

1 UNITED STATES

2 NUCLEAR REGULATORY COMMISSION

3 BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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5 In re: Docket Nos. 50-247-LR; 50-286-LR

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

7 Entergy Nuclear Indian Point 2, LLC, DPR-26, DPR-64

8 Entergy Nuclear Indian Point 3, LLC, and

9 Entergy Nuclear Operations, Inc. December 13, 2011

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11 PRE-FILED WRITTEN TESTIMONY OF

12 PETER A. BRADFORD

13 REGARDING CONTENTION NYS-9-33-37 ("NYS-37")

14 On behalf of the State of New York ("NYS" or "the State"),
15 the Office of the Attorney General hereby submits the following
16 testimony by Peter A. Bradford regarding Contention NYS 9-33-37
17 (consolidated as "NYS-37.")

18 Q. Please state your full name.

19 A. Peter Amory Bradford

20 Q. By whom are you employed and what is your position?

21 A. I am an adjunct professor at Vermont Law School and
22 CEO of Bradford Brook Associates, a firm advising on utility

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1 regulation, power supply planning and procurement, and energy
2 policy.

3 Q. Please summarize your educational and professional
4 qualifications.

5 A. I am a graduate of Yale University and Yale Law
6 School. My resume is attached as Exhibit NYS000104 to this
7 testimony.

8 I have been involved in the regulation of utilities and of
9 power supply procurement since 1971 and in energy policy making
10 since 1968. I was a member and chair of the Maine Public
11 Utilities Commission twice, between 1971 and 1977 and between
12 1982 and 1987. I chaired the New York Public Service Commission
13 between 1987 and 1995. I was a member of the U.S. Nuclear
14 Regulatory Commission between 1977 and 1982.

15 While in New York, I served also on the New York State
16 Energy Planning Board, the Board of the New York State Energy
17 Research and Development Administration, the New York
18 Environmental Board and as chair of the New York State Energy
19 Facilities Siting Board. These bodies had extensive
20 responsibility for the reliability and affordability of New
21 York's power supply, which was at all times adequate during my
22 term.

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1 I teach a course entitled "Nuclear Power and Public Policy"
2 at Vermont Law School and have taught "Energy Policy and
3 Environmental Protection" at the Yale School of Forestry and
4 Environmental Studies. I have been a member of the Keystone
5 Center "Nuclear Power Joint Fact Finding" (June, 2007) and the
6 National Research Council of the National Academy of Sciences'
7 Committee on "Alternatives to the Indian Point Energy Center for
8 Meeting New York Electric Power Needs" (June, 2006). I was also
9 a member of the International Expert Panel advising the European
10 Bank for Reconstruction and Development as to the economic case
11 for (and the alternatives to) completing Khmel'nitsky 2 and Rovno
12 4 (K2/R4) - two partly built, Soviet designed 1,000 MW VVER
13 nuclear units in Ukraine - to replace the two operational 1,000
14 MW units at Chernobyl (February, 1997).

15 Q. I show you what has been marked as Exh. NYS000105
16 Declaration of Peter A. Bradford, dated November 28, 2007
17 (ML073400205) (hereinafter "2007 Bradford Decl."). Do you
18 recognize that document?

19 A. Yes. It is a copy of my statement submitted in
20 support of New York State's Contention NYS-9 indicating
21 shortcomings in the licensee's Environmental Report as well as
22 in the NRC's historically cursory analysis of non-nuclear energy

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1 sources. The statement accurately reflects my analysis and
2 opinions.

3 Q. I show you what has been marked as Exh.
4 NYS000106: 2011 Bradford Declaration, dated February 2, 2011,
5 (ML110680290) (hereinafter "2011 Bradford Decl."). Do you
6 recognize that document?

7 A. Yes. It is a copy of my statement submitted in
8 support of New York State's Contention on the final impact
9 analysis of no-action energy alternative, NYS-37. My statement
10 set forth my analysis of the deficiencies in the Final
11 Supplemental Environmental Impact Statement ("FSEIS") for the
12 Indian Point Nuclear Generating Units 2 and 3. It identified
13 significant developments in New York State's energy markets that
14 contradicted the FSEIS's limited view of replacement capacity in
15 the event that Indian Point Units 2 and 3 are not relicensed.
16 The statement accurately reflects my analysis and opinions.

17 Q. What is the purpose of your testimony?

18 A. My testimony shows that the Final Supplemental
19 Environmental Impact Statement for Indian Point does not
20 constitute a detailed statement on the no-action alternative in
21 the event the Indian Point units are denied license renewal. In
22 particular, the FSEIS relies on outdated and demonstrably
23 inaccurate analyses, conclusions, and forecasts to assess these

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1 alternatives. The FSEIS also ignores more current and accurate
2 information presented by the state of New York and does not take
3 a hard look at the no-action alternative to license renewal.

4 The FSEIS looks at the consequences of the no-action
5 alternative to relicensing by relying in part on the findings
6 and conclusions in the discussion of specified alternatives in
7 the FSEIS at FSEIS § 8.3. See FSEIS § 8.2, p. 8-22. I have
8 also reviewed and analyzed that section of the FSEIS and
9 identified the deficiencies in the consideration of
10 conservation, renewable energy, purchased electrical power,
11 transmission constraints, and the need for power as these relate
12 to the no-action alternative.

