New York State Department of Environmental Conservation
Division of Legal Affairs, 14th Floor
625 Broadway, Albany, New York 12233-1500
Phone: (518) 402-9188 • **FAX:** (518) 402-9018
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

report

FILES
C 99-F-1625

September 4, 2001

PUBLIC SERVICE COMM.
RECEIVED
2001 SEP -4 PM 1:11
ALBANY, N.Y.

Honorable Janet Hand Deixler
Secretary
New York State Board on Electric Generation
Siting and the Environment
Three Empire State Plaza
Albany, New York 12223-1350

Re: Case 99-F-1625 – In the Matter of the Application of KeySpan Energy for a Certificate of Environmental Compatibility and Public Need to Construct and Operate a 250 Megawatt, Cogeneration, Combustion Turbine Electric Generating Facility to be Developed at the Existing Ravenswood Generating Station in Long Island City, Borough of Queens.

Dear Secretary Deixler:

Enclosed are the environmental permits developed by the Department of Environmental Conservation for the proposed addition to the Ravenswood Generating Station by KeySpan Energy. The DEC has made a determination on the following permits: a Clean Air Act Title V operating permit; a Clean Air Act Title IV Acid Rain Permit; Prevention of Significant Deterioration (PSD) permit; and finally, an Industrial State Pollutant Discharge Elimination System permit.

Please note that the Clean Air Act Title V permit is subject to a 45-day review period by the Environmental Protection Agency (EPA) pursuant to 6 NYCRR 621.9(a)(5) and 40 CFR 70.8(c). The Title V permit represents the DEC's determination regarding the proposed project, and brings to a close the DEC's project review for this permit. Should the Siting Board approve the proposed facility and issue an Article X Certificate to KeySpan Energy, DEC requests that the Siting Board condition the Certificate on compliance with the final permit issued by DEC at the close of the EPA comment period.

If you have any questions about the enclosed permits or the discussion above, please do not hesitate to contact me at 518-402-9188.

Sincerely,

Jennifer L. Hairie
Senior Attorney

cc: J. McDonnell, DPS
J. Smolinsky, DPS
L. Sedefian, DEC
A. Crocker, DEC
O. Lewinter, DEC

New York State Department of Environmental Conservation
Division of Environmental Permits, 4th Floor
625 Broadway, Albany, New York 12233-1750
Phone: (518) 402-9167 • **FAX:** (518) 402-9168
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

September 4, 2001

Mr. Brian McCabe
Project Manager
KeySpan Energy
200 Shore Road
Glenwood Landing, NY 11547

RE: Ravenswood 250 MW Gas-Fired Cogeneration Facility
Article X Case 99-F-1625
DEC No. 2-6304-00024/00004

I. DEC Permits
II. Title V Responsiveness Summary

Dear Mr. McCabe:

The New York State Department of Environmental Conservation (DEC) encloses the following permits:

- Industrial SPDES (issued)
- Title IV Phase II Acid Rain, including application for permit (issued)
- PSD (Prevention of Significant Deterioration) air quality permit conditions (Final Determination and Responsiveness Summary Noticed on July 11, 2001) (issued)
- Title V Air Permit (final draft permit) and Responsiveness Summary

Pursuant to Uniform Procedures (6 NYCRR Part 621.0(a)(5), the DEC may not issue a final Title V permit until the U.S. Environmental Protection Agency (EPA) has been provided 45 calendar days to review the Responsiveness Summary and resulting draft permit. The Air Title V Facility permit and Responsiveness Summary related to it have been transmitted to the EPA for its required 45-day review. The close of the 45-day review period falls on October 18, 2001. Following that date, DEC will revise the Title V permit, if necessary, to address EPA comments and will issue the final permit to KeySpan Energy.

Please note that the enclosed permits do not constitute complete approval to construct and operate the proposed facility. KeySpan must also obtain a Certificate of Environmental Compatibility and Public Need pursuant to Article X of the Public Service Law, must receive approval on all Compliance Filings required by the Article X Certificate, and must obtain a final Title V permit subsequent to EPA review.

If there are any questions, I may be reached at (518) 402-9162.

Sincerely,

for

Orest Lewinter
Environmental Analyst 2

Ravenswood.permits.ltr.8a

Enclosures
cc w/enc:

Regional Administrator, US EPA Region II
290 Broadway, NY, NY 10007
New Jersey Dept. of Environmental Protection, Bur. of Operating Permits
401 East State St., PO Box 27, Trenton, NJ 08625-0027
Connecticut Dept. of Environmental Protection, Bur. of Air Management
79 Elm St., Hartford, CT 06106-5127
Pennsylvania Dept. of Environmental Protection, Bur. Air Quality
Rachel Carson State Office Building, 12th Floor, P.O. Box 8468, Harrisburg, PA 17105-8468
Honorable Claire Shulman, Queens Borough President
120-55 Queens Blvd., Kew Gardens, NY 11424

cc w/o enc:

Honorable Janet Hand Deixler
C. Corrado - Keyspan Energy
P. Seidman - DPS
J. McDonnell - DPS
R. Garlin - DPS
T. Grey/K. Gleason - DOH
DEC Ravenswood Team
H. Goldberger
J. Hairie
L. Kuwik

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
State Pollutant Discharge Elimination System (SPDES)
DISCHARGE PERMIT
Special Conditions (Part 1)

First3.99

Industrial Code:	4911	SPDES Number:	NY - 0005193
Discharge Class (CL):	03	DEC Number:	2-6304-00024/00004
Toxic Class (TX):	T	Effective Date (EDP):	11/01/96
Major Drainage Basin:	17	Expiration Date (ExPD):	10/31/01
Sub Drainage Basin:	02	Modification Dates:	09/04/01
Water Index Number:	ER (0.3 - 10.1)	Attachment(s): General Conditions (Part II) Date: 11/90	
Compact Area:	ISC		C.O. #R2-2985-90-4

This SPDES permit is issued in compliance with Title 8 of Article 17 of the Environmental Conservation Law of New York State and in compliance with the Clean Water Act, as amended, (33 U.S.C. §1251 et.seq.)(hereinafter referred to as "the Act").

PERMITTEE NAME AND ADDRESS

Name: Keyspan Energy - Ravenswood, Inc., LIC Funding, ConEd Attention: H. Kosel, VP Generation
Street: 175 Old Country Road
City: Hicksville State: NY Zip Code: 11801
is authorized to discharge from the facility described below:

FACILITY NAME AND ADDRESS

Name: Ravenswood Generating Station
Location (C,T,V): Long Island City County: Queens
Facility Address: 38-54 Vernon Boulevard
City: Long Island City State: NY Zip Code: 11101
NYTM -E: 588.961 NYTM - N: 4512.613
From Outfall No.: 001 at Latitude: 40 ° 45 ′ 39 ″ & Longitude: 73 ° 56 ′ 49 ″
into receiving waters known as: East River Class: I
and; (list other Outfalls, Receiving Waters & Water Classifications)

002 - East River - Class I
003 - East River - Class I
01D - East River - Class I (via 001)
004 - East River - Class I
006 - East River - Class I

in accordance with the effluent limitations, monitoring requirements and other conditions set forth in Special Conditions (Part I) and General Conditions (Part II) of this permit.

DISCHARGE MONITORING REPORT (DMR) MAILING ADDRESS

Mailing Name: KeySpan Energy
Street: 445 Bradhollow Road
City: Melville State: NY Zip Code: 11747
Responsible Official or Agent: Robert Teetz Phone: (631)391-6133

This permit and the authorization to discharge shall expire on midnight of the expiration date shown above and the permittee shall not discharge after the expiration date unless this permit has been renewed, or extended pursuant to law. To be authorized to discharge beyond the expiration date, the permittee shall apply for permit renewal not less than 180 days prior to the expiration date shown above.

DISTRIBUTION:
Bob Hannaford, BWP
Regional Water Engineer, Region 2

Permit Administrator: William R. Adriance	
Address: 625 Broadway Albany, New York 12233	
Signature: William R. Adriance	Date: 09/04/01

FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning EDM
and lasting until October 31, 2001
the discharges from the permitted facility shall be limited and monitored by the permittee as specified below:

Outfall Number & Effluent Parameter	Discharge Limitations Daily Avg.	Daily Max.	Units	Minimum Monitoring Requirements Measurement Frequency	Sample Type
001 - Condenser Cooling					
Water Flow	Monitor	Monitor	MGD	Hourly	Pump Log
Discharge Temperature[a]	NA	97.5(36.4)	°F(°C)	Continuous	Recorder
Intake-Discharge Temperature Difference[a]	NA	17.5(9.7)	°F(°C)	Continuous	Recorder
Net Addition of Heat	NA	8.23×10^9	BTU/hr.	Monthly	Calculated
Total Residual Chlorine[b]	NA	0.2	mg/l	3/week[c]	Grab
pH	6.0 - 9.0 (Range)		SU	Weekly	Grab
001A - Floor Drains Boiler Blowdown, Filter Backwash, Condensate from Ion Exchange System (Low Volume Wastewater)					
Flow	Monitor	Monitor	GPM	Monthly	Calculated
Oil & Grease (From Oil/Water Sep)*	NA	15	mg/l	Weekly	Grab
Suspended Solids, Total	30	100	mg/l	Monthly	Grab
001B - Fuel Oil Heating System Condensate (No Monitoring Required)					
001C - Uncontaminated Stormwater Runoff (No Monitoring Required)					
01D - Combined Low-Volume Wastestreams (Unit 4). (Includes Unit 4 Discharges from Oil Water Separator, Boiler Blowdown, Granular Filter Backwash, Neutralized Ion Exchange Regenerant Reject Wastewater, Air Condenser Fan Cleaning Effluent, Ion Exchange Softening Reject Water, and External Heat Exchanger Blowdown)					
Flow	NA	Monitor	GPD	Weekly	Calculated
Oil and Grease	NA	15	mg/l	Weekly	Grab
Total Suspended Solids	NA	100	mg/l	Weekly	Grab
pH	(Range 6.0 - 9.0)		SU	Weekly	Grab
002 and 003 - Uncontaminated Stormwater Runoff (No Monitoring Required)					
004 - Rainey Tank Farm					
Flow	NA	Monitor	GPD	Monthly	Calculated
Oil & Grease	NA	15	mg/l	2/month	Grab
pH	(Range 6.0 - 9.0)		SU	2/month	Grab
Arochlor 1254	NA	0.30[1]	µg/l	2/month	Grab
Arochlor 1254	NA	Monitor[1]	g/day	2/month	Grab
Arochlor 1260	NA	0.30[1]	µg/l	2/month	Grab
Arochlor 1260	NA	Monitor[1]	g/day	2/month	Grab

* Sample to be taken from the discharge of the oil/water separator before combination with Outfall 001

004A - Hydrostatic Test Water (see page #6 for Action Levels)

Flow	NA	Monitor	GPD	Ea. Discharge	Calculated
Oil & Grease	NA	15	mg/l	Ea. Discharge	Grab
pH	(Range 6.0 - 9.0)		SU	Ea. Discharge	Grab

006 - Gas Turbine Site

Flow	NA	Monitor	GPD	Monthly	Calculated
Oil & Grease	NA	15	mg/l	Weekly	Grab
pH	(Range 6.0 - 9.0)		SU	Weekly	Grab

NOTE:
KeySpan-Ravenswood Services Corporation is the operator for this facility. Ownership of the facility discharges is as follows:

002, 003 ConEd
001, 01A-01C LIC Funding
004, 04A, 006, 01D KeySpan Ravenswood, Inc.

