January 7, 1988

UNITED STATES 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 & 2)	Docket No. 50-443 OL-1 ONSITE EMERGENCY PLANNING & TECHNICAL ISSUES

NEW ENGLAND COALITION ON NUCLEAR POLLUTION'S SECOND SET OF INTERROGATORIES AND REQUEST FOR THE PRODUCTION OF DOCUMENTS TO THE NRC STAFF ON NECNP CONTENTIONS I.V AND IV

INSTRUCTIONS

The following interrogatories are to be answered in writing and under oath by an employee, representative or agent of the Staff with personal knowledge of the facts or information requested in each interrogatory. We remind you of your obligation to supplement answers to interrogatories, under 10 C.F.R. § 2.740(e).

DEFINITIONS

The following definitions shall apply to these interrogatories:

1) "Document" shall mean any written or graphic matter or communication, however produced or reproduced, and is intended to be comprehensive and include without limitation any and all correspondence, letters, telegrams, agreements, notes, contracts, instructions, reports, demands, memoranda, data, schedules, notices, work papers, recordings, whether electronic or by other

means, computer data, computer printouts, photographs, microfilm, microfiche, charts, analyses, intra-corporate or intra-office communications, notebooks, diaries, sketches, diagrams, forms, manuals, brochures, lists, publications, drafts, telephone minutes, minutes of meetings, statements, calendars, journals, orders, confirmations and all other written or graphic materials of any nature whatsoever.

2) "All documents referring or relating to" shall mean all documents that in whole or in part constitute, contain, embody, reflect, identify, state, interpret, discuss, explain, apply to, deal with, or are in any way pertinent to a given subject.

3) "Identify" with respect to any document shall mean to state the following: the document's title, its date, the author of the document, the person to whom to document was sent, all persons who received or reviewed the document, the substance and nature of the document, and the present custodian of the document and of any and all copies of the document.

4) "Identify" with respect to any action or conduct shall mean state the following regarding any such action or conduct: the person or persons proposing and taking such action; the date such action was proposed and/or taken; all persons with knowledge or information about such action; the purpose or proposed effect of such action; and any document recording or documenting such action.

5) "Identify" with respect to an individual shall mean state the individual's name, address, employer, occupation, and title.

6) "Describe" with respect to any action, event or matter shall mean state the following regarding such action, event or matter: the date of such action, event, or matter; the substance or nature of such action, event or matter; the persons participating in or having knowledge of such action, event or matter; the current and past business positions and addresses of such persons; and the existence and location of any and all documents relating to such action or matter.

7) "Describe" with respect to any piece of equipment shall mean the type, manufacturer, equipment tag number and model number of the equipment.

8) "Reliability" shall mean the probability that a steam generator tube will be correctly labelled as "defective", "cracked", "degraded", "imperfect", or "leaking".

9) "Biofouling" shall mean any degree of sedimentation and/or corrosion of nuclear power plant cooling systems by aquatic debris, macro- or micro-biological organisms, silt, and mud, or by any other organic or inorganic material.

10) "Microbiologically induced corrosion" shall mean under-sediment corrosion, pitting or degradation of cooling systems that is generally caused by sulfate-reducing bacteria, or any sedimentation caused by that process.

11) "Cooling System" shall mean piping and other equipment contained in open and closed circulating water system, served by 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, and Emergency Feedwater systems.

GENERAL INTERROGATORIES

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.

STEAM GENERATOR TUBE INSPECTION

2) Identify all documents referring or relating to the "Analysis Round Robin" performed on or about 1984 at the Battelle Pacific Northwest Laboratories as part of the "Steam Generator Group Project", including but not limited to all documents referring or relating to the level of equivocation of the word "defect" and to the interpretation of the data from the eddy current inspection tapes.

3) Produce all documents identified in the response to Interrogatory 2).