13 Q. Have you reviewed materials in preparation for your
14 testimony?

15 A. Yes. I have reviewed the FSEIS, the GEIS, my previous
16 declarations in this proceeding and the materials referenced
17 therein. I have also reviewed the January 31, 2011 declaration
18 of David Schlissel and the February 1, 2011 declaration of Peter
19 Lanzalotta, as well as the 2011 "Gold Book" of the New York
20 Independent System Operator (NYISO), originally released in
21 April 2011. In addition, I have reviewed the New York State
22 Energy Research and Development Authority (NYSERDA) 2010 Annual
23 Report entitled "New York's Clean Energy Economy" and NYSERDA's

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1 "The 2010 New York State Renewable Portfolio Standard
2 Performance Review." Finally, I have reviewed a June 27, 2011
3 article from The Capitol entitled "Nuclear Options" by Jon Lentz
4 describing New York State's newly enacted power plant siting
5 law.

6 Q. Are many of these documents prepared by government
7 agencies or documents prepared by Entergy or the utility
8 industry?

9 A. Yes.

10 Q. Mr. Bradford, I show you Exhibits NYS000055 through
11 NYS00058, NYS000065 through NYS000069, NYS000103, NYS000107
12 through NYS000124. Do you recognize these documents?

13 A. Yes. These are true and correct copies of the
14 documents that I referred to, used, and/or relied upon in
15 preparing my prior declarations and this testimony. In some
16 cases where the document was extremely long and only a small
17 portion is relevant to my testimony, an excerpt of the document
18 is provided. If it is only an excerpt, that is noted on the
19 first page of the Exhibit.

20 Q. How do these documents relate to the work that you do
21 as an expert in forming opinions such as those contained in this
22 testimony?

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1 A. These documents contain the type of information that
2 persons within my fields of expertise rely upon in forming
3 opinions of the type offered in this testimony.

4 Q. Please summarize your testimony.

5 A. The FSEIS does not give decisionmakers a clear and
6 reasonably up-to-date picture of New York's power supply without
7 one or both of the Indian Pont units. Such a description, based
8 on the analysis of a few scenarios assuming combinations of
9 demand growth, gas prices, and carbon constraints, would not
10 have been difficult to provide. In its absence, the FSEIS plays
11 a game of pin-the-tail on the donkey, with options stuck
12 randomly on the wall around the Indian Point units.

13 For its assessment of New York specific electricity
14 circumstances, the FSEIS relies heavily on the 2006 National
15 Research Council Report prepared by a panel of which I was a
16 member. However, that Report's analyses have been superseded by
17 a number of events - some of them highly significant -
18 indicating that retiring the Indian Point units on a reasonable
19 schedule can be achieved at lower environmental impacts than the
20 FSEIS foresees. Demand for electricity is significantly lower
21 than we foresaw. New York has succeeded in expanding available
22 generation in the downstate region and has put in place policies
23 that have increased the supply of renewable energy.

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1 Transmission into the downstate area has also expanded. Natural
2 gas is cheaper and more plentiful than the National Research
3 Council Panel foresaw.

4 Each of these developments - but especially the lower
5 demand for electricity - indicates that retiring the Indian
6 Point units will result in fewer environmental impacts than the
7 FSEIS suggests. Many of these developments were called to the
8 NRC's attention by witnesses for the state of New York well in
9 advance of the publication of the FSEIS. While the FSEIS is an
10 improvement on the original Environmental Report in some areas,
11 it ignores much of the information that New York has provided
12 and sometimes uses instead projects and approaches that do not
13 apply to New York at all.

14 Developments since the preparation of the FSEIS reinforce
15 all of these points.

16 Taken altogether, the shortcomings of the FSEIS are
17 consistent with fundamental flaws in the NRC's approach to
18 analyzing alternatives, including the no-action alternative, to
19 nuclear construction and operation over many years, flaws that
20 have produced what should be an embarrassing record of dramatic
21 overestimation of demand for nuclear units whose subsequent
22 cancellation or early closure has had no adverse effect on the
23 nation's electric reliability.

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1 In short, the FSEIS does not adequately evaluate the costs
2 and benefits of the no-action alternative, thus preventing the
3 decision maker from having an adequate record on which to make a
4 decision on the no-action alternative. Only an analysis fully
5 consistent with power supply procurement realities - including
6 the abundance of available energy efficiency, renewable
7 generation, transmission enhancements, and purchased power -
8 will enable the NRC, and state energy decisionmakers, to assess
9 the comparative environmental impacts of the relicensing
10 decision.