Footnotes:

1. i. The permittee must monitor this discharge for PCBs using USEPA laboratory method 608. The laboratory must make all reasonable attempts to achieve an MDL of 0.065 µg/l or less per aroclor. Monitoring requirements may be modified in the future if the Department approves a method different from 608.

   ii. Non-detect at the MDL is the discharge goal. The permittee shall report all values above the Minimum Detection Level (MDL) (0.065 µg/l per Aroclor). If the level of any Aroclor is above the MDL, the permittee must evaluate the treatment system and identify the cause of the detectable level of PCBs in the discharge. Following three consecutive months that include analytical results above the MDL (0.065 µg/l), the permittee shall prepare an approvable report identifying the measures undertaken to eliminate the detections and proposed additional steps to be taken to eliminate the recurrence of such detections. This report shall be submitted to the Department within 28 days following receipt of sampling results from the third monitoring period.

   iii. If the Department determines that effluent monitoring results above the MDL (0.065 ug/l) can be prevented by implementation of additional measures as proposed by the permittee, the permittee shall implement such additional measures.

   iv. The treatment technology for this discharge constitutes the maximum feasible treatment technology for treatment of PCBs. As treatment technology improvements become available, the permittee shall, at its own initiative or the Department's request, review the available technology and submit for Department approval, plans to improve the treatment technology and/or Best Management Practices employed to remove maximum feasible amount of PCBs from the wastewater discharge.

   v. This limit is a phased Total Maximum Daily Loading limit, prepared in accordance with 6 NYCRR 702.16(b).

   vi. If a discharge limitation (0.30 µg/l) for any Aroclor is exceeded the measurement frequency for all Aroclors shall be weekly, until a period of eight (8) consecutive weekly sampling events shows no discharges above the MDL (0.065 µg/l) at which point 2/month monitoring may resume.

FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning EDP

and lasting until EDP + 5 YEARS

the discharges from the permitted facility shall be limited and monitored by the permittee as specified below:

Outfall Number & Effluent Parameter	Discharge Limitations Daily Avg.	Daily Max.	Units	Minimum Monitoring Requirements Measurement Frequency	Sample Type

[a] These limitations may be exceeded during periods when one or more condensing units are operating with only one circulating water pump (per unit), due to pump breakdown, routine maintenance, forced outage or any other technical problems, e.g. equipment failure. In the event of pump breakdown, the permittee shall take corrective action as soon as possible. Where possible, routine pump maintenance resulting in these limitations being exceeded, should be avoided during June-September. The permittee shall indicate on the Discharge Reporting Form (1) which circulating water pumps, if any, were not in operation (2) the dates and times such pumps were not operating, (3) the reason(s) for such pumps not operating, (4) the period(s) (dates and times) during which these limitations were exceeded. In no case shall these limitations be exceeded more than 5% of the time during the operating year.

[b] Total residual chlorine may not be discharged as a result of condenser cooling water chlorination for more than two hours per unit in any one day. There are no chlorine effluent limitations, duration limitations and/or monitoring requirements during separate service water chlorination.

[c] Chlorine Measurement Frequency
If there is no chlorination, no sampling is necessary for chlorine.
3 Samples per week with 4 equally spaced grab samples per event.
Sampling shall occur during chlorination of the unit with the maximum feed rate.

ACTION LEVEL REQUIREMENTS (TYPE I)

The parameters listed below have been reported present in the discharge but at levels that currently do not require technology or water quality based limits. Action levels have been established which, if routinely or excessively exceeded, will result in reconsideration and/or development of technology or water quality based limits.

Routine action level monitoring results, if not provided for on the Discharge Monitoring Report (DMR) form, shall be appended to the DMR for the period during which the sampling was conducted. If submission of DMR's is not required by this permit, the results shall be maintained in accordance with instructions on the RECORDING, REPORTING AND MONITORING page of this permit.

If any of the action levels is exceeded, the permittee shall undertake a short-term, high-intensity monitoring program for the parameter(s). Samples identical to those required for routine monitoring purposes shall be taken on each of at least three consecutive operating and discharge days and analyzed. Results shall be expressed in terms of both concentration and mass, and shall be submitted no later than the end of the second month following the month when the action level was first exceeded. Results may be appended to the DMR or transmitted under separate cover to the addresses listed on the RECORDING, REPORTING AND MONITORING page of this permit. If levels higher than the actions levels are confirmed the results shall constitute an application for permit modification and the permit may be reopened for consideration of revised action levels or effluent limits.

The permittee is not authorized to discharge any of listed parameters at levels which may cause or contribute to a violation of water quality standards.

Outfall Number & Effluent Parameter	**Action Level**	**Units**	**Minimum Monitoring Requirements**	
			Measurement Frequency	**Sample Type**
004 - Rainey Tank Farm				
Benzene	0.10	mg/l	Quarterly	Grab
Toluene	0.10	mg/l	Quarterly	Grab
Xylenes	0.10	mg/l	Quarterly	Grab
Ethylbenzene	0.10	mg/l	Quarterly	Grab
Limits apply for direct discharge to East River.				
006 - Gas Turbine Site				
Benzene	0.10	mg/l	Quarterly	Grab
Toluene	0.10	mg/l	Quarterly	Grab
Xylenes	0.10	mg/l	Quarterly	Grab
Ethylbenzene	0.10	mg/l	Quarterly	Grab

ACTION LEVEL REQUIREMENTS (TYPE I)

The parameters listed below have been reported present in the discharge but at levels that currently do not require technology or water quality based limits. Action levels have been established which, if routinely or excessively exceeded, will result in reconsideration and/or development of technology or water quality based limits.

Routine action level monitoring results, if not provided for on the Discharge Monitoring Report (DMR) form, shall be appended to the DMR for the period during which the sampling was conducted. If submission of DMR's is not required by this permit, the results shall be maintained in accordance with instructions on the RECORDING, REPORTING AND MONITORING page of this permit.

If any of the action levels is exceeded, the permittee shall undertake a short-term, high-intensity monitoring program for the parameter(s). Samples identical to those required for routine monitoring purposes shall be taken on each of at least three consecutive operating and discharge days and analyzed. Results shall be expressed in terms of both concentration and mass, and shall be submitted no later than the end of the second month following the month when the action level was first exceeded. Results may be appended to the DMR or transmitted under separate cover to the addresses listed on the RECORDING, REPORTING AND MONITORING page of this permit. If levels higher than the actions levels are confirmed the results shall constitute an application for permit modification and the permit may be reopened for consideration of revised action levels or effluent limits.

The permittee is not authorized to discharge any of listed parameters at levels which may cause or contribute to a violation of water quality standards.

Outfall Number & Effluent Parameter	Action Level	Units	Minimum Monitoring Requirements: Measurement Frequency	Minimum Monitoring Requirements: Sample Type
004A - Hydrostatic Test Water[3]				
Benzene	0.10	mg/l	Each Discharge[3]	Grab(s)
Toluene	0.10	mg/l	Each Discharge[3]	Grab(s)
Xylenes (Total)	0.10	mg/l	Each Discharge[3]	Grab(s)
Ethylbenzene	0.10	mg/l	Each Discharge[3]	Grab(s)
Chlorine, Total Residual[4]	0.5	mg/l	Each Discharge[3]	Grab(s)

[3] Each discharge of hydrostatic test water may be directly via outfall 004. Samples must be taken from the tank, pipe, etc...contents and analyzed for all parameters (both limits and action levels) that are independent of the normal monthly/quarterly storm water sampling. Tanks being hydrostatically tested must be cleaned ad free of product.

Unless specifically otherwise authorized by the Regional Water Engineer, analytical results of sampling must be reviewed by company personnel for compliance before initiation of a discharge. If effluent limitations are not attained additional measures must be implemented to attain compliance.

Departing from the standard procedure for action level results that indicate and action level was exceeded, the required additional sampling must be performed and if "exceedance" is confirmed, additional measures must be employed. On the other hand if the additional sampling results show conformance with the action levels, discharge may be initiated.

The Regional Water Engineer must be informed at least 2 business days prior to the discharge of hydrostatic test water.

Any discharge of hydrostatic test water must be done under the direct supervision of plant personnel. A visual check for the presence of oil and floating substances must be made of the discharge.

Data associated with hydrostatic test water shall be kept, along with the log of visual observations, at the facility for a period of three years and be available to department personnel upon request.

Unless waived by the Regional Water Engineer or his duly authorized representative hydrostatic test sampling from a storage tank must be from various levels within a tank

[4] Required when chlorinated supply is used for hydro testing water, e.g. water from a municipal system.

Prohibitions: Consistent with Department policy dilution is prohibited as a substitute for treatment. Except where expressly authorized to do so by an applicable Categorical Standard or the Commissioner or his duly authorized representative, no Industrial User shall ever increase the use of process water or, in any other way, attempt to dilute a discharge as a partial or complete substitute for adequate treatment to achieve compliance with a permit effluent limitation requirement.

No discharge of tank water bottoms and/or any industrial or manufacturing process wastewater effluents are permitted. Included in the effluents categorized as industrial process effluents are wastewaters resulting from vehicle maintenance or washing operations. Washing operations are those cleaning operations which involve the use of detergents or other emulsifying chemicals.

Tank water bottoms, vehicle maintenance and washing wastewaters are not likely to be effectively treated by gravity separation alone and therefore are not permitted to be discharged. After review of an Engineering Submission for the treatment of tank bottoms and/or maintenance and/or washing wastewaters these prohibitions may be altered.

NOTES: This SPDES permit is not to be construed as altering obligations of the permittee under 6NYCRR Part 613, i.e. 613.3(c)(iii). Storm water which collects within the secondary containment system must be controlled by a manually operated pump or siphon, or gravity drain...dike valves... All pumps, siphons and valves must be properly maintained and kept in good condition. If gravity drain pipes are used, all dike valves must be locked in a closed position except when the operator is in the process of draining...water from the diked area. The only exceptions shall be those expressly authorized by the Commissioner or his duly authorized representative.

A visual check for oil or floating substances must be made and logged prior to the initiation of any discharge from an impoundment or a discharge controlled by a normally closed valve. The log of visual observations shall be maintained at the facility for a period of at least three years and must be made available to the Department upon request.

Effective Date of Modification: 9/26/97

DISCHARGE NOTIFICATION REQUIREMENTS

a) The permittee shall, except as set forth in (c) below, maintain the existing identification signs at all outfalls to surface waters, which have not been waived by the Department in accordance with 17-0815-a. The sign(s) shall be conspicuous, legible and in as close proximity to the point of discharge as is reasonably possible while ensuring the maximum visibility from the surface water and shore. The signs shall be installed in such a manner to pose minimal hazard to navigation, bathing or other water related activities. If the public has access to the water from the land in the vicinity of the outfall, an identical sign shall be posted to be visible from the direction approaching the surface water.

The signs shall have **minimum** dimensions of eighteen inches by twenty four inches (18" x 24") and shall have white letters on a green background and contain the following information:

N.Y.S. PERMITTED DISCHARGE POINT

SPDES PERMIT No.: NY_____

OUTFALL No. :____

For information about this permitted discharge contact:

Permittee Name: _____

Permittee Contact: _____

Permittee Phone: ( ) - ### - ####

OR:

NYSDEC Division of Water Regional Office Address :

NYSDEC Division of Water Regional Phone: ( ) - ### -####

b) For each discharge required to have a sign in accordance with a), the permittee shall provide for public review at a repository accessible to the public, copies of the Discharge Monitoring Reports (DMRs) as required by the **RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS** page of this permit. This repository shall be open to the public, at a minimum, during normal daytime business hours. The repository may be at the business office repository of the permittee or at an off-premises location of its choice (such location shall be the village, town, city or county clerk's office, the local library or other location as approved by the Department). In accordance with the **RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS** page of your permit, each DMR shall be maintained on record for a period of three years.

c) If, upon November 1, 1997, the permittee has installed signs that include the information required by 17-0815-a(2)(a), but do not meet the specifications listed above, the permittee may continue to use the existing signs for a period of up to five years, after which the signs shall comply with the specifications listed above.

d) The permittee shall periodically inspect the outfall identification signs in order to ensure that they are maintained, are still visible and contain information that is current and factually correct.

Additional Requirements

1. There shall be no discharge of the following wastes to surface waters or groundwater of the State; fly ash and bottom ash sluice wastes or evaporator blowdown. Boiler and metal cleaning wastewater shall be transported for treatment to the Astoria Waste Treatment Facility.

