CLF

July 19, 1982

Frank J. Miraglia, Chief
Licensing Branch No. 3
Division of Licensing
Nuclear Regulatory Commission
Washington, D.C. 20555

re: DES concerning the operation of Seabrook Station

Dear Mr. Miraglia,

The Conservation Law Foundation of New England, Inc. appreciates this opportunity to comment on this DES. As the attached comments explain in detail, we found several aspects of the statement deficient either in substance or methodology.

Please contact us if you have any questions about these comments.

Thank you for granting us an extension to the comment period.

Sincerely,

Patricia A. Smith

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Linzee Weld

Linzee Weld

PAS/LW: enclosure

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CLF

COMMENTS ON THE DRAFT ENVIRONMENTAL STATEMENT CONCERNING THE OPERATION OF SEABROOK STATION, UNITS 1 and 2

Patricia A. Smith
Linzee Weld
July 19, 1982

Conservation Law Foundation of New England, Inc., 3 Joy Street, Boston, Massachusetts 02108 (617) 742-2540

The Conservation Law Foundation of New England, Inc. ("CLF") has reviewed the draft environmental statement ("DES") concerning the operation of Seabrook Station, Units 1 and 2. We find that several parts of this study have been inadequately prepared: not only are sections of the analysis insufficiently presented, but pertinent information is missing. We examine these instances in the following paragraphs. These inadequacies and omissions, CLF contends, introduce metnodological bias into the study which precludes impartial evaluation of safety and health risks associated with the operation of the Seabrook Station.

2 Purpose and Need for Action

Although the Nuclear Regulatory Commission ("NRC") acknowledges that need-for-power issues need not be addressed by the staff in this statement, the commission nonetheless proceeds to address this issue:

> Substantial information exists which supports the contention that nuclear power plants are lower in operating costs than conventional fossil plants. If conservation, or other factors, lowers anticipated demand, utilities remove generating facilities according to their cost of operation, with the most expensive facilities removed first. Thus, a completed nuclear plant would serve to substitute for less economical generating capacity. (2-1)

This statement presents a biased review of the information available on the economics of nuclear power generation. The NRC fails to cite recent studies which document just the reverse (cf. Charles Komanoff, 1981 Power Plant Cost Escalation). In so doing, the commission confuses its

responsibility of impartial evaluation with advocacy of the operation of Seabrook Station.

5.3.1 Water Quality

A citation is needed in the fifth paragraph to confirm the scientific basis of the statement: "with an initial concentration of 2 mg/l total residual oxidant, mussel setting is not likely to occur in the station intake piping" (5-2 - 5-3).

The applicant also omitted a description of how the sodium hypochlorite held on site will be stored and handled without adverse environmental or occupational effects. This issue must be addressed.

5.3.2 Hydrological Alterations

Insufficient information is presented in this section. Although the effect of the presence of the Seabrook Station on the 100-year floodplain is discussed, the effects of more severe flooding conditions on Seabrook Station are summarily dismissed: "the plant has been designed for floods far worse than the 100-year flood" (5-6). CLF asks that a detailed probabilistic assessment of severe flood and storm conditions be incorporated within the final statement together with an assessment of the degree of damage to the site and station under such conditions.

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5.4 Air Quality

The environmental impact of operating the auxiliary boilers and diesel generators has been insufficiently assessed. No basis for the estimate of annual time in use for the boilers and generators was given or how time in use may increase over the lifetime of the plant. This information is needed in order to ascertain whether or not emission levels will meet Clean Air Act standards.

5.5.1.2 Transmission Systems

No evaluation is made of the likelihood of adverse health effects occurring among transmission line maintenance workers as a result of frequent exposure to strong electric fields.

Although the NRC reports "the general population living along a right-of-way would receive a long-term exposure [of] less than 2 kV/m, which is below the value of 4 to 20 kV/m estimated by the staff to have resulted in the reported statistically significant effects in laboratory animals" (5-10), further analysis is needed in order to evaluate the consequences of such exposure. First, the value of 2 kV/m is cited as an average value. In order to assess exposure levels properly, a distribution of sample values about this mean value must be described. The percentage of the general population receiving exposure

near or above 4 kV/m should then be calculated and reported. The applicant will then be obligated to prepare mitigating measures and install protective devices where warranted.