11 Q. Please explain why you contend that the FSEIS relies
12 on outdated information.

13 A. The FSEIS relies heavily on documents completed in
14 2006 or earlier for an assessment of events commencing in 2011.
15 This is a peculiar methodology even in ordinary times. Given
16 the unique events of the last five years, it is simply not
17 acceptable and cannot yield a reasonable description of the no-
18 action alternative to continued operation of Indian Point.
19 Among the significant pre-2011 developments that the FSEIS
20 either ignores or pays inadequate attention to are:

21 a) the extraordinary decline in demand for electric
22 power, which is attributable only in part to the recession;

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1 b) the unforeseen and astonishing price decline and
2 availability increase of natural gas to meet New York and
3 Northeastern energy needs;

4 c) New York's progress in implementing its Renewable
5 Portfolio Standard, especially wind power;

6 d) New York's progress in implementing demand side
7 management ("DSM") pursuant to New York State's 15 X 15 program
8 and 45 x 15 Clean Energy Program, as well as the impact of
9 federal stimulus revenues and state incentives;

10 e) The implementation of the Regional Greenhouse Gas
11 Initiative ("RGGI");

12 f) The addition of significant additional transmission
13 resources in New York State.

14 The potential institutional constraints which the 2006
15 National Research Council Report emphasized (and which the FSEIS
16 referenced) have not proven to be a barrier to New York's
17 ability to acquire new electric resources at an adequate pace.
18 Indeed, the New York ISO now sees no likelihood of generation
19 constraints well into the future.

20 Furthermore, in 2011, after completion of the FSEIS, the
21 New York legislature enacted state-level "one stop" power plant
22 siting legislation, alleviating a primary concern of the
23 National Research Council. This legislation also expanded the

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1 availability of energy efficiency financing for New Yorkers.

2 Exh. NYS000107: 2011 NY Power Act.

3 Since 2000, New York has added over 7,800 MW of new
4 generation, nearly 1,300 MW of new transmission, and nearly
5 2,400 MW of demand response, 80% of which has been added where
6 demand growth has been the greatest, in the New York City, Long
7 Island, and Hudson Valley region. Exh.NYS000057: 2010 NYISO
8 Summer Outlook, p. 10.

9 The foregoing developments make it more likely that Indian
10 Point's generation can be replaced by low environmental impact
11 alternatives that are dismissed, or inadequately considered in
12 the FSEIS.

13 Q. Please identify any errors in the FSEIS analysis of
14 New York's energy markets and load forecasts as they relate to
15 the FSEIS consideration of replacement capacity in the event the
16 Indian Point Units are not relicensed.

17 A. Because the FSEIS does not analyze energy markets, it
18 gives no sense of the prioritization among energy sources that
19 will inevitably occur in the real world. As to load forecasts,
20 the FSEIS relies on the 2006 National Research Council study
21 citation of 2006 New York ISO forecasts for its 2010 estimate of
22 the amount of generation necessary to replace Indian Point Units
23 2 and 3 in the event the units are not relicensed for operation

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1 after 2013 and 2015. Specifically, the FSEIS asserts “[b]ased
2 on currently scheduled unit retirements and demand growth
3 projections, the NYISO predicted in 2006 that up to 1600 MW (e)
4 from new projects not yet under construction would be needed by
5 2010 and a total of up to 3300 MW (e) by 2015.” FSEIS p. 8-39,
6 lines 3-5 (citing National Research Council study).

7 These forecasts have been overtaken by dramatically
8 different results and forecasts that are easily available. The
9 New York ISO reiterated in 2010 its 2009 conclusion that
10 “Looking ahead, the NYISO’s latest assessment of the electric
11 system’s reliability needs concludes that New York has
12 sufficient installed generation to reliably serve load through
13 2018 . . . (W)e can also reasonably predict that no generation
14 gap will appear for years to come.” Exh. NYS000108: NYISO Power
15 Trends 2010, p. 4. Of course, this dramatic revision (from a
16 3300MW deficit in 2015 to assured sufficiency through 2018)
17 invalidates FSEIS assumptions as to actions that will need to be
18 taken in particular time frames, if indeed they need to be taken
19 at all.

20 The FSEIS also ignores the fact that New York State
21 experienced a 4.1% drop in power demand in 2008-09. Exh.
22 NYS000059: NYISO 2009 Energizing Annual Report, p. 6. Increases
23 in demand side management coupled with modest economic growth

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1 are projected to cause lower than historically expected energy
2 use through 2018. Exh. NYS000109: 2009 NYS Energy Forecasts, p.
3 10. During July, 2010 the NYISO met its third highest peak
4 load. Exh.NYS000110: 2010 NYISO Press Release. This load was
5 some 1000MW below the 2010 peak forecast used in the 2006
6 National Research Council Report. The resources available to
7 meet the peak were some 4000 MW higher than forecast. Exh.
8 NYS000055: 2006 National Research Council, p. 60, Table 5-1.

9 Finally, the FSEIS asserts "given that the demand for
10 electricity is increasing and, in the near term, planned new
11 sources within the NYCA are just keeping pace with retirements,
12 the FSEIS does not consider additional delays in the retirements
13 of existing plants to be a feasible alternative to compensate
14 for the loss of power from IP2 and IP3." FSEIS §8.3.4.11. But
15 of course demand for electricity in New York, and in the zones
16 specifically supplied by Indian Point, has sharply decreased as
17 a result of the economic downturn, coupled with the State's
18 energy efficiency programs and demand response programs. Here
19 again, the FSEIS's reliance on outdated need for power
20 projections incorrectly overstating New York's need for power
21 has unnecessarily restricted its evaluation of the no-action
22 alternative.

