

STATE OF NEW HAMPSHIRE
BEFORE THE
NUCLEAR DECOMMISSIONING FINANCING COMMITTEE
SEABROOK DECOMMISSIONING FUND

DOCKET NO. NDFC 87-1

DIRECT TESTIMONY
OF
LARRY S. ECKHAUS
ON BEHALF OF THE
OFFICE OF THE CONSUMER ADVOCATE

September 30, 1987

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I. Qualifications

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Larry S. Eckhaus and my business address is 8
Old Suncook Road, Concord, N.H. 03301.

Q. WHAT IS YOUR OCCUPATION?

A. I am a Utility Analyst with the New Hampshire Office of
the Consumer Advocate.

Q. WOULD YOU PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND?

A. I received a Bachelor of Science Degree with a major in
Accounting from Brooklyn College, City University of New
York in February, 1971. I have attended the Graduate
School of Business of Baruch College of the City
University of New York for several semesters, part-time,
concentrating in taxation, finance and business courses.
I received the degree of Juris Doctor from Suffolk
University Law School in Boston, Massachusetts, in June,
1981.

Q. ARE YOU A MEMBER OF ANY PROFESSIONAL ASSOCIATION?

A. Yes. I was admitted to the New Hampshire Bar Association in October, 1982.

Q. WOULD YOU PLEASE DESCRIBE YOUR PROFESSIONAL EXPERIENCE?

A. I commenced full-time employment with the Brooklyn Union Gas Company in December, 1970. I was an internal auditor in the Auditing Department for approximately three years during which time I performed operational and financial audits of Company departments and assisted the Company's outside independent auditors in performing their annual audit. In October, 1973, I was promoted to Research Analyst in the Economic Research Department. My duties included preparation of data and testimony for rate cases, financial, economic and market research and preparation of data and text for the Company's Annual Report and Review of Operations. The studies included economics of gas supply alternatives, allocated cost of service studies, monthly analysis of major economic and business trends, energy/demand/price relationships among others.

In September, 1976, I commenced employment with the Attorney General of the Commonwealth of Massachusetts as a Financial Analyst. My role there was to prepare data analyses and assist in the preparation of cross-examination and briefs as intervenor before the

Massachusetts Department of Public Utilities in electric and gas utility rate cases. The issues involved depreciation, cost of service, rate base, rate of return and rate design. I also analyzed the purchased gas adjustment clauses of the various jurisdictional gas utilities and developed a generic purchased gas adjustment clause for use by Massachusetts gas distribution utilities.

I left the Attorney General's Office in May, 1978 and was retained by the New Hampshire Legislative Utility Consumer's Council (LUCC) as Financial Analyst in utility matters. My responsibilities included preparation of discovery, analysis, cross-examination and briefs and assisting attorneys in preparing electric, gas, telephone and water utility rate cases before the New Hampshire Public Utilities Commission, the Federal Energy Regulatory Commission and appeals to the New Hampshire Supreme Court.

In October, 1979, I left the LUCC and became Staff Financial Analyst with the New England Conference of Public Utility Commissioners, Inc. (NEC/PUC), in Boston, Massachusetts. While there, I coordinated a major study evaluating financial assurance alternatives for decommissioning nuclear power plants under a grant from the Nuclear Regulatory Commission. In addition, I provided information and analyses to the Public

Utilities Commissions of the six New England states, assisted the Staff Attorney in rate cases before the FERC and the FCC involving cost of service and rate of return and was responsible for coordinating implementation of the Public Utility Regulatory Policies Act of 1978 (PURPA) in New England.

I became Finance Director in charge of PURPA Activities with the New Hampshire Public Utilities Commission (NHPUC) in June, 1980. My responsibility included administration of federal grants, supervision of professional staff members, supervision of subcontracts and ensuring Commission compliance with the ratemaking and regulatory standards of PURPA. My responsibilities included supervision of rate design, analysis of the conversion of a major generating station from oil to coal and encouragement of small power production and cogeneration. In addition, I presided as the Hearing Officer in rulemaking proceedings and drafted rules regarding regulatory standards.

In December, 1980, I joined R.W. Beck and Associates, of Wellesley, Massachusetts, an independent consulting firm. My responsibilities included presentation of expert testimony before public utilities commissions on various aspects of regulation including ratemaking and rates from and to small power producers. I was also involved in negotiations between a client and a public utility for purchases and sales of electricity.

In August, 1981, I left R.W. Beck and became an independent consultant specializing in public utility regulation. My practice consisted of providing expert testimony, technical support in rate negotiations and other services related to utility rates, revenue and other services related to utility rates, revenue and regulation.

In July, 1987, I took the position of Utility Analyst with the New Hampshire Office of the Consumer Advocate.

Q. HAVE YOU EVER TESTIFIED BEFORE ANY REGULATORY BODY?

A. Yes, I have provided testimony on behalf of the Massachusetts Attorney General's Office before the Massachusetts Energy Facility Siting Council in the matter of Boston Edison's long range demand forecast. I have also testified before the New Hampshire Public Utilities Commission, the Vermont Public Service Board, the Virginia State Corporation Commission, the Rhode Island Public Utilities Commission, the Pennsylvania Public Utilities Commission, the Public Service Commission of West Virginia, the New Jersey Board of Public Utilities, the Georgia Public Service Commission, and the Maryland Public Service Commission.