2. The permittee shall submit on a yearly basis a report to the Department's office in Albany and Region 2 by the 28th of the month following the end of the period;

   a. Daily minimum, average and maximum station electrical output shall be determined and logged.

   b. Daily minimum, average and maximum water use shall be directly or indirectly measured or calculated and logged.

   c. Daily minimum, average and maximum intake and discharge temperatures shall be logged.

   d. Measurements in a, b, and c shall be taken on an hourly basis. Temperature readings may be obtained from a continuous recording device. This requirement is not a substitute for other monitoring requirements.

3. There shall be no visible sheen of oil and grease from discharges 001 - 004, 006.

4. There shall be no discharge of PCB's from this facility.

5. The permit application must list all the corrosion/scale inhibitors, biocidal-type or slimicides compounds used by the permittee. If use of new boiler/cooling water additives is intended, application must be made prior to use.

6. In all instances chlorine shall be: 1) kept to the minimum amount which will maintain plant operating efficiency, and 2) done concurrently with thermal recirculation.

7. Information referred to in General Condition #11.5, items #c and #d shall be reported annually to NYSDEC office in Albany and Long Island City:

   Attn: James Gilmore
   New York State Department of Environmental Conservation
   Marine Resources Division
   One Hunters Point Plaza
   Long Island City, New York 11101-5407

8. All thermal discharges to the waters of the State shall assure the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on the body of water as provided in 6NYCRR Part 704.1(a). In this regard the Department has approved the permittee's request for alternative effluent limitations pursuant to Section 316(a) of the Clean Water Act. The thermal plume resulting from this facility's discharge may exceed 90°F (Part 704.2(b)(5)(I) of the State Water Quality Thermal Criteria) within a designated mixing zone area of 2,580,000 sq. ft. (60 acres).

9. Notwithstanding any other requirements in this permit, the permittee shall also comply with all of the Water Quality Regulations promulgated by the Interstate Sanitation Commission, including Section 1.01 and 2.05(f) as they relate to oil and grease.

10. Samples for monitoring pH, Temperature and chlorine are to be collected within the discharge tunnels.

11. Stormwater Discharges:
Any stormwater discharges must be identified and covered by a permit to discharge (SPDES/General Permit). When a stormwater survey is completed; a modification of the facility's SPDES Permit must be initiated by the applicant (if necessary). Facilities with SPDES Permits shall not have a separate General Permit for Stormwater.

12. Biological Monitoring Requirements:

    The permittee shall comply with the provisions agreed to under Consent Order #R2-2985-90-04, which are designed to study, and if necessary, mitigate biological impacts associated with the Ravenswood Generating Station condenser cooling water use.

13. The permittee shall submit written notification, which shall include detailed descriptions and appropriate figures, to the DEC Chief, Bureau of Environmental Protection, Regional Natural Resources Supervisor and Regional Engineer at least 60 days in advance of any change which results in the alteration of the location, design, construction, operation or capacity of the cooling water intake structure. The permittee shall submit, with its written notification, a demonstration that the change reflects the best technology available for minimizing adverse environmental impact. Prior DEC approval is required before initiating such change. Material changes may require a formal permit modification.

14. Traveling screen washings shall be returned directly to East River without passage through a solid removal device. This condition supersedes any requirement outlined previously in this permit which may be interrupted to contradict it.

SPECIAL CONDITIONS - BEST MANAGEMENT PRACTICES

1. The permittee shall develop a Best Management Practices (BMP) plan to prevent, or minimize the potential for, release of significant amounts of toxic or hazardous pollutants to the waters of the State through plant site runoff; spillage and leaks; sludge or waste disposal; and storm water discharges including, but not limited to, drainage from raw material storage. Completed BMP plans shall be submitted by **[WITHIN 6 MONTHS OF EDM]** to the Regional Water Engineer at the address shown on the Recording, Reporting and Additional Monitoring Requirements. The BMP plan shall be implemented within 6 months of submission, unless a different time frame is approved by this Department.

2. Subsequent modifications to or renewal of this permit does not reset or revise the deadline set forth in (1) above, unless a new deadline is set explicitly by such permit modification or renewal.

3. The permittee shall review all facility components or systems (including material storage areas; in-plant transfer, process and material handling areas; loading and unloading operations; storm water, erosion, and sediment control measures; process emergency control systems; and sludge and waste disposal areas) where toxic or hazardous pollutants are used, manufactured, stored or handled to evaluate the potential for the release of significant amounts of such pollutants to the waters of the State. In performing such an evaluation, the permittee shall consider such factors as the probability of equipment failure or improper operation, cross-contamination of storm water by process materials, settlement of facility air emissions, the effects of natural phenomena such as freezing temperatures and precipitation, fires, and the facility's history of spills and leaks. For hazardous pollutants, the list of reportable quantities as defined in 40 CFR, Part 117 may be used as a guide in determining significant amounts of releases. For toxic pollutants, the relative toxicity of the pollutant shall be considered in determining the significance of potential releases.

   The review shall address all substances present at the facility that are listed as toxic pollutants under Section 307(a)(1) of the Clean Water Act or as hazardous pollutants under Section 311 of the Act or that are identified as Chemicals of Concern by the Industrial Chemical Survey.

4. Whenever the potential for a significant release of toxic or hazardous pollutants to State waters is determined to be present, the permittee shall identify Best Management Practices that have been established to minimize such potential releases. Where BMPs are inadequate or absent, appropriate BMPs shall be established. In selecting appropriate BMPs, the permittee shall consider typical industry practices such as spill reporting procedures, risk identification and assessment, employee training, inspections and records, preventive maintenance, good housekeeping, materials compatibility and security. In addition, the permittee may consider structural measures (such as secondary containment and erosion/sediment control devices and practices) where appropriate.

5. Development of the BMP plan shall include sampling of waste stream segments for the purpose of toxic "hot spot"* identification. The economic achievability of effluent limits will not be considered until plant site "hot spot" sources have been identified, contained, removed or minimized through the imposition of site specific BMPs or application of internal facility treatment technology. For the purposes of this permit condition a "hot spot" is a segment of an industrial facility; including but not limited to soil, equipment, material storage areas, sewer lines etc.; which contributes elevated levels of problem pollutants to the wastewater and/or storm water collection system of that facility. For the purposes of this definition, problem pollutants are substances for which treatment to meet a water quality or technology requirement may, considering the results of waste stream segment sampling, be deemed unreasonable. For the purposes of this definition, an elevated level is a concentration or mass loading of the pollutant in question which is sufficiently higher than the concentration of that same pollutant at the compliance monitoring location so as to allow for an economically justifiable removal and/or isolation of the segment and/or B.A.T. treatment of wastewaters emanating from the segment.

6. The BMP plan shall be documented in narrative form and shall include any necessary plot plans, drawings or maps. Other documents already prepared for the facility such as a Safety Manual or a Spill Prevention, Control and Countermeasure (SPCC) plan may be used as part of the plan and may be incorporated by reference. USEPA guidance for development of storm water elements of the BMP is available in the September 1992 manual "Storm Water Management for Industrial Activities," USEPA Office of Water Publication EPA 832-R-92-006 (available from NTIS, (703)487-4650, order number PB 92235969). A copy of the BMP plan shall be maintained at the facility and shall be available to authorized Department representatives upon request. As a minimum, the plan shall include the following BMP's:

a. BMP Committee
b. Reporting of BMP Incidents
c. Risk Identification & Assessment
d. Employee Training
e. Inspections and Records
f. Preventive Maintenance
g. Good Housekeeping
h. Materials Compatibility
i. Security
j. Spill prevention & response
k. Erosion & sediment control
l. Management of runoff

7. The BMP plan shall be reviewed annually and shall be modified whenever: (a) changes at the facility materially increase the potential for significant releases of toxic or hazardous pollutants, (b) actual releases indicate the plan is inadequate or (c) a letter from the Regional Water Engineer highlights inadequacies in the plan.

RECORDING, REPORTING AND ADDITIONAL MONITORING REQUIREMENTS

a) The permittee shall also refer to the General Conditions (Part II) of this permit for additional information concerning monitoring and reporting requirements and conditions.

b) The monitoring information required by this permit shall be summarized, signed and retained for a period of three years from the date of the sampling for subsequent inspection by the Department or its designated agent. **Also;**

[X] (if box is checked) monitoring information required by this permit shall be summarized and reported by submitting completed and signed Discharge Monitoring Report (DMR) forms for each 1 month reporting period to the locations specified below. Blank forms are available at the Department's Albany office listed below. The first reporting period begins on the effective date of this permit and the reports will be due no later than the 28th day of the month following the end of each reporting period.

Send the **original** (top sheet) of each DMR page to:

Department of Environmental Conservation
Division of Water
Bureau of Water Compliance Programs
625 Broadway
Albany, New York 12233-3506

Send the **first copy** (second sheet) of each DMR page to:

Department of Environmental Conservation
Regional Water Engineer, Region 2
One Hunters Point Plaza
47-20 21st Street
Long Island City, New York 11101

c) A monthly "Wastewater Facility Operation Report.." (form 92-15-7) shall be submitted (if box is checked) to the [ ] Regional Water Engineer and/or [ ] County Health Department or Environmental Control Agency listed above.

d) **Noncompliance** with the provisions of this permit shall be reported to the Department as prescribed in the attached General Conditions (Part II)

e) Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

f) If the permittee monitors any pollutant more frequently than required by the permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of this monitoring shall be included in the calculations and recording of the data on the Discharge Monitoring Reports.

g) Calculation for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this permit.

h) Unless otherwise specified, all information recorded on the Discharge Monitoring Report shall be based upon measurements and sampling carried out during the most recently completed reporting period.

I) Any laboratory test or sample analysis required by this permit for which the State Commissioner of Health issues certificates of approval pursuant to section five hundred two of the Public Health Law shall be conducted by a laboratory which has been issued a certificate of approval. Inquiries regarding laboratory certification should be sent to the Environmental Laboratory Accreditation Program, New York State Health Department Center for Laboratories and Research, Division of Environmental Sciences, The Nelson A. Rockefeller Empire State Plaza, Albany, New York 12201.

TRC

Customer-Focused Solutions

report

C 99-F-1625

KeySpan Energy
Ravenswood Cogeneration Facility – Cumulative Air Quality Assessment

Submitted to:

New York City Department of Environmental Protection
59-17 Junction Boulevard
Corona, New York 11368

Prepared for:

KeySpan Energy
445 Broadhollow Road
Melville, New York 11747

Prepared by:

TRC Environmental Corporation
1200 Wall Street West, 2nd Floor
Lyndhurst, NJ 07071

November 2001

[redacted]

TRC

November 16, 2001

Mr. Darryl Cabbagestalk
City Planner II
New York City Department of Environmental Protection
Office of Environmental Planning and Assessment
59-17 Junction Boulevard, 11th Floor
Corona, New York 11368

Subject: KeySpan Energy – Ravenswood Cogeneration Facility
NYCDEP Requested Cumulative Air Quality Assessment

Dear Mr. Cabbagestalk:

Enclosed please find two (2) copies of the Cumulative Air Quality Assessment for the proposed KeySpan Energy Ravenswood Cogeneration Facility. Although not required by the Siting Board, KeySpan has continued to voluntarily perform the cumulative air quality assessment in accordance with the assessment protocols previously determined to be appropriate by NYCDEP and KeySpan. We understand that the Cumulative Impact Source Inventory, submitted to the NYCDEP on October 3, 2001, has not been approved yet; however, to expedite matters, KeySpan is submitting the results of the cumulative air quality assessment for your review based on the submitted inventory.

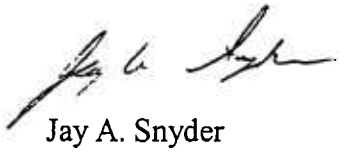
The 1,000 foot and 2,000 meter source inventories modeled in the cumulative air quality assessment are the same as submitted in the Cumulative Impact Source Inventory. The large sources within 10 kilometers inventory have been updated with the latest source inventory prepared for the Astoria Energy, LLC cumulative air quality assessment.