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1 Q. What are the consequences of the FSEIS's failure to
2 discuss the costs and benefits of the no-action alternative to
3 Indian Point in the event the units are denied license renewal?

4 A. By discussing need for Indian Point power in a vacuum
5 the FSEIS distorts the comparison between the Indian Point units
6 and the alternatives, including the no-action alternative. A
7 fair need for power comparison would of course consider actual
8 economic conditions.

9 The FSEIS did not account for the fact that New York
10 State's demand for power dropped significantly or that this
11 trend is forecast to continue over the period of license
12 renewal. The projected decline in demand growth over the period
13 in which the Indian Point units would be either granted license
14 renewal or retired is directly relevant to the timing, cost, and
15 viability of energy sources that would be relied upon in the
16 event either or both Indian Point units don't operate beyond the
17 end of their current licensed lives. Because the FSEIS does not
18 discuss the economics of the Indian Point units in comparison to
19 the economics of alternatives, including the no-action
20 alternative, it gives decision makers no sense of which among
21 the alternatives are likely to be deployed in what quantities in
22 the event that the no-action alternative is in fact pursued.

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1 Q. Please identify any errors in the FSEIS analysis of
2 New York's ability to import additional purchased power if the
3 Indian Point Units do not operate beyond their licensed lives.

4 A. The FSEIS discussion of New York State's transmission
5 grid and purchased power as a potential outcome of the no-
6 alternative is flawed in ways that undermine its usefulness to
7 decisionmakers seeking to understand the environmental impacts
8 of this alternative. Much of the problem flows from the FSEIS's
9 reliance on the 2006 National Research Council report as a
10 source of insight into this supply-side resource. This report
11 underestimated the resources that will (and have already) come
12 on line. In addition, as we have seen, it overestimated
13 electricity demand. Consequently, estimates of the amount of
14 new transmission and the amount of power that must flow over it
15 to replace one or both Indian Point units are too large. The
16 environmental impacts of the purchased power are therefore
17 overstated.

18 Furthermore, the FSEIS states "as of November 10, 2010 the
19 New York Regional Interconnection ("NYRI") is still seeking the
20 approval of the New York State Public Service Commission
21 ("NYPSC")" to build a major transmission project. In fact that
22 project was formally withdrawn on April 21, 2009. The NYRI
23 environmental impacts considered by the FSEIS are substantially

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1 higher than those of the transmission projects actually approved
2 in New York. FSEIS p. 8-40, lines 23-26. For example, the
3 three Linden Variable Frequency Transformers began operating at
4 the Linden, New Jersey cogeneration facility on December 8,
5 2009. They can convert up to 315 MW of electricity from the New
6 Jersey power system and feed it into New York City. These
7 transformers help to stabilize NYC's power grid, increase
8 reliability, and reduce the need for new capacity inside the
9 city. Therefore, they are relevant to the consideration of the
10 no-action alternative.

11 Furthermore, the Hudson Transmission Partners line was
12 approved by the NY PSC on September 8, 2010. This 345 kV line
13 will connect PJM to midtown Manhattan, running between the
14 Bergen Substation in Ridgefield, New Jersey and Consolidated
15 Edison substations. It is expected initially to provide 320 MW
16 of firm capacity from PJM to New York City, with the potential
17 to provide 660 MW of firm capacity if investments are made to
18 upgrade PJM facilities. In the Order approving this line, the
19 NY PSC stated that "the HTP facility will assist in maintaining
20 system reliability in the event that one or both of the Indian
21 Point plants close." Exh. NYS000111: Sept. 15, 2010 NYS PSC
22 Order, p. 44.

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1 Finally, the FSEIS discussion of purchased power declines
2 to estimate the environmental impacts from the power plants that
3 will run to provide the purchased power. FSEIS, p. 8-41, line
4 9ff. Such estimates can be made in environmental impact
5 assessments for transmission projects. Indeed, the New York
6 Public Service Commission recently did just such an assessment
7 in certifying the Hudson Transmission Partners project. Id.
8 Had the FSEIS used transmission projects that either exist or
9 are under construction, it could have provided an analysis of
10 the impacts of no-action alternative generation. The FSEIS
11 might well have found that, in the context of the no-action
12 alternative, Indian Point could have been replaced with a
13 purchased power alternative that required much less future
14 transmission construction than the two projects that were
15 considered. This in turn would have undercut the FSEIS
16 conclusion that "significant resource commitments would also be
17 required for development of transmission capacity." FSEIS,
18 Section 9.1.2, p. 9-6.

19 Q. Please identify any errors in the FSEIS analysis of
20 New York City's electricity prices affecting consideration of
21 replacement capacity in the event the Indian Point Units do not
22 operate beyond the expiration date of their current licenses.

