

United States Nuclear Regulatory Commission Official Hearing Exhibit	
In the Matter of:	Entergy Nuclear Operations, Inc. (Indian Point Nuclear Generating Units 2 and 3)
	ASLBP #: 07-858-03-LR-BD01
	Docket #: 05000247   05000286
	Exhibit #: NYS000226-00-BD01
	Admitted: 10/15/2012
	Rejected:
Other:	Identified: 10/15/2012
	Withdrawn:
	Stricken:

NYS000226  
Submitted: December 17, 2011

## Potential Impacts of Indian Point Relicensing on Property Values

### Summary of finding

I have been asked to report on the extent to which it is valid to regard the impact on off site land use of the continued operation of Indian Point 2 and Indian Point 3 as small in the sense of being undetectable or so minor as to not noticeably alter any important attribute of local resources, and in particular local land use. It is well established that, within regulatory bounds, land uses are determined by property values and the uses that tend to generate the highest values. In my examination of the existing research and evidence, I find that there are sound scientific reasons to expect that these impacts will not be small, and in fact may be substantial. The impacts can be expected to arise because of changes in property values that are associated with the presence of the power plant. The report below presents the basis for this finding.

### Introduction

There have been several scientific studies of the impacts of power generating plants, in general and nuclear fission power plants, in particular. The most useful of these, for present considerations, are those that have determined the impacts, if any, on property values. These studies are the most useful because it is the market value of property that is the most significant determinant of its use and maintenance. To assert that the changes in land use in the area around the Indian Point nuclear power plants will be small is equivalent to asserting that the impacts on property values of extending the operating license will be negligible. If the presence of the nuclear power generating plant has a significant impact on property values, then it logically follows that extending the license will have a significant impact on property values which in turn will affect land use by affecting the decisions made by thousands of property owners and developers. Whether this significant impact exists is a scientifically testable question.

Blomquist<sup>1</sup> was one of the first to present a scientifically sound estimate of the impact of power plants generally on property values, and to publish the result in a peer-reviewed journal. It is plausible that such land uses will be the source of modest to severe levels of nuisance and disamenity that could depress the market value of nearby properties. His analysis found that, after adjusting for other factors (property size, demographic composition of neighborhood, etc.), there was a clear and statistically significant impact of power plants on property values. The impact was most

<sup>1</sup> Glenn Blomquist, "The Effect of Electric Utility Power Plant Location on Area Property Value" *Land Economics*, Vol. 50, No. 1. (Feb., 1974), pp. 97-100.

clearly detectable up to a distance of 11,500 feet from the power plant. Within this zone, increasing the distance from the power plant by 10% was associated with an increase in market value of 0.9 percent. This level of impact was evaluated for sample mean properties, meaning that it could be expected to hold for typical properties in the area around the power plant. It did not cover the impacts on commercial properties.

Do these results hold for the particular case of nuclear power plants? The careful analysis across several urban areas undertaken by Clark and Nieves<sup>2</sup> suggests that if anything the impact of nuclear power plants is larger. Their analysis uses data covering the entire United States and includes the impacts of 21 nuclear power plants as well as 39 coal-fired and 53 gas or oil-fired generating facilities. They find impacts to a reasonable and professionally accepted degree of scientific certainty from all types of power plant. Their analysis further indicates that the impact of nuclear generating plants is more than 3 times the impact of coal fired plants and more than 4 times the impact of gas and oil fired generating facilities. Their analysis is particularly valuable because they have been careful to separate the impacts of the plants themselves from the employment or income-generating impacts of power plants. This must be done to isolate the pure impact of the power plant that would be observed if the facility is completely replaced with an alternative use that is also capable of generating employment and income.

Not all published studies suggest clear negative impacts, but those that suggest zero impacts or ambiguous impacts generally have flaws in their scientific design. For example, Clark, Michelbrink, Allison and Metz<sup>3</sup> estimate a hedonic model for residential property values around two nuclear power plants located in California. They find small increases in property value associated with proximity to the power plants.

The analysis of Clark *et al.* openly combines both the impact of job accessibility with the impact of disamenity and nuisance associated with proximity to the nuclear power plants. Combining these two impacts would be an appropriate technique for estimating the impact of the nuclear power plant ONLY in the case where the counterfactual being evaluated was complete removal of the plant and abandonment of the land. For most cases, and certainly in the case of decommissioning of the plant contemplated in the Indian Point case, this is not the appropriate question to ask. Decommissioning of the plant entails removal of all radioactive materials from the site and making the site available for alternative use. In the Indian Point case, the highest and best alternative use of the site where the nuclear power plant is located would certainly NOT be abandonment, but rather a combination of attractive riverfront development that would be likely to include employment and other attractive locations. It is therefore not scientifically valid to assert that the results of Clark *et al.* could be applied to the Indian Point site.

