

State of Vermont
Public Service Board

Docket No. 6545

Investigation in General Order No. 45)
Notice filed by Vermont Yankee Nuclear)
Power Corporation re: proposed sale)
of Vermont Yankee Nuclear Power Station)
and related transactions)

PREFILED TESTIMONY OF
BRUCE EDWARD BIEWALD
ON BEHALF OF THE
VERMONT DEPARTMENT OF PUBLIC SERVICE

REDACTED

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Summary: Mr. Biewald's testimony addresses the economics of the proposed sale of Vermont Yankee.

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List of Exhibits

- Exhibit__DPS-BEB-1 Resume of Bruce Edward Biewald
- Exhibit__DPS-BEB-2 Key Inputs to Synapse Economic Analysis of Proposed Sale
- Exhibit__DPS-BEB-3 Summary Results for Economic Analysis of Proposed Sale
- Exhibit__DPS-BEB-4 Comparison of Synapse and Vermont Yankee Analyses
- Exhibit__DPS-BEB-5 Annual Costs of VY, PPA Base Prices, and Market Price Forecasts
- Exhibit__DPS-BEB-6 Table of ICAP Value by Capacity Factor

1. Qualifications

Q. State your name, occupation and business address.

A. My name is Bruce Edward Biewald. My address is Synapse Energy Economics, Inc., 22 Pearl Street, Cambridge, Massachusetts, 02138.

Q. On whose behalf are you testifying in this case?

A. I am testifying on behalf of the Vermont Department of Public Service.

Q. Please describe your current employment.

A. I am President of Synapse Energy Economics, Inc., a consulting company specializing in economic and policy analysis of the electric industry, including restructuring, consumer protection, market power, stranded costs, renewables, efficiency, environmental quality, and nuclear power.

Q. What are your qualifications with regard to electric utility regulation and energy policy?

A. I graduated from the Massachusetts Institute of Technology in 1981, where I studied energy use in buildings. I was employed for 15 years at the Tellus Institute, where I was Manager of the Electricity Program, responsible for studies on a broad range of electric system regulatory and policy studies. I have testified on energy issues in more

than seventy regulatory proceedings in twenty-five states, two Canadian provinces, and before the Federal Energy Regulatory Commission. I have co-authored more than one hundred reports, including studies for the Electric Power Research Institute, the U.S. Department of Energy, the U.S. Environmental Protection Agency, the Office of Technology Assessment, the New England Governors' Conference, the New England Conference of Public Utility Commissioners, and the National Association of Regulatory Utility Commissioners. My papers have been published in the *Electricity Journal*, *Energy Journal*, *Energy Policy*, *Public Utilities Fortnightly* and numerous conference proceedings, and I have made presentations on the economic and environmental dimensions of energy throughout the U.S. and internationally. Recently I have been consulting for federal agencies, including the Department of Energy, the Department of Justice, the Environmental Protection Agency, and the Federal Trade Commission. My resume is provided here as Exhibit DPS-BEB-1.

Q. Have you previously testified before the Vermont Public Service Board?

A. Yes. I testified on behalf of the Department of Public Service in the following dockets:

- 1) Docket No. 5854 on electric industry restructuring (hearings in July 1996).
- 2) Docket No. 5983 on GMP's rates (direct testimony in

October 1997, rebuttal testimony in December 1997, and supplemental rebuttal testimony in January 1998).

3) Docket No. 6018 on CVPS's rates (direct testimony in February 1998).

4) Docket No. 6107 on GMP's rates (direct testimony in September 1998).

5) Dockets Nos. 6120 and 6460 on CVPS's rates (direct testimony in March 2001, and surrebuttal testimony in April, 2001).

In addition, I have assisted the Department in other dockets including CVPS and GMP rate cases (Dockets Nos. 6020 and 6107, respectively) which were settled.

2. Summary and Recommendations

Q. What issues does your testimony address?

A. My testimony addresses the economics of the proposed sale of the Vermont Yankee Nuclear Power Plant. I have analyzed "Keep" and "Sell" cases from the perspective of costs to Vermont utilities, with and without license extension. My analysis includes various sensitivity cases to key input assumptions. I also comment on the transaction from the

perspective of Entergy, as the buyer.

As discussed in this testimony, many of the input assumptions to this economic analysis were provided to me by other witnesses for the Department of Public Service in this case, specifically William Sherman, David Schlissel, David Efron, and David Lamont. My analysis also builds upon the analysis filed in this case by Vermont Yankee witness, Bruce Wiggett.

Q. Please summarize your findings.

A. Without license extension I project that the present value costs of keeping and operating the Vermont Yankee plant are very similar to the costs of the sell case. Specifically, I estimate a net benefit of \$13 million (in 2001 present value dollars) for the sale compared to the keep case. However, because this result is the difference between two large numbers (the projected costs in the keep and sell cases) both of which are subject to uncertainty, the small net benefit should, in my view, but thought of as a “breakeven” for practical purposes. Sensitivity cases with high and low inputs for market prices, capacity uprate, and O&M costs show results that range from a net benefit for the sale of \$38 million to a net cost for the sale (i.e., a net benefit for the keep case) of \$22 million.

With license extension, I project that there will be a large benefit to keeping the Vermont Yankee plant. Specifically, I calculate an expected

net cost for the sell case of \$266 million (in 2001 present value dollars) in the event of license extension. In the set of sensitivity cases that I analyzed, this net cost for the sell case ranges from \$157 million to \$363 million (in 2001 present value dollars).

Note that the cost results that I present here, and throughout my testimony and exhibits are for the full Vermont Yankee plant. The Vermont utilities' share of the plant, and thus their share of the costs and benefits, is 55 percent of the total.

Q. What are your findings with respect to the PPA and the LMA?

A. The PPA is a unit contract for power that is part of the broader proposed transaction transferring ownership of the Vermont Yankee plant. The Department's market price forecast has prices below the PPA price in the early years of the contract, rising to exceed the PPA prices in the later years of the contract. The presence of a Low Market Adjuster in the PPA is a positive factor of the sale, albeit diminished by the shortcomings I've identified below.

Q. What are your findings with respect to risks?

A. There are a number of risks and uncertainties that should be analyzed in evaluating the sale of Vermont Yankee. I have worked through one example, involving an extended outage, as an illustration of how such risks can be analyzed. That sample outage scenario analysis

shows that the proposed sale transfers some risks, but that is somewhat tempered by the uncertainty of who will pay costs and manage decommissioning if ENVY declares bankruptcy.

I also find that the petitioners' discussion of risks is cursory. The petitioners should have considered a number of risk scenarios in their analysis of the transaction.

Q. What did you find with respect to the costs and benefits to the buyer?

A. From the perspective of the buyer, Entergy Nuclear Vermont Yankee, there are substantial opportunities to benefit from purchasing and operating the Vermont Yankee plant. These derive from opportunities to cut operating costs, improve availability (e.g., with 24 month refueling cycle), uprate the capacity, and extend the plant's operating license.

3. Method for Economic Analysis of the Sale of Vermont Yankee

Q. How did you analyze the costs and benefits of the proposed sale of the Vermont Yankee plant?

A. I began with the results of Vermont Yankee's own financial analysis as presented in the direct testimony of Bruce Wiggett in this case. In Exhibits BW-9 and BW-10 Mr. Wiggett presented annual costs by category for keep and sell cases, respectively. His results were based upon analysis using Vermont Yankee's financial model. My analysis was

conducted by importing Vermont Yankee's results into a spreadsheet, and by making adjustments to the cost figures to reflect differences in assumptions.

Q. Did you run Vermont Yankee's financial model?

A. I did not run the model as the basic method for producing economic results in this case. I did, however, review the financial model runs provided by Vermont Yankee in response to discovery in this case. I also visited Vermont Yankee's office in order to review the model inputs and equations, and to make our own runs. I also requested, and Vermont Yankee produced, a set of model runs with inputs that I specified. All of this was useful for understanding Vermont Yankee's model and assumptions, and to give me confidence that our approach was reasonable in this case. It was not necessary to run Vermont Yankee's model to make the adjustments that we believe to be appropriate.

Q. How does your approach compare with that of CVPS and GMP in this case, with regard to the methodology?

A. My approach is virtually identical to that taken by CVPS witness Stephen Page and GMP witness Nancy Brock. That is, we all relied upon the results of Bruce Wiggett's analysis, and made various adjustments to those results without re-running Vermont Yankee's financial model. We differ with regard to inputs, but not methodology.

Q. How would you describe the essential method of your analysis?

A. It is a basic cost-benefit analysis, in which annual cost streams are projected and then discounted to present value dollars. The net benefit (or cost) of the transaction are determined by comparing a case with continued ownership (a “keep case”) to an analogous case with the proposed transaction (a “sell case”).

4. Inputs for Economic Analysis of the Sale of Vermont Yankee

Q. What inputs did you use in analyzing the economics of the Vermont Yankee sale?

A. I used input assumptions from Vermont Yankee, from other witnesses for the Department, and from my own analysis. A summary of my inputs with the source for each is provided as Exhibit DPS-BEB-2.

Q. What input assumptions did you use that were from Vermont Yankee?

A. Because I relied upon the Vermont Yankee financial model results as a starting point, there are many assumptions made by Bruce Wiggett and his colleagues at Vermont Yankee that are embedded in the model and that carry over into my analysis. Except where I have identified specific differences, I have relied upon Vermont Yankee’s assumptions. These include the general inflation rate of 3 percent, the discount rate of 10 percent, and many others.

- Q. What are the specific differences between your analysis and Vermont Yankee's?
- A. There are nine specific differences:

I would like to briefly discuss each. In addition, I should discuss the inputs for license extension and the market price forecast.

Q. What did you assume for NEIL reimbursements?

A. There is a refund due to Vermont Yankee for nuclear insurance. The value of this

refund should be counted as a credit in the Keep Case cost projection, which is what I assumed. Note that this is, actually, the assumption made by Bruce Wiggett, Stephen Page, and Nancy Brock, as well. I mention it specifically for clarity, because it is the one item that Bruce Wiggett made as an adjustment in his Exhibit BW-11, after his projections of annual costs (in Exhibits BW-9 and BW-10). Because I used the cost figures from Exhibits BW-9 and BW-10, it was appropriate for me to make an adjustment for NEIL reimbursements.

Q. What did you assume for Schedule B lost monthly generation?

A. Schedule B of the Power Purchase Agreement has monthly limits on energy. The generation from Vermont Yankee can and does exceed these monthly figures sometimes. To the extent that there is additional generation that would go to Vermont customers in the keep case that they do not get in the sell case, the energy should be valued at market and figured into the comparative analysis as a cost to the sell case. That is, if Vermont Yankee wants this additional energy, it will have to pay market prices rather than those established in the PPA.

I estimated the quantity of lost monthly generation by comparing the Schedule B amounts with monthly generation reported by Vermont Yankee in response to Data Request DPS 1-56. The amount of expected lost generation, on an annual basis amounts to 62 GWH in refueling years and 103 GWH in non-refueling years, or about 1.9 percent of the output of the plant.

Q. What did you assume for decommissioning funding?

A. I assumed that after 2002 there would be no further contributions to the Vermont Yankee nuclear decommissioning fund. This applies to the keep and sell cases, with and without license extension, and is supported in the testimony of William Sherman in this case.

Q. What did you assume for O&M cost reductions?

A. First, I made an adjustment to Vermont Yankee's year 2012 O&M cost figure. In the final year of its analysis Vermont Yankee assumed that the O&M costs will be \$76 million. This is nearly a full year of O&M, for a year in which the plant would, in the absence of license extension, close in March. Bruce Wiggett has explained that this is due to the assumption that Vermont Yankee will require eight months in order to complete its decommissioning plan. William Sherman has informed me that he has concluded that these O&M costs should be avoided by orderly planning for decommissioning.

Second, I made an adjustment to Vermont Yankee's projection of annual O&M costs. Vermont Yankee projects annual O&M costs at \$64 million in 2002, increasing gradually thereafter. I have reduced the O&M costs in my analysis by \$3 million in refueling years and by \$5 million in non-refueling years. These reductions in costs are in 2002 dollars, and are supported in the testimony of David Schlissel.

Q. What did you assume for nuclear security costs?

A. I have assumed that nuclear security at Vermont Yankee will be tightened, and that this will require a one time investment of \$1.1 million in 2002, and increased annual O&M costs by \$1.5 million starting in 2002 (costs in 2002 dollars). These figures are from David Schlissel, based upon information provided by Vermont Yankee in response to data request DPS 1-39 in this case.

Q. What did you assume for the spent fuel payment from DOE?

A. The courts have found that DOE has failed to fulfill its contractual obligations to nuclear plant owners under the contracts for spent nuclear fuel disposal. It is expected that DOE will provide payments to nuclear operators to compensate them for costs incurred as a result of DOE's failure to perform. William Sherman has estimated these costs, based upon information from Vermont Yankee in this case. Because they are expected to go to Vermont Yankee in the keep case, but to Entergy in the sell case, and I have included them as a credit to the keep case.

