BEFORE THE
ARKANSAS PUBLIC SERVICE COMMISSION

IN THE MATTER OF THE PETITION OF ENTERGY ARKANSAS, INC. FOR A DECLARATORY ORDER APPROVING REPLACEMENT OF THE STEAM GENERATORS AND REACTOR VESSEL CLOSURE HEAD AT ARKANSAS NUCLEAR ONE, UNIT ONE	)))))))	**DOCKET NO. 02-248-U**

Direct Testimony of
David A. Schlissel
Synapse Energy Economics, Inc.

On behalf of the
General Staff of the
Arkansas Public Service Commission

May 5, 2003

REDACTED

Q. Please state your name, position and business address.

A. My name is David A. Schlissel. I am a Senior Consultant at Synapse Energy Economics, Inc, 22 Pearl Street, Cambridge, MA 02139.

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

A. I am testifying on behalf of the General Staff of the Arkansas Public Service Commission.

Q. Please describe Synapse Energy Economics.

A. Synapse Energy Economics ("Synapse") is a research and consulting firm specializing in energy and environmental issues, including electric generation, transmission and distribution system reliability, market power, electricity market prices, stranded costs, efficiency, renewable energy, environmental quality, and nuclear power.

Q. Please summarize your educational background and recent work experience.

A. I graduated from the Massachusetts Institute of Technology in 1968 with a Bachelor of Science Degree in Engineering. In 1969, I received a Master of Science Degree in Engineering from Stanford University. In 1973, I received a Law Degree from Stanford University. In addition, I studied nuclear engineering at the Massachusetts Institute of Technology during the years 1983-1986.

Since 1983 I have been retained by governmental bodies, publicly owned utilities, and private organizations in 24 states to prepare expert testimony and analyses on engineering and economic issues related to electric utilities. My clients have included the Staff of the California Public Utilities Commission, the Staff of the Arizona Corporation Commission, the Staff of the Kansas State Corporation Commission, the Arkansas Public Service Commission, municipal utility systems in Massachusetts, New York, Texas, and North Carolina, and the Attorney General of the Commonwealth of Massachusetts.

I have testified before state regulatory commissions in Arizona, New Jersey, Connecticut, Kansas, Texas, New Mexico, New York, Vermont, North Carolina, South Carolina, Maine, Illinois, Indiana, Ohio, Massachusetts, Missouri, and Wisconsin and before an Atomic Safety & Licensing Board of the U.S. Nuclear Regulatory Commission.

A copy of my current resume is attached as Exhibit DAS-1.

Q. Have you previously submitted testimony before this Commission?

A. Yes. I submitted testimony in October 1998 addressing Entergy's proposed replacement of the steam generators at the ANO Unit 2 Steam Generating Station.

Q. What is the purpose of your testimony?

A. Synapse was retained by the General Staff of the Arkansas Public Service Commission to analyze issues related to Entergy's proposed replacement of the steam generators and the reactor vessel closure head at the ANO Unit 1 Steam Generating Station ("ANO 1"). This testimony presents the results of our investigation of these engineering and economic issues.

Q. Please explain how Synapse conducted its investigations and analyses on these issues.

A. We completed the following activities as part of this investigation:

1. We submitted more than 50 detailed interrogatories to Entergy and reviewed the tens of thousands of pages of documents that the Company provided in response to these questions. These documents included:

   - the findings of steam generator and reactor vessel head inspections at ANO 1
   - the assessments of the root causes of steam generator tube degradation and reactor vessel closure head cracking
   - materials related to Entergy's efforts to address steam generator and reactor vessel head issues at ANO 1

- documents related to steam generator tube degradation and reactor vessel head cracking at other operating nuclear power plants, particularly those that like ANO 1 were designed by Babcock & Wilcox ("B&W")
- engineering and economic analyses of Entergy's options for addressing steam generator tube damage and reactor vessel head cracking at ANO 1
- materials related to Entergy's participation in industry groups, particularly the Babcock & Wilcox Owners Group, on steam generator and reactor vessel head cracking issues
- documents related to nuclear industry efforts to address steam generator tube damage and reactor vessel head cracking issues
- assessments of the likely future progress of steam generator tube degradation and reactor vessel head cracking at ANO 1
- economic studies of the optimum date for replacing the ANO 1 steam generators
- documents related to the design and materials features of the replacement steam generators and reactor vessel closure head
- materials related to Entergy's efforts to preplan and prepare for the replacement of the ANO 1 steam generators and reactor vessel closure head
- materials related to Entergy's efforts to apply lessons learned from the replacement of the ANO 2 steam generators to the replacement of the ANO 1 steam generators and reactor vessel head

2. We have spoken to Entergy engineers on two occasions concerning the Company's efforts to address steam generator tube damage and reactor vessel closure head cracking at ANO 1 and the Company's analyses of whether replacement of these components was the most cost-effective alternative.

3. We have reviewed the extensive correspondence between Entergy (and the owners of other B&W designed plants) and the U.S. Nuclear Regulatory Commission concerning steam generator tube damage and reactor vessel related cracking issues.

4. We have reviewed the nuclear industry experience concerning steam generator tube damage and reactor vessel head cracking and the replacement of the steam generators and reactor vessel heads at both domestic U.S. and foreign nuclear power plants.

5. We have analyzed the economic studies presented in the testimony of Entergy witness Kenney and have prepared additional sensitivity analyses using the Company's economic model.

Q. Have you evaluated the replacement of the steam generators at other operating nuclear power plants?

A. Yes. I have evaluated the engineering and economic reasonableness of the proposed replacement of the steam generators at the ANO 2, Trojan, Indian Point Unit 2, and Point Beach Unit 2 nuclear power plants. I also have evaluated the reasonableness of Northeast Utilities' planning for and management of the replacement of the steam generators at the Millstone Unit 2 nuclear plant.

In addition, I have examined steam generator-related design and materials issues in a number of other investigations of nuclear power plant construction projects and operating facilities.

Q. Please summarize your findings.

A. Based on the information that we have reviewed and the economic sensitivity studies that we have prepared, we agree with Entergy that it is necessary to replace the ANO 1 steam generators and reactor vessel closure head and that replacement in 2005 appears to be the least cost option at this time.

Q. What were the root causes of the steam generator tube problems that have been experienced at ANO 1?

A. The root cause of the steam generator tube degradation experienced at ANO 1 was the susceptibility of the materials used in the original steam generators to degradation when exposed to the operating environment in the steam generators. In particular, the Alloy 600 material used to fabricate the steam generator tubes has been shown to be very susceptible to a variety of degradation mechanisms including Freespan axial groove intergranular attack, Upper roll transition primary water stress corrosion cracking, Tube end cracking, Sleeve transition cracking, re-

roll cracking, Upper tubesheet intergranular attack, Tube support plat cracking, Lower tubesheet/sludge pile cracking, and mechanical wear.[1]

Q. Were the materials used in the original ANO 1 steam generators typical of the types of materials used in steam generators built in the 1970s?