My testimony has been in retail gas, electric, water and telephone utility cases on matters pertaining

to revenue requirements, rate base, rate design and rate of return issues and in other proceedings regarding policy issues such as generating unit performance programs for electric utilities, gas purchasing practices, etc.

Q. WHAT OTHER ASSIGNMENTS HAVE YOU BEEN INVOLVED IN?

A. In addition to the above testimonies, I have reviewed the construction budget forecasts of gas and electric utilities on behalf of the District of Columbia People's Council, performed a wastewater rate study on behalf of the Town of Derry, NH Department of Public Works, assisted in the development of gas rates for a Massachusetts municipal utility, etc. I have been involved in regulatory proceedings as well as various rate negotiations and municipal rate studies.

II. Purpose and Scope of Testimony

Q. WHAT IS THE PURPOSE AND SCOPE OF YOUR TESTIMONY?

A. I have reviewed the testimony filed by New Hampshire Yankee (NHY) in this proceeding concerning the amount of the decommissioning fund and the monthly payments required. The purpose of my testimony is to review that testimony and comment thereon.

NHY filed the testimony of Thomas S. LaGuardia, William P. Hannon and Judith C. Dunn on March 19, 1987.

Since other parties will be filing testimony concurrently with the Office of the Consumer Advocate (OCA), I reserve the right to file Supplemental Testimony, if necessary.

III. Summary of Testimony

Q. PLEASE SUMMARIZE YOUR CONCLUSIONS.

A. Based on the information provided by NHY and its witnesses, I disagree with their conclusion as to the cost of the fund and the monthly contribution to the fund. In my opinion, the owners of Seabrook Unit I, should be required, at a minimum, to make equal monthly contributions of \$1.6 million (Table 1), rather than \$341,347 initially as recommended by Mr. Hannon. This is based on an analysis, utilizing the SAFSTOR Method and Mr. LaGuardia's estimate as a starting point, resulting is a present value cost in 1987\$ of \$547.4 million as compared with Mr. LaGuardia's cost of \$242.4 million for the DECON Method and \$328.5 million for the SAFSTOR Method, assuming cost escalation of 1.2% per year above an inflation rate of 4.0%.

The following table summarizes the major assumption differences, resulting in these conclusions.

	<u>NHY</u>	<u>OCA</u>
Method	DECON	SAFSTOR
Plant Life	40 yrs.	35 yrs.
Payments	Equal in Real \$	Equal in Nominal \$
Inflation	4%/yr.	4%/yr.
Cost Escalation	-0-	1.2%/yr.
Fund Earning Rate	6.2%/yr.	6.0%/yr.

The result of these differences is an increase in the total cost of decommissioning as well as an increase in monthly payments into the fund. However, utilization of equal nominal payments will mitigate the increase in the payments to the extent that the fund will generate greater income, because more funds, will be collected earlier. This also provides a greater cushion and security should the plant not reach thirty-five years of operation.

IV. Summary and Critique of NHY Testimony

Q. PLEASE SUMMARIZE NHY'S OPENING STATEMENT.

A. According to NH Yankee's opening statement, the issue is not whether a fund should be established, but rather to determine (1) the amount needed for decommissioning, and (2) the schedule of payments to be implemented. In addition, the Opening Statement refers to the statutory requirement that the fund is intended to cover the costs of those facilities that "complete their anticipated energy producing lives."

According to NHY, there are three basic alternatives for decommissioning a nuclear plant: Prompt removal and dismantling (DECON), safe storage entombment with delayed dismantling (ENTOMB), and safe storage mothballing with delayed dismantling (SAFSTOR). NH Yankee recommends DECON as the most prudent both technically and financially because it claims it is less expensive on a current dollar basis. Both ENTOMB and SAFSTOR include 30 year maintenance periods before dismantling. The cost and time involved for each alternative as per the filing is:

<u>Method</u>	<u>Cost (1987 \$)</u>	<u>Scheduled # of months</u>
DECON	\$242,429,000	72
ENTOMB	328,454,000	456
SAFSTOR	362,189,000	438

Assuming payments begin in 1988, and continue for 40 years, the amount at the end of the fortieth year, in nominal dollars, will be \$1,210,461, 896 under the DECON Method. The funding schedule proposed by NH Yankee is a level \$341,437 per month in real dollars, i.e. the nominal amount of each payment increases each year at the 4% rate of inflation.

Q. DO YOU HAVE ANY COMMENT CONCERNING THE OPENING STATEMENT?

A. Yes. As Mr. LaGuardia indicates in his study, the cost comparison of the three methods is based on current dollars (1987\$) and does not include interest or monetary escalation. It is, therefore, not a present value analysis (TAC Set 1, DR 8(c)). As p.5 of the study shows, more than 60% of the current cost of ENTOMB, and 87% of SAFSTOR will be spent during the 1 to 384 months period after DECON would be completed. Given the time value of money and cost escalation as proposed by NHY witness Hannon, delaying dismantlement and decommissioning may be less costly on a present value basis.

Other comments regarding the funding amounts are discussed, infra.

Q. PLEASE SUMMARIZE THE TESTIMONY OF THOMAS S. LAGUARDIA.

A. NH Yankee has utilized Thomas S. LaGuardia of TLG Engineering, Inc. to provide testimony concerning the engineering cost of decommissioning a nuclear reactor in 1987 dollars under the three methods described above. He developed the costs and schedules for each method.