Results of the cumulative air quality assessment indicate that the total concentrations (i.e., modeled concentrations plus the background air quality concentrations) for all pollutants and averaging periods are less than the National Ambient Air Quality Standards (NAAQS) for both the modeled ground-level and flagpole receptors. Therefore, the addition of the proposed Project will not cause or contribute to any potential modeled NAAQS exceedances.

We hope that by providing the results of the cumulative air quality assessment, the review of the source inventory and modeling methodology can be conducted simultaneously, thus allowing for the timely review and approval of the assessment. If you should have any questions or comments on the Cumulative Impact Source Inventory, please feel free to contact Gary Baranowski at (201) 933-5541 ext. 119 or, if you have questions on the Cumulative Air Quality Assessment, please contact me at (201) 933-5541 ext. 117, so that we may continue to work together to complete the assessment to your satisfaction.

1200 Wall Street West, 2nd Floor • Lyndhurst, New Jersey 07071
Telephone 201-933-5541 • Fax 201-933-5601

Sincerely,



Jay A. Snyder
Air Quality Scientist

Enclosure

cc: Rich Miller, NYCEDC
Robert Teetz, KeySpan
Donna Riccobono, KeySpan
Christopher Corrado, KeySpan
Andy Ratzkin, Arnold & Porter
Craig Wolfgang, TRC
Gary Baranowksi, TRC
TRC Project 30074-0750

TRC

Customer-Focused Solutions

KeySpan Energy
Ravenswood Cogeneration Facility – Cumulative Air Quality Assessment

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TABLE OF CONTENTS

1.0 INTRODUCTION

KeySpan Energy (KeySpan), in response to a request from the New York City Department of Environmental Protection (NYCDEP), has conducted a cumulative air quality impact assessment to demonstrate that the proposed Ravenswood Combined Cycle facility, in combination with all other sources identified in the cumulative source inventory, does not result in adverse air quality impacts. Although KeySpan is not required to perform a cumulative air quality impact assessment under the Article X process, the assessment was voluntarily performed in conjunction with the licensing of the proposed facility.

In the licensing process for the proposed facility, KeySpan demonstrated that the proposed facility would have maximum modeled concentrations less than the U.S. EPA air quality significant impact levels (SILs). Maximum modeled concentrations below the SILs indicate that the proposed facility will have insignificant air quality impacts and multisource modeling for Prevention of Significant Deterioration (PSD) Increment levels and National Ambient Air Quality Standards (NAAQS) is not required. Regardless of New York State Department of Environmental Conservation (NYSDEC) and U.S. Environmental Protection Agency (U.S. EPA) requirements, the NYCDEP requested a cumulative air quality assessment to focus on the local or microscale impacts.

The NYCDEP requested cumulative air quality assessment was performed following the modeling methodology described in the KeySpan Energy – Ravenswood Cogeneration Facility Air Quality Modeling Protocol (TRC, 2000a), which was submitted to the NYSDEC and U.S. EPA on June 9, 2000, and approved on July 27, 2000. Other modeling guidance used in the assessment was obtained from the City Environmental Quality Review (CEQR) Technical Manual (NYCDEP, 1993) and the U.S. EPA's Guideline on Air Quality Models (Revised) (U.S. EPA, 2001).

Off-site inventories were developed following the methodology outlined in the KeySpan Energy-Ravenswood Cogeneration Facility Cumulative Impact Source Inventory (TRC, 2001a) submitted to the NYCDEP on October 2, 2001. These off-site sources were modeled along with the proposed facility and the existing Ravenswood sources. The existing Ravenswood sources were modeled following the methodology used in the Environmental Justice Analysis (TRC, 2000b) submitted in support of the Prevention of Significant Deterioration (PSD) Air Permit Application for Proposed Ravenswood Cogeneration Facility (TRC, 2000c).

Results of the cumulative analysis show that the maximum modeled concentrations, including the background air quality concentrations, for all pollutants and averaging periods are less than their respective NAAQS. Thus, the proposed facility will not cause or contribute to any potential modeled NAAQS exceedance in the local area, as the modeled air quality impacts in the local area are less than the federal and state requirements.

2.0 PROJECT DESCRIPTION

KeySpan is proposing to construct and operate a nominal 250 megawatt (MW) electric generating facility, on a 2.5 acre parcel of land at its existing Ravenswood Generating Station in Long Island City, Queens County. The proposed facility will consist of one GE Frame 7FA combustion turbine with an evaporative cooler, one heat recovery steam generator (HRSG) equipped with a duct burner for supplementary firing, and a steam turbine. Selective Catalytic Reduction (SCR) will be used to control nitrogen oxide (NO_x) emissions and an oxidation catalyst will be used to control carbon monoxide (CO) and volatile organic compound (VOC) emissions. An air cooled condenser will be used to cool the steam exhausted from the steam turbine generator.

Natural gas will be the primary fuel with up to 30-days of kerosene (0.04% sulfur) as the back-up fuel for the combustion turbine. The duct burner will fire natural gas only.

Emissions from the combustion turbine will be exhausted to the atmosphere through a 400-foot turbine stack. A Good Engineering Practice (GEP) stack height analysis was conducted for the proposed stack in the PSD Application (TRC, 2000c) and demonstrated that the turbine stack will be a non-GEP height stack. Therefore, appropriate direction-specific building downwash parameters were input to the modeling analysis for the turbine stack.

KeySpan anticipates that the proposed facility will operate at "base load" exceeding 80% capacity, but the turbine may operate at maximum capacity (100% load) and partial loads, as low as 50% capacity. Furthermore, ambient temperatures of the inlet air will affect turbine performance. Thus, KeySpan proposes the use of an evaporative cooler to reduce the temperature of the inlet air during the warmer months. A load analysis of the varying loads (50%, 75%, 100%, and 100% with the duct burner) and the varying ambient temperatures (-5°F, 54.6°F, 54.6°F with the evaporative cooler, 100°F, and 100°F with the evaporative cooler) was conducted in the PSD Application (TRC, 2000c) to determine the worst-case operating scenario for each pollutant and averaging period.

3.0 MODELING METHODOLOGY

The NYCDEP requested cumulative air quality assessment was conducted following the CEQR Technical Manual (NYCDEP, 1993), the U.S. EPA's Guideline on Air Quality Models (Revised) (U.S. EPA, 2001), and the methodology outlined and approved by the NYSDEC in the KeySpan Energy – Ravenswood Cogeneration Facility Air Quality Modeling Protocol (TRC, 2000a). The assessment focused on the air quality impacts within the local area or the "study area", which has been defined by the NYCDEP as within 1,000 feet of the Ravenswood Generating Station fenceline. The study area is depicted on Figure 3-1.

3.1 Surrounding Area and Land Use

The facility will be located at the existing Ravenswood Generating Station along the East River in the Long Island City section of Queens Borough. The proposed site is located at approximately 40° 45' 53'' North Latitude, 73° 56' 44'' West Longitude. The approximate Universal Transverse Mercator (UTM) coordinates of the facility are: 589,000 meters east and 4,512,381 meters north in zone 18.

A land use classification analysis was conducted in the PSD Application (TRC, 2000c) and found that approximately 67% of the area within 3 km of the proposed facility can be classified as urban and approximately 33% of the land use can be classified as rural. Therefore, urban dispersion coefficients were used in the cumulative air quality assessment.

3.2 Model Selection

The Industrial Source Complex Short-term (ISCST3, Version 00101) model was used in the cumulative air quality assessment. The ISCST3 model is a Gaussian plume model capable of calculating impacts in simple (below stack top), intermediate (above stack top and below final plume rise), and complex (above final plume rise) terrain. Regulatory default options were used in the ISCST3 model according to the U.S. EPA's Guideline on Air Quality Models (Revised) (U.S. EPA, 2001). Urban dispersion coefficients and terrain elevations for each receptor were input to the ISCST3 model.

3.3 Source Data

The worst-case turbine operating scenario determined in the PSD Application (TRC, 2000c) for each pollutant and averaging period was modeled for the proposed facility. The pollutants and averaging periods of concern were: 1-hour and 8-hour for CO, 3-hour, 24-hour, and annual for sulfur dioxide (SO_2), 24-hour and annual for particulate matter with an aerodynamic diameter less than 10 micrometers (PM-10), and annual for nitrogen dioxide (NO_2).

Existing sources at the Ravenswood Generating Station were modeled following the methodology used in the Environmental Justice Analysis (TRC, 2000b), while the data collected and presented to the NYCDEP in the Cumulative Impact Source Inventory (TRC, 2001a) were used to model the off-site sources. These data are described further in Section 4.

3.4 Building Downwash

A GEP stack height analysis was conducted for the proposed turbine stack, the sources located within the Ravenswood Generating Station, and the Con Ed steam plant (the "A" House), which is located adjacent to the Ravenswood Generating Station. These are the only sources for which building downwash was considered as agreed upon with the NYCDEP (May 17, 2001 conference call). The GEP analysis determined that there are numerous stacks that are considered non-GEP height stacks. Therefore, the U.S. EPA approved Building Profile Input Program (BPIP, version 95086) was used to calculate the directionally dependent building downwash parameters for each stack for input to the ISCST3 model.

3.5 Meteorological Data

As used in the PSD Application (TRC, 2000c), five years (1991-1995) of hourly surface data from the LaGuardia Airport National Weather Service (NWS) station (NWS Station 14732) were used along with concurrent twice-daily mixing heights collected at the U.S. Department of Energy's Brookhaven National Laboratory site (NWS station 94703) and Atlantic City Airport (NWS station 93755). Two stations were required for complete the five year record of mixing heights because data collection at the Atlantic City airport NWS station was terminated in August of 1994, with the Brookhaven Laboratory site assuming responsibility at that time.

3.6 Receptor Grids

The cumulative air quality assessment was performed to assess impacts within the study area. Ground-level impacts in the study area were modeled using a receptor grid extending 1,000 feet from the fenceline of the Ravenswood Generating Station (the property line is fenced and public access is restricted). Receptors were located in a Cartesian grid, with 25 meter spacing. Terrain elevations were obtained from U.S. Geological Survey digital elevation data. The receptor grid used in the ground-level cumulative air quality assessment is shown in Figure 3-2.

The area within 1,000 feet of the Ravenswood Generating Station is generally occupied by light manufacturing and commercial operations. Public housing within the study area generally consists of one to three story residential units; a few two-story schools are in the study area as well. The only tall structures within the study area are associated with the Queensbridge Housing Complex (approximately 50 feet tall), the housing complex on Roosevelt Island (approximately 180 feet tall), the parking garage on Roosevelt Island (approximately 50 feet tall), and a warehouse at 35th Avenue and 10th Street (approximately 48 feet tall). Because of the height of these structures, flagpole receptors were modeled for these locations. The flagpole receptors were located at the top of the buildings and at half the building height to account for any possible open windows or balconies on the building. Figure 3-3 shows the locations of the flagpole receptors used in the cumulative air quality assessment.

3.7 Background Air Quality

As used in the Environmental Justice Analysis (TRC, 2000b), background air quality concentrations recorded at the NYSDEC monitors from 1997 through 1999 at the PS-59 monitor in Manhattan (1.7 km west of the site) and at the Greenpoint Sewage Treatment Plant in Brooklyn (3.1 km south of the site) were used to represent the background air quality in the study area. Table 3-1 presents the background air quality concentrations recorded at these monitors for the latest three years (1997-1999).

The maximum background air quality concentrations shown in Table 3-1 were added to the modeled concentrations for comparison to the NAAQS.

Table 3-1. Background Ambient Air Quality

Pollutant	Averaging Period	NAAQS[a] (ug/m^3)	Background Concentration[b] (ug/m^3)				Monitor Location
			1996	1997	1998	1999	
CO	1-Hour	40,000	--	5,150	5,040	**5,750**	PS 59 New York County (Manhattan)
	8-Hour	10,000	--	3,665	**4,485**	4,140	
SO_2	3-Hour	1,300	--	173	168	**228**	PS 59 New York County (Manhattan)
	24-Hour	365	--	105	100	**118**	
	Annual	80	--	31	31	**34**	
PM-10	24-Hour	150	45	**50**	40	NA	Greenpoint Sewage Treatment
	Annual	50	**26**	**26**	23	NA	
NO_2	Annual	100	--	75	75	77	PS 59 New York County (Manhattan)

[a]National Ambient Air Quality Standard.