5.8.1 Local Economy

No justification is given for the statement: "few positions would attract people from beyond the local employment area" (5-14). However, in Section 5.8.4 the commission contradicts this statement: "the staff also assumed that of the 430 workers relocating to work at the Seabrrok site ..." (5-17). These 430 workers represent 72% of the 600 people to be employed at the Seabrook facility. In order to ascertain the impact of employment opportunities at Seabrook Station on the local economy, this contradiction must be resolved.

5.8.3 Effects of Operating the Seabrook Station on the Local Economy

CLF requests that this section of the DES be substantially reworked. The NRC advocates the possible benefits of operating the Seabrook Station and fails to address possible adverse consequences. An impartial review is desired.

The NRC reports that "nearly all" of the local

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government officials and business people interviewed "could identify no negative impacts on tourism or recreation that could be attributed to the local nuclear power station" (5-15). This analysis, however, may not fully pertain to the operation of Seabrook Station. The development and presence of the Seabrook facility has been controversial and received much regional media exposure. This factor of public awareness must be considered along with the results of the NRC's sociological survey.

Furthermore, the commission does not quantify "nearly all", and none of the objections or opinions of this minority are reported. The NRC's bias is again disclosed in this statement: "Several respondents cited an improvement in tourism and recreation because of the cooling systems discharge (which results in increased fishing activity)" (5-15). Although this claim might be better assessed by state fish and wildlife departments, the report is nonetheless contradicted earlier in the DES. In Section 5.3.1 it is reported that fish avoid even very low concentrations of chlorine (5-5). This would contradict the presence of fish in the dispersing plumes of warmed coolant water.

Not in this section or anywhere else in the DES does the NRC weigh the costs of the impact of the Seabrook Station's operation on psychological health. In May 1982 the U.S. Appeals Court for the District of Columbia

found that psychological impacts are within the scope of environmental law. Therefore, within this section the NRC should evaluate the socioeconomic costs associated with the psychological impacts attributable to the plant's operation and presence. A new section of the DES should be created to analyze this factor of psychological stress and to assess adverse mental health consequences among plant employees, residents, and visitors to the area.

5.9.2 Radiological Impacts: Operational Overview

In the second paragraph an incorrect reference is made to Section 4.2.5. It should read Section 4.2.4.

Management of solid and liquid radioactive wastes is not considered. Descriptions are needed of types of on-site storage facilities, their capacities, types and amounts of radioactive wastes generated, handling and shipping facilities, and final disposal sites.

No mention is made of scheduling criteria for releases of airborne or waterborne radioactive effluents. Will atmospheric releases depend on meteorological conditions and be restricted under certain circumstances? Will oceanic releases depend on tidal or current patterns?

CLF is concerned that the NRC is attempting to minimize concern about radiation effects through semantic rather than substantive demonstrations. Such an approach

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is evident in this statement:

> Radioisotopes in the facility's effluents that enter unrestricted areas will produce doses through their radiations to members of the general public in a manner similar to the way doses are produced from background radiations ..., which also include radiation from nuclear weapons fallout. (5-19)

This statement holds minimal and misleading information, and its intent appears to be to assuage the reader's concern about the health consequences of radioactive releases. CLF asks that this sentence be stricken from the description of radiological- exposure pathways.

The operational monitoring program is described but no provisions are cited for the prompt reporting of releases of unexpectedly high levels of radioactivity. Notification of local agencies is essential if adverse health effects under such circumstances are to be minimized over the 30-year course of operation of the plant.

5.9.3.1 Occupational Radiation Exposure for PWRs [Pressurized Water Reactors]

Several statistics are lacking in this section which could aid in a more precise evaluation of the occupational risk of radiation exposure. Although a range of values is cited for collective annual radiological doses for occupational workers (18 - 5262 person-rems/year) and a

mean value (440 person-rems/year), only a mean value of average worker exposure is cited (0.8 rem/worker/year). In order to weigh the occupational risk of excess exposure, the range and distribution of exposure values must be examined. Although no significant variation in dose per worker is claimed, the collective annual range varies so greatly as to warrant documentation of the insignificance of variations in dose/worker values. The variation in radiation exposure among different job categories at the station must also be explored and the consequences analyzed.