According to his testimony, the study is not a decommissioning plan, and does not, therefore, commit the Company to a specific course of action, even though the DECON alternative is chosen (see also TOH 82). This estimate includes 25% for contingency and does not include future inflation, or cost escalation, either. (see Summary of Hannon testimony, infra). It is also assumed that all low level radioactive waste would be shipped to a hypothetical regional burial ground within 250 miles of the site.

For burial rates, Mr. LaGuardia utilized the current rates for Barnwell, South Carolina. It is his opinion that (1) the NRC favors site specific cost estimates and (2) decommissioning be accomplished in the shortest possible time (TAC Set 2, DR-7). He utilized a unit cost factor method assigning unit costs to the items to be removed. According to Mr. LaGuardia, the disposition of high level nuclear waste is outside the scope of decommissioning, because Public Law 94-425 places the responsibility on the Department of Energy

and charges each nuclear utility 1 mill/kwh for this purpose. Therefore, he assumed that other than high level nuclear waste, only low level nuclear waste will be left to disposed of. He recommends immediate dismantling, and claims his study is based on current state of the art technology and current Federal and State regulations.

Q. DO YOU HAVE ANY COMMENTS REGARDING MR. LAGUARDIA'S TESTIMONY?

A. Yes. Although Mr. LaGuardia claims to have utilized current state of the art technology and current federal and state regulations in developing his estimate of current costs of decommissioning, he has made several important assumptions concerning future events which bear closer examination. These assumptions, some implicit and some explicit, include (1) that all low level radioactive waste will be shipped to a hypothetical regional burial ground within 250 miles of the site, (2) that the burial rates at such a site will be equal to the current burial rates at Barnwell, SC in 1987\$, (3) that the DOE will have established a high level nuclear waste facility by the time Seabrook Unit I is decommissioned to handle the high level nuclear waste from Seabrook Unit I, (4) the implicit assumption, discussed supra, that the cost he proposes is the present value cost of future decommissioning (even though he says his study does not include future

inflation), (5) all decommissioning rad-wastes, other than high level waste handled by DOE are low-level radioactive waste, (6) that DECON is the safest method of decommissioning, and (7) that Seabrook Unit 2 will not be operational during the life of Seabrook Unit I. Based on these assumptions and the results of his study, he recommends DECON. The question is whether his assumptions are reasonable and whether the analysis should be based on those assumptions or, conservatively, on the current state of waste disposal, or other assumptions.

Q. PLEASE DISCUSS THE "250 MILE" ASSUMPTION.

A. Normally Mr. LaGuardia assumes a generic distance of 500 miles in his studies. However, because of the small geographic area of New England he claims this assumption is reasonable because of the regional compact required in accordance with the Low level Radioactive Waste Policy Act (Vt. DPS 5a). He says that States are responsible for the waste generated within their borders or via a regional compact (OCA-3). However, he admits that there is no specific location and there is no requirement that the burial ground be within 250 miles of Seabrook. Currently, Barnwell, SC is the only operating commercial burial facility in the eastern part of the country (VT DPS 6a). As the Worldwatch Paper 69 notes, both the State of Maine and the Commonwealth of

Massachusetts require voter approval of either compact or siting decisions (p. 22; see also SPB & G's response to OCA-3). New Hampshire has taken the position that it is an inappropriate place for such a site. That leaves Vermont, Connecticut and Rhode Island. Vermont is likely to react similarly to New Hampshire, and the population density of Connecticut and Rhode Island would make those states unlikely sites. Moreover, Rhode Island has no nuclear generating facilities. Voters in the State of Maine will again be considering the shutdown of the Maine Yankee Nuclear Plant, and there has been significant opposition there regarding a burial facility.

Should a low level waste site not be located in New England by the time Seabrook Unit I is decommissioned, the waste would have to be transported to some other site outside of New England or be stored on-site. It is unlikely that a site outside of New England would accept the waste at all, and if it did, there would likely be expensive surcharges, etc. If it were stored on-site, the DECON method could not be used, since the use of DECON assumes the availability of capacity to handle the waste requiring disposal (NRC proposed rules 50 FR 28, p. 5603). As the NRC noted, SAFSTOR may also become necessary in cases where there is a shortage of radioactive waste disposal offsite.

In light of the above, the assumption that a burial site will be located in New England is not conservative and, perhaps, not reasonable. At a minimum, the costs are likely to be greater and the worst case is that the waste will be stored on site. In the latter case, DECON will not be the chosen method. If no other site is ever developed, ENTOMB may be the only alternative. If a site is eventually developed after decommissioning, then SAFSTOR would be the chosen alternative. In any event, the cost would be greater than the DECON alternative.

Q. PLEASE DISCUSS THE USE OF THE CURRENT BARNWELL, S.C. BURIAL RATES.

A. The use of the current Barnwell, SC burial rates is also questionable. The TLG study in this proceeding assumes a 1987 Commercial Operating Date (COD) (VT. DPS 1). Information provided by PSNH indicates that NHY now estimates COD may not take place until mid-1989. At p. 30 of the study, burial costs for radioactive wastes have increased 14% in the last year and the availability of burial sites is of national concern. The study assumes that "cost elements in this estimate are based upon ideal conditions" (VT DPS 1 p. 33). Escalation in the cost of radioactive waste disposal is the prime contributor to increasing decommissioning projections. Construction costs increased an average of 48% since 1979, while the cost of burial increased 800%. Weight, curie and radiation surcharges have also escalated (AG Set 2, 4)

Further, the cost study assumes that radioactive waste greater than 10CFR61 Class C are estimated, and will be disposed of as Class C because there are no established guidelines. "Burial costs will undoubtedly increase whether or not new burial facilities are authorized and licensed." (p. 100). As Worldwatch Paper 69 indicates (p.29) new low-level burial grounds will be technologically superior to and more strictly regulated, further raising disposal costs. Even the NRC noted that the rate of increase in decommissioning costs was twice the rate of inflation as measured by the CPI, primarily due to the cost of radioactive waste disposal (p.5606).