[b]Highest second-highest short-term (1-, 3-, 8-, and 24-hour) and maximum annual average concentrations presented.

NA – Not available because the Greenpoint Sewage Treatment PM-10 monitor was shut down in 1999.

Bold values identify the greatest value over the three year period. These values were conservatively used to represent the background air quality in the study area.

4.0 SOURCE INVENTORY

As requested by the NYCDEP the cumulative analysis consisted of modeling the proposed facility, the sources at the existing Ravenswood Generating Station, and off-site sources up to 10 km from the site. The methodology for obtaining exhaust characteristics and emission rates for these sources varied depending on the location and size of the source.

4.1 Proposed Facility

The only proposed source that required modeling was the new combined cycle turbine stack. A turbine load analysis to determine the worst-case operating scenario for each pollutant and averaging period was conducted in the PSD Application (TRC, 2000c). The worst-case operating scenarios determined in the load analysis were modeled in the cumulative air quality assessment.

The worst-case operating scenarios for ground-level receptors were: scenario 23 (turbine firing kerosene at 100% load with the evaporative cooler on and the duct burner firing natural gas at 54.6°F) for 1-hour CO impacts and scenario 17 (turbine firing kerosene at 100% load and the duct burner firing natural gas at -5°F) for 8-hour CO impacts, 3-hour, 24-hour, and annual SO_2 impacts, 24-hour and annual PM-10 impacts, and annual NO_2 impacts. Operating scenario 17 was also the worst-case operating scenario for the flagpole receptors for all pollutants and averaging periods.

The worst-case operating scenario for the annual averaging period was case 17; however, this operating scenario is a kerosene-firing scenario. The proposed turbine will only be permitted to allow up to 30 days of kerosene firing. Therefore, for modeling annual impacts, the exhaust parameters for the worst-case natural gas operating scenario for ground-level and flagpole receptors (case 5 – turbine firing natural gas at 100% load and the duct burner firing natural gas at 54.6°F) was modeled with the annualized emissions (335 days of natural gas firing and 30 days of kerosene firing).

Thus, the proposed turbine stack was modeled with operating scenario 23 exhaust characteristics and emission rates to determine 1-hour CO ground-level impacts, while operating scenario 17 exhaust characteristics and emission rates were modeled to determine short-term ground-level and flagpole receptor impacts for all the other pollutants. Exhaust parameters for operating

scenario 5 and annualized emission rates were modeled to determine the annual ground-level and flagpole receptor impacts.

For more information on the proposed turbine stack load analysis, exhaust characteristics, and emission rates see Section 7 of the PSD Application (TRC, 2000c).

4.2 Ravenswood Generating Station

The existing Ravenswood Generating Station was modeled along with the proposed facility in the Environmental Justice Analysis (TRC, 2000b) to meet the requirements of Executive Order 12898, which is entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations". NYSDEC and U.S. EPA required the Environmental Justice analysis as part of the PSD permitting requirements for the proposed facility.

The existing Ravenswood Generating Station consists of three steam electric generators and seventeen simple cycle turbines. The steam electric generators are capable of burning No. 6 fuel oil or natural gas, while the turbines are capable of firing kerosene or natural gas, except for Unit 001 (CT001). Unit 001 is a black start combustion turbine that only burns natural gas.

As in the Environmental Justice Analysis (TRC, 2000b), the existing Ravenswood Generating Station was modeled assuming full load firing of the highest emitting fuel (i.e., kerosene, oil, or gas) for the short-term averaging periods (1-, 3-, 8-, and 24-hour). To calculate the annual concentrations, the existing boilers were assumed to be operating at full load on the highest emitting fuel, while the existing turbines were modeled with a 40% annual capacity factor (actual historical capacity factors have been considerably lower) while firing the highest emitting fuel. These short-term and annual operating scenarios are highly unlikely due to operational and economic reasons. Thus, the modeling of the existing Ravenswood Generating Station in this fashion will result in conservative estimates of the air quality impacts due to the existing facility.

Exhaust characteristics of the Ravenswood Generating Station used in the Environmental Justice Analysis (TRC, 2000b) were later updated from the original Con Edison data by KeySpan personnel. The exhaust characteristics were subsequently updated in the May 17, 2001, revision of Section 5.0 of the Article X Application (TRC, 2001b), which was submitted to the New York State Department of Health (NYSDOH) on May 30, 2001, in response to their May 15, 2001,

comments 1 through 29. KeySpan personnel further updated the original Con Edison data during the preparation of this cumulative air quality assessment.

Table 4-1 presents the updated exhaust characteristics and emission rates for the existing Ravenswood Generating Station modeled in the cumulative air quality assessment.

4.3 Off-Site Inventory

The methodology used to develop the off-site cumulative source inventory reflected guidance contained in the CEQR Technical Manual (NYCDEP, 1993), as well as the adoption of methods used for the Con Edison East River project (ENSR, 2001). The methods generally involve the delineation of sources according to the following criteria:

1. Compilation of nearby small sources (heat inputs equal to or greater than 2.8 mmBtu/hr) within 1,000 feet of the KeySpan Ravenswood Generating Station property line (note that the property line includes all of the property at the Ravenswood site owned by KeySpan, not just the property associated with the new project);

2. Compilation of intermediate mid-size sources (heat inputs greater than or equal to 50 mmBtu/hr) within 1,000-feet to 2,000 meters of the KeySpan Ravenswood Generating Station property line known as the "secondary study area"; and

3. Compilation of major existing/proposed power generating sources within 10 kilometers of the project site.

The methods proposed to develop the KeySpan cumulative source inventory were defined in the cumulative source inventory protocol submitted to the NYCDEP on May 7, 2001, and reflect what was done in developing the inventory for the Con Edison East River re-powering project. Several issues were raised by the NYCDEP as a result of their review of the protocol. These issues were discussed in a conference call held on May 17, 2001, between the NYCDEP, KeySpan, and TRC Environmental Corporation (TRC) and summarized in correspondence dated June 1, 2001. Additional issues were ultimately resolved during a June 18, 2001, meeting that was held among representatives from the NYCDEP, KeySpan and TRC at the Queens offices of the NYCDEP. The original protocol, as well as follow-up correspondence that summarizes the resolution of agency issues, the conference call minutes and the revised/final protocol that reflected the outcome of the June 18 meeting, are presented in the Cumulative Impact Source Inventory (TRC, 2001a). The Cumulative Impact Source Inventory (TRC, 2001a) also contains all the information compiled for the off-site sources.

The specific methodologies used in the compilation of sources for the three delineations outlined above are presented in the following sections.

4.3.1 Nearby Sources Within 1,000 Feet of Property Line

The effort to compile the cumulative source inventory began in February of 2000, when a field survey of potential sources within the 1,000-foot radius was performed. Seventeen potential sources were identified and a letter was prepared and submitted to the NYCDEP (Ms. Geraldine Kelpin) with a request for permit information (pollutant emission rates and stack parameters). Note, this and all other correspondence are provided in the Cumulative Impact Source Inventory (TRC, 2001a). At that time, the 1,000-foot radius was centered on, and originated from, the KeySpan project stack. The permitting of the KeySpan facility under the Article X process resulted in the need to re-define certain elements of facility design and operation. As such, a large period of time passed between the performance of the February 2000 inventory and the re-visitation of the matter when facility design and operation were finalized. During the interim period, the Con Edison East River cumulative source inventory was submitted to, and ultimately approved by, the NYCDEP. At that point, NYCDEP decided that since they had approved the methods used to develop that inventory, other applicants should adopt the resulting inventory source data. NYCDEP guidance, reflecting what was done for the East River project, resulted in the need to establish the 1,000-foot radius from the project property line, not the stack. As a result, a field survey of the area within 1,000 feet of the project property line was performed on Tuesday, June 5, 2001.

Results of the February 2000 and June 5, 2001 surveys were compiled as a list of sources and their addresses. This list was sent in the form of correspondence dated June 25, 2001, to the NYCDEP (Ms. Geraldine Kelpin) with a request for permit information. The list totaled 21 potential sources. The NYCDEP replied on July 16, 2001, via fax with first class mail follow-up. Five of the 21 potential sources have either permits or registrations with the NYCDEP, the remaining sources were not identified in the agency database. The NYCDEP response was reviewed and several inconsistencies and apparent errors were noted in the data provided by the NYCDEP. Follow-up correspondence dated July 26, 2001, to Ms. Geraldine Kelpin requested clarification of the data that appeared to be in error. Moreover, additional information in the form of a better street address, was provided to Ms. Kelpin for one source, 260 Engine Company, and a request for clarification of a source provided by NYCDEP in their response, but not identified as one of the original 21 sources in the initial letter to Ms. Kelpin, was requested in the

July 26 correspondence. The NYCDEP responded, via telephone and written correspondence (fax and first class mail), and many of the issues were resolved.

During this time, a decision was made by KeySpan to verify the exempt status of the sources identified by the NYCDEP as not having permits (i.e., not being listing in the agency database) to ensure inclusion of all eligible sources into the cumulative inventory. KeySpan opted to verify the source exempt status by performing a door-to-door survey of these sources. This survey was performed by two members of TRC and occurred on August 22nd. The survey covered 15 sources within 1,000-feet of the Ravenswood property line (another source, Hunter College, is addressed as a secondary study area source in the following section). The purpose of the survey was to identify any facility that had a stationary combustion source with a heat input at or above 2.8 mmBtu/hr. A summary of the survey effort is as follows:

- The majority of the sources were comprised of small manufacturing or commercial operations that had a production floor and finished office space. The office space was typically located on a floor above the production area or was comprised of an enclosed area within the production floor. The production floor was typically heated by natural gas or electric space heaters. The office areas were cooled/heated by roof-mounted air conditioners and heaters. The air conditioners were rated from 2.5 to 8 tons of capacity and the heaters were generally rated at 250,000 Btu/hr.

- Several of the sources did have natural gas or oil fired boilers or in one case an oven. However, these units were rated below the 2.8 mmBtu/hr inclusion threshold.

- Several of the facilities did utilize combustion units with heat inputs above the 2.8 mmBtu/hr threshold. Obtaining the permits for these facilities was difficult since the name of the building tenant(s), which often appeared prominently on the building facade, did not always match the name of the building owner. In one case, a large building that once served a single manufacturing operation was subdivided for numerous smaller tenants. None of the tenants, the names of which were copied from signs located on the outside of the building, were listed in the NYCDEP database. Ultimately, the owners of the building were identified and the permits were secured.

Table 4-2 shows a listing of all sources included in the cumulative air quality assessment as a result of the 1,000-foot survey. A topographic map showing the extent of the 1,000-foot radius is presented in Figure 4-1.

4.3.2 Inventory of Sources Within the Secondary Study Area

The threshold for inclusion of sources within the 2,000 meter "secondary study area" is 50 mmBtu/hr and greater. This threshold is large enough such that eligible sources would be

registered or permitted and included in the NYSDEC database. Mr. Tom Christoffel, of the NYSDEC, was contacted for an inventory of permitted sources within NYSDEC Region 2. Mr. Christoffel provided such an inventory in the form of 11 tables, which contained various pieces of information for facilities permitted (i.e., one file contained the street address and other contact information, another file contained process or combustion information). Relevant information was extracted from each of these files and a "master" listing for Region 2 was created. Sources within the secondary study area were identified as follows:

- A local map of New York City was reviewed and all zip codes contained within the secondary study area were identified (zip code was a parameter contained in the majority of the sources listed in the NYSDEC files, UTM coordinates were missing in numerous cases).

- All sources containing these zip codes were extracted from the master listing.

- For sources with UTM coordinates, straight-line distances were calculated using simple geometry and the UTM coordinate of the proposed turbine stack location. Any source within the extracted zip code file at a calculated distance greater than 2.5 kilometers from the project site was eliminated (a 500-meter buffer was added to account for the irregular distances from the proposed stack to the property line).