A. Yes. The materials used in the ANO 1 steam generators, including the Alloy 600 used for the steam generator tubes, were typical of the materials used in nuclear power plants of ANO 1's vintage.

Q. Is the steam generator tube damage that has been experienced at ANO 1 typical of the damage experienced at other operating nuclear power plants?

A. Yes. Essentially all of the operating nuclear power plants in the U.S. have experienced some degree of steam generator tube damage. However, the specific degradation mechanisms experienced and the numbers of tubes with defects have varied significantly from plant to plant.

Q. Who designed the original ANO 1 steam generators?

A. The original steam generators were included in ANO 1's Nuclear Steam Supply System which was designed and supplied to Entergy by Babcock & Wilcox ("B&W").

Q. Which operating nuclear power plants in the U.S. have steam generators designed by B&W?

A. The following seven nuclear power plants have steam generators that were originally designed and supplied by B&W: ANO 1, Davis-Besse, Three Mile Island Unit 1, Oconee Units 1, 2, and 3, and Crystal River Unit 1.

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[1] Entergy response to APSC 1-37, at page GE25.

Q. Are the specific steam generator tube damage mechanisms that have been experienced at ANO 1 typical of the mechanisms that have affected the other nuclear plants with B&W designed steam generators?

A. Yes. The damage mechanisms that have been experienced at ANO 1 are typical of the mechanisms that have degraded the steam generator tubes at other plants with B&W designed steam generators.

Q. Has tube damage led to the replacement of the steam generators at operating nuclear power plants in the U.S.?

A. Yes. Steam generator tube damage has led to the replacement of the steam generators at more than 25 nuclear power plants in the U.S. and at many foreign plants.

Q. Have the steam generators been replaced at any B&W designed power plants?

A. No. However, Duke Power is planning to replace the steam generators at all three of its Oconee Units during 2003 and 2004 and Exelon is planning to replace the steam generators at Three Mile Island Unit 1 in 2007.

Q. Have steam generator related problems led to the retirement of any operating nuclear power plants?

A. Yes. The cost of addressing steam generator damage problems was a major factor in the decisions to retire the Maine Yankee, San Onofre Unit 1, and Trojan nuclear plants.

Q. Is there any evidence that the Company's operational practices increased the severity of the steam generator tube degradation at ANO 1?

A. No. I have seen no evidence that suggests that Entergy's operational practices increased the severity of the steam generator tube damage at ANO 1.

Q. Were there any reasonable actions that Entergy could have taken that would have enabled it to avoid steam generator tube damage at ANO 1?

A. No. Given the experience of other nuclear power plants, it was almost inevitable that ANO 1 would experience significant steam generator tube damage.

The evidence I have reviewed shows that Entergy made reasonable efforts to investigate and mitigate the steam generator tube damage experienced at ANO 1 and to participate in and learn from industry efforts.

Q. Do the materials and design features of the replacement steam generators that Entergy is proposing to install at ANO 1 address the damage mechanisms that have degraded the original ANO 1 steam generators?

A. Yes. Design and materials improvements have been incorporated in the replacement steam generators to be installed at ANO 1 to minimize their susceptibility to the damage mechanisms that have affected the original steam generators. Most significantly, the replacement steam generators will use tubes fabricated from Alloy 690. This material offers a significantly superior resistance to damage in steam generator operating environments.

Q. What has been the operating performance of other replacement steam generators with Alloy 690 tubes?

A. Replacement steam generators with Alloy 690 tubes have been in service since March 1989. I have not seen any evidence that suggests that these Alloy 690 tubes have experienced any significant problems.

Q. Do the replacement steam generators in ANO 2 have Alloy 690 tubes?

A. Yes.

Q. Have the replacement ANO 2 steam generators experienced any significant problems?

A. No. Entergy has said that no significant problems have been experienced with the ANO 2 replacement steam generators since they have been installed.[2]

Q. Has the NRC expressed any serious concerns about the actions taken by Entergy concerning the steam generators at ANO 1?

A. No. The NRC criticized Entergy in 1994 and 1997 for some weaknesses in ANO 1's steam generator inspection programs.[3] However, these relatively minor weaknesses did not cause or contribute in any way to the tube damage that has been experienced in ANO 1's steam generators.

Q. Do you agree with Entergy's conclusion that the ANO 1 steam generators will have to be replaced if the plant is to operate through the end of its NRC-issued operating license?

A. Yes. The experience of other nuclear power plants and Entergy's engineering analyses show that the current steam generators will not last through 2034.

As shown in Figure G in the Direct Testimony of Entergy witness Campbell in this Docket, the Company's best estimate is that the 20 percent tube plugging limit will be reached by no later than 2015 or 2016. A worst case analysis shows that the plugging limit could be reached as early as 2005.

Moreover, as Mr. Campbell explains, the growth rates of some steam generator tube damage mechanisms cannot be accurately predicted. Industry experience confirms Mr. Campbell's observation that unforeseen steam generator tube damage mechanisms "can very quickly appear and result in large numbers of

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[2] Entergy response to APSC 1-18.a..

[3] Entergy's response to APSC 1-6, at pages JW75 and JW561.

damaged tubes."[4] Given these circumstances, I agree that ANO 1's steam generators will have to be replaced.

Q. Do you believe it is appropriate to assume pessimistic tube degradation rates when scheduling the replacement of the steam generators?

A. Yes. There could be significant cost consequences if Entergy delays the planned replacement of the steam generators to a future ANO 1 outage based on optimistic tube degradation rates and then is forced to plug a higher than expected number of tubes during the 2005 scheduled outage. Under those circumstances, Entergy might be required to keep ANO 1 shut down until the replacement steam generators have arrived and all pre-outage planning and preparations have been completed. Such an outage could last months or years. The unavailability of ANO 1 for such an extended period would lead to higher replacement power costs for both the Company and its ratepayers.

An internal Company memorandum concerning the replacement of the ANO 2 steam generators likened planning the date for that replacement based on optimistic degradation rates to "running out of gas as you roll into the gas station" and noted that this was a very risky scenario especially if the consequences were great. The memorandum also noted that such a strategy provided "no hedge against the variability in the degradation projections." I agree.

Q. Turning to the reactor vessel closure head replacement; What were the root causes of the reactor vessel closure head cracking that has been experienced at ANO 1?

A. As with the steam generator tube degradation, the root cause of the reactor vessel head cracking that has been experienced at ANO 1 was the susceptibility of the materials used for the control rod drive mechanism ("CRDM") nozzles in the original reactor vessel closure head to cracking when exposed to the plant's

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[4] Direct Testimony of William R. Campbell, at page 40, lines 7-8.

operating environment.[5] In particular, the reactor head Alloy 600 CRDM nozzles and smaller bore nozzles are susceptible to cracking as a result of Primary Water Stress Corrosion Cracking ("PWSCC") in primary system water at temperatures of approximately 600 degrees F and higher.