Based on the above, it is likely that the cost of radioactive waste disposal, if an off-site location is developed, will increase at a rate greater than the rate of inflation. The NRC has proposed using 2X the CPI based inflation rate. Mr. LaGuardia maintains in his prefiled testimony concerning the Diablo Nuclear plants (AG #5), that that factor appears to specifically apply to the \$100 million certification amount (at p.16), and that it is a short term correction factor only. However, that would require an assumption that future cost escalations will be no greater than the rate of inflation as measured by the CPI. There is no basis for that assumption, particularly in view of the fact that the estimated cost of dismantling the Shippingport

reactor currently is \$98 million (1985\$) (TOH 117). However, the cost to decommission the 150 mw Shippingport reactor, including disposal at Hanford, WA for \$98 million does not include the turbine generator and associated balance of plant systems. The initial estimate was \$66 million in 1982\$ (TOH 117).

A conservative estimate would be to utilize a factor greater than the CPI for the future. That factor would be less than historical increases in decommissioning cost estimates, but greater than NHY's implicit use of the CPI.

- Q. PLEASE DISCUSS THE ASSUMPTION CONCERNING DEVELOPMENT OF A HIGH LEVEL NUCLEAR WASTE FACILITY.
- A. Prior to commencement of decommissioning and removal of low level radioactive waste, the high level radioactive waste must be removed. The Department of Energy is responsible for disposal of the high level nuclear waste for which utility companies with nuclear facilities pay one mill per kwh generated, a cost which is passed on to consumers. Mr. LaGuardia assumes that such a site will be developed. The DOE is already behind schedule. Mr. LaGuardia admits (Vt. DPS 8) that if the DOE is not able to take responsibility for removal and disposition of the fuel at plant shutdown, the utility may elect to pursue alternatives such as a modified mothball scenario. As noted previously, the NRC indicated that

SAFSTOR may become necessary if there is a shortage of radioactive waste disposal offsite (p.5603) - this statement would also apply to the lack of high level waste storage facilities.

Since no high level waste site currently exists, and DOE is behind schedule in development of such a site, and development of site a site is a precondition to DECON, it appears to be unreasonable to assume, at this time, that DECON will be the alternative utilized for decommissioning. In addition, if the high level waste is not removed, the other decommissioning activities cannot be carried out. A more conservative approach, at this time, would be to assume a modified mothball approach, similar to SAFSTOR.

Q. PLEASE DISCUSS THE ASSUMPTION THAT ALL DECOMMISSIONING RAD-WASTES ARE LOW LEVEL.

A. Mr. LaGuardia assumes that all decommissioning radioactive wastes, other than high level waste handled by DOE, are low-level radioactive waste (see Testimony and 5-7-86 Minutes of NDFC meeting of 4-25-86). The TLG study assumes no mixed hazardous waste would be encountered (Vt. DPS 10). He assumes that the outer reactor building concrete will be non-radioactive (TOH 128). At p. 40 of the study, he indicates that radioactive waste greater than 10 CFR61 Class C will be

disposed in similar manner to Class C because there are currently no established guidelines. These include activated sections of the reactor vessel internals.

In this case, Mr. LaGuardia assumes, implicitly, that no guidelines will be established, and there will be no additional costs. These intermediate level nuclear wastes are more likely classified as high level than low level, and will greatly increase disposal costs. (Myths About Nuclear Decommissioning, Public Citizen, Environmental Action, April, 1985). It is likely that Mr. LaGuardia's assumption is unreasonable, and that the costs will be greater than he has estimated.

- Q. PLEASE DISCUSS MR. LAGUARDIA' CONCLUSION THAT DECON IS THE APPROPRIATE DECOMMISSIONING METHOD.
- A. For both safety and cost reasons, Mr. LaGuardia states that DECON is the appropriate decommissioning alternative. It is his opinion, that the NRC favors decommissioning be accomplished in the shortest possible time (TAC Set 2, DR-7). However, there are many reasons why DECON may be impractical. Some of these have been discussed previously. Amendment 19 to the Joint Owners Agreement (Vt. DPS 15), does not specify a particular method, and the Committee does not have jurisdiction to specify the method. LaGuardia's recommendation is not a decommissioning plan (TOH 82) and does not commit the Company to a specific course of action. If Seabrook

Unit 2 is ever placed in service, as a nuclear or non-nuclear facility, ENTOMB may be the appropriate method (see NRC proposed rules p. 5604). It should be noted, however, that the Seabrook Joint Owners voted to relinquish the Seabrook Unit 2 construction permit to the NRC, although this has not been concluded. Prompt dismantling would also entail some risk of occupational exposure to workers (see also NRC proposed rules p. 5601).

