


United States Nuclear Regulatory Commission Official Hearing Exhibit	
In the Matter of:	Entergy Nuclear Operations, Inc. (Indian Point Nuclear Generating Units 2 and 3)
	ASLBP #: 07-858-03-LR-BD01
	Docket #: 05000247 05000286
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NYS000106
Submitted: December 14, 2011

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

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In re: **Docket Nos. 50-247-LR, 50-286-LR**

License Renewal Application Submitted by **ASLBP No. 07-858-03-LR-BD01**

Entergy Nuclear Indian Point 2, LLC, **DPR-26, DPR-64**
Entergy Nuclear Indian Point 3, LLC, and
Entergy Nuclear Operations, Inc.

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DECLARATION OF PETER A. BRADFORD

Peter A. Bradford hereby declares under penalty of perjury that the following is true and correct:

1. My name is Peter Amory Bradford. I live in Peru, Vermont.
2. I am president of Bradford Brook Associates. I am an adjunct professor at Vermont Law School, where I teach a course entitled "Nuclear Power and Public Policy". I served as a commissioner of the Nuclear Regulatory Commission (NRC), (1977-82) and as chair of the New York (1987-95) and Maine (1982-87) utility regulatory commissions. I was also a member of the National Research Council Committee that produced the 2006 report entitled "Alternatives to the Indian Point Energy Center for Meeting New York Electric Power Needs" (2006 National Research Council). My complete CV has been previously submitted together with my November 2007 submission in this proceeding.
3. I have had extensive responsibility for state government power supply decisions (including design and implementation of demand side management, transmission expansion and power purchase programs) in both New York and Maine. I was also involved until 1995 in the design of electric industry restructuring in New York.

4. I have previously filed a declaration in this proceeding in November 2007.
5. The framework for my consideration of the Final Supplemental Environmental Impact Statement (FSEIS) includes the following points:
 - a) The NRC has concluded that relicensing of nuclear power plants is an action that substantially affects the environment.
 - b) NEPA requires an evaluation of alternatives to relicensing as well as of the alternative of not proceeding with relicensing.
 - c) Pursuant to the Generic Environmental Impact Statement (GEIS), the FSEIS does not evaluate either the need for the power from Indian Point or the economic costs and benefits of the alternatives that it describes, reasoning that energy planning and procurement are not part of the NRC's responsibilities.
 - d) Nevertheless, the NRC reasons that a decision to extend the Indian Point licenses by 20 years does nothing more than "provide a comparison that allows NRC to determine whether or not the adverse environmental impacts of license renewal are so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable." (FSEIS, p. 8-1).
 - e) The NRC staff recommends in the FSEIS "that the Commission determine that the adverse environmental impacts of license renewal for IP2 and IP3 are not so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable."
 - f) Because the FSEIS does not discuss the economics of the Indian Point units in comparison to the economics of alternatives, it gives decisionmakers no sense of which among the alternatives are likely to be deployed in what quantities in the event that the no action alternative is in fact pursued.
6. The FSEIS is somewhat more realistic than the 2007 Environmental Report (ER) in that it purports to consider conservation as a stand alone alternative to relicensing the Indian Point units. It also increases the amount of conservation in some combinations of alternatives.
7. However, it falls well short of the NRC's NEPA obligations both to take a hard look at specific alternatives in order to provide a rational basis for choosing among the

alternatives and to make relevant information available to other entities that may also play a role in the decision making process.

8. The FSEIS does not take adequate account of significant developments in the years 2007-2010, including developments very different from those foreseen in the 2006 National Research Council Report on which the FSEIS extensively relies. In particular, the potential institutional constraints on which the 2006 National Research Council report placed particular emphasis¹ have not in fact hindered New York's moving from a position in which ability to acquire new electric resources at an adequate pace was in serious doubt to one in which the New York ISO ("NYISO") sees no likelihood of generation constraints well into the future. Among the significant developments that the FSEIS either ignores or pays inadequate attention to are:

- a) the decline in demand for electric power, which is attributable only in part to the recession². New York State experienced a 4.1% drop in power demand due to the recession³. Increases in demand side management (DSM) coupled with moderate economic growth are projected to cause lower than normally expected energy use per capita through 2018⁴;

- b) the significantly declining price and increased availability of natural gas to meet New York and Northeastern energy needs. The 2006 National Research Council Report stated. "Current supplies of natural gas cannot always accommodate current, let alone increased demand for the product"⁵. Today, natural gas has become and is expected to

¹ "It is problematic whether the existing legal, regulatory and financial mechanisms provide sufficient incentive to build new capacity resources in New York", (2006 National Research Council, p. 4).