Q. Were the materials used in the original ANO 1 CRDM nozzles typical of the types of materials used in CRDM nozzles in other power plants designed and built at the same time as ANO 1?

A. Yes. The materials used for the ANO 1 reactor vessel head, including the Alloy 600 used for the CRDM nozzles, were typical of the materials used in nuclear power plants of ANO 1's vintage.

Q. Have other power plants experienced similar cracking in CRDM nozzles?

A. Yes. The first crack in an Alloy 600 CRDM nozzle was discovered in France in 1989. The first through-wall PWSCC crack in an Alloy 600 CRDM nozzle occurred at the Bugey 3 plant in France in 1991. Since November 2000, more than 50 CRDM nozzles have exhibited through-wall or partial through-wall PWSCC cracks at B&W plants. PWSCC-caused CRDM cracking also has occurred at non-B&W plants in the U.S. in 1994, 2001, and 2002.

Q. Is there any evidence that the Company's operational practices increased the severity of the reactor vessel head cracking at ANO 1?

A. No. I have not seen any evidence that suggests that Entergy's operational practices increased the severity of the CRDM nozzle cracking at ANO 1.

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[5] See pages 49 to 51 of the Direct Testimony of Entergy witness Campbell.

Q. Were there any reasonable actions that Entergy could have taken that would have enabled it to avoid the CRDM nozzle cracking at ANO 1?

A. No. Given the experience of other operating nuclear power plants of a similar vintage, both in the U.S. and abroad, it was almost inevitable that ANO 1 would experience significant cracking of its Alloy 600 CRDM nozzles.

Q. Do you agree with the Entergy conclusion that the ANO 1 reactor vessel head will have to be replaced in the near future?

A. Yes. Industry assessments suggest that the PWSCC-caused cracking of Alloy 600 CRDM nozzles is heavily dependent on temperature and operating time. Therefore, it is very likely that there will be future nozzle cracking as ANO 1 accumulates more operating time at its normal operating temperature.

ANO 1 is considered one of the four power plants most susceptible to PWSCC-caused cracking of CRDM nozzles. The alternatives for addressing this problem are (1) a program of intensive and expensive inspections and repairs or (2) replacement of the reactor vessel closure head. Given the great uncertainty about likely future cracking rates, I agree with Entergy that replacement of the ANO 1 reactor vessel closure head is the preferred option.

Q. Do the design and materials features of the replacement reactor vessel closure head address the causes of the CRDM cracking?

A. Yes. The replacement reactor vessel closure head incorporates design, materials, and fabrication improvements to address the root cause of the CRDM nozzle cracking.[6] Most significantly, the replacement reactor vessel closure head will include Alloy 690 nozzles. This material will offer a superior resistance to the cracking that has been experienced in the original reactor vessel closure head.

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[6] Entergy response to APSC 1-11, at page HC5552.

Q. Has CRDM nozzle cracking led to the replacement of the reactor vessel heads at any nuclear power plants?

A. Yes. Since 1992 Electricite de France (EDF) has installed 41 replacement reactor vessel heads with Alloy 690 nozzles. The reactor vessel head at the Davis-Besse plant has recently been replaced.

Q. What has been the operating experience of the replacement reactor vessel heads at other nuclear power plants?

A. EDF has said that it has not experienced any cracks in any of the replacement reactor vessel heads that have been installed at 41 of its operating nuclear power plants.[7] The Davis-Besse plant in the U.S. has not yet restarted with its replacement reactor vessel head.

Q. Are other B&W plants planning to replace their reactor vessel closure heads?

A. Yes. The reactor vessel closure head at the Davis-Besse plant already has been replaced. The owners of the other B&W plants also plan to replace the reactor vessel closure heads at their units in 2003 and 2004. Duke Power is planning to replace the reactor vessel closure heads at its three Oconee Units in 2003 and 2004. Exelon plans to replace the TMI Unit 1 reactor vessel closure head in 2003. Finally, Progress Energy plans to replace the Crystal River reactor vessel closure head in 2004.

Q. Do you agree with Entergy that it is reasonable to replace the reactor vessel closure head in 2005?

A. Yes. Given industry experience, safety concerns with circumferential cracking of CRDM nozzles, and the fact that it is not possible to accurately predict the rate at

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[7] *Nucleonics Week*, October 31, 2002, at page 1.

which new cracks will occur, I agree that ANO 1's reactor vessel closure head should be replaced as soon as possible.

Q. Was the selection of Framatome ANP to manufacture the replacement steam generators and replacement reactor vessel closure head consistent with industry practice?

A. Yes. Framatome ANP has extensive experience fabricating replacement steam generators for domestic U.S. and foreign nuclear power plants.

Q. What firm has Entergy retained to remove the existing steam generators and reactor vessel closure head and install the replacement steam generators and reactor vessel closure head?

A. I have been told that Entergy is currently negotiating a contract to retain [ ] to install the ANO 1 replacement steam generators and reactor vessel closure head.

Q. Was the selection of [ ] to install the replacement steam generators and reactor vessel closure head consistent with industry practice?

A. Yes. [ ] has significant experience planning, engineering and managing the installation of replacement steam generators.

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Q. Do you have any observations concerning the Company's efforts to preplan the replacement of ANO 1's steam generators and reactor vessel closure head?

A. Yes. Entergy appears to be taking reasonable efforts to preplan the replacement of ANO 1's steam generators and reactor vessel head. These efforts include:

- Applying the lessons it learned from the replacement of the steam generators at ANO 2 and from the experiences of other nuclear power plants.
- Retaining an experienced firm to install the replacement steam generators and reactor vessel closure head.
- Closely monitoring the replacement of the Oconee steam generators and reactor vessel closure heads in 2003 and 2004 and sending ANO staff to observe and learn from these replacements.

Q. Is Entergy's projected 80 to 90 day duration for the ANO 1 steam generator/reactor vessel closure head replacement outage consistent with the durations of similar outages at other nuclear power plants?

A. Yes. Entergy's 80 to 90 day projected outage duration is comparable to both industry experience and the 78 days that Duke Power is currently projecting for the upcoming 2003 Oconee Unit 1 and 2004 Unit 2 outages during which those units' steam generators and reactor vessel closure heads will be replaced.[8]

Q. Have you found any weaknesses in the Entergy economic analyses presented by Company witness Kenney?

A. No. The Company presents a base case analysis and a number of sensitivity studies that examine the economics of replacing the steam generators and reactor vessel closure head.

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[8] *Nuclear News*, April 2003.

Q. Have you nevertheless prepared any additional sensitivity studies to examine the economics of replacing the ANO 1 steam generators and reactor vessel closure head?

A. Yes. Using the Company's economic model we have prepared a number of additional sensitivity studies which examine the economics of replacing the steam generators assuming that the future capacity factors for ANO 1 are lower than Entergy has projected and/or that future O&M costs and annual capital additions expenditures are higher than the Company has estimated in its studies.

