REDACTED VERSION

# REPORT TO NORTHEAST UTILITIES ON THE INVESTIGATION INTO CERTAIN CONCERNS RELATED TO THE MILLSTONE UNIT 1 RADWASTE FACIL'TY

Prepared by:

Kevin P. Gallen
Morgan, Lewis & Bockius LLP
1800 M Street, N.W.
Washington, D.C. 20036
(202) 467-7462

August 1996

WA03/49257.1

Table of Contents

# Report To Northeast Utilities
# On The Investigation Into Certain Concerns
# Related To The
# Millstone Unit 1 Radwaste Facility

## I. EXECUTIVE SUMMARY

This is a report on the independent, non-privileged, fact finding investigation conducted by the law firm of Morgan, Lewis & Bockius LLP (ML&B) into concerns raised in NRC Inspection Report No. 96-03, dated February 13, 1996, regarding the quality of the information provided by Northeast Utilities (NU) and its employees to NRC inspectors concerning conditions at the Millstone Unit 1 (Millstone 1 or Unit 1) Radwaste Facility during the period from 1989-1995, and NU's related concerns about the adequacy of NU's internal communications with respect to the conditions in the Radwaste Facility during this period and the failure of NU's management to take aggressive and timely action to address these conditions.

This investigation included (a) a meeting with the three NRC inspectors who expressed concerns about the quality of the information provided by NU and its employees with respect to the Radwaste Facility, (b) interviews of over thirty different NU employees who were knowledgeable about conditions at the Millstone 1 Radwaste Facility and/or communicated with NRC inspectors and NU managers about the conditions at the Radwaste Facility during the period from 1988 to 1995, (c) a tour of the Radwaste Facility and the remediation efforts that are currently underway at the facility, and (d) a detailed review of the relevant

correspondence, records, reports, Radiation Work Permits, radiological surveys, videotapes, photographs, and other documents and materials pertaining to the conditions at the Radwaste Facility and NU's internal and external communications related to the Radwaste Facility during this period.

It should be cautioned that this investigation was hampered by the number of years that have elapsed since many of the relevant events took place, the conflicting recollections of the NRC inspectors and NU employees about conversations related to the Radwaste Facility -- some of which may have occurred as long as seven years ago, and a lack of "hard" evidence in the form of written reports, meeting minutes, logbook entries or other documents corroborating these conversations and other oral communications related to the Radwaste Facility.

Nevertheless, ML&B was able to review sufficient documentation and interview enough individuals with firsthand knowledge of the actual conditions in the Radwaste Facility, NU's internal communications about these conditions, and/or these conversations with the NRC inspectors to confirm that there was a series of miscommunications and misunderstandings between NU employees and NRC inspectors over the years concerning the conditions at the Radwaste Facility, particularly with respect to the status of the tank rooms in the lower level of the facility that were bricked-up and screened-off as high radiation areas.

However, ML&B does not believe that any NU employee knowingly provided any inaccurate information to the NRC or deliberately withheld any

material information concerning the conditions in the Radwaste Facility from the NRC. Rather, ML&B has concluded that these miscommunications and misunderstandings were generally attributable to one or more of the following factors:

1. Incomplete and/or inaccurate knowledge about the actual conditions in the tank rooms and other inaccessible areas in the Radwaste Facility on the part of the NU employees who engaged in these conversations with the NRC inspectors at the time these conversations occurred;

2. Differing interpretations of the significance of the conditions discovered at the Nine Mile 1 Radwaste Facility in 1989, compared with the conditions which existed at Millstone 1, by the NRC inspectors and the NU employees;

3. The general belief by most of the NU employees that (a) the tank rooms and other inaccessible areas were in a "controlled" status and did not pose a hazard to the health and safety of workers or the general public under normal operating conditions, (b) entry into these rooms and areas for non-essential operational and maintenance purposes would "violate" ALARA goals and requirements; and (c) there were no leaking tanks or pipes in any of the tank rooms during 1990-1994;

4. The assumption by many NU employees that the NRC inspectors (a) were generally aware of the conditions in the tank rooms and other

inaccessible areas and (b) were primarily interested in changes which had occurred in the condition of these rooms and areas since the preceding inspection; and

5. The apparent tendency of the NU employees to narrowly interpret inquiries from NRC inspectors about the conditions in any given area of the Radwaste Facility and to provide specific information in response to these inquiries, but not "volunteer" additional information concerning any other related areas or topics.

With respect to NU's related concerns about internal miscommunications at NU concerning the conditions in the Radwaste Facility and the failure of NU's management to take timely and aggressive corrective action to address the deteriorating conditions in the Radwaste Facility, we believe that these problems resulted from a combination of the factors described above and an array of additional factors, events, attitudes, and circumstances, rather than one single factor or the actions or inaction of any single individual or department.

These additional factors and circumstances included (a) the turnover of personnel in several key positions at Unit 1, (b) management preoccupation with other issues, such as operator requalification, (c) lack of effective coordination among various departments at Unit 1 on radwaste activities, (d) the apparently successful implementation of some equipment modifications and improved operating procedures which eliminated the need to enter the tank rooms on a regular basis for operational purposes during 1990-94, (e) an overly zealous interpretation of ALARA requirements, (f) reduced funding levels for

decontamination and cleanup projects, (g) overemphasis on meeting annual radiation exposure goals and setting an industry-wide BWR dose record, (h) a tendency to attempt to "analyze away" problems in the Radwaste Facility rather than actually fix them, (i) lack of "follow through" in actually completing radwaste projects that were planned and approved, and (j) failure to recognize and address the potential generic implications of individual equipment problems which were identified in the Radwaste Facility over the years.

These factors and circumstances help to explain why management at both Unit 1 and Millstone Station failed to adequately address and resolve the deteriorating conditions in the Radwaste Facility during the period from 1990 to 1995. However, these factors and circumstances do not provide an excuse for this failure.

While ML&B did not substantiate any deliberate misconduct or wrongdoing on the part of any NU employee in connection with this matter, the fact remains that management personnel at various levels and in various departments throughout the Unit and the Station knew or should have known about the deteriorating conditions in the Radwaste Facility, particularly the leak that was discovered in the Filter Sludge Tank in November, 1994, and failed to take whatever actions were required to ensure that these conditions were promptly and properly corrected.

## II. INTRODUCTION

NRC Inspection Report No. 50-245/96-03, identified a potential violation related to the condition of the Millstone Unit 1 Radwaste Facility.[1/] The inspection Report cited the long-standing leakage of certain equipment in this facility, the deposit of radioactive waste materials on the floors in certain tank rooms in the facility, and the poor material conditions in the facility.[2/] In the cover letter which accompanied this Inspection Report, the NRC expressed concern about the long-term nature of the problem, the failure of NU management to take appropriate corrective action, and "the quality of the information" regarding the con. .tion of the Radwaste Facility which the NRC had received "in response to verbal inquiries from various inspectors in the period 1990-1992."[3/] Inspection Report No. 96-03 provides additional details concerning NRC's concerns about the "quality of the information" issue. The report states:

> Discussions held by members of the NRC Region I staff also indicate that during the period 1990-1992, several discussions were held between a region-based health physics inspector and then-members of the Unit 1 technical staff, and between a resident inspector and the then-Unit 1 Radiation Protection

---

1/ NRC Inspection Report No.50-245/96-03, cover letter at 1 (Feb. 15, 1996). (NRC Doc. 34). The inspection reports and other NRC documents that ML&B reviewed and relied upon in the preparation of this report are listed in chronological order in an index in Appendix C of this report. References in this report to these NRC documents are cited as "NRC Doc. ____" based upon this index.

2/ Id. at 1.

3/ Id. at 1.

> Supervisor regarding the material conditions of the Unit 1 radwaste facility. These inquiries were made in light of a previous event that had occurred in the radwaste building at another nuclear facility in 1989. During these discussions, and in response to verbal inquiries, the licensee representatives did not indicate that the conditions in the facility had significantly degraded, or that there were waste materials in the form of resin leaks, sludge, or evaporator concentrates on the floor of the facility.[4/]

Shortly after receiving this inspection report, NU retained ML&B to perform an independent non-privileged investigation to address the concerns in Inspection Report No. 96-03 regarding the completeness and accuracy of the information which NU and its employees provided to the NRC.[5/]

---

4/ Id. at Insp. Report p. 3.

5/ A copy of the retention letter and ML&B's proposed investigation plan are contained in Appendix A to this report. NU also established a Root Cause Evaluation Team to address NRC's related concerns about the long term nature of the problems in the Radwaste Facility and management's failure to take effective corrective action. This Team produced a Root Cause Evaluation Report on the Degraded Material Condition of the Liquid Radwaste System at Millstone Unit 1 (March 8, 1996). (NU Doc 193). The NU documents that ML&B reviewed and relied upon in the preparation of the ML&B report are listed in chronological order in an index in Appendix C of this report. References in the ML&B report to these NU documents are cited as "NU Doc. ___" based upon this index. Upon the completion of the Root Cause Evaluation, the scope of ML&B's investigation was expanded by NU to include a more detailed review of NU's related concerns about (a) the quality of the internal, as well as external, communications at NU with respect to conditions in the Radwaste Facility and (b) management's failure to take appropriate action to address the deteriorating conditions in the Radwaste Facility, in light of the potential impact that these issues could have had on the quality of NU's communications with the NRC.

As an NRC licensee, NU has an obligation to ensure that information provided to the NRC by NU and its employees, and information required to be maintained by NU, is complete and accurate in all material respects. 10 C.F.R. § 50.9(a). In addition, NU has an obligation to notify the NRC of any information which NU identifies as having a significant implication for public health and safety or common defense and security. 10 C.F.R. § 50.9(b).[8/]

Under 10 C.F.R. § 50.5, the deliberate misconduct or "wrongdoer" rule, NRC licensees and their employees are prohibited from deliberately engaging in misconduct that causes a violation of an NRC rule, regulation, order, or license, including the deliberate submittal of any information to the NRC that the licensee or the employee "knows to be incomplete or inaccurate in some respect material to the NRC."

The focal point of ML&B's investigation was to determine whether NU, or any of its employees, knowingly and willingly provided any incomplete or inaccurate information to the NRC, or deliberately withheld any material

---

8/ In addition to the general requirements imposed under 10 C.F.R. § 50.9, NU is also subject to a variety of additional NRC reporting requirements applicable to specific areas or subjects. See e.g. 10 C.F.R. Part 20 (reporting of incidents involving radiation exposures, radiation levels, and releases of radioactive materials in excess of specified limits); 10 C.F.R. Part 21 (reporting of defects in basic components or failures to comply with NRC requirements that could create a "substantial safety hazard," i.e., a loss of safety function resulting in a major reduction in protection to public health and safety); 10 C.F.R. §§ 50.72,73 (reporting of certain operational events and plant conditions); 10 C.F.R. § 50.36(c)(7) (technical specification requirements for reporting certain operating events exceeding specified safety limits and settings).

information from the NRC, concerning the conditions in the Radwaste Facility in violation of 10 C.F.R. §§ 50.9 and 50.5.

In conducting this investigation, ML&B was guided by NRC's definition of "wrongdoing" as an act:

> In which an NRC requirement has been breached with some intent or purpose to commit the breach, rather than through mistake or error. As defined in NRC Manual Chapter 0517, wrongdoing consists of both intentional violations of NRC requirements and violations resulting from careless disregard of or reckless indifference to regulatory requirements amounting to intent.[7/]

In weighing the evidence assembled in this investigation, ML&B used the preponderance of evidence standard employed by the NRC in its wrongdoing investigations, as follows:

> A reasonable basis for belief of wrongdoing exists when, from the circumstances surrounding it, a violation of a regulatory requirement appears more likely to have been intentional or to have resulted from careless disregard or reckless indifference than from error or oversight.[8/]

---

7/ Investigative Procedure Manual. Office of Investigations, U.S. NRC at 1-4. See also NRC Enforcement Policy, 60 Fed. Reg. 34380,34385 (June 30, 1995); NUREG/BR-0195, NRC Enforcement Manual, Rev. 1, § 7.2.

8/ Id.

