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Dated: March 7, 1988

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

before the

ATOMIC SAFETY AND LICENSING BOARD

In the matter of PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE, et al. (Seabrook Station, Units 1 and 2)	Docket Nos. 50-443-OL-1 50-444-OL-1 (Onsite Emergency Planning and Safety Issues)

APPLICANT'S RESPONSES TO NEW ENGLAND COALITION ON NUCLEAR POLLUTION'S THIRD SET OF INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS TO APPLICANTS ON NECNP CONTENTION IV.

Pursuant to 10 CFR 2.740(b), Applicants herein respond to "New England Coalition on Nuclear Pollution's Third Set of Interrogatories and Request for the Production of Documents to Applicants on NECNP Contention IV."

Documents produced will be forwarded to NECNP under separate cover by New Hampshire Yankee (NHY) unless otherwise indicated in the response.

GENERAL OBJECTIONS

1. Applicants object to "New England Coalition on Nuclear Pollution's Third Set of Interrogatories and Request for the Production of Documents to Applicants on NECNP

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Contention IV" on the grounds that the interrogatories are untimely filed. On December 2, 1987 this Board issued a scheduling order regarding discovery concerning the remanded NECNP contentions I.V. and IV. "Order (Denying NECNP Motion for Extension; Rescheduling)." In that order the Board extended the original discovery schedule which required that discovery be completed by December 28, 1987. The Board then stated that "Applicants, NECNP and the Staff shall proceed with discovery upon the two remanded issues and complete discovery by February 19, 1988." Id. at 2-3 (emphasis added). NECNP's interrogatories were filed on February 19, 1988, requiring the Applicants to respond to discovery well past the Licensing Board's cut-off date. See, Statement of Policy on Conduct of Licensing Proceedings, CLI-81-8, 13 NRC 452, 454 (1981) ("The Commission expects licensing boards to set and adhere to reasonable schedules for proceedings"); Cleveland Electric Illuminating Company, (Perry Nuclear Power Plant, Units 1 and 2) LBP-83-79, 18 NRC 1400, 1401 (1983) ("[T]houghtful hearing management requires that matters that can be completed, be completed, so that they will not interfere with other matters that may arise"). Without waiving this objection, Applicants nevertheless respond herein.

2. Applicants object to any and all interrogatories regarding microbiologically induced corrosion because as

expressly held by the Licensing Board in this case, issues concerning the occurrence of microbiologically induced corrosion are not within the scope of Contention IV. Memorandum and Order (Granting NECNP's Motion for Leave; Denying NECNP's Motion to Compel) (February 17, 1988).

3. Applicants object to any and all interrogatories regarding circulating water systems other than cooling systems. Issues concerning non-cooling circulating water systems are outside the scope of Contention IV as Contention IV is limited to concerns regarding a surveillance and maintenance program at Seabrook Station to prevent the accumulation of mollusks, other aquatic organisms, and debris in cooling systems. It is well established that an intervenor is bound by the literal terms of the contention and basis as filed. Memorandum and Order (Granting NECNP's Motion for Leave; Denying NECNP's Motion to Compel) (February 17, 1988).

4. Applicants object to the proposed definition of "biofouling" in Paragraph 7 of the instructions. The term "biofouling" as used in these responses means extensive settlement of fouling organisms, resulting in significant percentages of the surfaces being covered and thus measurably affecting flow or heat exchanges efficiency. "Settlement" means colonization on plant surfaces by fouling organisms, primarily mussels and barnacles.

Interrogatory No. 1:

Please identify all persons who participated in the preparation of answers to these interrogatories, and identify the portions of your response to which each person contributed.

Response No. 1: See Attachment 1-1.

Interrogatory No. 2:

For each of the individuals listed in Attachment 1-1 of your response to NECNP's Second Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contention IV, state their area of expertise and qualification, including, but not limited to expertise in the field of microbiology, and identify the portions of your response to each interrogatory to which each person contributed.

Response No. 2: See Attachment 2-1 through 2-8 for the qualifications of the individuals who participated in the preparation of "Applicants' Responses to New England Coalition on Nuclear Pollution's Second Set of Interrogatories and Request for the Production of Documents to Applicants on NECNP Contention IV".

The responses were the result of the collective effort of all the individuals listed, with the exception of Dr. Gerald M. Kwasnik who, as noted, participated in the response to Interrogatory 7, only.

Interrogatory No. 3:

In your response to question 2(n) of NECNP's Second Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contention IV, on page 12, you stated that "The PCCW system is not chlorinated," and on page 34,

you stated "For the systems mentioned, PCCW, ECCS, SCCW, RHR and FW, the water is chlorinated...prior to being put into the systems." Please explain the apparent inconsistency between these statements.

Response No. 3:

In response to Interrogatory 8 of Applicants' Responses to NECNP's Second Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contention IV, Applicants stated that "for the systems mentioned, PCCW, ECCS, SCCW, RHR and FW, the water is chlorinated, demineralized and sterilized...prior to being put into the systems." As can be seen from the responses to Interrogatories 2(i) and 2(l) of Applicants' Responses to NECNP's Second Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contention IV, the water treatment process includes dechlorination of the water prior to distribution to various plant systems. In responding to Interrogatory 8 referenced above, Applicants included dechlorination as part of the demineralization process.

Interrogatory No. 4:

In your response to questions 2(l) and 8 of NECNP's Second Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contention IV, on pages 8 and 34, you stated that you performed "bulk water sampling" to monitor for bacterial contamination. For each system at Seabrook filled with circulating water, please answer the following questions:

(a) Describe the parameters measured by "bulk water

sampling," including but not limited to oxygen, cell count, chlorine concentration, algae.

(b) Describe the exact locations at which bulk water sampling is or will be performed.

(c) Describe the number of times per week, month or year, whichever is applicable, that bulk water sampling will be performed at each location.

(d) Describe the equipment used to perform bulk water sampling at each location.

(e) For each parameter being measured by the bulk water sampling, describe how you intend to extrapolate results from bulk water sampling to conditions existing at the pipe-liquid interface where biofouling and microbiologically induced corrosion occur.

(f) For each parameter being measured by the bulk water sampling, describe how the data or information resulting from "bulk water sampling" indicates the conditions existing at the pipe-liquid interface.

(g) Identify and produce any documents, reports, or protocols that provide information relating to bulk water sampling program.

Response No. 4:

Applicants object to Interrogatory 4 on the grounds that issues concerning the occurrence of microbiologically induced corrosion are outside the scope of Contention IV. See Applicant's General Objection No. 2, supra. Interrogatory 4 seeks further information relating to responses 2(l) and 8 of Applicants' Responses to NECNP's Second Set of Interrogatories and Request for Production of Documents on

NECNP Contention IV.[1] These responses related to the bulk

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[1] Interrogatory 2(1) referenced in Interrogatory 4 stated:

> Describe your program or techniques for preventing biofouling or microbiologically induced corrosion, including when such program was initiated. If biofouling or microbiologically induced corrosion played a role in this leak, explain why this program or techniques failed to prevent biofouling or microbiologically induced corrosion in this instance.