² During July, 2010 (one of the hottest months on record) the New York State Independent System Operator ("NYISO") experienced its third highest peak load and its highest single monthly use, *New York Sets Power Usage Record in July, NYISO news release, August 9, 2010*, http://www.nyiso.com/public/webdocs/newsroom/press_releases/2010/pr_nyiso_highestloadmonth_08092010.pdf. This actual 2010 peak was some 1000MW below the 2010 peak forecast used in the 2006 National Research Council Report while the resources available to meet the peak were some 4000MW higher (2006 National Research Council, p. 60, Table 5-1).

³ *NYISO 2009 Annual Report, p. 6*

⁴ *2009 NYS Energy Plan: Energy Demand and Price Forecasts, p. 10.*

⁵ 2006 National Research Council Report, p. 36

continue to be the fuel of choice for new and replacement generation in New York for the next several years due to its economic, operational and environmental advantages⁶;

c) New York's progress in implementing its Renewable Portfolio Standard, especially wind power. By 2009, nearly 1300 MW of wind projects had come on line in New York. Wind projects also comprise a dominant portion of the capacity of proposed new generation projects in the New York Independent System Operator's interconnection queue. Some 7,000 MW of additional wind power have been proposed for interconnection with the New York electric grid⁷.

A recent review of the New York ISO's first decade stated "According to the American Wind Energy Association ("AWEA"), which tracks wind projects and changes in wind capacity in states across the U.S., New York ranks sixth among the 50 states in terms of the amount of wind generating capacity added in the last year, and eighth in terms of total installed wind capacity as of the end of 2009. Furthermore, AWEA and other analysts have assessed the ease of entry of wind capacity into electric systems around the country and have concluded that RTOs like New York's, with open access to transmission and single clearing price competitive markets, provide a relatively supportive environment for renewable project investment⁸";

⁶ *New York State Energy Plan, Natural Gas Assessment*. December 2009, p. 9. Natural gas prices in New York State in 2009 were slightly less than half what they had been in 2008 (*Power Trends*, NYISO, p. 8). The U.S. Department of Energy's Energy Information Administration ("DOE/EIA") recently lowered its gas price forecast through 2035, noting "The annual average natural gas wellhead price remains under \$5 per thousand cubic feet through 2022, but it increases thereafter because significantly more shale wells must be drilled to meet growth in natural gas demand and offset declines in natural gas production from other sources.....Natural gas wellhead prices (in 2009 dollars) reach \$6.53 per thousand cubic feet in 2035, compared with \$8.19 in AEO2010 (Annual Energy Outlook Early Release Overview, December 16, 2010)." The 2006 National Research Council report's preferred gas price forecast declined from \$7.80 per MMBTU in 2008 to \$7.00 in 2015 (2006 National Research Council, p. 67).

⁷ *NYISO Power Trends 2010: New York's Emerging Energy Crossroads*, p. 16. The NYISO has expanded the eligibility of intermittent resources for special market rules from 500 MW to 3,300 MW to accommodate increased penetration levels of wind plants on the system. *NYISO Power Trends 2010: New York's Emerging Energy Crossroads*, at 16.

⁸ Susan Tierney, *The New York Independent System Operator: A Ten Year Review*, April, 2010, p. 50.