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<sup>2</sup> David Clark and Leslie Nieves, "An Interregional Hedonic Analysis of Noxious Facility Impacts on Local Wages and Property Values" *Journal of Environmental Economics and Management*, Vol. 27 (1994), pp 235-253.

<sup>3</sup> David Clark, Lisa Michelbrink, Tim Allison and William Metz, "Nuclear Power Plants and Residential Housing Prices" *Growth and Change*, Vol. 28, (1997) pp 496-519.

The study by Folland and Hough<sup>4</sup> does a somewhat better job of adjusting for the local employment effects, but unlike the Clark and Neives study discussed above does not fully account for the labor market impacts. They look at the impacts on the value of commercial or potentially commercial land in 494 market areas around the United States in years ranging from 1945 to 1992. They confirm that there is a statistically significant negative impact on property values that results from installation of a nuclear power plant.

In conclusion, there is clear scientific evidence that the presence of nuclear generating plants can reduce the value of property in the area around the plant. There are differences between the studies about how far the impact might extend, and about the magnitude of the impact. All properly done studies, however, indicate the potential for a significant, not a small, impact. In the next section I will present some estimates of how large that impact might be in the Indian Point case.

## **Analysis**

In order to obtain a general estimate of the magnitude of property value impacts, I have made use of data available from the 2000 Census for the region around the Indian Point generating facility, making appropriate adjustments as described below.

A conservative estimate of property value impacts can be obtained by applying the impact estimated by Blomquist discussed above. His analysis suggested that there are no impacts on property values beyond 11,500 feet, and that up to that distance moving 10% further away from the power plant would increase the value of the property by 0.9%.

According to the 2000 Census, there are 32,427 persons living in Census Block Groups whose center is within 2 miles of the Indian Point facility. Within this area there are 12,933 housing units. The area around Indian Point and the associated census block groups are illustrated in Figure 1 below. The block groups are shaded blue with darker shades indicating more dwelling units. Of these dwellings, 6886 units are owner occupied units whose collective value in 2000 was \$1,425,552,500 (over \$1.4 billion). There were 5468 renter-occupied properties, whose average median contract monthly rent was about \$750 per month. I approximate the value of the rental properties by calculating the discounted present value of the stream of rents that can be earned, and this produces an estimated value of rental property in the area of \$816,613,800 (nearly \$817 million). Combining these indicates that as of the 2000 Census the total value of residential property within 2 miles of the Indian Point facility was about \$2,242,166,300 (\$2.2 billion).

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<sup>4</sup> Sherman Folland and Robin Hough, "Externalities of Nuclear Plants: Further Evidence" *Journal of Regional Science* Vol. 40, No. 4, (2000) pp 735-753.

