzhenitsyn is a Senior Project Manager with TRC's Energy Group. His experience includes environmental impact assessments, siting studies and siting applications in several regions of the United States – the Northeast, Mid-Atlantic, and South. Projects include multidisciplinary permitting efforts for power generation facilities and interconnection corridors; siting studies for electric generating facilities; environmental due diligence associated with the purchase of existing facilities and brownfield development opportunities; and post-permitting support for permit compliance during financial close and project construction.

PROFESSIONAL EXPERIENCE

Electric Power Generation and Interconnection Projects

American National Power, Natural Gas Fired Facility – Brookhaven, New York (Long Island)
Project Manager for the ANP facility in Brookhaven, including siting analysis, permitting strategy, scope of studies, public hearing support, and primary responsibility for comprehensive multidisciplinary environmental permitting of a 580 MW natural gas-fired power plant in central Suffolk County. Filings for the plant include a preliminary scoping statement, air quality studies and NYSDEC applications, and an application pursuant to Article X of New York State's Public Service Law (June 2001). The project has received draft permits and its Article X application has been deemed compliant with respect to fulfilling its scope.

Calpine Eastern Corporation, Natural Gas Fired Facility – Wawayanda, New York
Project Manager for the Calpine facility in Orange County. Responsibilities include negotiation scope of application, public hearings, comprehensive multidisciplinary environmental study of a 540 MW natural gas-fired power plant in Orange County. Filings for the plant include a preliminary scoping statement, air permit applications (filed May 2001) and an application pursuant to Article X of New York State's Public Service Law.

Confidential Client – Nationwide Siting Study and Permitting Assessment
Project Manager for a collaborative nationwide siting study effort. Primary responsibilities include an analysis of permitting rigor and strategy in 16 US states; desktop "critical flaw" analyses of approximately 100 sites, and supervision over intensive field-level screening analysis, in advance of environmental permitting on approximately 12 sites. Nationwide study includes all areas of the United States except industrial and agricultural Midwest.

Competitive Power Ventures, Natural Gas Fired Facility – Polk County, Florida
Project Manager for non-Siting Board jurisdictional CPV facility in Polk County. Responsibilities include air permit filings, public hearings, environmental studies in support of Florida Water Use Permit and Environmental Resource Permit filings.

Confidential Clients, Critical Issues Assessments

Conducted dozens of "critical flaw" or "critical issues" assessments for clients that have identified potential development sites or investments across the northeastern United States, including the New York City load pocket. Critical Issues assessments have included the full breadth of environmental, land use, and gas/electric capacity analysis. Projects have included once-through, wet, and dry cooling proposals; proposals for both, LDC and interstate pipeline gas take stations; facilities in residential and industrial areas; simple-cycle as well as combined-cycle plants.

Confidential Client, Virginia Siting Study

Conducted initial electric and natural gas transmission available capacity research as well as environmental research in identifying up to 20 sites for both a combined-cycle and a simple cycle natural gas-fired plants. Formulated criteria for evaluation of the sites. Directed an affiliate office and oversaw primary data gathering and analysis.

Confidential Client, Down-state New York Siting Study

Identified and evaluated over 70 sites proximate to LDC and interstate pipeline routes, for a combined-cycle natural gas-fired plant. Formulated criteria for evaluation of the sites. Personally conducted primary data gathering and field visits. Analyzed finalist sites in-depth.

Glenville Energy, Natural Gas-fired Facility, Glenville, New York

Assisted in comprehensive environmental permitting efforts for a proposed two-unit 520 MW facility. Filings included a preliminary scoping statement and an application pursuant to Article X of New York State's Public Service Law.

Confidential Client, Environmental Due Diligence

Coordinated efforts associated with possible purchases of over 4,000 MW of existing generation within the in-city load pocket of Con Edison's service territory in New York State.

American National Power, Natural Gas-fired Facility and Electric Interconnection, Blackstone, Massachusetts
Assisted in comprehensive environmental permitting efforts for a proposed two-unit 580-MW natural gas-fired facility. Conducted route selection study for the project's electrical interconnection. Prepared extensive documentation for two dockets reviewed by the Energy Facilities Siting Board and provided continuing assistance under Massachusetts Environmental Policy Act review and local approvals. Following the receipt of permits, designed a database tracking all permit obligations incumbent upon ANP, distilling some 30 licenses and agreements

into a project task-driven reporting system that is being used for construction of the Blackstone plant.

American National Power, Post-Permitting Due Diligence –
San Marcos, Texas, and Bellingham, Massachusetts
Building on the obligations reporting system that was constructed for ANP's Blackstone plant, designed similar systems for two other ANP projects with similar designs but substantially different community and environmental permitting issues.

AES Enterprise, Inc., Natural Gas-fired Facility – Londonderry, New Hampshire.
Assisted in "critical flaws" assessment; performed baseline land use analysis; drafted and coordinated the scope of the project's application and numerous supplements; and provided witness preparation and support during hearings before the New Hampshire Site Evaluation Committee for the recently approved 720 MW AES Londonderry Cogeneration Facility. The Project was marked by unusual challenges and unusual solutions: airport constraints, innovation in wetlands avoidance; double interconnection; wet cooling using treated effluent.

Reliant Hope Energy – Johnston, Rhode Island
Performed baseline land-use analysis and prepared an application and supplements before the Rhode Island Energy Facility Siting Board on an accelerated schedule. Project Energy Facilities Siting Board (EFSB) approval was issued ahead of schedule and below cost.

Confidential Client – Vermont Siting Study
Identified and evaluated development opportunities along the only currently existing natural gas pipeline corridor in the state of Vermont, located in Chittenden and Franklin Counties.

Confidential Client, Tri-State Siting Study – Massachusetts, New Hampshire, Maine
Identified and evaluated over 140 sites proximate to the route of a major pipeline, now under construction, for a combined-cycle natural gas-fired plant. Formulated criteria for evaluation of the sites. A particular challenge in developing objective and defensible criteria was the difference in state regulations and the availability of data.

Power Development Company, Connecticut River Diversion Permit –
Cromwell to Meriden, Connecticut
Identified and evaluated alternative routing schemes in support of a major water diversion permit at the recently approved Meriden Power Project. Diverted Connecticut River water would be used to cool the facility's steam condenser.

Transportation and Land Use Projects
Massachusetts Turnpike Authority – Central Artery/Tunnel Due Diligence
Identified and analyzed mitigation obligations under Authority's acquisition of the Ted Williams Tunnel. Aided in issuance of RfPs for the operation of the new Haymarket Square parking garage.

Massachusetts Turnpike Authority – Surplus Parcels Project –
Berkshire to Suffolk Counties, Massachusetts

Recommended the highest and best use of approximately 150 land parcels along the Turnpike, including the use of parcels for the High Occupancy Vehicle Program and a packaged conveyance of wetland parcels to conservation groups.

City of Moscow, Yakimanka District – Environmental and Design Code Pilot Project – Moscow, Russia
Drafted principles of a wide-ranging urban regulatory code, designed to replace the vertical model of a General Plan. Recommended a threshold system of environmental reviews, an up-front declaration of the district government's architectural preferences, and the transfer of land title documents from the executive to the judicial sphere.

PROFESSIONAL AFFILIATIONS
American Institute of Certified Planners
American Planning Association

Michael D. Theriault - Executive Qualification Summary

Speciality - *Acoustics*

Mr. Theriault maintains over thirteen (13) years experience in acoustics and for more than a decade, has specialized in noise control and environmental noise impact assessment for combustion turbine power projects. With direct work experience on over 70 simple-cycle and combined-cycle power projects, ranging from 1 to 2000 megawatts, he has been retained by owners/developers to prepare environmental noise impact licensing applications; by architectural engineering firms to design and implement noise control programs; by construction firms to conduct plant noise level performance testing; and by financial underwriters and municipalities to perform noise control due diligence reviews. In addition, he has provided expert testimony in several legal arenas with respect to construction and operation of combustion-turbine power plants.

Mr. Theriault is a member of the Institute of Noise Control Engineering, and also of the Acoustical Society of America - Greater Boston Chapter. He holds a Bachelor of Science in Electrical Engineering from the University of Maine (1986), with a concentration in electro-acoustics and environmental noise control. From 1986 to 1988, he was employed as a project engineer by Brüel & Kjær Instruments, a leading manufacturer of sound level measurement instrumentation. From 1988 to 1995, he was employed as a noise control engineer by Stone & Webster Engineering Corporation, a worldwide-based architectural/engineering/construction firm. From 1995 to 1998, he was self-employed as an acoustical consultant and from 1998 to the present, he has been President and Principal Consultant for Michael Theriault Acoustics, Inc.

15 Worcester Square Suite 4
Boston Massachusetts 02118
617.437.9887 F 617.437.9343

SUSAN F. TIERNEY

Lexecon Inc.
One Mifflin Place
Cambridge, MA 02138
(617) 520-0200
(617) 520-0229 (direct)

PROFESSIONAL EXPERIENCE

Lexecon Inc., Cambridge, MA
(formerly The Economics Resource Group, Inc.)
Senior Vice President, July 1999 - present

The Economics Resource Group, Inc., Cambridge, MA
Principal, January 1997 - July 1999
Managing Consultant, November 1995 - December 1996

Consultant to business, government policy makers, and other organizations and on energy markets, economic and environmental regulation, environmental strategy, and electric facility projects in the U.S. Performs economic and policy analyses, gives strategic advice and consulting, and provides regulatory assistance and litigation support to supplier, user, and government clients in the electric, natural gas, and telecommunications industries. Provides expert witness services in regulatory cases and court proceedings involving electric industry restructuring, market analyses, mergers and acquisitions, generation and transmission projects, natural gas markets, electric system reliability, and environmental policy and regulation.

U.S. Department of Energy, Washington, DC
Assistant Secretary for Policy, May 1993 - July 1995
Appointed by President William J. Clinton; confirmed by U.S. Senate

Responsible for strategic planning and budgeting for DOE, and for policy analysis, policy development and advice on domestic and international energy policy, environmental policy, international trade and export promotion policy, science and technology policy, and global climate change policy. Managed staff of 225, with $30 million direct budget.

Specific Accomplishments: DOE Budget Priorities (1993/1994/1995/1996); DOE Strategic Plan (1994); Partnership for a New Generation of Vehicles (1993/94); Climate Change Action Plan (1993); Federal Fleet Conversion Task Force (1993); Domestic Natural Gas & Oil Initiative (1994); U.S. Joint

Implementation Initiative (1994); Presidential Advisory Committee on Personal Motor Vehicles (1994/95); U.S. Oil Import Study (1995); Sustainable Energy Plan (1995). Participated in trade missions to China, Mexico, and Pakistan. Led U.S. bilateral consultations (including policy advice on energy regulation and financing) with China, India, Indonesia, Canada, and Mexico.

Commonwealth of Massachusetts
Secretary of Environmental Affairs, January 1991 - March 1993
Appointed by Governor William F. Weld

Cabinet-level position with responsibility for five agencies, with combined budgets of $300 million: Department of Environmental Protection; Department of Environmental Management; Department of Fisheries, Wildlife and Environmental Law Enforcement; Department of Food and Agriculture; and Metropolitan District Commission. Chairman of the Board, Massachusetts Water Resources Authority.

Specific involvement in Boston Harbor Clean Up; Conservation Land Acquisition; Clean Air Act Implementation; Emissions Trading Regulations; Environmental Impact Reviews; Energy Facility Siting; gubernatorial trade missions to Hong Kong, Japan, South Korea, and Taiwan.

Massachusetts Department of Public Utilities, Boston, MA
Commissioner, April 1988 - January 1991
Appointed by Governor Michael S. Dukakis

Regulator of electric, gas, telecommunications and water companies in the state. Decided cases on consumer rates; cost recovery of utility investments; deregulation; PURPA contracts; competitive bidding policy; energy efficiency investments; pricing reform policy; utility integrated resource plans; gas transportation regulations.

Massachusetts Energy Facilities Siting Council, Commonwealth of Massachusetts
Executive Director, October 1984 - April 1988

Executive Director for ten-person state agency. Managed twenty person staff. Responsible for reviewing and approving proposals to construct power plants, transmission lines, and gas pipelines, and for forecasts of energy supply and demand.

Executive Office of Energy Resources, Commonwealth of Massachusetts
Senior Economist, May 1983 - October 1984

Massachusetts Energy Facilities Siting Council, Commonwealth of Massachusetts
Policy Analyst, October 1982 - May 1983

National Academy of Sciences, Washington, DC
Researcher, January 1982 - June 1982

University of California at Irvine, Irvine, CA
Assistant Professor, September 1978 - January 1982

Taught courses and conducted research on public policy analysis and planning.

EDUCATION

Cornell University, Department of City & Regional Planning, Ithaca, NY
Ph.D. in public policy analysis and planning, 1980
Dissertation on congressional policy making on energy policy issues
Masters of Regional Planning in public policy analysis and planning, 1976

Scripps College, Claremont, CA
B.A. in art history, 1973
Studied political science at L'Institut d'Etudes Politiques, Paris, France, 1971-72

SELECTED CONSULTING EXPERIENCE RELATING TO POWER MARKETS, FACILITY SITING, ENVIRONMENTAL ANALYSIS

Cross Sound Cable Company
Provides expert testimony regarding public benefits of proposal to construct merchant transmission facility across Long Island Sound. (2001)

Major independent power company
Provides expert witness support in litigation surrounding power plant development project. (2001)

MASSPOWER Inc.
Mediator in a contract dispute involving pricing of power purchases. (2001)

NRG Energy and Dynegy
Provided expert witness support in regulatory proceeding to review these companies' acquisition of power plants being divested by Sierra Pacific and Nevada Power. (2001)

Occidental Chemical Corporation
Provides expert witness support and economic/policy analysis of a major electric utility's transmission interconnection access and transmission

services policies and practices, and review of the proposed RTO. (2000 to present)

PP&L Global

Provides economic and environmental analysis and expert witness support for proposal to build the Kings Park power plant in Long Island, New York. (2000 to present)

Calpine

Provides economic and environmental analysis and expert witness support for proposal to build the Wawayanda power project in Rockland County, New York (2000 to present)

Provides environmental analysis and expert witness support for proposal to build the Towantic power plant in Oxford, Connecticut. (2001)

American National Power, Calpine, El Paso, NRG Energy, Sithe, Southern Energy

Provides support for the development of a proposal for a Regional Transmission Organization for New England. (2000 to 2001)

Duke Energy/Maritimes and Northeast Pipeline

Provides expert reports on the market and environmental impacts of new natural gas infrastructure and supply in New England and the public benefits of the Maritimes and Northeast Phase III and Hubline project. (2000 to present)

Arkansas Electric Distribution Cooperatives and Arkansas Electric Cooperative Companies

Provides expert witness support and analysis on economic and public policy issues associated with various aspects of wholesale and retail competition in Arkansas. (2000 to present)

TransÉnergie U.S.

Provides expert testimony regarding public benefits of proposal to construct merchant transmission facility. (2000 to present)

Conectiv

Provides strategic wholesale market analysis and support for procurement of supplies for distribution utility company's provision of Basic and General Services to retail customers. (2000)

SCS Energy Corp.–Astoria Energy

Provides economic and environmental analysis and expert witness support for proposal to build new power plant in New York City. (2000 to present)

HEFA Power Options

Provides strategic advice regarding wholesale electricity market for retail buyers' group. (2000 to present)

Investment company

Provided strategic advice to investment company with regard to potential investment in major electric generating equipment manufacturing company. (2000)

Major independent power company

Provided economic and environmental support for company's application to construct a merchant power plant in Florida. (2000)

Major railroad company

Provided expert witness support on economic and regulatory policy issues for railroad in state regulatory proceeding on a proposed utility merger. (2000)

Major brownfield property developer

Provided economic valuation of property to be developed as site for new electric generating facility. (2000)

Ozone Attainment Coalition

Provided strategic analysis and advice on electric system reliability issues relating to electric companies' implementation of 2003 NOx requirements issued by the U.S. EPA. (1999)

Municipal electric department

Analysis of the economics and need for a new natural gas pipeline proposed to save on existing electric power plant in Massachusetts. (1998 to 2001)

Seneca Nation

Provided expert analysis and strategic advice regarding the value of transmission rights of way, in a dispute with an electric utility company. (1998 to 2000)

Sithe Energies, Inc.

Provided strategic advice and regulatory support on a variety of issues (market analysis, transmission and ISO issues, federal and state market rules, legislation, siting, environmental strategy) relating to the company's participation in the New England, New York, and PJM markets. (1997 to present)

Provided transition assistance to the company in its acquisition and integration of approximately 2,000-megawatts of existing fossil fuel generation from Boston Edison Company. (1997 to 1998)

Provided transition assistance to the company in its acquisition and integration of approximately 4,100-megawatts of existing fossil and hydroelectric generation capacity from GPU Genco. (1998 to 1999)

Also provided support for the company's participation in electricity product markets structured by NEPOOL and operated by the Independent System Operator-New England, the New York power pool and the New York ISO, and PJM. (1997 to present)

Provided strategic project development advice and expert witness support for the company's applications to construct three natural gas merchant power plants (totalling 2865 megawatts) in Everett, Weymouth, and Medway, Massachusetts. (1998 to 2000)

Provided strategic guidance and regulatory support regarding design of air quality improvement plan for existing fossil units at Mystic Station. (1998 to present)

Provided strategic guidance regarding company's natural gas-fired merchant power plant development projects in Ontario, Canada. (2000 to present)

Various private electric companies, state legislative committees, gas companies, electric asset investor groups

Provided workshops and presentations on changes under way in the electric industry, with focus on issues of strategic importance to these particular decision-makers and stakeholders. (1995 to present)

Natural Resources Canada

Prepared a white paper on the implications for electric system reliability in Canada that are associated with restructuring the electric industry in the United States. (1999)

State energy office

Assisted the office in analyzing options for supporting renewable resource development in the state and in designing a market-based strategy to implement a new legislative mandate for a "renewables portfolio standard." (1997-1998)

U.S. Generating Company (now PG&E Generating Company)

Provided analysis of the economic, reliability, and environmental benefits to the host state and region of a new merchant power generation facility: the 360-megawatt Millennium project in Massachusetts. Provided expert witness testimony on the results of this analysis to the Massachusetts Energy Facility Siting Board. (1996-1997)

Provided analysis of the economic, reliability, and environmental benefits of a new merchant power generation facility: the 792-megawatt Lake Road Generating Project in Connecticut. Provided expert witness testimony on the need for this project to the Connecticut Siting Board. (1997-1998)

Major diversified electric equipment company

Provided strategic advice and analysis on market opportunities and risk in various regions of the U.S. electric industry, under numerous restructuring scenarios. (1996-1997)

National Council on Competition in the Electric Industry

Prepared a Briefing Paper on Regional Issues in Electric Industry Restructuring, for the NCCEI—a joint project of the National Association of Regulatory Utility Commissioners, the National Conference of State Legislatures, the U.S. Department of Energy, and the U.S. Environmental Protection Agency. Analyzed regional issues, including electric system reliability, transmission access and siting, environmental protection, market power, interstate reciprocity in retail access policies, and regulation of multi-state electric utility companies. (1997)

Major gas pipeline company

Provided analysis of market structures and prices for generation and delivery services in electric service territories where the gas pipeline would locate facilities that use electricity. (1997)

Major electric supply company

Provided analysis of regional electricity market conditions to support this company's analysis of the value of various utility assets that were being divested as part of an electric utility company's corporate restructuring. (1997)

Massachusetts Division of Energy Resources

Assisted the state's energy office in developing policies for establishing and implementing a statewide fund to support renewable resource development as part of the state's electric industry restructuring plan. Provided analytic support to the energy office as it participated in a working group of stakeholders attempting to reach consensus on the institutional design of such a renewables fund. Drafted legislative language to create the fund and the non-bypassable charge on electric distribution service in the state. (1997)

Coalition of marketers and independent power producers

Analyzed a state public utility commission's proposed rules for restructuring the electric industry, from the point of view of whether the proposed structure would assure a workably competitive market. Examined the regional power pool's proposal for an independent system operator. (1996-1997)

Major independent power producer

Analyzed market opportunities and risks for merchant plant development in a region of the U.S. (1996)

Major independent power producer

Analyzed the expected market price of power in two regions of the U.S. electricity markets. Presented results to company board of directors. (1996)

Intercontinental Energy Corporation

Provided strategic guidance, analytic support, and regulatory support for the company, a major independent power producer, as it developed its position in the state's electric industry restructuring proceeding. Issues involved regional industry structure (including independent system operator proposals), stranded cost recovery policy, stranded cost calculation methodologies, horizontal and vertical market power issues, environmental protection, and securitization. Provided expert witness testimony in state retail restructuring proceedings in Massachusetts and New Jersey. (1995-1997)

TESTIMONY ON BEHALF OF CLIENTS

Cross-Sound Cable Company/TransEnergie U.S.

Before the Connecticut Siting Council, in the matter of an application for a certificate of environmental compatibility and public need for the construction, operation and maintenance of a high voltage direct current submarine electric transmission facility from New Haven, Connecticut to Brookhaven, New York, prefiled direct testimony regarding the public benefits of the proposed transmission facility, July 24, 2001

Sithe New England (Sithe Edgar LLC, Sithe New Boston LLC, Sithe Framingham LLC, Sithe West Medway LLC, Sithe Mystic LLC)

Before the *Federal Energy Regulatory Commission, in the Matter of NSTAR Electric & Gas Corp., v. Sithe Edgar LLC, Sithe New Boston LLC, Sithe Framingham LLC, Sithe West Medway LLC, Sithe Mystic LLC, and PG&E Energy Trading*, Docket No. EL01-79-000, affidavit comparing historical cost recovery by Boston Edison for its portfolio of fossil generation units (pre-divestiture) under rate regulation, versus Sithe's revenue recovery for these same units (post-divestiture) under market prices, June 5, 2001.

NRG Energy Inc. and Dynegy Holdings Inc.

Before the Public Utilities Commission of Nevada, In re petition of the Attorney General's Bureau of Consumer Protection to issue an Order staying further proceedings regarding divestiture of Nevada's electric generation assets and to open a docket to consider whether to issue a moratorium on

divestiture in Nevada, supplemental prepared direct testimony on behalf of Valmy Power LLC, April 6, 2001.

Before the Public Utilities Commission of Nevada, In re petition of the Attorney General's Bureau of Consumer Protection to issue an Order staying further proceedings regarding divestiture of Nevada's electric generation assets and to open a docket to consider whether to issue a moratorium on divestiture in Nevada, prepared direct testimony on behalf of Reid Gardner Power LLC and Clark Power LLC, April 3, 2001.

Sithe New England, LLC

Before the *Federal Energy Regulatory Commission, In the Matter of Maine Public Utilities Commission and The United Illuminating Company v. ISO New England, Inc.*, affidavit on the role of price "spikes" in compensating generators for the services that they provide in the region, September 6, 2000.

Arkansas Electric Distribution Cooperatives

Before the *Arkansas Public Service Commission, In the Matter of a Generic Proceeding to Establish Uniform Policies and Guidelines for a Standard Service Package*, Prepared joint reply testimony (with Janet Gail Besser), July 21, 2000; prepared joint surreply testimony (with Janet Gail Besser), August 3, 2000.

TransÉnergie U.S.

Before the *Connecticut Siting Council*, on the public benefits of the proposed Cross Sound Cable Project. Expert report, July, 2000; prepared direct testimony, September 20, 2000; oral testimony, September 27, 2000; supplemental written testimony, December 7, 2000; oral testimony, December 14, 2000; oral testimony January 9-11, 2001.

SCS Energy Corp.

Before the *New York State Public Service Commission*, on the economic and environmental impact of a new combined cycle power plant in Queens, NY, June 19, 2000.

Reading Municipal Light Department

Before the *Massachusetts Energy Facilities Siting Board, Docket No. EFSB 97-4*, on the economics and need for a new natural gas pipeline, June 19, 2000; September 19, 2000; September 21-22, 2000; October 5, 2000; October 17, 2000.

Fitchburg Gas and Electric Light Company

Before the *Massachusetts Department of Telecommunications and Energy, Docket D.T.E. 99-66*, on gas and electric company rate design policy, January 14, 2000.

FirstEnergy Corp.

Before the *Public Utilities Commission of Ohio, In the Matter of the Application of FirstEnergy Corp. on behalf of Ohio Edison Company, the Toledo Edison Company, and The Cleveland Electric Illuminating Company: for Approval of an Electric Transition Plan and for Authorization to Recover Transition Revenues (Case No. 99-1212-EL-ETP); for Approval of New Tariffs (Case No. 99-1213-EL-ATA); for Certain Accounting Authority (Case No. 99-1214-EL-AAM)*, on recovery of transition costs and calculation of the market value of generation assets. Joint testimony (with Dr. Scott T. Jones), December 22, 1999; supplemental testimony (with Dr. Scott T. Jones), April 4, 2000; deposition, April 7, 2000.

Sithe New England, LLC

Before the *Massachusetts Energy Facilities Siting Board, Docket EFSB 98-10*, in support of an application to construct a 540 MW gas-fired single cycle peaking power plant in Medway, Massachusetts. Prepared direct testimony, April 1999; oral testimony, July 27, 1999.

Village of Bergen, et al.

Before the *Supreme Court of the State of New York, Index No. 081556*, Affidavit in Response to Defendant's Submission of February 25, 1999, in *Village of Bergen, et al., Plaintiffs, v. Power Authority of the State of New York, Defendant*, March 3, 1999.

Before the *Supreme Court of the State of New York, Index No. 081556*, Affidavit in Support of Petition to Correct Rates, in *Village of Bergen, et al., Plaintiffs, v. Power Authority of the State of New York, Defendant*, October 17, 1996.

Sithe New England, LLC

Before the *Massachusetts Energy Facilities Siting Board, Docket EFSB 98-7*, in support of an application to construct a 750 MW gas-fired combined cycle power plant at the Fore River Station in Weymouth, Massachusetts (Edgar). Prepared direct testimony, February 10, 1999; oral testimony, July 26, 1999.

Sithe New England, LLC

Before the *Massachusetts Energy Facilities Siting Board, Docket EFSB 98-8*, in support of an application to construct a 1500 MW gas-fired combined cycle power plant at the Mystic Station in Everett, Massachusetts. Prepared direct testimony, February 10, 1999; oral testimony, May 25, June 2, 1999.

U.S. Generating Company

Before the *Connecticut Siting Board, Docket No. 189*, on an application to construct a new Lake Road Generating Project, September 1998. Oral testimony only.

Central Hudson Gas & Electric Corporation

Before the *Supreme Court of New York, Index No. 255/1998, CHGE v. West Delaware Hydro Associates*, on issues relating to ratemaking treatment of costs relating to power contracts, April 13, 1998.

Sithe Energies, Inc.

Before the *Massachusetts Energy Facilities Siting Board, Docket No. EFSB98-3,* on issues related to the agency's rulemaking establishing a Technology Performance Standard, June 8, 1998.

Before the *Massachusetts Energy Facilities Siting Board, Docket No. EFSB98-1,* on issues related to the agency's review of project viability as part of its review of power plant applications, March 16, 1998.

Pennsylvania Power & Light

Rebuttal testimony on codes of conduct governing affiliate relations. *Pennsylvania Public Utility Commission, Docket Nos. A-122050F0003, A-120650F0006*, February 17, 1998.

Rebuttal testimony on rate unbundling and rate design issues, on consumer protection issues. *Pennsylvania Public Utility Commission, Docket No. R-00973954,* August 5, 1997.

Before the *Pennsylvania Public Utility Commission, Docket No. R-00973954,* on rate design, April 1, 1997.

Nextel Communications

Before the *Massachusetts Department of Public Utilities, Docket 95-59-B,* on telecommunications facility matters, January 1997.

Arizona Public Service Company

Before the *Arizona Corporation Commission, Docket No. U-0000-95-506,* on integrated resource planning and competition, October 1996.

U.S. Generating Company

Before the *Massachusetts Energy Facilities Siting Board, Docket 96-4,* on an application to construct a new Millennium power generating facility, October 1996.

MCI Communications, Inc.

Before the *Massachusetts Department of Public Utilities*, in the NYNEX interconnection docket. Opening up the Local Exchange Market to Competition: Common Themes with Retail Competition in Electricity and Natural Gas Industries, August 30, 1996.

Intercontinental Energy Corporation

Before the *New Jersey Board of Public Utilities, No. EX94120585Y,* on the Energy Master Plan Phase I Proceeding to Investigate the Future Structure of the Electric Power Industry, July 1996.

Before the *Massachusetts Department of Public Utilities, DPU 96-100,* on the Investigation Commencing a Notice of Inquiry/Rulemaking for Electric Industry Restructuring Proceedings, July 1996.

TESTIMONY BEFORE CONGRESS ON BEHALF OF DEPARTMENT OF ENERGY

Before the *Subcommittee on Energy Production and Regulation, Committee on Energy and Natural Resources, U.S. Senate, regarding S. 708,* The Electric Utility Ratepayer Act, June 6, 1995.

Before the *Subcommittee on Energy and Power, Committee on Commerce, U.S. House of Representatives,* regarding the Berlin Conference of the Parties of the Climate Change Convention, May 19, 1995.

Before the *Committee on Foreign Relations, U.S. Senate,* on the outlook for U.S. oil and gas production, imports, and energy security, March 27, 1995.

Before the *Committee on Interior Appropriations, U.S. House of Representatives,* regarding the Department of Energy budget, March 23, 1995.

Before the *Subcommittee on Energy and Power, Committee on Commerce, U.S. House of Representatives,* regarding the international climate change negotiations, March 21, 1995.

Before the *Subcommittee on Energy and Power, Committee on Energy and Commerce, U.S. House of Representatives,* regarding competition in the electric industry following the enactment of the Energy Policy Act of 1992, July 13, 1994.

Before the *Committee on Commerce and Energy, U.S. House of Representatives,* on reformulated gasoline, June 22, 1994.

Before the *Subcommittee on Clean Air and Nuclear Regulation, Committee on Environment and Public Works, U.S. Senate,* regarding the U.S. Climate Change Action Plan, April 14, 1994.

Before the *Subcommittee on Energy and Power, Committee on Energy and Commerce, U.S. House of Representatives,* regarding the adequacy of the supply of electricity and natural gas during the January 1994 cold wave, February 9, 1994.

Before the *Committee on Science, Space and Technology, U.S. House of Representatives* regarding the U.S. Climate Change Action Plan and Assessment, November 16, 1993.

Before the *Subcommittee on Oversight and Investigation, Committee on Energy and Commerce, U.S. House of Representatives,* regarding the federal government's programs to promote the use of alternative motor fuels in transportation, October 29, 1993.

Before the *Subcommittee on Energy and Power, Committee on Energy and Commerce, U.S. House of Representatives,* regarding the U.S. Climate Change Action Plan, October 27, 1993.

Before the *Subcommittee on Health and the Environment, Committee on Energy and Commerce, U.S. House of Representatives,* regarding U.S. policies for reducing greenhouse gas emissions, August 4, 1993.

Before the *Subcommittee on Rural Enterprises, Exports and the Environment, Committee on Small Business, U.S. House of Representatives,* on U.S. export promotion policy, July 26, 1993.

Before the *Subcommittee on Energy and Power, Committee on Energy and Commerce, U.S. House of Representatives,* regarding U.S. policy on global climate change, May 26, 1993.

Before the *Committee on Energy, U.S. Senate,* on the confirmation of Susan Fallows Tierney as Assistant Secretary of Domestic and International Energy Policy at the Department of Energy, May 4, 1993.

TESTIMONY BEFORE REGULATORY AGENCIES ON BEHALF OF DEPARTMENT OF ENERGY

Before the *Massachusetts Department of Public Utilities, DPU 95-30,* Investigation on electric industry restructuring, April 24, 1995.

Before the *Federal Energy Regulatory Commission, RM94-20-000,* Inquiry concerning Alternative Power Pooling Institutions Under the Federal Power Act, March 2, 1995.

Before the *Joint Oversight Committee on Lowering the Cost of Electric Service, California Legislature,* December 9, 1994.

Before the *California Public Utilities Commission, R.94-04-031, I.94-04-032,* full panel hearing on its investigation and rulemaking on the Commission's Proposed

Policies Governing Restructuring California's Electric Services Industry and Reforming Regulation, September 16, 1994 (August 24, 1994 filing).

Before the *California Public Utilities Commission, R.94-04-031,* full panel hearing on its proposed rulemaking on the Commission's Proposed Policies Governing Restructuring California's Electric Services Industry and Reforming Regulation, August 4, 1994 (July 26, 1994 filing).

Before the *California Public Utilities Commission, R.94-04-031,* on its investigation and rulemaking on the Commission's Proposed Policies Governing Restructuring California's Electric Services Industry and Reforming Regulation, June 8, 1994.

Before the *Federal Energy Regulatory Commission, RM93-19-000,* on Electric Transmission Pricing, April 8, 1994.

TESTIMONY ON BEHALF OF THE COMMONWEALTH OF MASSACHUSETTS

Before the *Massachusetts Legislature* on *S. 989,* an Act Relative to Motor Vehicle Laws and Motor Vehicle Emission Standards, March 16, 1992.

Before various *Massachusetts legislative committees* on environmental, energy, energy facilities siting, and budget matters, 1991-1993.

Before the *Federal Energy Regulatory Commission, EC90-10-000,* on Northeast Utilities Service Corporation's proposed merger with Public Service Company of New Hampshire, July 1990.

Before the *U.S. Department of Energy,* regarding the National Energy Strategy: "Energy and Productivity —A Northeast Perspective," Providence, RI, December 1, 1989.

Before the *Massachusetts Department of Public Utilities,* in its investigation of 1987 reliability problems in New England, Spring 1988.

Before the *Federal Energy Regulatory Commission,* on transmission policy, 1990.

REPRESENTATION

Vice-Chair, Governing Board of the International Energy Agency, 1993-1995

Board of Trustee Observer, North American Electric Reliability Council, 1994-1995

Co-Chair, U.S. Joint Initiative on Joint Implementation, 1994-1995

U. S. Department of Energy Trade Mission to Mexico, Second Member of Official U.S. Delegation, June 19-23, 1995

Chair, U.S. Delegation, Bilateral Energy Meetings with India, Washington DC, June 1995

Presidential Mission on Sustainable Energy and Trade to China, Second Member of Official U.S. Delegation, February 15-24, 1995

Chair, U.S. Delegation, Bilateral Energy Meetings with India, New Delhi, India, January 1995

Chair, U.S. Delegation, Bilateral Energy Meetings with Indonesia, Washington, DC, December, 1994

Presidential Mission on Energy Investment in Pakistan, Second Member of Official U.S. Delegation, September 12-25, 1994

Chair, U.S. Delegation, Bilateral Energy Meetings with Mexico, Mexico City, Mexico, 1994

Chair, U.S. Delegation, Bilateral Energy Meetings with Canada, Calgary, Canada, Spring, 1994

U.S. Representative to the International Energy Agency Ministerial on Environment, Interlaken, Switzerland, March 1994

1993 in-depth Review of the United States Energy Policy, International Energy Agency, Paris, France, March 1994

Vice-Chair, Federal Fleet Conversion Task Force, 1993-1994

Chairman of the Board, Massachusetts Water Resources Authority, 1991-1993

Founding Member and Massachusetts Representative, Ozone Transport Commission, 1991-1993

Member, U.S. Environmental Protection Agency Clean Air Act Advisory Committee, 1991-1993

Member, U.S. Environmental Protection Agency Science Advisory Committee, 1993

Member, National Electromagnetic Field Research Program Steering Committee, 1991-1993

Trustee for Natural Resources, New Bedford Harbor Clean Up, 1991-1993

PUBLICATIONS, REPORTS, ARTICLES

"Supplemental Report on The Benefits of New Gas Infrastructure in Massachusetts and New England: The Maritimes & Northeast Phase III Pipeline and the Algonquin Gas Transmission Company HubLine Projects," prepared for Maritimes & Northeast Pipeline, LLC and Algonquin Gas Transmission Company, July 2001. .

"A Better CO_2 Rule," op-ed, *The New York Times*, May 16, 2001.

"Air Pollution Reductions Resulting from the Kings Park Energy Project" (with Joseph Cavicchi), prepared for PPL Global, January 24, 2001.

"Report on "Economic Benefits of Wireless Telecommunications," prepared on behalf of the New Hampshire Coalition of Wireless Carriers for the New Hampshire HB 733 Study Committee, November 13, 2000.

Expert Report: "Public Benefits of the Proposed Cross Sound Cable Project Prepared for TransEnergie US Ltd.," July 2000.

"The Benefits of New Gas Infrastructure in Massachusetts and New England: The Maritimes & Northeast Phase III Pipeline and the Algonquin Gas Transmission Company HubLine Projects" (with Wayne Oliver of Navigant Consulting), prepared for Maritimes & Northeast Pipeline, LLC and Algonquin Gas Transmission Company, October 2000.

"Production Modeling for the Astoria Project: Report on Results" (with John G. Farr), report for SCS Energy Corp., June 14, 2000.

"Observations from Across the Border: Implications for Canadian Reliability of Recent Changes in U.S. Electricity Markets and Policy," white paper for Natural Resources Canada, 1999.

"Research Support for the Power Industry" (with M. Granger Morgan), *Issues in Science and Technology*, Fall 1998.

"Maintaining Reliability in a Competitive U.S. Electricity Industry," Final Report of the Task Force on Electric System Reliability, U.S. Department of Energy, September 29, 1998.

"Regional Issues in Restructuring the Electric Industry," *The Electricity Industry Briefing Papers*, The National Council on Competition and the Electric Industry, April 1998.

"Fueling the Future: America's Automotive Alternatives" (with Philip Sharp), The American Assembly, Columbia University, Arden House, NY, September, 1995.

"Needed: Broad Perspective, Fresh Ideas," guest editorial, *The Electricity Journal*, November 1994.

Foreword in J. Raab, *Using Consensus Building to Improve Utility Regulation*, American Council for an Energy-Efficient Economy, Washington, DC, 1994

"Massachusetts' Pre-Approval Approach to Prudence in Massachusetts," *The Electricity Journal*, December 1990.

"Using Existing Tools to Pry Open Transmission—A New England Proposal," *The Electricity Journal*, April 1990.

"Sustainable Energy Strategy: Clean and Secure Energy for a Competitive Economy" (directed), National Energy Policy Plan, July 1995.

"The Domestic Natural Gas and Oil Initiative: First Annual Progress Report" (directed), U.S. Department of Energy, February 1995.

General Guidelines for Voluntary Reporting of Greenhouse Gases under Section 1605(b) of the Energy Policy Act of 1992 (directed), U.S. Department of Energy, October 1994.

"Fueling a Competitive Economy: Strategic Plan for the U.S. Department of Energy" (directed), April 1994.

"The Domestic Natural Gas and Oil Initiative: Energy Leadership in the World Economy" (directed), U.S. Department of Energy, December 1993.

"Siting Needs: Issues and Options," U.S. Department of Energy, June 1993.

"The Nuclear Waste Controversy," in D. Nelkin, *Controversy: The Politics of Technical Decisions*, Sage, 1977; 1984 (second edition).

DATAWARS: Computer Models in the Federal Government (with Kenneth L. Kraemer, Siegfried Dickhoven, and John Leslie King), Columbia University Press, 1987.

"The Evolution of the Nuclear Debate: The Role of Public Participation," *Annual Review of Energy*, 1978.

OTHER PROFESSIONAL ACTIVITIES

Member, Advisory Committee, Carnegie Mellon Electricity Industry Center, 2001.

Member, Florida Energy 2020 Study Commission, Environmental Technical Advisory Committee, 2001.

Advisory Committee Member, Americans for Equitable Climate Solutions (SkyTrust), 2001.

Director, Electricity Innovation Institute, 2001

Chair of the Board of Directors, The Energy Foundation, 2000 to present; Vice-Chair, 1999-2000; Director, 1997 to present

Board of Directors, Clean Air–Cool Planet: A Northeast Alliance, 1999 to present

Member, Policy Advisory Committee, China Sustainable Energy Project–A Joint Project of The Packard Foundation and The Energy Foundation, 1999 to present

Director, NorthEast States Clean Air Foundation, 1998 to present

Director, Electric Power Research Institute, 1998 to present

Technical Advisor, Mid-Atlantic Area Council/PJM, Dispute Resolution Procedure, 1998.

Member, "ISO-New England" (Independent System Operator) Advisory Committee, 1998 to present

Director, The Randers Group (subsidiary of Thermo TERRATEK), 1997 to 2000

Director, MHI, Inc. (electric utility aggregator for non-profit organizations in Massachusetts), 1997 to 1999

Director, Thermo ECOTEK Corporation, 1996 to 1999

Member, United States Department of Energy, Electricity Reliability Task Force, 1996-1998

Associate, Center for Science and International Affairs, John F. Kennedy School of Government, Harvard University, 1996-1997

Participant, The Aspen Institute Energy Program, 1996, 1999

Board Member, Advisory Committee, Energy Program, Oak Ridge National Laboratory, 1996 to present

Member, Advisory Committee, Electric Power Research Institute, 1994-1998

Member, Harvard Electricity Policy Group, 1993 to present

Member, Advisory Committee, U.S. Agency for International Development Energy Training Program (Institute for International Education), 1995

Co-Director (with Philip R. Sharp) of the 88th American Assembly, Columbia University: "Fueling the Future: America's Automotive Alternatives," September 7-10, 1995

Member, Keystone, Dialogue on PURPA and PUHCA, 1994-1996

Member, Advisory Board, International Association for Energy Economists, 1995

Member, Utility Futures Working Group, The Energy Foundation, 1993-1995

Member, National Association of Regulatory Utility Commissioners, Gas Committee, 1994-1995

Member, Clean Air Act Advisory Committee, U.S. Environmental Protection Agency, 1991-1993

Member, Science Advisory Committee, U.S. Environmental Protection Agency, 1992-1993

Trustee for Natural Resources, New Bedford Harbor Clean Up, 1991-1993

Member, Keystone Dialogue on Independent Power and Electric Transmission, 1989-1990

Member, National Association of Regulatory Utility Commissioners, Energy Conservation Committee, 1988-1990

Chair, Transmission Task Force of the Power Planning Committee of the New England Governors' Conference, 1988-1990

HONORS AND AWARDS

Distinguished Alumna Award, Scripps College, Claremont, CA, 1998

Award for Individual Leadership in Public Service, *The Energy Daily*, 1995

Special Recognition Award for Outstanding Contribution to the Industry, Cogeneration and Competitive Power Institute, Association of Energy Engineers, 1994

Leadership Award, National Association of State Energy Officials, 1994

Commencement Speaker and Honorary Doctorate of Laws, Regis College, Weston, MA, 1992

Commencement Speaker, The Fessenden School, Newton, MA, 1992

Guest Lecturer at courses at John F. Kennedy School of Government, Harvard University; Russian Research Center, Harvard University; The Fletcher School, Tufts University; John Hopkins University; Massachusetts Institute of Technology; Boston College; Brandeis University; Yale University School of Management; Cornell University; University of Massachusetts/Boston; Boston University, 1988-95

Mackesay Prize for Academic Excellence, Cornell University, 1976

Herbert Lehman Fellowship in the Social Sciences, New York State, 1974-78

MICHAEL TYRRELL

EDUCATION

B.S., Natural Resources Science, University of Rhode Island, 1986

PROFESSIONAL REGISTRATIONS

Certified Professional Wetlands Scientist, MA, 313, 1995

EXPERIENCE SUMMARY

Mr. Tyrrell is responsible for the licensing and permitting of energy related projects. He has project experience involving more than 1,000 miles of natural gas pipelines throughout the Unites States and has been involved in the permitting of numerous power plants. Mr. Tyrrell is responsible for coordinating and managing all aspects of environmental permitting and field studies for a wide range of projects. Activities involve project scoping, regulatory/resource agency interface and coordination, corridor/route selection, environmental inventory and assessment and EIR/EIS preparation, mitigation planning, public participation, expert witness testimony and preparing federal, state and local permit/license applications.

Mr. Tyrrell has completed numerous environmental permit applications including: NEPA submittals and Federal Energy Regulatory Commission - Natural Gas Act Section 7 (c) Applications, Environmental Impact Reports, US Army Corps of Engineers Section 404 submittals, and state water quality applications under Section 401. He has worked on a wide range of projects requiring a thorough understanding of environmental permitting processes and regulatory agencies throughout the northeast. His technical field experience includes complete wetlands and wildlife inventories and evaluation, vegetative mapping, and wetland delineation. He has conducted assessments of protected species habitat and has developed numerous environmental constraint maps. Mr. Tyrrell has a complete knowledge base of the various state and federal wetland delineation procedures including the US Army Corps of Engineers Wetland Delineation Methodology

REPRESENTATIVE EXPERIENCE

Natural Gas Pipeline Projects

Duke Energy, HubLine Pipeline Project, Methuen to Weymouth, Massachusetts. Managed a 50-mile natural gas pipeline project extending cross country from Methuen to Salem and offshore from Salem to Weymouth. Managed preparation of environmental reports that address water resources, wetlands, wildlife, contaminated sediments, cultural resources, geology, soils, land use and alternatives, for filing with the Federal Energy Regulatory Commission. Managed routing evaluations, impact analysis, and construction mitigation. Managed field surveys including wetland delineation; rare, threatened, and

endangered species surveys; cultural resource surveys; sediment analysis; and offshore geophysical surveys. Directed preparation of permit applications including a Section 404/10 application with the U.S. Army Corps of Engineers, Section 401 Water Quality Certificate with the Massachusetts DEP, Coastal Zone Consistency Determination with Office of Coastal Zone Management, Chapter 91 License application, Environmental Notification Form with the EOEA, and Notices of Intent with the individual communities along the routes.

Duke Energy, Maritimes & Northeast Pipeline, Maine, New Hampshire and Massachusetts. Managed a 400-mile natural gas pipeline project with approximately 300 miles of mainline pipe, 100 miles of laterals, and two compressor stations. Coordinated the environmental aspects of this complex project, from the initial development stages through project certification and successful completion of the permitting phase in three states. Provided expert testimony in the permitting process in Maine. Managed the environmental aspects through the implementation plan phase, construction and in service of the mainline facilities. Prepared the FERC 7I applications, involving extensive routing evaluations, biological resources evaluations and impact assessment and agency coordination/public outreach. Coordinated field evaluations including wetland delineation activities, waterbody evaluations, and rare threatened and endangered species surveys for bald eagles, turtle, mussels, dragonflies, mayflies, and vascular plants. Coordinated the impact assessments of various waterbody-crossing methods on aquatic resources, including Atlantic salmon and native brook trout fisheries. Managed 15 wetland crews that identified and characterized 1,900 wetlands and 500 water bodies. Participated in the determination of the crossing method for wetland and water bodies. Provided training support during the environmental and contractor training programs held prior to construction. Prepared a comprehensive erosion control document used in permitting and during construction. Managed the biological staff that provided full time support to the environmental inspection staff during the construction effort.

National Fuel Gas Supply Corp., Laurel Fields Storage Project II, Pennsylvania. Participated in the preparation of a FERC 7I Resource Report and fieldwork for 58 miles of new right-of-way for a 24-inch natural gas pipeline. Routing includes a national forest, and three state forests containing both natural and proposed wild areas.

Algonquin Gas Transmission Company, 1996 In-Line Inspection, Connecticut, Rhode Island, New York. Managed inspection of 105 miles of 24-inch and 26-inch mainline pipeline, hydrostatic testing of 7 miles of pipe, and installation of a pig launcher/receiver. Coordinated with the regulatory agencies in all three states and 26 local communities to obtain specific information on wetlands, fisheries, construction timing restrictions and protected species locations. Attended pre-application meetings with each regulatory agency having jurisdiction over the project. Prepared a comprehensive project description and proposed construction procedures report used in the permitting and construction phases.

Algonquin Gas Transmission Company, 1995 In-Line Inspection, New Jersey and New York. Managed a 79.4-mile in-line inspection project. Coordinated the aerial mapping

and field verification of environmental resources along the route. Attended preapplication meetings with the New York Department of Environmental Conservation, New Jersey Department of Environmental Protection, and county Soil Conservation Districts. Coordinated the development of a detailed project description and proposed construction procedures report, which outlined issues such as erosion and sedimentation control, stream and wetland crossing procedures, and restoration techniques that would be implemented at identified anomaly locations. Obtained approval the regulatory agencies for this approach, which allowed Algonquin to test the pipeline and replace all identified anomalies during the summer construction season. Obtained a 5-year maintenance permit in New Jersey that authorized certain maintenance activities (e.g., cathodic protection, DOT replacements, valve site work, ROW maintenance), without obtaining separate permits.

Algonquin Gas Transmission Company AFT-5/FERC Filing Pipeline Facilities Permitting, Northeast. Managed a 12-mile natural gas pipeline project in four communities in Massachusetts, New Jersey, and New York. Coordinated the preparation of the Resource Report filing under the FERC regulations and Section 7I of the Natural Gas Act. Conducted on-site field investigations of the proposed alignments, delineated wetland boundaries, and collected field data necessary to document existing conditions and potential environmental impacts. Prepared Resource Reports on water use and quality, vegetation and wildlife, soils, land use, recreation and aesthetics. Identified sensitive resources including public water supplies, protected species, habitats of concern, wetlands and fisheries. Identified construction-related issues such as depth to bedrock, steep slopes, and potentially contaminated sites.

Public Service Electric and Gas, Natural Gas Pipeline Permitting, New Jersey. Managed preparation a New Jersey Freshwater Wetlands and Stream Encroachment Permit as well as the Soil Erosion and Sediment Control Plan Certification for an 8-inch distribution line in Bernards and Far Hills, crossing the Dead River and its associated wetland as well as a tributary. Managed wetland delineation, property survey, preparation of construction plans, and permit preparation.

Algonquin Gas Transmission Company, Integrated Transportation Projects I and II, Replacement and Expansion of Pipeline Facilities, New Jersey, New York, Connecticut, Rhode Island and Massachusetts. Managed the proposed Integrated Transportation Projects I and II, which consisted of multiple gas pipeline projects (over 26 miles) proposed for replacement or expansion. Managed preparation of Environmental Resource Reports for each project in accordance with Federal Energy Regulatory Commission requirements under accelerated schedules, completing data inventories, field verifications and environmental assessments within two months.

Texas Eastern Transmission Corporation, LNG Facilities and Pipelines, Staten Island, New York. Managed wetland and resource identification and mapping, and environmental permitting for the dismantlement of LNG facilities. Managed identification of wetland resources associated with supply liners to the facility and adjacent transmission lines.

Texas Eastern Transmission Corporation, Wetland Identification and Evaluation, Bedford and Lilly, Pennsylvania. Coordinated field work for identification and evaluation of wetland resources for pipeline expansion projects. Delineated wetland boundaries in accordance with US Army Corps of Engineers and state regulations. Completed data forms and acquired photographic documentation for permitting.

Algonquin Gas Transmission Company, DLP Dighton Project, Massachusetts, Connecticut, Rhode Island and New York. Coordinated quality review for FERC Resource Reports and a draft environmental assessment for a connection to the Dighton Power Project in Dighton, Massachusetts. The project included a 1.5-mile loop in Connecticut, a new tap, meter station, and connector in Dighton, and modifications at existing, compressor stations in New York and Rhode Island.