Q. What did you assume for the capacity uprate?

A. I have assumed a capacity uprate at Vermont Yankee of 13 percent, to be achieved in 3 steps as the fuel is replaced during routine refueling outages. In effect, the annual average uprates (given partial years) average out as follows:

002	zero
003	2.5%
004	8.33%
005	10.5%
006	13.0%

The cost of achieving the uprate is \$36.6 million, incurred in the years 2002 through 2005. The annual costs are \$7.5 million in 2002,

\$15.8 million in 2003, \$6.7 million in 2004, and \$6.6 million in 2005 (all in 2002 dollars). In addition, the increased generation with the capacity uprate requires additional nuclear fuel. I have included those costs by scaling Vermont Yankee's projected nuclear fuel cost (the "annual capital addition" portion) by the uprate percentage.

In the sell case, Entergy would incur the costs of the uprate, and Entergy would get the benefit from selling the additional generation at market prices. In the keep case, Vermont Yankee would incur the costs and realize the value of the additional generation.

Q. What did you assume for accounting adjustments?

A. David Effron recommended several adjustments based upon his review of Vermont Yankee's financial model. These include recalculation of the gain or loss on the case, accounting for equity remaining at the end of the study period, and calculation of continuing income and income taxes. These are described in the testimony of David Effron.

Q. What did you assume for the transaction date?

A. I have assumed that sale closes on July 15, 2002. Vermont Yankee's analysis assumes that the sale closes in March, 2002. A July closing date appears to be more likely given the schedule in this case, and the need for Vermont Yankee to issue bonds subsequent to Board approval.

Q. For the cases with extension of Vermont Yankee's license, what did you assume?

A. In the license extension cases, I have assumed that the plant can operate for an additional 20 years (through 2032), and that the initial investment in this is \$20 million. In addition, there are operating costs such as fuel and O&M associated with the license extension period. David Schlissel's testimony describes the cost and rationale for the license extension case.

Q. What did you assume for market prices for electricity?

A. In Vermont Yankee's analysis, the market price for electricity does not figure into the cost difference between keep and sell cases. In one case Vermont gets the generation from the plant and pays the costs of owning and operating it, while in the other case Vermont gets the generation from the plant and pays the price in the Power Purchase Agreement.

The market price for power is, however, important in my analysis because the amount of generation that Vermont customers get differs between the keep and sell cases for three reasons: the lost monthly generation, the capacity uprate, and the license extension. For each of these, Vermont customers would effectively get more energy from the plant in the keep case than in the sell case.

The market price forecast that I used in my analysis in this case is the Department's latest market price forecast, described in the testimony of David Lamont in this case.

5. Results of the Economic Analysis of the Sale of Vermont

Yankee

Q. What do you find for the expected net benefit of the sale?

A. My results are summarized in Exhibit DPS-BEB-3. I find that without license extension, the projected net benefit of the sale is \$13 million (in 2001 present value dollars). This figure is the difference between two large and uncertain cost streams, and really means that for practical purposes under my base case set of inputs the deal is a "breakeven" economically, without license extension.

With license extension, however, there is a large net cost of the sale – estimated at \$266 million.

Q. Please describe your sensitivity analyses.

A. I have analyzed a set of six sensitivity cases to the reference case without license extension, and another six with license extension. These results are summarized in Exhibit DPS-BEB-3. The sensitivity cases include higher and lower market prices (plus and minus 10 percent from the reference case DPS forecast); higher and lower Vermont Yankee

uprates (20 percent and 10 percent, instead of the reference case 13 percent uprate); and higher and lower O&M cost savings (no savings relative to Vermont Yankee's projected O&M costs, and double the reference case savings).

For the sensitivity cases without license extension, the results for the sensitivity cases range from \$38 million net benefit of sale to \$22 million net cost of sale (in 2001 present value dollars). For the cases with license extension, the sensitivity results range from \$157 million net cost of the sale to \$363 million net cost of the sale (in 2001 present value dollars).

Q. Can you explain the differences between your analysis and Vermont Yankee's?

A. Yes, I have conducted an analysis of the differences between Bruce Wiggett's results and my result by changing one assumption at a time. The results are presented in Exhibit DPS-BEB-4.

The four most significant sources of difference in the results are (1) decommissioning at \$111 million; (2) capacity uprate at \$56 million; (3) spent fuel payment at \$27 million; and (4) O&M cost reductions at \$44 million. Together, these are responsible for 97 percent of the \$245 million difference between my result and Bruce Wiggett's result.

6. The Purchased Power Agreement

Q. Please describe the Purchased Power Agreement.

A. The PPA is an important part of the proposed transaction. It is a contract between Entergy Nuclear Vermont Yankee, LLC and Vermont Yankee Nuclear Power Corporation, under which VYNPC would purchase the "facility product" through March of 2012 at specified "base prices." Under the PPA, if ENVY decides to uprate the plant's capacity or extend its operation beyond 2012, the additional output belongs to ENVY to sell into the market. The base prices in the PPA are compared with market price forecasts in Exhibit DPS-BEB-5. The Department's market price forecast is lower than the PPA price in the near term, but is expected to rise above the PPA price in 2006. The PPA also has a Low Market Adjuster ("LMA") that provides for adjustments to the base price in the event that New England market prices are more than 5 percent below the base prices.

Q. Is the PPA a "unit" purchase?

A. Yes. Under the PPA, VYNPC buys output from the Vermont Yankee station. When the plant is off line for planned or unplanned outage, no energy is transacted.

Q. How does this compare with a "system" purchase?

A. With a system purchase, the transaction is backed by other resources, and delivery of power is not curtailed in the event of a

generator outage. A system purchase would, in general, be more valuable than a unit purchase, in that the unit purchase may experience “lumpy” outages, either temporary or permanent. To the extent such outages can be anticipated, it is possible to line up other resources to fill in the gap, but this of course has a price. To the extent that such outages are not anticipated, the effort to replace the power can be particularly expensive or problematic, depending upon the timing requirements and system conditions at the time.

Q. Is it reasonable to evaluate the PPA as one would evaluate a stand alone power contract?

A. No. The PPA is one part of a complex transaction that also includes the transfer of a substantial generating asset, along with various responsibilities, risks and opportunities associated with that asset. The transaction includes the transfer of the decommissioning fund, as well as the responsibility for decommissioning. My understanding is that the sale of Vermont Yankee was negotiated as a package that included the PPA.

Thus, while it may be interesting for some purposes to compare the PPA with a stand alone power contract (e.g., to compare the the PPA price with the expected market price) the basic framework for evaluating the proposed transaction should consider the PPA in context, and compare continued ownership to a sell case that includes the PPA. I have

taken this more comprehensive approach in the economic analysis described in this testimony.

It is not reasonable to conclude that because the PPA is above market prices during some portion of the remainder of plant operation that the plant should be closed or that the deal is a bad one. A decision about plant retirement compared to continued operation should be made on the basis of forward going costs that would be incurred (or that can be avoided) in each of the cases. The proposed transaction should be understood as a potential opportunity to improve the current situation. In this context, the transaction should be evaluated relative to other possible scenarios, the most obvious of which is continued ownership and operation by VYNPC.

Q. How do the PPA base prices compare with projected market prices?

A. The Department's forecast is for market prices to increase after 2004 such that they exceed the PPA base price beginning in 2006. This has implications in that the above market prices in the near term are more certain to materialize than the below market prices in the longer term, which must be weighed along with all the other pros and cons.

Q. Please describe the Low Market Adjuster.

A. The Low Market Adjuster ("LMA") is a clause in the PPA designed to protect the buyer in the event market prices fall to more than 5 percent

below the PPA base prices. This feature of the contract assures the buyer that it will pay the lower of either the base PPA price or an adjusted price using the LMA. The LMA becomes effective when the market price falls below 95% of the base price of the PPA. Should that happen, the adjusted price under which power is sold under the PPA is 105% of the 12 month average "market price" as defined in the PPA.

Q. Please describe the calculation of the "market price."

A. For purposes of the LMA, the "market price" for any month is defined as the average spot clearing price over the previous 12 months plus the actual published clearing price for installed capacity ("ICAP"). If there is no published clearing price for ICAP, a default value of 10% will be used. Currently ISO-NE does not publish a clearing price for ICAP.

Q. Is 10% a reasonable proxy for the value of ICAP?

A. No. Exhibit DPS-BEB-6 translates various ICAP prices (stated in \$/kW-month) into \$/MWh at various capacity factors. It also shows the implied value of ICAP at the point where the LMA would become effective. There is some variation, but it is about \$4/MWh.

Now I will convert that \$4/MWh price to an equivalent ICAP price in \$/kW-month. Vermont Yankee operates at an average capacity factor of about 85%, including outages. An ICAP value of \$4.00 would translate into a price of about \$2.50/kW-month at an 85% capacity factor. Of

course if market prices dropped further, the ICAP value would fall as well.

Q. How does this value compare to current and projected ICAP prices?

A. In their respective price forecasts, the Department, GMP and CV used values in the \$1.50/kW-month range. Currently ICAP is trading at below \$1.00/kW-month.

Q. When would the LMA begin to be effective?

A. The LMA does not become effective until the first billing date after the end of the RFO25 refueling cycle. This is expected to be approximately October 2005. The period prior to 2005 is the period where PPA prices are expected to be above the market price. After 2005, the PPA price is expected to be below market prices, and so for the Department's reference case market forecast, the LMA would have no effect.

Q. What do you conclude about the LMA?

A. The LMA is a positive factor in that it provides a hedge against low market prices, but the concerns listed above are negative factors.

7. Risk Scenarios

Q. What do the Companies in this case say about the risk aspects of the transaction?

A. Bruce Wiggett testifying on behalf of Vermont Yankee (at page 26) and Nancy Brock testifying on behalf of GMP (beginning at page 10) both mention

that the proposed deal transfers risk to Entergy.

Q. Does the transaction transfer potential risks from Vermont Yankee to ENVY?

A. Yes. Unexpected occurrences are possible. Equipment failures, regulatory non-compliances, generic BWR and other industry problems, are all examples of plausible unexpected occurrences which could cause unplanned outages and higher operating costs. Currently, the full costs of prudently incurred, higher costs would likely be passed on to consumers. During unplanned outages, consumers would pay all of VYNPC outage expenses and would also pay for replacement power costs. The proposed sale shields consumers from these risks by the fixed-price power purchase agreement and by requiring no payments to ENVY when power is not delivered.

The effectiveness of the transfer of these risks to ENVY is, however, limited by Entergy's proposed corporate structure and credit line as discussed in the testimony of Andrea Crane on behalf of the Department in this case. That is, the risks are transferred, but if the financial assurance amount is exhausted or unavailable and in the event of ENVY bankruptcy, it is uncertain how costs associated with these risks would be paid.

Q. Does the transaction also transfer potential benefits from Vermont Yankee to ENVY?

A. Yes. Benefits unanticipated by the analysis of the transaction are possible. As described earlier, I chose a base case for the evaluation of the transaction

which, in my judgement, represents the most likely economic outcome. It would be possible for VYNPC to experience better economic performance. For example, in the last three years in a row, Vermont Yankee has exceeded the capacity factor assumed in my analysis. This represents benefit given up in the transaction that is not captured in my base case evaluation. Another example is the 2001 economic results. As of the end of November 2001, Vermont Yankee was \$21 million under its predicted budget for the year. Other up side potential includes the use of the site for other uses (which could provide additional revenues to the owners of Vermont Yankee), a run up in electricity market prices resulting from market power or shortage, and the introduction of climate change or other environmental policies that favor nuclear power.

Q. Can you comment on the symmetry of the transferred risks versus the abandoned benefits?

A. There is no generally accepted manner to assign probabilities to these risks and benefits. Generally, the trend in the nuclear industry and at Vermont Yankee in the last five years has been increasingly better economic performance. The possibility of continuing this upside trend is discussed by DPS witness David Schlissel. On the other hand, unanticipated expenses, such as those associated with an extended outage in 1998 or the design basis documentation program in the late 90's, have occurred at Vermont Yankee.

A specific area of concern seems to be high-cost unanticipated risks. It

may be useful to consider some specific high-cost scenarios and attach illustrative costs in order to provide some sense of the magnitudes involved.

Q. What are examples of risks and uncertainties that could be considered in weighing the risk transfer in proposed sale?

A. Among the risks and uncertainties that should be considered in evaluating the sale of Vermont Yankee are:

1. Extended, but temporary, outage
2. Equipment or regulatory problems at Vermont Yankee leading to permanent shutdown
3. Generic problems at nuclear plants affecting a number of Entergy plants
4. Low market prices leading to permanent shutdown
5. Unexpected decommissioning fund shortfall
6. Nuclear accident at another plant invoking Price-Anderson
7. Improved nuclear performance
8. Use of the site for other purposes (e.g., new gas fired generation)
7. Market power or shortage leading to extremely high market prices
8. Climate change or other environmental policy favoring nuclear power

Q. Can you illustrate, at least in part, how one of those scenarios might alter the risk profile faced by the public?

A. To some extent, as I will try to illustrate using one particular risk. To

ensure logical correctness, it is necessary to compare each scenario to the same reference scenario over the 2002 to 2012 plant license life. In this example, I will refer to six specific scenarios that address this particular risk:

1. Keep-No Outage Case – The scenario where we chose to keep the plant and a one year outage does not occur.
2. Keep-Outage Case – The scenario where we chose to keep the plant and a one year outage does occur.
3. Keep-Permanent Outage Case – The scenario where we keep the plant and a one year outage does occur and causes the owners to permanently shut down.
4. Sell-No Outage Case – The scenario where we chose to sell the plant and a one year outage does not occur.
5. Sell-Outage Case – The scenario where we chose to keep the plant and a one year outage does occur.
6. Sell-Permanent Outage Case – The scenario where we chose to sell the plant and a one year outage does occur and causes the owners to permanently shut down.