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1 A. On page 8-27, lines 32-34 the FSEIS asserts that
2 "[b]ecause of the area's dependence on local power generation
3 from natural gas and oil fuels, the [downstate] area has high
4 electricity rates." This selective use of cost data for the
5 consideration of generation alternatives in a no-action scenario
6 is misleading because the data is both incorrectly used and out
7 of date. Natural gas prices in New York State in 2009 were
8 slightly less than half what they had been in 2008. Exh.
9 NYS000108: 2010 NYISO Power Trends, p. 8. Furthermore,
10 downstate New York's high electric rates were reviewed often
11 during my term as chair of the NYPSC and a member of the New
12 York Energy Planning Board. They result in substantial part
13 from high utility taxes, labor costs, clean air requirements and
14 the costs of serving a dense urban territory. Today, when
15 natural gas prices are relatively low, New York City utility
16 bills remain high, so natural gas prices cannot explain New York
17 City's high rates. Because changes in the amount and price of
18 natural gas used to generate electricity will not change New
19 York's status as a high cost region (though such changes will
20 change the level of electric bills) the FSEIS overstates the
21 socio-economic impacts of generation sources involving natural
22 gas.

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1 Q. Please explain why you contend that the FSEIS ignores
2 New York's progress in implementing demand side management
3 pursuant to the State's clean energy policies and explain how it
4 affects the FSEIS's analysis of the no-action alternative in the
5 case of Indian Point.

6 A. The FSEIS is more realistic than the 2007
7 Environmental Report in that it purports to consider
8 conservation as a stand-alone measure available to energy
9 planners in the event the Indian Point units are denied license
10 renewal. It also increases the amount of conservation in some
11 combinations of alternatives.

12 However, the FSEIS does not take into account New York's
13 progress in implementing demand side management pursuant to the
14 State's clean energy policies which propose to reduce
15 electricity end-use by 15 percent below 2015 forecasted levels,
16 while simultaneously meeting 30 percent of the State's
17 electricity supply needs through renewable resources. The FSEIS
18 uses the 2006 American Council for an Energy-Efficient Economy
19 (ACEEE) state energy efficiency rankings indicating that New
20 York State ranks seventh nationwide in implementing energy
21 efficiency programs. In fact, New York ranked fourth in ACEEE's
22 2010 rankings, reflecting the State's progress in implementing

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1 its energy efficiency programs. Exh. NYS000112: 2010 ACEEE
2 Scorecard.

3 Demand side management encompasses energy conservation as
4 defined in the FSEIS, FSEIS, p.8-41, fn. 4, plus measures
5 designed to control peak loads without necessarily diminishing
6 energy consumption.

7 The FSEIS states "the NRC staff here considers an energy
8 conservation/energy efficiency alternative," FSEIS, p. 8-42,
9 lines 18-19, and "impacts from the conservation alternative are
10 generally lower than from other alternatives, including the
11 proposed plan." FSEIS, p. 8-73, lines 10-11. However, this
12 conservation alternative is never described at all. The FSEIS
13 "analysis" of the impact of the conservation in the event the
14 Indian Point units are denied license renewal is really just a
15 reference to analyses of conservation done for the relicensing
16 of the Three Mile Island and Shearon Harris units.

17 This sole reliance on data from two other states is
18 inconsistent with the site specific environmental impact
19 statement contemplated by the 1996 revisions to Part 51.

20 Neither Pennsylvania nor North Carolina has conservation
21 programs and goals as aggressive as those of New York.

22 Pennsylvania ranks 16th on ACEEE's 2010 ranking; North Carolina
23 ranks 24th. Exh. NYS000112: ACEEE 2010 Scorecard, p. 66.

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

6 Finally, despite the use of North Carolina and Pennsylvania
7 data as a general proxy for the impacts of conservation, the
8 FSEIS makes a site specific claim that the socioeconomic impacts
9 of lost tax revenues will be "SMALL TO MODERATE." FSEIS, p.8-
10 43. This claim pays no attention to the well documented
11 positive economic benefits of energy efficiency in terms of jobs
12 and property values throughout New York. These benefits include
13 direct job and property value increases, lower electric bills
14 for public buildings and jobs saved through lower production
15 costs; see for example NYSERDA's 2010 Annual Report entitled
16 "New York's Clean Energy Economy." Exh. NYS000113: NYSERDA 2010
17 Clean Energy Report.

18 Nor does the FSEIS's claim of negative socio-economic
19 impacts take into account the extent to which other Northeastern
20 communities in which nuclear plants have closed (Wiscasset,
21 Maine and Haddam Neck, Connecticut) continue to receive
22 substantial property tax payments because they contain interim
23 spent fuel storage facilities. It is not at all clear that a

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1 site specific evaluation of energy conservation would show the
2 net property tax impact of closing Indian Point to be
3 "moderate." Indeed, it is possible that the socioeconomic
4 impact will be positive. Certainly the FSEIS conclusion that
5 the lost tax revenues "will not be offset by conservation,"
6 FSEIS, p. 8-43, may well be wrong and cannot in any case be
7 substantiated without a state specific review.

8 In short, the FSEIS provides no meaningful site-specific
9 assessment of the potential of conservation programs with which
10 to aid decisionmakers in assessing the role of conservation in
11 replacing one or both Indian Point units. The contrast to the
12 Staff's detailed discussion of site specific cooling tower and
13 coal plant impacts, impacts over which the Nuclear Regulatory
14 Commission also has no jurisdiction, is dramatic, leaving one to
15 wonder why site specific analyses of relatively high impact
16 cooling towers and coal plants are presented while feasible low
17 impact conservation measures go undescribed.