The results of these additional sensitivity studies, in terms of the Net Present Value Benefit ("NPV") of Replacement, are shown in Table DAS-1 below. All of these studies use the Company's base case assumptions except for the noted changes in capacity factors, O&M costs and capital additions expenditures. All of these studies also assume that any steam generator replacements would occur in 2005:

Table DAS-1
Results of Sensitivity Studies
For Modified Post-Replacement Capacity Factors,
O&M Costs and Capital Additions Expenditures (in $000)

Scenario	NPV of Replacement Reference Case[9] ($000)	NPV of Replacement Low Case ($000)	NPV of Replacement High Case ($000)
Base Case Assumptions			
80% 3-Year Average Capacity Factors			
75% 3-Year Average Capacity Factors			
75% 3-Year Average Capacity Factors and [ ]% annual O&M and Cap Add Escalation starting post-replacement			
Declining Capacity Factors Starting in 2014 (85% in 2014-2023, 75% in 2024-2034)			
Declining Capacity Factors and [ ]% O&M Escalation all starting in 2014			
Serious Aging - Base Case assumptions through 2013 then 60% capacity factors and [ ]% O&M and Cap Add Escalation			

Q. Did you examine any "no steam generator replacement" scenarios in which the impact of steam generator tube damage on plant operating performance and costs is less than that projected by Entergy?

A. Yes. We believe that ANO 1's projected MWH losses and estimated costs due to SG tube damage in the "no replacement scenarios" are reasonable. However, to evaluate whether replacement remained the more economic option, we reran the scenarios listed in Table DAS-1 to reflect 50 percent lower MWH losses in the no replacement scenarios due to steam generator problems and 50 percent lower steam generator-related repair costs. The results of these studies are shown in Table DAS-2 below:

[9] The terms Reference Case, Low Case and High Case refer the three market price scenarios developed by Entergy and used in its economic analyses.

Table DAS-2
Results of Sensitivity Studies For 50% Lower MWH Losses in No Replacement Cases and 50% Lower Steam Generator-related Repair Costs (in $000)

Scenario	NPV of Replacement Reference Case ($000)	NPV of Replacement Low Case ($000)	NPV of Replacement High Case ($000)
Base Case Assumptions			
80% 3-Year Average Capacity Factors			
75% 3-Year Average Capacity Factors			
75% 3-Year Average Capacity Factors and [ ]% annual O&M and Cap Add Escalation starting post-replacement			
Declining Capacity Factors Starting in 2014 (85% in 2014-2023, 75% in 2024-2034)			
Declining Capacity Factors and [ ]% O&M Escalation all starting in 2014			
Serious Aging - Base Case assumptions through 2013 then 60% capacity factors and [ ]% O&M and Cap Add Escalation			

Q. Did you prepare any other sensitivity analyses?

A. Yes. We also looked at the economics of replacing the steam generators if we assume that post-replacement ANO 1 were to experience the need for another major capital addition expenditure, i.e., to replace another expensive plant component – at some point during its remaining operating life. As shown in Table DAS-3 below, the relative economics of replacement versus no replacement are not changed in a significant way in this scenario.[10]

In addition, we examined the relative economics of replacement versus no replacement in scenarios assuming that the plant is retired before 2034 even though the steam generators were replaced in 2005. As shown in Table DAS-3, replacement remains the more economic option if you assume that ANO 1 will

[10] In our analysis we assumed that this capital expenditure would occur in 2017, but this date could be changed without significantly altering the results.

continue to operate post-replacement through 2014 (using reference case and high case market prices), and 2017 (using low market prices).

Table DAS-3
Results for Sensitivity Analyses Reflecting Major Capital Expenditures And Early Shutdown (in $000)

Scenario	NPV of Replacement Reference Case ($000)	NPV of Replacement Low Case ($000)	NPV of Replacement High Case ($000)
Addition $100 million Capital Expenditure in 2017 (Shutdown in 2034)			
Early Shutdown in 2013			
Early Shutdown in 2014			
Early Shutdown in 2015			
Early Shutdown in 2017			

Q. What are your conclusions regarding the relative economics of replacing ANO 1's steam generators and reactor vessel closure head versus no replacement?

A. Replacement was the more economic option in almost all of the scenarios we examined. Most of the scenarios in which the no replacement alternative was the more economic option were based on the low case of Entergy's market price forecasts. [

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The two scenarios in which the no replacement alternative was the more economic option when using reference case market prices required modification of Entergy's projections of future ANO 1 operating performance and costs:

- Serious plant deterioration in plant performance and significantly higher O&M costs and capital additions expenditures starting in 2014 as a result of the aging of plant components, systems and structures.
- Significantly lower MWH losses and steam generator-related repair costs during the years 2005-2013 if the ANO 1 steam generators are not replaced in 2005.

These changed circumstances may well occur in future years. However, at this time we do not think that the occurrence of these scenarios is sufficiently probable to conclude that replacement of the steam generators is not the more economic option considering the potential economic benefits for replacement shown in most other sensitivity scenarios.

Q. What is your overall conclusion regarding Entergy's proposal to replace ANO 1's steam generators and reactor vessel closure head?

A. Based on the information we have reviewed and the sensitivity studies that we have prepared, we agree with Entergy that it is necessary to replace the steam generators and reactor vessel closure head at ANO 1 and the replacement in 2005 appears to be the least cost option at this time.

Q. Does this complete your testimony?

A. Yes.

EXHIBIT DAS-1

David A Schlissel

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SUMMARY

I have worked for twenty-eight years as a consultant and attorney on complex management, engineering, and economic issues, primarily in the field of energy. This work has involved conducting technical investigations, preparing economic analyses, presenting expert testimony, providing support during all phases of regulatory proceedings and litigation, and advising clients during settlement negotiations. I received undergraduate and advanced engineering degrees from the Massachusetts Institute of Technology and Stanford University and a law degree from Stanford Law School

PROFESSIONAL EXPERIENCE

Electric Industry Restructuring and Deregulation - Investigated whether generators have been intentionally withholding capacity in order to manipulate prices in the new spot wholesale market in New England. Evaluated the reasonableness of nuclear and fossil plant sales and auctions of power purchase agreements. Analyzed stranded utility costs in Massachusetts and Connecticut. Examined the reasonableness of utility standard offer rates and transition charges.

System Operations and Reliability Analysis - Investigated the causes of distribution system outages and inadequate service reliability. Evaluated the impact of a proposed merger on the reliability of the electric service provided to the ratepayers of the merging companies. Assessed whether new transmission and generation additions were needed to ensure adequate levels of system reliability. Scrutinized utility system reliability expenditures. Reviewed natural gas and telephone utility repair and replacement programs and policies.