## III. SPECIFIC NRC CONCERNS ABOUT THE QUALITY OF THE INFORMATION PROVIDED BY NU AND ITS EMPLOYEES

After NU retained ML&B to perform this investigation, NRC agreed to arrange a meeting between an attorney from ML&B and the three principal NRC inspectors who participated in discussions with NU personnel about conditions in the Radwaste Facility in order to enable ML&B to develop a better understanding of the nature and extent of NRC's concerns and obtain additional information about these discussions. This meeting was held in the NRC Region I Headquarters in King of Prussia, Pennsylvania on Wednesday, February 18, 1996. The three NRC inspectors who participated in this meeting were: _____

_____

_____

_____

_____

_____. The principal concerns of each of these inspectors are summarized below.

A. _____

_____ principal concerns involve a discussion that he recalls having with _____

at Unit 1, on a tour of the Radwaste Facility which occurred shortly after ___

_____ was aware of the degraded conditions which had existed at the Nine Mile 1 Radwaste

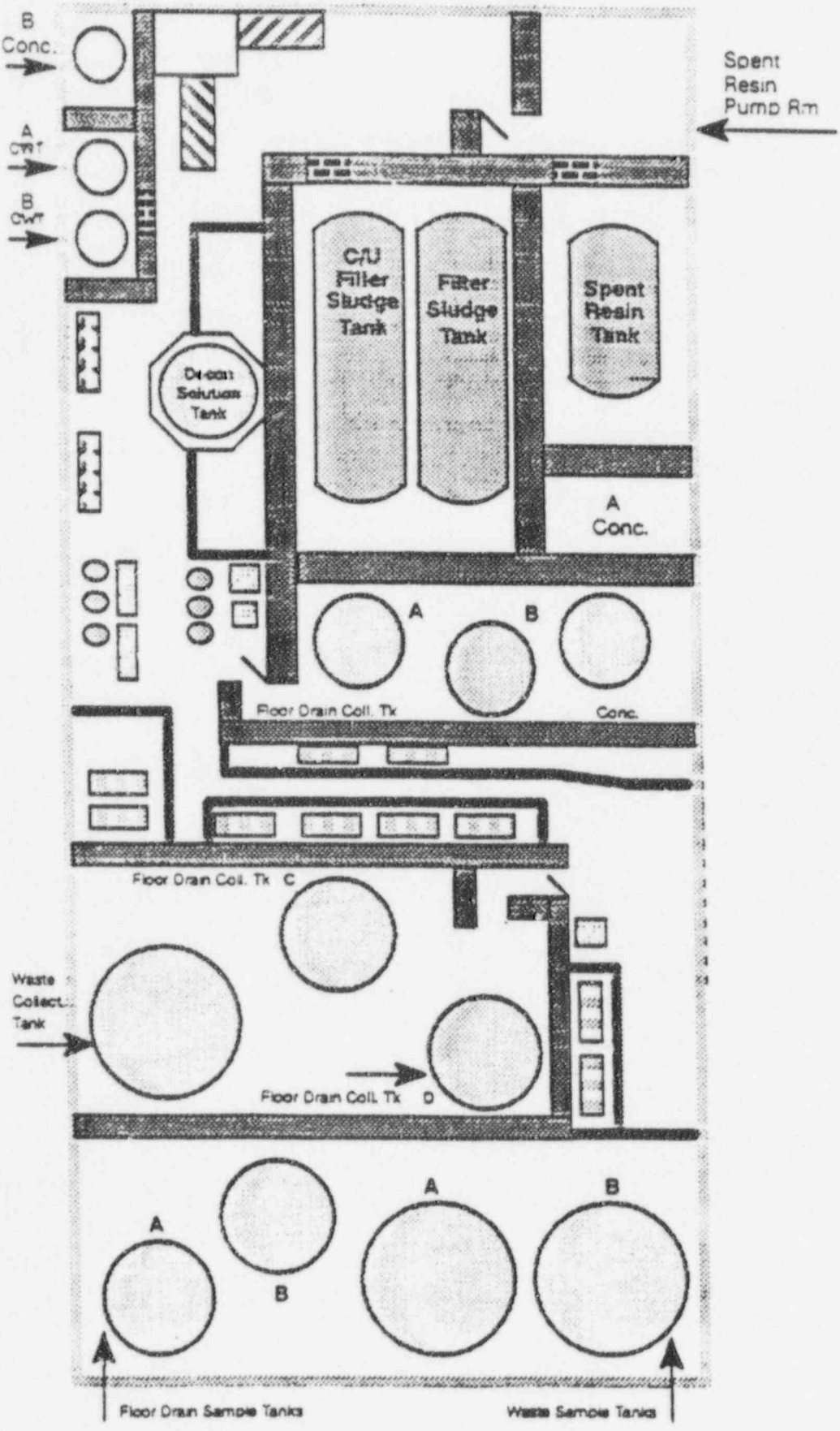
Facility in 1989 in which INPO discovered barrels of radioactive waste floating in tank rooms that had been sealed off.[2/] _____ recalls asking _____ whether "any Nine Mile 1" conditions existed at Millstone 1, particularly in the tank rooms in the lower level of the Radwaste Facility which were bricked-up and screened off as high radiation areas and inaccessible under normal operating conditions. A schematic drawing showing the layout of the lower level, the various tank rooms, and the location of the bricked-up walls and high radiation screens is provided in Figure 1.

_____ recalls that _____ indicated that (a) there was no spent resin on the floor of any of the tank rooms or degraded conditions in the Radwaste Facility other than the areas where cleanup work was already in progress (e.g., the tank room containing the C CWT Tank), (b) these tank rooms were inaccessible for ALARA reasons, but that HP personnel went into these rooms on "an annual basis" to conduct radiological surveys, (c) the conditions in the tank rooms were "acceptable," and (d) Unit 1 did not have any "Nine Mile 1" problems. _____ emphasized that he considered the conditions in the tank rooms at Unit 1 prior to the recent remediation project to be "as bad as" the Nine Mile 1 conditions.

---

2/ NRC subsequently issued an Inspection Report and NOV to Niagara Mohawk Power Corporation in connection with this incident. See NRC Inspection Report No. 50-220/89-90 (Oct. 2, 1989) and Notice of Violation (Feb. 23, 1990). (NRC Doc. 5).

Lower Level Rad Waste. −20′ elev.



B. _____

_____ principal concerns involve (a) a conversation he had with _____, during a walkdown of the lower level of the Radwaste Facility _____,and (b) NU's failure to apprise NRC of the deteriorating conditions in the Radwaste Facility and take appropriate corrective actions, particularly after the leaking tank was discovered in the Filter Sludge Tank room in November 1994.

During the _____ walkdown, _____ recalled asking _____ about the radiation warning signs posted around the Floor Drain Collector Tank room. See Figure 1. _____ recalled that _____ said that this room also contained the C Concentrated Waste Tank (the C CWT Tank) and that the C CWT Tank was a processing vessel that was no longer in use and was "probably full" of radioactive sludge. _____ inquiries about the status of the C CWT Tank ultimately led to the NU commitment to clean out this tank -- an action item that was completed in early 1993.[10/] _____ indicated that, at the time, he was not aware of the existence of two other CWT Tanks (i.e., the "A and B CWT" or "A and B Day" Tanks) which were also no longer in service and were located in a bricked-up room located elsewhere in the lower level. See Figure 1. Since NU was aware of his concern about the C CWT Tank, _____cannot understand

_____

10/ See NRC Inspection Report No. 50-245/90-15. (Sept. 5, 1990); See also NRC Inspection Reports Nos. 50-245/91-07 (May 2, 1991); 50-245/91-22 (Oct. 2, 1991); 50-245/92-26 (Nov. 27, 1992); Nos. 50-245/93-12 (Apr. 23, 1993). (NRC Docs. 14, 15, 17, 21, 23).

why _____ or anyone else at NU never informed him or any other NRC inspector about the status of the A and B CWT Tanks and made a similar commitment to clean out these tanks.

When _____ returned to Millstone _____ to inspect the Radwaste Facility,[11/] he observed additional deterioration in the accessible areas on the lower level and felt that little additional progress had been made in the cleanup of the facility, other than the clean out of the C CWT Tank. He was particularly concerned about NU's continued use of temporary flexible hoses for pumping sludge and spent resin, and the condition of the "pipe chases" above the Floor Drain Collector Tanks and Floor Drain Sample Tanks.

_____recalled that _____,

_____, _____, _____ _____ who worked in the Unit 1 Radwaste Facility, and _____, _____, all expressed concerns about the lack of progress that had been made on the cleanup effort over the intervening five year period. During this inspection, _____ was shown a videotape taken in November, 1994 of a leaking tank in the Filter Sludge Tank room. _____does not understand why an Adverse Condition Report (ACR) for this leak was not prepared at that time, why the NRC was not immediately informed of this leak and/or the videotape in November, 1994, and why NU failed to take aggressive and timely

_____

11/ See _____.

corrective action to remedy the deteriorating conditions in the Radwaste Facility, particularly after this leak was discovered in November 1994.

C. _____

_____ cannot recall any specific conversation or meeting with NU personnel in which anyone provided him with inaccurate information about the condition of the Radwaste Facility or failed to provide him with complete and accurate information. Based on his awareness of the Nine Mile 1 conditions and a checklist that he used during his inspections to determine whether any Nine Mile 1 conditions existed at any other nuclear plant that he inspected, however, he believes that he was misled about the condition of the tank rooms.

_____ believes that he asked numerous NU personnel during the course of his HP inspections at Millstone over the period _____ whether there were any leaking pipes or tanks, degraded systems, or spilled resin or sludge on the floor anywhere in the Radwaste Facility.[12/] He recalls that the answer he uniformally received from everyone at NU was "No." _____ believes that he must have discussed this issue with _____, _____ _____ with whom he had the most contact during his inspections. He may also have discussed this issue with _____, the _____

12/ See _____ _____ _____ _____ _____.

_____, or _____, _____.

He does not recall discussing this issue with _____ when he was either

_____

_____, but he regarded _____as being less "forthcoming" in his discussions about HP matters than other NU personnel with whom he regularly interacted. _____ believes that this issue may even have been discussed in general terms at his entrance and exit meetings with Unit and Station management, including _____.

_____stated that during his inspections he also reviewed, and relied upon, the most recent radiological surveys and Radiation Work Permits (RWP's) for contaminated areas, the relevant Plant Incident Reports/Plant Information Reports (PIR's) and ACR's, the Millstone Unit 1 System Familiarization Manual used for outages,[13/] and the internal NU QA/QC reports on the Radwaste and HP programs. He stated that these documents did not contain any indication of the deteriorating conditions in the tank rooms. He was also concerned that (a) the November, 1994 videotape of the leaking tank in the Filter Sludge Tank room was never made available to him during the inspections that he conducted during

---

13/ Chapter 8 of the Millstone Unit 1 Systems Familiarization Manual provides a concise description of the liquid radwaste systems, the manner in which these systems are operated, the overall layout of the Radwaste Facility, and the basic radiological status of various rooms and areas in the facility. A copy of this chapter of the manual is included in Appendix B of this report.

the period _____, ____[14] and (b) information about the actual conditions in the tank rooms was generally withheld from him throughout the entire period from _____.

_____

14/ _____
_____.

## IV. SCOPE OF INVESTIGATION

Once ML&B had a better understanding of NRC's specific concerns about the quality of the information that NU had provided to the NRC, ML&B modified its investigation plan accordingly to address all of these concerns, as well as NU's related concerns about the quality of NU's internal communications at Millstone with respect to the conditions at the Unit 1 Radwaste Facility and management actions to address these conditions. The final investigation plan included (a) a document search to identify and review material documentation related to the condition of the Unit 1 Radwaste Facility during the period from 1985-1995, including NU's written communications with the NRC and internal communications on this topic, (b) fact finding interviews with the NU personnel mentioned in the meeting with the NRC inspectors, other NU personnel with firsthand knowledge of the conditions in the Radwaste Facility and/or significant events related to this facility during the period from 1985-1995, and other management personnel from Unit 1 and Millstone Station with responsibilities in this area, and (c) a tour of the Radwaste Facility and a review of various videotapes and photographs which had been taken of this facility during the period from 1985-1995.

The document review included a review of the NRC Inspection Reports and SALP Reports related to the Radwaste Facility and other documents referenced in the meeting with the NRC inspectors, docketed correspondence with the NRC related to the Radwaste Facility, the RWP's and radiological surveys

related to the entries into the tank rooms and other unaccessible areas in the Radwaste Facility, relevant reports prepared by the Radwaste Remediation Project Team and the Root Cause Evaluation Team and the documents referenced therein, all internal NU "controlled routings" related to the Unit 1 Radwaste Facility, the personal files of individual interviewees related to the Radwaste Facility and other pertinent documents and records. Indices of the documents and other evidentiary materials that were reviewed by ML&B in connection with this investigation, including a brief description of each document or item, are contained in Appendix C of this report.[15/] Copies of the actual documents and other evidentiary materials are contained in a separate supplement to this report.

