UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

CHAIRMAN

June 28, 1996

50-443

The Honorable William H. Zeliff, Jr.
United States House of Representatives
Washington, D.C. 20515-2901

Dear Congressman Zeliff:

I am responding to your letter of May 13, 1996, in which you forwarded a letter from your constituent, Mr. Thomas J. Sedoric, who lives near the Seabrook Nuclear Station. Mr. Sedoric's concerns about the risk of competition in the electric industry that could lead to "cost cutting initiatives" by the plant owner, are based on his views that as the plant ages, safe operation will require increasingly exemplary management and on his misgivings about the quality of plant construction workmanship and materials.

The Commission recognizes that emerging competitive market forces within the electric utility industry are likely to lead to pressures on electric utility companies to reduce capital and operating costs as part of an overall plan to improve their competitiveness. We also recognize that safe, reliable, and economical performance cannot be attained without adequate financial expenditures to maintain and operate a facility. In addition to its inspection program, through which the NRC monitors a licensee's compliance with regulations, NRC senior management routinely reviews the overall operation of the nuclear facilities and identifies any trends in performance and their potential causes. The NRC also periodically evaluates a licensee's overall performance through a program called the Systematic Assessment of Licensee Performance (SALP). This program provides utilities with NRC's assessment of facility operation and assures appropriate inspections will be scheduled.

In the case of Northeast Utilities' (NU's) performance at Millstone, the Commission has noted a history of problems and issued a number of enforcement actions between 1986 and 1996. Unfortunately, the corrective actions taken by NU in response to these actions have not always prevented the repeated occurrence of violations with similar root causes. As you know, there have been employee allegations of ongoing safety problems. On the basis of these observations and issues raised about NU's maintenance of its licensing bases, the NRC staff has required NU to confirm that before the units are returned to operation, the Millstone units would be operated in accordance with the terms and conditions of the facility operating licenses, NRC regulations, and the licensing bases as detailed in the respective Millstone unit's updated final safety analysis report. In addition to this action, the NRC has initiated a number of other inspection and investigative activities to focus on specific areas of concern, such as the handling of employee concerns.

Originated by:DeAgazio, NRR

The Commission has been concerned lest similar problems arise with NU's operation of Seabrook, although to date, we have not identified issues at this facility that could indicate the kind of problems observed at Millstone. A recent integrated performance inspection (Inspection Report No. 50-443/96-80, dated April 3, 1996) found many strengths in the operation of Seabrook. Nonetheless, we will continue to evaluate the corrective actions being taken by NU at Millstone for their applicability at Seabrook.

With regard to Mr. Sedoric's comments regarding plant aging, the Commission has issued a maintenance rule as defined in Section 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," of Title 10 of the Code of Federal Regulations (10 CFR). Licensee compliance with this rule requires the monitoring of the performance or condition of structures, systems, and components against established goals to provide reasonable assurance that the structures, systems, and components are capable of fulfilling their intended functions. The NRC staff will periodically evaluate the effectiveness of this and other programs throughout the plant life.

With regard to the claim of "radiation spikes" discussed in the newspaper article attached to your letter, the NRC believes that Seabrook can be ruled out as a source of the radiation readings alleged by C-10. The chronology of the event is described in the attached letter of April 8, 1996, from the NRC's Regional Administrator to an officer of C-10. On November 25, 1995, while the licensee was performing a planned purge of gases from the Seabrook containment, the facility's Wide Range Gas Monitor experienced a power failure that placed it out of service for about 14 hours. During that time, in accordance with mandatory technical specifications, the licensee used other measures to assess radiological conditions. The gaseous effluents that were released were filtered and monitored, and were well within regulatory limits.

Almost two months later, on January 25, 1996, C-10 first informed the NRC, through its resident inspector at Seabrook, of the reported radiological "spike" detected on its monitors. The resident inspector noted that the reactor was shut down at the time of the event and that the potential for a high-activity release was therefore limited. The NRC evaluated licensee records and concluded that no known operational event or condition at the plant could have been responsible for the instrument indications reported by C-10.

Subsequently, the office of the Massachusetts Attorney General asked for an independent review by NRC. Accordingly, two inspectors from the NRC's regional office, accompanied by representatives from the State of New Hampshire and the Commonwealth of Massachusetts, performed an independent review on May 29-31, 1996. A copy of the inspection report is provided as Enclosure 2. The NRC staff's conclusion is that activities at Seabrook Station were not the cause of the instrument indications observed previously by C-10's radiation monitors. The plant had been shut down since November 4, 1995 and consequently a radioactive noble gas source term was not available

for release on November 29, 1995. A review of the plants radiation monitors, contamination surveys, and personnel monitoring also did not indicate the presence of noble gas. The radiological environmental monitoring program and analytical results from environmental sampling were also reviewed. Based on this review, no samples were found that indicated detectable radioactivity in various biological monitoring media, including surface water, sediment, fish, lobster, and mussels.

I want to assure you that the NRC will maintain a strong regulatory oversight program and will continue to monitor closely NU's performance at all of its sites to ensure the continued protection of public health and safety. I hope that this information will be useful to you in responding to the concerns raised by your constituent.

Sincerely,

Shirley Ann Jackson

Shirley Ann Jackson

Enclosures:
1. Ltr to S. Gavutis fm T. Martin
   dtd April 8, 1996
2. Ltr to T. Feigenbaum fm J. White
   dtd June 25, 1996

April 8, 1996

Sandra Gavutis, Executive Director
C-10 Research and Education Foundation, Inc.
44 Merrimac Street
Newburyport, MA 01950

Dear Ms. Gavutis:

This letter responds to your press release dated March 13, 1996, regarding the performance of Seabrook Station relative to a containment ventilation release that was monitored and controlled in conformance with NRC regulatory requirements. This release had no public health and safety consequence or adverse impact on the environment. We are providing a formal response since your press release did not include explanations previously provided to you by the NRC and because the press release questioned the integrity and motivation of our organization. We are unaware of the basis for your statement that there were "revelations of collusion between the NRC and the reactor operators." We take this statement seriously and urge you to report any evidence or information that you have that supports this contention to our Office of the Inspector General at 1-800-233-3497.

Our review of the circumstances found that on November 29, 1995, at 2:27 a.m. while performing a planned containment purge in support of refueling activities, the Seabrook Station Wide Range Gas Monitor (WRGM) experienced a power supply failure. The WRGM is an instrument that is normally used to monitor gaseous releases from the plant. The power supply was replaced and the WRGM was placed back in service at 4:05 p.m. that same day. In such conditions, the licensee is required to implement compensatory measures as specified by the applicable Technical Specifications. In this case, the licensee conformed with the applicable Technical Specifications, initiated sampling and radiological analysis of the effluent stream, and calculated the consequent dose to the public. The upstream process radiation monitors, which were in service, provided a supplemental means to assess radiological conditions while the WRGM was out of service. The gaseous effluent that was released was both filtered and monitored. The calculated organ dose due to the release was a small fraction of regulatory limits. Under these conditions, there was no federal regulatory requirement for the licensee to inform the NRC or the public relative to this matter.

Our resident inspector received a request on January 25, 1996, from your organization, to supply information pertaining to meteorological conditions and the nature of radiological releases that occurred on November 29, 1995, from approximately 2:00 a.m. to 6:30 a.m. As previously explained by our resident inspector, the information you sought was archived by the licensee and was not readily available. The inspector provided an estimate of the time required to access and retrieve the information, and indicated that other NRC regulatory activities had priority and would prevent a prompt response to your

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Enclosure 1

request. Notwithstanding, the inspector kept your organization informed of the status of the request and committed that he would follow up with your organization upon completion of his other more safety significant assignments. We believe that our efforts were appropriately prioritized from a safety standpoint and therefore sufficiently responsive.