Power Plant Operations and Economics - Investigated the causes of more than one hundred power plant and system outages, equipment failures, and component degradation, determined whether these problems could have been anticipated and avoided, and assessed liability for repair and replacement costs. Reviewed power plant operating, maintenance, and capital costs. Evaluated utility plans for and management of the replacement of major power plant components. Assessed the adequacy of power plant quality assurance and maintenance programs. Examined the selection and supervision of contractors and subcontractors. Evaluated the reasonableness of contract provisions and terms in proposed power supply agreements.

Nuclear Power - Examined the impact of industry restructuring and nuclear power plant life extensions on decommissioning costs and collections policies. Evaluated utility decommissioning cost estimates. Assessed the potential impact of electric industry deregulation on nuclear power plant safety. Reviewed nuclear waste storage and disposal costs. Investigated the potential safety consequences of nuclear power plant structure, system, and component failures.

Economic Analysis - Analyzed the costs and benefits of energy supply options. Examined the economic and system reliability consequences of the early retirement of major electric generating facilities. Quantified replacement power costs and the increased capital and operating costs due to identified instances of mismanagement.

Expert Testimony - Presented the results of management, technical and economic analyses as testimony in more than seventy proceedings before regulatory boards and commissions in twenty one states, before two federal regulatory agencies, and in state and federal court proceedings.

Litigation and Regulatory Support - Participated in all aspects of the development and preparation of case presentations on complex management, technical, and economic issues. Assisted in the preparation and conduct of pre-trial discovery and depositions. Helped identify and prepare expert witnesses. Aided the preparation of pre-hearing petitions and motions and post-hearing briefs and appeals. Assisted counsel in preparing for hearings and oral arguments. Advised counsel during settlement negotiations.

TESTIMONY

New Jersey Board of Public Utilities (Docket No. ER02080614) – January 2003
The prudence of Rockland Electric Company's power purchases during the period August 1, 1999 through July 31, 2002.

New York State Board on Electric Generation Siting and the Environment (Case No. 00-F-1356) – September and October 2002 and January 2003
The need for and the environmental benefits from the proposed 300 MW Kings Park Energy generating facility.

Arizona Corporation Commission (Docket No. E-01345A-01-0822) – March 2002
The reasonableness of Arizona Public Service Company's proposed long-term power purchase agreement with an affiliated company.

New York State Board on Electric Generation Siting and the Environment (Case No. 99-F-1627) – March 2002
Repowering NYPA's existing Poletti Station in Queens, New York.

Connecticut Siting Council (Docket No. 217) – March 2002
Whether the proposed 345-kV transmission line between Plumtree and Norwalk substations in Southwestern Connecticut is needed and will produce public benefits.

Vermont Public Service Board (Case No. 6545) – January 2002

Whether the proposed sale of the Vermont Yankee Nuclear Plant to Entergy is in the public interest of the State of Vermont and Vermont ratepayers.

Connecticut Department of Public Utility Control (Docket 99-09-12RE02) – December 2001
The reasonableness of adjustments that Connecticut Light and Power Company seeks to make to the proceeds that it received from the sale of Millstone Nuclear Power Station.

Connecticut Siting Council (Docket No. 208) – October 2001
Whether the proposed cross-sound cable between Connecticut and Long Island is needed and will produce public benefits for Connecticut consumers.

New Jersey Board of Public Utilities (Docket No. EM01050308) - September 2001
The market power implications of the proposed merger between Conectiv and Pepco.

Illinois Commerce Commission Docket No. 01-0423 – August, September, and October 2001
Commonwealth Edison Company's management of its distribution and transmission systems.

New York State Board on Electric Generation Siting and the Environment (Case No. 99-F-1627) - August and September 2001
The environmental benefits from the proposed 500 MW NYPA Astoria generating facility.

New York State Board on Electric Generation Siting and the Environment (Case No. 99-F-1191) - June 2001
The environmental benefits from the proposed 1,000 MW Astoria Energy generating facility.

New Jersey Board of Public Utilities (Docket No. EM00110870) - May 2001
The market power implications of the proposed merger between FirstEnergy and GPU Energy.

Connecticut Department of Public Utility Control (Docket 99-09-12RE01) - November 2000
The proposed sale of Millstone Nuclear Station to Dominion Nuclear, Inc.

Illinois Commerce Commission (Docket 00-0361) - August 2000
The impact of nuclear power plant life extensions on Commonwealth Edison Company's decommissioning costs and collections from ratepayers.

Vermont Public Service Board (Docket 6300) - April 2000
Whether the proposed sale of the Vermont Yankee nuclear plant to AmerGen Vermont is in the public interest.

Massachusetts Department of Telecommunications and Energy (Docket 99-107, Phase II) - April and June 2000
The causes of the May 18, 1999, main transformer fire at the Pilgrim generating station.

Connecticut Department of Public Utility Control (Docket 00-01-11) - March and April 2000
The impact of the proposed merger between Northeast Utilities and Con Edison, Inc. on the reliability of the electric service being provided to Connecticut ratepayers.

Connecticut Department of Public Utility Control (Docket 99-09-12) - January 2000
The reasonableness of Northeast Utilities plan for auctioning the Millstone Nuclear Station.

Connecticut Department of Public Utility Control (Docket 99-08-01) - November 1999
Generation, Transmission, and Distribution system reliability.

Illinois Commerce Commission (Docket 99-0115) - September 1999
Commonwealth Edison Company's decommissioning cost estimate for the Zion Nuclear Station.

Connecticut Department of Public Utility Control (Docket 99-03-36) - July 1999
Standard offer rates for Connecticut Light & Power Company.

Connecticut Department of Public Utility Control (Docket 99-03-35) - July 1999
Standard offer rates for United Illuminating Company.

Connecticut Department of Public Utility Control (Docket 99-02-05) - April 1999
Connecticut Light & Power Company stranded costs.

Connecticut Department of Public Utility Control (Docket 99-03-04) - April 1999
United Illuminating Company stranded costs.

Maryland Public Service Commission (Docket 8795) - December 1998
Future operating performance of Delmarva Power Company's nuclear units.

Maryland Public Service Commission (Dockets 8794/8804) - December 1998
Baltimore Gas and Electric Company's proposed replacement of the steam generators at the Calvert Cliffs Nuclear Power Plant. Future performance of nuclear units.

Indiana Utility Regulatory Commission (Docket 38702-FAC-40-S1) - November 1998
Whether the ongoing outages of the two units at the D.C. Cook Nuclear Plant were caused or extended by mismanagement.

Arkansas Public Service Commission (Docket 98-065-U) - October 1998
Entergy's proposed replacement of the steam generators at the ANO Unit 2 Steam Generating Station.

Massachusetts Department of Telecommunications and Energy (Docket 97-120) - October 1998
Western Massachusetts Electric Company's Transition Charge. Whether the extended 1996-1998 outages of the three units at the Millstone Nuclear Station were caused or extended by mismanagement.