4) With respect to the Analysis Round Robin referred to in Interrogatory 2):

a) State whether the different U.S. inspection teams disagreed as to the definition of the word "defect" in interpreting the same set of eddy current inspection tapes for the same tubes.

b) Did some inspection teams find "defects" at a particular location on the eddy current inspections tapes for the same steam generator tubes while other teams did not find "defects" at those same locations? If so, identify each such case and explain the reasons.

c) State the degree of disagreement among the different U.S. inspection teams as to the definition of the word "defect" in interpreting the same set of eddy current inspection tapes for the same steam generator tubes.

d) If one inspection team found a "defect" at a particular location on the eddy current inspection tape, what is the probability that a second inspection team would find a "defect" at that same location?

e) Was there any coincidence in the locations on the eddy current inspection tapes where the different inspection teams found "defects"?

f) Explain the meaning of the word "defect" in Regulatory Guide 1.83 if each inspection team would find "defects" at different points on the eddy current inspection tapes for the same steam generator tubes.

5) Identify all documents referring or relating to the research at Battelle Columbus Laboratories on or about the early 1980s in which a group of BWR pipe weld inspectors were asked to label sections of pipe weld as "cracked" or "uncracked".

6) Produce all documents identified in the response to Interrogatory 5).

7) State whether or not the NRC required the qualification testing of inspection methods for BWR pipe weld inspectors and instruments after the research at Battelle Columbus Laboratories referred to in Interrogatory 5).

8) Explain why qualification testing similar to that required for inspection methods for BWR pipe weld inspectors and instruments is not required for the testing procedures used for steam generator tubes.

9) With respect to the research at Battelle Columbus Laboratories referred to in Interrogatory 5):

a) State whether the different inspection teams disagreed as to the definition of the words "defect" or "crack" in labelling sections of the pipe weld.

b) Did some inspection teams find "defects" or "cracks" at particular locations on the sections of pipe weld while other teams did not find "defects" or "cracks" at those same locations? If so, identify each such case and explain the reasons.

c) State the degree of disagreement among the different inspection teams as to the definition of the words "defect" or "crack" in labelling sections of the pipe weld.

d) If one inspection team found a "defect" or "crack" at a particular location on the sections of pipe weld, what is the probability that a second inspection team would find a "defect" at that same location?

e) Was there any coincidence in the locations on the sections of pipe weld where the different inspection teams found "defects" or "cracks"?

10) With respect to nondestructive examination by eddy current testing:

a) Identify and describe the reliability of such testing.

b) Identify and describe how the reliability of such testing is defined, including but not limited to how the population of steam generator tubes is defined and how each tube is labelled as either acceptable (tube need not be plugged) or unacceptable (tube must be plugged).

c) Identify and describe by what method the reliability of such testing was established.

d) State whether the reliability of such testing was established based on a sampling of entities drawn from actual steam generators.

e) State whether the reliability of such testing was established based on a random (unbiased) sample.

f) Identify and describe the estimated probability of a false positive error of such testing.

g) Identify and describe the estimated probability of a false negative error of such testing.

h) Produce all documents referring or relating to the responses to Interrogatory Questions 10a) through 10g).

11) Describe what diagnostic procedures are used at the Seabrook plant to assess whether primary to secondary side leakage exceeds the Tech Spec limit.

12) For each diagnostic procedure identified in Interrogatory Question 11):

a) Describe its reliability.

b) Describe how its reliability is defined.

c) Describe how its reliability was established.

d) Describe what the estimated rate of false positive errors is for that diagnostic procedure.

e) Describe what the estimated rate of false negative errors is for that diagnostic procedure.

f) Describe any evidence both for and against the proposition that the leak rate test combined with the Tech Spec limit on leak rate accurately predicts subsequent tube bursts.

13) Produce all documents referring or relating to the information requested in Interrogatories 11) and 12).

14) Describe every known source or cause of leaking steam generator tubes.

15) For each source or cause identified in the response to Interrogatory 14), state whether nondestructive examination by eddy current testing will detect that source or cause.

16) For each source or cause identified in the response to Interrogatory 14), state what procedure other than nondestructive examination by eddy current testing will detect that source or cause. Describe each such procedure.

17) For each procedure identified in the response to Interrogatory Question 16) for which you have not previously provided the answers, answer Interrogatories 12 and 13.

18) Regulatory Guide 1.83, Part C.2.b. requires that inspection equipment be sensitive enough to detect imperfections 20% or more through the tube wall. Explain the factual and analytical bases for the judgment that imperfections less than 20% through the tube wall need not be detected?

19) Regulatory Guide 1.83, Part C.4.c. requires that at least 3% of the total number of tubes in each steam generator to be inspected should be tested during each inspection. What are the factual and analytical bases for the judgment that only 3% of the total number of tubes need be tested?