Without waiving an objection to the interrogatory, Applicants responded in part:

> The PCCW system is a closed-loop, high purity water system, which has its makeup water supply from the demineralized water system. Biofouling by marine or fresh water macro-organisms is not a concern.
>
> The program for prevention of microbiologically induced corrosion is based on water treatment, monitoring of plant systems by visual inspection, and bulk water sampling.

Interrogatory 8 also referenced in Interrogatory 4 concerned the identical issue and by the express terms of the Interrogatory, related only to microbiologically induced corrosion. Interrogatory 8 stated:

> For each system at the Seabrook plant filled with circulating water, either fresh water or salt water, including but not limited to the Fire Protection, PCCW, ECCS, Secondary Component Cooling Water, Residual Heat Removal, and Feedwater systems, please answer the following questions:
>
> a) Describe Applicants' program for detecting the conditions conducive to microbiologically induced corrosion prior to its occurrence, including techniques for determining the extent of sedimentation or corrosion.
>
> b) Describe Applicants' program for detecting the presence of microbiologically induced

water sampling program used by Applicants to prevent microbiologically induced corrosion.

Applicants object to Interrogatory 4 insofar as it concerns circulating water systems other than cooling systems on the grounds that issues concerning noncooling systems are outside the scope of Contention IV. See Applicants' General Objection No. 3, supra.

Interrogatory No. 5:

In your response to questions 2(1) and 8 of NECNP's Second Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contention IV, on pages 8 and 35, you stated that you performed "visual inspection when plant systems are opened for maintenance" to monitor for bacterial contamination. For each system at Seabrook filled with circulating water, either fresh water or salt water, including but not limited to the Fire Protection, PCCW, ECCS, RHR, SW, and FW systems, please describe how many times per year these plant systems are, or expected to be, opened for maintenance.

Response No. 5

Applicants object to Interrogatory 5 on the grounds that issues concerning the occurrence of microbiologically induced corrosion are outside the scope of Contention IV. See Applicants' General Objection No. 2, supra. Interrogatory 5 seeks further information relating to responses 2(1) and 8 of Applicants' Responses to NECNP's Second Set of Interrogatories and Request for Production of Documents on

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corrosion after its occurrence, including techniques for determining the extent of such corrosion.

NECNP Contention IV. These responses related to the monitoring of plant systems by visual inspection by Applicants to prevent microbiologically induced corrosion. See footnote 1, supra.

Applicants object to Interrogatory 5 insofar as it concerns circulating water systems other than cooling systems on the grounds that issues concerning noncooling systems are outside the scope of Contention IV. See Applicants' General Objection No. 3, supra.

Interrogatory No. 6:

In your response to question 8(b) of NECNP's Second Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contention IV, on page 35, you stated that you performed "visual examination of closed-loop systems ...[and] components on a routine bases" for determining the effectiveness of the microbiologically induced corrosion prevention program. For each such system, please answer the following questions:

(a) Please specifically identify which systems you consider "closed-loop systems."

(b) Please describe how many times per year such examinations will be performed.

(c) Please identify which components of each system will be examined, and the exact location of these components.

(d) Identify and produce any documents, reports, or protocols that provide information relating to this visual inspection program.

Response No. 6:

Applicants object to Interrogatory 6 on the grounds that issues concerning the occurrence of microbiologically induced

corrosion are outside the scope of Contention IV. See Applicants' General Objection No. 2, supra. Interrogatory 6 seeks further information regarding Applicants' visual examination of closed-loop systems to follow the effectiveness of the microbiologically induced corrosion prevention program. See footnote 1, supra.

Interrogatory No. 7:

For each system at Seabrook filled with circulating water, either fresh water or salt water, including but not limited to the Fire Protection, PCCW, ECCS, RHR, SW, and FW systems, for which microbiologically induced corrosion is controlled through injection of biocides or biostats, including but not limited to chlorine, hydrazine, or boric acid, please answer the following questions:

(a) Please describe the exact location of each place of injection, the distance (in feet of piping) between injection points, and the type of chemical injected at each place of injection.

(b) Please describe the equipment used to make such injections at each location.

(c) Please describe the precise frequency or duration of injections (i.e. 24 hours per day, 365 days per year) and concentration (in parts per million) at each location.

(d) Please describe your plans for monitoring the effectiveness of such treatments, including but not limited to sampling of the bulk water, sampling of pipe-liquid interfaces, inspection, or use of an on-line biofouling monitoring device.

(e) For each technique identified above for monitoring the effectiveness of such treatments, indicate the equipment used to perform such monitoring, indicate the exact locations at which the monitoring will be performed through the system, and the distance between monitoring points or locations, and the frequency which samples are taken.

(f) Please describe your criteria for residual chlorine concentration at each sampling point that you consider adequate to control microbiologically induced corrosion throughout that system.

(g) Identify and produce any documents, reports, or protocols that provide information relating to your chlorination or chemical treatment program.

Response No. 7:

Applicants object to Interrogatory 7 on the grounds that issues concerning the occurrence of microbiologically induced corrosion are outside the scope of Contention IV. See Applicants' General Objection No. 2, supra.

Applicants object to Interrogatory 7 insofar as it concerns circulating water systems other than cooling systems on the grounds that issues concerning noncooling systems are outside the scope of Contention IV. See Applicants' General Objection No. 3, supra.

Interrogatory No. 8:

For each system at Seabrook filled with circulating water, either fresh water or salt water, including but not limited to the Fire Protection, PCCW, ECCS, RHR, SW, and FW systems, for which biofouling is controlled through injection of biocides or biostats, including but not limited to chlorine, hydrazine, or boric acid, please answer the following questions:

(a) Please describe the exact location of each place of injection, the distance (in feet of piping) between injection points, and the type of chemical injected at each place of injection.

(b) Please describe the equipment used to make such injections at each location.

(c) Please describe the precise frequency or duration of injections (i.e. 24 hours per day, 365 days per

year) and concentration (in parts per million) at each location.

(d) Please describe your plans for monitoring the effectiveness of such treatments, including but not limited to sampling of the bulk water, sampling of pipe-liquid interfaces, inspection, or use of an on-line biofouling monitoring device.

(e) For each technique identified above for monitoring the effectiveness of such treatments, indicate the equipment used to perform such monitoring, indicate the exact locations at which the monitoring will be performed through the system, and the distance between monitoring points or locations, and the frequency which samples are taken.

(f) Please describe your criteria for residual chlorine concentration at each sampling point that you consider adequate to control biofouling throughout that system.

(g) Identify and produce any documents, reports, or protocols that provide information relating to your chlorination or chemical treatment program.