While we support the concept of your independent environmental monitoring efforts, we recognize the ability and responsibility of designated state agencies to validate and verify environmental information, data, conditions, and impacts. Accordingly, we encourage your organization to communicate your data and results with the appropriate state agencies.

Our continuing inspection program at Seabrook provides the basis for our confidence in the quality of the licensee performance relative to providing for public health and safety and protection of the environment. There are numerous regulatory requirements relative to effluent and environmental controls that are imposed and enforced by the NRC. In order to maintain the operating license for the facility, the licensee must perform in accordance with these regulatory specifications.

These specifications include the establishment, implementation, and maintenance of a radiological environmental monitoring program, which includes monitoring, sampling, and analysis of the atmospheric contaminants (air particulates and radioiodines), aquatic environment and life-forms (including various fish, mussels, and lobsters), terrestrial environment and vegetation, sediment, surface water and groundwater. The quality and performance of this program is routinely inspected by the NRC, and the data (which is reported on an annual basis and available to the public, copy attached) is independently evaluated and assessed.

We also inspect and verify the quality of the licensee's program for monitoring and controlling effluent releases to the environment. Based on our continuing efforts, we maintain confidence in the ability of the licensee to monitor, measure, and control radiological releases, and assess resultant exposure to the public in accordance with regulatory requirements. Additionally, the NRC maintains a network of thermoluminescent dosimetry (TLD) devices (as does the State of New Hampshire) that are used to independently confirm the licensee's assessment of dose impact to the public. The licensee's effluent reports and NRC's environmental dosimetry results are available to the public.

Your press release also questioned whether the recent "downsizing" at Seabrook compromised the health and safety of the public. The NRC performance and safety based inspection program continues to confirm the safe operation of Seabrook Station. Our assessment indicates that the licensee is operating the Seabrook facility in a manner that does not endanger the health and safety of the public and is protective of the environment. We have observed no change in performance or ability as a result of staffing changes.

We hope that this letter is responsive to your concerns. If you have any other questions in this area, I invite you to contact Mr. John Rogge of my staff at 610-337-5146.

Sincerely,

Original Signed by:

Thomas T. Martin
Regional Administrator

Attachment: North Atlantic's Annual Radioactive Effluent Release Report

cc w/ cy of press release:
Commonwealth of Massachusetts
State of New Hampshire

The Commonwealth of Massachusetts
Office of the Attorney General
200 Portland Street
Boston, MA 02114

SCOTT HARSHBARGER
ATTORNEY GENERAL

(617) 727-2200

April 30, 1996

Thomas T. Martin
Regional Administrator
Nuclear Regulatory Commission, Region 1
475 Allendale Road
King of Prussia, PA 19406-1415

Re: Elevated radiation readings at C-10 monitors

Dear Mr. Martin:

As you are aware, several monitors operated by the C-10 Research and Education Foundation revealed elevated levels of radiation on November 29th of last year. Those monitors were located in Amesbury, West Newbury, and Newburyport, Massachusetts, not far from the Seabrook nuclear power station in Seabrook, New Hampshire. We are writing today to express our concern regarding those results and to request formally that the NRC conduct an independent investigation of this matter.

We understand from your letter dated April 8, 1996 to Sandra Gavutis, Executive Director of C-10, that the NRC has already taken some steps to look into this matter. Your letter confirmed that a "planned containment purge" was released into the environment from Seabrook Station on the 29th. It also stated that the station's main instrument system for monitoring gaseous releases from the plant was inoperable between 2:27 a.m. and 4:05 p.m. that day, and that the plant operators had to rely upon "compensatory measures" to provide "a supplemental means to assess radiological conditions" in the interim. According to your letter, the analysis of these "compensatory measures" indicated that the public should not be concerned, because the "calculated organ dose" was "a small fraction of regulatory limits."

The focus of your letter to Ms. Gavutis was whether the April 29th release from Seabrook should be a cause for public concern. Nowhere did your letter question whether that release in fact caused the elevated readings in Massachusetts; to the contrary, the letter appears to have assumed that it did. Yet the plant operators are now claiming that the documented November 29th "purge" could not have caused those readings, and statements attributed to the NRC in the press have supported this conclusion. According to the press accounts, the plant operators have concluded that the Seabrook "purge" could not have caused the elevated monitoring results in Massachusetts, because for the release to have

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caused such readings, it would have had to have exceeded applicable standards by thousands of levels. Needless to say, this "explanation" is itself quite troubling.

We are extremely concerned that the public has not been given a full accounting of what occured on the 29th of November of last year. In particular, in light of the fact that your letter did not set forth what specific steps were taken to investigate this matter, we are concerned that an adequate independent review has not been conducted. Our concern in this regard has been heightened by recent revelations regarding a similar problem involving the Vermont Yankee nuclear power plant in Vermont. We have been told that in that incident, the NRC accepted the results of the plant's internal review, despite the fact that it appears that the engineer in charge of that review was not even aware of the plant's startup/shutdown bypass venting, a likely source of any release into the environment.

If you believe that a complete and adequate review has already been undertaken, please inform us of precisely what steps were taken, what conclusions were reached (including your conclusions as to the likely source of the release), and why you came to these conclusions. If you conclude that a complete and adequate review has not been done, please conduct such a review and let us know the results of that examination.

Very truly yours,

James R. Milkey
Assistant Attorney General
Director, Land Use & Environmental Projects

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

June 25, 1996

Mr. Ted C. Feigenbaum
Executive Vice President - Nuclear
Northeast Utilities Service Company
c/o Mr. Terry L. Harpster
Post Office Box 128
Waterford, CT 06385

SUBJECT: NRC SPECIAL INSPECTION 50-443/96-05

Dear Mr. Feigenbaum:

This letter refers to the specialist inspection conducted by Messrs. J. Jang and L. Eckert of this office on May 29-31, 1996, of activities authorized by NRC License No. NPF-86 at the Seabrook Station, Seabrook, New Hampshire. Our inspectors were accompanied by Mr. P. Paiton, Supervisor, Department of Public Health, New Hampshire; Mr. M. Nawoj, Chief, Technical Hazards, Office of Emergency Management, New Hampshire; and Mr. T. O'Connel, Radiation Scientist, Department of Public Health, Massachusetts. The inspection findings were discussed with Mr. W. DiProfio and other members of your staff on May 31, 1996.

Areas reviewed during the inspection are important to health and safety, and are described in the NRC Region I Inspection Report, which is enclosed with this letter. Within these areas, the inspection consisted of selected examinations of procedures and representative records, interviews with personnel, and observations by the inspectors to the extent possible.

This inspection was performed at the request of the Office of the Attorney General, Commonwealth of Massachusetts, to review licensed activities at the Seabrook Station relative to concerns that were expressed to the public by the C-10 Research and Education Foundation (C-10). Specifically, in a press release on March 13, 1996, the C-10 organization indicated their belief that certain anomalous indications, recorded by three of the organization's radiation monitoring instruments on November 29, 1995, were attributable to radioactive gas originating from Seabrook Station. In a separate press release on the same date, the C-10 organization announced that they had detected radioactive cobalt-58 and cesium-137 in mussels placed near the cooling water outfall of Seabrook Station. Though NRC previously provided correspondence to the C-10 organization on April 8, 1996, relative to their concern involving radioactive gas, this inspection formally documents NRC's

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review and evaluation of the licensed activities and plant conditions relative to these matters.