The names of the principal NU employees who were personally interviewed by ML&B and the positions that they held at NU at the time of their involvement with the matters under investigation are as follows:

---

15/ The document indices divide the documents into three basic categories: (1) NRC Documents containing NRC inspection reports, excerpts from SALP reports, and other NRC correspondence, (2) NU Documents containing NU correspondence, internal memoranda, RWPs, and other records and reports, and (3) ACR's and PIR's related to the Radwaste Facility. These indices list these documents in chronological order and provide a brief description of each document. References in this report to these documents are cited as "NRC Doc. ___," "NU Doc. ___," or "ACR/PIR ____," respectively, based on the indices in Appendix C.

| Name | Position |
| --- | --- |

Supplemental telephone interviews of these and other NU personnel were also conducted to obtain additional information and clarify certain issues as the investigation progressed.[16/] A summary of each interview conducted by ML&B is contained in a separate supplement to this report.[17/]

---

16/ The names and positions of the additional individuals who were interviewed by telephone are as follows:

| Name | Position |
|---|---|

17/ A draft summary of each employee's interview was prepared by ML&B and provided to that employee for his or her review in order to make any necessary corrections or clarifications. The final version of the interview summaries incorporate these corrections and clarifications. No significant substantive changes were made to any of the interview summaries in connection with this review process. The summaries of the supplemental interviews of the individual NU employees who had been interviewed previously are included as an addendum to the original interview summaries for these individuals. References to all interview summaries in this report are cited as "Last Name, ¶ ____".

Based upon these interviews and our document review,[18] ML&B was able to draw certain conclusions with respect to the specific concerns raised by the three NRC inspectors concerning the quality of the information which was provided to the NRC with respect to the conditions at the Unit 1 Radwaste Facility, as well as NU's related concerns about internal communications related to these conditions and management actions to address these conditions, particularly after the leak was discovered in the Filter Sludge Tank in November 1994. ML&B's findings and conclusions with respect to all of these concerns are discussed in the next section of this report.

---

[18] There are additional current and former NU employees who apparently have first-hand knowledge of issues related to this investigation. However, after reviewing all of the relevant documentation and completing the interviews of the individuals identified above, we concluded that we had a sufficient understanding of the underlying issues and had assembled enough information to enable us to make the necessary findings and conclusions about this matter and prepare this report.

## V. RESULTS OF INVESTIGATION

### A. SUMMARY OF MAJOR EVENTS RELATED TO THE CONDITION OF THE UNIT 1 RADWASTE FACILITY

In order to place the concerns about the quality of the internal and external communications related to the conditions at the Radwaste Facility in their proper context and systematically address these concerns, it is helpful to have a basic understanding of the operating characteristics of the liquid radwaste systems at Unit 1, the layout of the tank rooms in the lower level of the Radwaste Facility, and the major operational events which occurred at the Radwaste Facility over the past ten years. Appendix B contains a concise description of the Radwaste Facility itself and the liquid radwaste systems at Unit 1. The layout of the tank rooms in the lower level is shown on Figure 1.

The major events related to the conditions at the Unit 1 Radwaste Facility for purposes of this investigation are summarized on the chronology shown in Figure 2. During the 1970's and early 1980's, Millstone experienced numerous operational difficulties with the concentrator/evaporator system that had originally been installed at Unit 1 for the processing of certain types of liquid radwaste.[19/] This system was replaced by a skid-mounted ChemNuclear system in the

---

19/ _____. See also IE Information Notice 79-07, Rupture of Radwaste Tanks (Mar. 23, 1979) (NRC Doc. 1); Letter from _____ to _____ (Mar. 29, 1979) (NU Doc. 2).

# MILLSTONE UNIT 1
# RADWASTE FACILITY INVESTIGATION

## Chronology of Major Events

| | |
|---|---|
| 1981 | Last Entry into A Concentrator Room for Operational Purposes |
| 1983 | Last Entry into A and B CWT/Day Tank Room Prior to 1995 |
| 1988 | First Video of Filter Sludge Tank Room, Spent Resin Tank Room, and Floor Drain Collector Tank Room Showing Water, Sludge, Resin, and Debris on Floors |
| 1989 | Last Entry into Filter Sludge Tank Room Prior to Discovery of Leak in November 1994 |
| 1989 | New Level Instrumentation Installed on Spent Resin Tank |
| 1989 | Last Survey of A Concentrator Room Prior to 1995 |
| 1990 | Last Entry into Spent Resin Tank Room Prior to 1995 |
| 1990 | Last Survey of Hopper, Centrifuge and Measuring Rooms Prior to 1995 |
| 1991 | C CWT Tank Clean-Out Commences |
| 1992/93 | Unit 1 Sets Low Dose Records for BWR's |
| 1993 | C CWT Tank Clean-Out Closed out by NRC |
| 1993/94 | Photographs of Deteriorating Conditions in Pipe Chases |
| 1993 | New Pump/Hose Configuration Used to Unclog Hoses and Avoid Entry into Filter Sludge Tank Room |
| 1994 | Leak Detected in Filter Sludge Tank<br>Second Video of Filter Sludge Tank Room Showing Active Leak in Tank and Sludge and Debris on Floor |
| 1995 | Proposed Repairs to Filter Sludge Tank Deferred |
| 1995 | Radwaste Remediation Project Commences<br>Third Video of A and B Day Tank Room, A Concentrator Room, Filter Sludge Tank Room, and Spent Resin Tank Room Showing Resin and Sludge Piles, Leaks and Debris |

1980's.[20] The collection and processing tanks associated with the original system, including the A Concentrator and A and B CWT/Day tanks, were simply abandoned in place and sealed-off in the early 1980's.[21] Some other rooms in the solid radwaste portion of the facility (the hopper room, centrifuge room, and measurement room) were no longer required and also were sealed-off.[22] The Filter Sludge Tank room and the Spent Resin Tank room remained in use throughout the period from 1985-1995.[23]

The tank rooms with high radiation levels (e.g., the A and B Day Tank room, the Filter Sludge Tank room, and the Spent Resin Tank room) were all bricked-off, covered with bolted radiation protection screens and posted as high radiation areas.[24] Other high radiation areas (e.g., the A Concentrator Tank room, the Floor Drain Collector Tank room containing the C CWT Tank, and the hopper, centrifuge and measuring rooms) were also gated, locked-off, or otherwise

---

20/ _____. See also Letter from _____ to NRC (May 2, 1980) (NU Doc. 5); NRC Health Physics Appraisal (Mar. 24, 1981) (NU Doc. 7).

21/ _____.

22/ _____

23/ _____, NRC Inspection Report No. 50-245/95-35 (Sept. 11, 1995) (NRC Doc. 28).

24/ See _____, See also ALARA Design Review and PDCR Evaluation for High Rad Protection Screens (NU Docs. 70, 71). See also NRC SALP Report No. 88-99 (Oct. 2, 1989) concerning need for additional high radiation area gates and access controls at Unit 1 (NRC Doc. 4).

inaccessible and posted as high radiation areas.[25] Access to all of these rooms was strictly controlled.[26] During the 1980's, a number of projects were initiated to cleanup the common areas in the Radwaste Facility that were accessible under normal operating conditions and considerable progress was apparently made in this area.[27] Nevertheless, Unit 1 continued to experience operational difficulties with the filter sludge and spent resin processing systems.[28]

There were several entries into the Filter Sludge Tank room in the early and mid-1980's to unclog the hoses in this room.[29] An entry into this room, and several other tank rooms in the lower level, was also made in January 1988 to assess the radiological conditions in the rooms and evaluate the feasibility of using robotic equipment to cleanup these rooms.[30] A videotape (the "1988 Videotape")

---

25/ See _____. See also NRC Doc. 4.

26/ See _____, _____.

27/ _____. A special Radwaste Tank Force was also formed to upgrade the radwaste systems from an operational standpoint. (NU Docs. 12-15). See NU Docs. 22, 30, 46, 47; See also NRC Inspection Report No. 50-245/89-09 (May 19, 1989) and NRC SALP Report No. 88-99 (Oct. 2, 1989) noting improvements in decontamination activities and housekeeping in radwaste area at Unit 1 (NRC Docs. 2, 5).

28/ _____; Memorandum from ____ to ____ (Dec. 30, 1987) (NU Doc. 22).

29/ _____.

30/ _____, RWP (Jan. 1988) (NU Doc. 25).

of these tank rooms was taken in connection with this entry.[31] This 1988 videotape indicates that there is sludge, water, and debris on the floor of the Filter Sludge Tank room, dried resin and debris on the floor of the Spent Resin Tank room, and sludge and debris on the floor of the Floor Drain Collector Tank room. This videotape also appears to indicate that there is a leak in the bottom of one of the tanks in the Filter Sludge Tank room. The existence, contents, and potential significance of this videotape were not widely known at Unit 1.[32] The last entry into the Filter Sludge Tank room prior to the discovery of a major leak in the Filter Sludge Tank in November 1994 occurred in February, 1989.[33] This entry was made for the purpose of repositioning some hoses in one of the tanks.[34] At the

---

[31] _____, 1988 Videotape (NU Doc. 194).

[32] This videotaped entry was made by four individuals: _____, _____, and _____. RWP (Feb. 1, 1989) (NU Doc. 45). _____ recalled that the floor was wet and that the tank had a small leak in it. _____. _____ recalled that the floor was wet, but did not recall any leaks. _____, _____. _____ did not enter the tank room and does not recall any discussions about any leaks. _____. _____ no longer works at NU. _____ does not believe that he mentioned this leak to anyone else. _____. _____, _____, does not recall _____ ever mentioning this leak or ever seeing any videotape showing a leak. _____. None of the other key personnel in the Operations Department recall seeing this videotape or hearing anything about any active leaks in this tank during this time frame. _____; _____; _____. Nor do any of the HP managers and supervisors. _____, _____, _____, _____, _____.

[33] RWP (Feb. 1, 1989) (NU Doc. 45); _____, _____, _____, _____, _____.

[34] _____, _____, _____, _____.

time of this entry, the floor of this tank room was dry and there was apparently no indication of any active leaks in any of the tanks or piping in the room.[35/]

There were numerous entries into the Spent Resin Tank room during the 1980's due to problems associated with overflows and spills of resin from this tank during transfer operations.[36/] These problems appeared to have been resolved by the installation of a new level gauge on the tank in the 1989-1990 time frame and the use of more conservative operating procedures during spent resin transfer and pumping operations.[37/] The last entry into the Spent Resin Tank room prior to 1995 was in March, 1990.[38/] At the time of this entry in March, 1990, there was still resin on the floor of this tank room from some prior spills,

---

35/ _____, _____, _____, _____. See also _____. It is unclear why the apparent leak in the bottom of the Filter Sludge Tank shown in the 1988 videotape was not evident during the 1989 entry. _____ and _____ believe that the leak could have temporarily "sealed itself." _____, _____. This appears plausible, particularly in light of the fact that this "self-sealing" may have occurred again recently. _____. The water found in this tank room during the February, 1988 entry may also have been attributable, in part, to a rainwater leak, a back-up in the sump system, and/or an overflow when the tank was filled for shielding purposes prior to the entry. _____, _____.

36/ _____, _____, _____ _____, _____, _____.

37/ _____, _____, _____; see also Design Change No. 1-043-86, Rev. 1 (NU Doc. 78). See also NRC Mid-SALP Cycle Inspection Report 50-245/90-80 (July 5, 1990) noting the addition of a licensed control room operator to improve radwaste operations. (NRC Doc. 10).

38/ See _____; RWP (Mar. 13, 1990) (NU Doc. 9); Millstone Unit Operating Survey Matrices (1992-1995) (NU Doc. 201); Millstone Nuclear Power Station Unit 1, Radwaste Facility Radiation Surveys (1990-1995) (NU Doc. 202).

but no evidence of any active leaks in the Spent Resin Tank or any associated piping.[39/]

An action item to clean out the C CWT Tank was generated as a result an inspection of the Radwaste Facility conducted by _____ ____.[40/] The C CWT Tank and the Floor Drain Collector Tank room in which it is located were cleaned out in 1991-1993.[41/] NRC inspectors monitored this work and closed out this action item.[42/]

While additional cleanup projects were performed in the "common areas" in the Radwaste Facility during 1990-1994, no additional cleanup activities in the tank rooms were performed during this period.[43/] A number of cleanup projects were deferred because of budget reductions and concerns about radiation exposure levels.[44/] Unit 1's attempt to set a BWR record for low dose rates and

---

39/ _____, _____, _____.

40/ _____ _____, _____, __; See NRC Doc. 14.

41/ See also NU Docs. 81-83, 91, 93, 95, 98, 105-107, 110, 113 concerning the clean out of the C CWT Tank and the Floor Drain Collector Tank room.