Based on the above, and discussions below, assuming that DECON will be the appropriate alternative 20-30 years hence is unreasonable. It would be more conservative, at this time, to assume SAFSTOR or ENTOMB or modified mothballing.

- Q. PLEASE SUMMARIZE THE TESTIMONY OF NHY WITNESS WILLIAM P. HANNON.
- A. The purpose of Mr. Hannon's testimony is to provide a funding schedule based on Mr. LaGuardia's cost estimate. The objective, as he states it, is that (a) the funding cost should be equitably spread over the life of the facility, and (2) the funding level should comply with IRS guidelines in order to maintain a qualified status for those Seabrook participants subject to Federal corporate income taxes (NHY witness Judith C. Dunn testifies to the legal and tax aspects of the fund). He adjusted the amount of the DECON method cost of

\$252,125,952 in 1988 dollars, as determined by Mr. LaGuardia, to reflect inflation and investment return over the forty year life of the facility.

Hannon's assumptions include an annual long term inflation rate of 4.0% and an annualized investment return of 6.2%. The inflation estimate is based on 20, 30, and 40 year (1952-1985; 1962-1985; 1972-1985) average inflation rates.

The investment return is based on an average return of 7.0% on a taxable fixed income portfolio and 6.0% on a tax-free income portfolio assuming an 80:20 mix of investments. The investment returns are net of administrative expenses.

Q. DO YOU HAVE ANY COMMENT CONCERNING THE TESTIMONY OF MR. HANNON, REGARDING INFLATION ADJUSTED EQUAL ANNUAL PAYMENTS.

A. Yes, the montly contribution funding method utilized was prepared at the request of NHY: equal annual payment on an inflation adjusted basis, therefore, the payment is the same in real terms (TOH 1) but increases in nominal terms. There is no requirement that fund payments be structured this way. As NHY witness Dunn indicates, equal annual payments will also meet the IRS test allowing Seabrook Unit I owners full tax deductibility (VT. DPS 3). An additional advantage of this method is that out of pocket costs are minimized since more investment income will be generated (AG 13b).

Q. DO YOU HAVE ANY COMMENTS CONCERNING THE USE OF A 4% CPI RATE FOR COST ESCALATION?

A. Yes. Mr. Hannon uses the CPI because the FERC uses the CPI to project nuclear power plant construction costs (AG 14a). However, NHRSA 162-F, establishing the NFDC and the decommissioning fund, requires that "the monthly payment shall not be less than necessary to reach the specified amount needed for decommissioning as determined by the committee" (RSA 162-F:19II). The testimony filed by New Hampshire Yankee presents an estimate of the current cost of decommissioning, an estimate of the future inflation rate, an estimate of the investment return on the fund principal, and a plant life assumption. Unfortunately, no NHY witness is testifying as to the amount that will be needed for decommissioning "at the end of the useful or serviceable life of nuclear electric generating facilities."

Mr. LaGuardia specifically indicates that his analysis and testimony does not include future inflation, that it is based on "present day costs and available technology" (see also TAC Set 1, DR 8(c)). Hannon's testimony, while it does include a 4% long term annual inflation rate, does not relate that general inflation rate to the escalating cost of decommissioning as compared to the general inflation rate as measured by the CPI. This issue must be addressed if the mandate of

the statute is to be carried out. The implicit assumption in NHY's testimony is that the cost of decommissioning will not increase at a rate greater than the rate of inflation as measured by the CPI.

The implication is without foundation. For example the estimated decommissioning cost for the Shippingport Reactor is currently \$98 million in 1985\$ as compared with the original estimate of \$66 million in 1982\$, an annual rate of increase of over 14%, greater than the annual rate of inflation during that period (TOH 117). At p. 30 of the TLG study, LaGuardia states that "burial costs for radioactive wastes have increased approximately 14% in the last year" (VT. DPS 1). At p. 100, he states:

"In addition, there are costs associated with decommissioning activities that historically increase at rates significantly greater than inflationary trends. For each example, the cost of radioactive waste burial has increased rapidly in the last few years, and at the Barnwell, SC facility alone the costs have increased 50% since 1984 and 125% since 1982..."

In addition, the NRC, in its proposed rules referred to above, in adopting a "prescribed amount" of

\$100,000,000 (1984\$), recommended an adjustment for cost escalation and inflation of 2X the change in the CPI (p.5602), based on the analysis of the rate of escalation of major cost elements compared to inflation rates (p.5606). Various other texts have noted this escalation as well. LaGuardia, in response to the AG Set 2, Item 4, indicates that escalation in the cost of radioactive waste disposal is the prime contributor to increasing decommissioning projections. Construction costs increased an average of 48% since 1979, while the cost of burial increased almost 800%.

Q. DO YOU HAVE ANY COMMENTS CONCERNING MR. HANNON'S USE OF A 40 YEAR FUNDING MECHANISM?

A. Yes. There does not appear to be any specific testimony by any of the witnesses that the useful or serviceable life of Seabrook Unit I will be 40 years. Nevertheless, Mr. Hannon utilizes a 40 year period for developing the decommissioning fund. The maximum life span estimate for Seabrook Unit I is assumed to be 40 years based on the statement that "industry has generally accepted the operating license period as the basis for the maximum life span" (TOH 96). The study in that data response also states that realized life spans for fossil fuel plants is 30-40 years, and one might ordinarily project 30-40 year life spans for nuclear plants. A page 7 of TOH 96, the average service life estimate is 28-32 years. No commercial nuclear generating facility has ever reached 40 years, and many smaller ones have shut

down long before their operating license expiration date.

