

**UNITED STATES
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD**

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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, Entergy Nuclear Operations, Inc.	DPR-26, DPR-64 March 22, 2013
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**STATE OF NEW YORK'S PROPOSED
FINDINGS OF FACT AND CONCLUSIONS OF LAW
REGARDING CONTENTION NYS-17B**

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I. INTRODUCTION

1. In accordance with 10 C.F.R. § 2.1209 and the January 15, 2013 Order issued by the Atomic Safety and Licensing Board (“Board” or “ASLB”), the State of New York (“State”) submits its proposed Findings of Fact and Conclusions of Law on the State’s admitted Contention 17/17A/17B (“NYS-17B”).

2. Property values are a major determinant of local housing conditions, economic well-being and land use. But the applicant in its Environmental Report and NRC Staff in the Final Supplemental Environmental Impact Statement (“FSEIS”) failed to analyze the impact on property values of the Indian Point facility or the no action alternative.

3. A well-regarded economist and professor at Williams College did a site specific study of New York property values within 5 kilometers (3.11 miles) of Indian Point (“Indian Point” or “IPEC”). Dr. Stephen C. Sheppard’s results, reported in *Impacts of the Indian Point Energy Center on Property Values*, December 2011 (NYS000231), show “to a reasonable degree of scientific certainty, that IPEC reduced the value of residential housing services provided by properties within 5 kilometers of the IPEC facility, and that the reduced value of residential services was not compensated for by reduced required property tax payments on residential property.” NYS000231 at 9.

4. Although it relied upon a 2005 report that acknowledged that property values of homes near Indian Point might increase under the no action alternative, and after its inadequate socioeconomic analysis with respect to housing and offsite land use was brought to its attention by comments on its Draft Supplemental Environmental Impact Statement (“DSEIS”), NRC Staff made no effort to further investigate or quantify that consequence of the no action alternative. Instead, like the applicant, NRC Staff took the position that it had no obligation to analyze

property values. Entergy and NRC Staff err: both the 1996 Generic Environmental Impact Statement (“GEIS”) and the National Environmental Policy Act (“NEPA”) require consideration of foreseeable socioeconomic impacts of the no action alternative. NRC Staff’s failure violates NEPA.

5. Nor is NRC Staff’s failure cured by the belated efforts of the applicant to create a record. In 2009, Entergy retained an economist to challenge Dr. Sheppard’s preliminary work. Dr. George Tolley conducted a study based on hedonic regression, using a data set of properties offered for sale by their owners. Dr. Tolley’s final data set included fewer than 300 properties that were offered for sale on one date in July 2011; there is no evidence in the record that any of the properties in Dr. Tolley’s sample sold for anywhere near the price at which they were offered or, indeed, that the properties were ever sold. Moreover, analysis of the data collected by Dr. Tolley indicates that Indian Point is a disamenity that diminished property values by about 25% - remarkably close to Dr. Sheppard’s estimate that the facility depresses property values by about 27%. Dr. Sheppard’s findings, which Dr. Tolley rejects but cannot refute, show that the no action alternative would have a “large” impact on housing, on offsite land use, and on socioeconomics. Dr. Sheppard quantifies that impact at about \$1 billion, which his work shows would be restored to the local economy within about 10 years of the cessation of commercial operations. NRC Staff’s failure to identify or consider that impact of the no action alternative violates NEPA. Accordingly, Entergy’s application for renewed operating licenses for Indian Point Units 2 and 3 should be denied.

II. PROCEDURAL HISTORY

6. The State filed a petition for leave to intervene in this proceeding on November 30, 2007. *New York State Notice of Intention to Participate and Petition to Intervene* (Nov. 30,

2007) (NYS Petition), available at ML073400187, ML073400205, ML073400193. New York Contention 17 alleged that the applicant's Environmental Report ("ER") (ENT00015B, App'x E) should have analyzed adverse impacts on off-site land use and that its failure to do so led to the erroneous conclusion that relicensing would "have a significant positive economic impact on the communities surrounding" the facility, thus violating 10 C.F.R. Part 51, Suppart A, App'x B. *Id.* at 167-174. The State supported NYS-17 with the November 29, 2007 report of Stephen C. Sheppard, Ph.D., *Potential Impacts of Indian Point Relicensing on Property Values*. NYS000226. On July 31, 2008 the Board admitted NYS-17 as a contention of omission, ruling that "[i]n conducting its analysis of the impact of the license renewal on land-use, Entergy should have considered the impact on real estate values that would be caused by license renewal or non-renewal." *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 & 3), LBP-08-13, 68 N.R.C. 43, 116 (2008).

7. On December 22, 2008, NRC Staff issued a DSEIS. NRC000003 (DSEIS) (NYS00132A-D). The State subsequently filed new and amended contentions, including NYS-17A, which alleged that the DSEIS, like the ER, failed to analyze the impact of relicensing on off-site land use, including real estate values. *See* State of New York Contentions Concerning NRC Staff's Draft Supplemental Environmental Impact Statement (Feb. 27, 2009), ML090690303, at 14-19. In support of proposed NYS-17A, the State submitted the second Sheppard report, *Potential Impacts of Indian Point Relicensing with Delayed Site Remediation* (Feb. 26, 2009). NYS000227. Over the objections of Entergy and NRC Staff, the Board admitted NYS-17A, which it consolidated with NYS-17 (resulting in NYS-17/17A). June 16, 2009 ASLB Order (Ruling on New York State's New and Amended Contentions),

ML091670435, at 8; *see also* Apr. 22, 2010 ASLB Mem. and Order (Denying Entergy's Motion for the Summary Disposition of NYS Contention 17/17A), ML101120094, at 2.

8. With NRC Staff's support, Entergy moved for summary disposition of NYS-17/17A on February 26, 2010. Entergy Nuclear Operations, Inc. Motion for Summ. Disp. of NYS Contention 17/17-A (Property Values) (Feb. 26, 2010), ML101100474. Entergy (and NRC Staff) argued that NYS-17/17A was outside the scope of the proceeding or, if it was within the scope of the proceeding, it was moot because the Draft SEIS addressed the potential change in property values if the no-action alternative were selected. Entergy also argued that NYS-17/17A depended upon impermissible speculation about what might happen at the site if license renewal were denied and that it turned on the impermissible calculation of risk or fear about living near a nuclear facility. The State opposed the motion, State of New York's Response to Entergy's Motion for Summary Disposition on New York Contentions 17 and 17A (Mar. 18, 2010), ML100880169, submitting the third report of Stephen C. Sheppard, Ph.D., *Determinants of Property Values* (March 15, 2010). NYS000228 (*Determinants of Property Values* (Mar. 18, 2010)).

9. Adhering to its view that NYS-17/17A is within the scope of the proceeding, the Board ruled "that there remain[ed] a genuine dispute over a material fact regarding the socioeconomic environmental impacts of license renewal on property values adjacent to [Indian Point]." Apr. 22, 2010 ASLB Mem. and Order (Denying Entergy's Motion for the Summary Disposition of NYS Contention 17/17A) at 11. The Board cautioned that "proffered NEPA contentions relating to on-site spent fuel storage are outside the scope of this proceeding due to the Waste Confidence Rule (codified as 10 C.F.R. § 51.23), whose continuing viability we

recently certified to the Commission.” Apr. 22, 2010 ASLB Mem. and Order (Denying Entergy’s Motion for the Summary Disposition of NYS Contention 17/17A) at 13-14, 18.¹

10. On January 24, 2011, the State moved to file proposed NYS-17B, which alleged:

The FSEIS fails to address the impact of the continued operation of IP2 and IP3 for another 20 years on offsite land use, including real estate values in the surrounding area in violation of 10 C.F.R. §§ 51.71(a), 51.71(d), 51.95(c)(1), and 51.95(c)(4).

January 24, 2011 State of New York, Contention 17B, ML110390250, at 1. The State also sought leave to file amended bases. *Id.* The State’s filing was supported by a fourth report by Dr. Sheppard, also dated January 24, 2011. NYS000230 (*Potential Economic Impacts Related to Property Value Diminution in Communities Surrounding the IPEC* (Jan. 24, 2011)).

11. On July 6, 2011, the Board admitted NYS-17B, consolidating it with its predecessors, “insofar as it applies the bases of NYS-17/17A to the FSEIS instead of the DSEIS,” but declined to admit the proposed amended bases because it found that they contravened the Waste Confidence Rule, 10 C.F.R. § 51.23(b). Jul. 6, 2011 ASLB Mem. and Order (Ruling on Pending Motions for Leave to File New and Amended Contentions) at 16. The Board found that “the property value impacts of the presence of spent fuel storage facilities with the presence of other plant components during the period of extended operations” are “within the scope of this proceeding.” *Id.* at 3-4. The Board subsequently “clarif[ied] that the impact of IP2’s and IP3’s components on nearby property values may be litigated in this proceeding, but impacts attributed solely to the presence of spent fuel itself may not be litigated in this

¹ On June 8, 2012, the Court of Appeals for the District of Columbia invalidated the Commission’s 2010 update to the Waste Confidence Decision, finding, *inter alia*, that it constituted a major federal action that required either an environmental impact statement or a finding of no significant environmental impact. *New York v. NRC*, 681 F.3d 471 (D.C. Cir. 2012).

proceeding.” Memorandum and Order (Granting Entergy’s Request for Clarification) at 5 (Aug. 10, 2011).

12. The State filed its initial statement of position (NYS000223), expert reports and declarations (NYS000225-NYS000231), initial expert testimony (NYS000224) and exhibits (NYS000232-NYS000239) on December 17, 2011. Dr. Sheppard’s fifth and final report, *Impacts of the Indian Point Energy Center on Property Values*, December 2011, was submitted as NYS000231.

13. On March 28 and March 30, 2012, Entergy and NRC, respectively, filed their statements of position, pre-filed expert testimony and exhibits in response to Contention NYS-17B.

14. The State filed a revised statement of position (NYS000433), rebuttal testimony (NYS000434), and an additional exhibit (NYS000435) on June 29, 2012.

15. The hearing on the intervenors’ admitted contentions commenced on Monday, October 15, 2012. On Friday evening, October 12, 2012, Entergy disclosed a number of new documents, including a document designated Entergy 9422 and titled “Square Root of Distance Regression,” a new regression run by Entergy expert George S. Tolley in response to Dr. Sheppard’s June rebuttal testimony.

16. On the evening of Saturday, October 20, 2012, the State disclosed a supplemental statistical analysis in response to Dr. Tolley’s supplemental work (designated New York 1638).

17. The Board heard testimony on NYS-17B on October 22, 2012. *See* October 22, 2012 Transcript of Hearing (Tr.) 2538-2718. Dr. Sheppard testified for the State. During the hearing, the Board admitted as ENT000590 the Friday evening regression by Dr. Tolley (initially disclosed as Entergy 9422). Tr. 2711 (McDade, J.). Over Entergy’s objection, the Board also

admitted Dr. Sheppard's supplemental responsive regressions (NYS000446). *See* Tr. 2552, 2674 (McDade, J.).

18. On November 21, 2012, both Entergy and the State submitted additional documents relevant to NYS-17B. The State submitted a declaration by Dr. Sheppard (NYS000465), which did not contain new analytic work or regressions. Entergy submitted, among other things, Supplemental Testimony of George S. Tolley, Ph.D. (ENT000592), containing another new regression. *See* ENT000592 at 27-29. In response, on December 3, 2012, the State submitted Supplemental Rebuttal Testimony of Stephen C. Sheppard (NYS000467), which contained no new analytic work or regressions. By order dated December 27, 2012, the Board adopted corrections to the transcript.

III. WITNESSES

A. State of New York Witness

19. Stephen C. Sheppard, Ph.D., testified for the State on NYS-17B. As set forth in the procedural history, *supra*, he ultimately submitted five expert reports, as well as written direct and rebuttal testimony. On October 22, 2012, Dr. Sheppard testified in person at the evidentiary hearing in Tarrytown, New York. Following the hearing, and related to both parties' October 2012 regressions, Dr. Sheppard submitted a post-hearing declaration on November 21, 2012 (NYS000465) and written supplemental rebuttal testimony on December 3, 2012 (NYS000467).

20. Dr. Sheppard holds a Ph.D. in Economics and is the Class of 2012 Professor of Economics at Williams College in Williamstown, Massachusetts. Sheppard Rebuttal Test. (NYS000434) at 1; Sheppard Initial Test. at 1-2; *Curriculum Vitae of Stephen C. Sheppard* (NYS000208) at 1. Before he joined the faculty at Williams, where he was Chair of the

Economics Department from 2007 to 2010, Dr. Sheppard was a Professor of Economics at Oberlin College. Dr. Sheppard's particular area of expertise and the area in which he has conducted research, written, lectured and taught, is the impact of economic and regulatory policies on housing, land use, house prices and land valuation. Dr. Sheppard is the author of many peer-reviewed and published papers, including *On the Price of Land and the Value of Amenities*, Cheshire, P., and Sheppard, S., *Economica*, 62, 247-267 (1995); *Estimating Demand for Housing, Land and Neighborhood Characteristics*, Cheshire, P., and Sheppard, S., *Oxford Bulletin of Economics and Statistics*, 60, August 1998, 357-382; and *The Rise, Fall and Rise Again of Industrial Location Theory*, McCann, P., and Sheppard, S., *Regional Studies*, 37, 6-7, 649-663 (2003). With a co-author in 2004, Dr. Sheppard published *Capitalising The Value of Free Schools: The Impact of Supply Characteristics and Uncertainty*, which dealt with the impact of schools and other neighborhood conditions on housing values. The paper was awarded the Royal Economic Society Prize for the best paper published in 2004 in *The Economic Journal*, Vol. 114, Issue 499 at F397-F424 (2004).

21. In addition to writing on the topic, Dr. Sheppard conducts original research on land use policies and economics. He has been an academic consultant at the International Monetary Fund and an academic visitor at the London School of Economics, and has consulted for many banks and private corporations, including the World Bank and the Inter-American Development Bank. His education and experience are described in more detail in his curriculum vitae (CV). See NYS000208.

22. Based on his academic and professional credentials and experience, Dr. Sheppard is qualified to testify as an expert witness on land use and economics.

B. Applicant Witnesses

23. Entergy presented three witnesses on Contention 17B: (1) Donald P. Cleary; (2) George S. Tolley; and (3) William C. Reamer.

24. Mr. Cleary was a member of the NRC Staff for more than two decades, working on the socioeconomic impacts of the construction and operation of nuclear power plants. He is now an Environmental Safety Consultant with Talisman International, LLC, a company whose principal areas of expertise are the safety of nuclear facilities and the security of computer networks. *See* <http://www.talisman-intl.com>; ENT000133.

25. Dr. George Tolley is the President of RCF Economic and Financial Consulting, Inc. and a Professor Emeritus of Economics at the University of Chicago, where he has taught since 1966. Dr. Tolley holds a Masters degree and a Ph.D. in Economics, each from the University of Chicago. He has researched, consulted, written and published extensively over his long career (ENT000143).

26. Mr. Reamer is a lawyer who has worked in the nuclear industry for more than 30 years. He is familiar with regulations and guidance related to the decommissioning of nuclear facilities and sites, and spent fuel. He has been a consultant with Talisman International since his 2006 retirement from the NRC (ENT000140).

C. NRC Witnesses

27. NRC Staff also presented three witnesses: (1) Jeffrey J. Rikhoff; (2) Andrew L. Stuyvenberg; and (3) John P. Boska.

28. Mr. Rikhoff is a Senior Environmental Scientist/Socioeconomic in the Division of License Renewal, Office of Nuclear Reactor Regulation (NRC000082). He has worked on

NEPA environmental reviews for 23 years, and has also worked as a government contactor preparing NEPA documentation, including EISs (NRC000082).

29. Mr. Stuyvenberg, who has a Masters degree in Environmental Economics and Policy, is a project manager in the Division of License Renewal in the Office of Nuclear Reactor Regulation. He now analyzes potential alternatives to license renewal for NRC environmental impact statements, provides environmental expertise to agency processes, including the update of the Generic Environmental Impact Statement for License Renewal of Nuclear Plants, issues identified by the Fukushima Site Team, and proposed action by the Japan Lessons-Learned Directorate (NRC000083).

30. Mr. Boska is a senior project manager in the Division of Operating Reactor Licensing, Office of Nuclear Reactor Regulation, where he manages technical and regulatory reviews for the licensing actions associated with a particular nuclear power reactor. From May 2005 through March 2012, Mr. Boska's assigned power reactor was Indian Point Units 2 and 3. Specifically, Mr. Boska issued the NRC review of the Indian Point decommissioning cost estimate and schedule (NRC000084).

IV. LEGAL STANDARDS

31. The National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321-37, "is our basic national charter for protection of the environment." *Ilio'Ulaokalani Coalition v. Rumsfeld*, 464 F.3d 1083, 1093 (9th Cir. 2006) (quoting 40 C.F.R. § 1500.1(a) (2006)). Accordingly, NEPA requires federal agencies to follow certain procedures before they may undertake projects that will affect the environment. *Hughes River Watershed Conservancy v. Glickman*, 81 F.3d 437, 443 (4th Cir. 1996). "NEPA [also] requires agencies to balance a project's economic benefits against its adverse environmental effects." *Id.* at 446 (quoting

Calvert Cliffs' Coordinating Comm. v. U.S. Atomic Energy Comm'n, 449 F.2d 1109, 1113 (D.C. Cir. 1971)).

32. “Section 101 of NEPA declares a broad national commitment to protecting and promoting environmental quality. To ensure that this commitment is ‘infused into the ongoing programs and action of the Federal Government, the act also establishes some important ‘action-forcing procedures.’” *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989) (quoting 115 Cong. Rec. 40416 (remarks of Sen. Jackson)). Accordingly, all federal agencies must “to the fullest extent possible” detail both “the environmental impact of the proposed action,” and “any adverse environmental effects which cannot be avoided should the proposal be implemented,” as well as “alternatives to the proposed action.” 42 U.S.C. § 4332.

33. NEPA’s central requirement is that an agency prepare an environmental impact statement (EIS) to be included “in every recommendation or report on proposals for . . . major Federal actions significantly affecting the quality of the human environment.” 42 U.S.C. § 4332(2)(C). An EIS advances NEPA’s goals in two ways:

First, it ensures that an agency, when deciding whether to approve a project, will carefully consider, or take a ‘hard look’ at, the project’s environmental effects. Second, it ensures that relevant information about a proposed project will be made available to members of the public so that they may play a role in both the decisionmaking process and the implementation of the decision.

Hughes River Watershed, 81 F.3d at 443 (citations omitted).

34. An EIS must include a comparative analysis of the environmental consequences of the alternatives before the agency. *See* 42 U.S.C. § 4332(2)(C)(iii); 40 C.F.R. § 1502.14(d). NEPA also requires that the EIS “[r]igorously explore and objectively evaluate all reasonable alternatives.” *Pa’ina Hawaii, LLC* (Materials License Appl.), CLI-10-18, 72 N.R.C. 56 (Jul. 8, 2010), 2010 N.R.C. LEXIS 28. Among these alternatives is the no-action alternative, 40 C.F.R.

§ 1502.14(d), which provides the standard by which a reader may compare the “beneficial and adverse impacts related to the applicant doing nothing,” *Kilroy v. Ruckelshaus*, 738 F.2d 1448, 1453 (9th Cir. 1984) (*quoting* 40 C.F.R. § 6.203(c)).

35. NEPA obligates a federal agency to ensure “the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements.” 40 C.F.R. § 1502.24. “Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA.” 40 C.F.R. § 1500.1(b). A “final EIS must include ‘a discussion of adverse impacts that does not improperly minimize negative side effects.’” *Western Watersheds Project v. Kraayenbrink*, 632 F.3d 472, 491 (9th Cir. 2011) (*quoting Earth Island Inst. v. U.S. Forest Serv.*, 442 F.3d 1147, 1159 (9th Cir. 2006), *abrogated on other grounds by Winter v. NRDC, Inc.*, 555 U.S. 7 (2008)).

36. A hard look requires more than cursory research and does not include sweeping negative evidence under the proverbial rug. *See National Audubon Socy. v. Department of the Navy*, 422 F.3d 174, 181 (4th Cir. 2005). NRC Staff may not simply rely on incorrect assumptions or data provided by the licensee. 40 C.F.R. § 1500.1(b). Agencies have an affirmative obligation to “insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements . . . identify any methodologies used and . . . make explicit reference by footnote to the scientific and other sources relied upon for conclusions[.]” *Id.* § 1502.24. Nor do “general statements about possible effects and some risk . . . constitute a hard look absent a justification regarding why more definitive information could not be provided.” *Western Watersheds Project*, 632 F.3d at 491 (*quoting Blue Mtns. Biodiversity Proj. v. Blackwood*, 161 F.3d 1208, 1213 (9th Cir. 1998)).