42/ See NRC Inspection Reports Nos. 50-245/91-07, 50-245/91-22, 50-245/92-26 and 50-245/93-12 (NRC Docs. 15, 17, 21,23).

43/ _____, _____, _____, _____. See also NU Docs. 53, 55-58, 90, 94, 96, 112, 115.

44/ _____, _____ _____, _____, _____, _____, _____, _____, _____, _____, _____, See also NU Docs. 96, 112-115.

radiation exposure levels in 1992-1993 was also apparently a factor in the deferral of these projects.[45/]

A series of photographs of the pipechase area above the tank rooms was taken in late 1993/early 1994, because of HP concerns about the conditions in this area.[46/] These photographs indicate that there was significant rusting, corrosion, and scaling on many pipes and pipe supports in this area. An engineering inspection was performed which concluded that there were no structural deficiencies in these pipes and pipe supports and no action was taken to cleanup this area.[47/]

There were no entries into any of the other tank rooms from 1990 until November 1994 when a leak was discovered in the Filter Sludge Tank by monitoring the level gauge for this tank.[48/] Another videotape (the "1994 Videotape") was taken in connection with this entry.[49/] The 1994 Videotape

---

45/ _____. See NU Doc. 109. See also Millstone Unit 1 Radiation Exposure Goals and Actual Exposure Levels (1985-1995) (NU Doc. 189).

46/ _____ See _____

47/ _____. We were unable to locate copies of any formal documentation prepared in connection with this inspection.

48/ _____. See Daily Graphs of Filter Sludge Tank level (June 1994 - July 1995) (NU Doc. 160).

49/ 1994 Videotape (NU Doc. 195); _____; RWP for Filter Sludge Tank

(continued...)

indicates that there is a significant leak in the bottom of the Filter Sludge Tank, a large pile of sludge accumulating below the tank, and other debris in this tank room. The existence of this videotape was widely known and a still photograph of the leak in this tank taken from this video (Figure 3) was discussed at several morning management meetings at Unit 1.[50/] An NCR and PIR were prepared with respect to this leak and the repair of this leak was placed on the "Top 10" list of action items to be accomplished at Unit 1.[51/] The corrective action to temporarily repair this leak by designing, fabricating, and installing a "belly band" around this tank was approved.[52/] The belly band was fabricated, but its installation was delayed pending the completion of a related project involving the replacement of a decant line from this tank.[53/] The installation of the band was still pending when another NRC inspection of the Radwaste Facility was conducted in September 1995.[54/] Shortly thereafter, a comprehensive evaluation of the entire Radwaste

---

49/ (...continued)
Room (Nov. 4, 1994) (NU Doc. 130).

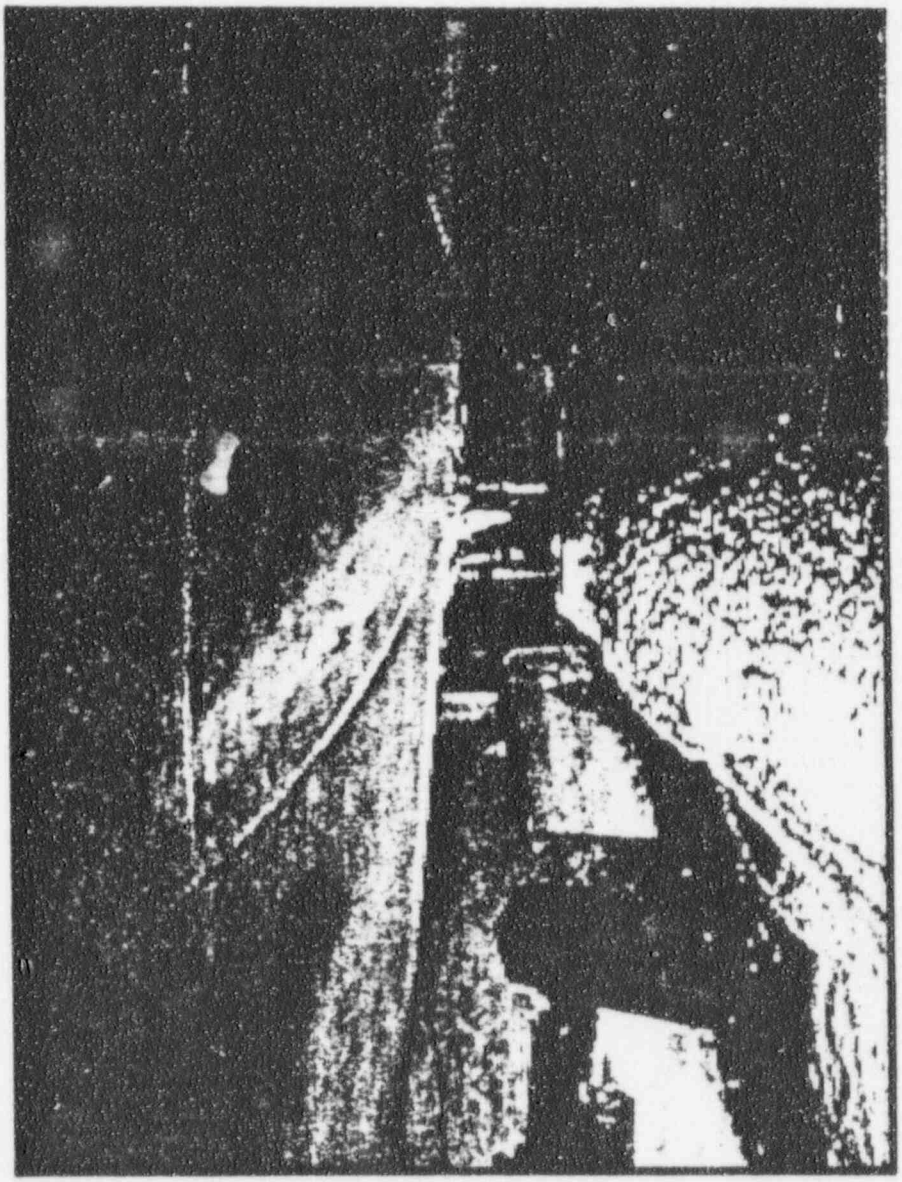
50/ _____.

51/ _____ PIR (Oct. 24, 1994), NCR (Nov. 8, 1994) (NU docs. 128, 131).

52/ _____; See NU Doc. 132.

53/ _____; See NU Docs. 154, 159, 191.

54/ _____.



Unit One Filter Sludge Tank Leak

Facility was undertaken and another videotaped entry (the "1995 Videotape") was made into all of the tank rooms and other high radiation areas.[55/] The 1995 videotape and the Remediation Proposal prepared as a result of this entry[56/] graphically illustrated the deteriorating conditions which existed throughout the Radwaste Facility. The Remediation Proposal was adopted and the Radwaste Remediation Project to address and resolve these conditions got underway. Additional information related to some of the more significant events described above is provided throughout the remaining sections of this report.

## B. GENERAL OBSERVATIONS

We did not consider any of the NU employees whom we interviewed to be untruthful. While there were a number of inconsistencies among the recollections of various employees with respect to certain events and discussions, we did not regard anyone's recollection of any conversation with any NRC inspector, other NU employee, or event related to the condition of the Radwaste Facility to be incredible or suspect. To the contrary, everyone with whom we spoke seemed candid and cooperative, and anxious to resolve the concerns that have arisen in this area. _____

_____.

_____

55/ See 1995 Videotape (NU Doc. 195).

56/ See Proposal for Remediation of Unit 1 Radwaste Facilities (Nov. 1, 1995) (NU Doc. 168) containing descriptions and photographs of the conditions in the tank rooms and other sealed-off areas that was prepared following this entry.

(i.e., _____) appeared somewhat nervous and guarded at the outset of their interviews, this is a natural reaction. As their interviews progressed, they became more at ease and spoke candidly and without reservation.

As the interview summaries of Messrs. _____, _____ _____ and other NU employees indicate, there were some obvious inconsistencies between the NRC inspectors' recollections of specific conversations or events and the recollections of the NU employees of these conversations or events. In several cases, the NU employee simply did not recall the conversation or event at all. In other cases, the NU employee could recall an overall "impression" of a conversation or event, but no specific statements or details. We do not regard this as unusual or surprising in light of the amount of time that has elapsed since some of these conversations and events actually occurred and the relative significance of that conversation or event at the time to the individual involved. As discussed previously, the NRC inspectors had similar difficulty recalling the details of specific conversations with NU personnel and their concerns appear to be based more on the "impression" or "understanding" that they took away from these conversations, rather than the specific words that may have actually been spoken.

In this regard, it became apparent early on in our interviews of the NU employees that there were some fundamental misunderstandings between the NRC inspectors, on the one hand, and the NU employees, on the other hand,

concerning several key issues related to the conditions in the tank rooms, NRC's knowledge of these conditions, and the significance of these conditions. Similar misunderstandings appeared to exist among the employees working in different departments at Unit 1 (e.g., Operations and Health Physics). The existence of these misunderstandings was reinforced in virtually every interview which we conducted. We believe that these misunderstandings distorted the communications between many of these individuals with respect to the conditions in the Radwaste Facility and shaped the impression or understanding that each individual took away from such communications.

The fundamental misunderstandings between the NRC inspectors and the NU employees can be summarized as follows:

1. The actual condition of the tank rooms

The NRC inspectors appear to have assumed that the conditions which were discovered in the tank rooms in 1995 were common knowledge throughout Unit 1. The Root Cause Evaluation Team appears to have reached a similar conclusion.[57] Based on our interviews, it appears that very few of the NU employees with whom the inspectors interacted had actually ever been in the tank rooms or were aware of the actual conditions in these rooms during the period

---

57/ Millstone Unit 1 Degraded Material Condition of the Liquid Radwaste System, Root Cause Evaluation (March 1996) (NU Doc. 193).

from 1990-1994.[58] Moreover, even the personnel who had been aware of the conditions which previously existed in these rooms were not aware of the additional deterioration which apparently occurred during the period from 1990-1994 after some operational modifications were made which eliminated the need to access these rooms on a regular basis, and there were no ongoing operational indications of additional leaks or spills in these rooms.[59]

2. The comparability of the conditions at Nine Mile 1 and Millstone 1

All three NRC inspectors indicated that (a) Nine Mile 1 involved a situation where there were "degraded" conditions in the Radwaste Facility and (b) the conditions at Unit 1 involving corroded/leaking tanks and pipes and spilled resin and sludge on the floor were comparable to, or even worse than, the conditions at Nine Mile 1. Without exception, all of the NU employees who recalled the Nine Mile 1 event indicated that it involved "floating barrels of radioactive waste" and was an extremely egregious situation which was much worse than the conditions that they thought existed at Unit 1 during the period from 1990-1994.[60]

---

[58] See _____, _____.

[59] See _____ _____.

[60] See _____ _____ _____.

3. The safety significance and status of the tank rooms

Virtually every NU employee whom we interviewed was under the impression that the tank rooms and other inaccessible areas were in a "controlled status" and did not pose a hazard to the health and safety of workers or the general public, so long as (a) these rooms and areas remained screened off as high radiation areas, (b) access to these rooms and areas was restricted solely to entries required for essential operational purposes, and (c) there were no indications of any additional spills or leaks in the rooms that were still used for operational purposes (i.e., the Spent Resin Tank room and the Filter Sludge Tank room).[61/] Most of these employees were also under the impression that these conditions were being met during the period from 1990-1994, and that there was nothing additional of any safety significance to disclose to the NRC about these tank rooms or any of the other inaccessible areas during this period. Many of these employees were even under the impression that it would have been inconsistent with ALARA, or perhaps even an ALARA "violation," to go into these rooms and incur unnecessary worker exposures by conducting any additional cleanup operations or even taking periodic radiological surveys.[62/]

---

61/ See e.g., _____, _____, _____.

62/ _____, _____. The NRC SALP reports during this period noted NU's continued strong performance in the ALARA area and may have

(continued...)

4. NRC's knowledge of the conditions in the tank rooms

A number of key NU employees assumed that the NRC inspectors were generally aware of the conditions that existed throughout the lower level of the Radwaste Facility, including conditions in the tank rooms and the other inaccessible areas that had been sealed off (e.g., the A Concentrator room, the A and B Day Tank room).[63] In responding to NRC inquiries about conditions in the Radwaste Facility, many NU employees readily acknowledged that their focus was on informing the NRC of changes and new developments that had occurred since the last inspection.[64] While the NRC inspectors also acknowledged that they tended to focus on new developments during their inspections, they were unaware of the actual conditions in these tank rooms and relied upon NU to keep them apprised of these conditions.

