

2009 APR 27 PM 2:18

1 STATE OF NEW YORK  
2 PUBLIC SERVICE COMMISSION

---

3  
4 Case 06-T-0650 - Application of New York Regional  
5 Interconnect Inc. For a Certificate of Environmental  
6 Compatibility and Public Need Pursuant to Article VII  
7 for a High Voltage Direct Current Electric Transmission  
8 Line Running Between National Grid's Edic Substation in  
9 the Town of Marcy, and Central Hudson Gas & Electric's  
10 Rock Tavern Substation Located in the Town of New  
11 Windsor

---

12  
13 Evidentiary Hearing  
14 3 Empire State Plaza  
15 19th Floor  
16 Albany, New York

17  
18  
19 March 30, 2009  
20 9:11 a.m.

21  
22 BEFORE: MICHELLE L. PHILLIPS,  
23 Administrative Law Judge

24  
25 JEFFREY STOCKHOLM,  
26 Administrative Law Judge

1                   (Exhibits 238 through 258 marked for  
2                   identification.)

3                   JUDGE PHILLIPS: Good morning. I'm calling  
4                   Case 06-T-0650, application of New York Regional  
5                   Interconnect, Incorporated, for a certificate of  
6                   environmental compatibility and public need pursuant to  
7                   Article VII for a high-voltage direct current electric  
8                   transmission line running between National Grid's Edic  
9                   Substation in the Town of Marcy and Central Hudson's Gas  
10                  and Electric Rock Tavern Substation located in the Town  
11                  of New Windsor.

12                  We'll begin by taking appearance of counsel.

13                  MR. SINGER: For New York Regional  
14                  Interconnect, the law firm of Couch White by Leonard  
15                  Singer, Garrett Bissell and William McCarthy.

16                  MR. KLUCSIK: For Communities Against Regional  
17                  Interconnect, the law firm of Gilberti, Stinziano,  
18                  Heintz & Smith, P.C., by Brenda Colella and John  
19                  Klucsik.

20                  MR. BELSITO: For the Department of Public  
21                  Service, Steve Blow and Anthony Belsito.

22                  MR. MALONE: For the New York Power Authority  
23                  Sarah Barish-Straus and Mark Malone.

24                  MS. LEARY: For the Office of Attorney General,

1 Maureen Leary.

2 MS. WILKINSON: For the New York State  
3 Department of Environmental Conservation, Lisa  
4 Wilkinson.

5 MR. POND: For the Millennium Pipeline Company,  
6 George Pond from the law firm of Hiscock & Barclay.

7 JUDGE PHILLIPS: For the future, you're going  
8 to have to use the microphone.

9 MR. POND: For Millennium Pipeline, George Pond  
10 from the law firm of Hiscock & Barclay, LLP. Thank you.

11 JUDGE PHILLIPS: Thank you. I think that's it  
12 for appearance of counsel. Are there any preliminary  
13 matters before we turn to I believe it's Panel B this  
14 morning? Hearing nothing --

15 MR. POND: Your Honor, yes.

16 JUDGE PHILLIPS: You have to be quicker than.

17 MR. POND: I have to jump and grab the mic,  
18 Your Honor. I apologize. Millennium has reached  
19 agreement with DEC and the Attorney General's Office.  
20 There will be no cross on the Millennium panel. We will  
21 be submitting a corrected version with some very minor  
22 changes and the affidavits and -- so the time for cross  
23 tomorrow for that panel is available for other use.

24 JUDGE PHILLIPS: Thank you. I think I heard,

1 unfortunately, multiple voices.

2 MS. WILKINSON: Yes, Your Honor. This actually  
3 is from last week. Judge Stockholm had wanted some  
4 clarification on the NYPA permits that DEC was currently  
5 processing. And I just will reference Mr. -- the  
6 rebuttal testimony of Mr. Snow at page 9, lines 7  
7 through I believe 19. And that references the permit  
8 that DEC is currently -- permit application that DEC is  
9 processing. And if additional information is required  
10 on the application, we'd be happy to provide it.

11 JUDGE STOCKHOLM: Thank you very much. I  
12 appreciate that.

13 Mr. Malone, I asked you from the regulatee's  
14 perspective what parts you thought were required for  
15 the -- and I believe this deals with the application of  
16 herbicides in the New York City watershed.

17 MR. MALONE: Yes, Your Honor. My understanding  
18 is that NYPA complies with Part 84 of the Public Service  
19 Law voluntarily, and that's with regard to transmission  
20 facilities right-of-way management. As part of that, we  
21 supply a vegetation maintenance schedule to the PSC, and  
22 also a maintenance summary to the PSC on a yearly basis,  
23 line-by-line, each of our transmission lines.

24 With regard to DEC, there is a permit -- as

1 Ms. Wilkinson indicated, there is a permit pending.  
2 NYPA has a system-wide ten-year wetland permit for  
3 application of herbicides in wetlands across our entire  
4 transmission system. And the permit expires  
5 December 31st, 2010. And I believe that that  
6 application is to continue another ten-year period.

7 And with regard to the watershed, Your Honor,  
8 there is a 1997 executive order, Number 51, which  
9 basically stated that all state departments, agencies,  
10 boards and commissions undertaking activities within the  
11 New York State watershed substantially comply with the  
12 substantive requirements of DEP's regulations with  
13 regard to herbicides in the watershed. NYPA adopted --  
14 I don't have the -- I have a copy of it, but we adopted  
15 a trustee item in which the trustees determined that the  
16 Power Authority would comply with the substantial  
17 requirements of DEP.

18 And I think those are the three things that you  
19 asked me about.

20 JUDGE STOCKHOLM: You just used the word  
21 "substantial" requirements. Did you mean substantive  
22 requirements?

23 MR. MALONE: I did. I apologize. Yes.

24 JUDGE STOCKHOLM: So does that mean that you do

1 not technically have a permit from DEP?

2 MR. MALONE: That's correct, Your Honor.

3 JUDGE STOCKHOLM: Thank you.

4 Any further matters preliminary? Okay.

5 JUDGE PHILLIPS: It looks like we only have two  
6 new members who have not yet been sworn in. I believe  
7 it's William Bailey, and I'm not going to be able to  
8 pronounce the last name, Thomas.

9 MR. LIVERNOIS: Livernois.

10 JUDGE PHILLIPS: If you could please stand and  
11 raise your right hands.

12 CHRISTOPHER THOMPSON, RICHARD BUCCI, SAED MOUJTAHED,  
13 ABRAHAM PICHARDO, STEPHEN WOOD, WILLIAM BAILEY,  
14 THOMAS LIVERNOIS,  
15 after first having been duly sworn, were examined and  
16 testified as follows:

17 JUDGE PHILLIPS: Can you please state your  
18 names for the record.

19 MR. BAILEY: William Bailey.

20 MR. LIVERNOIS: Thomas Livernois.

21 JUDGE PHILLIPS: Thank you. Please be seated.

22 DIRECT EXAMINATION

23 BY MR. SINGER:

24 Q Gentlemen, do you have before you a document

1 entitled the "Prefiled Direct Testimony of Panel B"  
2 consisting of Christopher Thompson, William Bailey,  
3 Richard Bucci, Stephen Wood, Saed Moujtahed, Abraham  
4 Pichardo, and Thomas Livernois?

5 A (Panel) Yes.

6 Q Does that document consist of four pages of  
7 written questions and answers and 19 pages with your  
8 resumes and curriculum vitae?

9 A (Panel) Yes.

10 Q Do you have any correction or changes to that?

11 A (Panel) No.

12 Q If I were to ask you the questions that are  
13 stated in the question and answer section of the  
14 document, would you provide the answers that are set  
15 forth therein?

16 A (Panel) Yes.

17 Q Do you adopt the prefiled direct testimony of  
18 Panel B as your sworn testimony in this case?

19 A (Panel) Yes.

20 Q Do you also have before you a document entitled  
21 "Rebuttal Testimony of Panel B" consisting of the same  
22 witnesses I just read for the direct testimony that  
23 includes 33 pages of written questions and answers?

24 A (Panel) Yes.

1           Q       Do you have any changes or corrections to that  
2 document?

3           A       (Panel) No.

4           Q       If I were to ask you the questions that are  
5 stated in the document, would you provide the answers  
6 set forth therein?

7           A       (Panel) Yes.

8           Q       And do you adopt it as your sworn testimony in  
9 this proceeding?

10          A       (Panel) Yes.

11               MR. SINGER: Your Honors, I request that the  
12 direct testimony, as well as the rebuttal testimony of  
13 Panel B be admitted into the record as if given orally.

14               JUDGE PHILLIPS: Granted.

15               (The following is the prefiled direct and  
16 rebuttal testimony of Panel "B":)

17

18

19

20

21

22

23

24

Before the  
New York State Public Service Commission  
New York Regional Interconnect, Inc.  
Case No. 06-T-0650

---

**NEW YORK REGIONAL INTERCONNECT INC.**

---

Pre-filed Direct Testimony of Panel "B" Consisting of:

Christopher Thompson  
William Bailey  
Richard Bucci  
Stephen Wood  
Saed Moujtahed  
Abraham Pichardo  
Thomas Livernois

On Behalf of New York Regional Interconnect Inc.

February, 2008

1 Q. PLEASE STATE YOUR NAMES AND RESPONSIBILITIES REGARDING THE  
2 NEW YORK REGIONAL INTERCONNECTION PROJECT.

3 A. Christopher Thompson, President, New York Regional Interconnect Inc.

4 A. William Bailey, Project EMF Consultant, Exponent®

5 A. Richard Bucci, Project Engineering Manager, WGI, Inc.

6 A. Stephen Wood, Project Environmental Consultant, ESS Group, Inc.

7 A. Saed Moujtahed, Project Engineering Consultant, WGI, Inc.

8 A. Abraham Pichardo, Project Engineering Consultant, WGI, Inc.

9 A. Thomas Livernois, Project Engineering Consultant, Exponent®

10

11 Q. DO YOUR RESUMES, ATTACHED HERETO AS APPENDIX A TO THIS  
12 TESTIMONY, FAIRLY AND ACCURATELY REPRESENT YOUR EDUCATION  
13 AND WORK EXPERIENCE?

14 A. Yes, our resumes are accurate.

15

16 Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

17 A. The purpose of our testimony is to support sections 4.16 and 4.17 of Exhibit 4, Exhibits E-  
18 5 and E-6 and Appendices G, P and Q of the New York Regional Interconnect's ("NYRI")  
19 Application for a Certificate of Environmental Compatibility and Public Need pursuant to  
20 Article VII of the New York Public Service Law ("Application").

21

22

23

**THOMPSON/BAILEY/BUCCI/WOOD/MOUJTAHED/PICHARDO/LIVERNOIS**

1 Q. WERE YOU RESPONSIBLE FOR THE PREPARATION OF ANY SECTIONS  
2 OF NYRI'S APPLICATION IN THIS PROCEEDING?

3 A. Yes, the following exhibits to NYRI's Article VII Application were prepared by us or  
4 under our direction and supervision; sections 4.16 and 4.17 of Exhibit 4, Exhibits E-5  
5 and E-6 and Appendices G, P and Q.

6

7 Q. DOES THE APPLICATION CHARACTERIZE EXISTING NOISE CONDITIONS  
8 ALONG THE PROPOSED ROUTE AND AT THE CONVERTER STATION  
9 SITES?

10 A. Yes, section 4.16 of the Application provides the existing noise conditions for the  
11 Project site.

12

13 Q. DOES THE APPLICATION ASSESS THE PROJECTED EFFECTS OF  
14 CONSTRUCTION AND OPERATION OF THE PROJECT ON EXISTING  
15 AMBIENT NOISE?

16 A. Yes it does.

17

18 Q. DOES EXHIBIT 4 DESCRIBE THE STEPS THAT NYRI PLANS TO TAKE TO  
19 MITIGATE NOISE FROM OPERATION OF THE CONVERTER STATIONS?

20 A. Yes it does.

21

**THOMPSON/BAILEY/BUCCI/WOOD/MOUJTAHED/PICHARDO/LIVVERNOIS**

1 Q. DOES THE APPLICATION DESCRIBE NYRI'S PLANS TO MITIGATE  
2 CONSTRUCTION NOISE?

3 A. Yes it does.  
4

5 Q. DOES THE FACILITY AS PROPOSED MEET ALL APPLICABLE LOCAL  
6 NOISE STANDARDS CONSIDERING THE STATE OF AVAILABLE  
7 TECHNOLOGY AND THE NATURE AND ECONOMICS OF  
8 ALTERNATIVES?

9 A. Yes it does, except for those local noise standards for which NYRI has sought a waiver  
10 for the reasons stated in Exhibit 7 of the Application.  
11

12 Q. DO SECTION 4.17 OF EXHIBIT 4 OF THE APPLICATION, AND APPENDIX G,  
13 CHARACTERIZE THE EXPECTED ELECTRIC AND MAGNETIC FIELDS  
14 ASSOCIATED WITH THE PROJECT?

15 A. Yes, they do.  
16

17 Q. WILL THE ELECTRIC OR MAGNETIC FIELDS CAUSED BY PROJECT  
18 OPERATIONS RESULT IN ADVERSE HEALTH OR ENVIRONMENTAL  
19 EFFECTS OR CAUSE ANY HEALTH-BASED EXPOSURE LIMIT TO BE  
20 EXCEEDED?

21 A. Based on the analysis set forth in section 4.17 of Exhibit 4 and Appendix G of the  
22 Application, the Project will not cause any adverse health or environmental effects nor

**THOMPSON/BAILEY/BUCCI/WOOD/MOUJTAHED/PICHARDO/LIVERNOIS**

1 will it cause any health-based exposure limit to be exceeded. In addition, the short,  
2 alternating current tie-lines that will connect the converter stations to the grid will comply  
3 with the Public Service Commission standards for electric and magnetic fields.  
4

5 **Q. IS THE INFORMATION PROVIDED IN EXHIBIT E-5 OF THE APPLICATION**  
6 **ACCURATE?**

7 A. Yes it is.  
8

9 **Q. IS THE INFORMATION PROVIDED IN EXHIBIT E-6 OF THE APPLICATION**  
10 **ACCURATE?**

11 A. Yes it is.  
12

13 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

14 A. Yes it does.  
15

16 J:\DATA\Client4 11825-12199\12010\Art 7 Filed Binders\Testimony\NYRI Supplement Direct Panel B.doc  
17

THOMPSON, Chris L., B.S.M.E, M.B.A., P. Eng. – Senior Vice President, Development, of American Consumer Industries Inc. (ACI); Senior Vice President of Colmac NYRI; Member, Board of Directors of ACI and Colmac NYRI. Over 30 years experience in engineering and management in the energy industry. Previously; President and CEO, CFO of Harris Group Inc. 1996-2003; Vice President of Industrial Development Resources 1995-1996; Senior Consultant, Operations Manager, Harris Group Inc. 1989-1995; RW Beck 1988-1989; Parsons Main 1986-1988; Stearns-Catalytic 1972-1986.

The logo for Exponent, featuring a stylized 'E' with a horizontal bar through it, followed by the word 'xponent' in a serif font.

# Exponent

**William H. Bailey, Ph.D.**  
Principal Scientist and Director, New York Office

## Professional Profile

Dr. William H. Bailey is a Principal Scientist in Exponent's Health Sciences practice and Director of the New York office. Before joining Exponent, Dr. Bailey was President of Bailey Research Associates, Inc., the oldest research and consulting firm with specialized expertise in electromagnetic fields and health. Dr. Bailey specializes in applying state-of-the-art assessment methods to environmental and occupational health issues. His 30 years of training and experience include laboratory and epidemiologic research, health risk assessment, and comprehensive exposure analysis. He is particularly well known for his research on potential health effects of electromagnetic fields and has served as an advisor to numerous state, federal, and international agencies. Dr. Bailey has investigated exposures to alternating current (ac), direct current (dc), and radiofrequency electromagnetic fields, 'stray voltage' and electrical shock, as well as to a variety of chemical agents and air pollutants. Currently, he is directing research projects on effects of electrical charge on the deposition of aerosols in the respiratory tract. He is a member of a working group that advises a committee of the World Health Organization on risk assessment, perception, and communication. Dr. Bailey is a visiting scientist at the Cornell University Medical College and has lectured at Rutgers University, the University of Texas (San Antonio), and the Harvard School of Public Health. He was formerly Head of the Laboratory of Neuropharmacology and Environmental Toxicology at the New York State Institute for Basic Research, Staten Island, New York, and an Assistant Professor and NIH postdoctoral fellow in Neurochemistry at The Rockefeller University in New York.

## Credentials and Professional Honors

Ph.D., Neuropsychology, City University of New York, 1975  
M.B.A., University of Chicago, 1969  
B.A., Dartmouth College, 1966

Sigma Xi; The Institute of Electrical and Electronics Engineers/International Committee on Electromagnetic Safety (Subcommittee 3, Safety Levels with Respect to Human Exposure to Fields (0 to -3 kHz) and Subcommittee 4, Safety Levels with Respect to Human Exposure to Radiofrequency Fields (3 kHz to 3 GHz); Elected member of the Committee on Man and Radiation (COMAR) of the IEEE Engineering in Medicine and Biology Society (1998-present); Invited Speaker, First Institute of Neurological Sciences Symposium in Neurobiology, University of Pennsylvania (1980); Invited Speaker, National Heart and Lung Institute (1977).

## Publications

Bailey, WH, Nyenhuis, JA. Thresholds for 60-Hz magnetic field stimulation of peripheral nerves in human subjects. *Bioelectromagnetics* (in press).

Bracken TD, Senior RS, Bailey WH. DC electric fields from corona-generated space charge near AC transmission lines. *IEEE Transactions on Power Delivery* (in press).

Bailey WH. Dealing with uncertainty in formulating occupational and public exposure limits. *Health Phys* 2002; 83: 402-408.

Bailey WH. Health effects relevant to the setting of EMF exposure limits. *Health Phys* 2002; 83:376-386.

Kavet R, Stuchly MA, Bailey WH, Bracken TD. Evaluation of biological effects, dosimetric models, and exposure assessment related to ELF electric- and magnetic-field guidelines. *Applied Occupational and Environmental Hygiene*; 2001; 16:1118-1138.

Bailey WH. ICNIRP recommendation for limiting public exposure to 4 Hz-1 kHz electric and magnetic fields. *Health Phys* 1999; 77:97-98.

Bailey WH. Principles of risk assessment with application to current EMF risk communication issues. In: *EMF Risk Perception and Communication*, Repacholi MH, Muc, AM (eds.), World Health Organization, Geneva, 1999.

De Santo RS, Bailey, WH. Environmental justice tools and assessment practices. *Proceedings, 1999 American Public Transit Association*, 1999.

Bailey WH, Su SH, Bracken TD. Probabilistic approach to ranking sources of uncertainty in ELF magnetic field exposure limits. *Health Phys* 1999; 77:282-290.

Bailey WH. Field parameters. *Proc. EMF Engineering Review Symposium, Status and Summary of EMF Engineering Research*, Bracken TD, Montgomery JH (eds.), Oak Ridge National Laboratory, Oak Ridge, TN, April 28-29, 1998.

Bailey WH. Policy implications. *Proceedings, EMF Engineering Review Symposium, Status and Summary of EMF Engineering Research*, Bracken TD, Montgomery JH (eds.), Oak Ridge National Laboratory, Oak Ridge, TN, April 28-29, 1998.

Bailey WH. Probabilistic approaches to deriving risk-based exposure guidelines: application to extremely low frequency magnetic fields. In: *Non-Ionising Radiation*, Dennis JA and Stather JW (eds.), *Special Issue of Radiation Protection Dosimetry* 1997; 72:327-336.

Bailey WH, Su SH, Bracken TD, Kavet R. Summary and evaluation of guidelines for occupational exposure to power frequency electric and magnetic fields. *Health Phys* 1997; 73:433-453.

Bracken TD, Senior RS, Rankin RF, Bailey WH, Kavet R. Magnetic field exposures in the electric utility industry relevant to occupational guideline levels. *Appl Occupat Environ Hyg* 1997; 12:756-768.

Blondin J-P, Nguyen D-H, Sbeghen J, Goulet D, Cardinal C, Maruvada P-S, Plante M, and Bailey WH. Human perception of electric fields and ion currents associated with high voltage DC transmission lines. *Bioelectromagnetics* 1996; 17:230-241.

Bailey WH, Charry JM. Acute exposure of rats to air ions: effects on the regional concentration and utilization of serotonin in brain. *Bioelectromagnetics* 1987; 8:173-181.

Bailey WH, Charry JM. Measurement of neurotransmitter release and utilization in selected brain regions of rats exposed to dc electric fields and atmospheric space charge. *Proceedings, Twenty-Third Hanford Life Sciences Symposium, Interaction of Biological Systems with Static and ELF Electric and Magnetic Fields, 1987.*

Pavildes C, Aoki C, Chen J-S, Bailey WH, Winson J. Differential glucose utilization in the parafascicular region during slow-wave sleep, the still-alert state and locomotion. *Brain Res* 1987; 423:399-402.

Bailey WH, Charry JM. Behavioral monitoring of rats during exposure to air ions and DC electric fields. *Bioelectromagnetics* 1986; 7:329-339.

Charry JM, Shapiro MH, Bailey WH, Weiss JM. Ion-exposure chambers for small animals. *Bioelectromagnetics* 1986; 7:1-11.

Charry JM, Bailey WH. Regional turnover of norepinephrine and dopamine in rat brain following acute exposure to air ions. *Bioelectromagnetics* 1985; 6:415-425.

Bracken TD, Bailey WH, Charry JM. Evaluation of the DC electrical environment in proximity to VDTs. *J Environ Sci Health Part A* 1985; 20:745-780.

Gross SS, Levi R, Bailey WH, Chenouda AA. Histamine modulation of cardiac sympathetic responses: a physiological role. *Fed Proc* 1984; 43:458.

Gross SS, Guo ZG, Levi R, Bailey WH, Chenouda AA. 1984. Release of histamine by sympathetic nerve stimulation in the guinea pig heart and modulation of adrenergic responses. *Circulation Res* 1984; 54:516-526.

Dahl D, Bailey WH, Winson J. Effect of norepinephrine depletion of hippocampus on neuronal transmission from perforant pathway through dentate gyrus. *J Neurophysiol* 1983; 49:123-135.

Guo ZG, Gross SS, Levi R, Bailey WH. Histamine: modulation of norepinephrine release from sympathetic nerves in guinea pig heart. *Fed Proc* 1983; 42:907.

Bailey WH. Biological effects of air ions on serotonin metabolism: fact and fancy. In: Conference on Environmental Ions and Related Biological Effects, pp. 90–120, Charry JM (ed.), American Institute of Medical Climatology, Philadelphia, PA, 1982.

Weiss JM, Goodman PA, Losito BG, Corrigan S, Charry JM, Bailey WH. Behavioral depression produced by an uncontrollable stressor: relationship to norepinephrine, dopamine, and serotonin levels in various regions of rat brain. *Brain Res Rev* 1981; 3:167–205.

Bailey WH. Ion-exchange chromatography of creatine kinase isoenzymes: a method with improved specificity and sensitivity. *Biochem Med* 1980; 24:300–313.

Bailey WH, Weiss JM. Evaluation of a 'memory deficit' in vasopressin-deficient rats. *Brain Res* 1979; 162:174–178.

Bailey WH, Weiss JM. Effect of ACTH 4-10 on passive avoidance of rats lacking vasopressin (Brattleboro strain). *Hormones and Behavior* 1978; 10:22–29.

Pohorecky LA, Newman B, Sun J, Bailey WH. Acute and chronic ethanol injection and serotonin metabolism in rat brain. *J Pharmacol Exper Therap* 1978; 204:424–432.

Koh SD, Vernon M, Bailey WH. Free-recall learning of word lists by prelingual deaf subjects. *J Verbal Learning and Verbal Behavior* 1971; 10:542–574.

#### Book Chapters

Bailey WH. Principles of risk assessment and their limitations. In: Risk Perception, Risk Communication and Its Application to EMF Exposure, Matthes R, Bernhardt JH, Repacholi MH (eds.), International Commission on Non-Ionizing Radiation Protection, Oberschleißheim, Germany, 1998.

Bailey, WH. Biological responses to air ions: is there a role for serotonin? In: Air Ions: Physical and Biological Aspects, pp. 151–160, Charry JM, Kavet R (eds.), CRC Press, Boca Raton, FL, 1987.

Weiss JM, Bailey WH, Goodman PA, Hoffman LJ, Ambrose MJ, Salman S, Charry JM. A model for neurochemical study of depression. In: Behavioral Models and the Analysis of Drug Action, pp. 195–223, Spiegelstein MY, Levy A (eds.), Elsevier Scientific, Amsterdam, 1982.

Bailey WH. Mnemonic significance of neurohypophyseal peptides. In: Changing Concepts of the Nervous System, pp. 787–804, Morrison AR, Strick PL (eds.), Academic Press, New York, NY, 1981.

Bailey WH, Weiss, JM. Avoidance conditioning and endocrine function in Brattleboro rats. In: Endogenous Peptides and Learning and Memory Process, pp. 371–395, Martinez JL, Jensen RA, Messing RB, Rigter H, McGaugh JL (eds.); Academic Press, New York, NY, 1981.

Weiss JM, Glazer H, Pohorecky LA, Bailey WH, Schneider L. Coping behavior and stress-induced behavioral depression: studies of the role of brain catecholamines. In: The Psychobiology of the Depressive Disorders: Implications for the Effects of Stress, pp. 125-160, Depue R (ed.), Academic Press, New York, NY, 1979.

### Reports

Johnson, GB, Bracken, TD, Bailey, WH. Charging and transport of aerosols near AC transmission lines: a literature review. EPRI, Palo Alto, CA, 2003.

Bailey WH. Probabilistic approach to ranking sources of uncertainty in ELF magnetic-field exposure limits. In: Evaluation of Occupational Magnetic Exposure Guidelines, Interim Report, EPRI Report TR-111501, 1998.

Bailey WH, Weil DE, Stewart JR. HVDC Power Transmission Environmental Issues Review. Oak Ridge National Laboratory, Oak Ridge, TN, 1997.

Bailey, WH. Melatonin responses to EMF. In: Proc. Health Implications of EMF Neural Effects Workshop, Report TR-104327s, Electric Power Research Institute, 1994.

Bailey, WH. Recent neurobiological and behavioral research: overview of the New York State powerlines project. In: Power-Frequency Electric and Magnetic Field Research, Electric Power Research Institute, 1989.

Bailey WH, Bissell M, Dorn CR, Hoppel WA, Sheppard AR, Stebbings, JH. Comments of the MEOB Science Advisors on Electrical Environment Outside the Right of Way of CU-TR-1, Report 5. Science Advisor Reports to the Minnesota Environmental Quality Board, 1986.

Bailey WH, Bissell M, Brambl RM, Dorn CR, Hoppel WA, Sheppard AR, Stebbings JH. A Health and Safety Evaluation of the +/- 400 KV Powerline. Science Advisor's Report to the Minnesota Environmental Quality Board, 1982.

Charry JM, Bailey WH, Weiss JM. Critical Annotated Bibliographical Review of Air Ion Effects on Biology and Behavior. Rockefeller University, New York, NY, 1982.

Bailey WH. Avoidance Behavior in Rats with Hereditary Hypothalamic Diabetes Insipidus. Dissertation, City University of New York, 1975.

### Presentations

Bailey, WH. Assessment of potential environmental effects of electromagnetic fields from submarine cables. Connecticut Academy of Science and Engineering, Long Island Sound Bottomlands Symposium: Study of Benthic Habitats, July 2004.

Bailey, WH, Bracken, TD, Senior, RS. Long-term monitoring of static electric field and space charge near AC transmission Lines. The Bioelectromagnetics Society, 26<sup>th</sup> Annual Meeting, Washington, DC, June 2004.

Bailey, WH, Erdreich, L, Waller, L, Mariano, K. Childhood leukemia in relation to 25-Hz and 60-Hz magnetic fields along the Washington DC—Boston rail line. Society for Epidemiologic Research, 35<sup>th</sup> Annual Meeting, Palm Desert CA, June 2002. American Journal of Epidemiology. 155:S38, 2002.

De Santo, RS, Coe, M, Bailey, WH. Environmental justice assessment and the use of GIS tools and methods. National Association of Environmental Professionals, 27<sup>th</sup> Annual Conference, Dearborn, MI, June 2002.

Bailey WH. Applications to enhance safety: research to understand and control potential risks. Human Factors and Safety Research, Volpe National Transportation Systems Center/Dutch Ministry of Transport, Cambridge, MA, November 2000.

Bailey WH. EMF health effects review. EMF Exposure Guideline Workshop, Brussels Belgium, June 2000.

Bailey WH. Dealing with uncertainty when formulating guidelines. EMF Exposure Guideline Workshop, Brussels Belgium, June 2000.

Bailey WH. Field parameters: policy implications. EMF Engineering Review Symposium, Status and Summary of EMF Engineering Research, Charleston, SC, April 1998.

Bailey WH. Principles of risk assessment: application to current issues. Symposium on EMF Risk Perception and Communication, World Health Organization, Ottawa, Canada, August 1998.

Erdreich L, Klauenberg BJ, Bailey WH, Murphy MR. Comparing radiofrequency standards around the world. Health Physics Society 43rd Annual Meeting, Minneapolis, MN, July 1998.

Bailey WH. Current guidelines for occupational exposure to power frequency magnetic fields. EPRI EMF Seminar, New Research Horizons, March 1997.

Bailey WH. Methods to assess potential health risks of cell telephone electromagnetic fields. IBC Conference—Cell Telephones: Is there a Health Risk? Washington, DC, June 1997.

Bailey WH. Principles of risk assessment and their limitations. Symposium on Risk Perception, Risk Communication and its Application to EMF Exposure, International Commission on Non-Ionizing Radiation Protection, Vienna, Austria, October 1997.

Bailey WH. Probabilistic approach for setting guidelines to limit induction effects. IEEE Standards Coordinating Committee 28: Non-Ionizing Radiation, Subcommittee 3 (0–3 kHz), June 1997.

Bracken TD, Senior RS, Rankin RF, Bailey WH, Kavet R. Relevance of occupational guidelines to utility worker magnetic-field exposures. Second World Congress for Electricity and Magnetism in Biology and Medicine, Bologna, Italy, June 1997.

Bailey WH. Epidemiology and experimental studies. American Industrial Hygiene Conference, Washington, DC, May 1996.

Bailey WH. Power frequency field exposure guidelines. IEEE Standards Coordinating Committee 28: Non-Ionizing Radiation, Subcommittee 3 (0-3 kHz), June 1996.

Weil DE, Erdreich LS, Bailey WH. Are 60-Hz magnetic fields cancer causing agents? Mechanisms and Prevention of Environmentally Caused Cancers, The Lovelace Institutes 1995 Annual Symposium, La Fonda, Santa Fe, NM, October 1995.

Bailey WH. Neurobiological research on extremely-low-frequency electric and magnetic fields: a review to guide future research. Sixteenth Annual Meeting of the Bioelectromagnetics Society, Copenhagen, Denmark, June 1994.

Blondin J-P, Nguyen D-H, Sbeghen J, Maruvada PS, Plante M, Bailey WH, Goulet D. The perception of DC electric fields and ion currents in human observers. Annual Meeting of the Canadian Psychological Association, Penticton, British Columbia, Canada, June 1994.

Erdreich LS, Bailey WH, Weil DE. Science, standards and public policy challenges for ELF fields. American Public Health Association 122nd Annual Meeting, Washington, DC, October 1994.

Bailey WH. Review of 60 Hz epidemiology studies. EMF Workshop, Canadian Radiation Protection Association, Ontario, Canada, June 1993.

Bailey WH. Biological and health research on electric and magnetic fields. American Industrial Hygiene Association, Fredrickton, New Brunswick, Canada, October 1992.

Bailey WH. Electromagnetic fields and health. Institute of Electrical and Electronics Engineers, Bethlehem, PA, January 1992.

Bailey WH, Charry JM. Particle deposition on simulated VDT operators: influence of DC electric fields. Tenth Annual Meeting of the Bioelectromagnetics Society, June 1988.

Charry JM, Bailey WH. Contribution of charge on VDTs and simulated VDT operators to DC electric fields at facial surfaces. Tenth Annual Meeting of the Bioelectromagnetics Society, June 1988.

Bailey WH, Charry, JM. Dosimetric response of rats to small air ions: importance of relative humidity. EPRI/DOE Contractors Review, November 1986.

Charry JM, Bailey WH, Bracken TD. DC electric fields, air ions and respirable particulate levels in proximity to VDTs. International Conference on VDTs and Health, Stockholm, Sweden, June 12-15 1986.

Charry JM, Bailey WH. Air ion and DC field strengths at  $10^4$  ions/cm<sup>3</sup> in the Rockefeller University Small Animal Exposure Chambers. EPRI/DOE Contractors Review, November 1985.

Charry JM, Bailey WH. DC Electrical environment in proximity to VDTs. Seventh Annual Meeting of the Bioelectromagnetics Society, June 1985.

Bailey WH, Collins RL, Lahita RG. Cerebral lateralization: association with serum antibodies to DNA in selected bred mouse lines. Society for Neuroscience, 1985.

Kavet R, Bailey WH, Charry JM. Respiratory neuroendocrine cells: a plausible site for air ion effects. Seventh Annual Meeting of The Bioelectromagnetics Society, June 1985.

Bailey WH, Charry JM. Measurement of neurotransmitter release and utilization in selected brain regions of rats exposed to DC electric fields and atmospheric space charge. Twenty-third Hanford Life Sciences Symposium, Richland, WA, October 1984.

Bailey WH, Charry JM, Weiss JM, Cardle K, Shapiro M. Regional analysis of biogenic amine turnover in rat brain after exposure to electrically charged air molecules (air ions). Society for Neuroscience, 1983.

Bailey WH. Biological effects of air ions: fact and fancy. American Institute of Medical Climatology Conference on Environmental Ions and Related Biological Effects, October 1982.

Goodman PA, Weiss JM, Hoffman LJ, Ambrose MJ, Bailey WH, Charry, JM. Reversal of behavioral depression by infusion of an A2 adrenergic agonist into the locus coeruleus. Society for Neuroscience, November 1982.

Charry JM, Bailey WH. Biochemical and behavioral effects of small air ions. Electric Power Research Institute Workshop, April 1981.

Bailey WH, Alsonso DR, Weiss JM, Chin S. Predictability: a psychologic/ behavioral variable affecting stress-induced myocardial pathology in the rat. Society for Neuroscience, November 1980.

Salman SL, Weiss JM, Bailey WH, Joh TH. Relationship between endogenous brain tyrosine hydroxylase and social behavior of rats. Society of Neuroscience, November 1980.

Bailey WH, Maclusky S. Appearance of creatine kinase isoenzymes in rat plasma following myocardial injury produced by isoproterenol. Fed Assoc Soc Exp Biol, April 1978.

Bailey WH, Maclusky S. Appearance of creatine kinase isoenzymes in rat plasma following myocardial injury by isoproterenol. *Fed Proc* 1978; 37:889.

Bailey WH, Weiss JM. Psychological factors in experimental heart pathology. Visiting Scholar Presentation, National Heart Lung and Blood Institute, March 1977.

Bailey WH, Weiss JM. Effect of ACTH 4-10 on passive avoidance of rats lacking vasopressin (Brattleboro strain). Eastern Psychological Association, April 1976.