37. In sum, in determining the adequacy of an EIS, a court looks at three factors: (1) whether the agency has, in good faith, objectively taken a hard look at the environmental consequences of the proposed project and reasonable alternative; (2) whether the EIS provides sufficient detail to allow those who did not participate in its preparation to understand and consider the pertinent environmental influences at issue; and (3) whether the EIS explanation of alternatives is sufficient to permit a reasoned choice among different courses of action. *Davis Mtns. Trans-Pecos Heritage Assoc. v. FAA*, 116 Fed. Appx. 3, *8 (5th Cir. 2004). If an independent review of the record reveals that an agency did not make a reasoned decision based on its analysis of the record, “a court ‘may properly conclude that the agency has acted arbitrarily and capriciously.’” *Environmental Defense v. U.S. Army Corps of Eng.*, 515 F. Supp.2d 69, 78 (D.D.C. 2007) (citation omitted).

38. In addition to ensuring that federal decisionmakers “will have available, and will carefully consider, detailed information concerning significant environmental impacts,” the EIS “also guarantees that the relevant information will be made available to the larger audience that may also play a role in both the decisionmaking process and the implementation of that decision.” *Methow Valley*, 490 U.S. at 349.

39. “Issuance or renewal of a license to operate a nuclear power plant is a ‘major Federal action’ triggering NEPA’s requirement that the agency produce an Environmental Impact Statement (‘EIS’) for such proceedings.” *Massachusetts v. United States*, 522 F.3d 115, 119 (1st Cir. 2008) (*quoting* 10 C.F.R. § 51.20). To streamline the “significant task” confronting the NRC when it proposes to license the operation of a nuclear facility, “the NRC in 1996 conducted a study to determine which NEPA-related issues could be addressed generically (that is, applying to all plants) and which needed to be determined on a plant-by-plant basis.” *Id.* The

first group of issues, so-called Category 1 issues, are common either to all nuclear facilities or to a sub-class of those facilities. *Id.* Category 2 issues, by contrast, require a site-specific review. *Id.*; *see also* 10 C.F.R. Part 51, subpart A., Appx. B, n. 2.

40. The NRC addressed Category 1 issues through a GEIS whose findings were codified in a 1996 rulemaking (Final Rule). *Environmental Review for Renewal of Nuclear Power Plant Operating Licenses*, 61 Fed. Reg. 28,467 (June 5, 1996) (NYS000127). “The process of creating the EIS for an operating licensing (or re-licensing) proceeding begins with the applicant, although producing the EIS is ultimately the NRC’s responsibility.” *Massachusetts*, 522 F.3d at 120. An applicant submits to the NRC an environmental report that provides a site-specific analysis of all Category 2 issues; the applicant generally can rest on the GEIS findings with respect to Category 1 issues. *Id.*

41. The NRC’s NEPA regulations require “analysis [in a draft EIS] of significant problems and objections raised by other Federal, State, and local agencies, by any affected Indian tribes, and by other interested persons.” 10 C.F.R. § 51.71(b). A draft EIS must, “to the fullest extent practicable, quantify the various factors considered.” *Id.* § 51.71(d).

42. Subsequently, NRC Staff

draw upon the applicant’s environmental report to produce a draft EIS (“SEIS”) for the license renewal. *See* [10 C.F.R.] § 51.95(c). This plant-specific SEIS addresses Category 2 issues and complements the GEIS, which covers Category 1 issues. *Id.* § 51.71(d). When the GEIS and SEIS are combined, they cover all issues that NEPA requires be addressed in an EIS for a nuclear power plant license renewal proceeding.

Once the agency has prepared a draft SEIS, it must be made available for comment both to the public and to other federal, state, and local agencies. *Id.* §§ 51.73, 51.74. After receiving comments, the NRC must then prepare a final SEIS. *Id.* § 51.95(c)(3) (referencing *id.* § 51.91).

Massachusetts, 522 F.3d at 120.

43. Offsite land use impacts are a Category 2 issue. “Because land use changes may be perceived by some community members as adverse and by others as beneficial, the staff is unable to assess generically the potential significance of site-specific off-site land use impacts. This is a Category 2 issue.” NRC000002 (GEIS) (NYS000131B) at § 4.7.4; *see also* NRC000081 (NRC Staff’s Testimony of Jeffrey J. Rikhoff, Andrew L. Stuyvenberg, and John P. Boska Concerning Contentions NYS-17, 17A and 17B) at 13 (Rikhoff) (“the offsite land use issue was addressed as a Category 2 issue in the Indian Point DSEIS and FSEIS”). Likewise, impacts to housing are a Category 2 issue. NRC000002 (GEIS) (NYS00131A) § 3.7.2 (“Because impact significance depends on local conditions that cannot be predicted at this time, housing is a Category 2 issue”).

44. NRC regulations define three adverse impact levels for evaluating environmental effects. *See* 10 C.F.R. Part 51, Subpart A, Appx. B, Table B-1. “Unless the significance level is identified as beneficial, the impact is adverse, or in the case of ‘small,’ [the impact] may be negligible.” *Id.* “Small” adverse impacts are those whose effect is either undetectable or so minor that it will neither destabilize nor noticeably alter any important attribute of the resource. *Id.* “Moderate” adverse impacts are those that are sufficient to alter noticeably, but not destabilize, important attributes of the resource. *Id.* And adverse “Large” impacts will have clearly “noticeable” effects sufficient to destabilize important attributes of the resource. *Id.*

45. Significantly, the 1996 GEIS specifically instructs applicants in how to assign the significance of a given nuclear plant’s impacts “on the desirability of housing located close to the plant.”

A small impact on housing desirability results when very few or no instances of outmigration occur because of the operation of the nuclear power plant. Also, very few cases of prospective home buyers refusing a home because of its proximity to the plant would occur. Under normal plant operations, housing

values should remain within the range of regional fair market prices. Moderate impacts on housing desirability include occasional difficulty in finding a buyer for a house because of its proximity to a nuclear plant. Impacts are also moderate if the proximity of the nuclear plant is cited as a reason for discounting the sale price of the housing units. Impacts on housing desirability are considered large if substantial migration from houses in the vicinity of the plant occurs or if realtors find it difficult or impossible to sell homes in the area. *A large impact may also result if a sustained and substantial drop in housing value occurs because of the house's proximity to the plant. Such impacts may be evidenced by a gradual increase in housing value with increasing distance from the plant.*

NRC000002 (GEIS) (NYS00131B) § 4.7.1.1 (emphasis added).

A. Burden of Proof for NEPA Contentions

46. The burden of complying with NEPA lies with NRC Staff alone.² By placing the burden on NRC Staff, NEPA “insures the integrity of the agency process by forcing it to face those stubborn, difficult-to-answer objections without ignoring them or sweeping them under the rug” and serves as an “environmental full disclosure law so that the public can weigh a project’s benefits against its environmental costs.” *See Sierra Club v. U.S. Army Corps of Eng’rs*, 772 F.2d 1043, 1049 (2d Cir. 1985) (citing *Silva v. Lynn*, 482 F.2d 1282, 1285 (1st Cir. 1973)). Thus, NRC Staff’s “responsibility is not simply to sit back, like an umpire, and resolve adversary contentions at the hearing stage.” *Calvert Cliffs’ Coordinating Comm.*, 449 F.2d at 1119.

47. NRC Staff cannot shift the burden of ensuring that its environmental analysis is adequate to intervenors. *See Harlem Val. Transp. Ass’n v. Stafford*, 500 F.2d 328, 336 (2d Cir. 1974) (an agency cannot be “content to place the burden on intervenors whose resources might

² *See, e.g., Progress Energy Florida, Inc.*, (Combined License Application, Levy County Nuclear Power Plant, Units 1 and 2), CLI-10-02, 71 N.R.C. 27, 34 (2010) (Commission recognizes that “the ultimate burden with respect to NEPA lies with the NRC Staff”); *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), CLI-83-19, 17 N.R.C. 1041, 1049 (1983) (as the proponent of the agency action at issue, an applicant generally has the burden of proof in a licensing proceeding, *see* 10 C.F.R. § 2.325, when NEPA contentions are involved, the burden shifts to the Staff, because the NRC, not an applicant, has the burden of complying with NEPA); 10 C.F.R. § 51.70(b) (NRC Staff must “independently evaluate and be responsible for the reliability of all information used in the draft environmental impact statement.”).

be limited to challenge any environmental statements that the [applicants] might make in their applications”); *Greene Co. Planning Bd. v. Federal Power Comm’n*, 455 F.2d 412, 419-20 (2d Cir. 1972), *cert. denied*, 409 U.S. 849 (1972) (a federal agency cannot abdicate its responsibility to independently evaluate federal actions proposed to it by other, non-federal entities).

48. Nor can NRC Staff shift the burden onto the applicant. “NEPA establishes environmental protection as an integral part of the Atomic Energy Commission’s basic mandate. The primary responsibility for fulfilling that mandate lies with the Commission.” *Calvert Cliffs’ Coordinating Comm.*, 449 F.2d 1109 at 1119; *U.S. Dep’t of Transp. v. Public Citizen*, 541 U.S. 752, 765 (U.S. 2004) (“Admittedly, the agency bears the primary responsibility to ensure that it complies with NEPA.”); *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc.*, 435 U.S. 519, 553 (1978) (“NEPA places upon an agency the obligation to consider every significant aspect of the environmental impact of a proposed action”); *Greene Co. Planning Bd.*, 455 F.2d at 420.

49. While the applicant can participate in the adjudicatory proceeding and advocate that the NRC Staff complied with its NEPA obligations, the compliance obligations remain with NRC Staff alone. Post-hoc analyses conducted by the applicant’s witnesses cannot substitute for the hard look required by NRC Staff, nor can they meet Staff’s burden of showing that the FSEIS complies with NEPA. *Cf. Dubois v. U.S. Dep’t of Agriculture*, 102 F.3d 1273, 1289 (1st Cir. 1996) (“[P]ost hoc rationalizations are inherently suspect, and in any event are no substitute for the agency’s following statutorily mandated procedures.”).

B. Evidentiary Standards for this Relicensing Proceeding

50. After a party’s contention has been admitted, that party has the burden of introducing sufficient evidence to establish a prima facie case. The burden then shifts to NRC

Staff to prove by a preponderance of the evidence that it complied with the requirements of NEPA. *See Louisiana Power and Light Co.*, 17 N.R.C. 1076, 1093 (Waterford Steam Elec. Plant, Unit 3) (1983) (*quoting Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-123, 6 A.E.C. 331, 345 (1973)).

51. Under NRC's regulations, "[o]nly relevant, material, and reliable evidence which is not unduly repetitious will be admitted." 10 C.F.R. § 2.377(a). Throughout this proceeding, rather than exclude evidence, this Board has generally opted to "give all evidence its appropriate weight at evidentiary hearing in the context of evaluating the specific issue before [it]." *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), Licensing Board Order (Granting in Part and Denying in Part Applicant's Motions in Limine) at 20 (Mar. 6, 2012), ML12066A170 (unpublished); *see also id.* at 24. Now that the Board is evaluating the evidence presented, it is important to note that "unsupported reasoning and computations, are insufficient" and should be afforded little or no weight. *Entergy Nuclear Generation Co.* (Pilgrim Nuclear Power Station), CLI-10-11, 71 N.R.C. 287, 315 (Mar. 26, 2010).

V. COMMERCIAL OPERATIONS DIMINISH PROPERTY VALUES

A. Procedural History of NYS-17B

52. Entergy submitted an ER (NYS00015B, App'x E) with its initial License Renewal Application ("LRA") on April 23, 2007. Letter from Fred Dacimo, Entergy, to N.R.C. Document Control Desk (Apr. 23, 2007), available at ADAMS Accession No. ML071210512; LRA App. E, available at ADAMS Accession No. ML071210530 (Applicant's Environmental Report, Operating License Renewal Stage, Indian Point Energy Center).

53. On November 30, 2007, the State of New York filed NYS-17 as part of its petition to intervene, contending that the ER improperly ignored the positive impact on land use

and land values that would flow from the denial of the LRA. *See* ML073400187, ML073400205, ML073400193.

54. New York alleged that if the LRA were denied, properties adjacent to the Indian Point Energy Center (“IPEC”) site would experience economic recovery upon the availability of the IPEC site for unrestricted use by 2025. New York State Notice of Intention to Participate and Petition to Intervene at 167-169 (Nov. 30, 2007) (“NYS Petition”).

55. In its Memorandum and Order of July 31, 2008, the Board admitted NYS-17 as a contention of omission, ruling that “[i]n conducting its analysis of the impact of the license renewal on land-use, Entergy should have considered the impact on real estate values that would be caused by license renewal or non-renewal.” *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 & 3), LBP-08-13, 68 N.R.C. 43, 116 (2008).

56. The State supported NYS-17 with the November 29, 2007 report of Stephen C. Sheppard, Ph.D., *Potential Impacts of Indian Point Relicensing on Property Values*. NYS000226.

57. In December 2008, the NRC Staff issued NUREG-1437, Supplement 38, Draft Supplemental Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Indian Point Nuclear Generating Unit Nos. 2 and 3 (Dec. 2008). NYS00132A-D. Within the context of the no-action alternative, the DSEIS says, “The shutdown of IP2 and IP3 may result in increased property values of the homes in the 2 communities surrounding the site (Levitan and Associates, Inc. 2005). This would result in some increases in tax revenues.” NRC000003 (DSEIS) (NYS00132B) at 8-29 to 8-30.

58. The DSEIS also speculated that, “to fully offset the revenues lost from the shutdown of IP2 and IP3, taxing jurisdictions most likely would have to compensate with higher

property taxes (Levitan and Associates, Inc. 2005). The combined increase in property values and increased taxes could have a noticeable effect on some area homeowners and business, though Levitan and Associates did not indicate the magnitude of this effect and whether the net effect would be positive or negative.” *Id.*

59. On February 27, 2009, the State moved to admit contention NYS-17A, contending that “The [Draft SEIS] fails to address the impact of the continued operation of IP2 and IP3 for another 20 years on off-site land use, including real estate values in the surrounding area in violation of 10 C.F.R. §§ 51.71(a), 51.71(d), 51.95(c)(1), and 51.95(c)(4).” State of New York Contentions Concerning NRC Staff’s Draft Supplemental Environmental Impact Statement (Feb. 27, 2009), ML090690303 at 14.

60. On March 18, 2009, the State submitted to the Nuclear Regulatory Commission (“NRC”) comments on the DSEIS. Specifically, the State commented that “[t]he DSEIS is thus defective because it fails to consider the negative impact of relicensing on real estate values and the positive impact on real estate values of the no action alternative – not relicensing IP 2 and 3.” NYS000134 at 13; *see also id.* at 12-17.

61. In its Memorandum and Order dated June 16, 2009, the Board admitted NYS-17A “to reflect that New York contends that the NRC Staff erred in a similar manner to Entergy and that the original contention is now relevant to the Draft SEIS, as well as to the ER.” Board Order (Ruling on New York State’s New and Amended Contentions), ML091670435 (June 16, 2009) at 8.

62. On February 26, 2010, Entergy filed a Motion for Summary Disposition of NYS-17/17A. Entergy Nuclear Operations, Inc. Motion for Summary Disposition of New York State Contention 17/17-A, ML101100474 (Feb. 26, 2010). NRC Staff supported Entergy’s Motion.

NRC Staff's Answer to Applicant's Motion for Summary Disposition of New York State Contention 17/17-A, ML100770570 (Mar. 18, 2010). Entergy argued that NEPA "does not require consideration of the impact that the license renewal would have on property values adjacent to the Indian Point plant since any effect on property values would not be based on a physical impact upon those properties." Memorandum and Order (Denying Entergy's Motion for the Summary Disposition of NYS Contention 17/17A) (Apr. 22, 2010), ML101120094 at 3. Staff took the same position. *Id.* at 7. Entergy also argued that NYS-17/17A was moot because the DSEIS's discussion adequately addressed the contention. *Id.* at 5-6.

63. While the motion was pending, NRC Staff issued the FSEIS. NRC000004 (FSEIS) (NYS00133A-J).

64. By Order dated April 22, 2010, the Board found summary disposition inappropriate because "the alleged facts from New York, Entergy and the NRC Staff present a genuine dispute over an issue of material fact" that was not mooted by the DSEIS. Memorandum and Order (Denying Entergy's Motion for the Summary Disposition of NYS Contention 17/17A) (Apr. 22, 2010), ML101120094, at 16-17.

65. On January 24, 2011, New York filed proposed NYS-17B:

The FSEIS fails to address the impact of the continued operation of IP2 and IP3 for another 20 years on offsite land use, including real estate values in the surrounding area in violation of 10 C.F.R. §§ 51.71(a), 51.71(d), 51.95(c)(1), and 51.95(c)(4).

ML110390250.

66. The Board admitted NYS-17B "insofar as it applies the bases of NYS-17/17A to the FSEIS instead of the DSEIS." July 6, 2011 Mem. and Order (Ruling on Pending Motions for Leave to File New and Amended Contentions, ML111870344, at 16.

67. Although the Board declined to admit new proposed bases on the ground that the Waste Confidence Rule precluded them, it held that

the negative effect on property values predicted by Dr. Sheppard that would result from the longer-term presence of spent fuel anticipated by the updated Waste Confidence Rule is not an environmental impact barred by the Waste Confidence Rule. The potential for spent fuel to indefinitely stay on-site is not an environmental impact associated with the spent fuel itself; rather, it is the occupation of the site by components of IPEC that has the potential to bring down property values if license renewal is granted. It is the value and uses of adjacent property that are site-specific environmental impacts (10 C.F.R. Part 51, app. B, tbl. B-1 (“Significant changes in land use may be associated with population and tax revenue changes resulting from license renewal.”)). A challenge based on the impact of IPEC components’ long-term on-site existence upon surrounding property values is not barred by the Waste Confidence Rule.

Id. at 18.

68. In response to a motion by Entergy, the Board subsequently “clarif[ied] that the impact of IP2’s and IP3’s components on nearby property values may be litigated in this proceeding, but impacts attributed solely to the presence of spent fuel itself may not be litigated in this proceeding.” Memorandum and Order (Granting Entergy’s Request for Clarification) (Aug. 10, 2011), ML11222A033, at 5.

69. The State filed its initial statement of position (NYS000223), expert reports and declarations (NYS000225-NYS000231), initial expert testimony (NYS000224) and exhibits (NYS000232-NYS000238) on December 17, 2011.

70. On March 28 and March 30, 2012, Entergy and NRC, respectively, filed their statements of position, pre-filed expert testimony and exhibits in response to Contention NYS-17B.

71. The State filed a revised statement of position (NYS000433), rebuttal testimony (NYS000434), and an additional exhibit (NYS000435) on June 29, 2012.

72. More than three months later, on Friday evening, October 12, 2012, Entergy disclosed a number of new documents, including a document designated Entergy 9422 and titled “Square Root of Distance Regression,” a new regression run by Entergy expert George S. Tolley using a dataset constructed by New York State expert Stephen C. Sheppard but subsequently modified by Entergy’s expert.

73. On Monday, October 15, 2012, the hearing on the admitted contentions commenced in Tarrytown, New York.

74. On that date, Dr. Sheppard received Dr. Tolley’s Friday night regression. On October 16 and 19, Dr. Sheppard was teaching at Williams College, and on October 17 and 18, he was in Tarrytown in anticipation of testifying on NYS-16B and NYS-17B. He was able to turn his attention to Dr. Tolley’s regression for the first time on Friday evening, October 19. Tr. 2669:22-2671:20 (Taylor/Sheppard).

75. On the evening of Saturday, October 20, 2012, the State disclosed a supplemental statistical analysis in response to Dr. Tolley’s supplemental work (designated New York 1638).

76. The Board heard testimony on NYS-17B on October 22, 2012. *See* October 22, 2012 Transcript of Hearing (Transcript) at 2538-2718. Dr. Sheppard testified for the State. During the hearing, the Board admitted as ENT000590 the Friday evening regression by Dr. Tolley (initially disclosed as Entergy 9422). Tr. 2711 (McDade, J.). Over Entergy’s objection, the Board also admitted Dr. Sheppard’s supplemental responsive regressions (NYS000446). *See* Tr. 2552, 2674 (McDade, J.).

77. On November 21, 2012, both Entergy and the State submitted additional documents relevant to NYS-17B. The State submitted a declaration by Dr. Sheppard (NYS000465), which did not contain new analytic work or regressions. Entergy submitted,

among other things, Supplemental Testimony of George S. Tolley, Ph.D. (ENT000592), containing another new regression. *See* ENT000592 at 27-29.

78. In response, the State submitted Supplemental Rebuttal Testimony of Stephen C. Sheppard (NYS000467), which contained no new analytic work or regressions. By order dated December 27, 2012, the Board adopted corrections to the hearing transcript for various contentions, including NYS-17B.