In Docket DF 84-200, pp. 129-131, the NHPUC discussed the estimated useful life of Seabrook Unit I. Although the NHPUC there assumed a 35 year life, it noted that this was not a determination for accounting or ratemaking purposes. However, the PUC noted that before the Bulk Power Site Evaluation Committee PSNH employed a 30 year assumption. Further, the PUC noted the testimony of Dr. Rosen of ESRG assuming a useful life of 30 years, and Mr. Chernick's testimony recommending a 25 to 30 year life. Inasmuch as RSA 162-F:21 III requires that "Each committee shall rely on all available data and experience... including, but not limited to, information from the United States Nuclear Regulatory Commission or its successor organization; the public utilities commission, ..." (emphasis added), the portions of Rosen and Chernick testimony in that docket pertaining to plant life should be made part of this record, as well as the Bulk Power Site Evaluation Committee exhibit.

Since the monthly contribution to the fund is significantly dependent on the estimated useful life of the facility, this is a key factor which must be more thoroughly reviewed. Use of too long a life will result in inadequate funding in early years, and a potential for underfunding at the end of the plant's useful life.

Q. DO YOU HAVE ANY COMMENT CONCERNING THE USE OF A 6.2% RETURN FACTOR?

A. Yes. This factor is based on 80:20 mix of taxable and tax-free investments, net of administrative expenses. However, RSA 162-F:20 requires that the fund not be subject to any federal or state taxes. SPB & G maintain (OCA-7) that limiting the investment to non-taxable securities would be inconsistent with the statutory purpose of minimizing the cost to the ratepayer, even though the statute clearly says that the fund "shall not be subject to any federal or state taxes." They probably accurately point out that state law limiting the federal government's power to impose income taxes would be unenforceable. However, the statutory prescription can be met by having the fund invest only in non-taxable investments. In fact, RSA 162-F:20, referring to fund administration refers only to "non-taxable funds." There is no attempt in the statute to limit the federal government's power to impose income taxes, only to require that the fund invest in non-taxable investments. Therefore, the 6.0% non-taxable return is the appropriate return to use in calculating the funding requirements.

Q. PLEASE SUMMARIZE THE TESTIMONY OF NHY WITNESS JUDITH C. DUNN.

A. Ms. Dunn is a tax lawyer with Ropes and Gray. Her testimony relates mainly to the legal and tax aspects of the funding mechanism. According to Ms. Dunn, there will be a Master Trust Agreement (see VT. DPS 11) among the Seabrook Joint Owners, the NH State Treasurer, and a Bank, as Trustee.

She further states that the decommissioning funds received by the participating utilities from ratepayers must be included in gross income, and, regardless of NH law, a tax deduction will be available to those utilities only if the fund qualifies as a Nuclear Decommissioning Reserve Fund under IRC 468A if certain requirements are met. She indicates that there are three significant limitations: (1) contributions to the fund cannot exceed the amount of decommissioning costs included in an owner's cost of service for ratemaking purposes for the year, and (2) it must be invested only in permissible investments, and (3) the contribution cannot be greater than the "ruling amount" approved by the IRS.

Permissible investments include: (1) public debt securities of the United States, (2) tax exempt obligations of a state or local government not in default and (3) time or demand deposits in banks or

credit unions. The "ruling amount" is an amount that is not more rapid than level funding. Therefore, level payments or increasing payments are allowed.

Q. DO YOU HAVE ANY COMMENTS REGARDING MS. DUNN'S TESTIMONY?

A. To the extent that they relate to Mr. Hannon's testimony, my comments have been indicated, supra. In addition, in a letter from Sheehan, Phinney, Bass and Green (SPB & G) to Chairman Iacopino, 10/29/86, in response to certain questions, she indicated that "the IRS will not issue a schedule of ruling amounts until an owner's rate commission has acted." (see Reg. Sec. 1.468 A-2T (b)). Therefore, it appears that a utility will not get a deduction until its commission has determined the amount to be included in rates for ratemaking purposes. Since any method of funding where the nominal dollars contributed to the fund remain the same from year to year or increase (but not decrease) would satisfy the IRC requirement (VT DPS 3), use of a set monthly payment would minimize the need for annual regulatory inclusion of new amounts in rates for ratemaking purposes.

Q. DO YOU HAVE ANY OTHER GENERAL COMMENTS TO MAKE REGARDING THE FUNDING MECHANISM?

A. Yes. Although the Statute only requires that the fund be sufficient to provide funds for decommissioning after the useful life of the facility, the Committee should

be mindful of the fact that nuclear reactors have tended to shut down before the expiration of their operating license for various reasons. Therefore, the Committee should conservatively assume that costs will escalate, that the useful life may be shorter, and that the plant may shut down prematurely. It would be prudent, therefore, to fund the collections with equal monthly nominal payments. This would not jeopardize the tax deductibility of the contributions by any of the Seabrook participants.