Within the scope of this inspection, the inspectors concluded that Seabrook Station activities were not the cause of the instrument indications observed previously by C-10's radiation monitors. This conclusion is based on the fact that the plant had been shut down since November 4, 1995, and consequently, a radioactive noble gas source term was not available for release on November 29, 1995. The inspectors also reviewed the radiological environmental monitoring program and analytical results from environmental sampling. Based on this review, no samples were found that indicated detectable radioactivity (i.e., greater than the lower limits of detection) in various biological monitoring media, including surface water, sediment, fish, lobster, and mussels.

No response to this letter is required. Your cooperation with us is appreciated.

Sincerely,

ORIGINAL SIGNED BY:

John R. White, Chief
Radiation Safety Branch
Division of Reactor Safety

Docket No. 50-443

cc w/encl:
J. Austin Jr., RAC Chairman, FEMA RI, Boston, Mass.
R. Backus, Esquire, Backus, Meyer and Solomon, New Hampshire
S. Choi, Director, Nuclear Safety, Massachusetts Emergency Management Agency
Commonwealth of Massachusetts, SLO Designee
L. Cuoco, Senior Nuclear Counsel, Northeast Utilities
W. DiProfio, Nuclear Unit Director
F. W. Getman, Jr., Vice President and General Counsel - Great Bay Power Corporation
R. Hallisey, Director, Dept. of Public Health, Commonwealth of Massachusetts
A. M. Callendrello, Licensing Manager, North Atlantic Energy
R. M. Kacich, Northeast Utilities
W. D. Meinert, Nuclear Engineer
Seacoast Anti-Pollution League
State of New Hampshire, SLO
D. Tefft, Administrator, Bureau of Radiological Health, State of New Hampshire

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Docket No.:	50-443
License No.:	NPF-86
Report No.:	96-05
Licensee:	North Atlantic Energy Service Corporation
Facility:	Seabrook Station
Dates:	May 29-31, 1996
Inspectors:	J. Jang, Senior Radiation Specialist, PhD L. Eckert, Radiation Specialist
Approved by:	John R. White, Chief Radiation Safety Branch Division of Reactor Safety

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EXECUTIVE SUMMARY

Seabrook Station
NRC Inspection Report 50-443/96-05

This inspection was performed at the request of the Office of the Attorney General, Commonwealth of Massachusetts to review licensed activities at the Seabrook Station relative to concerns, expressed to the public, by the C-10 Research and Education Foundation (C-10). Specifically, in a press release on March 13, 1996, the C-10 organization indicated their belief that certain anomalous indications, recorded by three of the organization's radiation monitoring instruments on November 29, 1995, were attributable to radioactive gas originating from Seabrook Station. In a separate press release on the same date, the C-10 organization announced that they had detected radioactive cobalt-58 and cesium-137 in mussels placed near the cooling water outfall of Seabrook Station.

In summary, the following was determined:

- There were no noble gas releases from the plant during the period between November 17, 1995 to December 5, 1995.

- There was no noble gas source term available, excepting the nuclear fuel, sufficient to cause the indications recorded by certain of C-10's radiation monitoring instruments, for the period between November 17, 1995, to December 5, 1995.

- Fuel clad integrity, has been and continues to be, maintained as evidenced by periodic radiochemistry surveillance and measurements.

- The NRC's independent thermoluminescent dosimetry (TLD) environmental monitoring results for the fourth quarter of 1995 were not statistically different from measurements made in previous quarters; and the licensee's environmental TLD results are comparable.

- In-plant radiation and contamination surveys, breathing zone and general area air samples, personnel contamination records, personnel whole body counts, and continuous air monitoring results are not indicative of the existence of, or site personnel exposure to, radioactive noble gas.

- Shipments of radioactive materials/waste from Seabrook Station on or about November 29, 1995, did not have sufficient activity to affect C-10's radiation monitoring equipment.

- The activity measured in surface water, sediment, fish, lobster, and mussels, sampled and analyzed by the licensee in the vicinity of the plant's effluent discharge, did not exceed the licensee's lower limits of detection (LLD), as defined in the licensee's Off-Site Dose Calculation Manual.

Report Details

R8 Miscellaneous RP&C Issues

R8.1 Evaluation of a Potential Noble Gas Release from Seabrook

a. Background

C-10 Research and Education Foundation (C-10) has located several (about 25) ambient radiation monitoring stations around the Seabrook nuclear plant site, as shown in Figure 1. According to press releases that the C-10 organization made available on March 13, 1996, on November 29, 1995, certain of the organization's radiation monitoring stations, located in Massachusetts detected significant "spikes" due to radiation in the atmosphere. The C-10 organization concluded, based on meteorological conditions at the time, that these instrument indications and their own plume prediction models indicated that clouds of radioactive gas had originated at the Seabrook reactor. Another press release on the same day indicated that the organization had detected cobalt 58 and cesium 137 in mussels that were placed near the plant's cooling water outfall in 1995.

As a result of a request by the Office of the Attorney General, Commonwealth of Massachusetts, the NRC conducted a special inspection of the plant conditions and licensed activities that prevailed on November 29, 1995. Representatives from the Commonwealth of Massachusetts and the State of New Hampshire accompanied the inspectors and observed all or part of the inspection activity.

b. Inspection Scope (84750, 83750)

The purpose of this inspection was to evaluate whether any licensee activity was the cause of the unusual instrument indications observed and recorded by the C-10 radiation monitoring stations located in Massachusetts (V23 Amesbury, V99 Newburyport, and V11 West Newbury).

The inspectors evaluated plant conditions, effluent monitoring data, and in-plant health physics data for the period in question by review of records, interviews with staff personnel, independent evaluation of radiological data, independent calculation of projected radiological doses, and review of licensed activities. Data reviewed included (but was not limited to) plant operating and activity logs, radiation monitoring system instrument records, radiological surveys (airborne, contamination, and radiation), radiological samples, personnel and environmental dosimetry monitoring records, surveillance activity records, and radiological environmental monitoring program records.

c. Observations and Findings

Plant Conditions

On November 2, 1995, the licensee began reducing reactor power in preparation for the refueling outage. The refueling outage began at 11:59 p.m. on November 3 when the generator was disconnected from the grid. The plant reached hot shutdown on November 4, 1995, at 4:05 a.m. The plant reached Mode 5, cold shutdown, at 8:42 p.m. on November 4. Core offload commenced on November 16 and the reactor was in a defueled condition on November 20. On November 23, operators began loading fuel back into the reactor. Core reload was completed on November 26, 1995.

From midnight until noon on November 29, 1995, the following conditions existed in the containment building:

- The wide range gas monitor (WRGM, plant vent radiation monitor, RM-6528) was declared inoperable for about 14 hours due to a high voltage failure in one of the components. Compensatory sampling was initiated by the licensee in accordance with Technical Specifications. All other upstream radiation monitoring systems (RMS), including the Waste Processing Building Exhaust and Fuel Storage Building Exhaust radiation monitors and RM 6532 remained in operation. (Figure 2 pertains.)
- Containment air handling (CAH) recirculation fans were off.
- Containment on-line purge (COP) system was not in service.
- Steam generator primary side work was complete.
- "C" reactor coolant pump (RCP) motor was in a test-run configuration and uncoupled.
- "B" residual heat removal primary isolation valve testing was in progress.
- Flux thimble reinstallation was in progress.
- The containment air purge (CAP) system was placed in service at 1:53 a.m. The CAP system has two modes of operation: filtered and unfiltered. CAP air flow is directed through the WRGM as shown in Figure 2. During this period, the system was configured as unfiltered.
- Reactor cavity draining was started at 2:27 a.m.
- The reactor vessel head was installed at 10:10 a.m.

Noble Gas Source Term

The inspectors reviewed the licensee's radiological analytical measurement (gamma spectrometry) results to quantify the noble gas source term on November 29, 1995. The inspectors reviewed selected analytical results for noble gas and radioactive liquid grab samples during the period of November 1, 1995, to December 5, 1995.