### Research Appointments

- Visiting Fellow, Department of Pharmacology, Cornell University Medical College, New York, NY (1986–present)
- Visiting Scientist, The Jackson Laboratory, Bar Harbor, ME (1984–1985)
- Head, Laboratory of Neuropharmacology and Environmental Toxicology, NYS Institute for Basic Research in Developmental Disabilities, Staten Island, NY (1983–1987)
- Assistant Professor, The Rockefeller University, New York, NY (1976–1983)
- Postdoctoral Fellow, Neurochemistry, The Rockefeller University, New York, NY (1974–1976)
- Dissertation Research, The Rockefeller University, New York, NY (1972–1974)
- CUNY Research Fellow, Dept. of Psychology, Queens College, City University of New York, Flushing, NY (1969–1971)
- Clinical Research Assistant, Department of Psychiatry, University of Chicago; Psychiatric Psychosomatic Inst., Michael Reese Hospital, and Illinois State Psychiatric Inst, Chicago, IL (1968–1969)

### Teaching Appointments

- Lecturer, University of Texas Health Science Center, Center for Environmental Radiation Toxicology, San Antonio, TX (1998)
- Lecturer, Harvard School of Public Health, Office of Continuing Education, Boston, MA (1995, 1997)
- Lecturer, Rutgers University, Office of Continuing Education, New Brunswick, NJ (1991–1995)
- Adjunct Assistant Professor, Queens College, CUNY, Flushing, NY (1978)

- Lecturer, Queens College, CUNY, Flushing, NY (1969–1974)

#### Advisory Positions

- National Institute of Environmental Health Sciences/ National Institutes of Health, Review Committee, Neurotoxicology, Superfund Hazardous Substances Basic Research and Training Program (2004)
- National Institute of Environmental Health Sciences, Review Committee Role of Air Pollutants in Cardiovascular Disease (2004)
- Working Group on Non-Ionizing Radiation, Static and Extremely Low-Frequency Electromagnetic Fields, International Agency for Research on Cancer (2000–2002)
- Working Group, EMF Risk Perception and Communication, World Health Organization (1998–present)
- Associate Editor, Non-Ionizing Radiation, *Health Physics* (1996–present)
- Member, International Committee on Electromagnetic Safety, Subcommittee 3 - Safety Levels with Respect to Human Exposure to Fields (0 to 3 kHz) and Subcommittee 4 - Safety Levels with Respect to Human Exposure (3kHz to 3GHz) Institute of Electrical and Electronics Engineers (IEEE) (1996–present)
- Invited participant, National Institute of Environmental Health Sciences EMF Science Review Symposium: Clinical and *In Vivo* Laboratory Findings (1998)
- Working Group, EMF Risk Perception and Communication, International Commission on Non-Ionizing Radiation Protection (1997)
- U.S. Department of Energy, RAPID EMF Engineering Review (1997)
- Oak Ridge National Laboratory (1996)
- American Arbitration Association International Center for Dispute Resolution (1995–1996)
- U.S. Department of Energy (1995)
- National Institute for Occupational Safety and Health (1994–1995)
- Federal Rail Administration (1993–1996)
- U.S. Forest Service (1993)
- New York State Department of Environmental Conservation (1993)

- National Science Foundation
- National Institutes of Health, Special Study Section—Electromagnetics (1991–1993)
- Maryland Public Service Commission and Maryland Department of Natural Resources, Scientific Advisor on health issues pertaining to HVAC Transmission Lines (1988–1989)
- Scientific advisor on biological aspects of electromagnetic fields, Electric Power Research Institute, Palo Alto, CA (1985–1989)
- U.S. Public Health Service, NIMH: Psychopharmacology and Neuropsychology Review Committee (1984)
- Consultant on biochemical analysis, Colgan Institute of Nutritional Science, Carlsbad, CA (1982–1983)
- Behavioral Medicine Abstracts, Editor, animal behavior and physiology (1981–1983)
- Consultant on biological and behavioral effects of high-voltage DC transmission lines, Vermont Department of Public Service, Montpelier, VT (1981–1982)
- Scientific advisory committee on health and safety effects of a high-voltage DC transmission line, Minnesota Environmental Quality Board, St. Paul, MN (1981–1982)
- Consultant on biochemical diagnostics, Biokinetix Corp., Stamford, CT (1978–1980)

#### **Professional Affiliations**

- The Health Physics Society (Affiliate of the International Radiation Protection Society)
- Society for Risk Analysis
- New York Academy of Sciences
- American Association for the Advancement of Science
- Air and Waste Management Association
- Society for Neuroscience/International Brain Research Organization
- Bioelectromagnetics Society
- The Institute of Electrical and Electronics Engineers/Engineering in Medicine and Biology Society

## Bio of Rich Bucci

Richard M. Bucci is the Director of Electric Power Delivery Systems for Washington Group International, Inc., located in Princeton, New Jersey, where he is responsible for transmission, substations and distribution projects, covering consulting studies, engineering services and turnkey projects. He is the functional leader of Washington Group's efforts in the electric power delivery area. He has led major projects for domestic and international clients, including leading utilities and independent power developers. Recently Mr. Bucci led the Washington Group engineering team for Transmission and Substations rehabilitation and reconstruction in Northern Iraq.

Mr. Bucci is a registered professional engineer in NY and has been employed by Washington Group International and its legacy company Ebasco Services Incorporated for over 30 years, in the areas of system planning, engineering, design, procurement and construction of electric power systems. He earned an MSEE from Polytechnic University of NY and a BEE from Pratt Institute. He is a member of various industry societies and committees including the AEIC's Electric Power Apparatus Committee, and is a senior member of the IEEE Power Engineering Society. He has authored over fifteen published technical papers and articles, and is the chief editor of the McGraw-Hill/Electrical World Electric Distribution Systems Handbook.

**Stephen B. Wood**  
**Vice President and Senior Project Manager**

---

***EXPERIENCE***

ESS Group, Inc. – January 2000 to Present  
 Years of Prior Related Experience – 22

***EDUCATION***

JD, Southern New England School of Law  
 MBA, Western New England College  
 BA, Biology, North Adams State College

***SUMMARY OF PROJECT EXPERIENCE***

Mr. Wood is a Vice President and Senior Project Manager with more than 28 years of experience in environmental licensing and permitting of energy facilities and in project management. Prior to joining ESS, he was the Director of Environmental Affairs for Commonwealth Energy System, a major electric and gas utility company in Massachusetts. Mr. Wood was responsible for directing and managing all aspects of environmental policy and programs for electric and gas operations, including: generation, transmission, and distribution functions; environmental licensing and permitting for construction and operation of gas and electric facilities; consulting services to other energy related subsidiary companies; conducting environmental studies, impact assessments, and environmental impact reports; providing regulatory interpretation and guidance; developing and implementing compliance programs; and developing and recommending environmental policies for the organization.

Mr. Wood has been responsible for managing the environmental siting and permitting of a number of power generating facilities, both fossil fuel fired and renewable wind projects and high voltage transmission facilities. Representative projects include:

- Astoria Repowering Project 1,816 MW Gas-Fired, Combined Cycle Independent Power Plant, New York.
- 345 kV Transmission Line, Connecticut.
- Cape Wind Offshore Renewable Electric Generation and 115 kV Submarine Cable Project, Sound.
- Environmental Licensing and Permitting 345kV Substation, and 115kV Transmission Facilities in Massachusetts.
- Marble River Wind Energy Project, New York.

***PROFESSIONAL CERTIFICATIONS***

- Admitted to the Massachusetts Bar – June 1996.
- Admitted to the United State District Court for Massachusetts – January 1997

***AFFILIATIONS AND MEMBERSHIPS***

- Advisor – Electric Power Research Institute
- Air & Water Management Association
- American Bar Association, Section of Natural Resources, Energy and Environment Law
- Boston Bar Association, Environmental Section



## SAED M. MOUJTAHED

Saed Moujtahed Over 20 years experience as a senior electric utilities design and planning engineer and project manager with Washington Group, Anaheim Public Utilities and Pasadena Water and Power. He is currently a project management consultant to Washington Division of URS Corporation.

MR. MOUJTAHED HAS EARNED A BSEE DEGREE FROM CALIFORNIA STATE UNIVERSITY, Long Beach, CA, majoring in power systems with a minor in control systems, electronics communication systems and networks. He has been responsible for a variety of electric power planning, design and construction projects, including:

- Participated in the design of overhead transmission lines from 400 kV through 12 kV and managed the construction activities including participation with all involved agencies and utilities.
- Project engineering management for the recent Iraq transmission, distribution and substations reconstruction project for the U.S. Government, as well as project cost control and estimating support.
- Managed Public Utility Demand-Side Management Programs, Capital Expansion Plans including a five-year underground transmission conversion program, Resource Adequacy Programs, Power Quality Programs, and Construction Projects.
- Represented Pasadena Water and Power on the Southern California Utility Power Pool (SCUPP) Resource Planning Committee and the Western System Coordination Council (WSCC)

## Bio

### Abraham Pichardo, P.E.

Abraham Pichardo is a Registered Professional Engineer in CT with over 25-years experience in engineering and design of high voltage AC and DC transmission and distribution systems in accordance with industry codes, company procedures and specifications. He is currently a senior consulting engineer with the Washington Division of URS Corporation.

Mr. Pichardo has extensive experience in electrical calculations and modeling tools such as short circuit analysis, protective device coordination, grounding analysis, bus calculations, load flow, reliability analysis, lightning protection, insulation coordination, etc. Through his many years of experience in the industry he has gained in-depth knowledge of electrical apparatus performance such as power transformers, circuit breakers, disconnect switches, cabling systems, grounding and ancillary subsystems. He has also been responsible for the development of numerous engineering designs, calculations, construction packages and specifications in compliance with applicable engineering, safety and environmental codes and standards such as NESC, NEC, IEEE, ANSI, EPA, OSHA, etc.

**Exponent***Failure Analysis Associates*

Exponent  
39100 Country Club Drive  
Farmington Hills, MI 48334

telephone 248-324-9100  
facsimile 248-324-9199  
www.exponent.com

**Thomas G. Livernois, Ph.D., P.E.**  
**Principal Engineer**

**Professional Profile**

Dr. Thomas G. Livernois is a Principal Engineer in Exponent's Electrical and Semiconductors practice. He specializes in the analysis and design of electrical and electronic systems, including automotive and commercial vehicle systems functionality in adverse environments. Specific vehicle experience covers powertrain, chassis, and safety systems, including system performance in crashes and fires. Other areas of expertise include mobile communication system performance including railroad and commercial vehicle applications, conformal antenna system design and integration, root cause analysis of electrical fires, corrosion performance of materials, electrocution risk assessment, electrical power distribution faults, automatic door sensor system performance requirements, electronic and feedback control system malfunctions, and various electrostatic discharge phenomena. Dr. Livernois has also been involved with several intellectual property cases.

Prior to joining Exponent, Dr. Livernois was founder and President of Physics Solutions, LLC, where he was responsible for engineering and client relations. He performed root cause analyses for many major corporate clients.

Dr. Livernois worked for several years in the automotive industry for both OEM's and suppliers, holding various positions related to automotive electrical and electronic system product design. He has worked in the advanced electrical and electronics systems office at Ford Motor Company, focusing primarily in vehicle architecture and power distribution system design. Work experience at DaimlerChrysler encompassed electrical and electronic systems compatibility testing and analysis, light truck chassis electronics design, and participation in various design standardization work. He was responsible for Failure Mode and Effects Analysis, Design Verification/Production Verification testing, process review and approval, and cost analysis. He was also employed by AGC America, Inc. where he was the director of a new product development activity that emphasized conformal antenna and sensor system design. Dr. Livernois is a member of the Institute of Electrical and Electronic Engineers (IEEE), the Society of Automotive Engineers (SAE), the American Society of Mechanical Engineers (ASME) the Industrial Advisory Board for Lawrence Technological University.

**Academic Credentials and Professional Honors**

Ph.D., Electrical Engineering, University of Michigan, Ann Arbor, 1991  
M.S., Electrical Engineering, Michigan State University, 1986  
B.S., Electrical Engineering, Michigan Technological University, 1984

### Licenses and Certifications

Registered Professional Engineer, Michigan, #51733  
Registered Professional Engineer, New York, #084688

### Publications

Livernois TG. On the reciprocity factor for shielded microstrip. *Microwave and Optical Technology Letters* 1995; 10(6):327-330, December.

Livernois TG. Characterization of dissipative losses in microwave circuits. *Microwave and Optical Technology Letters* 1994; 7(15):687-689, October.

Livernois TG, East JR. Analysis of a microstrip step discontinuity fabricated on a Metal-Insulator-Semiconductor (MIS) Substrate. *Microwave and Optical Technology Letters* 1992; 5(13):661-666, December.

Livernois TG, Nyquist DP, Cloud MJ. Scattering effects in the dielectric slab waveguide due to electrically dissipative and active discontinuities. *IEEE Transactions on Microwave Theory and Techniques* 1991; 39(3):579-583, March.

Livernois TG, Katehi PB. A simple method for characterizing planar transmission line discontinuities on dissipative substrates. *IEEE Transactions on Microwave Theory and Techniques* 1991; 39(2):368-370, February.

Livernois TG, Katehi PB. Characteristic impedance and transverse field distribution in MIS Microstrip. *IEEE Transactions on Microwave Theory and Techniques* 1990; 38(11):1740-1743, November.

Livernois TG, Katehi PB. Generalized method for deriving the Space-Domain Green's function in a shielded, multilayer substrate structure, with applications to MIS slow wave transmission lines. *IEEE Transactions on Microwave Theory and Techniques* 1989; 37(11):1761-1767, November.

Livernois TG, Nyquist DP. Integral equation formulation for scattering by dielectric discontinuities along open boundary waveguides. *Journal of the Optical Society of America A* 1987; 4(7):1289-1295, July.

### Symposium Papers

Teune J, Livernois TG. Correlation between automotive electromagnetic immunity tests. *IEEE 1999 International Symposium on Electromagnetic Compatibility*, Seattle, WA, August 2-6, 1999 (with J. Teune).

Slattery K, Neal J, Livernois T, Smith S. A description of the implementation of an automated conducted emissions chamber for automotive testing. *IEEE 1998 International Symposium on Electromagnetic Compatibility*, Denver, CO, August 24-28, 1998.

Thomas G. Livernois, Ph.D., P.E.

Page 2  
12/07

Ex™

Schuster JW, Leubbers RJ, Livernois TG. Application of the recursive convolution technique to modeling lumped circuit elements in FDTD simulations. IEEE AP-S Symposium, Atlanta, June 21-26, 1998.

Slattery KP, Monahan RL, Livernois TG, Smith SV. Characterization of TEM cell discontinuities due to filtered DUT test harnesses. IEEE EMC Symposium, Austin TX, August 18-22, 1997.

Slattery KP, Livernois TG. The Effects of I/O wire extensions on measured RF voltage. IEEE EMC Symposium, Austin TX, August 18-22, 1997.

Livernois TG. Module level conducted immunity testing. 1995 Society of Automotive Engineers EMC TopTec, Novi, MI, September 13-14, 1995.

Livernois TG. TEM Cell radiated immunity testing. 1995 Society of Automotive Engineers EMC TopTec, Novi, MI, September 13-14, 1995.

Livernois TG. Analysis and design of slow wave structures using an integral equation approach. IEEE/MTT-S International Microwave Symposium, Long Beach, CA, June 12-16, 1989.

#### **Doctoral Thesis**

Livernois TG. Numerical and experimental analysis of metal-insulator-semiconductor microstrip structures. The University of Michigan, Ann Arbor, Michigan, 1991.

**Before the  
New York State Public Service Commission  
New York Regional Interconnect, Inc.  
Case No. 06-T-0650**

---

**NEW YORK REGIONAL INTERCONNECT, INC.**

---

**Rebuttal Testimony of "Panel B" Consisting of:**

**Christopher Thompson  
Richard Bucci  
Saed Moujtahed  
Abraham Pichardo  
Stephen Wood  
William Bailey  
Thomas Livernois**

**On Behalf of New York Regional Interconnect Inc.**

**March 2, 2009**

1           **I.     INTRODUCTION**

2           **Q.     PLEASE STATE YOUR NAMES, RESPONSIBILITIES REGARDING**  
3           **THE NYRI PROJECT AND COMPANY AFFILIATION.**

4           A.     Christopher Thompson, President, New York Regional Interconnect Inc.

5           A.     Richard Bucci, Project Engineering Manager, Washington Group  
6           International, Inc.

7           A.     Saed Moujtahed, Project Engineering Consultant, Washington Group  
8           International, Inc.

9           A.     Abraham Pichardo, Project Engineering Consultant, Washington Group  
10          International, Inc.

11          A.     Stephen Wood, Project Environmental Consultant, ESS Group, Inc.

12          A.     William Bailey, Project EMF Consultant, Exponent®.

13          A.     Thomas Livernois, Project Engineering Consultant, Exponent®.

14  
15          **Q.     ARE YOU THE SAME INDIVIDUALS THAT PROVIDED THE**  
16          **DIRECT TESTIMONY FOR NYRI WITNESS PANEL B THAT WAS**  
17          **INCLUDED IN APPENDIX I OF NYRI'S APPLICATION?**

18          A.     Yes.

19  
20          **Q.     WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**

21          A.     Our testimony rebuts the direct testimony filed by other parties to this  
22          proceeding related to electric and magnetic fields, noise impacts, impacts to  
23          pipelines, and impacts on transportation associated with the Project.

1           **II.    REBUTTAL TESTIMONY OF WILLIAM BAILEY AND THOMAS**  
2           **LIVERNOIS**

3           **Q.    PLEASE STATE YOUR NAME, COMPANY AFFILIATION AND**  
4           **BUSINESS ADDRESS.**

5           A.    William H. Bailey, Principal Scientist, Exponent's Health Sciences, 420  
6           Lexington Avenue, New York, New York.

7           A.    Thomas G. Livernois, Principal Engineer, Exponent's Health Sciences, 420  
8           Lexington Avenue, New York, New York.

9

10          **Q.    PLEASE SUMMARIZE YOUR QUALIFICATIONS.**

11          A.    William H. Bailey, these are summarized on my curriculum vitae attached as  
12          Exhibit WHB/TGL-1.

13          A.    Thomas G. Livernois, these are summarized on my curriculum vitae attached  
14          as Exhibit WHB/TGL-2.

15

16          **Q.    WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**

17          A.    Our testimony rebuts the testimony of the DPS Staff and CARI witnesses that  
18          addressed the issue of electric and magnetic field impacts on the NYRI  
19          project. We also address DPS Staff witness Powell's testimony regarding  
20          audible noise.

21

1           **Q.    WHAT ARE THE TYPES OF ELECTRIC AND MAGNETIC FIELDS**  
2           **ASSOCIATED WITH THE PROPOSED NYRI PROJECT?**

3           A.    The proposed NYRI project involves the operation of transmission lines of  
4           two types and each is the source of electric and magnetic fields that differ  
5           markedly with respect to their frequency and thus their ability to interact with  
6           the environment, equipment, and persons.

7           a.    DC transmission line. The main transmission line is a direct current (DC)  
8           transmission line that is a source of electric and magnetic fields with a  
9           frequency of zero hertz (Hz). The IEEE dictionary defines a DC current as “a  
10          unidirectional current in which the changes in value are either zero or so small  
11          that they may be neglected “(ANSI-IEEE Std, 100-1009, p. 268 attached as  
12          Exhibit WHB/TGL-3). This also describes the electric fields and magnetic  
13          fields of a DC transmission line that are also unidirectional.

14          b.    AC transmission line. NYRI will provide AC power from utility  
15          substations over short AC tie-lines to converter stations that will convert AC  
16          electricity to DC electricity for transfer over the DC lines. The electric and  
17          magnetic fields associated with an AC transmission line are of a different  
18          character than those of a DC transmission line, as the fields are produced by  
19          voltage (the source of the electric field) and current flow (the source of the  
20          magnetic field) “which reverses at regularly recurring intervals of time and

Case No. 06-T-0650

NYRI Witness Panel B

1           which has alternately positive and negative values” (ANSI-IEEE Std 100-  
2           1998, p. 31 attached as Exhibit WHB/TGL-4).

3  
4           **Q. DO YOU AGREE WITH THE ASSERTION IN THE TESTIMONY OF**  
5           **DPS STAFF WITNESSES QUIMBY AND SCHROM (P. 7, LINES 6-14)**  
6           **THAT THE PROPOSED NYRI LINE CANNOT MEET THE NEW**  
7           **YORK STATE PUBLIC SERVICE COMMISSION’S (PSC)**  
8           **REQUIREMENTS FOR ELECTROMAGNETIC AND**  
9           **ELECTROSTATIC FIELDS?**

10          A. No. This assertion is flawed and there is absolutely no foundation in science,  
11          engineering, or the procedural history of the PSC requirements to claim that  
12          the requirements developed for AC transmission lines should apply to the DC  
13          electric and magnetic fields<sup>1</sup> produced by DC transmission lines. On the  
14          contrary, the evidence discussed below supports the conclusion that the PSC  
15          requirements just apply to the AC electric and magnetic fields associated with  
16          the operation of AC transmission lines.

17  
18          **Q. THE REFERENCE BY DPS WITNESSES QUIMBY AND SCHROM TO**  
19          **THE “NYRI LINE” IS UNCLEAR AS TO THE TYPE OF PROPOSED**

---

<sup>1</sup> The term electrostatic is another term for the DC electric field. The term electromagnetic field could refer either to an AC or DC magnetic field.

1           **FACILITIES ADDRESSED IN THEIR ASSERTION. CAN YOU**  
2           **CLARIFY WHAT THEY APPEAR TO MEAN?**

3           A.    Quimby and Schrom's assertions regarding the "NYRI line" cannot refer to  
4           the underground AC transmission tie-lines proposed by NYRI to connect  
5           utility substations to the NYRI converter stations. Section 6.4, Figure 21 of  
6           Exponent's 2007 report and the supporting data provided in response to DPS  
7           Interrogatory 24.1 demonstrate compliance of the proposed AC transmission  
8           tie-lines with the PSC standard for AC magnetic fields. Moreover, Quimby  
9           and Schrom concede that the NYRI AC transmission line would comply with  
10          PSC standards (Response to NYRI-158 attached as Exhibit WHB/TGL-5)<sup>2</sup>.

11  
12          **Q.    WOULD WITNESSES QUIMBY AND SCHROM BE CORRECT IF**  
13          **THEY ARE ASSERTING THAT THE PROPOSED NYRI DC**  
14          **TRANSMISSION LINE WOULD NOT MEET THE PSC STANDARD**  
15          **FOR AC MAGNETIC FIELDS SIMPLY BECAUSE THE NUMERICAL**  
16          **VALUES OF THE CALCULATED DC MAGNETIC FIELDS AT THE**  
17          **EDGES OF RIGHTS-OF-WAY ARE HIGHER THAN THE 200 MG**  
18          **PSC STANDARD FOR AC MAGNETIC FIELDS?**

---

<sup>2</sup> "Staff did not under take (sic) an extensive study of the proposed 345kv overhead AC transmission line. The line will be expected to be meet (sic) the commission's standards at the time the EM&CP is filed." The witnesses did not note that NYRI had proposed an underground AC transmission tie-line to both the northern and southern converter stations. An overhead AC transmission line would only be used if the alternate site for the southern converter station is used.

Case No. 06-T-0650

NYRI Witness Panel B

1           A.    No, such an assertion would be factually incorrect. Exponent's report  
2                    (Exponent, 2007 Exhibit G to the NYRI February 20, 2008 supplement) shows  
3                    that the calculated DC magnetic fields at the edges of the right-of-way for a  
4                    1200 MW load are less than 75 milligauss (mG) for proposed overhead  
5                    construction (Figures 10, 11) and less than 45 mG for proposed underground  
6                    construction (Figure 12). The highest DC magnetic field for any of the  
7                    configurations considered was still less than 100 mG at the edges of the right-  
8                    of-way (Appendix A-25). So, even if the loading on the DC line were to be  
9                    twice as great as the load modeled, the proposed line would not generate a  
10                   magnetic field large enough to exceed a numerical 200 mG level at the edges  
11                   of the rights-of-way. Furthermore, DPS staff witness de Waal Malefyt states,  
12                   "According to NYRI's figures for magnetic fields shown in Exhibit G of the  
13                   application, the proposed NYRI facility will meet the 200 milligauss interim  
14                   policy for magnetic fields of major electric transmission facilities adopted on  
15                   September 11, 1990, in Cases 26529 and 26559" (p. 20, 1 1-6), which is  
16                   contrary to witness Quimby and Schrom's assertion that the NYRI line would  
17                   not meet the PSC requirement for electromagnetic fields. Note, as explained  
18                   below the PSC requirement was developed and intended to apply to AC not  
19                   DC transmission lines.

20

Case No. 06-T-0650

NYRI Witness Panel B

1           **Q. DO YOU INTERPRET THE QUIMBY AND SCHROM CLAIM, AS**  
2                   **DOES MR. DE WAAL MALEFYT, TO MEAN THAT THE PROPOSED**  
3                   **NYRI DC TRANSMISSION LINE WOULD NOT MEET THE PSC**  
4                   **STANDARDS JUST BECAUSE THE DC ELECTRIC FIELD EXCEEDS**  
5                   **1.6 KV/M AT THE EDGE OF THE RIGHT-OF-WAY EVEN THOUGH**  
6                   **THE 1.6 KV/M WAS NOT MEANT TO APPLY TO A DC LINE?**

7           **A. Yes.**

8

9           **Q. ON WHAT BASIS DID WITNESSES QUIMBY AND SCHROM**  
10                   **CONCLUDE THAT THE ELECTRIC FIELD FROM THE PROPOSED**  
11                   **NYRI DC LINE IN AN OVERHEAD CONFIGURATION WOULD**  
12                   **EXCEED A VALUE OF 1.6 KV/M AT THE EDGES OF RIGHTS-OF-**  
13                   **WAY?**

14           **A. Messrs. Quimby and Schrom performed calculations of the nominal**  
15                   **electrostatic (DC) field associated with the proposed NYRI DC line, which are**  
16                   **summarized in response to Interrogatory NYRI-48 (Exhibit WHB/TGL-6).**  
17                   **We assume that the calculations are approximately correct, although they did**  
18                   **not provide any details as to the input data or methodology employed.**

19

20           **Q. IS THERE A SCIENTIFIC OR ENGINEERING RATIONALE FOR**  
21                   **COMPARING A CALCULATED ELECTROSTATIC FIELD, I.E., A**

1 DC ELECTRIC FIELD, TO THE PSC STANDARD DEVELOPED TO  
2 ADDRESS AC ELECTRIC FIELDS THAT OSCILLATE AT A BASE  
3 FREQUENCY OF 60 HERTZ (HZ) IN NORTH AMERICA?

4 A. No. The nature of the interaction of DC and AC electric fields with persons  
5 and objects and the effects observed are quite different because of the  
6 difference between fields with a frequency of zero Hz and those with a  
7 frequency of 60 Hz. Scientific and engineering standard-setting organizations  
8 have set standards for human exposure to these fields based on different  
9 principles governing interactions of the fields and their effects. For example,  
10 the recommended reference levels for exposure of the general public to electric  
11 fields and magnetic fields, below which no adverse effects are expected with  
12 an unlimited time of exposure, are presented in Table 1 below:

13 **Table 1. Comparison of Screening Guidelines for Public Exposure**  
14 **to AC and DC Electric and Magnetic Fields**

Frequency	ICNIRP		ICES	
	AC	DC	AC	DC
Electric Field (kV/m)	4.2	None recommended	5.0*	Not specified at 0 Hz
Magnetic Field (mG)	833	400,000	9,040	1,180,000

15 \* 10 kV/m on transmission line rights-of-way.  
16

17 No public exposure limits have been proposed for DC electric fields by either  
18 of these international organizations and their recommended exposure limits for

Case No. 06-T-0650 NYRI Witness Panel B

1 DC magnetic fields are 480 times (ICNIRP) and 130 times (ICES) greater than  
2 for 60-Hz magnetic fields.

3 Because DC electric fields do not couple well to the body, exposure standards  
4 for electric fields at these frequencies have not been developed by either  
5 ICNIRP or ICES. The reason is that the ability of a DC electric field to  
6 produce a field within a living body is about 4,000 times less than for a 60-Hz  
7 AC electric field of the same field strength (CRC Handbook of Biological  
8 Effects of Electromagnetic Fields, 1986). For example, the World Health  
9 Organization concludes:

10 Static electric fields do not penetrate electrically conductive  
11 objects such as the human body; the field induces a surface  
12 electric charge and is always perpendicular to the body surface.  
13 A sufficiently large surface charge density may be perceived  
14 through its interaction with body hair and by other effects such  
15 as spark discharges (microshocks). The perception threshold in  
16 people depends on various factors and can range between 10 -  
17 45 kV/m. Annoying sensation thresholds are probably equally  
18 variable, but have not been systematically studied. Painful  
19 microshocks can be expected when a person who is well  
20 insulated from the ground touches a grounded object, or when a  
21 grounded person touches a conductive object that is well

Case No. 06-T-0650

NYRI Witness Panel B

1 insulated from ground. However, the threshold static electric  
2 field values will vary depending on the degree of insulation and  
3 other factors. (WHO, 2006, pp. 6-7) [Emphasis added].

4  
5 The difference between AC and DC electric fields with respect to interaction  
6 with the body is exemplified in the differences in human perception  
7 thresholds. As indicated in the highlighted quote above from the WHO, the  
8 threshold for detection of a DC field ranges from 10-45/kV/m, whereas the  
9 threshold for detection of an AC field is far lower in the range of 2-20 kV/m  
10 (WHO, 2007, p. 121). This comparison underscores why it is inappropriate to  
11 apply the PSC standards developed to minimize perception and interactions of  
12 AC fields to DC fields.

13 Exposures to DC electric fields are not even considered by the WHO to be  
14 worthy of further human health research:

15 There appears to be little benefit in continuing research into the  
16 effects that static electric fields have on health. None of the  
17 studies conducted to date suggest any untoward health effects,  
18 except for possible stress resulting from prolonged exposure to  
19 microshocks. Thus, there are no recommendations for further  
20 research concerning biological effects from exposure to static  
21 electric fields. In addition, there is only limited opportunity for  
22 significant exposure to these fields in the workplace or living

1 environment and this therefore does not warrant any  
2 epidemiological studies (WHO, 2006, p. 11).

3  
4 **Q. PLEASE BRIEFLY SUMMARIZE THE HISTORY OF THE PSC**  
5 **REQUIREMENTS (STANDARDS) FOR AC ELECTRIC AND**  
6 **MAGNETIC FIELDS AT THE EDGES OF PROPOSED**  
7 **TRANSMISSION RIGHTS-OF-WAYS.**

8 A. In 1978, the PSC prescribed that the electric field at the edge of the right-of-  
9 way of 230-kV and 765-kV AC transmission lines should not exceed 1.6 kV/m  
10 (Opinion No. 78-13, Cases 26529 and 26559, 18 NY PSC 665, 690) based on  
11 testimony regarding biological effects of strong electric fields and induction  
12 effects on persons and vehicles under the lines. It should be noted that the  
13 electric field at the edge of an AC 230-kV or 765-kV AC transmission line  
14 would be an AC electric field not a DC electric field. In 1998, the  
15 Commission began developing an interim magnetic field standard for future  
16 transmission facilities to "ensure that magnetic fields at the edges of future  
17 major electric transmission facility rights-of-way will be no stronger than the  
18 fields typical of the many existing 345-kV lines operating throughout the  
19 State." (PSC, 1990, p. 1). This again is referring to AC transmission lines  
20 since there were no existing 345-kV DC lines in the state. The utilities  
21 presented a survey of the magnetic field strengths observed during the

Case No. 06-T-0650

NYRI Witness Panel B

1 operation of 345-kV transmission lines in the state and the Commission  
2 ordered that magnetic fields from future transmission facilities subject to  
3 Article VII of the Public Service Law be limited to 200 mG<sup>3</sup> to restrict “design  
4 options for future transmission facilities, thus avoiding unnecessary increases  
5 in magnetic field exposure” (p. 7).

6  
7 **Q. IS IT CLEAR FROM THE PROCEDURAL HISTORY THAT THE PSC**  
8 **IN DEVELOPING EITHER THE ELECTRIC OR MAGNETIC FIELD**  
9 **LIMITS FOR NEW TRANSMISSION LINES NEVER CONSIDERED**  
10 **THE STATIC FIELDS THAT ARE PRODUCED BY DC**  
11 **TRANSMISSION LINES?**

12 **A.** Yes. Mr. de Waal Malefyt of the PSC staff also agrees that the electric and  
13 magnetic field standards established by the Commission were based on studies  
14 of fields from AC transmission lines (Response to NYRI-132 attached as  
15 Exhibit WHB/TGL-7). He was unable to provide any studies or analyses used  
16 by Staff and/or Commission to justify the application of the PSC standards for  
17 AC transmission lines to DC transmission lines (Response to NYRI-133  
18 attached as Exhibit WHB/TGL-8), performed no study of other states in the  
19 U.S. that have applied AC standards for transmission lines to DC transmission

---

<sup>3</sup> 200 mG was “the average magnetic field at the edges of the rights-of-way for all 345 kV transmission line circuits in the State, calculated using their winter-normal conductor ratings...” (pp. 6-7). All of the 345 kV transmission line circuits were AC, thus the 200 mG also refers to an AC field.

Case No. 06-T-0650 NYRI Witness Panel B

1 lines (Response to NYRI-134) attached as Exhibit WHB/TGL-9 or of  
2 international standards for DC electric and magnetic fields (Response to  
3 NYRI-134 attached as Exhibit WHB/TGL-9). Messrs. Quimby and Schrom  
4 also confirm that the Commission had no experience with DC transmission  
5 lines prior to setting its standards for AC transmission lines, as they have no  
6 knowledge or belief that DC transmission lines had been permitted by the  
7 Commission prior to the establishment of these guidelines (Response to  
8 NYRI-165 attached as Exhibit WHB/TGL-10).

9  
10 **Q. HAVE DPS STAFF WITNESSES QUIMBY AND SCHROM**  
11 **PROVIDED ANY KNOWLEDGE OR EVIDENCE THAT WOULD**  
12 **SUPPORT THEIR CONCLUSION THAT THE COMMISSION'S**  
13 **STANDARDS FOR AC TRANSMISSION LINES SHOULD APPLY TO**  
14 **A DC TRANSMISSION LINE?**

15 **A.** No, the only support they referenced in responses to NYRI-153 attached as  
16 Exhibit WHB/TGL-11 and NYRI-154 attached as Exhibit WHB/TGL-12 for  
17 this interpretation are the responses of Mr. de Waal Malefyt to NYRI  
18 Interrogatories NYRI-133 and NYRI-134. In response to a request for  
19 technical studies or evidence that DC electric field exposures above 1.6 kV/m  
20 were harmful, witnesses Quimby and Schrom stated that they had not studied  
21 adverse human health effects or environmental impacts associated with DC

Case No. 06-T-0650

NYRI Witness Panel B

1 electric fields (Response to NYRI-161 attached as Exhibit WHB/TGL-13) or  
2 any standards or guidelines published by established engineering  
3 organizations, standard-setting bodies, or governmental health agencies with  
4 regard to any such potential effects (Responses to NYRI-155 and NYRI-162  
5 attached as Exhibit WHB/TGL-14).