20) Regulatory Guide 1.83, Part C.5.a. requires that if previously degraded tubes exhibit significant (greater than 10%) further wall penetration, additional steam generators should be inspected. What are the factual and analytical bases for the judgment that significant further wall penetration is only that wall penetration greater than 10%?

21) Regulatory Guide 1.83, Part C.5.b., requires that if the eddy current inspection indicates that more than 10% of the inspected tubes have detectable wall penetration or that one or more of the inspected tubes have an indication in excess of the plugging limit, an additional 3% of the tubes should be inspected.

a) What are the factual and analytical bases for the figure of 10%?

b) What are the factual and analytical bases for the judgment that only an additional 3% of the tubes need be tested?

22) Regulatory Guide 1.83, Part C.5.c. requires that if the additional inspection indicates that more than 10% of the additionally inspected tubes have detectable wall penetration or one or more of these additionally inspected tubes has an indication in excess of the plugging limit, additional tubes (no less than 6% of the total tubes in the steam generator) in the area of the tube sheet array where tubes with imperfections were found should be inspected. What are the factual and analytical bases for the figure of 6%?

23) Explain the factual and analytical bases for the time period of inspection contained in Regulatory Guide 1.83, Part C.6.a. that the first inservice inspection of steam generators should be performed after 6 effective full power months but before 24 calendar months.

24) Explain the factual and analytical bases for the time period of inspection contained in Regulatory Guide 1.83, Part C.6.b., that subsequent inservice inspections should be not less than 12 nor more than 24 calendar months after the previous inspection.

25) Explain the factual and analytical bases for the time period of inspection contained in Regulatory Guide 1.83, Part C.6.d., allowing for inspection frequency of 40 month intervals.

26) Tech Spec section 4.4.5.2 states that previously degraded tubes must exhibit "significant" (greater than 10%) further wall penetrations to be included in the above percentage calculations. What are the factual and analytical bases for the judgment that "significant" further wall penetrations are only those wall penetrations greater than 10%?

27) Tech Spec section 4.4.5.2 sets forth certain inspection results for classifying the results of each steam generator tube sample selection. What are the factual and analytical bases for each of the percentage figures contained in the inspection results for each category C-1, C-2, and C-3?

28) Tech Spec section 4.4.5.4a.1) states that eddy-current testing indications below 20% of the nominal tube wall thickness, if detectable, may be considered as "imperfections". What are the factual and analytical bases for the 20% figure?

29) Tech Spec section 4.4.5.4a.3) defines a "degraded tube" as a tube containing imperfections greater than or equal to 20% of the nominal wall thickness caused by degradation. What are the factual and analytical bases for the judgment that a tube containing imperfections less than 20% of the nominal tube wall thickness are not degraded tubes?

30) Tech Spec section 4.4.5.4a.6) defines the "plugging limit" as the imperfection depth equal to 40% of the nominal tube wall thickness. What are the factual and analytical bases for the judgment that a tube with an imperfection depth less than 40% of the nominal tube wall thickness need not be plugged?

CORROSION AND BLOCKAGE OF COOLANT FLOW RESULTING FROM BIOFOULING AND MICROBIOLOGICALLY INDUCED CORROSION

31) For each cooling system at the Seabrook plant, please answer the following questions:

(a) What is the Staff's position with respect to the adequacy of Applicants' program for monitoring and detecting the conditions that will allow microbiologically induced corrosion to occur in these cooling systems prior to its occurrence, including techniques for determining the extent of sedimentation or corrosion?

(b) What is the Staff's position with respect to the adequacy of Applicants' program for monitoring and detecting the presence of microbiologically induced corrosion in these systems after to its occurrence, including techniques for determining the type and extent of such corrosion?

(c) What is the Staff's position with respect to the adequacy of Applicants' program for treating and controlling biofouling and microbiologically induced corrosion in these systems after its occurrence?

(d) Identify and produce all documents prepared by the NRC or its contractors which assess, evaluate, or discuss the Applicants' programs for monitoring, detecting, treating or controlling biofouling and microbiologically induced corrosion.

(e) Identify any studies, evaluations, or assessments underway or planned by NRC or its contractors relating to the

occurrence, monitoring, detection, treatment or control of microbiologically induced corrosion.