Response No. 8:

Applicants object to Interrogatory 8 insofar as it concerns circulating water systems other than cooling systems on the grounds that issues concerning non-cooling systems are outside the scope of Contention IV. See Applicants' General Objection No. 3, supra. Nevertheless, without waiving the above objection, Applicants respond as follows:

The makeup water to plant systems (excluding salt water systems), specifically FW, ECCS, PCCW and RHR, is processed through the water treatment plant. As has been previously stated in Applicants' Responses to New England Coalition on Nuclear Pollution's Second Set of Interrogatories and Request

for Production of Documents to Applicants on NECNP Contention IV, response 2(i), 2(l), this water is chlorinated, dechlorinated, filtered, demineralized and sterilized prior to distribution within the plant. Therefore, there is no credible mechanism for the intrusion of slime, sediment, algae, or mollusk and barnacle organisms into these systems.

Hydrazine, boric acid, or other chemical control agents have been added to these systems for purposes unrelated to controlling biofouling. See response to Interrogatories 2(q) and 8, Applicants' Responses to NECNP's Second Set of Interrogatories and Request for Production of Documents to Applicants on NECNP contention IV.

In regards to controlling of biofouling in Circulating Water and Service Water Systems the following responses are provided:

a) See response to Interrogatory 3(q), Applicants' Responses to NECNP's Second Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contention IV.

b) See FSAR Section 10.4.5 and FSAR Figure 10.4-3a. However, a sodium hypochlorite storage tank is also being used as a source of chlorine for injection.

c) The concentration of chlorine at each injection point is controlled by the chlorine demand of the sea water and the 0.20 ppm residual chlorine discharge limit. The

demand is determined by analysis for the residual chlorine in the Circulating Water System. Typical concentrations of chlorine at the point of injection have been approximately 0.50 ppm.

The injection of chlorine into the Circulating Water and Service Water Systems is continuous (i.e., 24 hours per day) when there is flow through the systems.

d) See responses to Interrogatories 10 and 21-25 of Applicants' Responses to NECNP's First Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contention I.V. and IV and response to Interrogatories 3(s) and 3(t) of Applicants' Responses to NECNP's Second Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contention IV.

e) See response to Interrogatory 8(d).

f) The biopanels which are in the flowing system are examined weekly for the presence of biofouling organisms. Thus far we have controlled permanent settlement of biofouling organisms, with residual chlorine levels of less than 0.2 ppm. When we observe increasing transitory organisms on these panels, we increase the residual chlorine level until the number of organisms drops back down to lower levels. It should be

noted that at no time do we exceed the NPDES 0.2 ppm chlorine limit.

g) See Attachment 10-1 of Applicants' Responses to NECNP's First Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contentions I.V. and IV for documents relating to chlorination.

Interrogatory No. 9:

For each system at Seabrook filled with circulating water, either fresh water or salt water, including but not limited to the Fire Protection, PCCW, ECCS, RHR, SW, and FW systems, please describe your program or techniques for inspecting piping and heat exchanger surfaces, including valves, baffle plates, and other component parts of the heat exchanges, to determine the extent the presence of slime, sediment, or microbiological organisms. In your response, please also answer the following specific questions:

(a) Describe in detail how such inspections are or will be performed.

(b) Describe the operational phase of the system when the inspections are performed.

(c) Describe the frequency of such inspections, the exact location of the surfaces that will be inspected, and any equipment that will be utilized to perform such inspections.

(d) If no inspections are to be performed, explain why not.

Response No. 9:

Applicants object to Interrogatory 9 insofar as it concerns circulating water systems other than cooling systems on the grounds that issues concerning non-cooling systems are outside the scope of Contention IV. See Applicants' General

Objection No. 3, supra. Nevertheless, without waiving the above objection, Applicants respond as follows:

a) The inspection of piping and heat exchangers to determine the presence of slime, sediment, or microbiological organisms are planned to be performed in the following fashion:

   i) Whenever components (e.g. valves, spool pieces, pumps, heat exchangers, etc.) of systems are disassembled for maintenance an interior visual inspection is performed and any abnormalities are evaluated. This inspection would not necessarily include heat exchanger surfaces and baffle plates unless such a detailed inspection was warranted based on the evaluation. Typically, several portions of each system would be inspected in this manner each year. These inspections would be performed when the equipment is out of service.

   ii) Our present plans for verification of heat exchanger performance will determine the presence of slime, sediment, or microbiological organisms if such material effects heat exchanger performance. Heat exchanger performance testing will be conducted as described in "Standards of Tubular Exchanger Manufacturers Association" under "Temperature Efficiency". No special equipment is

required for these performance measurements. The heat exchanger performance measurements are planned to be implemented monthly on heat exchangers continuously cooled by salt water. Fresh water heat exchangers in continuous use will be monitored every six months. Other heat exchangers not in continuous use will be monitored when they are place in service on a refueling interval. Because of the lack of heat load, this program is not presently in place.

iii) Our plans for heat exchanger integrity presently included periodic eddy-current inspections. These inspections would require the heat exchanger to be removed from service. Our present plans are to perform these inspections every three years for the salt water heat exchangers and every ten years for the fresh water heat exchangers. During these inspections, we would also visually inspect the inside of the heat exchanger as described in the response to (i) above. The equipment used to perform the eddy-current inspection would be state-of-the-art contract equipment.

b) See response to 9a.

c) See response to 9a.

d) As described above inspections are performed therefore, the question is not applicable.

Interrogatory No. 10:

Please identify all systems filled with circulating water, either fresh water or salt water, including but not limited to the Fire Protection, PCCW, ECCS, RHR, SW, and FW systems, in which no chemical biocide, or biostat is used to control biofouling or microbiologically induced corrosion, and explain why you do not believe use of such chemicals is necessary to control biofouling or microbiologically induced corrosion in these systems.

Response No. 10:

Applicants object to Interrogatory 10 insofar as it concerns microbiologically induced corrosion on the grounds that issues concerning the occurrence of microbiologically induced corrosion are outside the scope of Contention IV. See Applicants' General Objection No. 2, supra.

Applicants additionally object to Interrogatory 10 insofar as it concerns circulating water systems other than cooling systems on the grounds that issues concerning non-cooling systems are outside the scope of Contention IV. See Applicants' General Objection No. 3, supra.

Nevertheless, without waiving the above objections, Applicants response as follows:

In systems such as PCCW, ECCS and FW, the purpose of adding chemicals is not for biocidal or biostat treatment, but for corrosion control. Response to Interrogatory 8 describes why there is no credible mechanism for biofouling.

Interrogatory No. 11:

Please identify all systems filled with circulating water, either fresh water or salt water, including but not limited to the Fire Protection, PCCW, ECCS, RHR, SW, and FW systems, which are not monitored for the presence of, or conditions conducive to, biofouling or microbiologically induced corrosion. For each system, please answer the following questions:

(a) Please identify the metallurgical composition or other material used in the piping and in each of the various component parts of the system, including but not limited to valves, baffle plates, and bearings.