5. Interactions with NRC Inspectors

---

[62] (...continued)
inadvertently reinforced this interpretation of ALARA. See NRC SALP Reports Nos. 89-99 (May 26, 1991), 93-99 (Aug. 26, 1994) (NRC Docs. 16, 26).

[63] See e.g., _____, _____. At a management briefing in March, 1989, NU had also advised NRC that the tank rooms in the lower level of the Unit 1 Radwaste Facility were "permanently contaminated" and that NU had no plans to cleanup those rooms over the next five years. (NRC Doc. 1).

[64] _____.

NU employees generally try to be very precise in responding to inquiries from NRC inspectors.[65/] Several employees stated that they were particularly careful in responding to some NRC inquiries because of concerns that an inspector might misinterpret their responses or draw improper inferences or conclusions from their responses.[66/] As a result, a number of NU employees were admittedly reluctant to "volunteer" any information to NRC inspectors that went beyond the minimum necessary to answer a particular inquiry.[67/] This "reactive" and "minimalistic" approach to communications with NRC inspectors stands in stark contrast to NRC's expectations of "proactive" communications from its licensees and their employees which would have kept the NRC inspectors informed about developments related to the Radwaste Facility as a matter of course during their inspections. _____ concern that certain NU employees appeared to be "defensive" and less forthcoming with him than they should have been about the conditions at the facility reinforces our conclusion that the guarded approach to regulatory communications which was actually followed by NU's employees at Unit 1 impeded the free flow of information in the inspection process during the period from 1991-1995. While this approach may have complied with "the letter" of 10 C.F.R. § 50.9, it appears to be inconsistent with "the spirit" of 10 C.F.R. §

---

65/ See e.g. _____. See also _____.

66/ _____. See _____.

67/ _____.

50.9 and NU's current expectations with respect to communications between its employees and the NRC.[68/]

We believe that, collectively, these fundamental misunderstandings had a significant adverse impact on the quality of the communications between the NRC and NU during the period from 1990-1994 concerning the conditions in the Radwaste Facility. We believe that these fundamental misunderstandings about the actual conditions in the tank rooms, NRC's knowledge of these conditions, and the significance of these conditions, resulted in the very different impression or understanding that the NU employees took away from their conversations and meetings with NRC inspectors on radwaste issues, vis a vis the impression or understanding that the NRC inspectors apparently took away from these conversations and meetings.

The results of ML&B's investigation with respect to the specific concerns raised by each of the NRC inspectors are summarized in the next subsection of this report.

---

68/ See Nuclear Group Procedure 4.2-4.4 (NU Doc. 200).

## C. SUMMARY OF FINDINGS WITH RESPECT TO CONCERNS RAISED BY INDIVIDUAL NRC INSPECTORS

### 1. Concerns Raised By _____

_____

_____

_____.[69] He does not recall going on a tour of the Unit 1 Radwaste Facility with _____

_____, nor does he recall the specifics of any conversations he may have had with _____ about the conditions in the Radwaste Facility during such a tour or at any other time.[70] _____ said that the brick walls and high radiation screens were in place at the entrances to the Filter Sludge Tank room, Spent Resin Tank room, and A and B Day Tank room when he arrived, that entry into these rooms was discouraged, and that no one was authorized to go into these rooms unless there was an absolute need to do so for operational purposes.[71] _____does not recall ever personally going into the rooms.[72] Nor does he recall that these blocks were ever taken down to gain access to these rooms _____.[73] These facts are corroborated

_____

69/ _____.

70/ _____.

71/ _____.

72/ _____.

73/ _____.

by the RWP's, the radiation surveys and the interviews of other NU employees.[74] It was _____ understanding in _____that there was some residue of spent resin and sludge, as well as some construction materials, on the floors of some of the tank rooms as a result of some spills and overflows that had occurred previously, but that there were no indications of any active leaks or degraded tanks or piping in these rooms.[75] This understanding was shared by many other NU employees during the period from 1990-1994.[76]

_____knew that there were radiological surveys on file for these rooms which had been taken during the prior entries into these rooms, but was also aware of the fact that no surveys of these rooms were being taken on an annual basis.[77] _____ was aware of the Nine Mile 1 incident. He recalled that it involved some "floating barrels" of radioactive waste in a flooded tank room and remembers talking with one of the NRC inspectors at Millstone

---

74/ See e.g., _____ See RWPs for entries into the tank rooms. (NU Docs. 9, 25, 45). See also Radwaste Facility Radiation Surveys (NU Doc. 202).

75/ _____.

76/ See _____ _____i _____.

77/ _____.

about this incident, but he does not remember whether the inspector was _____.[78]

_____ does not believe that he ever would have told __. _____ that there was no spent resin or sludge on the floors in the tank rooms, since it was his understanding that there was.[79] _____ also does not believe that he would have told _____ that "annual" radiological surveys were being taken of the tank rooms and other sealed-off areas, since he knew that was not the case. While he does not recall this conversation, _____ indicated that he may have told _____ that annual surveys were taken in va ous areas throughout Unit 1.[80] Alternatively, he may have told _____ that surveys of the tank rooms were being taken on a periodic basis, since he knew that surveys of these rooms were taken whenever the rooms were entered for operational purposes, and that, until 1990 or so, it was his understanding that this was occurring on a fairly regular basis.[81] While he was not pleased with the condition of these rooms, _____regarded them as "acceptable" from a

_____

78/ _____.

79/ _____.

80/ _____. See RMP 1, the Radiation Survey Matrix showing the locations and frequency of the radiological surveys taken at Millstone 1 on a regular basis. (NU Doc. 199). The Operating Survey Matrices and Radiation Surveys for Unit 1 indicate that only the common accessible areas of the lower level of the Radwaste Facility were surveyed on a regular basis (NU Docs. 201, 202).

81/ _____.

radiological control standpoint since they were not causing any worker exposures.[82] While he does not recall discussing this issue with _____, ___ _____ conceded that he therefore could have told _____ that the conditions in the tank rooms were "acceptable."[83] _____ also stated that if anyone had asked him whether Millstone had "any Nine Mile 1 problems" in 1992, he would have said "No," since he was not aware of any "floating barrels" of radioactive waste, leaking tanks, or other serious problems at Millstone 1.[84] He regarded the Nine Mile 1 conditions as being much more serious and uncontrolled.[85]

V nile there are obviously some inconsistencies between ___ _____ recollection of his conversation with _____ and ___ _____ beliefs about what he would have said, or not said, to _____ ___ about these issues at that point in time, we have no basis to conclude that ___ _____ is being untruthful. _____ seemed sincere and credible and his understanding of the conditions in the tank rooms is consistent with the

---

82/ _____.

83/ _____.

84/ _____.

85/ _____. Again, this distinction between the seriousness of the Nine Mile 1 conditions, compared with the conditions that were thought to exist at Unit 1, was shared by many other NU employees. See n.60, supra.

understanding of other NU employees at that time.[86] _____, _____ also prepared several memoranda recommending that (a) design and hardware improvements should be made in the sludge and spent resin pumping operations to avoid future spills, and (b) additional cleanup activities should be undertaken in the tank rooms.[87] If _____ had ever knowingly denied that deteriorated conditions existed in the Radwaste Facility, it seems unlikely that he would have prepared and circulated these memoranda acknowledging that he was aware of their existence.[88] Even _____ acknowledged that when he returned to conduct an inspection at Unit 1 in 1995, _____ stated that _____ was going to be "disappointed" by the "lack of progress" that had been made in cleaning up the Radwaste Facility since ___ _____. Again, if _____ had ever knowingly denied that deteriorated conditions existed in the Radwaste Facility, it seems unlikely that he would have made such a remark.

_____

[86] See _____, _____.

[87] See e.g., _____ _____ _____ _____.

[88] Several other NU employees also indicated that _____ had been actively promoting additional operational improvements and cleanup activities in the Radwaste Facility. See _____.

Accordingly, we do not believe that _____ knowingly provided _____ with any inaccurate information concerning the conditions in the Radwaste Facility or deliberately withheld any material information from _____. We believe that the inconsistencies between _____ recollection of his conversation with _____ and _____ beliefs about what he would have said in such a conversation are attributable to the fundamental misunderstandings among the NRC inspectors and NU employees about the conditions in the Radwaste Facility that are discussed in the General Observations section of this report.

2. Concerns Raised by _____

_____

and was responsible for the operation of the Radwaste Facility during that period.[89] _____ does not recall giving _____ a tour of the lower level of the Radwaste Facility in the summer of 1990 or having a discussion with _____ concerning the status of the C CWT Tank and the need to clean it out.[90] _____ does recall having discussions with _____ about the skid-mounted Chem-Nuclear liquid waste processing system that NU installed to replace the concentrator/evaporator system originally installed in the plant.[91]

_____

89/ _____.

90/ _____.

91/ _____.

_____thought that these discussions focused on the documentation of this system in the FSAR and the replacement of some of the rubber hoses utilized in this system with stainless steel hoses.[92]

However, _____ also acknowledged that he was actively involved in the clean out of the C CWT Tank.[93] _____ thought that this project was initiated as a result of an inspection by _____.[94] _____ clearly checked on NU's progress on this project during subsequent inspections.[95]

_____ made it very clear that if he ever had a conversation with _____ about the C CWT Tank, it would probably have never occurred to him to mention the status of the A and B Day Tanks during such a conversation for several reasons i.e., (a) because of the significant differences between the A and B Day Tanks and the C CWT Tank, (b) because he assumed that _____ was aware of the existence of the A and B Day Tanks, and (c) because he assumed that _____ would have specifically asked him about these tanks if he had any questions about their status.[96]

With respect to differences between these tanks and the C CWT Tank, _____emphasized that the A and B Day Tanks were considerably smaller _____

92/ _____.

93/ _____.

94/ _____.

95/ _____.

96/ _____.

than the C CWT Tank, and that it was his understanding that these tanks had been flushed out when they were removed from service and, unlike the C CWT Tank, they were not full of sludge.[97/] His understanding of the condition of these tanks was shared by other NU employees who worked in the Radwaste Facility and had participated in the shutdown of these tanks.[98/] Moreover, the C CWT Tank was located in the Floor Drain Collector Tank room which had to be accessible for operational purposes, whereas the A and B Day Tanks were isolated in a bricked-off room which had not been accessed for years.[99/] _____ emphasized that there were no potential worker exposure problems associated with the A and B Day Tanks under normal operating conditions and there was no reason to enter this room, or even consider an entry into this room, from an ALARA standpoint.[100/] The RWP logs indicate that there had been no entry into the A and B Day Tank room since it had been sealed off in 1983.[101/] _____ stated that the cleanup of the A and B Day Tank room was regularly listed as one of the ultimate goals of the cleanup program, but that this project did not have a

---

97/ _____.

98/ _____.

99/ _____.

100/ _____

101/ _____; RWP's for A & B Dry Tank room (NU Doc. 11).

high priority because of cost and ALARA considerations.[102/] His recollections on all of these issues are corroborated by the recollections of other NU employees and other documentation.[103/]

Finally, the existence of a separate A and B Day Tank room is clearly indicated on the floor plans, the radwaste system description, and the RWP form used for the lower level of the Radwaste Facility.[104/] The high radiation postings on the exterior wall of this room are also one of the first things encountered on a tour of the lower level. These postings went up in the late 1980's and were presumably in place at the time of _____.

_____ is very credible and forthright. He takes pride in the cleanup activities that actually occurred _____ and believes that NU made a lot of progress in this area during this period.[105/] While he had never personally entered the A and B Day Tank room, he had gone into the Spent Resin Tank room and the Filter Sludge Tank room.[106/] He had also been involved in some earlier cleanup efforts in both of these tank rooms, as well as the development and implementation of some of the hardware and operational

---

102/ _____.

103/ _____, _____. See NU Docs. 96, 112-115.

104/ See e.g., Appendix B; RWPs for A&B Day Tank room (NU Doc. 11).

105/ _____.

106/ _____ _____).

changes that were made to eliminate the need to access these rooms on a regular basis.[107] While _____ does not recall the conversation with _____ about the C CWT Tank, his explanation of why he might not have discussed the existence and status of the A and B Day Tanks during such a conversation is very plausible. We do not believe that he attempted to conceal any information concerning the existence, status, or condition of these tanks from _____ or knowingly withheld any material information about the conditions in the Radwaste Facility from _____.

Again, to the extent that there was any miscommunication between _____ during this conversation, we believe that it may have been attributable to some of the fundamental misunderstandings among the NRC inspectors and NU employees about the conditions in the Radwaste Facility discussed in the General Observations section of this report.

_____ other principal concern involves NU's failure to notify the NRC about the leak discovered in the filter sludge tank room in November 1994. This leak was apparently discussed at several morning meetings of the management staff at Unit 1.[108] _____ usually attended these morning meetings, but may not have actually attended the meetings at which this leak was

---

107/ _____.