IV. Recommendations

- Q. WHAT IS YOUR RECOMMENDATION CONCERNING THE AMOUNT OF THE FUND AND AMOUNT OF THE MONTHLY CONTRIBUTION?
- A. Based on the foregoing information, I would recommend the following assumptions. In calculating the fund amount and monthly fund contribution, the following assumptions should be made:
- a. Assume LaGuardia's SAFSTOR current 1987\$ cost.
 - b. Utilize a 4% CPI future inflation factor.
 - c. Utilize a 5.2% annual factor for cost escalation.
 - d. Assume Hannon's 6.0% tax exempt return factor.
 - e. Utilize a 35 year plant life.
 - f. Equal monthly payments.
 - g. Assume a mid-1989 startup.

The 4% CPI factor is the same as that proposed by Mr. Hannon. The 5.2% cost escalation factor is less than the NRC determination that decommissioning costs increase at a rate twice the CPI, but higher than NHY's implicit 4.0%. It is also a rate which has been utilized by PSNH in some of its financial scenarios. Mr. Hannon's tax-exempt rate of 6.0% is utilized rather than his blended 6.2% rate because of the RSA requirement that the fund not be subject to state or federal taxes. The 35 year life is more in line with reality, is supported by PSNH statements to the Bulk Facilities Siting Council, and is supported by the Chernick and Rosen studies cited, supra. The 40 year life used by NHY is based solely on the operating

license period granted by the NRC. Equal monthly payments will accelerate the growth of the fund, is consistent with IRS regulations and will provide additional funds in the event of a premature shutdown. The plan should be flexible and allow contingency for decommissioning at any time. In addition, another advantage of earlier contributions is lower out of pocket costs and greater investment income (AG #13).

These assumptions result in an equal monthly contribution of \$1.631 million over the thirty five year period (Table 1) as compared with Mr. Hannon's \$341,437 in the first year escalating to \$1,576,196 in the 40th year. This increase is due to a higher cost estimate used, a cost escalator, shorter useful life, and equal monthly payments. Out of pocket contributions will equal \$685.0 million over 35 years (Table 3), as compared with Hannon's \$389.3 million. Cumulative earnings will be \$1.561 billion (Table 3) as compared with \$821.1 million as projected by Mr. Hannon. The target cost at the end of 35 years is \$2.246 billion (Table 2) as compared with Mr. Hannon's \$1.2 billion at the end of 40 years.

Another benefit of the method proposed herein is that the unfunded liability will decrease from year to year in nominal dollars (Table 2). Under Mr. Hannon's proposal, the unfunded liability grows in nominal dollars from year 1 through year 21. In addition,

unfunded liability as a percentage of Year end Target cost declines at a much slower rate under Mr. Hannon's proposal than under the OCA proposal (Table 2). I must emphasize that this is a minimum funding requirement. Changing any of the assumptions can, as the NRC noted, significantly affect the decommissioning cost and annual funding requirement. I would recommend that the Committee review the funding requirement on a 3-5 year basis.

Q. DOES THAT CONCLUDE YOUR TESTIMONY AT THIS TIME?

A. Yes, pending receipt of additional information and review of other intervenor's testimony.

Seabrook Decommissioning Fund
Funding Schedule

Table 1

Year Beg.	Monthly Contribution	Annual Contribution	Annual Earnings	Fund Balance @ Year End
1989	\$1,631,033	\$19,572,391	\$587,172	\$20,159,563
1990	1,631,033	19,572,391	1,796,746	41,528,700
1991	1,631,033	19,572,391	3,078,894	64,179,985
1992	1,631,033	19,572,391	4,437,971	88,190,347
1993	1,631,033	19,572,391	5,878,593	113,641,331
1994	1,631,033	19,572,391	7,405,652	140,619,374
1995	1,631,033	19,572,391	9,024,334	169,216,099
1996	1,631,033	19,572,391	10,740,138	199,528,628
1997	1,631,033	19,572,391	12,558,289	231,659,909
1998	1,631,033	19,572,391	14,486,766	265,719,066
1999	1,631,033	19,572,391	16,530,316	301,821,773
2000	1,631,033	19,572,391	18,696,478	340,090,643
2001	1,631,033	19,572,391	20,992,610	380,655,644
2002	1,631,033	19,572,391	23,426,510	423,654,546
2003	1,631,033	19,572,391	26,006,444	469,233,382
2004	1,631,033	19,572,391	28,741,175	517,546,947
2005	1,631,033	19,572,391	31,639,989	568,759,327
2006	1,631,033	19,572,391	34,712,731	623,044,450
2007	1,631,033	19,572,391	37,969,839	680,586,680
2008	1,631,033	19,572,391	41,422,373	741,581,444
2009	1,631,033	19,572,391	45,082,058	806,235,893
2010	1,631,033	19,572,391	48,961,325	874,769,610
2011	1,631,033	19,572,391	53,073,348	947,415,350
2012	1,631,033	19,572,391	57,432,093	1,024,419,834
2013	1,631,033	19,572,391	62,052,362	1,106,044,587
2014	1,631,033	19,572,391	66,949,847	1,192,566,825
2015	1,631,033	19,572,391	72,141,181	1,284,280,397
2016	1,631,033	19,572,391	77,643,996	1,381,496,784
2017	1,631,033	19,572,391	83,476,979	1,484,546,154
2018	1,631,033	19,572,391	89,659,941	1,593,778,486
2019	1,631,033	19,572,391	96,213,881	1,709,564,759
2020	1,631,033	19,572,391	103,161,057	1,832,298,207
2021	1,631,033	19,572,391	110,525,064	1,962,395,663
2022	1,631,033	19,572,391	118,330,911	2,100,298,965
2023	1,631,033	19,572,391	126,605,110	2,246,476,466

