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Dated: January 14, 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)

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.

Pursuant to 10 CFR 2.740(b), Applicants herein respond 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."

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 the proposed definition of "biofouling" in Paragraph 7 of the instructions. The term

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"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 exchanger efficiency. "Settlement" means colonization on plant surfaces by fouling organisms, primarily mussels and barnacles.

2. Applicants object to any and all interrogatories regarding microbiologically induced corrosion because issues concerning the occurrence of microbiologically induced corrosion are not within the scope of Contention IV. 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. Texas Utilities Electric Company, (Comanche Peak Steam Electric Station), ALAB-868, 25 NRC ___, Slip op. at 37. n. 83 (June 30, 1987). Without waiving this objection, Applicants nevertheless agree to answer interrogatories regarding microbiologically induced corrosion in the cooling systems.

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

In NRC Inspection Report No. 50-443/87-23, at page 10, the inspector observed the repair of a pinhole leak on valve CC-V-298, the "D" primary component cooling water (PCCW) pump discharge check valve. Please 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) Produce a system or line isometric drawing, and a construction drawing of this valve.

d) Produce any vendor diagrams or drawings of this valve, and indicate on this diagram or drawing where on the valve this leak occurred.

e) Describe when, and the circumstances under which, this leak discovered.

f) Describe where on the valve this leak occurred, including whether this leak 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.

g) Describe the metallurgical composition or other material used for each of the various parts comprising this valve.

h) Describe the cause or causes of this leak, and all efforts you have made to determine the cause(s) of this leak, including whether microbiologically induced corrosion played a role in this leak.

i) If you determined that microbiologically induced corrosion did not play a role in this leak, explain how you reached this conclusion.

j) Identify the water flow velocity in the piping connected to this valve at or near the time the leakage was discovered, and describe how and when this measurement was taken.

k) Describe your program or techniques for monitoring this system to detect potential leakages prior to their occurrence, including when such program was initiated, and explain why this procedure failed to detect the problem in time to prevent the leak in this instance.

l) 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.

m) Describe what you have done, or intend to do, to repair this leak and prevent leaks from occurring in this system in the future.

n) If chlorination treatment is used as part of your program to prevent biofouling or microbiologically induced corrosion in this system, identify the distance, in feet and inches of piping lengths, between the point where the chlorine is injected into this system and the valve where the leak was discovered. If this question can be answered with reference to the system or line isometric drawings requested in Interrogatory 2(c), you may answer this question by indicating on this drawing the point where the chlorine is injected into this system.

o) If chlorination treatment is used as part of your program to prevent biofouling or microbiologically induced corrosion in this system, identify the amount of time it takes for the chlorine to travel to the valve where the leak was discovered. If flow rates in this system change at different operational phases, identify the various flow rates for different plan operational phases.

p) Describe all surveillance and control techniques you have implemented or intend in the future to implement to prevent similar leaks from occurring.

q) Describe any program you have to monitor oxygen level and chlorine concentration in this system.

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

s) Describe what the consequences of this leak would have been if it had occurred during low power operation of the plant.

t) Have you identified similar leaks in other circulating water systems in the plant? If the answer is yes, identify the system(s) where the leak(s) occurred, the time when the leak(s) were discovered, describe the equipment on which the leak(s) occurred, and describe the extent and nature of the leaks.

RESPONSE NO. 2

a) See Item 1, Attachment 2-1.

b) See FSAR Figure 9.2-3, Sheet 1.

c) See Item 12, Attachment 2-1. For the valve drawing see Response to 2(d).

d) See Item 13, Attachment 2-1. In regards to location of the leaks, see Pages 31 and 32 of Work Request 87W004556 [Item 1 - Attachment 2-1].

e) Two pin hole leaks were discovered on May 11, 1987, during a walkdown inspection in preparation for plant heatup.

f) The two leaks occurred through the body of the valve near the flange weld. See also Response to 2(d).

g) See the drawing provided in Response to 2(d).

h) The pin hole leaks were the result of a casting defect which degraded with service time. This was determined by considering and eliminating all other possible causes for the defect. Microbiologically induced corrosion was eliminated because there were no deposits characteristic of microbiologically induced corrosion. There was no sign of stress corrosion, cracking, or erosion.

i) We concluded that microbiologically induced corrosion did not play a role in these two leaks because there was no evidence of microbiologically induced corrosion when the internals of the valve was inspected to determine the extent of the leaks. Furthermore, the water in the PCCW system is sterilized prior to its introduction into the system and this condition has been and will be verified through periodic bioanalysis of the bulk fluid.