The licensee did not identify entrained noble gases in any of the samples collected from: (1) Spent Fuel Pool on November 1, 1995, and November 29, 1995; (2) Refueling Water Storage Tank on November 9, 1995, November 30, 1995, and December 5, 1995; and (3) Residual Heat Removal water on November 24, 1995, and November 30, 1995. Based on these analytical results, the inspectors determined that there were no entrained noble gases in the above systems. Therefore, there was no possibility of noble gas emission from radioactive liquid system processing activities.

The inspectors reviewed the gaseous effluent release pathways listed in the Off-site Dose Calculation Manual and depicted in Figure 2. On November 3, 1995, the licensee identified two noble gases, xenon-133 (Xe-133, 5.25 day half-life) and argon-41 (Ar-41, 1.83 hour half-life), in a containment atmosphere grab sample. The measured activity and standard error of Xe-133 and Ar-41 were 1.21E-7±1.5E-8 μCi/cc and 2.34E-7±1.6E-8 μCi/cc, respectively. The licensee did not identify any noble gas in a November 17, 1995, containment atmosphere grab sample. Additional analytical results for other process samples (such as grab samples taken from the Waste Processing Building, the Primary Auxiliary Building, and the Fuel Storage Building) did not identify any noble gas. Based on the above reviews, the inspectors determined that an entrained or containment volume noble gas source was not available for release from the plant after November 17, 1995.

Due to a power supply problem, the Wide Range Gas Monitor (WRGM, RM-6528) was declared inoperable at 2:27 on November 29, 1995. In conformance with the Technical Specifications, the licensee took two grab samples on at least a 12-hour frequency. Analytical results of these two compensatory samples did not identify any noble gas. All other upstream RMS, shown in Figure 2, were in operation while the WRGM was out of service for 14 hours. The monitoring results of these RMS indicated that there were no noble gas releases.

Computer Codes for Projected Dose Calculation

PCDOSE, a computer code developed by Idaho National Engineering Laboratory to estimate the affect of various radioactive releases from nuclear power plants, was used in this investigation to establish the magnitude of a radioactive gaseous release source term required to affect C-10's radiation detection instruments. The inspectors used the PCDOSE code during a previous inspection to verify the licensee's own Method II dose projection code. The comparison results were excellent. (Inspection Report No. 50-443/94-06 pertains.)

The indication of the C-10 Monitoring Station No. V23 located in Amesbury (3.9 miles from the Seabrook site), was about 0.1 mR/hr on November 29, 1995. This radiation level (0.1 mR/hr) was based on converting the indicated reading at Station No. V23 into a deep dose equivalent value, assuming that the indication was radiological.

The projected noble gas release needed to indicate 0.1 mR/hr, gamma air dose, at V23 was calculated by the NRC and the licensee independently. The inspectors used the PCDOSE code and applied the real time meteorological data for wind speed, wind direction, and straight line χ/Q (4.03E-6) for the calculation. The licensee used its Method II code and applied the same real time meteorological data.

Projected noble gas release for Xe-133, based on the PCDOSE code and the licensee's Method II, was calculated to be 2,230 curies and 2,226 curies, respectively. Accordingly, about 2,230 curies of Xe-133 would have had to have been released from Seabrook Station on November 29, 1995, to indicate 0.1 mR/hr at C-10's V23 radiation monitor. As previously discussed, a noble gas source term of that magnitude was not available on November 29, 1995.

The inspectors also calculated a projected noble gas release for Kr-85 (due to long half life, 10.72 years, and relevant abundance in the nuclear fuel) using the same meteorological data. The result was about 50,000 curies. The inspectors noted that Kr-85 was not available for release as evidenced by the maintenance of fuel clad integrity during the operating cycle, and the licensee's periodic radiochemistry and analytical surveillance data.

Gaseous Radioactive Waste System

Seabrook Station is not designed with waste gas decay hold tanks. During normal operations, fission product gases from the reactor coolant letdown, the primary drain tank, and the reactor coolant drain tank are processed by the radioactive gaseous waste system (RGWS). Waste gases are processed through an iodine guard bed and waste gas dryers prior to being directed through carbon delay beds. The carbon delay beds were designed to provide a delay of 60 days for xenon and 85 hours for krypton. A more detailed description of this system is contained in Section 11.3 of the licensee's Updated Final Safety Analysis Report (UFSAR). Based on Seabrook Station's gaseous waste system design, the inspectors determined that a batch release of radioactive gases from Seabrook Station could not have occurred.

Environmental Thermoluminescent Dosimetry (TLD) Program

The U.S. Nuclear Regulatory Commission (NRC) Direct Radiation Monitoring Network is operated by NRC Region I to provide continuous measurements of the ambient radiation levels around nuclear power plants throughout the Unites States. The NRC uses Panasonic Model UD-801 dosimeters, which have two calcium sulfate elements and two lithium borate elements. The NRC uses calcium sulfate elements to calculate the dose for routine

operations, because this element is very sensitive to noble gas or low gamma energy radionuclides. Data from the lithium borate elements are used only for the emergency operation. (See NUREG/CR-2560, NUREG/CR-3120, and NUREG/CR-3775 for details.)

The monitoring results are published in NUREG-0837 quarterly. The NRC's monitoring results indicated that there was no statistically significant difference in the 4th quarter, 1995 (October, November, December) compared to previous measurements, and no anomalous indications.

During the previous inspection conducted on July 10-14, 1995, the inspectors determined that the licensee maintained a similar TLD monitoring program that was evaluated as able to produce valid results (Inspection Report No. 50-443/95-03 pertains). The licensee evaluated their off-site TLD measurement results for the period of the first quarter 1989 to the 4th quarter of 1995 and concluded that there were no anomalous measurement results, including the 4th quarter 1995.

The TLD monitoring results by the NRC and the licensee reinforce other evidence that supports that there was no significant radioactive noble gas releases from the Seabrook site during the 4th quarter of 1995.

In-plant Radiation Protection Data

The inspectors reviewed licensee radiation surveys and contamination surveys of the containment and waste processing buildings. No unexpected changes in general area dose rates or contamination levels were found.

The inspectors reviewed over 200 licensee breathing zone and general area air sample results taken within the containment building between November 27, 1995, until November 30, 1995. Most general area air sample results from this time period indicated *particulate* activities of less than 1% of a derived air concentration (DAC)[1]. The maximum general area air sample result was taken during reactor head stand decontamination (conducted mid-morning 11/29/95), and indicated 3.8% of a DAC. Breathing zone air samples generally indicated *particulate* activities of a fraction of a DAC, with the exception of individuals who were working in highly contaminated areas or working on highly contaminated components.

The licensee does not routinely analyze general area and breathing zone air samples for noble gases after a few days into the outage since the noble gas source term is essentially non-existent (as discussed

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[1] Concentration of airborne radioactive material, that if breathed over 2000 hours (i.e., a working year) would result in a committed effective dose equivalent of 5 rems.

previously in Section R8.1, "Noble Gas Source Term"). A tritium air sample taken at 6:15 a.m. on November 29, 1995, indicated an activity of 0.17% DAC on the containment refueling floor.

The inspectors assessed that the licensee's general area and breathing zone air samples results were consistent with normal refueling outage activities and were not indicative of a release of the magnitude needed to cause the indications observed by C-10's radiation monitors.

