State University of New York
COLLEGE OF ENVIRONMENTAL SCIENCE AND FORESTRY

Faculty of Environmental and Forest Biology
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Jaclyn A. Brilling Secretary
New York State
Public Service Commission
3 Empire State Plaza
Albany, New York 12223-1350

Dear Secretary Brilling:

This letter and associated information are being sent in response to CASE 05-M-0090: In the Matter of the System Benefits Charge III. (NOTICE SOLICITING COMMENTS, Issued January 28, 2005).

The Systems Benefits Charge (SBC) has resulted in major benefits to the citizens of New York State. Only a small portion of the total amount of SBC collected is allocated for evaluating the impacts of energy utilization on the environment. The NYSERDA allocation of is $150 million of which the EMEP (Environmental Monitoring, Evaluation & Protection) program has an annual budget of ~$3 million of which ~ $2.7 M goes to research projects. These funds have been critical for obtaining information related to the environmental impact of energy utilization in New York State. Energy production and use impose major burdens on the environment. EMEP provides NYSERDA and the citizens of our state scientifically credible information on environmental impacts of energy USE. This information has been a key element associated with policy and litigations at both the State and Federal levels. In addition, the funds associated with EMEP and earlier versions of similar support programs from NYSERDA have served as the base for the development of more extensive and intensive analyses of environmental impacts associated with pollutants derived from energy production and utilization. ***Appendix I*** provides a synopsis of the response of the specific questions posed with respect to CASE 05-M-0090.

NYSERDA funds have been associated with the development and maintenance of the only fully instrumented watershed in the Adirondack Region that is examining the effects of the health of both terrestrial and aquatic ecosystems. The Arbutus Watershed is located in the Huntington Forest (HF) near the geographical center of the Adirondacks. The health of forests and waters in the Adirondack region of New York has had considerable attention due to well-known effects of "acid rain" in this region. Many waters of the Adirondacks have become acidified due to atmospheric pollutants. This acidification has resulted in a decline of fisheries in some lakes and may also be linked with some deleterious impacts on forests. Understanding the influence of air pollutants on forest health and water quality has been the focus of a major research effort at the Huntington Forest.

An important goal of research at the HF has been to obtain knowledge on how various environmental perturbations, including atmospheric pollutants and climatic changes, influence the Adirondacks. Air pollution research has included measurements of "acidic deposition" and other atmospheric pollutants including ozone, sulfur dioxide and nitrogen oxides. The HF has been part of the National Atmospheric Deposition Program (NADP) and the National Trends Network (NTN) since Oct. 31, 1978, one of the oldest operating sites within this network. Dr. Dudley J. Raynal (Distinguished Teaching Professor at SUNY-ESF and now Dean of Instruction and Graduate Studies) was instrumental in developing this site and maintaining its operation. A mercury deposition collector was added to the NADP site (2000) under the direction of Dr. Charles T. Driscoll (Distinguished University Professor, Syracuse University). There are major concerns related to mercury accumulation in fish of the region. Most mercury in fish originates from atmospheric contaminants produced from the combustion of fossil fuels. Adjacent to the Arbutus Watershed is a 38-m walk up tower equipped with meteorological instrumentation and filter packs for sampling air chemistry that has been monitored by NOAA (Dr. Tilden Meyers, Oak Ridge, TN). Using micrometeorological techniques (e.g., eddy correlation) measurements of ozone and sulfur dioxide fluxes have been made using this tower. Most recently, the Huntington Forest was added to the US-EPA Dry Deposition Monitoring Network (CASTNET in 2002).