These two leaks occurred on the PCCW side of the PCCW heat exchangers, or within the PCCW system. The water used to fill and makeup to this system is demineralized water, which is produced in the Seabrook Station water treatment plant. This water is first filtered and dechlorinated, then demineralized and passed through a UV sterilization unit prior to distribution to various plant systems. The PCCW system uses hydrazine as a chemical corrosion control agent. This material is also a biostat.

Inspection reports from December 1985 and one from October 1985 [see Items 2-9, Attachment 2-1] of other sections of the system state that there was no observation of any tubercles or microbiologically induced corrosion, and that the metal surfaces were in good condition. Specifically, the section of spool piece adjacent to "D" pump was inspected and this piece was in good condition.

Biological analysis of the bulk liquid in the PCCW system on July 16, 1986 and again on March 20, 1987 did not identify levels of bacteria conducive to microbiologically induced corrosion [see Items 10 and 11, Attachment 2-1].

j) Each primary component cooling water pump is rated at 11,000 gpm flow. This is equivalent to 8.3 ft/sec flow velocity. No flow measurements were taken at the time when the leaks were discovered.

k) This is the only occurrence of this type of defect found at Seabrook Station. Generally, a defect in the casting such as this would be found during testing performed at the factory prior to shipment of the valve, or after installation when hydrostatic testing is performed. Apparently, because of the extremely small holes in the casting, these leaks did not manifest themselves until shortly before 05/11/87. Once the leaks were identified they were evaluated and the repair scheduled with other preventative maintenance activities.

l) 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. Water from the Seabrook town wells is chlorinated at concentrations of 0.2 to 3 ppm. This is effective at killing the microbiologically induced corrosion related macro-organisms. This water is then processed through the water treatment system where it is filtered and dechlorinated, demineralized and passed through a UV sterilizer prior to distribution within the plant. See also response to Interrogatory 3(o).

When plant systems are opened for maintenance, inspections are performed to examine components for evidence of localized and general corrosion as well as microbiologically induced corrosion. For example, the Demineralized Water Storage Tank (DWST) was inspected for just this reason on February 27, 1987 and no evidence of microbiologically induced corrosion was found [see Item 11, Attachment 2-1].

Furthermore, the bulk liquids of plant systems are sampled quarterly to look for general bacteriological contamination and annually to look for microbiologically induced corrosion type micro-organisms.

The initial biocidal treatment of the well water influent to the water treatment plant commenced January 16, 1985. Thereafter, all water influent was chlorinated. In February 1985, this treatment program was modified so that in addition to chlorination the effluent of the water treatment plant was ozonated for added biocidal action. In April, 1986, the ozonator on the effluent was removed and replaced with a UV sterilizer unit.

Neither microbiologically induced corrosion nor biofouling played a role in the PCCW corrosion concern [see response to 2(h)].

m) As described in Work Request 87[illegible], [Item 1, Attachment 2-1], the leak was repaired by grinding out the flaw and repair welding the valve body. Since this was a casting defect and is now completely repaired, no further action is required.

n) The PCCW system is not chlorinated. See Response to 2(l) regarding the quality of water used in the PCCW system.

o) See Response to 2(n).

p) Piping systems are routinely inspected whenever they are opened for maintenance and any abnormalities are reported.

q) Chlorine is not used in this system. Hydrazine is used as a corrosion control agent. The system has a head tank vented to the building ventilation which means that oxygen will be present in the system. Hydrazine, an oxygen scavenger, is added to control the oxygen. The concentration of hydrazine is maintained between 5 and 30 ppm and is measured weekly by Chemistry personnel.

r) There is no data for oxygen concentrations. (See Response to 2(q)).

s) These leaks would have had no consequences if they had occurred during low power operation of the plant. The leaks were identified on May 11, 1987 and were determined to be not significant enough, based on the small amount of leakage, to prevent continued operation of the Primary Component cooling system. The system was secured and the valve repaired in September 1987. The leakage from the valve was not significant when compared to the normal amount of designed packing and seal leakage.

t) Applicants object to this interrogatory insofar as it concerns circulating water systems other than cooling systems. Issues concerning circulating water systems generally 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. Texas Utilities Electric Company, (Comanche Peak Steam Electric Station), ALAB-868, 25 NRC ___, Slip op. at 37. n. 83 (June 30, 1987).