(b) Please describe how you intend to detect the presence of, or conditions conducive to, biofouling or microbiologically induced corrosion in those piping materials and other component parts that are not concrete or epoxy-lined materials.

(c) If you perform inspections of tubing and heat exchanger components that are not cement or epoxy lined, please describe how such inspections are performed and the frequency of such inspections.

Response No. 11:

Applicants object to Interrogatory 11 insofar as it concerns microbiologically induced corrosion on the grounds that issues concerning the occurrence of microbiologically induced corrosion are outside the scope of Contention IV. See Applicants' General Objection No. 2, supra.

Applicants additionally object to Interrogatory 11 insofar as it concerns circulating water systems other than cooling systems on the grounds that issues concerning non-cooling systems are outside the scope of Contention IV. See Applicants' General Objection No. 3, supra.

Nevertheless, without waiving the above objections, Applicants response as follows:

In systems such as PCCW, ECCS and FW, the purpose of adding chemicals is not for biocidal or biostat treatment, but for corrosion control. Response to Interrogatory 8 describes why there is no credible mechanism for biofouling.

The Circulating and Service Water Systems are monitored for conditions conducive to biofouling as described in Responses 21 to 25 in Applicants' Responses to NECNP's First Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contentions I.V. and IV.

All circulating water systems, such as, but not limited to PCCW, ECCS, FW or RHR are maintained through Seabrook Station Chemistry Monitoring Program. The parameters which are routinely monitored during system operation (at least weekly) would reveal any raw or sea water intrusion at very low levels, and in very timely fashion. Therefore, these chemical controls also serve as biofouling monitors since no other pathways for fouling organisms into these systems exist. See response to Interrogatory 8. Therefore, there are no circulating water systems for which Seabrook Station is not monitoring for the presence of, or conditions conducive to, biofouling.

Interrogatory No. 12:

For each system at Seabrook filled with circulating water, either fresh water or salt water, including but not limited to the Fire Protection, PCCW, ECCS, RHR, SW, and FW systems, please describe any techniques you use, or plan to use, to prevent the build-up of slime in heat exchanges and all component parts thereof.

Response No. 12:

Applicants object to Interrogatory 12 insofar as it concerns circulating water systems other than cooling systems on the grounds the issues concerning non-cooling systems are outside the scope of Contention IV. See Applicants' General Objection No. 3, supra.

Nevertheless, without waiving this objection, Applicants respond as follows:

In the Circulating and Service Water Systems the "technique" we use and will continue to use, is continuous low level chlorination. See additional description in response to Interrogatory 8.

All other plant systems have no credible mechanism of slime buildup, since they are closed-loop systems whose makeup comes from the demineralized water system, the purification of which is described in response to Interrogatory 8.

Interrogatory No. 13:

For each system at Seabrook filled with circulating water, either fresh water or salt water, including but not limited to the Fire Protection, PCCW, ECCS, RHR, SW, and FW systems, please answer the following questions:

(a) Describe any program you have to monitor oxygen level and chlorine concentration in each system.

(b) Produce any data you have measuring the oxygen levels and chlorine concentrations in each system, including the time such samples or measurements were taken, and the location of the sampling or measurement points.

Response No. 13:

Applicants object to this interrogatory insofar as it concerns circulating water systems other than cooling systems on the grounds that issues concerning circulating water systems generally are outside the scope of Contention IV. See Applicants' General Objection No. 3, supra.

However, without waiving this objection, Applicants respond as follows.

(a) For the Service Water System and Circulating Water System see response to Interrogatory 3(t) Applicants' Responses to NECNP's Second Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contention IV. For PCCW, see responses to Interrogatories 2(n) and 2(q) Applicants' Responses to NECNP's Second Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contention IV. For all other circulating water systems in the plant, chlorine is not used.

The oxygen level is only measured in the following systems or components as described.

1. Continuous process instrument analysis as well as daily grab sampling for the Feedwater System.
2. Daily grab samples for the Reactor Coolant System when system temperatures are above 180°F.
3. Weekly grab samples of three water storage tanks DWST, CST, and RWST.

(b) For the Service Water System and Circulating Water System see response to Interrogatory 3(u) Applicants' Responses to NECNP's Second Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contention IV. For PCCW see response to Interrogatory 2(r) Applicants' Responses to NECNP's Second Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contention IV. In regards to chlorine measurements see 13(a) above, for all other circulating water systems. In regards to oxygen level measurements for those systems or components for which oxygen level measurements are performed:

1. Since the Feedwater System has not been put into operation, there are no oxygen data.

2&3. As to the oxygen level data for the Reactor Coolant System and the three storage tanks, this information is available at Seabrook Station for inspection. Please contact Mr. William J. Daley, Jr. at (603) 474-9521, extension 2057 to arrange for inspection.

Interrogatory No. 14:

In NRC Inspection Report No. 50-443/87-24, at page 15-17, the inspector observed several problems concerning the service water piping and determined that neither microbiologically induced corrosion or biofouling was involved. Please describe the exact nature of the problem for which microbiologically induced corrosion or biofouling was considered a possible cause, and answer the following questions regarding this problem:

(a) Identify and produce any documents, inspection reports, work requests, station information reports or photographs that in any way discuss, investigate, or evaluate this leak, or that identify or describe the extent and nature of the leak.

(b) Produce the most current version of piping and instrumentation diagrams for this system. This question may be answered by reference to the appropriate diagram in the F.S.A.R.

(c) Describe when, and the circumstances under which, this problem was discovered.

(d) Describe exactly where in this system, the problem occurred, including whether it occurred on a weld, through the body of a valve, through any internal part of a valve, or through a mechanical joint on or in the valve.

(e) Describe the metallurgical composition or other materials used for each of the various parts where this problem occurred, comprising this heat-exchanger.

(f) Explain how you reached the conclusion that microbiologically induced corrosion played a role in this problem.

(g) Describe what you have done, or intend to do, to solve this problem and prevent it from occurring in this system in the future.

Response No. 14:

Applicants object to Interrogatory 14. It is Applicants' understanding that this interrogatory relates to NRC Inspection Report No. 50-443/87-24 concerning a pin-hole leak in the non-safety related Service Water piping on the inlet side of the SCCW heat exchanger. As is noted in the interrogatory, in the report the inspector determined that biofouling was not involved. Since biofouling was not a contributor to the pin-hole leak and since microbiologically induced corrosion is not within the scope of Contention IV (See, Applicants' General Objection No. 2, supra) the information sought in this Interrogatory is outside the scope of Contention IV.