To evaluate how pollutants are affecting forested watersheds the "small watershed approach" combined with studies on forest stands is being used. This work includes investigations on fundamental studies of the hydrology and biogeochemistry of forested and aquatic ecosystems as well as research questions directed at environmental issues such as the effects of acid rain. This effort has been led by Dr. Myron J. Mitchell (Distinguished Professor and Director of Council on Hydrologic Systems Science). The Arbutus Lake Watershed has been gauged at the lake outlet since October 1991 with a V-notch weir. The 135 ha Archer Creek Catchment drains into Arbutus Lake. This catchment has been monitored since 1994 using a H-flume equipped with an automated system for measuring stream discharge logging and collecting samples during storms. Detailed stream and wetland maps have been produced, and this information is part of a geographical information system (GIS) database. The watershed includes a wide range of sampling devices that are used for measuring snow, soil and groundwater chemistry. There is more information on the biogeochemistry and hydrology of this watershed than for any other site in the Adirondacks. The combination of this hydrobiogeochemical data combined with other information available from the Huntington Forest results in a comprehensive picture of various ecosystem attributes of this region. However, major issues still need to be addressed including how changes in vegetation, climate and recovery from acidification will affect water quality in the region. Future work at the HF will be important for these efforts.

The HF has also been a site in various regional and international biogeochemical studies including the Integrated Forest Study (IFS), the Adirondack Manipulation and Modeling Project (AMMP), and the Adirondack Long-Term Monitoring (ALTM) Lake Project. The Huntington Forest was also the site of a soil warming experiment using buried heating cables the results of

which have also been compared with other sites with similar experiments. The HF is part of the Northeastern Ecosystem Research Cooperative (NERC).

Much of the research on Adirondack hydrology and biogeochemistry has been centered at the HF including research not only on the forests, wetlands, streams and lakes within the HF, but also at sites throughout the entire Adirondack Park. The current research includes collaboration with other faculty members at ESF (Dr. Russell Briggs, Dr. Donald J. Leopold, Dr. Ruth D. Yanai) and individuals throughout North America who have expertise on wetlands (Dr. Chris Cirmo, SUNY-Cortland), isotopic geochemistry (Dr. Sheery Schiff, University of Waterloo, Ontario; Dr. Carol Kendall, USGS, Menlo Park, CA; Dr. Bernhard Mayer, University Calgary, Alberta), modeling (Dr. Shreeram Inamdar, State University of New York College at Buffalo, NY) and hydrology (Dr. Elizabeth W. Boyer, UC Berkeley; Dr. Doug Burns, USDA, Troy, NY; Dr. Helmut Elsenbeer, University of Cincinnati, Cincinnati, OH; Dr. Jeff McDonnell, Oregon State University, Corvallis, OR). A partial list of publications (>120) associated with this work is given in ***Appendix II.***

NYSERDA funding has been provided the baseline funding for this site and has resulted in leverage of additional funding for this site and related studies. A partial list of these leveraged projects (**>$4.5 million**) is provided in ***Appendix III***. ***This baseline funding is the foundation for the research effort not only at the HF and Arbutus Watershed, but also for work throughout the Adirondacks. If these funds are not available, it is likely that the research effort at this site will be curtailed and possibly even stopped. This would be a major blow to the research effort on the environmental impacts of energy utilization in the Adirondacks.***

If you have any question or if I can provide any further information, please let me know.

Sincerely yours

Myron J. Mitchell

Myron J. Mitchell
Distinguished Professor and Director of the
Council on Hydrologic Systems Science

Appendix I

Answers to Specific Questions

1. To what extent have the goals and objectives established by the Commission been achieved?

EMEP funds have been especially important for obtaining information related to the environmental impact of energy utilization in New York State. Energy production and use impose one of the greatest burdens on our environment of any human activity. Findings from projects directly supported by these funds as well as projects that depend on NYSERDA funds for base support provide scientifically supportable information on environmental impacts of energy systems to assist the State in developing science-based and cost-effective policies to mitigate impacts. This information has been a key element associated with policy and litigations at both the State and Federal level.

2. Should the SBC program continue beyond its current expiration date of June 30, 2006? If so, for what duration should the SBC be extended and at what funding level?