B. Property Values Impact Offsite Land Use

79. It is undisputed that property values determine land use and that changes in property values can lead to changes in land use. ENT00132 at 8 (Tolley) (methodologies exist that permit the assessment of land use changes associated with changes in property values). “[W]ithin regulatory bounds land uses are determined by property values. Specifically, land uses that generate the highest property values predominate.” NYS000434 (Sheppard Rebuttal Test.) at 10.

Property values and land use are intimately connected, and the role of property values in determining land use patterns has been understood and written about for a long time, going back to the middle of the 19th century. For example, 30 years ago George Tolley wrote, in a book he co-authored with Douglas Diamond, that “. . . the same things that influence house price also determine location patterns. . . city size and migration.” *The Economics of Urban Amenities*, edited by Douglas B. Diamond, Jr. and George S. Tolley, New York: Academic Press (1982). The location patterns of human activities, and the resulting population and size of cities are central to understanding land use. The very meaning of the phrase “land use” refers to the uses to which land is put by persons in the community--in particular by the owners of the land. *One cannot understand the land use consequences of a decision or public policy without careful analysis of how the decision or policy will affect house prices and property values.*

NYS000434 (Sheppard Rebuttal Test.) at 8-9 (emphasis added). An evaluation of the impacts on housing of a proposed action requires some idea of what can be expected to happen to housing prices under both scenarios: if the proposed action is taken and if it is not. NYS000434

(Sheppard Rebuttal Test.) at 11. Further, “[a]n EIS that lacks any analysis of property values cannot be said to have evaluated land use impacts.” NYS000434 (Sheppard Rebuttal Test.) at 11.

C. Impacts of the No Action Alternative Can Be Quantified

80. “For license renewal, the no-action alternative refers to a scenario in which the NRC would not renew the IP2 and IP3 operating licenses and Entergy would then cease operating both units on or before the expiration of their current operating licenses. Following the shutdown of each unit, Entergy would initiate decommissioning of the facility in accordance with the NRC decommissioning requirements in 10 CFR 50.82, ‘Termination of License.’ Full dismantling of structures and decontamination of the site may not occur for up to 60 years after plant shutdown.” NRC000004 (FSEIS) (NYS00133C) at 8-20 (emphasis added). Contrary to Entergy’s characterization in its ER, the no action alternative is not “the *early* retirement of IP2 and IP3” (emphasis added). ENT00015B § 8.4 (“This section investigates the consequences of the early retirement of IP2 and IP3”). In this proceeding, the status quo is denial of Entergy’s application (that is, absent a major federal action, the licenses will expire).

81. Urban economists frequently measure the impact of a suspected disamenity. A “disamenity [is] a localized land use . . . or a structure or activity . . . that generates . . . an adverse impact that reduces the desirability or use of the land by other nearby land owners or occupants.” Tr. 2556:19-2557:5 (Sheppard). A land use, structure or activity can be a disamenity as a consequence of “the classic indicia of nuisance,” including “substances, noise, unusual levels of activity, warning alarms, a variety of different things that could happen at a particular location that would affect the desirability of using land in nearby locations.” Tr. 2556:19-2557:5 (Sheppard).

82. In general, “the way we typically look for [disamenities] or test for them as economists is to look for some alteration in nearby property values. This can give us both an indication of the extent of the disamenity and its importance or magnitude for local property owners. Identifying, measuring the disamenity, and distinguishing it from others is a part of the skill, [the] training of an urban economist.” Tr. 2557:8-15. Indeed, as discussed in more detail in ¶¶ 107, 113, *infra*, the 1996 GEIS expressly contemplated that an alteration in property values would provide evidence that a power plant was a disamenity. *See* NRC000002 (GEIS) (NYS00131B) § 4.7.1.1.

83. It is undisputed that “economic techniques” exist that permit economists “to assess the benefits and costs of activities that may affect the environment and the development and application of methodologies, such as hedonic models, to estimate direct and indirect impacts on potential property values and to assess likely associated land use changes.” ENT000132 at 8 (Tolley). Specifically, it is possible to “estimate the impact of a nuclear power plant on surrounding property values.” ENT000132 at 62 (Tolley). It is also possible to estimate the impact of the no action alternative, that is, denial of the license renewal application, on offsite land use. *See* ENT00132 at 46-47 (Cleary); NRC000081 at 18 (Stuyvenberg); NYS000434 at 13-14.

D. Entergy Failed to Analyze the Impact on Property Values of the Facility or the No Action Alternative as Part of its License Renewal Application

84. Entergy addressed the land use impacts of the no action alternative in ER §§ 7.3, 7.4 and 8.4.3.3. ENT00132 at 38 (Cleary) (§§ 7.3, 8.4); NRC00081 at 16 (Stuyvenberg) (§ 7.4). In § 7.3, Entergy defined the no action alternative and advised that, because Indian Point is a baseload facility, the no action alternative would require construction of a replacement electric

generating facility.³ Thus, Entergy reasoned, the no action alternative would require analysis of the environmental impacts of both decommissioning *and* the hypothetical replacement facility located at either a greenfield or the site itself, which Entergy described as a brownfield. ENT00015B, App'x E, at § 7.3. Against this backdrop, Entergy had no difficulty concluding that the no action alternative had nothing to recommend it.

85. In § 7.4, Entergy observed that it would “eventually have to decommission all units on the site; license renewal would only postpone decommissioning for a maximum of 20 years. NRC has established in the GEIS that the timing of decommissioning operations does not substantially influence their environmental impacts.” Accordingly, the applicant merely “adopt[ed] by reference the NRC findings (10 CFR Part 51, Appendix B, Table B-1, Decommissioning) to the effect that delaying decommissioning until after the renewal term would have small environmental impacts.” ENT00015B § 7.4. Entergy concluded that decommissioning’s impacts would be the same whether they occurred in 2015 or 2065.

86. Entergy repeatedly asserts that the NRC’s 60 year outside *limit* on decommissioning is in fact *approval* of such a long timeframe. It is not. The evidence provided by Dr. Sheppard is precisely the kind of information “that an agency, when deciding whether to approve a project, will carefully consider.” *Hughes River Watershed*, 81 F.3d at 443. That property values would begin rising when commercial operations cease is also precisely the kind of “relevant information about a proposed project [that must] be made available to members of the public so that they may play a role in both the decisionmaking process and the implementation of the decision.” *Id.*

³ As set forth in Contention NYS-37 and supporting briefs and documents, the State takes issue with this assumption.

87. In § 8, Entergy identified a litany of adverse impacts that it predicted would flow from the no action alternative, and could identify no positive impacts. “In the event that the IP2 and IP3 Operating Licenses are not renewed for an additional 20 years, then adverse impacts can be expected due to loss of tax revenues (*see* Table 2-9).” ENT00015B § 8.4. Entergy also claimed the adverse socioeconomic impacts would include lost PILOT payments, increased market energy prices, and lost employment. ENT00015B § 8.4.3.3. In sum, Entergy claimed that “the continued operation of IP2 and IP3 will have a significant positive economic impact on the communities surrounding the station. Positive impacts [of continued operation] include, but are not limited to, reduced local unemployment, significant contributions to local property tax revenue, economic support of southeastern New York, and lower energy costs.” ENT00015B § 8.5. Entergy did not analyze the impact on property values of the no action alternative in the ER.

88. In March 2012, more than three years after NRC Staff issued its DSEIS and more than a year after it issued the FSEIS, Entergy produced work by expert who “independently assessed the potential impacts to land use and property values for areas surrounding Indian Point.” *See* ENT000132 at 8 (Tolley).

89. Notably, the applicant’s expert did not rely on the FSEIS’s discussion of the no action alternative or the Levitan report or the “more appropriate method” touted by Entergy “to evaluate potential offsite land use impacts [that] would consider historic land use patterns, current land use regulations and zoning ordinances, tax rates and incentives, population growth trends, and pending and proposed development plans.” ENT000131 at 33. Like Dr. Sheppard, Dr. Tolley instead conducted “an original econometric study to determine the potential for current impacts on property values from Indian Point.” ENT000132 at 70 (Tolley).

E. NRC Staff Failed to Analyze the Impact of the No Action Alternative on Property Values

1. DSEIS

90. In December 2008, the NRC Staff issued NUREG-1437, Supplement 38, DSEIS. NRC000003 (DSEIS) (NYS00132A-D). Within the context of the no-action alternative, the DSEIS says “The shutdown of IP2 and IP3 may result in increased property values of the homes in the 42 communities surrounding the site (Levitan and Associates, Inc. 2005). This would result in some increases in tax revenues.” NRC000003 (DSEIS) (NYS00132B) at 8-29 to 8-30. The DSEIS speculated, “[h]owever,” that

to fully offset the revenues lost from the shutdown of IP2 and IP3, taxing jurisdictions most likely would have to compensate with higher property taxes (Levitan and Associates, Inc. 2005). The combined increase in property values and increased taxes could have a noticeable effect on some area homeowners and business, though Levitan and Associates did not indicate the magnitude of this effect and whether the net effect would be positive or negative.

NRC000003 (DSEIS) (NYS00132B) at 8-29 to 8-30.

91. On March 18, 2009, the State submitted comments on the DSEIS. Specifically, the State commented that “[t]he DSEIS is thus defective because it fails to consider the negative impact of relicensing on real estate values and the positive impact on real estate values of the no action alternative – not relicensing IP 2 and 3.” NYS000134 at 13; *see also id.* at 12-17.

2. FSEIS

92. In December 2010, NRC Staff issued the FSEIS. NRC000004 (FSEIS) (NYS00133A-J). The FSEIS “includes the NRC staff’s analysis which considers and weighs the environmental impacts of the proposed action, the environmental impacts of alternatives to the proposed action, and mitigation measures available for reducing or avoiding adverse impacts. It

also includes the NRC staff's recommendation regarding the proposed action.” NRC000004 (FSEIS) (NYS00133A) at iii.

93. “The recommendation of the NRC staff is that the Commission determine that the adverse environmental impacts of license renewals for IP2 and IP3 are not so great that not preserving the option of license renewal for energy planning decision makers would be unreasonable.” *Id.*

94. The FSEIS observes that the no-action alternative could cause a “combined increase in property values and increased taxes [that] could have a noticeable effect on some area homeowners and business[es].” NRC000004 (FSEIS) (NYS00133C) at 8-25. Like the DSEIS, the FSEIS did no more than observe that “Levitan and Associates did not indicate the magnitude of this effect and whether the net effect would be positive or negative.” NRC000004 (FSEIS) (NYS00133C) at 8-25; NRC000081 at 18 (Stuyvenberg).

95. Even though property values are a major driver of housing prices and offsite land use, NYS000224 at 7-8 (Sheppard), NRC Staff “concluded that the socioeconomic impacts of plant shutdown would likely be SMALL to MODERATE (with MODERATE effects for some local jurisdiction[s], including the Hendrick Hudson Central School District, Village of Buchanan, Town of Cortlandt, and the Verplanck Fire District).” NRC000004 (FSEIS) (NYS00133C) at 8-25.

96. NRC Staff also directed readers to Appendix J to NUREG-0586, Supplement 1 (a supplement to the Generic Environmental Impact Statement for Decommissioning, published in 2002) “for additional discussion of the potential impacts of plant shutdown.” NRC000081 at 19 (Stuyvenberg). With respect to property values, Appendix J warns that “[i]f the local economy is stable or declining, the result of the reduction in work force related to plant closure could be

economic hardships, including declining property values and business activity, and problems for local government as it adjusts to lower levels of tax revenues.” Like the Levitan report, however, Appendix J makes no attempt to quantify the impact of plant closure on property values, and, in fact, provides no analysis at all. *See* ENT000163 at J-3.

97. Nor did NRC Staff amend the DEIS in response to comments on its failure to address the impact on property values of the no action alternative.

The following comment requests that the impacts of the No Action Alternative include the impacts to property values: 129-d-ALILU.

Response: Off site land use impacts of spent fuel storage in an ISFSI are not part of the proposed action and are not within the regulatory scope of license renewal and therefore are not addressed in the SEIS. These impacts have been addressed as part of a separate NEPA review conducted by the NRC. Regarding potential impacts to land use as a result of no action, the NRC staff assigned an impact level of SMALL. In the staff's discussion of possible socioeconomic impacts of no action, the staff notes that no action may result in positive effects on property values while it may also cause reductions in tax revenues for local jurisdictions. The NRC staff notes that it is not likely that the site would be cleared by 2025, as the commenter asserts, if the licenses are not renewed. Denial of the license renewal applications would not result prompt removal of spent fuel from the IPEC site. Spent fuel would continue to be stored at the site, prior to eventual decommissioning. Even in cases where licensees immediately decommission a power plant site, dismantle existing structures, and decontaminate the site to applicable standards, ISFSIs can remain onsite and are subject to separate licensing procedures. Further, Entergy has not indicated that it would immediately initiate site dismantling and decontamination if its licenses are not renewed. NRC decommissioning regulations provide that licensees may maintain a facility in SAFSTOR status for up to 60 years before fully decommissioning a site.

NRC000004 (FSEIS) (NYS00133D) at A157-158.

98. Similarly, NRC Staff made no changes in response to the assertion that the socioeconomic effects from the shutdown of IP2 and IP3 would be less severe than expected: (comments 32 50-s-S0; 171-a-SO). NRC Staff said:

Response: Should the licenses not be renewed, the owner of the Indian Point property would continue to make property tax payments to the Town of Cortlandt,

the Village of Buchanan, and the Hendrick Hudson Central School District. Depending on the commencement of decommissioning activities, some workers would continue to be employed at Indian Point for an extended period of time after the termination of power plant operations. The majority of the impacts associated with plant operations would cease with reactor shutdown; however, some impacts would remain unchanged, while others would continue at reduced or altered levels. Terminating nuclear power plant operations would not immediately lead to the dismantlement (decommissioning) of the reactor and infrastructure. Some socioeconomic impacts resulting from terminating nuclear plant operations could be mitigated through new uses of the land. Impacts from the decommissioning of IP2 and IP3 in the future would be similar to what would occur now if the licenses were not renewed. *Other economic values (e.g., property values and eco-tourism) could have been diminished by the presence of Indian Point. These values might flourish after plant shutdown, decommissioning, and removal and could make up for some economic loss; however this issue along with Indian Point workers ability to change jobs is speculative. These comments do not present any significant new information that would warrant a change to the final SEIS.*

133D at A-104-105 (emphasis added).

99. Nonetheless, NRC Staff witness Jeffrey Rikhoff answered “[y]es” to the question “Has the Staff addressed the impact of license renewal on offsite property values for land near Indian Point?” NRC000081 at 15-16. Mr. Rikhoff explained that the relevant analysis was located in Appendix C to the 1996 GEIS. *Id.* Appendix C to the 1996 GEIS is a support document to GEIS § 3.7, which “describes the socioeconomic impacts associated with nuclear power plant refurbishment.” NRC000002 (GEIS) (NYS00131A) § 3.7.1. It supports the discussion of “the socioeconomic impacts that occurred during construction of seven case study nuclear plants [that] were identified and used to forecast refurbishment-related impacts at the same seven plants.” *Id.* Appendix C provides “[a]n overview of the socioeconomic research methods used” to study the seven sample plants, of which Indian Point was one. NRC000002 (GEIS) (NYS00131A) §3.7.1. But NYS-17B raises no “refurbishment-related impacts.” Appendix C is irrelevant.

100. Further, offsite land use and housing impacts are Category 2 issues. “Because land use changes may be perceived by some community members as adverse and by others as beneficial, the NRC Staff is unable to assess generically the potential significance of site-specific off-site land use impacts. This is a Category 2 issue.” NRC000002 (GEIS) (NYS00131B) at § 4.7.4; *see also* NRC000081 at 13 (Rikhoff) (“the offsite land use issue was addressed as a Category 2 issue in the Indian Point DSEIS and FSEIS”). Indeed, the 1996 GEIS expressly provided that “[j]udgments on whether or not potential environmental impacts in each subject area would need to be further addressed in each individual license renewal application were made based on the nature of the projected impact and its level of significance. These conclusions are not discussed in Appendix C but are presented in the body of the Generic Environmental Impact Statement (GEIS).” NRC000002 (GEIS) (NYS00131F) at C-9 to C-10. The body of the GEIS specifically determined that off-site land use and housing, which could have moderate or large impacts, were both Category 2 issues requiring site specific analyses. *See, e.g.*, NRC000002 (GEIS) (NYS00131A) at xliii; NRC000002 (GEIS) (NYS00131B) at § 4.7.4. As a matter of law, the 1996 case study of Indian Point does not satisfy the site-specific review requirement for Category 2 impacts, including housing and offsite land use.

101. Yet Entergy witness Donald P. Cleary testified that it was appropriate to rely on the Indian Point evaluations contained in the 1996 GEIS to evaluate offsite land use impacts in this proceeding “as long as any changed circumstances are properly accounted for—which, as discussed in response to [Entergy] Questions 84 and 88, is the case here.” ENT000132 at 50-51 (Cleary). Even if that were the case, the responses to Questions 84 and 88 do not address the impact on property values, and therefore offsite land use, of the no action alternative in this case. In A84, Mr. Cleary, an environmental safety consultant, testified that Westchester County has

experienced relatively low population growth and limited land use changes since the 1990s and therefore neither tax nor population driven land use changes would result from license renewal. ENT000132 at 58-59. In A88, Mr. Cleary opines that *future* land use changes are unlikely. ENT000132 at 61. But as Dr. Sheppard testified, “increased values of residential property will cause owners to make more careful use of land and allocate the land to different types of uses.” NYSR000224 at 40:4-8 (Sheppard). Land use follows value, not the other way around. The responses to Questions 84 and 88 in no way render the 1996 GEIS sufficient on the issue of property values.

102. Even if the 1996 review of Indian Point conducted for the GEIS could satisfy the site specific analysis requirement, which it cannot, Appendix C of the 1996 GEIS does not “[r]igorously explore and objectively evaluate all reasonable alternatives.” *Pa’ina Hawaii, LLC* (Materials License Appl.), CLI-10-18, 72 N.R.C. 56 (Jul. 8, 2010), 2010 N.R.C. LEXIS 28.

NRC Staff relies on the following language in Appendix C of the GEIS:

Most local planners and realtors believe that the operation of the Indian Point plants has not inhibited residential growth in neighboring communities of Buchanan, Peekskill, and Verplank, and the town of Cortlandt. Rather, the low property taxes and good school district have served to encourage residential development and facilitate the quick sale of existing housing. Local residents express no reluctance about living near the plants, although occasionally an outside buyer is deterred from the area because of the plants. However, there are always other buyers for the property, so the housing market has not slowed. Conversely, one realtor maintains that more development in communities neighboring Indian Point would have occurred had it not been for Indian Point.

Local realtors agree that housing values in communities neighboring the plant have not been deflated because of the presence of Indian Point. Homes in the immediate area are moderately priced and are currently selling very fast on the market. Developments within 3 km (2 miles) of the plant include homes in the \$400,000 to \$600,000 range. Representatives of the Westchester County Office of Community Development believe otherwise, however, and indicated that the presence of the plant perpetuated the image of these communities being low to middle class.

In summary, it appears that neither construction nor operation of the Indian Point plants has considerably affected housing in the communities neighboring the plants or in the whole of Westchester and Dutchess counties.

NRC000002 (GEIS) (NYS00131G) at § C.4.4.2.1.

103. This fourteen-year old anecdotal evidence is not evidence that Indian Point has no impact on property values. The speed with which houses apparently sold sometime before May 1996 is not evidence that the facility has little or no impact on property values. NYS000434 (Sheppard Rebuttal Test.) at 17-18. That “there [we]re always other buyers for the property” in 1996 provides no evidence about the facility’s impact on property values. NYS000434 (Sheppard Rebuttal Test.) at 18 (“Houses could be selling very quickly and that fact would not tell us anything about the price for which they were sold. What matters is what price a house would have sold for with the plant and in the plant’s absence”). Likewise, that there may have been, in 1996, “homes in the \$400,000 to \$600,000 range” within 2 miles of the facility provides no evidence about what those homes would have been worth if they were not within 2 miles of the facility. NYS000434 (Sheppard Rebuttal Test.) at 18.

104. In addition to having no evidence to support its view that Indian Point is not a disamenity, NRC Staff ignored evidence that the facility depresses property values by dismissing the fact that “outside buyers” were deterred in 1996 from the local market (“although occasionally an outside buyer is deterred from the area because of the plants”). NRC000002 (GEIS) (NYS00131G) at § C.4.4.2.1; *see also* NYS000434 (Sheppard Rebuttal Test.) at 17.