Interrogatory No. 15:

For each system at Seabrook filled with circulating water, either fresh water or salt water, including but not limited to the Fire Protection, PCCW, ECCS, RHR, SW, and FW systems, please describe your program for preventing or controlling bivalve larvae from settling on piping and heat-exchanger surfaces.

Response No. 15:

Applicants object to this interrogatory insofar as it concerns circulating water systems on the grounds that issues concerning circulating water systems generally are outside the scope of Contention IV. See, Applicants' General Objection No. 3, supra.

However, without waiving this objection, Applicants respond as follows.

For the Circulating Water and Service Water Systems see responses to Interrogatories 21-25 Applicants' Response to NECNP's First Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contentions I.V. and IV.

For all other circulating water systems see response to Interrogatory 8 regarding the prevention of the intrusion of macrobiological organisms such as bivalve larvae into these systems.

Interrogatory No. 16:

For each system at Seabrook filled with circulating water, either fresh water or salt water, including but not limited to the Fire Protection, PCCW, ECCS, RHR, SW, and FW systems, please describe your program for measuring flow velocity to estimate flow rate, and answer the following questions regarding this system:

(a) Describe the equipment used to take such measurements.

(b) Identify the locations or points at which such measurements will be taken.

(c) Identify the distance between measuring points or locations.

(d) Describe the frequency with which such measurements will be taken, and the operational phase of the plant when measurements will be taken.

(e) Describe your criteria for flow velocity differential at each point that you consider adequate to indicate the presence and/or absence of biofouling or other blockage throughout that system.

(f) Identify and produce any documents, reports, or protocols that provide information relating to your flow velocity measurement program.

Response No. 16:

Applicants object to this interrogatory insofar as it concerns circulating water systems on the grounds that issues concerning circulating water systems generally are outside the scope of Contention IV. See, Applicants' General Objection No. 3, supra.

However, without waiving this objection, Applicants respond as follows.

In responding to this interrogatory it should be understood that flow rates are what is provided by the in-plant measuring equipment. Knowing the flow rate one can then calculate the applicable flow velocity.

(a) Inline flow elements are typically used. These elements transmit pressure signals either directly to a flow indicator or to a flow transmitter which

in turn sends an electrical signal to a flow indicator.

(b) The locations of flow elements relative to system components are shown on the respective system P&IDs in the FSAR.

(c) One flow element (measuring point) is installed in the respective system loop circuit, where flow measurement is required. The distance between measuring points is therefore not applicable.

(d) The method of measuring flow velocity and verifying the absence of significant biofouling or other blockage throughout any of the Seabrook circulating water systems is two-fold. First, as required by the Seabrook Station Technical Specifications, system flow values for safety-related equipment is recorded and evaluated quarterly whenever such systems are required by the Technical Specifications to be operable. Additionally, the thermal performance of the various circulating water heat exchangers is measured and evaluted monthly for sea water systems and every six months or when the system is in service for fresh water systems to ensure that no significant biofouling or blockage exists.

16e) The criteria for system flow acceptability discussed in response to Interrogatory 16(d) is based on pump and heat exchanger performance, however, such criteria will envelop any and all system flow deviations such that system performance will not be impaired regardless of the source of the flow deviation (e.g., pump performance, biofouling).

16f) There are tens of thousands of documents associated with flow data at Seabrook Station. These documents include computer recorded flow measurements, logs of flow measurements, test procedures that record flow documents are available at Seabrook Station for inspection. Please contact Mr. William J. Daley, Jr. at (603) 474-9521 extension 2057 to arrange for inspection.

Interrogatory No. 17:

In your response to interrogatory 24 of NECNP's First Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contention I.V and IV, on page 18, you stated that should Applicants' chlorination and heat treatment program "not be appropriate, there are a number of options including mechanical cleaning, injection of higher chlorine levels...and/or heat treatment of the transition (intake) structure and intake tunnel." Please answer the following questions regarding this statement:

(a) For each system at Seabrook filled with circulating water, either fresh water, or salt water, including but not limited to the Fire Protection, PCCW, ECCS, RHR, SW, and FW systems, describe your current heat treatment program, including the equipment used in

performing such heat treatment, the temperatures for such heat treatments, and the frequency such heat treatment will be performed.

(b) For each system at Seabrook filled with circulating water, wither fresh water or salt water, including but not limited to the Fire Protection, PCCW, ECCS, RHR, SW, and FW systems, please describe the criteria or parameters you will use to determine that chlorine and heat treatment are "not appropriate," and the criteria or parameters you will use to determine what alternative treatment(s) should be used.

(c) For each system at Seabrook filled with circulating water, either fresh water or salt water, including but not limited to the Fire Protection, PCCW, ECCS, RHR, SW, and FW systems, describe how frequently you plan to conduct "mechanical cleaning" should your current program "not be appropriate," and describe any equipment that will be used to perform such "mechanical cleaning."

(d) For each system at Seabrook filled with circulating water, either fresh water or salt water, including but not limited to the Fire Protection, PCCW, ECCS, RHR, SW, and FW systems, describe your plan to conduct "heat treatment of the transition (intake) structure and intake tunnel," including the frequency that such treatments will be made, and explain how this treatment differs from your current heat treatment program.

(e) Identify and produce any documents, reports, or protocols that provide information relating to your current heat treatment program.

(f) Identify and produce any documents, reports, or protocols that provide information relating to your program or plans for "mechanical cleaning, injection of higher chlorine levels...and/or heat treatment of the transition (intake) structure and intake tunnel."

Response No. 17:

Applicants object to this interrogatory insofar as it concerns circulating water systems on the grounds that issues

concerning circulating water systems generally are outside the scope of Contention IV. See, Applicants' General Objection No. 3, supra.

However, without waiving this objection, Applicants respond as follows.

Initially it should be noted that the Interrogatory and Response thereto referenced was in regards to "Applicant's program for treating biofouling". As indicated in the response to Interrogatory 8 except for Circulating Water and Service Water, biofouling of the other Circulating Water Systems is not credible. As such the following questions are only applicable to Circulating Water and Service Water and will be answered accordingly.

(a) The phrase "should this not be appropriate" was making reference to the expectation that chlorine will continue to be an effective biostat and biocide.

The heat treatment program referred to is performed only on the intake portion of the Circulating Water System as described in FSAR Section 10.4.5, FES-OL Section 3.4.5, and within the NPDES permit issued to Seabrook Station.

(b) As indicated in response to Interrogatory 17(a), the phrase "not appropriate" was directed to chlorination.

The chlorination levels of the Circulating Water and Service Water Systems are being monitored by the Seabrook Station Staff and compared to the history of mussel settlement or growth. As discussed in response to Interrogatory 8(f), when there was an increase in settlement on the biopanels, the chlorination level was increased and the settlement reduced. This method will be used to determine the effectiveness of chlorination as a biostat/biocide. In addition, inspections, equipment, heat exchangers, etc., will provide further information as to the effectiveness of chlorination.