Seabrook Decommissioning Fund
Schedule of Annual Unfunded Liability

Table 2

Year Beg.	Fund Balance @ Year End	Target Cost @ Year End	Unfunded Liability	Unfunded Liability as % of Target
1989	\$20,159,563	\$400,836,000	\$-380,676,437	-95.0%
1990	41,528,700	421,679,472	-380,150,772	-90.2%
1991	64,179,985	443,606,805	-379,426,820	-85.5%
1992	88,190,347	466,674,358	-378,484,011	-81.1%
1993	113,641,331	490,941,425	-377,300,094	-76.9%
1994	140,619,374	516,470,379	-375,851,006	-72.8%
1995	169,216,099	543,326,839	-374,110,740	-68.9%
1996	199,528,628	571,579,834	-372,051,207	-65.1%
1997	231,659,909	601,301,986	-369,642,077	-61.5%
1998	265,719,066	632,569,689	-366,850,623	-58.0%
1999	301,821,773	665,463,313	-363,641,540	-54.6%
2000	340,090,643	700,067,405	-359,976,763	-51.4%
2001	380,655,644	736,470,910	-355,815,266	-48.3%
2002	423,654,546	774,767,398	-351,112,852	-45.3%
2003	469,233,382	815,055,302	-345,821,921	-42.4%
2004	517,546,947	857,438,178	-339,891,231	-39.6%
2005	568,759,327	902,024,963	-333,265,636	-36.9%
2006	623,044,450	948,930,261	-325,885,811	-34.3%
2007	680,586,680	998,274,635	-317,687,955	-31.8%
2008	741,581,444	1,050,184,916	-308,603,472	-29.4%
2009	806,235,893	1,104,794,532	-298,558,638	-27.0%
2010	874,769,610	1,162,243,847	-287,474,237	-24.7%
2011	947,415,350	1,222,680,527	-275,265,178	-22.5%
2012	1,024,417,834	1,286,259,915	-261,840,081	-20.4%
2013	1,106,044,587	1,353,145,430	-247,100,844	-18.3%
2014	1,192,566,825	1,423,508,993	-230,942,168	-16.2%
2015	1,284,280,397	1,497,531,460	-213,251,063	-14.2%
2016	1,381,496,784	1,575,403,096	-193,906,312	-12.3%
2017	1,484,546,154	1,657,324,057	-172,777,903	-10.4%
2018	1,593,778,486	1,743,504,908	-149,726,422	-8.6%
2019	1,709,564,759	1,834,167,163	-124,602,405	-6.8%
2020	1,832,298,207	1,929,543,856	-97,245,649	-5.0%
2021	1,962,395,663	2,029,880,136	-67,484,474	-3.3%
2022	2,100,298,965	2,135,433,904	-35,134,938	-1.6%
2023	2,246,476,466	2,246,476,466	0	.0%

Seabrook Decommissioning Fund
Cumulative Contributions & Earnings

Table 3

Year Beg.	Cumulative Contribution	Cumulative Earnings
1989	\$19,572,391	\$587,172
1990	39,144,783	2,383,917
1991	58,717,174	5,462,811
1992	78,289,565	9,900,782
1993	97,861,956	15,779,374
1994	117,434,348	23,185,026
1995	137,006,739	32,209,360
1996	156,579,130	42,949,498
1997	176,151,521	55,508,387
1998	195,723,913	69,995,153
1999	215,296,304	86,525,469
2000	234,868,695	105,221,947
2001	254,441,087	126,214,558
2002	274,013,478	149,641,068
2003	293,585,869	175,647,512
2004	313,158,260	204,388,687
2005	332,730,652	236,028,676
2006	352,303,043	270,741,407
2007	371,875,434	308,711,246
2008	391,447,825	350,133,618
2009	411,020,217	395,215,677
2010	430,592,608	444,177,002
2011	450,164,999	497,250,350
2012	469,737,391	554,682,443
2013	489,309,782	616,734,805
2014	508,882,173	683,684,652
2015	528,454,564	755,825,833
2016	548,026,956	833,469,829
2017	567,599,347	916,946,807
2018	587,171,738	1,006,606,748
2019	606,744,129	1,102,820,629
2020	626,316,521	1,205,981,686
2021	645,888,912	1,316,506,751
2022	665,461,303	1,434,837,662
2023	685,033,695	1,561,442,772

Glossary of Abbreviations

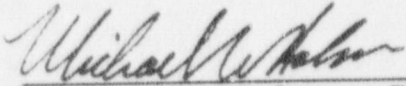
The following abbreviations have been used throughout the testimony to refer to NHY responses to various intervenors data requests:

TAC	Technical Analysis Corp.
OCA	Office of the Consumer Advocate
VT DPS	Vermont Department of Public Service
SPB & G	Sheehan, Phinney, Bass & Green
AG	New Hampshire Attorney General
TOH	Town of Henniker

STATE OF NEW HAMPSHIRE
BEFORE THE
NUCLEAR DECOMMISSIONING FINANCING COMMITTEE
SEABROOK DECOMMISSIONING FUND
DOCKET NDFC 87-1

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing Direct
Testimony of Larry S. Eckhaus in the above proceeding has
been sent to each person on the attached service list.



Michael W. Holmes, Esq.
Consumer Advocate

Dated: September 30, 1987