6  
7 **Q. DID DPS STAFF WITNESSES PROVIDE ANY SCIENTIFIC,**  
8 **ENGINEERING, OR OTHER TECHNICAL BASIS FOR APPLYING**  
9 **STANDARDS DEVELOPED TO ADDRESS THE FIELDS FORM AC**  
10 **TRANSMISSION LINES TO DC TRANSMISSION LINES, CORRECT?**

11 A. No, they did not. According to Mr. de Waal Malefyt's Response to NYRI-  
12 163, attached as Exhibit WHB/TGL-15, the DPS Staff position is based on two  
13 decisions of the PSC involving DC transmission facilities. In the first decision  
14 in Case 00-T-1831, the PSC noted evidence provided by Applicants as part of  
15 their application for permits for the construction of DC undersea/underground  
16 cables that the AC electric fields from tie-lines and converter stations comply  
17 with the Commission standards, as did the DC magnetic fields from an  
18 undersea/underground cable. The second case cited (Case 02-T-0036) involves  
19 the application for an underground/undersea DC transmission line. In the text  
20 quoted from the decision by Mr. de Waal Malefyt, the PSC comments

Case No. 06-T-0650

NYRI Witness Panel B

1 regarding compliance with applicable policy and standards pertain only to “the  
2 [AC] electric fields at the converter station...”

3  
4 The Commission’s note of assertions by applicants in these submissions,  
5 which almost exclusively relate to AC not DC fields, does not compare to the  
6 thorough vetting of opinions and evidence provided by a variety of experts in  
7 the lengthy and hotly contested case that supported the Commission’s decision  
8 to adopt an AC electric field standard. Rulemaking and good regulatory  
9 practice should not be supported only by declarations of DPS Staff that  
10 “electric and magnetic field standards apply to all major electric transmission  
11 facilities, whether AC or DC” (Response to NYRI-133), especially when they  
12 admit that they have done no studies or investigations of the issues relating to  
13 exposure to DC electric or DC magnetic fields from DC transmission lines,  
14 which would support or justify such a claim.

15  
16 **Q. DOES THE RESPONSE OF MR. DE WAAL MALEFYT ON PP. 18-22**  
17 **OF HIS TESTIMONY REGARDING HIS HISTORY OF**  
18 **MONITORING THE “HUMAN HEALTH IMPLICATIONS OF HIGH**  
19 **VOLTAGE TRANSMISSION LINES AND IN PARTICULAR, WHAT**  
20 **HAS BEEN CALLED THE “EMF ISSUE” SOLELY PERTAIN TO AC**

Case No. 06-T-0650

NYRI Witness Panel B

1           **ELECTRIC AND MAGNETIC FIELDS FROM AC TRANSMISSION**  
2           **LINES?**

3           A.    Yes and he acknowledged this in his response to NYRI-136 attached as  
4           Exhibit WHB/TGL-16.

5  
6           **Q.    IN RESPONSE TO A QUESTION ABOUT HIS REVIEW OF THE**  
7           **“HUMAN HEALTH IMPLICATIONS OF NYRI’S PROPOSED HVDC**  
8           **FACILITY” DOES MR. DE WAAL MALEFYT DISCUSS ARTICLES**  
9           **DESCRIBING    EPIDEMIOLOGICAL,    OCCUPATIONAL    AND**  
10           **ANIMAL STUDIES THAT HE HAS READ (P. 22, LINE 8 TO P. 25,**  
11           **LINE 4) THAT EXCLUSIVELY INVOLVE EXPOSURES TO AC**  
12           **ELECTRIC AND MAGNETIC FIELDS FROM AC TRANSMISSION**  
13           **LINES AND OTHER AC SOURCES?**

14           A.    Yes.

15  
16           **Q.    HAVE EITHER SCIENTIFIC OR HEALTH AGENCIES CONCLUDED**  
17           **THAT RESEARCH PERTAINING TO 60 HZ AC ELECTRIC AND**  
18           **MAGNETIC FIELDS CAN BE VALIDLY EXTRAPOLATED TO**  
19           **EVALUATE POTENTIAL EFFECTS OF DC ELECTRIC AND**  
20           **MAGNETIC FIELDS?**

Case No. 06-T-0650

NYRI Witness Panel B

1           A.    No, because it is like comparing apples and oranges. Both are fruit and are  
2                    grown on trees, but such similarities would not persuade health scientists to  
3                    study apples if we wanted to learn about the health effects of oranges.

4

5           **Q.    WHEN MR. DE WAAL MALEFYT IN HIS TESTIMONY MENTIONS**  
6                   **RESEARCH ON DC ELECTRIC AND MAGNETIC FIELDS ON P. 25,**  
7                   **LINES 9-21, DOES HE PRESENT THE FULL PICTURE OF THE**  
8                   **WHO'S EVALUATION OF ALL THE SCIENTIFIC RESEARCH?**

9           A.    No, he only quotes a section of the report that discusses epidemiologic studies  
10                   and he does not indicate, as we did above, that the WHO in that same report  
11                   concluded: "Thus, there are no recommendations for further research  
12                   concerning biological effects from exposure to static electric fields. In  
13                   addition, there is only limited opportunity for significant exposure to these  
14                   fields in the workplace or living environment and this therefore does not  
15                   warrant any epidemiological studies." The WHO clearly indicates that DC  
16                   electric fields are not a health issue based upon available evidence and that  
17                   there is little opportunity for significant exposure to these fields in either living  
18                   environments or the workplace. It should also be pointed out that DC electric  
19                   fields, unlike DC magnetic fields, are readily blocked or shielded by materials  
20                   including trees, shrubs, fences, and buildings. This further reduces the

Case No. 06-T-0650

NYRI Witness Panel B

1           likelihood of any chronic exposure to adjacent landowners from a DC  
2           transmission line.

3  
4           **Q.    IN HIS TESTIMONY DPS STAFF WITNESS MR. POWELL OF THE**  
5           **PSC STATES THAT NO INFORMATION WAS PRODUCED AT 1/3**  
6           **OCTAVE BANDS FOR AUDIBLE NOISE TO IDENTIFY THE**  
7           **PRESENCE OF PURE TONES MOST LIKELY TO RESULT IN NOISE**  
8           **COMPLAINTS.  IS THERE A NEED FOR 1/3 OCTAVE BAND**  
9           **AUDIBLE NOISE DATA FOR THE DC TRANSMISSION LINE AND**  
10          **CONVERTER STATIONS?**

11          A.    No.  Audible noise produced by DC corona on DC transmission lines and  
12          systems has an audible noise spectrum that covers the kilohertz range, but  
13          lacks pure tones.  Pure tones are most likely associated with AC power  
14          equipment not DC power equipment.  The DC convertor will be located inside  
15          a building where any audible noise would be shielded from the outside.  The  
16          ancillary AC equipment needed to bring AC power to the DC convertor and  
17          conversely deliver the power back to the AC system would be similar to the  
18          equipment in an AC substation.  The same installation and design methods  
19          would be used that are used for AC substations.

20

1           **Q.    IN THE TESTIMONY OF MR. SCOTT AND MS. YORK, THEY**  
2           **INDICATE THAT THE NYRI DC TRANSMISSION LINE MAY**  
3           **CREATE AN ELECTROMAGNETIC CORRIDOR 1750 FEET WIDE.**  
4           **DO YOU AGREE?**

5           **A.    This is a misleading statement. It appears this assertion is based on a**  
6           **calculation of the distance at which the DC magnetic field from the proposed**  
7           **NYRI DC line diminishes to 0.2 mG on either side of the line. This is a very**  
8           **low magnetic field level. This 0.2 mG level should be put in context with the**  
9           **existing magnetic field level of the earth in the vicinity of the proposed NYRI**  
10          **line. The existing magnetic field of the earth is also a DC or static field with**  
11          **an intensity of approximately 540 mG, approximately 2500 times greater. It**  
12          **appears that the focus on a 0.2 mG field comes from the potential use of**  
13          **equipment using e-beam technology such as a scanning electron beam**  
14          **microscope (SEM) or e-beam etching. Literature for some of this equipment**  
15          **may state that a magnetic field of 0.2 mG may produce effects. This effect**  
16          **may take the form of a somewhat blurred image in the case of an SEM. The**  
17          **0.2 mG listed may not specify if the concern is for an AC magnetic field or**  
18          **DC magnetic field. It is actually the change (or oscillation) in the magnetic**  
19          **field that may blur the image, thus it is the oscillating AC magnetic field that is**  
20          **of concern and not the static DC magnetic field. It is the rapid oscillation of**  
21          **an AC magnetic field that can produce blurring or fuzzing of images in SEMs**

Case No. 06-T-0650 NYRI Witness Panel B

1 (scanning electron microscopes), electron beam lithography, or other devices  
2 that use charged beams.

3

4 Background sources of AC magnetic fields within any building, including  
5 within the proposed nanotech center, from wiring, grounding, and other nearby  
6 equipment, are likely to produce AC magnetic fields exceeding 0.2 mG. To  
7 keep levels from these sources below 0.2 mG, shielding of the sensitive  
8 equipment would likely be required regardless of potential fields contributed  
9 by more distant sources such as the NYRI line. Such shielding would also  
10 reduce any variation in the ambient DC magnetic field around the equipment  
11 that might be attributable to the NYRI line.

12

13 **Q. CAN SOME SOURCES OF DC MAGNETIC FIELDS CAUSE**  
14 **INTERFERENCE TO THE TYPES OF EQUIPMENT DISCUSSED BY**  
15 **MR. SCOTT AND MS. YORK?**

16 **A.** Yes. There are some sources of DC magnetic fields such as DC-powered light  
17 rail or subway systems that produce rapid shifts in the intensity and direction  
18 of the DC field, which can affect the operation of the equipment cited by Mr.  
19 Scott and Ms. York. However, such fluctuations are not characteristic of a DC  
20 transmission line, which creates an essentially constant magnetic field over  
21 time since the load (current) on a DC line is relatively static. And, if there is a

Case No. 06-T-0650

NYRI Witness Panel B

1 change in the DC line load, it would normally occur slowly over minutes,  
2 unlike the rail/subway sources described.

3

4 **Q. WOULD AN AC TRANSMISSION LINE POTENTIALLY PRODUCE**  
5 **GREATER INTERFERENCE TO THE EQUIPMENT USING E-BEAM**  
6 **TECHNOLOGY THAN A DC TRANSMISSION LINE?**

7 A. Yes. An AC transmission line produces an oscillating AC magnetic field.  
8 Since the magnetic field is oscillating 60 times per second it will have more of  
9 an effect on e-beam equipment than a static DC magnetic field of the same  
10 peak level.

11

12 **Q. WOULD THE MAGNETIC FIELD LEVEL PRODUCED BY AN AC**  
13 **TRANSMISSION LINE FOR A CORRIDOR OF 1750 FEET BE LESS**  
14 **THAN THE PROPOSED NYRI DC TRANSMISSION LINE?**

15 A. No. In fact, a 345kV AC transmission line designed to carry the same amount  
16 of power as the proposed DC transmission line would produce an AC  
17 magnetic field greater than 0.5 mG at the edges of a 1750-foot corridor. The  
18 AC magnetic field would be oscillating 60 times per second instead of being a  
19 DC magnetic field and relatively static.

20

Case No. 06-T-0650 NYRI Witness Panel B

1 Q. MR. QUIMBY AND MR. SCHROM PROPOSE IN THEIR  
2 TESTIMONY (EXHIBIT 1, PROPOSED CERTIFICATE CONDITIONS  
3 ¶20) THAT THE LINE SHOULD BE DESIGNED SUCH THAT A  
4 TRUCK CAN BE DRIVEN UNDERNEATH THE LINE ALONG THE  
5 LENGTH OF THE LINE. PLEASE COMMENT ON THIS PROPOSAL.

6 A. No technical basis for this proposal was provided by these witnesses.  
7 However, if one assumes that there is a road under the entire length of the line,  
8 then for the proposed NYRI DC line to comply with the NESC (National  
9 Electric Safety Code), a minimum clearance to ground of 32 feet at the point  
10 of maximum conductor sag would need to be demonstrated. All of the DC  
11 line designs considered by NYRI have a minimum clearance to ground for the  
12 conductors that meet or exceed this minimum value. In this regard, in meeting  
13 the NESC clearance requirement, the NYRI line is designed so that a truck  
14 could be driven underneath the line along its entire length.

15  
16 Q. IS THE CONCERN OF MR. QUIMBY AND MR. SCHROM ABOUT  
17 THE CLEARANCE OF THE NYRI LINE OVER A TRUCK  
18 UNDERNEATH A MISAPPREHENSION BASED UPON THE  
19 INCORRECT APPLICATION OF A GUIDELINE FOR AN AC  
20 TRANSMISSION LINE TO A DC TRANSMISSION LINE?

21 A. Yes, it would appear so.

Case No. 06-T-0650

NYRI Witness Panel B

1           **Q.    WOULD A CLEARANCE ABOVE GROUND OF 32 FEET BE**  
2                   **APPROPRIATE FOR AN EQUIVALENT VOLTAGE AC**  
3                   **TRANSMISSION LINE?**

4           A.    No. The clearance for an AC transmission line would have to be higher.  
5                   Unlike a DC line, the determination of the appropriate clearance for a truck  
6                   underneath an AC high voltage line requires consideration of both the strength  
7                   of the AC electric field and the size of the vehicle.

8

9           **Q.    WHY IS THAT?**

10          A.    An AC electric field will induce a continuous AC current in a conductive  
11                  object under the line such as a vehicle. An additional clearance height is  
12                  required of high voltage AC lines in order to insure that the AC electric field  
13                  does not induce a current of more than  $5\text{mA}_{\text{rms}}$  on the largest anticipated  
14                  vehicle under the line, such as a semi-trailer truck. This additional clearance  
15                  distance for AC lines is described in the Article 232 C.1.c of the (NESC, 2007  
16                  attached as Exhibit WHB/TGL-17.

17

18          **Q.    DOES THE NESC ARTICLE 232 C.1.C APPLY TO DC**  
19                  **TRANSMISSION LINES?**

20          A.    No.

21

1           **Q.    WHAT MINIMUM LINE HEIGHT ABOVE GROUND WOULD BE**  
2                   **REQUIRED FOR AN AC LINE WITH A VOLTAGE EQUIVALENT**  
3                   **TO THAT USED ON THE DC LINE?**

4           A.    This can be estimated in the following way.  First, determine what the AC  
5                   electric field would be limited to based on the largest vehicle anticipated under  
6                   the line.  Using a semi-trailer truck 55 feet long by 8 feet wide and 12.5 feet  
7                   high as the largest anticipated vehicle under the line, the AC electric field from  
8                   an overhead AC transmission line would have to be less than approximately  
9                   6.6 kV/m in order to keep the induced current on the truck to  $5\text{mA}_{\text{rms}}$  or less.

10  
11                   Second, determine the AC line voltage that would be equivalent to the DC  
12                   line.  An equivalent AC line voltage to be considered for line clearance  
13                   purposes would be a 400kV waveform-crest voltage to ground.  This would  
14                   produce an AC voltage of  $400\text{kV}/\sqrt{2}$  or  $283\text{ kV}_{\text{rms}}$  phase to ground.  A  
15                   490kV 3-phase AC transmission line would produce this phase-to-ground AC  
16                   voltage.

17  
18                   Third, the final step would be to determine the minimum line height for a  
19                   490kV 3-phase AC line design that would keep the maximum electric field  
20                   found under the line to 6.6 kV/m or less.  For a 500kV 3-phase line in a  
21                   horizontal H-frame configuration with a 34-foot phase spacing, the line height

1 required to maintain the maximum electric field under the line to 6.6 kV/m or  
2 less is approximately 45 feet.

3  
4 This example illustrates why compliance with the NESC for the comparison  
5 above would require that the conductors of an AC transmission line be at least  
6 12 feet higher than for the proposed NYRI DC line.

7  
8 **Q. MR. BAILEY AND MR. LIVERNOIS, DOES THIS CONCLUDE YOUR**  
9 **REBUTTAL TESTIMONY?**

10 A. Yes.

11

12 **III. NOISE IMPACTS**

13 **Q. ON PAGE 19 OF HIS DIRECT TESTIMONY, DPS STAFF WITNESS**  
14 **POWELL RECOMMENDS THAT NYRI UNDERTAKE A**  
15 **PRECONSTRUCTION ASSESSMENT MEASURING THE AMBIENT**  
16 **SOUND LEVELS AT EACH CONVERTER STATION COMBINED**  
17 **WITH THE EQUIPMENT SOUND LEVEL INFORMATION AND**  
18 **PROPOSED CONVERTER STATION DESIGN AND NECESSARY**  
19 **ACOUSTICAL MITIGATION TO DEMONSTRATE THAT STATION**  
20 **OPERATION WILL NOT RESULT IN SOUNDS LEVELS THAT ARE**

1           **SUFFICIENT TO PRODUCE COMPLAINTS. DO YOU AGREE WITH**  
2           **THIS RECOMMENDATION?**

3           A.   NYRI proposes to undertake ambient sound level measurements at each  
4           converter station during development of the EM&CP. Using this ambient data  
5           and noise data that will be provided by the manufacturers selected to provide  
6           the converter station transformers and any other noise generating equipment  
7           that will be located in the converter station, NYRI will undertake the necessary  
8           study to determine what, if any, noise mitigation will be necessary at each of  
9           the converter stations to meet regulatory/governmental noise regulations and  
10          will incorporate those mitigation measures into the project's design. The noise  
11          study will be submitted with the EM&CP.

12  
13   **IV. PIPELINE IMPACTS**

14          **Q.   SHOULD THE PSC ADOPT DPS STAFF WITNESS QUIMBY'S**  
15          **PROPOSAL, SET FORTH ON PAGE 12 OF HIS TESTIMONY, THAT**  
16          **THERE ARE ADDITIONAL STUDIES THAT NEED TO BE DONE TO**  
17          **EVALUATE THE FAULT CURRENT EFFECTS OF NYRI'S**  
18          **TRANSMISSION LINE GOING PAST GAS LINES?**

19          A.   No. An evaluation of fault current effects of the NYRI transmission line on  
20          pipelines was studied and presented in Attachment D of Appendix P titled:  
21          *New York Regional Interconnection: Regional Pipeline Compatibility.* As

Case No. 06-T-0650

NYRI Witness Panel B

1           stated in the conclusion of that report “only a dc fault current that arises from  
2           infrequent, short circuits from one pole to ground would be large enough to  
3           potentially interfere with the pipeline. The fault current and any interference  
4           produced, however, are of extremely short duration.”

5  
6           Ground fault currents associated with a DC transmission line are typically  
7           significantly lower than for an AC system. Further, any effect on the pipeline  
8           from a ground fault will be of shorter duration for a DC line compared to an  
9           AC line. DC ground faults are typically cleared in a few milliseconds while  
10          AC ground fault clearing takes significantly longer due to the mechanical  
11          action required in order for circuit breakers to open. Further, any interactions  
12          during the brief duration of fault current are not expected to cause any adverse  
13          effects on the pipeline. (see page 9 of report)

14  
15          Finally, pipeline systems typically utilize protection such as cathodic  
16          protection systems and costings that are designed to protect a pipeline from the  
17          effects of nearby transmission lines. While pipeline companies may choose to  
18          evaluate their protection system after a route is certified, no further studies  
19          need to be done to evaluate the potential effects of fault current from the NYRI  
20          transmission line on nearby pipelines.

21

1           **Q.    ON PAGE 3 OF HIS DIRECT TESTIMONY, DPS STAFF WITNESS**  
2                   **STOLICKY STATES THAT DEPENDING ON THE ROUTE**  
3                   **SELECTED, THE NYRI TRANSMISSION LINE WILL GREATLY**  
4                   **IMPACT THE MILLENNIUM PIPELINE LLC ROW, AS WELL AS**  
5                   **CROSS NUMEROUS OTHER TRANSMISSION AND DISTRIBUTION**  
6                   **PIPELINES. DO YOU AGREE WITH THIS ASSERTION?**

7           **A.    No. The impacts discussed in DPS Staff Witness Stolicky's testimony are**  
8                   those associated with heavy equipment crossings of buried pipeline and  
9                   blasting near pipelines. Design standards to safely cross buried pipelines with  
10                  heavy equipment and to safely blast in proximity to buried pipelines are well  
11                  understood and routinely implemented. His characterization of "greatly  
12                  impact" would only occur if the actions NYRI has agreed to undertake with  
13                  Millennium were not undertaken. However, NYRI has already agreed to  
14                  actions to minimize potential impacts associated with heavy equipment  
15                  crossings and blasting with Millennium. Therefore, Mr. Stolicky's  
16                  characterization that the NYRI transmission line will greatly impact the  
17                  Millennium Pipeline is not accurate.

18

19           **Q.    SHOULD THE PSC ADOPT DPS STAFF WITNESS STOLICKY'S**  
20                   **RECOMMENDATION ON PAGE 5 OF HIS DIRECT TESTIMONY**

1           **THAT NYRI SHOULD REIMBURSE PIPELINE OPERATORS FOR**  
2           **THE REASONABLE COST TO PERFORM LEAKAGE SURVEYS?**

3           A.   No. Pipeline companies routinely perform leakage surveys. In areas where  
4           blasting occurs, if any, a pipeline company would likely only advance a  
5           previously scheduled leakage survey. As such, it would be unreasonable to  
6           expect NYRI to pay for it.

7  
8           **Q.   SHOULD THE PSC ADOPT DPS STAFF WITNESS STOLICKY'S**  
9           **RECOMMENDATION THAT NYRI EVALUATE ALL INSTANCES**  
10          **WHERE TRANSIENT CURRENT COULD IMPACT PIPELINE**  
11          **FACILITIES AND INSTITUTE MITIGATION EFFORTS TO KEEP**  
12          **SUCH AN INCIDENT FROM OCCURRING?**

13          A.   No. Transient currents seen by a pipeline are typically from one of two  
14          sources: a lightning strike or a ground fault on a nearby electric transmission  
15          line. In either case the duration of the transient current and any potential  
16          impact is extremely short. This has been evaluated and presented in  
17          Attachment D of Appendix P titled: *New York Regional Interconnection:*  
18          *Regional Pipeline Compatibility*. The nature of these types of transient  
19          currents are well understood and pipelines are routinely protected from the  
20          effects of such currents. While pipeline companies may reevaluate their

Case No. 06-T-0650

NYRI Witness Panel B

1 protection in light of the certified route, no further studies by NYRI are  
2 warranted.

3

4 **Q. ON PAGES 6-7 OF HIS DIRECT TESTIMONY, DPS STAFF WITNESS**  
5 **STOLICKY STATES THAT IF PART OF THE NYRI SYSTEM FAILS,**  
6 **WHETHER IT OCCURS AT ONE POLE OR BOTH CONDUCTORS**  
7 **FALL TO GROUND, IT IS POSSIBLE THAT THE FAULT CURRENT**  
8 **FROM A MONO POLE OPERATION COULD CAUSE CURRENT TO**  
9 **FLOW TO GROUND. DO YOU AGREE WITH THIS ASSERTION?**

10 A. If there is a ground fault on the NYRI system, from whatever cause, current  
11 will flow to ground until it is interrupted by the transmission line protection  
12 system. This typically takes a fraction of a second. Once the current is  
13 interrupted, it no longer flows to ground.

14

15 **Q. ON PAGE 7 OF HIS DIRECT TESTIMONY, DPS STAFF WITNESS**  
16 **STOLICKY RECOMMENDS THAT NYRI PERFORM A STUDY**  
17 **THAT ANALYZES ALL POSSIBLE INSTANCES WHERE A FAULT**  
18 **ON ITS SYSTEM COULD IMPACT A BURIED PIPELINE. IS THIS**  
19 **NECESSARY?**

20 A. No, it is not, for the reasons stated above regarding Mr. Quimby's  
21 recommendation.

1           **Q.    ON PAGE 7 OF HIS DIRECT TESTIMONY, DPS STAFF WITNESS**  
2           **STOLICKY STATED THAT NYRI SHOULD TAKE PRECAUTIONS**  
3           **TO AVOID A FAULT ON ITS SYSTEM FROM JUMPING ON TO A**  
4           **BURIED PIPELINE. IN ADDITION, HE STATES THAT IF A FAULT**  
5           **REACHES A PIPELINE, THERE IS THE LIKELIHOOD OF A**  
6           **CATASTROPHIC INCIDENT OCCURRING. DO YOU AGREE WITH**  
7           **THIS ASSERTION?**

8           **A.    No. It is not clear how a fault current of dangerous magnitude would reach the**  
9           **pipeline. NYRI has agreed to place the DC line at least 100 feet away from**  
10          **the pipeline and has agreed with Millennium to confirm this separation**  
11          **distance at its request as a precautionary measure.**

12  
13          The DC line conductors cannot make physical contact with the underground  
14          pipeline. However, if an energized conductor were to contact the ground  
15          underneath the conductor or a DC transmission line tower, the fault current  
16          density would be greatly diminished due to dispersion through the earth before  
17          it reached the pipeline, and the fact that the pipeline is physically larger than  
18          the DC transmission line conductor. In addition, a ground fault would be  
19          detected and mitigated in a fraction of second as a result of the DC  
20          transmission line fault protection system. For a catastrophic event to occur as  
21          Mr. Stolicky speculates, would require two improbable and independent

Case No. 06-T-0650 NYRI Witness Panel B

1 failures; namely, a leak in the pipeline and a DC line ground fault in close  
2 proximity to each other. The probability of these events occurring  
3 simultaneously is vanishingly small.  
4

5 **Q. ARE THERE ELECTRICAL AND SAFETY IMPACTS OF LOCATING**  
6 **THE NYRI PROJECT ADJACENT TO THE MILLENNIUM PIPELINE**  
7 **THAT CANNOT BE ADDRESSED OR MITIGATED DURING THE**  
8 **DETAILED DESIGN OF THE PHASE OF THE PROJECT?**

9 **A.** No, the electrical and safety impacts of locating the NYRI project adjacent to  
10 the Millennium Pipeline can be addressed or mitigated during the detailed  
11 design of the phase of the project.

12 NYRI has already agreed to the proposed Millennium Certificate conditions.  
13 The additional studies referred to on pages 14-15 (as described in Exponent  
14 report) will be undertaken during detailed design and presented in EM&CP.  
15

16 **V. TRANSPORTATION IMPACTS**

17 **Q. ON PAGE 28-29 OF HIS DIRECT TESTIMONY, DPS STAFF**  
18 **WITNESS POWELL RECOMMENDS THAT NYRI DEVELOP A**  
19 **PLAN TO BE FILED WITH THE EM&CP FOR ADDRESSING THE**  
20 **IMPACT OF ITS TRANSMISSION FACILITY CONSTRUCTION ON**  
21 **LOCAL AND STATE ROADS. IN ADDITION, DPS RECOMMENDS**

Case No. 06-T-0650

NYRI Witness Panel B

1           **THAT NYRI SUBMIT A DETAILED TRAFFIC CONTROL PLAN. DO**  
2           **YOU AGREE WITH THIS RECOMMENDATION?**

3           A.    Yes.    During development of the EM&CP, NYRI will develop a detailed  
4           traffic control plan for each road crossing and access road point of intersection  
5           showing the traffic control measures to be employed at each location as well  
6           as any site specific requirements. The plan will vary with the type of roadway  
7           and nature of work at the site. The plan will show, for example, work zone,  
8           location and type of signage, location of any needed flag persons, need for  
9           any shoulder or lane closures, and any other NYSDOT or local highway  
10          department requirements. The traffic control plans will be submitted with the  
11          EM&CP.

12

13          **Q.    DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?**

14          A.    Yes.

15

16          J:\DATA\Client4 11825-12199\12010\Rebuttal\Rebuttal Testimony FINAL\Panel B Rebuttal 022809.doc

1 BY MR. SINGER:

2 Q Gentlemen, are there a number of exhibits  
3 attached to the rebuttal testimony of Panel B? Actually  
4 there's 17 exhibits?

5 A (Panel) Yes.

6 Q Those exhibits have been marked for  
7 identification as Exhibits 238 through 254. Gentlemen,  
8 were those exhibits prepared by you or under your  
9 supervision?

10 A (Panel) Yes.

11 Q Thank you.

12 MR. SINGER: The witnesses are available for  
13 cross-examination.

14 JUDGE PHILLIPS: Who has cross for this panel?  
15 And can you tell me about how much each starting with  
16 CARI?

17 MR. KLUCSIK: I would estimate an hour, Your  
18 Honor.

19 JUDGE PHILLIPS: Okay. And Staff?

20 MR. BLOW: An hour-and-a-half perhaps, maybe a  
21 bit more.

22 JUDGE PHILLIPS: Anyone else? NYPA?

23 MR. MALONE: Yes, Your Honor. Fifteen minutes.

24 JUDGE PHILLIPS: And AG?

1 MS. LEARY: Fifteen.

2 JUDGE PHILLIPS: And DEC?

3 MS. WILKINSON: Your Honor, there are just two  
4 documents that I would like entered into the record for  
5 this panel if that's possible, and then I don't think I  
6 have cross-examination.

7 JUDGE PHILLIPS: All right. Does anyone want  
8 to go first? Where is the enthusiasm? Why don't we  
9 start with DEC then. Are you prepared?

10 MS. WILKINSON: Your Honor, the two documents  
11 that I would like marked are assessing and mitigating  
12 noise impacts, that's DEC's noise policy, which is  
13 referenced in the application I believe Appendix Q. And  
14 the second is DPS 117, an interrogatory by Mr. Davis  
15 regarding converter station noise.

16 JUDGE PHILLIPS: Okay. We'll mark them -- the  
17 next available numbers actually are 259 and 260. There  
18 are some in between, yes.

19 MS. WILKINSON: Okay. Which one will be which?

20 JUDGE PHILLIPS: The first one you mentioned  
21 will be 259, and the second one will be 260.

22 (Exhibits 259 and 260 marked for  
23 identification.)

24 JUDGE STOCKHOLM: Counselor, you want to lay a

1 foundation for these documents with the witnesses?

2 MS. WILKINSON: Sure. I'm not sure who to  
3 direct the question to, but I believe in the -- the  
4 document I'm referring to is the -- I believe it's  
5 Appendix Q of the application, "Estimation of predicted  
6 sound levels from the northern and southern converter  
7 stations", on page 4 of that document.

8 And the paragraph 2.1 states "Noise regulations  
9 references the New York State Department of  
10 Environmental Conservation program policy entitled  
11 "Assessing and Mitigating Noise Impacts." Anyone from  
12 the panel?

13 MR. WOOD: Yes, it's there. Yes.

14 MS. WILKINSON: And the policy which has been  
15 marked as Exhibit 259, is that the document that you  
16 were referring to?

17 MR. WOOD: We didn't get a copy.

18 MS. WILKINSON: I apologize.

19 MR. BLOW: Your Honor, I believe Appendix Q is  
20 Exhibit 31.

21 MS. WILKINSON: Exhibit 31.

22 JUDGE STOCKHOLM: Thank you.

23 MR. WOOD: Okay. We have them now.

24 MS. WILKINSON: And I just want to confirm

1 that's the document that you were referencing?

2 MR. WOOD: Yes. Yes, it is.

3 MS. WILKINSON: And is that sufficient, Your  
4 Honor?

5 JUDGE STOCKHOLM: Yes.

6 MS. WILKINSON: As to Exhibit 260, which is  
7 DPS-117, and was that response prepared by Panel B?

8 MR. WOOD: Yes, it was.

9 MS. WILKINSON: Sufficient?

10 JUDGE PHILLIPS: Thank you. I guess we're  
11 moving to AG.

12 MS. LEARY: Your Honor, I would actually prefer  
13 that CARI go first because I won't -- I believe I will  
14 have few, if any, questions following their cross, if  
15 that's acceptable.

16 JUDGE PHILLIPS: They're nodding yes. So we'll  
17 start with CARI.

18 MR. KLUCSIK: Thank you, Your Honor.

19 CROSS-EXAMINATION

20 BY MR. KLUCSIK:

21 Q Supplemental filing February 2008, Section 4.17  
22 addresses electric and magnetic fields, correct?

23 A (Bailey) Yes.

24 Q Mr. Livernois, were you involved in the

1 preparation of Section 4.17?

2 A (Livernois) Yes, I was.

3 Q Could you briefly describe that involvement for  
4 us?

5 A (Livernois) Engineers working under my  
6 supervision used well-known field calculation software  
7 and calculates magnetic field audible noise, ion field  
8 densities, things of that nature to characterize the  
9 fields and those parameters that would be generated by  
10 the proposed design of the transmission lines at the  
11 time we did the report.

12 Q Were you similarly involved in the preparation  
13 of Appendix G including the study entitled "Electric and  
14 Magnetic Fields, Ions, Audible Noise and Radio Noise"  
15 dated November 2007?

16 A (Livernois) Yes, that's correct.

17 Q And were you similarly involved in the  
18 preparation of the study referenced therein and also  
19 referenced in Appendix G entitled "Regional Railroad  
20 Compatibility"?

21 A (Livernois) Yes, that's correct.

22 Q As part of the analysis presented in Appendix  
23 G, did you measure ambient audible noise along the  
24 proposed route?

1           A       (Livernois) Measurements of the audible noise  
2 along the proposed route were not performed.

3           Q       How about along any of the NYRI proposed  
4 alternate routes?

5           A       (Livernois) We did not do ambient field or  
6 audible noise measurements for this report.

7           Q       And that applies to both the northern and  
8 southern converter locations?

9           A       (Livernois) Yes, that's correct.

10          Q       Is it correct that the proposed transmission  
11 line in some segments is directly over active railroad  
12 tracks?

13          A       (Livernois) Under the current proposed route,  
14 that is correct, in some segments.

15          Q       And are there conditions in which the DC line  
16 could produce interference with railroad communication  
17 signaling systems?

18          A       (Livernois) We evaluated the -- the commonly  
19 used systems. And our analysis showed that -- that  
20 while RF noise is generated by the corona field of a  
21 high-voltage DC line, there are numerous established  
22 effective mitigation techniques should the interference  
23 levels rise to the point where they were an issue. So  
24 the physics of it is that noise is produced, but that it

1 is a solvable technical problem.

2 Q And that description would apply to the power  
3 line under normal operations; is that correct?

4 A (Livernois) That's correct.

5 Q Are there non-normal conditions under which  
6 that description would not apply?

7 A (Livernois) Given that non-normal conditions of  
8 this line -- fault conditions of this line are detected  
9 typically in a fraction of a second, it's not  
10 anticipated that communications would be significantly  
11 or even really affected at all by -- by a short fault  
12 condition on this line.

13 Q Would ground faults be among those conditions  
14 that would be -- that would have the potential to  
15 disrupt railroad signaling or railroad communications?

16 A (Livernois) I believe the ground fault  
17 situation would fall under the description I just gave  
18 because they last for such a short time before they're  
19 detected and -- and shut down.

20 Q And is there a circumstance involving  
21 unbalanced railroad ballast resistance that would also  
22 fall in that category?

23 A (Livernois) It would depend on a specific  
24 configuration, but that is something we looked at at a

1 high level. And given the existence of high-voltage  
2 transmission lines that are used throughout this country  
3 and around the world, these problems have been looked  
4 at. And so it's sort of a case-by-case review.

5 Q But they do occasionally occur?

6 A (Livernois) There are cases where they occur,  
7 and then they are able to be mitigated.

8 Q Are the mitigation steps proposed for such  
9 circumstances described in the application?

10 A (Livernois) I can speak to what we put in the  
11 report. And in the report, we describe that mitigation  
12 methods exist, and that if there is a situation along  
13 the proposed route where an issue arises, that can be  
14 addressed at the detail level. When we did this  
15 analysis, we did not have a detailed system designed,  
16 and so it -- it would not be an analysis we could have  
17 done.