(c) At present Seabrook Station has no preplanned activities with regards to mechanical cleaning. If after inspecting biopanels, equipment, heat exchangers, piping, etc., such a cleaning process would be necessary, services or equipment appropriate for the specific circumstance would be obtained and the item cleaned.

It should be noted that to date, there has been no instances of biofouling where the performance of the Circulating Water or Service Water Systems required mechanical cleaning.

(d) See response to 17(a).

(e) See response to 17(a). The documents referenced therein have either been previously produced by Applicants or are public documents.

(f) See responses to 17(a), 17(c), and 8(f).

As to Answers:

Ted C. Feigenbaum

Ted C. Feigenbaum, Vice President
New Hampshire Yankee Division of
Public Service Company of New Hampshire

March 7, 1988

State of New Hampshire
Rockingham County, ss.

Then appeared before me the above subscribed Ted C. Feigenbaum an made oath that he is the Vice President of New Hampshire Yankee Division, authorized to execute the foregoing responses to interrogatories on behalf of the Applicants, that he made inquiry and believes that the foregoing answers accurately set forth such information as is available to the Applicants.

Before me,

Beverly E. Sullivan

Notary Public
My Commission Expires. 3/6/90

As to objections:

Deborah S. Steenland

Thomas G. Dignan, Jr.
Deborah S. Steenland
Ropes & Gray
225 Franklin Street
Boston, Massachusetts 02110
(617) 423-6100

Counsel for Applicants

ATTACHMENT 1-1

Gregory A. Kann
Program Support Manager, Seabrook Station
New Hampshire Yankee

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P.O. Box 300
Lafayette Road
Seabrook, NH 03874

Richard R. Cliche
Systems Engineer, Seabrook Station
New Hampshire Yankee

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Kenneth W. Dow
Environmental Scientist
Yankee Atomic Electric Company

Yankee Atomic Electric Company
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Dr. Robert Litman
Chemistry Supervisor, Seabrook Station
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Richard A. Frey
Chemist, Seabrook Station
New Hampshire Yankee

Seabrook Station
P.O. Box 300
Lafayette Road
Seabrook, NY 03874

ATTACHMENT 2-1

STATEMENT OF PROFESSIONAL QUALIFICATIONS

RICHARD R. CLICHE

PROFESSIONAL EXPERIENCE

Public Service Company of N.H.

- 1986 to present — Senior Engineer - Plant Engineering
  Responsible for resolution of Nuclear Plant operation problems. Preparation design packages, engineering reports and calculations to support nuclear and non-nuclear fluid system changes.

- 1981 to 1986 — Senior Engineer - Construction Management
  Responsible for management of a major piping contractors' engineering department. Developed and implemented a program to control the installation of 30,000 pipe supports. Provided supervisory support for the pipe stress reconciliation program.

Stone & Webster Engineering - Boston, Ma.

- 1979 to 1981 — Support Engineer - Operational Services Division
  Responsible for resolution of operational problems and implementation of regulatory changes. Preparation of nuclear, and non-nuclear, fluid system "Design Change Packages" and calculations to support power plant outages.

- 1976 to 1979 — Support Engineer - Project Nuclear Group
  Responsible for Nuclear Power Plant engineering during construction and test phase. Responsibilities included, but were not limited to the following:

  1) Mechanical equipment (pumps, valves, piping, heat exchanges, tanks, refrigeration units, evaporators, radwaste filters and various radwaste equipment) sizing and selection.

  2) Specification preparation and control.

  3) Bid review and vendor recommendations.

4) Provide equipment and system installation instructions.

5) Engineering, design, procurement, construction, and testing of various nuclear fluid systems such as boron recovery, radioactive liquid and gaseous waste, instrument air system, decontamination system, sampling system, etc.

6) Equipment trouble shooting.

- 1974 to 1976 — Nuclear Plant Licensing Coordinator
  Responsible for scheduling of supplements to the safety analysis report, processing of report changes and coordination with client licensing staff.

U.S. Navy - Submarine Force

- 1968 to 1974 — Nuclear Plant (Mechanical) Operator
  Responsible for the safe operation of nuclear mechanical and fluid systems. Duties also include equipment maintenance, testing of fluid systems, training and supervision of mechanical operators. Assisted shipyard staff during reactor refueling and complete mechanical plant overhaul.

EDUCATION

New Hampshire College	MBA - March 1985
University of Lowell	B.S. Mechanical Engineering Technology, Magna Cum Laude

U.S. Navy Nuclear Power School - Mare Island, California - Theoretical
Windsor, Conn. - Practical

ST. Thomas Aquinas High School - Dover, N.H.

REGISTRATION

Registered Professional Engineer - State of N.H.

ASSOCIATIONS

Member - American Society of Mechanical Engineers

ATTACHMENT 2-R

STATEMENT OF PROFESSIONAL QUALIFICATIONS

DR. GERALD M. KWASNIK

CORPORATE HEALTH PHYSICIST

Dr. Kwasnik received his Bachelor of Science Degree in Biological Science in 1972, and his Master of Science Degree in Biological and Environmental Science in 1975 - both from the University of Detroit. In 1977, Dr. Kwasnik received his Doctorate Degree from Purdue University in Radiation Health Physics.

Upon graduation from Purdue University, he was employed by Exxon Nuclear, Inc. as a Senior Health Physicist at the Idaho Nuclear Fuels Reprocessing Facility. While at the nuclear fuel reprocessing facility he performed a wide range of health physics and radioactive waste management duties and responsibilities. In October of 1978, Dr. Kwasnik was part of the initial plant recovery and assessment team following the uncontrolled criticality incident that occurred there.

In 1980 he joined American Nuclear Insurers (ANI) as a Staff Health Physicist. His primary responsibilities and duties were nuclear power and fabrication plant inspections, development of inspection standards and criteria for ANI inspections and providing technical support for radiation claim litigation including the Three Mile Island class action suit.

In 1982 Dr. Kwasnik joined Public Service of New Hampshire as the Principal Health Physicist for the corporate support staff. His duties and responsibilities include station health physics support, managing interface for the radioactive waste management program, serving as the New Hampshire Yankee (NHY) liaison with all regulatory agencies in the areas of radiation protection and radioactive waste management and corporate liaison for on-site emergency planning.