The first scenario, the Keep-No Outage Case, will serve as the “zero point” to which the other scenarios will be compared. It employs the assumptions in the Synapse Reference Case described in Section 5 of my testimony. Please

note that all dollar amounts in the following discussion are in 2001 present value dollars, and the itemized impacts may not include all significant effects. I present it as an illustration of how risks can be analyzed.

Consider the possibility that at some point during the period 2002 to 2012, there is an equipment, regulatory or operational problem that results in the plant needing to be out of service for one year. This is the Keep-Outage Case in the example. This scenario is possible, but of low probability. For illustrative purposes, I will assume that the outage takes place during calendar year 2007 and that market prices for power in each year equal the Department's market price projection.

Q. How would such a one year outage affect the Keep-No Outage Case costs?

A. In the Keep-Outage Case, Vermont Yankee retains ownership of the plant and one outcome is that the outage cause will be repaired and the plant will continue to operate normally the remainder of its license life, since the current sponsorship agreements provide access to capital for the costs of weathering the outage. For this assumption, the effect on ratepayers, relative to our Keep-No Outage Case, would be:

1. a \$107 million cost for replacement power at the market price for that year;
2. some cost, possibly large, for fixing the cause of the outage; and
3. a savings of \$11 million in nuclear fuel costs for that year

The total change from the Base Case Keep Scenario would be additional costs of \$96 million plus outage “repair” cost.

On the other hand, if VYNPC elected to close the plant (the Keep-Permanent Outage Case), the effect on ratepayers, relative to the Keep-No Outage Case, would be:

1. The cost of replacement power for 2006 through 2012;
2. The difference between annual operating costs if there is a shutdown in 2007 and annual operating costs under normal end of life operation (this includes the nuclear fuel costs savings);
3. Special additional costs (not included in the shutdown EOL costs) to get to decommissioning.

Assuming that number 3 is \$50 million, the total of these three together would be about \$170 million in costs above those in the Keep-No Outage Case.

Q. What would the impact of this outage scenario be upon the Sell Cases?

A. In the Sell Cases, ENVY would buy the plant under the transaction as proposed. With the outage, again assuming that the Department’s market price forecast applies, it is unclear but certainly doubtful whether ENVY would be able to absorb the cost of a full year of plant operating costs (possibly \$130 million), plus some amount, possibly large, for fixing the cause of the outage, especially with the loss of revenue under the PPA, Power Schedule B, and uprate power. I will consider both possible outcomes.

First, if ENVY is able to and chooses to weather that outage and continue operation (the Sell-Outage Case) then the likely effect on ratepayers, relative to the Sell-No Outage Case, would be a \$9 million net cost for replacement power at the market price vs. the PPA price for that year. This would offset the \$13 million benefit from the sale. Therefore, compared to the Keep-No Outage Scenario, it would result in a \$4 million benefit.

Alternatively, if ENVY is not able to weather that outage and to continue operation or chooses not to do so, the result would be a permanent shutdown of the plant. In that event, the likely effect on ratepayers, relative to our Sell-No Outage Case, would be a \$9 million excess power cost for the outage year (2007) plus \$65 million excess power costs for the remaining years of the PPA (2008 to 2012). This total net replacement power cost of \$74 million is the difference between the PPA price and the Department's market price forecast. The likely effect on ratepayers relative to our Sell-No Outage Case would be that \$74 million net cost for replacement power. Therefore, compared to the Keep-No Outage Case, this would result in a cost of \$61 million to ratepayers, plus a possibly large amount of costs that are dropped by ENVY.

Q. What do you mean by "costs that are dropped by ENVY?"

A. The outage scenario would put a significant financial stress on a thinly capitalized LLC. If ENVY bankruptcy is assumed because ENVY is unable or unwilling to bear the costs of plant fixed costs for one year plus remedial costs for

the cause of the outage, then it is uncertain whether ENVY would likewise be able or willing to manage the unexpected shutdown and decommissioning. If it is assumed that the working capital line of credit from Entergy Global Investments, Inc. (“EGI”) is exhausted at the beginning of the extended outage, then the remaining \$35 million line of credit from Entergy International Holdings, Ltd., LLC (“EIHL”) would most likely not be sufficient to fully pay the expenses, estimated to be between \$50 million and \$80 million, necessary to begin using the decommissioning fund. Therefore, the source of funds necessary to bring Vermont Yankee to a point where it can begin using the decommissioning fund is uncertain. I call these “dropped costs.” There could also be significant legal fees and similar expenses to Vermont ratepayers or taxpayers to address such a situation.

Q. Could you please summarize this example?

A. In the Table, below, I have summarized the costs for the six cases in this outage scenario example.

Summary of Outage Scenario Costs
 (Millions of 2001 present value dollars)

	No Outage Case	Outage Case (12 month outage in 2007)	Permanent Outage Case (beginning in 2007)
Keep	0 (as a reference	96 plus repair	170

	point)		
Sell	-13	-4	61 ¹

Negative numbers represent a benefit to ratepayers relative to the Keep-No Outage Case; positive numbers represent a cost relative to the Keep-No Outage Case.

Please bear in mind that while some of the dollar amounts used in the above discussion may be precise, I have not attempted to include all the possible costs to factor in all the related uncertainties and contingent events.

Q. What do you conclude from this illustrative example?

A. First, reviewing the table above, it can be seen that the exposure to sponsors and ratepayers may be reduced. However, there is an important issue to keep in mind when considering the results in the table. For the Keep decision, I consider it more likely that continued operation would be chosen by VYNPC since sponsor agreements provide access to capital. For the Sell decision, I consider shutdown more likely because of ENVY's limited access to guaranteed capital and necessity to turn a competitive profit. DPS witness Andrea Crane

¹ In this situation (Sell-Permanent Outage Case) after bankruptcy and after financial assurance funds are exhausted, the source of funds to meet what I have called dropped costs is uncertain. The \$61 million figure in this cell does not include any dropped costs.

specifically demonstrates this in her testimony. Therefore, there is some transfer of risk, but this is tempered by the uncertainty of who will pay costs and manage decommissioning if ENVY declares bankruptcy.

Second, I conclude that the petitioners should have considered a number of such scenarios both against the Sell and Keep Cases, as well as with and without license extension.

Q. Have the Petitioners adequately analyzed the effect of these uncertainties?

A. No, they have not. Their discussion of risks and risk transfer is cursory and vague, as well as partly focused on the risk profile faced by the Sponsors rather than the ratepayers and the public. From their risk discussion, it is not possible to form a comprehensive balancing of those risks, the economics and the other facets of the transaction discussed elsewhere in my testimony, and in the testimony of other Department witnesses.

8. Costs and Benefits to the Buyer

Q. What are the costs and benefits of this transaction to the buyer, Entergy?

A. The main cost elements of the transaction to Entergy Nuclear Vermont Yankee, LLC ("ENVY") are the purchase price, and the ongoing costs of owning and operating the Vermont Yankee plant. Under the Power Purchase Agreement, ENVY then has the obligation to sell

electricity to Vermont Yankee for use by Vermont customers, and ENVY has a revenue stream associated with those sales.

Q. How do the costs compare with the benefits.

A. Entergy has not adequately responded to our data requests related to this topic, and I have not been able to conduct a complete analysis. However, it appears that there will be substantial net benefits to Entergy from this transaction.

One specific example of potential savings is to extend the time between refueling outages. Entergy has indicated an interest in switching to a 24 month refueling schedule.

In addition, a capacity uprate at Vermont Yankee appears to be likely. I've estimated the net benefit of a 13 percent uprate at \$56 million (in 2001 present value dollars, assuming no license extension).

Perhaps most importantly, the opportunity to renew the plant's operating license offers a potential for enormous gains. Our economic analysis of the license extension puts the value at \$253 million (in 2001 present value dollars).

Q. What has Entergy said about the benefits of owning Vermont Yankee?

***** BEGIN CONFIDENTIAL MATERIAL *****

Z.

***** END CONFIDENTIAL MATERIAL *****

Q. Does this conclude your testimony?

A. Yes.

Bruce Edward Biewald

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PROFESSIONAL EXPERIENCE

Synapse Energy Economics, Inc., Cambridge, MA. President, 1996 to present. Consulting on issues of energy economics, environmental impacts, and utility regulatory policy, including electric industry restructuring, electric power system planning, performance-based regulation, stranded costs, system benefits, market power, mergers and acquisitions, generation asset valuation and divestiture, nuclear and fossil power plant costs and performance, renewable resources, power supply contracts and performance standards, green marketing of electricity, environmental disclosure, nuclear plant decommissioning and radioactive waste issues, climate change policy, environmental externalities valuation, energy conservation and demand-side management, electric power system reliability, avoided costs, fuel prices, purchased power availability and cost, dispatch modeling, economic analysis of power plants and resource plans, and risk analysis.

Tellus Institute, Boston, MA. Senior Scientist and Manager of the Electricity Program, 1989 to 1996. Responsible for research and consulting on all aspects of electric system planning, regulation, and restructuring.
Research Associate, later Associate Scientist, 1980 to 1988.

EDUCATION

Massachusetts Institute of Technology,
BS 1981, Architecture, Building Technology, Energy Use in Buildings.
Harvard University Extension School,
1989/90, Graduate courses in micro and macroeconomics.

SUMMARY OF TESTIMONY, PUBLICATIONS, AND PRESENTATIONS

Expert testimony on energy, economic, and environmental issues in seventy regulatory proceedings in two Canadian provinces, twenty five States, and before the Federal Energy Regulatory Commission.

Co-author of more than one hundred reports, including studies for the Electric Power Research Institute, the U.S. Department of Energy, the U.S. Environmental Protection Agency, the Office of Technology Assessment, the New England Governors' Conference, and the National Association of Regulatory Utility Commissioners.

Papers published in the Electricity Journal, the Energy Journal, Energy Policy, Public Utilities Fortnightly, and numerous conference proceedings.

Invited to speak by American Society of Mechanical Engineers, International Atomic Energy Agency, National Association of Regulatory Utility Commissioners, National Association of State Utility Consumer Advocates, National Consumer Law Center, the Latin American Energy Association (OLADE), the Swedish Environmental Protection Agency (SNV), the U.S. Environmental Protection Agency, and others.

TESTIMONY

New Jersey Board of Public Utilities (Docket No. EM01050308) – September 2001

Analysis of the proposed merger between Conectiv and PEPCo. Also, surrebuttal testimony in November. (Joint testimony with David Schlissel.)

Indiana Utility Regulatory Commission (Cause No. 41954) – June 2001

System planning and joint operation in a partially deregulated context.

Federal Energy Regulatory Commission (Docket No. ER01-200-001) – April 2001

Termination of the Cinergy Operating Agreement, treatment of merger savings, and affiliate relationships. Also cross-answering testimony in April.

New Jersey Board of Public Utilities (Docket No. EM00110870) – April 2001

Analysis of the proposed merger between FirstEnergy and GPU. Also, supplemental testimony in April. (Joint testimony with David Schlissel.)

Vermont Public Service Board (Dockets Nos. 6120 and 6460 – March 2001

Used and useful policy issues, electricity market prices, and above market costs of the purchase from Hydro Quebec. Also, surrebuttal testimony in April.

Department of Energy (Docket No. EE-RM-500) – December 2000

Oral testimony on proposed rules for central air conditioner and heat pump energy conservation standards.

Illinois Commerce Commission (Docket No. 00-0361) – July 2000

Review of ComEd's funding for nuclear power plant decommissioning.

California Public Utilities Commission (Rulemaking 99-10-025) – July 2000

Distributed generation and related rate design issues. Also, rebuttal testimony in August.

Massachusetts Department of Environmental Protection – July 2000

Comments on reliability implications of proposed emission standards for power plants.

Arkansas Public Service Commission (Docket No. 00-048-R) – June 2000

Requirements for electricity market power analyses.

Illinois Commerce Commission (Docket No. 99-0115) – September 1999

Review of ComEd's nuclear power plant decommissioning cost estimates.

West Virginia Public Service Commission (Case No. 98-0452-E-GI) – August 1999

AEP and Allegheny Power restructuring, market power, divestiture of generation, electric system market price modeling, statistical analysis of comparable sales, and responsibility for stranded costs and gains.