- For sources without UTM coordinates, street addresses were located using an Internet mapping program such as "MapQuest" and distances were then determined. Any source located greater than 2,000 meters from the project property line was eliminated.

- The NYSDEC groups permitted sources as "ATV" (Title V), ASF (State Facility), AFR (Facility Registration), and EP (Emission Point). Sources within the master listing classified ATV are major source Title V facilities and sources classified ASF are state permit facilities (those that are major on a potential emission basis but are permit–restricted to minor status). The AFR and EP classes are for sources that are minor. Only those sources that are major (ATV) and major on a potential basis (ASF) were retained, those classified as AFR and EP were removed from further consideration.

- If the file contained any combustion information for the remaining sources (such information was not provided for many sources), this information was reviewed and any sources with emission units having a heat input below 50 mmBtu/hr were eliminated. If the heat input was not indicated, the source was not eliminated.

- All sources did have an identifying DEC ID number. The NYSDEC maintains a web site listing final and draft Title V permits in Adobe format. Each facility with a draft or final permit is listed in alphabetical order along with the DEC ID. Permits for several sources were obtained in this fashion.

For those sources not listed on the NYSDEC permit web site, an attempt was made to gather as much information as possible from the files sent by Mr. Christoffel. The remaining sources were reviewed and none contained enough of the information needed to make a determination of eligibility (i.e., heat input). Moreover, many sources were missing stack and emission parameters important for modeling. As such, the July 26, 2001, letter was developed and submitted to the NYCDEP (Geraldine Kelpin) requesting permit information for these sources. The NYCDEP responded with as much information as was available in their database. Note that the request for permit information for Hunter College (in Manhattan) was re-iterated in correspondence dealing with the 1,000-foot survey.

Minimal information was available for Hunter College, both from the data supplied by the NYSDEC and from a response received from the NYCDEP. The Internet was utilized to search the Hunter College Web site for facilities management contact names. A call was placed and it was determined that Hunter College is on the Con Ed steam loop, but is proceeding with efforts to supply their own steam through installation of three new steam boilers. The project is ongoing and the units will likely go online by November 2001. Air permits issued for the project are too new to be included in any agency database, explaining the lack of available data.

A site visit was made to Hunter College on August 23rd for the purpose of obtaining heat input and emission parameter information. A visit to the boiler plant (which was still under construction), and subsequent telephone contact with the boiler manufacturer, Nebraska Boiler, resulted in the collection of all information needed to include the source in the modeling.

Information specific to the 2,000-meter secondary study area inventory is presented in Table 4-3, while Figure 4-2 shows a topographic map showing the extent of the 2,000-meter radius.

4.3.3 Existing and Proposed Power Generating Sources to 10 Kilometers from the Project

The process for developing the inventory for existing and proposed power generating sources within 10 kilometers of the project site involved working with existing inventories previously developed for proposed power projects located in New York. The following two inventories were used:

1. The inventory developed and approved by the NYCDEP for the Con Ed East River re-powering project (located along East 14th Street and the East River); and

2. The inventory currently under development for the SCS Power Project (located immediately east of the New York Power Authority Poletti facility and immediately west of the Bowery Bay Waste Water Treatment Plant).

A 10-kilometer radius was drawn around each of these two facilities and the 10-kilometer radius for the KeySpan facility was superimposed over these two circles. There was significant overlap and only a small portion of the KeySpan radius was not overlapped by the other two circles. It was determined that no existing or proposed power projects existed in this non-overlap area.

The following protocol was used in selecting sources from each circle:

- Sources from the Con Ed East River circle, the portion of which overlapped the KeySpan circle but not the SCS circle, were selected without question;
- Sources from the SCS circle, the portion of which overlapped the KeySpan circle but not the Con Ed East River circle, were selected without question; and
- Preference was given to the Con Ed East River sources from the area where the three circles overlapped since this inventory was already approved. Key exceptions to this involved all sources located at the KeySpan site and the Astoria site (including NYPA, Con Ed, NRG, and Orion). TRC, working with KeySpan, NYPA, and NRG, has direct access to source information at these sites and therefore, the most up-to-date permit information.

Note that the combination of identical sources performed by Con Ed in preparing the East River inventory was carried through to the KeySpan inventory in that the combined sources were used. This included the following sources presented by Con Ed; "59STCK1", "74ST1", "NAVY1", "NAVY2", "ASTCT12", "GOWCT13", "GOWCT24", "GOWCT35", "GOWCT44", and "NARCT14".

The list of sources compiled from these inventories and used in the cumulative air quality assessment is presented in Table 4-4. The extent of the 10-kilometer radius is shown on a topographic map in Figure 4-3.

Table 4-1. Existing Ravenswood Generating Station Exhaust Parameters and Emission Rates[a]

Source	Location		Elevation (ft)	Stack Height (ft)	Exit Temperature (F)	Exit Velocity (ft/sec)	Stack Diameter (ft)	Modeled Emission Rates					
	UTM East (m)	UTM North (m)						CO (lb/hr)	SO_2[b] (lb/hr)	SO_2[b] (tons/yr)	PM-10[b] (lb/hr)	PM-10[b] (tons/yr)	NO_x[b] (tons/yr)
Boilers													
Unit 1	588,905	4,512,178	15	499	260	158	13.3	143.2	1,354.6	5,933.2	438.3	1,919.9	3,011.1
Unit 2	588,937	4,512,237	15	499	260	158	13.5	142.0	1,343.8	5,885.9	434.9	1,905.0	2,988.1
Unit 3	588,979	4,512,288	15	499	270	112	23.5	319.6	3,021.9	13,235.9	977.9	4,283.0	6,719.1
Combustion Turbines													
001	588,893	4,512,133	15	47	1,000	160	7.6	19.8	1.0	1.7	1.6	2.8	34.1
004	588,966	4,512,502	10	47	1,000	160	7.6	19.8	4.8	8.3	2.9	5.2	34.1
005	588,970	4,512,509	10	47	1,000	160	7.6	19.8	4.8	8.3	2.9	5.2	34.1
006	588,974	4,512,519	10	47	1,000	160	7.6	19.8	4.8	8.3	2.9	5.2	34.1
007	588,979	4,512,526	10	47	1,000	160	7.6	19.8	4.8	8.3	2.9	5.2	34.1
008	588,981	4,512,547	10	32	1,090	190	8.4	21.0	5.2	9.0	2.9	5.2	13.6
009	588,986	4,512,557	10	32	1,090	190	8.4	21.0	5.2	9.0	2.9	5.2	13.6
010	588,990	4,512,566	10	32	1,090	190	8.4	21.0	5.2	9.0	2.9	5.2	13.6
011	588,996	4,512,575	10	32	1,090	190	8.4	21.0	5.2	9.0	2.9	5.2	13.6
203	589,041	4,512,468	23	47	1,090	190	11.9	43.2	10.7	18.8	6.4	11.1	27.5
204	589,054	4,512,493	23	47	1,090	190	11.9	43.2	10.7	18.8	6.4	11.1	27.5
201	589,065	4,512,456	23	47	1,090	190	11.9	43.2	10.7	18.8	6.4	11.1	27.5
202	589,078	4,512,481	23	47	1,090	190	11.9	43.2	10.7	18.8	6.4	11.1	27.5
303	589,061	4,512,506	23	47	1,090	190	11.9	43.2	10.7	18.8	6.4	11.1	27.5
304	589,074	4,512,530	23	47	1,090	190	11.9	43.2	10.7	18.8	6.4	11.1	27.5
301	589,085	4,512,494	23	47	1,090	190	11.9	43.2	10.7	18.8	6.4	11.1	27.5
302	589,097	4,512,517	23	55	1,090	190	11.9	43.2	10.7	18.8	6.4	11.1	27.5

[a]Stack parameters provided by KeySpan Energy. Potential emission rates calculated based on maximum fuel throughputs, heat inputs, and AP-42 emission factors.
[b]Annual emission rates from boilers based on an annual capacity factor of 100% (i.e., 8,760 hours per year) and annual emissions from combustion turbines based on an annual capacity factor of 40% (i.e., approximately 3,500 hours per year).

Table 4-2. Off-Site Source Inventory within 1,000 Foot Study Area

Modeling Data for Ravenswood Primary Study Area

FACILITY			STACK					EMISSIONS[1]				
Name	UTME (m)	UTMN (m)	Grade (m)	Height (m)	I. Diameter (m)	Temp. (K)	Velocity (m/s)	CO (g/s)	NOx (g/s)	Adj NO_x[a] (g/s)	SO2 (g/s)	PM (g/s)
P.S. 76	589,300	4,512,500	3.1	16.76	0.70	477	3.35	0.13	0.23	0.17	0.32	0.04
Queensbridge Houses	588,960	4,511,940	4.6	21.64	1.07	466	9.75	0.52	0.91	0.68	1.29	0.16
Commercial/Industrial Complex	589,050	4,512,230	4.6	45.72	1.52	583	4.27	0.17	0.30	0.23	0.43	0.05
Modern International Corporation	589,440	4,512,230	7.6	12.19	0.61	477	0.91	0.07	0.13	0.10	0.18	0.02
Ravenswood Houses	590,000	4,512,660	3.7	32.00	2.74	394	2.44	0.41	4.54	3.41	3.89	0.94
Phoenix House	589,410	4,512,950	4.6	16.78	0.76	450	1.53	0.02	0.09	0.07	0.13	0.02
			4.6	20.13	0.84	487	1.22	0.02	0.08	0.06	0.11	0.01
Con Ed "A" House	588,940	4,512,500	3.0	45.70	3.36	580	22.30	0.73	5.48	4.11	4.20	0.30

[a] 0.75 NOx/NO2 conversion factor applied.

Table 4-3. Off-Site Source Inventory Between 1,000 Feet and 2,000 Meters of the Ravenswood Generating Station

Modeling Data for Ravenswood Secondary Study Area

FACILITY			STACK					EMISSIONS[1]				
Name	UTME (m)	UTMN (m)	Grade (m)	Height (m)	I. Diameter (m)	Temp. (K)	Velocity (m/s)	CO (g/s)	NO_x (g/s)	Adj NO_x[a] (g/s)	SO_2 (g/s)	PM (g/s)
Rockefeller University	588,400	4,513,200	1.5	94.79	0.15	339	5.79	0.49	5.50	4.13	4.70	1.14
			1.5	94.79	0.15	339	5.79	0.11	0.13	0.10	0.01	0.01
Plaza 400	587,500	4,512,300	11.3	123.10	2.15	311	2.13	0.26	2.85	2.14	2.44	0.59
Hunter College	587,200	4,513,300	24.4	64.01	1.07	496	4.70	1.20	1.67	1.25	2.83	0.19
29-10 Thomson Avenue Bldg.	589,600	4,511,000	22.9	55.78	2.40	307	1.22	0.03	3.35	2.51	2.86	0.69

[a] 0.75 NOx/NO2 conversion factor applied.