As to the cooling systems, similar leaks have not been identified.

INTERROGATORY NO. 3

In NRC Inspection Report No. 50-443/87-23, at page 10, the inspector observed tube degradation in the "B" train PCCW heat exchanger CC-E-17B. Please answer the following questions regarding this observation:

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

b) Identify all sources of water serving this PCCW system.

c) Identify the source of water having contact with the side of the tube on which the degradation was observed.

d) 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.

e) Produce a system or line isometric drawing of this PCCW system.

f) No interrogatory submitted.

g) Produce any vendor diagrams or drawings of this valve.

h) Describe exactly where on the heat exchanger this degradation occurred, including whether the degradation occur on the tube or the shell side of this heat exchanger. If this question can be answered with reference to the system or line isometric drawings or vendor drawings requested in Interrogatories 2(e) and (f), you may answer this question by indicating on this drawing where the degradation occurred.

i) Describe when, and the circumstances under which this degradation discovered.

j) Describe the extent and nature of this degradation.

k) Describe the metallurgical composition or other material for the piping connected with this heat exchanger.

l) Identify the water flow velocity in the piping connected to this heat exchanger at or near the time the degradation was discovered, and describe how and when this measurement was taken.

m) Describe the cause of this degradation, and all efforts you have made to determine the cause of this degradation, including whether biofouling or microbiologically induced corrosion played a role in this problem.

n) Describe your program or techniques for preventing the occurrence of biofouling or microbiologically induced corrosion in this system, including when such program was initiated. If biofouling or microbiologically induced corrosion played a role in this degradation, explain why this program or techniques failed to prevent the degradation in this instance.

o) Describe your program or techniques for monitoring this system to detect the presence or occurrence of biofouling or microbiologically induced corrosion, including when such program was initiated. If biofouling or microbiologically induced corrosion played a role in this degradation, explain why this program or techniques failed to detect the presence or occurrence of biofouling or microbiologically induced corrosion in time to prevent the degradation in this instance.

p) Describe what you have done, or intend to do, to repair this tube and prevent such degradation from occurring in the future.

q) If chlorination treatment is used as part of your program to prevent biofouling or microbiologically induced corrosion in this system, identify the distance, in feet and inches of piping lengths, between the point where the chlorine is injected into this system and the place where the degradation was discovered. If this question can be answered with reference to the line or isometric drawings requested in Interrogatory Question 3(e), you may answer this question by indicating on this drawing the point where the chlorine is injected into this system.

r) If chlorination treatment is used as part of your program to prevent biofouling or microbiologically induced corrosion in this system, identify the amount of time it takes for the chlorine to travel to the point where the degradation occurred. If flow rates in this system change at different operational phases, identify the various flow rates for different plant operational phases.

s) Describe all surveillance and control techniques you have implemented or intend in the future to implement to prevent similar problems from occurring.

t) Describe any program you have to monitor oxygen level and chlorine concentration in this system.

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

v) Describe what the consequences of this leak would have been if it had occurred during low power operation of the plan.

w) Have you identified similar tube degradation in other circulating water systems in the plant? If the answer is yes, identify the system(s) where the tube degradation occurred, the time(s) when the tube degradation was discovered, identify the exact location in the system(s) where the tube degradation occurred, and describe the extent and nature of the tube degradation.

RESPONSE NO. 3

a) See documents listed in Attachment 3-1.

b) In responding to this interrogatory we assumed this interrogatory was inquiring into the sources of water to the PCCW heat exchanger.

The shell side of the PCCW heat exchanger is served by the PCCW system, a closed loop system. The sources of water to the PCCW system are discussed in FSAR Section 9.2.2.2.