ATTACHMENT 2-3

STATEMENT OF PROFESSIONAL QUALIFICATIONS

JOHN THOMAS LINVILLE III

EXPERIENCE:

1981 to Present	PUBLIC SERVICE CO OF NEW HAMPSHIRE, SEABROOK STATION, Seabrook, NH Chemistry Department Supervisor, 1986 to present Overall responsibility for 27-man department providing technical and administrative supervision to [illegible]. Responsible for chemistry, radio-chemistry, effluent surveillance, hazardous waste and filter testing. Chemistry Supervisor, 1981 to 1986 Supervisor for new construction of two unit PWR.
1972 to 1981	NORTHERN STATES POWER PRAIRIE ISLAND NUCLEAR PLANT, Welch, MN Plant Chemist for two unit PWR, 1978 to 1981, Overall responsibility for chemistry, radiochemistry and effluent surveillance. Designed and installed all chemistry post TMI modifications. Served on EPRI RP 404 Steam Generator program advisory committee 1974-1981. Working Foreman, 1975 to 1978 First line supervision for commercial operation of two unit PWR, including chemistry, radiochemistry and effluent surveillance. Health Physics/Chemistry Technician, 1972 to 1975 Responsible for technical aspects of construction and startup of two unit PWR.

1965 to 1971	UNITED STATES NAVY, NUCLEAR PROGRAM Involved in new construction and nine Polaris patrols. Qualified as leading ELT and EWS.

EDUCATION:

1977	WINONA STATE UNIVERSITY, Winona, Minnesota B.A.
1964	STATE UNIVERSITY OF NEW YORK AT MORRISVILLE, NY A.A.S. Degree

ATTACHMENT 2-4

STATEMENT OF PROFESSIONAL QUALIFICATIONS

RICHARD ALEXANDER FREY

EDUCATION: The City University, London, 9/67-6/71
B.Sc. (Hons.), Industrial Chemistry

Brockley County Grammar School, London, 9/59-9/65

EXPERIENCE

1/84 to present SEABROOK STATION, New Hampshire, USA
Position: Senior Chemist

Seabrook Station is a four-loop Westinghouse PWR in New England. Fuel was loaded in the autumn of 1986, but licensing has been delayed by political intervention.

As Senior Support Chemist, I have responsibilities in areas including corrosion assessment, radwaste characterization, laboratory data handling, tending and review, laboratory QC, compliance with discharge requirements and biofouling control.

I am responsible for the monitoring of corrosion in safety-related cooling loops, and have developed side-stream programs for the assessment of chromate alternatives. During construction, I initiated methods for the detection of Microbiologically Influenced Corrosion (MIC) of stainless steels, particularly in welds in austenitic tanks and primary pipework. As part of an effort to limit the problem, I led an effort to sterilize vulnerable systems and tankage, and introduced fluorescent antibody and other laboratory methods for the estimation of bacterial activity.

I developed the Radwaste Characterizations Program to meet the requirements of 10 CFR 61, and am involved with commissioning of the radgas and radwaste handling systems. Currently I am developing software for QC of laboratory liquid scintillation and gamma spectroscopy equipment.

I am System Manager for the laboratory data handling system. I coordinated the work of the software contractor and extensively tailored the source code for our system. As an enhancement, I have written two quite extensive routines for the tending and analysis of laboratory data.

I am responsible for laboratory QC, and have developed a software system for the calculation of control limits. The routines provide immediate flagging of unacceptable values, executive summaries, and analysis of technician performance.

I have responsibility for ensuring compliance with EPA water discharge regulations and for regulatory reporting. I developed EPA-mandated programs for chlorine minimization and the control of biofouling.

I have supervised the development of analytical methods for ppb-level organics and morpholine. PWR training courses I have attended include Core Damage Mitigation, NSSS Detail, Balance of Plant Detail, Primary Chemistry, and Emergency Response. Courses of a more general nature include Corrosion Engineering, Heat Exchanger Inspection, and Eddy Current Inspection Methods.

1983 HOLLEX, INC., Boston, Massachusetts, USA
Position: Switching Logic Analyst

Analysis of switching configurations for instrument design.

1982 Moved to Australia to pursue opportunities in power industry. Unable to take up Chemist position offered, due to newly-introduced government visa restrictions.

1975 to 1981
HINKLEY POINT B POWER STATION
Position: Shift Chemist

Technical supervision and trouble-shooting of chemical-based plant, including condensate polishing, water treatment, gas drying, methanation, electrolysis, and spent fuel ponds.

Provision of advice and chemistry support to Operations staff, monitoring of all on-line

chemical instrumentation, operation of minicomputer data logging system, and routine chemical analysis.

1973 to 1975

BERKELEY POWER STATION
Position: Assistant Chemist

Monitoring of chemical-based plant, including water treatment and gas-drying, coolant gas analysis and adjustment, spent fuel pond analysis and chemistry control, feedwater and environmental analysis. Large scale projects such as boiler cleans.

1972 to 1973

FERRYBRIDGE C POWER STATION
Position: Assistant Chemist

Routine analysis of coal, oil, condensate and boiler water, Monitoring of chemical aspects of plant operation, environmental pollution analysis and site photography.

1967 to 1971

Sandwich Course in Industrial Chemistry at the City University, London, with industrial semesters spent at:

Fisons Ltd, Avonmouth:	Analytical Chemist
Unilever Ltd, Isleworth:	Research Chemist
ICI ltd, Billingham:	Research Chemist

Professional Affiliations: Computer Society of Boston
National Association of Corrosion Engineers

ATTACHMENT 2-5

STATEMENT OF PROFESSIONAL QUALIFICATIONS

ROBERT LITMAN

EDUCATION

1. City University of New York - Ph.D. Analytical/Nuclear Chemistry, 1975.

2. Brooklyn College - B.S. Chemistry, 1971.

PROFESSIONAL EXPERIENCE

1. Seabrook Station, Chemistry Supervisor, 1985 to present.

   Job responsibilities include:

   a. NPDES permit compliance and sampling.

   b. Chlorination System control, modifications and operation. Recommended system design changes for better operation which have been implemented.

   c. Implementation and monitoring of biofouling in the Circulating and Service Water Systems.

   d. Corrosion control and measurement of plant systems. Received an INPO "Good Practice" in 1987 for implementation and monitoring of corrosion control and additional monitoring points in plant systems.

   e. Laboratory Quality Control. Designed and implemented laboratory QC program. All analyses were "in-control" for EPA and NRC cross-check samples.

   f. Implementation of the station expendable products control program in 1985.

2. Seabrook Station, Senior Chemistry Training Instructor 1981 to 1985.

   Job responsibilities included:

   A. Development and teaching of Chemistry Technician Training Modules.

   b. Development and teaching of CRO Chemistry Training Modules.

   c. Development and teaching of Plant Systems Course - Chemistry related sections.

   d. Initial JTA for Chemistry Technician position.

3. University of Lowell, Assistant Professor of Chemistry 1975 to 1981.

   Job responsibilities included:

   a. Teaching undergraduate Freshman and Analytical Chemistry.

   b. Teaching Graduate Analytical and Radiochemistry.

   c. Directing Ph.D and M.S. theses in Analytical and Radiochemistry.

   d. Chairman of the Graduate Faculty.

   e. Organization of Engineering/Chemistry joint Ph.D program.

   f. Sixteen published papers in refereed scientific journals (Analytical, Radiochemical and Environmental).

   g. Twelve scientific conference presentations on research in progress.

   h. DOE grant on Radioactive Waste Disposal Techniques 1974-1976.