- d) New York's progress in implementing demand side management (DSM)⁹ pursuant to the 15 X 15 program and the 45 x 15 Clean Energy Program,¹⁰ including the impact of federal stimulus revenues and state incentives;
- e) The implementation of the Regional Greenhouse Gas Initiative (RGGI), pursuant to which New York's cumulative proceeds from the auctions of emissions permits is some \$282 million, most of which is invested in energy efficiency and renewable energy projects. This program is now more than two years old and will continue to hold several permit auctions per year;
- f) The addition of significant additional supply, transmission and DSM resources in New York State. Since 2000, New York has added over 7,800 MW of new generation, nearly 1,300 MW of new transmission, and nearly 2,400 MW of demand response, 80% of which has been added where demand is the greatest in the New York City, Long Island and Hudson Valley region.¹¹ The recently released 2010 NYISO Comprehensive Reliability Plan notes an increase of 2805 gWh in projected cumulative savings from energy efficiency programs when compared to the 2009 forecast.¹²
- g) Major electrical transmission line developments, including a significant expansion of existing and licensed transmission capacity into Metro NYC markets as a result of the Linden Variable Frequency Transformers and approval of the Hudson Transmission Partners project¹³, as well as steps to integrate wind generation, and mandatory inclusion

⁹ Demand side management encompasses energy conservation as defined by the NRC staff in the FSEIS (FSEIS, p.8-41, fn. 4) plus measures designed to control peak loads without necessarily diminishing energy consumption. As nearly as I can tell, the FSEIS does not consider peak load control measures to be part of the conservation alternative. If true, this results in an underestimation of the potential role of DSM, at least in the combination alternatives.

¹⁰ In January 2009, Governor David Paterson announced the '45 by 15' clean energy goal, which proposes to reduce energy electricity end-use by 15 percent below 2015 forecasted levels, while simultaneously meeting 30 percent of the State's electricity supply needs through renewable resources. Governor David A. Paterson. *Our Time to Lead: State of the State Address*. 2009. [Http://www.state.ny.us/governor/keydocs/speech_0107091.html](http://www.state.ny.us/governor/keydocs/speech_0107091.html)

¹¹ *NYISO 2010 Summer Outlook, May 2010, p. 10 -11.*

¹² *NYISO 2010 Comprehensive Reliability Plan, December 2010, p. 9.* http://www.nyiso.com/public/webdocs/committees/mc/meeting_materials/2010-12-15/agenda_04_CRP_2010_FINAL_DRAFT_FOR_MC_REVIEW_120610.pdf.

¹³ The three Linden Variable Frequency Transformers began operating at the Linden, New Jersey cogeneration facility on December 8, 2009 and have the capability to convert

of renewable sector, energy efficiency and demand response programs into New York State's energy and transmission planning processes¹⁴;

9. The actual FSEIS "consideration" of a conservation alternative to relicensing the Indian Point units is nonexistent. The FSEIS states "the NRC staff here considers an energy conservation/energy efficiency alternative" (FSEIS, p. 8-42, lines 18-19) and "impacts from the conservation alternative are generally lower than from other alternatives, including the proposed plan" (FSEIS, p. 8-73, lines 10-11). However, this conservation alternative is never described at all. The FSEIS "analysis" of the impact of the conservation alternative is nothing more than a reference to analyses of conservation done for the relicensing of the Three Mile Island and Shearon Harris units.
10. This sole reliance on data from two other states is inconsistent with the site specific environmental impact statement contemplated by the 1996 revisions to Part 51. Neither Pennsylvania nor North Carolina has conservation programs and goals as aggressive as

up to 315 MW of electricity from the New Jersey power system and feed it into New York City. These transformers help to stabilize NYC's power grid, increase reliability, and reduce the need for new capacity inside the city.

The Hudson Transmission Partners line was approved by the NY PSC on September 8, 2010. This 345 kV line will connect PJM to midtown Manhattan, running between the Bergen Substation in Ridgefield, New Jersey and terminating at Consolidated Edison substations. It is expected initially to provide 320 MW of firm capacity from PJM to New York City, with the potential to provide 660 MW of firm capacity if investments are made to upgrade PJM facilities. In the Order approving this line, the NY PSC stated that "the HTP facility will assist in maintaining system reliability in the event that one or both of the Indian Point plants close". Case 08-T-0034: Application of Hudson Transmission Partners, LLC for a Certificate of Environmental Compatibility and Public Need for a 345 kV Submarine/Underground Electric Transmission Link Between Manhattan and New Jersey, p. 44"

¹⁴ "Energy efficiency gains have become an integral component in forecasting New York State's energy market. NYISO's Comprehensive Reliability Plan is the starting point for the new economic planning process called the Congestion Assessment and Resource Integration Study (CARIS), which evaluates transmission constraints and potential economic solutions to the congestion identified. All three resource types (generation, transmission and demand side management (DSM) programs) are now considered on a comparable basis as potential economic solutions for alleviating the identified congestion." 2009 NYISO Final Report *Comprehensive Reliability Plan: Comprehensive System Planning Process, May 19, 2009, p. 1.*

those of New York.¹⁵ Furthermore, North Carolina is a fully regulated jurisdiction, which creates a very different conservation framework than New York's competitive power market. North Carolina has also not adopted any program comparable to the Regional Greenhouse Gas Initiative.