Construction Inspection Services

Algonquin Gas Transmission Company, Construction Inspection, New England. Worked as an environmental inspector during the construction phases of five natural gas pipeline projects in Massachusetts and Rhode Island. Provided daily on-site monitoring of construction activities to ensure compliance with the FERC, US Army Corps of Engineers Section 404, Water Quality Certification, USEPA NPDES, and state and local wetland permits. Conducted daily surveys to find and relocate state protected reptile species to safe locations as part of specific permit requirements. Provided project coordination with regulatory agencies and trouble-shooting construction-related environmental concerns. Worked closely with the pipeline contractor during the installation of erosion and sedimentation controls. Monitored wetland-crossing procedures and approved all wetland and stream restoration activities.

Algonquin Gas Transmission Company, Environmental Inspection Services, Brockton, Massachusetts. Provided 4 months of environmental compliance monitoring services for the construction of 3.9 miles of 16-inch natural gas pipeline. Ensured contractor compliance with federal, state, and local permit conditions, involving numerous wetland and stream crossings and a combination of cross-country construction and congested city street construction. Due to this unique combination, provided close coordination with the Federal Energy Regulatory Commission through the preparation of weekly compliance reports.

Algonquin Gas Transmission Company, Environmental Inspection Services, Tiverton, Rhode Island. Provided environmental inspection services for the construction of 2.4 miles of 16-inch natural gas pipeline. Ensured contractor compliance with federal, state, and local permit conditions, involving seven wetland and stream crossings. Inspected post-construction cleanup, which involved extensive wetland restoration including restoring wetland microtopography to a mound and pit environment, replanting all wetland areas with indigenous trees and shrubs. Worked closely with state field personnel during the construction and wetland restoration phases and prepared weekly progress reports.

Power Plant Projects

Dartmouth Power, Massachusetts. Coordinated permitting and field work for this 68-megawatt power plant project. Identified and delineated wetland resources on the site. Designed and oversaw the construction of a 0.5-acre wetland mitigation area. Prepared numerous permit applications, including Section 404, Section 401, a Notice of Intent, and a state environmental impact report.

Dighton Power, Massachusetts. Coordinated permitting and field work for a 170-megawatt power plant project. Identified and delineated wetland resources on the site. Completed a wildlife habitat assessment, vernal pool survey, and detailed impact analysis in support of the permit applications. Designed and oversaw the construction of a 0.75-acre wetland mitigation site. Prepared numerous permit applications including, Section 404, Section 401, a Notice of Intent, and state environmental impact report.

Pawtucket Power, Rhode Island. Coordinated permitting and field work or this 68-megawatt power plant project. Identified and delineated wetland resources along the electric interconnect route. Prepared a detailed routing analysis to determine the most environmentally sensitive and constructable route. Prepared numerous permit applications including; Section 404, Section 401, and state formal wetlands permit application.

Gorham Energy, Maine. Coordinated permitting and field work for this 825-megawatt power plant project. Identified and delineated wetland resources on the site. Completed a wildlife habitat assessment and detailed impact analysis in support of the permit applications. Designed a 0.75-acre wetland mitigation site. Prepared numerous permit applications including, Section 404, Section 401, state Site Law application and Natural Resource Protection Act filing.

Other Infrastructure and Development Projects

Massachusetts Water Resource Authority, Fells Reservoir Covered Storage Project, Melrose and Stoneham, Massachusetts. Assisted in the development of a comprehensive Natural Resources Inventory Report, which included gathering data on baseline conditions and preparing an assessment of the environmental impacts and proposed mitigation for MWRA projects within the Fells Reservoir Study Area. The natural resource surveys completed included wetland and terrestrial vegetation mapping, special natural area surveys, vernal pools investigations, rare plants inventories, breeding bird surveys, winter wildlife track counts and owls stimulus response surveys. Coordinated and participated in the breeding bird and owl surveys. The Natural Resource Inventory also provided methodologies and field checklists to be used as a model for future inventory efforts in the Fells Reservoir Area.

New Hampshire Department of Transportation, North Conway Bypass, New Hampshire. Coordinated and assisted in the preliminary environmental assessments for

this 16-mile bypass project through the Mt. Washington Valley. Identified potential wetland resource area constraints for the various study corridors. Participated in the identification and evaluation of terrestrial resources throughout the proposed study area. Participated in the Spaulding Turnpike Highway Study and coordinated the preliminary natural resource data collection to be used in the development of constraint maps.

Massachusetts Department of Public Works, Route 128 Add-A-Lane Project, Massachusetts. Assisted with the delineation of wetland resource areas along the 16-mile route in accordance with federal and state delineation procedures.

Towns of Canton, Dover, and Tyngsboro Conservation Commissions, Massachusetts. Provided technical review services for each Conservation Commission. Managed several detailed construction projects and oversaw biologic and engineering review. Completed site inspections and prepared biological evaluations of each project in accordance with the Massachusetts Wetlands Protection Act. Prepared detailed recommendations outlining the potential environmental impacts and assisted in the development of draft Orders of Conditions.

SPECIALIZED TRAINING

Wetland Delineator Certification Program, University of New Hampshire.

Natural Gas Pipeline Environmental Compliance Training Course, Boston, MA, sponsored by Algonquin Gas Transmission Company.

Hazardous Waste Site Refresher Course in Compliance with OSHA. Standard 29 CFR 191.120 and SARA 126(d).

Personnel Protection and Safety Training Course, USEPA.

PROFESSIONAL MEMBERSHIPS

Society of Wetland Scientists

Rhode Island Association of Wetland Scientists

American Ornithologists Union

MARK A. WILLIAMS, P.G. — ENVIRONMENTAL GEOLOGIST

EDUCATION

M.S. course work , Environmental Science, SUNY-ESF, 1990
B.S., Geology, East Carolina University, Greenville, North Carolina, 1986

REGISTRATION & CERTIFICATIONS

Professional Geologist, Commonwealth of Pennsylvania - Department of State Bureau of Professional and Occupational Affairs, Reg. # PG-002626G

SPECIALIZED TRAINING

Certified Hazardous Site Worker, OSHA 1910.120(e)(2)
Certified Hazardous Site Supervisor, OSHA 1910.120(e)(3)

AREAS OF EXPERTISE

- Environmental Assessments and Site Characterization
- Regulatory Permitting and Compliance
- Remedial Investigations / Feasibility Studies

PROFESSIONAL SUMMARY

Mr. Williams has 13 years of experience as a Professional Geologist focused in hydrogeology and environmental consulting. He specializes in subsurface investigations, including the characterization and analysis of suspected or confirmed contaminated sites. Mr. Williams is also experienced in investigating the feasibility of proposed landfill sites, well fields, and power plants. He is experienced with a wide variety of subsurface investigative techniques including all types of drilling and sampling procedures, aquifer testing and analysis, hydrogeologic and geochemical data interpretation, sampling protocols, and quality assurance/quality control (QA/QC) procedures. He has designed groundwater monitoring programs, characterized groundwater and contaminant movement, designed and implemented soil and groundwater remedial plans, and assessed public health and environmental risks.

Typical projects involve site investigation, land development, geo hazard and impact assessment and mitigation, land development, groundwater resources, environmental remediation and regulatory compliance. The majority of this work has been done for major industry in the eastern U.S., and state and local agencies. These projects typically require his expertise in assessing and evaluating environmental conditions, subsurface investigations, remedial alternatives, and contract/contractor management. His assistance to clients typically includes negotiations with regulatory agencies and other involved parties.

He has prepared and coordinated a variety of environmental project documents, including state (SEQR) and federal (NEPA) environmental impact statements (EISs) and environmental assessments (EAs). He is familiar with a wide variety of federal and state environmental regulations and permitting issues regarding various media and regulatory processes. Mr. Williams has analyzed and prepared documentation related to project impacts on numerous environmental elements, including land use, utilities, public services, noise, historic resources, safety and security, geology and soils, hydrogeology, water supply, wastewater, groundwater resources and natural resources.

PROJECT EXPERIENCE

Environmental Assessments and Site Characterization

Confidential Client, Manufacturing Facility, Industrial Stormwater and Sewer Sediment Evaluation and Corrective Measures, Schenectady, New York. Project Manager for voluntary program to identify and eliminate sources of the low levels of persistent organic chemicals (PCBs) occasionally observed during storms in industrial stormwater effluent at the manufacturing facility's on-site wastewater treatment plant. Task Manager for several permit-required confined space entries into large diameter industrial storm sewers to determine flow during baseflow events and stormflow events and characterize sediment quality in critical areas of the storm sewer network. Project required delineating sewer network at the 350-acre facility; identifying drainage sub-basins; metering sewer flow; sampling stormwater sediment at strategic locations in the 20-mile system during baseflow events; and abandoned select inactive storm sewer lines at the plant. Project also required characterizing site hydrology; site-wide sampling of sediment; evaluating existing wastewater treatment plant operations; and documenting program strategy and success. [2000 to Present]

Glenville Energy Park, Focused Environmental Site Assessment, Town of Glenville, Schenectady County, New York. Site Coordinator for initial site engineering activities for a proposed 520 MW combined-cycle natural gas-fired power plant at a 20-acre site located over an impacted sole-source aquifer. Served as Task Manager for Phase 1 and 2 environmental site assessments at the site - a former federal naval depot. Worked in close cooperation with NYSDEC. Developed detailed sampling and analysis plan consisting of sampling existing monitoring wells, EM-31 geophysical surveying, passive soil gas measurements, test pitting, soil borings, installation of new monitoring wells, soil and groundwater sampling and analysis. Determined nature and on-site extent of VOC-contaminated groundwater (TCE), and evaluated its potential impacts on plant development and site classification. Based on his background and experience, worked with several technical experts from the NYSDEC, Defense National Stockpile Center / Defense Logistics Agency (DNSC/DLA), General Services Administration (GSA), United States Army Corps of Engineers (USACOE), and Schenectady County Intermunicipal Watershed Board to identify the source(s) of trichloroethene (TCE) and other volatile organic compounds (VOCs) in the Great Flats Aquifer. [1999-present]

Wilsonart International, Inc., Preliminary Environmental Hydrogeologic Investigation / Voluntary Cleanup Program Site Investigation, Congers, Rockland County, New York. Project Geologist for a groundwater investigation of VOC (Freon, TCE, and others) contamination, including the installation of passive coated wire soil gas samplers, installation of monitoring wells in glacial till and bedrock, groundwater sampling and analysis. Project Manager/Project Hydrogeologist for a subsurface investigation within New York State's Voluntary Cleanup Program. Work has included the preparation of approved work plans, photo-lineament analysis, excavation of test pits, sampling and analysis of subsurface soil, installation of bedrock monitoring wells, and groundwater sampling and analysis. The objective of the investigation was to evaluate possible VOC impacts to soil and groundwater, determine groundwater flow directions, and assess the potential for off-site sources of VOCs impacting onsite groundwater quality. [1998-present]

Burmah-Castrol, Voluntary Cleanup Program Site Investigation, Freeport, Nassau County, Long Island, New York. Project Hydrogeologist for investigation of a VOC spill (1,1,1-TCA) that occurred during tanker truck offloading at an active adhesives manufacturing facility located in an industrial redevelopment park developed over the former town landfill on a tidally-influenced peninsula. The hydrogeologic investigation was performed within New York State's Voluntary Cleanup Program to characterize potential impacts to environmental media from the above-noted 1,1,1-TCA spill. Work has included development and implementation of a drilling and sampling program to investigate the potential for vertical migration of contaminants through leaking aquitards into deeper aquifers. Work has included development of work plans for state approval and report preparation. [1997- Present]

American National Can Company, Voluntary Cleanup Program Site Investigation, Fairport, Monroe County, New York. Project Hydrogeologist for a site investigation performed within New York State's Voluntary Cleanup Program to characterize potential impacts to environmental media from volatile organic compounds and metals associated with former underground storage tanks. Work has included development of work plans for state approval, client assistance in negotiating the Voluntary Cleanup Agreement with the state, subsurface drilling both inside and outside an operating warehouse facility, soil and groundwater sampling, aquifer testing, and assessing potential human exposure scenarios. [1998-Present]

Chevron, Monitoring of Free-Product at the Gulf Terminal, Port of Rensselaer, New York. Field Hydrogeologist for the preparation of a site investigation report for a former owner of a petroleum storage terminal. Tasks included the supervision of geoprobe drilling, collection and logging of subsurface soils, evaluation of the existing monitoring well network, extension of select monitoring wells in the West Yard and the collection and review of quarterly depth to product / depth to water measurements. [1996]

Freihofer Baking Company, Leaking UST Investigation, Verona, New York. Project Hydrogeologist for a project involving the evaluation of an existing groundwater pump and treat/soil venting system. Based on the results of this evaluation, he supervised drilling by geoprobe and hollow stem auger techniques, logged subsurface soils, installed monitoring wells, developed the newly-installed and existing monitoring wells, collected groundwater samples and conducted additional historical research. The investigation results were used to delineate impacted subsurface soils and groundwater, to characterize groundwater flow, to evaluate if off-site sources contributed or were responsible for the petroleum contamination and to develop design information necessary for the development of an effective remedial system. A new system consisting of a shallow tray air-stripper and recovery wells was selected, designed and subsequently installed. [1995]

American National Can Company, Leaking UST Investigation and Tank Removal, Whitehouse, Ohio. Task Geologist for a project which involved the drilling of soil borings, collection of subsurface soil samples for headspace screening and laboratory analysis, characterization of impacts to subsurface soil and groundwater, removal of underground storage tanks and off-site disposal of contaminated soils. [1994]

WMI, Field Activity/Odor Control Report, Metz Construction and Demolition Debris Landfill, South Bethlehem, New York. Provided field supervision and served as Project Hydrogeologist for a subsurface investigation and fire abatement study at a permitted construction and demolition debris landfill. Services included the installation and monitoring of temperature probes, temperature probing, health and safety monitoring and supervision of boring and grouting activities. Tasks also included geologic and geotechnical logging, subsurface soil sampling, coordination of field activities, installation of monitoring wells, groundwater sampling, data evaluation and report preparation for this project. [1993]

NYSDEC, Domestic Well and Initial Environmental Sampling Report (IRM), Lehigh Valley Railroad Derailment Site, LeRoy, New York. Task Manager and Health and Safety Officer for an investigation to determine the extent of TCE and cyanide contamination in surficial and subsurface soil, river sediment, and groundwater (bedrock) at the site for the purpose of evaluating site remedial alternatives. He supervised the logging and sampling of over 20 test pits, using Level C health and safety protection, at a railroad derailment site where liquid trichloroethane (TCE) and crystalline cyanide were spilled. In addition, he served as the air monitoring/field health and safety officer during initial sampling activities using real-time direct reading instruments and indirect sampling techniques for organic vapors and respirable particulate. Activities included collecting work zone/perimeter monitoring for volatile organic contaminants and cyanide particulate to determine effects of sampling activities on adjacent properties. Mr. Williams also conducted personnel monitoring for a number of other contaminants using various collection methods. During later stages of the investigation, Mr. Williams performed groundwater sampling, hydraulic conductivity testing and data analysis of all 55 newly installed bedrock-monitoring wells. [1993]

Regulatory Permitting and Compliance

Calpine Corporation, Wawayanda Energy Center, Article X Permitting, Wawayanda, Orange County, New York. Project Hydrogeologist for environmental permitting and licensing of a 540 megawatt gas-fired electric power generating facility near Middletown, New York. Performed an evaluation of existing surface water, groundwater, and gray water supplies for the Project (Water Resources Critical Issues Assessment). Assisted in the completion of a Preliminary Scoping Statement (PSS), which was filed with the NYS Public Service Commission (NYSPSC). Continue to investigate environmental, wastewater, and water supply issues relating to the Project. Coordinated the development of an on-site private, non-potable bedrock well field in compliance with local, state and federal guidelines. The well field has exceeded the quality and quantity requirements for the project. Assisted in the preparation of the water supply and groundwater resource sections of the Article X application for the NYSPSC. Worked in close cooperation with the NYSDEC, NYSPSC, NYSDOH, town of Wawayanda, and city of Middletown. Served as expert during numerous public hearings to answer questions regarding the environmental character of the property and water supply for the project. [2000 to Present]

Glenville Energy Park (GEP), Article X Permitting, Evaluation of Great Flats Aquifer, Town of Glenville, Schenectady County, New York. Assisted in the completion of a Preliminary Scoping Statement (PSS) and the preparation of an Article X application for the New York State Public Service Commission (NYS PSC). Served as Project Geologist for the evaluation of water supply alternatives, structural geology and seismicity, land use, and groundwater resources. Worked in close cooperation with the NYSDEC, NYSPSC, NYDOH, town of Glenville, village of Scotia, and city of Schenectady. Served as expert during numerous public hearings to answer questions regarding the environmental character of the property, water supply, Great Flats Aquifer, and the TCE-impacted groundwater plume.

Project Hydrogeologist who coordinated a technical project team to characterize and evaluate the water supply for this proposed 520 megawatt combined-cycle natural gas-fired power plant. The primary objectives of this assessment were to determine whether the chosen water supply alternative (city of Schenectady well field) has sufficient capacity to meet the additional water demands by the GEP and to evaluate the potential impacts of the project on the quantity and quality of the water resources available in the aquifer. Presented findings to the NYS PSC, NYSDEC, Technical Committee for the Intermunicipal Watershed Board, town of Glenville (TACC), *The Daily Gazette*, and The Sierra Club. [1999-present]

International Paper Co., Solid Waste Permitting, Ticonderoga, Essex County, New York. Project Hydrogeologist for a landfill permit renewal project. Managed the completion of a detailed hydrogeologic investigation. Fieldwork consisted of a seismic refraction survey for depth to bedrock determination; the installation and sampling of 25 monitoring wells and piezometers, many of which were double-cased bedrock wells; and, downhole packer and in-situ hydraulic conductivity aquifer testing. Geologic, hydrogeologic and geochemical data was compiled into a comprehensive hydrogeologic report, in accordance with 6 NYCRR Part 360 regulations. [1995-1998]

Waste Management, LLP, Solid Waste Permitting, Hydrogeologic Investigation of Valley Phase II Area - High Acres Landfill and Recycling Center, Perinton, Ontario County, New York. Project Hydrogeologist who supervised the excavation of 14 test pits, drilling and installation of nine monitoring wells, five piezometers and five test borings. Performed borehole and corehole logging, packer testing, well development and hydraulic conductivity testing. In addition, he reviewed and analyzed new and existing data and prepared the site investigation report. [1998–Present]

International Paper, Facility Permitting, Subsurface Investigation Report for Proposed Phase III Landfill Development, Ticonderoga, Essex County, New York. Field hydrogeologist who provided field supervision of a hydrogeologic investigation as part of a permit application for a lateral expansion of an existing solid waste management facility. The investigation included the design of the monitoring well network, test pitting, drilling, borehole and corehole logging, geotechnical sampling, monitoring well installation, packer testing, hydraulic

conductivity testing, groundwater sampling using Well Wizard equipment. The investigation results were used to characterize groundwater flow, assess groundwater quality and to develop design information necessary for landfill cell construction. [1994-1997]

Blue Circle Cement, Inc., Facility Permitting, Engineering Report for Cement Kiln Dust Monofill Expansion, Ravena, New York. Project Hydrogeologist responsible for design of monitoring well network and supervision of field activities including drilling, monitoring well and piezometer installation, well development, hydraulic conductivity testing and surface, sediment and groundwater sampling. He also evaluated the geologic and hydrogeologic data and aided in the NYSDEC-approved Engineering Report Tasks included the following regional and site geologic and hydrogeologic characterization, preparation of groundwater contour maps utilized in the design of the northern expansion footprint, determination of causes for groundwater elevation fluctuation, determination of potential groundwater monitoring zones and the establishment of a long-term groundwater monitoring system. [1994]

Encore Paper Corporation, Facility Permitting, Hydrogeologic Investigation of Proposed Papermill Byproduct Management Facility, South Glens Falls, New York. Project Hydrogeologist who performed site screening and ranking, supervised the drilling and installation of over 25 monitoring wells, test pit supervision, borehole and corehole logging, packer testing, collecting groundwater and surface water samples and hydraulic conductivity testing. In addition, he reviewed and analyzed new and existing data, prepared the site investigation report and provided analysis of solid waste/environmental impact on areas relating to solid waste treatment for a Draft Environmental Impact Statement of a proposed development area. [1993]

Remedial Investigations / Feasibility Studies

C & D Charter Systems, Remedial Investigation / Feasibility Study Work Plan and Citizen Participation Plan, Huguenot, New York. Project Geologist for completion of RI / FS Work Plan, including Citizen's Participation Plan for a battery manufacturing facility, overlying an aquifer previously impacted by fluoride. [1998-1999]

Orange and Rockland Utilities, Inc., ORU-West Nyack Service Facility, Remedial Investigation/ Feasibility Study, West Nyack, Rockland County, New York. Provided field supervision and served as Project Hydrogeologist for a subsurface investigation of a former 10,000-gallon UST Area, former Dry Well and a Suspected Transformer Disposal Area. Supervised the drilling of 45 soil borings, drilling and installation of three monitoring wells and subsurface exploration of three test pits. Additional activities included borehole, corehole and test pit logging, collecting sediment, surface water and groundwater samples, surficial geologic mapping, aerial photo interpretation, hydraulic conductivity testing, review and analysis of new and existing data and aided in the determination of the nature and extent of subsurface soil and groundwater contamination. [1996]

NYSDEC, Remedial Construction Oversight, Philmar Electronics Site, Morrisonville, New York. Field Manager who provided field construction management of remedial activities (oversight of recovery trench and infiltration field construction) at the Philmar Electronics Site. As assistant construction manager and project hydrogeologist, responsibilities included supervising and coordinating the activities of all on-site contractors, review of submittals, approval of subcontractors' invoices, inspection of equipment installation, daily oversight and tracking of excavation, oversight of the installation of recovery trench and discharge piping, oversight of installation of a permeable soil cap, performing required inspection and quality assurance testing, yield testing and the collection of treatability samples. Based on water quality and yield tests performed on the recovery trench after construction, design plans were subsequently prepared for the treatment system. The treatment system design included thermal enhanced air stripping followed by filtration and activated carbon adsorption. In late 1995, the treatment system was built and the recovery and treatment system was put into operation in early 1996. [1994-1995]

General Electric, East Street/Lyman Street Site Investigation, Pittsfield, Massachusetts. Project Hydrogeologist and Project Manager for a remedial investigation/pilot study focused on determining the extent of DNAPL in

subsurface soil and groundwater at the EPA-regulated site. Responsibilities included supervision of field activities, soil sampling and logging, supervision of groundwater monitoring well, piezometer and recovery well construction, borehole and monitoring well log preparation using gINT software, well development using compressed nitrogen, groundwater sampling, hydraulic conductivity testing, data evaluation and analysis and report writing. [1994]

NYSDEC, Remedial Investigation, Philmar Electronics Site, Morrisonville, New York. Project Hydrogeologist for the Philmar Site, an inactive hazardous waste site where groundwater was contaminated by chlorinated volatile organic chemicals and petroleum hydrocarbons as a result of waste spills and disposal on the property. Tasks included supervision of field activities, surface and subsurface soil sampling and logging, groundwater monitoring well construction supervision, borehole and monitoring well log preparation, well development, groundwater sampling, hydraulic conductivity testing, data evaluation and analysis and report writing. Objectives of the investigation were to determine the extent of groundwater contamination at the site for the purpose of evaluating site remedial alternatives. Based on the results of the RI/FS, the NYSDEC selected a remedy for the site which provided for installation of a recovery trench in the weathered till, treatment of recovered groundwater, and disposal of water in an on-site infiltration field. [1992-1993]

MCI, Environmental Liability Assessment/Subsurface Investigation, Newell, West Virginia. Project Hydrogeologist/Environmental Scientist that performed test pit supervision, soil logging, oversight of monitoring well installation and groundwater sampling for a pre-purchase site assessment of a specialty chemicals manufacturing facility in northwestern West Virginia. The project involved a hydrogeologic investigation, environmental monitoring, review of historical files and calculation of a preliminary liability assessment score. Mr. Williams also provided project management, technical direction and supervision, data compilation and reporting. The liability assessment focused on the level of current regulatory compliance, the possible effect of future regulations on the operating ability of the plant, and the condition of soil and groundwater quality at the site. After review of our report, the client did not pursue further acquisition efforts. [1994]

NYSDEC, Remedial Investigation, Almy Brothers Site, Binghamton, New York. Project Geologist for the investigation to determine the extent of pesticide contamination in waste drums, surficial and subsurface soil, storm sewer and river sediment, air and groundwater at the site for the purpose of evaluating site remedial alternatives. Performed the following tasks supervision of field activities, surface and subsurface soil sampling and logging, groundwater monitoring well construction supervision, borehole and monitoring well log preparation, well development, groundwater sampling, drum sampling (Level B), hydraulic conductivity testing, data evaluation and analysis and report writing. The investigation results were used to evaluate the nature and extent of pesticide and dioxin contamination and to collect design information necessary for selection of a remedial system.[1992]

NYSDEC, Engineering Investigation at Construction and Demolition Debris Sites, Final Preliminary Site Assessment, upstate and southern New York state. Conducted Phase II investigations under contract to the NYSDEC at seven Class 2A construction and demolition debris landfills located in upstate and southern New York state. The objective of these investigations was to determine if hazardous waste was disposed at any of these sites. Mr. Williams, providing assistance as a task manager, was involved with the development of a generic work plan, generic quality assurance project plan (QAPP), site-specific health and safety plans and preliminary site assessment reports. Mr. Williams also served as field/project geologist for one site in Columbia County (LaMunyan) and one site in Greene County (Ferro). Tasks performed in the field included test trench logging, geologic research and field mapping, soil logging/waste characterization and sampling and drum sampling. In addition, he also collected air samples for hydrogen sulfide using real-time direct reading and indirect sampling techniques. Other responsibilities included oversight and coordination of project personnel for completion of field tasks, evaluation/interpretation of hydrogeologic and analytical data and the organization and preparation of project report(s). Investigation concluded that hazardous wastes were not present at these sites. [1990/1991]

Seneca Meadows, Inc., Supplemental Hydrogeologic Investigation/Engineering Report and Remedial Design for

Groundwater/Leachate Interceptor Trench, Seneca Falls, New York. Task Manager and Project Hydrogeologist. Responsibilities included field supervision of a hydrogeologic investigation as part of a permit application for one of the largest solid waste landfills in New York state. The investigation included design of a monitoring well network, test pitting, drilling, borehole and corehole logging, monitoring well installation, hydraulic conductivity testing, geotechnical and groundwater sampling and participated in meetings with regulatory agencies. The investigation results were used to evaluate the nature and extent of groundwater contamination, to characterize groundwater flow, and to develop design information necessary for development of a remedial system. [1991]

NYSDEC, (19) Class 2A Preliminary Site Assessments, New York state. Subtask manager of a multi-site work assignment for the NYSDEC - Division of Hazardous Waste Remediation. The focus of these multi-task investigations was to determine whether the disposal of hazardous waste, as defined by 6 NYCRR Part 371, is documented at these sites, and if so, to determine whether they present a potential threat to public health and/or the environment as a result of the presence of hazardous waste. Responsibilities included the development and implementation of site-specific scopes of work, data interpretation and report preparation. [1990-1991]

PROFESSIONAL MEMBERSHIPS

National Water Well Association (Association of Groundwater Scientists and Engineers)
National Solid Waste Management Association
Hudson-Mohawk Professional Geologists Association

PRESENTATIONS, PUBLICATIONS

Presentations
"Secondary Material Utilization." University of Montreal, Environmental Issues Symposium, 1988.

AWARDS

Utilization Award, Dunn Corporation, 1991
Robin Hood Oak Award, SUNY - Environmental Science and Forestry College, 1988
Who's Who Among Colleges and Universities, SUNY-Environmental Science and Forestry College, 1989
W.A. Tarr Award, Sigma Gamma Epsilon - Epsilon Phi Chapter, East Carolina University, 1986
Outstanding Senior Award, Department of Geology, East Carolina University, 1986

EMPLOYMENT HISTORY

1998-Present, Earth Tech, Inc.
1993-1998, RUST Environment & Infrastructure (merged into Earth Tech, Inc.)
1989-1993, Dunn Corporation (merged into RUST)
1987-1989, SUNY - Environmental Science and Forestry College
1986 (Summer), Dunn Geoscience Corporation

CRAIG H. WOLFGANG, AICP

EDUCATION

- M.C.P., City Planning, Georgia Institute of Technology, 1979
- B.S., Natural Resource Conservation, University of Connecticut, 1976

PROFESSIONAL AFFILIATION

- American Planning Association – Member
- American Institute of Certified Planners

TECHNICAL SPECIALTIES

Mr. Wolfgang has 21 years of experience encompassing:

- Project Management
- NEPA Compliance
- Environmental Permitting
- Expert Testimony
- Land Use and Aesthetic Impact Assessment
- Public Participation

REPRESENTATIVE EXPERIENCE

Mr. Wolfgang has 21 years of experience as a Project Manager and Environmental Planner on a variety of development and infrastructure improvement projects. Mr. Wolfgang is experienced in a variety of environmental assessment and public participation techniques, and is skilled at managing complex and controversial projects under strict budget and schedule constraints, providing the interface between clients, multidisciplinary technical staff, regulatory approval agencies, and the affected public. Specific project experience includes the following:

Power Generation Projects

KeySpan Energy, 250 MW Spagnoli Road Energy Center. Project Manager for the preparation of an Article X Preliminary Scoping Statement and an Article X Application for a 250 MW combined cycle facility to be constructed by KeySpan Energy at a former sand quarry in the Town of Huntington, Long Island, New York. Project issues include impacts to the nearby Republic Airport, protection of the underlying sole source aquifer, property values, air quality and noise.

New York Power Authority, 500 MW Combined Cycle Project. Project Manager for the preparation of an Article X Pre-Application Report and an Article X Application for a 500 MW combined cycle facility to be constructed by the New York Power Authority at the Charles Poletti Power Project in Astoria, Queens, New York. Project issues include impacts to nearby La Guardia Airport, cumulative air quality impacts, and environmental justice.

KeySpan Energy, 250 MW Ravenswood Cogeneration Project. Project Manager for the preparation of an Article X Pre-Application Report and an Article X Application for a 250 MW cogeneration project proposed to be constructed by KeySpan Energy at their Ravenswood Generating Station in Long Island City, Queens, New York. Project issues include air quality impacts, water quality and aquatic ecology impacts associated with once-through cooling, noise, and visual impacts associated with nearby residential neighborhoods.

Southern Energy, 750 MW Bowline Unit 3 Project. Responsible for preparing the visual impact assessment to support the Article X Application for a 750 MW combined cycle project proposed to be constructed by Southern Energy at their bowline Point Generating Station in Rockland County, New York. Located on the Hudson River, the analysis included consideration of potential impacts from historic and visually sensitive resources in Westchester County as well as nearby Bear Mountain, Harriman and High Tor State Parks.

Calpine Corporation, 540 MW Wawayanda Energy Center. Responsible for preparing the visual impact assessment to support the Article X Application for a 540 MW combined cycle project proposed to be constructed by Calpine Corporation at a site near Middletown, Orange County, New York.

Regulatory Review/Fatal Flaw Analysis (Confidential Client). Conducted site reconnaissance and prepared a regulatory review/fatal flaw analysis for a proposed 750 MW combined cycle power project in north central Pennsylvania. Identified preliminary route for an approximately 4-mile long gas pipeline.

Inter-Power of New York, Halfmoon Cogeneration Project. Managed specific environmental analyses for the licensing effort of a 210 MW coal-fired, fluidized-bed cogeneration project near Albany, New York. Negotiated stipulation agreements with New York Department of Public Service regarding scope and content of environmental analyses. Provided expert testimony during administrative hearings before the New York Public Service Commission, and later managed the preparation of required compliance filings, working closely with the engineering team in preparing the detailed design and construction plans. The required Article VIII Certificate was granted by the New York Public Service Commission.

Enserch Development Corporation, Lavair Cogeneration Project. Managed specific environmental analyses for a comprehensive environmental impact statement to support the licensing of a 120 MW gas-fired cogeneration project near Catskill, New York. This project required negotiation with the New York Department of State regarding coastal zone (Hudson River) issues and potential aesthetic impacts to nearby Olana, the former home of artist Frederic Church.

Destec Energy Inc., Northway Cogeneration Project. Managed specific environmental analyses and the preparation of a comprehensive environmental impact statement for a 57 MW gas-fired cogeneration project near Harriman, New York. Identified and evaluated several alternatives to the proposed one-mile-long 69 kV underground transmission line. Held discussions with the proposed thermal host, Nepera, Inc., regarding safety management and emergency response plans.

Electric Transmission Projects

Southern Energy, 750 MW Bowline Unit 3 Project, Electric and Gas Interconnections. Project Manager for the preparation of Article VII applications required for a proposed 1.7-mile 345 kV underground feeder and a proposed 4.2-mile 24-inch diameter natural gas pipeline to serve the existing Bowline Point Generating Station and the proposed Bowline Unit 3 Project. The proposed facilities would be located within an existing utility corridor and would involve major road crossings, wetland crossings, and a crossing of Minisceongo Creek.

New York Power Authority, Marcy South Project. Supervised staff and consultants for the licensing of a 200-mile, 345 kV transmission facility in upstate New York, including a submarine crossing of the Hudson River. Assisted during the hearings before the New York Public Service Commission, and coordinated the support activities for the federal agency review of the U.S. Army Corps of Engineers' Section 10 and Section 404 permit applications. Managed the development and filing of the Environmental Management and Construction Plan and actively coordinated the required state agency review and approvals. Developed and improved regulatory agency relations, specifically the Department of Environmental Conservation, the Department of Public Service, and the Department of Agriculture and Markets. Construction started in 1985, and the first segment was placed in-service in 1987.

New York Power Authority, Sound Cable Project. Managed specific environmental analyses and the preparation of the Environmental Management and Construction Plan for the licensing of a 27-mile, 345 kV underground/submarine transmission line between Westchester County and Nassau County, New York. Provided support during the hearings before the New York Public Service Commission. Prepared the U.S. Army Corps of Engineers Section 10 and Section 404 permit applications and other documentation for the Coastal Zone Consistency determination. Construction started in 1989 and the line was placed in-service in 1991.

Central Hudson Gas & Electric, P&MK Transmission Lines. Assistant Project Manager for specific environmental analyses and the preparation of the Article VII Application to support the licensing of the upgrading and rebuilding of 40 miles of 69 kV overhead transmission line to 115 kV in Ulster County, New York. Provided expert testimony before the New York Public Service Commission. Key issues included electric and magnetic field (EMF) effects and potential impacts to the former Delaware and Hudson Canal, a National Historic Landmark. The required Article VII Certificate was granted in 1995.

Niagara Mohawk Power Corporation, System Forestry Audit. Conducted an audit of Niagara Mohawk's transmission line right-of-way management program. This project focused on the management of the System Forestry Department and included field evaluation of several rights-of-way to evaluate compliance with corporate policy and state requirements. This audit was undertaken at the request of the New York Department of Public Service.

Belleville Hydroelectric Project, Transmission Facilities. Project Manager for the preparation of an environmental assessment under a third-party contract with the Federal Energy Regulatory

Commission regarding a new 26-mile, 138 kV transmission line in Meigs County, Ohio. This project, which represented a realignment of the transmission facilities for a 42 MW hydroelectric project at the existing Belleville Lock and Dam near Belleville, West Virginia, required an amendment to the FERC license for the hydroelectric project. This project was extremely schedule-sensitive due to a mandated construction start date specified in the FERC license.

Thermo Energy Systems, Staten Island Cogeneration Project. Evaluated licensing requirements and New York City regulatory approval process for the natural gas service line and an underground electric transmission line associated with a 55 MW gas-fired cogeneration project on Staten Island, New York. Since the transmission facilities were exempt from the requirements of Article VII of the New York Public Service Law, the review and approval process defined by the New York City Uniform Land Use Review Procedures (ULURP) applied.

Natural Gas Pipelines

Iroquois/Tennessee Pipeline Project, Phase I. Managed the preparation of an environmental impact statement for a new 370-mile interstate gas pipeline in New York and Connecticut, 155 miles of pipeline loops and laterals in New York, Massachusetts, Connecticut and Rhode Island, and various compressor and metering facilities. The project included extensive inter-agency coordination among various state and federal agencies, and included the review of numerous nonjurisdictional facilities (i.e., connections to Local Distribution Companies and cogeneration projects).

Iroquois/Tennessee Pipeline Project, Phase II. Managed the preparation of an environmental assessment for 53 miles of pipeline loops and laterals in Massachusetts, Connecticut, and Rhode Island, including new compressor facilities.

Empire State Pipeline Project. Managed the preparation of an environmental assessment for 22 miles of new pipeline and pipeline loops in New York and Michigan and a new 157-mile-long nonjurisdictional pipeline in New York. This document included a detailed evaluation of several alternatives involving competing pipeline systems in New York and the evaluation of a controversial border crossing at Grand Isle, New York.

Florida Gas Transmission System Phase III Expansion. Prepared an assessment of public interest areas (i.e., National Forests, Wild and Scenic Rivers, public and private wildlife management areas, and public recreation areas) for approximately 450 miles of pipeline facilities in Louisiana, Mississippi, Alabama and Florida. This project involved construction through the DeSoto National Forest and across numerous recreational rivers.

Liberty Pipeline Project. Prepared an assessment of public interest areas and socioeconomics for a new pipeline in New York and New Jersey. This project involved construction through urban and suburban areas and a major underwater crossing of Lower New York Bay between Middlesex County, New Jersey, and Queens County, New York.

Rhode Island Extension and ANR Phase II. Conducted construction and post-construction compliance inspections for new pipelines in Rhode Island and New Jersey. Documented compliance

with FERC construction procedures regarding environmental protection and restoration.

FERC Order 555. Reviewed industry and agency comment and developed responses for proposed order concerning gas pipeline certificate application requirements and standard construction procedures.

WORK HISTORY

TRC Environmental Corporation
Project Manager
1999 – present

Principal Planner
Louis Berger & Associates, Inc.
1994 – 1999

Supervisor, Resources Planning
Ebasco Environmental
1986 – 1994

Licensing Specialist
New York Power Authority
1983 – 1986

Environmental Planner
Claude Terry & Associates
1980 – 1983

APPENDIX C SYSTEM PRODUCTION MODELING

Economic and Environmental Benefits of the Wawayanda Energy Center: System Production Modeling Report

Stipulation No. 14

Report Submitted by Lexecon Inc.

on behalf of the Wawayanda Energy Center, LLC (a subsidiary of Calpine)
for a Certificate of Environmental Compatibility and Public Need
to construct a 540-megawatt gas-fired combined-cycle combustion turbine electric generating plant in the Town of Wawayanda, Orange County, New York State

Susan F. Tierney, Ph.D.
Joseph Cavicchi
August 14, 2001

LEXECON

ECONOMIC AND ENVIRONMENTAL BENEFITS OF THE WAWAYANDA ENERGY CENTER

1. Introduction

The Wawayanda Energy Center is a 540-megawatt natural gas-fired combined-cycle power generation facility proposed to be built in the town of Wawayanda, New York. As part of its application to the New York State Board on Electric Generation Siting and the Environment ("NY Siting Board"), Wawayanda Energy Center, LLC, a subsidiary of Calpine Corporation ("Calpine") asked Lexecon Inc. to perform an analysis[1] of the impact of the addition of the Wawayanda Energy Center on the New York electricity

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[1] This analysis is required to fulfill Stipulation No. 14 associated with Calpine's application to the NY Siting Board for approval of the proposed Wawayanda Energy Center. Stipulation No. 14 reads as follows:

1. The Application will include the following analysis of statewide emissions and production cost impacts, which will be developed using MAPS, PROMOD, or a similar computer modeling tool:

(a) Case 1 (without the Wawayanda facility)
- Estimated statewide levels of SO_2, NO_x, and CO_2 emissions; and
- Estimated minimum, maximum, and average annual spot prices (based on variable production costs) in New York State and in Areas A, G, and K of the New York Control Area.

(b) Case 2 (with the Wawayanda facility)
- Estimated statewide levels of SO_2, NO_x, and CO_2 emissions;
- Estimated minimum, maximum, and average annual spot prices (based on variable production costs) in New York State and in Areas A, G, and K of the New York Control Area; and
- Estimated capacity factor for Wawayanda.

2. The analyses in Cases 1 and 2 will assume that, subject to publicly announced in-service and retirement dates, the following power plants are in service: all existing electric generation facilities, the New York Power Authority's proposed in-city gas turbines, and those electric generation facilities that have received notification that their application is in compliance with Article X 30 days prior to the date of this application. Notwithstanding the foregoing, Cases 1 and 2 shall not include any power plants that are listed as "on hold" on the DPS Article X case list.

3. Calpine will consult with DPS Staff with the goal of agreeing to a mutually acceptable input data set, including modeling for Calpine's proposed facility, to be used in the above-discussed analyses. The default data set will be that which was used in the preparation of the most recent New York State Energy Plan, with updates to the database to reflect significant changes that have occurred since the data set was developed and reasonable assumptions about the other new facilities identified in paragraph 2 herein.

system. The analysis focuses on estimating the effect of the operation of the proposed project on the New York State electric system's power production, air emissions, and wholesale spot energy prices.

To carry out this analysis in accordance with Stipulation No. 14, Lexecon used General Electric's Market Assessment and Portfolio Strategies ("MAPS") model. Lexecon conducted MAPS modeling analyses of New York State's power system without the Wawayanda Energy Center and then with the Wawayanda Energy Center, in order to estimate the impacts of the Wawayanda Energy Center on: (1) output at generation facilities in and surrounding New York State that would be dispatched to meet the state's electrical power demand; (2) the total combined air emissions produced by these generating facilities; and (3) the wholesale power prices in New York State. The difference between these two "with Wawayanda" and "without Wawayanda" analyses provides an estimate of emissions reduction benefits, power production impacts, and wholesale price impacts associated with introducing the Wawayanda Energy Center into the electricity supply mix in New York State.

This report consists of the following four sections. Section 2 describes the MAPS model and the input data and assumptions that are necessary to run it. Section 3 reviews the objectives of the modeling, which are derived in part from Stipulation No. 14. Section 4 presents the overall results of the system production modeling. Section 5 summarizes conclusions.

2. Description of the Model and the Input Data

2.1 Simulation Model

In accordance with Stipulation No. 14, Lexecon used the GE MAPS electric system dispatch model to carry out the system production modeling.[2] MAPS is a highly detailed

[2] Lexecon used GE MAPS Version 11.156 for its analysis.

model that simulates the hourly operation of the region's power supply system. MAPS uses extensive information on the operating costs and production characteristics of power plants to simulate the most cost-effective dispatch of plants available to meet hourly electrical load. MAPS is generally recognized as one of the most sophisticated electricity system simulation tools available in the United States, especially for use in modeling electricity markets (like New York State) with significant transmission constraints. MAPS analyses have been endorsed in numerous regulatory forums, and were relied upon by many applicants whose power plant applications have been approved by the NY Siting Board.[3]

The model simulates operation of a competitive bid-based spot energy market (such as is administered by the New York Independent System Operator, "NYISO") while simultaneously recognizing the system's security constraints (transmission and various operational constraints) that are enforced by the system operator to ensure reliable power system operations. The MAPS model determines security-constrained economic dispatch of all facilities using input assumptions that characterize: power plants' efficiencies (heat rates), expected fuel costs, variable emissions allowance costs (SO_2 and NO_x), and variable operations and maintenance costs. The combination of these power plant variable costs is used by MAPS to determine power plant dispatch given transmission system limitations.

Although under the NYISO's market rules, power resources are dispatched on the basis of bids (as opposed to costs) submitted by suppliers, MAPS provides a reasonable approximation of NYISO spot market operations because in competitive markets generating companies can be expected to bid their marginal (or variable) costs. Unlike other electricity system simulation models, MAPS incorporates detailed information on the transmission system (e.g., numerous transmission line ratings and operational

[3] See, for example, Case 97-F-1563, Application by Athens Generating Company, L.P., and Case 99-F-0558, Application by Heritage Power LLC.

contingencies) in order to accurately estimate the impact of transmission system constraints on the operation and dispatch of power plants. The resulting MAPS system dispatch results are then compiled to report estimated plant run-times, generation output, air emissions, and spot market energy prices by location on the grid.

2.2 Input Data

In accordance with Stipulation No. 14, Item 3, Lexecon's modeling of the New York electric system with and without the Wawayanda Energy Center relied upon data on electricity demand and supply resources that were compiled and used by the New York State Economic Research and Development Agency ("NYSERDA") to develop the most recent New York State Energy Plan. The NYSERDA data used in Lexecon's analysis were last modified by NYSERDA in the Spring of the year 2000. These input data are referred to formally as the input set data used for the 1998 State Energy Plan; a general description of these data is in Appendix 1. These input data were provided by NYSERDA in a format that can be readily interpreted by the MAPS model.[4] These input data represent the most comprehensive, up-to-date electricity system data that are publicly available.[5]

Although the data were relatively up-to-date, Lexecon still had to make certain additional modifications to the NYSERDA data and assumptions in order to model the Wawayanda facility in an appropriate way, given changes that have occurred in New York's electric system since the time NYSERDA prepared its own data set and analysis. Most importantly, several new power plant proposals have advanced in the permitting process during the time period since NYSERDA prepared the New York State Energy

[4] The actual MAPS input data files that were used to conduct the system production modeling have been provided to the NY Siting Board as Appendix 2 to this report. These files were originally developed by NYSERDA and were then modified by Lexecon as described in this report in order to incorporate new capacity additions under consideration in New York State.

[5] In accordance with Stipulation No. 14, Lexecon consulted with the New York Public Service Commission when evaluating the input data set and changes to the data set. The changes in the NYSERDA data incorporated in our report are described above.

Plan. Therefore, in accordance with Stipulation No. 14, Item 2, Lexecon added to the NYSERDA data set the eight proposed new generation facilities that have received notification from the NY Siting Board that their Article X applications are compliant and removed the four generic power plants that NYSERDA had included in the analysis in order for the state's supply to meet projected peak loads reliably.[6] (See Figure 1, which indicates the location of these proposed power projects as well as the bulk power electric sub-regions (transmission areas) defined in accordance with the internal transmission interfaces within New York State.) In addition, also in accordance with the Stipulation at Item 2, Lexecon added the eleven New York Power Authority gas turbine facilities that are currently being installed in the New York City region.

Lexecon also made two other modifications to the NYSERDA data set in order to incorporate facility operational changes that have been announced or are under way. First, recognizing that the model analyzes interactions between New York State and neighboring regions, Lexecon made a relevant adjustment in pollution control assumptions at certain power plants in the neighboring regions. Several plants located in Pennsylvania and Maryland have announced plans to install selective catalytic reduction ("SCR") systems to reduce emissions of nitrogen oxides.[7] To adjust the NYSERDA data set for these recent announced SCR additions, Lexecon reduced the most recently reported nitrogen oxide emissions at these plants by 90% to correspond

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[6] These projects, totaling approximately 5840 MW, are: PGE's Athens Generating Plant (1080 MW, filed 8/28/98); Southern Energy's Bowline Unit 3 (750 MW, filed 3/20/00); Sithe Heritage (800 MW, filed 2/23/00); ConEd's East River Re-powering (360 MW, filed 6/1/00); KeySpan's Ravenswood Cogeneration Facility (250 MW, filed 7/28/00); Ramapo Energy's Ramapo Plant (1100 MW, filed 11/29/99); New York Power Authority's Poletti Station Expansion (500MW, filed 8/18/00); and SCS Energy's Astoria Plant (1000MW, filed 6/19/00). Due to the addition of these proposed units, Lexecon removed four 300 MW generic expansion units in New York State that NYSERDA had added in the data set to meet local reliability and reserve requirements during the study period.

[7] These are: in Pennsylvania, Homer City 1-3 and Montour 1 and 2; and in Maryland, Brandon Shores 1 and 2, Chalk Point 1 and 2, Herbert A. Wagner 3, and Morgantown 1 and 2.

to the typical control effectiveness of an SCR system.[8] These revised emission rates were then used in the modeling.

Second, the modeling of the Homer City facility located in Pennsylvania was modified so that the plant's output is utilized regardless of whether it is consumed in New York or in Pennsylvania. The NYSERDA data set had one-half of Homer City committed to the New York State power system, reflecting power purchase agreements made between New York State Electric and Gas Company and Edison Mission Energy when the plant was sold in 1999.[9] Since these contracts expire in 2001 with no indication of a renewal, Lexecon removed this assumption. Therefore, since Homer City is physically located in the Pennsylvania-New Jersey-Maryland ("PJM") power region, it is committed to that region. Although this changes the way that Homer City's dispatch is determined, its generation can still be used in New York or PJM.

3. Modeling Objectives

In accordance with Stipulation No. 14, Item 1, the primary objective of this modeling analysis is to calculate the extent to which the addition of the Wawayanda power plant to the New York electric supply system changes output at other power plants in New York State, and produces benefits in the form of net reductions in air emissions and lower wholesale power prices in different parts of the state. The modeling scenario – analyzing the operation of the electric system with and without the Wawayanda Energy Center during the year 2004[10] – is designed to produce reasonable estimates of the benefits that can be attributable solely to the addition of the Wawayanda Energy Center.

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[8] Although a 90% removal rate is aggressive, this assumption is conservative as it reduces the variable costs of plants that typically dispatch before Wawayanda. It does this because the model estimates production costs of a plant by including the variable costs of emission allowances, equal to the estimated price of emission allowances times the amount of emissions. The 90% removal rate assumption would significantly reduce a plant's emissions, and thus its variable costs, relative to a less aggressive assumption about removal rate.

[9] This assumption caused 50% of Homer City to be modeled as if it were under the control of the NYISO.

[10] The year 2004 was selected since it is the first year when the Wawayanda Energy Center expects to be operational for a full calendar year.

As stated in the previous section, the modeling runs relied exclusively on the NYSERDA GE MAPS database, modified as described above. For each of the runs Lexecon collected those output data that were necessary to determine the impact of Wawayanda on the New York electricity system. These results are reported in Section 4.

The MAPS system production modeling provides an estimate of the amount of savings, emissions reduction, and full reliability and transmission system benefits that additional generating capacity offers at a new location on the transmission system during a snapshot in time (2004 in this case). Nonetheless, the MAPS analysis provides a reasonable approximation of the overall system benefits associated with the relatively efficient and clean Wawayanda Energy Center.

4. Modeling Results

4.1 Overall Results

In the analysis performed by Lexecon, the addition of the Wawayanda Energy Center to New York's power supply system shows benefits in the form of air emissions reductions and reductions in the cost to produce power from the regional electricity system to meet New York loads. The analyses reveal that by virtue of Wawayanda's efficiency, its use of natural gas, and its high degree of emissions control, the proposed plant is expected to be dispatched ahead of and therefore displace output at existing power plants located in the same vicinity (Transmission Area G)[11] as Wawayanda as well as plants located in other parts of New York State and the adjacent regions. Wawayanda's output produces lower total emissions of NO_x, SO_2, and CO_2 than other older, less efficient plants that are displaced, since Wawayanda's emissions rates are relatively low when compared to those of the power plants that run less when Wawayanda operates. Additionally, the introduction of Wawayanda, with its low operating cost, leads to

[11] The vicinity or Transmission Area G refers to the counties Orange, Rockland, Ulster, Dutchess, and Putnam.

reductions in system operational costs that will ultimately put downward pressure on New York's wholesale power prices. As described in more detail below, Wawayanda is expected to provide net air quality benefits and lower overall wholesale power supply clearing prices.