Table 4-4. Off-Site Inventory of Existing and Proposed Major Power Generating Sources within 10 Kilometers of the Ravenswood Generating Station

FACILITY			STACK					EMISSIONS				
Name	UTME (m)	UTMN (m)	Grade (m)	Height (m)	I. Diameter (m)	Velocity (m/s)	Temperature (K)	CO (g/s)	NO_x (g/s)	Adj. NO_x[a] (g/s)	SO_2 (g/s)	PM-10 (g/s)
E 60th Street, Stack 1	587,830	4,512,250	10.7	91.50	4.53	10.45	400	11.84	8.58	6.44	0.09	1.09
Hudson Avenue, Stack 4	586,090	4,506,300	2.4	114.90	7.09	12.50	489	11.57	25.65	19.24	103.10	12.37
Hudson Avenue, Gas Turbine CT0003	585,941	4,506,300	3.3	14.33	2.80	39.01	759	0.83	0.57	0.43	6.22	1.19
Hudson Avenue, Gas Turbine CT0004	585,924	4,506,300	3.3	14.33	2.80	39.01	759	0.83	0.57	0.43	6.22	1.19
Hudson Avenue, Gas Turbine CT0005	585,907	4,506,300	3.3	14.33	2.80	39.01	759	0.83	0.57	0.43	6.22	1.19
Hudson Avenue, Boiler 100	586,060	4,506,172	8.8	108.50	4.65	19.60	422	8.38	24.82	18.61	77.33	10.10
Gowanus Gas Turbines, CT13 Max	584,006	4,497,071	0.0	16.15	4.04	23.61	768	5.73	--	--	63.30	8.80
Gowanus Gas Turbines, CT13 Annual	584,006	4,497,071	0.0	16.15	4.04	23.61	768	--	4.96	3.72	0.91	0.17
Gowanus Gas Turbines, CT24 Max	583,998	4,597,914	0.0	16.15	4.04	23.61	768	5.73	--	--	63.30	8.80
Gowanus Gas Turbines, CT24 Annual	583,998	4,597,914	0.0	16.15	4.04	23.61	768	--	4.96	3.72	0.91	0.17
Gowanus Gas Turbines, CT35 Max	583,870	4,501,754	0.0	16.15	4.04	23.61	768	5.73	--	--	63.30	8.80
Gowanus Gas Turbines, CT35 Annual	583,870	4,501,754	0.0	16.15	4.04	23.61	768	--	4.96	3.72	0.91	0.17
Gowanus Gas Turbines, CT44 Max	583,794	4,501,809	0.0	16.15	4.04	23.61	768	5.73	--	--	63.30	8.80
Gowanus Gas Turbines, CT44 Annual	583,794	4,501,809	0.0	16.15	4.04	23.61	768	--	4.96	3.72	0.91	0.17
NARCT14	582,349	4,500,227	0.0	17.37	4.04	25.64	779	11.38	19.80	14.85	125.74	17.49
59STCK1	585,150	4,513,700	5.8	154.50	5.03	18.60	461	9.12	10.65	7.99	81.27	12.13
74ST1	588,440	4,513,340	6.7	150.60	4.88	34.02	457	30.44	28.58	21.44	135.62	30.19
East River Stack 1	586,728	4,508,788	2.6	112.00	6.47	17.40	377	7.28	--	--	36.50	7.50
East River 1 Annual	586,728	4,508,788	2.6	112.00	6.47	14.60	365	--	12.60	9.45	9.53	4.29
East River Stack 2	586,695	4,508,806	2.6	112.00	6.47	13.10	357	3.46	4.31	3.23	0.53	3.14
East River Stack 3	586,622	4,508,847	2.6	112.00	6.47	9.90	436	8.19	--	--	77.10	9.88
East River 3 Annual	586,622	4,508,847	2.6	112.00	6.47	4.40	436	--	17.00	12.75	7.71	1.50
East River Stack 4	586,577	4,508,872	2.6	112.00	6.47	20.10	430	8.41	--	--	79.20	6.78
East River 4 Annual	586,577	4,508,872	2.6	112.00	6.47	8.90	430	--	11.00	8.25	5.98	0.86
NYPA Hell Gate 1	591,947	4,516,803	3.1	32.50	3.66	23.50	655	0.66	0.57	0.43	0.00	0.38
NYPA Hell Gate 2	591,947	4,516,803	3.1	32.50	3.66	23.50	655	0.66	0.57	0.43	0.00	0.38
NYPA Harlem River Yards 1	590,984	4,517,137	3.1	32.50	3.66	23.50	655	0.66	0.57	0.43	0.00	0.38
NYPA Harlem River Yards 2	590,984	4,517,137	3.1	32.50	3.66	23.50	655	0.66	0.57	0.43	0.00	0.38
NYPA Pouch Terminal	578,076	4,497,227	5.2	32.50	3.66	23.50	655	0.66	0.57	0.43	0.00	0.38
NYPA, N 1st and Grand, 1	587,239	4,507,608	3.1	32.50	3.66	23.50	655	0.66	0.57	0.43	0.00	0.38
NYPA, N 1st and Grand, 2	587,239	4,507,608	3.1	32.50	3.66	23.50	655	0.66	0.57	0.43	0.00	0.38
NYPA, 3rd Ave & 23rd St	584,517	4,501,669	1.5	32.50	3.66	23.50	655	0.66	0.57	0.43	0.00	0.38
NYPA, Vernon Blvd 1	588,625	4,511,788	3.1	45.70	3.66	23.50	655	0.66	0.57	0.43	0.00	0.38
NYPA, Vernon Blvd 2	588,625	4,511,788	3.1	45.70	3.66	23.50	655	0.66	0.57	0.43	0.00	0.38
PSE&G Hudson, Boiler 1	578,000	4,511,000	0.9	99.10	4.30	33.95	389	57.50	9.06	6.80	183.78	57.43
PSE&G Hudson, Unit 3 all	578,000	4,511,000	0.9	12.90	5.10	55.47	591	198.70	290.30	217.73	8.42	29.03
PSE&G Hudson, Boiler 2	578,000	4,511,000	0.9	151.80	5.30	49.23	400	75.60	217.94	163.46	1738.80	76.48
NAVY1	586,500	4,505,700	3.1	94.49	5.18	21.24	416	4.54	4.29	3.22	7.95	6.82
NAVY2	586,500	4,505,700	3.1	41.15	0.41	45.90	810	0.48	0.01	0.01	0.15	0.56
Sunset Energy 1	584,000	4,501,900	0.0	38.10	5.49	27.10	425	7.53	3.82	2.87	31.90	11.70
Sunset Energy 2	584,000	4,501,900	0.0	38.10	5.49	27.10	425	7.53	3.82	2.87	31.90	11.70
Sunset Gen	584,000	4,501,900	0.0	4.60	0.31	44.80	666	2.05	7.53	5.65	0.11	0.14
SEFCO, Kent Ave	587,668	4,508,163	3.1	32.50	3.65	23.50	655	0.66	0.57	0.43	0.00	0.38
NRG21 Max	592,328	4,515,467	5.2	10.67	5.40	18.59	672	5.27	--	--	2.60	0.77

Table 4-4. Off-Site Inventory of Existing and Proposed Major Power Generating Sources within 10 Kilometers of the Ravenswood Generating Station

FACILITY			STACK					EMISSIONS				
Name	UTME (m)	UTMN (m)	Grade (m)	Height (m)	I. Diameter (m)	Velocity (m/s)	Temperature (K)	CO (g/s)	NO_x (g/s)	Adj. NO_x[a] (g/s)	SO_2 (g/s)	PM-10 (g/s)
NRG21 Annual	592,328	4,515,467	5.2	10.67	5.40	18.59	672	--	5.21	3.91	0.57	0.17
NRG22 Max	592,323	4,515,461	5.2	10.67	5.40	18.59	672	5.27	--	--	2.60	0.77
NRG22 Annual	592,323	4,515,461	5.2	10.67	5.40	18.59	672	--	5.21	3.91	0.57	0.17
NRG23 Max	592,346	4,515,452	5.2	10.67	5.40	18.59	672	5.27	--	--	2.60	0.77
NRG23 Annual	592,346	4,515,452	5.2	10.67	5.40	18.59	672	--	5.21	3.91	0.57	0.17
NRG24 Max	592,341	4,515,446	5.2	10.67	5.40	18.59	672	5.27	--	--	2.60	0.77
NRG24 Annual	592,341	4,515,446	5.2	10.67	5.40	18.59	672	--	5.21	3.91	0.57	0.17
NRG31 Max	592,370	4,515,430	5.2	10.67	5.40	18.59	672	5.27	--	--	2.60	0.77
NRG31 Annual	592,370	4,515,430	5.2	10.67	5.40	18.59	672	--	5.21	3.91	0.57	0.17
NRG32 Max	592,365	4,515,424	5.2	10.67	5.40	18.59	672	5.27	--	--	2.60	0.77
NRG32 Annual	592,365	4,515,424	5.2	10.67	5.40	18.59	672	--	5.21	3.91	0.57	0.17
NRG33 Max	592,388	4,515,414	5.2	10.67	5.40	18.59	672	5.27	--	--	2.60	0.77
NRG33 Annual	592,388	4,515,414	5.2	10.67	5.40	18.59	672	--	5.21	3.91	0.57	0.17
NRG34 Max	592,383	4,515,408	5.2	10.67	5.40	18.59	672	5.27	--	--	2.60	0.77
NRG34 Annual	592,383	4,515,408	5.2	10.67	5.40	18.59	672	--	5.21	3.91	0.57	0.17
NRG41 Max	592,412	4,515,392	5.2	10.67	5.40	18.59	672	5.27	--	--	2.60	0.77
NRG41 Annual	592,412	4,515,392	5.2	10.67	5.40	18.59	672	--	5.21	3.91	0.57	0.17
NRG42 Max	592,407	4,515,387	5.2	10.67	5.40	18.59	672	5.27	--	--	2.60	0.77
NRG42 Annual	592,407	4,515,387	5.2	10.67	5.40	18.59	672	--	5.21	3.91	0.57	0.17
NRG43 Max	592,429	4,515,376	5.2	10.67	5.40	18.59	672	5.27	--	--	2.60	0.77
NRG43 Annual	592,429	4,515,376	5.2	10.67	5.40	18.59	672	--	5.21	3.91	0.57	0.17
NRG44 Max	592,424	4,515,371	5.2	10.67	5.40	18.59	672	5.27	--	--	2.60	0.77
NRG44 Annual	592,424	4,515,371	5.2	10.67	5.40	18.59	672	--	5.21	3.91	0.57	0.17
NRG05 Max	592,315	4,515,598	5.2	12.80	3.61	42.37	680	0.10	--	--	1.22	0.37
NRG05 Annual	592,315	4,515,598	5.2	12.80	3.61	42.37	680	--	2.44	1.83	0.27	0.08
NRG07 Max	592,326	4,515,588	5.2	12.80	3.61	42.37	680	0.10	--	--	1.22	0.37
NRG07 Annual	592,326	4,515,588	5.2	12.80	3.61	42.37	680	--	2.44	1.83	0.27	0.08
NRG08 Max	592,338	4,515,578	5.2	12.80	3.61	42.37	680	0.10	--	--	1.22	0.37
NRG08 Annual	592,338	4,515,578	5.2	12.80	3.61	42.37	680	--	2.44	1.83	0.27	0.08
NRG09 Max	592,361	4,515,557	5.2	12.80	3.61	42.37	680	0.10	--	--	1.22	0.37
NRG09 Annual	592,361	4,515,557	5.2	12.80	3.61	42.37	680	--	2.44	1.83	0.27	0.08
NRG10 Max	592,269	4,515,535	5.2	8.23	5.07	31.09	727	0.14	--	--	1.76	0.52
NRG10 Annual	592,269	4,515,535	5.2	8.23	5.07	31.09	727	--	3.52	2.64	0.39	0.12
NRG11 Max	592,283	4,515,522	5.2	8.23	5.07	31.09	727	0.14	--	--	1.76	0.52
NRG11 Annual	592,283	4,515,522	5.2	8.23	5.07	31.09	727	--	3.52	2.64	0.39	0.12
NRG12 Max	592,298	4,515,508	5.2	8.23	5.07	31.09	727	0.14	--	--	1.76	0.52
NRG12 Annual	592,298	4,515,508	5.2	8.23	5.07	31.09	727	--	3.52	2.64	0.39	0.12
NRG13 Max	592,313	4,515,495	5.2	8.23	5.07	31.09	727	0.14	--	--	1.76	0.52
NRG13 Annual	592,313	4,515,495	5.2	8.23	5.07	31.09	727	--	3.52	2.64	0.39	0.12
Berrians Max	592,253	4,515,623	5.2	46.02	4.51	40.54	699	11.33	--	--	6.40	2.52
Berrians Annual	592,253	4,515,623	5.2	46.02	4.51	40.54	699	--	0.65	0.49	0.27	0.28
Poletti CT1 & CT2	592,277	4,515,655	4.6	76.20	8.00	21.40	414	6.20	5.51	4.13	21.20	16.90
Poletti Boiler 6	591,738	4,515,619	6.1	91.40	6.50	36.60	426	20.50	62.50	46.88	33.70	5.60
Poletti Gen	592,173	4,515,633	6.1	4.60	0.31	44.80	666	0.09	0.07	0.05	0.002	0.002

Table 4-4. Off-Site Inventory of Existing and Proposed Major Power Generating Sources within 10 Kilometers of the Ravenswood Generating Station

FACILITY			STACK					EMISSIONS				
Name	UTME (m)	UTMN (m)	Grade (m)	Height (m)	I. Diameter (m)	Velocity (m/s)	Temperature (K)	CO (g/s)	NO_x (g/s)	Adj. NO_x[a] (g/s)	SO_2 (g/s)	PM-10 (g/s)
Orion 1	591,700	4,515,500	4.9	88.10	5.49	22.10	404	3.60	5.90	4.43	10.30	7.50
Orion 2	591,700	4,515,500	4.9	88.10	5.49	22.10	404	3.60	5.90	4.43	10.30	7.50
Orion 3	591,700	4,515,600	4.9	88.10	5.49	22.10	404	3.60	5.90	4.43	10.30	7.50
SCS Turbine	593,103	4,514,825	3.4	81.99	11.28	22.49	434	9.93	24.50	18.38	35.10	29.10
SCS Fire Pump	593,018	4,514,767	3.4	15.39	0.15	45.00	683	0.02	0.02	0.01	0.01	0.01
SCS Aux Boiler	593,103	4,514,825	3.4	81.99	5.49	0.15	450	0.25	0.02	0.01	0.01	0.06

[a] 0.75 NO_x/NO_2 conversion factor applied.