108/ See _____.

discussed.[109] The leak was discovered by monitoring the printouts of the level indicator for this tank and a videotaped entry was made into the tank room to assess the extent of the leak and the condition of the tank. This 1994 Videotape dramatically illustrates the extent of the problem. A still photograph taken from this videotape (Figure 3) was reviewed at one or more of these morning meetings and widely circulated throughout the management at Unit 1.[110] While the still photograph does not have the same visual impact as the videotape, it clearly shows the leak itself and the sludge pile accumulating beneath the tank.

A separate PIR and NCR were immediately prepared with respect to this leak and the repair of this leak was placed on the "Top 10" list of action items for Unit 1.[111] These Top 10 lists were widely circulated and posted throughout

---

109/ Attendance lists and minutes were not prepared in connection with the morning meetings. See _____.

110/ _____, _____. The morning meetings were attended by the ____ _____ of the various departments at Unit 1 and other management personnel at Unit 1. The videotape itself was seen by a number of key managers (_____ ) and was probably seen by other managers during this time frame. _____. It was also reviewed by personnel in the departments involved with the belly band project. _____.

111/ _____; See also PIR re: Filter Sludge Tank (Oct. 24, 1994) (NU Doc. 128); Radiation Survey (Nov. 4, 1994) (NU Doc. 130); NCR re: Filter Sludge Tank (Nov. 8, 1994) (NU Doc. 131).

the Unit and made available to _____[112] The Engineering Department was assigned the responsibility of assessing this problem and resolving it. A temporary repair involving the design, fabrication, and installation of a "belly band" around the tank was developed and approved within two months.[113] The design was completed, an Engineering Work Order (EWO) was prepared for the fabrication and installation of this "belly band," and this issue was deleted from the Top 10 list.[114] This belly band was fabricated and awaiting installation when this project was deferred pending the completion of a related project involving the replacement of a decant line from the filter sludge tank.[115] The belly band was still awaiting installation when _____ saw the 1994 videotape in _____ _____.[116]

No separate ACR or LER was ever prepared with respect to the leak in the Filter Sludge Tank, because the Unit 1 personnel who initiated and approved the NCR and PIR and worked on the resolution of this problem all thought that the

---

112/ _____.

113/ _____.

114/ _____; See also NCR and Jumper Device Control Sheet (NU Doc. 132).

115/ _____, Decant Line Replacement Documents (NU Doc. 191).

116/ _____.

leak did not involve a safety-related system or unresolved safety question.[117] NRC inspectors had access to the ACR, NCR, and PIR files, and apparently reviewed the PIR's on a regular basis. In addition, the facts that (a) this leak was discussed at several morning meetings which were usually attended by _____, (b) the leak was included in the Top 10 list of action items which were circulated and posted throughout the Unit and made available to _____, and (c) the leak was being addressed through NU's standard problem identification and reporting systems would appear to negate any suggestion that NU was deliberately attempting to conceal the existence of this leak from the NRC. The fact that no NU employees took any other actions to ensure that the NRC was informed of the existence of the leak or the 1994 Videotape prior to September 1995 appears to be attributable to the widely held assumption that the NRC was already aware of

---

[117] See NU Docs. 128 and 132; See also _____; Root Cause Evaluation of the Degraded Condition of the Liquid Radwaste System at 7 (NU Doc. 193). The PIR prepared when the leak was first detected on October 24, 1994 confirms that a determination was made that the leak itself was not reportable to the NRC. The PIR indicates that this reportability determination was subsequently reviewed and verified by several managers at Unit 1, including _____. (NU Doc. 128). This original reportability determination was apparently never formally reevaluated after the entry to the tank room was made on November 8, 1994 and the extent of the leak and the accumulated sludge pile became known. Even if it had been reevaluated, the leak probably would still not have been considered reportable under (a) 10 C.F.R. Part 50 since the leak was not viewed as a significant operational event or plant condition and the Filter Sludge Tank was not considered to be part of a safety-related system (_____), or (b) 10 C.F.R. Part 20 since the leak occurred in a "location where personnel are not normally stationed during routine operations."

this leak. The assumption that NRC inspectors were generally aware of the existence and significance of these types of events is one of the fundamental misunderstandings between the NRC inspectors and NU employees about the conditions in the Radwaste Facility discussed in the General Observations section of this report. _____ related concern about NU's failure to take aggressive and timely action to remedy the deteriorating conditions in the Radwaste Facility, particularly after this leak was discovered in November, 1994, are addressed in the last section of this report.

3. Concerns Raised By _____

The concerns raised by _____ were more difficult to address since he does not recall a specific conversation with any individual NU employee where he may have been provided with inaccurate or incomplete information about the conditions in the Radwaste Facility. Rather, _____ recalls that, in light of the Nine Mile 1 incident, during his inspections he regularly asked a number of NU employees a series of questions designed to determine whether there were any leaking pipes or tanks, spilled resin or sludge, or other degraded/deteriorated conditions in the Unit 1 Radwaste Facility. He also recalls that these NU employees uniformally denied that these types of conditions existed at Unit 1.

No one whom we interviewed recalled ever being asked such an all-encompassing question by _____ or ever providing such a categorical denial. The NU employees who dealt with _____ on a regular basis during his

inspections included_____ _____.[118]

_____

_____.[119] _____

_____ _____

_____ __.[120] _____.

_____.[121]

_____

__ __ _____.[122]

_____ _ _____.[123]

_____

[118] _____
_____. Most of the other managers, HP technicians and personnel from other departments whom we interviewed do not recall ever having any discussions with _____ about the Radwaste Facility, or only very limited discussions on very specific matters.
_____
_____. _____ also do not recall any discussions with ___ _____ about these types of concerns at any exit meetings. _____, _____.

[119] _____

[120] _____.

[121] _____

[122] _____.

[123] _____.

None of these employees had apparently ever actually been inside any of the tank rooms in the lower level of the Radwaste Facility.[124/] Several of them were aware of the fact that there had been some earlier leaks and spills in these rooms in the 1980's, but none of them thought that there were any "active" leaks or degraded tanks or pipes in these rooms until the leak was discovered in the Filter Sludge Tank room in November 1994.[125/] None of them were apparently aware of the extent of the deterioration that had occurred in the other tank rooms until they were surveyed in the Fall of 1995 in connection with the Radwaste Remediation Project.[126/] None of them recalled _____ ever specifically asking them about the conditions in these tank rooms.[127/] None of them recall _____ ever asking if NU had any "Nine Mile 1 problems, " but they all indicated that they did not think that NU had any "Nine Mile 1 problems" or that the Nine Mile 1 incident was more serious because it involved "floating barrels" of contaminated materials.[128/]

The document that _____ indicated that he used as part of his checklist to determine whether there were any degraded conditions in the Unit 1 Radwaste Facility was Item 03.09b.5 of NRC Inspection Procedure No. 83750

---

124/ _____.

125/ _____.

126/ _____.

127/ _____.

128/ _____.

dealing with the "identification of plant areas that have become unusable as a result of an operational occurrence and licensee actions to control and recover such areas."[129] None of these NU employees recall this item, but several employees indicated that none of the tank rooms and other areas that NU had sealed off had become unusable as a result of an "operational occurrence."[130] The A and B Tank room, the A Concentrator room, and the hopper, measuring and centrifuge rooms had all been sealed off because of decisions to abandon this equipment in place which had been made in the late 1970's and early 1980's.[131]

The Spent Resin Tank room and Filter Sludge Tank room were still usable and operational during the time frame when _____ was conducting his HP inspection at Millstone, even though entry into these rooms was discouraged and access to these rooms was restricted for ALARA reasons.[132] _____ indicated that he regularly reviewed the PIR's, ACR's, RWP's, and radiation surveys related to the Radwaste Facility. Other than the paperwork generated in connection with the clean out of the C CWT Tank, he said that he had never seen any indication of the extent of the deterioration and contamination in the tank rooms in these documents. Once the hardware fixes were made to the Filter

---

129/ See NRC Inspection Manual, Procedure No. 83750 (NRC Doc. 35).

130/ See e.g. _____ _____.

131/ _____.

132/ _____ _____.

Sludge Tank pumping system and the level indicator for the Spent Resin Tank, there was apparently no need to enter these rooms for operational purposes.[133/] Radiation surveys of these sealed-off areas were generally only conducted when these areas were being accessed for operational purposes.[134/] No significant PIR's, ACR's, or RWP's were apparently prepared with respect to these rooms themselves _____ time frame prior to the detection of the leak in the Filter Sludge Tank room in November 1994.[135/] The RWP's and radiation surveys that were provided to _____ as a matter of course during his inspections were generally only the RWP's and surveys which had been prepared

---

133/ _____.

134/ _____. Although the common areas in the lower level of the Radwaste Facility were surveyed on a regular basis, the tank rooms themselves were not included on the Operating Survey Matrix (NU Doc. 201).

135/ See Appendix C, Index of Major PIR's and ACR's Related to Millstone Unit 1 Radwaste Facility. Most of these PIR's and ACR's listed in this appendix were generated and processed in connection with the ongoing Radwaste Remediation Project.

since the last NRC HP inspection.[136] The years in which the last RWP's and/or radiation surveys were prepared for each of these areas prior to the November 1994 entry into the Filter Sludge Tank room are as follows:

A and B Day Tank Rooms (1983)
Filter Sludge Tank Room (1989)
A Concentrator Room (1989)
Spent Resin Tank Room (1990)
Hopper/Centrifuge/Measuring Rooms (1990)[137]

The next surveys of these rooms, other than the Filter Sludge Tank room, were not taken until late 1995 in connection with the comprehensive evaluation of the condition of the entire Radwaste Facility prior to the commencement of the Radwaste Remediation Project.[138] The RWP's and surveys taken by the Unit 1 HP personnel were usually forwarded to the Nuclear Records Department on an annual basis.[139] The RWP's and surveys for entries to these rooms prior to 1990 would apparently not have been routinely provided to _____ when he was

---

136/ _____.

137/ _____; RWP's and Radiation Surveys for Radwaste Facility (NU Docs. 8, 9, 11, 17, 23, 25, 42, 45, 50, 202).

138/ See Radiation Survey of Tank Rooms (Sept. 21, 1995) (NU Doc. 162). See also Radwaste Remediation Project Weekly Reports (NU Docs. 165-173, 175-176, 178-181, 183, 186). One additional survey of the Spent Resin Tank room was apparently taken by HP personnel during a temporary shutdown in June, 1995 prior to the commencement of the Radwaste Remediation Project in the fall of 1995. (NU Doc. 202).

139/ _____.

conducting his inspections in _____.[140] It is not clear why _____ did not see the PIR related to the leak in the Filter Sludge Tank, the RWP and radiation survey related to the videotaped entry into this tank room which were prepared in November 1994, or the 1994 Videotape itself

_____.[141]

However, we found no evidence of any deliberate attempt to withhold this information from _____.

_____ also indicated that he relied upon the Unit 1 Systems Familiarization Manual and internal NU QA reports on the Unit Radwaste Facility and felt that these documents should have identified and described the deteriorating conditions in the Radwaste Facility. Several NU employees noted that the Systems Familiarization Manual was designed to familiarize outage contractors and their personal with the major systems where work was going to

---

140/ _____. It should be noted that the Radiation Survey Figures for the lower level of the Liquid Radwaste Facility and the centrifuge and hopper areas that were used for the weekly radiation surveys do show the tank rooms and the centrifuge and hopper rooms on the figures themselves, even though no radiation readings were actually being taken in these areas. Consequently, anyone conducting an annual or semi-annual review of a stack of the weekly surveys for these areas, along with copies of the weekly surveys for all of the other areas in all of the other Millstone Units, could easily come away with the impression that the rooms themselves were also being surveyed. See NU Doc. 202.

141/ See NRC Inspection Report Nos. 50-245/94-37 (Jan. 13, 1995); 50-245/95-19 (June 2, 1995) (NRC Docs. 37, 38).

be performed during the outage.[142] Considerably less detail is included in these manuals with respect to systems, such as the liquid radwaste systems, which were not scheduled to undergo major work during the outages in this period.[143] NU's QA and self-assessment reports focused on procedural compliance related to the packaging and shipping of wastes and HP dose levels, not the material condition of the Radwaste Facility.[144] In addition, under the prevailing ALARA philosophy at Unit 1, the QA and self-assessment teams would not have been routinely granted access to the tank rooms and other areas that were screened off as high radiation areas.[145]

All of the NU employees who dealt with _____ on a regular basis seemed candid and credible. A number of them indicated that they cooperated with _____ and provided him with everything he asked for during his inspections.[146] However, a number of them also stated that they were particularly careful in responding to inquiries from _____ because of concerns that he

_____

142/ _____; See Unit System Familiarization Manual (NU Doc. 190).