4.2 Impacts on Generation Output

The Wawayanda Energy Center will produce an estimated 3,789 gigawatt hours (GWh) of electricity in the year 2004, which corresponds to a 75% annual capacity factor for the facility.[12] Because the analysis holds electricity consumption constant in both cases (i.e., the system with and without Wawayanda), the introduction of Wawayanda results in decreased run-times for certain other generation facilities located in New York and adjacent regions.[13] In the analysis, Wawayanda's estimated 3,789 GWh of electricity generation replaces electricity generation that would have otherwise been produced by other plants had Wawayanda not been included in the analysis. This results from the fact that Wawayanda will use high-efficiency, gas-fired combined-cycle technology, which tends to be dispatched ahead of certain less efficient, existing power plants with fossil steam boilers and poor "heat rates" (the amount of fuel required to produce a kilowatt-hour of electricity).

As is shown in Table 1, the Wawayanda Energy Center has a notable impact on the generation levels at plants located nearby and in other parts of central New York State, with a somewhat lesser impact on plants located in more distant areas. The generation from Wawayanda primarily displaces generation that would normally have been provided by existing steam boiler plants (see Figure 2). Table 1 shows the impact of the Wawayanda facility on New York's Transmission Area G, which is the electric sub-region of New York State in which Wawayanda is located. The results indicate that

[12] The annual capacity factor is a measure of the percentage of a facility's total maximum production potential that is actually utilized during a year. It is calculated as the ratio of the estimated facility production during a year to the total potential amount of facility production during that year.
[13] The NYSERDA database explicitly includes the PJM region, which is where the majority of regional generation unit displacement is observed in this analysis.

almost 15% of the total generation displaced by Wawayanda is located in the same geographical area (Orange and Rockland Counties) as the proposed facility. Table 1 also shows that 59% of Wawayanda's output displaces generation at plants located throughout the balance of New York State, which drops by 2,231 GWh in 2004 once Wawayanda is built and operates. The remaining displaced generation tends to be from power plants in PJM. In the system production modeling, Wawayanda's relatively high efficiency and low operating costs cause it to be dispatched as a base load facility.

Table 1

Generation Displaced in 2004 with the Addition of the Wawayanda Energy Center

Location	Generation Displaced (GWH)
Transmission Area G[1]	559
Balance of New York State[2]	2,231
Imports/Exports[3]	999
Total[4]	**3,789**

[1] Area G includes the following counties: Orange, Rockland, Dutchess, Putnam, and Ulster (see Figure 1).

[2] This represents approximately 1.4% of state-wide generation.

[3] This reflects net changes in the amount of electricity transmitted between New York State and adjacent regions.

[4] The Wawayanda Energy Center produced 3,789 GWH in the modeling analysis.

4.3 Impacts on Air Emissions

Because Wawayanda's emissions rates are so much lower than those of the power plants whose output is displaced, producing power at Wawayanda instead of the other plants leads to lower overall levels of nitrogen oxides (NO_x), sulfur dioxide (SO_2), and carbon dioxide (CO_2) emissions in New York State as a whole. These emissions reductions are a significant environmental benefit of siting, constructing, and operating the plant. NO_x and SO_2 are related to acid rain. NO_x plays a role in ground-level ozone

(smog) formation. And CO_2 is a greenhouse gas that contributes to global warming. Reducing NO_x, SO_2, and CO_2 can help to reduce the adverse impacts of these environmental problems.

The total estimated emissions for the Wawayanda Energy Center in 2004 are 97 tons of NO_x, 30 tons of SO_2, and 1.53 million tons of CO_2.[14] These emissions are included in Table 2, below, embedded in the column entitled "Total Emissions with Wawayanda." As is shown in Table 2, total statewide emissions are expected to go down with Wawayanda in the power supply mix, because the power plants that run less as a result of Wawayanda's output would have run more and produced higher total emissions. Total annual statewide NO_x emissions are estimated to drop by 2,056 tons – a 3.6% reduction in statewide NO_x emissions and a benefit that is roughly 21 times the 97 tons of emissions estimated to be produced by the plant. Similarly, SO_2 emissions drop 6,304 tons (a 2.9% reduction) in 2004, while CO_2 emissions decline statewide by 221,960 tons (a 0.4% reduction).

Table 2

Statewide Power Plant Emissions of NO_X, SO_2, and CO_2 in 2004 with the Addition of the Wawayanda Energy Center

Emission	Total Emissions without Wawayanda (tons)	Total Emissions with Wawayanda[1] (tons)	Net Change in Emissions (tons)	Percentage Change in Emissions (%)
NO_X	56,808	54,752	-2,056	-3.6%
SO_2	216,313	210,009	-6,304	-2.9%
CO_2	58,153,664	57,931,704	-221,960	-0.4%

[1] Includes Wawayanda's emissions which are 97 tons of NO_x, 30 tons of SO_2, and 1.53 million tons of CO_2.

[14] Wawayanda's estimated annual emissions in 2004 are obtained from the MAPS modeling results that predict a 75% capacity factor. The project's annual potential to emit, as defined in the Wawayanda air permit application, is based on a 100% capacity factor.

As shown in Table 3, there are significant reductions in NO_x and SO_2 emission levels in Transmission Area G (see Figure 1), or close to the plant. For example, the addition of the Wawayanda Energy Center reduces net annual NO_x emissions in Area G by 24.2% (769 tons), and reduces SO_2 emissions by 27.5% (a 1,676-ton reduction in 2004). Because the total amount of electricity generated in Transmission Area G increases with the addition of Wawayanda, CO_2 emissions increase locally although it decreases statewide CO_2 emissions by almost a quarter of a million tons. This occurs because Wawayanda has a lower CO_2 emission rate than many existing plants in New York due to its use of natural gas as a primary fuel as opposed to fuel oil or coal, which have higher carbon contents. However, these local increases are more than offset by the decline in total statewide CO_2 emissions, and indeed, statewide emissions are a more appropriate measure in light of the fact that the impacts of CO_2 emissions occur on a global basis, rather than a regional or local level.

Table 3

Power Plant Emissions of NO_X, SO_2, and CO_2 in 2004 in Transmission Area G with the Addition of the Wawayanda Energy Center[1]

Emission	Total Emissions without Wawayanda (tons)	Total Emissions with Wawayanda[2] (tons)	Change in Emissions (tons)	Percentage Change in Emissions (%)
NO_X	3,181	2,413	-769	-24.2%
SO_2	6,103	4,428	-1,676	-27.5%
CO_2	3,703,513	4,762,976	1,059,463	28.6%

[1] Transmission Area G includes the following counties: Orange, Rockland, Dutchess, Putnam, and Ulster (see Figure 1).
[2] Includes Wawayanda's emissions which are 97 tons of NO_x, 30 tons of SO_2, and 1.53 million tons of CO_2.

4.4 Impacts on Wholesale Spot Prices and Supply Costs

In addition to its role in reducing overall air emissions from the power sector,

Wawayanda Energy Center will also help reduce wholesale spot energy prices. As directed by Stipulation No. 14, statewide wholesale electric energy price impacts are reported (see Table 4) for the state and for various sub-market transmission zones, as shown in Figure 1.[15] On average, Wawayanda's operation results in lower prices during the majority of hours of the year. On a statewide basis, the net impact of the price changes results in estimated savings of $60 million for consumers in 2004.[16]

Although the statewide results show that consumers will benefit from reduced wholesale electricity prices, there are some hours where minimum and maximum prices increase in some transmission areas.[17] In the case of minimum prices, Table 4 shows there is a very small increase in the minimum price in some transmission areas following the addition of Wawayanda. Table 4 also shows that maximum prices increase slightly in some transmission areas following the addition of Wawayanda. Because the increases are observed for only a small number of hours and the dispatch of Wawayanda decreases prices more substantially and in many more hours, the observed trend in changes in average prices provides a better measure of the impact of the addition of Wawayanda. Once again, the overall trend shows net reductions in wholesale prices when Wawayanda is added to the system.

5. Conclusion

The addition of the proposed Wawayanda Energy Center is expected to result in both lower overall emissions of certain important air pollutants in New York State and lower wholesale power prices in New York. All else equal, such spot energy market price

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[15] In accordance with the Stipulation, the price estimates shown in Table 4 are results of the modeling analysis and are based on a security-constrained system dispatch where bids are assumed to be based on variable production cost assumptions.

[16] The net impact is determined by summing the costs to serve all of the loads represented by the consumers across all of the transmission areas for the "with Wawayanda"and "without Wawayanda" cases and calculating the difference.

[17] This result is related to the impact that the addition of Wawayanda has on the dispatch order determined by MAPS. New unit additions change the outcome of the MAPS unit commitment algorithm and in certain cases result in different marginal units in some hours of the "with Wawayanda" analysis as compared to the "without Wawayanda" case.

reductions can be expected to produce savings for consumers. These impacts result from (a) Wawayanda's relatively efficient power generation technology, (b) its use of low-emitting fuel (natural gas), and (c) its lower emissions rates, as compared to other existing power plants which run less due to the dispatch of Wawayanda. Without the Wawayanda Energy Center, other less efficient and more expensive plants run more and emit more NO_x, SO_2, and CO_2; with the Wawayanda Energy Center, the existing plants located in Area G and the middle part of New York State run less than they otherwise would. The net effect is lower total overall emissions of NO_x, SO_2, and CO_2 and lower overall wholesale electricity spot prices and power supply costs in New York State as a whole. These are significant economic and environmental benefits associated with the Wawayanda Energy Center.

Table 4

Load-Weighted Average Prices for Wholesale Spot Market Energy in 2004 with and without the Wawayanda Energy Center

Trans-mission Area[1]	Average Price without Wawayanda Project ($/MWH)	Average Price with Wawayanda Project ($/MWH)	Change in Average Price ($/MWH)	Percentage Change in Average Price (%)	Minimum Price without Wawayanda Project[2] ($/MWH)	Minimum Price with Wawayanda Project[2] ($/MWH)	Maximum Price without Wawayanda Project ($/MWH)	Maximum Price with Wawayanda Project ($/MWH)	Total Energy Consumption (GWH)
A	26.79	26.55	-0.24	-0.9%	0.34	0.41	66.43	67.55	20,212
B	26.97	26.80	-0.17	-0.6%	19.01	18.27	242.77	246.09	8,238
C	26.59	26.38	-0.21	-0.8%	18.99	17.99	103.35	104.55	16,363
D	27.02	26.54	-0.48	-1.8%	18.98	18.94	45.29	45.29	7,052
E	27.32	26.82	-0.50	-1.8%	18.96	18.91	58.64	64.64	8,858
F	27.29	26.80	-0.49	-1.8%	16.67	18.90	46.73	72.34	12,770
G	28.68	28.08	-0.60	-2.1%	18.91	10.48	81.02	68.85	12,551
H	29.59	28.88	-0.71	-2.4%	18.91	12.77	223.74	77.33	917
I	29.70	28.98	-0.71	-2.4%	18.91	17.27	225.04	78.27	5,409
J	28.45	27.91	-0.54	-1.9%	18.91	18.87	217.77	91.90	49,088
K	48.02	48.12	0.10	0.2%	18.92	18.87	225.00	225.00	19,240
All of New York	**30.17**	**29.79**	**-0.38**	**-1.2%**	**0.34**	**0.41**	**242.77**	**246.09**	**160,698**

[1] The Transmission Areas as defined by New York State are shown on Figure 1.

[2] For a de minimis number of hours the prices determined by the model are negative. These prices have not been reported as minimums in this table.

Appendix 1

NYSERDA Data:

The following is a brief description of NYSERDA's MAPS input data. The input data start with the material used for the 1998 State Energy Plan. The following notes related to the data set correspond to the updated data set used by Lexecon.

- The final outlook demand and energy forecast is contained in the data.
- Revised fuel prices consistent with the Final State Energy Plan document are used.
- The data set still models two control areas (NYCA and PJM).
- Revised nuclear unit availability levels are not incorporated in the data set.
- New must-run assignments are used for several steam-electric units in the NYCA system.
- Revised voltage/stability limits for the Central East Interface are used.
- Unit capacities for NYCA are matched to the 1998 NYPP Yellow Book levels.
- Unit capacities for PJM are matched to the 1998 MAAC Sec. 411 Report.
- Revised expansion supply units are added to the two simulated systems to maintain reliability objectives. Regarding this item, the MAPS data set intentionally does not contain any simulation units which equate to any proposed project being considered under the Article X process.
- The former RG&E Allegany IPP unit is reconfigured as a dispatchable thermal unit to reflect recent ownership changes.
- An erroneous winter period rating value for the PJM share of the Homer City

2 unit is corrected.

- The retirement date for the Oyster Creek nuclear unit is changed to end of current license (December 2009) based on recent PJM announcements.

- The input files are upgraded to work with Version 10.136 of MAPS, which contains revised simulation logic from that used for the Draft State Energy Plan.

- The data set supplied contains emission trading cost values for the simulation years 2002, 2005, and 2010 only, and instructions are supplied to the program to incorporate these costs in commitment dispatch decisions. The emission trading cost values were considered in the analysis of the Wawayanda Energy Center.

Lexecon Modifications to NYSERDA Data:

Lexecon made the following adjustments to NYSERDA's database:

- Addition of the power plants that had received notice from the NY Siting Board that their Article X applications were compliant. These projects, totaling approximately 5340 MW, are:
  - PGE's Athens Generating Plant (1080 MW, filed 8/28/98);
  - Southern Energy's Bowline Unit 3 (750 MW, filed 3/20/00);
  - Sithe Heritage (800 MW, filed 2/23/00);
  - ConEd's East River Re-powering (360 MW, filed 6/1/00);
  - KeySpan's Ravenswood Cogeneration Facility (250 MW, filed 7/28/00);
  - Ramapo Energy's Ramapo Plant (1100 MW, filed 11/29/99);
  - SCS Energy's Astoria Plant (1000MW, filed 6/19/00); and
  - New York Power Authority's Poletti Expansion (500 MW, filed 8/18/00).

- Addition of eleven New York Power Authority gas turbine facilities that are currently being installed in the New York City region.

- Deletion of the four 300 MW generic expansion units in New York State that NYSERDA had added in the data set to meet local reliability and reserve requirements during the study period.

Appendix 2

Attached computer disk with zip files that contain the following input files used for the analysis:

Gtr001.in41

Mifbase1.in05

rawpf.i40

shape.i24

NY Loads: ce.doc, ch.doc, li.doc, lim.doc, nm.doc, ny.doc, or.doc, pad.doc, pau.doc, rg.doc

PJM Loads: ace.doc, bge.doc, dpl.doc, gpu.doc, nug.doc, pec.doc, ppl.doc, psg.doc

The only difference between the "with Wawayanda" and "without Wawayanda" runs is that the in-service date of Wawayanda is changed to the beginning of 2004.

APPENDIX D PUBLIC INVOLVEMENT PROGRAM

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APPENDIX D-1

NEWS RELEASE

CONTACT: 408/995-5115
Media Relations: Bill Highlander, X1244
Investor Relations: Rick Barraza, X1125

CALPINE ANNOUNCES DEVELOPMENT OF 540-MEGAWATT WAWAYANDA ENERGY CENTER

State-of-the-Art Facility to Complement Company's New York Portfolio

(SAN JOSE, CALIF.) March 23, 2000—Calpine Corporation [NYSE:CPN], the national independent power company, today announced plans to build, own and operate a new 540-megawatt natural gas-fired electricity generation facility to be located near Middletown, N.Y. in Orange County. The proposed **Wawayanda Energy Center** will represent a $250 million investment. Commercial operation will begin in early 2004.

In making the announcement, Calpine Senior Vice President Bob Alff stated, "The Wawayanda Energy Center is a flagship project for developing a strong position in the New York merchant power market." Alff added that, "Wawayanda will complement our existing power assets on Long Island, allowing us to operate and optimize our projects as an integrated system, selling power primarily into the New York City metropolitan area."

The Wawayanda Energy Center will use advanced technology power generation equipment supplied by Siemens-Westinghouse. With two 501F series combustion turbines in combined-cycle with a single steam turbine, the project represents a highly efficient and environmentally responsible design. The facility will exclusively use clean, natural gas and will be equipped with advanced emissions control technology.

-more-

Calpine currently has ownership interests in 152 megawatts of New York power generating assets located in Stony Brook, Bethpage and at Kennedy International Airport on Long Island, and at Lockport in western New York State.

According to Alff, "These earlier projects, developed under the Public Utilities Regulatory Policies Act (PURPA), give us a strong, core asset base in the high-value New York market. As a merchant project, Wawayanda will fit well with these assets as a combined system, and represents the next step in the evolution of bringing the benefits of competition to consumers."

Calpine will manage all aspects of project development for the Wawayanda Energy Center, including engineering and design, construction, fuel supply and power marketing. The project will be located on a 20-acre site close to an existing New York Power Authority 345kv transmission line.

Based in San Jose, Calif., Calpine Corporation is the leading U.S. independent power company dedicated to providing customers with reliable and competitively priced electricity. Calpine is the nation's largest producer of renewable geothermal energy and is focused on clean, efficient combined-cycle natural gas-fired generation. Nationally, Calpine currently has a combined interest in approximately 17,000 megawatts of electric generating capacity in operation, under construction or announced development in 20 states across the country—representing the largest power development program in the U.S. The company was founded in 1984 and is publicly traded on the New York Stock Exchange under the symbol CPN. For more information about Calpine, visit its website at www.calpine.com.

This news release discusses certain matters that may be considered "forward-looking" statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, including statements regarding the intent, belief or current expectations of Calpine Corporation ("the Company") and its management. Prospective investors are cautioned that any such forward-looking statements are not guarantees of future performance and involve a number of risks and uncertainties that could materially affect actual results such as, but not limited to, (i) changes in government regulations and anticipated deregulation of the electric energy industry; (ii) commercial operations of new plants that may be delayed or prevented because of various development and construction risks, such as a failure to obtain financing and the necessary permits to operate or the failure of third-party contractors to perform their contractual obligations, (iii) cost estimates are preliminary and actual cost may be higher than estimated, (iv) the assurance that the Company will develop additional plants, (v) a competitor's development of a lower-cost generating gas-fired power plant or (vi) the risks associated with marketing and selling power from power plants in the newly competitive energy market. Prospective investors are also referred to the other risks identified from time to time in the Company's reports and registration statements filed with the Securities and Exchange Commission

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APPENDIX D-2

The Times Herald-Record ONLINE

$250M power plan puts charge into Wawayanda

WAWAYANDA: A $250 million power plant could be on the way.

By Michael Levensohn
The Times Herald-Record
mblevens@th-record.com

03/24/00 09:45 AM

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A national power company has chosen the Town of Wawayanda as the potential site for a $250 million power plant.

Calpine Corp., an independent power company based in San Jose, Calif., announced plans yesterday for the Wawayanda Energy Center, a 540-megawatt electricity-generating power plant to be located on a 20-acre parcel off Dolsontown Road.

The plant would generate electricity by burning natural gas. Calpine spokesman John Flumerfelt said the process is very clean and compared the plant to a large-scale home furnace.

"There are no toxic issues, no issues with runoff or waste disposal," Flumerfelt said.

The plant would be located near the Masada Resource Group's proposed waste-to-ethanol plant, the subject of much controversy because of concerns about possible air pollution.

Calpine's plant would also be close to Middletown's sewage treatment facility, which could provide water for coolant. State power lines are nearby as well. But the closest access to a natural gas pipeline is at least seven miles away, Flumerfelt said.

"Probably our biggest concern is the gas line, where that's going to run," said Thomas J. DeBlock, supervisor of Wawayanda.

The plant faces a long regulatory approval process, and then would take about 18 to 20 months to build, Flumerfelt said.

It would create about 300 construction jobs, and 25 to 30 permanent jobs. The projected operating date is early 2004.

Calpine will present the project at the town's April 6 board meeting.

"This one project, tax-wise, probably will pay two or three times (as much property taxes) as the largest thing we have in town," DeBlock said. He estimated it could generate close to $1 million a year in tax revenue, more than a third of the town's current budget.

With the widespread deregulation of the power industry,

Calpine has found an opportunity for rapid growth as an unregulated power provider.
The company operates 40 plants across the country, with about 27 more under construction or in development. The power those plants generate is then sold to utility service providers, who deliver the power to homes and businesses.

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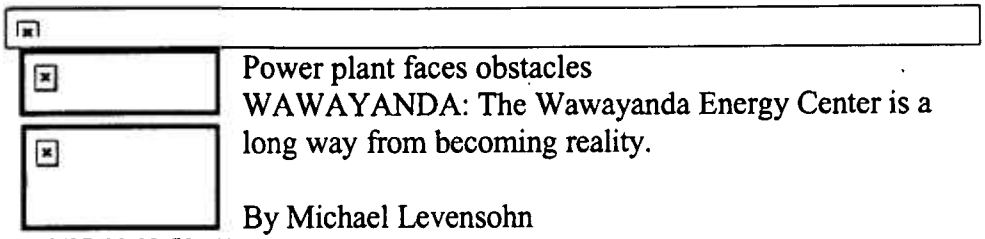
APPENDIX D-3



03/25/00 08:50 AM

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Power plant faces obstacles

WAWAYANDA: The Wawayanda Energy Center is a long way from becoming reality.

By Michael Levensohn
The Times Herald-Record
mblevens@th-record.com

If everything goes according to plan, the Wawayanda Energy Center could be up and running by 2004.

First, though, the proposal to build a $250 million power plant off Dolsontown Road will undergo regulatory scrutiny from a number of angles and agencies, not to mention a trial in the court of public opinion.

Calpine Corp., a national independent power company, plans to build, own and operate the 540-megawatt plant. It would sit on a 20-acre parcel in the Town of Wawayanda, near Middletown's sewage treatment plant and not far from the Masada Resource Group's proposed waste-to-ethanol plant.

If the uproar generated by Masada's plan is a fair indicator, Calpine could be in for a battle.

Five years ago, plans for a $200 million power plant in the Town of Wallkill overcame the public outcry, but were ultimately dashed by Orange and Rockland, which decided not to buy power from the plant.

Calpine would sell power on the open market and wouldn't be dependent on a single buyer. Tally one obstacle removed.

At the state level, since New York state adopted its new review standards in 1992, the state hasn't completed a single review. Its first decision is expected in a couple months. Score one point for uncertainty, with the following caveat:

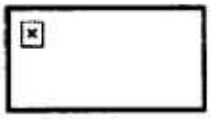
Gas-fired plants like the one proposed by Calpine are "state of the art facilities that are much cleaner than plants we've seen in the past, and much more efficient," state Public Service Commission spokesman Dave Flanagan said yesterday. The state likes natural gas.

Local approval would depend on the placement of a feeder line to tap into a natural gas pipeline, in addition to the usual environmental and economic considerations. Count on some concerned neighbors.

Then there are the federal regulators, who would have to approve the gas line, and have yet to OK the Millennium Pipeline, which Calpine hopes to tap into. The Federal Energy Regulatory Commission is putting the final touches on its environmental report, to be followed by a

decision on the pipeline.

On the Web: www.calpine.com



APPENDIX D-4

Wawayanda Energy Center
Initial Stakeholder Contacts

01/20/00	Joined Stone & Webster for meeting with Al Fusco, Middletown Commissioner of Public Works
02/29/00	Follow up meeting with Al Fusco to discuss potential Calpine involvement in project
03/08/00	Meeting with Al Fusco, (City of Middletown) and Tom DeBlock, Bob Clarke, Jim Ulrich, Dave Zuckerman (Town of Wawayanda). Discussed Calpine involvment in project and solicited input on project details and logistics of initial public announcement.
03/14/00	Introductory meeting in Albany to discuss PIP requirements with Department of Public Service (Dianne Cooper, Steven Blow).
03/24/00	Kick-off meeting with DPS & Dept. of Environmental Conservation (John Smolinski and Staff)
04/04/00	Presentation to Middletown City Council. Provided general overview of project and regulatory process and answered questions.
04/05/00	Meeting with Wawayanda Town Supervisor Tom DeBlock, including initial discussion of issues surrounding potential pipeline route. Meeting with Al Fusco to discuss water supply from Middletown POTW, etc..
04/06/00	Presentation to Wawayanda Town Board. Provided general overview of project and regulatory process and answered questions.
04/26/00	Initial Public Informational Meeting held in Wawayanda
04/27/00	Introductory meeting with Mike Edelstien of Orange Environment.
05/01/00	Telephone conversation with Wawayanda residents Mr & Mrs. Tyak.
05/02/00	Telephone conversations with Tom DeBlock and others from Town Office concerning potential water supply. Wawayanda resident Joe Carr called with several questions.

05/24/00	Meeting with NYPA (Ken Haase, Rajee Mustafaa, George Dunn) to discuss transmission issues. Meeting with Orange County Planning Department. First DPS Process Forum held.
06/07/00	Meeting with Wawayanda Town Officials to discuss water and other issues.
07/13/00	Meeting with Orange County Partnership to introduce project.
07/19/00	Meeting with State Senator Bonacic. Telephone conversation with State Assemblyman Gunther.
07/28/00	Meeting with various Town Officials to discuss project status.
08/01/00	First CAG meeting, Middletown Hampton Inn
08/07/00	Wawayanda resident Joe Karpiena called to discuss questions about water supply.
08/08/00	Meeting with Town Officials to discuss water, pipeline route and other issues.
08/09/00	Meeting w/ DPS & DEC - update on PIP, Stips, Article X completeness, and gas pipeline route
08/16/00	Meeting with Town Officials and staff to discuss bedrock well exploration.
08/28/00	Meeting with Town staff to discuss pipeline routing and areas of concern.
09/01/00	Telephone discussion with project abutter Donna Jados concerning various issues of concern regarding living immediately next door to plant.
09/13/00	Second Public Informational Meeting (Review Stipulations)
09/14/00	Meeting with Town Officials and staff to discuss Comprehensive plan approval and zoning.
09/15/00	Telephone discussion with local resident Connie Lossaro regarding general project questions.

09/20/00 Meeting with Orange County Partnership. Second CAG meeting held at Middletown Hampton Inn.

APPENDIX D-5

APPENDIX D-6

Calpine touts clean reputation

WAWAYANDA: The energy company will be at tonight's Town Board meeting to talk about its power plant proposal.

By Michael Levenson
The Times Herald-Record
mblevens@th-record.com

Calpine is coming to town.

Representatives of energy wholesaler Calpine Corp. will appear tonight before the Wawayanda Town Board to discuss the company's plans to build and operate a $250 million power plant off Dolsontown Road, just outside Middletown.

The presentation is just a preliminary step in the lengthy process of gaining regulatory approval for The Wawayanda Energy Center, which company officials hope to have up and running by 2004.

The plant would burn natural gas and generate up to 540 megawatts of electricity. Calpine is already talking with Wawayanda and Middletown officials about resource issues. For instance, the plant would be built near Middletown's sewage treatment facility, which could provide water for coolant. Nearby power lines would afford access to the state power pool.

A feeder pipeline will be needed to tap into the closest source of natural gas, which is several miles away.

Calpine has an option to buy the 20-acre site for the plant, which would easily be the largest taxable property in town.

Company officials appeared at Tuesday night's Middletown Common Council meeting to introduce the project.

They said Calpine's plants are efficient and clean – cleaner than natural gas plants built a few years ago, and miles ahead of the oil and coal plants of decades past.

It's like comparing your new Honda to a '60s Buick, without a catalytic converter, burning leaded gas, Calpine spokesman John Flumerfelt said yesterday. "We have a very clean history. We've been able to develop a very good track record, and obviously we're going to try to maintain that."

Calpine, founded in 1984, is a fast-growing player in the independent power production game. As deregulation of the utility industry proceeds, companies like Calpine have emerged as energy producers, selling electricity to the utility companies, who then sell it to commercial and residential customers.

Calpine operates 44 plants across the country, with 27 more in various stages of construction or development. The company is based in California, and is publicly traded.

Officials in a couple cities where Calpine runs plants said they didn't know of any problems with the plants. In other cities, officials weren't aware of Calpine's presence.

"We take that as a compliment. We're very unobtrusive," Flumerfelt said. "You won't ever see any smoke coming out of the smokestack, no toxic waste, just steam out of the cooling towers."

Natural gas burns more cleanly than other fossil fuels, and filtering advancements have greatly reduced the emissions that lead to air pollution and smog.

"A new plant is definitely going to be far cleaner than anything you already have. You'll get the cleanest state-of-the-art power plant," said Lucia Libretti, a spokeswoman for the Bay Area Air Quality Management District.

Libretti's agency regulates industrial sources of air pollution in a nine-county region of California where Calpine has several plants.

California has some of the tightest regulations in the country, Libretti said, adding that she wasn't aware of any problems with Calpine's plants.

Beginning last year, New York state introduced a stringent new regulatory approval process of its own, called Article X. It calls for a variety of studies and hearings. Public participation is a key component.

Calpine hasn't begun the Article X process yet, but for residents of the Town of Wawayanda, the opportunity to be heard begins tonight.

For more information

- Calpine officials will speak at tonight's Wawayanda Town Board meeting, 7:30 p.m., Town Hall.
- Call Calpine toll-free at (877) 281-9957
- A project Web site will be up and running soon.

APPENDIX D-7

April 17, 2000

Orange and Rockland Utilities
One Blue Hill Plaza
Pearl River NY 10965

Notice to Abutters

Dear Landowner:

Calpine Corporation has announced that it intends to construct and operate a natural gas-fired electric generation facility that would be located off Dolsontown Road in Wawayanda, New York. We are writing this letter to all property owners in the vicinity of the project to advise you of our plans and to let you know how to contact us if you have any questions. I have also enclosed a one-page fact sheet that provides a general overview of the project.

Our proposed Wawayanda Energy Center must be reviewed and approved by New York State regulators before any construction can begin. We expect to begin that regulatory process later this summer and anticipate that the entire approval process will take about a year. Calpine has already taken steps to ensure that we will have a meaningful and comprehensive public involvement program as the process moves forward.

The facility will use what is know as "combined-cycle" technology to generate 540 megawatts of electricity. It will be clean, quite and extremely energy efficient, and it will be built to meet or exceed strict modern environmental standards. The entire project will fit comfortably on a 20-acre site, and will be very similar in design to a number of other projects we currently have under construction.

If you would like to contact us by phone, please feel free to call toll-free at 1-877-281-9957. We also have set up a project-specific website located at www.wawayanda-energy.com. And finally, we would like to invite you to a public informational meeting that will be held at the Wawayanda Social Hall (1975 Rt. 284) on April 26 from 7:00 to 9:00 p.m. At that meeting, members of our project team, including our engineering and environmental staff, will give a brief overview of the project and answer questions. We will keep you advised about any future public meetings as they are scheduled.

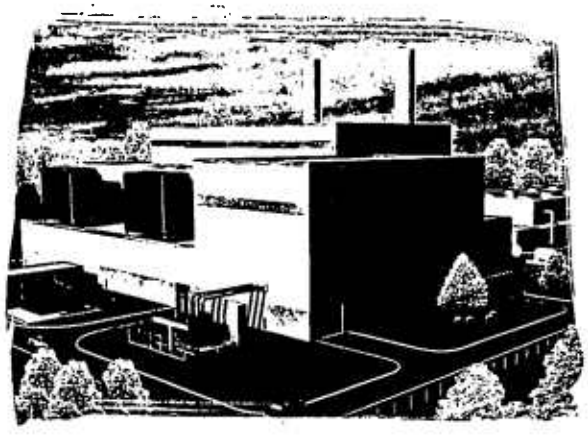
Sincerely,

John Flumerfelt
Project Development Consultant

APPENDIX D-8

CALPINE
WAWAYANDA
ENERGY CENTER

- **Located in Wawayanda, New York (near Middletown)**
- **Will nominally produce 540 MW of electricity—enough to meet the needs of about 500,000 homes**
- **Commercial operation slated for early 2004**
- **Advanced technology power generation equipment supplied by Siemens Westinghouse**
- **Will generate significant new property tax revenues and support about 25 family-wage jobs**
- **Will cost approximately $250 million, supporting up to 300 workers during peak construction**
- **Will exclusively use clean-burning natural gas**
- **Will be equipped with advanced air emissions control technology**
- **Will provide a new source of competitively-priced, reliable and environmentally responsible wholesale electricity**



For more information, call Calpine toll-free at:

(877) 281-9957

or visit:

www.wawayanda-energy.com

APPENDIX D-9

TOWN OF WAWAYANDA - ASSESSOR'S OFFICE

Office (914) 355-3704/5705
Fax (914) 355-3842

Post Office Box 296
Slate Hill, NY 10973

1-1-1
Orange and Rockland Utilities, Inc.
One Blue Hill Plaza
Pearl River, NY 10965

1-1-3.1
Orange and Rockland Utilities, Inc.
One Blue Hill Plaza
Pearl River, NY 10965

1-1-2
Country View Manor
c/o Concord Management Ltd.
Attn: Michael S. Yonge
1551 Sandspur Rd.
Maitland, FL 32751

1-1-4.2
Robert Catzen
121 Water St.
Baltimore, MD 21202

1-1-49
Vincent and Marie Rotundo
1249 Dolsontown Rd.
Middletown, NY 10940

1-1-50.1
George and Kathleen Giovannoni
1219 Dolsontown Rd.
Middletown, NY 10940

1-1-4.31
Onofrio and Angela Molitemo
1213 Dolsontown Rd.
Middletown, NY 10940

1-1-52.1
Samuel Simon
7 Lookerman Ave.
Poughkeepsie, NY 12601

1-1-3.222
Sheldon Diesenhouse
Robert Feinson
Norman Shapiro
Edward Meyer
P O Box 2106
Middletown, NY 10940

TOWN OF WAWAYANDA - ASSESSOR'S OFFICE

Office (914) 355-5704/5705
Fax (914) 355-3842

Post Office Box 296
Slate Hill, NY 10973

1-1-3.221	Donna DeStafeno Robert Jados 1187 Dolsontown Rd Middletown, NY 10940
1-1-3.223 1-1-56 1-1-57 1-1-58	Paul Mielke C/O Orange Hollow Raquet Club 10-6 ½ Station Rd. P O Box 298 Goshen, NY 10924
1-1-4.11	City of Midddletown 16 James St. Middletown, NY 10940
1-1-51.21	Sebastino Verrelli 1700 Matthews Ave. Bronx, NY 10462
1-1-51.22	Orange and Rockland Utilities, Inc. One Blue Hill Plaza Pearl River, NY 10965

TOWN OF WAWAYANDA - ASSESSOR'S OFFICE

Office (914) 355-5704/5705
Fax (914) 355-3842

Post Office Box 296
Slate Hill, NY 10973

6-1-1	Carol Ann Moore P O Box 605 New Hampton, NY 10958
6-1-3.2	Christian Church Fellowship, Inc. 10 East Main Street Middletown, NY 10940
6-1-3.31	Javier and Mirta Bianchi 258 Mt. Orange Rd. Middletown, NY 10940
6-1-3.1	Pericles Gardianos P O Box 302 Westtown, NY 10998
6-1-91	Richard and Debora Klingman 1065 Dolsontown Rd Middletown, NY 10940
6-1-2	Earl C. and Margaret Weymer 1069 Dolsontown Rd. Middletown, NY 10940
6-1-92	Earl Weymer 1073 Dolsontown Rd. Middletown, NY 10940
6-1-90.1	John Van Fleet Jr. 155 Egret St. Fort Myers Beach, FL 33931
6-1-90.22	Deevy-Jane Greitzer 27 Caskey Lane Middletown, NY 10940

TOWN OF WAWAYANDA - ASSESSOR'S OFFICE

Office (914) 355-5704/5705
Fax (914) 355-3842

Post Office Box 296
Slate Hill, NY 10973

6-1-90.24 Sal and Sherry Vito
24 Caskey Lane
Middletown, NY 10940

6-1-3.32
6-1-107 Samuel Simon
7 Lookerman Ave.
Poughkeepsie, NY 12601

APPENDIX D-10

APPENDIX D-11

APPENDIX D-12

APPENDIX D-13

BUSINESS

Calpine submits preliminary statement

TOWN OF WAWAYANDA: A citizens advisory panel will meet Tuesday to discuss the $250 million power plant project.

By Michael Levenson
The Times Herald-Record
mblevens@th-record.com

Calpine Corp. has filed a preliminary scoping statement for its proposed 540-megawatt electric generating plant in the Town of Wawayanda.

Yesterday's filing begins the state's regulatory review process, which could take a year to 18 months to complete.

"The preliminary scoping statement reflects the significant amount of technical and environmental analysis that we have undertaken thus far, and establishes a strong baseline for the further review of our project," said project development manager Dave Devine in a prepared statement.

Calpine announced plans in March to build and operate the $250 million Wawayanda Energy Center, to be built off Dolsontown Road just outside Middletown. The 20-acre site is not far from the location recently approved for the highly controversial Masada waste-to-ethanol recycling plant.

The 167-page filing provides an initial overview of the power plant and addresses issues such as visual impact, air and water quality, noise and traffic levels, and wildlife.

The plant will burn natural gas to create electricity. It will use air, rather than water, to cool its steam condensers, a concession made based on input Calpine received at two public meetings earlier this year.

More than 100 copies of the scoping statement were sent out yesterday through an overnight parcel delivery service.

Copies of the plan will be available for public viewing at the Wawayanda and Wallkill town halls, Middletown Thrall Library and Goshen Public Library. It can also be viewed on Calpine's project Web site: www.wawayanda-energy.com

A citizens advisory board assembled by Calpine will meet from 7-9 p.m. Tuesday at the Hampton Inn in Middletown to discuss the project. The meeting is open to the public.

APPENDIX D-14

APPENDIX D-15

The Times Herald Record ONLINE

Middletown residents fret over possible Masada-Calpine combo

By Michael Levensohn
The Times Herald-Record
mblevens@th-record.com

05/25/00 12:12 AM

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Middletown – Chalk it up to a case of suspicion by association.

There is no formal relationship between Calpine Corp.'s proposal to build a $250 million power plant off Dolsontown Road in Wawayanda and the planned Masada waste-to-ethanol recycling project to be built nearby.

But that didn't stop concerned neighbors from grilling Calpine and state officials last night about the combined effect the two plants could have on air and water quality, traffic, noise pollution and the potential for a disaster.

It seems that if one of them goes, it would take half of Orange County with it, said Larry Maxon, who lives on Ryerson Road in New Hampton.

"Nothing is more sacred to us than the safety of our employees and the public," said Dave Devine, of Calpine.

Last night's forum in Harriman Hall at Orange County Community College was just a preliminary step in the lengthy process of reviewing plans for The Wawayanda Energy Center. The 540-megawatt natural gas-burning plant is projected to be up and running by 2004.

The state's Article X approval process is expected to take 12 to 18 months to complete.

The state's Public Service Commission allows for public input throughout the approval process.

Calpine is talking with Wawayanda and Middletown officials about resource issues. The plant would be built near Middletown's sewage treatment facility, a possible source of coolant water.

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APPENDIX D-16

PUBLIC NOTICE

CALPINE
WAWAYANDA

This is to advise you that Calpine Corporation has filed a Preliminary Scoping Statement pursuant to Article X of the Public Service Law to build and operate a natural gas-fired, 540 megawatt electric power generating facility on a 25-acre site in the town of Wawayanda. The proposed Project site is located just south of the city of Middletown, adjacent to the northwest corner of the intersection of Dolsontown Road and McVeigh Road. Electric transmission lines are available in close proximity to the site and a natural gas interconnection will be required. The Project will utilize air-cooled condensers in order to minimize water demand. The Project will also minimize environmental impacts, will be a source of significant revenue for its host community, and will contribute to regional economic development.

Calpine Corporation included Draft Stipulations with the Preliminary Scoping Statement. The Draft Stipulations are intended as a starting point for discussions with government agencies and the public regarding the scope of technical studies required for licensing this project. The studies will cover a wide range of disciplines, including visual impacts, aesthetics, cultural resources, air quality, water quality, noise levels, traffic, vegetation, wetlands, and wildlife. The discussions are part of the process pursuant to Article X of the New York State Public Service Law and the regulations promulgated thereunder for seeking approval for authorization to develop a major electric generating facility.

Members of the public are encouraged to send comments on the Preliminary Scoping Statement to David Devine, Project Manager, Calpine Eastern, The Pilot House 2nd Floor, Lewis Wharf, Boston Massachusetts, 02110. Comments should be submitted within 21 days, or on or about August 18th, 2000. The public is also encouraged to submit comments on the Draft Stipulations included in the Preliminary Scoping Statement. A process forum sponsored by the Department of Public Service was held on May 24, 2000 to advise interested members of the public about the Article X process and opportunities for public input throughout the process. Additionally, a public informational meeting concerning the Draft Stipulations will be scheduled, and a public notice will be published in advance of that meeting. For additional information regarding the scheduling of discussions and any other questions regarding the proposed project, please call: 1-877-281-9957.

A copy of the Preliminary Scoping Statement and the Draft Stipulations can be viewed during normal business hours at the offices of the Department of Public Service at Three Empire State Plaza, Albany, and a copy can be viewed via the Internet at www.wawayanda-energy.com – Public review copies are also available at the following locations:

Wawayanda Municipal Building
80 Ridgebury Hill Rd., Slate Hill
(845)355-3841

Middletown Thrall Library
11-19 Depot Street, Middletown
(845)341-5454

Walkill Town Hall
600 Route 211 East, Middletown
(845)692-7826

Goshen Public Library
203 Main Street, Goshen
(845)294-6606

APPENDIX D-17

The Times Herald
RECORD
40 Mulberry Street, Middletown, NY 10940

State of New York }
County of Orange } ss:

Olga M. Zernhelt

being duly sworn deposes and says that ORANGE COUNTY PUBLICATIONS Division of Ottaway Newspapers-Radio, Inc. is a corporation organized under the laws of the State of New York and is, at all the times hereinafter mentioned, was the printer and publisher of The Times Herald-Record, a daily newspaper distributed in the Orange, Ulster and Sullivan Counties, published in the English language in the City of Middletown, County of Orange, State of New York, that deponent is the.....

sales consultant

.....

of said The Times Herald-Record acquainted with the facts hereinafter stated, and duly authorized by said Corporation to make this affidavit; that the

Display Advertisement

.....

a true printed copy of which is hereunto annexed, has been duly and regularly published in the manner required by law in said The Times Herald-Record in each of its issues published upon each of the following dates, to wit: In its issues of

July 29th & July 30th

Principal Clerk

Olga M Zernhelt

Sworn in before me this 31st

day of July 2000

Jacqueline Ingrassia

Notary Public, Orange County

JACQUELINE INGRASSIA
NOTARY PUBLIC STATE OF NEW YORK
REG. # 011N5070502
QUALIFIED IN ORANGE COUNTY
COMMISSION EXPIRES DECEMBER 23, 2000

APPENDIX D-18

APPENDIX D-19

PUBLIC NOTICE

CALPINE

On July 27, 2000, Calpine Corporation filed a Preliminary Scoping Statement pursuant to Article X of the Public Service Law to build and operate a natural gas-fired, 540 megawatt electric power generating facility on a 25-acre site in the town of Wawayanda. The proposed Project site is located just south of the city of Middletown, adjacent to the northwest corner of the intersection of Dolsontown Road and McVeigh Road. Electric transmission lines are available in close proximity to the site and a natural gas interconnection will be required. The Project will utilize air-cooled condensers in order to minimize water demand. The Project will also minimize environmental impacts, will be a source of significant revenue for its host community, and will contribute to regional economic development.

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A copy of the Preliminary Scoping Statement and the Draft Stipulations can be viewed during normal business hours at the offices of the Department of Public Service at Three Empire State Plaza, Albany. A copy may also be reviewed via the Internet at: www.wawayanda-energy.com

Copies have also been sent to the following locations:

Wawayanda Municipal Building
80 Ridgebury Hill Rd., Slate Hill
(845)355-3841

Wallkill Town Hall
600 Route 211 East, Middletown
(845)692-7826

Middletown Thrall Library
11-19 Depot Street, Middletown
(845)341-5454

Goshen Public Library
203 Main Street, Goshen
(845)294-6606

at Dulles airport outside Washington, D.C.

As a Concorde was taking off, two tires on the main left landing gear blew out, and tire debris and wheel shrapnel damaged the No. 2 engine and punctured three fuel tanks. A large hole was torn in

Concorde flights, said yesterday he wanted across-the-board supplementary security procedures before allowing the supersonic jets to take to the sky again.

Air France said yesterday its Concorde jets would remain grounded.

PUBLIC NOTICE

CALPINE

On July 27, 2000, Calpine Corporation filed a Preliminary Scoping Statement pursuant to Article X of the Public Service Law to build and operate a natural gas-fired, 540 megawatt electric power generating facility on a 25-acre site in the town of Wawayanda. The proposed Project site is located just south of the city of Middletown, adjacent to the northwest corner of the intersection of Dolsontown Road and McVeigh Road. Electric transmission lines are available in close proximity to the site and a natural gas interconnection will be required. The Project will utilize air-cooled condensers in order to minimize water demand. The Project will also minimize environmental impacts, will be a source of significant revenue for its host community, and will contribute to regional economic development.

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(845)341-5454

Goshen Public Library
203 Main Street, Goshen
(845)294-6606

APPENDIX D-20

APPENDIX D-21

Public Information Meeting

Wawayanda Energy Center

Members of the public are invited to attend a Public Information Meeting to discuss the status of the Wawayanda Energy Center, a proposed power generation facility to be located on Dolsontown Road in Wawayanda:

Date: Monday, March 19, 2001
Time: 7:00 p.m. to 9:30 p.m.
Place: Wawayanda Social Hall (1975 Route 284)

Calpine Corporation intends to apply for regulatory approval to build a 540-megawatt power plant that will use natural gas to produce electric power for wholesale distribution into the New York State power grid. The project must be approved under Article X (ten) of the New York State Public Service Law (Case No. 00-F-1256).

Calpine has already substantially completed the pre-application phase of the process and expects to file its formal Article X application this spring. Copies of initial filings and other documents are available for review at local town offices, libraries and on the internet. Once the formal application is filed, the Article X process provides numerous opportunities for additional public review and comment before any permits are issued.

During the March 19 meeting, representatives from Calpine, New York State regulatory agencies and the Wawayanda Citizens Advisory Group will provide an overview of the project and the regulatory process, and will answer questions from the audience.

The following resources are available for further information:

Calpine Corporation

The Pilot House
Lewis Wharf
Boston, Massachusetts, 02110
www.wawayanda-energy.com
1-877-281-9957 (toll free)

New York State Board on Electric Generation and the Environment

Three Empire State Plaza
Albany, NY 12223-1350
www.dps.state.ny.us/wec.htm
1-800-342-3377 (toll free)

Wawayanda Citizens Advisory Group

PO Box 16
New Hampton, NY 10958
www.geocities.com/serials_rule/
Email: wcag1@hotmail.com

CALPINE
WAWAYANDA
ENERGY CENTER

APPENDIX D-22

Reunión Pública de Información

Centro de Energía Wawayanda

Miembros de la comunidad están invitados a asistir a la Reunión Pública de Información para discutir el estado del Centro de Energía Wawayanda, una facilidad de generación de energia propuesta para ser localizada en la Ruta Dolsontown en Wawayanda:

Fecha: Lunes, 19 de Marzo de 2001
Hora: Desde las 7:00 p.m. hasta las 9:30 p.m.
Lugar: Salón Social Wawayanda (Ruta 284 #1975)

La intención de la Corporación Calpine es solicitar el permiso para construir una planta de poder de 540-Megavatios que usará gas natural para producir energía eléctrica, la cual se distribuirá por mayor en la red de poder del Estado de Nueva York. El proyecto tiene que ser aprobado bajo el Articulo X (diez) de la Ley de Servicio Público del Estado de Nueva York (Caso N. 00-F-1256)

Calpine ha completado sustancialmente la fase de preaplicación del proceso y espera entregar su solicitud formal del Articulo X esta primavera. Copias de las aplicaciones iniciales pueden ser encontradas en las oficinas locales del pueblo, bibliotecas y a través de la Internet. Una vez que la aplicación formal sea entregada, el proceso del Artículo X provee varias oportunidades para revisar y comentar antes de que cualquier permiso sea otorgado.

Durante la reunión del día 19 de marzo, representantes de Calpine, agencias reguladoras del estado de Nueva York y el Grupo de Consejeros de Wawayanda darán un avance del proyecto y el proceso regulador, y responderá a preguntas de los asistentes.

Para futura información contacte:

Calpine Corporation
The Pilot House
Lewis Wharf
Boston, Massachusetts, 02110
www. wawayanda- energy. com
1- 877- 281- 9957 (llamada gratuita)

New York State Board on Electric
Generation and the Environment
Three Empire State Plaza
Albany, NY 12223- 1350
www. dps. state. ny. us/ wec. htm
1- 800- 342- 3377 (llamada gratuita)

Wawayanda Citizens
Advisory Group
PO Box 16
New Hampton, NY 10958
www. geocities. com/ serials_ rule/
Email: wcag1@ hotmail. com

APPENDIX D-23

The Times Herald Record ONLINE

04/27/00 09:47 AM

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Calpine to consider fire and water needs

TOWN OF WAWAYANDA: At a meeting to discuss a proposed power plant, questions are raised about the impact on the town's water supply and fire companies.

By Oliver Mackson
The Times Herald-Record
omackson@th-record.com

One of the wells on Carol Moore's property off Dolsontown Road ran dry last year, for the first time in the nearly 23 years she's lived there.

With Calpine's proposed Wawayanda Energy Center and Middletown's proposed Masada trash-to-ethanol plant both having water needs, Moore had an observation last night for Calpine's officials.

"They (Masada) want water, you want water and water is something we don't have a lot of," Moore said during a two-hour discussion of Calpine's proposal.

About 55 people attended the meeting at the Wawayanda Social Hall.

Calpine wants to build a 540-megawatt, $250 million plant on 10 acres of a 20-acre parcel, on the south side of Dolsontown Road. If it gets state approval, the company hopes to have the plant on line by 2004, transmitting electricity via the New York Power Authority Marcy-South line.

San Jose-based Calpine hopes to use wastewater from Middletown's sewage treatment plant to cool the power plant's turbines. The sewage plant has a flow of nine million gallons per day, but that can dip as low as three million.

Calpine officials, answering questions by Moore and others, said they would do hydrogeological studies in the area before deciding whether to rely entirely on water to cool the turbines, or using alternative means, such as air.

"This is a very, very big concern," Moore said. "This water issue is probably a prime concern."

Project Manager David Devine also said Calpine will have to discuss fire protection for the plant with Wawayanda's two volunteer fire companies, Slate Hill and New Hampton.

The power plant would be in New Hampton's district, and neither company has a ladder truck.

"That, I'm sure, is a concern that is going to have to be addressed," said Tom Walker, a Wawayanda resident who is also a New Hampton fire commissioner.

He wasn't speaking on behalf of the commissioners.