The tube side of the PCCW heat exchanger is served by the Service Water system as discussed in FSAR Section 9.2.1.2. The sources of water to the Service Water system are discussed in FSAC Section 9.2.5.2.

c) The side of the tube in question is served by the Service Water system.

d) Refer to FSAR Figure 9.2-1 for the Service Water system and FSAR Figures 9.2-2, 9.2-3, and 9.2-11 for the PCCW system.

e) There are no isometric drawings associated with the PCCW heat exchanger which we understand to be the subject of this interrogatory.

f) No question submitted.

g) We understand the interrogatory to be asking for a vendor drawing of the PCCW heat exchanger. In this regard, see Item 4, Attachment 3-1.

h) Refer to Engineering Evaluation Report No. 87-001, dated June 1, 1987, "PCCW "A" Train Heat Exchanger" contained in SIR-87-076 [see Item #1 of Attachment 3-1].

i) A PCCW to Service Water Leak in PCCW Heat Exchanger 1-CC-E-17A was reported on April 30, 1987 [reference SIR-87-076, Item 1, Attachment 3-1]. A subsequent inspection and evaluation of this heat exchanger was performed which identified the area of degradation. Although no leak occurred in 1-CC-E-17B, the subject of this interrogatory, similar degradation was suspected and later confirmed by inspection.

j) The extent and nature of the degradation in 1-CC-E-17B, the subject of this interrogatory, was similar to that described in the Engineering evaluation prepared for the PCCW "A" Train heat exchanger [see Response to 3(h)].

k) In responding to this interrogatory we understood it to be looking for information concerning the piping connected to this heat exchanger.

Refer to our response to Interrogatory No. 15 of "Applicant's Responses to NECNP's First Set of Interrogatories And Request For Production Of Documents To Applicants On NECNP Contentions I.V. and IV" for service water system piping materials. For PCCW System Piping Materials refer to FSAR Table 9.2-7.

l) In responding to this interrogatory we assumed that the inquiry was as to when the degradation was discovered in the "A" Train heat exchanger since the inspection of the "B" Train heat exchanger [see Response to Interrogatory 3(i)], the subject of this interrogatory, was performed under no flow service water conditions.

When the leak was detected on 1-CC-E-17A, Service Water was being supplied from the Atlantic Ocean at a nominal flow rate of 10,000 gpm to the heat exchanger. The velocity through the 24-inch piping, connected to the heat exchanger, at this flow rate is approximately 7.7 ft/sec. No flow measurements were taken at the time when the leak was discovered.

m) The cause of the degradation was determined to be velocity induced erosion of the heat exchanger to inlet ends. Engineering Evaluation 87-001, provided with SIR-87-076, [Item 1, Attachment 3-1], documents the assessment made of this condition. Biofouling and microbiologically induced corrosion were determined not to be the cause because of the absence of biosettled material and corrosion deposits characteristic of microbiologically induced corrosion. It should be noted that some unattached debris was found. This material, however, was not characteristic of biofouling. See also Responses to 3(n) and 3(o).

n) The program or technique for preventing the occurrence of biofouling or microbiologically induced corrosion in the Service Water and PCCW systems is discussed in detail in the Response to Interrogatory 3(o). However, briefly stated the conclusions reached in Response 3(o) are as follows:

   1) Biofouling of the service water system is prevented from occurring by means of continuous low-level chlorination.

   2) Service water piping system materials in contact with water

are not susceptible to microbiologic 'ly induced corrosion or h   not exhibited any incidence of microbiologically induced corrosion. See response to Interrogatory 3(o).

3) The makeup water source to the PCCW system is sterilized demineralized water thereby precluding the presence of macro-organisms (i.e. biofouling) and the presence of bacteria conducive to microbiologically induced corrosion.

o) In responding to this interrogatory, we understood the question to be concerned with both systems (i.e., PCCW and Service Water) serving the PCCW heat exchanger. Refer to our responses to Interrogatories 21-24 of NECNP's First Set of Interrogatories and Request for Production of Documents to Applicants on NECNP Contentions I.V. and IV in regards to programs and techniques for monitoring biofouling in the Service Water (SW) system.