CLF finds that the information compiled in Table 5.4 (5-24) does not reasonably assess occupational risk for nuclear plant workers. With the exception of nuclear plant workers, the incidences of job-related mortalities reported are based on statistical censuses. For nuclear power plant workers only a projected value of the mortality rate can be provided. Since this estimate is based in part on the questionable average value of 0.8 rem/worker, this table potentially distorts the relative occupational risk for Seabrook Station employees.

The DES refers to two models which generate different estimates of the occupational risks of contracting a fatal cancer or bearing offspring with genetic disorders. The NRC cites values generated by an "absolute risk" model. The "relative risk" model differs from the "absolute risk"

model in that the former carries the assumption that risk prevails for the duration of the worker's life. "Use of the 'relative risk' model would produce risk values up to about four times greater than those used in this report. The staff regards the use of the 'relative risk' model values as a reasonable upper limit of the range of uncertainty." (5-25)

The NRC staff failed to include expected values for the number of cancer deaths and the number of instances of genetic disorders among plant workers' offspring resulting from 30 years of plant operation. They also fail to analyze whether the probabilities of cancer deaths and genetic disorders increase among plant workers as their job tenure lengthens. According to the "absolute risk" model, 3 to 4 cancer deaths within the work force will be attributable to the plant's operation over a 30 year period. However, using the "relative risk" model these expected values could increase up to 12 to 16 deaths. No probability is assigned to assess the increased risk of nonfatal cancers within the work force. Over the 30 year period of operation the "absolute risk" model predicts that there will be 5 to 7 genetic disorders among offspring of plant workers; the upper bounds of the "relative risk" model estimate 20 to 28 cases of genetic disorders. CLF asks the NRC to estimate the percentage of the entire work force who

will directly or indirectly experience adverse health effects due to exposure to radiation. Again this analysis neglects to address variation in exposure among the various occupations at the plant.

5.9.3.2 Radiological Impact on Humans

CLF contends that multiplying the annual U.S. general public population dose received from exposure to radioactivity from Seabrook Station's operation by the risk estimators cannot sufficiently estimate cancer deaths or genetic disorders which are dosage-dependent events. The distribution of the doses must be considered as well as the projected duration of plant operation. In order to assess the radiological impact on humans or other biota (cf. Section 5.9.3.3), temporal variations in the predicted risk estimators must be explored. We reiterate that in order to assess radiological impacts, average values alone cannot be used: spaciotemporal variation in dosage levels must be ocnsidered.

A point estimate of the risk to the population alive in the year 2000 cannot suffice to support the conclusion that "the risk to public health and safety from exposure to radioactive effluents and the transportation of fuel and wastes from normal operation of the Seabrook facility will be very small" (5-29 - 5-30). Again CLF disapproves of

of the use of semantics as a substitute for substantive demonstrations.

5.9.3.4 Radiological Monitoring

The NRC's lack of critical review of the proposed operation of Seabrook Station surfaces again in this ill-considered statement: "Secondarily, the environmental monitoring programs could identify the highly unlikely existence of releases of radioactivity from unanticipated release points that are not monitored" (5-30). The commission is resorting to the use of semantic devices in order to emphasize what they estimate to be events with a low probability of occurrence. If an unanticipated release point exists, it implies a release has occurred. Does the NRC mean that it is highly unlikely that such a release contains radioactivity? If the release is not radioactive, how would it be detected? CLF asks the NRC to rewrite this passage. It should read: "The environmental monitoring programs will also identify the existence of releases of radioactivity from unanticipated release points. Although the facility has been engineered to minimize such occurrences, within the industry [x] number of occurrences have been reported in [y] reactor-years of operation."

Also the NRC must ask the applicant to submit procedures for promptly notifying the state if abnormal releases of

radioactivity occur.

5.9.3.4.2 Radiological Monitoring: Operational

CLF requests that a table similar to Table 5.6 (5-32 - 5-34) be included to substitute for the statement: "The applicant states that the operational program will in essence be a continuation of the preoperational program ..." (5-31). Why are fruit, vegetable, soil, and gamma radiation survey samples deleted from operational monitoring? Why is the review of the proposed operational monitoring program not a part of this DES?

5.9.4.2 General Characteristics of Accidents

Besides the brief discussion of safety design and operational safety features, the NRC must also provide discussion of design flaws in pressurized water reactors and of unresolved safety issues.

CLF asks that the reactor containment structure design features which minimize the likelihood of radioactive noble gas releases (5-37) be specified.