Mississippi Public Service Commission (Docket No. 96-UA-389) – August 1999

Review of Entergy Mississippi, Inc. and Mississippi Power Company stranded cost filings, divestiture of generation, statistical analysis of comparable sales, responsibility for stranded costs and gains.

Connecticut Department of Public Utility Control (Docket No. 99-03-36) – July 1999

Connecticut Light and Power Company standard offer service, market prices for electricity and the influence of market power, simulation analysis of the New England electricity market.

Connecticut Department of Public Utility Control (Docket No. 99-03-35) – July 1999

United Illuminating Company standard offer service, market prices for electricity and the influence of market power, simulation analysis of the New England electricity market.

Utah Public Service Commission (Docket No. 98-2035-04) – June 1999

Cost savings expectations for the proposed merger of PacifiCorp and Scottish Power.

Washington Utilities and Transportation Commission (Docket No. UE-981627) – June 1999

Cost savings expectations for the proposed merger of PacifiCorp and Scottish Power and assessment of whether the merger is in the public interest.

Federal Energy Regulatory Commission (Docket Nos. EC98-40-00, et al.) – April 1999

Horizontal market power and barriers to entry in consideration of the proposed merger of American Electric Power Company and Central and South West Corporation.

Connecticut Department of Public Utility Control (Docket No. 99-03-04) – April 1999

Market power, market prices, and simulation modeling as related to the application of United Illuminating Company for recovery of stranded costs.

Connecticut Department of Public Utility Control (Docket No. 99-02-05) – April 1999

Market power, market prices, and simulation modeling as related to the application of Connecticut Light & Power Company for recovery of stranded costs.

Maryland Public Service Commission (Case No. 8797) – January 1999

Simulation analysis of the ECAR market and projected market prices for electricity for estimation of Potomac Electric Company's stranded generation costs and unbundled rates.

Maryland Public Service Commission (Case No. 8795) – December 1998

Simulation analysis of the PJM market and projected market prices for electricity for estimation of Delmarva Power and Light Company's stranded generation costs and unbundled rates.

Maryland Public Service Commission (Cases Nos. 8794 and 8804) – December 1998

Simulation analysis of the PJM market and projected market prices for electricity for estimation of Baltimore Gas and Electric Company's stranded generation costs and unbundled rates.

Vermont Public Service Board (Docket No. 6107) – September 1998

Excess capacity, used & useful, and the economics of Green Mountain Power's purchase from Hydro Quebec.

Mississippi Public Service Commission (Docket No. 96-UA-389) – September 1998

Analyses of market concentration and market power, behavior of affiliated companies, need for an independent system operator.

California Public Utilities Commission (Application No. 97-12-020) – July 1998

Nuclear power plant decommissioning and radioactive waste disposal. Also, rebuttal testimony in August.

Federal Energy Regulatory Commission (Docket No. EC97-46-000) – June 1998

Affidavit on market power implications of the proposed merger between Allegheny Power System and Duquesne Light Company.

New Jersey Board of Public Utilities (Docket Nos. EX4120585Y, EO97070460, and EO97070463) – March 1998

Economic and environmental benefits of energy efficiency, including estimation of marginal air emissions from the PJM System. (Joint testimony with Nathanael Greene, Edward Smeloff, and Thomas Bourgeois.)

Vermont Public Service Board (Docket No. 6018) – February 1998

Excess capacity and the economics of Central Vermont Public Service Company's purchase from Hydro Quebec.

Public Service Commission of Maryland (Case No. 8774) – February 1998

Market power implications of the APS-DQE merger.

Federal Energy Regulatory Commission (Docket Nos. OA97-237-000 and ER97-1079-000) – January 1998

Market power in New England electricity markets.

British Columbia Utilities Commission – November 1997

British Columbia Hydro and Power Authority Wholesale Transmission Services Application.

Pennsylvania Public Utility Commission (Docket R-00973981) – November 1997

West Penn Power Company Restructuring Plan. Environmental disclosure, consumer education, and allocation of default customers.

Pennsylvania Public Utility Commission (Docket R-00974104) – November 1997

Duquesne Light Company Restructuring Plan. Environmental disclosure, consumer education, nuclear decommissioning, and allocation of default customers. Also surrebuttal testimony in December 1997.

Mississippi Public Service Commission (Docket No. 97-UA-496) – November 1997

Petition of Mississippi Power Company for a Certificate of Public Convenience and Necessity Authorizing Construction of a Generating Plant in Jackson County.

Pennsylvania Public Utility Commission (Docket Nos. R-00973953 and P-00971265) – November 1997

Application of PECO Energy Company for approval of its restructuring plan and petition on Enron Energy Services Power, Inc. for approval of an electric competition and customer choice plan. Allocation of default customers.

Vermont Public Service Board (Docket No. 5983) – October 1997

Excess capacity and the economics of Green Mountain Power Company's purchase from Hydro Quebec. Also rebuttal testimony in December 1997 and supplemental rebuttal testimony in January 1998.

Pennsylvania Public Utility Commission (Docket No. R-00973953) – September 1997

Joint petition for partial settlement of PECO Energy Company's proposed restructuring plan and application for a qualified rate order. Environmental disclosure, nuclear decommissioning and spent fuel.

Pennsylvania Public Utility Commission (Docket No. R-00974009) – September 1997

Pennsylvania Electric Company's Restructuring Plan. Environmental disclosure, customer education, and nuclear issues.

Pennsylvania Public Utility Commission (Docket No. R-00974008) – September 1997

Metropolitan Edison Company's Restructuring Plan. Environmental disclosure, customer education, and nuclear issues.

Indiana Legislature, Regulatory Flexibility Committee -- September 23, 1997.

Testimony on "Electric Industry Restructuring To Benefit Consumers and the Environment: Stranded Costs, Nuclear Issues, and Air Emissions."

Pennsylvania Public Utility Commission (Docket No. R-00973954) – June 1997

Pennsylvania Power & Light Company's Restructuring Plan. Environmental disclosure, customer education, PJM market structure, nuclear decommissioning and spent fuel, rate design for stranded cost recovery. Also, surrebuttal testimony in August.

Pennsylvania Public Utility Commission (Docket No. R-00973953) – June 1997

PECO Energy Company's Restructuring Plan. Environmental disclosure, PJM market structure, nuclear decommissioning and spent fuel.

New York Public Service Commission (Case 96-E-0897) -- April 1997

Consolidated Edison Company's Plans for Electric Rate Restructuring. Analysis of market power in the New York City load pocket.

Pennsylvania Public Utility Commission (Docket No. R-00973877) -- February 1997

Application of PECO Energy Company for Issuance of a Qualified Rate Order. Nuclear power plant decommissioning costs, stranded cost recovery, and securitization.

New Hampshire Public Utilities Commission (DR 96-150) -- November 1996

Electric industry restructuring, including stranded costs, industry structure, market power, and nuclear issues.

Massachusetts Department of Public Utilities (96-100) -- July 1996

Nuclear plant stranded costs and decommissioning.

Vermont Public Service Board (5854) – July 1996

Electric industry restructuring, including stranded costs, industry structure, and environmental protection.

Ontario Energy Board (H.R. 23) -- June 1995

Electricity rate options (joint evidence with John Stutz).

Pennsylvania Public Utility Commission (R-00943271) -- April 1995

Discount rates and system benefits charge.

Colorado Public Utilities Commission (94A-516A) – January 1995

Construction of new generating resources.

Public Service Commission of Nevada (94-9002) – November 1994

Environmental and health impacts of a proposed power plant.

Nuclear Decommissioning Finance Committee of New Hampshire (93-001) – September 1994

Seabrook decommissioning cost, spent fuel storage, and cost collection methodology (joint testimony with William Dougherty).

Public Service Commission of Wisconsin (6630-CE-197 and 6630-CE-209) – September 1994

Point Beach externalities, economics, spent fuel storage, and aging (joint testimony with William Dougherty).

British Columbia Utilities Commission – August 1994

Greenhouse gas emissions and environmental externalities policy

Public Service Commission of Wisconsin (05-EI-14) – February 1994

Cost of decommissioning Point Beach and Kewaunee nuclear power plants. Also, rebuttal and surrebuttal testimony in February.

Delaware Public Service Commission (91-39) – September 1992

Nuclear and fossil power plant performance targets.

Massachusetts Department of Public Utilities (91-131) – December 1991

Internalization of environmental externalities, greenhouse gas valuation and policy.

Massachusetts Department of Public Utilities (91-131) – October 1991

Environmental externalities valuation, emissions effects and global warming.

Massachusetts Department of Public Utilities ((89-141, 90-73, 90-141, 90-194 and 90-270) – December 1990

The incorporation of environmental externalities in specific utility RFPs.

Massachusetts Department of Public Utilities (90-55) – June 1990

Costs and benefits of high-efficiency gas heating equipment.

Massachusetts Department of Public Utilities (86-36-G and 89-239) – March 1990

Environmental externalities of electric resources.

Florida Public Service Commission (890973-E1) – January 1990

Integrated energy planning, power plant emissions, and nuclear plant performance.

Pennsylvania Public Utilities Commission (R-891364) – October 1989

Generating capacity requirements of the Philadelphia Electric Company and the Pennsylvania-New Jersey-Maryland Interconnection.

Maryland Public Service Commission (8199) – October 1989

Performance standards for coal, oil, and nuclear power plants.

Michigan Public Service Commission (U-9172) – April 1989

Economic analysis of the Palisades Power Purchase Agreement. Ratepayer impacts, incentives, and implications for plant operation and decommissioning.

Pennsylvania Public Utility Commission (P-870216, P-880283, P-880284, and P-880286) – March 1989

Allegheny Power System planning and avoided costs.

Michigan Public Service Commission (U-8880) – February 1988

Detroit Edison Company power supply costs, economics of Fermi “buy-back” purchase, nuclear fuel expense, oil costs, and power transactions.

Michigan Public Service Commission (U-8866) – December 1987

Consumers Power Company power supply costs, including projections of oil prices and purchased power costs.

Pennsylvania Public Utility Commission (R-850220) – September 1987

Economic analysis of West Penn Power Company’s participation in the Bath County Pumped Storage Project, and Allegheny Power System capacity reserve requirements. Also, surrebuttal testimony in October.

Arizona Corporation Commission (U-1345-85-367) – February 1987

Palo Verde decommissioning cost.

Michigan Public Service Commission (U-8545) – December 1986

Consumers Power Company power costs, projected cost of oil and purchased power, economic evaluation of the Big Rock Point nuclear unit.

Public Service Commission of Indiana (38045) – November 1986

Northern Indiana Public Service Company system reliability and excess capacity.

California Public Utility Commission (84-06-014 and 85-08-025) – July 1986

Diablo Canyon decommissioning cost and collection issues.

Michigan Public Service Commission (U-8042R) – June 1986

Review of Consumers Power Company system operations during 1985 and economic evaluation of the Big Rock Point nuclear unit.

Michigan Public Service Commission (U-8291) – April 1986

Detroit Edison Company power supply costs, application of a multi-area dispatch model.

Michigan Public Service Commission (U-8286) – February 1986

Consumers Power Company power supply costs, application of a multi-area dispatch model.

Maine Public Service Commission (85-132) – January 1986

Standard and long term rates for cogeneration and small power production. Surrebuttal testimony in February.

Arkansas Public Service Commission (84-249-U) – June 1985

Impact of the Grand Gulf nuclear unit upon Arkansas Power and Light Company and Middle South Utilities electricity production costs.

Kentucky Public Service Commission (8666) – February 1984

Production costing modeling issues.

REPORTS

Best Practices in Market Monitoring: A Survey of Current ISO Activities and Recommendations for Effective Market Monitoring and Mitigation in Wholesale Electricity Markets, a Synapse Energy Economics report for the Maryland Office of People's Counsel, the Pennsylvania Office of Consumer Advocate, the Delaware Division of the Public Advocate, the New Jersey Division of the Ratepayer Advocate, and the Office of the People's Counsel of the District of Columbia, by Paul Peterson, Bruce Biewald, Lucy Johnston, Etienne Gonin, and Jonathan Wallach, forthcoming.

Electricity Market Analysis of Coal Waste Regulations: An Illustrative Midwest Case Study, a Synapse Energy Economics report prepared for US Environmental Protection Agency by Bruce Biewald, David White, and Montserrat Ramiro, October 31, 2001.

The Other Side of Competitive Markets: Developing Effective Load Response in New England's Electricity Market, a Synapse Energy Economics report prepared for the Maine Department of Attorney General and the Maine Office of the Public Advocate, June 13, 2001.

Room to Breathe: Why the Massachusetts Department of Environmental Protection's Proposed Air Regulations Are Compatible With Electric System Reliability, a Synapse Energy Economics report prepared for MASSPIRG and Clean Water Fund, March 2001

Repowering the Midwest: A Plan for Cleaning Up the Electricity Industry in America's Heartland, prepared for the Environmental Law and Policy Center and a coalition of Midwest environmental organizations, February, 2001.