Connecticut Department of Public Utility Control (Docket 98-01-02) - September 1998
Nuclear plant operations, operating and capital costs, and system reliability improvement costs.

Illinois Commerce Commission (Docket 97-0015) - May 1998
Whether any of the outages of Commonwealth Edison Company's twelve nuclear units during 1996 were caused or extended by mismanagement. Whether equipment problems, personnel performance weaknesses, and program deficiencies could have been avoided or addressed prior to plant outages. Outage-related fuel and replacement power costs.

Public Service Commission of West Virginia (Case 97-1329-E-CN) - March 1998
The need for a proposed 765 kV transmission line from Wyoming, West Virginia, to Cloverdate, Virginia.

Illinois Commerce Commission (Docket 97-0018) - March 1998
Whether any of the outages of the Clinton Power Station during 1996 were caused or extended by mismanagement.

Connecticut Department of Public Utility Control (Docket 97-05-12) - October 1997
The increased costs resulting from the ongoing outages of the three units at the Millstone Nuclear Station.

New Jersey Board of Public Utilities (Docket ER96030257) - August 1996
Replacement power costs during plant outages.

Illinois Commerce Commission (Docket 95-0119) - February 1996
Whether any of the outages of Commonwealth Edison Company's twelve nuclear units during 1994 were caused or extended by mismanagement. Whether equipment problems, personnel performance weaknesses, and program deficiencies could have been avoided or addressed prior to plant outages. Outage-related fuel and replacement power costs.

Public Utility Commission of Texas (Docket 13170) - December 1994
Whether any of the outages of the River Bend Nuclear Station during the period October 1, 1991, through December 31, 1993, were caused or extended by mismanagement.

Public Utility Commission of Texas (Docket 12820) - October 1994
Operations and maintenance expenses during outages of the South Texas Nuclear Generating Station.

Wisconsin Public Service Commission (Cases 6630-CE-197 and 6630-CE-209) - September and October 1994
The reasonableness of the projected cost and schedule for the replacement of the steam generators at the Point Beach Nuclear Power Plant. The potential impact of plant aging on future operating costs and performance.

Public Utility Commission of Texas (Docket 12700) - June 1994
Whether El Paso Electric Company's share of Palo Verde Unit 3 was needed to ensure adequate levels of system reliability. Whether the Company's investment in Unit 3 could be expected to generate cost savings for ratepayers within a reasonable number of years.

Arizona Corporation Commission (Docket U-1551-93-272) - May and June 1994
Southwest Gas Corporation's plastic and steel pipe repair and replacement programs.

Connecticut Department of Public Utility Control (Docket 92-04-15) - March 1994
Northeast Utilities management of the 1992/1993 replacement of the steam generators at Millstone Unit 2.

Connecticut Department of Public Utility Control (Docket 92-10-03) - August 1993
Whether the 1991 outage of Millstone Unit 3 as a result of the corrosion of safety-related plant piping systems was due to mismanagement.

Public Utility Commission of Texas (Docket 11735) - April and July 1993
Whether any of the outages of the Comanche Peak Unit 1 Nuclear Station during the period August 13, 1990, through June 30, 1992, were caused or extended by mismanagement.

Connecticut Department of Public Utility Control (Docket 91-12-07) - January 1993 and August 1995
Whether the November 6, 1991, pipe rupture at Millstone Unit 2 and the related outages of the Connecticut Yankee and Millstone units were caused or extended by mismanagement. The impact of environmental requirements on power plant design and operation.

Connecticut Department of Public Utility Control (Docket 92-06-05) - September 1992
United Illuminating Company off-system capacity sales.

Public Utility Commission of Texas (Docket 10894) - August 1992
Whether any of the outages of the River Bend Nuclear Station during the period October 1, 1988, through September 30, 1991, were caused or extended by mismanagement.

Connecticut Department of Public Utility Control (Docket 92-01-05) - August 1992
Whether the July 1991 outage of Millstone Unit 3 due tot he fouling of important plant systems by blue mussels was the result of mismanagement.

California Public Utilities Commission (Docket 90-12-018) - November 1991, March 1992, June and July 1993
Whether any of the outages of the three units at the Palo Verde Nuclear Generating Station during 1989 and 1990 were caused or extended by mismanagement. Whether equipment problems, personnel performance weaknesses and program deficiencies could have been avoided or addressed prior to outages. Whether specific plant operating cost and capital expenditures were necessary and prudent.

Public Utility Commission of Texas (Docket 9945) - July 1991
Whether El Paso Electric Company's share of Palo Verde Unit 3 was needed to ensure adequate levels of system reliability. Whether the Company's investment in the unit could be expected to generate cost savings for ratepayers within a reasonable number of years. El Paso Electric Company's management of the planning and licensing of the Arizona Interconnection Project transmission line.

Arizona Corporation Commission (Docket U-1345-90-007) - December 1990 and April 1991
Arizona Public Service Company's management of the planning, construction and operation of the Palo Verde Nuclear Generating Station. The costs resulting from identified instances of mismanagement.

New Jersey Board of Public Utilities (Docket ER89110912J) - July and October 1990
The economic costs and benefits of the early retirement of the Oyster Creek Nuclear Plant. The potential impact of the unit's early retirement on system reliability. The cost and schedule for siting and constructing a replacement natural gas-fired generating plant.

Public Utility Commission of Texas (Docket 9300) - June and July 1990
Texas Utilities management of the design and construction of the Comanche Peak Nuclear Plant. Whether the Company was prudent in repurchasing minority owners' shares of Comanche Peak without examining the costs and benefits of the repurchase for its ratepayers.

Federal Energy Regulatory Commission (Docket EL-88-5-000) - November 1989
Boston Edison's corporate management of the Pilgrim Nuclear Station.

Connecticut Department of Public Utility Control (Docket 89-08-11) - November 1989
United Illuminating Company's off-system capacity sales.

Kansas State Corporation Commission (Case 164,211-U) - April 1989
Whether any of the 127 days of outages of the Wolf Creek generating plant during 1987 and 1988 were the result of mismanagement.

Public Utility Commission of Texas (Docket 8425) - March 1989
Whether Houston Lighting & Power Company's new Limestone Unit 2 generating facility was needed to provide adequate levels of system reliability. Whether the Company's investment in Limestone Unit 2 would provide a net economic benefit for ratepayers.

Illinois Commerce Commission (Dockets 83-0537 and 84-0555) - July 1985 and January 1989
Commonwealth Edison Company's management of quality assurance and quality control activities and the actions of project contractors during construction of the Byron Nuclear Station.

New Mexico Public Service Commission (Case 2146, Part II) - October 1988
The rate consequences of Public Service Company of New Mexico's ownership of Palo Verde Units 1 and 2.

United States District Court for the Eastern District of New York (Case 87-646-JBW) - October 1988
Whether the Long Island Lighting Company withheld important information from the New York State Public Service Commission, the New York State Board on Electric Generating Siting and the Environment, and the U.S. Nuclear Regulatory Commission.