(f) Describe the type and extent of any microbiologically induced corrosion that has been identified or detected in any of these systems.

32) In NRC Inspection Report No. 50-443/87-07, at page 16, the inspector discussed the Applicants' dissassembly, 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 incident:

a) Identify and produce any documents, memoranda, reports, drawings, or photographs produced by resident inspectors or other NRC staff that in any way discuss, investigate, or evaluate this incident.

b) What measures, if any, could have prevented this problem from occurring?

33) 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 incident:

a) Identify and produce any documents, reports, drawings, or photographs produced by resident inspectors or other NRC staff that in any way discuss, investigate, or evaluate this incident.

b) Describe the cause or causes of this degradation, including whether microbiologically induced corrosion played a role in this degradation?

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

d) Describe what measures, if any, could have prevented this degradation from occurring?

34) 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 incident:

a) Identify and produce any documents, memoranda, reports, drawings, or photographs produced by resident inspectors or other NRC staff that in any way discuss, investigate, or evaluate this incident.

b) Describe the cause or causes of this leak, including whether microbiologically induced corrosion played a role in this degradation?

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

d) Describe what measures, if any, could have prevented this leak from occurring?

35) Describe what measures the NRC has taken, and plans to take, to assure itself that microbiologically induced corrosion will be detected, treated and controlled at Seabrook.

36) Do General Design Criteria 2, 4, 5, 44, 45, and/or 46 require Applicants to monitor cooling systems for the presence of biofouling or microbiologically induced corrosion? If yes, identify each cooling systems that should be so monitored and state whether it is a closed or open water system.

37) Do General Design Criteria 2, 4, 5, 44, 45, and/or 46 require Applicants to monitor cooling systems for the conditions that allow biofouling or microbiologically induced corrosion to occur? If yes, identify each cooling systems that should be so monitored and state whether it is a closed or open water system.

38) In NUREG/CR-4626, Volume 2, at page 20, it is concluded that flow velocity is the most reliable indicator of conditions that allow microbiologically induced corrosion to occur, and that visual inspection is the most effective surveillance technique for determining the type and extent of microbiologically induced corrosion after its occurrence. Do you agree? If not, provide your reasons.

39) In NUREG/CR-4626, Volume 2, at page 30, it is concluded that high-velocity flushing in combination with continuous chlorination may be an effective way of controlling microbiologically induced corrosion. Do you agree? If not, provide your reasons.

40) Please identify what other treatments or combinations of treatments that you believe are as or more effective than high-velocity flushing combined with continuous chlorination, in controlling microbiologically induced corrosion, including but not limited to the treatments described in NUREG/CR-4626, Volume 2, at pages 23 to 30.

41) Do you believe that chlorination is effective in preventing or minimizing microbiologically induced corrosion? If yes, please answer the following questions:

a) Explain the conditions under which chlorination is most effective in preventing or minimizing microbiologically induced corrosion, including the location that chlorine should be injected in each cooling system, and the frequency and duration of chlorine injections, and concentration (in parts per million) of chlorine at the point of injection, in each cooling system.

b) At what level must chlorine concentration (in parts per million) be maintained to be effective in preventing or minimizing microbiologically induced corrosion?

42) Describe the Staff's position with respect to the effectiveness of thermal backflushing in controlling microbiologically induced corrosion.

43) Describe any harm or damage to cooling systems that might occur as a result of thermal backflushing at the Seabrook plant up to four time per year.

44) Describe any harm or damage to cooling systems that might occur as a result of thermal backflushing at the Seabrook plant more than four times per year.

45) Describe any incidents of microbiologically induced corrosion that has been identified or detected in any other nuclear power plants, including the type and extent of such corrosion or sedimentation, the systems in which the microbiologically induced corrosion occurred, and identify any documents related to these incidents.

46) Identify and produce any studies, reports, or documents produced by NRC or its contractors that discuss potential problems associated with backflushing of the plant as a method for controlling biofouling in nuclear power plants.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I certify that on January 7, 1988, copies of the foregoing NECNP'S SECOND SET OF INTERROGATORIES AND REQUEST FOR THE PRODUCTION OF DOCUMENTS TO THE NRC STAFF ON NECNP CONTENTIONS I, V AND IV were served by first-class mail on all parties listed on the attached service list.

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