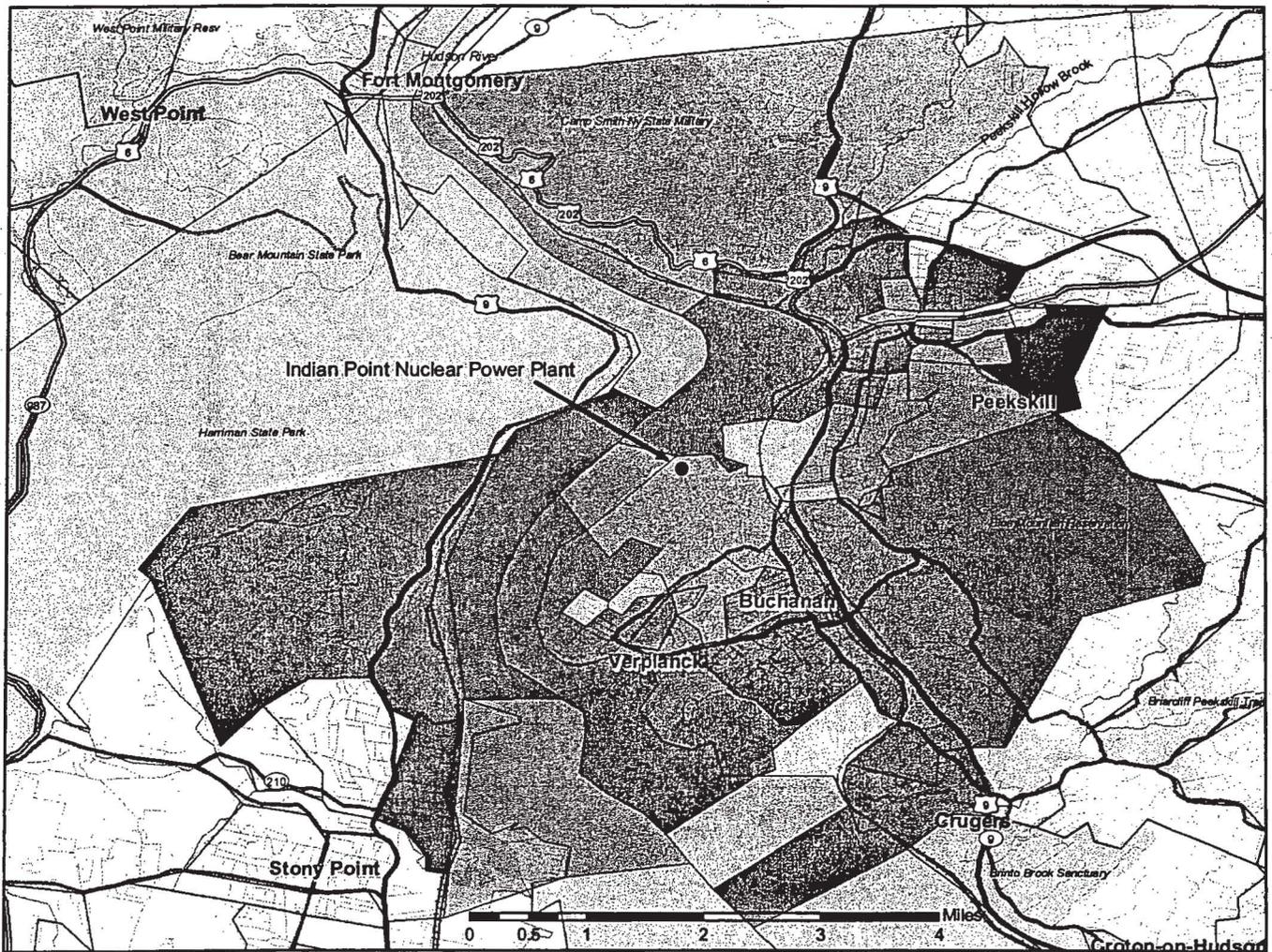


Figure 1: Region around Indian Point Nuclear Power Plant

Property values have continued to increase with the overall market, and the Office of Federal Housing Enterprise Oversight (OFHEO) tracks the course of house prices in every state and many metropolitan areas in the US. Using the index for the state of New York indicates that on average house prices have increased 93% from the first quarter of 2000 to the first quarter of 2007. Therefore the current market value of residential property within 2 miles of the Indian Point plant is approximately equal to \$4,327,380,959 (over \$4.3 billion).

For each Census block group, I calculated the percentage increase in distance from the Indian Point plant that would be required to move the block group to be 11,500 feet away from the plant. This is a very conservative estimate, based on Blomquist's study, of how far away from the plant properties would have to be to be free of impact from the plant. To be particularly certain that I obtain a minimum estimate of the impact, I excluded those houses in the block group

that actually contain the plant, since these are not typical of the sample in a way that would make application of Blomquist's results scientifically valid in all circumstances.

The resulting calculations indicate that removal of the impacts of the Indian Point Nuclear plant would increase property values by \$576,026,601 (over \$500 million). This is clearly sufficient to alter the decisions about land use made by the owners of the most affected properties. The result indicates that the assertion that the impacts of extended licensing of the plant would be non-existent or undetectable cannot be accepted as scientifically valid.

### **Concluding remarks**

The results presented in the report above provide a very cautious preliminary estimate. I have not considered the impact on commercial or agricultural property, although research suggests that these impacts can be significant as well. I have used a scientifically respected result based on analysis of power plants in general, while research suggests that the impact of nuclear power plants can be several times higher.

Finally, I have made use of the Census data only because they are widely regarded as reliable. A more complete analysis of residential and commercial properties is possible using detailed data from property tax records and land use information obtainable from the individual communities in the region. This would also permit examination of the extent to which the impacts extend beyond the very localized area I consider in this report.