The inspectors reviewed personnel contaminations, which occurred from November 27-30, 1995, and security logs of individuals entering and leaving containment from 11:00 p.m. on November 28, 1995, until 7:00 a.m. on November 29, 1995. Of the 144 workers who left containment between midnight and 6:00 a.m. on November 29, 1995, there were no personnel contaminations. As noted in Section R8.1, "Computer Codes for Projected Dose Calculation," about 2,230 Ci of Xe-133 would have had to have been released to cause the indications observed on the C-10 radiation monitors. Between midnight and 6:00 a.m. on November 29, 1995, 2 personnel contaminations occurred at the station. Both of the contaminations were shoe contaminations and not indicative of working in a cloud of noble gas of such magnitude. The inspectors noted that noble gas exposure to the activity, needed to affect the C-10 radiation monitors, would have resulted in significant contamination of personnel working in the area. The evidence indicated that personnel contaminations of this type did not occur during this period.

The projected noble gas release needed to indicate 0.1 mR/hr, gamma air dose, at V23 was detailed in Section R8.1, "Computer Codes for Projected Dose Calculations," of this report. Using these results, the inspectors calculated the concentration of Xe-133 within containment needed to indicate 0.1 mR/hr gamma air dose at V23. If it is assumed that the release was from the containment building, the inspectors estimated that the Xe-133 concentration would have been about 300-400 DAC, and the Kr-85 concentration would have been about 7,000-8000 DAC.

The concern regarding both Xe-133 and Kr-85 is submersion dose. As noted previously, dozens of workers were entering and leaving containment, all of whom were required to wear electronic self-readings dosimeters (ESRDs), which would have alarmed if the workers were exposed to this projected concentration of noble gases. No significant personnel exposures or indications of such exposure were determined to have occurred.

The inspectors reviewed data from continuous air monitors (CAMs) located throughout the station. No abnormal readings on these monitors were noted.

About 50 licensee-conducted whole body count results, which had been performed between November 28-30, 1995, were reviewed by the inspectors. The licensee also reviewed over 100 whole body count results. The inspectors noted that no noble gas isotopes were identified.

Accordingly, the inspectors determined that there were no personnel whole body count results that were indicative of any significant noble gas exposure.

Radioactive Waste/Materials Shipments

There were no radioactive material shipments in the early morning of November 29, 1995, which could have caused an indication on C-10 radiation monitors. The following table summarizes shipments of radioactive materials carried out by the licensee around November 29, 1995. The time denoted in the table is the time at which the shipment left Seabrook Station.

Shipment #	Date	Time	Maximum Dose Rate (mR/hr)
95-48	11/28/95	1034	0.6
95-46	11/29/95	1429	<0.1
95-49	11/30/95	1010	0.5
95-45	11/30/95	1117	<0.1

Based on this information, the inspectors determined that shipment of radioactive materials from Seabrook Station could not have been the cause for the indications observed on the C-10 radiation monitors.

Review of Licensee's Investigation Results

The inspectors reviewed the licensee's internal investigation results and interviewed licensee personnel relative to the potential for a noble gas release on November 29, 1995. The investigation team concluded that operating activities at Seabrook could not have caused the indications observed by the C-10 monitoring stations. The inspectors noted that the investigation team's conclusions were independently based on the assessment of monitoring results, plant activities, and plant conditions. The inspectors considered the licensee's investigation method and approach to be thorough, objective, and technically sound.

d. Conclusions

Based on the above findings and observations, the inspectors made the following conclusions.

- There was no noble gas release from the plant during the period between November 17, 1995 to December 5, 1995.
- There was no noble gas source term available in containment or entrained in liquid or gaseous waste processes for the period between November 17, 1995, to December 5, 1995.

- The NRC's independent TLD monitoring results and the licensee's TLD monitoring results for the fourth quarter of 1995 did not indicate any radiation dose that was statistically different from that measured in previous quarters.

- Radiation and contamination surveys, breathing zone and general area air samples, personnel contamination reports, whole body count results, and continuous air monitoring results demonstrated that station personnel had not been exposed to a cloud of noble gas.

- Shipment of radioactive materials or waste from Seabrook Station were of insufficient activity to cause the indications observed on C-10's radiation monitors.

Based on this evidence, the inspectors' concluded that Seabrook Station licensed activities were not the cause of the indications on the C-10 radiation monitors.

In addition, the preliminary evaluation results of C-10's radiation detection instrument data by the Department of Public Health (DPH) staff, Commonwealth of Massachusetts, were reported to the licensee at the time of this inspection. The DPH staff concluded that the Seabrook station was not responsible for the C-10's radiation detection instrument indications, and noted that the indications were inconsistent with typical plume passage characteristics. The DPH observed that the peaks reported by C-10 were sharp and narrow (relative to the time scale), and were not comparable to typical radiation monitor responses to a radioactive gas plume passage. The DPH representatives noted that radioactive plumes would typically be observed by a gradual increase and subsequent decrease in radiation instrument count rates as cloud shine was detected from an approaching and departing plume, respectively. DPH also noted that the monitoring results of other C-10 stations located in the same downwind direction did not indicate elevated indications (e.g., V20, V17, V13, as depicted on Figure 1); and that monitor responses were not consistent relative to the type of radiation detected (i.e., only one of the three stations provided a beta radiation indication).

R8.2 Evaluation of a Potential Contamination of the Marine Environment

a. Background

In a press release on March 13, 1996, the C-10 organization announced the detection of radioisotopes cobalt-58 and cesium-137 in mussels that the organization had placed near the cooling water outfall of Seabrook Station in 1995.

b. Inspection Scope (84570)

The purpose of this inspection activity was to review the licensee radiological environmental monitoring program and review analytical data to determine if the licensee had detected radioactivity in the various

biological media that is sampled to monitor the environmental impact of plant operations. The licensee's Radiological Environmental Monitoring Program (REMP) is periodically inspected by the NRC. The most recent inspections were conducted in July 1995 relative to the environmental program; and in January 1996 relative to the effluent control program. Although a routine inspection of the REMP was recently performed, this inspection was specifically focused to evaluate whether any radioactive contamination in surface water, fish, mussels, lobsters, or sediment had been detected as a result of normal waste effluent released through the plant's discharge outfall. Sampling locations for the various media in the REMP are specified in the Off-site Dose Calculation Manual (ODCM).

This review included the evaluation of radiological environmental monitoring program reports, analytical sampling results, and liquid radioactive waste system processes.

c. Observations and Findings

The licensee's ODCM describes the radioactive liquid effluent pathways that contribute to the total liquid discharge that is processed through the plant's discharge outfall. Figures 3 and 4 illustrate the discharge tunnel systems from the plant to the discharge nozzles. When radioactive liquid discharges from the radioactive liquid storage tank to the tunnel, a massive dilution is effected (a factor of about 2,600) as the result of the circulation cooling water discharge flow stream. Another dilution of a factor of 10 occurs at the discharge nozzles to the ocean.

The licensee has an administrative self-imposed release concentration limit for the gamma emitter cobalt 58 (Co-58), which is less than 1.0E-5 μCi/cc. When the concentration of Co-58 exceeds to the administrative limit, the radioactive liquid is reprocessed to reduce the concentration. The radioactivity of Co-58 in the radioactive liquid storage tank is usually below 1.0E-6 μCi/cc. If radioactive liquid containing the administrative limit of 1.0E-5 μCi/cc, Co-58 was discharged, the expected concentration at the discharge nozzles would be about 3.8E-10 μCi/cc due to the dilution effect.

The licensee's 1994 and 1995 annual reports contained analytical results of gamma emitters, including Co-58, for the surface water, sediment, fish, mussels, and lobsters collected near the discharge nozzles. All results were below the licensee's lower limit of detection (minimum detectable concentrations).