105. Moreover, NRC Staff ignored the concerns of at least one local realtor who in 1996 “maintain[ed] that more development in communities neighboring Indian Point would have occurred had it not been for Indian Point.” NRC000002 (GEIS) (NYS00131G) at § C.4.4.2.1. NRC Staff also dismissed the 1996 views of “[r]epresentatives of the Westchester County Office

of Community Development” that the facility depresses local property values and “perpetuate[s] the image of these communities being low to middle class.” NYS000434 (Sheppard Rebuttal Test.) at 17 (*quoting* 1996 GEIS, Appx. C (C.4.4.2)).

106. The belief of real estate professionals and local government officials that Indian Point depressed property values in nearby communities is consistent with the impact on property values of electric generating facilities, as set forth in Dr. Sheppard’s 2007 report and in other research papers. NYS000434 (Sheppard Rebuttal Test.) at 17-18; NYS000226 (*Potential Impacts of Indian Point Relicensing on Property Values*) at 2-3.

107. Inexplicably, however, the 1996 case study concludes “In summary, it appears that neither construction nor operation of the Indian Point plants has considerably affected housing in the communities neighboring the plants or in the whole of Westchester and Dutchess counties.” NRC000002 (GEIS) (NYS00131G), § C.4.4.2.

108. This conclusion, not supported by the discussion that precedes it, should be given no weight. It is also inconsistent with the GEIS’s finding that “A third type of impact, unrelated to workers’ demands, is the continuing impact of the plant on housing value and marketability.” NRC000002 (GEIS) (NYS00131B) at 4-102. The GEIS specifically instructs applicants in how to assign the significance of a given nuclear plant’s impacts “on the desirability of housing located close to the plant.”

A small impact on housing desirability results when very few or no instances of outmigration occur because of the operation of the nuclear power plant. Also, very few cases of prospective home buyers refusing a home because of its proximity to the plant would occur. Under normal plant operations, housing values should remain within the range of regional fair market prices. Moderate impacts on housing desirability include occasional difficulty in finding a buyer for a house because of its proximity to a nuclear plant. Impacts are also moderate if the proximity of the nuclear plant is cited as a reason for discounting the sale price of the housing units. Impacts on housing desirability are considered large if substantial migration from houses in the vicinity of the plant occurs or if realtors

find it difficult or impossible to sell homes in the area. *A large impact may also result if a sustained and substantial drop in housing value occurs because of the house's proximity to the plant. Such impacts may be evidenced by a gradual increase in housing value with increasing distance from the plant.*

NRC000002 (GEIS) (NYS00131B) § 4.7.1.1 (emphasis added).

109. Like Dr. Sheppard's, Dr. Tolley's work indisputably shows a "sustained and substantial drop in housing value . . . because of the house's proximity to the plant," and "a gradual increase in housing value with increasing distance from the plant." ENT000144 (Tolley Report) at 21 ("nearness to IPEC is actually an amenity up to 1.99 miles from the plant, but then counter-intuitively becomes an increasingly great[er] disamenity as distance from the plant becomes greater") *and id.* ("distance is everywhere a disamenity, with the disamenity effect becoming increasingly strong as distance from the plant increases"). It is undisputed that Indian Point's impact on housing is LARGE as defined by the GEIS. NRC000002 (GEIS) (NYS00131B) § 4.7.1.1 ("A large impact may also result if a sustained and substantial drop in housing value occurs because of the house's proximity to the plant. Such impacts may be evidenced by a gradual increase in housing value with increasing distance from the plant").

110. The FSEIS's analysis of the impact on offsite land use and housing of the no action alternative is also inadequate. Relying on Levitan's 2005 report, NRC Staff concluded in the FSEIS that the no action alternative could cause a "combined increase in property values and increased taxes could have a noticeable effect on some area homeowners and business, though Levitan and Associates did not indicate the magnitude of this effect and whether the net effect would be positive or negative." NRC000004 (FSEIS) (NYS00133C) at 8-25.

111. Despite finding that the impact could be "noticeable," NRC Staff did no subsequent analysis at all, merely "noting that Levitan did not indicate the overall magnitude of the property value and tax effect or whether the net effect on tax revenues would be positive or

negative.” NRC000081 at 18 (*quoting* NRC000004 (FSEIS) (NYS00133C) at 8-25); NYS000434 at 39 (only Drs. Sheppard and Tolley evaluated IPEC’s impacts on property values “using data collected from the area around IPEC”).

112. “Noticeable” impacts must be classified as “moderate” or “large.” *See* 10 CFR Part 51, Appendix B, Table B-1; *see also* NRC000004 (FSEIS) (NYS00133C) at 8-2.

113. NRC Staff went on to conclude that “losses from Indian Point operation would affect the communities closest to and most reliant on the plant’s tax revenue and PILOT. If property values and property tax revenues increase, some of these effects would be smaller. The NRC staff concludes that the socioeconomic impacts of plant shutdown would likely be SMALL to MODERATE (MODERATE effects for the Hendrick Hudson Central School District, Village of Buchanan, Town of Cortlandt, and the Verplanck Fire District). *See* Appendix J to NUREG-0586, Supplement 1 (NRC 2002), for additional discussion of the potential impacts of plant shutdown.”

114. The GEIS also refutes the position of the applicant and staff that they need not analyze impacts of relicensing (or the no action alternative) on property values in the area surrounding Indian Point. The GEIS clearly contemplated that impacts to property values should be analyzed in site specific environmental impact statements. The GEIS expressly advised that “[a] third type of impact, unrelated to workers’ demands, is the continuing impact of the plant on housing value and marketability.” NRC000002 (GEIS) (NYS00131B) at 4-101.

115. Accordingly, and in conformity with 40 C.F.R. § 1508.14, each of the seven case studies included in the 1996 GEIS addressed the impact of relicensing on property values. *See id.* § C.4.1.2 (impacts on property values of relicensing Arkansas Nuclear One); *id.* § C.4.2.2 (D.C. Cook Nuclear Plant); *id.*

116. § C.4.3.2 (Diablo Canyon) (“If the private land holdings that surround the site were to be developed, there could be extensive public visual access to the site, raising the potential for an adverse impact. Such an impact could be reflected in property values not reaching their full potential”); *id.* § C.4.5.2 (Oconee Nuclear Station); *id.* § C.4.6.2 (Three Mile Island); *id.* § 4.7.2 (Wolf Creek Generating Station). “Possible impacts to housing include changes in the number of housing units, particularly the rate of growth of the housing stock; changes in occupancy rates; changes in the characteristics of the housing stock; and changes in rental rates and property values.” NRC000002 (GEIS) (NYS00131F) at § C.4.4.2 (Indian Point).

117. This treatment is consistent with both NEPA’s mandate to study the potential “effects” of a proposed action on the “human environment,” 40 C.F.R. §§ 1508.8, 1508.14, and NUREG 1555, Suppl. 1, “Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Environmental Standard Review Plan for Operating License Renewal.” (Mar. 2000) (ENT00019B), which makes clear that extensive site- and station-specific information is necessary to support a license renewal application. *Id.* § 2.2.8-3. In the lengthy list of information that may be necessary, the guidance document includes “housing information, including the sales and rental market in the region, number and types of units, turnover and vacancy rates, and trends in addition to housing stock, adequacy of structures, and location of existing and projected housing (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies),” and “local plans concerning land use and zoning that are relevant to population growth, housing, and changes in land-use patterns (from the ER and consultation with Federal, State, regional, local, and affected Native American tribal agencies).” *Id.* These factors are commonly used by property appraisers in determining property value. March 2010 Supplemental Sheppard Declaration (NYS000229) at 6. NUREG 1555,

Suppl. 1, describes an *inclusive* approach aimed at determining what information is necessary and relevant to each environmental review.

118. As the Commission held in 1998, “a conclusory statement on ‘some negative’ impact on property values, without explanation of analysis,” is “deficient on its face.” *Louisiana Energy Svces., LLC* (Claiborne Enrichment Ctr.), 47 N.R.C. 77, 1998 N.R.C. LEXIS at *43 (Apr. 3, 1998). NRC Staff’s conclusory statement that a “combined increase in property values and increased taxes [that] could have a noticeable effect on some area homeowners and business[es]” is deficient on its face and should be given no weight. *See* NRC000004 (FSEIS) (NYS00133C) at 8-25.

F. The Facility has Physical Impacts on the Environment

119. A “disamenity [is] a localized land use . . . or a structure or activity . . . that generates . . . an adverse impact that reduces the desirability or use of the land by other nearby land owners or occupants.” Tr. 2556:19-2557:5 (Sheppard). A land use, structure or activity can be a disamenity as a consequence of “the classic indicia of nuisance,” including “substances, noise, unusual levels of activity, warning alarms, a variety of different things that could happen at a particular location that would affect the desirability of using land in nearby locations.” Tr. 2556:19-2557:5 (Sheppard).

120. Land use in the Town of Cortlandt “is predominately [sic] residential zoning with 1/2-acre to 2-acre plots further protecting environmentally sensitive areas and open spaces.” NRC000004 (FSEIS) (NYS00133B) at 2-123. Noise from IP2 and IP3 is detectable offsite. NRC000004 (FSEIS) (NYS00133B) § 2.2.8.4; ENT00015A § 2.1. Power is delivered offsite “by way of two double-circuit 345-kV lines. These lines connect the main onsite transformers to the offsite Buchanan substation[,] which is located immediately across Broadway near the main

entrance to the site. The lines that connect the transformers to the substation are about 2000 ft (610 m) in length and, except for the terminal 100 ft where they cross over Broadway (a public road) and enter the substation, lines are located within the site boundary.” NRC000004 (FSEIS) (NYS0133A) at 2-5. In addition, more than 3,500 vehicles traverse the stretch of Broadway immediately outside the complex daily. ENT00015B at 4-43-44; NYS00133B § 2.2.8.2); *see also* NYS00133D at A-136 (transportation impacts of SNF).

121. “The facility can be seen easily from the river.” NRC000004 (FSEIS) (NYS00133A) at 2-2; NRC000004 (FSEIS) (NYS00133B) at 2-123; ENT0015B at 4-46 (App’x E) (facility is “highly visible on the Hudson River side”). “The town also has made an effort to increase public access to the Hudson River waterfront.” NRC000004 (FSEIS) (NYS00133B) at 2-123. National security precludes public access to the facility’s Hudson River waterfront. Att. D (Coastal Zone Management Consistency Determination) at 8 to ENT00015B. In the Village of Buchanan, the facility can be seen from Broadway. NCR000004 (NYS00133B) at 2-123. “[T]he immediate area around the Indian Point site is completely enclosed by a fence. Access to the site is controlled at a security gate.” NRC000004 (FSEIS) (NYS00133A) at 2-2; *see also* FSEIS §§ 2.1, 2.1.1, 2.2.1, 2.2.6.1, A-116 (security measures include armed guards, perimeter fence, and multiple security stations).

122. “Other visible IP2 and IP3 site features include auxiliary buildings, intake structures, the discharge structure, electrical switchyard, and associated transmission lines.” NRC000004 (FSEIS) (NYS00133A) at 2-5. “The superheater stack for IP1 (334 ft (102 m) tall), the IP2 and IP3 turbine buildings (each 134 ft (41.8 m) tall), and reactor containment structures (each 250 ft (76 m) tall) dominate the local landscape and can be seen from the Hudson River.” NRC000004 (FSEIS) (NYS00133B) at 2-123.

123. Groundwater at the site is contaminated with tritium, Strontium-90, Cesium-137, and Nickel-63. ENT0015B at 5-4 to 5-5; FSEIS §§ 4.5, 4.8.5 (spent fuel leaking into groundwater); *id.* (strontium-90, tritium, radioactive forms of cesium, cobalt, nickel, and strontium). The IP1 spent fuel pool may also be contributing radionuclides to the contamination. ENT0015B at 5-4 to 5-5. “Entergy has concluded that some contaminated groundwater has likely migrated to the Hudson River.” ENT0015B at 5-4. Entergy attributes these environmental impacts to “historical pool leakage” that occurred in the 1990s. ENT0015B at 5-6.

124. It is well established in the literature that “electric generating facilities are a classic disamenity. The facility indisputably has physical impacts on the environment including pollutant leaks, sirens, traffic impacts, and aesthetic impacts. These are classic indicia of nuisances. They are all physical impacts.” NYS000434 (Sheppard Rebuttal Test.) at 13. “A power plant affects property values because people consider it a nuisance and require compensation for coping with its undesirable effects.” NYS000234 (Blomquist, *The Effect of Electric Utility Power Plant Locations on Area Property Value*, Land Economics, Vol. No. 50, No. 1 (Feb. 1974) at 97). Indeed, Entergy itself describes the facility as a “brownfield.”⁴ ENT00015B, App’x E, §§ 7.3, 8.2.

125. It is undisputed that power generating facilities may impact property values. Scholars have conducted “several scientific studies of the impacts of power generating plants, in general and nuclear fission power plants in particular.” NYS000226 (*Potential Impacts of Indian Point Relicensing on Property Values*) (Sheppard) at 2. Power plants can be “the source of modest to severe levels of nuisance and disamenity that could depress the market value of nearby

⁴ “The term ‘brownfield site’ means real property, the expansion, redevelopment or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.” 42 U.S.C. § 9601(39)(A).

properties.” NYS000226 at 2 (*citing* Blomquist, *The Effect of Electric Utility Power Plant Locations on Area Property Value*, Land Economics, Vol. No. 50, No. 1 (Feb. 1974) at 97-100). The effect exists for conventional and nuclear power plants alike. NYS000225 at 3 (*citing* Clark and Nieves, *An Interregional Hedonic Analysis of Noxious Facility Impacts on Local Wages and Property Values*, Journal of Environmental Economics and Management, Vol. 27 (1994) at 235-253). Indeed, Entergy expert George S. Tolley acknowledges the potential impact of disamenities, including “noisy freeways or polluting facilities” on home prices. ENT000132 at 62 (Tolley); *see also id.* at 63-64 (*citing* “extensive literature” identifying “relatively large property values impacts” from power plants).

126. These physical effects on the environment trigger an obligation to examine a proposed action’s impact on property values. *See, e.g., Lee v. U.S. Air Force*, 354 F.3d 1229, 1241 (10th Cir. 2004) (Air Force considered impact on property values of stationing and use of additional training aircraft at base in New Mexico); *Britt v. U.S. Army Corps of Eng.*, 769 F.2d 84, 91 (2d Cir. 1985) (FSEIS for possible bridge removal discussed property values); *Town of Norfolk v. U.S. E.P.A.*, 761 F. Supp. 867, 887-888 (D. Mass. 1991) (EIS related to sewage residuals landfill considered impact on property values), *aff’d*, 960 F.2d 143 (1st Cir. 1992).

127. No evidence in the record suggests that the facility’s adverse impact on property values is caused by any public perception of risk or any aversion to nuclear power facilities and spent fuel storage, rather than by the facility’s undisputed physical effects on the environment. *See* NYS000434 (Sheppard Rebuttal Test.) at 13.

G. Dr. Sheppard’s Methodology

128. “For license renewal, the no-action alternative refers to a scenario in which the NRC would not renew the IP2 and IP3 operating licenses and Entergy would then *cease*

operating both units on or before the expiration of their current operating licenses. Following the shutdown of each unit, Entergy would initiate decommissioning of the facility in accordance with the NRC decommissioning requirements in 10 CFR 50.82, ‘Termination of License.’ Full dismantling of structures and decontamination of the site may not occur for up to 60 years after plant shutdown.” NRC000004 (FSEIS) (NYS00133C) at 8-20 (emphasis added).

129. Thus, for purposes of evaluating the impact of the no action alternative on land use, “we want to know what will be *the impact of the cessation of commercial . . . operation* as a commercial power generator In 2015, there will cease to be commercial generation of electric power at that site.” Tr. 2560:23-2561:7 (Sheppard) (emphasis added). “In a situation where the interest is in knowing the impact of a single significant change in the community, where the location and timing of that change are unambiguous, the analysis requires thinking of housing as an asset whose rate of return is or might be affected by the single significant change. This approach is similar to so-called “event studies” that are widely used to determine the impact of events that affect the value of stocks and other financial instruments.” NYSR00224 at 14. Dr. Sheppard “used this approach to study the ‘event’ of the construction and operation of Units 2 and 3 on nearby residential properties.” NYSR00224 at 14.

130. To determine whether Indian Point was a disamenity that impacted property values of nearby residences, Dr. Sheppard employed a resale price analysis, also sometimes called a “paired sales” analysis, which was similar in spirit to “event” studies. Tr. 2558:4 (Sheppard); NYSR00231 at 34 (“event” study); Tr. 2570:8-20 (“paired sales”).

131. A resale price analysis is a method of measuring a potential disamenity by “track[ing] properties over time and observ[ing] the purchase price and sale price of the property, and estimat[ing] the impact on property values at the time that a possible source of disamenity

emerges.” Tr. 2558:4-8 (Sheppard). Dr. Sheppard “collected information over time from property tax records and . . . calculated, essentially, the annual rate of return or the annual percentage interest rate that the owner of a home gets viewing the home as an asset.” Tr. 2558:13-18 (Sheppard).

132. Dr. Sheppard’s dataset comprised 1500+ properties that were located within 5 kilometers of Indian Point and that had been bought and sold at least twice between 1945 and 2009. NYS000434 (Sheppard Rebuttal Test.) at 7, 14. Dr. Sheppard calculated the rate of price appreciation over time for each of the 1500+ properties and compared that appreciation to the rate of appreciation for properties that were located outside the study area. NYS000434 (Sheppard Rebuttal Test.) at 7.

133. Dr. Sheppard’s analysis included the identification of a “treatment group” and a “control group.” Tr. 2558:25-2559:1 (Sheppard). The control group is “a set of observations that are unambiguously not subject to impacts from IPEC.” NYS000434 (Sheppard Rebuttal Test.) at 30. In this case, “[t]he control group is the set of properties that are either bought and sold before IP2 and IP3 commenced commercial operation, or bought and sold after IP2 and IP3 commenced commercial operation.” Tr. 2559:1-5 (Sheppard). The “treatment group” is “properties [on the east side of the Hudson River] that are purchased before IP2 commenced commercial operation and sold after IP3 commenced commercial operation.” Tr. 2559:10-12 (Sheppard).

134. Some of the paired sales involved one transaction before Indian Point commenced commercial operation and one transaction after commercial operation began. NYS000434 (Sheppard Rebuttal Test.) at 7. These properties constitute the “treatment group.” If Indian Point is, in fact, a disamenity that adversely impacts property values, “the rate of price

appreciation for” transactions within the treatment group “will be lower than” the rate of appreciation for properties in the control group. NYS000434 (Sheppard Rebuttal Test.) at 7. By contrast, “[i]f IPEC generated no disamenity, the rate of price appreciation for these sales would be generally equivalent to the rate observed throughout the area.” NYS000434 (Sheppard Rebuttal Test.) at 7-8.

135. Dr. Sheppard’s resale price analysis “directly addresses exactly the question posed when we ask about the impact of the No Action Alternative.” Tr. 2559:20-23 (Sheppard). Dr. Sheppard’s treatment group is comprised of properties that “experienced the commencing of commercial operation.” Tr. 2560:3-4 (Sheppard). Dr. Sheppard’s treatment group permits him to “isolate just that part of the disamenity that is relevant for evaluating the No Action Alternative, and that means evaluating the cessation of commercial operation of IP2 and IP3.” Tr. 2562:6-9 (Sheppard). “By focusing on this particular time period,” Dr. Sheppard is “zeroing in on exactly that part of the disamenity that’s most relevant for the issue at hand.” Tr. 2562:12-16 (Sheppard).

136. Dr. Sheppard’s study controlled for other variables that could account for diminution in value, like high interest rates or other turbulence in the housing market. Tr. 2563:11-2564:1 (Sheppard). Dr. Sheppard’s methodology also accounted for other potential sources of disamenity. Tr. 2557:7-2558:8 (Sheppard). Dr. Sheppard’s methodology was particularly appropriate in a case where there might be “other nearby disamenities” because it focused on a particular time period. Diminutions or increases in property values are thus tied to the emergence of disamenities or amenities. Tr. 2557:25 (Sheppard).

137. In sum, to determine whether Indian Point is a disamenity that adversely impacts property values, Dr. Sheppard

collected information over time from property tax records and . . . calculated, essentially, the annual rate of return or the annual percentage interest rate that the owner of a home gets viewing the home as an asset. So, think of what annual interest rate would be equivalent to the difference between the purchase price and the sales price of the home. And then I distinguish those homes both by location, their proximity to Indian Point, and by the time period when Indian Point IP2 and IP3 commenced commercial operations. This establishes for me a treatment group that can be compared with the control group. The control group is the set of properties that are either bought and sold before IP2 and IP3 commenced commercial operation, or bought and sold after IP2 and IP3 commenced commercial operation. Because in either of those cases, the impact of commercial operation would affect both purchase and sales price. And those are contrasted with the treatment group that are properties . . . purchased before IP2 commenced commercial operation and sold after IP3 commenced commercial operation. That establishes a treatment group to help me understand, analyze, and estimate the impact of operating these plants as commercial electricity generators. . . . This provides a clearer experimental design than standard hedonic analysis, although standard hedonic analysis still has something to teach us in this case, but looking at the resale price analysis establishes a cleaner experimental design, and it directly addresses exactly the question posed when we ask about the impact of the No Action Alternative.