18 Q So your report does not include a description  
19 of that mitigation?

20 A (Livernois) It includes a high-level  
21 description of mitigation techniques that are used, but  
22 as far as specific locations along this proposed route,  
23 we didn't look at those.

24 Q Or specific means I gather?

1           A           (Livernois) In the detailed design level, we  
2 did not.

3           Q           Am I correct in the understanding that the  
4 proposed line would affect AM radio reception on the  
5 transmission line right-of-way?

6           A           (Livernois) There would be some AM stations  
7 depending on the location of the transmitter that would  
8 be affected by the existence of the RF noise generated  
9 by the high-voltage line. It would be very similar to  
10 what we see on countless AC lines and DC lines. For a  
11 strong AM station, it would not typically be affected to  
12 the point where you could not hear it and listen to it.  
13 For a weaker AM station, it could interfere with the  
14 signals/noise ratio so that you would hear popping and  
15 cracking on the reception end.

16          Q           And that effect would occur, for example, where  
17 a road is under the power line? Is that a likely  
18 scenario?

19          A           (Livernois) That is a likely scenario.

20          Q           You mentioned the signal-to-noise ratio. Is  
21 radio interference often characterized by that  
22 signal-to-noise ratio?

23          A           (Livernois) Yes, it is.

24          Q           And the signal part of the signal-to-noise

1 ratio, that would be the radio broadcast signal strength  
2 at the location of the radio receiver; is that correct?

3 A (Livernois) That's correct.

4 Q And the noise part of the signal-to-noise  
5 ratio, that would be the level of radio frequency noise  
6 produced in this case, for example, by the transmission  
7 line; is that correct?

8 A (Livernois) In, for example, the AM reception  
9 band, yes. A receiver can only pick up a small window  
10 of noise that's out there, but -- but in general, your  
11 description is correct.

12 Q So in order to understand the potential for  
13 radio interference and, in fact, to calculate the  
14 signal-to-noise ratio, you need both values, don't you,  
15 the broadcast strength and the radio frequency strength  
16 of the power line?

17 A (Livernois) Yes. If a detailed map of AM  
18 stations along the proposed route were done, you'd be  
19 able to better quantify what the signal-to-noise ratio  
20 would be as a result of this line. And we did not do  
21 that.

22 Q NYRI set a target radio frequency noise level  
23 for its transmission line design; is that correct?

24 A (Livernois) I believe that's correct. Our

1 approach was to analyze the proposed design and not  
2 necessarily try and implement design targets, so.

3 Q Did you measure AM radio broadcast signal  
4 strength along the proposed route?

5 A (Livernois) I did not. We did not do that. I  
6 would add, in my professional career, I've done that a  
7 number of times, and so I'm familiar with the process  
8 and what it would tell us as I described earlier.

9 Q And did you do any such measurement along any  
10 alternate route proposed by NYRI?

11 A (Livernois) We did not do any AM station signal  
12 strength mapping.

13 Q Did you contact any AM radio station with  
14 respect to broadcast radio signal strength along the  
15 proposed route?

16 A (Livernois) I do not believe we contacted  
17 specific stations. There are handbooks out there that  
18 talk about estimated receiving areas and signal  
19 strengths for AM stations. That information is  
20 available.

21 Q Did you contact any radio stations with respect  
22 to broadcast radio signal strength along any of NYRI's  
23 proposed alternate routes?

24 A (Livernois) We did not. I -- just to clarify,

1 you're referring to AM radio stations?

2 Q Yes. AM radio stations.

3 A (Livernois) Okay. We did not contact AM radio  
4 stations.

5 Q Do you know how many residents live within a  
6 quarter mile of the proposed route along its length?

7 A (Livernois) I do not know the number of  
8 residents that live in that range.

9 Q Would you be willing to agree with me that  
10 there are residents who live within a quarter mile of  
11 the line?

12 A (Livernois) My understanding is that there are  
13 residential areas through which the line passes.

14 Q Would it be reasonable to assume that virtually  
15 all of the residents located within a quarter mile of  
16 the line own an AM radio receiver?

17 MR. SINGER: I object to that. I don't see how  
18 that's relevant or how the witness could even answer  
19 that question.

20 JUDGE STOCKHOLM: Well, I'm not so sure it  
21 isn't relevant, but how this -- how these witnesses  
22 could possibly answer that question, I agree with it.  
23 I'll sustain the objection.

24 MR. KLUCSIK: Let me ask it another way then

1 perhaps.

2 Q Do you believe it would be a reasonable  
3 assumption to assume that residents along the power line  
4 route own an AM radio receiver?

5 MR. SINGER: I think we would stipulate that  
6 there are some residents that may own an AM radio  
7 receiver.

8 JUDGE STOCKHOLM: Yes. And -- and beyond  
9 "some", we could quibble, perhaps, over a word "many".  
10 I don't think we're going to get any more accurate  
11 definition of who has an AM receiver and who doesn't  
12 along the line.

13 MR. KLUCSIK: I'm prepared to move on, Your  
14 Honor.

15 Q Mr. Livernois, does Section 4.17.1 of Appendix  
16 G describe the existing conditions along the proposed  
17 transmission route in terms of electric and magnetic  
18 fields?

19 A (Livernois) That's on page 135 of Exhibit 4?

20 Q I believe that's correct.

21 A (Livernois) Those paragraphs describe that  
22 portion of the country and of the State of New York of  
23 what the ambient conditions are.

24 Q Does Section 4.17.1 of Appendix G describe the

1 existing conditions along any alternative route proposed  
2 by NYRI in terms of electric and magnetic fields?

3 A (Livernois) My -- my understanding of these  
4 paragraphs are that this covers the -- the ambient  
5 environments in a general level for the proposed route  
6 and alternative routes.

7 Q Does any other portion of the application  
8 describe the existing conditions along any alternate  
9 route proposed by NYRI in terms of electric and magnetic  
10 field?

11 A (Livernois) I believe this covers our -- our  
12 look at that.

13 Q Did you measure the existing magnetic field  
14 strength anywhere along the proposed route?

15 A (Livernois) We did not do ambient field  
16 measurements along the proposed route or the alternative  
17 proposed route.

18 Q Did you measure the existing electric field  
19 strengths anywhere along the proposed route?

20 A (Livernois) We -- we didn't measure. However,  
21 we did calculate with -- to an accurate level the  
22 existing AC fields that are in portions of the proposed  
23 route that are generated by the 115 kV AC lines that are  
24 located along the proposed route. So we have an

1 understanding of what some of the higher ambient field  
2 levels are in that -- on portions of the proposed route.

3 Q Would it be accurate to say that those  
4 calculations used as their starting point the general  
5 treatment of magnetics field strength in New York  
6 generally?

7 A (Livernois) Well, portions of the ambient field  
8 calculations are what you described, and then along  
9 specific areas we know that there are 115 kilovolt AC  
10 60-hertz lines, and we also calculated the fields due to  
11 those with the existing tower conditions and things. So  
12 although we didn't measure them, we have accurate values  
13 based on our calculations.

14 Q And where did you --

15 JUDGE STOCKHOLM: Excuse me, counselor. Did  
16 you do any calculations with regard to the ambient  
17 fields around Marcy South's 345 kV line?

18 MR. LIVERNOIS: Yes, we did.

19 Q And where did the information upon which those  
20 calculations are based come from?

21 A (Livernois) I believe the configurations were  
22 provided to us by NYRI.

23 Q Do you have an understanding of how NYRI came  
24 to know the values associated with the existing power

1 lines?

2 A (Livernois) I would defer to NYRI  
3 representatives to answer that. We accepted them as  
4 being accurate and we worked from that point on.

5 Q Mr. Livernois, did you calculate the DC  
6 magnetic field strength produced by equipment within the  
7 converter stations?

8 A (Livernois) Our analysis focused on the  
9 transmission line configurations themselves. So we did  
10 not do calculations inside the converter station.

11 Q Would there be equipment inside the converter  
12 stations that create magnetic fields?

13 A (Livernois) Yes, there would be. However, the  
14 levels would be equal to or less than the fields  
15 generated by the lines just because of the localized  
16 nature of a converter station. The transmission line  
17 spans 190 miles, so it basically has an opportunity to  
18 establish a magnetic field, whereas a converter station  
19 is sort of a localized source, so the fields from that  
20 wouldn't be any greater than the DC line, near the  
21 converter station.

22 Q But you didn't do any calculations to confirm  
23 that?

24 A (Livernois) No. We did literature research

1 and -- and, you know, our understand was as I just  
2 described.

3 Q Will the northern converter station obtain AC  
4 power from Niagara Mohawk's existing Edic substation?

5 A (Livernois) That's my understanding based on  
6 the analysis that we did.

7 Q And the northern converter station includes  
8 thyristor valves; is that correct?

9 A (Livernois) Yes, that's correct.

10 Q And these thyristors rectify a portion of the  
11 AC wave form of that incoming AC current; is that  
12 correct?

13 A (Livernois) That's correct.

14 Q And this is part of the process of converting  
15 AC current to DC current, correct?

16 A (Livernois) Correct.

17 Q The conversion of AC to DC current can result  
18 in oscillating currents on the DC side of the AC to DC  
19 converter; is that correct?

20 A (Livernois) That's correct. Typically with the  
21 system that's proposed, there are going to be integral  
22 multiples of the twelfth harmonic of a 60-hertz  
23 switching process in the converter station, so there  
24 would be 720, and then three times that and, you know,

1 two times that. But I would add that there are very  
2 well-known filtering and mitigation techniques so that  
3 these harmonics do not get out on the high-voltage  
4 lines. There's many ways to do it.

5 Q Well, let me make sure I understand your  
6 earlier description. The oscillating currents on the DC  
7 side of the converter are essentially alternating  
8 current artifacts of the AC to DC conversion; is that  
9 correct?

10 A (Livernois) Without filtering, you will have AC  
11 harmonics on the DC side of the converter station.  
12 However, in virtually every high-voltage DC line,  
13 filtering is -- is put across those DC lines in the  
14 neutral so that the harmonics do not make it out on to  
15 the line. If you take the filtering away, they can get  
16 out on the line, but with the filtering there, they  
17 don't.

18 Q And are these AC artifacts that could find  
19 their way on to the DC side of the line, can they be a  
20 source of oscillating magnetic field?

21 A (Livernois) Well, I would -- I would first  
22 reply by saying they won't get out on the line, but if  
23 the filtering was removed or found to not appropriately  
24 mitt -- or dissipate the harmonics, then they could get

1 out on the high-voltage DC line. It would be very easy  
2 to pick them up and identify them and go back and modify  
3 the filters so that they did not get out.

4 Q Does the application as it stands today  
5 identify any such filter?

6 A (Livernois) My understanding of the application  
7 is that the detailed design level of the actual filters  
8 on the converter stations are not final. I would add  
9 that you'd -- you could go to virtually any high-voltage  
10 DC converter station and find filters that are effective  
11 at suppressing these harmonics. But we did not analyze  
12 the effect of those filters in our analysis. However,  
13 we do know that effective filtering designs exist.

14 JUDGE PHILLIPS: If you could please use your  
15 microphone.

16 A (Pichardo) If you refer to the Appendix B, the  
17 one-line diagram Figure E-2.1 on the application, they  
18 show in this converter station two AC filters.

19 Q So they identify the presence of AC filters,  
20 but they do not describe the frequency or their  
21 harmonics or other details at which they would operate;  
22 is that correct?

23 A (Pichardo) Yes. They also identify some of the  
24 many harmonic that we expecting on the system,

1 particularly -- I mean, we're talking about the 11  
2 harmonic, the 13 harmonic, the high pass harmonic.

3 Q Mr. Pichardo, let me interrupt you to ask for  
4 that citation one more time. I'd like to look at the  
5 diagram as you describe it.

6 A (Pichardo) Certainly. It's Figure E, as in  
7 echo, 2.1.

8 Q In Exhibit E, E-1?

9 A (Pichardo) E-2.

10 Q I'm sorry. E-2.

11 A (Pichardo) Excuse me. Will be the Appendix R.

12 Q A different book.

13 I'm now in Appendix R. Okay. We're getting  
14 closer. Your reference again, please?

15 A (Pichardo) The figure number is E-2.1.

16 JUDGE STOCKHOLM: Okay. I'm looking at a  
17 document entitled "Appendix B, New York Regional  
18 Interconnection single-line diagram." Is that the  
19 document that the witness is referring to?

20 MR. PICHARDO: Yes, sir. Yes, Your Honor.  
21 Yes, Your Honor.

22 MR. SINGER: Your Honor, Appendix B of which  
23 document?

24 JUDGE STOCKHOLM: That's a -- that's a very

1 good question. It's toward the end. It's probably in  
2 the last 15 percent of Appendix R. And --

3 MR. KLUCSIK: Mr. Pichardo, Figure E-2.1?

4 MR. PICHARDO: Yes, sir.

5 MR. KLUCSIK: Single-line diagram.

6 Your Honor --

7 JUDGE STOCKHOLM: One -- one second, counselor.  
8 It's in the -- it's Appendix B to a document entitled  
9 "Scope of the System Reliability Impact Study for the  
10 New York Regional Interconnect HVDC Transmission Line."  
11 Do we have the Appendix B of the Appendix A of the  
12 Appendix R?

13 Please proceed, counselor.

14 MR. KLUCSIK: With that introduction, I think  
15 I'm looking at the same picture as you are,  
16 Mr. Pichardo.

17 Thank you, Your Honor.

18 MR. BUCCI: I guess if it would help everyone,  
19 at least for citation purposes, the same figure actually  
20 appears in Exhibit E2 as E-2.1.1. And it is the DC  
21 system single-line diagram.

22 BY MR. KLUCSIK:

23 Q I think I'm there in both places. So,  
24 Mr. Pichardo, you were going to direct our attention to

1 a portion of the diagram and tell us what it means.

2 A (Pichardo) Okay. Just looking on the drawing,  
3 on the drawing on the page, on the upper left corner  
4 says "Southern Converter Station". They say AC filter  
5 bank number one and number two.

6 Q Mr. Pichardo, if I'm looking at the right boxes  
7 on the figures, they describe electrical one-line  
8 drawings denominated with certain harmonic values; is  
9 that correct?

10 A (Pichardo) Yes, sir.

11 Q And it's your testimony I gather that that  
12 describes the filtering to which Mr. Livernois makes  
13 reference?

14 A (Pichardo) And also if you refer to the other  
15 figure mentioned in the testimony, the one-line diagram  
16 that is also DC filter.

17 Q And that would be the filter that prevents, in  
18 Mr. Livernois's opinion, the propagation of AC currents  
19 on the DC side of the conversion?

20 A (Pichardo) To the AC side. And both of them  
21 work in conjunction.

22 Q Could you read for me the description of the  
23 one-line portion of the diagram that relates to the  
24 filtering on the DC side of the converter? How is that

1 described?

2 A (Pichardo) The DC circuit, they also were  
3 described in item 4.2.2.1.

4 Q Well, if we can, let's stick to the diagram for  
5 just a moment since that's our starting point.

6 There is a portion of the one-line diagram  
7 which relates to the filtering on the DC side of the  
8 conversion; is that correct?

9 A (Pichardo) Correct, sir.

10 Q And how is that described on the figure?

11 A (Pichardo) The description is that would have a  
12 reactor, capacitor and switching connection. This is a  
13 very simplified one-line diagram. This technology will  
14 be expected to have a lot of dynamic --

15 The one-line diagram show the DC with switches,  
16 reactors, capacitors. This is expected to be more  
17 detail as we're getting closer to the engineering detail  
18 design with the aspect of the protection control and  
19 dynamic application of the filtering system to the DC  
20 converting stations.

21 Q And the capacitors and the other components  
22 that you just described are represented on the one-line  
23 drawing; is that correct?

24 A (Pichardo) Yes, sir.

1 Q For lack of a more sophisticated description,  
2 those components are described by the bumps and  
3 squiggles in the line; is that correct?

4 A (Pichardo) What is the dotted lines with a  
5 couple elements electrical symbology that show in there,  
6 yes.

7 Q Thank you. Yes. And -- and what do the words  
8 say, Mr. Pichardo?

9 A (Pichardo) They say DC filters.

10 Q And that's all they say; is that correct?

11 A (Pichardo) Yes, sir.

12 Q Thank you.

13 Once operational, the NYISO would operate the  
14 transmission line in concert with other elements of the  
15 grid; is that correct?

16 A (Thompson) That is correct.

17 Q And if I understand the application and  
18 previous testimony correctly, one of the advantages  
19 claimed for the proposed DC transmission line over an AC  
20 transmission line is its ability to adapt to changes in  
21 the grid as its operated in connection therewith; is  
22 that correct?

23 A (Thompson) That's correct.

24 Q And among those perceived advantages are the DC

1 transmission line's ability to adapt to changes in load;  
2 is that correct?

3 A (Thompson) The line can be controlled. The  
4 load flowing across the line can be controlled. Is  
5 that --

6 Q How large a change in load can be accommodated?

7 A (Bucci) The -- the DC system would be  
8 adjustable over its entire range capacity.

9 Q So would that be from zero megawatts to  
10 1,200 megawatts?

11 A (Bucci) That would be the -- the full range,  
12 yes.

13 JUDGE STOCKHOLM: Is 1,200 megawatts the  
14 maximum under emergency conditions? I mean, I know that  
15 there's capacities on the AC power lines that -- that  
16 can exceed their normal ratings for a certain period of  
17 time. And I guess my question is, is a DC line rated  
18 the same way?

19 MR. BUCCI: It -- Your Honor, it will have the  
20 ability to -- to carry additional emergency --  
21 additional capacity during emergency conditions.  
22 However, it's something that's totally controllable.  
23 And at this point, we haven't determined that we would  
24 tap into that ability. The ability is there, but it

1 needs to be -- it doesn't happen unless you actually  
2 allow it to happen, you control -- by your controls.

3 JUDGE STOCKHOLM: By the ISO in the operation  
4 of the network can call upon transmission lines to  
5 operate at that emergency level, can't they?

6 MR. BUCCI: Your Honor, when you say -- you're  
7 talking about the AC part now, the AC part of the  
8 system?

9 JUDGE STOCKHOLM: Yes.

10 MR. BUCCI: They --

11 JUDGE STOCKHOLM: Why wouldn't it apply equally  
12 to -- to this line?

13 MR. BUCCI: Well, it -- the only difference is  
14 that with DC, it's controllable. With AC, the  
15 additional power flows on the line because it's forced  
16 to by taking the path of least resistance. With a DC  
17 system, you can -- by the -- the control system will  
18 control exactly how much flow goes over the line. So  
19 the New York ISO can, if we design it to the control  
20 system, they will have the ability to adjust to allow  
21 that to happen, but it will be totally controllable,  
22 whereas with an AC line, the additional flow is not --  
23 not normally controllable.

24 JUDGE STOCKHOLM: What is the maximum possible

1 under emergency conditions that this line could carry?

2 MR. BUCCI: Well, right now, Your Honor, we  
3 haven't designed it for additional capacity, but the  
4 capacity is available within the converters and within  
5 the -- it will be available within the lines. We  
6 haven't -- we haven't put a number on it because we're  
7 limiting ourselves to 1,200 megawatts at this -- this  
8 application.

9 JUDGE STOCKHOLM: Okay.

10 Sorry. Go ahead, counsel.

11 BY MR. KLUCSIK:

12 Q How quickly will the line be able to react to  
13 changes in load?

14 A (Bucci) It's essentially instantaneous. It's  
15 within the microsecond to millisecond time frame.

16 Q So if I understand you correctly, the line,  
17 because of its controllable nature, would have the  
18 ability to react to changes in load ranging from zero to  
19 1,200 megawatts in milliseconds and -- and adjust again  
20 milliseconds after that to some different load; is that  
21 correct?

22 A (Bucci) If the AC system requires an adjustment  
23 in capacity of that nature, it can -- it can do it and  
24 would be designed into the control system. It doesn't

1 react unless it's -- unless it's -- it follows its  
2 control system design, but it can react that quickly,  
3 yes.

4 Q Do you have any sense of how frequently the  
5 line would experience those kinds of load changes?

6 A (Bucci) That -- that question would be -- be  
7 able to be answered by the folks who did the SRIS  
8 studies, which is the Panel C.

9 Q Based on your experience, would you anticipate  
10 that changes in load occur every hour?

11 A (Bucci) No.

12 Q Can you give me a sense of how frequently you  
13 would expect the change in load to occur during normal  
14 DC transmission line operation?

15 A (Bucci) Typically our DC system will be at  
16 1,200 megawatts --

17 Q Does that --

18 A (Bucci) -- Continuously.

19 Q -- mean that you don't ever expect the change  
20 in load?

21 A (Bucci) No. It can react -- we can adjust the  
22 changes in load as necessary, but I wouldn't expect it  
23 to be frequent.

24 Q And when the line experiences a change in load,

1 that produces a change in the magnetic field generated  
2 by the DC line, doesn't it?

3 A (Bucci) Well, the magnetic field is  
4 proportional to the load on the line.

5 Q Thank you.

6 MR. KLUCSIK: I think that exhausts my  
7 questions, Your Honor.

8 JUDGE PHILLIPS: Thank you.

9 Does Staff want to go next?

10 MR. BLOW: I think the Attorney General wanted  
11 to.

12 JUDGE PHILLIPS: I think she wanted to go last,  
13 so it's either you or NYPA. You can -- does NYPA want  
14 to go next?

15 MR. MALONE: We could do that. Yes, Your  
16 Honor.

17 JUDGE PHILLIPS: Thank you.

18 The document that's been circulated identified  
19 as NYPA-4 has been marked for identification as Exhibit  
20 255.

21 MR. MALONE: Yes, I believe that's correct,  
22 Your Honor.

23 MR. KLUCSIK: Your Honor, Mr. Malone --

24 JUDGE PHILLIPS: Yes.

1 MR. KLUCSIK: -- would you both indulge me one  
2 further question before Mr. Malone moves forward?

3 JUDGE PHILLIPS: Go ahead.

4 BY MR. KLUCSIK:

5 Q Mr. Livernois, did Exponent model any change in  
6 DC load on the line in terms of its magnetic effect?

7 A (Livernois) No. In our report, our report  
8 contains all of the data we generated, but as indicated  
9 before, if you cut the current level in half, or cut the  
10 load in half, then the magnetic field will drop back a  
11 factor of two.

12 Q And is it correct to say that when it goes up,  
13 the reverse process will occur; the magnetic field will  
14 increase as load increases?

15 A (Livernois) That's correct.

16 Q Thank you.

17 MR. KLUCSIK: Thank you, Your Honor. Thank  
18 you, Mr. Malone.

19 MR. MALONE: Your Honors, I would just note  
20 that with regard to Exhibit 255, which is NYPA-4, there  
21 were numerous attachments. I have not made them part of  
22 this exhibit. My questions will be directed towards the  
23 responses that were given. If -- if someone wants the  
24 complete package in the record, I can do that and bring

1 that back tomorrow.

2 BY MR. MALONE:

3 Q Panel B, can you take a look at what's been  
4 marked as Exhibit 255, which is NYRI-4 -- I'm sorry,  
5 NYPA-4 from NYRI?

6 Just give me a heads-up when you're ready?

7 A (Wood) We only had one copy, so.

8 I guess we're ready.

9 Q Can you take a look at -- well, let me just ask  
10 you. Did Panel B participate in preparing this  
11 response?

12 A (Bucci) Yes.

13 Q And did you review all of the responses?

14 A (Bucci) Yes.

15 Q Would you change any of your answers today?

16 A (Bucci) No.

17 Q Thank you.

18 I'd like you to take a look at question 1a,  
19 NYRI's response; the second paragraph. Do you see that  
20 section that says, "Calculations of the audible noise  
21 levels out to 700 feet have not been performed at this  
22 time, and therefore, are not available"? Do you see  
23 that?

24 A (Bucci) Yes.

1 Q Since the reply date of June 30th, 2008, has  
2 NYRI performed any calculations of the audible noise  
3 levels out to 700 feet?

4 A (Livernois) We have performed no additional  
5 calculations.

6 Q And can you take a look at your -- NYRI's  
7 response to 1b of Exhibit 255? Do you see that last  
8 paragraph? Actually, the last two paragraphs:  
9 "Calculations of the exceedance levels for audible noise  
10 levels out to 700 feet have not been performed at this  
11 time, and therefore, are not available"?

12 A (Livernois) Yes.

13 Q Since the reply date of this interrogatory on  
14 June 30th, have any additional -- has NYRI conducted any  
15 additional studies with regard to this area?

16 A (Livernois) We have not.

17 Q And do you see that next paragraph,  
18 "Calculations of"? Has NYRI performed any further  
19 studies with regard to that area?

20 A (Livernois) No. The results that we have done  
21 are contained in the reports that we've issued in  
22 Appendix G.

23 Q Well, do you see that portion that says, "and  
24 the calculations are not available"?

1 A (Livernois) Yes.

2 Q And have you -- since June the 30th when you  
3 submitted this reply, have you conducted any additional  
4 studies?

5 A (Livernois) We have not been asked to do  
6 additional studies. When I say "we", I'm referring to  
7 Exponent, P.C.

8 Q Take a look at lc. Do you see the response?  
9 It says, "Calculations of the audible noise spectra has  
10 not been performed at this time, and therefore, is not  
11 available"?

12 A (Livernois) Yes, I see that.

13 Q And since the June the 30th, 2008, have you  
14 performed any additional studies or calculations of  
15 audible noise spectra?

16 A (Livernois) We have not.

17 Q Can you take a look at what's been marked as  
18 number 2 on Exhibit 255? Do you see where it says,  
19 "Ambient studies were not performed at this time, and  
20 therefore, are not available"?

21 A (Livernois) Yes.

22 Q Since the time that you responded to this  
23 interrogatory, have you done any further studies on  
24 ambient noise?

1 A (Livernois) We have not.

2 Q Just below that, number 3 on Exhibit 255,  
3 NYRI's response: "Housing density between 200 feet and  
4 2,000 feet from the proposed and alternate route  
5 corridors was not calculated, and therefore, is not  
6 available."

7 A (Livernois) Yes.

8 Q Have you done any further studies since  
9 June 30th, 2008 with regard to housing density between  
10 200 feet and 2,000 feet from the proposed or alternate  
11 route corridors?

12 A (Livernois) We have not.

13 Q Question 4 on Exhibit 255, NYRI's response,  
14 last paragraph: "Calculations of the radio noise levels  
15 out to 2,000 feet at 100 kilohertz or 100 megahertz have  
16 not been performed at this time, and therefore, are not  
17 available." Do you see that response?

18 A (Livernois) I see that response.

19 Q Since June the 30th, 2008, have you performed  
20 any additional calculations with regard to radio noise  
21 levels out to 2,000 feet?

22 A (Livernois) No, we have not. However, we do  
23 know that electromagnetic fields, they attenuate as one  
24 over the distance squared. And so we have a good

1 understanding that out at 2,000 feet, the RF noise is --  
2 is almost near ambient, so.

3 Q But the answer to my question is, have you  
4 performed -- you indicate there that the calculations  
5 are not available. Have you performed additional  
6 calculations since you answered this interrogatory on  
7 June the 30th, 2008?

8 A (Livernois) No, we have not.

9 Q Question -- or Interrogatory 5 or what's been  
10 indicated on Exhibit 255 as 5, NYRI's response:  
11 "Studies indicating existing radio and reception along  
12 the preferred and alternate routes have not been  
13 performed at this time, and therefore, are not  
14 available."

15 Since June 2008 when you answered this  
16 interrogatory, have you performed any additional studies  
17 with regard to radio and reception along the preferred  
18 and alternate routes?

19 A (Livernois) No, we have not as we discussed  
20 earlier, that it was not done.

21 Q Number 6 on Exhibit 255, NYRI's response is,  
22 "The expected polarization angle between the earth and  
23 magnetic field and the magnetic field produced by the  
24 proposed DC line have not been calculated at this time,

1 and therefore, are not available."

2 Since June 30th, 2008, have you performed  
3 the -- any other calculations with regard to that area?

4 A (Livernois) We have not.

5 JUDGE STOCKHOLM: Would you -- excuse me,  
6 counselor. Would you explain to me why that calculation  
7 is meaningful?

8 MR. LIVERNOIS: Me?

9 JUDGE STOCKHOLM: Yes, the panel. Why would  
10 one do such a calculation? I don't understand it.  
11 Explain it to me.

12 MR. LIVERNOIS: With regard to the earth's  
13 magnetic field, one of the phenomenon that -- that could  
14 occur is a compass reading might be changed a little bit  
15 near the line, and so there's going to be a point away  
16 from the line where the effects of the line are  
17 negligible.

18 So, you know, in our initial analysis here, we  
19 looked at approximately plus or minus 250 feet as  
20 requested. And some of these questions said, well, what  
21 happens out at further distances? And we have not been  
22 asked to -- we have not performed additional studies.

23 JUDGE STOCKHOLM: Okay. Let me ask the  
24 question more directly. What is polarization angle?

1 MR. LIVERNOIS: Polarization angle is the angle  
2 between the earth's magnetic field and the -- the actual  
3 angle between -- the vector angle between the field  
4 generated by the line and the earth's magnetic field.

5 In general, the earth has a vertical component  
6 which points away from the surface of the earth, and  
7 then it has sort of a north/south component. And so  
8 it's essentially, you know, anywhere on this earth. So  
9 the earth -- there's two components to it.

10 The magnetic field generated by the  
11 transmission line also has two components, the way we  
12 modeled it. And so what you would do is you would add  
13 the horizontal component from the be -- from the  
14 transmission line to the horizontal component of the  
15 earth's field, and then you'd add the vertical component  
16 from the transmission line to the vertical component of  
17 the earth's field, and then you'd do basically a vector  
18 addition and you calculate the angle between the  
19 resultant field. And that's the polarization angle.

20 JUDGE STOCKHOLM: So they're additive?

21 MR. LIVERNOIS: The components are additive.

22 JUDGE STOCKHOLM: Thank you.

23 MR. SINGER: Your Honor, plus regarding this  
24 line of questioning, the witnesses have already

1 testified that they wouldn't change any of their  
2 answers. So I think it's an indication that they  
3 haven't done any additional studies as set forth in the  
4 document.

5 JUDGE STOCKHOLM: That does seem to make some  
6 sense. Mr. Malone.

7 MR. MALONE: So can I get a stipulation from  
8 counsel that since June 30th, they performed no further  
9 calculations or studies?

10 MR. SINGER: The witnesses have already  
11 testified that the answers set forth in Exhibit 255 are  
12 accurate and they haven't done any other studies that  
13 are identified in Exhibit 255.

14 MR. MALONE: Thank you.

15 BY MR. MALONE:

16 Q Is the panel aware of the PSC standards for  
17 audible noise annoyance?

18 A (Livernois) I'm aware generally of those  
19 standards, yes.

20 Q Can you tell me briefly what they are?

21 A (Livernois) Briefly what they are is audible  
22 noise that exceeds a recommended limit so that it  
23 doesn't become a nuisance to people or animals.

24 Q With regard to questions 4 and 5, how does NYRI

1 plan to respond to complaints of radio noise?

2 MR. SINGER: I'm sorry. This is -- just for  
3 clarification, Mr. Malone, you're talking about  
4 questions 4 and 5 on Exhibit 255?

5 MR. MALONE: That's correct.

6 MR. SINGER: Okay.

7 A (Wood) I think NYRI would have a -- a mechanism  
8 set up, a call number or some such thing to, you know,  
9 receive complaints that could then be investigated to  
10 see, you know, what the level of the complaint was, what  
11 the problem was, and then, you know, address it as  
12 appropriate.

13 Q Are you aware of the FCC requirements for  
14 responding to radio noise?

15 A (Wood) I am not.

16 Q Anyone on the panel?

17 A (Livernois) Forgive me. Was the previous  
18 question about audible noise, and then now it's about  
19 radio noise? I'm just --

20 Q Right. That's correct.

21 A (Livernois) FCC has limits for transmitters  
22 that are designed to transmit a signal. And so the  
23 answer to the question is yes, they have requirements.

24 Q And -- and would setting up a telephone line

1 meet those requirements?

2 A (Livernois) What sort of a telephone line?

3 Q I don't know. Mr. Wood indicated that NYRI  
4 would set up a telephone line to take such complaints.

5 A (Livernois) I'm sorry. I don't understand. I  
6 thought that was for the audible noise.

7 Q No. I think I asked, how would NYRI respond to  
8 complaints of radio noise?

9 A (Livernois) I misunderstood. I'm sorry.  
10 Typically if there was a complaint of radio  
11 noise, maybe going to some of the earlier questioning  
12 about AM radios, I think, you know, I can only speak for  
13 NYRI, but the way to do it would be to set up a phone  
14 call and have someone call in and say, my radio isn't  
15 working, and go from there.

16 Q And that would meet with FCC requirements?

17 A (Livernois) I don't know as I sit here.

18 Q And, Mr. Wood, you said you'd set up a  
19 telephone line. Where would that telephone line be  
20 located?

21 A (Wood) I'm not sure at this point. That's --  
22 that's down the -- down the road a little ways.

23 Q And how would you investigate those complaints?

24 A (Wood) I'm not sure at this point. They would

1 be, you know, NYRI staff that would respond to those  
2 type complaints, but, again, those details haven't been  
3 worked out.

4 Q Does the DC line produce audible noise  
5 primarily in foul or fair weather?

6 A (Livernois) It produces audible noise in both  
7 situations, but it's -- in foul weather, it's a little  
8 lower than fair weather.

9 Q How do you measure the DC fields?

10 A (Livernois) The DC electric or magnetic fields?

11 Q Let's start with the electric.

12 A (Livernois) There is a field meter that's  
13 designed to measure electric fields. And you go into  
14 the vicinity that you want to measure the field, make  
15 sure that you understand any possible impact from  
16 surrounding objects, and read the -- read the number on  
17 the meter.

18 Q And would that be different from an AC line?

19 A (Livernois) Well, the field itself is different  
20 from an AC line because the DC field does not change  
21 with time, and the AC field obviously oscillates at  
22 60-hertz, 60 times per second.

23 Q Would the way that you measure a DC field be  
24 different from an AC field?

1           A       (Livernois) The measurement equipment is  
2 different.

3           Q       And how about with regard to a magnetic field,  
4 how is that measured as far as a DC line is concerned?

5           A       (Livernois) There's a DC magnetic field probe  
6 that you could use for the DC field and an AC magnetic  
7 probe for the AC field.

8           Q       Can you tell me what standard or methodology  
9 was used to assess the impact of ions?

10          A       (Livernois) As I sit here, I don't know the  
11 standard number, but what I know about the DC  
12 transmission line is that the ion densities are on the  
13 order of those that we would observe in everyday life;  
14 for example, the ion density caused by the HVDC line,  
15 under normal operating conditions, you know, it's 15- to  
16 20,000 ions per cubic centimeter. And if you're sitting  
17 in your living room with a couple of candles burning,  
18 you might have a level of 10,000 ions per cubic  
19 centimeter.

20                 So I guess the best way to answer it is, in  
21 most respects, at least the ones that we looked at,  
22 the -- the environmental impact of the high-voltage DC  
23 line, those things fall into almost the background level  
24 of everyday life. So they're not significant in that

1 regard.

2 Q Do DC ions attach to air aerosols?

3 A (Livernois) A DC ion will attach to anything  
4 that has an opposite charge than itself. Most of them  
5 tend to propagate back toward ground.

6 MR. MALONE: I have nothing further. Thank  
7 you, Judge.

8 JUDGE PHILLIPS: Thank you.

9 Before we go to our next cross-examiner, I  
10 think we should take our morning break. So let's break  
11 for 15 minutes.

