



Memorandum

To: David Gordon, Esq. and Reed Super, Esq.
From: David Schlissel, David White and Geoff Keith
Date: November 3, 2003

Subject: The Impact of Converting Indian Point Units 2 and 3 to Closed-Loop Cooling Systems with Cooling Towers on Entergy's Likely Future Earnings

We have conducted an independent assessment to evaluate whether (1) the conversion of Indian Point Units 2 and 3 to closed-loop cooling systems will prevent Entergy from earning significant pre-tax income from the sale of power that will be generated at Indian Point and (2) whether there is any reason to believe that the cost of converting Indian Point would force Entergy to permanently shut down the facility.

Conclusion

Our ultimate conclusion is that Entergy will continue to earn substantial income from the sale of the electricity produced at Indian Point even if those units are converted to closed-loop cooling systems. In fact, using conservative assumptions as to future plant operating costs and performance, Entergy can be expected to earn between \$2.5 and \$2.8 billion in present value 2003 dollars in pre-tax income from the sale of power generated at Indian Point. These figures reflect the additional capital costs that Entergy would have to spend to convert Indian Point to closed-loop cooling systems; the revenues that Entergy would lose if the units were shut down for conversion-related outages; and the minor capacity losses that would result from the conversion from once-through to closed-loop cooling systems. Consequently, there is absolutely no reason to believe that the cost of converting Indian Point would force Entergy to permanently shut down the facility rather than convert it to closed-loop cooling systems with cooling towers.

Key Assumptions in Analyses

Our analyses reflect the following key assumptions:

Capital Cost of Conversions – We have used the \$130 million high end of the \$100 million \pm 30 percent per unit capital cost for adding a cooling tower estimated by Powers Engineering. We also used a ten percent annual fixed charge rate to reflect: the annual depreciation costs for amortizing these expenditures over the remaining service lives of each unit; the interest that Entergy would have to pay on the portion of the capital costs financed by debt; and any additional property taxes that Entergy would have to pay because of the cooling system conversions.

Capacity Losses from Conversions – We have used the 20 MW individual unit parasitic load penalty and the 4 MW individual unit thermal efficiency penalty estimated by Powers Engineering.

Additional O&M Resulting due to Conversions – We have used the estimates of the additional annual O&M due to the additional of cooling towers that were prepared by Enercon Services on behalf of Entergy: \$751,000 per unit during years 1-5; \$1,251,000 per unit during years 6-15, and \$2,351,000 during years 16-30.

Durations of Conversion-related Outages – We have looked at three different outage durations, assuming that each Indian Point unit will be shut down for no additional time to complete the conversion to closed-loop cooling systems and for additional outages of one month and nine months. These outage durations represent the range of additional downtime estimated by Powers Engineering and Synapse on behalf of Riverkeeper and Enercon Services on behalf of Entergy.

Net Capacity of Indian Point Units 2 and 3 - We assumed that Indian Point Unit 2 will have a net 984 MW of capacity and that Indian Point Unit 3 will have a net 995 MW of capacity. These figures reflect the 1.4 percent power uprates that have been approved by the U.S. Nuclear Regulatory Commission (“NRC”) but do not reflect any further power uprates during the units’ remaining operating lives. This is a conservative assumption because plants with designs similar to Indian Point Units 2 and 3 have received NRC approval for power uprates of approximately seven percent. The additional power from such additional uprates would provide Entergy with significantly more electricity and capacity to sell into the markets and, consequently, would increase Entergy’s earnings from Indian Point.

Annual Capacity Factors for Indian Points Unit 2 and 3 – For our base case analyses, we have assumed that each Indian Point unit will achieve an average annual capacity factor of 85 percent for the next ten years and then would achieve an average annual capacity factor of 75 percent through the remaining years of its service life. We believe that these capacity factors are reasonable given the recent operating performance of units similar in design to the Indian Points units.

Future Indian Point Non-Fuel Operating & Maintenance and Capital Improvement Project Expenditures – The Indian Point units had very high non-fuel operating & maintenance expenditures (“non-fuel O&M”) in the years prior to their sale to Entergy, especially in the years 1999 and 2000. In fact, Entergy has noted that the average production cost at Indian Point when the units were acquired was about \$36 per megawatt hour. This was significantly higher than the production costs at Entergy’s other facilities in the southern part of its system, which averaged about \$16 per megawatt hour and were “trended downwards.” Therefore, according to Entergy, there was tremendous opportunity at Indian Point to reduce production costs down to the levels in the south.¹

¹ John Wilder, EVP & CFO of Entergy, Event Briefing of 4th Quarter 2002 Entergy Earnings – Conference call on February 4, 2003.

We have conservatively assumed that Entergy will be able to reduce non-fuel O&M by only 20 percent over the average costs for the years 1995 to 2000 due to its improved management of Indian Point and economies of scale with its other nuclear operations. This would still leave the production costs at Indian Point significantly above the \$16 per megawatt hour production cost cited by Entergy for its plants in the south.

We also assumed that each unit would spend \$10 million in 2003 on capital improvement projects unrelated to the conversion to closed-loop cooling systems. We then escalated this \$10 million figure at the overall rate of inflation to develop the average annual capital improvement expenditures for Indian Point Units 2 and 3.