11. As a result of these differences, the FSEIS provides no meaningful specific assessment of the potential of conservation programs to aid decisionmakers in assessing the role of conservation in replacing one or both Indian Point units. The contrast to the Staff's detailed discussion of site specific cooling tower and coal plant impacts, impacts over which the Nuclear Regulatory Commission also has no jurisdiction, is dramatic, leaving one to wonder why site specific analyses of cooling towers and coal plants are presented while a feasible conservation alternative goes undescribed.
12. Furthermore, the FSEIS does not consider an alternative scenario involving only energy conservation and renewable energy, the sources having the lowest environmental impacts. The FSEIS does acknowledge rapid growth in NYS energy conservation programs (8-42, 43) and renewable generation (8-28, 8-61) and that the choice of generation in New York will be driven increasingly by carbon and other environmental considerations (8-28). However, it fails to consider a non-fossil fuel generation alternative to relicensing. As a result, the FSEIS overstates the environmental impacts of the non-conservation alternative scenarios as well as of the no action alternative. Indeed, the FSEIS even overstates the environmental impacts of renewables by combining them not with conservation or DSM but with operation of fossil fuel generation or with one Indian Point unit with a cooling tower.
13. The FSEIS discussion of a purchased power alternative is seriously flawed in ways that undermine its usefulness to decisionmakers seeking to understand the environmental impacts of this alternative. Much of the problem flows from NRC Staff's reliance on the 2006 National Research Council report as a source of insight into this alternative. This report significantly overestimates future demand and underestimates the resources that will (and have already) come on line. Consequently, estimates of the amount of transmission and the amount of power that must flow over it to replace one or both Indian Point units are too large. The environmental impacts of the purchased power alternative are therefore overstated.
14. Furthermore, the NRC staff discussion of the purchased power alternative declines to estimate the environmental impacts from the power plants that will run to provide the

¹⁵ Pennsylvania ranks 16th on ACEEE's 2010 ranking; North Carolina ranks 24th. New York is fourth. (ACEEE 2010 State Energy Efficiency Scorecard, p. 66).

purchased power (FSEIS, p. 8-43, line 9ff). However, such estimates can be made in environmental impact assessments for transmission projects. Indeed, the New York Public Service Commission recently did just such an assessment in certifying the Hudson Transmission Partners project¹⁶. Had NRC staff used actual transmission projects that either exist or are under construction, it could have provided an analysis of the impacts of alternative generation and might well have found that Indian Point could have been replaced with a purchased power alternative that required much less transmission construction than the two projects that were purportedly considered.

15. The FSEIS contains some other specific errors that undermine its usefulness in assessing environmental impacts. For example,

a) p. 8-27, lines 32-34 – “Because of the area’s dependence on local power generation from natural gas and oil fuels, the area has high electricity rates”. Downstate New York’s high rates are a result in substantial part of high utility taxes, labor costs, clean air requirements and the costs of serving a dense urban territory. Today, when natural gas prices are low, New York utility bills remain high, so natural gas prices cannot explain New York City’s high rates. Thus the FSEIS may well overstate the socio-economic impacts of alternatives involving natural gas.

b) p. 8-39, lines 3-5 – “Based on currently scheduled unit retirements and demand growth projections, the NYISO predicted in 2006 that up to 1600 MW(e) from new projects not yet under construction would be needed by 2010 and a total of up to 3300 MW(e) by 2015 (National Research Council 2006).” Having been made in 2006, these estimates are not the best available data for decisions to be made in 2011. Indeed, the projections in the National Research Council’s 2006 Report have been overtaken by dramatically different results and forecasts that are easily available. The New York ISO reiterated in 2010 its 2009 conclusion that “Looking ahead, the NYISO’s latest assessment of the electric system’s reliability needs concludes that New York has sufficient installed generation to reliably serve load through 2018 . . . (W)e can also reasonably predict that no generation gap will appear for years to come.”¹⁷

¹⁶ Case 08-T-0034: Application of Hudson Transmission Partners, LLC for a Certificate of Environmental Compatibility and Public Need for a 345 kV Submarine/Underground Electric Transmission Link Between Manhattan and New Jersey, pp. 47ff.