The SW system has not been monitored for microbiologically induced corrosion. The piping materials which come into contact with the sea water are concrete, epoxy-lined materials, or copper-nickel (Cu-Ni). Concrete and epoxy-linings are not susceptible to microbiologically induced corrosion. Recent inspections of the Cu-Ni tubing in the PCCW heat exchangers has shown that there is no evidence of microbiologically induced corrosion on the SW side. This was expected based on Service Water being an aerated, flowing system.

The PCCW system is not monitored for biofouling because there are no macro-organisms within the system, since its makeup source is the demineralized water system.

Since makeup water to the PCCW system is sterilized, the presence of microbiologically induced corrosion is not expected. However, on a quarterly basis the system is monitored for general biological activity, and annually for microbiologically induced corrosion related organisms. To date, analyses have shown no concern regarding microbiologically induced corrosion related bacteria and visual inspections show no microbiologically induced corrosion present in system components such as pumps, valves, piping, and the heat exchanger.

The PCCW system is treated with hydrazine as corrosion inhibitor and oxygen scavenger. Corrosion monitoring coupons placed in the system since March 1986 are examined quarterly for visual signs of corrosion and the corrosion rate determined gravimetrically. These coupons have shown no indications of microbiologically induced corrosion.

p) Tube sleeves have been installed in the inlet end of tubes in both PCCW heat exchangers. The sleeves covering the degraded area are made of 70/30 Cu-Ni, which is more resistant to velocity induced degradation by water box turbulence than the 90/10 Cu-Ni tubes. The heat exchangers will be reinspected during the first refueling, as described in SIR-87-076 [Item 1, Attachment 3-1].

q) In responding to this interrogatory, we understood the question to be concerned with both systems (i.e., PCCW and Service Water) serving the PCCW heat exchanger. As provided in the Response to 2(n) the PCCW system is not chlorinated.

The chlorination of the Service Water system is by means of injecting sodium hypochlorite in the throat of the intake structures. There is approximately 3 miles of piping between the point of injection and the PCCW heat exchanger. It should be noted that the chlorination treatment program also has the flexibility to boost the chlorine concentration in the following locations:

- Service Water pump bay
- Circulating Water pump bay
- Intake transition structure

r) As to the PCCW system, as indicated in the Response to 2(n) this system is not chlorinated.

In regards to the Service Water system, the chlorination process is continuous. Therefore, delay times are only relevant during Chlorination system startup when delay times are 8 hours with one (1) Circulating Water pump running and approximately 4 hours if two Circulating Water pumps are running.

s) Whenever heat exchangers are opened, inspections are performed and any abnormalities are reported.

t) The chlorine concentration in the service water system is measured in accordance with NPDES Permit NH0020338. This is three times per day at the discharge transition structure, as described in the Chemistry Program Manual, Chapter 9.1. [See Item 3, Attachment 3-1]. Chlorine measurements are made more frequently during chlorination system startup. The oxygen level in this system is not monitored since this is an aerated system. In regards to the PCCW system, see response to Interrogatories 2(q) and 2(r).

u) The minimum, maximum, and average monthly values for chlorine in the circulating water system, are identified in the documents referenced in response to Interrogatory 7. These values are in the DMRs under discharge point 001.

As to the data taken to arrive at the chlorine levels reported in the DMRS, this information is available at Seabrook Station for inspection. Please contact Mr. William J. Daley at (603) 474-9521 extension 2057 to arrange for inspection. In this regard it should be noted that the number of chlorine measurements taken is on the order of 1000-3000 measurements. Regarding oxygen levels see response 3(t).

v) As indicated in the Response to 3(i), there was no leak in the "B" Train PCCW heat exchanger. In general because the PCCW system operates at a higher pressure than the Service Water system, a leak in a PCCW heat exchanger would decrease the level in the affected PCCW head tank resulting in a level alarm actuation. Make-up water would be provided to compensate for the level decrease. In any event, further plant operation would proceed consistent with the applicable Technical Specifications [Spec. No. 3/4.7.3].

w) Applicants object to this interrogatory insofar as it concerns circulating water systems other than cooling systems. Issues concerning circulating water systems generally 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. Texas Utilities Electric Company, (Comanche Peak Steam Electric Station), ALAB-868, 25 NRC ___, Slip op. at 37. n. 83 (June 30, 1987).