Generator Outage Increases: A Preliminary Analysis of Outage Trends in the New England Electricity Market, a Synapse Energy Economics report prepared for the Union of Concerned Scientists, by Daniel Allen, Bruce Biewald, and David Schlissel, January 7, 2001.

Marginal Price Assumptions for Estimating Customer Benefits of Air Conditioner Efficiency Standards: Comments on the Department of Energy's Proposed Rules for Central Air Conditioners and Heat Pump Energy Conservation Standards, a Synapse Energy Economics report prepared for the Appliance Standards Awareness Project, by Tim Woolf, Bruce Biewald, and Daniel Allen, December 4, 2000.

Transmitting Windpower from the Dakotas to Chicago: A Preliminary Analysis of a Hydrogen Transmission Scenario, a Synapse Energy Economics report prepared for the Environmental Law and Policy Center, with funding from the Leighty Foundation, by Barclay Gibbs and Bruce Biewald, September 8, 2000.

Valuation of Hydroelectric Generating Facilities on the Connecticut and Deerfield Rivers in Vermont, a Synapse Energy Economics report for the Vermont Department of Taxes, by Bruce Biewald, Daniel Allen, David White, Neil Talbot, Paul Kirshen, Lawrence Martin, Paul Chernick, and Rachel Brailove, April 1, 2000.

Use of Selective Catalytic Reduction For Control of NOx Emissions From Power Plants in the U.S., a Synapse Energy Economics report for the OntAIRio Campaign, February, 2000.

Electricity Market Distortions Associated With Inconsistent Air Quality Regulations, by Tim Woolf, Bruce Biewald, and David White for the Project for Sustainable FERC Energy Policy, November 18, 1999.

Avoided Energy-Supply Costs for Demand-Side Management Screening in Massachusetts, a Resource Insight report for the AESC Study Group, by Rachel Brailove, Paul Chernick, Susan Geller, Bruce Biewald, and David White, July 7, 1999.

Comments on the Scope of Issues for FERC Staff's Environmental Assessment of the Proposed Rule on RTOs by the Project for Sustainable FERC Energy Policy on behalf of Multiple Parties, prepared by Terry Black and Bruce Biewald, June 14, 1999.

Stranded Nuclear Waste: Implications of Electric Industry Deregulation for Nuclear Plant Retirements and Funding for Decommissioning and Spent Fuel, by Bruce Biewald and David White, January 15, 1999.

New England Tracking System, a report to the New England Governors' Conference, Inc., funded by a grant from the U.S. Environmental Protection Agency, prepared with Environmental Futures, Inc. and Tellus Institute, October 1998.

The Role of Ozone Transport In Reaching Attainment in the Northeast:

Opportunities, Equity and Economics, a Synapse Energy Economics report for the Northeast States for Coordinated Air Use Management, by Tim Woolf, David White, Bruce Biewald, and William Moomaw, July 1998.

Competition and Market Power in Northern Maine Electricity Market, a Synapse Energy Economics report for the Maine Public Utilities Commission, by Tim Woolf, Bruce Biewald, and Duncan Glover, November 24, 1998.

Grandfathering and Environmental Comparability: An Economic Analysis of Air Emission Regulations and Electricity Market Distortions, a Synapse Energy Economics report for the National Association of Regulatory Utility Commissioners, by Bruce Biewald, David White, Tim Woolf, Frank Ackerman, and William Moomaw, June 11, 1998.

Analysis of Market Power in the APS and Duquesne Service Territories, prepared for the Maryland Office of People's Counsel, by Bruce Biewald and David White, February 9, 1998.

Performance-Based Regulation in a Restructured Electric Industry, a Synapse Energy Economics report for the National Association of Regulatory Utility Commissioners, by Bruce Biewald, Tim Woolf, Peter Bradford, Paul Chernick, Susan Geller, and Jerrold Oppenheim, November 8, 1997.

Massachusetts Electric Utility Stranded Costs, a Synapse Energy Economics report for MASSPIRG, Union of Concerned Scientists, Clean Water Action, Massachusetts Citizens for Safe Energy, and Public Citizen, by Bruce Biewald, Tim Woolf, and Marc Breslow, November 4, 1997.

Horizontal Market Power in New England Electricity Markets: Simulation Results and a Review of NEPOOL's Analysis, prepared for the New England Conference of Public Utility Commissioners, by Bruce Biewald, David E. White, and William Steinhurst, June 11, 1997 (a draft was published as Vermont DPS Technical Report No. 39 in March, 1997).

Zero Carbon Electricity: The Essential Role of Efficiency and Renewables in New England's Electricity Mix, a Tellus Institute report for the Boston Edison Company Settlement Board, by Bruce Biewald, Tim Woolf, Bill Dougherty, and Daljit Singh, April 30, 1997.

Full Environmental Disclosure for Electricity: Tracking and Reporting Key Information, a Regulatory Assistance Project report funded by the Pew Charitable Trusts, the Joyce-Mertz Gilmore Foundation, the U.S. EPA, and the U.S. DOE, by David Moskovitz, Tom Austin, Cheryl Harrington, Bruce Biewald, David E. White, and Robert Bigelow, March 1997.

Restructuring the Electric Utilities of Maryland: Protecting and Advancing Consumer Interests, for the Maryland People's Counsel, by Paul Chernick, Jonathan Wallach, Susan Geller, John Plunkett, Roger Colton, Peter Bradford, Bruce Biewald, and David Wise, February 20, 1997.

Sustainable Electricity for New England: Developing Regulatory and Other Governmental Tools to Promote and Support Environmentally-Sustainable Technologies in the Context of Electric Industry Restructuring, a report to the New England Governors' Conference, by Bruce Biewald, Max Duckworth, Gretchen McClain, David Nichols, Richard Rosen, and Steven Ferrey, Tellus No. 95-310, January 1997.

Restructuring New Hampshire's Electric Power Industry: Stranded Costs and Market Power, a report for the New Hampshire Office of Consumer Advocate, by Bruce Biewald, Paul Chernick, Jonathan Wallach, and Peter Bradford, Synapse Report No. 96-05, November 1996

Comments of the New Hampshire Office of Consumer Advocate on Restructuring New Hampshire's Electric Utility Industry, by Bruce Biewald, Paul Chernick, Jonathan Wallach, and Peter Bradford, Synapse Report No. 96-04, October 18, 1996.

Can We Get There From Here?: The Challenge of Restructuring the Electricity Industry so that We Can All Benefit, a White Paper for CalNeva, Consumer Action, Consumer Federation of California, Consumers First, Greenlining Coalition, Latino Issues Forum, Towards Utility Rate Normalization, and Utility Consumers' Action Network, by John Stutz, Bruce Biewald, Daljit Singh, Tim Woolf, George Edgar, and Wayne DeForrest, April 1996.

A Study of the Impacts of EPA Phase II SO₂ and NO_x Emissions Standards on Electrical Facilities in the ECAR Region, for the Advisory Committee on Competition in Ontario's Electricity System, Ministry of Environment and Energy, by Stephen Bernow, Bruce Biewald, William Dougherty, Maxim Duckworth, and Daljit Singh, Tellus No. 96-069, April 15 1996.

A Projection of Future Market-Based Prices for Air Emissions: Consequences for Renewable and Demand-Side Management Resources, for the Massachusetts Division of Energy Resources, by Maxim Duckworth and Bruce Biewald, Tellus Institute, March 29, 1996.

Promoting Environmental Quality in a Restructured Electric Industry, for the National Association of Regulatory Utility Commissioners, Tellus No. 95-056, December 1995.

Systems Benefits Funding Options, a report to Wisconsin Environmental Decade, Tellus No. 95-248, October 1995.

Costing Energy Resource Options: An Avoided Cost Handbook for Electric Utilities, prepared for the U.S. EPA, Tellus No. 93-251, September 1995.

Electric Resource Planning for Sustainability, a report to the Texas Sustainable Energy Development Council, Tellus No. 94-114, February 1995.

New York State Environmental Externalities Cost Study Report; Report 3a: EXMOD User manual; Report 3b: EXMOD Reference manual; Report 4:

Case Studies, prepared for the Empire State Electric Energy Research Corporation and New York State Energy Research and Development Authority. ESEERCO Project EP91-50, December 1994.

"Comments on the DOE's Proposed Rulemaking Regarding Energy Conservation Standards for Three types of Consumer Products: Including Fuel Cycle Environmental Impacts and Resource Depletion in a Societal Cost-Benefit Framework," December 1994.

Comments on the Northwest Power Planning Council's Issue Paper #94-50: "Accounting for Environmental Externalities in the Power Plan," Tellus No. 94-284, December 1994.

Comments on Incentive Regulation in Massachusetts, DPU 94-158, November 1994.

Valuation of Environmental and Human Health Risks Associated with Electric Power Generation: A Discussion of Methods and a Review of Greenhouse Gas Studies, a report prepared for the Izaak Walton League of America, Minnesotans for an Energy Efficient Economy, American Wind Energy Association, Clean Water Action, American Lung Association, Minnesota Center for Environmental Advocacy, and Institute for Local Self Reliance, Tellus No. 94-202, November 1994.

Resource and Compliance Planning: A Utility Case Study of Combined SO₂/CO₂ Reduction, Report Prepared in Cooperative Agreement with the U.S. EPA Acid Rain Division, Tellus No. 92-185, October 1994.

Modelling Renewable Electric Resources: A Case Study of Wind, a report to the U.S. Department of Energy, Tellus No. 91-187, October 1994.

A Review of Methods and Models for Estimating the System Risk Reduction Value of DSM, prepared for the Boston Edison Settlement Board, Tellus No. 93-174B, September 1994.

Life Extension and Repowering for Fossil Plants: Guidelines for Evaluating Projects, prepared for the Energy Foundation, Tellus No. 92-147A, August 1994.

License Renewal for Nuclear Power Plants: Guidelines for Evaluating Continued Operation, prepared for the Energy Foundation, Tellus No. 92-147B, August 1994.

Greenhouse Gas Emissions: Targets and Control Costs, for the British Columbia Energy Coalition, Tellus No. 94-195, August 1994.

Non-Price Benefits of BECo Demand-Side Management Programs, for the Boston Edison Settlement Board, Tellus No. 93-174A, July 1994.

Development of Externality Values for Energy Resource Planning in Ontario: Air Pollutants, prepared for the Ontario Externalities Collaborative, Tellus No. 94-016/2, June 1994.

Development of Externality Values for Energy Resource Planning in Ontario: Air Toxics - Heavy Metals, prepared for the Ontario Externalities Collaborative, Tellus No. 94-016/3, June 1994.

Development of Externality Values for Energy Resource Planning in Ontario: Greenhouse Gases, prepared for the Ontario Externalities Collaborative, Tellus No. 94-016/4, June 1994.

Development of Externality Values for Energy Resource Planning in Ontario: Land and Water Impacts, prepared for the Ontario Externalities Collaborative, Tellus No. 94-016/5, June 1994.

Development of Externality Values for Energy Resource Planning in Ontario: Nuclear Fuel Cycle Externalities: Uranium Mining, Reactor Operations, Accidents, and Waste Disposal, prepared for the Ontario Externalities Collaborative, Tellus No. 94-016/6, June 1994.

Comments on the State of Wisconsin Draft Environmental Impact Statement - Point Beach Nuclear Power Plant Projects Proposed by Wisconsin Electric Power Company, for the Wisconsin Citizens' Utility Board, Tellus No. 92-058, April 1994.

Incorporating Environmental Externalities in Energy Decisions: A Guide for Energy Planners, a report to the Swedish International Development Agency, Tellus No. 91-157, February 1994.

Development of Externality Values for Energy Resource Planning in Ontario: Introductory Report, prepared for the Ontario Externalities Collaborative, Tellus No. 94-016/1, January 1994.

Cooling Towers for Hudson River Power Plants, Economic and Environmental Considerations, for Scenic Hudson, Inc., Tellus No. 92-022, July 1993.

Energy Efficiency for Massachusetts: A Strategy for Energy, Environment and the Economy, a report to the Massachusetts Division of Energy Resources, Tellus No. 92-236D, April 1993.

Renewable Energy for Massachusetts: A Strategy for Energy, Environment and the Economy, a report to the Massachusetts Division of Energy Resources, Tellus No. 92-236H, April 1993.

The Environmental Impacts of Demand-Side Management Measures, a report for the Electric Power Research Institute, EPRI No. TR-101573, Research Project 3121-05, Tellus No. 92-089, December 1992.

Incorporating Environmental Externalities in Electric System Planning, a report to the Colorado Office of Energy Conservation, Tellus No. 91-203/SB, April 1992.

Evaluation of the Application of Aquidneck Power Limited Partnership to Construct an Energy Facility in Portsmouth, Rhode Island, a report to the Rhode Island Division of Public Utilities and Carriers, The Governor's Office of Housing, Energy and Intergovernmental Relations, and The Department of Administration/Division of Planning, Tellus No. 91-255, April 1992.

Need for and Alternatives to Nuclear Plant License Renewal, a report sponsored by the Vermont Department of Public Service, Tellus No. 91-248, March 1992.