¹⁷ *Power Trends 2010: New York’s Emerging Energy Crossroads*, NYISO, April 2010, p. 4. This conclusion assumes no “unplanned” retirement of the Indian Point units. The term “unplanned” is not clear in this context. The shutdown of unit 2 at Three Mile Island because of a sudden accident was genuinely unplanned. There is no reason to think the New York would pursue closure of Indian Point without planning for it.

c) p. 8-40, lines 26 -29 – The FSEIS states “as of November 10, 2010 the New York Regional Interconnection (“NYRI”) is still seeking the approval of the New York State Public Service Commission (“NYPSC”)” to build a major transmission project, when in fact the project was formally withdrawn from development consideration before the New York State Public Service Commission on April 21, 2009. The NYRI environmental impacts considered by the FSEIS would have been substantially higher than those of transmission projects actually approved in New York.¹⁸

d) p. 8-42, lines 1-7 – The FSEIS uses data from the 2006 ACEEE state energy efficiency rankings. The 2010 edition was published in October 2010. New York’s overall ranking has improved from seventh to fourth in the intervening five years.

e) p. 8-43, lines 24-26 – “The NRC staff also notes that loss of tax and PILOT revenue paid to municipalities near IP2 and IP3, as well as lost jobs, may result in SMALL to MODERATE socioeconomic impacts, which will not be offset by conservation.” The NRC staff offers no proof that investments in energy conservation do not increase building values and therefore tax revenues by an amount sufficient to offset losses from IP2 and IP3, especially since municipalities with discontinued nuclear plants often continue to receive substantial payments for serving as interim spent fuel storage sites.

f) p. 8-49, lines 11-13 – “The NRC staff notes that the current IP2 and IP3 are only used to produce electrical power, and do not supply heat to any offsite users. Combined heat and power, then, fulfills a need not currently met by IP2 and IP3 and is not a direct alternative to IP2 and IP3 license renewal.” This statement is wrong in two respects. The electrical portion of CHP is of course a potential replacement for IP power. The heat may also substitute for any heat that is produced electrically or may free up natural gas as an alternative to electricity for other purposes. This erroneous assessment of combined heat and power results in a serious underassessment of the potential impact of this source in any replacement scenario.

g) pages 8-61, lines 20-21 - Section 8.3.5.1 (Impacts of Combination Alternative 1) cites the New York State Department of Public Service as stating that 1076 MW of new wind generation is anticipated to be available in the years 2011 through 2015 (together with almost 700 MW of other renewables). However, these numbers are inconsistent with the Renewable Energy Assessment portion of the NYS 2009 Energy Plan. The FSEIS then limits the total share of renewable generation to 600 MW in both of the Combination

¹⁸ See footnote 13, *supra* pages 5-6. For example, the FSEIS discussion of purchased electrical power (Section 8.3.2) omits consideration of two significant transmission developments.

Alternatives analyses. By contrast, the April 2010 NYISO report *Powertrends* (p. 17) is just one among several recent documents noting that 7000 MW of new wind power alone has been proposed for New York, in addition to the almost 1300 MW already connected to the NY grid.

16. These errors plus the shortcomings listed previously overstate the need for the relicensing. There are no errors tending to minimize the need for relicensing. Taken together with the admittedly unnecessary discussion of the impacts of the coal-fired alternative,¹⁹ the combined effect has produced an FSEIS likely to mislead decisionmakers as to the environmental impact and feasibility of the alternatives to relicensing one or both of the Indian Point units.
17. Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

Dated: February 2, 2011
Peru, Vermont



Peter A. Bradford

¹⁹ The FSEIS bafflingly devotes nearly 10 pages to discussion of the environmental impacts of a coal fired alternative that it has “dismissed from individual consideration”. This discussion dwarfs the space devoted to discussion of more environmentally benign alternatives such as DSM and renewables.