5.9.4.3 Accident Experience and Observed Impacts

This section offers a very limited presentation of accident experience associated with the operation of PWRs. CLF requests that at least discussion be included

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of the March 1978 mishap at Rancho Seco I and its implications and of the January 1982 accident at Ginna. A compilation of the abnormal occurrences which have resulted in releases of radioactivity (both within plant and into unrestricted areas) should be included and a value for releases/reactor-year calculated.

5.9.4.4 Mitigation of Accident Consequences: Design Features

If the NRC chooses not to address unresolved safety issues in Section 4.9.4.2, design-related unresolved safety issues should be discussed in this section. Signs of steam generator tube degradation are present in well over half the PWRs on line in the United States; in particular, steam generator tube degradation associated with leakage of condenser saltwater into the secondary cooling system should be addressed. Reactor vessel embrittlement and thermal shock have also received wide press. CLF requests that the NRC require the applicant to submit what, if any, mitigation measures are being adopted to cope with age-related design deficiencies.

5.9.4.4 Mitigation of Accident Consequences: Emergency Preparedness

No substantive information about emergency procedures

at Seabrook Station are yet available. Without this information CLF contends that the DES cannot be approved. Good intentions cannot substitute for adequate planning. The emergency preparedness plans must be subject to public comment.

5.9.4.5 Accident Risk and Impact Assessment: Design-Basis Accidents

CLF requests the inclusion of worst-case scenarios in calculating the environmental impact of accidental releases of radioactivity. These dose values are then to be compared with the calculated "realistic doses". Again, such an analysis is incomplete and misleading if only average values are calculated and interpreted.

5.9.4.5 Accident Risk and Impact Assessment: Probabilistic Assessment of Severe Risk

A full explanation of the exclusion of accident sequences initiated by natural phenomena or sabotage from the probabilistic assessment of risk is needed as well as a discussion of the basis of the NRC's decision "that the additional risk from sever accidents initiated by natural events or sabotage is within the uncertainty of risks presented ..." (5-48). The NRC acknowledges that substantial uncertainty is associated with their probability

estimates. CLF requests a quantitative assessment of this substantial uncertainty. We believe that the exclusion of sequences initiated by natural phenomena and sabotage from the calculation of the point estimate increases the cahnce of Type II errors, that is, the failure to reject a false hypothesis or false estimate of a point value.

CLF requests that the NRC assess how the probability per reactor-year of particular accident sequences varies with the age of the power station.

Another inadequacy of this section is that only atmospheric releases are addressed. CLF requests the inclusion of analyses of the probabilities and consequences of spills of radioactive liquids into the ocean or marsh or onto the plant site either here or elsewhere in the DES.

5.9.4.5 Accident Risk and Impact Assessment: Dose and Health Impacts of Atmospheric Releases

The probability density functions (Figures 5.4 - 5.7), insofar as they are based on "realistic dose" values similar to those presented earlier in Section 5.9.4.5, are of limited value without companion functions based on doses calculated using worst-case scenarios and consideration of the uncertainty underlying Table 5.9 Little consideration

is given here to demographic variations in tolerance to radiation exposure.

5.9.4.5 Accident Risk and Impact Assessment: Risk Considerations

Table 5.11, "Average Values of Environmental Risks due to Accidents per Reactor-Year" (5-64), needs to be expanded to include population exposure, in person-rems, within 16 km of the station. Also it is unclear from which population the average value of .0006 early fatalities/ reactor-year is derived. Nevertheless, the NRC proceeds to use this value to assess the early fatality risk for the population living within 16 km of the reactor in the year 2000. This usage is scientifically unsound: an average value from a population cannot be assumed to be the average value of a non-randomly selected subpopulation. CLF insists that this analysis be revised in order to remove such errors. The NRC's failure to apply the rudimentary principles of statistics correctly calls the validity of this risk analysis into doubt.

5.9.4.5 Accident Risk and Impact Assessment: Uncertainties

This section fails to specify the uncertainty involved in the derivation of exposure risk probabilities. Instead the commission offers a brief history of the development of risk assessment methodology and notes "it is of interest

that this [the occurrence of the Three Mile Island accident after 400 reactor-years of operation] was within the range of frequencies estimated by the RSS [Reactor Safety Study] for an accident of this severity" (5-70). This example may be of interest, but it cannot, CLF emphasizes, be considered to verify the validity of the RSS figures. This occurrence could as well be due to chance, and the example should be stricken from the text.