As to the cooling systems, similar tube degradation has not been identified.

INTERROGATORY NO. 4

In NRC Inspection Report No. 50-443/87-07, at page 16, the inspector discussed the Applicants' disassembly, cleaning and reassembly of fire protection piping inside the fire pump house (part of the Fire Protection System) which contained microbiologically induced corrosion. Please answer the following questions regarding this problem:

a) Identify and produce any documents, inspection reports, work requests, or station information reports that in any way discuss or evaluate this problem.

b) What was the date construction of this Fire Protection System was completed and the system became operational for purposes of testing?

c) What was the date when water was first added to the pipes of this system?

d) Identify all sources of water serving this system.

e) 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.

f) Produce a system or line isometric drawing of this fire protection piping in the fire pump house.

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

h) Describe the metallurgical composition or other material used in the piping in this Fire Protection System.

i) Describe any program in place for monitoring this Fire Protection system to detect the presence of microbiologically induced corrosion, including when such program was initiated, and explain why this procedure failed to detect the problem in time to prevent this problem.

j) Describe any program in place for preventing the build-up of microbiologically induced corrosion in this Fire Protection System, including when such program was initiated, and explain why this procedure failed to prevent this problem.

k) Describe all surveillance and control techniques you have implemented or intend in the future to implement to prevent similar problems from occurring.

RESPONSE NO. 4

Applicants object to Interrogatory No. 4 on the grounds that issues regarding the Fire Protection system, which is not a cooling system, are outside the scope of Contention IV. 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. Texas Utilities Electric Company, (Comanche Peak Steam Electric Station), ALAB-868, 25 NRC ___, Slip op. at 37. n 83 (June 30, 1987).

INTERROGATORY NO. 5

Please describe all occasions on which evidence of microbiologically induced corrosion has been discovered for each water circulating system at the Seabrook plant.

RESPONSE NO. 5

Applicants object to this interrogatory insofar as it concerns circulating water systems other than cooling systems. Issues concerning circulating water systems generally 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. Texas Utilities Electric Company, (Comanche Peak Steam Electric Station), ALAB-868, 25 NRC ___, Slip op. at 37. n. 83 (June 30, 1987).

As regards cooling systems, no indication of microbiologically induced corrosion has been discovered.

INTERROGATORY NO. 6

For each incidence of microbiologically induced corrosion described in answer to Interrogatory 5, how and when was it treated?

a) If chlorination or alternative treatments are used to control the microbiologically induced corrosion, identify the chemical and describe the amount and frequency of treatment, in parts per million.

b) If chlorination or alternative treatments are used to control microbiologically induced corrosion, describe your techniques or procedures for monitoring the use of these chemicals to insure compliance with your NPDES Permit No. NH0020338, as modified, for the discharge of non-contact cooling water and process wastewater.

c) If chlorination or alternative treatments are used to control microbiologically induced corrosion, describe any corrosion, pitting or leakage in piping or valves attributable to the use of these chemicals.

RESPONSE NO. 6

See Response to Interrogatory No. 5.

INTERROGATORY NO. 7

Produce copies of all Discharge Monitoring Reports submitted to applicable state and/or federal environmental protection agencies after August, 1985 as required by your NPDES Permit No. NH0020338, as modified, for the discharge of non-contact cooling water and process wastewater.

RESPONSE NO. 7

As indicated above, the DMRs requested (September, 1985 - December, 1987) will be sent under separate cover. It should be noted that the same DMRs were submitted to the state and federal authorities.

INTERROGATORY NO. 8

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

RESPONSE NO. 8

Applicants object to this interrogatory insofar as it concerns circulating water systems other than cooling systems. Issues concerning circulating water systems generally 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. Texas Utilities Electric Company, (Comanche Peak Steam Electric Station), ALAB-868, 25 NRC ___, Slip op. at 37. n. 83 (June 30, 1987).