Tr. 2558:13-2559:23 (Sheppard); *see also id.* at 2567:11-2569:14 (Sheppard).

138. Unlike the hedonic approach, Dr. Sheppard's paired sales methodology permitted the measurement of exactly what would happen to property values if the no action alternative were implemented. Tr. 2562:3-15 (Sheppard); Tr. 2557:18-20 (Sheppard); Tr. 2569:11-14 (objective was to focus on impact on property values of the "disamenity, if any, that will cease once the plant ceases commercial operation") (Sheppard). "It is possible to measure the impact on property values of any amenity or disamenity taking place at a fixed location." NYS000224 (Sheppard Initial Test.) at 12. Dr. Sheppard designed a study to measure Indian Point's impact on the property values of rental and owner-occupied homes located within 5 kms. His analysis considered "housing as an asset whose rate of return is or might be affected by the single significant change" at issue. NYS000224 (Sheppard Initial Test.) at 14. The "single significant change," or "event," at issue in this case was "the construction and operation of Units 2 and 3 on

nearby residential properties.” NYS000224 (Sheppard Initial Test.) at 14. To measure the impact of that event, Dr. Sheppard designed a study “similar to so-called event studies that are widely used to determine the impact of events that affect the value of stocks and other financial instruments.” NYS000224 (Sheppard Initial Test.) at 14. “Event studies measure the relationship between an event that affects securities and the return of those securities.” ENT000175 (Kritzman, *What Practitioners Need to Know About Event Studies*, 50 *Fin. Analysts J.* 17 (1994)) at 17. In this case, Dr. Sheppard focused on “housing as an asset whose rate of return is (or might be) affected by” the commencement of commercial operations. NYS000231 at 3 (Sheppard).

139. Dr. Sheppard obtained data from actual residential property markets in and around IPEC, using data from the New York Office of Real Property Services (“ORPS”) and published announcements of real estate transactions dates and prices. Dr. Sheppard collected data providing address, sales date and sales price for properties in Peekskill, Cortlandt and Buchanan sold during the period May 1999 through June 2009. NYS000231 at 5. ORPS data also supplied information about a small number of other properties sold outside that time period. NYS000231 at 5. These data “provided an initial sample of approximately 1900 residential properties.” NYS000231 at 5. A researcher under Dr. Sheppard’s supervision then visited the assessors’ offices for the towns of Peekskill and Cortlandt (whose records include real property located in the Village of Buchanan), obtaining photograph copies of the property record files for each of the sample properties. NYS000231 at 6.

140. Working from the photograph records of assessor’s data files, the information contained in the records, including every legible recorded sale price and sales date for each of the properties, was entered to a computer database. NYS000231 at 6. Dr. Sheppard then excluded

recorded sales or transfers that were not at “arm’s length” (either because they were transfers between family members, transfers that took place at symbolic or zero prices, transfers that took place within 60 days of the previous transfer, or transfers that were identified by assessor’s records as not arm’s length). NYS000231 at 6. Sales not made at arm’s length might fail to represent the market price of the property that would be reached by unconstrained negotiation between a willing buyer and willing seller. NYS000231 at 6. Dr. Sheppard also excluded a small number of observations because they were unusual and unrepresentative in other ways (miscoded sales dates, unusual commercial properties converted to residential use). NYS000231 at 6.

141. Dr. Sheppard then “geocoded these data to determine precise latitude and longitude, and [used] Geographic Information System software . . . to measure the linear distance of each property from the IPEC site.” NYS000231 at 6. Dr. Sheppard analyzed only those New York properties located within 5 kilometers of the facility, “a very conservative estimate of the possible extent of IPEC property value impacts.” NYS000231 at 6. The blue dots in the following figure represent the properties sampled. The large + sign indicates the facility and the 5 km. boundary is shown in red. NYSR00231 at 7.

experienced any impact⁵ that the commercial operation might have had on nearby properties because they were bought before the impact occurred and subsequently sold. NYSR00231 at 8.

143. By contrast residential properties that were bought and sold before 1974 or bought and sold after 1976 would have been unaffected by the facility. NYSR00231 at 8. For ownership periods that began and ended prior to 1974, the property would have been either not affected by IPEC, or would have been affected primarily by the presence of the smaller unit 1, which was shut down in 1974 and emptied of fuel by 1976. NYSR00231 at 8. For ownership periods that began and ended after 1976, any impact of IPEC operations would have been reflected in both the purchase price and the sale price, leaving the rate of price increase between purchase and sale unaffected by the operation of IPEC. NYSR00231 at 8. This group constituted the “control” group. NYSR00231 at 8.

144. The earliest sales in Dr. Sheppard’s sample occurred in mid-1945, and the latest sales occurred in mid-2009. The average first sales price was just over \$165,000 and the average second sales price just over \$215,000. The average nominal rate of return on properties in the sample was just over 9%. Dr. Sheppard’s data contained at least 1554 observed repeat sales with data on at least one of the relevant variables; 1511 repeat sales (paired sales) contained data on all required variables. These paired or repeat sales concerned 507 different residential properties. NYS000231 at 9. The treatment group consisted of about 10% of observed repeat sales.

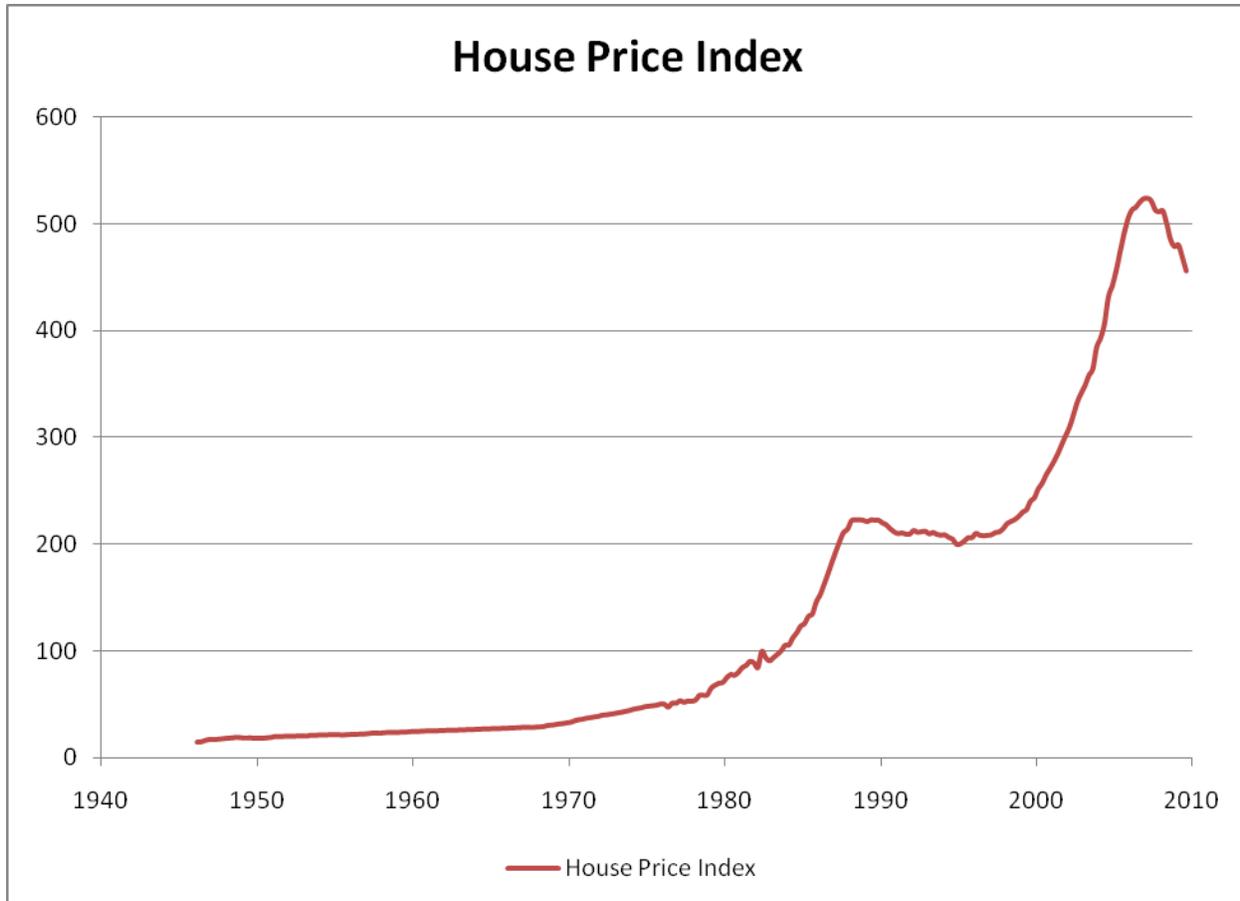
145. Dr. Sheppard compared the rate of return of the properties in the treatment group against the rate of return obtained by properties in the control group. NYSR00231 at 8. He used OLS regression with clustered standard errors based on individual properties. NYS000231 at 9.

⁵ They “experienced” the impact by virtue of the diminution in their property values by 3% per year.

146. In order to calculate the approximate total loss to the community, rather than the average loss to individual homeowners, Dr. Sheppard combined data from the Federal Housing Finance Administration house price index data and the BLS data on prices (used for constructing the CPI and other price indices) to construct a price index for the region that allowed him to estimate total residential property values at different times. Dr. Sheppard's price index is shown below. In this way, he was able to measure the facility's impact without requiring, for each individual property, the "many characteristics of the individual property such as the number of rooms, total square footage, lot size, and proximity to amenities (such as parks and high-quality schools) or remoteness of disamenities (such as noisy freeways or polluting facilities)." ENT000144 at 9. Instead, Dr. Sheppard's study required, for each property, "information on sales date, previous sales date, sales price, previous sales price, the distance from IPEC plant, rate of return during the time period between the sales date and previous sales date, and the indicator variable that determines whether the repeat sale of the residential property is in the treatment or control group." NYS000231 at 8.

147. Dr. Sheppard's analysis showed that commercial operation of the facility caused a statistically significant reduction in the nominal rate of return to owning residential property in the surrounding region. NYS000231 at 9. The reduction was just under 3% per annum. Because the average ownership period was about 9 years, this resulted in a 27% diminution in value (3% multiplied by 9 years). There can be no doubt, "to a reasonable degree of scientific certainty, that IPEC reduced the value of residential housing services provided by properties within 5 kilometers of the IPEC facility, and that the reduced value of residential services was not compensated for by reduced required property tax payments on residential property." NYS000231 at 9.

148. Dr. Sheppard constructed a house price index for residential property. The index is show below.



Using his house price index, together with census data, Dr. Sheppard was able to estimate total rental and owner-occupied property values using 2000 data, and then translate that data into 1976 values. He then calculated total property values and associated impacts as of January 2011.

NYS000231 at 10-11. First, Dr. Sheppard used 2000 census data to estimate the total value of residential property within 5 kilometers of IPEC, considering all census block groups whose center lies with the 5 kilometer boundary. Census surveys provide owner estimates of the market value of owner-occupied properties and of the values of monthly contract rent. Dr. Sheppard capitalized rents at an annual rate of 5% to estimate the value of rental property and sum the

estimated rental property value and owner-occupied property values to get a total for residential property in the block group. He then used the house price index to calculate what the value of these properties would have been at the end of 1976. Using those values and the estimated reduction in the nominal return to home ownership, he calculated the total reduction in property values as of December 1976, conservatively estimating that these reduced returns were experienced for an ownership period that is equal to the sample mean duration of ownership of 9 years.⁶ NYS000231 at 10-11. The following chart shows the percent loss in residential property values between 1976 and 2000.

Description	Value
Value in 1976 of residential property within 5 km of IPEC facility	\$449,625,380
Total loss in value of residential property in 1976	-\$121,737,345
Total value in 2000 of owner-occupied and renter-occupied residential property within 5 km of IPEC facility (from census)	\$2,227,926,067
Total value of affected residential property in January 2011	\$3,952,218,345
Total loss in residential property values as of January 2011	-\$1,070,074,312
Percentage loss in residential property values	-27.08%

149. Dr. Sheppard’s December 2011 report shows that Indian Point caused a loss in value of approximately 27% over the average home ownership period of 9 years (3% loss per annum). *Id.*

150. Had they existed in the relevant time period, Dr. Sheppard’s method would have revealed other potential sources of disamenity. Tr. 2562:16-19 (Sheppard) (“if I’m missing a major part of the disamenity, the data might have told me there is no statistically significant impact, but that’s not what the data tell me”). Dr. Sheppard’s focus on the 1974-1976 time

⁶ In fact, properties subject to the IPEC treatment were owned for longer than the sample mean ownership period. Using the longer ownership period as the duration of reduced annual returns to ownership would have generated larger property value impacts because the 3% diminution in property values caused by IPEC would have been multiplied by more than 9 ownership years.

period eliminated other broader potential causes of diminution in value to nearby houses. Tr. 2563:11-2564:1 (Sheppard).

151. No evidence in the record shows or even suggests that any other facility or land use is the cause of the diminution in property values identified by Dr. Sheppard.

1. Property Values Would Rise by One Billion Dollars Under the No Action Alternative

152. As to “those properties that were subject to the treatment of being owned when IP2 and IP3 . . . commenced commercial operation[,] they did experience a diminution in value.” Tr. 2562:20-23 (Sheppard). “[T]o a reasonable degree of scientific certainty,” Dr. Sheppard determined “that there is an adverse impact on property values resulting from IPEC’s presence in the community.” NYSR00231 (Dec. 11, 2011 Sheppard Decl.) at 1; *see also* NYSR00224 (Initial Testimony of New York State Expert Sheppard) (Jan. 30, 2012) at 7.

153. “[D]ecommissioning of IPEC and reclamation of the site for alternative uses would generate a recovery in property values that could add more than \$1 billion dollars to the value of residential property, increasing its value by approximately 27%. This would increase the wealth of many individuals residing in the community and generate significant impacts on surrounding land use.” NYSR00231 at 1; NYSR00224 at 7 (“Based on conservative assumptions, my analysis suggests that denial of the license renewal application and reclamation of the site for alternative uses would generate a recovery in property values that could add more than 27% to the value of residential property located within 5 kilometers. This increase, which would total \$1,070,074,312, would significantly increase the wealth of many individuals living in the community”).

154. Contrary to the applicant’s claims, Dr. Sheppard took PILOT payments into account. PILOT payments notwithstanding, IPEC diminishes property values by about 27%.

155. The applicant's expert included in his analysis "a specific variable for the amount of PILOT payments." But the applicant's own model "shows that the impact of such payments is statistically insignificant," which "means that we cannot reject the hypothesis that the true impact of PILOT payments on property values is zero." NYS000434 at 40; Tr. 2641:15-17 (Tolley) ("But it's true. In my hedonic analysis, it was not statistically significantly different from zero"). And if PILOT payments have no impact, as the applicant's expert's own work suggests, there is no reason to include them in the model. *Id.*

156. Moreover, Dr. Sheppard's model included PILOT payments, even though they appear to make no material difference. NYS000434 at 41 ("My estimate calculates all of the impacts on property values that occur when IPEC is built. This includes any disamenity or amenity associated with IPEC as well as any change in property tax rates that might be associated with the facility"). Dr. Sheppard's "analysis doesn't ignore PILOT payments; it shows that they are not enough to cause house values to increase." *Id.* In sum, "the disamenity burden is so great that it OVERWHELMS the benefits of PILOT payments." NYS000434 at 41.

157. Dr. Sheppard's estimate of Indian Point's impact on property values, which is closely matched by Entergy's expert, would have large, not small or moderate, impacts on housing and offsite land use.

From early 2007 through the first quarter of 2011, house prices in the United States fell by approximately 16%. A few large markets experienced a diminution in value of more than 16% and some other markets experienced a lesser diminution. But the average impact, 16% nationwide, has had profound impacts on land use around the country; these impacts are likely to persist for at least a decade. This event, and related economic trends, is being called the "Great Recession." But the impacts I have documented in the five kilometers around IPEC are even greater. By any measure, those impacts may only be described as LARGE.

NYS000224 (Sheppard) at 40.

158. As Dr. Sheppard testified, “[a] 27% loss in value is one that will clearly have noticeable effects on land use decision making.” He testified that it would be “certainly sufficient to result in very significant impacts. These include economic impacts such as the value of residential property and the associated wealth of property owners. They also could include environmental land use impacts that will arise because the increased values of residential property will cause owners to make more careful use of land and allocate the land to different types of uses. This is why I disagree so strongly with the assertions made in the FSEIS that land use would experience ‘no noticeable . . . change.’” NYS000224 at 40.

159. Dr. Sheppard based his opinion “[o]n recent experience that we have all shared to a greater or lesser degree. From early 2007 through the first quarter of 2011, house prices in the United States fell by approximately 16%. A few large markets experienced a diminution in value of more than 16% and some other markets experienced a lesser diminution. But the average impact, 16% nationwide, has had profound impacts on land use around the country; these impacts are likely to persist for at least a decade. This event, and related economic trends, is being called the “Great Recession.” But the impacts I have documented in the five kilometers around IPEC are even greater. By any measure, those impacts may only be described as LARGE.” *Id.*

160. Further, when testifying on NYS-37, NRC Staff witness Stuyvenberg candidly admitted that NRC Staff had difficulty considering that large positive impacts could be somehow “destabilizing,” *see* 10 C.F.R. Part 51, Subpart A, Appx. B, Table B-1. November 28, 2012 Transcript of Hearing (Tr.) 3243:9-18 (Stuyvenberg).

The challenging part for us is our level of impact system is kind of built around adverse impacts. We talk about definitions at least for large that the impacts are somehow destabilizing. The notion of that somehow being a positive thing is hard to consider. So usually what we do is we look to

how we reduce adverse impacts on the levels to which it reduces adverse impacts. So it is kind of perhaps a flaw of the system the Agency uses but it is a reality.

Nov. 28, 2012 Tr. 3243:9-18 (Stuyvenberg).

161. Dr. Sheppard's December 2011 report establishes that the no action alternative would have large and destabilizing positive impacts on the community in which the facility is located.

162. NEPA requires agencies to balance a project's economic benefits against its adverse environmental effects." *Hughes River Watershed*, 81 F.3d at 443. Dr. Sheppard's study provides extremely relevant information for a decisionmaker "because it gives you the magnitude, an estimate of the dollar value magnitude of property value recovery that can be expected after cessation of operations. And then you, the Board, or whomever can consider the difference between getting \$1 billion now, or getting \$1 billion in 2015 versus getting \$1 billion 20 years later." Tr. 2565:9-16 (Sheppard).

H. Entergy's Methodology

163. The resale price analysis used by Dr. Sheppard is just one way of measuring the impact of a suspected disamenity. Another way to measure a suspected disamenity's impact would be the hedonic method employed by Dr. Sheppard in other contexts, and by Dr. Tolley in this case. ENT000132 at 70 (Tolley); ENT000144 at 15. "Hedonic pricing models are used to assess the impacts of house and neighborhood characteristics on property values. The price of a home depends on many characteristics of the individual property such as the number of rooms, total square footage, lot size, and proximity to amenities (such as parks and high-quality schools) or remoteness of disamenities (such as noisy freeways or polluting facilities)." ENT000144 at 9. "Because real estate properties are heterogeneous capital goods, most property value studies

have relied on hedonic regressions where the price of a house is explained by the characteristics of that property.” ENT000593 at 334. “One of these characteristics is the environmental quality at that location.” *Id.* Entergy’s expert employed the hedonic method to examine whether Indian Point impacted property values.

164. However, “[s]ince all characteristics that influence the value of a house must be included in the regression equation to ensure unbiased estimates, data requirements can be burdensome.” ENT000593 at 334. Indeed, “[d]ata may be required on 30 or more characteristics of the structure and location, and these data must be derived from several different sources.” ENT000593 at 334.

165. Dr. Sheppard rejected the hedonic methodology for two reasons. “Working with local tax assessors, [he] determined that it was not possible to obtain a sufficiently large sample – including sales from before IPEC was built – to use the hedonic approach with a proper control group.” NYS000434 (Sheppard Rebuttal Test.) at 30. The local assessment data are not available in digital form. NYS000224 (Sheppard Initial Test.) at 24.