The funding should be extended for at least another five years and the funding for programs such as EMEP need to be increased (at least doubled) if credible efforts can be done in understanding the environmental impact of energy utilization in New York.

3. Have conditions changed since the establishment of the SBC that would necessitate a change in the overall goals and objectives of the SBC? If so, what changes are recommended?

The overall goals and objectives of the SBC are still sound.

4. If assuming continuation of the SBC, how should programs be prioritized to meet those goals and objectives?

Environmental issues need to have greater priority. This information is needed to make appropriate assessments of how different usages of energy both within and outside of New York result in environmental impacts to ecosystem and human health.

*5. How might the SBC programs be adjusted given the Commission's order, issued September 24, 2004, regarding a Renewable Portfolio Standard(Case No. 03-E-*0188)?

No comment.

6. In what ways might the current SBC fund collection and allocation process be improved?

No comment.

7. What specific program(s) should be eliminated, expanded or created?

No comment.

8. How can future SBC funded programs be more responsive to the needs of New York's energy consumers?

In its current form the SBC funded programs are responsive to consumers.

9. How can SBC funded programs be marketed more effectively?

No comment.

10. In what ways can NYSERDA improve its administration of the SBC?

No comment.

11. Is the current NYSERDA program evaluation process adequate? How might it be improved?

The evaluation process is adequate.

12. Should SBC funds be extended to programs that encompass research and development into retail and/or wholesale electric market competitiveness issues, or transmission and/or distribution of the State's energy resources?

No

13. Should the scope of the SBC program be expanded to include programs for natural gas customers? If so:

Possibly especially if there are specific environmental issues associated with the use of natural gas.

a. What kinds of programs would benefit New York's gas consumers?
b. Which classes of customers would be served most effectively by a natural gas SBC program?

No comment

Appendix II.

Publications on Air Pollution Effects in the Adirondacks Associated with NYSERDA/EMEP Funded Projects Centered at the Huntington Forest

(Most recent first)

Ito, M., M.J. Mitchell, C.T. Driscoll and K.M. Roy. 2005. Nitrogen input-output budgets for lake-watersheds in the Adirondack region of New York. Biogeochemistry. (In Press)

Mitchell, M.J. 2005. Review of Book: "E. Matzner (editor): Biogeochemistry of Forested Catchments in A Changing Environment, A German Case Study", Journal of Plant Nutrition and Soil Science 168:145-146.

Mitchell, M.J. 2005. Episodic Acidification. In: Jay H. Lehr (ed). Encyclopedia of Water. John Wiley and Sons Publishing (In Press).

Mitchell, M.J. and C. Alewell. 2005. Sulfur Transformations and Fluxes. In: The Encyclopedia of Soil Science and Technology (In Press).

Watmough, S.A., J. Aherne, C. Alewell, P. Arp, S. Bailey, T. Clair, P. Dillon, L. Duschesne, C. Eimers, I. Fernandez, N. Foster, T. Larsson, E. Miller, M. Mitchell and S. Page. 2005. Sulphate, nitrogen and base cation budgets at 21 forested catchments in Canada, the United States and Europe. Environmental Monitoring and Assessment (In Press).

Campbell, J.L., J.W. Hornbeck, M.J. Mitchell, M.B. Adams, M.S. Castro, C.T. Driscoll, J.S. Kahl, J.N. Kochenderfer, G.E. Likens, J.A. Lynch, P.S. Murdoch, S.J. Nelson and J.B. Shanley. 2004. Input-output budgets of inorganic nitrogen for 24 forest watersheds in the Northeastern United States: A review. Water, Air and Soil Pollution 151:373-396.

Chen, L., C.T. Driscoll, S. Gbondo-Tugbawa, M.J. Mitchell and P.S. Murdoch. 2004.The application of an Integrated Biogeochemistry Model (PnET-BGC) to five forested watersheds in the Adirondack and Catskill Regions of New York. Hydrological Processes 18:2631–2650.