Public Utility Commission of Texas (Docket 6668) - August 1988 and June 1989
Houston Light & Power Company's management of the design and construction of the South Texas Nuclear Project. The impact of safety-related and environmental requirements on plant construction costs and schedule.

Federal Energy Regulatory Commission (Docket ER88-202-000) - June 1988
Whether the turbine generator vibration problems that extended the 1987 outage of the Maine Yankee nuclear plant were caused by mismanagement.

Illinois Commerce Commission (Docket 87-0695) - April 1988
Illinois Power Company's planning for the Clinton Nuclear Station.

North Carolina Utilities Commission (Docket E-2, Sub 537) - February 1988
Carolina Power & Light Company's management of the design and construction of the Harris Nuclear Project. The Company's management of quality assurance and quality control activities. The impact of safety-related and environmental requirements on construction costs and schedule. The cost and schedule consequences of identified instances of mismanagement.

Ohio Public Utilities Commission (Case 87-689-EL-AIR) - October 1987
Whether any of Ohio Edison's share of the Perry Unit 2 generating facility was needed to ensure adequate levels of system reliability. Whether the Company's investment in Perry Unit 1 would produce a net economic benefit for ratepayers.

North Carolina Utilities Commission (Docket E-2, Sub 526) - June 1987
Fuel factor calculations.

New York State Public Service Commission (Case 29484) - May 1987
The planned startup and power ascension testing program for the Nine Mile Point Unit 2 generating facility.

Illinois Commerce Commission (Dockets 86-0043 and 86-0096) - April 1987
The reasonableness of certain terms in a proposed Power Supply Agreement.

Illinois Commerce Commission (Docket 86-0405) - March 1987
The in-service criteria to be used to determine when a new generating facility was capable of providing safe, adequate, reliable and efficient service.

Indiana Public Service Commission (Case 38045) - December 1986
Northern Indiana Public Service Company's planning for the Schaefer Unit 18 generating facility. Whether the capacity from Unit 18 was needed to ensure adequate system reliability. The rate consequences of excess capacity on the Company's system.

Superior Court in Rockingham County, New Hampshire (Case 86E328) - July 1986
The radiation effects of low power testing on the structures, equipment and components in a new nuclear power plant.

New York State Public Service Commission (Case 28124) - April 1986 and May 1987
The terms and provisions in a utility's contract with an equipment supplier. The prudence of the utility's planning for a new generating facility. Expenditures on a canceled generating facility.

Arizona Corporation Commission (Docket U-1345-85) - February 1986
The construction schedule for Palo Verde Unit No. 1. Regulatory and technical factors that would likely affect future plant operating costs.

New York State Public Service Commission (Case 29124) - January 1986
Niagara Mohawk Power Corporation's management of construction of the Nine Mile Point Unit No. 2 nuclear power plant.

New York State Public Service Commission (Case 28252) - October 1985
A performance standard for the Shoreham nuclear power plant.

New York State Public Service Commission (Case 29069) - August 1985
A performance standard for the Nine Mile Point Unit No. 2 nuclear power plant.

Missouri Public Service Commission (Cases ER-85-128 and EO-85-185) - July 1985
The impact of safety-related regulatory requirements and plant aging on power plant operating costs and performance. Regulatory factors and plant-specific design features that will likely affect the future operating costs and performance of the Wolf Creek Nuclear Plant.

Massachusetts Department of Public Utilities (Case 84-152) - January 1985
The impact of safety-related regulatory requirements and plant aging on power plant operating costs and performance. Regulatory factors and plant-specific design features that will likely affect the future operating costs and performance of the Seabrook Nuclear Plant.

Maine Public Utilities Commission (Docket 84-113) - September 1984
The impact of safety-related regulatory requirements and plant aging on power plant operating costs and performance. Regulatory factors and plant-specific design features that will likely affect the future operating costs and performance of the Seabrook Nuclear Plant.

South Carolina Public Service Commission (Case 84-122-E) - August 1984
The repair and replacement strategy adopted by Carolina Power & Light Company in response to pipe cracking at the Brunswick Nuclear Station. Quantification of replacement power costs attributable to identified instances of mismanagement.

Vermont Public Service Board (Case 4865) - May 1984
The repair and replacement strategy adopted by management in response to pipe cracking at the Vermont Yankee nuclear plant.

New York State Public Service Commission (Case 28347) -January 1984
The information that was available to Niagara Mohawk Power Corporation prior to 1982 concerning the potential for cracking in safety-related piping systems at the Nine Mile Point Unit No. 1 nuclear plant.

New York State Public Service Commission (Case 28166) - February 1983 and February 1984
Whether the January 25, 1982, steam generator tube rupture at the Ginna Nuclear Plant was caused by mismanagement.

U.S. Nuclear Regulatory Commission (Case 50-247SP) - May 1983
The economic costs and benefits of the early retirement of the Indian Point nuclear plants.

REPORTS, ARTICLES, AND PRESENTATIONS

Financial Insecurity: The Increasing Use of Limited Liability Companies and Multi-tiered Holding Companies to Own Electric Generating Plants. A presentation at the 2002 NASUCA Annual Meeting. November 12, 2002.

Determining the Need for Proposed Overhead Transmission Facilities. A Presentation by David Schlissel and Paul Peterson to the Task Force and Working Group for Connecticut Public Act 02-95. October 17, 2002.

Future PG&E Net Revenues From The Sale of Electricity Generated at its Brayton Point Station. An Analysis for the Attorney General of the State of Rhode Island. October 2, 2002.

PG&E's Net Revenues From The Sale of Electricity Generated at its Brayton Point Station During the Years 1999-2002. An Analysis for the Attorney General of the State of Rhode Island. October 2, 2002.

Financial Insecurity: The Increasing Use of Limited Liability Companies and Multi-Tiered Holding Companies to Own Nuclear Power Plants. A Synapse report for the STAR Foundation and Riverkeeper, Inc., by David Schlissel, Paul Peterson, and Bruce Biewald, August 7, 2002.

Comments on EPA's Proposed Clean Water Act Section 316(b) for Cooling Water Intake Structures at Phase II Existing Facilities, on behalf of Riverkeeper, Inc., by David Schlissel and Geoffrey Keith, August 2002.

The Impact of Retiring the Indian Point Nuclear Power Station on Electric System Reliability. A Synapse Report for Riverkeeper, Inc. and Pace Law School Energy Project. May 7, 2002.

Preliminary Assessment of the Need for the Proposed Plumtree-Norwalk 345-kV Transmission Line. A Synapse Report for the Towns of Bethel, Redding, Weston, and Wilton Connecticut. October 15, 2001.

ISO New England's Generating Unit Availability Study: Where's the Beef? A Presentation at the June 29, 2001 Restructuring Roundtable.