Market Prices for Power Generated at Indian Point - We used the actual contracted prices that Entergy will receive in 2003 and 2004 for power from Indian Point Unit 2 (\$39/MWh) and Indian Point Unit 3 (\$36/MWh). We then assumed that the market price of the electricity from Indian Point would increase to \$48/MWh by 2008. This is the figure used in the Enercon Services Study. We also assumed that market prices would continue to increase after 2008, but only at the general rate of inflation.

It is not clear from the Enercon Services Study whether this \$48/MWh price reflects only the wholesale energy price or if it includes capacity prices as well. To be conservative, we have assumed that the \$48/MWh figure includes the revenues that Entergy will earn from selling both Indian Point's capacity and energy in the wholesale markets or through bi-lateral contracts.

The net pre-tax earnings figures we have calculated would be even higher if we assumed that the \$48/MWh reflected only the price at which Entergy will be able to sell the energy produced at Indian Point. If that is correct, Entergy will be able to gain substantial additional revenues through the sale of the nearly 2,000 MW of capacity from the two nuclear units.

Indian Point Fuel Costs - We used nuclear fuel costs for Indian Point that are based on the average fuel costs experienced by each unit in the years 1995 to 2000. We then escalated this average cost by the overall rate of inflation.

Remaining Service Lives for Indian Point – We have assumed a remaining service life of 30 years for Indian Point Unit 2 and 32 years for Indian Point Unit 3.

Property Taxes – We have assumed that Entergy will make reported tax and payments in lieu of taxes to the Village of Buchanan, the Town of Cortlandt, Hendrick Hudson School District and the County of Westchester through 2014. Thereafter, we have escalated the tax payments by about \$1.5 million per year. In addition, as we noted above, we have applied a 10 percent annual fixed charge rate to the cost of the conversion. This reflects some additional increases in property taxes due to the conversion.

Escalation Rate and Discount Rate – We have used a 2.7 percent escalation rate and an 11.8 percent discount rate. These are the same figures recently used by the EPA in its analyses of the cost consequences of requiring the conversion of the Brayton Point Station to closed-cycle cooling systems with towers.

Results

The base case results of our analyses are presented in Table 1 below.

Table 1

Entergy's Net Pre-Tax Earnings from Indian Point					
No Additional Downtime in 2008 for Conversion-related Outage (billion)		One Additional Month of Downtime in 2008 for Conversion-related Outage (billion)		Nine Additional Months of Downtime in 2008 for Conversion-related Outage (billion)	
Indian Pt 2	\$1.3	Indian Pt 2	\$1.3	Indian Pt 2	\$1.1
Indian Pt 3	\$1.5	Indian Pt 3	\$1.5	Indian Pt 3	\$1.4
Total	\$2.8	Total	\$2.8	Total	\$2.5

Thus, Entergy can be expected to gain between \$2.5 billion and \$2.8 billion in net pre-tax earnings from Indian Point over the units remaining service lives even if it is required to convert the units to closed-loop cooling systems.

Sensitivity Analyses

We also have evaluated the sensitivity of our results to changes in three key variables: future Indian Point non-fuel O&M expenditures, future market prices, and the capital cost of the conversion. The results of these sensitivity analyses are presented in Tables 2, 3 and 4 below.

Table 2: Total Entergy Pre-Tax Earnings - Capital Cost Sensitivity Analysis

	\$100 Million Capital Cost	Base Case \$130 Million Capital Cost	\$200 Million Capital Cost
No Additional Downtime in 2008	\$2.84 billion	\$2.81 billion	\$2.75 billion
One Additional Month of Downtime in 2008	\$2.76 billion	\$2.73 billion	\$2.66 billion
Nine Additional Months of Downtime in 2008	\$2.56 billion	\$2.53 billion	\$2.47 billion

Table 3: Total Entergy Pre-Tax Earnings – Market Price Sensitivity Analysis

	10% Lower Market Prices	Base Case Market Prices	10% Higher Market Prices
No Additional Downtime in 2008	\$2.25 billion	\$2.81 billion	\$3.36 billion
One Additional Month of Downtime in 2008	\$2.18 billion	\$2.73 billion	\$3.27 billion
Nine Additional Months of Downtime in 2008	\$2.01 billion	\$2.53 billion	\$3.05 billion

Table 4: Total Entergy Pre-Tax Earnings – Non-Fuel O&M Sensitivity Analysis

	Lower Non-Fuel O&M	Base Case Non-Fuel O&M	Higher Non-Fuel O&M
No Additional Downtime in 2008	\$2.25 billion	\$2.81 billion	\$3.54 billion
One Additional Month of Downtime in 2008	\$2.18 billion	\$2.73 billion	\$2.46 billion
Nine Additional Months of Downtime in 2008	\$2.01 billion	\$2.53 billion	\$2.26 billion

Our base case analysis assumed that Entergy will be able to reduce non-fuel O&M expenditures at Indian Point by 20 percent over historic levels in 1995-2000. The higher non-fuel O&M sensitivity assumes that Entergy will be able to reduce non-fuel O&M by only 10 percent over historic levels. The lower non-fuel O&M sensitivity assumes that Entergy will be able to reduce non-fuel O&M expenditures by 30 percent over historic levels.

It is significant that in each sensitivity analysis, Entergy will continue to earn very substantial net pre-tax earnings from the sale of power and capacity from Indian Point even if it is required to convert the units to closed-loop cooling systems.