166. Dr. Sheppard also testified that the hedonic method is “quite useful if you have a spatially distinct or isolated disamenity, and there’s no ambiguity about other nearby disamenities that could be causing -- affecting property values. But when you have other nearby disamenities, it’s helpful to tie the estimation of the impact down to a particular point in time.” Tr. 2557:21-2558:2 (Sheppard). For this reason, too, Dr. Sheppard decided not to use the hedonic method.

1. Entergy’s Study was Flawed

167. Dr. Tolley’s study suffered from serious flaws. Sample size is important in all statistical analysis but is particularly important in hedonic analysis. NYS000434 (Sheppard

Rebuttal Test.) at 25. Dr. Tolley’s sample comprised 296 homes, which is much smaller than seen in most peer-reviewed published studies. ENT000144 at 15; NYS000434 (Sheppard Rebuttal Test.) at 25. Hedonic analysis seeks to take a large number of properties and information about their sales prices and their characteristics. NYS000434 (Sheppard Rebuttal Test.) at 25. Ideally, the sample should include many individual properties of every type. NYS000434 (Sheppard Rebuttal Test.) at 25-26. A hedonic study examining the possible impact of Indian Point on property values should include in its sample “expensive houses that are very close to IPEC, a short distance away, and a long way from IPEC. For each of these there should be old and new houses, and everywhere in between. There should be many examples of every combination of characteristics.” NYS000434 (Sheppard Rebuttal Test.) at 26.

168. In order to estimate reliably with the number of characteristics employed in Dr. Tolley’s model,⁷ a sample should have 1458 observations (double the sum of 3 raised to the 6th power). NYS000434 (Sheppard Rebuttal Test.) at 26-27. Estimates made from a sample of only 296 are much less reliable. NYS000434 (Sheppard Rebuttal Test.) at 27.

169. In addition, Dr. Tolley’s study is too narrowly focused in time. The sample consists of 296 houses offered for sale on July 13, 2011. ENT000144 at 15. House price indices released by the Federal Housing Finance Authority indicate that between the first quarter of 2007 and second quarter of 2011, house prices in the region in which IPEC is located declined by more than 17%. Minimally, that “makes this time period very unusual and possibly unrepresentative.” NYS000434 (Sheppard Rebuttal Test.) at 27-28.

⁷ Dr. Tolley’s model has 7 characteristics, 6 of which are continuously variable and one of which is dichotomous, meaning that it takes only 2 values. NYS000434 (Sheppard Rebuttal Test.) at 26.

170. Moreover, Dr. Tolley's study used asking price, not sale price. ENT000144 at 15; Tr. 2667-68 (Tolley). But "asking price tells us only what the homeowner, or the homeowner's realtor, thought the property was worth or what would make a good starting point for negotiations, not what the market ultimately determined to be the property's value. Asking price is meaningless for purposes of determining fair market value, particularly in a time period when property prices may be changing in unexpected ways. Asking price also does not reveal whether a property in fact was sold." NYS000434 (Sheppard Rebuttal Test.) at 28.

171. Dr. Tolley's study also has *no* control group. NYS000434 (Sheppard Rebuttal Test.) at 29. As set forth *supra*, Dr. Sheppard rejected a hedonic analysis because the data were inadequate to establish a proper control group. By default, Dr. Tolley's "control" group consists of houses outside the five mile radius he drew around Indian Point, which is not consistent with good scientific method. *See* NYS000434 (Sheppard Rebuttal Test.) at 29. In essence, Dr. Tolley's study assumed that Indian Point had no disamenity impact beyond five miles but the "existence, or not, of a disamenity is precisely what the analysis is trying to discover, so to assume that none exists at some distance makes the analysis invalid, or at least contingent on the accuracy of the assumption, which then remains untested." NYS000434 (Sheppard Rebuttal Test.) at 29.

172. In addition, Dr. Tolley used some of his selected variables inconsistently. NYS000434 (Sheppard Rebuttal Test.) at 31. The variables used in a hedonic analysis are generally those that would be considered by a potential buyer. NYS000434 (Sheppard Rebuttal Test.) at 31-31. Specifically, Dr. Tolley calculated the distance of each home from IPEC plus that distance squared. But when calculating the distance of each home from a nearby amenity, a train station, Dr. Tolley calculated only the distance, not distance squared. NYS000434

(Sheppard Rebuttal Test.) at 31. In essence, Dr. Tolley assumed that the desirability of proximity to what is usually perceived as an amenity was linear while the desirability or lack thereof of being near to IPEC was non-linear. NYS000434 (Sheppard Rebuttal Test.) at 32. Dr. Tolley did not explain this assumption. NYS000434 (Sheppard Rebuttal Test.) at 32. And when the analysis is run treating IPEC and the rail station consistently (that is, calculating distance and distance squared for each), both distance and the square of distance are statistically significant and significantly alter Dr. Tolley's result. NYS000434 (Sheppard Rebuttal Test.) at 33. Had Dr. Tolley included distance squared from the nearest likely amenity (the train station), as he did for IPEC (the nearest likely disamenity), his result would have shown that property values decline to a distance of 1.04 miles from IPEC then begin to increase, "*exactly as would be expected if IPEC were an important source of disamenity that was suppressing property values.*" NYS000434 (Sheppard Rebuttal Test.) at 33 (emphasis added). Dr. Tolley did not explain his asymmetric treatment of the two variables, without which his results would have shown that the facility is a statistically significant disamenity.

I. Entergy's Expert Dismissed All Contrary Findings, Including His Own

173. Entergy's expert did a hedonic analysis that he claims shows that Indian Point positively impacts residential property values within 5 kilometers. To be able to make that claim, Dr. Tolley had to first dismiss those of his own findings that contradict the claim of NRC Staff and the applicant that the no action alternative would have only small (moderate in a subset of jurisdictions) socioeconomic impacts. Entergy's expert also dismissed Dr. Sheppard's work, testifying that "[i]n sum, Dr. Sheppard's conclusions are false. License renewal can be expected to increase property values. Dr. Sheppard's work contains multiple fundamental errors, each one of which would have to be refuted to be able to take his results seriously. Sloppiness of

theoretical and empirical procedures, technical errors and biases contribute further to inaccuracy of his estimates.” ENT000144 at 54. Dr. Sheppard, the Williams College Class of 2012 Professor of Economics, refuted Entergy’s criticisms, pointing out the errors, flaws or misapprehensions in Dr. Tolley’s critique of Dr. Sheppard’s work, as well as in Dr. Tolley’s original econometric work.

1. Dr. Sheppard Properly Defined the “Event” Whose Impact Should Be Measured as Commencement of Commercial Operations (1974-1976)

174. “In a license renewal proceeding, the no-action alternative involves examining the potential environmental impacts associated with denying the license renewal application instead of renewing the operating licenses for an additional 20-year period.” ENT000132 at 20 (Reamer, Cleary) (*citing* ENT00019B (NUREG-1555, Supp. 1, at 8.1-3)); NYS00133C at 8-20. Dr. Sheppard defined the “event” at issue as occurring between 1974 and 1976 (from the opening of Indian Point 2 through and including the opening of Indian Point 3). Tr. 2560:8-13 (McDade, J./Sheppard). In this way Dr. Sheppard was able to measure the impact of the no action alternative, which is what NYS-17B addresses. Tr. 2560-61 (Sheppard).

175. NYS-17B alleges that “[t]he FSEIS fails to address the impact of the continued operation of IP2 and IP3 for another 20 years on offsite land use, including real estate values in the surrounding area in violation of 10 C.F.R. §§ 51.71(a), 51.71(d), 51.95(c)(1), and 51.95(c)(4).” The no action alternative would result in the cessation of commercial operations. Jan. 24, 2011 State of New York Proposed Contention NYS-17B, ML110390250. To comply with NEPA, NRC Staff must evaluate the socioeconomic impacts of that cessation. To measure the impact of “cessation,” one must first know what impact “commencement” had. In other words, because “the continued operation” is the proposed action, a proper event study must

evaluate the impact “operation” had on property values. Dr. Sheppard’s study measured exactly that. Tr. 2560-2561 (Sheppard).

176. As Dr. Sheppard explained in his live testimony, the facility may have had additional disamenity effects in addition to the discrete effect that Dr. Sheppard measured (commencement of commercial operations) but that in no way means that commencement of commercial operations was not the relevant event for purposes of measuring the socioeconomic impacts that would result from the no action alternative. Tr. 2561-62 (Sheppard). A disamenity may have multiple components or occur in phases over time, including, for instance, an early diminution in property values when Indian Point was planned and the public became aware of it. Tr. 2562 (Sheppard).

What’s at issue here is not to evaluate those other sources of disamenity. That’s why I have adopted the methodology I have adopted. I’m trying to isolate just that part of the disamenity that is relevant for evaluating the No Action Alternative, and that means evaluating the cessation of commercial operation of IP2 and IP3.

Tr. 2562:3-9 (Sheppard). The real significance of a potentially “missed” disamenity is that it means Dr. Sheppard’s estimate of IPEC’s impact on property values is, if anything, too low. Because the no action alternative requires analysis of the economic impact of the cessation of commercial operation, Dr. Sheppard’s definition of the commencement of commercial operations as the “event” to be studied was correct.

2. Good Science Does Not Require the Hedonic Method

177. Perhaps Dr. Tolley’s most scathing criticism of Dr. Sheppard’s work⁸ was his choice of an event study, or paired sales measurement method, rather than the hedonic method that Dr. Tolley employed. First, as Dr. Tolley eventually conceded, Dr. Sheppard’s approach is

⁸ See n. 10.

not “unprecedented.” *Compare* ENT000144 at 35 (Sheppard methodology is “new and unprecedented”) *with* Tr. 2649:25-2650:1 (Tolley). Indeed, Dr. Tolley testified that one of the two non-hedonic analyses of the impact of a disamenity on property values sent to him by Dr. Sheppard was “excellent.” Tr. 2650:3-4 (Tolley); *see also* ENT000593 (*Measuring Environmental Effects on Property Values without Hedonic Regressions*, Palmquist, R. (1981)).

178. Second, and as previously set forth, Dr. Sheppard rejected a hedonic analysis in this case because, after reviewing the assessor data, he concluded the sample would not be large enough to allow a scientifically valid study. NYS000434 (Sheppard Rebuttal Test.) at 30. That Dr. Tolley’s sample comprised fewer than 300 properties that were merely offered for sale on a single date in July 2011 suggests that Dr. Sheppard’s concerns were well founded. The paired sales methodology also permitted the measurement of what would happen to property values if the no action alternative were implemented. Tr. 2562:3-15 (Sheppard); Tr. 2557:18-20 (Sheppard). Because a hedonic methodology would not permit such a precise inquiry, even if the data were available (which they were not), Dr. Sheppard chose a “cleaner” design that is well documented in the literature and has been used to measure the impact of disamenities by other scholars. *See, e.g.*, ENT000593 (*Measuring Environmental Effects on Property Values without Hedonic Regressions*, Palmquist, R. (1981); Tr. 2650:3-4 (Tolley) (testifying that one of the non-hedonic analyses of the impact of a disamenity on property values was “excellent”). The applicant’s criticisms of Dr. Sheppard’s work are without merit.

3. Entergy’s Expert Also Rejected His Own Findings When Necessary

When His Own Study Showed that Property Values in the Areas Immediately Surrounding Indian Point were Depressed, Dr. Tolley Attributed it to an “Unobserved Variable”

179. Even worse than Dr. Tolley's meritless attacks on Dr. Sheppard, however, is his willingness to dismiss those of his own results that undermine his conclusions. *See* ENT000144 at 22 (describing as "anomalous" his own finding that Indian Point is a disamenity that depresses property values); ENT000132 at 75-76 (Tolley); ENT000592 at 12.

180. Entergy's expert conducted an original econometric analysis that, he says, shows that Indian Point has no impact on property values. In fact, however, Dr. Tolley's original research shows that distance to the facility is both statistically significant and adverse. ENT000132 at 75 (Tolley) ("the coefficient of Distance to IPEC Squared is positive" and "at greater distances, the plant becomes a disamenity and, in fact, the disamenity effect increases the farther the property is from the plant"); *see also* ENT000144 at 22. Dr. Tolley's results "show that for property in an area of about 12.5 square miles, proximity to IPEC might be desirable, while for properties in a much larger area of 66 square miles, IPEC appears to depress property values. For those properties the "no-action" alternative would be likely to lead to eventual increase in property values and potentially important land use changes." NYS000434 at 22 (Sheppard). Dr. Tolley characterized his own result as "anomalous" and attributed it to "the presence of an unobserved variable." ENT000132 at 75-76; ENT000592 at 12. Dr. Tolley's finding is not anomalous: it is in fact evidence that: "a sustained and substantial drop in housing value occurs because of [a] a house's proximity to the plant[, which] . . . may be evidenced by a gradual increase in housing value with increasing distance from the plant." NRC000002 (GEIS) (NYS00131B) § 4.7.1.1 (defining "large" impact to housing).

181. What Dr. Tolley finds anomalous is that house values increase *at an increasing rate* as they get further from the plant. ENT000132 at 75; ENT000144 at 21-22; ENT000592 at 12; Tr. 2595:10-2596:6 (Tolley). In other words, the facility's disamenity effect increases with

distance and buyers are willing to pay more to be located further from Indian Point. Dr. Tolley finds the notion that willing buyers would pay more to be further from the facility unacceptable. He therefore dismisses it out of hand, finding it to be “counterintuitive. It doesn’t make economic sense. That’s not the way people behave. And we have all kinds of -- otherwise we’d be eating oranges out of our ears if we started consuming oranges like this.” Tr. 2595:20-23; ENT000592 at 12 (finding is “completely contrary to the well-understood principle that any disamenity becomes a lesser concern—not a greater concern—at greater distances”) (Tolley).

182. Unwilling to accept that Indian Point caused the diminution in value and unable to identify any other nearby disamenity, Dr. Tolley blames the diminution in value shown by his own study on “the presence of some unobserved variable—some other non-Indian Point amenity or disamenity—that is influencing property values in the area.” ENT000592 at 12; Tr. 2596:4 (ascribing problematic results to “omitted variable bias”). Dr. Tolley added that “No evidence exists, however, that this unobserved variable is somehow masking a large significant adverse Indian Point property value impact.” ENT000592 at 12-13. Of course, no one but Dr. Tolley has suggested that an unobserved variable even exists, much less that one exists *and* is “masking Indian Point’s impact.” Dr. Tolley’s testimony on this point is entitled to no weight.

183. Dr. Sheppard identified several possible explanations for Dr. Tolley’s finding that the few houses located close to the facility might be worth more. The likeliest explanation is that the finding is the consequence of imprecision in Dr. Tolley’s study, is simply wrong, and Indian Point is *not* an amenity even for houses located less than 2 miles away. NYS000434 at 24. As set forth in Dr. Sheppard’s report, very few houses are located less than 2 miles away from the facility. *Id.* at 33-34.

184. This prospect is raised, but ignored, by Dr. Tolley himself. As set forth in Dr. Tolley's report, ENT000144, "If the linear term is ignored because it is statistically insignificant and the statistically significant squared term is retained, distance is everywhere a disamenity." ENT000144 at 21.

185. The applicant's expert has employed a distance variable that is statistically insignificant. "What this means in plain English is that Dr. Tolley's estimates cannot reject the hypothesis that[,] within the range covered by his sample, house prices unambiguously *increase* as distance from IPEC is increased" (emphasis added). In other words, as Dr. Tolley himself acknowledged, if he had employed in his analysis only functional form terms that were statistically significant, instead of his preferred but statistically insignificant linear form, "distance is everywhere a disamenity." ENT000144 at 21.

186. What Dr. Tolley "really means to say is that IPEC [not the euphemistic "distance"] is everywhere a disamenity in this case." NYS000434 at 35.

187. Dr. Tolley did not deny that Dr. Sheppard correctly translated his concession that the facility depresses property values of all houses, near or far. *See* NYS000592 at 1-30. Instead, Dr. Tolley rebutted Dr. Sheppard's speculation that Indian Point workers might be willing to pay a premium to live closer to their workplace. NYS000434 at 23. Dr. Tolley testified that the facility employs so few workers that their choice of housing could not possibly explain why someone would be willing to pay more to live within 2 miles of the facility. ENT000592 at 13 (Tolley); Tr. 2597:3-10 ("there are so few people who work in this plant, so few people who work in the plant who live anywhere near close to it, that 10 or 20 people living in the Town of Buchanan or something, which is what it would be," could have no impact on property values).

188. Dr. Tolley liked Dr. Sheppard’s third possible explanation for his problematic finding even less. Dr. Sheppard “pointed out Dr. Tolley’s concern that house values continued to increase *at an increasing rate* as distance from the facility increased was due to the functional relationship between house price and distance from the facility. The functional relationship — linear or quadratic (squared) is imposed by the investigator — in this case, Dr. Tolley himself. See NYS000434 at 36.” NYS000465 ¶ 5 (Sheppard).

Importance of Functional Form

189. As both expert economists testified, economists often “consider alternative functional forms.”⁹ Tr. 2601:8 (Sheppard); ENT000144 at 22, 49 (Tolley report noting that “[s]ensitivity tests were run with alternative functional forms”).

190. Dr. Tolley concludes that proximity to Indian Point has no impact whatsoever on property values

because of the analysis that he describes as “quadratic” by which he means using the linear distance and the square of distance together in the hedonic analysis. This “quadratic” approach is how Dr. Tolley has chosen to characterize proximity to IPEC, but it is not the only way nor even the most frequently used way of measuring proximity. If Dr. Tolley were to use linear distance alone, or the square of distance alone, or the square root of distance (as I have suggested) alone, he would have to conclude, as I do (and as common sense suggests), that Indian Point’s commercial operations have a statistically significant impact on nearby residential property values. Dr. Tolley tells us in his report and in testimony that he considered other approaches to proximity. He appears to have very carefully selected the one approach that provides partially ambiguous estimates of the impact of IPEC on property values, and even his quadratic

⁹ In this context functional form refers to the algebraic form of a relationship between a dependent variable and regressors (or explanatory variables). For example, the price of a good may be assumed to be equal to the sum of constants multiplied times the value of the explanatory variables, or constants times the values of those variables raised to some power, or both. Economists use a variety of functional forms to measure impacts of suspected amenities or disamenities and, in this case, “to determine whether adverse property value impacts are associated with Indian Point.” ENT000592 at 3 (Tolley).

estimates show that property values rise proportional to the square of distance, and that this increase is statistically significant.

NYS000467 at 7-8 (Sheppard Suppl. Rebuttal Test.).

191. In this case, as Dr. Sheppard explained, “[s]ubstituting square root of distance in place of distance and distance squared” results in a model that “conforms well to the impact that Dr. Tolley illustrates in figure 1 [of his report [ENT000144 at 20]].” *Id.* In other words, changing the functional form assumed in Dr. Tolley’s analysis – which is nothing more than looking at the results from a different perspective – reveals that Dr. Tolley and Dr. Sheppard’s results are consistent: they both show that the facility is a statistically significant disamenity. NYS000434 at 36-37.

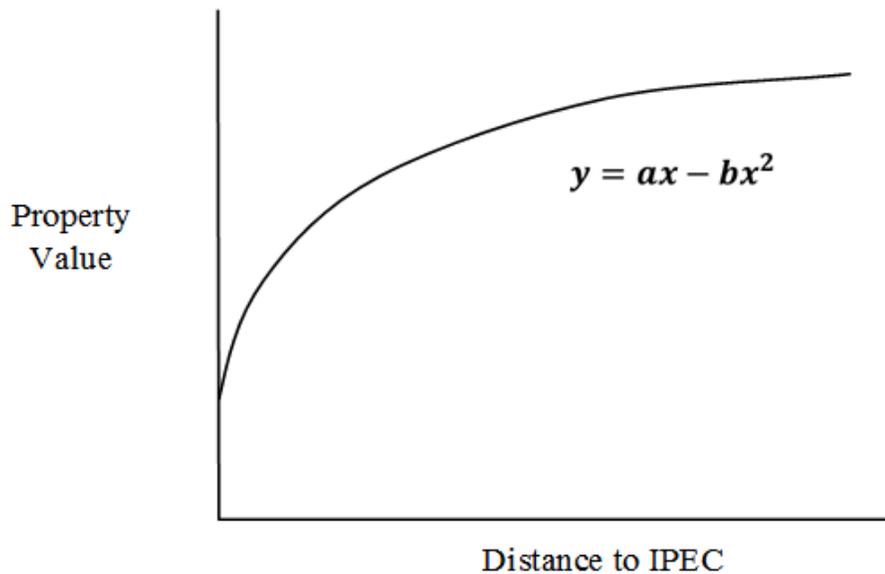
192. Indeed, the degree of agreement between the hedonic regression and the paired sales regression is remarkable. Dr. Tolley’s data imply that property values are depressed by about 25% while Dr. Sheppard’s data imply a diminution of about 27%. NYS000434 at 38. Like Dr. Sheppard’s analysis, that of Dr. Tolley reveals a substantial disamenity that is depressing property values within the area immediately surrounding the facility.