The state Public Service Commission will sponsor a public forum from 7 to 10 p.m. May 24, at the Goshen

Middle School on Lincoln Avenue. The state review process for the Calpine proposal will be explained during the forum.

APPENDIX D-24

Power plant gets no support

WAWAYANDA: Opposition to Calpine's proposed power plant seems strong.

By Roberta T. McCulloch
The Times Herald - Record
rmcculloch@th - record.com

Nearly 200 residents packed Monday night's meeting on Calpine Corp.'s proposed $250 million power plant off Dolsontown Road.

At one point, McVeigh Road resident Eric Federlein asked for a show of hands from those who wanted the plant built.

Not one hand was raised.

But Calpine public relations Director John Flumerfelt said he'd seen stronger opposition to past projects. After all, he said, 4,500 fliers went out advertising Monday's meeting, so a show of 200 people wasn't terribly discouraging.

Sponsored by the Wawayanda Citizens Advisory Group, the meeting featured an 11-member panel of Calpine representatives and others who showed up to explain the project.

Calpine is conducting studies of the power plant's potential impact on water and air quality, noise, soil, wetlands and wildlife before filing an application.

Donnice Morris, whose children have asthma, was among the concerned residents at the meeting.

"What about the health risks five years down the line? Can you guarantee me that nothing's going to happen to the people who breathe this air?" she asked.

Though residents cannot block the project, they are able to have input on its development.

"If you raise a point and defend it, then you can have an effect on the project," Flumerfelt said.

Harry Ross, a board member of the group Orange Environment, had conflicting views about the power source.

"In the short term, it does look like we'll need this," Ross said. "But they're not doing anything for the community."

Many residents left the three-hour meeting feeling their questions had been dodged.

"I think we have a percentage of opponents ... I

regret that people feel this way," Flumerfelt said. "... People want final answers and we're in the process."

APPENDIX D-25

May 22, 2000

Mike Edelstein
Orange Environment
P.O. Box 25
Goshen, NY 10924

Dear Mr. Edelstein:

Dave Devine has asked me to contact you regarding participation by Orange Environment on the Citizen's Advisory Group (CAG) that will assist us with our Public Involvement efforts for the proposed Wawayanda Energy Center. This letter is to invite you to suggest a representative from your organization.

A number of local residents signed up to be considered for participation on the CAG during our public information meeting on April 16. We will also give people an opportunity to sign up at upcoming public forum on May 24 (7-9 p.m. at the Orange County Community College), after which we will formally inaugurate the process.

Our intent is to make sure we have a well-balanced group that represents a good cross section of the community. Please let me know by phone, email or return mail if Orange Environment would like to participate and, if so, the name of the proper contact person. We sincerely appreciate your help and input.

Sincerely,

John Flumerfelt
207-671-1621

APPENDIX D-26

June 23, 2000

James E. Skinner
256 Ridgebury Rd
Slate Hill NY 10973

Dear James E. Skinner:

We at Calpine very much appreciate your interest in serving on the Community Advisory Group (CAG) for our proposed Wawayanda Energy Center. I am writing to thank you for your interest and to provide you with some information about how we are proceeding with this effort.

As was announced at our meeting on April 26th, the New York State Department of Public Service will be holding a meeting of its own on our proposed project on May 24th (note new location: Harriman Hall, Orange County Community College, 7:00 to 9:00 p.m.) At that meeting, we will see if anyone else wants to add his or her name to the list. In addition, we are writing to government officials in Wawayanda and Middletown to get their suggestions on possible participants.

Once we have collected any additional names that may be forthcoming, we will move to formally implement the process. Hopefully, depending upon the number of volunteers, we will be able to accommodate everyone who has indicated an interest.

We will be back in touch with you in late May or early June with an update. In the meantime, thanks again for your interest, and please don't hesitate to give us a call with any questions.

Sincerely,

John Flumerfelt

May 15, 2000

Thomas Walker
P.O. Box 83
395 Greeves Rd.
New Hampton NY 10958

Dear Thomas Walker:

We at Calpine very much appreciate your interest in serving on the Community Advisory Group (CAG) for our proposed Wawayanda Energy Center. I am writing to thank you for your interest and to provide you with some information about how we are proceeding with this effort.

As was announced at our meeting on April 26th, the New York State Department of Public Service will be holding a meeting of its own on our proposed project on May 24th (note new location: Harriman Hall, Orange County Community College, 7:00 to 9:00 p.m.) At that meeting, we will see if anyone else wants to add his or her name to the list. In addition, we are writing to government officials in Wawayanda and Middletown to get their suggestions on possible participants.

Once we have collected any additional names that may be forthcoming, we will move to formally implement the process. Hopefully, depending upon the number of volunteers, we will be able to accommodate everyone who has indicated an interest.

We will be back in touch with you in late May or early June with an update. In the meantime, thanks again for your interest, and please don't hesitate to give us a call with any questions.

Sincerely,

John Flumerfelt

May 15, 2000

Marjorie Rampe
27 McVeigh Rd
New Hampton NY 10958

Dear Marjorie Rampe:

We at Calpine very much appreciate your interest in serving on the Community Advisory Group (CAG) for our proposed Wawayanda Energy Center. I am writing to thank you for your interest and to provide you with some information about how we are proceeding with this effort.

As was announced at our meeting on April 26th, the New York State Department of Public Service will be holding a meeting of its own on our proposed project on May 24th (note new location: Harriman Hall, Orange County Community College, 7:00 to 9:00 p.m.) At that meeting, we will see if anyone else wants to add his or her name to the list. In addition, we are writing to government officials in Wawayanda and Middletown to get their suggestions on possible participants.

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We will be back in touch with you in late May or early June with an update. In the meantime, thanks again for your interest, and please don't hesitate to give us a call with any questions.

Sincerely,

John Flumerfelt

May 15, 2000

Carol A. Moore
P.O. Box 605
New Hampton NY 10958

Dear Carol A. Moore:

We at Calpine very much appreciate your interest in serving on the Community Advisory Group (CAG) for our proposed Wawayanda Energy Center. I am writing to thank you for your interest and to provide you with some information about how we are proceeding with this effort.

As was announced at our meeting on April 26th, the New York State Department of Public Service will be holding a meeting of its own on our proposed project on May 24th (note new location: Harriman Hall, Orange County Community College, 7:00 to 9:00 p.m.) At that meeting, we will see if anyone else wants to add his or her name to the list. In addition, we are writing to government officials in Wawayanda and Middletown to get their suggestions on possible participants.

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Sincerely,

John Flumerfelt

May 15, 2000

Pericles Gardianos
1128 Dolsontown Rd
Middletown NY 10940

Dear Pericles Gardianos:

We at Calpine very much appreciate your interest in serving on the Community Advisory Group (CAG) for our proposed Wawayanda Energy Center. I am writing to thank you for your interest and to provide you with some information about how we are proceeding with this effort.

As was announced at our meeting on April 26th, the New York State Department of Public Service will be holding a meeting of its own on our proposed project on May 24th (note new location: Harriman Hall, Orange County Community College, 7:00 to 9:00 p.m.) At that meeting, we will see if anyone else wants to add his or her name to the list. In addition, we are writing to government officials in Wawayanda and Middletown to get their suggestions on possible participants.

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Sincerely,

John Flumerfelt

May 15, 2000

David S. Cole
320 Gardnerville Rd.
New Hampton NY 10958

Dear David S. Cole:

We at Calpine very much appreciate your interest in serving on the Community Advisory Group (CAG) for our proposed Wawayanda Energy Center. I am writing to thank you for your interest and to provide you with some information about how we are proceeding with this effort.

As was announced at our meeting on April 26th, the New York State Department of Public Service will be holding a meeting of its own on our proposed project on May 24th (note new location: Harriman Hall, Orange County Community College, 7:00 to 9:00 p.m.) At that meeting, we will see if anyone else wants to add his or her name to the list. In addition, we are writing to government officials in Wawayanda and Middletown to get their suggestions on possible participants.

Once we have collected any additional names that may be forthcoming, we will move to formally implement the process. Hopefully, depending upon the number of volunteers, we will be able to accommodate everyone who has indicated an interest.

We will be back in touch with you in late May or early June with an update. In the meantime, thanks again for your interest, and please don't hesitate to give us a call with any questions.

Sincerely,

John Flumerfelt

May 15, 2000

Eileen M. Monroe
1055 Ridgebury Rd.
New Hampton NY 10958

Dear Eileen M. Monroe:

We at Calpine very much appreciate your interest in serving on the Community Advisory Group (CAG) for our proposed Wawayanda Energy Center. I am writing to thank you for your interest and to provide you with some information about how we are proceeding with this effort.

As was announced at our meeting on April 26th, the New York State Department of Public Service will be holding a meeting of its own on our proposed project on May 24th (note new location: Harriman Hall, Orange County Community College, 7:00 to 9:00 p.m.) At that meeting, we will see if anyone else wants to add his or her name to the list. In addition, we are writing to government officials in Wawayanda and Middletown to get their suggestions on possible participants.

Once we have collected any additional names that may be forthcoming, we will move to formally implement the process. Hopefully, depending upon the number of volunteers, we will be able to accommodate everyone who has indicated an interest.

We will be back in touch with you in late May or early June with an update. In the meantime, thanks again for your interest, and please don't hesitate to give us a call with any questions.

Sincerely,

John Flumerfelt

May 15, 2000

Rose Robinson
1100 Ridgebury Rd.
New Hampton NY 10958

Dear Rose Robinson:

We at Calpine very much appreciate your interest in serving on the Community Advisory Group (CAG) for our proposed Wawayanda Energy Center. I am writing to thank you for your interest and to provide you with some information about how we are proceeding with this effort.

As was announced at our meeting on April 26th, the New York State Department of Public Service will be holding a meeting of its own on our proposed project on May 24th (note new location: Harriman Hall, Orange County Community College, 7:00 to 9:00 p.m.) At that meeting, we will see if anyone else wants to add his or her name to the list. In addition, we are writing to government officials in Wawayanda and Middletown to get their suggestions on possible participants.

Once we have collected any additional names that may be forthcoming, we will move to formally implement the process. Hopefully, depending upon the number of volunteers, we will be able to accommodate everyone who has indicated an interest.

We will be back in touch with you in late May or early June with an update. In the meantime, thanks again for your interest, and please don't hesitate to give us a call with any questions.

Sincerely,

John Flumerfelt

May 15, 2000

Charles M. Nuara
59 Bates Gates Rd.
New Hampton NY 10958

Dear Charles M. Nuara:

We at Calpine very much appreciate your interest in serving on the Community Advisory Group (CAG) for our proposed Wawayanda Energy Center. I am writing to thank you for your interest and to provide you with some information about how we are proceeding with this effort.

As was announced at our meeting on April 26th, the New York State Department of Public Service will be holding a meeting of its own on our proposed project on May 24th (note new location: Harriman Hall, Orange County Community College, 7:00 to 9:00 p.m.) At that meeting, we will see if anyone else wants to add his or her name to the list. In addition, we are writing to government officials in Wawayanda and Middletown to get their suggestions on possible participants.

Once we have collected any additional names that may be forthcoming, we will move to formally implement the process. Hopefully, depending upon the number of volunteers, we will be able to accommodate everyone who has indicated an interest.

We will be back in touch with you in late May or early June with an update. In the meantime, thanks again for your interest, and please don't hesitate to give us a call with any questions.

Sincerely,

John Flumerfelt

May 15, 2000

Eugene J. Dowd
657 Pocatello Rd
Middletown NY 10940

Dear Eugene J. Dowd:

We at Calpine very much appreciate your interest in serving on the Community Advisory Group (CAG) for our proposed Wawayanda Energy Center. I am writing to thank you for your interest and to provide you with some information about how we are proceeding with this effort.

As was announced at our meeting on April 26th, the New York State Department of Public Service will be holding a meeting of its own on our proposed project on May 24th (note new location: Harriman Hall, Orange County Community College, 7:00 to 9:00 p.m.) At that meeting, we will see if anyone else wants to add his or her name to the list. In addition, we are writing to government officials in Wawayanda and Middletown to get their suggestions on possible participants.

Once we have collected any additional names that may be forthcoming, we will move to formally implement the process. Hopefully, depending upon the number of volunteers, we will be able to accommodate everyone who has indicated an interest.

We will be back in touch with you in late May or early June with an update. In the meantime, thanks again for your interest, and please don't hesitate to give us a call with any questions.

Sincerely,

John Flumerfelt

May 15, 2000

Deborah Marie Glover
120 Greeves Rd.
New Hampton NY 10958

Dear Deborah Marie Glover:

We at Calpine very much appreciate your interest in serving on the Community Advisory Group (CAG) for our proposed Wawayanda Energy Center. I am writing to thank you for your interest and to provide you with some information about how we are proceeding with this effort.

As was announced at our meeting on April 26th, the New York State Department of Public Service will be holding a meeting of its own on our proposed project on May 24th (note new location: Harriman Hall, Orange County Community College, 7:00 to 9:00 p.m.) At that meeting, we will see if anyone else wants to add his or her name to the list. In addition, we are writing to government officials in Wawayanda and Middletown to get their suggestions on possible participants.

Once we have collected any additional names that may be forthcoming, we will move to formally implement the process. Hopefully, depending upon the number of volunteers, we will be able to accommodate everyone who has indicated an interest.

We will be back in touch with you in late May or early June with an update. In the meantime, thanks again for your interest, and please don't hesitate to give us a call with any questions.

Sincerely,

John Flumerfelt

APPENDIX D-27

Agenda

Wawayanda Energy Center

Citizens Advisory Group

Kick Off Meeting – August 1, 2000

I. Introductions and Welcome

II. Review Agenda

III. Meeting Logistics and Ground Rules

IV. Overview of CAG Scope and Role in Article X Process

V. Calpine's Role in CAG

VI. Initial Review of Preliminary Scoping Statement

VII. Identification of Key Issues

VIII. Comments From the Audience

IX. Scheduling and Next Steps

X. Adjourn (9:00 p.m.)

APPENDIX D-28

DRAFT

Minutes

Meeting of August 1, 2000

Wawayanda Energy Center
Citizens Advisory Group

The first meeting of the Citizens Advisory Group (CAG) for the proposed Wawayanda Energy Center was held on August 1, 2000, from 7:00 p.m. to approximately 9:00 p.m. at the Middletown Hampton Inn.

A copy of the meeting agenda is attached. The following members attended the meeting:

James Skinner (Town of Wawayanda)
Warren Tomlins (on behalf of Thomas Walker, New Hampton Fire Dept.)
David Cole (local resident)
Rose Robischon (local resident)
Deborah Marie Glover (local resident)
Carol Moore (local resident)
Charles Nuara (local resident)
Eugene Dowd (local resident)
Tom Nosworthy (Town of Walkill)
Dave Devine (Calpine)

Calpine consultant John Flumerfelt served as facilitator for the meeting in Judy Hoffman's absence. Three members of the public attended in the audience, as well as Mike Levensohn, a reporter for the Times Herald Record.

I. Introductions and Welcome

Members of the group introduced themselves and briefly explained their interest in serving on the CAG.

II. Agenda

The group reviewed the proposed Agenda. No modifications were suggested.

III. Logistics and Ground Rules

The group agreed that the Hampton Inn was a convenient meeting place, but decided that future meetings should take place on the 3rd Wednesday of the month, and begin at 7:30 p.m., instead of 7:00 p.m. It was agreed that meetings should be two hours in length.

One member noted that Barbara Parsons (Wawayanda Planning Board) had expressed an interest in being involved in future CAG meetings.

The group discussed the logistics of public notification of each meeting to ensure adequate public knowledge and participation. It was suggested that Calpine take additional steps to ensure outreach to all parties and that additional media outlets be used such as Cable Channel 8 and Radio 1340, as well as flyers and other advertising that would communicate to various sectors of the community.

The group agreed that meeting minutes would be compiled and reviewed in draft form as an agenda item at the next scheduled meeting, and that, once approved, meeting minutes would be part of the public record, posted on the project internet site, etc. However, the group requested that members' address and telephone information not be posted on the website. The group agreed that any and all communication to individual members be routed through the facilitator (Judy Hoffman for future meetings).

The group agreed that it would be desirable to conduct a site visit to an operating Calpine power plant in order to better understand the nature of the proposed project. The group requested that the visit include a plant with a long enough operating history such that local residents and/or community officials could provide meaningful comments on the plant's local impacts.

Action Items:

- CAG members will provide Calpine with names and/or contact information of other potential stakeholders that should be advised of the meeting schedule.
- Calpine will pursue more comprehensive notification of future meetings.
- Calpine will contact Ms. Parsons re: future meetings.
- The group will discuss the timing and logistics of a fact-finding mission to an existing plant at its next meeting.

IV. CAG Scope and Role in Article X Process

The group held a preliminary discussion on its overall mission, in terms of assisting with public involvement efforts for the proposed project and generally helping to ensure adequate community involvement in the regulatory process. The group also discussed the potential availability of intervenor funding under Article X. In general, the group sees its

mission as supporting the ongoing implementation of the public involvement program and ensuring coordination between Calpine, as applicant, the adjacent communities, and other stakeholders.

V. Calpine's Role

Mr. Devine noted that Calpine sees its role as assisting the CAG and providing information and other resources as appropriate, but that the CAG should view itself as an independent entity. Calpine offered that the group could meet independently, without Calpine present, if it ever felt the need to do so. Members of the group felt that it would generally be more helpful to have a Calpine representative present.

VI. Preliminary Scoping Document

Mr. Devine provided an initial overview of the Article X Preliminary Scoping Document, which had been provided to CAG members in advance of the meeting. During the discussion, the group raised a number of issues that may require further review or clarification (see "Key Issues" below).

Action Items:

- Calpine will arrange and publicly notice and Public Information Meeting on the Preliminary Scoping Statement to be held at the Wawayanda Social Hall beginning at 7:30 p.m. on September 13. Mr. Skinner will help arrange use of the space. During the meeting, Calpine personnel and project consultants will describe the project and take questions from the audience.

VII. Key Issues

The group was asked to identify key issues, on a preliminary basis, that required further review or clarification. Issues include:

- Project height and visibility
- Pipeline routing, particularly in the Slate Hill area, including pipeline regulatory jurisdiction
- Noise, especially concerning use of air-cooled condenser
- Air impacts, including use of Best Available Control Technology (BACT) concerning NOx and use of ammonia
- Impact to local bird population and other wildlife
- Local zoning and Master Plan
- Cumulative impacts regarding air, noise and traffic with respect to other locally proposed development projects (e.g., Masada)
- Need to communicate using "lay" language to audiences not familiar with these types of issues
- Labor and employment impacts, including use of union vs. non-union labor
- Negotiations concerning local taxation and other economic impact issues

- Impact/benefits of project on local and regional electric consumers

Action Item:

- Calpine will provide followup information on several specific issues, as requested by various members of the group.

VIII. Comments from the audience

None offered.

IX. Scheduling and Next Steps

The next meeting of the group will be held September 20, 2000 at 7:30 p.m. at the Hampton Inn.

X. Adjourn

The meeting was adjourned just after 9:00 p.m.

APPENDIX D-29

WAWAYANDA ENERGY CENTER
COMMUNITY ADVISORY GROUP
MEETING AGENDA
SEPTEMBER 20, 2000

I. Introductions and Welcome – J. Hoffman

II. Review Minutes of August 1, 2000 Meeting

III. Status of Action Items from August 1 Meeting

IV. Discussion of Public Information Meeting – September 13, 2000

V. Discussion of Intervenor Funding – Diane Cooper, NYS Public Service Commission, Department of Public Service

VI. Discussion of Site Visit to Operating Calpine Plant – John Flumerfelt

VII. Comments from the Audience

VIII. Next Steps?

IX. Adjournment

APPENDIX D-30

DRAFT

MINUTES OF THE WAWAYANDA ENERGY CENTER
CITIZENS ADVISORY GROUP
September 20, 2000

The second meeting of the Citizens Advisory Group (CAG) for the proposed Wawayanda Energy Center was held on September 20, 2000 from 7:30 – 9:30 p.m. at the Middletown Hampton Inn. A copy of the meeting agenda is attached.

Present at the meeting:

James Skinner (Town of Wawayanda)
Thomas Walker (New Hampton Fire Department)
Carol Moore (local resident)
Rose Robischon (local resident)
David Cole (local resident)
Deborah Marie Glover (local resident)
Pericles Gardianos (local resident)
John Flumerfelt (Calpine)
Don Neal (Calpine)
Dave Devine (Calpine)
Dianne Cooper (NYS Department of Public Service)

Also in attendance in the audience were four local residents and Mike Levenson, a reporter for the Times Herald Record.

I. Introductions

Since the facilitator, Judy Hoffman, had not been able to attend the first meeting, everyone present (including the audience members) introduced themselves and briefly explained their interest in serving on the CAG.

II. II. Review of the Minutes and Proposed Agenda

The minutes of the August 1, 2000 meeting had been mailed to the CAG prior to the meeting and they were adopted with no changes. The proposed agenda for this meeting was accepted with no changes or additions.

III. Project Status

Calpine Project Manager Dave Devine explained that the main efforts at Calpine right now are to do all work necessary to file the Article X application

before the end of the year. Don Neal explained that the Preliminary Scoping Statement had been distributed to the CAG and other interested parties at the Open House on September 13th. Calpine is working to incorporate all of the comments received from the public and the various government agencies into the Stipulations. Dave reported that Calpine had met earlier in the day with representatives of the New York Power Authority to talk about the interconnection with high voltage circuits near I-84.

IV. Status of Action Items from August 1st Meeting

In response to issues raised during the first CAG meeting, Judy distributed a listing of locations where public notices were posted about the Public Information Meeting on September 13th and tonight's CAG meeting. (See attached.) CAG members thought this was an improvement and suggested we add the Middletown Post Office.

Several comments were made about sending direct mail notices out earlier, which Calpine agreed to do.

Follow-up Items from Last Meeting:

John Flumerfelt noted that he had contacted Barbara Parsons and ascertained that she is quite interested in being a part of the CAG and would attend when her schedule allowed.

Dave Devine noted that he had sent written answers to questions raised at the last meeting. These were distributed with the minutes.

V. Discussion of Public Information Meeting – August 13, 2000

There was some discussion about the format of the meeting, which some believe did not lend itself to the community's being able to share their concerns. While the ability to have in-depth one-on-one discussions with representatives of Calpine was appreciated, some members suggested it would have been preferable to have at least a portion of the meeting be held as a more formal presentation. Calpine agreed that, prior to any future meetings, it would seek input from the CAG on how the meeting should be structured.

One member suggested that it might be helpful to have at least one meeting where the CAG members from the community would meet without the representatives of Calpine in attendance. It was suggested that such a meeting could be a separate meeting or could occur before or after a regular meeting. Calpine indicated that it has no objection and would help provide administrative or other support as required.

As a follow up to the September 13 public meeting, CAG members highlighted a number of issues that seem to be of greatest concern to those who came to the meeting. These issues include: impact on local wells in the area, the visual impact of the stacks, the noise level, and the location of the gas transmission lines. In response, Calpine indicated that many of these issues were undergoing continued analysis and would be more fully defined in the Article X application.

The CAG also discussed related to whether it would be the same agencies and the same people within those agencies who would be reviewing this project and the locally controversial Masada project. It appears that it would be the same people from Region 3 of the Department of Environmental Conservation (air). However the Department of Public Service adds a separate level of oversight. The concern of the CAG members is that someone be taking into account the cumulative effects of the projects. Calpine stated that, from its perspective, Article X requires that cumulative effects be taken into account in the context of the application process.

VI. Presentation by Dianne Cooper – NYS Department of Public Service

Dianne distributed some materials to the CAG members including (1) information on power choice; (2) a document that the PSC distributes to applicants laying out the agency's expectations of the applicants; (3) draft comments that the PSC staff wants addressed by Calpine; and (4) the Article X Consumer Guide.

Dianne explained that the purpose of the intervener fund is to allow citizens and municipalities to conduct studies that will add information to the record for the review process. Such funds may be used for a variety of consulting expenses, but not attorney fees, and are not intended to duplicate the studies that the applicant carries out as part of the Article X process. Interested parties must apply for the funds, and Dianne provided copies of a sample application. She encouraged people (either individuals or groups) to apply for these funds as early as possible.

VII. Discussion of a Site Visit to an Operating Calpine Plant

John Flumerfelt distributed a sheet describing the various operating facilities that might be possibilities for a site visit. CAG members decided that an initial visit to the Calpine facility in Tiverton, Rhode Island would be desirable. In addition to inviting CAG members, it was also noted Wawayanda elected officials and the Building Inspector should also be included in the group. Calpine indicated that a group of up to 12 persons would be feasible, and agreed to look into scheduling and other logistics. Calpine also agreed to invite a representative of the Times Herald Record on the site visit.

VII. Comments from the Audience

None.

VIII. Next Steps

CAG members concluded that the next step should be the site visit to Tiverton, after which the group will discuss the timing and agenda for the next formal CAG meeting.

ACTION ITEMS:

1. Dave Devine will ascertain potential dates for the site visit to Tiverton.
2. Judy Hoffman will compile a mailing list, complete with e-mail addresses and distribute it to all CAG members.
3. John Flumerfelt will provide the CAG members with a list of abutters so they can review it and notify him if there are any omissions.
4. The Middletown Public Library will be added to the list of places where public notices about the project will be posted.
5. Members of the CAG will distribute copies of the new brochure to interested parties and place them in strategic locations where allowed.

APPENDIX D-31

Date: August 12, 2001

To: Wawayanda Citizens Advisory Group

From: Dave Devine

Subject: **August 1, 2000 CAG Meeting – Answers to Questions**

This responds to several issues that were raised during the August 1, 2000 meeting of the citizens advisory group (CAG). In particular, I am writing to provide additional information on the following issues:

- Requested exemption relative to requirements for pre-construction air monitoring;
- Cumulative impact analyses; and,
- GE turbine emission specifications and ammonia technology.

The following paragraphs respond to these issues.

Preconstruction Air Monitoring

EPA has established air-monitoring thresholds for regulated pollutants as follows:

Pollutant	Averaging Period	Threshold Concentration (ug/m3)
Nitrogen dioxide	Annual	14
Sulfur dioxide	24-hour	13
Particulate matter	24-hour	10
Carbon monoxide	8-hour	575
Lead	3-hour	0.1

If air modeling for the proposed Wawayanda Energy Center indicates that the project impacts would exceed any of the above threshold concentrations, then the EPA and/or the state Department of Environmental Conservation could require on-site ambient air quality monitoring prior to construction in order to establish local air quality conditions. However, Calpine is

confident that modeled air impacts will be well below the above concentrations and therefore the project will not likely require preconstruction ambient air quality monitoring.

Cumulative Impact Analyses

The Article X application will contain analyses of cumulative impacts for a number of areas. Appendix A of the Preliminary Scoping Statement contains proposed stipulations that specify the scope of cumulative analyses, which are summarized below.

Air

If modeled air quality impacts from the Wawayanda Energy Center are above EPA Significant Impact Levels, then Calpine will analyze cumulative impacts from background air, existing emission sources, and proposed air emission sources including the Masada project and other major electric generating facilities in New York.

Electric Transmission

The Article X application will contain an analysis of cumulative impacts to the regional electrical grid to ensure that the transmission infrastructure is sufficient to transport electricity generated by the Wawayanda Energy Center.

Gas Transmission

The application will include an assessment of the capacity of the gas supply, capacity, and impact of the project on the existing gas transmission infrastructure.

Land Use

The stipulations propose that the application include an analysis of existing and proposed land uses within one mile of the project site.

Traffic and Transportation

The application will include an evaluation of traffic impacts taking into consideration existing conditions and proposed projects nearby (including Masada) that will change area traffic.

GE Turbine Emissions and Ammonia Technology

GE Turbine Emissions

Calpine continues to work with GE to establish emission parameters specific to the Wawayanda Energy Center. At this time the GE turbines are expected to have the following emissions at 100 percent load.

Pollutant	Concentration (parts per million)
Nitrogen Oxides	25
Volatile Organic Compounds	1.4
Carbon Monoxide	10
Sulfur Dioxide	1.4
Particulate Matter	9

Please note, however, that the emissions in the above table are what will come from the GE turbine exhaust, not from the stack. Prior to being emitted through the stacks, the exhaust gases will be routed through the SCR and an oxidation catalyst to significantly reduce air emissions.

Ammonia Technology

The Wawayanda Energy Center requires ammonia for controlling emissions of nitrogen oxides (NO_x) through Selective Catalytic Reduction (SCR). The use of SCR technology is widely accepted by environmental regulators across the country as the best way to control NOx emissions in gas-fired power plants. No non-ammonia technology has yet been proven on a commercial scale. The ammonia is stored in a tank prior to injection into the boiler upstream of a catalyst that reduces NO_x. Calpine can either use **anhydrous ammonia** or **aqueous ammonia** for this system. Ammonia management is subject to a number of strict environmental and safety requirements designed to protect workers and public health.

Anhydrous ammonia is basically pure ammonia. It is cheaper than aqueous ammonia, requires fewer truck deliveries, and results in smaller tanks. However, anhydrous ammonia would result in greater impacts in the unlikely event of an accidental release.

Aqueous ammonia is about 19 percent ammonia by volume. Because it is diluted, more deliveries by truck and larger storage tanks are needed compared to anhydrous ammonia. The aqueous nature of the solution also allows for more effective containment in the unlikely event of an accidental release.

Calpine proposes to use aqueous ammonia in the Wawayanda Energy Center. As part of the Article X application, Calpine will present accidental release modeling and traffic analyses related to ammonia deliveries in order to quantify potential impacts.

*****

I hope this information answers your questions. If you have any questions before then please call me at 617-557-5323 or Donald Neal our Environmental Manager at 617-557-5333.

APPENDIX D-32

November 15, 2000

Re: Site Visit to Tiverton, Rhode Island

** *Please RSVP as noted below* **

Dear Members of the CAG and other Interested Parties:

Thank you for your interest in joining us for a tour of an operating power generating facility in Tiverton, Rhode Island on November 30, 2000. I am writing to confirm the details of the event.

The Tiverton Plant

Tiverton Power Partners is a 265-megawatt natural gas-fired combined cycle electric generating plant. The facility is brand new and has been in commercial operation for about two months. Barring any unforeseen circumstances, the plant should be running at full capacity during our visit. (If we think the plant is not likely to be up and running on the 30th, we will probably want to reschedule.)

The Tiverton plant uses GE combustion turbine technology and air-cooled condensers, so it is almost identical to our proposed facility in Wawayanda. The major difference is that, while Tiverton uses only one combustion turbine and one steam turbine generator, Wawayanda will generate about 540 megawatts using two combustion turbines feeding into a single steam turbine generator.

Calpine is currently a 50 percent owner of the Tiverton plant, in partnership with Energy Management, Inc. of Dartmouth, Mass. However, Calpine has announced that it will acquire the remaining interest in the facility and expects to close in the near future, subject to receipt of several final regulatory approvals. All of the operating personnel you will meet on the tour are expected to become Calpine employees once the transaction is complete.

Travel Logistics

Our plan is to travel to the Tiverton area the evening of the 29th in order to best accommodate people's work schedules. We have arranged for a 21-passenger VIP Coach that will be supplied by West Point Tours. The bus will leave from the Wawayanda Town Hall (80 Ridgebury Hill Road) at 6:00 p.m. on the 29th. We will provide some drinks and light snacks, but we will not be stopping for supper on the way to Tiverton so that we do not arrive too late at night. (We will have just a bathroom break or two, as required).

Therefore, please have dinner before you meet the bus, or feel free to bring something with you.

We have reserved a block of rooms at the Westport, Mass. Hampton Inn for the night of the 29th. On the 30th, we will have a continental breakfast at the hotel. Lunch will be provided at the plant at the conclusion of the tour, around noon. If we can leave by 1:30 or 2:00 p.m., we can have everyone back in Wawayanda by 5:00 or 6:00 p.m. on the 30th, in time for dinner. If we're running late, and/or based on what the group would like to do, we could arrange for a dinner stop on the way back, if necessary.

Please let us know if you need to make alternate travel arrangements. Anyone traveling directly to the plant on Thursday morning will need to arrive by 9:30 a.m., so that we can accommodate the tour and get everyone back on the bus in a timely manner. Driving time from Wawayanda should be just under 4 hours.

The Site Visit

Based on our successful experience with similar tours, we will begin the site visit in the plant's conference room. After introducing the Plant Manager and other local operating personnel, we will give a briefing on how the technology works and the similarities and differences between the Tiverton plant and our proposed Wawayanda facility. We will answer any questions you may have. We will then don hard hats, etc. and walk around the inside and outside of the plant. We may break up into 2 or more smaller groups, since conversations next to operating plant equipment can be difficult.

Important: You will be touring an industrial facility! Dress code is casual and everyone should wear sturdy shoes. Work boots or hiking boots are best. Sneakers, open-toed shoes or sandals are not allowed. All required safety equipment will be provided.

After walking around the plant, we will all reconvene in the conference room to answer any follow up questions. Lunch will be provided, and the bus will leave the site by 2:00 p.m. Anyone who wants to spend additional time canvassing adjacent neighborhoods should plan on having their own transportation.

RSVP (ONLY IF YOU PLAN TO JOIN US ON THE TOUR)

Please RSVP to Judy Hoffman at (845) 928-8239. You need not call if you are not able to join us. We need to know:

(1) If you will be joining us on the bus;
(2) If you need directions to drive yourself;
(3) Your preference for a smoking or non-smoking room for the 29th; and
(4) Any specific dietary or other requirements.

We look forward to having everyone come and "kick the tires" at Tiverton. It will be a great opportunity to gain a better understanding of what we have proposed in Wawayanda. You will be able to see every aspect of the plant and ask any questions that come to mind.

If you have any questions about the tour, please feel free to give me a call on my cell phone at (207) 671-1621. Also, if you wish to leave emergency contact numbers with those at home, use this cell phone number for the time of the tour. If someone needs to contact you on the evening of the 29th or early morning of the 30th, the number of the Hampton Inn is 508-675-8500. If you need to contact Judy about the need for a last minute cancellation (so we don't wait for you), her cell phone number is (914) 645-7303.

Sincerely,

John Flumerfelt

APPENDIX D-33

APPENDIX D-34

WCAG
Wawayanda Citizens Advisory Group
wcag1@hotmail.com
845-343-3745(fax)

CAROL A. MOORE

April 16th 2001

Dear Mr. O'Brien,

I am writing on behalf of our Wawayanda Citizens advisory group to thank you and your Wonderful Crew and staff for a most enjoyable visit to your plant, on March 26th.

You could not have done more to oblige us or make us feel welcome.

the introductions and the Orientation were informative, the tour was very interesting and helpful, Lunch was a delicious treat (we spoke again of the clam chowder at our recent meeting) and your entire staff was extreamly gracious, and forthright.

Unanimously we feel the trip was well worth our time and effort.

Thank you again for your kind hospitality.

Sincerely,

Carol Moore WCAG.

APPENDIX D-35

CITIZENS ADVISORY GROUP

November 6, 2000

MR.DAVID DEVINE
PROJECT DEVELOPMENT MANAGER
CALPINE
THE PILOT HOUSE, 2ND FLOOR
LEWIS WHARF
BOSTON, MA 02110

RE: CASE 00-F-1256

WAWAYANDA ENERGY CENTER – ARTICLE X PRELIMINARY SCOPING STATEMENT

DEAR MR.DEVINE:

THE CITIZENS ADVISORY GROUP FOR THE WAWAYANDA ENERGY CENTER-ARTICLE X PROPOSED POWER PLANT PROJECT REQUEST THE FOLLOWING FROM THE CALPINE CORPORATION:

ITEM 1: A 90 DAY EXTENSION TO THE PRELIMINARY SCOPING STATEMENT COMMENT PERIOD.THIS WILL ENABLE THE CAG TO HAVE AN ENVIRONMENTAL ENGINEER REVIEW THE DOCUMENTS AND ADVISE THE CAG.

ITEM 2: THE CAG WOULD LIKE TO RETAIN THE SERVICES OF MR.MATHY STANISLAUS AND HIS FIRM, ENVIRO-SCIENCE, TO REVIEW THE PREAPPLICATION AND THE PRELIMINARY SCOPING STATEMENT AND STIPULATIONS. WE WOULD ASK CALPINE TO ADVANCE HIS FEE FOR THIS SERVICES.WE ASK FOR A PREAPPLICATION (ADVANCE) FOR MONEY PRE THE INTERVENOR FUND. THE AMOUNT IS $15,000(FLAT FEE). WE WILL SEND FOR YOUR REVIEW WHAT SERVICES THIS FEE WILL COVER.

ITEM 3: THE CAG WOULD LIKE TO HAVE A ARTICLE X WORKSHOP AS SOON AS POSSIBLE.WE WOULD LIKE THIS TO BE PRESENTED BY THE DPS, PSC, AND DEC.WE WOULD ALSO WELCOME DIALOGUE AND DISCUSSION FROM CALPINE AND MR.STANISLAUS DURING THIS WORKSHOP.ADDITIONALLY, WE WOULD LIKE AT THIS TIME TO REQUEST IF NEEDED, FUTURE WORKSHOPS, IF DEEMED NECESSARY BY THE CAG.i.e. HEALTH RISK ISSUES ADDRESSED BY THE NYS DOH.THE CAG WOULD LIKE THE WORKSHOPS HELD ON MONDAY NIGHTS BETWEEN THE HOURS OF 06:30PM AND 10:00PM.

ITEM 4: THE CAG HAS RECEIVED A REQUEST FROM SEVERAL INTERESTED RESIDENTS TO CONDUCT OUR PUBLIC MEETINGS ON ALTERNATING DAYS, i.e. EVERY OTHER MONTH HOLD A MEETING ON A MONDAY NIGHT.

ITEM 5: THE CAG WILL CONTINUE TO OCCASIONALLY HAVE A MEETING WITHOUT CALPINE PRESENT.WE WILL SUPPLY CALPINE WITH THEIR RIGHT TO KNOW INFORMATION FROM THE MEETING.i.e.AGENDA, WHO ATTENDED AND A BRIEF SUMMARY OF THE

120 GREEVES ROAD
NEW HAMPTON, N.Y. 10958

MEETING.THESE MEETINGS WILL BE HELD ON SUNDAY AFTERNOON FROM 3PM TO 5PM AT THE WAWAYANDA TOWN HALL.

ITEM 6: THE CAG WILL BE APPLYING FOR THE INTERVENOR FUND. WE WILL BE INTERVIEWING ENVIRONMENTAL CONSULTANTS AND EXPERTS TO ADVISE US ON THE CERTIFICATION PROCESS AND IF THERE ARE ANY ENVIRONMENTAL IMPACTS TO OUR COMMUNITY. THIS WILL ALSO ENABLE US TO CREATE A HIGH LEVEL OF AWARENESS AND UNDERSTANDING CONCERNING THE NATURE OF YOUR PROJECT.THESE CONSULTANTS WILL HELP US UNDERSTAND AND SHOULD BE ABLE TO DEMONSTRATE TO US HOW WE THE CAG WILL FUNCTION DURING THE COMPLETE PROCESS.THESE CONSULTANTS WILL BE AN EFFECTIVE TOOL WITH RESPECT TO OURS AND THE PUBLICS INVOLVEMENT. THE CONSULTANTS WILL INCREASE OUR AWARENESS OF THE PROJECT AND ITS STATUS.

ITEM 7:THE CAG WILL RETAIN A ENVIRONMENTAL CONSULTING FIRM FOR THE REMAINING PORTION OF THE CERTIFICATION PROCESS.WE WILL MAKE A DECISION TO EITHER REMAIN WITH MR.STANISLAUS AFTER THE PRELIMINARY DRAFT STIPULATIONS OR SEEK OTHER PROFESSIONAL ADVISE FROM ANOTHER ENVIRONMENTAL ENGINEERING FIRM.THERE IS A COMMITTEE THAT WILL RECEIVE THE RESUMES AND REVIEW THE DOCUMENTS. THEY WILL PRESENT THE RESULTS TO THE CAG.THE CAG WILL THEN INTERVIEW THE CANDIDATES. THE COMMITTEE MEMBERS ARE: MR.DAVID COLE, MRS.BARBARA PARSON, MS.ROSE ROBISCHON AND MRS.DEBORAH GLOVER.

ITEM 8: THE CAG WOULD LIKE AT LEAST 2-3 MORE FACILITY TOURS.THEY FEEL THIS WILL ENABLE ALL MEMBERS TO HAVE THE OPPORTUNITY TO SEE A CALPINE POWER PLANT.THE CAG WOULD ESPECIALLY LIKE TO SEE A PLANT THAT WOULD MIRROR THE PLANT BEING PROPOSED FOR WAWAYANDA, N.Y. i.e.GE TURBINES, WATTAGE, AIR COOLED VERSUS WATER COOLED.ETC.

IN CLOSING, WE THE CAG RECOGNIZE THAT THE DRAFT STIPULATIONS PROPOSED BY CALPINE ARE PRELIMINARY. WE ALSO RECOGNIZE THAT THE STIPULATIONS WILL REQUIRE ADDITIONAL REVIEW BY THE DPS, DEC, CALPINE, AS WELL AS INTERESTED AGENCIES, AND REVISIONS TO ADDRESS THE SPECIFIC ISSUES RAISED DURING THE PUBLIC REVIEW AND SCOPING PROCESS.THE CAG APPRECIATES CALPINES EFFORT FOR IT'S PUBLIC OUTREACH.WE RECOGNIZE CALPINES EXTENSIVE INITIAL PUBLIC INVOLVEMENT INITIATIVES WITH RESPECT TO THE PIP.HOWEVER, THE CAG TAKES OUR JOB EQUALLY AS COMPREHENSIVE AS CALPINE WITH RESPECT TO OUR COMMUNITY. WE AGREE WITH THE DPS THAT UNTIL ALL IMPACTS HAVE BEEN SPECIFICALLY IDENTIFIED, ADDITIONAL SCOPING AND OUTREACH EFFORTS SHOULD BE MADE. THE CAG WOULD LIKE THE OPPORTUNITY TO ADDRESS ALL ENVIRONMENTAL AND PUBLIC ISSUES ASSOCIATED WITH SITING THIS FACILITY AND THIS SHOULD BE DEVELOPED PRIOR TO THE FINAL ROUTING AND DESIGN DECISIONS.WE NEED TO KNOW THE ANSWER TO THE FOLLOWING QUESTION: HOW DOES A CONCERN CITIZEN (CAG) CONFIRM THAT THE STIPULATIONS HAVE GONE FAR ENOUGH IN PROTECTING THE PUBLIC HEALTH AND THE ENVIRONMENT? THE CAG FEELS ONE ANSWER IS TO HIRE OUR OWN CONSULTANT.WE SEE THIS AS OUR ROLE IN THIS CERTIFICATION PROCESS.

SINCERELY,

CITIZENS ADVISORY GROUP

WAWAYANDA ENERGY CENTER – ARTICLE X

APPENDIX D-36

File 10.9

CALPINE EASTERN

THE PILOT HOUSE, 2ND FLOOR
LEWIS WHARF
BOSTON, MASSACHUSETTS 02110
617.723.7200
617.723.7635 (FAX)

November 14, 2000

Wawayanda Citizens Advisory Group
120 Greeves Rd.
New Hampton NY 10958

Via Fax and Overnight Mail

Dear CAG Members:

We are in receipt of the November 6, 2000 letter from the Wawayanda Citizens Advisory Group (CAG) requesting a Calpine response to a number of issues. Our responses appear below, following the same format as your original letter.

Item 1 (90-day Extension)

You have requested a "90 day extension to the preliminary scoping statement comment period."

Response:

Calpine believes that the CAG and its consultant still have plenty of time to comment on the proposed Stipulations. At present, Calpine is hoping to complete the negotiation process and have the Stipulations finalized and executed by Calpine, the Department of Public Service (DPS), the Department of Environmental Conservation and the Department of Health in mid-January. Therefore, we believe that no formal extension of time is necessary, especially considering the amount of time the proposed Stipulations already have been available for public review.

As you recognize in your letter, Calpine has expended much effort to include the public early and extensively in the Wawayanda project. We note, for example, that a preliminary set of draft Stipulations was enclosed with the PSS and forwarded to local municipal officials, members of the CAG and other interested parties well over 3 months ago. In response to a request from Ms. Glover, Calpine subsequently forwarded a copy of the PSS and the draft Stipulations to Mr. Mathy Stanislaus, the CAG's proposed consultant, on October 4, 2000—over one month ago.

It is important that the CAG understand that Calpine did not draft its own unique proposed Stipulations but used as a model Stipulations that already had been reviewed and approved in earlier Article X cases. In other words, the proposed Stipulations already benefit from a great deal of expert opinion and analysis and will continue to be refined through the negotiation process. Moreover, the Stipulations are not intended to resolve specific substantive issues, but are merely the template used to identify the type and

scope of the studies that must be included in the Article X application. It should also be noted that there will be substantial opportunities for ongoing public involvement with respect to all of the issues even after the Article X application is filed.

In addition, Calpine hopes that the CAG will recognize that any significant delay in the already extensive and comprehensive Article X process could have serious consequences relative to Calpine's ongoing development schedule and its competitive position in the New York wholesale power market. It also would serve to delay the many energy and environmental benefits of this project to the State of New York, which clearly needs a substantial investment in new electric power resources. Thus, while we unfortunately cannot agree to a formal 90-day extension, we believe there is ample time to allow the CAG to provide comments to the Stipulations before they are finalized. Calpine will continue to make every effort to facilitate the CAG's review of the Stipulations.

Item 2 (Advance Intervener Funding)

You have requested that Calpine advance the amount of $15,000 as a flat fee to fund the services of Mr. Stanislaus from Enviro-Science in order that he may review the Wawayanda Preliminary Scoping Statement and proposed Stipulations.

Response:

Calpine agrees to provide advance intervenor funding to support the CAG's consultant, assuming that there is a reasonable liklihood that such funds will be credited against the official intervener fund that will be established once the Article X application is filed early next year. While the DPS has not yet established formal procedures related to providing advance intervener funding, they have clearly indicated the desirabilty of providing early funding to prospective interveners.

In order to help ensure that this expenditure will be credited against the intervener fund, Calpine requests that the CAG submit a formal application to us that would mirror what would be required for intervenor funding during the normal course of the Article X process. As you will recall, during our most recent CAG meeting, Dianne Cooper of the DPS discussed issues related to intervener funding and showed us an application that the DPS felt was a good model. A copy of that application is enclosed herewith for your convenience.

The application will need to justify the public benefits of the requested studies. It also will need to include specific detail concerning the cost and scope of the proposed review(s), including the qualifications of the individuals that will perform the work, their respective billing rates, and time estimates for each component of the work. Calpine is not inclined to fund this type of effort on a flat fee basis, and requests that the application reflect billing at usual and customary hourly billing rates. Upon receipt of an acceptable application, Calpine will fund the CAG's consultant during the pre-application phase of this proceeding for a total amount not to exceed $15,000.

Item 3 (Article X Workshop)

You have requested that a workshop be held to discuss issues related to the Article X process.

Response:

Calpine understands that a workshop has now been scheduled for December 4, 2000 and plans to attend that meeting. In addition, Calpine and its consultants are highly knowledable about the Article X requirements and would be happy to answer any process-related questions the CAG may have at any time.

Item 4 (CAG Schedule)

You have indicated that several interested residents have requested that we hold public meetings on alternating days (other than just on Wednesdays).

Response:

Calpine sincerely appreciates this type of feedback from the CAG and will coordinate with the CAG in terms of the scheduling and logistics of all future public meetings.

Item 5 (CAG Meetings Without Calpine)

You indicate that the CAG will continue to have occasional meetings without a Calpine representative being present.

Response:

As we have previously stated, Calpine has no objection to having the CAG meet independently.

Item 6 (Intervener Funding)

You have advised us that the CAG will be applying for intervener funding for additional consultant studies once the Article X application has been filed.

Response:

Calpine has no objection to having the CAG, or any individual member of the CAG, apply for intervener funding in accordance with the Department's rules and regulations. It is our understanding that intervener funds may be distributed only to entities and individuals that intend to participate as active parties in the Article X hearing process. Since other potential parties also have the right to apply for intervener funding, it is important that such funds be distributed among eligible parties in a fair and equitable

manner. Calpine therefore reserves the right to comment on specific applications as they are submitted.

Item 7 (Environmental Consultants)

You have advised us that the CAG will retain an environmental consulting firm for the remaining portion of the certification process.

Response:

Calpine assumes that the CAG will apply for intervener funding or use other funds for this effort. The CAG should not expect Calpine to fund such consultants beyond our agreement to provide limited funding during the pre-application phase, as described above.

Item 8 (Additional Facility Tours)

You have requested "at least 2-3" additional facility tours (presumably in addition to the site visit that is now scheduled for November 30), and tours to a plant that "would mirror" the proposed Wawayanda facility.

Response:

Calpine is willing to consider additional site visits if there is a good reason to do so, but we do not think that numerous additional site visits would necessarily be constructive. Calpine hopes that the CAG will recognize that site visits are resource intensive (in both time and money) and can be intrusive to the operations of the plant. However, Calpine will consider this request further after our November 30, 2000 tour to Tiverton.

As we discussed during our last CAG meeting, Calpine does not have an operating facility that "would mirror" Wawayanda in every respect. By their very nature, every plant has different attributes and none of our projects is exactly identical to Wawayanda. As you will recall, in discussing an initial site visit, Calpine offered several alternatives and the CAG chose to visit our 265-megawatt Tiverton, Rhode Island facility. Calpine believes Tiverton is a very suitable proxy, since it utilizes the same technology (GE-based combined-cycle design with air-cooled condensers). The only significant difference is that Tiverton has a single combustion turbine while Wawayanda will have two combustion turbines. Moreover, moving from a 265-megawatt plant to a 540-megawatt plant does not result in a proportional increase in the overall impact of the project.

Once again, Calpine greatly values the CAG's input into the Article X process. We look forward to continuing to work with you as the process continues to evolve.

Respectfully submitted,

Dave Devine J.F.

David A. Devine

Cc: Members of the Citizens Advisory Group
Department of Public Service

APPENDIX D-37

CALPINE

EASTERN REGIONAL OFFICE
THE PILOT HOUSE, 2ND FLOOR
LEWIS WHARF
BOSTON, MASSACHUSETTS 02110
617.723.7200
617.723.7635 (MAIN FAX)

June 13, 2001

Wawayanda Citizens Advisory Group
Ms. Deborah Glover
120 Greeves Road
New Hampton, NY 10958

Dear Deborah,

This letter responds to your request for an update on how we are incorporating the suggestions of the Wawayanda Citizens Advisory Group (WCAG) into our Article X Public Involvement Program (PIP). In summary, we have already implemented many of the WCAG's suggestions and will continue to do so as the process moves forward. For example, we used many of your ideas in the context of the public announcement for the WCAG's March 19 public meeting, including larger and more frequent ad space displays and an expanded mailing list. We are also preparing a newsletter to address frequently asked questions and other concerns.