143/ _____; Compare Appendix B with description of other systems in the Systems Familiarization Manual (NU Doc. 190).

144/ _____; See NU Audits and Self-Assessments Reports for Radwaste Facility and Radwaste Systems (NU Docs. 31-40, 102, 135, 136).

145/ _____.

146/ _____.

would misinterpret their responses and draw inappropriate inferences or conclusions from their responses.[147/] Several employees admitted that they were reluctant to "volunteer" any information to _____ beyond the minimum necessary to answer any particular inquiry that he might make.[148/] This is consistent with _____ impression that certain NU employees were "defensive" and less forthcoming than they should have been with him about these and other issues. We believe that the reluctance of some NU employees to be open and forthcoming with _____ had a significant effect on the quality of the communications between NU and the NRC with respect to the Radwaste Facility during the period _____. However, we did not uncover any hard evidence indicating that any NU employee withheld any material information from _____ in response to a specific inquiry. While there were undoubtedly some significant, and apparently repetitive, miscommunications between ___ _____and a number of NU employees, we do not believe that these miscommunications resulted from any NU employee knowingly and willingly providing_____ with incomplete or inaccurate information or deliberately withholding any material information from _____. Rather, we believe that these miscommunications were attributable to the fundamental misunderstandings which existed between the NU employees and the NRC inspectors about the _____

147/ _____ _____.

148/ _____.

conditions in the Radwaste Facility that are discussed in the General Observations section of this report, particularly Item No. 5.

## D. SUMMARY OF FINDINGS WITH RESPECT TO INTERNAL MISCOMMUNICATIONS AND ACTIONS BY NU MANAGEMENT

A number of the factors which impaired the communications between the NU employees and NRC inspectors with respect to the Radwaste Facility also had an adverse impact on the effectiveness of the internal communications within and among the various departments at Unit 1. For example, many of the Millstone Station, Unit 1, HP, and Operations Department managers who were responsible for different functions and activities related to the Radwaste Facility in _____ (e.g., _____) rarely, if ever, toured the lower level of this facility or had any first-hand knowledge of the conditions in the tank rooms.[149/] Moreover, the PEO's and HP technicians who worked in this area assumed that management was aware of the conditions in these rooms and tolerated these conditions. HP considered these rooms to be in a "controlled" and "acceptable" status from an HP standpoint during this period and actively discouraged entry into these rooms. The personnel in the Operations Department who had tried to cleanup these rooms in the past (e.g., _____) were either transferred to new assignments, became accustomed to working around these conditions, or

_____

149/ _____

See also _____.

simply abandoned pursuit of any ambitious cleanup projects because of perceived budgetary and ALARA restrictions. All of these factors inevitably led to internal miscommunications about the actual conditions in the tank rooms and the potential significance of these conditions.

NU's failure to take aggressive and timely action to address the deteriorating conditions in the Radwaste Facility appears to have been attributable to a combination of these internal miscommunications and an array of additional factors, events, attitudes and circumstances, rather than any single factor or the action or inaction of any single individual or department. These additional factors and circumstances are discussed below.

There appears to have been a major decontamination and cleanup effort underway in the Radwaste Facility in the mid to late 1980's.[150/] Plans were regularly being developed to continue this effort and proceed with the cleanup of the tank rooms in the early 1990's.[151/] For a variety of reasons, this effort received less attention during the period from 1990 to 1995, and the cleanup of the tank rooms never went beyond the Floor Drain Collector Tank room containing the C CWT Tank.

First, there was a turnover of personnel in some of the key management positions at Unit 1 and in the Unit 1 Operations Department during

---

150/ _____. See n. 27, supra.

151/ See n. 43, supra.

this period (e.g., _____ were succeeded by Messrs. _____, _____, and _____, respectively, as _____ _____; _____ _____.[152] This resulted in a significant loss in "institutional memory" of the actual conditions in the Radwaste Facility within the department that was responsible for the operation and material condition of this facility. The new management of the Operations Department became preoccupied with other issues (e.g., operator requalification), and did not conduct regular inspections or tours of this area.[153] Several management initiatives to address housekeeping, decontamination, and cleanup activities were never fully implemented or were just getting underway when additional problems were identified in the Radwaste Facility in 1995 (e.g., the Material Condition Management Walkdown Program).[154]

Second, certain hardware "fixes" and changes in operating procedures were made in the tank rooms which appeared to have eliminated some of the operational problems that had caused spills and leakage in the past (e.g., installation of new pumps and hoses in the filter sludge transfer system and a new level indicator in the Spent Resin Tank, use of more conservative procedures in

---

[152] _____.

[153] _____.

[154] _____ See _____ NU Docs. 143, 192, 193.

transfer and pumping operations).[155] These changes also eliminated the need to access the tank rooms on a regular basis for operational purposes.[156] While a number of Operations and HP personnel were aware of the presence of spilled resin and sludge in these tank rooms, no one (_____. ____) appeared to believe that there were any "active" leaks in any of these rooms until the leak was discovered in the Filter Sludge Tank in November 1994.[157]

Third, under the prevailing ALARA philosophy at Unit 1, entering the tank rooms or any other areas that had been screened off as high radiation areas for non-essential operational purposes, or even for the purpose of taking routine

---

155/ _____. See also n. 107 supra.

156/ _____. These changes may have contributed to a sense of complacency about the conditions in the tank rooms, reinforced the impression that these rooms were in a "controlled" status, and reduced the urgency of cleanup initiatives.

157/ See e.g., _____ _____. This is a critical point. As discussed previously (at pp. 26-27 and nn. 32-35), the Filter Sludge Tank may have been leaking in 1988. However, we found _____ to be very credible and believe his account of the subsequent entry into the Filter Sludge Tank room in _____, _____in which he stated that the room was dry and that there was no evidence of any leak in this tank. See _____. His recollection of the conditions in this room during this _____entry were corroborated by the other NU employees who participated in this entry and the RWP. See _____; NU Doc. 45. While __. ____ did not actually enter the Filter Sludge Tank room during the _____entry, he is listed on the RWP and apparently performed some work outside the room in connection with this entry. _____ stated that he did not recall any water on the floor or any discussion of a leak in connection with this _____entry. _____.

radiological surveys on a periodic basis, was actively discouraged.[158] The A Concentrator Room had not been entered for operational purposes since 1981, the A and B Day Tank room had not been at all entered since 1983, and the most recent entry for survey purposes into the other sealed-off areas in the solid radwaste area had occurred in 1990.[159] As a result, no one appeared to be aware of the spilled resin on the floor of the A Concentrator Tank room, degraded conditions in the A and B Day Tank room, or any additional leaks or spills that might have occurred in the other tank rooms since the last entries into these rooms.

Fourth, while the cleanup of these tank rooms was regularly listed as one of the ultimate goals of the decontamination program for the Radwaste Facility,[160] these types of projects received reduced funding and were often deferred during the period from 1990 to 1995.[161] Indeed, several studies conducted during this period concluded that it would be more cost effective from a budget/ALARA standpoint to wait until decommissioning to cleanup contaminated areas which were not in use and were not causing worker exposures under normal

---

158/ See _____, See also nn. 132-134 supra.

159/ _____; RWP's for entries into the various tank rooms and Radiation Surveys for Radwaste Facility. (NU Docs. 8, 9, 11, 17, 25, 45, 50, 202).

160/ _____, See also n. 99 supra.

161/ _____.

operating conditions.[162] Management interest in meeting the annual exposure goals for Unit 1 and establishing a BWR dose record in 1992-1993, also appeared to have been a significant factor in the decision to defer certain cleanup activities in this area.[163]

Fifth, whenever a specific problem was identified, (e.g., the need to clean out the C CWT Tank, reduce the high volume and curie content of liquid radwaste in the wake of findings in an INPO report, or inspect the pipe supports and condition of the piping in the pipe chases), the corrective measures appeared to focus on efforts to "analyze the problem away" or resolve only that specific problem without appropriate consideration of the potential generic implications of the problem.[164]

---

[162] See e.g., _____ _____.

[163] _____. See also n. 45 supra. Although meeting annual radiation exposure goals was one of the criteria identified in the performance matrix for bonus payments under the various management incentive plans that were in effect at NU during the period from 1992-1995, this was only one of many different performance criteria included in this matrix. See NU Doc. 188. We do not believe that individual financial incentives were a significant factor in the deferral of these activities. Similarly, we do not believe that the potential impact of the higher exposures levels associated with these activities on NU's SALP scores was a significant factor in the decision-making process related to undertaking or deferring any specific cleanup projects.

[164] See n. 40 supra (clean out of C CWT Tank); NU Docs. 99, 100, 103, 108, 111, 121, 122, 133 (response to INPO findings); _____, _____. (analysis of pipechase conditions).

Sixth, as noted previously, there were obvious internal miscommunications and misunderstandings within and among several key departments at Unit 1 (Operations, HP, Engineering and Maintenance) concerning the conditions in the tank rooms, and the roles and responsibilities of the respective departments with respect to these rooms.[165/] There also seemed to be a lack of coordination among these departments in addressing problems and a lack of "follow through" on problem resolution.[166/]

As a result of these factors, the management of Unit 1 was apparently unaware of the magnitude of the additional leakage and deterioration which was occurring in the tank rooms and other sealed-off areas during the period from 1990 to 1994. Moreover, when management did become aware of the leak in the Filter Sludge tank in November 1994, it did not take aggressive

---

165/ For example, many of the HP employees whom we interviewed indicated that the cleanup activities were deferred or abandoned because "Ops did not want to spend the money" or words to that effect. See e.g., _____. Conversely, many of the Ops employees whom we interviewed indicated that these activities were not preformed "because HP wouldn't let us" or words to that effect. See e.g., _____. See also n. 44 supra.

166/ For example, when the hoses from the Filter Sludge Tank room backed up in 1993, Ops Department personnel wanted to enter this room to fix the problem and check the conditions in this room. The ALARA restrictions that HP wanted to impose in connection with this entry led Ops to abandon this entry and propose an alternative approach (i.e., installing new hoses and pumps outside the room) See _____; NU Docs. 116-118, 120. An entry into the Filter Sludge Tank room in 1993 might have led to the earlier identification and correction of the leak in the Filter Sludge Tank.

action to ensure that this problem was completely resolved in a timely manner. Nor did it recognize that this leak could be symptomatic of a much larger problem.

As discussed earlier in this report, the 1994 Videotape records the entry that was made into the Filter Sludge Tank room to assess the extent of the leak. The leak was discussed at several morning meetings at Unit 1 and a still photograph of the leak was reviewed at these meetings. Both the videotape and the still photograph illustrate the extent of the leak and the accumulation of sludge on the floor of the tank room. The entire management team at Unit 1 knew about this problem, but collectively exhibited a lack of urgency, coordination, and follow-through in implementing appropriate corrective action (i.e., actually installing the belly band and cleaning up the sludge pile, rather than just passing the paperwork on this project from one department to another).

The repair of this leak was initially given a high priority. This project was placed on the "Top 10" list of action items to be accomplished at Unit 1. Shortly thereafter, the Engineering Department developed a technical solution, involving the design, fabrication, and installation of the temporary belly band around this tank. A "jumper bypass" was initiated which expedited the processing and approval of this temporary repair. This issue was then deleted from the Top 10 list on the expectation that the installation of the belly band would resolve this problem.[167] The EWO for the fabrication and installation of this belly band was

---

[167] One of the obvious deficiencies in the Top 10 process was the fact that an (continued...)

approved and the band was fabricated by the Maintenance Department. The installation was initially scheduled to occur in May, 1995. The entry into the tank room to install the band was delayed in the interest of minimizing worker exposure levels in order to perform the work in conjunction with another related project involving the replacement of a section of the decant line to the sludge tank.[168] This pipe replacement project encountered its own problems and delays.[169] The facts that (a) the level in the tank had apparently stabilized in the meantime and (b) consideration was also being given to a permanent solution involving the replacement of the entire filter sludge processing system may have also contributed to the lack of urgency in completing the repairs.[170] Nevertheless, after an initial burst of activity, the tank repair and cleanup project languished throughout the summer of 1995.

The factors and circumstances described above help to explain why NU failed to take timely and aggressive action to cleanup the Radwaste Facility

---

[167] (...continued)
item would apparently be deleted from the list when a plan for the corrective action was developed and approved, rather than when this plan was actually implemented. _____.

[168] _____.

[169] _____, See NU Docs. 154, 159, 191.