The licensee's Annual Effluent Report indicated that the station typically released Co-58, Co-60, antimony 124 (Sb-124), and Sb-125 in radioactive liquid wastes that were discharged through the cooling water outfall. The radioactivity concentration of these gamma emitters was similar and well below the regulatory limits. Accordingly, if contamination of the surface water, sediment, fish, lobster, and mussels were to occur due to discharge, then Co-58, Co-60, Sb-124, and Sb-125 should be expected to be measured in the media, including biological

media such as mussels. The half-lives of Co-58, Co-60, Sb-124, and Sb-125 are about 71 days, 5.3 years, 60 days, and 2.8 years, respectively. Co-60 and Sb-125, because of their relatively long half-lives would be the radionuclides most likely to be detectable and persist in biological media. However, none of these isotopes were found in concentrations greater than the licensee's lower limit of detection.

d. Conclusions

Based on the above reviews, the inspectors made the following conclusions:

- The surface water, sediment, fish, lobster, and mussels sampled and analyzed by the licensee around the discharge nozzles indicated activities that did not exceed the licensee's lower limits of detection as defined by the ODCM.

- If a contamination was detectable in the sample media, several radionuclides, including Sb-125, would be expected to be measured.

V. Management Meetings

X1 Entrance Meeting Summary

The inspectors presented the inspection scope to members of licensee management at the beginning of the inspection on May 29, 1996. The inspectors asked the licensee whether any of the materials or reports prepared or the data retrieved from archives should be considered proprietary. No proprietary information was identified.

X2 Exit Meeting Summary

The inspectors presented the findings and observations and the preliminary conclusions and results to members of licensee management on May 31, 1996. Representatives from the State of New Hampshire and the Commonwealth of Massachusetts, who observed some or all of the inspection, presented their impressions and findings, and discussed their assessment of the NRC inspection activity. The Commonwealth of Massachusetts representative expressed general agreement with NRC's findings and conclusions.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

B. Cash, Health Physics (HP) Department Supervisor
E. Darois, Senior Health Physicist
W. DiProfio, Unit Director
J. Kwasnik, Senior Radiation Scientist
W. Leland, Manager Chemistry and HP
R. Litman, Chemistry Supervisor
D. Robinson, Senior Chemist
J. Sobotka, NRC Coordinator