Preliminary Study on Integrated Resource Planning for the Consumers' Gas Company, Ltd., prepared for Consumers Gas Company, Ltd., Tellus No. 91-001, January 1992.

America's Energy Choices: Investing in a Strong Economy and a Clean

Environment, in collaboration with the Union of Concerned Scientists, the American Council for an Energy Efficient Economy, the Natural Resources Defense Council, and the Alliance to Save Energy, Tellus No. 90-067, 1991.

Valuation of Environmental Externalities: Sulfur Dioxide and Greenhouse Gases, for the Massachusetts Division of Energy Resources, Tellus No. 91-085, December 1991.

CASM: Coordinated Abatement Strategy Model, Stockholm Environment Institute, Stockholm, Sweden, November 1991.

Valuation of Environmental Externalities for Electric Utility Resource Planning in Wisconsin, a report to Citizens for a Better Environment, Milwaukee, WI, Tellus No. 91-104, November 1991.

The Environmental Costs and Benefits of DSM: A Framework for Analysis, prepared for the Electric Power Research Institute, Tellus No. 90-177, January 1991.

The Potential Impact of Environmental Externalities on New Resource Selection and Electric Rates, for and with the Massachusetts Division of Energy Resources, Tellus No. 90-165, January 1991.

Environmental Impacts of Long Island's Energy Choices: The Environmental Benefits of Demand-Side Management, prepared for Long Island Power Authority, Tellus No. 90-028A, September 1990.

Review of Southern Connecticut Gas Company's Conservation Impact Model, prepared for the Conservation Collaborative Group (Southern Connecticut Gas Company, Connecticut Department of Public Utility Control (DPUC), Prosecutorial Division, DPUC, Office of Policy and Management/Energy Division, and Office of Consumer Counsel), Tellus No. 90-084, July 1990.

Disposal Costs at Existing and Proposed Low-Level Radioactive Waste Disposal Facilities and the Implications for Vermont, prepared for the Vermont Department of Public Service, Tellus No. 89-168, March 1990.

Affidavit on Seabrook Decommissioning, prepared for the Massachusetts Attorney General, ESRG Project No. 89-246, February 1990.

The Economics of the Palisades Nuclear Plant: An Analysis of the Proposed Sale and Power Purchase Agreement, a report to the Michigan Attorney General, ESRG No. 88-100C, April 1989.

An Analysis of Physical Excess and Uneconomic Capacity Resulting from the Addition of Beaver Valley 2 and Perry 1 to the Centerior Generating System, a report for the Ohio Office of Consumers' Counsel, ESRG No. 88-38B, October 1988.

The Economics of Diablo Canyon: Analyses of the Proposed Settlement Agreement and the Continued Operation of the Plant, a report for the Redwood Alliance, ESRG No. 88-050R, September 1988.

The Fort St. Vrain Nuclear Plant: Economics and Related Issues, a report to the Colorado Office of Consumer Council, ESRG No. 86-004, May 1987.

Towards an Energy Transition on Long Island: Issues and Directions for Planning, a report for Nassau and Suffolk Counties, New York, ESRG No. 87-05, April 1987.

The Economics of Completing and Operating the Vogtle Nuclear Generating Facility, prepared for the Georgia Office of Consumers' Utility Counsel, ESRG No. 85-098, April 1986.

Audit-Related Issues in the WHIP Program, a report to Technical Development Corporation, ESRG No. 85-41, January 1986.

Two Issues in Georgia Power Company's Planning: The Economics of the Vogtle Plant - The Company's Load Forecasting, ESRG No. 85-51A, December 1985.

Cost-Benefit Analysis of the Cancellation of Commonwealth Edison's Braidwood Nuclear Generating Station, ESRG No. 83-87, October 1984.

The Economics of Seabrook 1 from the Perspective of the Three Maine Co-owners, a report to the Maine Public Utilities Commission, ESRG No. 84-38, September 1984.

Evaluation of the Massachusetts Energy Conservation Service, ESRG No. 84-07, August 1984.

Electric Rate Consequences of Cancellation of the Midland Nuclear Power Plant, ESRG No. 83-81/1, May 1984.

Power Planning in Kentucky: Assessing Issues and Choices, Technical Report III: Conservation as a Planning Option, ESRG No. 83-51/TRIII, January 1984.

Electric Rate Consequences of Retiring the Robinson 2 Nuclear Power Plant, ESRG No. 83-10, January 1984.

Power Planning in Kentucky: Assessing Issues and Choices, Technical Report I: Long Range Forecasts of Electricity Requirements for Kentucky and its Six Major Utilities, ESRG No. 83-51/TRI, December 1983.

Power Planning in Kentucky: Assessing Issues and Choices, Project Summary to the Public Service Commission, ESRG No. 83-51, November 1983.

Electricity and Gas Savings from Expanded Public Service Electric and Gas Company Conservation Programs, a report to the New Jersey Division of Rate Counsel, ESRG No. 82-43/2, October 1983.

Long Island Without the Shoreham Power Plant: Electricity Cost and System Planning Consequences, ESRG No. 83-14/S, July 1983.

A Technical Report to the Staff of the District of Columbia Public Service Commission on the Benefits to Ratepayers of the Electric Power Research Institute and Gas Research Institute Programs, ESRG No. 83-11, February 1983.

Customer Programs to Moderate Demand Growth on the Arizona Public Service Company System: Identifying Additional Cost-Effective Program Options, ESRG No. 82-14, December 1982.

The Economics of Alternative Space and Water Heating Systems in New Construction in the New Jersey Power and Light Service Area, a report to the Public Advocate, ESRG No. 82-31, December 1982.

Report on Electricity Conservation in the State of Vermont: Assessing the Potential and Developing Program Strategies, a report to the Department of Public Service, ESRG No. 82-23, October 1982.

Long-Range Forecast of Electric Loads in the State of Vermont, ESRG No. 82-16, October 1982.

The Economics of Closing the Indian Point Nuclear Power Plants, ESRG No. 82-40, October 1982.

Priority Residential Customer Programs to Conserve Electricity and Gas in the Public Service Electric and Gas Company Area, a report to the Division of Rate Counsel for New Jersey Board of Public Utilities, ESRG No. 82-43, September 1982.

The Impacts of Early Retirement of Nuclear Power Plant: The Case of Maine Yankee, ESRG No. 82-91, August 1982.

Long Range Forecast of Atlantic City Electric Company Electric Energy and Peak Demand, a report to the New Jersey Board of Public Utilities, ESRG No. 82-17/1, July 1982.

A Power Supply and Financial Analysis of the Seabrook Nuclear Station as a Generation Option for the Maine Public Service Company, a report to the Staff of the Maine Public Utilities Commission, April 1982.

Long Range Forecast of Detroit Edison Company Electric Energy Requirements and Peak Demands, a report to the Michigan Public Service Commission, ESRG No. 81-60/2, April 1982.

Long Range Forecast of Consumer's Power Company Electric Energy Requirements and Peak Demands, a report to the Michigan Public Service Commission, ESRG No. 81-60, March 1982.

A Conservation Case Forecast of Electric Energy Consumption and Peak Demand in the Sierra Power Company Service Area, ESRG No. 81-42/2, February 1982.

Maine Public Service Company's Electric Energy Requirements and Peak Demands, a report to the Maine Public Utilities Commission, ESRG No. 81-61, January 1982.

A Conservation Investment Scenario for the Northeast Utilities Connecticut Service Area, ESRG No. 81-12/1, October 1981.

The Conservation Investment Alternative for New York State, ESRG No. 80-42, September 1981.

A Conservation Investment Program for Alabama Power Company, a report to the Alabama Public Service Commission, ESRG No. 80-62/2, July 1981.

A Conservation Investment Strategy for Utah Power and Light Company: Cost- Benefit Analysis, Public Service Commission of Utah, Case No. 80-035-17, ESRG No. 81-06, February 1981.

The Conservation Alternative to the Power Plant at Shoreham, Long Island,
ESRG No. 80-3I, November 1980.

PAPERS

Electricity Market Distortions Associated with Inconsistent Air Quality Regulations, Tim Woolf and Bruce Biewald, *The Electricity Journal*, April 2000.

Grandfathering and coal plant emissions: the cost of cleaning up the Clean Air Act, Frank Ackerman, Bruce Biewald, David White, Tim Woolf, William Moomaw, *Energy Policy*, Volume 27, Number 15, December 1999.

Follow the Money: A Method for Tracking Electricity for Environmental Disclosure, Bruce Biewald, David White, and Tim Woolf, *The Electricity Journal*, May 1999.

Book Review of "U.S. Utility Mergers and the Restructuring of the New Global Power Industry," in *Energy*, October 1998.

"Implications of Premature Nuclear Plant Closures: Funding Shortfalls for Nuclear Plant Decommissioning and Spent Fuel Transportation and Storage," Bruce Biewald and David White, prepared for the United States Association for Energy Economics and International Association for Energy Economics, 19th Annual North American Conference, Albuquerque, NM, October 1998.

"Efficiency, Renewables and Gas: Restructuring as if Climate Mattered," Tim Woolf and Bruce Biewald, *The Electricity Journal*, January/February 1998.

"Green Electricity: Tracking Systems for Environmental Disclosure," B. Biewald and J.A. Ramey, proceedings of WINDPOWER '97, the American Wind Energy Association's annual conference in Austin, Texas, forthcoming.

"Competition and Clean Air: The Operating Economics of Electricity Generation," *The Electricity Journal*, January/February 1997.

"Electric Industry Restructuring and Environmental Sustainability," proceedings of the United States Association for Energy Economics and International Association for Energy Economics, 17th North American Conference on (De)regulation of Energy, Boston, October 1996.

"Residential Real-Time Metering Technology for Electricity Restructuring," Daljit Singh and Bruce Biewald, presented at the National Training and Information Center conference, Chicago, September 1996.

"Competition and Environmental Impacts in the U.S. Electric Sector: Must Market Forces be Tamed?," presented at the International Society of Ecological Economics conference, Boston, August 1996.

"Stranded Risk: Nuclear Power Issues in Electricity Restructuring," for Energy Advocates meeting in Austin, Texas, May 1996.

"Counting the Costs: Scientific Uncertainty and Valuation Perspective in EXMOD," Stephen Bernow, Bruce Biewald, William Dougherty, and David White, presented at technical meeting of the International Atomic Energy Agency, Vienna, Austria, December 4-8, 1995.

"Environmentally Targeted Objectives for Reducing Acidification in Europe," *Energy Policy*, C.A. Gough, P.D. Bailey, B. Biewald, J.C.I. Kuylenstierna and M.J. Chadwick, December 1994.

"Environmental Externalities: Highways and Byways," NRRI Quarterly Bulletin, Vol. 15 No. 4, Bruce Biewald, Paul Chernick and Bill Steinhurst, December 1994. Also presented at NARUC's 5th National Conference on Integrated Resource Planning, Kallispell, Montana, May 15-18, 1994.

"From Social Costing to Sustainable Development: Beyond the Economic Paradigm," Stephen Bernow, Bruce Biewald, and Paul Raskin, in *Social Costs of Energy: Present Status and Future Trends*, Proceedings of an International Conference held at Racine, Wisconsin, September 8-11, 1992. Edited by Olav Hohmeyer and Richard Ottinger. Published by Springer-Verlag, September 1994.

"Modelling Renewable Electric Resources: A Case Study of Wind," Stephen Bernow, Bruce Biewald, Daljit Singh, and Jeff Hall, proceedings of the Ninth NARUC Biennial Regulatory Information Conference, Columbus, OH, September 7-9, 1994.

"Alternative Closed Cycle Cooling Systems for Power Plants: A Framework of Evaluation in Integrated Resource Planning," Daljit Singh and Bruce Biewald, in the proceedings of the Ninth NARUC Biennial Regulatory Information Conference, Columbus, OH. September 7-9, 1994.

"Misconceptions, Mistakes and Misnomers in DSM Cost-Effectiveness Analysis, Or What Do You Really Mean By T.R.C.?," Mark Fulmer and Bruce Biewald, ACEEE 1994 Summer Study, Pacific Grove, CA. August 28- Sept. 2, 1994.

"Modelling Renewable Electric Resources: A Case Study of Wind Power," Stephen Bernow, Bruce Biewald, and Daljit Singh, presented at WINDPOWER 1994, Sponsored by American Wind Energy Association, Minneapolis, Minnesota, May 9-13, 1994.

"National Climate Change Policy and Clean Air Act Compliance: A Case Study of Combined CO₂/SO₂ Reduction," Stephen Bernow, Bruce Biewald, Mark Fulmer, Tim Woolf, Kristen Wulfsberg, and Barry Solomon, in the proceedings of NARUC's 5th National Conference on Integrated Resource Planning, Kallispell, Montana, May 15-18, 1994.

"Modelling Renewable Electric Resources: A Case Study of Wind Reliability," Stephen Bernow, Bruce Biewald, and Daljit Singh, presented at the NARUC-DOE National Regulatory Conference on Renewable Energy, Savannah, Georgia, October 3-6, 1993.