193. Unlike Dr. Sheppard, however, Dr. Tolley attributes the diminution to an “unobserved variable,” ENT000144 at 22, rather than to the neighboring electric generating facility described by its owner as a “brownfield” that blocks public access to the Hudson River, from which it is also visible; is audible; is surrounded by fencing, transmission lines, and security guards; and is polluting both the Hudson River and groundwater with strontium and tritium. Despite all of this, Entergy’s expert claims that Indian Point increases property values. ENT000144 at 54. Dr. Tolley’s testimony on this point deserves no weight.

Entergy's Expert Cannot Explain His Choice of Functional Form

194. In Figure 1 of his March 2012 report, Dr. Tolley illustrates the relationship that one would see between property values and distance to IPEC “if Dr. Sheppard’s hypothesis is true,” that is, “that proximity to IPEC depresses property values.” ENT000144 at 20. Dr. Tolley’s Figure 1 is reproduced below.

Figure 1: Distance Relationship Expected if Nuclear Plant is a Disamenity



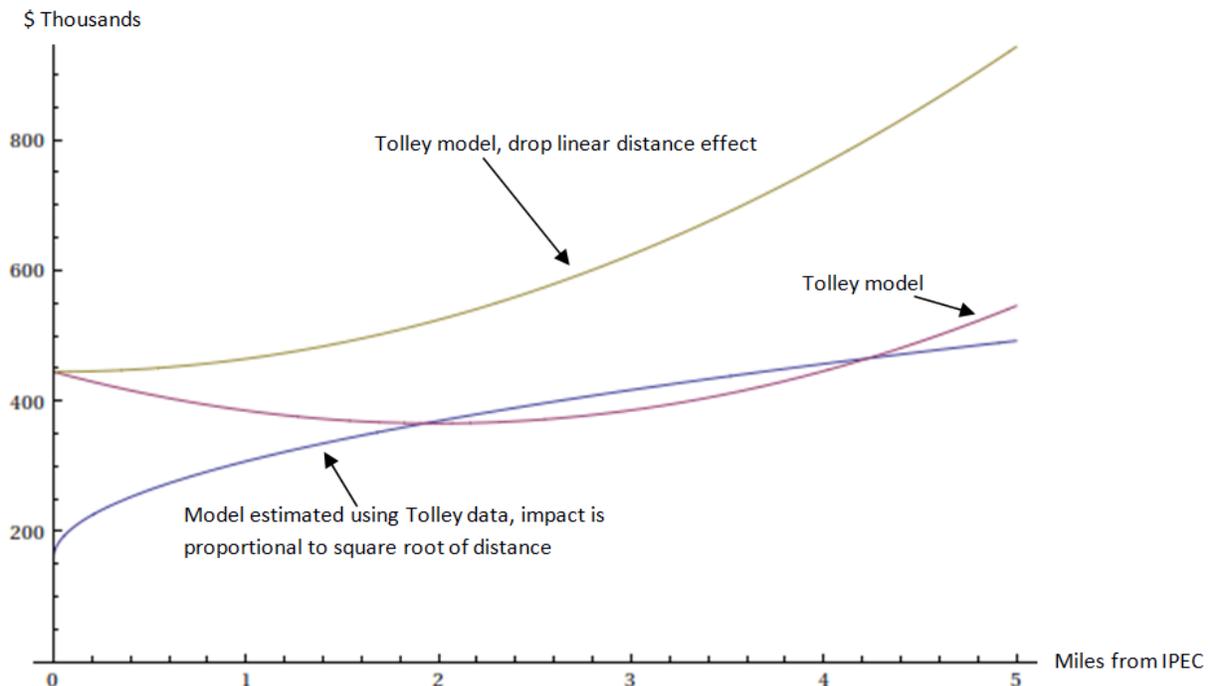
195. As Dr. Tolley explained,

[t]he figure depicts the effect of a positive coefficient of Distance to Indian Point and a negative coefficient of Distance to Indian Point Squared. Property values increase moving away from the plant, reflecting the lessening of the negative impact of the supposed disamenity the farther away a property is from the plant. The property value increase is reflected in the positive coefficient of Distance to Indian Point in the regression. The impact of an increase in distance from the supposed disamenity gradually diminishes as the plant becomes a lesser concern at greater distances. The diminishing impact is imparted by the negative coefficient of Distance to Indian Point Squared. The positive slope of the relation between property value and distance from the plant diminishes as distance

becomes greater. Eventually a maximum is reached where the distance is so great that there is no longer an effect of the disamenity.

ENT000144 at 20.

196. Dr. Sheppard pointed out that if Dr. Tolley had considered using the non-linear functional form “square root of distance” instead of the linear form “distance” plus “distance squared,” he would have found that “[t]he resulting model fits the data essentially as well as the model presented in Dr. Tolley’s report, and the estimated parameter associated with the square root of distance is estimated with such precision that it is statistically significant.” NYS000434 at 38 (Sheppard). To show what he meant, Dr. Sheppard used the non-linear functional form square root of distance instead of distance plus distance squared (Dr. Tolley’s preferred functional form). Dr. Sheppard produced the following graph.



NYS000435; *see also* NYS000434 at 34.

197. Dr. Sheppard explained that “[u]sing this model to predict the value of an average house at various distances produces the blue line in the figure, labeled “Model estimated using

Tolley data, impact is proportional to square root of distance.” The blue line shows house values at distance zero of about \$158 thousand, increasing to nearly \$492 thousand at a distance of 5 miles. The blue line takes approximately the same shape as the line in Dr. Tolley’s Figure 1 and thus “conforms well to the impact that Dr. Tolley illustrates in figure 1 (page 20) as supporting [Dr. Sheppard’s] hypothesis that IPEC is the source of a disamenity.”

198. “Thus it appears that Dr. Tolley’s data are consistent with [Dr. Sheppard’s] analysis. He just did not see this because while he claims to have considered some alternative specifications, he apparently failed to consider this obvious and simple alternative.” NYS000434 at 36-37 (Sheppard).

199. In response to Judge Wardwell’s question about the square root of distance functional form, “But why wouldn’t you use it?,” the applicant’s expert did not explain why the square root functional form was inappropriate. *See* Tr. 2608:16-17. To the contrary, he conceded that “[t]heoretically,” the square root functional form “does work.” Tr. 2608:23 (Tolley).¹⁰ Instead, Dr. Tolley claimed that “What you have to do when you’re interpreting with regressions is think sensibly. You don’t just mechanically run the regression. You think sensibly about what the results mean. And if they don’t make economic sense you throw them out. You’re not going to be a slave to a statistician. A statistician has wonderful tools. The statistician doesn’t know how to think about the sense of these, or the common sense of these.” Tr. 2596:7-15 (Tolley).

200. Faced with evidence that Indian Point depresses property values, Entergy’s expert advocates throwing out the results on the flimsy ground that they don’t make “economic sense.”

¹⁰ Dr. Tolley also described the square root form as “highly unusual,” ENT000592 at 6, “rare,” *id.* at 9, the result of “cherry picking,” *id.*; *see also* Tr. 2608:23-09:04 (Tolley), and used only in a “paltry” handful of published hedonic studies, *id.* at 5; Tr. 2609:25 (Tolley).

Given that Dr. Tolley described his own results as so “unexpected” (ENT000144 at 22) that he had to postulate an omitted or unobserved variable to try to make sense of his own findings, this is particularly unsettling and entitles the testimony to no weight.

201. There is no omitted or unobserved variable. As demonstrated by the independent expert work of economists from the University of Chicago and Williams College, and consistent with the site-specific experience of municipal officials and real estate professionals in Westchester County, Indian Point depresses residential property values to a “large” and destabilizing degree. *See supra*, ¶ 157; *see also* NYS000224 at 40.

4. PILOT payments

202. Dr. Tolley has repeatedly criticized Dr. Sheppard for failing to take into account the allegedly positive impact of the PILOT payments that the applicant pays. *E.g.*, ENT000144 at 7; ENT000132 at 93 (Cleary, Reamer, Tolley); ENT000592 at 4. As previously set forth, Dr. Tolley’s criticism has no merit. Not only does the applicant concede that PILOT payments are statistically insignificant but the paired sales analysis accounts for any amenity or disamenity associated with the facility, including PILOT payments (a presumed amenity).

203. Dr. Sheppard’s analysis shows that a home purchased before the facility commenced commercial operation but sold after operation commenced and also after PILOT payments commenced would still experience a below normal rate of price appreciation. In other words, the facility depresses property values *despite* the PILOT payments (and despite any other positive attribute the facility might have). NYS000434 at 41 (“the disamenity burden is so great that it OVERWHELMS the benefits of PILOT payments”). NYS000434 at 41.

204. Dr. Tolley’s criticism is baseless for a second reason: his own analysis of local property markets shows that the impact of PILOT payments is statistically insignificant.

NYS000434 at 40-41; ENT000144 at 17; Tr. 2641:16-17 (Tolley). Thus, even if Dr. Sheppard had failed to account for PILOT payments, which he did not, Dr. Tolley has conceded that the payments are statistically insignificant and cannot be distinguished from zero. Tr. 2641:15-17 (Tolley) (“But it’s true. In my hedonic analysis, it was not statistically significantly different from zero”); *id.* at 2716:5 (Tolley) (same).

205. When asked to explain his conviction that PILOT payments matter despite the evidence to the contrary, Entergy’s expert said, “we have to not be a slave to the statistics. If we look at a great body of literature, started with Oates and people probably about 1970, they established very clearly that taxes, local taxes do get passed through, and they are borne by the property owners in the -- where the taxes are levied. So if you don’t accept this, you don’t accept the body of received public finance literature on this point, and we have to look at this as reasonable human beings, as an economist, that there is such an effect, if we believe the literature.” Tr. 2641:21-2642:6 (Tolley).

206. The applicant’s expert again rejects actual site-specific evidence on the flimsy ground that it is contrary to “the body of received public finance literature on this point.” Notably, the actual site-specific evidence that PILOT payments have little or no impact is consistent with the testimony of Entergy witness Donald Cleary, who testified that “population levels and land use conditions in the Town of Cortlandt, Village of Buchanan, and Westchester County *have not changed significantly since Entergy started making payments to local jurisdictions.*” ENT000132 at 58 (Cleary) (*citing* FSEIS at 4-46 (NYS00133B) (emphasis added)).

5. Discount rate

207. Dr. Tolley criticized Dr. Sheppard for using a 4% rather than 7% discount rate. ENT000132 at 98-99 (Tolley); ENT000144 at 26-27 (7% is the conservatively low rate preferred by NRC guidance). Because Dr. Sheppard applied no discount rate in his final report (and none was needed), it appears that Dr. Tolley confused the analysis presented in Dr. Sheppard's February 26, 2009 report (NYS000227)¹¹ with that in his final December 2011 report (NYS000231). Dr. Sheppard applied *no* discount rate in his final report because he used "the actual change in house prices in the broader region as a basis for estimating the impact of removing the IPEC disamenity" identified by both economists. Because IPEC's impact was evaluated as of a particular date (January 2011), no discount at all is required. NYS000434 at 43. Dr. Tolley errs in his belief that Dr. Sheppard applied a discount rate in his final report.

6. Dr. Sheppard's Analysis Included Renters

208. Dr. Tolley faults Dr. Sheppard for failing to account for renters. ENT000132 at 98-99 (Tolley); ENT000144 at 30. But the paired sales approach plainly accounts for all facets of the residential market, including renters. Tr. 2653-2654 (Sheppard); NYS000231 at 11 ("As a first step, I use 2000 census data to estimate the total value of residential property within 5 kilometers of IPEC. I consider all census block groups whose center lies with the 5 kilometer boundary. Census surveys provide owner estimates of the market value of owner-occupied properties and of the values of monthly contract rent. I capitalize rents at an annual rate of 5% to estimate the value of rental property and sum the estimated rental property value and owner-occupied property values to get a total for residential property in the block group").

¹¹ Dr. Sheppard considered in the 2009 report "the impact of delay in receipt of benefits, examining a range of discount rates up to and including the 7% rate that Dr. Tolley likes." NYS000434 at 42-43.

209. Dr. Tolley's criticisms of Dr. Sheppard's work are without merit and entitled to no weight.

VI. CONCLUSIONS OF LAW

210. The FSEIS fails to address the impact of the continued operation of IP2 and IP3 for another 20 years on offsite land use, including real estate values in the surrounding area in violation of 10 C.F.R. §§ 51.71(a), 51.71(d), 51.95(c)(1), and 51.95(c)(4).

Indian Point has a considerable impact on property values in the area surrounding the facility, which exerts a large socioeconomic influence on housing and offsite land use. The failure of the Final Environmental Impact Statement to consider property values renders its conclusions about socioeconomics, including offsite land use and housing, invalid.

NYS000434 at 5.

211. NRC Staff failed to analyze reasonably foreseeable socioeconomic impacts on housing and offsite land use because they failed to consider the impact of the facility and the no action alternative on housing. A site specific study conducted by the Stephen C. Sheppard, Ph.D., demonstrated "to a reasonable degree of scientific certainty, that IPEC reduced the value of residential housing services provided by properties within 5 kilometers of the IPEC facility, and that the reduced value of residential services was not compensated for by reduced required property tax payments on residential property." NYS000231 at 9. This finding is consistent with many other studies, including non-hedonic studies. *See, e.g.,* ENT000593 (*Measuring Environmental Effects on Property Values without Hedonic Regressions*, Palmquist, R. (1981)). Moreover, Dr. Sheppard's finding is not inconsistent with the econometric analysis done by Entergy's expert.

212. An increase in property values of 27% (or 25%) would be positive but destabilizing. *See* NYS000224 at 40 (describing impact on national economy of 16% drop in property values).

213. But even if Dr. Sheppard's work were fatally flawed, which it was not, and even if Dr. Tolley's results were inconsistent with Dr. Sheppard's, which they were not, NRC Staff did not meet its burden. First, "*post hoc* rationalizations are inherently suspect, and in any event are no substitute for the agency's following statutorily mandated procedures." *Dubois*, 102 F.3d at 1289. That suspicion is fully justified here, where Dr. Tolley has not only rejected contrary findings by another eminently qualified economist but has also tried to dismiss his own unhelpful results.

214. Second, the FSEIS cannot be said to have "[r]igorously explore[d or] . . . objectively evaluate[d] all reasonable alternatives. *Pa'ina Hawaii, LLC* (Materials License Appl.), CLI-10-18, 72 N.R.C. 56 (Jul. 8, 2010), 2010 N.R.C. LEXIS 28. There can be no dispute that a hard look requires that NRC Staff quantify the impact of the proposed action (license renewal), as well as the impact of the no action alternative (denial of the license renewal application), on property values: "A large impact [on housing] may also result if a sustained and substantial drop in housing value occurs because of the house's proximity to the plant. Such impacts may be evidenced by a gradual increase in housing value with increasing distance from the plant." NRC000002 (GEIS) (NYS00131B) § 4.7.1.1 (emphasis added).

215. The 2005 Levitan report plainly put NRC Staff on notice that property values might increase if license renewal were denied. Yet NRC Staff did no further analysis or investigation. NRC Staff's citation to the 2005 report, which indicated neither the magnitude of the effect nor whether it would be positive or negative," does not constitute the "hard look"

required by NEPA. “[G]eneral statements about possible effects and some risk . . . [do not] constitute a hard look absent a justification regarding why more definitive information could not be provided.” *Western Watersheds Project*, 632 F.3d at 491 (quoting *Blue Mtns. Biodiversity Proj. v. Blackwood*, 161 F.3d 1208, 1213 (9th Cir. 1998)). “[W]ithout explanation or analysis,” “[t]he current FEIS gives only cursory attention to the property-values issue” and is therefore “deficient on its face.” *Louisiana Energy Svces., LLC* (Claiborne Enrichment Ctr.), 47 N.R.C. 77, 1998 N.R.C. LEXIS at *43.

216. Nor does NRC Staff’s attempt to bootstrap Appendix C to the 1996 GEIS into serving as the required site specific analysis cure the defect. Even if the Appendix C could serve as a site specific analysis, which it cannot, like the Levitan report, it does not constitute the “hard look” required by NEPA. After failing to follow up on the Levitan warning that property values might rise without the plant, NRC Staff willfully ignored evidence the evidence in Appendix C, provided by local realtors and municipal officials, that the plant was in fact adversely impacting property values. See NRC000002 (GEIS) (NYS00131G) at § C.4.4.2.1. A “final EIS must include ‘a discussion of adverse impacts that does not improperly minimize negative side effects.’” *Western Watersheds Project*, 632 F.3d at 491 (quoting *Earth Island Inst. v. U.S. Forest Serv.*, 442 F.3d 1147, 1159 (9th Cir. 2006), *abrogated on other grounds by Winter v. NRDC, Inc.*, 555 U.S. 7 (2008)). A hard look requires more than cursory research and does not include sweeping negative evidence under the proverbial rug. See *National Audubon Socy. v. Department of the Navy*, 422 F.3d 174, 181 (4th Cir. 2005).

217. Had NRC Staff taken the hard look that NEPA requires, it would have learned that, in fact, Indian Point is a disamenity that depresses property values now, just as it did when it commenced commercial operations, and, in 1996 when local realtors and elected officials

confirmed it. The work of two highly regarded academic economists confirms that Indian Point depresses property values. As set forth in the GEIS, the no action alternative would have LARGE impacts on housing. *See* NRC000002 (GEIS) (NYS00131B) § 4.7.1.1 (“A large impact may also result if a sustained and substantial drop in housing value occurs because of the house’s proximity to the plant. Such impacts may be evidenced by a gradual increase in housing value with increasing distance from the plant”).

218. After observing that property values might increase, NRC Staff made no effort to investigate the actual or likely impact of the no action alternative on housing.

Q.23. Did the Staff address the impact of the no-action alternative on offsite property values for the area around Indian Point?

A.23. (ALS) Yes. In FSEIS Section 8.2, No-Action Alternative, Socioeconomics subsection on page 8-24 to 8-25, the Staff indicated that the shutdown of IP2 and IP3 may result in increased property values of the homes in the communities surrounding the site, and relied on an assessment performed by Levitan and Associates, Inc., in 2005 for Westchester County. (NYS000056).

NRC000081 at 19 (Stuyvenberg). FSEIS § 8.2 concludes that the socioeconomic impacts of the no action alternative would be small except in the Hendrick Hudson Central School District, Village of Buchanan, Town of Cortlandt, and the Verplanck Fire District taxing jurisdictions. As to those jurisdictions, NRC Staff concluded that the socioeconomic impacts would be MODERATE because of lost tax revenue and PILOT payments. NRC000004 (FSEIS) (NYS00133C) § 8.2.

219. In order to reach this conclusion, NRC Staff simply ignored the comments by those local realtors and elected officials who believe that the facility depresses property values. NRC000002 (GEIS) (NYS00131G) at § C.4.4.2.1 (“occasionally an outside buyer is deterred from the area because of the plants”); *id.* (“one realtor maintains that more development in communities neighboring Indian Point would have occurred had it not been for Indian Point”);

id. (“Representatives of the Westchester County Office of Community Development believe otherwise, however, and indicated that the presence of the plant perpetuated the image of these communities being low to middle class”). NRC Staff’s conclusions that, “[i]n summary, it appears that neither construction nor operation of the Indian Point plants has considerably affected housing in the communities neighboring the plants or in the whole of Westchester and Dutchess counties” is the kind of “unsupported reasoning” that NEPA does not countenance. *Entergy Nuclear Gen. Co. (Pilgrim Nuclear Power Sta.)*, CLI-10-11, 71 N.R.C. 287, 315 (Mar. 26, 2010); *see also Sierra Club*, 772 F.2d at 1049 (*citing Silva v. Lynn*, 482 F.2d 1282, 1285 (1st Cir. 1973)).

220. Dr. Sheppard testified that his study provided a decisionmaker with critical information: the economic impact of the no action alternative would mean an additional billion dollars to the homeowners and their municipalities beginning in 2015 rather than twenty years later. Tr. 2565:9-16 (Sheppard). Had NRC Staff investigated and quantified the impact of the no action alternative on property values, it would have concluded that the no action alternative would have a LARGE, “significant,” and positive but destabilizing, impact on housing. The failure to do so violates NEPA. *See, e.g., Western Watersheds Project*, 632 F.3d at 491; *Davis Mtns.*, 116 Fed. Appx. at *8.

221. The State raised this precise omission in its comments on the DEIS yet NRC Staff failed to address it. For this reason, too, NRC Staff has violated 10 C.F.R. § (“[t]he final environmental impact statement will discuss any relevant responsible opposing view not adequately discussed in the draft environmental impact statement or in any supplement to the draft environmental impact statement, and respond to the issues raised”).