PROFESSIONAL TRAINING WHILE AT SEABROOK (outside Courses).

1. 1981 Babcok and Wilcox "PWR Secondary Systems" Training Course.

2. 1982 Babcok and Wilcox "PWR Primary Systems" Training Course.

3. 1984 Westinghouse "Mitigating Core Damage" Training Course.

4. 1986 Symposium "Microbiologically Influenced Corrosion in Nuclear Power Plants" (ERPI)

5. 1987 Symposium on Nuclear Plant Lay-up and Service Water System Maintenance (EPRI).

ATTACHMENT 2-6

STATEMENT OF PROFESSIONAL QUALIFICATIONS

Winthrope B. Leland

QUALIFICATIONS: Sixteen years of experience in Chemistry and Health Physics disciplines. Experience ranged from six years at the SIC Naval Reactors Prototype, 1 year at Argonne National Laboratory and 4 years at Connecticut Yankee Atomic Power Company.

EXPERIENCE:

Nov 1979 to present

Public Service Company of New Hampshire. Seabrook Station.
Job Title: Chemistry and Health Physics Manager - February to present

Responsible for the coordination and direction of the Chemistry and Health Physics Departments. Advise Station Manager of plant radiological conditions and radiation protection program status.

Job Title: Chemistry Department Supervisor - May 1981 to February 1986

Responsibilities: Manage the Chemistry Department in planning, developing and implementing programs of chemistry and radiochemistry which result in the safe and efficient operation of the nuclear generating station.

Job Title: Chemist - November 1977 to May 1981.

Responsibilities: Supply technical and supervisory support to the Chemistry Supervisor. Implement current techniques, concepts and analytical methods necessary to support the efficient operation of the nuclear generating supervise chemistry and radiochemistry functions of the station.

Nov 1975 to Nov 1979	Connecticut Yankee Atomic Power Company, Haddam, CT Job Title: Chemistry and Health Physics Technician Responsibilities: Perform Chemical and Radiochemistry functions required for all phases of operation of a pressurized water nuclear plant. Provide Health Physics support during maintenance and operation of the plant.
Oct 1974 to Oct 1975	Argone National Laboratory, INEL, Idaho Falls, Idaho Job Title: Senior Health Physics Technician Responsibilities: Write procedures for Laboratory Health Physics Manual, administer radiation worker training course, introduce and train radiation worker in concepts of total containment devices, perform safety audits, provide radiation protection for EBR-II reactor maintenance, operate multi channel analyzer for detection of reactor fission breaks.
Jan 1971 to Oct 1974	General Electric Company, Knolls Atomic power Laboratory. SIC Prototype, Windsor, CT Job Title: Radiological Controls Technician Responsibilities: Maintain Qualification as Radiological Controls and Engineering Laboratory Technician (ELT) as specified by Naval Reactors. Performed and encountered technical aspects of: monitoring radiation exposure, shield planning, liquid and solid waste disposal, thermoluminescent dosimetry, environmental monitoring, perform plant chemical and radiochemical analysis, operate and calibrate instrumentation, radiation and contamination surveys, first aid, audit radiological operations

of Navy personnel and submit written reports of audits.

Jan 1969 to Jan 1971

Combustion Engineering - Naval Reactors Division, Windsor, CT (S1C Prototype, same facility as above)
Job Title: Radiological Controls Technician

Responsibilities: Same as above under General Electric

EDUCATION: Bachelor of Science in Chemistry from the University of Hartford - August 1980

MISCELLANEOUS: Held "L" clearance with the Energy Research and Development Administration. Member of the Health Physics Society.

STATEMENT OF PROFESSIONAL QUALIFICATION
KENNETH W. DOW

I received a Bachelor of Science degree in Wildlife Management from the University of New Hampshire in 1976 and a Master of Science degree in Environmental Studies from the University of Lowell in 1984. I have ten years of experience as a scientist having primary focus in the areas of environmental impact assessment, biological sampling, and permitting. I have been employed at Yankee Atomic since early 1977 and have been involved during this time with various industry groups on issues of environmental analysis, permitting, and study. My current position involves the oversight of environmental activities for sponsor companies of Yankee Atomic. For Seabrook Station, I currently manage biological studies and consultants as mandated by the National Pollutant Discharge and Elimination System (NPDES) permit jointly issued by the Environmental Protection Agency (EPA) and the New Hampshire Water Supply and Pollution Control Division. My experience with the use of chlorine (sodium hypochlorite) as the desired means for preventing biological growth and subsequent fouling of the Seabrook Station Circulating Water and Service Water systems began in 1981, through the preparation of an analysis of the potential effects of continuous chlorination during station operation.

ATTACHMENT 2-8

STATEMENT OF PROFESSIONAL QUALIFICATIONS

GREGORY A KANN

PROGRAM SUPPORT MANAGER

EDUCATION

B.S. Nuclear Engineering, Lowell Technological Institute, June 1969.

M.A. Management and Supervision, Central Michigan University, August 1974.

PROFESSIONAL AFFILIATIONS

American Society of Mechanical Engineers

American Nuclear Society

LICENSE

USNRC Senior Operator License, License No. SOP-3349, North Anna Power Station, Unit No. 1, 1978.

Mr. Kann has participated in startup test programs and operation of commercial nuclear power facilities since 1974. Mr. Kann joined Virginia Electric and Power Company (VEPCO) as a test engineer at the North Anna Power station following his separation from the U.S. Air Force. During his time with VEPCO Mr. Kann participated in preoperational and initial startup testing required by Regulatory Guide 1.68 for North Anna Units 1 and 2. Mr. Kann's participation included the development of detailed test procedures, performance of tests, and the review and approval of test results.

At North Anna Power Station Mr. Kann held the position of Test Engineer, Lead Preoperational Test Engineer, Startup Test Engineer, Design Control Engineer and Engineering Supervisor. As Engineering Supervisor, Mr. Kann was responsible for the Reactor Engineering Section, Technical Specification Surveillance Test Section, and the Design Control Section. As a Staff Engineer at the corporate office for VEPCO, Mr. Kann developed design change packages for implementation at both North Anna Power Stations and Surry Power Stations.

Since joining Yankee Atomic Electric Company in 1981, Mr. Kann has participated in the preoperational and initial startup test program in accordance with Regulatory Guide 1.68 (Revision 2) for Seabrook Station.

Mr. Kann transferred to Public Service Company of New Hampshire (PSNH) in 1984 and continued to participate in the preoperational and initial startup test program at Seabrook Station. Presently Mr. Kann is the Program Support Manager at Seabrook Station. In this position Mr. Kann is responsible for the Inservice Inspection Program, the Inservice Testing Program, the Test Control Program and other various technical programs.