"Environmental Sustainability as a Goal in Resource Planning and Policy," Stephen Bernow and Bruce Biewald, Office of Technology Assessment workshop, Washington, DC. April 1993.

"Climate Change and the U.S. Electric Sector," Bruce Biewald and Stephen Bernow, presented at NARUC's 4th National Conference on Integrated Resource Planning, Burlington, Vermont, September 1992.

"Coordinating Clean Air Act Compliance with Integrated Resource Planning: The Role of Externalities," Stephen Bernow, Bruce Biewald, and Kristin Wulfsberg, the Eighth NARUC Biennial Regulatory Information Conference, Ohio State University, Columbus, Ohio. September 9-11, 1992.

"Direct Environmental Impacts of Demand-Side Management," Stephen Bernow, Frank Ackerman, Bruce Biewald, Mark Fulmer, Karen Shapiro, and Kristin Wulfsberg, American Council for an Energy Efficient Economy (ACEEE) 1992 Summer Study, September 1992.

"Modelling Fuel Cycle and Site-Dependent Environmental Impacts in Electric Resource Planning," Stephen Bernow and Bruce Biewald, invited paper at OECD-IEA Expert Workshop on Life-Cycle Analysis of Energy Systems, Paris, France, May 18 and 19, 1992. Proceedings published OECD/IEA Paris, 1993.

"Computer Model Use in Energy Conservation Planning," presented at the Latin American Energy Organization (OLADE) Seminar on Power Systems Computer Modelling in Quito, Ecuador, September 23-25, 1991.

"Environmental Externalities Measurement: Quantification, Valuation and Monetization," Bernow, Biewald and Marron, in External Environmental Costs of Electric Power, proceedings of a German-American workshop, Ladenburg, FRG, October 23-25, 1991. Edited by Olav Hohmeyer and Richard Ottinger, published by Springer-Verlag (Berlin, Heidelberg, New York).

"Some Microcomputer Tools for Least Cost Integrated Energy Planning: ECO, LEAP and EDB," Bruce Biewald and Harvey Salgo, presented at workshop on Energy Pricing and Planning, Bratislava, Czechoslovakia, May 21-22, 1991.

"Confronting Uncertainty: Contingency Planning for Decommissioning," Bruce Biewald and Stephen Bernow, Chapter 18 of "Nuclear Decommissioning Economics," a special issue of *The Energy Journal* of the International Association for Energy Economics, Volume 12, March 1991.

"Avoided Emissions and Environmental Dispatch," Stephen Bernow and Bruce Biewald, presented at the Conference on "Demand-Side Management and the Global Environment," Arlington, Virginia, April 22-23, 1991.

"Environmental Benefits of DSM in New York: Long Island Case Study," Bruce Biewald and Stephen Bernow, presented at the Conference on "Demand-Side Management and the Global Environment," Arlington, Virginia, April 22-23, 1991.

"Full Cost Dispatch: Incorporating Environmental Externalities in Electric System Operation," Stephen Bernow, Bruce Biewald and Donald Marron, the *Electricity Journal*, March 1991.

"EDB: A Flexible Database System for Energy-Environmental Analysis," Bruce Biewald, Michael Lazarus, and David Von Hippel, presented at International Atomic Energy Agency (IAEA) Technical Committee Meeting on "Development of a Database for Comparative Health and Environmental Impacts of Various Energy Systems," in Vienna, Austria, October 15-19, 1990.

"Full Cost Economic Dispatch: Recognizing Environmental Externalities in Electric Utility System Operation," Stephen Bernow, Bruce Biewald, and Donald Marron, presented at NARUC Conference on Externalities, Jackson Hole, Wyoming, October 1990.

"An Assessment of Demand-Side Management Models and Their Use and Applicability in Canadian Utilities," Martin Adelaar and Bruce Biewald, in the proceedings of the Canadian Electrical Association Demand-Side Management Conference, Halifax, Nova Scotia, September 1990.

"Avoided Cost Contracts Can Undermine Least Cost Planning," Stephen Bernow, Bruce Biewald, and Donald Marron, Energy Policy, September 1990.

"Environmental Externalities Measurement: Quantification, Valuation, and Monetization," Stephen Bernow, Bruce Biewald, and Donald Marron, in the proceedings of the Seventh NARUC Biennial Regulatory Information Conference, September 1990.

"Do We Really Need Nuclear Generating Companies?," Public Utilities Fortnightly, June 7, 1990.

"Nuclear Power Economics: Construction, Operation and Disposal," Bruce Biewald and Donald Marron, March 1989.

"Electric Utility System Reliability Analysis: Determining the Need for Generating Capacity," Stephen Bernow and Bruce Biewald, in the proceedings of the Sixth NARUC Biennial Regulatory Information Conference, September 1988.

"Nuclear Power Plant Decommissioning: Cost Estimation for Power Planning and Ratemaking," Stephen Bernow and Bruce Biewald, Public Utilities Fortnightly, October 29, 1987.

"Cost and Performance of Boiling Water Reactors," Stephen Bernow, Bruce Biewald and Tim Woolf, Public Utilities Fortnightly, August 1987.

PRESENTATIONS

(Note: Presentations that were accompanied by a written paper are listed in the section for "papers," above.)

"Regulation of Waste Management at Large Electric Utilities: Modeling Industry Impacts," US Environmental Protection Agency, August 7, 2001.

"Quality of Service in Performance-Based Regulation: US Experiences," presented at the Seminar on Regulation of Electricity Supply Quality, Milan, Italy, June 8, 2001.

"Demand Response in Electricity Markets," presented at the National Association of State Utility Consumer Advocates Mid-Year Meeting in Santa Fe, New Mexico, June 18, 2001.

Presentation on "Repowering the Midwest: The Clean Energy Development Plan for the Heartland," at the National Wind Coordinating Committee Upper Midwest Transmission Workshop, Minneapolis, Minnesota, May 1, 2001.

"Observations on New England's Electricity Markets," National Regulatory Research Institute Market Power Conference, Columbus, Ohio, April 10, 2001.

Presentation on "Derailing Coal: The Economics of Coal-Fired Electricity Generation in the U.S.," Tax Shift Strategy Meeting, Washington, D.C., December 2, 2000.

Presentation on "Repowering the Midwest: A Clean Energy Development Plan for the Heartland," presentation with Howard Learner at the National Association of Regulatory Utility Commissioners Annual Meeting, San Diego, California, November 14, 2000.

Presentation on "Electricity in New England: Market Imperfections of Failure?" at National Association of State Utility Consumer Advocates Annual Meeting, San Diego, California, November 13, 2000.

Presentation on "How Green is Green? Verifying Energy Advertising Claims," at the New England Conference of Public Utility Commissioners Symposium, Bretton Woods, New Hampshire, May 25, 1999.

Presentation on "Consumer Perspectives on Market Power – Case Studies from New England, New York, PJM, and Mississippi," IBC Conference on Market Power, Washington DC, May 24, 1999.

Presentation on "Grandfathering and Environmental Comparability," at the National Association of Regulatory Utility Commissioners 1998 Summer Committee Meetings, Seattle, July 26, 1998.

Presentation on "Tracking Electricity in the New England Market," at the National Association of Regulatory Utility Commissioners 1998 Summer Committee Meetings, Seattle, July 26, 1998.

Presentation on "Tracking Electricity in the New England Electricity Market," at the National Council on Competition and the Electricity Industry National Executive Dialogue on Customers' Right to Know, Chicago, May 13, 1998.

Presentation on "Comparable Environmental Regulations in a Restructured Electricity Industry: The Grandfathering Effect," National Association of Regulatory Utility Commissioners meeting in Washington, D.C., March 1, 1998.

Presentation on "Market Power in Electricity Generation," National Consumer Law Center Conference, Washington, D.C., February 9, 1998.

Presentation on "Electricity Market Power in New England," Massachusetts Electric Industry Restructuring Roundtable, Boston, December 15, 1997.

Presentation on wind power development and air quality, National Wind Coordinating Committee New England Wind Issues Forum, Boston, November 7, 1997.

Invited speaker on market power, National Association of State Utility Consumer Advocates meeting in Boston, November 12, 1997.

Presentation on "Distortions to Future and Current Competitive Electric Energy Markets Due to Grandfathering Environmental Regulations of Electric Power Plants," National Association of Regulatory Utility Commissioners meeting in Boston, November 9, 1997.

Presentation on "Electric Industry Restructuring as if the Environment Mattered," Boston Area Solar Energy Association, October 9, 1997.

Invited speaker on "Modeling Market Power in Electricity Generation," National Association of Regulatory Utility Commissioners meeting in San Francisco, July 22, 1997.

Presentation on "Performance-Based Regulation in a Restructured Electric Industry," National Association of Regulatory Utility Commissioners meeting in San Francisco, July 20, 1997.

Presentation on "State Initiatives and Regional Issues," New England Governors' Conference Workshop on Restructuring and Environmentally Sustainable Technologies, Warwick, Rhode Island, March 25, 1997.

Invited speaker on stranded costs, National Association of State Utility Consumer Advocates meeting in San Francisco, November 1996.

Presentation on "Nuclear Power Plant Decommissioning Costs and Electricity Restructuring," Nuclear Decommissioning Trusts conference, New York City, November 18, 1996.

Invited speaker on stranded costs, Indiana Utilities Regulatory Commission Forum, Indianapolis, November 1, 1996.

Presentation on "Electric Industry Restructuring and the Environment," at the Indiana Energy Conference, Indianapolis, Indiana, October 10, 1996.

Presentation on "Small Customers in a Restructured Electricity Industry: Transaction Costs, Advanced Metering Technologies and Aggregation Options" to the Consumers' Energy Conference, South Portland, Maine, July 1996.

Presentation on "Electric Generation Market Power in New England" to New England Conference of Public Utility Commissioners, Manchester Village, Vermont, May 1996.

Presentation on "Advanced Metering for Residential Customers on Electricity Restructuring" to National Consumer Law Center's 10th Annual Conference in Washington, DC, February 1996.

Presentations on "Market Power," "Environmental Aspects of Restructuring" and "Market Access for Small Customers" to Vermont Public Service Board workshops on electricity restructuring, January and February 1996.

Presentation on "Environmental Impacts of Energy: Sustainability and Social Costing" to British Columbia Utilities Commission Workshop, Vancouver, BC, March 1995.

Presentation on "Competition and Economic Efficiency" to the National Council on Competition and the Electric Industry, December 1995.

Presentation on "Compliance Planning Under Regulatory Uncertainty," to EPA "Opportunities Conference: Energy Efficiency and Renewable Energy," Washington, DC, June 1993.

Presentation on "Energy and Sustainability" to Hydro-Quebec Conference, Hampshire College, Amherst, Massachusetts, April 1993.

Invited Speaker on environmental externalities, ASME "ECO World" conference in Washington, DC, June 1992.

Invited Speaker, Association of Energy Engineers, Boston, Massachusetts, February 1992.

Presentation of Acid Rain Abatement Optimization Model to the Swedish Environmental Protection Agency, Solna, Sweden, November 1991.

Presentation on Integrated Resource Planning to Boston Gas Company, July 1990.

Training on Methods for Calculating Electric System Avoided Costs, provided to energy planners and policy makers from five Southeast Asian countries sponsored by U.S. Agency for International Development and administered by the Institute of International Education, May 1990.

Invited Speaker, National Association of State Utility Consumer Advocates (NASUCA) Mid-Year Meeting, Annapolis, Maryland, and June 1988.

Invited Speaker, Conference on New Developments in Nuclear Decommissioning Costs and Funding Methods, sponsored by the Northeast Center for Professional Education, Washington, DC, April 1988.