12 (A brief recess was taken.)

13 JUDGE PHILLIPS: If we could come to order,  
14 please. We're going to -- is Staff prepared to go next?

15 MR. BLOW: Yes, Your Honor, but I understand  
16 from Mr. Malone that he missed a couple of questions.  
17 And I have no problem with him doing that if you don't.

18 JUDGE PHILLIPS: All right. We'll go back to  
19 cross-examination by NYPA.

20 MR. MALONE: Thank you, Your Honor.

21 BY MR. MALONE:

22 Q Can the panel tell me when the last DC line was  
23 built in the United States?

24 A (Bucci) That's -- well, there's -- there's some

1 under construction now. The last one that was built in  
2 New York was energized in May of 2007, I believe. That  
3 was the Neptune project.

4 Q And was that an underground project or an  
5 overhead project?

6 A (Bucci) That was -- that was a submarine and  
7 underground, underwater and underground.

8 Q So can you tell me when the last overhead DC  
9 line in the United States was built?

10 A (Bucci) Are we excluding -- back-to-back DC  
11 converter stations are -- have an overhead tie. I'm  
12 assuming you're talking about some length.

13 Q Correct.

14 A (Bucci) I would have the same hesitation  
15 thinking about the last major AC line on the project,  
16 too. It's been a while. I believe northern  
17 California --

18 (Bailey) To my recollection, the most recent  
19 line would probably be the New England intertie coming  
20 down from Hydra-Quebec.

21 Q And do you know when that was built?

22 A (Bailey) It would have been energized in the  
23 1980s, approximately. I can't tell you the exact year.

24 Q Okay. Thank you.

1           Is anyone on the panel aware of the Common  
2 Record hearings held by the PSC on transmission lines in  
3 1978?

4           A       (Bailey) I'm aware that they had those  
5 hearings.

6           Q       And do you know what those hearings covered,  
7 the topics, the subject matter of those hearings?

8           A       (Bailey) In general, yes.

9           Q       What were they?

10          A       (Bailey) Electric fields was a major topic and  
11 audible noise.

12          Q       Would it be fair to say that those hearings  
13 examined the effects of DC fields and ions on health and  
14 safety?

15          A       (Bailey) Are you talking about the -- in New  
16 York State?

17          Q       Yes.

18          A       (Bailey) I don't -- I don't recall that those  
19 concerned DC phenomena. It was -- since it was an AC  
20 transmission line, if I recall correctly, it would  
21 have -- it would have not included that phenomena.

22                   JUDGE STOCKHOLM: When -- when you refer to  
23 "that phenomena", are you referring to ionization?

24                   MR. BAILEY: That would not have been part of

1 that discussion during those hearings.

2 JUDGE STOCKHOLM: Okay. I just wanted to  
3 clarify your answer. You made reference in your answer  
4 to "that phenomena".

5 MR. BAILEY: Yes. That would mean phenomena  
6 specifically associated with a DC transmission line,  
7 including DC electric fields, DC magnetic fields and  
8 corona ions.

9 BY MR. MALONE:

10 Q So are there New York State standards with  
11 regard to the DC lines?

12 A (Bailey) Not to my knowledge.

13 MR. MALONE: Thank you, Your Honors.

14 JUDGE PHILLIPS: Staff.

15 MR. BLOW: Thank you, Your Honor.

16 BY MR. BLOW:

17 Q To pick up on the last question -- I'm sorry, I  
18 don't know voices well. The witness that just answered  
19 the question from NYPA.

20 A (Bailey) Bill Bailey.

21 Q Mr. Bailey, were you here or did you read the  
22 transcript or see the webcast when Mr. de Waal Malefy,  
23 who had participated in the studies concerning the  
24 combined proceeding, testified that, in fact, there had

1       been DC studies that had been reviewed?

2           A       (Bailey) I -- I was not -- I did not see that  
3       part of the hearing.

4           Q       Okay. So you wouldn't know whether -- you  
5       wouldn't know whether you should challenge or -- or  
6       accept Mr. de Waal Malefyt's representation?

7           A       (Bailey) I don't know what his -- his  
8       representation was. It's -- it's not uncommon,  
9       particularly in early days of discussion about electric  
10      and magnetic fields, for people to bring forth a large  
11      number of studies that would have covered a wide range  
12      of frequencies going from DC to 60-hertz to 50-hertz, to  
13      even radio frequency fields. So it could very well be  
14      that studies that were dealing with exposures across a  
15      wide range of frequencies might have been brought up or  
16      mentioned or cited at the hearings, but the -- the bulk  
17      of the assessment and review would have been focused on  
18      the fields that were specific to the transmission lines  
19      under consideration, and those lines would be sources of  
20      60-hertz electric and magnetic fields.

21          Q       Thank you.

22                   Now, to turn to a question that -- or a topic  
23      that Judge Stockholm brought up, it's my -- it's my  
24      understanding that the panel said that the ISO would

1 control the NYRI line during operation, right?

2 A (Bucci) Yes.

3 Q And that the NYRI line could be called on if  
4 there were a change in load, there might be a change in  
5 the controls, right? In other words, that more load  
6 could -- more electricity could flow over the NYRI line  
7 or less.

8 A (Bucci) I believe I said that less. If we're  
9 talking about the rating of 1,200 megawatts, it would be  
10 less.

11 Q Okay. And that's what I wanted to get at.

12 Now, and you're saying that -- correct me if  
13 I'm wrong, but what you were stating or implying was  
14 that unless the control equipment, the controls were  
15 built into the control logic, or whatever was built into  
16 the NYRI system to allow it to go above 1,200 megawatts,  
17 it wouldn't go above 1,200 megawatts, right?

18 A (Bucci) Yes.

19 Q And so that -- so that it's not like an AC that  
20 would -- AC system that could operate at an -- if the --  
21 if the controls were -- would only allow a loading of  
22 1,200 megawatts, it's not like an electric, an AC system  
23 that could operate for a short term -- short time at,  
24 say, 10 percent above its rating, right?

1           A           (Bucci) I would use the word "would" operate  
2 rather than "could" operate. The AC line will operate  
3 with whatever flow is -- is given to it. Even if that  
4 flow happens to be above its rating, that would be --  
5 you know, that would not be desirable, but that happens.  
6 It's controlled by relaying. You would have to trip a  
7 line if the load -- it's the only way to really control  
8 the flow on an AC line, is to -- is to open circuit  
9 breakers if the flow gets too high. On a DC line, you  
10 can specifically control how much flow goes down the  
11 line with a control system.

12           Q           Right. But what you're saying is, unlike an AC  
13 line that -- that would operate above -- at certain  
14 times would operate above its normal rating for a short  
15 period of time, and it would be allowed to do that under  
16 emergency conditions, for example, with a DC line, this  
17 would -- NYRI's DC line and the controls that you're  
18 proposing, the highest it would operate at would be  
19 1,200 megawatts?

20           A           (Bucci) That's the proposed maximum rating,  
21 yes.

22           Q           So the proposed maximum rating is the emergency  
23 rating. There's no separate emergency rating, right?

24           A           (Bucci) As the line is proposed right now, no.

1 And I mentioned that the -- the AIRS (ph) capability  
2 within the equipment to -- to, you know, revisit that at  
3 a later date and make some emergency rating if that's  
4 what -- if that was advantageous, if that was requested  
5 by New York ISO, and, you know, it would have to be  
6 looked at separately. But now it's proposed to stay  
7 at -- right now it's proposed to be a at 1,200 megawatt  
8 rating.

9 Q But if -- but if -- if there was a proposal or  
10 desire to have some emergency rating or some higher  
11 rating, wouldn't a lot of things that had been looked at  
12 in this case have to -- have to be revisited, let's --  
13 for example, the sag of the line?

14 A (Bucci) You're asking about the sag of the line  
15 or a lot of things? I can't answer a lot of things.

16 Q Let's start with the sag of the line. That's  
17 what I'm saying. Let's start with the sag of the line.  
18 Wouldn't that have to be revisited?

19 A (Bucci) Yes.

20 Q And also the -- would the electric fields have  
21 to be revisited?

22 A (Bucci) Well, yes.

23 Q And the magnetic fields?

24 A (Bucci) When you say "revisited", I'm not sure

1 what you mean by "revisit". As I said, the -- in order  
2 to operate at an emergency rating, that would have to be  
3 looked at as a -- separately. And anything that relates  
4 to operating above the 1,200 megawatts, you know, for  
5 this short time, emergency rating would have to be  
6 looked at.

7 Q But that would include, would it, electric  
8 fields?

9 A (Thompson) You know, I think we should go back  
10 to the original proposal which says very clear, it says  
11 that we're proposing a 1,200 megawatt HVDC line, and  
12 that's what the ratings are and that's what all of the  
13 studies are and that's what the expectation is. And  
14 you're correct, it's different than an AC line, which  
15 tends to have this emergency rating structure to it.

16 Q I understand. And I don't mind doing that.  
17 However, I've been around long enough to know that a lot  
18 of times companies that propose one thing want to make a  
19 nominal increase in -- in that -- in a particular  
20 parameter, or whatever, which requires more of a look  
21 than they might otherwise think at the beginning, so,  
22 you know, when they -- when they first thought about  
23 that, quote, unquote, nominal increase.

24 So I just wanted to explore briefly, we got --

1 I got an answer on the line sag. Would electric fields  
2 have -- would the question of electric fields have to --  
3 have to be revisited?

4 A (Livernois) I can address that I believe.

5 Essentially the current flow in the two  
6 transmission lines would generate the magnetic field.  
7 So if the power capacity were increased such that it was  
8 the current that was increased, then the magnetic field  
9 would increase proportionally.

10 Conversely, if the voltage difference between  
11 the two lines were to change from plus or minus 400,000  
12 volts to some other number, the electric field would be  
13 affected. So if the voltage and current parameters of  
14 the transmission line as proposed are changed, then the  
15 calculations of magnetic field, electric field and other  
16 parameters would also need to be relooked at.

17 Q Yeah. Thank you. That's all -- I wanted to  
18 just get somewhat of an understanding, then move along.

19 Now, talking about electric and magnetic fields  
20 for a few more minutes. Correct me if I'm wrong, but  
21 it's your testimony that decisions on electric and  
22 magnetic fields at the edge of electric transmission  
23 rights-of-way do not apply to major DC transmission  
24 facilities, right?

1           A           (Bailey) The position -- our analysis is that  
2 the standards that were developed in the State of New  
3 York were developed to apply to AC transmission lines  
4 and that there was not a rationale based upon the  
5 physics and operating experience and other factors that  
6 would be relevant for DC transmission lines. And so  
7 therefore, standards for a DC transmission line have not  
8 been developed in the State of New York.

9           Q           And so you're saying -- correct me if I'm  
10 wrong, you're saying -- are you saying that the  
11 standards that were developed and the decisions that the  
12 Commission made do not apply or should not apply to  
13 DC -- major DC facilities?

14          A           (Bailey) I don't see an evidentiary basis that  
15 they do apply. And I think that if you want to develop  
16 a standard for DC transmission lines, that that is an  
17 entirely separate issue.

18          Q           Now, if the Commission did apply the  
19 electric -- I'm talking about electric field standard  
20 now. If the Commission did apply the electric field  
21 standard of 1.6 kV per meter at the edge of the ROW in  
22 this case, NYRI would have to increase its proposed ROW  
23 in some locations along the proposed route, correct?

24          A           (Bailey) Yes.

1 Q Does NYRI know where these --

2 A (Bucci) Or change the design in some other way  
3 to reduce the -- the field.

4 Q We'll get to that, then, I guess.

5 Staying with this -- the -- my question about  
6 location. Does NYRI know where these areas are that  
7 would require a wider right-of-way?

8 A (Bailey) We -- we haven't made a specific  
9 inventory of those locations.

10 Q Okay. So -- so you haven't -- correct me if  
11 I'm wrong, but then you haven't looked at whether there  
12 are any residences or human habitations that NYRI would  
13 have to acquire to meet the 1.6 standard if the  
14 Commission were to apply it in this case, right?

15 A (Wood) That's correct.

16 Q Now, Mr. Bucci, you mentioned that the -- that  
17 there could -- NYRI could propose a change in design to  
18 reduce the electric field, right?

19 A (Bucci) I didn't -- I didn't say that exactly.  
20 I said in regards to electric fields exceeding the  
21 number you mentioned at the edge of the right-of-way,  
22 widening the right-of-way is not the only way to --  
23 to -- to make the number lower.

24 Q Okay. And what other ways would -- would there

1 be to make that 1.6 number lower? I'm sorry. Make the  
2 number -- to make the number lower than 1.6?

3 A (Bucci) Well, of course, any answer I give you  
4 has not been checked for feasibility in this case, but,  
5 however, desirability, but by -- because our design is  
6 as proposed. But if you raise the height of the  
7 structures, that would be one way. I mean, there are  
8 numerous, I guess, possibilities, like I say, not  
9 necessarily feasible for the project, but that's a known  
10 fact that if you make the -- if you raise the  
11 conductors --

12 Q Right.

13 A (Bucci) -- the field on the ground would be  
14 lower.

15 Q Right. But what -- but what -- but you said  
16 you weren't sure if that was feasible. Wouldn't  
17 undergrounding be a feasible way to reduce the electric  
18 field, the edge of the right-of-way?

19 A (Bucci) Would undergrounding be a -- I'm sorry.  
20 Could you --

21 Q Feasible way to reduce the electric field?

22 A (Bucci) We haven't looked at the feasibility of  
23 any reductions of the MF.

24 (Bailey) But undergrounding would reduce --

1 would block the electric field from an underground line.

2 JUDGE STOCKHOLM: How about magnetic field?

3 MR. BAILEY: Not the magnetic field, per se.

4 JUDGE STOCKHOLM: And would the magnetic field  
5 be dampened depending on the configuration and proximity  
6 of the conductors?

7 MR. BAILEY: The magnetic field from an  
8 underground configuration like that of an overhead  
9 configuration would depend upon how far apart the  
10 conductors are and their configuration. So generally,  
11 you might have a, at some locations, a lower magnetic  
12 field from an underground configuration, just simply  
13 because the conductors are placed closer together, and  
14 the magnetic field vectors for each of the conductors  
15 would tend to cancel one another. But just merely  
16 placing conductors underground would not be an effective  
17 means of reducing the magnetic field.

18 JUDGE STOCKHOLM: Thank you.

19 Counsel.

20 MR. BLOW: Thank you.

21 BY MR. BLOW:

22 Q You mentioned there are other ways, but you  
23 haven't, as you said, explored the feasibility of any of  
24 the ways, right?

1           A       (Bucci) That's correct.

2           Q       Now, I'm going to be in your -- look at your  
3 rebuttal testimony pretty much. And then when I'm  
4 finished, Mr. Belsito has a few questions, but we'll go  
5 to your rebuttal testimony. And I can give you a page  
6 reference, and then tell me when you -- when you get  
7 there.

8                   Please refer to page 3 of your rebuttal  
9 testimony. Do you have it?

10          A       (Bailey) Yes.

11          Q       Okay. On line 11, I believe it -- you  
12 reference the ANSI-IEEE standard, 100-1009, page 268,  
13 right?

14          A       (Bailey) Yes.

15          Q       Now, that standard is really referencing on  
16 shipboard, in quotes, electric, that is on board a  
17 vessel, correct?

18          A       (Bailey) The purpose of the citation was  
19 basically this is from the IEEE dictionary. And so  
20 basically, it's just to define what we mean by a DC  
21 current, not as to specific applications because -- and  
22 that's why this is a reference to a dictionary.

23          Q       Would you refer to page 4, line 1? Would the  
24 same -- do you have it?

1 A (Bailey) Yes.

2 Q Would the same be true -- would your answer  
3 that you just gave apply also to the ANSI-IEEE standard  
4 100-1998, page 31?

5 A (Bailey) Yes.

6 Q Okay. Would you refer to page 7 of your  
7 rebuttal testimony, lines 14 to 18 where you question  
8 staff witnesses Quimby and Schrom about the input data  
9 they used? Do you have that?

10 A (Bailey) Yes.

11 Q Did you provide your work papers and all  
12 supporting information concerning your EMF study?

13 A (Bailey) We did.

14 Q Now, if Messrs. Quimby and Schrom used your  
15 inputs, they should have come out with the same graphs,  
16 correct?

17 A (Bailey) There could be some differences. I  
18 did not have a response -- I don't recall that they  
19 provided response that indicated the input values that  
20 are used, so I could not determine -- we could not  
21 determine that the input values they used in the  
22 calculations were, in fact, the same ones that we had  
23 used.

24 Q We can check, but I believe that we have a

1 discovery response that referred back to the inputs  
2 that -- that you had provided, but --

3 A (Bailey) I understand that that was -- that  
4 that may have been the response, but I have often seen  
5 the cases where people have made calculations using  
6 different values than, in fact, were referenced. So  
7 that just refers to the fact that those input values  
8 that were specifically used in those calculations were  
9 not provided in response to the interrogatory.

10 Q Would you refer to page 22, lines 1 through 5  
11 of your rebuttal testimony where you discuss DPS staff's  
12 proposed certificate condition requiring that NYRI  
13 design the facility to allow a Semi truck to travel on  
14 the right-of-way along the entire distance of the line.  
15 Do you have that?

16 A (Livernois) Yes, I see that.

17 Q During facility operation, does a transmission  
18 owner regularly investigate accidents on ROW and --  
19 that's one question?

20 A (Livernois) What do you mean by "accident"?

21 Q Line contacts, for example.

22 A (Livernois) Okay.

23 Q So you would say that such accidents would be  
24 investigated?

1           A       (Livernois) Yes.

2           Q       And do routine patrols of a transmission  
3 owner's ROW, do they -- do they take place?

4           A       (Livernois) The transmission lines, they're  
5 monitored by a number of ways. They can be monitored  
6 remotely. And based on maintenance requirements and  
7 things, I'm sure they have people that physically  
8 monitor them as well.

9           Q       So would you say that a transmission owner has  
10 a crew drive their line trucks along the line when they  
11 have to do a repair?

12          A       (Livernois) The general answer to that is if  
13 the line needs repair, then it's repaired, but as far as  
14 the specific procedures that NYRI would use, I would  
15 defer to them to answer that.

16          Q       I asked in general, basically.

17          A       (Livernois) The answer is yes.

18          Q       If NYRI -- somebody for NYRI wants to answer  
19 that, that's fine.

20          A       (Livernois) There's -- in these sorts of  
21 systems, there are people assigned to repairing the line  
22 if there's an identified problem. That's -- that's  
23 required.

24          Q       Now, is NYRI willing to provide regular

1 training programs and ground chains to farmers operating  
2 equipment underneath its line?

3 A (Thompson) Can you repeat that one more time?

4 Q Sure. Is NYRI willing to provide regular  
5 training programs and ground chains to farmers operating  
6 equipment underneath its line?

7 A (Thompson) Certainly the intention would be to  
8 go along and educate the farmers working in and around  
9 the lines, correct.

10 Q Does somebody on the panel for the record want  
11 to describe what a ground chain is?

12 A (Livernois) A ground chain is a physical  
13 conductor that's attached to the body or chassis of a  
14 moving vehicle. It drives on the ground to let charge  
15 that might be built up on the vehicle dissipate back to  
16 earth.

17 Q I appreciate that. So would NYRI be willing to  
18 provide ground chains to farmers operating equipment  
19 underneath this line as a part of the training program?

20 A (Bucci) I think we would need to look into  
21 whether that was effective or necessary. We haven't  
22 looked at -- I mean, we -- your question assumes that  
23 that's necessary. We haven't determined that.

24 Q But if it were determined to be necessary, it

1 sounds like NYRI would be willing to provide it?

2 A (Thompson) Correct.

3 Q Is NYRI willing to design the line to the  
4 National Electric Safety Code required vertical  
5 clearances for the entire length of the line?

6 A (Bucci) Yes.

7 Q And that would be a minimum. I think we saw --  
8 we talked last week we -- for example, there would be  
9 perhaps a higher clearance crossing the canal?

10 A (Bucci) No. I think we said that higher  
11 clearance would be required by the National Electric  
12 Safety Code.

13 Q Okay. Would you refer to page 26, lines 19 to  
14 21 of your testimony?

15 Have it?

16 A (Livernois) Yes.

17 Q Am I correct that the applicant believes that  
18 the studies done in the Article VII application was  
19 sufficient for studying the effects of fault current on  
20 gas pipelines?

21 A (Livernois) The analysis that was done on the  
22 effect on gas pipelines assumed a bipolar line with a  
23 return-neutral conductor, and so that the results that  
24 were obtained in the reports contained in Appendix G did

1 address that. And the amount of current that could flow  
2 through the ground under normal operating is negligible.  
3 In the event of a ground fault, it would be detected in  
4 such a short time that there would be no opportunity for  
5 any substantial adverse effect to pipelines caused by  
6 electric current flow through the earth.

7 Further to that, NYRI has agreed to not operate  
8 the line if the neutral return conductor, which is the  
9 main path for any current that would end up at ground,  
10 they've agreed to not operate the line if there's a  
11 problem with the ground conductor. So the corrosion  
12 risk is essentially nil for this system based on all the  
13 facts in front of us -- in my assessment based on all  
14 the facts in front of me.

15 Q Help me understand. Are you saying that NYRI  
16 is unwilling to undertake further studies of --  
17 regarding major gas lines and gas distribution  
18 facilities its line will parallel or cross?

19 A (Livernois) No, that wasn't what I intended to  
20 say. What I intended to say was based on the proposed  
21 route and our understanding of this system, we could not  
22 identify any risk that required additional effort until  
23 that time in which the final design is completed. If  
24 there are situations that arise once the actual line is

1 built and issues arise, then they could be addressed on  
2 a case-by-case basis. And no one can predict the  
3 future, but I am comfortable saying that if there is a  
4 problem identified with a pipeline, there are known  
5 remedies for those.

6 Q Would you refer to page 29, lines 13 to 20 of  
7 the rebuttal testimony where you discuss transient  
8 events.

9 A (Livernois) Yes, I see that.

10 Q Help me understand your position. Are you  
11 saying that NYRI is unwilling to study the impacts of a  
12 direct lightning strike to its transmission line or --  
13 on its transmission line or tower could have on a gas  
14 pipeline, an electric line or telephone cable that  
15 NYRI's line will parallel or cross?

16 A (Livernois) If you're -- are you saying that if  
17 a lightning strike hits one of the transmission line  
18 towers, are we unwilling to look at what effect that  
19 might have on surrounding facilities? Is that what the  
20 question was?

21 Q Are you willing to -- are you saying you're  
22 willing or unwilling to study the impact that a direct  
23 lightning strike to the transmission line or -- on the  
24 transmission line or tower? If a lightning -- lightning

1 strikes the transmission line or the tower -- this is --  
2 this is -- to study it beforehand, not waiting until a  
3 lightning -- lightning does strike the transmission line  
4 or tower, but are you saying you're willing or unwilling  
5 to look at what effect a direct lightning strike on  
6 NYRI's transmission line or tower could have on a gas  
7 pipeline, an electric line or a telephone cable that the  
8 NYRI facility will parallel or cross?

9 A (Livernois) The way I would answer that is to  
10 say that lightning, when it strikes a tower, it's not  
11 that concerned about whether or not it's associated with  
12 an AC or DC line because the towers themselves are  
13 grounded in the earth at that point. And the lightning  
14 bolt, it might last, you know, ten microseconds. It's  
15 very short in duration. And it basically gets  
16 dissipated to ground if it hits the tower. So based on  
17 what we've looked at and based on the proposed design,  
18 we don't feel that there's additional risk that needs to  
19 be looked at based on lightning strikes to the tower on  
20 surrounding facilities.

21 If there are specific situations where it  
22 appears that there is a risk that we don't see at the  
23 present time, I'm sure that NYRI would be willing to  
24 look at that, but our assessment now is that the towers

1 grounding strategy is going to handle the lightning  
2 strikes if any occur.

3 Q All right. I want to get to that. Could you  
4 explain how a direct strike to NYRI's facility would be  
5 prevented from affecting a parallel gas line, electric  
6 line or telephone cable?

7 A (Livernois) To quantify that, I would need to  
8 know the specific geometry of the pipeline, of the  
9 telephone line.

10 Q You have a preventative method?

11 A (Livernois) The preventative method is to  
12 properly ground the tower so that the lightning strike  
13 energy is dissipated in and around where the tower is.

14 Q Could you explain what route a fault current  
15 will follow when a pole falls to ground?

16 A (Livernois) Given a specific configuration, you  
17 can estimate that. One of the key factors is how far  
18 away the tower is that's struck by lightning, how far  
19 that tower is away from a pipeline or a railroad or, you  
20 know, other facility. But ultimately all energy wants  
21 to get back to earth. All electric energy wants to get  
22 back to earth ground.

23 Q What if the -- what if a pole or a conductor  
24 falls to the ground, and therefore, there's a fault?

1 A (Pichardo) Which of them?

2 Q Well, take one at a time.

3 A (Livernois) You're saying if one of the towers  
4 carrying the two high-voltage lines falls to the ground?

5 (Bucci) One of the -- one of the poles meaning  
6 one of the conductors I believe.

7 Q Right the pole -- yes. I'm sorry. A pole --

8 JUDGE STOCKHOLM: Yeah, but if the pole falls  
9 to the ground, doesn't the conductor fall to the ground?

10 MR. BLOW: We're not talking the tower. We're  
11 talking the conductor pole. There are --

12 JUDGE STOCKHOLM: Oh, I'm sorry. You're using  
13 pole in a different sense. I apologize.

14 A (Bucci) Positive or negative pole, yes.

15 Q Positive or negative -- yes.

16 A (Livernois) That would represent in effect a  
17 ground fault of sorts with a finite ground impedance.  
18 And as I indicated earlier, that would be picked up  
19 immediately by the control system and dealt with.

20 Q And what route did you say that would -- the  
21 lightning would take, what -- what path? I mean, sorry,  
22 the fault would take, what path?

23 A (Livernois) Well, in that -- in that case, of  
24 course, since because the high-voltage line is touching

1 the earth, you're going to have current flowing through  
2 earth for a short time.

3 Q So you can't guarantee what path that -- that  
4 electricity would take, right?

5 A (Livernois) I can guarantee it's going to want  
6 to go back to the converter station one end or the  
7 other. That's the way it's going to want to go.

8 Q Okay. And if there was a gas -- a gas pipeline  
9 or an electric line or -- or a telephone cable or a  
10 railroad track paralleling or, you know, near the --  
11 near that fault, wouldn't -- wouldn't the current tend  
12 to -- tend to jump on to one of those whatever it was  
13 parallel?

14 A (Livernois) Well, what happens if you have one  
15 of the lines landing on the ground, the first thing that  
16 happens is the approximately 1,500 amps that are flowing  
17 through the cable, it's going to spread out when it hits  
18 the ground. And as it propagates through the ground,  
19 only a small portion of it is going to couple on to a  
20 pipeline or couple on to a railroad. So the answer is  
21 yes, there is a chance some of the current for a short  
22 time could flow through a pipeline or a railroad, but,  
23 again, the system is controlled such that in the event  
24 of a fault like that, it would immediately shut things

1 down.

2 (Pichardo) What I should add --

3 JUDGE STOCKHOLM: What is a short time?

4 MR. LIVERNOIS: A short is when you  
5 basically --

6 JUDGE STOCKHOLM: No, no, no, not what is a  
7 short, but your answer referred to "it would flow for a  
8 short time".

9 MR. LIVERNOIS: Fractions of a second. It  
10 takes you a quarter second to blink your eye. And  
11 that's approximately how fast or less the system would  
12 react.

13 JUDGE STOCKHOLM: Okay. So quarter of a second  
14 is the reaction time?

15 MR. LIVERNOIS: Well, it -- when I say fraction  
16 of a second, it's very quick. So that's the reaction  
17 time of the control system or less.

18 JUDGE STOCKHOLM: That is the reaction time of  
19 the control system, a quarter of a second?

20 MR. LIVERNOIS: Or less.

21 MR. PICHARDO: Or less. Hundred microsecond  
22 could be a standard number. But I should add to the  
23 other -- adding to the current path to the ground, that  
24 our system is designed with a metallic return. What

1 that mean is there is a connection lead between two  
2 converter station that will be split in the current  
3 between the earth and the metallic return. Now, we  
4 believe at this moment that most of the current would be  
5 going straight to the metallic return between the two  
6 converter station rather than going in the ground  
7 itself. So when it hit in the ground portion of the  
8 current would be splitting in the metallic return and  
9 the rest of the ground including the pipeline, the air  
10 itself, or any other facility in the path. We're  
11 talking about the completely huge volume or area where  
12 the current will be flowing in the system.

13 JUDGE STOCKHOLM: If that wire fell on the  
14 train tracks, and the train tracks being metallic, would  
15 a significant portion of that fault flow up the train  
16 tracks.

17 MR. PICHARDO: Well, when the fault happen at  
18 any point would be detected by the control system as a  
19 fault. Part of the system itself, when you have a --  
20 going to the ground momentarily would be those kind of a  
21 microsecond type of fault flowing in an entire system  
22 including everything around. But we believe, not  
23 design, comparing with other electrical system, that  
24 most likely is safer than most of the transmission

1 system that we've been see in operation normally today.

2 BY MR. BLOW:

3 Q Now, in monopole operation on an overhead line,  
4 where is the ground return?

5 A (Bucci) You mean through the -- for the NYRI  
6 system monopole operation?

7 Q Yes.

8 A (Bucci) Through the metallic return conductor.

9 Q And is it insulated from the tower?

10 A (Bucci) Yes.

11 Q Please refer to page 31 of your testimony,  
12 lines 13 to 21.

13 Do you have that?

14 A (Livernois) I see that, yes.

15 Q What studies of the soils along the route have  
16 you done that will assure everyone that, quote, the  
17 fault current density would greatly diminish due to  
18 dispersion through earth before it reaches the pipeline?

19 A (Livernois) As far as the proposed route, we  
20 haven't done surveys of the soil, but we know that  
21 resistivities of soil even on the most conductive end of  
22 it are still much less conductive than the neutral  
23 return. And so, you know, if you have the full -- if  
24 you have some of the fault current going through the

1 ground, it has -- it has to, by nature, disperse itself.

2 JUDGE STOCKHOLM: Does it go back up the  
3 adjacent poles and get on the neutral return? How does  
4 it get on the neutral return?

5 MR. LIVERNOIS: Well, if it's -- if it's a  
6 fault condition, the neutral return is isolated from the  
7 earth. And so it wouldn't work its way back up the  
8 pole. And if it's a ground fault as discussed earlier,  
9 it would be picked up in, you know, I guess a hundred  
10 microseconds was the term. So it would -- for a short  
11 time, you'd have current flowing through the earth.  
12 Yeah.

13 JUDGE STOCKHOLM: Gotcha.

14 Q Isn't it possible that someone at a later time  
15 would lay a conductive medium down that the fault  
16 current could follow and go on a pipeline or some other  
17 facility, paralleling facility?

18 A (Livernois) I'm not sure I understand what you  
19 mean by "conductive medium". Are you talking about  
20 facilities added to the area where the transmission line  
21 is in the future?

22 Q Yes.

23 MR. SINGER: Are you talking about within the  
24 NYRI right-of-way?

1           MR. BLOW: Well, in proximity to it such  
2 that -- I'm just trying to explore whether -- whether --  
3 how -- how certain we can be of the -- of the points  
4 that the witnesses have been making.

5           MR. SINGER: So -- so the hypothetical is that  
6 somewhere outside the NYRI right-of-way someone builds a  
7 linear facility that's parallel to the NYRI facility?  
8 Is that your hypothetical?

9           MR. BLOW: Yeah, just outside the right-of-way,  
10 for example.

11          A       (Livernois) Based on my experience with this  
12 project, it seems as though anyone building anything  
13 near this would have to go through a process similar to  
14 what's happening here and any associated risks would be  
15 looked at. It would not -- it would not happen in a  
16 vacuum I don't believe.

17           MR. BLOW: That's all I have, Your Honor, but  
18 Mr. Belsito has some questions.

19           JUDGE PHILLIPS: Please proceed.

20           MR. KLUCSIK: Before Mr. Belsito begins, if I  
21 may ask a question to follow-up on the last one asked by  
22 Judge Stockholm.

23           JUDGE PHILLIPS: Go ahead.

24           BY MR. KLUCSIK:

1 Q Judge Stockholm asked about ground current.

2 I'm sorry. About ground faults.

3 Would a ground fault change the current flow on  
4 the transmission line, on the DC portion of the  
5 transmission line?

6 A (Livernois) When you say "change", what do you  
7 mean?

8 Q Cause it to differ from its status before the  
9 ground fault.

10 A (Livernois) If you look at the length of the  
11 line, which is hundreds of miles, and you look at the  
12 time in which the system reacts, which is a hundred  
13 microseconds, there's an associated what's called  
14 inductance with that long piece of a wire that would  
15 restrict the ability of the voltage to change  
16 substantially in that time frame. So, you know,  
17 theoretically, it might change, but just by the very  
18 nature of it, if you're trying to switch current flow on  
19 a line that's that long in a hundred microseconds, the  
20 inductance of the line, which is essentially the stored  
21 energy in the magnetic field, that prevents change in  
22 current. And so my initial assessment would be that it  
23 would resist any substantial change. That's, you know,  
24 that's a high-level review of that. We haven't looked

1 at that in detail, but inductance and stored magnetic  
2 energy tend to control the voltage level -- the current  
3 level. I apologize.

4 JUDGE STOCKHOLM: Would that be dissipated with  
5 a ground fault very quickly.

6 MR. LIVERNOIS: Well, it wouldn't have a chance  
7 to react because the current would be switched off at  
8 the converter station.

9 BY MR. KLUCSIK:

10 Q So if I understand your answer correctly, the  
11 ground fault would cause the switch to flip and the line  
12 would be de-energized?

13 A (Livernois) Yes. The way -- in the same way  
14 when you -- when you put a piece of bread in the toaster  
15 and it pops up, the wires are still hot. You know, it  
16 doesn't cool off immediately. And the electric current  
17 flow doesn't stop immediately in the transmission line  
18 even with the, you know, with the change in the -- with  
19 the ground fault.

20 Q Okay. So it wouldn't happen quickly. It's not  
21 all on or all off. It would occur gradually?

22 A (Livernois) Well, I don't know how -- I don't  
23 know the -- to specific number, but what I know is that  
24 a line this long in a hundred microseconds, when you

1 look at the LDIDT sort of change in voltage, it would  
2 resist that, you know.

3 Q And assuming for the moment that there is some  
4 change in current as a result of the ground fault, would  
5 that cause a change in the magnetic field generated by  
6 the line?

7 A (Livernois) I think beyond what I've said, the  
8 magnetic field is going to resist changes in itself, and  
9 by doing that, it's going to resist allowing the current  
10 to change. I don't know a specific answer to that  
11 question as I sit here.

12 Q Thank you, Mr. Livernois.

13 MR. KLUCSIK: Thank you, Your Honor.

14 JUDGE PHILLIPS: Mr. Belsito.

15 MR. BELSITO: Thank you.

16 BY MR. BELSITO:

17 Q If you could please turn to Figure 253 of  
18 Exhibit 37, 37 as identified in this proceeding.

19 JUDGE PHILLIPS: Which figure again?

20 MR. BELSITO: It's number 253. It's actually  
21 the last figure in the book. I believe it's an image of  
22 the southern converter station.

23 Q Everyone on the same page?

24 A (Wood) Yes, we are.

1 Q Do you see a house approximately a quarter inch  
2 to the right of the white dotted line just below the  
3 southern converter station or the image of the southern  
4 converter station of the map?