NRC

D. Mannai, Resident Inspector, Seabrook Station
J. White, Branch Chief, Radiation Safety Branch

State of New Hampshire

M. Nawoj, Chief, Technical Hazards, Office of Emergency Management
P. Paiton, Supervisor, Department of Public Health

Commonwealth of Massachusetts

T. O'Connel, Radiation Scientist, Department of Public Health

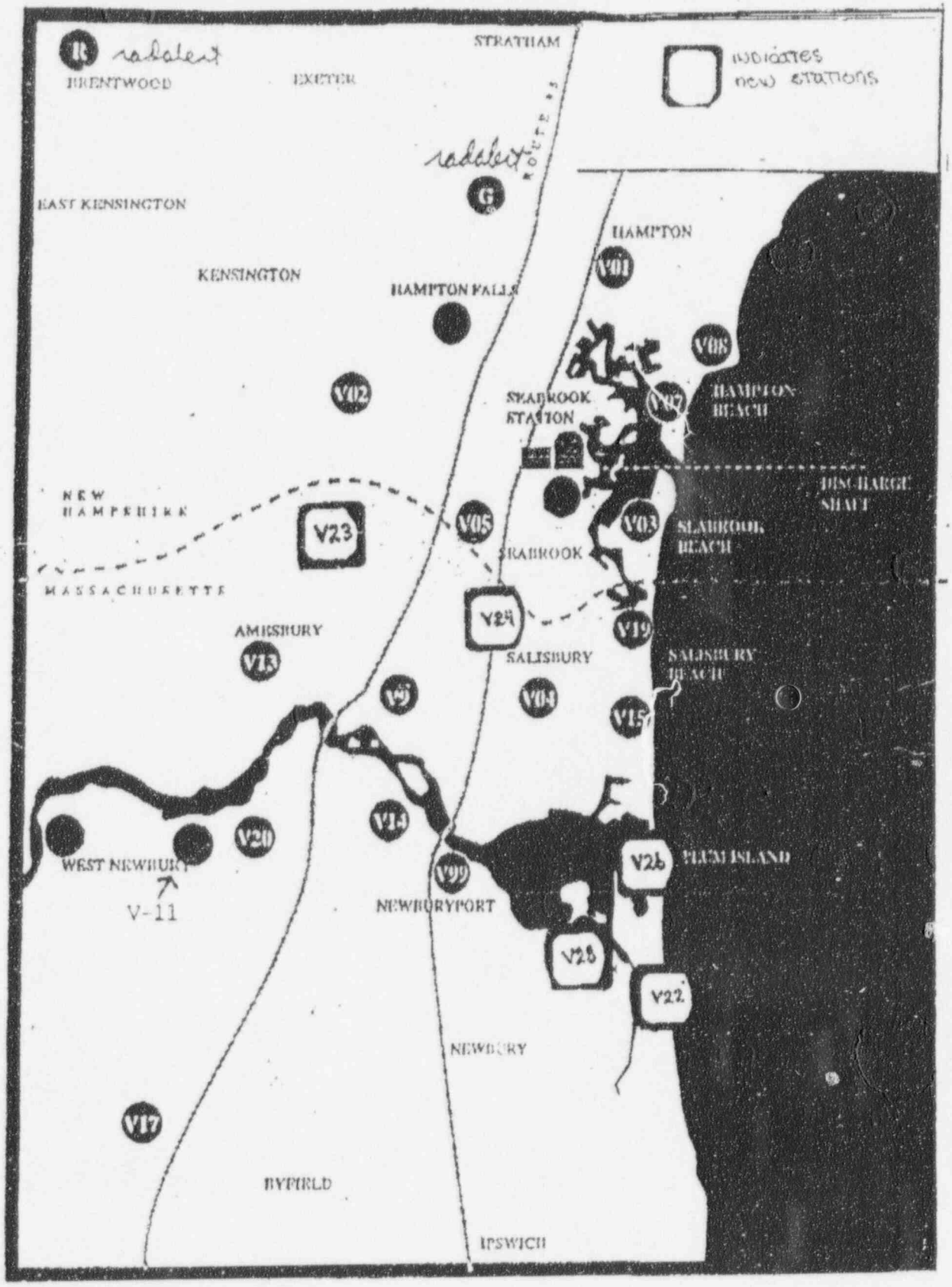


Figure 1. C-10 Radiological Monitoring Network

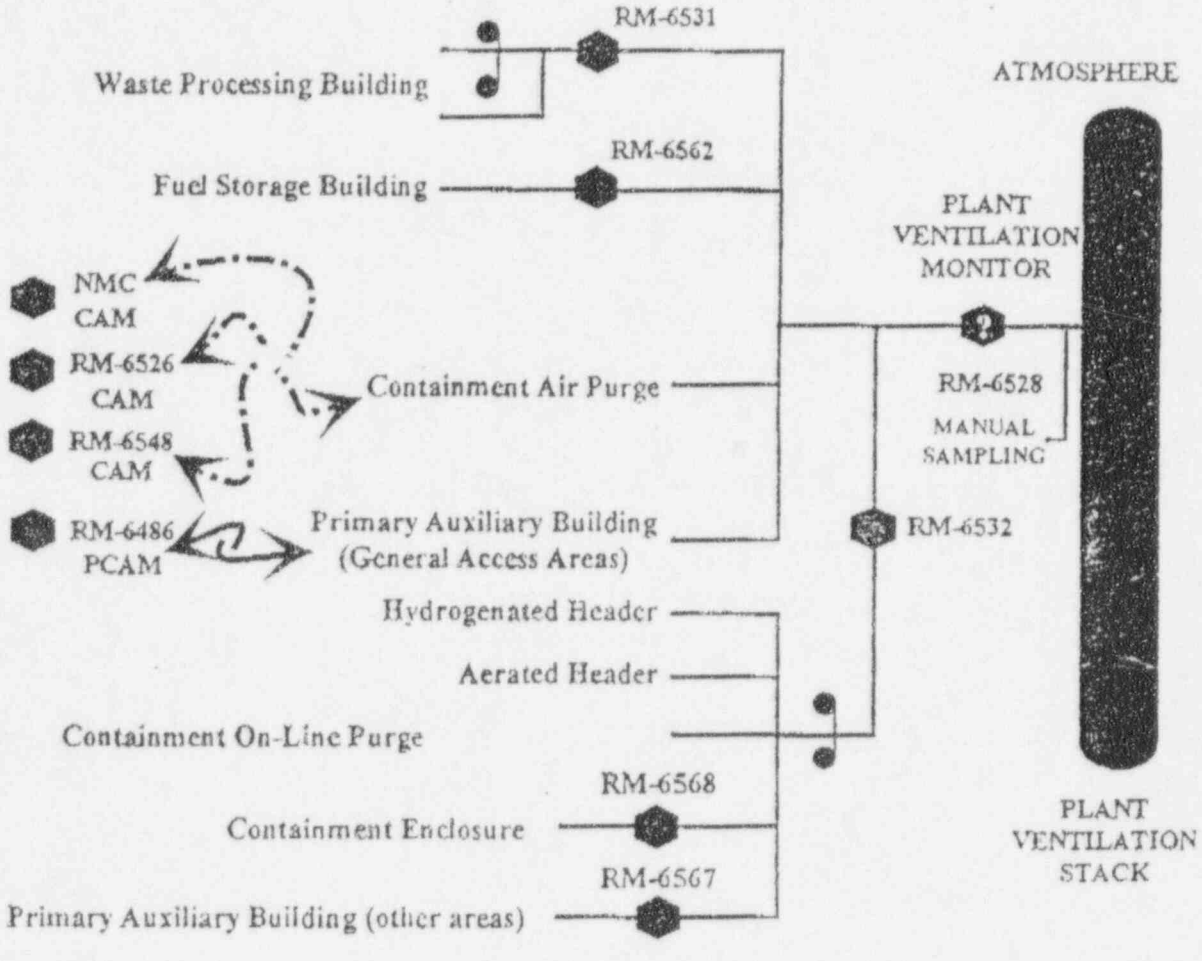


Figure 2. Radioactive Gaseous Effluent Pathways

Figure 3.
Circulating Water Tunnel Layout

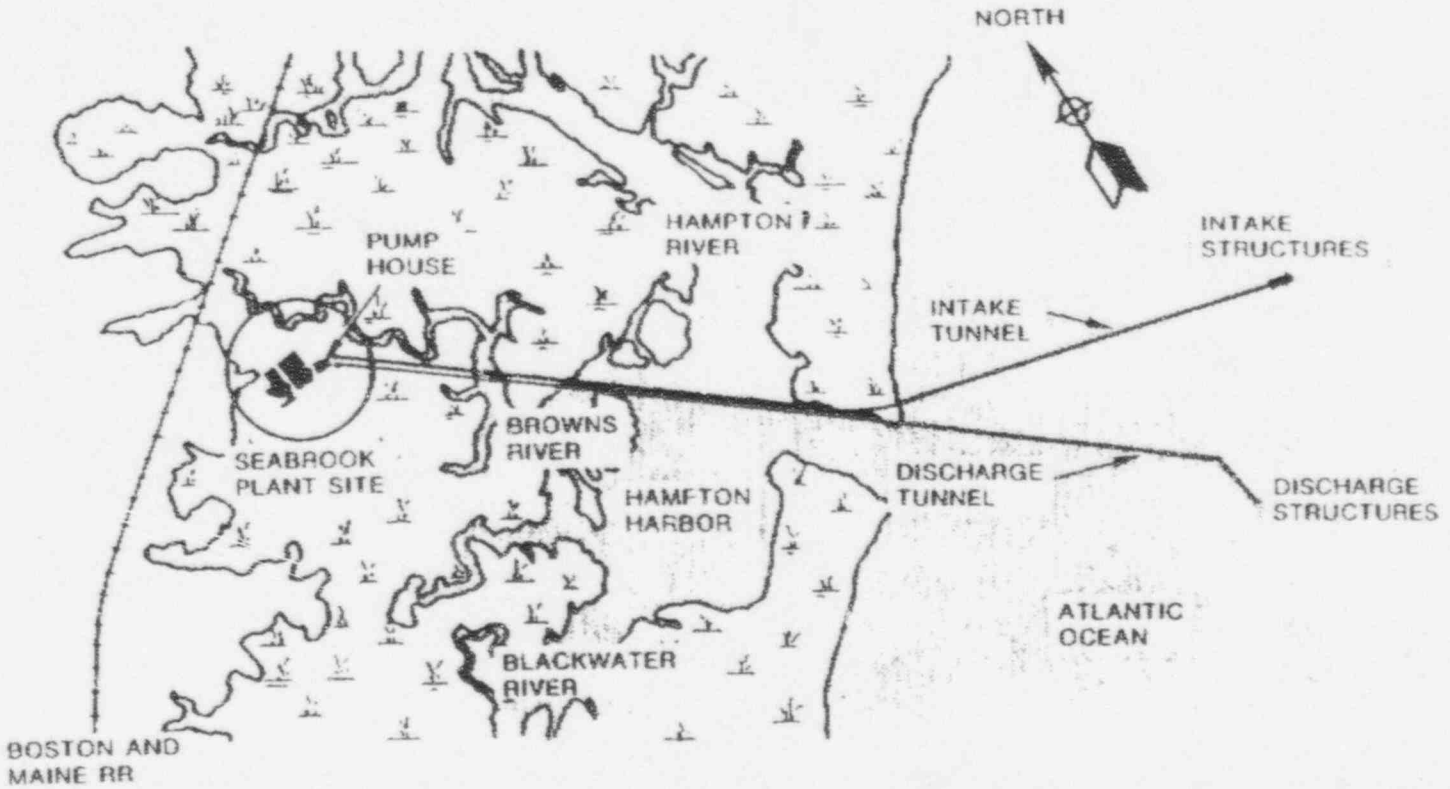
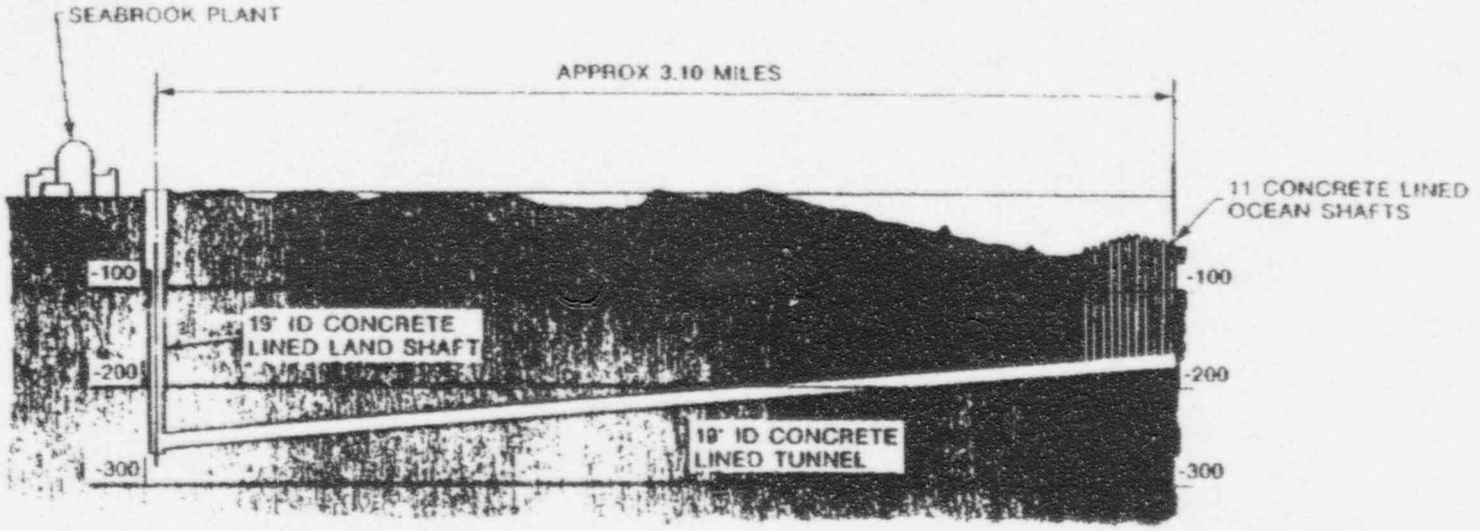