If the NRC is going to mention that "the radiological risk of accidents discussed in this chapter does not reflect these improvements [in safety from investigative studies]" (5-70), the staff should also, at some point within the chapter, list all factors that were dismissed in the calculations of radiological risk. Particular attention should be paid to the factors of reactor age and spaciotemporal variations in radiation exposure within the local population.

Appendix F: Consequence Modeling Considerations (Evacuation Model)

While it is informative to explain the evacuation model, no attempt is made within the DES to apply this model to the area surrounding the Seabrook Station. Neither is the early warning system described nor mention made of the Ginna accident and the controversy concerning

the Ginna officials' failure to activate the early warning system. In order for evacuation plans to be effective, they must be explicitly documented, publicized, and tested. CLF asks that these plans be detailed and made available for public comment before approval of the DES. The plans should address at least these factors: (1) time of day, (2) time of week, (3) weather conditions, (4) the structure and condition of the transportation system, (5) the capacity of different sections of the transportaiton system, (6) access to transportation, (7) the presence of tourists, beach users, and other non-residents.

6.4 Benefit-Cost Summary

The DES subjectively dismisses the costs of the Seabrook project as being small or nonexistent and asserts that the benefits are large. These judgments are supported with dollar values or references to the text. CLF has discussed at length the deficiencies of the DES text on environmental impacts and concludes that these "costs" may be significant. The dollar amounts presented in the cost-benefit summary suffer from omissions and low estimates. If only the data submitted here are considered, the analysis fails to reveal the range of plausible values for these costs or the extensive public dispute about how large costs will be.

The principle omission in the cost-benefit summary is the cost of construction of Units I and II of the Seabrook Station. The Public Service Company of New Hampshire ("PSNH") estimates the cost of the two units to be $3.56 billion. An independent analysis of cost based on historic data on nuclear power plant construction cost and duration calculated the project cost to be $7.21 billion (Dr. Richard Rosen, Energy Systems Research Group, Maine Public Utilities Commission Docket No. 81-114). The cost-benefit summary must include this range of plausible construction cost estimates.

The economic costs that were listed in the summary are either lower than PSNH's estimates or are at the low end of a range of plausible costs. PSNH estimates that the cost of fuel at Seabrook to be 13.3 mills/kWh and 15.5 mills/kWh at Units I and II respectively (1982$), rather than the 11.6 mills/kWh cited in the summary. PSNH has projected an 8.3 milss/kWh cost for operation and maintenance increasing at a rate of 9% annually. However, operating experience at two existing New England plants, Millstone I and II, indicates that operation and maintenance costs have been $35/kW (1980$) escalating at a rate of 15% annually: this translates into a cost of 17.6 mills/kWh in 1987 or double the DES estimate. Finally, estimates of decommissioning costs are generally recognized to be speculative. The NRC

recently commissioned a study which projects decommissioning costs for a large plant to be $250 million (1981$) or roughly $500 million for Seabrook (Paul Chernick et al., Design, Costs, and Acceptability of an Electric Utility Seof-Insurance Pool for Assuring the Adequacy of Funds for Nuclear Power Plant Decommissioning Expense. NUREG/CR-2370 Nov. 1981) which is significantly higher than the DES estimate of $21 to $43 million.

The cost-benefit summary has omitted several costs which affect the cost of power form the plant. The cost of interim replacements and insurance should be included. In addition there is an opportunity cost. Investment in Seabrook precludes investment in alternative power sources. Several times in the last six months the New Hampshire Public Utility Commission has noted this investment's impairment of the Company's financial flexibility.

A revision of costs in the cost-benefit summary affects the calculation of benefits. The largest benefit attributed to Seabrook is reduced generating costs. If the higher range of construction and operating costs are in fact incurred, the cost per kilowatthour of power from Seabrook will be significantly higher than the cost of oil. This would negate all generating cost savings leaving the benefit of backing out from oil. At this point it becomes necessary to re-evaluate the opportunity cost:

if alternative means exist to displace oil at a lower cost, then the opportunity cost of precluding these investments becomes very large. A revised cost-benefit summary would show that under a certian set of assumptions economic costs alone, not including environmental, health, and safety costs, outweigh economic benefits.

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