5 A (Wood) Yes, we do.

6 Q Approximately how far from the proposed fence  
7 line of the southern converter station is that house?  
8 We have a ruler if you need one.

9 A (Thompson) Would you accept about a hundred  
10 feet?

11 Q I might accept something a little lower.

12 A (Thompson) Okay. Fifty feet. Would that work?

13 Q We'll accept that. Thank you.

14 Now, in reference to what's been marked as  
15 Exhibit 260, DPS, it's Panel D's response to DPS-117.  
16 In that table that's provided as part of that response.  
17 I'm sorry. I'll give you a minute to find it. It was  
18 marked for identification this morning.

19 There's a table towards the back of that  
20 response. I believe it's the last two pages.

21 I'm sorry. Let me back up just one bit, but  
22 hold on to that table, please. Would you expect there  
23 to be any noise impacts on the residents that we just  
24 pointed out on Figure 23 -- excuse me, 253?

1           A           (Thompson) Would it be appropriate -- excuse  
2 me. I think it's probably worth noting for the record  
3 that we actually have had some communications with the  
4 owners of that residence about the possibility of  
5 acquiring that residence from them. And they seem to be  
6 very interested in pursuing that if this project were to  
7 go forward with the converter station located in that  
8 position.

9           Q           That information is certainly useful, but am I  
10 able to infer from that answer that you would expect  
11 there to be noise impacts on that residence?

12          A           (Thompson) I don't know if it was specific just  
13 to noise or as much a visual and just the fact that we  
14 were basically going to be requiring such a large  
15 portion of their -- I'll call it their back yard.

16          Q           Okay.

17          A           (Thompson) It certainly seemed appropriate.

18          Q           And just, again, referencing the table in  
19 Exhibit 260. Are there any noise receptors listed in  
20 that table that are less than a hundred feet from the  
21 fence line of the southern converter station?

22                       Perhaps I could clarify my question. Is there  
23 a cross-reference or a reference in that table to the  
24 house that we were just speaking of in Figure 253, that

1 I think we agreed is about 50 feet away from the center  
2 line?

3 I was asking specifically with reference to the  
4 table. If there's a reference anywhere in the question  
5 we can take it, but the question was, again, specific to  
6 the table.

7 Is the house that we refer to in Figure 253  
8 listed in the table as a possible noise receptor?

9 A (Bucci) Doesn't appear to be listed.

10 Q Thank you.

11 Now, if you could -- if you could please refer  
12 to Exhibit 32, otherwise known as Appendix Q.

13 A (Bucci) Appendix Q.

14 Q I stand corrected. It is Exhibit 31, but  
15 Appendix Q.

16 A (Bucci) Appendix Q, yes.

17 Q As part of the supplemental filing?

18 A (Bucci) Yes.

19 Q Okay. I believe at page 11, there's a table  
20 numbered 4.3-1 titled "The Converter Station Equipment  
21 Model Sound Power Levels In DB"?

22 A (Bucci) Yes.

23 Q Are the equipment and the associated octave  
24 band levels in that table based on specific

1 manufacturers' data, or are these generic sound power  
2 levels for the types of equipment listed?

3 A (Bucci) They are based on manufacturers' data,  
4 but we haven't selected the specific manufacturers for  
5 this -- our specific equipment yet.

6 Q They're generic numbers?

7 A (Bucci) They're manufacturers' data for  
8 equipment of this type and size.

9 Q So the actual equipment to be installed may  
10 have somewhat different characteristics -- I'm sorry.

11 So the active -- the actual equipment to be  
12 installed may have somewhat different characteristics  
13 than Table 4.3-1 states; is that correct?

14 A (Bucci) Yes.

15 Q It could be greater or lesser?

16 A (Bucci) We think it would be less.

17 Q And it could also have different octave band  
18 levels; is that correct?

19 A (Bucci) I don't understand what you mean by "it  
20 could have different" -- you mean the levels within each  
21 octave band could be different than the levels listed in  
22 this table --

23 Q Yes.

24 A (Bucci) -- for a specific octave band? Yes, it

1 could be slightly different, sure.

2 Q Thank you.

3 For the equipment listed in Table 4.3-1 in  
4 Appendix Q, is the noise or sound power level a  
5 continuous level or instantaneous noise?

6 A (Bucci) It is -- it's not instantaneous. It's  
7 the normal sound level during -- during normal  
8 operation.

9 Q Okay. Perhaps I should have asked this  
10 question at the beginning. What is noise?

11 A (Bucci) Noise would generally be referred to as  
12 sound which is -- sound level which is not pleasing to  
13 the ear.

14 Q Okay. But unwanted sound be an acceptable  
15 definition?

16 A (Livernois) It's a subjective interpretation.

17 (Bucci) That's subjective, but it -- I would  
18 say that it is -- it is often considered unwanted. It's  
19 not -- it's not the logical definition, but noise that  
20 is displeasing to the ear is unwanted --

21 Q Okay.

22 A (Bucci) -- Normally. Yes.

23 Q Thank you.

24 All these numbers are interesting and

1 technical. Perhaps I should stick with just the word  
2 "technical". So what would be the overall nature of  
3 noise around, in layman's terms, if you will, around a  
4 converter station?

5 A (Bucci) It would be no different than an AC  
6 substation.

7 Q And what would be the nature of that sound?

8 A (Bucci) I don't understand what you mean by  
9 "the nature".

10 Q I believe Mr. Pichardo was giving me the answer  
11 I was looking for, if he can speak into the microphone.

12 A (Pichardo) I was talking to him.

13 Anyway, what I tried to say, he pointed out  
14 pretty well, it's no different than the regular  
15 substation. So you're going to have transformer noise.  
16 It's frequency dependent type of noise accorded with  
17 most of the regulation that we're working with in a  
18 power system. So it would be in the 50-plus decibel  
19 type of buzzing noise that you hear in a regular  
20 substation of this nature. So we measure that, by the  
21 way, at the property line of the facility.

22 Q Okay. So a buzzing noise. Is there crackling  
23 or hum? Are those words that could be used to describe  
24 the nature of the sound?

1           JUDGE STOCKHOLM: Perhaps we could schedule a  
2 visit to a 345 kV substation.

3           A       (Bucci) It's typically referred to as a hum.  
4 You know, a 60-cycle hum may be something that people  
5 could relate to.

6           Q       Okay.

7           A       (Livernois) You know, just for reference,  
8 the -- the 50 to 55 dB number mentioned, that's a sound  
9 level on a typical office environment, you know, just  
10 ruffling of papers, you know, and people walking and  
11 talking. So it's not -- it's a number, you know, but  
12 the meaning of it is it's not unnecessarily unpleasant.

13           JUDGE STOCKHOLM: Is it -- would it be fair to  
14 say based on your testimony the noise level outside the  
15 Rock Tavern substation today at the property line would  
16 be no different from the noise level at the property  
17 line with regard to the converter station?

18           MR. BUCCI: Your Honor, we have -- I think  
19 that's a little bit too absolute for me to say -- to  
20 make that statement, but we do have the sound levels  
21 modeled all around the perimeter of the converter  
22 station.

23           JUDGE STOCKHOLM: So is your answer no, that  
24 there would be sound levels that would be higher at the

1 edge of the property at the -- of the converter station  
2 as compared to the edge of the property at the  
3 substation?

4 MR. BUCCI: Well, Your Honor, I haven't  
5 measured -- I obviously haven't measured the sound  
6 levels at the Rock Tavern station, but all the -- for  
7 example, the southern converter site, they would all be  
8 within the local ordinance for dBA sound levels at  
9 the -- at the property line. So they could be --

10 JUDGE STOCKHOLM: Just out of curiosity. My  
11 assumption is that when we go in the field, that the  
12 converter stations are going to be stops that we make.

13 MR. SINGER: Yes, Your Honor. They're on our  
14 list.

15 JUDGE STOCKHOLM: Okay. Would it be possible  
16 to bring the appropriate equipment to measure noise  
17 levels at those locations? Is that something that we  
18 can do as a group, or being a group, does it preclude us  
19 doing that?

20 MR. SINGER: I'm seeing some nodding of the  
21 heads on the panel that that is a possibility.

22 MR. WOOD: Yeah. We could bring a noise level  
23 meter.

24 JUDGE STOCKHOLM: I think it -- I think it may

1 help only because 50 to 55, all of us have some idea of  
2 what that means, but I'd be willing to bet you that we  
3 all have a very different idea of what that means. In  
4 any event, if that can be done without a great deal of  
5 effort, I think we ought to put that on our list.

6 MR. KLUCSIK: Follow-up on this topic, Your  
7 Honor?

8 JUDGE STOCKHOLM: Yes. Go ahead.

9 Is Staff done? Did you say you were done?

10 MR. BELSITO: We're not done. There's a  
11 pertinent follow-up question to this particular topic.

12 JUDGE STOCKHOLM: Yeah. Okay. Fine. I was  
13 just getting confused as to whether or not you were  
14 finished. Go ahead.

15 MR. KLUCSIK: Panel, is it correct that in  
16 measuring noise, sound pressure levels are additive?

17 MR. BUCCI: Yes.

18 MR. LIVERNOIS: I'd like to just add to that  
19 with an example. If you have, for example, 230 dBA  
20 levels of sound, you have 30 and 30 dBA, you don't get  
21 60 dBA. You get 33 dBA, okay, because you have to take  
22 them out of their decibel units, and then add the  
23 physical quantities, and then retake it. It's something  
24 that can be confusing. And I wanted to make sure it was

1 clear.

2 JUDGE STOCKHOLM: Decibels are logarithmic, no?

3 MR. LIVERNOIS: Correct.

4 JUDGE STOCKHOLM: Thank you.

5 MR. PICHARDO: And I should add, and this could  
6 be the worst-case scenario. You know, occasionally when  
7 you have the frequency in the opposite way, they cancel  
8 the noise, which normally in an engineering level, we're  
9 taking the worst-case scenario, but for the benefit, we  
10 could have zero noise.

11 JUDGE STOCKHOLM: Are you saying that you'd  
12 accept that kind of a certificate condition?

13 MR. PICHARDO: I would not go that far, Your  
14 Honor.

15 JUDGE STOCKHOLM: Okay. Just to make the  
16 record clear.

17 MR. KLUCSIK: So if I understand correctly  
18 then, in order to understand the noise level near a  
19 converter station once it is in operation, you would  
20 take the noise contributed from the existing nearby  
21 substation and add it -- and add the noise contributed  
22 by the converter station to it in the manner that  
23 Mr. Livernois has described; is that correct?

24 MR. LIVERNOIS: That's correct.

1 MR. KLUCSIK: Thank you.

2 Thank you, Your Honor. Thank you, Mr. Belsito.

3 BY MR. BELSITO:

4 Q I believe you just testified that the sound  
5 that the facility -- or the southern converter station  
6 would make would be best described by a hum; is that  
7 correct?

8 A (Bucci) It could be described as a hum. I  
9 don't know about best.

10 Q Okay. That's fair.

11 My next question would be, it's -- will the --  
12 will you guarantee that the southern converter station  
13 does not have a corona such that no cracking noises are  
14 also heard in the vicinity of the facility?

15 A (Livernois) The fact that the DC lines are  
16 connected to the converter station, and by their nature,  
17 the DC corona does have a low level of crackling, almost  
18 like bacon frying off in the distance without the smell,  
19 it's hard to isolate the line from the converter  
20 station. So, you know, there would be some, but I don't  
21 know that it would be substantial.

22 Q So there would be some crackling and some  
23 humming; fair enough?

24 A (Livernois) Fair enough.

1 Q Okay. Thank you.

2 Have any of the panelists been inside a  
3 high-voltage DC substation?

4 A (Pichardo) I've been there.

5 (Bucci) Yes.

6 Q While it was operating -- while it was  
7 operating at full-design capacity?

8 A (Pichardo) Even little bit beyond the capacity,  
9 too.

10 Q Mr. Pichardo, could you please --

11 JUDGE STOCKHOLM: You've got -- you've got to  
12 give those answers, especially when they're good ones,  
13 in the microphone.

14 MR. PICHARDO: Thank you, Your Honor.

15 A (Pichardo) I say the first answer to your  
16 question, yes, I've been in the converter station  
17 myself.

18 Q And the second half of that question, while it  
19 was operating at full-design capacity?

20 A (Pichardo) Yes, I've been in a full capacity  
21 station.

22 Q Was the equipment in that substation identical  
23 to what's proposed for the NYRI facility?

24 A (Pichardo) There is nothing identical in life,

1 but I will say they have the similar component,  
2 transformers, filter, reactors, capacitors, breakers,  
3 disconnect switches, a portion outdoor, indoor. The  
4 converter station, for instance, is indoor, inside the  
5 building. Many of the equipment is outdoor.

6 Q Thank you. If you could please refer to  
7 Exhibit 260, the information response -- the information  
8 request response we were referring to earlier. On parts  
9 5 and 6 of the question -- excuse me, parts 5 and 6 of  
10 the question requested operational noise levels  
11 including any pure tone generation from the equipment  
12 proposed to be installed. The response refers to  
13 various exhibits including octave bands, sound power  
14 levels in Table 4.3-1 in Appendix Q; is that correct?

15 A (Bucci) We're still trying to get the correct  
16 exhibit.

17 Q I'm sorry. It was DPS-117, which has been  
18 marked for identification as Exhibit 260.

19 MR. SINGER: Which number request in 117 are  
20 you referring to?

21 MR. BELSITO: Parts 5 and 6.

22 Q Have you found it?

23 A (Bucci) Yes.

24 Q Is it correct to say that the response refers

1 to various exhibits including octave band sound power  
2 levels in Table 4.3-1 in Appendix Q?

3 A (Bucci) I don't see the 4.3-1.

4 JUDGE STOCKHOLM: It's a response to question  
5 6.

6 A (Bucci) Okay. Yes.

7 Q What is an octave band?

8 A (Bucci) An octave band is a series of  
9 frequencies, consecutive frequencies between a given  
10 frequency and twice its number.

11 Q Do octave band sound power levels indicate  
12 whether there will be a pure tone, or are more detailed  
13 measurements appropriate?

14 A (Bucci) The answer to the first part of the  
15 question, it doesn't predict the pure tone.

16 Q So to predict -- I'll rephrase the second part  
17 of the question. To predict pure tone, would more  
18 detailed measurements be necessary?

19 A (Bucci) More detailed analysis, not necessarily  
20 measurements.

21 Q Okay. Are one-third octave band sound levels  
22 appropriate for evaluating the presence of pure tones?

23 A (Bucci) We did have a specific interrogatory  
24 about one-third octave bands and pure tones. I don't

1 recall the number right now.

2 (Livernois) I could I think clarify a little  
3 bit of that. The one-third octave essentially takes a  
4 regular octave and brakes it up into narrower bands.  
5 And so if a pure tone were to fall on one of the  
6 narrower bands, you might have, instead of a flat  
7 amplitude across one octave, you might have three  
8 amplitudes at different levels that when you average  
9 them, you get the -- the single octave result. So you  
10 would be able to narrow your frequency response and  
11 understand better using the third octave approach.

12 Q So the description you just gave, is that  
13 essentially the same response provided for part 7 of  
14 Exhibit 260, the same interrogatory we were just  
15 referring to? More specifically in that response in the  
16 second paragraph.

17 A (Livernois) Yeah. This paragraph talks about  
18 the presence of pure tones. And so if you had a, you  
19 know, a single octave measurement that was flat across  
20 the band, and then you went back and did a third octave,  
21 and perhaps you found one of those bands within the  
22 regular octave, one of the three was much higher, that  
23 would point you toward that there maybe a pure tone  
24 embedded in this octave. So it would give you more

1 information.

2 Q Thank you.

3 MR. BELSITO: Nothing further, Your Honor.

4 JUDGE PHILLIPS: We'll turn to the AG.

5 MS. LEARY: Thank you. Most of the my  
6 questions have been asked, so I have very few.

7 BY MS. LEARY:

8 Q Dr. Bailey, I reviewed some of the publications  
9 that you've authored. And I noted that you had looked  
10 at human health exposure issues with respect to electric  
11 and magnetic fields; is that fair to say?

12 A (Bailey) Yes.

13 Q So fundamentally, is there a potential for  
14 human health exposure or risk from DC lines?

15 A (Bailey) Not based upon the scientific evidence  
16 that has been reviewed.

17 Q When you say "not based on the scientific  
18 evidence that has been reviewed", would you consider  
19 that a significant level of scientific evidence, or is  
20 that because there isn't a lot of evidence?

21 A (Bailey) In risk assessment, we're not always  
22 given the ideal amount of evidence to address any  
23 question, and so all of our judgments are based upon the  
24 research that has been done to date, and -- and equally

1 important, our knowledge of the mechanisms involved.  
2 So, for instance, we know from the physics of the  
3 exposures that the charge on the electric field produces  
4 a charge on the outside of the body, and from a DC  
5 electric field, it is not producing any significant  
6 internal current or voltage. So we know things from the  
7 mechanisms involved and the physics of these exposures  
8 that tell us a great deal, and so that also gives us a  
9 clue as to about whether further investigation would be  
10 warranted.

11           So, for instance, the World Health Organization  
12 has looked at the issue of, for instance, electric  
13 fields and determined that, in fact, that there's --  
14 there's no basis for doing further research on that  
15 exposure from a health perspective. Similarly, for  
16 magnetic fields, the field from the line is a small  
17 fraction of that of the earth's geomagnetic field of  
18 which all life on earth has evolved.

19           So where the questions are with regard to DC  
20 magnetic fields have to do with the very strong DC  
21 magnetic fields that are produced, for instance, in a  
22 magnetic resonance imaging device. We're talking about  
23 fields in the order of 1-and-a-half to maybe 3 tesla.

24           So where there are uncertainties, it's not in

1 the area of where we're -- have exposures in our  
2 everyday life, which would encompass the fields from the  
3 NYRI line.

4 Q Well, in the best of all possible worlds, would  
5 you be more comfortable with more science in reaching a  
6 conclusion that there are not human health risks? Are  
7 you happy with the science you have?

8 A (Bailey) Science is -- is not the -- in the  
9 process of proving the absence of something. That's --  
10 that's clearly difficult. You know, for -- as a  
11 scientist, for me to prove that Winston Churchill is not  
12 alive and well and living in Argentina, there are only  
13 two ways to do this. Either we examine every person  
14 living in Argentina, or that you produce a person in  
15 front of me and we examine that person and say, is this  
16 Winston Churchill.

17 So what science can do is continually examine  
18 very specific questions, analogous to examining the  
19 person that you present here in the hearing and ask if  
20 they're Winston Churchill. So we do an experiment, we  
21 analyze data, and we make a judgment as to whether that  
22 evidence that we've examined is either supportive or not  
23 supportive of specific hypothesis. And it's this  
24 accumulation of evidence and testing of hypotheses that

1 we become more and more sure that there either is or  
2 isn't some appreciable health risk.

3 So given that we have these studies that have  
4 been done over many decades, we don't -- we don't see  
5 that at particularly the levels we're talking about that  
6 there is any likelihood of a health risk.

7 Q Would you identify the studies to which you  
8 refer?

9 A (Bailey) There's a whole literature which --  
10 some of which if you go to the major reviews that I  
11 cited, there are hundreds of studies.

12 Q On the DC line -- transmission line question  
13 with regard to human exposure, are those studies that  
14 you're referring to directly related to whether  
15 high-voltage direct current transmission lines present a  
16 human health risk?

17 A (Bailey) They're relevant to that question in  
18 that --

19 Q Do they address that question?

20 A (Bailey) Yes.

21 Q Okay. So you're happy with the amount of  
22 science in order to conclude, as I understand your  
23 testimony, that a high-voltage direct current line does  
24 not present a human health risk?

1           A           (Bailey) Yes. But like any scientist, we  
2 always like to have more money for research.

3           Q           Can you tell me the publications in which you  
4 participated or authored, whether -- let's just take the  
5 first five or six listed on page --

6           A           (Bailey) Which document are you referring to?

7           Q           Page 2 of your resume, which is Exhibit 238,  
8 Hearing Exhibit 238. What was the funding source for  
9 those studies? And I'm referring specifically to the  
10 human health risk assessment studies.

11          A           (Bailey) Just one moment. There's -- there's  
12 two -- referring to Exhibit WHB/TGL-1?

13          Q           Yes.

14          A           (Bailey) Okay. And your question again is?  
15 MS. LEARY: Would you read back the question?  
16 JUDGE STOCKHOLM: Yes, please.

17                    (Requested portion of the record read back by  
18 the reporter.)

19          Q           Let me broaden that from just -- I don't want  
20 you to get tied up in human health risk.

21          A           (Bailey) Is there a specific study that you  
22 have a question about?

23          Q           I do. I'm asking about the funding source for  
24 the first six studies that are listed on that page that

1 date from 2002 to 2008. Who funded -- who funded those  
2 studies?

3 A (Bailey) Publications Kavet, et al, 2008;  
4 Bailey and Nyenhuis 2005; Bracken, et al, 2005; and  
5 Bailey 2002 were supported by a research contract from  
6 the Electric Power Research Institute.

7 Q So I read your testimony or the panel's  
8 testimony to indicate that the PSC standard that I  
9 believe Mr. -- I'm not sure which DPS witness presented  
10 it, but you indicate that that standard is applicable to  
11 an AC line rather than a DC line. Is that your  
12 testimony?

13 A (Bailey) That was how that standard was  
14 developed, yes.

15 Q Well, is it your testimony that that standard  
16 would not be applicable to the NYRI line?

17 A (Bailey) I don't believe that there is a  
18 scientific or engineering basis to take a number that  
19 was specifically developed for an AC line and apply it  
20 to a DC line that has different methods of interacting  
21 with nearby objects.

22 Q So is it NYRI's position that that standard is  
23 not applicable to its line?

24 A (Bailey) I can't speak for NYRI, but from a

1 scientific perspective, I do not believe it does.

2 Q Mr. Thompson?

3 A (Thompson) Yes. I've been told that there is  
4 no indication that there's any judicial basis either  
5 for -- the application of those standards, the AC  
6 standards to a DC line.

7 Q So I'm asking just a slightly different  
8 question, which is, is it the company's position that  
9 that standard does not apply, not whether there's  
10 scientific basis or evidence or any of that, but is it  
11 your position it does not apply?

12 A (Thompson) We believe that's correct.

13 Q Okay. This is also for the panel. And this is  
14 my last question.

15 There's been some discussion about what will  
16 happen in the right-of-way this morning. Is there any  
17 limitation to the public's ability to gain access to the  
18 right-of-way so that on any given day in, say, May, you  
19 would not see hikers or farmers or children anywhere  
20 near the right-of-way? Is there anything that blocks  
21 access?

22 A (Thompson) No. It's open access.

23 Q Thank you.

24 A (Thompson) Or normal access I should say.

1 MR. SINGER: Well, you're just referring to the  
2 transmission line right-of-way, not the converter  
3 stations.

4 MR. THOMPSON: That's correct. I'm sorry.  
5 Yeah, permanent facilities like converter stations,  
6 transition stations are all fenced in.

7 MS. LEARY: Right. Thank you for that  
8 clarification.

9 I have nothing further.

10 MS. WILKINSON: Your Honor, I have a couple  
11 questions if that's possible.

12 JUDGE STOCKHOLM: And I was going to compliment  
13 you, counselor, on only putting evidence into the  
14 record.

15 MS. WILKINSON: It's based on a question you  
16 asked and a couple things came up. And it's going to be  
17 very short.

18 JUDGE STOCKHOLM: Go ahead.

19 BY MS. WILKINSON:

20 Q Mr. Thompson, I believe NYRI has stated that it  
21 is the intention to turn over operation of the line to  
22 NYISO?

23 A (Thompson) That is correct.

24 Q And also the maintenance of the line to other

1 transmission owners that you might contract with?

2 A (Thompson) We have not made permanent operation  
3 and maintenance arrangements. That was presented as one  
4 of the options we certainly would look to.

5 Q But I believe in response to -- and I'll give  
6 the discovery request. You had stated in response to  
7 DPS-103 that it would be NYRI's intent to subcontract --

8 A (Thompson) That's our intent. That's correct.

9 Q Your intent. So with respect to, for example,  
10 Mr. Blow's questioning about how NYRI would handle  
11 issues with farmers to ensure their safety, which of  
12 those entities would you intend to handle that issue?

13 A (Thompson) That would be dependent upon which  
14 entities we end up contracting with and what services  
15 they're able to provide. It could end up being a NYRI  
16 group that ends up providing that.

17 Q But it's possible that another entity with whom  
18 you contract could --

19 A (Thompson) Absolutely.

20 Q And another entity would be handling noise  
21 complaints, for example?

22 A (Thompson) I don't know about noise complaints.  
23 Certainly I think there's -- you have to look at the  
24 project in two phases. One would be the initial

1 construction and I'll call it start-up or commissioning  
2 phase. That's when obviously that we expect to have a  
3 very active group, whether it's a 800 number or some  
4 sort of a call-in center to field general complaints.  
5 One of them was specifically brought up, I forgot what  
6 this morning somebody was asking about, but anyway, it  
7 would be an 800 number for people to call. And we would  
8 log their complaints, track them, make sure we respond  
9 to them and so forth. I think it was a noise issue this  
10 morning was the question.

11 Q Yeah, I think it was.

12 A (Thompson) So we would field that through the  
13 construction, the start-up and the initial operation.  
14 Beyond that period, we would expect additional  
15 complaints or issues coming up to be very minimal. And  
16 those then, depending upon what arrangements we make for  
17 normal maintenance, including, you know, clearing and so  
18 forth, that's where we would expect probably the  
19 majority of additional comments or questions to arise  
20 would be relative to right-of-way maintenance.  
21 Depending upon who we contract with for that, we may  
22 turn over addressing those kinds of issues, too, at  
23 least initially.

24 Q Okay. So it's possible that compliance of

1 certificate conditions could be turned over to another  
2 transmission owner on behalf of NYRI?

3 A (Thompson) When you say "compliance", certainly  
4 there's always going to be a corporate entity that is  
5 responsible and maintains that. We may subcontract a  
6 large portion of those types of activities out, which  
7 doesn't mean that we're not responsible for them.

8 Q Understood. Thank you.

9 A (Thompson) Sure.

10 MS. WILKINSON: I'm done.

11 BY JUDGE STOCKHOLM:

12 Q Just to follow-up on that last piece just a  
13 little bit. What is NYRI's -- what are NYRI's thoughts  
14 about what is going to be required from a corporate  
15 perspective in terms of operating this line? Do you  
16 intend to, for example, have an office and a staff and  
17 how many employees and all those kinds of issues post  
18 construction?

19 A (Thompson) Sure. We will have an office and a  
20 staff. As a minimum, we'll have some administrative  
21 duties reporting specifically more along financial  
22 aspects, reporting back to the lenders and so forth.  
23 We'll certainly have environmental compliance  
24 requirements, whether we subcontract those out or not.

1 So there are a number of I guess unresolved issues  
2 relative to who and how we arrange for things, whether  
3 we do it internally with our own staff or externally  
4 through subcontracting to existing utilities or other  
5 existing service suppliers. There will be a core group.  
6 There will always probably be a president of the company  
7 and a secretary and the staff and some accountants and  
8 secretaries. Beyond that, I can't say.

9 Q Okay. There were some questions to the panel  
10 with regard to health and safety effects of DC lines.  
11 And I'd like to ask health and safety effects just for a  
12 second of AC lines. There are a number of studies that  
13 I have seen have been cited by various and sundry of  
14 witnesses, some of which might fairly be concluded on  
15 the AC side to indicate health and safety -- potential  
16 health and safety impacts from high-voltage AC lines.  
17 Do you agree with that?

18 A (Bailey) There has been for many decades  
19 ongoing research investigation to the question of  
20 whether exposure to strong alternating current electric  
21 and magnetic fields might pose a public health risk.  
22 Much of this focus has developed subsequent to a study  
23 of distribution lines primarily in Denver, Colorado in  
24 1979.

1           Since then, maybe 35 epidemiology studies have  
2           been performed in Europe and the United States and  
3           Canada, and also in Asia in which the statistical  
4           associations between distance from transmission lines or  
5           estimated exposures to people living near transmission  
6           lines or using electric appliances have been looked at  
7           to determine whether there's a basis for doing  
8           additional research on this topic.

9           This question came up prominently in the late  
10          1980s and early 1990s. Congress appropriated money and  
11          directed the National Institute of Environmental Health  
12          Sciences to investigate these statistical associations,  
13          and they launched a research program to look into this,  
14          and they reported back to Congress in 1999.

15          Since that time, numerous other scientific and  
16          health agencies have looked into the research on this  
17          topic; for instance, the World Health Organization  
18          issued a monograph in June of 2007 that summarized a  
19          more than a year-long review of the scientific data.  
20          Other agencies in Great Britain, the National  
21          Radiological Protection Board, the Swedish Radiation  
22          Institute, the Health Council in the Netherlands,  
23          numerous agencies have looked into this.

24          Also, the International Agency for Research in

1 Cancer assembled a panel to look into the potential  
2 relationship between exposure to these fields, including  
3 static electric and magnetic fields and cancer. I was a  
4 member of that scientific review panel that IARC  
5 assembled. And what our panel concluded was that for AC  
6 power lines and AC sources, that there wasn't an issue  
7 with regard to AC electric fields, but there was a  
8 statistical association that had been reported in  
9 several studies between estimated exposures to magnetic  
10 fields and childhood leukemia. The evidence was  
11 insufficient to look at associations with other types of  
12 cancer, other health effects. But here we saw an  
13 association which appeared to be consistent.

14 The difficulty is, however, that in these types  
15 of studies, that the -- the numbers of children that in  
16 the higher exposure levels is very small. And so what  
17 could be ruled out is associations for a vast percentage  
18 of the population, but where you have exposures that are  
19 very unusual because they're high and you have a small  
20 number of children in those exposed groups, and you have  
21 uncertainty about whether those groups that are being  
22 compared are truly comparable. So you have questions  
23 about does the difference -- does the association arise  
24 because the groups that we're comparing are not exactly

1 the same, they haven't been drawn from the same  
2 population base; is there some kind of systematic bias  
3 in the way that we assembled one of the groups; is there  
4 a systematic error in terms of the way exposure was  
5 assessed?

6 So these are all questions that have precluded  
7 us and other agencies together with the absence of a  
8 mechanism that would explain how these fields would  
9 cause cancer or any good evidence from animal studies  
10 that these fields cause cancer or have toxic effects.  
11 Putting all those things together, we do not come to the  
12 conclusion that, in fact, that there is a causal  
13 relationship between exposure to higher average magnetic  
14 field levels and health effects.

15 There are some -- in this area, there are some  
16 additional questions that have been deemed worthy of  
17 research. And WHO has identified a program to -- for  
18 agencies around the world to fill in those gaps, but  
19 they said given the weakness of the evidence, that it  
20 would be appropriate to take only low or no-cost steps  
21 to minimize exposures. They did not conclude that the  
22 amount of evidence and its strength was sufficient to  
23 recommend any further public health action.

24 Q Thank you. That was a little longer answer

1 than I anticipated for that question, but thank you for  
2 your thoroughness.

3           It sounds to me from your answer as if the --  
4 and I'll let you characterize it the vast majority, the  
5 majority, however that may be, of scientists believe  
6 that an electric field effects are not consequential  
7 with regard to health impacts; is that fair to say?

8           A       (Bailey) I think that's -- that's true both for  
9 alternating current and DC current electric fields, yes.

10          Q       Okay. So we're only dealing with the magnetic  
11 current. Is there any consensus in the field with  
12 regard to how magnetic current may be having health  
13 effects?

14          A       (Bailey) For -- for AC magnetic fields, there  
15 are a number of hypotheses that have been advanced.  
16 None of them appear to be supported or able to explain  
17 any large fraction of the scientific data, so that  
18 essentially there is no mechanism that would explain  
19 this. For instance, the National Institute of  
20 Environmental Health Sciences conducted studies on a  
21 national toxicology program in which animals were  
22 exposed over their entire lifetime to levels of magnetic  
23 fields that would be 50 -- up to 10,000 times higher  
24 than what the average field would be in your home.

1 Other investigations in Asia did similar studies and  
2 went to higher levels of 50,000 times the average field  
3 level in a home. At the end of the study, the animals  
4 were sacrificed, their tissues examined under the  
5 microscope, and there was no consistent difference in  
6 the characteristics of the cells, whether it be cancer  
7 or other evidence of toxic effects between these two  
8 groups.

9 Q These are alternating fields?

10 A (Bailey) These are alternating --

11 Q Alternating magnetic fields?

12 A (Bailey) Alternating magnetic fields. So we  
13 don't have a mechanism that would explain how these  
14 fields at such weak levels would have an adverse health  
15 effect.

16 Q Is there any recognized conclusion that an  
17 alternating field might have an effect whereas a static  
18 field would not?

19 A (Bailey) Yes. I mean, one of the types of  
20 mechanisms that -- that has not been put forth to  
21 explain statistical associations with childhood  
22 leukemia, but alternating fields, whether they're  
23 electric or magnetic, have the ability to induce  
24 voltages and currents within nearby conductive objects

1 including people, trees, and so on, whereas a static  
2 field does not. And so that is a major difference in  
3 terms of their interactions with the environment between  
4 static fields and alternating fields. And so that is a  
5 principal mechanism that differentiates these two types  
6 of exposures.

7 Q Thank you.

8 One other topic. I believe it was CARI asked  
9 you questions about when the last major DC line was  
10 built in the United States. And I believe Mr. Bucci  
11 said, among other things, he couldn't off the top of his  
12 head remember the AC line that was built in the United  
13 States?

14 A (Bucci) Major.

15 Q Major. Right. Yes. Yes.

16 My question is, there are a number of proposals  
17 that I've seen in the Trade Press, there's a line from  
18 Arizona into California. There's a line that's being  
19 proposed from Ohio into PJM. I think there's another  
20 line in Canada that is -- that is a DC line that's being  
21 proposed. But what I'd like to ask you is what is on  
22 the drawing board now that is DC?

23 A (Bucci) Well, Your Honor, within the United  
24 States, there's several lines being proposed from --

1 being proposed or in the planning stages, preliminary  
2 engineering stages, some are in licensing stages, lines  
3 proposed from Canada -- additional lines proposed from  
4 Canada into the United States, particularly New England,  
5 New York, planning awards are in planning stages.  
6 There's additional HVDC lines being proposed in  
7 California from, again -- most of these lines are for  
8 bringing low-cost power, say, for example, hydropower  
9 into the population centers which are far away from the  
10 hydropower source. There are additional HVDC lines  
11 under consideration for bringing in other renewable  
12 energy sources that are, again, are far away from the  
13 load centers.

14           There are some -- there are some smaller HVDC  
15 projects that are underway back to back, HVDC for  
16 connecting non-synchronous AC -- portions of the AC  
17 system together and strengthening the ties.

18           Q       Do you know if any of the -- either of the  
19 projects, either I think it's called the Trail project  
20 from Ohio through Pennsylvania, West Virginia, et  
21 cetera, into the PJM system or -- and I may be wrong  
22 about this, but I think the name of the project is the  
23 Sunrise Line that runs from Arizona into San Diego. I  
24 may have the name of that line wrong, but are they DC

1 lines, do you know?

2 A (Bucci) The Trail project is AC. The -- the  
3 lines from at southern California --

4 MS. LEARY: Devers-Palo Verde.

5 MR. BUCCI: Excuse me?

6 MS. LEARY: Devers-Palo Verde.

7 A (Bucci) That's an AC line, 345 kV.

8 Q Okay. Those are both AC. Why would -- I know  
9 it's speculation. I object, too. But why -- why do you  
10 think that they have not proposed those as DC? Do you  
11 have any idea?