Under the National Environmental Policy Act, the Appropriate Remedy for a Deficient Environmental Impact Statement is for the Atomic Safety and Licensing Board to Remand the Matter to NRC Staff to Perform a Reanalysis of Site-Specific Environmental Impacts and Prepare a Revised and Supplemental Environmental Impact Statement

222. The assertion by Entergy and NRC Staff that a deficient FSEIS can be cured after the fact by submissions of NRC Staff, the applicant, or interveners during the adjudicatory hearing pursuant to Atomic Energy Act (“AEA”) § 189 (42 U.S.C. § 2239) is incorrect. First, the suggestion is inconsistent with federal regulations that emphasize the importance of the EIS itself, as well as the public’s right to review and participate in the process. Nor does any NRC regulation expressly authorize licensing boards themselves to fix or supplement a deficient FSEIS. Moreover, NRC regulations provide a specific means to supplement an FSEIS—a process similar to that used to prepare an EIS in the first instance. 10 C.F.R. § 51.92. Having promulgated a regulation for supplementing an FSEIS, NRC is bound by it. Further, the Commission’s deliberate elimination of an earlier regulation that permitted licensing boards to “modify the content” of an EIS precludes any suggestion that *post hoc* supplementation by the Board might be available to cure deficiencies in the challenged FSEIS. Finally, federal courts have consistently recognized that when an EIS is deficient, NEPA requires it be remedied by remanding the proceeding to the administrative agency to re-initiate the EIS process.

223. NEPA directs agencies contemplating “major [f]ederal actions significantly affecting the quality of the human environment” to prepare an EIS demonstrating agency consideration of the reasonably foreseeable environmental effects. *Brodsky v. U.S. Nuclear Regulatory Comm’n*, 704 F.3d 113, 119 (2d Cir. 2013) (citing 42 U.S.C. § 4332(2)(C)). The statute’s implementing regulations “identify public scrutiny as an ‘essential’ part of the NEPA process, 40 C.F.R. § 1500.1(b) (‘Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA’).” *Brodsky*, 704 F.3d at 120. Accordingly,

NEPA regulations “provide that ‘NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken.’” *Brodsky*, 704 F.3d at 120 (*quoting* 40 C.F.R. § 1500.1(b)). “In addition to providing crucial information to the decisionmaker, NEPA also ‘guarantees that the relevant information will be made available to the larger audience that may also play a role in both the decisionmaking process and the implementation of that decision.’” *Sierra Club v. Watkins*, 808 F. Supp. 852, 858 (D.D.C. 1991) (*quoting Methow Valley*, 490 U.S. at 349). That “larger audience” clearly includes the public. *Id.*

224. NRC’s regulations show that an environmental impact statement is of critical importance in an environmental review under NEPA. 10 C.F.R. § 51.70 (general requirements for draft EIS); 10 C.F.R. § 51.71 (describing contents of draft EIS); 10 C.F.R. § 51.72 (supplement to draft EIS); 10 C.F.R. § 51.73 (comments on draft EIS); 10 C.F.R. § 51.74 (distribution of draft EIS); 10 C.F.R. § 51.90 (preparation of final EIS after receipt of comments on draft EIS); 10 C.F.R. § 51.91 (contents of final EIS); 10 C.F.R. § 51.92 (supplementation of final EIS); 10 C.F.R. § 51.93 (distribution of final EIS); 10 C.F.R. § 51.94 (Commission obligated to consider the final EIS); 10 C.F.R. § 51.95(a) (supplement to final EIS “will include a request for comments as provided in § 51.73”); 10 C.F.R. § 51.95(c) (EIS for license renewal stage); 10 C.F.R. § 51.100(a)(1)(i),(ii) (prohibiting Commission action until after draft or final EIS filed with the Environmental Protection Agency). NRC’s regulations further recognize that “[a]n appendix to an environmental impact statement [itself] will . . . [n]ormally consist of material which substantiates any analysis fundamental to the impact statement.” 10 C.F.R. Part 51, Subpart A, Appendix A, 9(b) (format for presentation of material in EIS).

225. Nothing in the NRC’s regulations expressly permits testimony or exhibits from an adjudicatory hearing to supplement an environmental impact statement. To the contrary, regulatory history confirms that the Agency lacks the power to “deem modified” an otherwise inadequate EIS. In 1980, NRC initiated a comprehensive revision to the NEPA regulations, which it “inherited” from the Atomic Energy Commission. *Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions and Related Conforming Amendments*, 45 Fed. Reg. 13,739 (Mar. 3, 1980). As part of that regulatory revision, NRC eliminated an earlier version of 10 C.F.R. § 51.52, which had provided that:

an initial decision of the presiding officer may include findings and conclusions which affirm or modify the content of the final environmental impact statement prepared by the staff. To the extent that findings and conclusions different from those in the final environmental statement prepared by the staff are reached, the statement will be deemed modified to that extent and the initial decision will be distributed as provided in § 51.26(c).

10 C.F.R. § 51.52 (1975 version) (emphasis added). The rulemaking was finalized in 1984.

Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions and Related Conforming Amendments, 49 Fed. Reg. 9,352 (Mar. 12, 1984).

226. NRC’s current NEPA-implementing regulations require a formal supplement to the FSEIS: “NRC staff will prepare a supplement to a final environmental impact statement . . . if . . . [t]here are new and significant circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.” 10 C.F.R. § 51.92(a)(2). The regulations require that a draft supplement be circulated for public review and comment and that NRC Staff must address the comments before NRC Staff may issue a final document. *See* 10 C.F.R. § 51.92(d) (“The supplement to a final environmental impact statement will be prepared in the same manner as the final environmental impact statement except that a scoping process

need not be used.”); § 51.92(f)(1) (“A supplement to a final environmental impact statement will be accompanied by or will include a request for comments . . .”). “[J]udicial ‘review of administrative choices under NEPA . . . focuses primarily on the procedural regularity of the decision,’ rather than on its substance.” *Brodsky*, 704 F.3d at 118 (quoting *Sierra Club*, 772 F.2d at 1055).

227. Thus, when NRC established an ASLB under AEA § 189 and referred the Indian Point relicensing to that Board, the referral cited to 10 C.F.R. §§ 2.104, 2.300, 2.303, 2.309, 2.311, 2.318, and 2.321—provisions that give the Board no authority to amend, modify, or correct NRC Staff’s FSEIS. *Establishment of Atomic Safety and Licensing Board*, 72 Fed. Reg. 60,394 (Oct. 24, 2007). Rather, the Board is charged with ruling on, among other things, whether or not the Staff complied with NEPA in the FSEIS.

228. Courts have consistently held that a supplemental NEPA analysis, prepared by agency staff and open to public comment, is the appropriate remedy for a NEPA violation. Materials prepared after the FSEIS are not a substitute for supplementation and recirculation for public comment. “[S]udies [prepared after the EIS was finalized] could not cure these particular inadequacies because they were [not included in an EIS supplement and were] not circulated for review and comment in accordance with procedures established to comply with NEPA.” *I-291 Why? Ass’n v. Burns*, 517 F.2d 1077, 1081 (2d Cir. 1975); accord *Brodsky*, 704 F.3d at 120 (“NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken.”) (quoting 40 C.F.R. § 1500.1(b)).

229. Likewise, the First Circuit has found “no indication in the [NEPA] statute that Congress contemplated that studies or memoranda contained in the administrative record, but not

incorporated in any way into an EIS, can bring into compliance with NEPA an EIS that by itself is inadequate.” *Grazing Fields Farm v. Goldschmidt*, 626 F.2d 1068, 1072 (1st Cir. 1980) (finding that even if agency staff made an informed, good faith decision to reject a proposed alternative, staff had nonetheless violated NEPA’s procedural mandate by failing to explain that decision in the EIS). The Ninth Circuit, too, has made clear that “a non-NEPA document . . . cannot satisfy a federal agency’s obligations under NEPA.” *South Fork Band Council of W. Shoshone v. U.S. Dep’t of Interior*, 588 F.3d 718, 726 (9th Cir. 2009) (citing *Klamath-Siskiyou Wildlands Ctr. v. BLM*, 387 F.3d 989, 998 (9th Cir. 2004)). And the Tenth Circuit declined to consider an affidavit concluding that environmental impacts were adequately analyzed because “no such conclusion was recorded in any NEPA document prior to the [agency action]” and it “is a post hoc analysis that does not satisfy the NEPA.” *Pennaco Energy v. U.S. Dep’t of Interior*, 377 F.3d 1147, 1159 (10th Cir. 2004).

230. Furthermore, when an EIS is found deficient, courts often enjoin the agency action at issue until the supplement is completed, in order to ensure that the agency takes the supplemental information into consideration in its final decision. In *Natural Resources Defense Council v. Callaway*, the Second Circuit held:

The Navy should not be permitted to proceed with further dumping at the New London site until . . . the serious deficiencies in the EIS [are] remedied. Otherwise application of a “rule of reason” would convert an EIS into a mere rubber stamp for post hoc rationalization of decisions already made. If the spirit as well as the letter of NEPA is to have any real meaning in this case, the Navy should prepare and circulate for consideration and comment a supplemental statement

524 F.2d 79, 94-95 (2d Cir. 1975) (emphasis added). Hence, at a minimum, if the FSEIS is found deficient, NRC Staff must revise and supplement it before the Board can make a decision on the license renewal application.

231. Although few federal agencies have internal administrative procedures for adjudicating or appealing NEPA decisions, one such example is the Interior Board of Land Appeals (“IBLA”) within the Department of Interior (“DOI”).¹² Like the federal courts, the IBLA has required that a deficient EIS be remedied through a formal supplement to the EIS. *See, e.g., Wyoming Outdoor Council*, 158 IBLA 155 (IBLA 2003) (reversing the Bureau of Land Management’s project approval because staff failed to take a “hard look”, and remanding for further NEPA analysis). Moreover, the IBLA has found that the relevant record for determining NEPA compliance is the record at the time of the agency action, not the record as supplemented by material prepared after the NEPA document is complete.¹³

232. Nor can Determinations of NEPA Adequacy (“DNAs”)—which DOI staff use to evaluate the adequacy of previous NEPA assessments—be used to supplement a formal review after the fact. *See Ctr. for Native Ecosystems*, 170 IBLA 331, 332 (IBLA 2006) (DNAs cannot be used to supplement previous Environmental Assessments or EISs, or “to address site-specific environmental effects not previously considered in them.”). In *Center for Native Ecosystems*, because new and significant information developed after the initial NEPA statements were completed, a new NEPA statement was required. *Id.; see also Wyoming Wilderness Assoc.*, 158 IBLA 155, 171-72 (2003) (new information showed that the agency did not take the required

¹² The IBLA is an appellate review body that exercises the delegated authority of the Secretary of the Interior to issue final decisions for the Department of the Interior. Located within the Department’s Office of Hearings and Appeals, IBLA is separate and independent from the Bureaus and Offices whose decisions it reviews.

¹³ For example, after an 18-day hearing in *National Wildlife Federation, et al. v. Bureau of Land Management*, 140 IBLA 85 (IBLA 1997), in which the National Wildlife Federation presented evidence of the environmental impacts of grazing, the administrative law judge (“ALJ”) found that regardless of which route the agency chose to go, an adequate environmental review is required. *Id.* at 95-96. Because the agency wrongfully determined that the action would not significantly affect the quality of the human environment, the ALJ stated that the agency was prohibited from going forward with that action until an adequate EIS was prepared and considered. *Id.*

“hard look,” “[a]ccordingly, these cases must be remanded to BLM for an expanded examination of the water quality impacts”); *Biodiversity Conservation Alliance*, 171 IBLA 313, 321 (IBLA 2007) (“The DNA cannot supplement what is not sufficient in NEPA documentation”) (*quoting Native Ecosystems*, 170 IBLA at 332).

233. The administrative cases upon which NRC Staff and the applicant rely either do not support their claim or are wrongly decided. In *Louisiana Energy Services* (Nat’l Enrichment Facility [New Mexico]), CLI-06-15, 63 N.R.C. 687, 707 n.91 (2006), the Commission affirmed two ASLB decisions in which intervenors raised challenges under NEPA. Both ASLB decisions involved the environmental impacts of near-surface disposal of depleted uranium. But all of the disposal sites under consideration were regulated by states or by the Department of Energy; none was regulated by the Commission. *Id.* at 691. Therefore, NRC Staff had no obligation to conduct “a full-scale site-specific review, an inquiry in the purview of the responsible licensing agency.” *Id.* at 690 (internal quotations omitted). After expressing its concern “that the Board (and the underlying FEIS) may not have fully explored potential long-term effects from disposing of depleted uranium – whose radiological hazard gradually increases over time,” the Commission affirmed the Board decisions “as supplemented by our decision today.” *Id.* at 689-90. In a final footnote, the Board observed that “[a]djudicatory findings on NEPA issues, including our own in this decision, become part of the environmental ‘record of decision’ and in effect supplement the FEIS.” *Id.* at 707 and n.91. Here, however, no “adjudicatory findings” could cure the defect in NYS-17B. NRC Staff’s failure to consider the impact on property values of the facility or the no action alternative cannot be remedied by “adjudicatory findings.”

234. Moreover, in reviewing a subsequent petition for judicial review, the District of Columbia Circuit considered only whether the Board’s supplementation of the FEIS by the

hearing record violated the Atomic Energy Act's requirement (at 42 U.S.C. § 2243) that the EIS be prepared before the administrative hearing was completed. It did not determine whether the Commission's method of supplementing the EIS violated the Commission's NEPA regulations, a question the court itself made clear was not at issue in the case. *See Nuclear Info. & Res. Serv. v. NRC*, 509 F.3d 562, n.1 (D.C. Cir. 2007) ("Petitioners have not argued that the NRC's method of supplementing the EIS violated its regulations implementing NEPA. *See* 10 C.F.R. § 51.92.").¹⁴

235. To the extent that *Philadelphia Electric Co* (Limerick Generating Station, Units 1 and 2), ALAB-819, 22 N.R.C. 681, 705-07 (1985) and *Louisiana Energy Services, L.P.* (Claiborne Enrichment Center [Louisiana]), CLI-98-3, 47 N.R.C. 77, 94 (1998) suggest that a licensing board may supplement an environmental impact statement with the hearing record, they are inconsistent with 10 C.F.R. § 51.102(c) and NEPA's goals.

236. Section 51.102(c) provides that, in a contested proceeding, the record of decision is comprised of "the initial decision of the presiding officer or the final decision of the Commissioners acting as a collegial body." However, neither the "initial decision" of the presiding officer nor the Commissioners' "final decision" includes testimony or exhibits from the

¹⁴ Moreover, the legal framework, procedural history, and petitioner's legal claims distinguish *Louisiana Energy Services* ("LES") from the present situation. NRC's review of LES's application to operate an uranium enrichment facility was controlled by a highly specific and specialized amendment to the Atomic Energy Act, 42 U.S.C. § 2243. That provision required NRC to hold a single adjudicatory hearing (*id.* at § 2243(b)(1)), declared that the issuing of such a license "shall be considered a major Federal action" under NEPA thereby necessitating the preparation of an environmental impact statement (*id.* at § 2243 (a)(1)), and directed NRC to prepare that environmental impact statement before the adjudicatory hearing (*id.* at § 2243(a)(2)). Indeed, this special provision of the AEA seems to anticipate only one EIS, only one hearing, and that Staff's work on the EIS would be complete before the hearing. Petitioners' single NEPA challenge was limited to a claim that NRC did not adequately address the environmental consequences of disposing the waste generated by the facility. *Nuclear Info.*, 509 F.3d at 566. In the *LES* proceeding, NRC staff released the draft EIS for public review in September 2004 and then issued the final EIS in July 2005—well before both the NRC's principal rulings on petitioners' contentions and the "mandatory hearing" in March 2006 on the remaining, uncontested issues. *Id.* at 568.

adjudicatory proceeding. Nor does 10 C.F.R. § 51.103(c), which provides that “[t]he record of decision may incorporate by reference material contained in a final environmental impact statement,” make any similar provision for the incorporation by reference of testimony or exhibits in an adjudicatory hearing.

237. The situations in which courts have allowed board supplementation are distinguishable from this matter. In one case, NRC Staff was relying upon the opinion of another agency and the environmental report had been revised by the applicant.¹⁵ In another, the parties stipulated to add additional detail to the EIS, but not to change its conclusions.¹⁶ Neither of those circumstances is present here.

238. Permitting deficiencies in the December 2010 FSEIS to be “deemed supplemented” by the hearing record or by Board [or Commission] order is fraught with problems. First, it would not be clear to the decision-makers or the public which part of the “record as a whole” was curing the NEPA deficiency. Second, the information that was deemed to supplement the FSEIS would not necessarily have been analyzed in a meaningful way, or at all, by NRC Staff. Third, the procedure would be inconsistent with the notice, comment, and response requirements in NRC and CEQ regulations. 10 C.F.R. § 51.92(f)(1); 40 C.F.R. §

¹⁵ *New England Coal. on Nuclear Pollution v. N.R.C.*, 582 F.2d 87, 93-94 (1st Cir. 1978) (NRC did not violate NEPA when it required the applicant to revise its environmental report to reflect a new location for a cooling water intake tunnel, but did not redo its own FEIS, because EPA had decided that the new location would have a smaller impact on the aquatic environment than the original location and NRC was entitled to rely on the EPA conclusion.). As the text of the decision makes clear, this holding was based on the earlier—and subsequently eliminated—version of § 51.52.

¹⁶ *Citizens for Safe Power, Inc. v. N.R.C.*, 524 F.2d 1291, 1294, n.5 (D.C. Cir. 1975) (Where a stipulation entered into by the parties refined portions of an EIS, and those refinements were deemed to be included in the EIS and published in the Federal Register as part of the Board’s decision, the court stated: “Not questioning the importance of full disclosure and the necessity of real opportunity for public input under NEPA, we believe in the circumstances that there was no departure from either the letter or spirit of the Act.”). This decision was decided during the tenure of the superseded version of § 51.52.

1502.9(b). Fourth, all the pertinent environmental information would no longer appear in one document that contains the agency's analysis of that information. *See Minn. Pub. Interest Research Group v. Butz*, 541 F.2d 1292, 1300 (8th Cir. 1976) ("The detailed statement serves to gather in one place a discussion of the relative impact of alternatives so that the reasons for the choice of alternatives are clear."). Indeed, CEQ regulations direct federal agencies to "adopt procedures for introducing a supplement into its formal administrative record..." 40 C.F.R. § 1502.9(c)(3). In sum, allowing the FSEIS to be "deemed supplemented" by the hearing record would undermine the very purpose of conducting an environmental analysis in an EIS that is circulated for public comment. 10 C.F.R. § 51.92(f)(1) ("A supplement to a final environmental impact statement will be accompanied by or will include a request for comments . . ."); see also 40 C.F.R. § 1500.1(b) ("public scrutiny [is] essential to implementing NEPA.").

239. This Board has implicitly recognized that remand to NRC Staff is the appropriate remedy when the Board concludes that the FSEIS is deficient. *Entergy Nuclear Operations, Inc.* (Indian Point Nuclear Generating Units 2 and 3), Memorandum and Order (Ruling on Motion and Cross-Motions for Summary Disposition of NYS-35/36), CLI-11-17, 74 N.R.C. 11, at * 27 (Jul. 14, 2011) (ML111950712). Staff cannot shift to the intervenors or the applicant its obligation to consider the socioeconomic impacts associated with the proposed action and the no action alternative. It must address property values, analyze the impact of the proposed action and the no action alternative on property values, in a way that permits public participation and informed environmental decisionmaking.

240. The State has proffered evidence that shows that the NRC Staff's environmental analysis in the FSEIS is inadequate, inaccurate, incomplete, and/or entirely missing. By contrast, NRC Staff and the applicant have presented evidence intended to convince the Board that the

FSEIS complies with NEPA. Ultimately, the Board has only two options: It may rule that the December 2010 FSEIS satisfies NEPA, or it may conclude that it does not, and remand to Staff to correct the deficiencies.

VII. PROPOSED ORDER

241. For the foregoing reasons, the State of New York's Contention NYS-17B is resolved in favor of the State of New York. Accordingly, the Director of Nuclear Reactor Regulation is not authorized to issue, and may not issue, renewed operating licenses for the Indian Point nuclear power plants Units 2 and 3.

242. In accordance with 10 C.F.R. § 2.341(b)(1), any party to this proceeding may file a petition for review of this Initial Decision with the Commission within twenty-five (25) days after service of this initial decision. In accordance with 10 C.F.R. § 2.340(g) and § 2.1210, this Initial Decision shall constitute the final decision of the Commission forty (40) days after its issuance, unless there is a petition for Commission review filed, or the Commission decides to review this Initial Decision under 10 C.F.R. § 2.1210(a)(2) or (3).

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