At this juncture, as we move into the formal Article X process, we believe it is important to clarify the relationship between Calpine and the WCAG. Although it was our original intent to facilitate the formation of a broad-based advisory group to assist Calpine with its PIP requirements and, more importantly, act as valuable informational link to the community, the WCAG, by your own admission, has become a wholly independent, self-directed entity. You have indicated that the WCAG will become a formal party to the Article X proceeding, and you have taken the first step toward that process by helping to negotiate and then signing the Stipulations. In addition, you have used advance intervenor funding that we provided to support consultants and have indicated that you will continue to pursue intervenor funding once we file the formal Article X application.

Calpine believes that the WCAG has provided valuable and constructive assistance in identifying key stakeholders and expanding our public outreach activities. However we are aware that some current members of the WCAG have taken a singularly adversarial position toward the project. We certainly do not object to individuals expressing their personal opinions about our plans, but we are concerned that there is a public perception that the opinions of those individuals are contrary to the WCAG's continued formal expressions of neutrality. There have been statements made on the record by members of the WCAG regarding the project that have been quite inflammatory and, in our view, misleading. This directly contradicts the primary role an advisory group.

While it is clear that the WCAG is no longer a neutral party advising the project, we will certainly consider your views and suggestions with respect, as we would any other official party to the proceeding. We are quite confident that you will see many of your

suggestions implemented once we file the Article X application and continue our public involvement efforts.

Sincerely,

David A. Devine
Project Development Manager

C: Tina Palmero – DPS
Dianne Cooper - DPS

APPENDIX D-38

July 20, 2001

Calpine questions citizens advisory panel's objectivity

WAWAYANDA: Calpine officials feel a citizens advisory group is "not neutral enough."

By Roberta T. McCulloch
The Times Herald-Record
rmcculloch@th-record.com

The Wawayanda Citizens Advisory Group and the Calpine Corp. agree on one thing – the CAG was created to keep the public informed.

That's where the unity ends.

Calpine, the company that proposes to build a 540-mega-watt power plant off Dolsontown Road by 2004, feels the CAG has not been "neutral" disseminators of information, says John Flumerfelt, a Calpine spokesperson.

Last month, several members of the advisory group signed a petition against the town's re-zoning, an act many in the town thought was done to ease Calpine in.

"I'm told the language of the petition was not only against the zoning, but the project," Flumerfelt says. "I think its too bad they came out (against it), before we came out with the studies completed."

Calpine now hopes to file an application for the plant in August.

The tension is especially thick because Calpine wasn't required to have the citizens advisory group. "We basically started the process," Flumerfelt says. "Then they declared their independence."

Under the state's Public Involvement Program (PIP), Calpine was required to choose a way to keep the public informed of the project's development, said Dave Flanagan, a spokesman for the state Department of Public Service.

Assembling a citizens group was one way to do so, he said. "The CAG is a group formed by the applicant (Calpine)," Flanagan says, whose purpose it is "to help the applicant plan and evaluate public involvement."

Other than that stated purpose, Flanagan said there were no "set parameters," of how the CAG and Calpine would interact.

Since the CAG's inception in June 2000, the group has been steadily involved with the Calpine project, even signing off on the stipulation, something only required of the applicant and state agencies.

"They've added a lot of value," Flanagan said.

But now that the 12-member CAG has affirmed their independence, Flumerfelt he wonders now who they really are advising.

"At the March 19 meeting, clearly there were people (of the CAG) who were trying to whip up the public (against Calpine)," Flumerfelt says. "The fact that several members of the CAG used their positions has created controversy."

But Debbie Glover, the chairperson of the CAG, says she disagrees with Calpine's view. She says once Calpine has completed its studies and files an application, the CAG will then take an official position.

"All the people made a consensus that they would wait for the scientific data to come."

Until then, the group has a right to speak out as long as members are not representing the CAG.

"As individuals, we can do what we want, but we don't speak as the Wawayanda Citizens Advisory Group," she says. "We're not their employees, our job is to serve the community."

The zoning petition was just an expression of their rights, she says.

"It's not Calpine (specifically) on Dolsontown Road," she says, "but any project that

may not be of a benefit."

APPENDIX D-39

Regulatory Review

- New York State Board on Electric Generation, Siting and the Environment
  - Pre-Application Process
  - Preliminary Scoping Document
  - Formal Application
  - Decision within 12-18 months
  - Parallel review with NYSDEC
  - Public Involvement Program

Project Contact Information:

- Call Toll Free: (877) 281-9957
- Visit: www.wawayanda-energy.com
- E-mail: DavidDe@Calpine.com

Calpine Eastern Corp.
The Pilot House, 2nd Floor
Lewis Wharf
Boston, MA 02110
(617) 723-7200

APPENDIX D-40

APPENDIX D-41

APPENDIX D-42

APPENDIX D-43

APPENDIX D-44

APPENDIX D-45

DEBORAH MARIE GLOVER
120 GREEVES RD
NEW HAMPTON,N.Y.10958
SURETOGO@HOTMAIL.COM
FAX:845-374-2214

CALPINE CORPORATION

OCT 16 AM 12

To: MR.DAVE DEVINE **Fax:**

CALPINE CORP.

PILOT HOUSE,LEWIS WHARF

BOSTON,MA 02110

From: DEBORAH MARIE GLOVER **Date:** 10/12/00

Re: SCOPING/STIPULATION **Pages:** 5

CASE 00-F-1256

CALPINE CORP

WAWAYANDA ENERGY

CC: CALPINE CORP. AND CHIEF
ADMIN.LAW JUDGE JUDITH LEE

X Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

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DEBORAH MARIE GLOVER
120 GREEVES ROAD
NEW HAMPTON, N.Y.10958
EMAIL: SURETOGO@HOTMAIL.COM
PHONE: 845-374-5852

DEBORAH MARIE GLOVER

October 12, 2000

HON. JUDITH LEE
CHIEF ADMINISTRATIVE LAW JUDGE
NEW YORK STATE PUBLIC SERVICE COMMISSION
THREE EMPIRE STATE PLAZA
ALBANY, N.Y.12223-1350

RE: CASE 00-F-1256-APPLICATION BY CALPINE POWER CORPORATION FOR CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED TO CONSTRUCT AND OPERATE A NOMINAL 540-MEGAWATT COMBINED-CYCLE NATURAL GAS-FIRED ELECTRIC GENERATING PLANT IN THE TOWN OF WAWAYANDA, N.Y.

DEAR JUDGE LEE:

I AM ASKING FOR A 30-DAY EXTENSION TO THE ARTICLE X PRELIMINARY SCOPING STATEMENT COMMENT PERIOD. I ASK THIS AS A RESIDENT OF WAWAYANDA.I ASK THIS FOR THE FOLLOWING REASONS:

AS A MEMBER OF THE CITIZENS ADVISORY GROUP, IT IS MY OPINION THAT MYSELF AND MY FELLOW CAG MEMBERS NEED A WORKSHOP TO UNDERSTAND THE PERMITTING PROCESS.ADDITIONALLY, SEVERAL OF THE CAG HAVE HAD RECENT DEATHS IN THEIR FAMILIES, THIS HAS PROHIBITED THEM FROM REVIEWING AND PARTICIPATING IN THE PRELIMINARY PROCESS OF THE PROJECT.

WE ARE UNABLE TO HIRE A CONSULTANT TO REVIEW THE SCOPING/STIPULATIONS BECAUSE WE NEED TO FIRST APPLY FOR THE INTERVENOR FUND. AT OUR LAST MEETING MS.DIANNE COOPER OF THE OFFICE OF CONSUMER EDUCATION AND ADVOCACY GAVE US A BRIEF OVERVIEW OF THE PROCESS TO APPLY FOR THE INTERVENOR FUND.

IT IS MY BELIEF THAT MOST OF MY FELLOW CAG MEMBERS WERE UNAWARE OF THE FACT THAT WE COULD COMMENT THIS EARLY ON IN THE SCOPING/STIPULATION PROCESS. MOST OF US ARE RESIDENTS OF THE HOST COMMUNITY WITH LITTLE OR NO BACKGROUND IN POWER PLANT PERMIT PROCESS. WE ARE CONCERNED CITIZENS WHO WANT TO PROTECT THE AIR, WATER,AND GROUND OF OUR TOWN. WE WANT TO ASSURE THAT THIS APPLICANT MEETS SEVERAL STANDARDS I.E.BEST TECHNOLOGY AVAILABLE FOR CLEAN OPERATION.MINIMIZE THE USE OF OUR WATER FROM OUR LAKES, PONDS, STREAMS AND RIVERS. WE WANT TO MAKE SURE THAT THIS APPLICANT WILL . . . . . SERVE AS A MODEL FOR ALL EXISTING AND . .

DMG/LPG

FUTURE POWER PLANT CONSTRUCTION IN NEW YORK STATE. WE WANT TO PROTECT THE AIR WE BREATHE, THE WATER WE DRINK AND THE GROUND OUR CHILDREN PLAY ON. WE WANT TO ASSURE THAT THIS APPLICANT WILL INCORPORATE ALL THE FEDERAL AND STATE POLLUTIONS CONDITIONS. WE WANT TO PROTECT OUR EXISTING WATER QUALITY. WE DON'T WANT IT BEING DEGRADED.

THE ONLY WAY YOUR HONOR THAT WE COULD DO THIS EFFECTIVELY IS BY HIRING A CONSULTANT. THE CAG HAS HAD ONLY TWO MEETINGS TO DATE. THE FIRST BEING AN INTRODUCTION TYPE MEETING. THE SECOND WAS MORE INFORMATIVE IN NATURE. THE PSC DISCUSSED THE INTERVENOR FUND. ADDITIONALLY, WE TALK ABOUT THE VISIT TO A PLANT AND CALPINE WANTING TO SUBMIT ITS APPLICATION BEFORE THE END OF THE YEAR.

AS FOR MYSELF YOUR HONOR, I HAVE BEEN VERY BUSY TRYING TO PLAY CATCH UP WITH THIS PROPOSAL.CURRENTLY, I AM A INTERESTED PARTY IN SEVERAL TITLE V PERMITS IN ORANGE COUNTY (MASADA AND ALTURI LANDFILL) AS WELL AS A ACTIVE PARTICIPANT WITH THE NEPERA CHEMICAL PLANT IN HARRIMAN, NY.I JUST COMPLETED A TWO WEEK ONLINE DIALOGUE WITH THE U.S.EPA AND THE PUBLIC LIBRARY PARTNERSHIP. DURING THAT TIME I HAVE TRIED TO ACQUIRE THE PRO BONO SERVICES OF A CONSULTANT TO REVIEW THE ARTICLE X SCOPING STATEMENT AND STIPULATIONS. IT TOOK SEVERAL WEEKS TO LOCATE AN ENGINEERING CONSULTANT WHO WOULD REVIEW THE DOCUMENT AND GIVE ME FEEDBACK. THEREFORE, I ASK YOUR HONOR FOR AN EXTENSION TO THE COMMENT PERIOD. THIS WILL ENABLE THE CAG TO INTERVIEW SEVERAL CONSULTANTS AND APPLY FOR FUNDS FROM THE INTERVENOR FUND. WE WILL THEN BE ABLE TO RETAIN A CONSULTANT ON BEHALF OF THE CAG IN THE PREAPPLICATION PHASE OF THE ABOVE MATTER.

THE LIST BELOW ARE MY CONCERNS AND COMMENTS OF THE SCOPING AND STIPULATIONS. I HAVE ALSO ATTACHED SEVERAL ITEMS OF INTEREST AND CONCERN.

AMMONIA IS LISTED UNDER THE AIR TOXICS "HOT SPOTS" PROGRAM DUE TO ACUTE AND CHRONIC NON-CANCER HEALTH EFFECTS. WHAT IS THE HEALTH AND RISK ASSESSMENTS ISSUES?

IS THERE GUIDANCE THAT CONTINUOUS EMISSIONS MONITORS (CEMS) ARE NOT REQUIRED FOR VOC AND NH3? WHERE CAN THAT BE FOUND?

WHAT IS THE RECOMMENDED FREQUENCY OF SOURCE TESTING AND THE MONITORING MECHANISMS TO DEMONSTRATE COMPLIANCE WITH EMISSIONS LIMITS?

IS BACT EQUIVALENT TO FEDERAL LOWEST ACHIEVABLE EMISSION RATE (LAER)?

IS THERE SUCH A THING AS "NEW YORK STATE BACT"?

WHAT IS THE EFFECTIVENESS OF CATALYTIC SYSTEMS ON THE LEVEL OF OXIDES OF NITROGEN (NOX) EMISSION CONTROL? IS IT DEPENDENT ON TURBINE EXHAUST GAS TEMPERATURE? WILL THE TEMPERATURE BE A CONSIDERATION IN EVALUATING THE APPLICABILITY OF THE RECOMMENDED NOX BACT EMISSION LEVEL FOR A COMBINED CYCLE POWER PLANT.OR WILL THE PLANT RECOVER THE HEAT FROM THE TURBINE EXHAUST GAS.

BACT FOR PARTICULATE MATTER OF 10 MICRONS OR LESS WHAT IS THE GUIDANCE? WILL THAT INFORMATION BE SUPPLIED TO THE PSC/DEC?

WHAT IS THE FLEXIBILITY WITH REGARD TO THE USE OF FACILITY-WIDE EMISSIONS LIMITS? WHAT IS ADEQUATE MONITORING? PLEASE SPECIFY.

HOW DO I A CONCERN CITIZEN CONFIRM THAT THE STIPULATIONS HAVE GONE FAR ENOUGH IN PROTECTING THE PUBLIC HEALTH AND ENVIRONMENT?

HOW DO WE ENSURE THAT THIS APPLICANT WILL EMPLOY THE BEST AVAILABLE CONTROL TECHNOLOGY, AND CONSTRUCT AND OPERATE IN A WAY THAT ELIMINATES OR MINIMIZE ADVERSE AIR QUALITY IMPACTS?

THIS PROPOSED POWER PLANTS AND OTHERS ARE LARGER THAN, AND ARE EXPECTED TO BE OPERATED DIFFERENTLY THAN EXISTING POWER PLANTS IN THE PAST YEARS. HOW WILL WE BE ABLE TO DETERMINE WHETHER OR NOT THIS PROJECT CAN COMPLY WITH APPLICABLE REQUIREMENTS? WHERE IS THE CONSISTENCY IN THE STATE POWER PLANT ENFORCEMENT (SEE ARTICLE: STATE TO ENFORCE CLEAN AIR VIOLATIONS AGAINST NY UTILITIES DATED MAY 25,2000)?

THIS POWER PLANT COMMONLY REFERRED TO, AS "MERCHANT POWER PLANTS" WILL OPERATE IN THE "MERCHANT MODE" IN THIS COMPETITIVE MARKET. THIS WILL MEAN MORE STARTUPS AND SHUTDOWNS AND WILL OPERATE AT VARIOUS POWER LOADS. THIS ACTIVITY WILL ACCOUNT FOR A GREATER PROPORTION OF EMISSIONS FROM THIS NEW PLANT, THAN TRADITIONAL PLANTS. WILL THE NOX EMISSIONS FROM THIS NEW PLANT BE MORE THAN EMISSIONS FROM EXISTING POWER PLANTS? WHAT IS THE RATE (LB/MW-HR) FOR NOX FROM THIS POWER PLANT? WILL IT BE MORE THAN 0.1(LB/MW-HR)?

WILL THIS MERCHANT OPERATION AND ITS LARGE SIZE TURBINES NOT RESULT IN SUBSTANTIAL EMISSIONS? IN FACT, ISN'T IT MOST LIKELY TO EXCEED NSR PERMITTING REGULATION THRESHOLDS FOR EMISSIONS OFFSETS FOR NOX AND CO?

COULD THIS PLANT ALSO EXCEED THE OFFSETS THRESHOLDS FOR PM10, OXIDES OF SOX AND VOC?

YOUR HONOR UNLESS ADEQUATELY MITIGATED AS PART OF THE SCOPING/STIPULATUIONS AND OF THE NSR, THESE EMISSIONS COULD HAVE THE POTENTIAL TO NEGATIVELY IMPACT AMBIENT AIR QUALITY!

TO SUMMARIZE:

BACT/LAER..... WILL IT BE CALPINE'S IDEA OF BACT/LAER?

WILL IT BE NYS 'S IDEA OF BACT/LAER?

OR

FOR A MILLION MORE DOLLARS COULD WAWAYANDA HAVE THE BACT IN THE WORLD?

EMISSIONS OFFSETS: WHO WILL ASSURE THAT EMISSIONS OFFSETS PROVIDED BY THE PROJECT WILL BE SUFFICIENT IN QUALITY AND TYPE TO PROVIDE AN AIR QUALITY BENEFIT, WITH SPECIFIC DIRECTION ON INTERPOLLUTANT AND INTERBASIN OFFSET TRADING?

AMBIENT AIR QUALITY IMPACT ANALYSIS. WHAT PROCEDURES WILL BE USED FOR PERFORMING THE ANALYSIS?

HEALTH RISK ASSESSMENT: WHO WILL BE INVOLVED AND WHAT WILL THEIR PURPOSE BE? WHAT IS THE HEALTH RISK ASSESSMENT FOR TOXIC AIR CONTAMINANT? WHO WILL PERFORM THE PROCEDURE FOR THE ANALYSIS?

ALL OTHERS PERMITTING CONSIDERATIONS: THEY NEED TO BE ADEQUATELY IDENTIFIED. THEY ARE DIFFERCULT TO ADDRESS AT THIS TIME IN THE STAGE OF THE PERMIT. THESE ARE MY IMMEDIATE AREA OF CONCERN:

EMISSION LIMITS

EQUIPMENT STARTUP AND SHUTDOWNS

SOURCE TESTING AND MONITORING

FUEL SULFUR CONTENT

AMMONIA SLIP (SCR) CONTROL TECHNOLOGY. LEVELS PPMVDAT WHAT %

DEFINE BACT

DEFINE LAER

I CONCLUDE MY COMMENTS AT THIS TIME, HOWEVER I WILL RETURN ONCE I AM MORE FAMILIARIZE MYSELF WITH THIS PROJECT AND THE ARTICLE X PUBLIC SERVICE LAW.

Sincerely,

DEBORAH MARIE GLOVER

CALPINE

EASTERN REGIONAL OFFICE
THE PILOT HOUSE, 2ND FLOOR
LEWIS WHARF
BOSTON, MASSACHUSETTS 02110
617.723.7200
617.723.7635 (MAIN FAX)

October 20, 2000

Deborah Marie Glover
120 Greeves Road
New Hampton, New York 10958

Re: Calpine Wawayanda Energy Center
Request for Extension to Comment on Draft Stipulations

Dear Deborah :

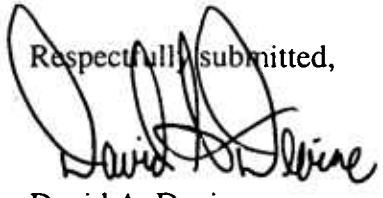
The Department of Public Service (DPS) has asked us to respond to your request for an extension to comment on the draft stipulations governing the scope of the studies to be performed and included in the Article X application for the Wawayanda Energy Center. Members of the public had been asked to submit their comments on the initial draft stipulations on or before October 13, 2000. A copy of the draft stipulations was also included in the Preliminary Scoping Statement for that reason.

The October 13 deadline was established to ensure public involvement in the stipulation process as early as possible, but was not a formal deadline that would preclude comments after that date. Rest assured that the public is free to comment on the stipulations right up until they are finalized and executed by Calpine, DPS, the Department of Environmental Conservation and the Department of Health. Formal negotiations with those agencies have not even commenced.

As a member of the citizen's advisory group (CAG), we greatly value your input on the project. We encourage you to provide your comments to the draft stipulations at your earliest convenience so that they can be fully considered as negotiations proceed.

If you have any questions, please feel free to contact me at this office.

Respectfully submitted,



David A. Devine

cc: Hon. Jeffrey Stockholm
Stephen Blow, Esq.
Christina Palmero

DEBORAH MARIE GLOVER
120 GREEVES ROAD
NEW HAMPTON, N.Y.10958
SURETOGO@HOTMAIL.COM
PHONE: 845-374-5852

DEBORAH MARIE GLOVER

October 13, 2000

HON.JUDITH LEE

CHIEF ADMINISTRATIVE LAW JUDGE

NEW YORK STATE PUBLIC SERVICE COMMISSION
THREE EMPIRE STATE PLAZA
ALBANY, N.Y. 12223-1350

RE: CASE 00-F-1256 APPLICATION BY CALPINE POWER CORPORATION FOR CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED TO CONSTRUCT AND OPERATE A NOMINAL 540-MEGAWATT COMBINES-CYCLE NATURAL GAS-FIRED ELECTRIC GENERATING PLANT IN THE TOWN OF WAWAYANDA, N.Y.

DEAR JUDGE LEE:

AS I STATED IN A PREVIOUS LETTER DATED OCTOBER 11,2000. I AM ASKING FOR A 30-DAY EXTENSION TO THE ARTICLE X PRELIMINARY SCOPING/STIPULATIONS COMMENT PERIOD. I AM ASKING FOR THIS EXTENSION AS A RESIDENT OF THE TOWN OF WAWAYANDA.MY REASONS ARE AS FOLLOWS:

ASSEMBLY BILL: 9938—A

SENATE BILL: 8240

BOTH OF THE ABOVE BILLS ADDRESS" THE CUMULATIVE EFFECTS OF AIR EMISSIONS, INCLUDING BUT NOT LIMITED TO SULFUR DIOXIDE, NITROUS OXIDES, AND PARTICULATE FLY ASH FROM EXISTING FACILITIES LOCATED WITHIN A FIVE-MILE RADIUS OF THE SITE OF THE PROPOSED FACILITY AND MEASURE TO REDUCE SUCH EMISSIONS, TO THE MAXIMUM EXTENT AND PRACTICABLE, TO ELIMINATE ANY SIGNIFICANT DETERIORATION IN AIR QUALITY WITHIN SUCH COUNTIES IN THE STATE DESIGNATED AS BEING IN SEVERE OR EXTREME NONATTAINMENT OF THE NATIONAL AMBIENT AIR QUALITY STANDARD FOR OZONE PURSUANT TO THE 1990 AMENDMENTS OF THE CAA(42 U.S.C. 7511) RESULTING FROM THE PROPOSED FACILITY....."

YOUR HONOR, CURRENTLY IN A 0.5-3.0 MILE RADIUS OF THIS PROPOSED FACILITY THERE ARE TWO TITLE V PROPOSAL'S; ONE IS THE ORANGE RECYCLING AND ETHANOL PRODUCTION FACILITY AND THE OTHER IS THE SUPERIOR HUDSON VALLEY LANDFILL EXPANSION (AL TURI LANDFILL). IN ADDITION, THERE IS AN EXISTING POWER PLANT, THE NAME OF THE FACILITY IS ORANGE AND ROCKLAND. ADDITIONALLY, LOCATED LESS THAN 0.2 MILES FROM THE PROPOSED PROJECT (CASE 00F-1256) IS THE MARCY-SOUTH POWER LINE. EQUALLY AS IMPORTANT IS THAT, THIS

DMG/LPG

SMALL AREA OF LAND HOSTS THE CITY OF MIDDLETOWN'S SEWAGE TREATMENT PLANT AND THE GEMPAK PLANT WHICH MANUFACTURES PLASTIC.

WITH RESPECT TO THE ETHANOL PRODUCTION FACILITY, IT WILL HAVE LARGE ABOVE THE GROUND STORAGE TANKS FILLED WITH AMMONIA, ETHANOL, SULFURIC ACID, GASOLINE AND NO.2 FUEL OIL AND ONLY A STONES THROW FROM THE WAWAYANDA ENERGY POWER PLANT. IF THAT WASN'T ENOUGH TO GET YOUR ATTENTION, ALL THIS IS EITHER BEING BUILT ON OR WILL SURROUND A CLASS 3 INACTIVE HAZARDOUS LANDFILL SITE.

I WOULD LIKE TO TELL YOU YOUR HONOR THAT THIS IS ALL IN THE MIDDLE OF NOWHERE BUT UNFORTUNATELY IT IS WITHIN OR LOCATED VERY CLOSE TO THE CITY OF MIDDLETOWN, N.Y. (POPULATION OVER 35,000) THIS SECTION OF THE CITY OF MIDDLETOWN, WHERE MASADA AND CALPINE WILL BE LOCATED IS RIGHT BETWEEN A PUBLIC HOUSING AREA AND LOW-INCOME HOUSING AREA (SECTION 8). THE ISSUE OF ENVIRONMENTAL JUSTICE MUST BE COMPLETELY ADDRESSED IN BOTH THESE PROPOSED PLANTS PERMITS.

OTHER NEED TO KNOW INFORMATION THAT CONCERN THE PUBLIC HEALTH AND THE ENVIRONMENT:

SCHOOLS AND HOSPITAL NEARBY (NURSERY SCHOOL LESS THAN 0.3 MI.)

RANDALL AIRPORT WITHIN 0.5 MILES FROM CALPINE AND MASADA (WORST CASE SCENARIOS)

INTERSTATE 84 TRAFFIC WITHIN 0.5 MILES FROM CALPINE AND MASADA

ROUTE 6/17M TRAFFIC WITHIN 0.5 MILES FROM CALPINE AND MASADA

STEWART INTERNATIONAL AIRPORT FLIGHT PATTERN (WORST CASE SCENARIOS)

VOLUNTEER FIRE DEPARTMENT (IN MUCH NEED OF UPDATED EQUIPMENT AND MANPOWER)

POLICE DEPARTMENT (NONE LOCATED IN TOWN) STATE POLICE AVAILABLE BUT WAWAYANDA DOES NOT HAVE A SUBSTATION

LAND USE ISSUE QUESTION (CURRENTLY ZONING BEING CHANGE TO ALLOW CALPINE AND OTHER COMPANIES TO LOCATE THEIR BUSINESS IN THIS AREA OF WAWAYANDA) ETHICAL/LEGAL ISSUE.

IN CLOSING, THESE AND OTHER CONCERNS PROMPT ME TO RESPOND TO THIS SCOPING/STIPULATION COMMENT PERIOD.THIS IS WHY I HAVE ASKED FOR A 30 DAY EXTENSION ON THE PROJECT. PLEASE TAKE MY REQUEST UNDER SERIOUS CONSIDERATION.

SINCERELY,

Deborah M. Glover

DEBORAH M.GLOVER

Stockton

October 12th, 2000
P.O. Box 605
New Hampton N.Y.
10958

Judith Lee
Chief Administrative Law Judge
Department of Public Service
NYS Board of Electric Generation
Siting and the enviornment
Three Empire State Plaza
Albany N.Y. 12223-1350

RE: Calpine Corp.
Case # 00-F-1256
Wawayanda Energy Proposal (project)

Dear Ms. Lee,

Due to the grave illness and subsequent death of a close family member, I have been unable to devote the necessary time to this project.

I am therefore respectfully requesting a 30 day extension on this deadline. My home borders the proposed Calpine project and I feel great frustration because I do not understand what article X is all about but I Know I need to. I am also adrift as to most of the technical terms used throughout most of the paperwork I have seen. Please help us, I feel there is a strong need for a workshop not only for us who border this project but also for the public at large. We are afterall, just lay-persons who have never encounterd anything like this before.

I hope you will give my request your serious consideration.
Thanking you in advance,

Most Sincerly,

Carol A. Moore
Carol A. Moore
Homeowner and citizens advisory group member

CALPINE

EASTERN REGIONAL OFFICE
THE PILOT HOUSE, 2ND FLOOR
LEWIS WHARF
BOSTON, MASSACHUSETTS 02110
617.723.7200
617.723.7635 (MAIN FAX)

November 7, 2000

Carol A. Moore
P.O. Box 605
New Hampton NY 10958

Dear Carol:

I recently received a copy of your October 12 letter to the New York State Department of Public Service concerning our proposed stipulations for the Wawayanda Energy Center. I am writing to let you know that Calpine had previously responded to a similar letter from Debbie Glover. I have enclosed a copy of that letter for your review.

Thank you, again, for your ongoing interest in our project and for your continued participation as a member of the Citizens Advisory Group.

Please feel free to give me a call at (617) 557-5323 if you have any questions about the enclosed letter or any other aspect of the project.

Sincerely,

David A. Devine
Project Development Manager

C: Judy Hoffman
John Flumerfelt
Don Neal

CALPINE

EASTERN REGIONAL OFFICE
THE PILOT HOUSE, 2ND FLOOR
LEWIS WHARF
BOSTON, MASSACHUSETTS 02110
617.723.7200
617.723.7635 (MAIN FAX)

October 20, 2000

Deborah Marie Glover
120 Greeves Road
New Hampton, New York 10958

Re: Calpine Wawayanda Energy Center
Request for Extension to Comment on Draft Stipulations

Dear Deborah :

The Department of Public Service (DPS) has asked us to respond to your request for an extension to comment on the draft stipulations governing the scope of the studies to be performed and included in the Article X application for the Wawayanda Energy Center. Members of the public had been asked to submit their comments on the initial draft stipulations on or before October 13, 2000. A copy of the draft stipulations was also included in the Preliminary Scoping Statement for that reason.

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As a member of the citizen's advisory group (CAG), we greatly value your input on the project. We encourage you to provide your comments to the draft stipulations at your earliest convenience so that they can be fully considered as negotiations proceed.

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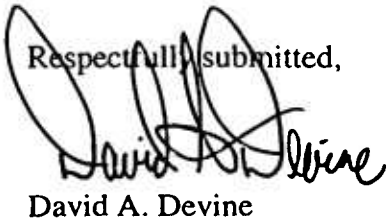
Respectfully submitted,



David A. Devine

cc: Hon. Jeffrey Stockholm
Stephen Blow, Esq.
Christina Palmero

Bernard M.Mitzner
288 Greeves RD.
New Hampton, New York 10958

December 8, 2000

Calpine
David Devine, Project Manager

'00 DEC 11 PM 1 48

Dear Mr. Devine,

Kindly include in your stipulations:

1-The Carbon dioxide content of the air on a windless day 1000 feet from the plant, 2000 feet from the plant and 3000 feet from the plant and compare this with the values prior to the construction.

The values should be at 3 in the morning.

2-Please supply similar figures for the proposed carbon dioxide values when the plant is fully operational.

3-Please give me the corresponding values of Oxygen in the air for the situation mentioned in 1 above.

4-Please give me the corresponding values of oxygen in the air expected under 1 above when the plant is fully operational on a windless day at 3 in the morning.

I hope you understand that there should be values to compare both oxygen and carbon dioxide without the plant in operation at 3 AM and after the plant is fully operational at this same time.

Thank you.

Bernard M Mitzner

COHPAP
19 OVERHILL RD
MIDDLETOWN, NY 10940
(845) 344-1527
Jan. 3, 2001.

Coalition of Health Professionals Against Pollution

Dear Mr. David Devine:

I am a resident and concerned citizen of Middletown, N.Y., in Orange County, which borders Wawayanda.

As an interested party, I attended the Dec. 11,'00 meeting at Silent Farms. I am not a CAG member. I am a interested party.

As you requested, I am writing about the stipulations and subject matters in your Appendix A Stipulations, which set forth the scope of studies that will be undertaken by Calpine as part of the Article X process.

I am requesting research studies, evaluations, and analyses on the health impact of criteria and non-criteria pollutants and contaminants which will be emitted from the proposed Calpine power plant. In addition, I would like Cumulative Air Quality Impact studies,and their affects on health, completed. In addition to Calpine, the proposed Masada project, if approved, will be your neighbor, as well as many other polluters within a 2.5 mile radius . Masada will emit 18 various pollutants and contaminants 24 hours a day, 7 days a week, for the next 20 plus years.

Your letter of Nov. 30, '00 showed that the Calpine project will emit NITROGEN OXIDES (NOx), SULFUR DIOXIDE (SO2), CARBON MONOXIDE (CO), VOLATILE ORGANIC COMPOUNDS (VOC), SULFURIC ACID MIST,and PARTICULATE MATTER (PM10). You mentioned only the above 6. Are there any more Major Air Pollutants (MAP) and Toxic Air Pollutants (TAP), also known

as Hazardous Air Pollutants (HAP)? If so, I would like them included in your studies, evaluations, and analyses'.

As you know, the power plant siting Bill (Article X) requires that public health hazards that might result from the operation of power plants, under consideration for certification, be carefully considered.

Even PARTICULATE MATTER (PM 10) size range can create serious health hazards and problems. Particulates produced by natural gas combustion are NOT benign. It is of the utmost importance that all parties, D.E.C., E.P.A., D.O.H, D.P.S., Calpine, and power plant siting chairmen and their siting boards become fully aware of this pollutant and its impacts on health. I hope that you will personally see to this urgent and import task of informing them.

Presently, thousands of Middletown and Orange County (OC) residents suffer from asthma, cardiac problems, allergies, and other respiratory problems associated with PARTICULATE MATTER (PM), spewing from operating plants and tail pipes.

NOx create ozone formation and are a health problem themselves. They irritate the respiratory tract and may threaten human health. The American Lung Associations Motto is: "If you can't breathe, nothing else matters."

Governor Pataki announced a new initiative to significantly reduce emissions of ACID RAIN and OZONE causing pollutants generated from power plants. His initiative requires electric generators in NY to reduce SO2 emissions by an additional 50% below federal CLEAN AIR ACT (CAA) standards and implement recently adopted strict summer time NOx controls on a year-round basis. I hope that Calpine will abide by this initiative.

SULFURIC MIST can cause cancer, aggravate pre-existing skin, eye, and breathing problem.

CARBON MONOXIDE (CO) interferes with the bloods ability to carry oxygen to the brain, heart, and other body organs. It is dangerous to those with heart disease, circulatory problems, damaged lungs and breathing

passages, as well as unborn, or newborn babies and children.

VOLATILE ORGANIC COMPOUNDS (VOC) are released from burning natural gas. They have high ozone forming potential and/or are toxic and cause SMOG. VOC's can cause serious health problems such as cancer, and other effects.

Controls for Toxic Air Pollutants also reduce VOC's and PM10 emissions.

HAP's and toxic contaminants will be inhaled into the lungs of every Middletown/OC resident, where they then enter the blood stream, infiltrate the heart, brain, bone marrow, and other vital organs of the body such as liver and kidneys, silently doing their damage, causing illnesses such as cancer, asthma, emphysema, leukemia, liver, and kidney diseases, etc., etc..

Furthermore, Calpines' transportation vehicles will add to the 200 or more Diesel trucks entering Middletown daily, to service the proposed Masada project. Studies were completed by the EPA which link lung cancer and respiratory irritation to Diesel exhaust, a major source of particulate pollution. All of this truck traffic can also destroy the infrastructure of the city and increase residents' taxes.. Please study this phenomenon.

Presently Orange County has the third highest rate of cancer in N.Y.S. (Colon-Rectal Cancer), and the second highest rate of respiratory diseases (asthma, emphysema, allergies, cancer of the lungs, and sinus problems) in N.Y.S.. You see, we live in a valley where everything settles and remains. O.C. is also in the NE Ozone transport region, a moderate non-attainment area.

The emissions from the proposed Calpine and Masada facilities can contaminate soil, air, and water. Wells and an aquifer near the site can lead to water contamination problems. Where will Calpine get their water? Where will their plant water drain? Calpine should request a storm water discharge permit.

It's reasonable to expect that the Calpine officials will DEMAND the Best Available Control Technology (BACT) as the Clean Air Act (CAA) requires.Your power plant must have the BACT and the lowest achievable emission rates, especially for NOx,SO2, PM, CO, AND VOC's.

I would expect that Calpine will be provided with Maximum Available Control Technology (MACT) standards to regulate these emissions.

I have concerns regarding AMMONIA storage. The proposed Masada project will store 22,000 gallons of ammonia on its premises. In case of an explosion a creeping, traveling cloud of ammonia is a death sentence to those within a one-mile radius.

I would request and not expect Calpine to use, or store ammonia.

Calpine's NOISE POLLUTION levels, generated from the turbines, need to be researched, studied, evaluated, and analysed. Noise levels from turbines can create many serious problems. Noises can trigger seizures in Epileptics, or those with damage to their brain. Low frequency noises can cause nausea and vomitting. Vibrations of infrasound noise can cause animals to become disturbed and restless. Noise can damage and impair hearing. The noise from continuous operation of the power plant can interfere with residents sleep and REM patterns, leading to lethargy, confusion, failure to concentrate, accident prone behaviors, and even psychotic symptoms and behaviors. Calpine must look upon the Noise Stipulation as fully and carefully as they will look upon the health stipulations. School, churches, and private homes are nearby.

C.O.H.P.A.P.'s concerns are HEALTH, SAFETY, and the ENVIRONMENT. These issues must not be taken for granted, nor taken advantage of. PREVENTION and EDUCATION are our priorities. Our philosophy and beliefs are, "It is far better and less expensive to PREVENT problems and illnesses, than to spend billions of dollars treating them and trying to find cure-alls."

I have nothing to gain here except to see a happy, HEALTHY, SAFE community and environment. I CARE!!

I hope we can depend on you to work on the PREVENTION of the hazards to HEALTH and the ENVIRONMENT, and to keep our children and residents SAFE from pollution, and danger.

If Calpine or the DPS CANNOT or WILL NOT perform the additional studies requested on these above listed stipulations and subjects and will not PROVE to us (before certification) that their power plant is SAFE, and will NOT destroy our HEALTH and ENVIRONMENT, then in that case we have no other choice than to invite you and your company to leave and look elsewhere, outside of Orange County, to build your power plant.

Middletown/Orange County cannot accept or sustain anymore pollution or contamination from any additional sources or facilities of any kind.

HEALTH, SAFETY, and the ENVIRONMENT, not corporate business, are my priorities.

Sincerely, J. Nebus

Jeanette Nebus, BSN, RN; BS, MS. ED., C.S.N.-T.

President; Coalition of Health Professionals Against Pollution

(C.O.H.P.A.P.)

Phone: (845)-344-1527.

CALPINE

EASTERN REGIONAL OFFICE
THE PILOT HOUSE, 2ND FLOOR
LEWIS WHARF
BOSTON, MASSACHUSETTS 02110
617.723.7200
617.723.7635 (MAIN FAX)

January 9, 2001

Ms. Jeanette Nebus
President
Coalition of Health Professionals Against Pollution
19 Overhill Road
Middletown, NY 10940

Re: Wawayanda Energy Center – Comments on Stipulations

Dear Ms. Nebus:

Thank you for your letter dated January 3, 2001 which outlines your concerns with the Wawayanda Energy Center and requests changes to the Stipulations that define the scope of studies for the project's Article X application. I have enclosed a copy of the current version of the Stipulations for your information; all of the issues raised in your letter are specifically addressed in the Stipulations and will be included in the Article X application for the project.

Much of your letter relates to cumulative impact assessment, particularly as it pertains to the proposed Masada facility. The Stipulations specifically include provisions to perform such cumulative impact assessments related to air quality, noise, traffic, land use, and visual environment (see Stipulation 15, Paragraph 3). In addition, if the Wawayanda Energy Center predicted air quality impacts are above the U.S. Environmental Protection Agency's Significant Impact Levels, then Calpine will be required to perform an interactive source impact assessment that will include facilities well beyond the 2.5 radius mentioned in your letter (see Stipulation 1, Paragraph 2(n)).

Note that the Stipulations require Calpine to quantify emissions of pollutants other than the six "criteria" pollutants included in our November 30, 2000 letter to you (see Stipulation 1, Paragraph 3(a)). Regarding your comment about public health hazards, Stipulation 1, Paragraph 3(e and f) contain provisions for determining if a health risk assessment is necessary.

The Wawayanda Energy Center will not contaminate any water resources. The Stipulations require Calpine to evaluate several alternative water supplies and wastewater discharge options (see Stipulation 12). Presently, Calpine plans to obtain water from on-site wells and discharge wastewater to the Middletown Publicly Owned Treatment Works (POTW). The facility will incorporate a permitted storm water management system.

Ms. Jeanette Nebus
Coalition of Health Professionals Against Pollution

The Stipulations also require Calpine to determine Best Available Control Technology and Lowest Achievable Emission Rate for applicable air pollutants. The project will use aqueous ammonia for the air emissions control system. Ammonia-based Selective Catalytic Reduction is widely viewed in New York and across the country as the best available control technology for reductions of nitrogen oxide emissions in modern combined-cycle power plants, therefore requiring the on-site storage of ammonia. For the Wawayanda project Calpine has proposed using dilute aqueous ammonia in order to minimize potential offsite effects in the unlikely event of a release. .Calpine will perform an offsite consequence analysis for ammonia (see Stipulation 1, Paragraph 2(o)). Stipulation 6 and the attached noise modeling protocol provide for extensive analyses of noise for the project. The state guidelines on noise are designed to prevent the types of impacts described in your letter.

Calpine is committed to developing a facility that protects the environment, safety, and health of its workers and the public. The Stipulations require a comprehensive set of studies and analyses designed to allow the state agencies and general public to decide if the Wawayanda Energy Center site is an appropriate location for an electric generating facility.

Calpine thanks you for your comments. We make frequent visits to Wawayanda, and would be happy to meet with you to discuss the Stipulations and your important concerns. Please call me if you have any questions, or would like to arrange a meeting

Sincerely,

David A. Devine
Project Development Manager

Enclosure

Cc: Tina Palmero, Department of Public Service
Chris Hogan, Department of Environmental Conservation
Henry M. Spliethoff, Department of Health
Deborah Glover, Wawayanda Citizens Advisory Group
Thomas DeBlock, Town of Wawayanda

January 4th, 2001
P.O. Box 605
New Hampton, N.Y.
10958

CASE # 00-F-1256
David Devine, Project Manager
The Pilot House, 2nd Floor
Lewis Wharf
Boston, Massachusetts, 02110

Dear Mr. Devine,

After reviewing Calpine's Proposed Stipulations, Wawayanda Energy Center, of December 7th,2000, I am writing to you as a citizen of the town of Wawayanda, but, also and primarily as an immediate neighbor to the proposed WAWAYANDA ENERGY CENTER. The property which I own and reside at is located at #1081 Dolsontown Road and abutts the proposed power plant.

Our home and well is only a few hundred feet north/west of Calpine's proposed location, NOT nearly as much as the 1,500 feet you indicated in your stipulations on page 23, #2. I am perplexed as to how you arrived at that calculation. Due to the proximity of your generating building and giant cooling condenser building, to our home, we anticipate severe problems. One major problem will be the significant drop in value of our property, which we can not hope to recoup. Another is the impact this plant will cause on the quality of our lives.

My husband and I have some very serious concerns which need to be addressed, in earnest, by the Calpine Corporation. Please note the following:

1. My husband has a pre-exsisting, cardiovascular, condition, having already suffered one heart attack.
2. I suffer from chronic bronchitis.

In view of numbers one and two, the particulate matter emitted from a gas fired, power plant, of the size proposed by Calpine for this site, worries us greatly. We would like to suggest a smaller plant which would allow for the particulate matter to be reduced in volume.

3. Calpine's construction plan includes taking away a considerable amount of soil from the westerly side of the site. This poses a very strong possibility of eliminating surface water which feeds our row of mature trees along that whole property line, threatening the life of every tree. These trees are our ONLY visual buffer between us and the proposed plant.

4. The ammonia which Calpine plans to use in the power plant is of a paramount concern as is the particulate matter mentioned earlier. Since the site is on a flight plan of both commercial aircraft, (Stewart Airport) and private aircraft, (Randall Airport and Orange County Airport), a worse case scenerio of an aircraft plunging into an ammonia tank would be catastrophic and possible. Once again, downsizing the plant would enable Calpine to implement a non-ammonia system.

5. The exsistence of necessary flood lights at the completed plant will make restful sleep an impossibility....our bedroom faces the proposed plant.

6. For the two years it will take to complete construction of this plant, there will be excessive noise from a plethora of machinery of various size, shape and sounds as well as many voices of people on the work crews..your number quoted to us was up to 300 people. THIS WILL disrupt our peaceful exsistence and certainly cause us stress.

7. There will be CONSTANT dust from the raw construction and excavation, since I am allergic to dust, (hence leading into the bronchitis) this poses a health threat to me, one not to be taken lightly.

8. A fact of construction life is, the matter of debris, which carried by wind, manages to wind up on other people's property, and as an abutter, that concerns me.

9. The exhaust from the construction machinery coupled with the exhaust from the added traffic from up to 300 workers, will increase the levels of carbon monoxide emitted into the immediate area, and that can and will likely affect our quality of health.

10. Once the power plant construction is started, it will de-valuate the re-sale of my property.

11. The electromagnetic spectrum and it's connection with cancer is an alarming reality.

12. Since we have not yet been taken to a power plant like the one now proposed, we are uncertain as to the level of noise which will be emitted by the cooling fans, however, since they will be AIR COOLED, we DO know that they will be louder than the water cooled ones. Loud noise is a proven cause of stress to the central nervous system, especially sustained, loud, noise. Stress to the central nervous system is a contributing factor to heart problems...see #1.

13. When the plant does it's testing, or, clearing the lines, the noise has been described to me, by 3 differnt men who heard this at the Calpine's Tiverton Rhode Island plant, all using the exact same phrase, "It sounds like a 747 jet plane going down a runway". One man said it could be heard 5 miles away in another town, and the noise lasted for about 8 hours. I am concerned with how often this process would need to be done as it would be unthinkable to be next door to that kind of sustained noise even for ONE hour. Also, would Calpine notify the community each time it would do this process, as there are many residences nearby that would be greatly affected. Also regarding this noise from the Tiverton R.I. plant... The proposed WAWAYANDA PLANT would be twice the size, exactly, as the one in Tiverton, so, twice the noise.

14. What are the results of air quality when the plant does the wash down of the smoke stacks....what are the emissions released into the air?

15. The natural gas lines are a potential hazard, I site the recent N.J. explosion. We are now being told that the size of the lines have been increased to 36". Who will be accepting responsibility in the event of a disaster?

16. And then there is the matter of acid rain!! Resulting vehicle damage.

17. When the stacks emit the "PLUME" of steam and "matter", what will be the result to Dolsontown road when it is freezing weather? This emission will certainly cause a sheet of ice on this road, creating hazardous conditions for driving.

18. We have a home based business. The increased traffic during construction could very likely cause people to take their business elsewhere rather than contend with the congestion. Two years of that kind of thinking would be very detrimental to our income, as we are retired and living on social security.

19. It might seem like a small thing to you but, we have laying hens and the constant noiseand strange sounds of construction will most assurdly cause them to stop producing eggs.

20 Already abutting my property is: The Middletown Sewer plant and it's offensive odors, The proposed Masada Project(garbage to ethenol) and I am seperated from the Orange & Rockland power sub station by a mere small parcel of land as well as from Gen-Pac co. in the same way, and O&R plans to expand. Now the Calpine plant will complete the loop around me by abutting me on the east. We are EXTREAMLY concerned by the CUMULATIVE effect of all of these entities and in particular the fact that BOTH Calpine and Masada plan to use ammonia, Masada having 22,000 gallons on site.

21. The uncertainty of just what repercussions might result from all of this and what direct impact it might have on us personally is causing anxiety to both my husband and me.

22. The aprox. 14 acres of woods belonging to me and abutting the proposed plant is home to a wide variety of wildlife, including, deer, foxes, cyote, wild turkey, racoons, opossum, squirrel, chipmunks and many other small animals and birds indigenous to our area including the once almost extint, eastern bluebird. Two years of major construction will most certainly disturb this quiet habitat and drive away most of these animals.

23. Our potable water source is from our own private, 110 feet deep, well which is located next to our home. If Calpine digs and uses it's own wells on the proposed site, 450 to 500 feet deep as you indicated, it will in all likelyhood, cause our well to go dry, especially during a drought such as we experienced here in 1999.

24. BLASTING: We know you do not plan to do any blasting, however, if it should become necessary to do so, let it be noted that our home is 100 years old and the walls and ceilings are made of lath and plaster. ANY form of blasting or significant vibrations could and most likely would cause severe damage to this structure.

25. Also relating to possible blasting, this could have a detrimental impact on our well.

26. VIBRATIONS: There is bound to be ground vibrations of and from various sources during the construction of a project of this magnitude. Since the proposed project is located so close to our home and other building, we are concerned as to what the possible, if any, sources might be and what their impact could cause to our buildings and well.

27. The issue of possible fumes has not been properly addressed or explored, and needs to be.

28. We are concerned with the number of workers and the fact that they might tresspass onto our property..we prize our privacy, it's one of the reasons this parcel appealed so greatly to us.

29. It is our understanding that the plume which is emitted from the stacks causes "FOG". This fog needs to be considered as it would have an impact not only on Dolsontown Road, but also Interstate Route 84 and possibly also Dolson Avenue to the west. Also to be considered is the small aircraft which could be impacted as they fly in and out of nearby Randall Airport.

30. VISUAL IMPACT: We now sit on our side porch(facing the proposed site) and enjoy all our summer meals there, in sight of the children in the pool. Our view is pleasing and satisfying to one's soul. At this point in our lives we are retired and content, surrounded by all the people and things we love. Now our contentment will be shattered by a huge, 10 story high building with two stacks higher than the building and the two years of chaos it will take to build it. A building larger than any building yet to be built in this community of Wawayanda OR the city of Middletown which our property borders. The aesthetic value of our property will be greatly diminished!!

31. The delight of Dolsontown Road has always been, for us, the great fact that it is a farm road. It's rural ambiance is refreshing and charming, it's location represents the best of both worlds...the convience of good shopping, a nearby hospital and the amenities of a desirable community coupled with the eye appeal of a really nice country road. This huge plant will change that forever.

32. We purchased this property 25 years ago as our "forever" home. My husband and I have known each other since we were little children, we grew up together, went to school together, planned our future together. When I was 17 years old, he promised me a little farm... this is it. I told the realtor we would take it before we even saw the inside..we loved the property instantly!!! It is the only place our 12 grandchildren have known as, "Gramiere's and Grand-dad's farm". These children traverse the fields and woods, run their go-carts on trails they themselves have carved out, it has become a haven for them and all the nieces and nephews. This farm has become "central" to our whole family and extended family...it's where all the family reunions take place,because of it's spaciousness. The house sits back far enough from the road so as to be safe for the little ones. We have enjoyed quiet, serenity and peacefullness here. Now, at the age of 63, we will have our tranquill surroundings turned upside down replaced by constant noise, blarring lights, fine dust all over my home in everything, strangers by the hundreds just over our stone wall, and more traffic than is acceptable for this road.

If Calpine gets it's permits to build, this project will bring about changes in our lives that would forever have a negative effect on the quality of our daily lives and change our lives in an unacceptable way. Obviously, our problems become Calpine's problems!

This farm is very important to us, our entire life and savings are in this property. We expected to continue to live here without cause of detriment to either our health or quality of life, until which time WE decided to make a change, which would be in the distant future. Due to all the above concerns, there is only one thing left for us to do..leave!!

While all the problems and concerns are multifarious, they can be resolved. At this juncture, it would be appropiate for Calpine to offer to buy us out. We would be agreeable to meeting with you to discuss the possibility of such an arrangement.