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Inamdar, S., P., S. F. Christopher, and M. J. Mitchell. 2004. Export mechanisms for dissolved organic carbon and nitrate during summer storm events in a glaciated forested catchment in New York, USA. Hydrological Processes 18:2651-2661.

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Appendix III

Research Projects on the Effects of Air Pollutants on Ecosystem Health Leveraged with Support with NYSERDA and/or EMEP Funds

Atmospheric Deposition, Transport, Transformations and Bioavailability of Mercury across a Northern Forest Landscape. NSF-Biocomplexity. $1,799,953. 2003-2008.

Integrated Major Research Instrumentation for Realtime Analyses within an Experimental Watershed. NSF-MRI. $388,117. 2004-2006

Regional Analysis of Snowmelt and Storm Events: Biogeochemical and Hydrological Responses. NERC-US Forest Service. $148,000 2003-2005

Evaluation of discrepancies in sulfur budgets of watersheds in the Northeast U.S. and Southeast Canada: a modeling and isotopic approach. U.S. Forest Service, Northeastern Ecosystem Cooperative, $150,000. 2001-2005.

The impact of forest management on hydrology and biogeochemistry. McIntire-Stennis Cooperative Forestry Research Program. $72,000. 2001-2004.

Topographical linkages between nitrogen and organic carbon solutes within a forested watershed. NSF-Ecosystems. $543,376. 2000-2004.

Terrestrial-Aquatic linkages controlling nutrient dynamics in a forested catchment of the Adirondack Mountains. McIntire-Stennis Cooperative Forestry Research Program. $74,344. 2000-2003.

Nitrogen transport dynamics through aquatic/terrestrial interfaces in a forested headwater watershed in Northeastern United States. USDA-NRICCP Water Resources and Assessment Program $100,000. 1999-2002.

Measurement of Precipitation Chemistry at the Huntington Wildlife Forest. US-EPA via RPI. $193,073. 1998-2007.

Evaluation of hydrological and biogeochemical pathways and fluxes in a forested watershed in the Adirondack Mountains. McIntire-Stennis $66,630. 1994-1997.

Principal Investigator. Analysis of the Patterns of Nitrate Leaching in Response to Atmospheric Deposition of Nitrogen in the Northern U.S. U.S. E.P.A. $270,000 1994-1998.

A Spatial/Temporal Investigation of the Hydrology and Biogeochemistry of Nitrogen Transport within a Forested Hillslope/Wetland/Lake Ecotone. USDA National Research Initiative, Water Resources and Protection. $130,000 1994-1996.

Increasing soil temperature in a northern hardwood forest: effects on elemental dynamics and primary productivity. U.S.D.A. Forest Service. $315,052. 1991-1995.

Forest health of northern hardwoods: relationships to mineral acid inputs and nutrient cations. McIntire-Stennis. $54,000 1989-1991.

Support of dry deposition program at Huntington Forest, Adirondack Region, New York. US-EPA. $25,000 1988-1989.

Principal Investigator. Integrated forest study on effects of atmospheric deposition. EPRI. $673,000 1985-1989.

Paleoecological reconstruction of recent lake acidification in acid sensitive areas of North America. EPRI, via Indiana University. $110,100 1983-1986.

Sulfur mobilization and immobilization in a forested ecosystem. Syracuse University Res. Inst. $4,500 1983-1984.

Role of sulfur in affecting nutrient status of forest systems in the Adirondack Mountains. USDA-SEA. $30,000 1982-1984.

Project Director. Sulfur constituents of an Adirondack forest soil. S.U.N.Y. Research Foundation Grant. $2,939 1981-1983.

Principal Investigator. Effect of atmospheric sulfur pollutants derived from acid precipitation on the benthic dynamics of lakes in the Northeastern United States. OWRT. $121,654 1979-1982.