Key Inputs to Synapse Economic Analysis of Proposed Sale

Item	Assumption	Source
1. NEIL Reimbursements	Insurance reimbursements of \$8 million (2001 present value)	Bruce Wiggett (Exhibit BW-11)
2. Schedule B generation	Lost generation related to limits in Schedule B of PPA	Synapse calculation based upon VY's monthly generation figures for 2000 to 2004.
3. Decommissioning funding	Nuclear decommissioning costs zero after 2002 in all cases	William Sherman
4. O&M costs reduced	Costs for annual O&M reduced by \$3 million and \$5 million in refueling and non-refueling years, respectively; also reduction to year 2012 O&M	David Schlissel and William Sherman
5. Nuclear security costs	Additional security costs \$1.1 million investment (in 2002) plus a recurring annual operating O&M cost of \$1.5 million	David Schlissel, based on VY response to data request
6. Spent fuel payment from DOE	Payment from DOE for spent nuclear fuel damages	William Sherman
7. Capacity uprate	Increase of 13% achieved in three stages	David Schlissel, based on VY and GE
8. Accounting adjustments	Recalculation of gain/loss on the sale; terminal equity; and calculation of continuing income and income taxes	David Efron
10. Delayed sale	Transaction date July 15, 2002	Consistent with docket schedule

Summary Results for Economic Analysis of Proposed Sale
(millions of 2001 present value dollars)

	Without license extension (Vermont Yankee retired in 2012)		With license extension (Vermont Yankee retired in 2032)	
	Benefits (Costs) of Sell Compared to Keep Cases	Change from Synapse Reference Case	Benefits (Costs) of Sell Compared to Keep Cases	Change from Synapse Reference Case
Synapse Reference Case	13	NA	-266	NA
High market price (10% higher)	2	-12	-363	-97
Low market price (10% lower)	37	+23	-157	109
High uprate (20% increase)	-22	-36	-361	-96
Low uprate (10% increase)	34	+20	-220	46
High O&M savings (roughly doubled)	-7	-20	-303	-37
Low O&M savings (VY projection)	38	+25	-220	45

Comparison of Synapse and Vermont Yankee Analyses
(millions of 2001 present value dollars)

	Without license extension (retire Vermont Yankee retired in 2012)		With license extension (Vermont Yankee retired in 2032)	
	Benefits (Costs) of Sell Compared to Keep Cases	Change	Benefits (Costs) of Sell Compared to Keep Cases	Change
Vermont Yankee's Analysis	258	NA	-27	NA
1. NEIL reimbursements	250	-8	-35	-8
2. Schedule B generation	250	-1	-36	-1
3. Decommissioning funding	138	-111	NA	NA
4. O&M costs reduction	94	-44	-81	-45
5. Nuclear security costs	106	+12	-61	+20
6. Spent fuel payment from DOE	80	-27	-88	-27
7. Capacity uprate (13%)	23	-56	-256	-168
8. Accounting adjustments	19	-5	-260	-5
9. Transaction date (July 15, 2002)	13	-5	-266	-5
Synapse Reference Case	13	NA	-266	NA

Notes to Exhibit DPS-BEB-4:

- (1) Each change is added one at a time to all of the previous changes. Note that in some cases there are interactions such that results for a particular change will vary somewhat depending upon the order in which the changes are made.
- (2) Sources: The starting value of \$258 million is from Exhibit BW-11 to Bruce Wiggett's September 27, 2001 prefiled testimony. In that Exhibit Mr. Wiggett makes the adjustment for NEIL reimbursements of \$8 million.
- (3) Vermont Yankee did not provide an analysis with license extension and no capacity uprate. Our starting point here for the Vermont Yankee perspective on license extension (\$27 million cumulative present value cost to the sell case compared to the keep case) is based upon Vermont Yankee's response to DPS 1-43 (keep case with operation through 2032) compared to Bruce Wiggett's Exhibit BW-10 (sell case).
- (4) Figures may not add exactly due to rounding.
- (5) For the license extension cases, the decommissioning funding adjustment is not applicable, since Vermont Yankee's own cost projection for this case has zero decommissioning cost collections in the keep case.

Annual Costs of VY, PPA Base Prices, and Market Price Forecasts
(Dollars per MWh)

	VY's Projection of VY Costs	PPA Base Prices	DPS 2001c Market Price Forecast	GMP Market Price Forecast	CVPS Market Price Forecast
2002	50.9	42.6	38.8	40.9	45.9
2003	42.8	42.0	36.3	39.2	43.0
2004	55.0	42.8	34.4	37.3	38.0
2005	56.1	39.5	37.7	38.2	39.1
2006	44.8	39.0	41.0	37.2	40.2
2007	57.0	40.0	44.3	37.1	41.3
2008	59.2	41.0	47.6	40.5	42.5
2009	49.4	42.0	50.9	41.4	43.7
2010	62.3	43.0	52.7	42.9	45.0
2011	60.3	44.0	54.6	45.7	46.5
2012	113.6	45.0	56.6	49.4	47.9

Sources:

- (1) Vermont Yankee costs are from Bruce Wiggett's Exhibit BW-9.
- (2) PPA Base Prices are from Bruce Wiggett's Exhibit BW-10, consistent with Schedule D of the PPA.
- (3) DPS market price forecast is from the testimony of David Lamont.
- (4) GMP market price forecast is calculated from figures in Nancy Brock's Exhibit__(NRB-2). It is based upon the February, 201 LaCapra study, with adjustments for market changes (10%), ancillary services (3%), and ICAP (\$1.60/kW-month or \$2.19/MWh)

(5) CVPS market price forecast is from Stephen Page's Exhibit CVPS Page-6. The forecast is date November 2000.

Exhibit DPS-BEB-6

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Table of ICAP Value by Capacity Factor (\$/MWh)

Capacity Factor	65%	70%	75%	80%	85%	90%	95%											
\$/kW-mo	\$0.60	\$1.26	\$1.17	\$1.10	\$1.03	\$0.97	\$0.91	\$0.87										
	\$0.80	\$1.69	\$1.57	\$1.46	\$1.37	\$1.29	\$1.22	\$1.15										
	\$1.00	\$2.11	\$1.96	\$1.83	\$1.71	\$1.61	\$1.52	\$1.44										
	\$1.20	\$2.53	\$2.35	\$2.19	\$2.05	\$1.93	\$1.83	\$1.73										
	\$1.40	\$2.95	\$2.74	\$2.56	\$2.40	\$2.26	\$2.13	\$2.02										
	\$1.60	\$3.37	\$3.13	\$2.92	\$2.74	\$2.58	\$2.44	\$2.31										
	\$1.80	\$3.79	\$3.52	\$3.29	\$3.08	\$2.90	\$2.74	\$2.60										
	\$2.00	\$4.21	\$3.91	\$3.65	\$3.42	\$3.22	\$3.04	\$2.88										
	\$2.20	\$4.64	\$4.31	\$4.02	\$3.77	\$3.55	\$3.35	\$3.17										
	\$2.40	\$5.06	\$4.70	\$4.38	\$4.11	\$3.87	\$3.65	\$3.46										
	\$2.60	\$5.48	\$5.09	\$4.75	\$4.45	\$4.19	\$3.96	\$3.75										
	\$2.80	\$5.90	\$5.48	\$5.11	\$4.79	\$4.51	\$4.26	\$4.04										
	\$3.00	\$6.32	\$5.87	\$5.48	\$5.14	\$4.83	\$4.57	\$4.33										
	\$3.20	\$6.74	\$6.26	\$5.84	\$5.48	\$5.16	\$4.87	\$4.61										
	\$3.40	\$7.17	\$6.65	\$6.21	\$5.82	\$5.48	\$5.18	\$4.90										
	\$3.60	\$7.59	\$7.05	\$6.58	\$6.16	\$5.80	\$5.48	\$5.19										
									2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
PPA Base Price									\$42.00	\$42.80	\$39.50	\$39.00	\$40.00	\$41.00	\$42.00	\$43.00	\$44.00	\$45.00
LMA price									\$39.90	\$40.66	\$37.53	\$37.05	\$38.00	\$38.95	\$39.90	\$40.85	\$41.80	\$42.75
ICAP implied value									\$3.99	\$4.07	\$3.75	\$3.71	\$3.80	\$3.90	\$3.99	\$4.09	\$4.18	\$4.28

Summary Results for Economic Analysis of Proposed Sale

Note: This is an update to Exhibit DPS-BEB-3
(millions of 2001 present value dollars)

	Without license extension (Vermont Yankee retired in 2012)		With license extension (Vermont Yankee retired in 2032)	
	Benefits (Costs) of Sell Compared to Keep Cases	Change from Synapse Reference Case	Benefits (Costs) of Sell Compared to Keep Cases	Change from Synapse Reference Case
Synapse March 2002 Reference Case	39	NA	-238	NA
High market price (10% higher)	27	-12	-335	-97
Low market price (10% lower)	62	+23	-129	+109
High uprate (20% increase)	3	-36	-333	-96
Low uprate (10% increase)	59	+20	-192	+46
High O&M savings (roughly doubled)	19	-20	-275	-37
Low O&M savings (VY projection)	64	+25	-192	+45
High capacity factor (plus 5%)	-4	-43	-329	-92
Low capacity factor (minus 5%)	82	+43	-146	+92

Comparison of Synapse and Vermont Yankee Analyses

Note: This is an update to Exhibit DPS-BEB-4
(millions of 2001 present value dollars)

	Without license extension (retire Vermont Yankee retired in 2012)		With license extension (Vermont Yankee retired in 2032)	
	Benefits (Costs) of Sell Compared to Keep Cases	Change	Benefits (Costs) of Sell Compared to Keep Cases	Change
Vermont Yankee Feb 2002 Analysis	263	NA	-7	NA
1. NEIL reimbursements	NA	NA	NA	NA
2. Schedule B generation	262	-1	-7	-1
3. Decommissioning funding	256	-106	NA	NA
4. O&M costs reduction	112	-44	-53	-45
5. Nuclear security costs	NA	NA	NA	NA
6. Spent fuel payment from DOE	85	-27	-80	-27
7. Capacity uprate (13%)	29	-56	-247	-168
8. Accounting adjustments	39	+10	-238	+10
9. Transaction date (July 15, 2002)	NA	NA	NA	NA
Synapse March 2002 Reference Case	39	NA	-238	NA

Notes to Exhibit DPS-BEB-8:

- (1) Each change is added one at a time to all of the previous changes. Note that in some cases there are interactions such that results for a particular change will vary somewhat depending upon the order in which the changes are made.
- (2) Sources: The starting value of \$263 million is from Bruce Wiggett's February 25, 2002 rebuttal testimony, page 9, line 16.
- (3) Vermont Yankee did not provide an analysis with license extension and no capacity uprate. Our starting point here for the Vermont Yankee perspective on license extension (\$7 million cumulative present value cost to the sell case compared to the keep case) is a Synapse Energy Economics calculation based upon Vermont Yankee's response to DPS 1-43 (keep case with operation through 2032).
- (4) Figures may not add exactly due to rounding.
- (5) The adjustments made previously (in Exhibit DPS-BEB-4) for NEIL Reimbursements, nuclear security costs, and transaction date are marked "NA" here because they are no longer applicable given that they have been incorporated in the February Vermont Yankee model that we use as a starting point.
- (6) For the license extension cases, the decommissioning funding adjustment is not applicable, since Vermont Yankee's own cost projection for this case has zero decommissioning cost collections in the keep case.

DPS2001, CVPS 2002, and LaCapra 2002 Market Price Forecasts
(Dollars per MWh)

	DPS 2001c Market Price Forecast	CVPS February 2002 Market Price Forecast	LaCapra January 2002 Market Price Forecast
2002	38.8	30.9	30.7
2003	36.3	31.4	26.4
2004	34.4	32.2	25.9
2005	37.7	32.5	26.5
2006	41.0	32.7	27.5
2007	44.3	35.3	28.9
2008	47.6	40.3	30.3
2009	50.9	41.6	31.7
2010	52.7	42.9	33.8
2011	54.6	44.2	35.4
2012	56.6	45.6	37.4

Sources:

- (1) DPS market price forecast is from the direct testimony of David Lamontin this docket.
- (2) The CVPS February 2002 market price forecast is from CVPS's supplemental response to DPS Interrogatory Set 1, Question 11.
- (3) The LaCapra January 2002 market price forecast is from "Wholesale Electricity Prices in New England: January 2002 Analysis"

prepared for Green Mountain Power by LaCapra Associates.

Results with a Selected Market Price Forecasts

(costs in millions of 2001 present value dollars)

	Sell Case Cost	Keep Case Cost	Benefit (Cost) of Sell Compared to Keep
Without License Extension			
DPS 2001 market price forecast	1138	1177	39
CVPS 2002 market price forecast	1086	1177	91
LaCapra 2002 market price forecast	976	1177	201
With License Extension			
DPS 2001 market price forecast	2184	1946	-238
CVPS 2002 market price forecast	1944	1946	2
LaCapra 2002 market price forecast	1828	1946	118

Summary of Inputs: VY, Synapse, and Case B

	Vermont Yankee February 2002 Analysis	Synapse March 2002 Reference Case	Case B
Decommissioning Funding	\$18.5 million annual decommissioning fund contribution, increasing after 2006	No additional decommissioning fund contributions after 2002	\$11.4 million annual ongoing decommissioning fund contribution
O&M Costs	VY's revised projection	Reduction to VY's projection of \$3 million and \$5 million in non- refueling and refueling years respectively. Also, a \$55 million reduction in 2012 (post-closure) O&M cost.	Annual reductions of \$1.5 million and \$2.5 million, \$25 million of 2012 post-closure O&M cost.
Spent Fuel Payment from DOE	None	VY compensated for DOE's failure to perform	VY compensated for DOE's failure to perform
Capacity Uprate	None	13% uprate	None
Accounting		David Effron's	David Effron's

Adjustments	NA	adjustments	adjustments
Resulting Net Benefit for Sell Compared with Keep (in 2001 present value dollars)	\$263 million	\$39 million	\$177 million

Summary of Case B Results
(costs in millions of 2001 present value dollars)

	Sell Case Cost	Keep Case Cost	Benefit (Cost) of Sell Compared to Keep
Without License Extension			
DPS 2001 market price forecast	1040	1217	177
CVPS 2002 market price forecast	1005	1217	212
LaCapra 2002 market price forecast	912	1217	306