Thank you for your consideration in these all important matters,

Sincerely,

Carol A. Moore

Carol A. Moore

CALPINE

EASTERN REGIONAL OFFICE
THE PILOT HOUSE, 2ND FLOOR
LEWIS WHARF
BOSTON, MASSACHUSETTS 02110
617.723.7200
617.723.7635 (MAIN FAX)

February 7, 2001

Mrs. Carol A. Moore
P.O. Box 605
New Hampton, N.Y. 10958

Dear Mrs. Moore:

Thank you for your comments regarding the Wawayanda Energy Center (letter of January 4, 2001), which you submitted to us in the context of comments on the proposed Stipulations. This response addresses all of the main points in your letter. Please note that for some of the issues, we are not yet able to provide the results of studies, but in those cases we describe studies that will be done to address the concern. The forthcoming Article X Application will address these issues in more detail and will document all studies.

1&2. Health effects/particulate matter. Calpine will use the cleanest fossil fuel there is – natural gas. Unlike coal or oil, natural gas combustion produces very low particulate emissions, and together with good operational control of the combustion process, this is the best available control technology for particulate matter. Furthermore, we will demonstrate that all particulate matter emissions will fall not only below the national and state air quality standards, but also below the minimal thresholds for further study that EPA and the Department of Environmental Conservation have established for particulate matter. Building a 1-unit plant (instead of the proposed 2 units) in order to reduce particulate matter emissions, as you suggest, is not an appropriate mitigation measure.

3. Surface water recharge to vegetation. This is a concern that can be addressed by engineering the site in such a way that the rainwater from the site is channeled to approximate present conditions, both in terms of duration of flow and its direction. We have agreed to study the issue of wetland recharge in the application, and your concern will be similarly addressed by channeling the equivalent amount of rainwater toward your trees.

4. Safety/ammonia. Calpine proposes to use an aqueous ammonia solution in order to help control emission of nitrogen oxides down to the lowest achievable emission rate. Unlike the anhydrous ammonia that is used by farmers ubiquitously, aqueous ammonia is safely stored in a contained area built specifically for that purpose. Furthermore, we will demonstrate that even in the event of a worst-case catastrophic release of the ammonia solution, ammonia vapor levels would stay below toxic levels.

5. Floodlights/glare. The facility will use a design whereby lights are directed downward and shielded. Calpine will prepare a lighting plan that shows lighting intensity levels over distance. Our aim will be to minimizing lighting impacts and we will make every effort to ensure that it does not represent an adverse impact to you as a neighbor.

6. Construction noise. Calpine will conduct a thorough study of construction noise, which takes into account the different phases of construction. Most construction – and especially the noisier earth-moving phase – occurs during the workday. Impacts due to construction noise will be quantified and assessed.

7. Dust. Calpine will take vigorous steps to control fugitive dust during construction, including applying dust palliatives and putting in place erosion control barriers. These measures can effectively mitigate fugitive dust impacts.

8. Airborne debris. Calpine will institute a solid waste management plan during construction, so that debris is handled professionally.

9. Localized CO emissions. Vehicle emissions from workers coming to and from the site are very minor compared to daily traffic on Dolsontown Road. Construction equipment, when it operates, will operate within the site. However, CO levels are not significantly affected, especially in an unobstructed field environment such as the proposed project site.

10. Property values. We do not anticipate that the construction and operation of our facility will have any adverse impact on local property values. There is no evidence of these types of impacts near other operating facilities of this type.

11. Electro-magnetic fields. We will perform an analysis of electric and magnetic fields as described in Stipulation 3, Paragraph 21. This analysis is to ensure that the plant will comply with the Public Service Commission's applicable electric field strength standards under all plant loading conditions.

12. Air cooling/noise. Air-cooled condensers are not necessarily louder than cooling towers. The location of fans, the size of the fans, and the speed of the fans, among other factors, affect noise levels. Thus, noise levels can be controlled and noise impacts mitigated. Calpine will study the noise impacts on the basis of a method that measures and predicts community response. In other words, noise will be evaluated not just from a public health perspective, but from a community perspective, as well.

13. Steam cleaning. The process you refer to is commonly referred to as "steam blow," whereby pipes are cleared of any residual matter through the delivery of steam at pressure. This is a one-time activity that would occur during commissioning. It

would happen only during the daytime, and Calpine will ensure that the community is notified days in advance.

14. Air quality during washdown. Exhaust stacks will not be operated or maintained in a way that causes air pollution releases other than through combustion.

15. Natural gas safety. Pipelines are the safest way to transport energy, and the natural gas pipeline licensing process, held under the auspices of the Federal Energy Regulatory Commission (FERC), will address safety as well as environmental issues relating to the pipeline. There is a strict federal code for construction as well as inspection and maintenance of pipelines. Emergency response plans are also required.

16. Acid rain. Acid rain forms slowly in the atmosphere, and in that sense it is not a local problem. Because the Wawayanda Energy Center would have much lower sulfur oxides emissions than the existing fleet of power plants, it should help to *reduce* the problem of acid rain. Acid rain deposition will be addressed for 18 specific locations in the northeastern United States and Canada, consistent with New York State requirements on this issue. Also, Calpine will buy sulfur emission allowances as part of a system to reduce overall sulfur emissions.

17. Icing & 29. Fogging. The water vapor that is released from the exhaust stacks is hot and buoyant. While icing (or, during warm weather, fogging) can sometimes be a concern for cooling towers, it is not a concern for combustion turbine exhaust stacks. To demonstrate this, Calpine will include ground-level points along local roads as part of its analysis of the water vapor plume. In addition, the same analysis will assess how far water vapor will travel in a condensed form in the air (i.e., the length of a visible plume).

18. Construction traffic. Please note that construction traffic will only be a concern during shift beginning and end. When work is ongoing, there will be little to no traffic impact, since workers will be on premises, not along Dolsontown Road.

19. Effect of noise on hens laying eggs. We would not expect a project of this type to have any adverse impact on adjacent domestic or other animal life.

20. Cumulative effects. Calpine will address the concern about cumulative effects by including all the facilities you list as part of the air quality analysis that would be required if the Wawayanda Energy Center were to have impacts above the minimal thresholds for further study that EPA and the Department of Environmental Conservation have established.

21. General anxiety. We understand and respect your interest in being fully informed about our proposal and will continue to keep the lines of communications open.

22. Wildlife. Calpine will conduct a study of the wildlife at and around the project site. As part of the study, availability of habitat for the mammals and birds you mention will be assessed.

23. Groundwater impacts/wells. Calpine is conducting a planned and careful study of groundwater withdrawals at various depths, the purpose of which is to withdraw water in a way that does *not* impact adjacent wells. A summary of the groundwater investigation has been sent to the Wawayanda Citizens Advisory Group and is attached for your reference.

24-26. Blasting/vibration. As agreed at our meeting of January 17, Calpine would undertake additional measures to both avoid blasting impacts and to ensure that if they occur, the situation is remedied. This plan will include pre- and post-blast inspection with video or still camera documentation. Impacts of blasting on underground structures such as wells will be assessed in addition to impacts on aboveground structures. Also, our seismological analysis will assess whether any other kinds of vibration (except blasting) could affect nearby structures – we expect that none will.

27. Fumes. Assuming that you are referring to air pollution from the combustion process, please note they are/will be discussed as follows: December 22, 2000 Air Modeling Protocol; Prevention of Significant Deterioration permit application (forthcoming); NYS Department of Health air toxics study; and other related studies in the forthcoming air quality application. The issue will be comprehensively addressed.

28. Worker trespass. Calpine will vigorously enforce parcel access procedures. All workers will be instructed to stay off your property, and this will be policed.

30. Visual impact. Because the proposed power plant is a large building, Calpine will evaluate many different mitigation options, including – the appearance of the building; stack height; and off-site landscaping. Off-site landscaping (that is, new plantings on your property) may offer the most effective mitigation in your case. Calpine would pay for such planting.

31 & 32. Rural character. Calpine will study the plant relative to local land uses and will develop the project consistent with local zoning regulations.

In your letter, you conclude that it would be appropriate for Calpine to purchase your property. We feel that the project will not adversely affect your property on Dolsontown Road. However, in response to your concerns, we are willing to consider purchasing your property at fair market value, plus a reasonable premium for inconvenience and relocation expenses. We would suggest that two appraisals of your property be prepared, so we have accordingly attached a list of 5 local appraisers. Kindly select the two that you wish us to employ, and we will arrange and pay for

appraisals to be prepared. Once the appraisals have been completed, we can meet to craft an agreement that would allow you to exercise the sale should the plant be built and its presence does indeed cause you to want to relocate.

Thank you very much for your letter and comments, and please do not hesitate to contact us with any concerns or questions.

Sincerely,

David A. Devine

David A. Devine
Project Development Manager

Cc: John Flumerfelt
Judy Hoffman
Don Neal
Stephan Solzhenitsyn

SUMMARY OF WAWAYANDA ENERGY CENTER GROUNDWATER INVESTIGATION

OBJECTIVES

The primary objectives of Earth Tech's water supply investigation are to (1) determine whether the water supply source (i.e., on-site bedrock groundwater) is sufficient to meet the needs of the Wawayanda Energy Center and (2) evaluate the potential impacts of the Project on the quantity and quality of available water resources and other groundwater users. In order to accomplish these objectives Earth Tech will:

- Define the vertical and lateral extent of the hydrogeologic unit that represents the consolidated aquifer and define the nature and locations of the aquifer boundaries, recharge areas and discharge areas
- Define the groundwater flow paths and patterns within the bedrock aquifer
- Evaluate the extent of the cone of drawdown and zone of recharge of the on-site bedrock well field resulting from Calpine's additional water demand
- Assess whether any changes in drawdown will impact the availability of water to other municipal and private water supplies relying on groundwater
- Assess whether groundwater flow patterns will be changed due to increased pumping at the Property
- Assess whether any predicted changes in groundwater flow patterns will affect the movement of contaminants that have been identified in the aquifer

Data will be collected to address issues raised in Stipulation No. 12: Water Resources in the Article X permitting process. Specific issues are detailed in Paragraphs 1 through 10 (Water Supply) and Paragraphs 21 through 25 (Groundwater). The work detailed below will help address Paragraphs 4, 5, 6, 8, 9, 10, 21, 22, 23, 24, and 25.

WORK PLAN

The purpose of this water supply investigation is to define the geologic and hydrogeologic setting of the Property and vicinity. The drilling work currently being performed at the site is intended to locate bedrock supply well(s) capable of producing a safe sustainable yield to meet project demands. The following tasks have been performed or will be conducted in order to achieve objectives of the investigation and fulfill requirements outlined in Stipulation No. 12. The investigation includes 8-inch diameter test well exploration, construction, pump testing, water quality sampling of select bedrock supply well(s), and data analysis.

Earth Tech had previously performed a photo-lineament analysis that identified 11 potential test well locations on the site (Figure 1). Utilizing the existing remote sensing imagery, Earth Tech field staff identified 13 potential test well drilling locations (Figure 2).

Two 8-inch diameter open hole bedrock wells (about 425 feet deep) were drilled. Preliminary yield estimates ranged from 115,200 gpd to 180,000 gallons per day. A third bedrock well is currently being drilled at the Property.

Based on Earth Tech's knowledge of the structure and water-bearing potential of the bedrock a preliminary list of off-site wells has been prepared (Figure 3). The list will be reviewed with the Town of Wawayanda and the WCAG. It is Calpine's objective to monitor these off-site water supply wells to assess the pumping affects on the local and regional water resources. A representative from Earth Tech will communicate with these well owners to collect additional information (during pump testing) and obtain access agreements, if applicable.

Earth Tech will complete a focused review of existing public and private bedrock well supplies within one-mile of the site. Prior to step pumping tests (3 to 4 steps consisting of 90 minutes per step) or long-term pumping tests (72-hour constant rate), a potential contamination threats review will be performed within a one-mile radius of the site. Based on experience with other bedrock test well programs, there is no potential to impact groundwater beyond the one-mile radius during these limited pumping tests. The potential contamination threat review is being performed to ensure that the pump testing does not impact other users of the bedrock aquifer or effect the movement of potential contaminant threats such as the Old Al Turi Landfill (Figure 4).

Calpine will evaluate the impact of the on-site development of the bedrock aquifer upon sensitive environmental receptors (i.e., local bedrock wells, sub-tributary to Monhagen Brook, nearby potential contaminant threats, etc.).

Local Appraiser listing for Wawayanda/Middletown area:

Valuation Consultants
6 Front Street
Newburgh, NY 12550
Phone: (845) 568-0600

Bill Buchalter
Certified Appraisal Service
769 East Main Street
Middletown, NY 10940
Phone (845) 343-6463

A& J Appraisals
Joseph Fontana
Middletown
Phone (845) 344-1943

Drew Property
Deborah Mazzolinio (not sure of spelling)
Middletown
Phone (845) 343-8818

Wohl Appraisers
Jane Wohl
Goshen
Phone (845) 294-3677

DEBORAH MARIE GLOVER
120 GREEVES RD
NEW HAMPTON, NEW YORK
10958
PHONE 845-374-5852
FAX 845-374-2214
saratoga@hotmail.com

January 8, 2001

Mr.Dave Devine
The Pilot House
2nd Floor
Lewis Wharf
Boston, Massachusetts 02110
617-723-7200
617-723-7635(fax)

RE: ARTICLE X APPLICATION, CASE NO.00-F-1256
WAWAYANDA ENERGY CENTER, CALPINE INC.

Dear Mr. Devine,

THIS IS A RESPONSE TO THE CALPINE'S STIPULATIONS DATED DECEMBER 8,2000 ON THE WAWAYANDA ENERGY CENTER WHICH IS PROPOSED FOR THE TOWN OF WAWAYANDA ON DOLSON TOWN RD.THE FOLLOWING THOUGHTS AND OPINIONS ARE FROM A CONCERNED CITIZEN FROM THE TOWN OF WAWAYNANDA.MY THOUGHTS AND OPINIONS ARE MY OWN AND IN NO WAY REFLECT THE THOUGHTS AND OPINIONS OF THE WAWAYANDA CITIZENS ADVISORY GROUP, OF WHICH I AM A MEMBER.

MY CONCERNS ARE AS FOLLOWS:

<u>WATER:</u> FOR THE PAST NINETEEN YEARS IN WAWAYANDA, I HAVE WITNESSED THE FINE CITIZENS OF WAWAYANDA EXPRESS THEIR PROBLEMS WITH WATER SUPPLY AND THE QUALITY OF THEIR DRINKING WATER. I HAVE ATTEND MANY A TOWN BOARD MEETING AND PUBLIC HEARING'S CONCERNING THE MANY PROBLEMS OF WATER HERE IN WAWAYANDA. FOR EXAMPLE

THERE ARE SEVERAL WATER DISTRICTS AND COMMUNITY WELLS THAT HAVE HAD LONG STANDING PROBLEMS i.e.GREEVES RD - DENTON WELL, RYERSON RD-ARLUCK WELL, RIDGEBURY ESTATES-RIDGEBURY AREA, APPLE LANE, SUNRISE PARK LANE, TO NAME A FEW. THERE ARE MORE AREAS THROUGHOUT WAWAYANDA.THE PROBLEMS THAT WERE STATED OVER THE YEARS ARE FROM GOING DRY TO SALT COMTAMINATION.IN ADDITION, WELLS OUTPUT BEING DECREASE, DUE TO OVER DEVELOPMENT, FOUL SMELLING WITH SULFUR, HEAVY WITH SILT, CONTAMINATED WITH CHEMICALS FROM BALCHEM CORP, CONTAMINATED FROM THE FERTILIZER USED BY THE FARMERS, WELLS CONTAMINATED BY OUR TOWNS SALT STORAGE AREA.ETC.THE ORANGE COUNTY LANDFILL HAS BEEN REPORTED AS HAVING CONTAMINATED THE RESIDENTIAL WELLS THAT SURROUND IT.IN SHORT WAWAYANDA HAS HAD SOME REAL SERIOUS PROBLEMS CONCERNING THE AMOUNT AND QUALITY OF ITS WATER.

YOU MIGHT ASK, HOW DOES THIS CONCERN CALPINE? IT SIMPLE TO ANSWER.FIRST, WAWAYANDA HAS VERY LITTLE WATER RESOURCES BESIDE THE ECHO LAKE AREA AND THE PROMISED WATER FROM MIDDLETOWN (NEW WATER DISTRICT). IN YOUR STIPULATIONS AND THE FACT THAT YOU ARE LOOKING FOR WATER ON A PROPERTY IN WAWAYANDA (OFF OF GOLF LINKS RD) AND THAT YOU ARE REQUESTING THE 200,000 GALLONS PER DAY FROM THE CITY OF MIDDLETOWN. THIS HAS ME GREATLY CONCERN ABOUT THE VIABILITY AND FUTURE OF OUR TOWN.IT APPEARS YOU -CALPINE WANTS TO DEPLETE OUR WATER RESOURCES.THIS IS GROSSLY UNFAIR AND NOT VERY NEIGHBORLY I MIGHT ADD.

THIS 200,000 GALLONS THAT HAS BEEN PROMISED TO THE RESIDENTS, LET ME REPHRASE THAT, THE LONG STANDING TAX PAYING RESIDENTS OF WAWAYANDA.AS WELL AS, THOSE BUSINESS OWNERS (RESIDENTS) WHO HAVE HELD OFF STARTING BUSINESS PROJECT'S THESE MANY YEARS HERE IN WAWAYANDA.

THEY'VE HELD OFF WAITING FOR THE WATER DISTRICT TO EVOLVE.LET ME FILL YOU IN ABOUT HOW WE OBTAINED THAT 200,000GAL/DAY. WE HAD SOME OF OUR LAND ANNEX TO THE CITY OF MIDDLETOWN BECAUSE WE COULDN'T PROVIDE WATER AND SEWAGE TO COMMERCIAL OWNERS IN THAT AREA.FOR THAT WE WERE PROMISED WATER FROM THE CITY OF MIDDLETOWN TO HELP DEVELOPED THE RT17M-RT6 CORRIDOR AND TO HELP THE RESIDENTIAL AREA'S ON AND OFF THAT CORRIDOR WITH THEIR WATER PROBLEMS. NOW CALPINE WALKS IN WHILE THE LAST

DANCE (WAWAYANDA AND MIDDLETOWN SIGNING CONTRACTS) IS PLAYING HOPING TO GO HOME WITH THE PROM QUEEN AND HER COURT.THAT IS UNJUST AND NOT FAIR TO THE RESIDENTS OF WAWAYANDA.HOW WILL WE DEVELOPED OUR TAX RATABLES IN OTHER AREAS OF THE RT17M-RT6 CORRIDOR.HOW WILL WE SOLVE THE DRY WELL PROBLEMS ON APPLE LANE?
WE THE RESIDENTS OF WAWAYANDA HAVE EARN AND PAID FOR THE RIGHT TO THAT WATER.CALPINE HAS NOT EARNED THAT RIGHT? ARE YOU CURRENTLY PAYING TAXES HERE IN WAWAYANDA OR ARE YOU RENTING WITH OPTION TO BUY? IT APPEARS THAT YOU -CALPINE HAVE NOT EARNED THE RIGHT TO GOBBLE UP OUR WATER.YOU NEED TO MAKE OTHER ARRANGEMENTS FOR YOUR DAILY NEED OF 200,000 - 300,000 GALLONS PER DAY.
<u>LOCATION:</u> ALTHOUGH I CAN CLEARLY SEE WHY THIS SITE IS OF GREAT IMPORTANCE TO CALPINE. I AM NOT THAT SURE IT IS IN THE BEST INTEREST OF OUR TOWN AND THE SURROUND COMMUNITIES OF MIDDLETOWN AND WALLKILL.SECTION 168 OF THE PUBLIC SERVICE LAW, REQUIRES THAT THE SITING BOARD, IN REVIEWING AN ARTICLE X APPLICATION, MUST DETERMINE THE FOLLOWING:
EITHER CONSTRUCTION OF THE FACILITY IS REASONABLY CONSISTENT WITH THE MOST RECENT STATE ENERGY PLAN, OR THE FACILITY WAS SELECTED BASED ON THE FACT THAT ELECTRICITY GENERATED BY IT WILL BE SOLD INTO THE COMPETITIVE MARKET.IS CALPINE REASONABLY CONSISTENT WITH THE MOST RECENT SEP AND HOW DO WE SECURE THAT THIS CORPORATION WILL SELL ITS ELECTRICITY TO THE STATE OF NY WHEN WE ARE IN NEED OF IT.OR WILL CALPINE TAKE THE HIGHEST BIDDER (OUT OF STATE BUYER) WHEN ELECTRIC SUPPLIES ARE DOWN, i.e.SUMMER DEMAND?
HOW CAN THE NATURE OF THE PROBABLE ENVIRONMENTAL IMPACTS BE KNOWN UNTIL ALL THE FOLLOWING: CALPINE, MASADA, GEMPAK, ORANGE AND ROCKLAND AND ALL THE OTHER COMPANY'S THAT EMIT HEALTH HAZARDS INTO THE AIR WE BREATHE, BE CUMULATIVELY DETERMINED? CALPINE NEEDS TO CLEARLY DEMONSTRATE HOW IT WILL MINIMIZE ADVERSE ENVIRONMENTAL IMPACT (CUMULATIVE IMPACTS), GIVEN ENVIRONMENTAL AND OTHER PERTINENT CONSIDERATIONS?

HOW CAN THIS FACILITY DEMONSTRATE THAT IT WILL BE COMPATIBLE WITH THE PUBLIC HEALTH AND SAFETY? THIS IS ESPECIALLY INTERESTING SINCE ORANGE COUNTY HAS THE THIRD HIGHEST RATE OF CANCER IN NYS AND RANKS THE SECOND HIGHEST RATE WITH RESPECT TO RESPIRATORY DISEASE.

CONSTRUCTION AND OPERATION OF THIS FACILITY AND THE CUMULATIVE IMPACTS OF OTHER PLANTS IN THE AREA, WILL ONLY ADD TO THE EXISTING MEDICAL PROBLEMS.THEREFORE I FEEL IT IS TO GREAT OF A HEALTH RISK FOR THE RESIDENTS OF WAWAYANDA AND ITS SURROUNDING TOWNS.THE FACILITY THEREFORE IS NOT COMPATIBLE WITH THE PUBLIC HEALTH AND SAFETY.

THE COMPANY NEEDS TO DEMONSTRATE HOW IT CAN EFFECTIVELY REDUCE THE EMISSIONS OF PM2.5 HAZARDS.IN FACT, CALPINE NEEDS TO DEMONSTRATE HOW IT WILL GET RID OF THE ORGANIC COMPOUNDS REFERRED TO AS PRODUCTS OF INCOMPLETE COMBUSTION (PIC=S). IN ADDITION, SOME HAZARDOUS TRACE METALS WILL ALSO BE RELEASED ALONG WITH THE PIC=S.

IN 1997 THE EPA WAS FULLY AWARE OF THE PM2.5 RISK AND EFFECTS ON OUR HEALTH.IT HAS TAKEN THEN OVER 4 YEARS TO START TAKING ACTION IN THIS AREA.THE NY DPS NEEDS TO DO THE SAME.

THE DPS AND CALPINE MUST LOOK AHEAD IN THIS ARTICLE X CERTIFICATION PROCESS, YOU MUST BE PROACTIVE WITH RESPECT TO PM 2.5 OR LESS AND STATE THAT THE FACILITY WILL NOT DISCHARGE OR EMIT ANY POLLUTANTS IN VIOLATION OF EXISTING OR NEAR FUTURE REQUIREMENTS AND STANDARDS.YOU KNOW ABOUT THE DANGERS TO MANKIND THE PM 2.5 CAN CAUSE.HOW MANY SEVERE ASTHMA ATTACKS DO THE CHILDREN OF ORANGE COUNTY HAVE TO EXPERIENCE, HOW MANY HEART ATTACKS AND PREMATURE DEATH IN PEOPLE WITH PRE-EXISTING CARDIOVASCULAR DISEASE WILL IT TAKE BEFORE YOU ACT? WHY DON'T THE DPS, DEC , DOH AND CALPINE CONDUCT A COMPLETE AND THROUGH STUDY ON THE FOLLOWING ILLNESS'S BEFORE ISSUING THIS PERMIT: BRONCHITIS, EMPHYSEMAS, ASTHMA, AND OTHER PULMONARY DISEASES. A SUGGESTION FOR THE DPS, DEC, DOH AND CALPINE. SEND OUT QUESTIONNAIRES TO THE FOLLOWING: SCHOOL NURSES, DOCTORS OFFICE, COMMUNITY HEALTH CLINIC, EMERGENCY ROOMS, RISK MANAGEMENT PEOPLE IN OUR AREA (WORK, SCHOOLS, HOSPITAL, PRISONS, JAILS ETC.) INFECTION DISEASE PHYSICIANS AND NURSE PRACTITIONERS, ORANGE COUNTY HEALTH DEPARTMENT, AND OTHER RELATED INDIVIDUALS OR ORGANIZATIONS. IF I MAY AS TO BE BOLD TO SUGGEST THE FOLLOWING. ***GO AMMOMIA FREE!*** *THERE ARE COST EFFECTIVE AND FEASIBLE ALTERNATIVES AVAILABLE.JUST THINK CALPINE COULD REDUCE THE DEATH RATE AND ILLNESS ASSOCIATED WITH PM10, AND PM2.5. YOUR COMPANY WOULD NOT CONTRIBUTE AND AVOID 1,460 DEATHS ANNUALLY HERE IN NEW YORK DUE TO POWER PLANTS AND*

THEIR OPERATIONS.CALPINE WOULD ALSO NOT CONTRIBUTE TO THE 37,000 ASTHMA ATTACKS ANNUALLY HERE IN NEW YORK STATE. NOW THAT'S BEING A GOOD NEIGHBOR TO ORANGE COUNTY AND IT'S RESIDENTS.I KNOW MY TWO ASTHMATIC CHILDREN WOULD CERTAINLY BENIFIT BY THAT BOLD AND RESPONSIBLE MOVE BY CALPINE.MY HUSBAND WOULD ALSO APPRECIATE IT AS WELL, SINCE HE HAS HAD BY-PASS SURGERY AND A HEART ATTACK. I WOULD BE THANKFUL, SINCE CALPINE WOULD THEN HAVE REMOVED A SERIOUS HEALTH THREAT TO MY FAMILY. WHO MEAN THE WORLD TO ME.

JUST HOW WILL THE FACILITY CONTROL THE DISPOSAL OF SOLID AND HAZARDOUS WASTES? WHAT ABOUT AGAIN THE CUMULATIVE IMPACTS ON THE MONHAGEN BROOK AND THE WALLKILL RIVER.

HOW WILL THE DPS, DEC, DOH AND THE TOWN OF WAWAYANDA ENFORCE THE FACILITY TO OPERATE IN COMPLIANCE WITH STATE AND LOCAL LEGAL PROVISIONS.QUITE FRANKLY, NONE OF THE ABOVE AGENCIES HAVE DONE A BANG UP JOB TO DATE HERE IN ORANGE COUNTY.LETS SEE THERE WAS BALCHEM, ORANGE COUNTY LANDFILL, AL TURI LANDFILL, NEPERA, RSR, GENERAL ELECTRIC, MASADA, MIDDLETOWN CLASS 3 INACTIVE HAZARDOUS WASTE SITE.THIS IS BUT A FEW OF A LONG LIST HERE IN ORANGE COUNTY.THE TRACK RECORD SPEAKS FOR ITSELF.

THEREFORE, THE CONSTRUCTION AND OPERATION OF THE FACILITY AT THIS SITE MIGHT NOT BE IN THE PUBLIC'S INTEREST.

I WOULD LIKE TO KNOW THE ANSWER TO THE FOLLOWING QUESTIONS.WHAT WILL IS THE AMOUNT OF PM RELEASED FROM CALPINE'S PLANT? WILL IT DEPEND ON THE PERCENTAGE OF THE TIME IT OPERATES AT PEAK CAPACITY? WHAT IS THE EMISSION RATE OF THE INDIVIDUAL POWER-GENERATING TURBINES CALPINE WILL OPERATE? WHAT PERCENTAGE OF THE PARTICULATE MATTER WILL YOU EMIT THAT WILL BE LESS THAN PM10.HOW MANY TONS PER YEAR? SINCE NO POWER PLANT OPERATES AT PEAK CAPACITY 100% OF THE TIME.WHAT WILL THE AIR PERMIT REQUIRE THE PERCENTAGE BE? WHAT IS THE MAXIMUN AND WHAT IS THE MINIMUN TOTAL PER YEAR? WHAT WILL BE THE TOTAL AMOUNT PER YEAR? IS THE EMISSION RATE PROPORTIONAL TO YOUR MEGAWATT CAPACITY? WHAT IS THE ***TRUE*** *MEGAWATT CAPACITY OF THIS PLANT? HOW MANY OF THE DIRTY DOZEN-AIR POLLUTANTS WILL CALPINE EMIT? WHAT WILL THEIR PERCENTAGE BE AND TONS PER YEAR?*

I HAVE GREAT CONCERN ABOUT THE NATURAL GAS LINE THAT

YOU HAVE PROPOSED FOR YOUR PROJECT.THE ONE THING THAT STICKS OUT TO ME, IS THAT IF YOU USE THE RT6 CORRIDOR YOU WILL VIRTUALLY CAUSE GRID-LOCK IN THE RT6 TRANSPORTATION CORRIDOR.THIS ROUTE IS USED BY COMMUTERS WHO RESIDE IN THE FOLLOWING TOWNS AND HAMLETS:
GREENVILLE, JOHNSON, WESTTOWN, SOUTH CENTERVILLE, SLATE HILL AND PORT JERVIS AREA, AND MINISINK.
THESE AREAS ARE BEDROOM COMMUNITIES FOR PEOPLE WHO WORK IN NYC. ADDITIONALLY, THERE IS THE MINISINK VALLEY CENTRAL SCHOOL ON THE RT6 TRANSPORTATION CORRIDOR.HOW WILL CALPINES GAS LINE DISRUPTS THE DAILY WORKING OF THE SCHOOL? THE SCHOOL IS IN OPERATION FROM 06:30AM TILL 05:00PM MOST DAYS.THE BUSES RUN DURING THAT TIME.TEACHERS WILL NEED TO BE IN SCHOOL BEFORE THE CHILDREN ARRIVE.WHAT ARE CALPINES PLANS? HAVE THEY OUTREACHED TO THE SCHOOL DISTRICT TO MAKE A RISK ASSESSMENT? WHAT ARE CALPINES PLANS WITH RESPECT TO THE TRANSPORTATION CORRIDOR? WILL YOU BE RESPONSIBLE OR WILL YOUR SUBCONTRACTORS BE LEFT TO MAKE PLANS TO DEAL WITH LETS SAY AN EMERGENCY AT THE SCHOOL.i.e.BOMB THREAT.FIRE.MEDICAL EMERGENCY? I AM CONCERN BECAUSE I WILL HAVE TWO OF MY CHILDREN AT THAT SCHOOL DURING THAT TIME FRAME.HOW WILL I KNOW THAT THE COMPANY THAT INSTALLS THE PIPELINE WILL AS RESPONSIBLE TO WAWAYANDA AS CALPINE HAS STATED ON MANY OCCASIONS? WHAT RECOURSE WILL THE RESIDENTS AND TOWN HAVE IF THEY ARE NOT UP TO THE STANDARDS THAT WE SHOULD EXPECT WITH REGARD TO OUR HEALTH, SAFETY AND THE ENVIRONMENT.FOR THAT MATTER THE STANDARDS THAT CALPINE HAS EXPRESSED TO THE TOWN OF WAWAYNADA AT THE TOWN HALL MEETINGS, PUBLIC MEETINGS HELD BY CALPINE AND AT THE WAWAYANDA CITIZENS ADVISORY GROUPS GATHERINGS.

ON CLOSING, I HAVE OTHER CONCERNS WHICH I WILL EXPRESS AT THE MANY MEETING THAT WILL TAKE PLACE OVER THE NEXT 14 OR SO MONTHS.I AM TRULY LOOKING FORWARD TO A RESOLVE THAT ALL OF US COULD LIVE WITH HERE IN WAWAYANDA.
Sincerely,

Deborah Marie Glover

DEBORAH MARIE GLOVER
RESIDENT, CONCERN CITIZEN, WIFE AND MOTHER
CC DPS
DEC

CALPINE

EASTERN REGIONAL OFFICE
THE PILOT HOUSE, 2ND FLOOR
LEWIS WHARF
BOSTON, MASSACHUSETTS 021
617.723.7200
617.723.7635 (MAIN FAX)

February 22, 2001

Ms. Deborah Marie Glover
120 Greeves Road
New Hampton, NY 10958

Re: Response To January 8, 2001 Comments on Wawayanda Energy Center draft Stipulations.

Dear Ms. Glover:

Thank you for your comments regarding the Wawayanda Energy Center (letter of January 8, 2001), which you submitted in the context of comments on the proposed Stipulations. Please note that for some of the issues raised in your letter, we are not yet able to provide the results of studies, but in those cases we describe what studies will be done to address the concern. The forthcoming Article X Application will address these issues in more detail and will document all studies.

Water
Calpine has modified Stipulation 12, Paragraphs 5, 6, 23 and 24 to ensure that the Article X application addresses the project impacts on known water supplies in the town (both from Middletown and groundwater sources). As you know, we are currently undertaking a detailed evaluation of on-site groundwater. The results of that work will determine if the project water requirements can be obtained from on-site sources without affecting neighboring water supplies.

Energy Planning
Stipulation 14 requires Calpine to perform detailed modeling of the projected dispatch of the Wawayanda Energy Center into the New York power market. This modeling will be performed using data available from the most recent New York State Energy Plan.

PM-2.5
PM-2.5 is not a regulated pollutant and DEC refuses to be party to a stipulation that includes PM-2.5. In addition, there is no approved monitoring protocol, modeling techniques, data to permit measurement of current levels of PM-2.5, data to estimate of PM-2.5 emissions from the Project, or a standard against which PM-2.5 impacts can be judged. Although DEC has objected to the inclusion of PM-2.5, as provided in Paragraph 4 of the Preamble to the Stipulations, if a PM-2.5 regulation, ruling, or order becomes effective then Calpine will be required to demonstrate compliance with the regulation, ruling or order.

Public Health
Stipulation 1 was modified to require an analysis of available data on incidence of asthma in the local population.

Ammonia
Calpine proposes to use an aqueous ammonia solution in order to help control emission of nitrogen oxides down to the lowest achievable emission rate. Stipulation 1 requires modeling of ammonia emissions and Stipulation 5, Paragraph 18 requires an evaluation of emergency response capability in the event of an incident involving ammonia.

Solid and Hazardous Waste
The project will discharge process wastewater to the Middletown Water Pollution Control Plant, not Monhagen Brook. Stipulation 7 requires Calpine to evaluate impacts of project solid waste generation, including hazardous waste.

Air Emissions
Stipulation 1 requires that the Article X application include detailed estimates of air emissions.

Natural Gas Pipeline
The purpose of conducting analyses related to the pipeline under Article X is to provide the Siting Board with as complete an understanding of potential environmental impacts as possible. However, formal regulatory review and approval of the pipeline will involve a separate and distinct comprehensive environmental permitting process under the jurisdiction of the Federal Energy Regulatory Commission (FERC). That process includes a detailed study of alternative routes and numerous opportunities for public involvement.

Thank you again for your interest in the Wawayanda Energy Center. If you have any questions please do not hesitate to contact me.

Sincerely,

David A. Devine
Project Development Manager

Cc: Tina Palmero, NYSDOH
Chris Hogan, NYSDEC
Tom DeBlock, Town of Wawayanda

David Devine

From: Mathy Stanislaus [mstanisl@concentric.net]
Sent: Tuesday, January 09, 2001 4:46 PM
To: David Devine; Don Neal
Cc: steven_keller@dps.state.ny.us; steven_blow@dps.state.ny.us; robert_johnson@dps.state.ny.us; richard_powell@dps.state.ny.us; peter_seidman@dps.state.ny.us; paul_eddy@dps.state.ny.us; norman_morrisson@dps.state.ny.us; martin_cummings@dps.state.ny.us; jim_de_waal_malefyt@dps.state.ny.us; fred_ulrich@dps.state.ny.us; edward_schrom@dps.state.ny.us; dianne_cooper@dps.state.ny.us; daniel_downs@dps.state.ny.us; andrew_harvey@dps.state.ny.us; andrew_davis@dps.state.ny.us; alan_domaracki@dps.state.ny.us; Frank J. DeCotis; cmhogan@gw.dec.state.ny.us; David Devine; Christina C Palmero (E-mail); Don Neal; Henry M. Spliethoff; Anthony J. Grey; A. Kevin Gleason; Debra Glover I; Robert Henshaw
Subject: WCAG Comments to Calpine Stipluations

Stipulations Comments.doc

January 9, 2001

VIA E-MAIL ONLY

Dave Devine, Don Neal
Eastern Regional Office
The Pilot House, 2nd Floor
Lewis Wharf
Boston, Massachusetts 02110

Re: Wawayanda Energy Center Article X DPS Case 00-F-1256; Proposed Stipulations

On behalf of the Wawayanda Community Advisory Group (WCAG), attached is the WCAG comments to the Capine's Proposed Stipulations, Wawayanda Energy Center, December 7, 2000 (the "Stipulations"). Pursuant to an advancement of intervenor funds to the WCAG, Dr. Robert Henshaw and Enviro-Sciences Engineering, P.C. (the "WCAG's Consultants") were retained by the WCAG to provide technical assistance to review the Stipulations and the Preliminary Scoping Statement ("PSS").

The comments reflect the WCAG's identification of issues of concern, based on its outreach activities; the WCAG's Consultants recommendations based on its review of the PSS and Stipulations; and the WCAG's determination, in consultation with WCAG's Consultants,of recommendations appropriate to the Article X proceeding. During this process many issues were raised that, while technically outside the regulatory authority of Article X, were necessarily connected to the project. Of greatest concern to the WCAG is the manner in which routes will be selected, and the impacts analyzed, for the gas transmission pipelines. The WCAG will shortly issue a separate letter regarding all such issues and a proposed manner for addressing such issues.

Very truly yours,

Mathy V. Stanislaus (On behalf the WCAG)

cc: Debra Glover, WCAG
Dr. Robert Henshaw

Stipulation No. 1: Air Quality and Meteorology

Cumulative Air Impact Analysis

Conduct a cumulative impact analysis that includes significant stationary sources within 5 miles of the project that, at a minimum, includes the following facilities: Masada, Rever, Balchem, O&R, Reynolds, Gempak, Metal Yard Landfills, Quarry's, and Elvee Farm.

Climatological Data

p. 6, # 2(a): specify which existing and local climatological data sources are to be used. If Calpine finds it must use other than listed sources, all parties will be contacted at the earliest possible date, and before further calculations are initiated, to determine if such new source(s) are agreeable.

Opacity/Condensation Plumes

¶4, p. 10: Calpine should provide visual analysis of all steam/vapor plumes from the project, including from the dry cooling system. This analysis shall include the potential visual impact of secondary particulate formation associated with ammonia slip.

PM 2.5 Analysis

Conduct an analysis of the dispersion and impact of PM 2.5.

Inclusion of Non Combustion Air Emissions

The air quality issues associated with sources other than combustion sources, including the discharge of ammonia from storage tank loading/unloading operations, must be evaluated. This analysis must consist of an analysis of total ammonia slip associated with the SCR control technology and impacts of the ammonia in the atmosphere including secondary particulate formation.

Analysis of alternative air emissions technology

Calpine shall conduct an analysis of alternatives to its proposes SCR control technology that would achieve greater levels of control of particulates, NOx, and VOCs. At a minimum, this analysis must include an analysis of including SCONOx.

If the Proposed Project is determined to be a major source for hazardous air pollutants (HAPs) under the Clean Air Act, shall conduct an analysis of control technologies that would achieve HAPs control greater than the technology through a Case-by-Case MACT analysis. If the Proposed Project is determined **not** to be a major source HAPs, Calpine agrees to conduct an analysis of design and operational alternatives to reduce HAPs emissions from the stack and fugitive emissions. This analysis shall factor technical feasability, cost and increase HAPs removal.

Analysis of Impact of Duct Burners

If Calpine plans to use duct burners, it shall conduct an analysis of the air quality impacts (e.g., particulates, VOCs) associated with duct burners. This analysis shall include a comparison of particulate and VOCs emissions with and without the duct burners based on fuel combustion and electricity produced.

Environmental Justice Analysis

An environmental justice air quality analysis must be conducted that consists of the following factors:

1) all air emissions from the plant;

2) populations in closest proximity of the plant and include an analysis of the radii of particulate dispersion (PM 10 and PM 2.5);

3) for such populations, an analysis of the percentage of minority and low-income residents; and

4) for the population identified in 2, an analysis of the percentage of the population that suffers from incidence of asthma based on NYS Department of Health data and local health departments data, if available,

Net Air Emissions Reduction Analysis

Calpine shall conduct analysis (e.g., PROMOD) of the potential of displacement of older, less efficient and more polluting plants by the Project and the regional air quality impacts. This analysis must include the emissions of all proposed Article X projects in the region.

Analysis of start-up conditions

Calpine agrees to provide an analysis of the air emissions during start-up, and the projected number of start-up events on an annual basis. If Calpine expects to operate the CTGs independently, such analysis shall include analysis of the start up of each CTG and projected number of start-up events for each CTG.

Stipulation No. 2: Cultural Resources

Calpine should consult with the Orange County Historian, Ted Sly and the Waywayanda Town Historian, Emma Duvall and Assistant Historians, Elizabeth Kirby and Gladys Hall, and Betty Curtis.

Stipulation No. 3: Electric Transmission Facilities

Calpine's Interconnection Study should either be submitted under PSL Article VII, or, if such is not subject to PSL Article VII, Calpine agrees to comply with the Article VII requirements and guidelines with respect to analysis of environmental impacts, mitigation measures and post-construction maintenance.

¶ 11, p. 16: Calpine shall provide one copy of the final scope of Interconnection Study to the WCAG.

¶ 8(a), p. 15: After 'significant', add: hydrological, biological, and aesthetic (at the least)...

¶ 9 (new, proposed): Calpine agrees to consider alternate routes for interconnections. Two such alternates will include: a) exiting the project to the northeast and thence to the southeast adjacent to the O&R ROW, and b) exiting the project to the northeast adjacent to the O&R ROW and thence southeast along the north side of the abandoned Lackawana rail road bed. All stipulations regarding studies and reports of interconnections shall pertain to alternate routes as well.

¶21, p. 17: This analysis should include projected electric and magnetic levels at the edge of the rights-of-way and at the closest residence in proximity to the proposed transmission interconnection. This should be modified to clearly state that existing loads at probable peaks will be used as a basis for calculations of electric and magnetic field strengths.

Stipulation No. 4: Gas Transmission Facilities

¶3. Add to list: WCAG needs to receive the detailed route, and to participate in planning discussions at the earliest possible time. WCAG emphasizes that they are very concerned about routing issues. They do not want to be presented with a *fait accompli.*

¶ 4 (proposed new): If any interconnection falls beneath threshold for applicability of PSL Article VII, Calpine agrees that studies and subsequent report will meet standards and criteria of Art. VII and utilize an EM&CP such as required under Art. VII. Regardless of the regulatory requirements applicable to the gas transmission facilities, Calpine, or, should Calpine not construct the pipeline, Calpine in coordination with the entity that shall build and operate the pipeline, shall enter into an agreement with the WCAG for consultation regarding the proposed transmission route. Such agreement shall specify the consultation process and provide for a technical assistance fund, in a amount that is mutually agreed upon, to enable the WCAG to evaluate all proposed transmission routes for its impacts and alternative routes.

Stipulation No. 5: Land Uses and Local Laws

¶ 1(b): add: Copies of all correspondence with the Planning Boards of Town of Waywayanda and City of Middletown with respect to zoning shall be incorporated into the application.

¶ 1. Add: (f) maps of socio-economics (including but not limited to housing, demographics, social conditions) within a 2 mile radius of the Project. (Note this might better be combined into Stip 7.)

¶ 1(g) (new and proposed): maps of present and proposed Town and City water districts.

¶ 6: The study of "cumulative associated multiple facility land use impacts" of the Project must

include the following facilities: Masada, Rever, Balchem, O&R, Reynolds, Gempak, Metal Yard Landfills, Quarry's, and Elvee Farm.

New ¶: Calpine will provide a model of the proposed site and Project that includes a depiction of surrounding topography at an appropriate scale to portray the magnitude of Project.

New ¶Alternative Site Analysis: Calpine agrees to conduct an analysis of alternative sites for the proposed project or provide a description of its site evaluation process, and other sites considered in proximity to the proposed site and within the Town of Wawayanda.

Stipulation No. 6: Noise

In ¶ 2, add the following to areas to be examined for noise impacts: David Moore Heights, Phillips Mews, Canterbury Knoll, Tudor Time School, Sutton Hill, Ryerson Road And Its Off Streets, Apple Lane(Behind Fulton Chevy Dealer, Mcveigh Road, All Of Genung Street And Its Off Streets, Shutt Road, and Airport Road. Note: 1081 Dolsontown Road is inaccurately described.

¶ 7, p. 22: Add: Such measures will include consideration of alternative placement of the condenser facility on site, and development of coverings for the facility which reduce aesthetic impacts.

¶ 8, p. 22: Delete: 'low frequency.'

¶ 2, p. 23: WCAG should examine list, and specify any additions right now.

¶ 5.1: Calpine should provide an analysis of noise mitigation measures during construction, including, the use of muffler systems on its construction equipment, construction schedules developed in consultation with the community to minimize noise impacts.

Modify the following language: "For areas where estimated construction sounds levels are expected to exceed the existing background sound level by more that 10 dBA, . . " add "a mitigation plan will be established to minimize such exceedances."

¶ 5.2: A comparative noise assessment must be developed that compares the noise impacts from the construction and operation of the Project to significant local activities. At a minimum, it is proposed that the comparative noise assessment include: Middletown Racetrack during summer months, sound level of fireworks and National Guard C5A Airplanes.

Stipulation No. 7: Social and Economic Implications

¶1 (new and proposed): Calpine will the existing social and economic conditions within a 2 mile radius. Study should contain a map as appropriate; see Stip. 5.

¶¶ 1, 3 and 4: These analyses must include the total number of jobs created, the type of jobs created (e.g., construction, technical), the total number and type of jobs expected to be filled by Orange County residents.

¶¶ 9 and 10: Calpine must specify each affected school district.

¶¶ 11, 12, and 13: Calpine must provide a breakdown of its financial responsibilities during construction and for the life of the Project.

New ¶ 19, p. 29: (new and proposed): Calpine shall provide a description of all projected emergency events associated with the Project, an analysis of necessary emergency services due to such emergency events and whether such emergency services can be fulfill by existing local emergency response capacity. Such analysis must include the potential for reasonable multi-facility emergency events, e.g., involving both Masada and the Project.

New ¶ 20: An assessment of the electricity rate benefits to local residents and commercial customers from the Project and energy efficiency project for local residents and commercial customers that could be supported by the project.

Stipulation No. 8: Geology et al.

¶ (i): Insert at beginning: 'For the project site and all interconnections, '

new ¶: Such preliminary blasting plan and projected impacts, along with a proposed blasting schedule will be presented to the WCAG for its comments. If the WCAG identifies needed changes or problems, Calpine agrees accommodate all feasible requests.

¶(j): Calpine shall conduct a structural survey of all areas and structures identified as potentially impacted from blasting and provide such to the WCAG. All areas or structures that are identified shall be inspected subsequent to each blasting event. Upon request, Calpine agrees to a third party assessment of potentially impacted areas or structures to assess the presence and extent of damage. Should damage arise to any areas or structures from blasting activities, Calpine agrees to conduct all necessary activities to restore such to pre-blasting condition. If restoration is not possible, Calpine agrees to provide full compensation for the value of such damage. For purposes of determining the value of damage, at the request of the owner of such damaged area or structure, Calpine agrees to hire a mutually agreed-upon independent third party assessor, whose assessment shall be determinative in assessing the value of the damage.

Stipulation No. 9: Terrestrial Ecology

¶ 13, p. 34: (new): An analysis of various stack lighting methods which might mitigate bird collision mortality.

Stipulation No. 10: Traffic

¶ 1.(b): The following additional intersections shall be evaluated: Dolsontown/Genung, Dolsontown/Schutt, Dolsontown/Airport, Dolsontown/E.Main, Dolsontown/County Route 78, Dolsontown/Dolson Ave.(17m).

¶ 1: A pre-construction assessment of all roadways to be used for construction of the project shall be conducted. Calpine agrees to restore all identified roadways to pre-construction condition.

Stipulation No. 11: Aesthetics

¶3(d): Calpine will confer with the WCAG in selecting viewpoints.

¶. Project Footprint:

a. If present placement of the generating facility and the switchyard will require significant excavation of the existing hill, and maintenance of steep slopes later, consider moving generating facility to the southeast. The object here is to try to maintain the ground water supply to the Moore's property minimally disrupted.

b. To reduce visual presence from the south, plant should be dug into the ground as deeply as possible.

c. Consider routing the transmission line exiting the switchyard toward the north until adjacent to the O&R ROW, then either follow that ROW to the southeast until intercepting the Coopers Corners line, or follow the abandoned Lackawana rail road bed to the southeast, placing the line in the lowland to the north of the existing forest for aesthetic screening. (See Stipulation 3, paragraph 9.)

d. Consider possible advantages of moving the cooling condenser to the southeast until it is about flush with the SE face of the generating facility. Reasoning: this may permit constructing at a lower elevation, and also may reduce noise to surrounding area. It may also permit relocating the switchyard to the north, shortening the transmission route and reducing necessary excavation of the hill to the northeast of the generating facility.

e. Consider using excavated material on site to create an earth berm between Dolsontown Road and the switchyard.

f. How will cut steep slopes be maintained?

Condenser Structure:
Item g. Condenser should be fully enclosed with visually continuous siding. If the manufacturer does not plan, or has no knowledge of such siding, and there is concern about adequate air movement into the structure, Calpine should sponsor studies of siding options that meet both visual and air flow needs.

¶ 10, p. 40 (new and proposed): WCAG will be permitted to name two members of the 'Public Assessment Panel' if such is convened as part of the Corps of Engineers aesthetic assessment.

Stipulation No. 12: Water Resources

¶ 5(b), p. 41: Change 'and groundwater' to 'and on the entire aquifer.'

¶9: Calpine agrees that the analysis of potential water supply options shall include: the potential of effluent from the water pollution control plant and contaminated aquifer water associated with the Orange County Sanitary Landfill, and Hudson Superior Landfill being used for cooling purposes.

¶ 6(a), p. 42: After 'existing', add 'and possible future'

¶ 6: This analysis must include an assessment of the impacts to the water service plan referred to as "Wawayanda Water Loop 1." The analysis of impacts must include the potential for diminished service to existing residential and commercial customers identified in such plan and the impact to all future users identified in such plan.

¶ existing 22, p. 44: this should be modified to require presentation and analysis of the entire aquifer unless this is sufficiently covered in other stips.

¶ existing 22, p. 44: this stipulation should be modified to require estimation of the total recharge rate for the entire aquifer, and the rate of delivery of water from recharge to users.

¶ 24, p. 45: This analysis must consider water levels based on the 1999 drought. After 'private water supplies' insert: ", including especially on neighboring properties,'.

¶ 33 - 35, p. 46: move all to the Terrestrial Ecology Section, and retitle that section 'Aquatic and Terrestrial Ecology'.