12 A (Bucci) Yeah. I'm sure that one of the reasons  
13 is cost, but, you know, DC still has to overcome the  
14 cost of the converter stations at each end, number one.  
15 Number two, it needs to be point to point in order to be  
16 economical, in other words, no --

17 Q No off-ramps.

18 A (Bucci) No off-ramps. So those are --

19 Q Okay. Well, I was asking to you speculate  
20 anyway, so I'm not sure that that's making a good  
21 record, but that gives me some ideas. Thank you.

22 JUDGE STOCKHOLM: I don't have anything else.

23 MR. MALONE: Judge, can I ask one follow-up  
24 questions based on your questions?

1 BY MR. MALONE:

2 Q On the Marcy South Alternate, you'd had a  
3 situation where you had a magnetic field environment  
4 where there are AC and DC, correct?

5 A (Livernois) That's correct.

6 Q Have there been any studies that deal with that  
7 particular combination?

8 A (Livernois) When you say "study" --

9 Q Health studies that reflect that an AC/DC in  
10 the same magnetic environment.

11 A (Bailey) There have been experimental studies  
12 looking at that. In fact, there are studies in  
13 literature that have looked at those combinations, but  
14 in terms of studies around AC/DC transmission line  
15 combinations together, I don't know of any human  
16 epidemiology studies that have been done of those  
17 combinations.

18 MR. MALONE: Thank you.

19 MS. LEARY: Your Honor, I have one follow-up as  
20 well based on your question.

21 BY MS. LEARY:

22 Q Dr. Bailey, would it be fair to say that there  
23 are scientists in the United States and around the world  
24 that would disagree with your conclusion that there's no

1 association between exposure and risk particularly in  
2 the context of childhood leukemia? I mean, that's not a  
3 universal position, is it?

4 A (Bailey) Well, first of all, I think you  
5 mischaracterized what my statement -- my position was.  
6 I didn't say that there was no association. In fact, I  
7 was one of the people who identified this association  
8 with the other panel members for the International  
9 Agency for Research in Cancer. What I pointed to was  
10 none of the health agencies that I mentioned in my  
11 testimony have reached the conclusion that that  
12 statistical association means that there is a causal  
13 relationship between exposure to magnetic fields and the  
14 development of childhood leukemia.

15 Q Are you saying none of the organizations  
16 identified in your testimony or none of the  
17 organizations in the United States or the world? I just  
18 want to clarify.

19 A (Bailey) I don't know of a scientific or health  
20 agency that has drawn a conclusion that exposure to  
21 electric and magnetic fields are a cause of disease.  
22 Now, obviously on any topic that we come across whether  
23 it's, you know, topic in science or who's going to win  
24 the World Series, there are people who can disagree with

1 those conclusions, but when people ask me where should  
2 they go for guidance on assessing questions like  
3 electric and magnetic fields, I recommend that they look  
4 to the reviews that have been conducted by  
5 multi-disciplinary panels of scientists who have  
6 experience in all the areas necessary to evaluate the  
7 research and to look at all of the research rather than  
8 cherry-picking individual studies and trying to draw  
9 conclusions from this.

10 MS. LEARY: Thank you.

11 JUDGE PHILLIPS: Do you know if you have  
12 redirect?

13 MR. SINGER: Yes, I will have redirect.

14 JUDGE PHILLIPS: Do you know if you have a lot,  
15 like more than ten minutes?

16 MR. SINGER: I think that's likely, but I also  
17 want to talk to the witnesses for a few minutes, if  
18 that's acceptable.

19 JUDGE PHILLIPS: I'm trying to figure out  
20 whether we should break for lunch. So I'd like to break  
21 for lunch. If everyone can come back at ten of 2.

22 MR. MALONE: Judge, can I just ask a question?  
23 On Thursday or Friday --

24 JUDGE PHILLIPS: I'm sorry. Do you want to be

1 on the record?

2 MR. MALONE: Yes, if we could be. I'm sorry.

3 JUDGE PHILLIPS: Okay. Stay on the record.

4 MR. MALONE: There was a question asked on  
5 Thursday or Friday, I don't recall now, and I believe  
6 Mr. Thompson indicated that he wanted the state to have  
7 the right to make a decision in this case. And I  
8 believe Your Honor asked whether he would be willing to  
9 waive the one-year requirement. And Mr. Thompson  
10 indicated that he would have to speak with his  
11 investors. I was just wondering if we had any word  
12 about that.

13 JUDGE STOCKHOLM: I don't know that we've had  
14 any word, although just for the record, your  
15 description, while more than sufficient to bring the  
16 conversation to mind, is not necessarily in every detail  
17 exactly what I said, for the record. But I'll ask  
18 Mr. Thompson.

19 MR. THOMPSON: Yes, Your Honor, I did raise the  
20 request with the investors. And in light of some of the  
21 recent developments and whatnot, I think the investors  
22 do not feel comfortable waiving any of their current  
23 rights beyond -- certainly there are -- there are  
24 continued commitment and appearance here. And the

1 hearings I think supports that we still do have a desire  
2 to push forward in the state process, but the investors  
3 are not willing to waive their rights to pursue other  
4 things.

5 JUDGE STOCKHOLM: Thank you.

6 MR. SINGER: Your Honor, I would be remiss if I  
7 didn't add to that response.

8 It's our position that NYRI could commence the  
9 FERC pre-filing process now, because the one-year period  
10 under Section 1221 of the Energy Policy Act ended on  
11 February 20th of 2009, which was one year after we filed  
12 the application in this case.

13 The FERC has indicated that its pre-filing  
14 process could run in parallel to a state certification  
15 process. We, as Mr. Thompson said, continually evaluate  
16 all our options, and that is something that is being  
17 evaluated. And no decisions have been made, but, you  
18 know, that is our position, that the definition in the  
19 Act, as well as the FERC order implementing the Act  
20 would -- does state that the one-year period starts upon  
21 the filing of the application.

22 MR. KLUCSIK: Your Honor, I would be remiss if  
23 I didn't put on the record the fact that CARI does not  
24 share Mr. Singer's view.

1           JUDGE STOCKHOLM: I understand. And these  
2 issues are not going to be decided by this bench. The  
3 thought, however, of having these parties run in  
4 parallel, these hearings in New York, while you're  
5 flying back and forth to D.C. to hold their hearings  
6 does seem to be an interesting picture.

7           MR. SINGER: Well, I don't want to belabor this  
8 point because it's almost lunchtime, and I'm sure  
9 everyone, once you mention lunch, gets kind of hungry,  
10 but -- I know I do, but the FERC -- the pre-filing  
11 process at the Federal Energy Regulatory Commission does  
12 not involve hearings. It is a -- essentially a process  
13 between the applicant and the FERC to decide which --  
14 which documents and how studies should be done.

15          MS. WILKINSON: Your Honor.

16          JUDGE STOCKHOLM: We have a couple we could  
17 offer them.

18          Yes.

19          MS. WILKINSON: If there are documents  
20 associated with NYRI's discussions with FERC, is it  
21 possible that the parties here could get a copy of them  
22 so we're aware of what is going on with the pre-filing  
23 process?

24          JUDGE STOCKHOLM: I would ask you to discuss

1 that with counsel off the record, and you certainly can  
2 still do discovery in this proceeding.

3 MS. WILKINSON: Thank you.

4 MR. SINGER: Just to be clear, we haven't  
5 initiated any type of pre-filing process at FERC.

6 JUDGE STOCKHOLM: I didn't -- I didn't hear you  
7 to say that.

8 JUDGE PHILLIPS: Okay. Now we're going break  
9 for lunch, but you still have to come back at ten of 2.  
10 Thank you.

11 (A lunch recess was taken.)

12 JUDGE PHILLIPS: I believe we were going to  
13 have redirect from NYRI.

14 MR. SINGER: Thank you, Your Honor.

15 REDIRECT EXAMINATION

16 BY MR. SINGER:

17 Q Mr. Livernois, there were some questions I  
18 believe by Mr. Klucsik about measurements of ambient  
19 audible noise on the route and at the converter  
20 stations. Do you recall that?

21 A (Livernois) Yes, I do.

22 Q In doing your work for NYRI, did you assume an  
23 ambient audible noise level for purposes of your  
24 analysis?

1           A       (Livernois) Yes, we did. In the analysis, we  
2 used essentially a zero noise level for the ambient,  
3 which would -- which would present the noise contributed  
4 by the line as worst case. So anything that we would  
5 have related to measurements, we've already captured the  
6 worst case with our data.

7           Q       Could you explain why you would describe that  
8 as worst case?

9           A       (Livernois) Because -- yes, I can. And I  
10 believe I talked about it a little bit earlier, but when  
11 you have essentially two levels of acoustic noise  
12 represented in terms of dB, the change that you get in  
13 the actual level between, say -- let's just use an  
14 example again. If you have 30 dB from one source and 30  
15 dB from another source, and you add them together, you  
16 don't get 60 dB. You would get 33 dB. And so -- and  
17 that's with the typical ambient noise level. If you  
18 assume zero noise level and you add 30 dB noise level,  
19 then the combination would still be 30 dB because you'd  
20 be increasing it from zero. So it makes it look worse  
21 than it might be in reality.

22          Q       And just to be clear, to your knowledge, has  
23 NYRI asked for any waivers of any applicable noise  
24 regulations?

1           A           (Livernois) Not to my knowledge, no.

2           Q           Let's turn to the issue of AM interference that  
3 came up during the cross-examination this morning. Do  
4 you know or could you give us an opinion about how far  
5 the effect on AM RF interference would go  
6 geographically?

7           A           (Livernois) Yes. About 250 feet away from the  
8 tower, the RF noise decreases to a level that is -- it's  
9 essentially the ambient level of RF noise in the AM  
10 receiving band.

11          Q           So that was -- I'm sorry. I missed that. You  
12 said about 200 feet?

13          A           (Livernois) About 250 feet.

14          Q           And can even that effect be mitigated?

15          A           (Livernois) Yes, in fact, it can be. There's a  
16 number of ways you could do it. You know, one would be  
17 to use a different receiving antenna inside -- if we  
18 just look at the -- a residence and someone says that  
19 they can no longer receive their AM radio with their  
20 vertical whip antenna, there are loop antennas that you  
21 can actually orient that would isolate and separate the  
22 field contributed by the transmission line and the field  
23 from the AM station. And so in the old days when you'd  
24 move your antenna to improve your reception for your tv,

1 same concept holds for AM radio.

2 Q Let's turn to the questioning this morning with  
3 regard to potential loading on the NYRI transmission  
4 line. How often would you expect the load level on the  
5 line to change?

6 A (Livernois) The way that DC lines are used over  
7 a period of let's just say 24 hours is you might have a  
8 total of three changes in level over an entire period.  
9 And it's -- and so, essentially, if you go from a low  
10 load level to a higher load level, that might take  
11 several hours or several minutes at a minimum to get  
12 there. And so the effect that that would have on the  
13 magnetic field, it would mean that the magnetic field  
14 away from the line would change at precisely that rate  
15 for a DC line.

16 When you compare that to how a high-voltage AC  
17 line is used, in addition to more rapid amplitude  
18 changes, you also have the oscillating nature of the AC  
19 field at 60 times per second. So if you were to do a  
20 typical comparison, it would be orders of magnitude more  
21 frequent changes in an AC magnetic field than it would  
22 be in a DC magnetic field in the context that we're  
23 speaking about.

24 JUDGE STOCKHOLM: Would you define "orders of

1 magnitude"?

2 MR. LIVERNOIS: Yes. A hundred, a thousand,  
3 10,000, or powers of ten.

4 Q Is there any experience that you're aware of  
5 with respect to how often there's load changes on a DC  
6 line?

7 A (Bailey) As part of work that we did for the  
8 Crossan cable project, which is a submarine cable  
9 connecting Connecticut and Long Island, we monitored  
10 over many hours the loading on the DC line. And it's  
11 much as described by Mr. Livernois, very, very slowing  
12 changes that took many minutes or hours to accomplish.

13 Q Now, given that, what relevance would you  
14 expect that effect in terms of changes in magnetic field  
15 from a DC line to have on equipment, say, the type of  
16 equipment you might find in a nanotech facility?

17 A (Livernois) We -- we looked at some of the  
18 typical types of equipment that are used in a higher  
19 tech facility. And the ones that it was expressed  
20 concern, it had to do with devices such as scanning  
21 electron microscopes and electron beam lithography  
22 machines. And essentially these devices use little  
23 beams of electrons to do certain things. And a moving  
24 electron is a moving charge, and its affected by changes

1 in magnetic field if that change is rapid enough. For  
2 the -- for the types of changes with time of the load on  
3 a DC line and how that would translate to a change in  
4 its magnetic field, it's not going to have an effect  
5 effectively on the performance of these devices.

6 Now, if by chance that, you know, that was --  
7 that was claimed or identified, there are  
8 self-compensating scanning electron microscopes and  
9 self-compensating electron beam lithography devices  
10 where they basically have an internal magnetic field  
11 generator that offsets any changes in the ambient. So,  
12 you know, these devices are very sensitive to certain  
13 situations, and so there's been equipment designed to  
14 address that.

15 Q Turning to the -- what's been marked as Exhibit  
16 255 in this proceeding, which was the interrogatory  
17 response that counsel for NYPA pointed you to. He went  
18 over a number of the responses that were provided by New  
19 York Regional Interconnect regarding the calculations  
20 out to a certain level. Do you recall that?

21 A (Livernois) Yes, I do.

22 Q And is it correct that most of NYRI's  
23 calculations that are covered in Exhibit 255 were out to  
24 250 feet from the center line?

1           A       (Livernois) Yes. That's correct.

2           Q       And could you tell us why you didn't go beyond  
3       250 feet?

4           A       (Livernois) In effect, it's because the levels  
5       that were observed out there in the calculation, that  
6       there's no -- we didn't identify anything that it would  
7       adversely impact. So we know it's only going to get  
8       smaller if you get away from the transmission line, and  
9       we know that it follows an approximately one over the  
10      distance square rule. So, you know, we felt at plus and  
11      minus 250 feet, we had identified any potential risks.  
12      And those that we did identify, there are mitigation  
13      techniques.

14          Q       Thank you.

15                 MR. SINGER: That's all I have.

16                 JUDGE PHILLIPS: Does any party have recross?

17                 MS. WILKINSON: Your Honor, I have an area of  
18      clarification, and maybe Mr. Singer can clarify, but I  
19      thought I heard the panel say just now that NYRI was not  
20      requesting any waivers from local noise ordinances. Is  
21      that correct?

22                 JUDGE PHILLIPS: That's what I thought I heard,  
23      but --

24                 MS. WILKINSON: Okay. Well, then we may have

1 to go through --

2 JUDGE PHILLIPS: Did you want them to confirm?

3 MS. WILKINSON: Well, I'm looking at Exhibit 7,  
4 Local Ordinances, and I see a number of local ordinances  
5 where NYRI has requested a waiver from noise ordinances.  
6 So I'm trying to understand for the record what -- what  
7 it is. I mean, I can go through some of them.

8 MR. SINGER: No. I was referring to during the  
9 operation phase. I think we have requested some  
10 temporary during the construction phase.

11 JUDGE PHILLIPS: Okay. Do you still need  
12 clarification, or did you want to still ask some  
13 questions?

14 MS. WILKINSON: Okay. So I just -- yeah. So  
15 for clarification, the waiver requests here in Exhibit 7  
16 are only for the construction phase with respect to  
17 noise?

18 MR. SINGER: That's correct.

19 MS. WILKINSON: Okay. But -- Len, can you tell  
20 us where that is, where that says it?

21 MR. BISSELL: If you refer to the  
22 description --

23 JUDGE PHILLIPS: You need to use the  
24 microphone.

1 MR. BISSELL: If you refer to the description  
2 where we've requested waivers from local noise  
3 ordinances, those descriptions relate to, for example,  
4 the need to either complete construction to make an area  
5 safe or in order to meet a NYISO requirement in order to  
6 get the line fixed. The description itself gives the  
7 limiting nature to which we request waivers.

8 MS. WILKINSON: All right.

9 RECROSS-EXAMINATION

10 BY MS. WILKINSON:

11 Q May I ask the panel, then, have they assessed  
12 the difference in noise impacts from the project during  
13 construction versus the operational phase?

14 A (Livernois) I have not. We looked at  
15 operational phase only.

16 MS. WILKINSON: Thank you.

17 JUDGE PHILLIPS: Was that your only --

18 MS. WILKINSON: Yes.

19 A (Bucci) We have --

20 JUDGE PHILLIPS: I'm sorry. I don't know who  
21 that was talking.

22 MR. BUCCI: That was me. Sorry.

23 A (Bucci) Yes, we have --

24 MR. BUCCI: I'm not Mr. Woody.

1           A           (Bucci) We did look at -- certainly along the  
2 transmission line after the construction period, the  
3 noise is -- is very much reduced. And the same would go  
4 for the converter station, not only reduced, but a  
5 different type of noise. The operational noise is  
6 described in the -- in the -- well, for the converter  
7 stations, it's described in the Appendix Q during  
8 operation. During construction, we talk about  
9 construction vehicle type noises. None of that would  
10 exist. Diesel engine type noise. That's only during  
11 the construction phase.

12                   BY MS. WILKINSON:

13           Q           Okay, but this is not a quantitative analysis  
14 in terms of decibel levels difference; is that correct,  
15 Mr. Bucci?

16           A           (Bucci) No. I would say no.

17           Q           So you present -- you've presented a  
18 difference -- a comparative of the difference of the  
19 noise levels during construction versus operation in  
20 terms of decibel levels?

21           A           (Bucci) Not exactly the way you put it. We've  
22 asked for waivers where we felt that we couldn't meet  
23 the -- we might not be able to meet during periods of  
24 construction the decibel levels or other noise issues in

1 the local ordinances, and whereas we're going to meet  
2 all decibel levels for operation.

3 MS. WILKINSON: Okay. Thank you.

4 JUDGE PHILLIPS: I think CARI indicated  
5 recross.

6 MR. KLUCSIK: Yes, Your Honor.

7 BY MR. KLUCSIK:

8 Q Mr. Livernore -- I'm sorry, Livernois, with  
9 respect to the measurement and calculation of -- with  
10 respect to the calculation of audible noise, if you  
11 assume an existing noise level of zero in the ambient  
12 and add transmission line noise of 50 decibels, is it  
13 your testimony that the resulting noise level would be  
14 50 decibels?

15 A (Livernois) That's what the modeling indicated,  
16 right, because you're adding it -- you're adding it to a  
17 quiet area, and then you add 50 decibels, that's what  
18 you're going to get.

19 Q Now, if you use some value larger than zero for  
20 the existing condition and you add 50 decibels for the  
21 transmission line, the result of that calculation would  
22 be more than 50 decibels, wouldn't it?

23 A (Livernois) That's correct. It would. When I  
24 said worst case, I was referring to the change in the

1 noise contributed by the transmission line. The  
2 difference between the 50 and what you add, I understand  
3 where you're going, you know, so.

4 Q So in that sense, the use of a zero value would  
5 not represent the worst case?

6 A (Livernois) It depends on what -- it would  
7 represent the worst case in that the change to the  
8 ambient would be less than -- than it would be for a  
9 zero ambient.

10 Q But the calculated noise level during operation  
11 of the transmission line would be higher if you assume a  
12 non-zero value for the existing ambient?

13 A (Livernois) When you add a non-zero ambient to  
14 the calculated level of ambient audible noise, it will  
15 be a little higher than what it is, right.

16 Q Thank you.

17 With respect to AM radio reception, is it  
18 NYRI's position that they're going to buy new antennas  
19 for everybody who has AM radio interference?

20 A (Livernois) I actually asked that question over  
21 lunch. And they said yes, so -- so.

22 Q Then I'd assume they would be willing to take  
23 an ordering condition to that effect.

24 MR. SINGER: Well, I think we've already

1 indicated that we would work with anyone who experienced  
2 that and attempt to do whatever was necessary to  
3 mitigate that, and that would include purchasing those  
4 items if that's what it came to.

5 JUDGE STOCKHOLM: And -- and Staff can correct  
6 me if I'm wrong, but I believe similar radio and tv  
7 interference issues were dealt with on previous power  
8 lines in the same way. Do you know if that's true,  
9 Mr. Blow?

10 MR. BLOW: I'm virtually certain, Your Honor.

11 JUDGE STOCKHOLM: Thank you.

12 BY MR. KLUCSIK:

13 Q Mr. Livernois, in response to Mr. Singer's  
14 question, you addressed some opinions with respect to  
15 the potential impact of transmission line magnetic  
16 fields, fields generated -- magnetic fields generated by  
17 the transmission line on the operation of nanotech  
18 tools. Can you tell me what your experience in the  
19 nanotech industry is?

20 A (Livernois) Beyond using scanning electron  
21 microscopes in -- during my career and in being involved  
22 with semiconductor fabrication activities where they  
23 were used for lithography purposes, I'm familiar with  
24 how the equipment works. And I'm familiar with the

1       electromagnetic modeling that goes with the force on an  
2       electron contributed by a magnetic field.  So it's not a  
3       stretch to figure out what would happen if you have a  
4       very slowly varying magnetic field such as with a DC  
5       line and you have a process that occurs very rapidly.  
6       In effect, the electron path is not going to be  
7       perturbed.

8                If there are cases as I -- as I had indicated,  
9       if there are cases where this does occur, there are  
10      self-compensating devices.  There is shielding that can  
11      be used in certain -- in rooms where this equipment is  
12      used.  There's magnetic shielding that can be used.  
13      And, in fact, the levels of the fields contributed by  
14      the DC line are actually less than the field that you  
15      would see due to the wiring, you know, for example, in  
16      this room, the current flowing in this room.  So it's  
17      not an unmitigable or an unsolvable issue.

18           Q       Have you ever advised a nanotech manufacturer  
19      on site selection?

20           A       (Livernois) I have not.

21           Q       Have you ever advised a nanotech manufacturer  
22      on the selection of tools to be used in a nanotech  
23      manufacturing operation?

24           A       (Livernois) I have advised a new product

1 development company in a previous position, Asahi Glass  
2 Company, on equipment to purchase for those purposes.  
3 They were a electronics and glazing manufacturer. It  
4 doesn't qualify as sort of a nanotech, but the  
5 challenges and the recommendations would be the same.

6 Q I suspect this is one for you, Mr. Bucci. If  
7 the change in load anticipated on the DC transmission  
8 line occurs over minutes or hours, why is the control  
9 system designed to provide response in milliseconds?

10 A (Bucci) There are -- there are system  
11 disturbances that the DC line can -- if it reacts  
12 quickly enough can serve to alleviate on the AC system,  
13 for example, short-circuit. It has to react very  
14 quickly to interrupt the short-circuit.

15 Q So there are circumstances in which the DC  
16 control system would regulate load on the line within a  
17 matter of milliseconds?

18 A (Bucci) No. Interruption of a short-circuit is  
19 not regulating load at all. It's -- it's responding to  
20 a system disturbance. I would refer to it as clearing  
21 the -- clearing the disturbance -- the disturbance.

22 Q Does clearing the disturbance result in a  
23 change in load on the DC line?

24 A (Bucci) Certainly, yes.

1 Q Thank you, Mr. Bucci.

2 MR. KLUCSIK: No further questions, Your Honor.

3 A (Bucci) Excuse me. I'm not focusing properly.  
4 You asked me if it would be considered a change in load  
5 on the line?

6 Q I think that's what I asked.

7 A (Bucci) If you have a situation where you need  
8 to -- to trip the line, naturally the line -- the flow  
9 on the line goes to zero if it's interrupted.

10 JUDGE STOCKHOLM: Let me -- let me ask the  
11 question this way. Let's assume that there is a short  
12 somewhere on the AC system and you're running your line  
13 at, I don't know, 80 percent, and you're called on to  
14 help alleviate that short on the AC system, would under  
15 those circumstances the load on your line increase?

16 MR. BUCCI: You could do that. Yes, Your  
17 Honor.

18 JUDGE STOCKHOLM: Thank you.

19 MR. KLUCSIK: No further questions, Your Honor.

20 JUDGE PHILLIPS: Were there any other parties  
21 who had -- okay. NYPA.

22 BY MR. MALONE:

23 Q Can you tell me what standard did NYRI use to  
24 assess hearable noise impacts along the route?

1           A       (Livernois) I didn't hear the description of  
2 the noise, audible?

3           Q       Audible. That would be audible. Right.

4           A       (Livernois) I don't know the specific standard.  
5 We calculated what the -- what the lines would provide,  
6 and someone at NYRI took that.

7           Q       Does anyone on the panel know?

8           JUDGE STOCKHOLM: Mr. Malone, can I understand  
9 your question, because I don't. What was the question?

10          MR. MALONE: What standard did NYRI use to  
11 assess audible noise impacts along the route?

12          JUDGE STOCKHOLM: Thank you.

13          A       (Bucci) Well, certainly --

14          (Livernois) I have an answer. I was able to  
15 check back into the report.

16          Essentially there was an EPA guideline issued  
17 in 1974 that says a 55 dB ambient noise is acceptable,  
18 55 dB and below. That's on page 32 of the report in  
19 Appendix G.

20          Q       Did you at any point look at the PSC 1978  
21 Common Record hearings on health and safety?

22          A       (Bucci) Another noise standard that we -- we  
23 used was the New York State DEC from 2001 Assessing and  
24 Mitigating Noise Impacts.

1 Q Is that Exhibit 259?

2 A (Bucci) Yes.

3 Q And just to repeat my question, did you use the  
4 PSC 1978 findings from the Common Record hearings?

5 A (Livernois) I don't believe we looked at that  
6 for the report that we did.

7 MR. MALONE: I have nothing further. Thank  
8 you, Judge.

9 JUDGE PHILLIPS: Are there any other parties  
10 who have recross?

11 Okay. Hearing nothing, I want to thank the  
12 panel for its time. And you're excused.

13 I believe the next witness is Mr. Scott. Is  
14 that correct?

15 MR. KLUCSIK: Your Honor, we'd like to present  
16 Mr. Scott and Ms. York as a panel.

17 JUDGE PHILLIPS: Off the record.

18 (A brief recess was taken.)

19 JUDGE PHILLIPS: Proceed. I'm sorry. You  
20 can't proceed yet. I see that the panel is there. If  
21 you could please stand and raise your right hand.

22 DAVIDSON SCOTT and LARA YORK,  
23 after first having been duly sworn, were examined and  
24 testified as follows:

1 JUDGE PHILLIPS: Please state your names for  
2 the record using the microphones. You may sit down.

3 MR. SCOTT: Davidson Scott.

4 MS. YORK: Lara York.

5 JUDGE PHILLIPS: Thank you.

6 Counselor.

7 DIRECT EXAMINATION

8 BY MR. KLUCSIK:

9 Q Mr. Scott, do you have before you an eight-page  
10 document titled the "Prepared Testimony of Davidson A.  
11 Scott, P.E."?

12 A (Scott) I do.

13 Q And is that your prefiled direct testimony  
14 filed with the Commission January 9, 2009?

15 A (Scott) Yes, it is.

16 Q Do you have any changes or additions to make to  
17 that document?

18 A (Scott) I do not.

19 Q And if I were to ask you today the questions  
20 presented in that document, would your answers be the  
21 same as those in that document?

22 A (Scott) Yes, they would.

23 JUDGE PHILLIPS: Can you just look at your mic  
24 and see if the green light is on?

1 MR. SCOTT: The green light is on.

2 JUDGE PHILLIPS: Okay. It was too far away  
3 from you.

4 MR. KLUCSIK: Your Honor, I would ask that Mr.  
5 Scott's direct testimony be entered as if rendered  
6 orally today.

7 JUDGE PHILLIPS: Granted.

8 (The following is the prefiled direct testimony  
9 of Davidson A. Scott, P.E.):

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

Case No. 06-T-0650

Scott

BEFORE THE  
STATE OF NEW YORK  
PUBLIC SERVICE COMMISSION

---

In the Matter of  
New York Regional Interconnect

Case No. 06-T-0650

January 9, 2009

---

Prepared Testimony of:

Davidson A. Scott, P.E.  
Vice President  
VitaTech Engineering, LLC  
115 Juliad Ct.  
Suite 105  
Fredericksburg, VA 22406

On Behalf of:

Communities Against  
Regional Interconnect

Case No. 06-T-0650

Scott

1       **Q.     Please state your name, title, affiliation, and address.**

2       A.     My name is Davidson Scott. I am employed by VitaTech Engineering,  
3             LLC (“Vita Tech”) with offices in Fredericksburg, Virginia.

4       **Q.     What is your present position and current responsibilities?**

5       A.     I am the Vice President of Engineering for VitaTech Engineering,  
6             LLC, where I am responsible for the engineering and assessment  
7             methods for company projects, including the oversight of VitaTech’s  
8             technical staff in the execution of assignments for the private and  
9             public sectors.

10      **Q.     What services does VitaTech Engineering, LLC provide today?**

11      A.     In 1993, VitaTech established a new engineering service:

12             Electromagnetic field (EMF) services including surveys and  
13             measurements, exposure and risk assessment electromagnetic  
14             interference (EMI)/radio frequency interference (RFI) detection,  
15             shielding and cancellation. Our staff is qualified to provide the  
16             following commercial, industrial and residential EMF services:

- 17             •    EMF Surveys & Measurements: DC (subways, elevators, MRIs,  
18                    NMRs), AC (power lines, transformers, trains), RF (AM/FM, TV,  
19                    mobile, cellular) & Microwave/Radar  
20             •    Exposure Levels, Safety Limits, Risk Assessment and Mitigation  
21             Services

Case No. 06-T-0650

Scott

- 1           • EMI/RFI Detection, Control & Reduction – Electromagnetic  
2           Compatibility (EMC)
- 3           • EMF Shielding (rooms & MRIs), EMF Abatement (correct N.E.C.  
4           violations, net & grounding problems) & EMF Cancellation  
5           Systems (buildings & residences).

6           **Q.    Would you describe your education and professional**  
7           **qualifications?**

8           A.    I hold a Bachelor of Science degree in Electrical Engineering from  
9           Virginia Military Institute, and a Master of Science degree in Systems  
10          Engineering from Virginia Polytechnic Institute. I am also a registered  
11          Professional Engineer in 5 states.

12          I have 25 years of electromagnetics experience, including running my  
13          own firm for 7 years, working as a telecom consultant for an ENR 25  
14          engineering firm, a smaller engineering startup, and a major cellular  
15          carrier. I have over fifteen years of proposal development, program  
16          management, systems engineering, and systems integration experience  
17          in federal and commercial environments.

18          **Q.    On whose behalf are you testifying?**

19          A.    I am testifying on behalf of Communities Against Regional  
20          Interconnect (“CARI”) with respect to electromagnetic fields

Case No. 06-T-0650

Scott

1 associated with the proposed New York Regional Interconnect  
2 transmission line project.

3 **Q. Are you sponsoring any Exhibits?**

4 A. Yes. My curriculum vitae is offered as Exhibit DAS-1. Topics  
5 addressed in my testimony are also covered in greater detail in the  
6 Abbie Gregg, Inc. report sponsored by CARI witness Lara York as  
7 Exhibit LY-2.

8 **Q. Have you reviewed NYRI's application materials filed with the  
9 Public Service Commission in this proceeding?**

10 A. Yes. I have reviewed NYRI's Supplemental Filing, February 2008,  
11 and in particular its Appendix G, the Exponent Report "New York  
12 Regional Interconnection Study: Electric and Magnetic Fields, Ions,  
13 Audible Noise, and Radio Noise", and the companion Exponent Study  
14 "New York Regional Interconnection Study : Regional Railroad  
15 Compatibility, November 2007", referenced therein, Appendix P,  
16 "Analysis of the Potential Cumulative Impact of the Facilities of the  
17 Millennium Pipeline Company, LLC, and the New York Regional  
18 Interconnection," and Supplemental Filing Exhibits E1 through E6.

19 **Q. Have you conducted an evaluation of the electromagnetic fields  
20 that will be created by the NYRI line?**

Case No. 06-T-0650

Scott

1       A.     Yes. VitaTech prepared an electromagnetic field (EMF) model to  
2             predict EMF field strength at various distances from the High Voltage  
3             Direct Current (HVDC) transmission line proposed by NYRI.

4       **Q.     Can you briefly explain how you constructed your model?**

5       A.     Yes. Using data supplied by NYRI and applying commonly known  
6             principles of physics with respect to the behavior of electrical currents  
7             and the creation of EMFs, VitaTech built a model to predict the  
8             propagation of EMFs from the transmission line.  
9             Using the NYRI data, we benchmarked our model against the EMF  
10            field decay information provided by NYRI. The NYRI information  
11            provided EMF field strength values out to a distance of 250 feet. We  
12            confirmed the validity of the model by comparing our field strength  
13            predictions to NYRI's field strength predictions at distances from 0  
14            feet to 250 feet from the transmission line.  
15            Once the model was validated, we used it to predict EMF field strength  
16            at distances beyond 250 feet from the transmission line.

17       **Q.     How are these magnetic fields created?**

18       A.     In this case we are concerned with AC current being superimposed on  
19             the DC transmission line. Such currents are sometimes referred to as  
20             residual harmonic currents.

21             In order to convert AC power, such a will be delivered to NYRI's

Case No. 06-T-0650

Scott

1           proposed Marcy Converter Station, into DC power, a process known as  
2           rectification is used. The AC current must be rectified using specific  
3           electronic devices to convert it to DC power. This process introduces  
4           the potential for AC current “artifacts” to be superimposed on an  
5           HVDC transmission line. Some AC current artifacts are generally  
6           present as a result of rectification. The presence of these AC artifacts  
7           superimposed on the DC transmission line can be a source of time-  
8           varying electromagnetic field creation around the DC transmission  
9           line.

10          Where an AC and a DC line are in close proximity, as would be the  
11          NYRI line and the Porter Terminal #6 line, inductive coupling can  
12          occur. Inductive coupling is the technical term for the effect of  
13          “inducing” a voltage on a wire that is within the alternating magnetic  
14          flux influence of another wire. In the case of a high voltage DC line,  
15          this voltage could be induced upon it if the DC wire is placed within  
16          the flux lines of an adjacent AC transmission line – generally within  
17          tens or hundreds of feet. Generally the closer the HVDC and an AC  
18          transmission line are to each other, the higher the induced voltage.

19          Where the NYRI HVDC line is near the Porter Terminal #6 AC  
20          transmission line, there is potential for inductive coupling. This would  
21          be another way AC current could be superimposed on the DC

Case No. 06-T-0650

Scott

1 transmission line in a way that would create a time-varying  
2 electromagnetic field around the DC transmission line.

3 **Q. Why did you model EMF strength beyond 250 feet?**

4 A. Our objective was to determine the distance from the power line at  
5 which the NYRI induced EMF would decay to levels of about 0.2  
6 milligauss. NYRI's analysis stopped at 250 feet.

7 **Q. Why did you use 0.2 milligauss as the threshold for EMF  
8 modeling?**

9 A. That is the level of sensitivity of high resolution imaging instruments  
10 such as electron microscopes and other devices used in nano  
11 technology laboratories and manufacturing facilities.

12 **Q. What did your modeling effort disclose?**

13 A. The model indicates that the NYRI transmission line will create EMFs  
14 strong enough to disrupt the operation of these sensitive instruments  
15 over a distance of almost 900 feet on either side of the transmission  
16 line. That is to say, the transmission line will create a corridor almost  
17 1800 feet wide within which field strength would be above 0.2  
18 milligauss.