Figure 4
Profile of Discharge Tunnel and Shafts



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

CHAIRMAN

The Honorable William H. Zeliff, Jr.
United States House of Representatives
Washington, D.C. 20515-2901

Dear Congressman Zeliff:

I am responding to your letter of May 13, 1996, in which you forwarded a letter from your constituent, Mr. Thomas J. Sedoric, who lives near the Seabrook Nuclear Station. Mr. Sedoric is concerned about (1) the risk of mishaps at Seabrook in light of aging considerations and Seabrook's relationship with Northeast Utilities (NU) and (2) the U.S. Nuclear Regulatory Commission's (NRC's) long-term plan to ensure that competition in the electric industry does not lead to "cost cutting initiatives" by the plant owner, which would jeopardize public health and safety. In support of his concerns, Mr. Sedoric enclosed an article prepared by the Wall Street Journal on April 18, 1996, discussing the findings in an NRC Office of Investigations report regarding NU's operation of the Millstone Nuclear Plant and a May 10, 1996, article in Foster's Daily Democrat that described an alleged radiation "spike" recorded south of Seabrook by a citizens' organization.

Mr. Sedoric based his concerns about the risk of mishaps at Seabrook on the belief that, as the plant ages, safe operation will require increasingly exemplary management and on his misgivings about the quality of plant construction workmanship and materials. Because NU operates both Seabrook and Millstone, he is further concerned that the Millstone problems were being caused by utility measures to minimize operating costs. In light of the utility's previous violations of regulations, he is concerned that NU will not manage and operate Seabrook in compliance with NRC regulations and procedures.

The NRC is fully aware that emerging competitive market forces within the electric utility industry will pressure electric utility companies to reduce capital and operating costs as part of an overall plan to improve their competitiveness. The NRC recognizes that safe, reliable, and economical performance cannot be attained without adequate financial expenditures to maintain and operate a facility. In addition to its inspection program, through which the NRC monitors a licensee's compliance with regulations, NRC senior management routinely reviews the overall operation of the nuclear facilities and identifies any trends in performance and their potential causes. The NRC also periodically evaluates a licensee's overall performance through a program called the Systematic Assessment of Licensee Performance (SALP). This program provides utilities with NRC's assessment of facility operation and assures appropriate inspections will be scheduled.

In the case of NU's performance at Millstone, the NRC has noted a history of problems and issued a number of enforcement actions between 1986 and 1996. The NRC has recognized that the corrective actions taken by NU in response to these actions have not always prevented the repeat occurrence of violations with similar root causes. The inability of the licensee to attain prompt and lasting corrective actions have led to employee allegations of ongoing safety problems. On the basis of these observations and issues raised about NU's maintenance of its licensing bases, the NRC has required NU to confirm that before the units are returned to operation, the Millstone units would be operated in accordance with the terms and conditions of the facility operating licenses, NRC regulations, and the licensing bases as detailed in the respective Millstone unit's updated final safety analysis report. In addition to this action, the NRC has initiated a number of other inspection and investigative activities to focus on specific areas of concern, such as the handling of employee concerns.

The NRC has been concerned that similar problems could arise with NU's operation of Seabrook. However, to date, the NRC has not identified issues at this facility that could indicate the kind of problems observed at Millstone. A recent integrated performance inspection (Inspection Report No. 50-443/96-80, dated April 3, 1996) found many strengths in the operation of Seabrook. Nonetheless, the NRC will continue to evaluate the corrective actions being taken by NU at Millstone for their applicability at Seabrook.

With regard to Mr. Sedoric's comments regarding plant aging, the NRC has issued a maintenance rule as defined in Section 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," of Title 10 of the Code of Federal Regulations (10 CFR). Licensee compliance with this rule requires the monitoring of the performance or condition of structures, systems, and components against established goals to provide reasonable assurance that the structures, systems, and components are capable of fulfilling their intended functions. The NRC will periodically evaluate the effectiveness of this and other programs throughout the plant life.

As stated in the newspaper article addressing the alleged radiation spike, the NRC staff, in a letter dated April 8, 1996 (enclosed), to Citizens Within a 10-Mile Radius (commonly referred to as "C-10"), responded to the organization's press release dated March 13, 1996. In the news release, C-10 stated that three of its radiation detectors displayed increased radiation levels on November 29, 1995, which it believed might be attributable to Seabrook plant operations. Sometime before that press release, C-10 contacted the NRC and inquired about possible plant releases on November 29, 1995. The NRC staff gave C-10 information about plant conditions that existed and activities that took place at Seabrook on that date. The resident inspector noted that the Seabrook facility was shut down and in an outage condition on that date so that the potential for a high-activity release was limited. The resident inspector also reviewed pertinent licensee records and interviewed members of the plant staff in order to establish plant conditions and determine if any abnormal situation occurred that resulted in unplanned or abnormal release of radioactive effluent on November 29. On the basis of this review and the results of the normal ongoing inspection program at Seabrook, the NRC staff determined that the licensee operated the facility in

determined that the licensee operated the facility in conformance with regulatory requirements and that no known operational event or condition at the plant on November 29, 1995, would have caused the instrument indications reported by C-10.

However, on April 30, 1996, the Attorney General's Office for the Commonwealth of Massachusetts inquired into the basis and conclusions of the NRC review of the alleged offsite radiation situation and asked for an independent review. Although the NRC has found no evidence that suggests that activities at Seabrook were responsible for the indications C-10 reported, an NRC inspector from the NRC's regional office, accompanied by representatives from the State of New Hampshire and the Commonwealth of Massachusetts, performed an independent review on May 29 to 31, 1996. Although the report of this review has not been issued, the NRC has preliminarily determined that the Seabrook facility has been ruled out as a source of the alleged radiation readings. The plant had been shut down for 20 days before these readings such that the fission process to form noble gases was not present and any radioactive gases in the radioactive waste system would have decayed to levels that could not have caused these readings. If these determinations should be modified as the documentation is finalized, the NRC staff will send this information to you.

I assure you that the NRC will maintain a strong regulatory oversight program and will continue to closely monitor NU's performance at Millstone and Seabrook to ensure the continued protection of public health and safety. I also trust that this information will be useful in responding to the concerns raised.

Sincerely,

Shirley Ann Jackson

Enclosure: NRC letter of April 8, 1996

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Rep. Bill Zeliff

TO:

Chairman Jackson

FOR SIGNATURE OF : ** PRI ** CRC NO: 96-0511

Chairman Jackson

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CONCERNS RE SEABROOK

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Milhoan
Thompson
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DATE: 05/16/96

ASSIGNED TO: CONTACT:

NRR Russell

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BY May 24, '96

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