¶ existing 36, p. 46: After 'wetlands' insert: 'and all wetlands smaller than either federal or state minimums,'

¶ existing 38, p. 46: Delete 'federal and state regulated'

¶ existing 42, p. 47: After 'potential' insert 'deicing salt,'; after 'regarding' insert 'possible'.

¶ 45, p. 47 (new and proposed): An analysis of means of assuring water recharge of any onsite wetland adequate to assure maintenance of biological integrity.

Stipulation No. 14: System Production

¶ 1: Such analyses must include an assessment of available transmission capacity.

¶ 4: Calpine shall provide an analysis of the projected annual periods of operation. Such analysis shall include periods of start up and shut down due to supply/NYSISO conditions and maintenance.

New ¶ 5: WCAG desires a stipulation that Calpine will sell generated power only into the NYS ISO distribution system, i.e. sell basically only to New York consumers.

Stipulation No. 15: Combined Impacts

¶: 4, p. 5 (new and proposed): Such study also will propose means of mitigating or eliminating any discovered or projected cumulative impacts.

II. Affirmative Stipulations

1. Calpine agrees to fully study and consider adopting alternatives for the interconnections which might mitigate visual, electrical and magnetic field exposure, or other issues. Two such alternates will include: a) exiting the project to the northeast and thence to the southeast adjacent to the O&R ROW, and b) exiting the project to the northeast adjacent to the O&R ROW and thence southeast along the north side of the abandoned Lackawana rail road bed. All stipulations regarding studies and reports of interconnections shall pertain to alternate routes as well as those proposed in the PSS.

2. Calpine agrees to comply with reasonable requests regarding its operation made by Regulatory agencies reviewing the Masada Project application. (Essentially, this is intended to address cumulative impact issues through operational modifications at both facilities.)

3. Calpine agrees to install siding or skirts around the condenser facility which mitigate aesthetic impact. If such siding does not now exist, Calpine agrees to fund such development studies.

4. Calpine agrees that if any of the onsite wetland needs to be removed, that it will be replaced acre for acre, preferably contiguous to and continuous with the onsite wetland. Modern wetland replacement methodologies, particularly with respect to harvesting the hydric soils in the wetland to be obliterated, acceptable to DEC and to the WCAG will be employed.

CALPINE

EASTERN REGIONAL OFFICE
THE PILOT HOUSE, 2ND FLOOR
LEWIS WHARF
BOSTON, MASSACHUSETTS 02110
617.723.7200
617.723.7635 (MAIN FAX)

February 6, 2001

Mathy V. Stanislaus
Enviro-Sciences, Inc.
199 Arlington Place, Suite C
Staten Island, NY 10303

Dear Mr. Stanislaus:

We have reviewed the comments on the Proposed Stipulations for the Wawayanda Energy Center that you submitted on behalf of the Wawayanda Citizens Advisory Group (WCAG). We appreciated the opportunity to review your comments and to discuss them at a meeting with the WCAG on January 15, as well as at the joint meeting with DEC, DPS and DOH staff and representatives from the Town of Wawayanda on January 17.

The attached document provides our formal written response to your comments. As you will see, for the most part we have either incorporated your comments into the Stipulations or identified existing language in the Stipulations that, in our view, effectively addresses the issues raised.

Calpine truly appreciates the commitment made by the WCAG on the stipulations. The comments made by the WCAG and its consultants will ensure that the scope of the Article X application adequately addresses the interests of the community.

Sincerely,

David A. Devine
Project Development Manager

C: Tom DeBlock, Town of Wawayanda
Tina Palmero, New York State Department of Public Service
Bill Little, New York State Department of Environmental Conservation

Stipulation No. 1: Air Quality and Meteorology

Cumulative Air Impact Analysis

Conduct a cumulative impact analysis that includes significant stationary sources within 5 miles of the project that, at a minimum, includes the following facilities: Masada, Rever, Balchem, O&R, Reynolds, Gempak, Metal Yard Landfills, Quarry's, and Elvee Farm.

All these facilities have now been included in Paragraph 2(n).

Climatological Data

p. 6, # 2(a): specify which existing and local climatological data sources are to be used. If Calpine finds it must use other than listed sources, all parties will be contacted at the earliest possible date, and before further calculations are initiated, to determine if such new source(s) are agreeable.

The climatological sources to be used are listed in Section 4.1 of the Air Modeling Protocol, and the air quality data are listed in Table 4-1 of the Air Modeling Protocol, a draft of which was sent to the WCAG on 22 December 2000. The meteorological stations are Stewart Airport and Orange County Airport. The air quality monitoring stations are Bellayre Mtn., Albany, Mt. Ninham, and Saugerties. Because the Protocol will essentially become part of the stipulations, the stations are not written in paragraph 2(a).

Opacity/Condensation Plumes

¶4, p. 10: Calpine should provide visual analysis of all steam/vapor plumes from the project, including from the dry cooling system. This analysis shall include the potential visual impact of secondary particulate formation associated with ammonia slip.

There is no introduction of moisture into the atmosphere from the air-cooled condenser, and thus no change is proposed in the language of paragraph 4. The visual impact due to downwind particulate formation, using the most up-to-date modeling techniques, is subsumed in the analysis that is stipulated under paragraph 2(i). (Note that the exhaust stack emission rates for PM-10 conservatively include condensable particulates.) No change in the stipulations is proposed.

PM 2.5 Analysis

Conduct an analysis of the dispersion and impact of PM 2.5.

PM-2.5 is not a regulated pollutant and DEC refuses to be party to a stipulation that includes

PM-2.5. In addition, there is no approved monitoring protocol, modeling techniques, data to permit measurement of current levels of PM-2.5, data to estimate of PM-2.5 emissions from the Project, or a standard against which PM-2.5 impacts can be judged. Although DEC has objected to the inclusion of PM-2.5, as provided in Paragraph 4 of the Preamble to the Stipulations, if a PM-2.5 regulation, ruling, or order becomes effective then Calpine will be required to demonstrate compliance with the regulation, ruling or order.

Inclusion of Non Combustion Air Emissions

The air quality issues associated with sources other than combustion sources, including the discharge of ammonia from storage tank loading/unloading operations, must be evaluated. This analysis must consist of an analysis of total ammonia slip associated with the SCR control technology and impacts of the ammonia in the atmosphere including secondary particulate formation.

Paragraph 2(o) already addresses the issue of worst-case ammonia emissions related to accidental release (see also Air Modeling Protocol section 5.7). Ammonia stack emissions are already included as part of the non-criteria pollutant study (see section 5.1 in the Air Modeling Protocol). In terms of ammonia discharges from loading/unloading operations, Calpine will provide a detailed description of the methods of ammonia transfer from truck to tank, protective equipment used, and a qualitative description of ammonia emissions during this process (see new Paragraph 6 in Stipulation 1). Finally, secondary particulate formation is conservatively included within the stack PM-10 emission rate. Thus, no changes in the stipulations are proposed.

Analysis of alternative air emissions technology

Calpine shall conduct an analysis of alternatives to its proposed SCR control technology that would achieve greater levels of control of particulates, NOx, and VOCs. At a minimum, this analysis must include an analysis of including SCONOx.

Paragraph 2(d) requires an analysis of alternative control technologies. This paragraph was modified to specifically reference SCONOx.

If the Proposed Project is determined to be a major source for hazardous air pollutants (HAPs) under the Clean Air Act, shall conduct an analysis of control technologies that would achieve HAPs control greater than the technology through a Case-by-Case MACT analysis. If the Proposed Project is determined **not** to be a major source HAPs, Calpine agrees to conduct an analysis of design and operational alternatives to reduce HAPs emissions from the stack and fugitive emissions. This analysis shall factor technical feasability, cost and increase HAPs removal.

Even though the Project will fall below the MACT thresholds, Calpine will implement the

technology that meets MACT requirements for organic HAPs – an oxidation catalyst. Calpine will document the HAP emissions with and without the proposed oxidation catalyst. See new language to this effect in Paragraph 2(d).

Analysis of Impact of Duct Burners

If Calpine plans to use duct burners, it shall conduct an analysis of the air quality impacts (e.g., particulates, VOCs) associated with duct burners. This analysis shall include a comparison of particulate and VOCs emissions with and without the duct burners based on fuel combustion and electricity produced.

Calpine does not plan to use duct burners, and thus the analysis will not be necessary. Calpine's Air Modeling Protocol, to which the Project must adhere, already shows that duct burners have been eliminated. No change in the stipulations is therefore proposed.

Environmental Justice Analysis

An environmental justice air quality analysis must be conducted that consists of the following factors:

1) all air emissions from the plant;

2) populations in closest proximity of the plant and include an analysis of the radii of particulate dispersion (PM 10 and PM 2.5);

3) for such populations, an analysis of the percentage of minority and low-income residents; and

4) for the population identified in 2, an analysis of the percentage of the population that suffers from incidence of asthma based on NYS Department of Health data and local health departments data, if available,

Environmental Justice is a requirement of the PSD program. The EJ analysis must be based on EPA Region 2 guidance documents. Calpine will conduct such an environmental justice analysis as more fully described in Section 5.8 of the Air Modeling Protocol. The provisions of the fourth paragraph in the above comment have been included in a general, new Paragraph 7. Note that the EJ analysis will consider PM-10 but not PM-2.5, as discussed earlier in our response to the WCAG comment on "PM-2.5 Analysis."

Net Air Emissions Reduction Analysis

Calpine shall conduct analysis (e.g., PROMOD) of the potential of displacement of older, less efficient and more polluting plants by the Project and the regional air quality impacts. This analysis must include the emissions of all proposed Article X projects in the region.

This analysis is addressed in Stipulation 14 (see all 3 paragraphs).

Analysis of start-up conditions

Calpine agrees to provide an analysis of the air emissions during start-up, and the projected number of start-up events on an annual basis. If Calpine expects to operate the CTGs independently, such analysis shall include analysis of the start up of each CTG and projected number of start-up events for each CTG.

In its final Air Modeling Protocol, Calpine will include backup calculations for the potential-to-emit data that make explicit the assumptions related to startup. The potential-to-emit data in the Application will include startups and shutdowns.

Stipulation No. 2: Cultural Resources

Calpine should consult with the Orange County Historian, Ted Sly and the Waywayanda Town Historian, Emma Duvall and Assistant Historians, Elizabeth Kirby and Gladys Hall, and Betty Curtis.

Calpine will consult with all of the above. See change in the preamble to Stipulation 2.

Stipulation No. 3: Electric Transmission Facilities

Calpine's Interconnection Study should either be submitted under PSL Article VII, or, if such is not subject to PSL Article VII, Calpine agrees to comply with the Article VII requirements and guidelines with respect to analysis of environmental impacts, mitigation measures and post-construction maintenance.

Under 16 NYCRR 1000.2(i), the electrical interconnection will be an "offsite electrical facility" if it is not subject to PSL Article VII. Calpine is already required to address the interconnect to the new substation in as much detail as the Project. Thus, no changes to stipulation language are proposed.

¶ 11, p. 16: Calpine shall provide one copy of the final scope of Interconnection Study to the WCAG.

Calpine commits to providing a copy of the final scope of the Interconnection Study to the WCAG.

¶ 8(a), p. 15: After 'significant', add: hydrological, biological, and aesthetic (at the least)...

All environmental aspects will be covered, but the purpose of the electric transmission stipulation is system reliability, not environmental impact. Environmental impact is addressed inasmuch as the Project's electric transmission facilities fall under the definition

of "interconnection" for purposes of environmental study. The scope of environmental studies related to the interconnections is addressed in each stipulation. Therefore, no separate reference is necessary.

¶ 9 (new, proposed): Calpine agrees to consider alternate routes for interconnections. Two such alternates will include: a) exiting the project to the northeast and thence to the southeast adjacent to the O&R ROW, and b) exiting the project to the northeast adjacent to the O&R ROW and thence southeast along the north side of the abandoned Lackawana rail road bed. All stipulations regarding studies and reports of interconnections shall pertain to alternate routes as well.

Calpine will consider alternative routes. See the new language in Stipulation 13 addressing this issue.

¶21, p. 17: This analysis should include projected electric and magnetic levels at the edge of the rights-of-way and at the closest residence in proximity to the proposed transmission interconnection. This should be modified to clearly state that existing loads at probable peaks will be used as a basis for calculations of electric and magnetic field strengths.

The PSC's policy on EMF already states that the right-of-way edge is the point at which EMF prudent avoidance guidelines are implemented. By saying that the EMF analysis will be based on "summer normal, winter normal, and short term emergency" conditions, the stipulations address probable peaks.

Stipulation No. 4: Gas Transmission Facilities

¶3. Add to list: WCAG needs to receive the detailed route, and to participate in planning discussions at the earliest possible time. WCAG emphasizes that they are very concerned about routing issues. They do not want to be presented with a *fait accompli*.

While Calpine encourages the WCAG to participate in the planning process for the pipeline interconnection, that facility is not subject to Article X approval. Calpine's Article X application will show a possible route for the pipeline, and Calpine will provide that information to the WCAG. The purpose of conducting analyses related to the pipeline under Article X is to provide the Siting Board with as complete an understanding of potential environmental impacts as possible. However, formal regulatory review and approval of the pipeline will involve a separate and distinct comprehensive environmental permitting process under the jurisdiction of the Federal Energy Regulatory Commission (FERC). That process includes a detailed study of alternative routes and numerous opportunities for public involvement. Calpine will participate in the process and commits to working with the WCAG during the FERC proceeding.

¶ 4 (proposed new): If any interconnection falls beneath threshold for applicability of PSL Article VII, Calpine agrees that studies and subsequent report will meet standards and criteria of Art. VII and utilize an EM&CP such as required under Art. VII. Regardless of the regulatory requirements applicable to the gas transmission facilities, Calpine, or, should Calpine not construct the pipeline, Calpine in coordination with the entity that shall build and operate the pipeline, shall enter into an agreement with the WCAG for consultation regarding the proposed transmission route. Such agreement shall specify the consultation process and provide for a technical assistance fund, in a amount that is mutually agreed upon, to enable the WCAG to evaluate all proposed transmission routes for its impacts and alternative routes.

The process for the pipeline will be FERC jurisdictional, not subject to Article VII. Calpine will participate in the process and commits to working with the WCAG during the FERC proceeding.

Stipulation No. 5: Land Uses and Local Laws

¶ 1(b): add: Copies of all correspondence with the Planning Boards of Town of Waywayanda and City of Middletown with respect to zoning shall be incorporated into the application.

This provision has been written into the local law consultation section -- Paragraph 5(e).

¶ 1. Add: (f) maps of socio-economics (including but not limited to housing, demographics, social conditions) within a 2 mile radius of the Project. (Note this might better be combined into Stip 7.)

This information will be included as part of Stipulation 7 (Socioeconomics). See first comment under that Stipulation for more details.

¶ 1(g) (new and proposed): maps of present and proposed Town and City water districts.

See the proposed language revision – new paragraph 1(f).

¶ 6: The study of "cumulative associated multiple facility land use impacts" of the Project must include the following facilities: Masada, Rever, Balchem, O&R, Reynolds, Gempak, Metal Yard Landfills, Quarry's, and Elvee Farm.

Calpine will include all existing facilities within a 2-mile radius as part of its land use study. See Paragraph 1. Cumulative impacts related to the proposed Masada project will be covered pursuant to Paragraph 7.

New ¶: Calpine will provide a model of the proposed site and Project that includes a depiction of surrounding topography at an appropriate scale to portray the magnitude of Project.

Calpine proposes to show computer-modeled bird's-eye views to achieve this effect as part of

the visual resources study. This technique is effective in portraying the magnitude of the project.

New ¶Alternative Site Analysis: Calpine agrees to conduct an analysis of alternative sites for the proposed project or provide a description of its site evaluation process, and other sites considered in proximity to the proposed site and within the Town of Wawayanda.

As required by 16 NYCRR 1000.2(o) and 1001.2(d)(2) for private applicants, Calpine will analyze alternative sites under its ownership or control.

Stipulation No. 6: Noise

In ¶ 2, add the following to areas to be examined for noise impacts: David Moore Heights, Phillips Mews, Canterbury Knoll, Tudor Time School, Sutton Hill, Ryerson Road And Its Off Streets, Apple Lane (Behind Fulton Chevy Dealer, Mcveigh Road, All Of Genung Street And Its Off Streets, Shutt Road, and Airport Road. Note: 1081 Dolsontown Road is inaccurately described.

The proposed noise receptor points are representative of the nearest locations. At the other locations named above, the facility's noise levels would be lower than those at the proposed points. Calpine's analysis will include isopleths on a dBA scale that would permit the estimation of noise levels at these and other locations.

Based on the Project layout, the distance to 1081 Dolsontown Road (and for all receptor points) will be considered separately for each noise-producing source. The noise protocol has been re-worded, identifying the nominal distance between a point within the site and the 1081 Dolsontown Road property as 700 feet.

¶ 7, p. 22: Add: Such measures will include consideration of alternative placement of the condenser facility on site, and development of coverings for the facility which reduce aesthetic impacts.

Stipulation 13, Paragraph 3 was modified. Relocation, siding or skirts around the air-cooled condenser will be qualitatively evaluated from the point of view of noise, operations/economics, and aesthetics.

¶ 8, p. 22: Delete: 'low frequency.'

Low frequency noise annoyance is analyzed <u>in addition to</u> general community complaint potential (Modified CNR Method). To remove low frequency noise annoyance would reduce the scope of analysis.

¶ 2, p. 23: WCAG should examine list, and specify any additions right now.

¶ 5.1: Calpine should provide an analysis of noise mitigation measures during construction, including, the use of muffler systems on its construction equipment, construction schedules developed in consultation with the community to minimize noise impacts.

Paragraph 5.1 of the Noise Impact Assessment Protocol was modified to address the comment.

Modify the following language: "For areas where estimated construction sounds levels are expected to exceed the existing background sound level by more that 10 dBA, . . " add "a mitigation plan will be established to minimize such exceedances."

The mitigation evaluation provided in the final paragraph of Section 5.1 of the Noise Impact Assessment Protocol will subsume this request, and thus no change is proposed.

¶ 5.2: A comparative noise assessment must be developed that compares the noise impacts from the construction and operation of the Project to significant local activities. At a minimum, it is proposed that the comparative noise assessment include: Middletown Racetrack during summer months, sound level of fireworks and National Guard C5A Airplanes.

To the degree that Calpine can quantify the noise produced by significant local activities, this noise level comparison will be made. Calpine will investigate this and will report available results to the WCAG. The protocol has been adjusted accordingly through a new paragraph 5.3.

Stipulation No. 7: Social and Economic Implications

¶1 (new and proposed): Calpine will the existing social and economic conditions within a 2 mile radius. Study should contain a map as appropriate; see Stip. 5.

The recommendation is accepted. In addition to the Environmental Justice data to be presented in the PSD analysis, Calpine will describe and map, as appropriate, for each census tract whose geographic center is within a 2 mile radius of the Project site, the following parameters: population, age distribution, sex, marital status, percent minority vs. percent non-Hispanic white, household type and size, tenure of housing units, and persons per occupied housing unit. The latest available 100% census count will be used. Also, the following will be mapped on the basis of the latest available sample counts: place of work, educational attainment, and household income (as a distribution and median). In addition, Calpine will use any Orange County Planning Department data that is adequate and more recent than available census data.

¶¶ 1, 3 and 4: These analyses must include the total number of jobs created, the type of jobs created (e.g., construction, technical), the total number and type of jobs expected to be

filled by Orange County residents.

"Discipline" in these paragraphs already refers to the type of job created. See the stipulation for amended language related to employment of Orange County residents in Paragraph 6. It cannot responsibly be predicted whether operational employees will reside or currently reside in Orange County. However, Calpine prefers to staff plants from the local workforce.

¶¶ 9 and 10: Calpine must specify each affected school district.

Paragraphs 9 and 10 were revised to address the comment.

¶¶ 11, 12, and 13: Calpine must provide a breakdown of its financial responsibilities during construction and for the life of the Project.

Calpine is financially responsible for the cost of constructing and operating the Project. Calpine will also be financially responsible for taxes and other payments, which are not appropriately addressed in the Article X process.

New ¶ 19, p. 29: (new and proposed): Calpine shall provide a description of all projected emergency events associated with the Project, an analysis of necessary emergency services due to such emergency events and whether such emergency services can be fulfill by existing local emergency response capacity. Such analysis must include the potential for reasonable multi-facility emergency events, e.g., involving both Masada and the Project.

See the proposed language revisions to paragraph 18. Calpine is not aware of any reasonable multi-facility emergency events. Coordination with the LEPC has been included into paragraph 18.

New ¶ 20: An assessment of the electricity rate benefits to local residents and commercial customers from the Project and energy efficiency project for local residents and commercial customers that could be supported by the project.

Stipulation 14, Paragraph 1 requires an assessment of electricity prices. Lower prices would bring electricity rate benefits to local customers. Energy efficiency projects are not within the scope of Article X.

ADDITIONAL WCAG COMMENT: Examination of recovering waste heat from the Project to serve adjacent existing and future commercial and residential users. The WCAG believes that if some of the waste heat could be recaptured and used locally, it could both improve the economics of the power plant, and spur economic development of the area, and therefore have beneficial socioeconomic consequences.

As a combined cycle plant, the Wawayanda Energy Center will maximize its recapture of

waste heat to power a steam turbine. In terms of a steam diversion arrangement, the Project will not operate continuously and therefore would not be expected to produce a reliable steam source. Furthermore, cogeneration is most economical when a major industrial load with constant and high steam demand is located adjacent to the cogeneration plant, which is not the case for the Project.

Stipulation No. 8: Geology et al.

¶ (i): Insert at beginning: 'For the project site and all interconnections, '

Per the definition in the Preamble, unless otherwise noted each stipulation applies to the project site and all interconnections; therefore no change is necessary.

new ¶: Such preliminary blasting plan and projected impacts, along with a proposed blasting schedule will be presented to the WCAG for its comments. If the WCAG identifies needed changes or problems, Calpine agrees accommodate all feasible requests.

This material will be included with the Article X application for review and comment by the WCAG.

¶(j): Calpine shall conduct a structural survey of all areas and structures identified as potentially impacted from blasting and provide such to the WCAG. All areas or structures that are identified shall be inspected subsequent to each blasting event. Upon request, Calpine agrees to a third party assessment of potentially impacted areas or structures to assess the presence and extent of damage. Should damage arise to any areas or structures from blasting activities, Calpine agrees to conduct all necessary activities to restore such to pre-blasting condition. If restoration is not possible, Calpine agrees to provide full compensation for the value of such damage. For purposes of determining the value of damage, at the request of the owner of such damaged area or structure, Calpine agrees to hire a mutually agreed-upon independent third party assessor, whose assessment shall be determinative in assessing the value of the damage.

Paragraph 2(k) was modified to address the comment.

Stipulation No. 9: Terrestrial Ecology

¶ 13, p. 34: (new): An analysis of various stack lighting methods which might mitigate bird collision mortality.

Paragraph 13 was modified to address the comment.

Stipulation No. 10: Traffic

¶ 1.(b): The following additional intersections shall be evaluated:

Dolsontown/Genung, Dolsontown/Schutt, Dolsontown/Airport, Dolsontown/E:Main, Dolsontown/County Route 78, Dolsontown/Dolson Ave.(17m).

The Dolsontown-Genung-Schutt-Airport and the Schutt/East Main intersections have been added to Paragraph 1(b).

¶ 1: A pre-construction assessment of all roadways to be used for construction of the project shall be conducted. Calpine agrees to restore all identified roadways to pre-construction condition.

Paragraph 4 provides for such an analysis.

Stipulation No. 11: Aesthetics

¶3(d): Calpine will confer with the WCAG in selecting viewpoints.

Paragraph 3(d) was revised to address the comment.

¶. Project Footprint:

a. If present placement of the generating facility and the switchyard will require significant excavation of the existing hill, and maintenance of steep slopes later, consider moving generating facility to the southeast. The object here is to try to maintain the ground water supply to the Moore's property minimally disrupted.

This will be considered as one of the mitigation strategies. It is presently covered under NYSDEC's visual resources policy dated July 31, 2000 ("relocation" criterion). The stipulation requires an analysis in accordance with the NYSDEC visual resources policy.

b. To reduce visual presence from the south, plant should be dug into the ground as deeply as possible.

This will be considered as one of the mitigation strategies. It is presently covered under NYSDEC's visual resources policy dated July 31, 2000 ("low profile" criterion). The stipulation requires an analysis in accordance with the NYSDEC visual resources policy.

c. Consider routing the transmission line exiting the switchyard toward the north until adjacent to the O&R ROW, then either follow that ROW to the southeast until intercepting the Coopers Corners line, or follow the abandoned Lackawana rail road bed to the southeast, placing the line in the lowland to the north of the existing forest for aesthetic screening. (See Stipulation 3, paragraph 9.)

Stipulation 13, Paragraph 5 was modified to address the comment.

> d. Consider possible advantages of moving the cooling condenser to the southeast until it is about flush with the SE face of the generating facility. Reasoning: this may permit constructing at a lower elevation, and also may reduce noise to surrounding area. It may also permit relocating the switchyard to the north, shortening the transmission route and reducing necessary excavation of the hill to the northeast of the generating facility.

This will be considered as one of the mitigation strategies ("relocation" criterion in NYSDEC visual resources policy).

e. Consider using excavated material on site to create an earth berm between Dolsontown Road and the switchyard.

This will be considered as one of the mitigation strategies ("screening" criterion in NYSDEC visual resources policy).

f. How will cut steep slopes be maintained?

Stipulation 8, Paragraph 2(b) was modified to address the comment.

Condenser Structure:
Item g. Condenser should be fully enclosed with visually continuous siding. If the manufacturer does not plan, or has no knowledge of such siding, and there is concern about adequate air movement into the structure, Calpine should sponsor studies of siding options that meet both visual and air flow needs.

Stipulation 13, Paragraph 3 was modified to address the comment.

¶ 10, p. 40 (new and proposed): WCAG will be permitted to name two members of the 'Public Assessment Panel' if such is convened as part of the Corps of Engineers aesthetic assessment.

Calpine proposes to consult with the WCAG regarding viewpoint consultation (see paragraph 3(d)). Thereafter, for impact assessment using the ACOE Visual Resources Assessment Procedure, Calpine proposes to use the Basic Procedure, which requires a thorough analysis of all viewpoints selected.

Stipulation No. 12: Water Resources

¶ 5(b), p. 41: Change 'and groundwater' to 'and on the entire aquifer.'

"Groundwater" more accurately reflects the resource being evaluated. No change is proposed. There is no geographic limitation (e.g., 1 mile) in the "Water Supply" section of

this stipulation.

¶9: Calpine agrees that the analysis of potential water supply options shall include: the potential of effluent from the water pollution control plant and contaminated aquifer water associated with the Orange County Sanitary Landfill, and Hudson Superior Landfill being used for cooling purposes.

Paragraph 9 was modified to include the Middletown WPCP. Landfill aquifer water lacks adequate quality and quantity to be feasible as a water supply source.

¶ 6(a), p. 42: After 'existing', add 'and possible future'

Paragraph 6 was modified to address the comment, except that it is inappropriate to speculate as to other possible future users. "Water Loop 1" identified users will be analyzed (see below).

¶ 6: This analysis must include an assessment of the impacts to the water service plan referred to as "Wawayanda Water Loop 1." The analysis of impacts must include the potential for diminished service to existing residential and commercial customers identified in such plan and the impact to all future users identified in such plan.

New Paragraph 6(d) was added to address the comment.

¶ existing 22, p. 44: this should be modified to require presentation and analysis of the entire aquifer unless this is sufficiently covered in other stips.

Calpine believes that Paragraphs 21-25 as whole, and especially Paragraph 24, require the impact analysis to be expanded as necessary. No changes are proposed in the stipulations language.

¶ existing 22, p. 44: this stipulation should be modified to require estimation of the total recharge rate for the entire aquifer, and the rate of delivery of water from recharge to users.

Paragraph 24 requires this information.

¶ 24, p. 45: This analysis must consider water levels based on the 1999 drought. After 'private water supplies' insert: ", including especially on neighboring properties,'.

Paragraph 24 was modified to address the comment.

¶ 33 - 35, p. 46: move all to the Terrestrial Ecology Section, and retitle that section 'Aquatic and Terrestrial Ecology'.

The stipulation organization was based on previous stipulation documents accepted by the

DPS.

¶ existing 36, p. 46: After 'wetlands' insert: 'and all wetlands smaller than either federal or state minimums,'

No change is necessary in this paragraph. Federal wetlands are not defined by size, but rather by the criteria of hydrology, soils, and vegetation. Wetlands smaller than the state (ECL Article 24) minimum of 12.4 acres will therefore be included as Federal wetlands.

¶ existing 38, p. 46: Delete 'federal and state regulated'

The protection of wetlands relies on a criterion by which wetlands can be delineated and differentiated from uplands. It is not meaningful to speak of wetlands other than through the use of such criteria. Thus, no change in language is necessary.

¶ existing 42, p. 47: After 'potential' insert 'deicing salt,'; after 'regarding' insert 'possible'.

The paragraph was modified to address the comment.

¶ 45, p. 47 (new and proposed): An analysis of means of assuring water recharge of any onsite wetland adequate to assure maintenance of biological integrity.

Paragraph 44 was modified to address the comment.

Stipulation No. 14: System Production

¶ 1: Such analyses must include an assessment of available transmission capacity.

Available transmission capacity is already part of the analysis proposed in the stipulation.

ADDITIONAL WCAG COMMENT: Emissions of CO2 and the impact of Kyoto Agreement. With the exception of regulation of CO2 in the near future, the WCAG proposes that Calpine examine alternatives to minimize CO2 emissions or offset strategy.

The stipulation requires an analysis of CO2 levels with and without the project. The Kyoto Agreement has not been approved. If it is approved during the proceeding then Calpine will be required to provide an analysis pursuant to Paragraph 4 of the Preamble to the stipulations.

¶ 4: Calpine shall provide an analysis of the projected annual periods of operation. Such analysis shall include periods of start up and shut down due to supply/NYSISO conditions and

maintenance.

The model will record starts and stops as well as maintenance outages for the Wawayanda Energy Center.

New ¶ 5: WCAG desires a stipulation that Calpine will sell generated power only into the NYS ISO distribution system, i.e. sell basically only to New York consumers.

This is not a request for a scope of study and therefore is not appropriate for inclusion in the stipulations.

Stipulation No. 15: Combined Impacts

¶: 4, p. 5 (new and proposed): Such study also will propose means of mitigating or eliminating any discovered or projected cumulative impacts.

While Calpine can only evaluate mitigation measures for the Wawayanda Energy Center, the Application will do so on the basis of both the plant-specific and cumulative impacts. No change in the stipulations language is necessary.

II. Affirmative Stipulations

1. Calpine agrees to fully study and consider adopting alternatives for the interconnections which might mitigate visual, electrical and magnetic field exposure, or other issues. Two such alternates will include: a) exiting the project to the northeast and thence to the southeast adjacent to the O&R ROW, and b) exiting the project to the northeast adjacent to the O&R ROW and thence southeast along the north side of the abandoned Lackawana rail road bed. All stipulations regarding studies and reports of interconnections shall pertain to alternate routes as well as those proposed in the PSS.

Stipulation 13 was modified to address the comment.

2. Calpine agrees to comply with reasonable requests regarding its operation made by Regulatory agencies reviewing the Masada Project application. (Essentially, this is intended to address cumulative impact issues through operational modifications at both facilities.)

Such agencies are free to participate in the Article X review process. Therefore, no additional language in the Stipulations is required. As a general matter, Calpine has and will continue to respond to all reasonable requests from any party.

3. Calpine agrees to install siding or skirts around the condenser facility which mitigate aesthetic impact. If such siding does not now exist, Calpine agrees to fund such development studies.

Stipulation 13, Paragraph 3 was modified. Relocation, siding or skirts around the air-cooled condenser will be qualitatively evaluated from the point of view of noise, operations/economics, and aesthetics.

4. Calpine agrees that if any of the onsite wetland needs to be removed, that it will be replaced acre for acre, preferably contiguous to and continuous with the onsite wetland. Modern wetland replacement methodologies, particularly with respect to harvesting the hydric soils in the wetland to be obliterated, acceptable to DEC and to the WCAG will be employed.

Stipulation 12, Paragraphs 42 through 44 address wetland mitigation issues (if impacts should occur). Calpine's conclusions in this regard will be based on the results of the study. Therefore, no additional language in the Stipulations is required.

TECTONIC *ENGINEERING CONSULTANTS P.C.*

OFFICES:
Albany, NY
Cornwall, NY
Mt. Vernon, NY
Cincinnati, OH
Hartford, CT
Northborough, MA
Richmond, VA

P. O. Box 37, 70 Pleasant Hill Road
Mountainville, New York 10953

(800) 829-6531 FAX: (845) 534-5999
www.tectonicengineering.com

David Devine, Project Development Manager
Calpine
The Pilot House, 2nd Floor
Lewis Wharf
Boston, MA 02110

January 9, 2001

RE: W.O. 922.4001
CALPINE'S WAWAYANDA ENERGY CENTER
PROPOSED STIPULATIONS
TOWN OF WAWAYANDA
ORANGE COUNTY, NEW YORK

Dear Mr. Devine:

Tectonic Engineering Consultants and the project review team have completed a review of the above referenced Stipulations. Based on our review we have prepared the following comments regarding the completeness of this document. Our review has been prepared to conform to the applicable Stipulation sections and has identified the team member responsible for each section.

EXECUTIVE SUMMARY

As the host municipality for the proposed Project, the Town of Wawayanda has several key concerns in the review of its potential impacts. Short term impacts, of primary concern, relating to construction and operation of the project include: provision for adequate water supply, including fire flow; fire safety; traffic; economic impacts of tax abatement; balancing educational benefits to the Town's three school districts; air quality and aesthetic resources. Evaluation of the potential long term and growth inducing impacts related to the project are also critical to the Town's future, particularly as they relate to the economic security of the Town and its three school districts.

STIPULATION #1 AIR QUALITY AND METEOROLOGY ALPINE-M. BONJE

1-1 What number of years of meteorological data will be used, upper and lower and from what source?

1-2 Calpine is petitioning to waive pre-construction monitoring. Pre-application monitoring should not be waived on a project of this magnitude. Pre-construction monitoring is customary for projects in this area and has been required for projects with less potential air impacts such as a shopping mall and an aggregate processing facility nearby. Please provide justification for the proposed waiver.

1-3 Please provide hard and electronic copies of input and output for the modeling and the Met data to the Town as well as NYSDEC and PSC.

1-4 The site may be within 10 miles of the Delaware River with National Forests and Parks up and down same. It is our understanding that federal regulations require a look at these sites for impact. There may be none of any significance but I believe they must be analyzed and a conclusion made.

1-5 Para. 2h: Visual impact analysis should include a photographic array and computer-generated post-construction scenarios by season.

1-6 Para 2k: Growth related impacts should be considered in light of the 2000 Comprehensive Plan and Draft 2001 (or final if completed) Zoning Ordinance.

1-7 Para. 3b: Strike "combustion."

1-8 Para. 3c: Middletown WWTP and GenPak should be considered.

STIPULATION #2 CULTURAL RESOURCES ALPINE-BTK

2-1 Para. 1b: An analysis of any changes in scope of the interconnections should be provided.

2-2 The project sponsor should be responsible for the cost of permanent curation.

STIPULATION #3 ELECTRIC TRANSMISSION FACILITIES TEC-ATO.

3-1 Identify methods of analysis to be used in determining electric and magnetic field strengths at substation connections and along transmission lines from the plant.

3-2 Identify methods that will be used to prevent plant transients from degrading reliability of the existing transmission grid.

3-3 Identify plant on-site electrical demands, and address requirements for on-site standby generation and/or off-site power requirements.

3-4 Page 16 numbers 10-12 should include the Town of Wawayanda.

STIPULATION #4 GAS TRANSMISSION FACILITIES TEC-ATOMETRICS

4-1 Provide map with proposed gas pipeline routing and identify existing and new right-of-way and access locations.

4-2 Identify property owners on routing map.

4-3 Add "wildlife habitats" to Item 3.

4-4 Identify applicable codes and standards that will form basis of selection of pipe materials, type of pipe connections, and piping support system and structures

4-5 Identify appropriate grounding and corrosion protection requirements for the gas pipeline.

4-6 Identify methods/equipment required for gas compression.

4-7 Identify impacts and proposed mitigation due to the location and construction of the gas main.

4-8 Calpine to make available to the Town a professional knowledgeable in the construction and permitting of gas transmission facilities.

STIPULATION #5 LAND USE AND LOCAL LAWS ZUCKERMAN\APLINE

5-1 Para. 1b: Should read existing/proposed Zoning Districts, etc. as well as CEA's, Watershed Protection Districts and the Sewer and Water District.

5-2 Para. 1d: Growth-inducing impacts should be addressed.

5-3 Para. 1c: "above-ground" should be stricken.

5-4 Para. 3: Further studies or investigations that are called for in the Phase I should be included.

5-5 Para. 5a: Should include discussion of existing/proposed local law compliance.

5-6 The potential for reduced-rate electric/steam or heat zones in proximity to the facility should be addressed. Given that the NYPA transmission line parallels the Town's proposed IORB and MI zoning districts, induced growth resulting from the project should be considered. The potential for extension of such districts into the City of Middletown should be addressed.

STIPULATION #6 NOISE ALPINE-STAIANO

6-1 Sensitive receptors should include health care facilities, childcare locations, farms and professional offices.

6-2 Para. 11: Cumulative impacts should include the potential for project-induced growth.

STIPULATION #7 SOCIOECONOMIC ALPINE-TEC

7-1 Para. 3: The potential for favorable development zones should be addressed.

7-2 This section should also include an analysis of the proposed Town of Wawayanda Water and Sewer District.

7-3 Page 29 discusses using the "most recent assessed value" for the project site. The discussion on taxes should include the projected assessed value of the project.

7-4 An outline of any proposed PILOT or other abatement program should be presented. The following elements should be included:

1. Provision for facilities or infrastructure necessary to protect the health, safety and welfare of Town residents.

2. Alternatives for County, Town and Fire District levies and time schedules.

3. Provision for return of the project to full assessment at the end of any abatement program.

4. Provision for alternative educational payments, including, but not limited to, a scholarship program for Town residents.

STIPULATION #8 GEOLOGY, SEISMOLOGY AND SOILS TECTONIC

8-1 The "Orange County Ground-water Study" prepared by Leggette, Brashears & Graham, Inc. (1995) should be a considered a key reference for this stipulation.

8-2 GEOLOGY Item (h): If on site soils subject to cuts are to be used as bulk or structural fill, then detailed earthwork specifications for the same should be included in the geotechnical investigation report.

8-3 BLASTING: If blasting is to be performed, a detailed blasting plan should be submitted.

8-4 SEISMOLOGY: No comment.

8-5 SOILS: Four cross sections should be prepared for the site, two sets in perpendicular directions, indicating the soil formations, depth to rock (if found), and groundwater table (and/or piezometric surfaces).

8-6 Agricultural soils resources should be addressed including Agricultural District impacts.

STIPULATION #9 TERRESTRIAL ECOLOGY TECTONIC

NO COMMENTS

STIPULATION #10 TRAFFIC AND TRANSPORTATION TECTONIC

10-1 Para. 1: The proposed Study should include physical and safety conditions as well as operating characteristics. In addition, consideration should be given to including Dolsontown Road and Airport Road intersections and East Main Street and Schutt Road intersection in the analysis.

10-2 Section 1(b) - What will define a "typical" weekday and insure that the counts to not reflect a seasonal bias?

10-3 Section 1(c) - How many counts will be conducted. Counts should be conducted on both weekday and weekend to determine the days, which produce the peak traffic demand.

10-4 Section 4 - Since the existing road traffic will probably vary between weekday and weekend, and the traffic generated by the Energy Center will also vary between weekday and weekend, the LOS of both cases (weekday and weekend) should be looked at unless the counts can empirically demonstrate otherwise.

STIPULATION #11 AESTHETICS AND VISUAL RESOURCES APLINE

11-1 Para. 2e: An iso-lumen lighting plan should be included in the application.

11-2 Para. 3c: Sensitive visual receptors should include public facilities, schools and health care facilities.

11-3 Para. 4: Plume depiction should be based on meteorological information gathered on-site.

11-4 Para. 8: Cumulative impacts should include project-induced long-term growth within a one-mile radius.

STIPULATION #12 WATER RESOURCES TECTONIC

12-1 Para. 6: Potential expansion of the Town's Water and Sewer District, including new source development, should be addressed.

12-2 Para. 37: Impacts along the interconnections should be addressed.

12-3 WATER SUPPLY: Items 5(g) and 5(h): Submit these documents at the earliest possible date for our review.

12-4 WATER SUPPLY: Item 6 should explain the water and sewer agreement currently in place between the Town of Wawayanda and the City of Middletown

12-5 WATER SUPPLY: Item 9: Identify proposed water sources at earliest possible date with a discussion of the progress towards obtaining control and/or contracts for the same.

12-6 GROUNDWATER: Item 21: It is unclear what will be provided. Groundwater contour maps of the groundwater table/piezometric surfaces for unconsolidated and bedrock deposits should be provided for the site.

12-7 SURFACE WATERS: Item 29: the analysis should include an evaluation of the stormwater effluent water quality and quantity as related to discharge to the surface waters (related to "CONSTRUCTION/OPERATION STORMWATER RUNOFF").

12-8 AQUATIC: No comment.

12-9 WETLANDS: No comments.

12-10 CONSTRUCTION/OPERATION STORMWATER RUNOFF: See comment under "SURFACE WATERS." It should be demonstrated that effluent will not be hazardous and therefore not subject to other federal and state regulations other than a SPDES permitting process.

12-11 EROSION CONTROL: The proposed storm frequencies to be used in the hydraulic calculations are not consistent with the NYSDEC criteria.

12-12 SPILL PREVENTION AND CONTROL PLAN: The description is very generalized; a detailed plan will be required.

12-13 WASTE WATER must meet the commercial/industrial standards of the City of Middletown.

STIPULATION #13 RELIABILITY AND ALTERNATIVES TEC-ATOMETRICS

13-1 Provide detailed failure analysis with fault tree of on-site equipment failure and appropriate actions to follow (i.e. notification to officials).

13-2 Identify how the local environmental effects as a result of air cooling will be determined, and mitigated if required.

13-3 Address the impact of air cooling in the reliability assessment.

STIPULATION #14 SYSTEM PRODUCTION MODELING TEC-ATO.

14-1 Identify all assumptions used and limitations of programming capabilities for system production modeling.

STIPULATION #15 IMPACT FROM MULTIPLE FACILITIES ALL

NO COMMENT

As I am going away on vacation for the 10th-19th any questions regarding Tectonics comments should be directed to Pete Southerland, P.E. at Tectonic. Alternatively, any comments from Alpine or its consultants should be addressed to Jim Ulrich of Alpine Environmental Consultants.

Sincerely,
TECTONIC ENGINEERING CONSULTANTS, P.C.

Ross Winglovitz, P. E.
Chief Civil Engineer

CC: Town of Wawayanda, Town Board
David Zuckerman, Esq.
Jim Ulrich, AEC

CALPINE

EASTERN REGIONAL OFFICE
THE PILOT HOUSE, 2ND FLOOR
LEWIS WHARF
BOSTON, MASSACHUSETTS 02110
617.723.7200
617.723.7635 (MAIN FAX)

February 12, 2001

Thomas J. De Block, Supervisor
Town of Wawayanda
80 Ridgebury Road,
Slate Hill, NY 10973

Dear Mr. De Block:

We have reviewed the comments on the Proposed Stipulations for the Wawayanda Energy Center that Tectonic and Alpine submitted on behalf of the Town of Wawayanda. We appreciated the opportunity to review your comments and to discuss them at the joint meeting with the DEC and DPS staff on January 17.

The attached document provides our formal written response to your comments. For the most part Calpine has incorporated your comments into the Stipulations or identified existing language in the Stipulations that effectively addresses the issue raised. The document also includes explanations for those instances where we do not agree to change the stipulations.

We appreciate the effort put forth by the town during the preparation of the Stipulations and look forward to working with you as we continue through the Article X process.

Sincerely,

David A. Devine

Cc: Tina Palmero, NYSDPS
Chris Hogan, NYSDEC
Ross Winglovitz, Tectonic
Jim Ulrich, Alpine
Deborah Glover, WCAG

Responses to Tectonic/Alpine comments on Dec. 7 stipulations on behalf of the Town of Wawayanda.

1-1 What number of years of meteorological data will be used, upper and lower and from what source?

Re: The meteorological data sets and the years are described in Section 4.2.3 the Air Modeling Protocol, a draft of which was sent to the town on 22 December 2000. The available years are 1993, 1994 and 1996 (Stewart Airport), along with 1998 and 1999 (Orange County Airport). No change in stipulation language is necessary.

1-2 Calpine is petitioning to waive pre-construction monitoring. Pre-application monitoring should not be waived on a project of this magnitude. Pre-construction monitoring is customary for projects in this area and has been required for projects with less potential air impacts such as a shopping mall and an aggregate processing facility nearby. Please provide justification for the proposed waiver

Re: EPA has the authority to waive preconstrucion modeling, as they have done for every Article X case to date. As outlined in a January 8, 2001 letter to EPA, there is ample evidence to warrant such a waiver. No change in the stipulation language is necessary because if preconstruction monitoring is required then it will be part of the air modeling protocol.

1-3 Please provide hard and electronic copies of input and output for the modeling and the Met data to the Town as well as NYSDEC and PSC

Re: Stipulation 1, Paragraph 2(h) has been adjusted accordingly.

1-4 The site may be within 10 miles of the Delaware River with National Forests and Parks up and down same. It is our understanding that federal regulations require a look at these sites for impact. There may be none of any significance but I believe they must be analyzed and a conclusion made.

Re: No change in the stipulations is necessary. The federal regulations require evaluation of the potential impacts to visibility and air quality in "Class I" areas, defined ascertain national parks and wilderness zones. The Delaware River and associated parks are not Class I areas. The nearest Class I areas are the Brigantine National Wildlife Refuge near Atlantic City New Jersey and the Lye Brook Wilderness in Vermont.

1-5 Para. 2h: Visual impact analysis should include a photographic array and computer-generated post-construction scenarios by season.

Re: Stipulation 11 contains the visual impact analysis methodology, including photographic array and computer generated renderings.

1-6 Para 2k: Growth related impacts should be considered in light of the 2000 Comprehensive Plan and Draft 2001 (or final if completed) Zoning Ordinance.

Re: Stipulation 5 provides for such an analysis.

1-7 Para. 3b: Strike "combustion."
Re: The stipulations were modified to address the comment.

1-8 Para. 3c: Middletown WWTP and GenPak should be considered
Re: Paragraph 2(n) was modified to address the comment.

2-1 Para. 1b: An analysis of any changes in scope of the interconnections should be provided.
Re: The preamble to the Stipulations require such an analysis if there is a change in scope.

2-2 The project sponsor should be responsible for the cost of permanent curation.
Re: This is not a request for a scope of study and therefore is not appropriate for inclusion in the stipulations.

3-1 Identify methods of analysis to be used in determining electric and magnetic field strengths at substation connections and along transmission lines from the plant.
Re: This information will be provided in the Article X application.

3-2 Identify methods that will be used to prevent plant transients from degrading reliability of the existing transmission grid.
Re: This will be addressed as part of the System Reliability Impact Study (SRIS) and design study. These are described in more detail in Paragraph 2.

3-3 Identify plant on-site electrical demands, and address requirements for on-site standby generation and/or off-site power requirements.
Re: Calpine expects the Project will be back-fed off the grid during normal operations. The Project's rating already reflects its own parasitic load. It will be equipped with a backup emergency diesel generator.

3-4 Page 16 numbers 10-12 should include the Town of Wawayanda.
Re: Calpine commits to providing a copy of the draft and final scope of the Interconnection Study (attached), as well as general updates on the Interconnection Study, to the Town of Wawayanda.

4-1 Provide map with proposed gas pipeline routing and identify existing and new right-of-way and access locations.
Re: This will be provided as part of the requirements of Paragraph 1(a).

4-2 Identify property owners on routing map.
Re: This information is beyond the scope of the Article X process. Detailed property owner information will be provide as part of the Federal Energy Regulatory Commission (FERC) approval process under Section 7(c) of the Natural Gas Act. No changes to the Stipulations are necessary.

4-3 Add "wildlife habitats" to Item 3.
Re: The paragraph was modified to address the comment.

4-4 Identify applicable codes and standards that will form basis of selection of pipe materials, type of pipe connections, and piping support system and structures.

Re: This information is beyond the scope of Article X but will be addressed, as necessary, during the FERC approval process.

4-5 Identify appropriate grounding and corrosion protection requirements for the gas pipeline.

Re: This information is beyond the scope of Article X but will be addressed, as necessary, during the FERC approval process.

4-6 Identify methods/equipment required for gas compression.

Re: This information is beyond the scope of Article X but will be addressed, as necessary, during the FERC approval process.

4-7 Identify impacts and proposed mitigation due to the location and construction of the gas main.

Re: The Stipulations provide for a map level analysis, which is consistent with the requirements of the DPS. A detailed environmental study will be provided as part of the FERC Section 7(c) process.

4-8 Calpine to make available to the Town a professional knowledgeable in the construction and permitting of gas transmission facilities.

Re: This request will be considered as part of the FERC approval process. No changes to the Stipulations are required.

5-1 Para. 1b: Should read existing/proposed Zoning Districts, etc. as well as CEA's, Watershed Protection Districts and the Sewer and Water District.

Re: The stipulations were modified to address the comment.

5-2 Para. 1d: Growth-inducing impacts should be addressed.

Re: The stipulations were modified to address the comment.

5-3 Para. 1c: "above-ground" should be stricken.

Re: Paragraph 1e was modified to include consideration of below-ground interconnections.

5-4 Para. 3: Further studies or investigations that are called for in the Phase I should be included.

Re: Calpine's Phase I ESA did not recommend further site investigations. This follows normal protocol for site investigative activities. Therefore the Stipulations do not require modification to respond to this comment.

5-5 Para. 5a: Should include discussion of existing/proposed local law compliance.

Re: Paragraphs 5 and 6 were modified to address the comment.

5-6 The potential for reduced-rate electric/steam or heat zones in proximity to the facility should be addressed. Given that the NYPA transmission line parallels the Town's proposed IORB and MI zoning districts, induced growth resulting from the project should be considered. The potential for extension of such districts into the City of Middletown should be addressed.

Re: The Stipulations do not require modification because the project is not designed to provide dedicated electricity or steam supplies.

6-1 Sensitive receptors should include health care facilities, childcare locations, farms and professional offices.

Re: The Stipulations do not require modification. The Article X application will include noise contours that will permit the estimation of noise levels at locations of interest.

6-2 Para. 11: Cumulative impacts should include the potential for project-induced growth.

Re: The Stipulations do not require modification. Induced growth linked specifically to the Project is not expected. Furthermore, it is not possible to estimate noise-producing elements of an induced-growth development unless that specific development has been adequately characterized.

7-1 Para. 3: The potential for favorable development zones should be addressed.

Re: As a private applicant, Calpine cannot effect the establishment of such zones. Therefore the Stipulations do not require modification.

7-2 This section should also include an analysis of the proposed Town of Wawayanda Water and Sewer District.