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1 Q. Please discuss the FSEIS treatment of combined heat
2 and power ("CHP") technology.

3 A. Despite the substantial contribution that CHP is
4 making in some parts of the U.S., the FSEIS does not consider
5 CHP as a source of replacement power in a combined alternative
6 in the context of the no-action alternative. The FSEIS states:

7 "the current IP2 and IP3 are only used to produce
8 electrical power, and do not supply heat to any
9 offsite users. Combined heat and power, then,
10 fulfills a need not currently met by IP2 and IP3, and
11 is not a direct alternative to IP2 and IP3 license
12 renewal."

13 FSEIS, § 8.3.4.12, p. 8-49, lines 11-13.

14 This statement is wrong in two respects. The electrical
15 portion of CHP is of course a potential replacement for IP
16 power. The heat may also substitute for any heat that is
17 produced electrically or may free up natural gas as an
18 alternative to electricity for other purposes. This erroneous
19 assessment of CHP results in an underassessment of the potential
20 impact of this source in any replacement scenario.

21 Q. How is the FSEIS deficient, if at all, in its analysis
22 of renewable energy, especially wind?

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1 A. The FSEIS's consideration of New York State's
2 renewable sector understates New York's renewable energy
3 achievements and potential.

4 The FSEIS limits the total share of renewable generation to
5 600 MW in the Combination Alternatives analysis. FSEIS, p. 8-
6 60. However, by the end of 2009 nearly 1300 MW of wind projects
7 had come on line in New York.

8 Section 8.3.5.1 of the FSEIS cites the New York State
9 Department of Public Service as stating that 1076 MW of new wind
10 generation is anticipated to be available in the years 2011
11 through 2015 (together with almost 700 MW of other renewables).
12 FSEIS, § 8.3.5.1., pages 8-61, lines 20-21. These numbers are
13 somewhat lower than the Renewable Energy Assessment portion of
14 the NYS 2009 Energy Plan, Exh. NYS000068: 2009 NYS REA at (p.
15 34), which asserts that 30% of New York's technical potential of
16 8527 MW of wind (or an additional 1258 MW after 2009) will be
17 realized by 2015.

18 Wind projects also comprise a dominant portion of the
19 capacity of proposed new generation projects in the NYISO
20 interconnection queue. Some 7,000 MW of additional wind power
21 have been proposed for interconnection with the New York
22 electric grid. Exh. NYS000108: NYISO 2010 Power Trends, pp. 16-
23 17. The NYISO has expanded the eligibility of intermittent

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1 resources for special market rules from 500 MW to 3,300 MW to
2 accommodate increased penetration levels of wind plants on the
3 system. Exh. NYS000069: 2008 Integration of Wind Study, p 1-1.

4 Furthermore, a recent review of the New York ISO's first
5 decade stated

6 According to the American Wind Energy Association
7 ("AWEA"), which tracks wind projects and changes in
8 wind capacity in states across the U.S., New York
9 ranks sixth among the 50 states in terms of the amount
10 of wind generating capacity added in the last year,
11 and eighth in terms of total installed wind capacity
12 as of the end of 2009. Furthermore, AWEA and other
13 analysts have assessed the ease of entry of wind
14 capacity into electric systems around the country and
15 have concluded that RTOs like New York's, with open
16 access to transmission and single clearing price
17 competitive markets, provide a relatively supportive
18 environment for renewable project investment.

19 Exh. NYS00014: Tierney Review.

20 Q. Is the FSEIS correct in asserting that wind, as an
21 intermittent resource, must be backed up by new baseload
22 resources?

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1 A. Intermittent resources above a certain level may
2 require support from load management, other renewables or a load
3 following unit, most likely natural gas. However, it is
4 important also to understand a factor that the FSEIS does not
5 mention, namely that in a system with surplus capacity (like New
6 York at present) new intermittent electricity generation may
7 well not require backup. Instead, it reduces the time that the
8 most expensive (and probably gas fired) units must run.
9 Substantial wind can be added to a large system in surplus with
10 no new back up and no other effect than reducing use of the
11 highest cost units that would otherwise operate at the time the
12 wind resource is available.

13 Q. What is the impact of the FSEIS treatment of
14 renewables on the validity of its conclusions regarding the no-
15 action alternative?

16 A. Taken together with the underestimation of the
17 potential of energy efficiency, the FSEIS shortcomings overstate
18 the environmental impacts of the combination of generation
19 alternatives available in a no-action scenario. In particular,
20 the FSEIS concludes that the proposed combination of generation
21 sources "are likely to have smaller aquatic impacts than
22 continued operation of IP2 and IP3, while they have potentially
23 larger impacts in other areas, including air quality,

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1 aesthetics, and land use." FSEIS § 8.4, p. 8-73. However,
2 these impacts are attributable largely to the installation of
3 cooling towers at one of the IP units, or to the new gas-fired
4 plant. To the extent that these can be reduced or eliminated in
5 a combination based on efficiency and renewables, the relative
6 environmental standing of that combination improves accordingly.