As regards the cooling systems, Applicants respond as follows:

a) It is generally recognized in the industry that the following conditions are conducive to microbiologically induced corrosion in these systems:

1) Lack of initial treatment of water with a biocidel agent.

2) Lack of a monitoring program to identify corrosion products or corrosion rate.

3) Lack of a chemical treatment for a system (whether it be closed or open loop) during its operation.

4) Lack of a monitoring program to identify bacterial contamination in those systems, or their water sources.

As to these conditions, Seabrook Station has taken the following action. For the systems mentioned, PCCW, ECCS, SCCW, RHR, and FW, the water is chlorinated, demineralized, and sterilized with high-intensity UV light prior to being put into the systems. The water is monitored for bacterial contamination as stated in response 2(1). PCCW, SCCW, and PW contain hydrazine as a chemical corrosion control agent and their corrosion products are monitored. ECCS and

RHR systems contain boric acid (which acts as a biostat) and corrosion products and scale forming agents are monitored. Thus, all of the conditions conducive to microbiologically induced corrosion are avoided.

Furthermore, inspections of system internals are made, whenever they are taken out-of-service, to provide visual confirmation of effective chemical control or to address any concerns which might be observed.

The Service and Circulating Water systems are chlorinated as described in Responses to 3(n), 3(q), and 3(r).

b) Visual examination of closed-loop systems (such as PCCW, SCCW, FW, ECCS, and RHR) components on a routine basis will be employed to follow the effectiveness of the microbiologically induced corrosion prevention program as outlined in Response to 8(a).

Techniques for determining the extent of any microbiologically induced corrosion, should it occur, would need to be evaluated at the time of discovery based on location of the concern, system that it is in, type of surface it occurs on, type of metal, etc.

In the salt water, open-loop systems such as service and circulating water, all piping is either cement or epoxy-lined. These surfaces are not susceptible to microbiologically induced corrosion. Heat exchanger tubes will undergo visual inspections or eddy-current testing on a periodic basis.

As to Answers:

Ted C. Feigenbaum

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

State of New Hampshire
Rockingham County, ss.

Then appeared before me the above subscribed Ted C. Feigenbaum and 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,

Mary E. Sloan
, Notary Public
My Commission Expires: 1992

As to objections:

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<u>ATTACHMENT 1-1</u>

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ATTACHMENT 2-1

1. Work Request No. 87W004556, dated May 20, 1987, PCCW Pump 'D' Discharge Check Valve repair of two pin-hole leaks.

2. Inspection Report, 10/22/86, 1-CC-V122.

3. Inspection Report, 12/10/85, PCCW Pump 'C'.

4. Inspection Report, 12/12/85, Spool Pieces Adjacent to vlv. 407 and 143.

5. Inspection Report, 12/16/85, PCCW Pump 'B' and 'D'.

6. Inspection Report, 12/13/85, Pipework Adjacent to vlv. CC-168, 122, 57, 121.

7. Inspection Report, 12/19/85, RHR Heat Exchanger E-9-B.

8. Inspection Report, 04/12/86, RHR Heat Exchanger 'A'.

9. Microbiological (Bugs) Logsheet, 07/16/86, PCCW 'A' and 'B' Log Entries.

10. Microbiological (Bugs) Logsheet, 03/20/87, PCCW 'A' and 'B' Log Entries.

11. DWST Inspection Report, 02/27/87 (SS #29687).

12. Isometric Drawing No. 9763-D-800797 Rev. 6.

13. Walworth Company Drawing No. SK-1952-75.

ATTACHMENT 3-1

1. Memo dated October 15, 1987, "SIR-87-076", M.E. Satchell to distribution.

2. Work Request No. .87W006994, dated October 1, 1987, Installation of sleeves required in the inlet tube ends of PCCW "B" heat exchanger, per DCR-87-223.

3. Figure 5-1, Chapter 9.1 Chemistry Program Manual, "NPDES Sampling".

4. Joseph Oat Corporation Drawing No. 5607 (Sheet 1 of 3) Rev. 13.

CERTIFICATE OF SERVICE

I, Deborah S. Steenland, one of the attorneys for the Applicants herein, hereby certify that on January 14, 1988, I made service of the within document by mailing copies thereof, postage prepaid unless otherwise marked, to:

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