Re: Stipulation 5, Paragraphs 1(b) and 1(f) and Stipulation 12, Paragraph 6 already require such an analysis.

7-3 Page 29 discusses using the "most recent assessed value" for the project site. The discussion on taxes should include the projected assessed value of the project.

Re: This information is beyond the scope of the Article X process.

7-4 An outline of any proposed PILOT or other abatement program should be presented. The following elements should be included:

1. Provision for facilities or infrastructure necessary to protect the health, safety and welfare of Town residents.
2. Alternatives for County, Town and Fire District levies and time schedules.
3. Provision for return of the project to full assessment at the end of any abatement program.
4. Provision for alternative educational payments, including, but not limited to, a scholarship program for Town residents.

Re: This information is beyond the scope of the Article X process. Nothing in Article X prohibits municipalities or other tax-levying districts from negotiating agreements with developers on a bilateral basis.

8-1 The "Orange County Ground-water Study" prepared by Leggette, Brashears & Graham, Inc. (1995) should be a considered a key reference for this stipulation.

Re: The Stipulations were modified to address the comment.

8-2 GEOLOGY Item (h): If on site soils subject to cuts are to be used as bulk or structural fill, then detailed earthwork specifications for the same should be included in the geotechnical investigation report.

Re: This information will be included in a compliance filing during the detailed design phase, and will be sent to the Town of Wawayanda.

8-3 BLASTING: If blasting is to be performed, a detailed blasting plan should be submitted.

Re: The Stipulation 8, Paragraph 2(i) requires a blasting plan.

8-4 SEISMOLOGY: No comment.

8-5 SOILS: Four cross sections should be prepared for the site, two sets in perpendicular directions, indicating the soil formations, depth to rock (if found), and groundwater table (and/or piezometric surfaces).

Re: The Article X application will substantively contain this information.

8-6 Agricultural soils resources should be addressed including Agricultural District impacts.

Re: This is addressed in Stipulation 5, Paragraph 1(b).

10-1 Para. 1: The proposed Study should include physical and safety conditions as well as operating characteristics. In addition, consideration should be given to including Dolsontown Road and Airport Road intersections and East Main Street and Schutt Road intersection in the analysis.

Re: The Stipulations were modified to address the comment.

10-2 Section 1(b) - What will define a "typical" weekday and insure that the counts to not reflect a seasonal bias?

Re: Paragraph 1(b) was modified to address the comment.

10-3 Section 1(c) - How many counts will be conducted. Counts should be conducted on both weekday and weekend to determine the days, which produce the peak traffic demand.

Re: Paragraph 1(b) was modified to address the comment.

10-4 Section 4 - Since the existing road traffic will probably vary between weekday and weekend, and the traffic generated by the Energy Center will also vary between weekday and weekend, the LOS of both cases (weekday and weekend) should be looked at unless the counts can empirically demonstrate otherwise.

Re: Paragraph 1(b) was modified to address the comment.

11-1 Para. 2e: An iso-lumen lighting plan should be included in the application.

Re: Paragraph 2(e) was modified to address the comment.

11-2 Para. 3c: Sensitive visual receptors should include public facilities, schools and health care facilities.

Re: Paragraph 3(d) requires the consideration of such visual receptors in consultation with the Town.

11-3 Para. 4: Plume depiction should be based on meteorological information gathered on-site.

Re: See the Air Modeling Protocol response to Comment 1-2 above regarding air quality monitoring.

11-4 Para. 8: Cumulative impacts should include project-induced long-term growth within a one-mile radius.

Re: Induced growth linked specifically to the Project is not expected. Furthermore, it is not possible to predict visual elements of an induced-growth development unless that specific development has been adequately characterized.

12-1 Para. 6: Potential expansion of the Town's Water and Sewer District, including new source development, should be addressed.

Re: Paragraphs 5 and 6 were modified to address the comment.

12-2 Para. 37: Impacts along the interconnections should be addressed.

Re: Paragraphs 42 and 44 require an evaluation of impacts along the interconnections.

12-3 WATER SUPPLY: Items 5(g) and 5(h): Submit these documents at the earliest possible date for our review.

Re: The documents will be submitted at the earliest possible date.

12-4 WATER SUPPLY: Item 6 should explain the water and sewer agreement currently in place between the Town of Wawayanda and the City of Middletown

Re: Paragraph 6 was modified to address the comment.

12-5 WATER SUPPLY: Item 9: Identify proposed water sources at earliest possible date with a discussion of the progress towards obtaining control and/or contracts for the same.

Re: Calpine will continue to keep the Town apprised of developments in this regard.

12-6 GROUNDWATER: Item 21: It is unclear what will be provided. Groundwater contour maps of the groundwater table/piezometric surfaces for unconsolidated and bedrock deposits should be provided for the site.

Re: Item 21 will include depth to groundwater based on Orange County Soil Survey, supplemented by readings from on-site and off-site wells. It will include a groundwater contour map based on those data.

12-7 SURFACE WATERS: Item 29: the analysis should include an evaluation of the stormwater effluent water quality and quantity as related to discharge to the surface waters (related to "CONSTRUCTION/OPERATION STORMWATER RUNOFF").

Re: Stormwater quality is addressed in Paragraphs 45 through 51.

12-8 AQUATIC: No comment.

12-9 WETLANDS: No comments.

12-10 CONSTRUCTION/OPERATION STORMWATER RUNOFF: See comment under "SURFACE WATERS." It should be demonstrated that effluent will not be hazardous and therefore not subject to other federal and state regulations other than a SPDES permitting process.

Re: The Article X application will demonstrate the nonhazardous nature of the stormwater discharge.

12-11 EROSION CONTROL: The proposed storm frequencies to be used in the hydraulic calculations are not consistent with the NYSDEC criteria.

Re: Paragraph 50 was modified to address the comment.

12-12 SPILL PREVENTION AND CONTROL PLAN: The description is very generalized; a detailed plan will be required.

Re: The detailed SPCC or similar plan can only be based on final design, not conceptual design. As such, it will be submitted as part of a compliance filing and circulated to the Town.

12-13 WASTE WATER must meet the commercial/industrial standards of the City of Middletown.

Re: Paragraph 16 requires such a demonstration.

13-1 Provide detailed failure analysis with fault tree of on-site equipment failure and appropriate actions to follow (i.e. notification to officials).

Re: Stipulation 7, Paragraphs 17 and 18 address municipal concerns about response preparedness and procedure.

13-2 Identify how the local environmental effects as a result of air cooling will be determined, and mitigated if required.

Re: Each kind of potential impact will be addressed in the appropriate individual section of the Application.

13-3 Address the impact of air cooling in the reliability assessment.

Re: Paragraph 1 was modified to address the comment.

14-1 Identify all assumptions used and limitations of programming capabilities for system production modeling.

Re: This information will be included in the Article X application.

COHPAP
19 OVERHILL RD
MIDDLETOWN, NY 10940
(845) 344-1527
Jan. 12, 2001

Coalition of Health Professionals Against Pollution

Re: Wawayanda Energy Center-Comments on Stipulations.

Dear David A. Devine:

I am in receipt of your letter of January 9, 2001 and the Appendix A Stipulations which you mailed to me, in response to my Jan. 3, '01 letter to you, regarding additional studies on Stipulations.

You mentioned that all of the issues I raised in my Jan.3 letter are specifically addressed in the Stipulations and will be included in the Article X application for the project..

On page five of my Jan. 3,'01 letter I mentioned "<u>additional studies</u>," that is to say, I am requesting additional studies to the stipulations.

I would like to make the following amended comments and responses to your letter with respect to clarify my intent and request additional information regarding Stipulation 1, Paragraph 3 (a), and Stipulation 1, Paragraph 3 (e and f).

First, since you have <u>NOT</u> given me a complete list of emissions, other than NOx, SO2, VOC, Sulfuric Acid Mist, CO, and PM-10, (total 6), I'm not clear about the number of <u>Non-Criteria pollutants</u> and <u>Criteria Pollutants</u>. What are the others? I am requesting a complete list of both categories, (including formaldehyde and ammonia)..

I am requesting additional studies on everything mentioned in Stipulation 1, paragraph 3 (a), that only mentions <u>non-criteria</u> pollutants. Please include additional studies on <u>Criteria</u> as well as

Non-Criteria Pollutants. This is in addition to the stipulations. This was mentioned on Page I of my Jan. 3 letter.

An addition to Stipulation 1, paragraph 3 (e), would also include my request for an analysis of cancer effects as well as your already mentioned non-cancer effects, and that Calpine WILL conduct a cumulative air quality analysis, NOT "that Calpine will consult with the NYSDOH to determine "IF" a cumulative air quality analysis is needed in the application." It is reasonable to expect that this is something that Calpine would automatically be willing to proceed with, regardless. I am requesting that this additionally be done.

Again, regarding Stipulation 1, paragraph 3 (f), I am requesting additions to this stipulation to also include Criteria Pollutants as well as your already mentioned Non-Criteria pollutants, and that the application includes "an evaluation for a multipathway risk assessment regardless, NOT "IF" whether or not (1.) "the maximum air concentration from the project exceeds 10% of the corresponding health risk-based benchmark air concentration", and (2.) to include criteria pollutants as well as non-criteria pollutants.

You stated that your project will use aqueous ammonia. The proposed Masada project will also use and store ammonia. I view the diluted aqueous ammonia scenario as a way of avoiding a worst case scenario requirement. I mentioned previously that I would like Calpine to be ammonia-free. I am not happy about your on-site storage and use of ammonia.. The proposed Masada project will also store ammonia, if approved. This is VERY DANGEROUS!! A release of ammonia is ALWAYS a LIKELY POSSIBILITY at any time, especially when it is being used and stored on site.

In addition I am requesting, again, that Calpine provide the Maximum Available Control technology (MACT) standards to regulate these emissions. It is reasonable to expect Calpine will provide not only the Best Available Control Technology (BACT), but also the Maximum Available

Control Technology (MACT). I am <u>again</u> requesting that addition to the Stipulations.

I don't think it's unreasonable to believe that within the next decade there will be even more additional forms of more strigent regulations on emissions of pollutants, contaminents, etc..

Therefore it is reasonable to expect Calpine to examine alternatives to minimize the identified emissions (<u>ALL</u> of them), or to produce a comprehensive off-set strategy which would protect our communities' health, safety, and environment.

I would also like additional and complete studies done on the Electro-Magnetic Fields, since there are two Electro-Magnetic fields here, the Orange and Rockland Switching and Sub-Station, and the Marcy South Lines. I believe this to be a very important issue in regard to health and safety. Please include this addition in your stipulations.

I hope that my ammended comments clarify my intent.

Furthermore, if in doing these studies any newly discovered data presents, or is discovered, that was not part of my original request in the stipulation, I would want to be informed of the newly discovered data and any subsequent study done on them that would be necessary to give complete details and information about them.

If, within the time frame when Calpine would issue their final permit, new legislation, laws, or regulatory standards evolve by the various federal, state, and local agencies in the near future, I would additionally request and expect that Calpine will comply with them, and inform me of your compliance. This should be added to the stipulations.

The Coalition of Health Professionals Against Pollution (COHPAP) is committed to protecting the environment, safety, and health of our city and county residents, including workers in facilities.

I expect that Calpine will comply with my requests. Frankly I feel that a site outside of Orange County would be a more appropriate

location for your electric generating facility because of my previously mentioned information in the Jan. 3 letter to you. They are:

1. Presently, thousands of Middletown and Orange County residents are suffering from asthma, cardiac problems, allergies, and other respiratory problems associated with PARTICULATE MATTER (PM), spewing from operating plants, and tail pipes, and other contaminants and pollutants.

2. There are already many other polluting facilities within a 2.5 mile radius of the proposed Calpine and the Proposed Masada project sites.

3. Presently Orange County has the third highest rate of cancer in N.Y.S., and the second highest rate of respiratory diseases. We DON'T want to become Number One.

4. Orange County is in the North East Ozone transport region, a moderate non-attainment area.

5. Orange County is in a Valley where everything settles and remains.

6. The emissions from the proposed Calpine and proposed Masada may contaminate soil, air, and water, cause acid rain and smog, thereby destroying our environment and health even further.

7. Middletown and Orange County cannot accept or sustain anymore pollution or contamination from any additional sources or facilities of any kind.

Sincerely,

Jeanette Nebus, BSN, RN.; BS, Ms.Ed., CSN-T

President; Coalition of Health Professionals Against Pollution

(C.O.H.P.A.P.)

cc: Deborah Marie Glover (WCAG)
Jeffrey Stockholm, Pre-Applic. Hearing Exam..
Steven Blow, Assist. Counsel
Christina Palmero, Project Mgnr..
Dianne Cooper, Outreach and Educ. Specialist
William Little, DEC
Chris Hogan, Proj. Mngr. DEC
John Cahill, Dir. DEC
Ronald Tromantano, DOH
Edward Horn, DOH, Dept. Toxicology
A. Kevin Gleason, DOH Bur. Toxic Subs. Assess..
Anthony J. Grey, Ass't. Dir. DOH
Frank J. DeCotis, Div. Legal Affairs
Henry Spliethoff, DOH
Thomas De Block, Wawayanda town supervisor
Antonia C. Novello, DOH
Monica L. Abreu Conley, Environ. Justice Coord..
Dr. Marcy Smith, Orange County DOH

CALPINE

EASTERN REGIONAL OFFICE
THE PILOT HOUSE, 2ND FLOOR
LEWIS WHARF
BOSTON, MASSACHUSETTS 02110
617.723.7200
617.723.7635 (MAIN FAX)

February 23, 2001

Ms. Jeanette Nebus
President
Coalition of Health Professionals Against Pollution
19 Overhill Road
Middletown, NY 10940

Re: Wawayanda Energy Center – Comments on Stipulations

Dear Ms. Nebus:

We are in receipt of your January 12, 2001 letter requesting additional clarification in the stipulations. This letter responds to the various issues raised in your letter. Your first issue is that the Stipulations do not include a complete list of non-criteria pollutants. Stipulation 1, Paragraph 3(a) requires that Calpine identify all pollutants that will be emitted by the proposed project as part of the Article X process

Your second comment requests a study of the potential for carcinogenic impacts from the project. Stipulation 1, Paragraph 3(e and f) provides for such studies.

Your third comment about ammonia does not request any new studies in addition to those contained in Stipulation 1, Paragraphs 2(o) and 6.

Your fourth comment regarding the maximum achievable control technology (MACT) standards will be addressed in the Article X application per Stipulation 1, Paragraph 2(d).

Your fifth comment requesting studies of electric and magnetic fields will be addressed in the Article X application in accordance with Stipulation 3, Paragraph 21.

Calpine also notes your comment regarding changes to regulations during the project review process. Paragraph 4 of the Preamble to the Stipulations requires Calpine to perform additional studies if required by changes to applicable regulations.

Ms. Jeanette Nebus
Coalition of Health Professionals Against Pollution

We thank you for taking the time to provide your comments. Calpine believes that all of the issues you have raised will be adequately covered in the studies proposed and agreed to in the signed Stipulations. Please call me if you have any questions.

Sincerely,

David Devine

David Devine
Project Development Manager

Enclosure

Cc: Tina Palmero, Department of Public Service
Chris Hogan, Department of Environmental Conservation
Henry M. Spliethoff, Department of Health
Deborah Glover, Wawayanda Citizens Advisory Group
Thomas DeBlock, Town of Wawayanda

APPENDIX D-46

THE TIMES HERALD
RecordONLINE
Every day by 5 a.m.

Time for tough choices in many back yards

By Douglas Cunningham
The Times Herald-Record
dcunningham@th-record.com

The table groans with examples of "not in my back yard." Don't build a power plant in Wawayanda, not even a clean-burning, natural gas one, not even in an area separated from a good part of the town by either Dolson Avenue/Route 17M or four lanes of Interstate 84.

Call me crazy, but the road noise from this heavily trafficked area is probably going to insulate the rest of the town from the latest in GE turbine design. And the proposed site is, after all, not far from the Middletown sewer plant, nor far from a large power line, but let's not be distracted by details.

Don't open a new drugstore, like CVS, in Warwick, because Warwick is cute and precocious, and a chain drugstore, horrors, will spoil the lovely ambience. Warwick, after all, deserves and must have free-range, organic carrots. And milk from cows that sleep on organic straw.

This all comes up because Grand Union went out of business. Coincidentally, Grand Union had been fighting for years in the village to open a new or expanded store.

I realize that Grand Union would have gone out of business anyway, for a host of macro reasons. But in other communities with relatively modern Grand Unions, Stop & Shop or Hannaford's picked up the stores. One reason Warwick finds itself without a proper grocery within the village limits is its past intransigence and a fight between the town and the village.

And whose fault is this intransigence? Why the rest of us, of course. Warwick's idea of taking responsibility for its troubles is to have a few dozen residents march around and chant. And hold up signs.

This activity does not, apparently, extend to actually patronizing local stores, such as

Homefront America, which is closing in May.

In the Town of Wallkill, meanwhile, in the southeast section, along Mount Joy Road, not far from the Town of Goshen, residents are protesting a proposed cul-de-sac and 12 new homes.

That's right, 12 new homes. Again, the ambience is threatened. If I was high enough up the food chain, this is the point where I would shout, "Stop the presses!"

"We moved out to Mount Joy Road because we wanted a rural setting. We paid to have that," said one resident.

Another said, "We liked it this rural."

Well, gee, that's great. But let's analyze this a minute. Did these residents, the ones who are ever so fond of rural peace and quiet, buy up 20 or 30 acres to keep it that way?

Well, no, of course not. Everyone wants to look at the view. But to actually pay for it?

And these are longtime residents, right? Farmers and such, people who've been in Wallkill for decades, right?

Well, no. Most came within the past decade, and some blew in just a couple of years ago. And while some of the homes are quite modest, some are what we might call tony.

But now that we're here, let's close the gates and pull up the drawbridge. Can't have any other folks going after the American Dream of home ownership.

These are but the latest examples I've culled from the sorry state of affairs around the region. I've said it before: The decisions that will affect growth and development in the next few years were, for the most part, made a decade ago.

If we want to materially change the course of the region, it's going to take some drastic steps. Electing new municipal leadership. Volunteering for planning and zoning boards so that these posts don't go begging. Spending money to preserve land. Finding land for uses like power plants.

Thus far, we don't seem to have the stomach for anything quite so difficult.

Douglas Cunningham is business editor of The Times Herald-Record; his commentary appears on Mondays. He can be reached at dcunningham@th-record.com, or at 845-346-3202.

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Find out about proposed power plant

By Deborah M. Glover

What does a community have the right to know?

The community has the right to know that there is a 540-megawatt power plant proposed for Dolsontown Road in the Town of Wawayanda. The name of this proposed power plant is the Wawayanda Energy Center. The plant's closest neighbor will be the controversial waste-to-energy plant known as Masada. What will be the cumulative effects of the proposed plants on our health, safety and the environment?

The community has the right to know this power plant will have two natural gas-fired turbines (similar to jet engines). The main building and cooling towers will encompass more than 10 acres of land. The building will be 10-12 stories in height. The two emissions stacks will tower over the building another 100-plus feet, for a total of 25 stories in height.

The community has the right to know this power plant will use a minimum of 200,000 gallons of water per day. The plant will be air-cooled with 50 large exterior industrial-sized fans running 24/7. The plant will use and store large amounts of ammonia on site. The community must be informed of the worst-case scenario with regards to an accident at the power plant, as well as a multi-facility accident scenario.

The community has the right to know that this power plant will emit a health-hazard pollutant known as PM 2.5 (Particulate Matter 2.5). The residents who live in the 10940, 10941, 10958 and 10924 zip codes must be made aware of the high rate of lung and colorectal cancer in their area.

The community has the right to know this power plant will require a 30-inch gas line. This gas line will be constructed and brought in from New Jersey to Dolsontown Road in Middletown. Residents must be informed of the economical benefits for hosting this plant in their community for the next 30 years.

Would you like to learn more about this power plant and how it will affect you? Attend the public meeting 7 p.m. March 19, Slate Hill Firehouse Social Hall, Route 284, Slate Hill; e-mail wcag1@hotmail.com.

Deborah M. Glover lives in New Hampton.

Experts warn state not to fall asleep at the electric switch

ENERGY: New York isn't likely to find itself in the same mess as California anytime soon. But it shouldn't rest too easy. The gap between supply and demand continues to shrink here.

By Michael Levensohn
The Times Herald-Record
mblevens@th-record.com

Could California's power crisis, complete with rolling blackouts and utilities on the verge of bankruptcy, be reproduced here?

The answer, according to a range of experts, is a qualified "no."

This is not California, they say, but it could be. Several important differences between the two states' situations suggest New York won't approach the dire conditions in California. But one crucial similarity – the shrinking gap between the supply of power and growing demand – must be addressed if New York is to avert a crisis of its own.

"Our demand is growing, and it's growing faster than we had anticipated a couple years ago," said Dave Flanagan, a spokesman for New York's Public Service Commission, which regulates the state's utilities. "We need to start siting new, safer, more efficient plants."

Two states, two paths

In both New York and California, electricity deregulation schemes require the utility companies to sell their power plants and focus on the delivery of power.

The idea in both states was for the companies that buy and operate the plants to sell power back to the utilities in an open market, which would create competition and ultimately drive down prices for consumers.

By and large, neither state's deregulation scheme has worked as planned so far. In New York, customers of some utilities, including Orange and Rockland Utilities, saw their bills climb by 20 percent or more last summer. But that's nothing compared to the mess out West.

In California, utilities aren't allowed to sign long-term supply agreements with generators, so they have no choice but to pay market-driven wholesale prices for energy that must then be sold to consumers at far lower fixed prices.

A drought in the Northwest has hurt the effectiveness of hydro plants, which account for a large portion of the state's power supply, and the price of natural gas – the fuel for many other plants – has gone through the roof.

Meanwhile, rapid growth in California's population and in power-hungry technology – like the computers and servers that drive Silicon Valley – has created a surge in demand that the static supply can no longer meet.

Competition between generators is nonexistent. They know that any power they offer will be bought. The price of electricity on California's wholesale market has skyrocketed, and the state's two largest utilities have lost more than $12 billion paying through the nose for power they have to sell to consumers at the regulated prices.

The financial shortfall has put both major utilities at the brink of bankruptcy. Thursday, California lawmakers approved a $10 billion package that puts the state in the electricity-buying business for as long as a decade, and even that's only a partial fix.

"Where the problem started in California was 10 or 15 years ago. They stopped building generators, and began depending more and more on outside sources," said Ken Klapp, a spokesman for the New York Independent System Operator, which runs the state's wholesale energy market. "Even if they weren't deregulated, they were destined to have some sort of problem."

As in California, New York has gone a decade since its last major power plant was built. But New York's supply situation isn't nearly as dire.

"We're not at the critical point California is at, where we're constantly bumping up against the limits of our supply," said Flanagan.

California is at the edge of its supplies. The state has spent most of the past three weeks under a "Stage 3" alert, in which reserves are at or below 1.5 percent, and rolling blackouts are possible.

New York's deregulation scheme calls for an 18 percent "buffer" of supply that exceeds expected demand. The buffer ensures that, in times of unexpectedly high demand, or in the event that a plant goes down for repairs, there isn't an immediate crisis.

Also, there are two key differences in how New

York's deregulation plan operates.

New York's utilities were allowed to sign long-term supply contracts with the purchasers of their plants, providing a valuable hedge against rising market prices. About half of New York's power supply is purchased through such contracts. Central Hudson Gas & Electric, New York State Electric & Gas and O&R all use them, in varying degrees.

Also, utilities such as Central Hudson and O&R have agreements with the PSC that allow them to pass along the price they pay for electricity – whether through long-term contracts or on the next-day or real-time NYISO market – to their customers. That's why many customers of O&R and its parent company, Consolidated Edison have seen their bills climb in the past eight months. The utilities, unlike those in California, are virtually assured of making a profit, albeit at the expense of their customers.

NYSEG's retail approach, on the other hand, closely resembles that of the California utilities.

NYSEG opted for an agreement with the PSC in which it has guaranteed to freeze and incrementally lower the prices its customers pay for electricity.

"By freezing our prices, we take on considerable market risk. We understand those risks and we do our best to manage them," said Clayton Ellis, a NYSEG spokesman.

Ellis said NYSEG has a variety of supply contracts that will cover about 95 percent of its anticipated demand for the next two years. But he wouldn't discuss whether the company was making or losing money on the contracts.

"Our track record in terms of earnings speaks for itself," he said.

Nobody's crying for Con Ed

Indeed, all three local utilities are quite profitable. And power generators, especially those that do business in California, have been making out like bandits.

As deregulation continues, that pattern is likely to persist, at least until natural-gas exploration picks up and enough new plants are built to create genuine competition.

According to the NYISO's Klapp, there are enough plant proposals to add 30,000 megawatts to the state's supply, which would nearly double it. One of the proposals, by Calpine Corp., would put a 540-megawatt plant in the Town of Wawayanda in Orange County.

A megawatt is enough power to run about 1,000 homes.

Of course, if there's one kind of plant no one wants to see in the back yard, it's a power plant.

Despite community objections, the New York Power Authority plans to install 11 generators around New York City this spring that will add about 440 megawatts to the city's power supply.

In Buchanan, The Indian Point 2 nuclear plant is up and running again after spending most of last year out of commission. That brings another 950 megawatts to the table.

Last week, the NYISO came out with its forecasts for summer demand. The projected peak demand is 30,621 megawatts, just 421 more than last summer's projected peak. Of course, last summer was unusually cool, and actual demand topped out under 29,000.

"On paper, we're looking a little bit better than last year," Klapp said.

"On that day when the real hot weather comes, the real concern is, 'Do you have that extra power to work with?'"

The answer, from the experts, is a qualified "yes."

"The forecasts say the supply is sufficient for the immediate future," said O&R spokesman Michael Donovan. "This is one of those situations where you never say never."

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Feb. 16 letters to the editor

Support for Purple Heart stamp

As a former WWII war veteran with a presidential citation and four bronze stars, Normandy and Germany; chairman of the Newburgh joint Memorial Day Parade Committee for 42 years; commander of the VFW Post 973 two times; American Legion Post 152 two times; and DAV Chapter 152 two times, now adjutant, I wholeheartedly endorse New York state Sen. Bill Larkin's campaign to ask Congress to pass a federal law that the U.S. Post office be allowed to use the "Purple Heart Stamp" forever!

You can send your letter in support of the "Purple Heart Stamp" to the following address: Dr. Virginia Noelke, chairperson, Citizens Stamp Advisory Committee, Room 4474E, U.S. Postal Stamp Development, 475 L'Enfant Plaza, SW, Washington, D.C. 20260-0010.

Aurey Hollenbeck
Newburgh

* * *

Re Larkin to promote Purple Heart stamp: To whom it may concern, and it should bloody well concern all of you at the Citizens Stamp Advisory Committee.

It's time you put all your nonsensical first-class stamps on hold, the Daffy Ducks, etc., and issue a stamp in honor of all those who have fought the big battle.

Many received the Purple Heart, but we must honor those also who gave up years of their lives on battlefields and those who never returned and, perhaps, never had the Purple Heart pinned on them.

The issuance of the first-class Purple Heart stamp is more than 50 years overdue.

Rosemarie Werkman
Monroe

Beware of power plant dangers

The Calpine Electric Plant will be built within approximately a few hundred feet of the Masada Ethanol Garbage Plant (if it gets approved). The environmental study must be inclusive of what the combined air emissions will be! Calpine will also store ammonia on site just like Masada. Any

type of lightning, flood or human error could be catastrophic and totally eliminate the Dolson Avenue population for good. What will be the reaction by Wawayanda and city officials – a big whoops?

Particle matter is produced as smoke during combustion, some particulate matter is produced in the atmosphere by spontaneous chemical reactions among pollutant gases such as sulfur dioxide, oxides of nitrogen and volatile organic matter.

Each year, power plant particulate pollution causes an estimated 37,000 asthma attacks in children and adults, chronic bronchitis, emphysema and even premature death in people with pre-existing cardiovascular disease.

Kathleen House
Middletown

Definition of success too narrow

I am surprised that you would cite research by the American Association of University Women. That organization is in such disrepute for its phony research and campaign of social reform based on a false claim of discrimination against girls in our schools that no one will listen seriously to what they have to say for another generation.

But if Hispanic girls on average do not progress as well in school as others, it is probably due to the different values of a different culture – a culture which the girls themselves endorse. To be otherwise would be to surrender their culture. To what extent should we be criticizing someone else's culture? Realistically, people surrender much of their culture when they move from its geographical center of influence, but people certainly have a right to hold on to their traditional values as long as they can.

However, the issue here is neither Hispanic culture nor some problem in the schools that needs fixing. Rather, it is this: first, we need to broaden our idea of success in life beyond what is offered by the American model formal education, credentials and material wealth. Second, we need to provide other routes to material success than those provided by formal education.

K.J. Walters
Monroe

We need more civil schools

I believe schools should only be owned and operated by civil organizations but some disagree. Reading, writing and math are the same regardless of the school's owner or operator they

say. Political schools, those owned or operated by the government, missed the mark for me when I examined why we educate in addition to how effective education is.

The two main reasons we buy education are faith and freedom. Faith: Education allows us to understand what and why we believe in addition to discussing and reading other's views. Freedom: 175 years ago, educating slaves was a crime – free citizens must be educated. President Lincoln said, "As the children are taught, so goes the nation."

Political schools are unable to objectively handle faith and freedom. "Value neutral" classrooms are impossible. Families, not government, should make the choices about the values education occurs in. Family choice of who educates their children is the foundation of freedom.

Jim Sutton
Warwick

generating technology to Hudson Valley

By JOHN DUVOLI

BOSTON – It's not your father's generating plant, or at least the common perception of one, is how Calpine explains itself and planned projects in the Hudson Valley.

A state-of-the-art 540 megawatt ant, the Waywayanda Energy Center, a 20-acre site on Dolsontown Road st outside Middletown, is tracking forard and, right behind it, are tentative ians for a second Hudson Valley facily in Sullivan County.

Located in offices at the Pilot House, st steps from a famed marina, Calpine as been at the cutting edge in building enerating plants that wholesale energy so suppliers. Calpine does not directly erve the retail consumer. Their most ecent project is in Maine.

Calpine officials, including Project evelopment Manager David Devine and Public Relations Director John Flumerfelt use the slogan "Reenergizing America" to stress what the firm is all about, and what it expects to accomplish for the region.

Devine and Flumerfelt note the vision that many people have regarding enerating plans, of smokestacks spewng forth dark clouds of toxics, is no onger applicable, and that those driving by a contemporary site would not, from sight only, think it was one. Calpine projects are far from high impact in traffic and/or noise pollution or consuming inordinate amounts of water.

Calpine leaders note that energy costs (which projects such as theirs bring down by about 40 percent) are an important marketing tool for New York state, and others, because low cost and reliable (in terms of consistency of flow) power is deemed necessary to attract certain high-tech firms.

Surprisingly though, 13 percent of hat power presently goes to service consumer items that are hardly ever hought of in heavy-use terms, such as cell phones and in-home and office computers and Internet stations.

Calpine officials hope to convince area residents that they will be a good neighbor. Devine and Flumerfelt maintain that most governmental officials and constituents are willing to give technologies a fair hearing and are open to education. There are, of course, gadflies in virtually every community who are more interested in latching on to rumor and spreading distortions and misinformation.

New York state is one of the toughest markets to enter because of strict regulations, particularly regarding environmental safety, and the time and cost of navigating the regulatory process is a factor that must be considered before making a commitment, which in this case will result in a $300 million project. Calpine reps said.

The upside, for the community, is that the New York State Department of Environmental Conservation is a reliable watchdog, and it is unlikely that an unsound project would ever get a green light, Flumerfelt and Devine maintain. "There is a level of public protection here (New York state) that doesn't exist in many other portions of the country," Devine reported.

Regulations are now being hurdled, and, if all goes as planned, construction could begin in 2002 and the facility could open before the end of 2004. A second project, in the Town of Thompson just outside Monticello, is also planned, but is not as far along in the preliminary municipal and New York state public service law process.

Calpine has 28 projects in various stages throughout the nation. Wherever they are located they help drive down the cost of energy. New York is a good place to be, from an entrepreneur

See CALPINE TECHNOLOGY on Page 29

ial perspective, because, largely due to deregulation and other policies, new plants are not often being built. The closest Calpine, in proximity to the Hudson Valley, is near JFK International Airport.

Despite regulation and absence of new facilities, Calpine does not believe New York state is in danger of mirroring a pattern of rolling blackouts that recently made headline in California. These were reportedly due to a combination of outdated facilities, deregulated wholesale and frozen retail prices.

New York State Independent System Operator recently issued a press release reporting that the state should not see blackouts, or even significant brown-outs, during even warmer summer weeks, but that energy demands will, however, exceed generation in about three years.

Toward remedying this, the Chamber of Commerce of Orange County, located in Newburgh, has passed a resolution calling for the construction of new power plants, and streamlining site approval processes.

Orange County Partnership supports efficient power generation projects

GOSHEN – The Orange County Partnership is calling on local, regional, and state officials and the public at large, to support new, environmentally efficient power generation projects. While the short-term energy outlook is stable, it is widely understood that the long-term impact of rising energy costs and growing consumption could constrain economic existing businesses and future economic development and job creation.

"We clearly recognize that without additional power generation being added regionally and statewide on a consistent basis, we could lose some existing and potential business. Any business considering relocation or expansion to Orange County and the Hudson Valley needs assurance that there is a reliable source of available energy both now and in the future," says David Dirks, president/CEO of the Orange County Partnership.

See PARTNERSHIP on Page 31

Continued from Page One

The Partnership also urges New York state agencies to review all proposed power generation projects carefully. This includes moving appropriate proposed power projects through the review process as quickly and efficiently as possible. "The current review process insures that we have electric power generation plants that are environmentally safe and we encourage that process. However, the future of our economy and economic development demands that we speed the approval process up wherever appropriate and possible," adds Dirks.

Orange County is the site of a possible power generation plant being proposed by the Calpine Corporation. Calpine is looking to locate the plant in the town of Wawayanda.

"The local economic benefits from the Calpine project are considerable. In addition to increased power generation, it provides millions of dollars of direct economic benefits to Orange County," Dirks said. "The Calpine project is a great example of a highly efficient and environmentally sound power generation project. We are one of the few counties in all of New York that has the opportunity to benefit from a project of this nature."

Giving power to the people

By Michael Levensohn
The Times Herald-Record
mblevens@th-record.com

The deregulation of New York state's electricity market was supposed to create competition and drive down the price of electricity.

That was the theory, anyway.

In practice, many customers have seen their bills skyrocket this summer. Customers of Orange and Rockland Utilities saw their July bills jump 20 percent from last year for the same amount of juice.

The one saving grace: This summer hasn't been very hot. A scorcher could have been fatal.

Deregulation backers say the state's free market isn't yet mature, and that the kinks will eventually get worked out.

For now, customers can fume and politicians can pound their lecterns. But no one seems sure of how to fix what's ailing New York's power market.

"We're committed to an open market, but there's definitely a concern because it's an untried market, it's in the early stages, and it's under some growing stress," said Ken Klapp, spokesman for the New York Independent System Operator (NYISO), which runs the show.

How it was supposed to work

Back in the days of the utility monopolies, your electric company did just about everything: pProducing power at its own plants, transporting it on its own lines and dropping it into each home or business.

The only thing utilities didn't do was set prices. The state Public Service Commission set rates based on each company's cost of doing business, with some profit tacked on. It wasn't glamorous, but business was steady, as were supplies.

A couple of years ago, that scenario began to change. Utilities were ordered to sell their power plants and focus on delivery, which would still be regulated. Other companies would buy the plants and sell power competitively through a wholesale state market run by the NYISO.

According to the plan, the promise of free-market profits would attract investment in new power plants to support the state's growing power needs. Increased competition would lower prices for consumers.

More power plants are indeed on the way. The PSC has received 10 applications, with several more in progress.

"If you had a sufficient number of plants up and running, that would drive down the wholesale price," said John Flumerfelt, a spokesman for Calpine Corp., which plans to build a 540-megawatt plant in the Town of Wawayanda. "In a big, growing state like New York, you should be building a power plant every year."

But it's been years since New York christened a new power plant. And it will likely be a couple more before any of the pending proposals yield power.

Free market or freedom from it?

Thanks to the thin margin between burgeoning demand and stagnant supply, the plants already running can demand hefty prices for power.

That's why customers of O&R and parent company Consolidated Edison have seen their bills jump. The utilities are heavily dependent on the market, where customers are exposed to fluctuations in price.

Customers of New York State Electric & Gas, on the other hand, have been insulated from price increases. NYSEG operates under a rate agreement with the PSC that guarantees fixed and declining customer rates through 2003. The company also has long-term contracts with energy suppliers.

"We knew the amount we had to pay for each unit of electricity" in order to satisfy the rate agreement and still make a profit, explained NYSEG spokesman Frank Scollan.

NYSEG bet it could get a better deal by staying out of the market. So far, that bet has paid off for NYSEG customers. Of course, if all the utilities followed NYSEG's lead, the market wouldn't mean much.

"If you tie up the market by getting contracts, you stifle the market," said O&R spokesman Michael Donovan.

Central Hudson Gas & Electric still produces its own power, so its customers have also been insulated from the market.

Price spikes and shortages

For consumers who buy their power on the market, the early days of the NYISO have been a disaster.

Rising prices for oil and natural gas – the fuels many generators burn to create electricity – have boosted the price of electricity this summer. So has increasing demand. But to understand why prices have risen so rapidly, you have to look at how the NYISO sets prices.

Electricity is traded on two markets, the "day-ahead" market and the "real-time" or spot market.

In the "day-ahead" auction, utilities across the state tell the NYISO how much power they expect to use the following day.

Energy suppliers then offer to sell a certain amount of power on the market at a certain price per megawatt-hour.

The NYISO accepts the lowest bid first, then the next-lowest and so on, until statewide demand is met. Plants whose bids aren't accepted don't get to sell any power on the day-ahead market. But all the winning bidders get the price set by the highest bid accepted.

If a company offers to supply 100 MWH of power at $40 each, and the highest bid accepted is $150, the company will get $150.

"If you price too high you won't get dispatched, but you still want to price high enough to make a profit," said NYISO spokesman Klapp. But because New York's supply is so tight, suppliers can be fairly certain of their bids being accepted often.

In fact, many suppliers bid the bulk of their power at no charge (some even offer to pay for the privilege of providing power) to ensure that they'll sell it, while betting that the final price will be set by a higher bid.

About half of New York's power is sold through long-term contracts. Another 45 percent moves on the day-ahead market.

That leaves a relatively small amount for the highly volatile and lucrative spot market.

In the spot market, suppliers and utilities bid on power to be delivered just a few minutes ahead. On a hot day when air conditioners are churning and supplies are tight, prices soar. In July, the spot market produced prices in the $1,000 to $1,300 per MWH range, compared with typical prices of $20 to $60 per MWH. From hour to hour and day to day, it's hard to say where prices will end up.

"During peak periods, the supply is more limited. Under the normal laws of supply and demand, the prices are going to be higher," Klapp said. "We're hoping that the pricing will send signalsØ...Øfor generators to build in New York, and that would create more supply."

The waiting game

The flurry of plant proposals indicates that signal has been sent. But until those plants come online, there is little relief in sight. Last month, the Federal Energy Regulatory Commission imposed a bid cap of $1,000 per MWH on New York's market.

In California, where the energy crisis makes New York's troubles seem minute, the state ISO recently lowered its bid cap to $250. Now there's growing concern that producers might be scared off.

It's a dilemma New York faces as well: Do nothing and customers pay the price now; or take action to reduce prices now and risk scaring away producers who could provide relief later.

The lack of easy answers hasn't stopped politicians from laying blame at the feet of the utilities and the PSC. Everyone from Sen. Charles Schumer to Senate hopeful Hillary Clinton to Orange County legislator Jeffrey Berkman has weighed in.

Schumer called for a complete overhaul of New York's "half a loaf" effort. Clinton joined a growing list of Con Ed bashers. And Berkman, in a resolution presented Friday to the county Legislature, asked that the PSC investigate alleged predatory pricing by O&R.

Berkman's resolution was tabled, but his comments summed up a complaint subjects of the NYISO experiment have voiced all summer long: "It is outrageous that the people and businesses of Orange County must endure such burdensome increases, while areas serviced by O&R in Pennsylvania and New Jersey do not."

Power questions deserve answers

By Oliver Mackson
The Times Herald-Record
omackson@th-record.com

Paul Bennis grew up in Delaware County and fell in love with a woman from Queens. For settling-down purposes, they met halfway between hometowns and moved into the town of Wawayanda.

That's pronounced "Way-way-yonda." It's a name that conjures up images of farmland and fresh air and quaint old houses. The Bennises bought one of those houses. It was their first. Paul, 32, gets as lively as a little kid with a Lego set when he talks about it: "It was a real fixer-upper. Had no water, no nothing. I put a lot of sweat equity into it." He drilled a well, put in oak and bluestone floors.

And then one day last year, he heard that a big power company named Calpine, from California, wanted to build a big power plant in his neighborhood.

Anyone who's reading the news, or reading their utility bills and reaching for Alka-Seltzer, knows that power plants are a big deal these days. Power demand is up. So are prices. Power companies and their flacks warn that if more power plants don't come on line, but quick, we'll be burning old socks to stay warm and burning dinner in the dark.

But Paul Bennis isn't some nitwit who can be scared into silence or swayed by slick PR. He's got reasonable, intelligent questions about how Calpine's plans might change his life. This isn't just a Wawayanda thing: They're asking the same questions in Queens, where Con Ed's talking about building new plants. And reasonable, intelligent questions deserve reasonable, intelligent answers. Especially when the people doing the asking are the ones who have to live with noises, odors or worse.

"If my wife wakes up with breast cancer, is it going to be, 'Well, we didn't really see that?' "

Bennis said this on Friday at the Colonial Diner

in Middletown, after he put in a full day of history at Goshen High School. He had three of questions written in a legal pad.

If the Calpine plant needs water, where will the water come from? From the same aquifer that feeds the wells of Bennis' home, his neighbors' homes? What happens to the water that goes through the plant? How loud will the plant be it's running? If the plant is powered by gas, extended from a pipeline in Jersey, how much land will Calpine need to connect to the pipeline? How closely will the pipeline run toward Bennis and his neighbors? How will the Calpine plant benefit the town? Why couldn't Calpine build somewhere less crowded? Wawayanda's right next door to Middletown. Wawayanda's small, but it's grown about 16 percent since the last census.

Bennis isn't some googly-eyed fanatic. He can go an entire conversation without using words like "corporate profits" and "deregulation scam," even though those words have cropped up in discussions about why energy bills are vacuuming wallets from New York to California.

"We're talking about quality of life. We'd like a little more specific answers. We're talking about real estate values, too."

Calpine says it'll have answers for Bennis and everyone else who's asking. Here's something else for Calpine to consider, as well as every politician from the governor's mansion to the Assembly floor and the Senate chamber, right down to town hall:

Paul Bennis votes. Pays taxes. Owns a home. His neighborhood is growing. And the demand for straight answers about the impact of new power plants, that has the same urgency as the demand for energy. That goes for Queens, and it goes for Paul Bennis' neighborhood up here.

Oliver Mackson's column appears Wednesday, Friday and Sunday. He can be reached at 346-3130 and omackson@th-record.com.

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Residents hope loss of local Shangri-La not on horizon

TOWN OF WAWAYANDA: In the Hudson Valley, ground zero in the energy crisis plays out here.

By Michael Levensohn and Roberta T. McCulloch
The Times Herald-Record
mblevens@th-record.com
rmcculloch@th-record.com

For 26 years, Carol Moore's Shangri-La has been her 20-acre farm off of Dolsontown Road in the Town of Wawayanda.

"This home has become the heart of my family," said Moore of the white Victorian where she and her husband, Arthur, raised five children.

Unfortunately for Moore, her small slice of paradise happens to fall along the path of the Marcy-South power transmission line, which carries high-voltage electricity from Canada to the New York City area.

The chance to pump juice into that power line and let it run down to power-hungry New York is what attracted Calpine Corp., which plans to build a 540-megawatt power plant off of Dolsontown Road, right next door to Moore.

"When we first look at a project, we look at the capacity of the transmission system," said Calpine spokesman John Flumerfelt. "If the transmission capacity doesn't exist ... then the project is a nonstarter."

The energy task force report released yesterday by the Bush administration detailed the need for increased supplies of electricity and improvements in transmission infrastructure if areas such as New York are to avoid power crises like the one plaguing California.

Transmission is a particularly vital issue in the Hudson Valley, because New York City depends on power imported from upstate.

Under New York state's electricity deregulation scheme, the utility companies have sold off most of their power-generating capacity, and now focus on delivering power to their customers. Other companies such as Calpine have become the

power producers, selling some of the energy they produce directly to utilities and offering the rest on the state's power market.

Calpine is one of several companies that hope to take advantage of the city's power needs by building plants in the suburbs and sending the power to the city.

In addition to the Wawayanda site, Calpine is considering one or more sites in Sullivan County for a possible sister plant. Nationwide, Calpine has some 110 projects in operation, under construction or in advanced development.

The project in Wawayanda falls into the third of those categories. Calpine announced the $250 million project in March 2000, has spent the better part of the past year conducting studies and public meetings, and is perhaps two months away from filing its application for the state's formal approval process.

Neighbors have several concerns about the Calpine project: They say it would be a 100-foot-tall eyesore, reduce area property values and could damage air and water quality.

Calpine just filed an air-permit application with the state Department of Environmental Conservation, which addresses some of those concerns.

"We would really like to have this project under construction this time next year," with an eye toward putting the plant in operation by the summer of 2004. "That's important for us and for the market," Flumerfelt said.

Most forecasts project that if the weather is mild and the state's older plants hold up, New Yorkers should make it through this summer without any blackouts.

But many will pay higher electricity bills. Orange and Rockland Utilities projects its residential customers will pay bills that are 15 percent to 20 percent higher this summer than last because of the higher price of natural gas and the tight power supply.

A recent study prepared for New York state's Independent System Operator, which administers the energy market, projects that wholesale electricity costs could increase by 46 percent by 2005 if no power plants are built by then.

The addition of power plants like the one Calpine proposes would alleviate the strain on the state's power grid. But if the company builds a power plant next door, Carol Moore isn't sure she'll want to stay in the neighborhood.

"My Shangri-La will be gone forever," she said.

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Wawayanda residents wary of new water, sewer district

By Roberta T. McCulloch
The Times Herald-Record
rmcculloch@th-record.com

Sal DeVito does not want to stop using the well on his property.

The creation of the new sewer and water district on Dolsontown Road in the Town of Wawayanda means DeVito and other residents nearby will soon have to join the district, says Ross Winglovitz, an engineer of Tectonic Engineering Consultants, who supervised the town's project.

"They're going to force me to be a part of it," said DeVito, who lives on Caskey Lane off Dolsontown Road. "You can't have a well connected when you have city water."

"They will be given a certain amount of time to make the transition," Winglovitz said of the change that will be official "sometime within the summer." The water and sewer district begins by the Kirby Farm on Dolsontown Road to Interstate 84 by Route 17M and continues to the cemetery on Route 6.

Residents can still use their wells for lawn purposes only, he said. The estimated total cost for water and sewer hookup for a single-family residence is $2,000. The estimated annual fee is $827.18, part of which will be paid quarterly and the rest with county and town taxes.

Some residents are concerned that the new district was created to facilitate the water needs of the Calpine Corp. The company proposes to build a 540-megawatt power plant on Dolsontown Road. The plant, scheduled for operation by 2004, will need a maximum of 200,000 gallons of water a day, said John Flumerfelt, a spokesman for Calpine.

Flumerfelt said the plant will use the maximum "at full capacity on the hottest summer day." Calpine plans to get most of its water from the Middletown waste water treatment plant, though plans have not been completed yet, he says.

DeVito says he's not convinced.

"There's no question about it," DeVito said. "They're accommodating Calpine and they're not even here yet."

But Winglovitz says that's just not true. Talks for the district started in 1994, he says, and four years later, in 1998, the town actually formalized the plans.

"Calpine wasn't even heard of in 1998," Winglovitz said, referring to the plant proposal that Calpine officially introduced to the town in March 2000. "Calpine knew where it was zoned and they took advantage of the opportunity."

Deevy-Jane Greitzer, who's lived off Caskey Lane since 1998, doesn't think there's necessarily collusion between town officials and Calpine, but she is skeptical.

"No, there's not a conspiracy," Greitzer said, "they (the town) always had a water and sewer plant in the works for the last 20 years. But all of sudden they're having all these things without the input from the people," she said, "I feel like they're rushing it through."

Residents question Town Board

By Roberta T. McCulloch
The Times Herald-Record
rmcculloch@th-record.com

Wawayanda – Bruce Miller wants Wawayanda's Town Board to protect the town he and his wife fell in love with.

"Wawayanda's going to be developed, but we have to do it responsibly," said Miller, who addressed the board at Monday night's public hearing on proposed zoning changes to increase commercial development in the town. "If we don't protect those things, there's going to be no history to tell."

About 200 residents attended the meeting, the town's second public hearing on the zoning changes. Calpine, the power plant proposed to be built off Dolsontown Road by 2004, also came up in conversation.

This time around, residents questioned the board's loyalty to them.

"No disrespect, but it seems that Wawayanda has a reputation of being rolled over," Vinny Camgemi told the board. Camgemi and several others complained that there were pages missing in the Draft Environmental Impact Statement. The statement cites the impacts the Calpine project would have on the town.

"I'd like to assume that this was an oversight and not a deliberate act," Camgemi said.

Marguerite Lowry was more skeptical. "I don't understand why at this meeting those pages weren't handed out," she asked.

Jim Ullrich, the town's environmental consultant, said all the pages were in fact there, but the page numbers were wrong.

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Wawayanda denies catering to Calpine on zoning

WAWAYANDA: Town officials say proposed zoning changes are meant to draw business in general.

By Roberta T. McCulloch
The Times Herald-Record
rmcculloch@th-record.com

A public hearing on Wawayanda's proposed zoning changes attracted 100 residents Wednesday night.

But what was supposed to be a session about creating a commercial/industrial zone, part of which would be along Dolsontown Road, erupted into talks about The Calpine Corp., which has proposed to build a power plant on Dolsontown Road by 2004.

"I think there's a rush to accommodate, or what appears to accommodate, Calpine," said Carol Moore, a resident on Dolsontown Road.

Town officials rebutted the charge, saying the revisions were made to attract more business in general.

Dolsontown Road, Lower Road and sections of Route 6 have been selected for the possible rezoning.

"As it applies to zoning, Calpine isn't the subject of the hearing," said Jim Ullrich, the town's environmental consultant. "Wawayanda did not plan it for them."

A seven-member zoning commission started the revisions process in February 1998. "We made the determination that the area was suitable for industry," Ullrich said.

Though Pericles Gardianos, who lives on Dolsontown Road, will be affected by the zoning if approved, he says it's a logical move for the town.

"I can understand why the town would want to zone it," Gardianos says. "It's a prime location because its right in the middle of everything."

With many questions and concerns still unanswered, town officials decided to schedule a

second public hearing at 7:30 p.m. May 14.