19 **Q. Would you expect this to be the case along the entire length of the  
20 line?**

21 A. Yes, recognizing that we don't have detailed design information for

Case No. 06-T-0650

Scott

1           each segment of the route and that changes in the design specifications  
2           could change the predicted field strength and width of the  
3           electromagnetic corridor.

4           **Q. Does the result change if the HVDC line is located immediately**  
5           **adjacent to another power line, as the NYRI line is proposed to be**  
6           **relative to the existing Niagara Mohawk Porter Terminal #6 AC**  
7           **line south of Hazard Road and parallel to Edic Road in Marcy?**

8           A. No, not significantly. Curiously enough, when the Porter Terminal #6  
9           line is modeled adjacent to the NYRI line, there is a slight mitigating  
10          effect, reducing the width of the electromagnetic corridor about 50 feet  
11          on the side of the HVDC line where Porter Terminal #6 would be  
12          located.

13          **Q. Does this conclude your testimony?**

14          A. Yes, it does.

1 BY MR. KLUCSIK:

2 Q Mr. Scott, do you have a document -- a one-page  
3 document in front of you labeled DAS-1, an exhibit to  
4 your direct testimony?

5 A (Scott) I'm not sure I do.

6 Q It would be the summary of your experience.

7 A (Scott) Yes, I do.

8 Q Do you have any changes -- and was that  
9 document prepared by you or under your supervision?

10 A (Scott) Yes, it was.

11 Q And do you have any changes or additions to  
12 that document today?

13 A (Scott) I do not.

14 MR. KLUCSIK: Your Honor, I'd ask that DAS-1 be  
15 marked for identification.

16 JUDGE PHILLIPS: DAS-1 was marked previously as  
17 256.

18 MR. KLUCSIK: Thank you, Your Honor.

19 Q Ms. York, do you have before you an eight-page  
20 document?

21 A (York) Yes, I do.

22 Q And is that entitled the "Prepared Testimony of  
23 Lara York"?

24 A (York) Yes, it is.

1 Q And is that document the one filed with the  
2 Commission as your direct testimony on January 9th,  
3 2009?

4 A (York) Yes, it is.

5 Q Do you have any changes or additions to that  
6 document?

7 A (York) No, I do not.

8 Q And if I were to ask you the questions in that  
9 document, would your answers be the same today?

10 A (York) Yes.

11 MR. KLUCSIK: Your Honor, I'd ask that  
12 Ms. York's direct testimony be entered into the record  
13 as if rendered orally today.

14 JUDGE PHILLIPS: Granted.

15 (The following is the prefiled direct testimony  
16 of Lara York:)

17

18

19

20

21

22

23

24

Case No. 06-T-0650      York

BEFORE THE  
STATE OF NEW YORK  
PUBLIC SERVICE COMMISSION

---

In the Matter of  
New York Regional Interconnect

Case No. 06-T-0650

January 9, 2009

---

Prepared Testimony of:

Lara York  
Vice-President  
Abbie Gregg, Inc.  
1130 East University Drive  
Suite 105  
Tempe, Arizona 85281

On Behalf of:

Communities Against  
Regional Interconnect

Case No. 06-T-0650

York

1       **Q.    Please state your name, company affiliation, and business address.**

2       A.    My name is Lara York. I am employed by Abbie Gregg, Inc. with  
3           offices in Tempe, Arizona.

4       **Q.    What is your present position and responsibility?**

5       A.    I am Vice-President Advanced Technology Operations for Abbie  
6           Gregg, Inc. I am responsible for project management of design/build  
7           projects, process analysis and engineering for yield enhancement,  
8           cycle time reduction and product development in micro electronics and  
9           medical products manufacturing.

10      **Q.    Please describe your education and professional experience.**

11      A.    I hold a Bachelor of Science in Engineering degree from the United  
12           States Military Academy at West Point, New York and a Master of  
13           Science degree in Systems Management from the University of  
14           Southern California.

15           I have served as a key consultant and team leader for Environmental,  
16           Health and Safety, cycle time reduction, technology transfer and start-  
17           up projects for semiconductor, Opto, Display and Bio/Pharm Products.

18           I developed renovation and new construction strategies for BSL3,  
19           SA&T laboratories and EMI/Vibration sensitive imaging labs. I  
20           developed factory cost models for wafer fab, hybrid assembly and  
21           FPD products including flexible displays. My key clients include

Case No. 06-T-0650

York

1 Arizona State University, University of Louisville, Flip Chip  
2 Technologies, Schein Pharmaceuticals, 3M, Display Sciences,  
3 Teledyne Hybrid Operations and Motorola.

4 **Q. On whose behalf are you testifying?**

5 A. I am testifying on behalf of Communities Against Regional  
6 Interconnect ("CARI") with respect to the effect of electromagnetic  
7 fields on sensitive electronic equipment.

8 **Q. Are you sponsoring any Exhibits?**

9 A. Yes. In addition to my curriculum vitae sponsored as Exhibit LY-1, I  
10 am sponsoring Exhibit LY-2, an Abbie Gregg, Inc. report.

11 **Q. Have you reviewed NYRI's application materials filed with the  
12 Public Service Commission in this proceeding?**

13 A. Yes. I have reviewed NYRI's Supplemental Filing, February 2008,  
14 and in particular its Appendix G, the Exponent Report "New York  
15 Regional Interconnection Study: Electric and Magnetic Fields, Ions,  
16 Audible Noise, and Radio Noise, and the companion Exponent Study  
17 "New York Regional Interconnection Study: Regional Railroad  
18 Compatibility, November 2007", referenced therein, Appendix P,  
19 "Analysis of the Potential Cumulative Impact of the Facilities of the  
20 Millennium Pipeline Company, LLC and the New York Regional  
21 Interconnection", and Supplemental Filing Exhibits E1 through E6.

Case No. 06-T-0650

York

1       **Q.    Have you conducted an evaluation of the electromagnetic fields**  
2       **that will be created by the NYRI line?**

3       A.    Yes. I collaborated with VitaTech Engineering, LLC (VitaTech)  
4       personnel on the creation of an electromagnetic field (EMF) model and  
5       used the output from that model to evaluate the likely EMF effects on  
6       sensitive electronic equipment anticipated to be used at the Marcy  
7       NanoCenter and potentially elsewhere along the NYRI transmission  
8       line route.

9       **Q.    What is the Marcy NanoCenter?**

10      A.    The Marcy NanoCenter is a 300 acre site on the campus of the State  
11      University of New York Institute of Technology (SUNYIT) at Marcy,  
12      Oneida County, that is being developed as a “shovel-ready” location  
13      for microchip manufacturing or other similar nanotechnology uses.  
14      The state has pledged in excess of \$20 million to develop the Marcy  
15      NanoCenter as a home to high tech industry and has offered benefits of  
16      up to \$2.1 billion to entice microprocessor manufacturers to locate  
17      there.

18      In 2006, the Marcy NanoCenter was deemed a “world class” location  
19      by nanotechnology site selectors and was selected the second most  
20      attractive nanotechnology site in the state by Advanced Micro Devices  
21      (AMD), one of the largest microchip manufacturers in the world.

Case No. 06-T-0650

York

1           The Marcy NanoCenter site has been laid out to accommodate two  
2           microchip manufacturing facilities.

3           **Q.    What is your involvement with the Marcy NanoCenter?**

4           A.    Abbie Gregg, Inc. has been engaged by Mohawk Valley EDGE to  
5           assist in the development of the site for nanotech uses. Mohawk  
6           Valley EDGE is responsible for developing the site as “shovel ready”  
7           and marketing it to nanotechnology companies as a location for their  
8           production facilities.

9           **Q.    What is the relationship between the Marcy NanoCenter and the  
10          NYRI High Voltage Direct Current (HVDC) transmission line?**

11          A.    NYRI’s preferred route would run through the center of the Marcy  
12          Nanotech site, bisecting the area identified as the location for the  
13          microchip manufacturing facilities.

14          **Q.    Does that create a problem?**

15          A.    Yes. Based on the VitaTech EMF modeling work, the presence of the  
16          NYRI line through the center of the Marcy NanoCenter site may create  
17          an electromagnetic corridor approximately 1750 feet wide around the  
18          power line and through the center of the area designated as the location  
19          for the microchip manufacturing facilities. Electromagnetic field  
20          strength in that corridor is predicted to be in excess of 0.2 milligauss at

Case No. 06-T-0650

York

1 the edge of the electromagnetic corridor and stronger as the distance to  
2 the NYRI power line decreases.

3 **Q. What is the significance of the electromagnetic field strength being**  
4 **in excess of 0.2 milligauss in this electromagnetic corridor that will**  
5 **surround the NYRI power line?**

6 A. The production of microprocessors, i.e., computer chips, and a wide  
7 range of other nanotechnology devices requires the use of electron  
8 microscopes and other imaging, characterization and lithography  
9 devices that employ electron beam technology. Both imaging and  
10 process systems which use electron beams are sensitive to  
11 electromagnetic interference (EMI) which is caused by fluctuations in  
12 DC or AC magnetic fields near the instrument. In the presence of  
13 EMI, images become blurry or distorted and this affects the ability to  
14 image, characterize and to produce nanotechnology devices and  
15 materials.

16 Current nanotechnology tools are typically sensitive to EMF at 0.2  
17 milligauss. Design standards being used at world class research and  
18 development centers recommend 0.2 milligauss, and less, in EMI  
19 Quiet Labs. New Super Scanning Tunneling Electron Microscopes  
20 (STEMs) can require levels as low as 0.01 milligauss.

Case No. 06-T-0650

York

1       **Q.     Given the sensitivity of these nanotechnology tools, what is the**  
2           **implication of NYRI generated EMF strength of 0.2 milligauss and**  
3           **greater through the center of the Marcy NanoCenter site?**

4       A.     EMF of greater than 0.2 milligauss would make this property very,  
5           very unattractive to nanotechnology users. It would have adverse  
6           effect on the operation of the EMF sensitive tools previously  
7           described.

8       **Q.     Isn't the same problem posed by an existing power line that runs**  
9           **through the center of the Marcy NanoCenter site?**

10      A.     Yes. Similar EMF effects would be caused by the existing Niagara  
11           Mohawk Porter Terminal No. 6 AC transmission line that runs through  
12           the Marcy NanoCenter site, immediately adjacent and parallel to  
13           where the NYRI preferred route would place the HVDC line.  
14           Mohawk Valley EDGE plans to relocate the Porter Terminal No. 6 line  
15           off the Marcy NanoCenter site and has been in discussion with  
16           Niagara Mohawk personnel about how and where to accomplish that  
17           relocation. The Mohawk Valley EDGE plan is to move the AC line to  
18           a location where its EMF would not influence the operation of  
19           nanotechnology tools.

20      **Q.     Would this electromagnetic corridor with a field strength of 0.2**  
21           **milligauss out to 900 feet on either side of the HVDC line affect the**

Case No. 06-T-0650

York

1           **use of sensitive electronic equipment elsewhere along the NYRI**  
2           **route?**

3       A.    Yes.  Anywhere the line produced an electromagnetic field of 0.2  
4           milligauss or more, the use of electron microscopes, nanotechnology  
5           tools or other highly sensitive electronic devices would be precluded  
6           as a practical matter.  This means that land uses such as university,  
7           research or commercial laboratories employing electron microscopy as  
8           well as nanotechnology uses would be precluded within about 1,000  
9           feet of the overhead portions of the HVDC line for its entire 190 mile  
10          length.

11       **Q.    Does that conclude your testimony?**

12       A.    Yes.

1 BY MR. KLUCSIK:

2 Q Ms. York, do you have a one-page document in  
3 front of you labeled LS-1, an exhibit providing a  
4 summary of your experience --

5 A (York) It actually says Exhibit LY-01.

6 Q I'm sorry.

7 MR. KLUCSIK: Your Honor, I'd ask that be  
8 marked.

9 JUDGE PHILLIPS: It has been marked for  
10 identification as Exhibit 257.

11 Q And, Ms. York, do you have a document of 33  
12 pages in front of you marked LY-2?

13 A (York) Yes, I do.

14 Q And is that document entitled "Impact of the  
15 NYRI High-Voltage Direct Current Power Line on  
16 Electromagnetic Fields in Operation of Sensitive  
17 Electronic Equipment"?

18 A (York) Yes, it is.

19 Q Do you have any changes or additions to that  
20 document today?

21 A (York) No, I do not.

22 MR. KLUCSIK: Your Honor, I'd ask that Exhibit  
23 LY-2 be marked for identification.

24 JUDGE PHILLIPS: It has been marked for

1 identification as Exhibit 258.

2 MR. KLUCSIK: Your Honor, the witnesses are  
3 available for cross-examination.

4 JUDGE PHILLIPS: Can I just have an indication  
5 of who have has cross-examination for this panel?

6 NYRI, about how long?

7 MR. SINGER: About a half an hour.

8 JUDGE PHILLIPS: Anyone else?

9 Okay. Please proceed.

10 CROSS-EXAMINATION

11 BY MR. SINGER:

12 Q Good afternoon, panel. My first few questions  
13 are for Ms. York.

14 Ms. York, you would agree, wouldn't you, that a  
15 DC transmission line produces a different type of  
16 magnetic field than an AC transmission line?

17 A (York) Yes, I would.

18 Q Thank you. I'd like to refer to you -- I'm  
19 sorry, I'm going to get the exhibit number wrong, your  
20 Exhibit LY-02 and Appendix A at page 11 of 33 --

21 A (York) Yes.

22 Q -- of LY-02? Under the section "Introduction",  
23 I see that you distinguish between DC EMI disturbances  
24 and AC EMI disturbances; is that correct?

1           A       (York) Yes.

2           Q        Could you read the paragraph regarding DC EMI  
3 disturbances?

4           A        (York) Yes.

5                    DC EMI disturbances, the disturbances in  
6 earth's magnetic field from ferromagnetic moving objects  
7 such as --

8                    "DC EMI disturbances (the disturbance in  
9 earth's magnetic field from ferromagnetic moving  
10 objects) such as the movement of metal chairs, doors,  
11 hand-trucks, elevators or perhaps disturbances from  
12 automobiles, buses and rail traffic."

13          Q        What is the level of magnetic field disturbance  
14 from, let's say, the movement of a metal chair?

15          A        (York) I have various studies of different  
16 things that have moved, such -- that move such as a  
17 hand-truck or -- or a chair, but I don't have those with  
18 me.

19          Q        Okay. Would you know what the level of the  
20 magnetic field would be that would be created by the  
21 movement of an elevator?

22          A        (York) Mostly I deal backwards from that in  
23 terms of the setback required to achieve a  
24 0.2 milligauss rating from an elevator. So, for

1 example -- because I'm interested in building design and  
2 mitigation of nanotechnology tools from such moving  
3 objects. So, for example, a freight elevator, very  
4 large elevator might be something like 18 meters --

5 Q And --

6 A (York) -- whereas a passenger elevator might be  
7 something a little bit less than that, but from a  
8 designing standpoint, we might use a fixed number.

9 Q And does the difference have to do with the  
10 weight of the object?

11 A (York) I wouldn't say the weight, but a mass.

12 Q And what about auto, bus or rail traffic, do  
13 you work backwards with respect to that?

14 A (York) Yeah. I have setbacks that I use  
15 depending on how large the bus might be that would then  
16 allow me to decide where I would place an electron  
17 microscope lab inside of a building, the distance from  
18 maybe a bus route, a light rail, et cetera. These are  
19 more rules of thumb when we're in a design mode and we  
20 don't have an actual known source.

21 Q If you know, how far would auto traffic have to  
22 be away from a facility in order to -- let's just use a  
23 scanning electron beam microscope. How far would auto  
24 traffic have to be in order to maintain a point

1 2 milligauss standard?

2 A (York) Typically, let's say, a large, like, for  
3 example, like a cement mixer, we just recently did a  
4 study on that, and that was close to a hundred feet, but  
5 a small, let's say, VW or a small four-door vehicle  
6 might be something closer to 60 feet, as measured.

7 Q And are there ways to -- to mitigate that  
8 impact?

9 A (York) Yes, there are. They are very costly.

10 Q Could you describe them?

11 A (York) Actually, Davidson built these -- these  
12 enclosures for us, so it might be better if he described  
13 them, but in a much more technical detail.

14 (Scott) A DC shield, this would be known as a  
15 DC shield, is a much more complicated element of  
16 electromagnetic shielding than, for instance, AC  
17 shielding. A DC shield takes into account, not only the  
18 earth's magnetic field, but the perturbations. And they  
19 can be very costly because they're not as  
20 straightforward in design as other shielding systems  
21 because as a room gets bigger, a design -- a given DC  
22 shield design would change in character. You know, I  
23 can look at a, for instance, of researchers in MIT  
24 recently published a paper where they designed a DC

1 shield -- I believe the figure that they used was  
2 \$2 million, but it was certainly in the millions of  
3 dollars, and they mitigated the earth's magnetic field,  
4 but not transient such as moving vehicles and other --  
5 other causes of the DC disturbances that they were --  
6 that they were encountering at their site.

7 Q Do you know what the existing magnetic field of  
8 the earth is at the Marcy Nanotech site?

9 A (Scott) It's -- it's as stated in some of the  
10 testimony, and it's -- it's around 4- to 500 milligauss.

11 (York) That was actually measured and  
12 documented in another report that we had done.

13 Q Now, with respect to AC magnetic fields,  
14 there's an existing 115 kV AC line at the site right  
15 now; is that right?

16 A (York) Yes, that's correct.

17 Q And it runs right through the center of the  
18 site; would you agree with that?

19 A (York) Yeah. It's also known as the Porter  
20 Terminal Number 6.

21 Q Right. And you talk about that in your  
22 testimony, right?

23 A (York) That's correct.

24 Q As we sit here today, would you agree with me

1 that there's no agreement between National Grid and the  
2 owner of the site to move that line?

3 A (York) I haven't been privied to the most  
4 recent level of negotiations, but it is my understanding  
5 that there is a pursuit to relocate that line to the  
6 last.

7 Q But as far as you know, there's no agreement to  
8 do that?

9 A (York) There's no agreement to do that at this  
10 time. However, I'd also like to state that the setbacks  
11 from the 115 kV line, there is a parcel of leftover land  
12 that we did create a layout where we actually could  
13 achieve at least a one fab layout in light of that line  
14 being there. However, that's not ideal.

15 MR. SINGER: I'd like to mark for  
16 identification the two interrogatory responses, one to  
17 NYRI-76 and NYRI-77.

18 MS. YORK: Would that be 176?

19 MR. SINGER: No. 76 and 77.

20 (Exhibits 261 through 263 marked for  
21 identification.)

22 JUDGE PHILLIPS: The IRs will be marked as  
23 follows: NYRI-76 is 261. NYRI-77 is 262. And NYRI-78  
24 is 263.

1 Q Turning first to Exhibit 261, which is NYRI-76.  
2 Was that prepared by you?

3 A (York) Yes.

4 Q Thank you. In regard to Exhibit 262, which is  
5 NYRI-77, could you read the last sentence of the  
6 request?

7 A (York) So the question itself?

8 Q The portion that says "Provide all  
9 correspondence".

10 A (York) Sure.

11 "Provide all correspondence, memorandum,  
12 contracts and other documents from any entity that has  
13 indicated an intent to or interest in locating a  
14 nanotechnology facility at the Marcy NanoCenter."

15 Q And were any such documents provided in  
16 response to this request?

17 A (York) No.

18 Q With respect to Exhibit 263, which is NYRI-78,  
19 was that prepared by you?

20 A (York) Yes.

21 Q This request also requests you to provide  
22 documents that are described therein; would you agree  
23 with that?

24 A (York) Yes.

1 Q And did you provide any documents?

2 A (York) No.

3 MR. SINGER: Sorry to make you jump up again.

4 I'd like to have another document marked,

5 response to NYRI-80.

6 (Exhibit 264 marked for identification.)

7 JUDGE PHILLIPS: The document will be marked

8 for identification as Exhibit 264.

9 Q Ms. York, was Exhibit 264 prepared by you?

10 A (York) That's NYRI-80.

11 Q NYRI-80. I'm sorry.

12 A (York) Yes, that's correct.

13 Q I should have said that.

14 Now, in this response, you say that the Porter

15 line would have to be moved 400 feet from the site

16 property line to reach an AC EMF standard of

17 0.2 milligauss; is that right?

18 A (York) To render the entire property available,  
19 yes.

20 Q How far would it have to be moved to reach a .1  
21 milligauss standard?

22 A (York) I'm not sure we took it that low in the  
23 study.

24 Q Well, would you agree with me that if the line

1 was only moved 400 feet off the property line, it would  
2 preclude using the site for super scanning electron  
3 microscopes?

4 A (York) Could you state that piece of equipment  
5 that you were just speaking of?

6 Q Yes. Actually, I'm referring -- if you want to  
7 turn to your testimony at page 6, lines 19 through 20.  
8 You state there, "New super scanning tunneling electron  
9 microscopes can require levels as low as .01 milligauss?

10 A (York) Yes.

11 Q So if the -- if the site was set up so that the  
12 maximum amount was .2 milligauss and it required point  
13 .01 milligauss, then would it preclude use of that type  
14 of equipment?

15 A (York) I'm sorry. Restate that question one  
16 more time. I was listening to him.

17 Q Okay.

18 A (York) It wouldn't preclude the site. However,  
19 some level of abatement would be required.

20 Q Okay.

21 A (York) Very costly abatement.

22 Q So could you describe that abatement?

23 A (York) Yes. It goes back to the six-sided box  
24 which Davidson was speaking of in terms of creating an

1 abated box in which to put this tool, which can be,  
2 let's say, I would say 20 feet by 14 feet, and the cost  
3 of that type of box might be \$350,000 to a half million  
4 dollars, for a single tool.

5 MR. SINGER: I'd like to have the responses to  
6 NYRI-186 and NYRI-187 marked as the next two exhibits  
7 for identification.

8 JUDGE STOCKHOLM: While counsel is passing  
9 those out, a question: Why is -- given the testimony  
10 we've had this morning, why is the recommendation not to  
11 have this site brought down to 0.01 milligauss?

12 MS. YORK: Well, actually, the ambient -- the  
13 ambient measured condition on that site is actually much  
14 closer to 0.2 milligauss.

15 JUDGE STOCKHOLM: So there's nothing that could  
16 be done with regard to moving lines or roads or anything  
17 else that would get you below that in any event; is that  
18 what you're saying?

19 MS. YORK: That's true.

20 (Exhibits 265 and 266 marked for  
21 identification.)

22 JUDGE PHILLIPS: NYRI-186 has been marked for  
23 identification as 265. NYRI-187 has been marked for  
24 identification as 266.

1 BY MR. SINGER:

2 Q Ms. York, was Exhibit 266, NYRI-186, prepared  
3 by you?

4 A (York) Yes, it was.

5 Q And is it still correct as we sit here today  
6 that no equipment has been proposed for purchase at the  
7 NanoCenter site and the tool set has not been defined?

8 A (York) In -- in terms of a user identifying the  
9 equipment site, let's say, if someone was going to come  
10 in and they're interested in the property and they  
11 identify an equipment type, that is correct. However,  
12 when we prepare a site to be marketed, we use some  
13 typical tools to create an environment of which we're  
14 interested in suggesting that the property can meet.

15 Q So are you changing the answer to NYRI-186,  
16 Exhibit 265?

17 A (York) No, I don't think I am.

18 Q And was Exhibit 266, NYRI-187, prepared by you?

19 A (York) Yes, it is. Yes, it was.

20 Q I'd like to go back to your Exhibit LY-02 and  
21 page 20 of that exhibit. If you could turn to that,  
22 please.

23 Could you read the last sentence just above the  
24 heading "Power Line and Tower Configuration"?

1 A (York) The one that starts with Appendix G?

2 Q No. Are you on page 20 of 33 of LY-02?

3 A (York) I am. And I see the bold header that  
4 says "Power Line".

5 Q And the sentence just above that, it starts  
6 with the word "They".

7 A (York) Yes.

8 "They NYRI report an analysis was limited to  
9 250 milligauss in larger EMI fields."

10 Q I wasn't trying to point out the typo there. I  
11 just wanted to ask you a question about that. It should  
12 be the -- or it should be NYRI, "The NYRI report", but I  
13 assumed that.

14 A (York) Yes.

15 Q So is it your testimony that NYRI's EMF report  
16 did not consider DC magnetic field values at levels  
17 below 250 milligauss?

18 A (York) So you're talking about the Appendix G  
19 report --

20 Q Yes.

21 A (York) -- with the -- the data? I guess I  
22 would have to look back at the -- the actual data to  
23 see. I'm -- I'm sorry. I can't answer that question.

24 Q I can show that to you. Do you have NYRI

1 Appendix G there handy, or do we need to bring you a  
2 copy?

3 A (York) I think there might be one over there.  
4 That's actually an error. And it probably is  
5 supposed to mean the 250 feet.

6 Q Okay. . So you're changing that particular  
7 sentence in your exhibit?

8 A (York) At this exact second in time, no. I  
9 guess I would rather pull out the original report, as  
10 well as the 845 out doc SM and look at -- you know,  
11 there were, I don't know, 70 of these. And each one was  
12 several pages long. But based on what makes sense, this  
13 appears to me to be 250 feet.

14 Q So you would agree with me that the report and  
15 analysis was not limited to 250 milligauss?

16 A (York) Absolutely not limited to  
17 250 milligauss. Numbers were definitely larger than  
18 that as you got closer to the zero point of where the  
19 line was.

20 Q Mr. Scott, have you ever been involved in the  
21 design of an electric transmission line?

22 A (Scott) No, I have not.

23 Q How about the construction of an electric  
24 transmission line?

1           A       (Scott) No.

2                   MR. SINGER: I'd like to have marked as the  
3 next exhibit the response to NYRI-176, which is I  
4 believe a copy of your resume, Mr. Scott.

5                   (Exhibits 267 and 268 marked for  
6 identification.)

7                   JUDGE STOCKHOLM: In looking at the document  
8 marked for identification as Exhibit 266, which is the  
9 response to NYRI-187, if I could ask the witnesses to  
10 look at the second page of that document, just a single  
11 sentence. And that sentence indicates that the nanotech  
12 center web site indicates that the site is capable of  
13 supporting buildings with less than a 0.1 milligauss  
14 background interference. I suspect there's something I  
15 don't understand here, but I thought you said that the  
16 best you could do on site was 0.2 milligauss. Is this  
17 advertising puffery?

18                   MS. YORK: We actually measured the site at  
19 Marcy with actual equipment. And certain areas of the  
20 property as you got closer to the center were much --  
21 well, not much lower, but 0.1 milligauss whereas in  
22 terms of our report, the lowest piece of equipment that  
23 we had at the time when we were measuring gauss was  
24 0.2 milligauss.

1 JUDGE STOCKHOLM: Okay.

2 MS. YORK: And yes, you are correct. This is  
3 marketing information on their site.

4 JUDGE STOCKHOLM: Okay. You didn't mean to say  
5 yes to my question about puffery, did you?

6 MS. YORK: I'm -- I'm not an expert on  
7 marketing.

8 JUDGE STOCKHOLM: That's a very good way to  
9 answer that question.

10 MS. YORK: But portions of our report did show  
11 0.1, which was --

12 JUDGE STOCKHOLM: Even -- even with the 115 kV  
13 line running through the middle of the parcel, you still  
14 got 0.1.

15 MS. YORK: It's 300-acre parcel. And actually,  
16 it doesn't exactly run completely through the middle,  
17 but it's a little bit of an offset. As I mentioned  
18 before, we actually were able to find it and place a  
19 footprint of a building in a very acceptable range from  
20 the 115 kV line.

21 JUDGE STOCKHOLM: Do I assume correctly that  
22 this reading of 0.1 milligauss was a fair distance away  
23 from the 115?

24 MS. YORK: I would say 400-some feet.

1 JUDGE STOCKHOLM: Feet. Okay. Good. Thank  
2 you.

3 MS. YORK: We're actually looking to achieve  
4 ambient, right. We want to show that there are no  
5 measured noise contributors. So we're looking for an  
6 ambient site that is no longer being polluted by an  
7 existing source.

8 MR. KLUCSIK: Your Honor, if I may, I'd like  
9 the witness to clarify what she means when she refers to  
10 noise in this context, so we don't have confusion with  
11 other types of noise that have been the subject of  
12 earlier testimony.

13 MS. YORK: Thank you for -- for stating that.

14 I'm used -- I'm used to calling noise anything  
15 that is acoustic noise, vibrational noise,  
16 electromagnetic field noise, disturbances to the site.  
17 So thank you for correcting me. I did not mean acoustic  
18 in this case.

19 JUDGE PHILLIPS: Okay. There were two  
20 documents handed out. NYRI-176 has been marked for  
21 identification as Exhibit 267. NYRI-177 has been marked  
22 for identification as Exhibit 268.

23 BY MR. SINGER:

24 Q Mr. Scott, Exhibit 267, NYRI-176, was a

1 response provided by you, correct?

2 A (Scott) Yes.

3 Q And the attachment is your most current resume;  
4 is that right?

5 A (Scott) Yes.

6 Q Under your job description for VitaTech  
7 Engineering, you talk about AC, slash, ELF mitigation.  
8 Could you describe what that is?

9 A (Scott) ELF is extremely low frequency, refers  
10 to AC power line frequency magnetic field mitigation.

11 Q And what is RF electromagnetic exposure?

12 A (Scott) Radio frequency electromagnetic  
13 exposure.

14 Q What causes that?

15 A (Scott) Transmitters, other noise sources like  
16 coronas on power lines. It could be -- could be any  
17 number of things.

18 Q Under your description of your work for RF  
19 People, LLC, you refer to VLF. Could you describe what  
20 that is?

21 A (Scott) That's very low frequency. That's  
22 higher than -- higher in frequency than ELF, generally  
23 refers to frequencies below and including the AM radio  
24 bands.

1 Q And Exhibit 268, the response to NYRI-177, was  
2 that prepared by you?

3 A (Scott) Yes.

4 Q Thank you.

5 MR. SINGER: That's all the questions I have.

6 JUDGE PHILLIPS: Do you have any redirect?

7 MR. KLUCSIK: If we might have a moment, Your  
8 Honor. I believe the answer is going to be yes.

9 JUDGE PHILLIPS: Okay.

10 REDIRECT EXAMINATION

11 BY MR. KLUCSIK:

12 Q Mr. Scott, Judge Stockholm asked you a question  
13 I believe that related to the ability to mitigate  
14 below-ambient levels. Do you recall that?

15 A (Scott) I would appreciate restating the  
16 question.

17 MR. KLUCSIK: Did I get it right, Your Honor?

18 JUDGE STOCKHOLM: I'm not entirely certain, but  
19 please proceed.

20 Q Earlier in your testimony, you also gave us an  
21 illustration of folks -- that one of the leading  
22 universities in terms of their efforts to construct a  
23 room which was not subject to magnetic interference; is  
24 that right?

1           A        (Scott) That's -- that's correct.

2           Q        Was that -- I'm sorry. Was it Harvard or MIT?

3           A        (Scott) MIT.

4           Q        And if I recall your testimony correctly, it  
5 was that these folks at MIT spent \$2 million to mitigate  
6 even the influence of the earth's magnetic field; is  
7 that correct?

8           A        (Scott) That's correct.

9           Q        And therefore, that would be an answer to the  
10 judge's question with respect to whether it's possible  
11 to mitigate the earth's magnetic field?

12          A        (Scott) Let me restate. Let me restate. It  
13 wasn't necessarily the earth's magnetic field. It was  
14 perturbations caused by moving ferromagnetic masses that  
15 were caused by the movement of those masses through the  
16 earth's magnetic field.

17          Q        And is it correct that those types of changes  
18 in magnetic field are what's important relative to the  
19 sensitive electronic equipment that is the subject of  
20 your testimony and Ms. York's exhibit?

21          A        (Scott) That's correct. I usually refer to  
22 them as transient events that occur from the passage  
23 of -- or movement of ferromagnetic objects in the  
24 earth's magnetic field. That -- that would be what

1 you're referring to.

2 JUDGE STOCKHOLM: So the concern is not a  
3 field, but a change in the field that causes the  
4 problems? Is that -- am I right about that?

5 MR. SCOTT: That's correct. The earth's  
6 magnetic field is stable and constant and does not cause  
7 a problem when calibrating and operating electron beam  
8 devices. However, they -- they do have to be, depending  
9 on orientation, adjusted to compensate for the static  
10 magnetic field that's -- that's present at a particular  
11 site. So when they change, when it changes, it changes  
12 the beam.

13 MR. KLUCSIK: No further questions, Your Honor.

14 JUDGE STOCKHOLM: Any recross?

15 MR. SINGER: No, Your Honor.

16 JUDGE PHILLIPS: Thank you very much for your  
17 time. And you're excused.

18 I have this huge smile on my face because I'm  
19 shocked. Do we have anyone else who is available to go  
20 today? I mean, we've exhausted the people who are on  
21 the list for today, the witnesses I believe; is that  
22 correct?

23 JUDGE STOCKHOLM: Do we have any volunteer  
24 witnesses that would like to --

1 MR. BLOW: May we go off the record, Your  
2 Honor?

3 JUDGE PHILLIPS: Yes. We're off the record.  
4 (Discussion off the record.)

5 JUDGE PHILLIPS: Before we go any further, we  
6 had marked today Exhibits 238 through 268. Absent any  
7 objection, those exhibits will be moved into the record  
8 as evidence. Are there any objections?

9 Hearing none, the exhibits are moved into  
10 evidence.

11 (Exhibits 238 through 268 received in  
12 evidence.)

13 JUDGE PHILLIPS: We also had some discussion  
14 off the record about the starting time for tomorrow. I  
15 believe that we have established the starting time will  
16 be 9:30 a.m. tomorrow.

17 And other than that, I don't believe we have  
18 any matters to address, so we're going to now close the  
19 record for today. And thank you very much.

20 (Whereupon, the proceedings adjourned at  
21 3:34 p.m.)  
22  
23  
24

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24

INDEX

PANEL/WITNESSES:

D            C            RD            RC

Panel B:                    3250    3313    3427    3435

Scott/York:                3445    3466    3483

EXHIBITS:

MARKED

238	WHB/TGL-1			3246
239	WHB/TGL-2			3246
240	WHB/TGL-3			3246
241	WHB/TGL-4			3246
242	WHB/TGL-5			3246
243	WHB/TGL-6			3246
244	WHB/TGL-7			3246
245	WHB/TGL-8			3246
246	WHB/TGL-9			3246
247	WHB/TGL-10			3246
248	WHB/TGL-11			3246
249	WHB/TGL-12m			3246
250	WHB/TGL-13			3246
251	WHB/TGL-14			3246
252	WHB/TGL-15			3246
253	WHB/TGL-16			3246
254	WHB/TGL-17			3246
255	NYPA-4			3246
256	DAS-1			3246

INDEX

(Continued)

	<u>EXHIBITS:</u>	<u>MARKED</u>
1		
2		
3		
4	257 LY-01	3246
5	258 LY-02	3246
6	259 IR DPS-117	3311
7	260 Assessing and Mitigating Noise Impacts	3311
8	261 IR NYRI-76	3471
9	262 IR NYRI-77	3471
10	263 IR NYRI-78	3471
11	264 IR NYRI-80	3473
12	265 IR NYRI-186	3475
13	266 IR NYRI-187	3475
14	267 IR NYRI-176	3479
15	268 IR NYRI-177	3479
16		
17		
18		
19		
20		
21		
22		
23		
24		