7 Q. Does the FSEIS discriminate against the role of
8 renewables in a no-action alternative in any other way?

9 A. Yes. The FSEIS relies on the DOE/EIA "Annual Energy
10 Outlook 2010 with Projections to 2035" report (DOE/EIA 2010) to
11 "help select reasonable alternatives to license renewal," FSEIS
12 § 8.3. pp. 8-28, l. 37. The FSEIS adopted DOE/EIA 2010's
13 conclusion that coal generation will decline and removed coal
14 from consideration as a source of replacement capacity to Indian
15 Point's generation. Yet the FSEIS does not mention the DOE/EIA
16 2010 conclusion that renewable generation is forecast to
17 increase sharply over the time period relevant to license
18 renewal, with wind generation providing the greatest share of
19 this growth. Exh. NYS000115, 2010 Energy Outlook. Thus, the
20 FSEIS concluded, with no analysis that renewable sources could
21 not provide more than 600 MW toward replacing the power supplied
22 by the IP units in the event they are denied license renewal.
23 See FSEIS § 8.3.5. 8-59 to 8-61. The FSEIS does not explain why

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1 it found one DOE/EIA 2010 conclusion persuasive and the other
2 not worth mentioning.

3 Q. Please discuss the FSEIS consideration of a no-action
4 alternative combination of energy conservation and renewable
5 energy.

6 A. The FSEIS improves on earlier assessments in that it
7 at least considers combination alternatives. However, it does
8 not consider a no-action alternative scenario involving only
9 energy conservation and renewable energy, the sources having the
10 lowest environmental impacts. This omission was identified by
11 New York in comments on the DSEIS. See NYS-33 ¶ 21:
12 "Combination 3". The FSEIS does acknowledge rapid growth in New
13 York's energy conservation programs (8-42, 43) and renewable
14 generation (8-28, 8-61) and that the choice of generation in New
15 York will be driven increasingly by carbon and other
16 environmental considerations (8-28). However, it fails to
17 consider a non-fossil fuel generation no-action alternative
18 scenario to relicensing. As a result, the FSEIS overstates the
19 environmental impacts of the non-conservation alternative
20 scenarios as well as the no-action alternative. Indeed, the
21 FSEIS even overstates the environmental impacts of renewables by
22 combining them not with conservation or DSM but with operation

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1 of fossil fuels or with one Indian Point unit with a cooling
2 tower.

3 Relying in part on two outdated studies (Levitan 2005 and
4 National Research Council 2006) to evaluate the renewable sector
5 generation's current and future potential, the FSEIS considers a
6 maximum of 600 MW of renewable generation in combination with
7 either new cooling towers at one IP unit or the construction of
8 a new gas plant. FSEIS § 8.3.5 pp. 8-59-70. The FSEIS then
9 aggregates the impacts of renewable generation with those of the
10 gas-fired plant or the impacts attributed to the construction of
11 cooling towers for a relicensed plant, resulting in higher
12 environmental impacts in all categories than would relicensing
13 Indian Point. But of course the impacts of the no-action
14 alternative under a combination of energy conservation with
15 renewables (and perhaps a small share of natural gas) might well
16 be smaller than the impacts of relicensing or the FSEIS's
17 combination no-action alternative scenarios. The New York State
18 Renewable Portfolio Standard Performance Report for 2010 gives a
19 sense of the extent to which renewables are likely to have
20 positive socioeconomic impacts sufficient to offset any negative
21 impacts resulting from the closing of one or both Indian Point
22 units:

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1 Progress in the program through December 31, 2010 has
2 yielded, and is expected to yield, significant economic
3 benefits to New York State and its associated locales.
4 Economic benefits accrue from the planning, development,
5 construction, and operation of renewable energy facilities.
6 These economic benefits come in the form of long- and
7 short-term jobs, property tax, or payment-in-lieu of tax
8 benefits to local governments and school districts, and
9 biomass fuel purchases, as well as from lease and/or
10 royalty payments to landowners. For example, long-term
11 jobs include such positions as asset and project management
12 jobs, operations and maintenance jobs, and administrative
13 staff. Payments in lieu of taxes inject money into towns,
14 counties, and school districts, without requiring
15 additional services. Similarly, host community payments
16 invest more dollars directly to a community where a new
17 renewable project is sited. Project development and
18 construction also creates localized demand for short-term
19 laborers, who in turn fill New York State hotels, motels,
20 and restaurants. These direct economic benefits have a
21 significant impact on New York's economy. NYSERDA
22 estimates that New York could realize up to \$2.1 billion in
23 direct economic benefits over the expected 20 year life of

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1 the facilities with active contracts under the first five
2 main tier solicitations. When the effects induced on the
3 broader economy are considered, the total economic benefits
4 have been estimated to more than double.

5 Exh. NYS000117: 2010 NYS RPS Report at p.3.

6 Q. Please comment on the extent to which the FSEIS
7 improves, if at all, upon the flaws that you noted in the
8 Environmental Report in your 2007 declaration.