Clean Air and Reliable Power: Connecticut Legislative House Bill HB6365 will not Jeopardize Electric System Reliability. A Synapse Report for the Clean Air Task Force. May 2001.

Room to Breathe: Why the Massachusetts Department of Environmental Protection's Proposed Air Regulations are Compatible with Reliability. A Synapse Report for MASSPIRG and the Clean Water Fund. March 2001.

Generator Outage Increases: A Preliminary Analysis of Outage Trends in the New England Electricity Market, a Synapse Report for the Union of Concerned Scientists, January 7, 2001.

Cost, Grid Reliability Concerns on the Rise Amid Restructuring, with Charlie Harak, Boston Business Journal, August 18-24, 2000.

Report on Indian Point 2 Steam Generator Issues, Schlissel Technical Consulting, Inc., March 10, 2000.

Preliminary Expert Report in Case 96-016613, Cities of Wharton, Pasadena, et al v. Houston Lighting & Power Company, October 28, 1999.

Comments of Schlissel Technical Consulting, Inc. on the Nuclear Regulatory Commission's Draft Policy Statement on Electric Industry Economic Deregulation, February 1997.

Report to the Municipal Electric Utility Association of New York State on the Cost of Decommissioning the Fitzpatrick Nuclear Plant, August 1996.

Report to the Staff of the Arizona Corporation Commission on U.S. West Corporation's telephone cable repair and replacement programs, May, 1996.

Nuclear Power in the Competitive Environment, NRRI Quarterly Bulletin, Vol. 16, No. 3, Fall 1995.

Nuclear Power in the Competitive Environment, presentation at the 18th National Conference of Regulatory Attorneys, Scottsdale, Arizona, May 17, 1995.

The Potential Safety Consequences of Steam Generator Tube Cracking at the Byron and Braidwood Nuclear Stations, a report for the Environmental Law and Policy Center of the Midwest, 1995.

Report to the Public Policy Group Concerning Future Trojan Nuclear Plant Operating Performance and Costs, July 15, 1992.

Report to the New York State Consumer Protection Board on the Costs of the 1991 Refueling Outage of Indian Point 2, December 1991.

Preliminary Report on Excess Capacity Issues to the Public Utility Regulation Board of the City of El Paso, Texas, April 1991.

Nuclear Power Plant Construction Costs, presentation at the November, 1987, Conference of the National Association of State Utility Consumer Advocates.

Comments on the Final Report of the National Electric Reliability Study, a report for the New York State Consumer Protection Board, February 27, 1981.

OTHER SIGNIFICANT INVESTIGATIONS AND LITIGATION SUPPORT WORK

Assisted the Connecticut Office of Consumer Counsel in reviewing the auction of Connecticut Light & Power Company's power purchase agreements. August and September, 2000.

Assisted the New Jersey Division of the Ratepayer Advocate in evaluating the reasonableness of Atlantic City Electric Company's proposed sale of its fossil generating facilities. June and July, 2000.

Investigated whether the 1996-1998 outages of the three Millstone Nuclear Units were caused or extended by mismanagement. 1997 and 1998. Clients were the Connecticut Office of Consumer Counsel and the Office of the Attorney General of the Commonwealth of Massachusetts.

Investigated whether the 1995-1997 outages of the two units at the Salem Nuclear Station were caused or extended by mismanagement. 1996-1997. Client was the New Jersey Division of the Ratepayer Advocate.

Assisted the Associated Industries of Massachusetts in quantifying the stranded costs associated with utility generating plants in the New England states. May through July, 1996

Investigated whether the December 25, 1993, turbine generator failure and fire at the Fermi 2 generating plant was caused by Detroit Edison Company's mismanagement of fabrication, operation or maintenance. 1995. Client was the Attorney General of the State of Michigan.

Investigated whether the outages of the two units at the South Texas Nuclear Generating Station during the years 1990 through 1994 were caused or extended by mismanagement. Client was the Texas Office of Public Utility Counsel.

Assisted the City Public Service Board of San Antonio, Texas in litigation over Houston Lighting & Power Company's management of operations of the South Texas Nuclear Generating Station.

Investigated whether outages of the Millstone nuclear units during the years 1991 through 1994 were caused or extended by mismanagement. Client was the Office of the Attorney General of the Commonwealth of Massachusetts.

Evaluated the 1994 Decommissioning Cost Estimate for the Maine Yankee Nuclear Plant. Client was the Public Advocate of the State of Maine.

Evaluated the 1994 Decommissioning Cost Estimate for the Seabrook Nuclear Plant. Clients were investment firms that were evaluating whether to purchase the Great Bay Power Company, one of Seabrook's minority owners.

Investigated whether a proposed natural-gas fired generating facility was need to ensure adequate levels of system reliability. Examined the potential impacts of environmental regulations on the unit's expected construction cost and schedule. 1992. Client was the New Jersey Rate Counsel.

Investigated whether Public Service Company of New Mexico management had adequately disclosed to potential investors the risk that it would be unable to market its excess generating capacity. Clients were individual shareholders of Public Service Company of New Mexico.

Investigated whether the Seabrook Nuclear Plant was prudently designed and constructed. 1989. Clients were the Connecticut Office of Consumer Counsel and the Attorney General of the State of Connecticut.

Investigated whether Carolina Power & Light Company had prudently managed the design and construction of the Harris nuclear plant. 1988-1989. Clients were the North Carolina Electric Municipal Power Agency and the City of Fayetteville, North Carolina.

Investigated whether the Grand Gulf nuclear plant had been prudently designed and constructed. 1988. Client was the Arkansas Public Service Commission.

Reviewed the financial incentive program proposed by the New York State Public Service Commission to improve nuclear power plant safety. 1987. Client was the New York State Consumer Protection Board.

Reviewed the construction cost and schedule of the Hope Creek Nuclear Generating Station. 1986-1987. Client was the New Jersey Rate Counsel.

Reviewed the operating performance of the Fort St. Vrain Nuclear Plant. 1985. Client was the Colorado Office of Consumer Counsel.

WORK HISTORY

2000 - Present: Senior Consultant, Synapse Energy Economics, Inc.

1994 - 2000: President, Schlissel Technical Consulting, Inc.

1983 - 1994: Director, Schlissel Engineering Associates

1979 - 1983: Private Legal and Consulting Practice

1975 - 1979: Attorney, New York State Consumer Protection Board

1973 - 1975: Staff Attorney, Georgia Power Project

EDUCATION

1983-1985: Massachusetts Institute of Technology
Special Graduate Student in Nuclear Engineering and Project Management,

1973: Stanford Law School,
Juris Doctor

1969: Stanford University
Master of Science in Astronautical Engineering,

1968: Massachusetts Institute of Technology
Bachelor of Science in Astronautical Engineering,

PROFESSIONAL MEMBERSHIPS

- New York State Bar since 1981
- American Nuclear Society
- National Association of Corrosion Engineers
- National Academy of Forensic Engineers (Correspondent Affiliate)