5.0 MODELING RESULTS

A NYCDEP requested cumulative air quality assessment was voluntarily performed in conjunction with the licensing for the proposed Ravenswood Combined Cycle Facility. The cumulative air quality assessment consisted of modeling the proposed facility, the existing Ravenswood Generating Station, and the off-site source inventory using the ISCST3 model with five years (1991-1995) of LaGuardia airport meteorological data. Directionally dependent building downwash parameters were input to the model for the non-GEP height stacks located at the Ravenswood Generating Station and the adjacent Con Ed "A" house and ground-level receptors were placed throughout the study area. Building receptors or flagpole receptors were placed at four locations located within the study area.

The modeled ground-level and flagpole receptor concentrations were then added to the representative background air quality concentrations and compared to the NAAQS. Results of the cumulative air quality assessment indicate that the modeled concentrations plus the background air quality concentrations are less than their respective NAAQS. Thus, the proposed facility will not cause or contribute to any potential modeled NAAQS exceedance, as all the modeled concentrations are less than the NAAQS.

5.1 Ground-Level Results

Results of the cumulative air quality assessment for ground-level receptors located within the study area are presented in Table 5-1. As shown in the table, all of the total concentrations (i.e., the modeled concentrations plus the background air quality concentration) are less than their respective NAAQS. Table 5-1 also shows the distance and direction of the modeled concentration from the proposed turbine stack. All of the modeled maximum concentrations are located between approximately 375 and 400 meters north-northeast of the proposed Ravenswood Combined Cycle Facility turbine stack, except for the modeled 24-hour PM-10 and annual SO_2 concentrations. The modeled maximum 24-hour PM-10 concentration is located approximately 140 meters south-southeast of the proposed turbine stack and the maximum modeled annual SO_2 concentration is located approximately 140 meters east of the proposed turbine stack.

The modeled 1-hour and 8-hour CO concentrations are less than 18 percent and 14 percent, respectively, of the background air quality concentrations. Thus, the total CO concentrations are dominated by the monitored background air quality concentrations. Comparing the total CO concentrations to the NAAQS results in the total 1-hour CO concentration being approximately

17 percent of the NAAQS and the total 8-hour CO concentration being approximately 51 percent of the NAAQS.

Total 3-hour and 24-hour SO_2 concentrations are close to an even split between the modeled concentrations and the background air quality concentrations. The total annual SO_2 concentration is made up of approximately 33 percent modeled concentration and 67 percent background air quality concentration. A comparison of the total 3-hour, 24-hour, and annual SO_2 concentrations to their respective NAAQS shows that the total SO_2 concentrations are approximately 37 percent, 67 percent, and 63 percent of the NAAQS, respectively.

The modeled 24-hour PM-10 concentration is approximately 26 percent higher than the background air quality concentration, while the modeled annual PM-10 concentration is approximately a quarter of the background air quality concentration. The sum of these concentrations results in the total 24-hour and annual PM-10 concentrations being approximately 75 percent and 64 percent, respectively, of their 24-hour and annual NAAQS.

Background annual NO_2 concentrations, as shown in Table 3-1, over the latest three years (1997-1999) of available monitoring data range from 71 to 77 percent of the NAAQS. The modeled annual NO_2 concentration was approximately 20 percent of the NAAQS. Thus, the total annual NO_2 concentration presented in Table 5-1 is dominated by the background air quality concentration; however, the total annual NO_2 concentration remains less than the annual NO_2 NAAQS.

5.2 Flagpole Receptor Results

Table 5-2 presents the results of the cumulative air quality assessment for the flagpole receptors within the study area. The location of the flagpole receptor with the maximum modeled concentration is also presented in Table 5-2. Comparing the modeled flagpole receptor concentrations to modeled ground-level concentrations shows that the modeled flagpole receptor 3-hour and annual SO_2 and annual PM-10 concentrations are greater than the modeled ground-level concentrations. However, the modeled 3-hour and annual SO_2 and annual PM-10 concentrations remain less than the NAAQS when added to their respective background concentrations. Therefore, all of the total flagpole receptor concentrations (modeled concentrations plus the background air quality concentrations) are less than the NAAQS.

All of the maximum modeled concentrations were located at the top of the parking garage on Roosevelt Island. While this location does not reflect a continuously inhabited area, using the modeled concentrations at this location will conservatively assess the cumulative air quality at all the modeled flagpole receptors.

The modeled 1-hour and 8-hour CO concentrations are less than 4 percent of their respective NAAQS. However, when added to the background air quality concentrations, the total 1-hour and 8-hour CO concentrations are approximately 16 percent and 48 percent, respectively, of their NAAQS.

When the modeled 3-hour SO_2 concentration is summed with the background 3-hour SO_2 air quality concentration, the total 3-hour SO_2 concentration is approximately 39 percent of the NAAQS. The modeled 24-hour and annual SO_2 concentrations are approximately 32 percent and 24 percent of their respective 24-hour and annual NAAQS. However, when the modeled 24-hour and annual SO_2 concentrations are summed with their respective background air quality concentrations, the total 24-hour SO_2 concentration increases to approximately 64 percent of the NAAQS and the total annual SO_2 concentration increases to approximately 66 percent of the NAAQS.

The background 24-hour and annual PM-10 concentrations are one-third and approximately half their NAAQS, respectively. Summing the background concentrations with the modeled PM-10 concentrations results in a total 24-hour PM-10 concentration that is less than two-thirds (approximately 62 percent) the 24-hour PM-10 NAAQS and a total annual PM-10 concentration that is approximately 64 percent of the annual PM-10 NAAQS.

As with the ground-level NO_2 results, the background air quality concentration is more than 75 percent of the NAAQS. The addition of the modeled NO_2 concentration increases the total annual NO_2 concentration to approximately 93 percent of the annual NO_2 NAAQS.

All of the flagpole receptor modeled concentrations were located at the top of the structures, thus no further refinement of receptor placement on the structures was necessary.

Table 5-1. Cumulative Air Quality Assessment Ground-Level Modeling Results

Pollutant	Averaging Period	NAAQS (ug/m^3)	Modeled Concentration[a] (ug/m^3)	Background Concentration[b] (ug/m^3)	Total Concentration[c] (ug/m^3)	Distance[d] (m)	Direction[d] (deg)
CO	1-Hour	40,000	1,012.3	5,750	6,762.3	375	6
	8-Hour	10,000	623.5	4,485	5,108.5	378	10
SO_2	3-Hour	1,300	253.5	228	481.5	375	22
	24-Hour	365	127.3	118	245.3	338	39
	Annual	80	16.4	34	50.4	141	91
PM-10	24-Hour	150	63.2	50	113.2	142	153
	Annual	50	6.2	26	32.2	378	10
NO_2	Annual	100	20.3	77	97.3	398	359

[a]Modeled concentrations reflect the highest second-highest for the short-term (1-, 3-, 8-, and 24-hour) and maximum annual modeled concentrations, except for 24-hour PM-10. The 24-hour PM-10 concentration is the highest sixth-highest concentration.

[b]Background air quality concentrations reflect the maximum monitored concentrations from 1997 through 1999 as presented in Table 3-1.

[c]Total concentration = modeled concentration + background concentration.

[d]Distance and direction relative to the proposed turbine stack location (approximately 588,990 m UTM East, 4,512,370 m North).

Table 5-2. Cumulative Air Quality Assessment Flagpole Receptor Modeling Results

Pollutant	Averaging Period	NAAQS (ug/m^3)	Modeled Concentration[a] (ug/m^3)	Background Concentration[b] (ug/m^3)	Total Concentration[c] (ug/m^3)	Location
CO	1-Hour	40,000	537.1	5,750	6,287.1	Roosevelt Island Parking Garage[d]
	8-Hour	10,000	302.6	4,485	4,787.6	
SO_2	3-Hour	1,300	279.9	228	507.9	
	24-Hour	365	117.0	118	235.0	
	Annual	80	19.1	34	53.1	
PM-10	24-Hour	150	43.2	50	93.2	
	Annual	50	6.2	26	32.2	
NO_2	Annual	100	16.1	77	93.1	

[a]Modeled concentrations reflect the highest second-highest for the short-term (1-, 3-, 8-, and 24-hour) and maximum annual modeled concentrations, except for 24-hour PM-10. The 24-hour PM-10 concentration is the highest fourth-highest concentration.

[b]Background air quality concentrations reflect the maximum monitored concentrations from 1997 through 1999 as presented in Table 3-1.

[c]Total concentration = modeled concentration + background concentration.

[d]The Roosevelt Island Parking Garage is located approximately 588 meters at 350 degrees from the proposed turbine stack location.

6.0 MODELING SUBMITTAL

A listing of modeling input and output files used in the cumulative air quality assessment is included on the CDROM contained in the Appendix. Also included on the CDROM are all the modeling files for the ground-level and flagpole receptor analyses.

7.0 REFERENCES

ENSR, 2001. East River Repowering Project – Cumulative Impact Air Quality Analysis. Submitted to the NYCDEP on behalf of Con Edison Company of New York, Inc. by ENSR International. April 2001.

NYCDEP, 1993. City Environmental Quality Review (CEQR) Technical Manual. New York City Department of Environmental Protection. December 1993.

TRC, 2001a. KeySpan Energy – Ravenswood Cogeneration Facility Cumulative Impact Source Inventory. Submitted to the NYCDEP on behalf of KeySpan Energy by TRC Environmental Corporation. October 2001.

TRC, 2001b. Revised Section 5.0 of the KeySpan Energy – Ravenswood Cogeneration Facility Application for Certification of a Major Electric Generating Facility Under Article X of the New York State Public Service Law. Submitted to the NYSDOH on May 30, 2001.

TRC, 2000a. KeySpan Energy – Ravenswood Cogeneration Facility Air Quality Modeling Protocol. . Submitted to the NYCDEP on behalf of KeySpan Energy by TRC Environmental Corporation. October 2001

TRC, 2000b. Environmental Justice Analysis – Ravenswood Cogeneration Facility. Submitted to the NYSDEC on behalf of KeySpan Energy by TRC Environmental Corporation. June 2000.

TRC, 2000c. KeySpan Energy PSD Air Permit Application for Proposed Ravenswood Cogeneration Facility. Submitted to the U.S. EPA on behalf of KeySpan Energy by TRC Environmental Corporation. November 2000.

U.S. EPA, 2001. Guideline on Air Quality Models (Revised). Appendix W to Title 40 U.S. Code of Federal Regulations (CFR) Parts 51 and 52. Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina. July 2001.

A CDROM of modeling input and output files used in the cumulative air quality assessment has not been included in this copy of the report.