9 A. In that declaration, I noted that the Nuclear
10 Regulatory Commission's approach to assessing alternatives to
11 the construction and operation of nuclear power plants has been
12 deficient since the agency was created in 1975. In particular,
13 the NRC has been ineffective in assessing the role that energy
14 efficiency can play (and has played) in displacing nuclear power
15 plants. A study done for me when I was an NRC Commissioner in
16 1979 concluded, *inter alia*:

17 The Commission has consistently failed to perform full
18 cost-benefit analyses for reasonable alternatives as
19 required by NEPA. . . . NRC environmental statements
20 display a clear bias in favor of central station
21 facilities, and a mix of potentially more cost-
22 effective (and environmentally benign) technologies is
23 never adequately assessed.

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1 Exh. NYS000116: 1979 Warburg Study.

2 I noted several instances in which operating or nearly
3 operating nuclear plants had been displaced by combinations of
4 alternatives. These instances were Shoreham, Seabrook's Maine
5 owners and Rancho Seco, where the Sacramento Municipal Utilities
6 District's history notes:

7 To replace nuclear power, the SMUD Board moved away
8 from the concept of a large central plant toward
9 diverse power sources, such as cogeneration plants,
10 wind power, low-cost purchased power from the Pacific
11 Northwest and Canada, and research and development of
12 renewable resources and advanced technologies like
13 solar, fuel cells, gas turbines and biomass. Exh.

14 NYS000118: SMUD History.

15 The FSEIS improves on the Environmental Report in that it
16 does consider combinations of resources as potential
17 replacements to Indian Point. However, as I have shown in this
18 testimony, the combinations reflect neither power market
19 realities, current data, nor the optimal mixtures of generation
20 and conservation.

21 The recent history of the electric power industry in the
22 United States, and in New York State in particular, demonstrates
23 beyond dispute the ability of a large power system such as New

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1 York to effectively create portfolios of replacement energy
2 resources comprised of energy efficiency, renewable generation,
3 and transmission enhancements once a decision has clearly been
4 made to close a particular unit or once unexpected circumstances
5 produce the same result.

6 The NRC has been presented with substantial evidence that
7 the amount of energy efficiency and other resources put into
8 place in New York State since the 2006 National Research
9 Council's study was published vastly exceeds the forecasted
10 availability of a few years earlier. It is the realization that
11 generating capacity will not be available that creates the
12 climate in which alternative resources will be developed and put
13 into place. For sound economic and political reasons, the
14 planning and investment necessary to add large blocks of
15 replacement energy efficiency, purchased power, transmission
16 enhancements, or new generation to a system will not occur
17 without a clear indication that the investments are needed and
18 have a reasonable likelihood of earning a competitive return.

19 The assertion that a decision to extend the license of the
20 two Indian Point units is merely a decision to keep the Indian
21 Point option open and need therefore not be regarded as an
22 either/or decision between the nuclear power plants and a
23 decision to replace them with other resources ignores the

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1 realities of power supply planning and procurement. In order to
2 make a properly informed relicensing decision, the NRC and other
3 responsible governmental entities need an analysis that reveals
4 whether other options are environmentally preferable to
5 extending the Indian Point license or compare favorably in
6 cost/benefit terms. Only an analysis fully consistent with
7 power supply procurement realities - including the abundance of
8 available energy efficiency, renewable generation, transmission
9 enhancements, and purchased power - will enable the NRC, and
10 state energy decisionmakers, to assess the comparative
11 environmental impacts of a relicensing decision.

12 Q. In your opinion, does the FSEIS provide an unbiased
13 and meaningful analysis of the economic and environmental
14 impacts of not relicensing Indian Point?

15 A. The shortcomings and errors I have identified in the
16 FSEIS overstate the need for the relicensing. There are no
17 errors tending to minimize the need for relicensing. Taken
18 together with the admittedly unnecessary discussion of the
19 impacts of the coal-fired alternative, the combined effect has
20 produced an FSEIS likely to mislead decisionmakers as to the
21 environmental impact and feasibility of the no-action
22 alternative to relicensing one or both of the Indian Point
23 units.

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1 Q. Does this conclude your testimony?

2 A. Yes

3 I have reviewed all the exhibits referenced herein. True
4 and accurate copies are attached.

5

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1 UNITED STATES

2 NUCLEAR REGULATORY COMMISSION

3 BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

4 -----x

5 In re: Docket Nos. 50-247-LR; 50-286-LR

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

7 Entergy Nuclear Indian Point 2, LLC, DPR-26, DPR-64

8 Entergy Nuclear Indian Point 3, LLC, and

9 Entergy Nuclear Operations, Inc. December 13, 2011

10 -----x

11
12
13 **DECLARATION OF PETER A. BRADFORD**

14

15

16 I, Peter A. Bradford, do hereby declare under penalty of

17 perjury that my statements in the foregoing testimony and my

18 statement of professional qualifications are true and correct to

19 the best of my knowledge and belief.

20
21 Executed in Accord with 10 C.F.R. § 2.304(d)

22
23 

24 _____

25 Peter A. Bradford

26 President of Bradford Brook Associates

27 Peru, Vermont

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December 13, 2011

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