[170] _____; See also NU Docs. 145-148, 150-151, 153, 155-159 dealing with the proposed replacement of Ecodex precoat media in the filtration system with a new Equa-Flex system, thereby eliminating the need for the existing Filter Sludge Tanks.

during the period from 1990 to 1995 and, in particular, repair the leak in the Filter Sludge Tank and cleanup the Filter Sludge Tank room immediately after this leak was discovered in November, 1994. However, these factors and circumstances do not provide an excuse for this failure.

During our investigation, we did not substantiate any deliberate misconduct or wrongdoing on the part of any NU employee in connection with this failure. To the extent that any mistakes or errors in judgment occurred, we believe that they were due to inadvertence or oversight. However, the fact remains that management personnel at various levels in various departments throughout Unit 1 and Millstone Station[171/] knew, or should have known, about the deteriorating conditions in the Radwaste Facility and failed to take whatever actions were required to ensure that these conditions were promptly and properly corrected. Most of these managers now admit that they are "embarrassed" by these conditions and that they would not have tolerated them had they known the full extent of these conditions.[172/]

Yet, many of them knew about one of the most serious conditions that existed in the Radwaste Facility. Most, if not all, of the senior managers at Unit 1 and other key personnel at Millstone Station saw the photographs and/or

---

171/ See Northeast Utilities Nuclear Group, Millstone Station and Unit 1 Organizational Charts (April 1994/January 1995) (NU Docs. 204).

172/ See e.g., _____ _____ _____.

the videotape of the leak in the Filter Sludge Tank and the sludge pile in the Filter Sludge Tank room during late 1994 and early 1995. In light of their professed intolerance for these types of conditions, it is unclear why one or more of these managers, and/or one or more of the departments involved in the repair project, did not take the initiative to ensure that appropriate action was immediately taken to repair the leak, cleanup this tank room, and investigate the conditions in the other tank rooms.

## VI. CONCLUSIONS

Based upon the results of our investigation, we have confirmed that there were a series of miscommunications between NU and the NRC concerning the conditions at the Millstone Unit 1 Radwaste Facility. However, we believe that these miscommunications resulted from certain fundamental misunderstandings between the NU employees and the NRC inspectors concerning the actual conditions in the Radwaste Facility, NRC's knowledge of these conditions, and the significance of these conditions. We do not believe that any NU employee knowingly provided the NRC with incomplete or inaccurate information concerning the conditions at the Radwaste Facility or deliberately withheld material information concerning the conditions at the Radwaste Facility from the NRC. We have also concluded that there were internal communication problems within and among the various departments at Unit 1 which contributed to NU's failure to take timely and aggressive action to identify and remedy the deteriorating conditions in the Radwaste Facility. However, we did not substantiate any deliberate misconduct or wrongdoing on the part of any NU employee in connection with any of these matters.

APPENDIX A

1800 M Street, N.W.
Washington, D.C. 20036-5869
202-467-7000
Fax: 202-467-7176

Morgan, Lewis
& Bockius LLP
COUNSELORS AT LAW

Kevin P. Gallen
202-467-7462

February 26, 1996

Lillian M. Cuoco, Esq.
Senior Nuclear Counsel
Northeast Utilities Service Company
P.O. Box 270
Hartford, Connecticut 06141-0270

Re: Millstone Unit 1 Radwaste Investigation

Dear Lillian:

This is to confirm that on February 13, 1996, Northeast Utilities Service Company retained Morgan, Lewis & Bockius LLP to conduct a full factfinding review of the concerns raised in NRC Inspection Report No. 96-03 regarding the completeness and accuracy of certain information provided by Northeast Utilities System (NU) employees to NRC inspectors concerning the condition of the Millstone 1 Radwaste Facility. Specifically, our firm has been requested to review documentation, conduct interviews, as appropriate, and to take other such actions as this firm deems necessary to fully investigate the issues related to potential wrongdoing by company personnel in connection with this information. Our proposed investigation plan and schedule for this review is attached.

Documents reviewed by our firm in connection with this factfinding review will be assembled, indexed, and maintained in an auditable file. Similarly, our firm will prepare a summary of each interview, which will be provided to the individual being interviewed to review for accuracy. Information pertaining to each interview will be maintained in a separate interviewee file for each employee, together with other documents relevant to the interview.

We will immediately bring to your attention any information obtained from interviews or document reviews which raise issues other than those involving the quality of information provided to the NRC. This will be done in writing,

addressed to both you and T.L. Harpster, the Director, Nuclear Licensing Services.

Recognizing that this issue, and other issues identified in NRC Inspection Report No. 96-03, will be considered at a March 11, 1996 Pre-Decisional Enforcement Conference, we shall endeavor to complete our investigation and be prepared to provide an oral briefing on our findings to appropriate NU representatives no later than March 8, 1996. Shortly thereafter, we shall prepare and submit a written report documenting the results of our investigation.

This report and the contents of any interviews which our firm may conduct or work product we develop in connection with this factfinding review will not be subject to the attorney-client privilege or considered to be attorney work product. The final report will be provided to you and NU management, and at your direction will also be made available to the NRC.

Sincerely,

Kevin Gallen

Kevin P. Gallen

KPG/pas
Enclosure

## PROPOSED INVESTIGATION PLAN AND SCHEDULE

The proposed investigation plan and schedule for the factfinding investigation being undertaken by Morgan, Lewis & Bockius LLP (ML&B) for NU in connection with the concerns raised in NRC Inspection Report No. 96-03 regarding the completeness and accuracy of the information provided to NRC inspectors by NU employees concerning the condition of Millstone Unit 1 Radwaste Facility is summarized below.

| | Task | Tentative Schedule | Status |
|---|---|---|---|
| 1 | Meetings with NU Licensing Department and Preliminary Document Review. | Feb. 21-22 | Documents reviewed to date include NRC Inspection reports, NU/NRC correspondence, and internal NU memos and reports. |
| 2 | Meetings with NRC Inspectors (_____, _____ ___) to Identify Basis and Extent of NRC Concerns. | Feb. 28 | Terry Harpster (Licensing) has contacted NRC to arrange meetings. |
| 3 | Finalize Scope of Investigation Based Upon Information Obtained in Tasks 1 & 2. | Feb. 28 | This will be done in consultation with NU Legal Department. |
| 4 | Conduct Additional Document Reviews and Interviews at Millstone Site. | Feb. 29-Mar. 1 | An initial list of proposed interviews has been developed. This list will be finalized upon completion of Tasks 1-3. |

| | Task | Tentative Schedule | Status |
|---|---|---|---|
| 5 | Prepare Interview Summaries and Complete Document Reviews. | Mar. 2-4 | Additional document reviews will include personal files of interviewees and additional internal NU documents (QA reports, HP reports, work orders). |
| 6 | Conduct Additional Interviews, As Required, Based Upon Document Reviews and Initial Interviews. Develop Preliminary Findings. | Mar. 5-7 | --- |
| 7 | Provide Preliminary Findings and Conclusions to NU Legal Department and Management. | Mar. 8 | --- |
| 8 | Prepare Final Report. | Mar. 20 | --- |
| 9 | Present Final Report to NU Legal Department and Management. | As requested | --- |

# LIQUID RADIOACTIVE WASTE

## RISK PROFILE

- Low to High

## TYPICAL WORK AREA GAMMA & CONTAMINATION LEVELS

- Upper Level-
  - <0.2–16 mr/hr
  - to 300 mr/hr on piping in valve alley overhead
  - <1k dpm/100cm² general area
  - <1k–25k dpm/100cm² in valve alley moats
  - 1k dpm/100cm² – 12 mrad/100cm² inside piping systems
- Lower Level general area
  - 1–50 mr/hr
  - to 300 mr/hr on various piping
  - <1k–30k dpm/100cm²
  - Higher contamination levels of 100k–400k dpm/100cm² possible in moats if leaks occur on pumps, valves, etc., with alpha levels of 300 dpm/100cm².
  - Smears to 3mr/100cm² in trenches and sumps, with 10k dpm/100cm² alpha.

Spent Resin Pump Room in lower level
- 15–35 mr/hr with up to 400 mr/hr on hoses
- 20k–80k dpm/100cm²

Waste Collector Tank Room in lower level
- 15–30 mr/hr with up to 400 mr/hr on tank bottoms
- <1k–5k dpm/100cm²

Floor Drain Collector Tank Room in lower level
- 60–350 mr/hr with up to 1,800 mr/hr on tank bottoms.
- 10k–25k dpm/100cm²

Radwaste Roof
- 0.2 - 10 mr/hr
- <1k–10k dpm/100cm²

## SPECIAL ATTENTION AREAS

- Higher contamination levels are likely from leaks on most of the fluid systems in rad waste.
- Alpha contamination likely on high level smears.
- Hot particles possible from system breaches.
- Hot spots on various piping.
- General area dose rates and contact dose rates on various tanks and pipes can change greatly depending on what operations is doing.

## WATER PROCESSING

The liquid rad waste systems serve as a collection, storage, and processing point for all radioactive equipment drains, floor drains, resins and sludge generated in Unit 1. These fluids and slurries either drain or are pumped or blown from the various tanks, sumps, moats, and demins to the tanks or sumps in rad waste.

Equipment drains from the various buildings are pumped to the waste collector tank. The waste collector pump takes a suction on this tank and pumps the water through the waste collector filter, then either A or B waste demin and to one of two waste sample tanks. Chemistry samples the processed water and if it meets specifications the water is pumped to the condensate storage tank in the backyard. If it doesn't meet specs it is pumped back to the waste collector tank and processed again. The waste collector filter is a coated filter and when the dp across the filter gets too high the collection medium (ecodex) is blown to the filter sludge tank and new ecodex added to the filter. Periodically when the waste demins become depleted Chemistry will blow the demin down to the spent resin tank and replenish it with a new charge.

Floor drains from the sumps in the various buildings as well as the three sumps in the radwaste building are pumped to one of four floor drain collector tanks in radwaste. The original system of concentrators and concentrated waste tanks is no longer used. A system of bag filters, cuno filters and demins, owned and operated by Chem Nuclear, is used to process the water from the floor drain collector tanks. Water that has been processed is pumped to one of two floor drain sample tanks. Chemistry samples these tank and if the water meets specifications it is pumped to Long Island Sound by the floor drain sample pumps. If the water doesn't meet specs it is sent back to a floor drain collector tank for reprocessing.

The Chem-Nuclear system used to process the floor drain water uses a bag type filter as a pre-filter. This filter is changed out quite frequently depending on the amount of suspended solids in the water. A remote reading instrument in the radwaste control room gives a readout of the dose rates on the side of the filter housing. Typically the filter will read 2-4 times the remote readout and range from 20 - >1000 mr/hr. The next step in the processing is through a set of Cuno filters. These are a finer filter but end up requiring changing less frequently. The final step is through a set of resin beds.

When the filters need changing an HP works with the Chem-Nuc operator. Depending on the dose rates on the filter they are either temporarily stored locally in a drum or immediately transferred to solid radwaste. Any high rad filters that can't be transferred to solid radwaste for whatever reason are temporarily stored in the spent resin pump room. The resin when it becomes depleted is slurried to the spent resin tank.

The waste and floor drain collector tanks tend to accumulate sludge on the bottoms of the tanks. This causes the dose rates on the bottoms of the tanks to be the major source in these areas. A and B floor drain collector tanks are in a locked Tech Spec High Rad Area. In the past, operation of the systems has resulted in dramatic changes in the dose rates on some of the tanks, pumps and piping in lower level.

## SLUDGE AND RESIN

Sludge originating from the waste collector filter, fuel pool filter, and off the bottoms of the rad waste tanks is pumped or blown down to the sludge tanks. These tanks are behind a removable block wall and not normally accessible. In the process of transferring sludge to the tank you end up with excess water also. The sludge is allowed to settle out then the water is pumped off using the decant pump. This pump is located just off the main walkway. While decanting the sludge tanks the operator monitors tank level and watches a TV monitor showing the sightglass in the suction line of the pump. This is to prevent pumping sludge into the decant lines, pump, and floor drain collector tanks. Pumping sludge into these lines will result in dramatic changes in area dose rates and the dose rates on the floor drain collector tank. After decanting the HP tech will verify the dose rates on the decant lines and pump.

Resin originating from the clean-up, fuel pool, or condensate systems as well as the Chem-Nuc skid is sluiced, blown, or pumped to the spent resin tank. The spent resin tank is located behind a removable block wall in lower level. When clean-up and fuel pool resin is transferred to the spent resin tank the lower level access points are posted as High Rad Areas, NO Entry, Resin Transfer In Progress, until the transfer is complete and dose rates verified.

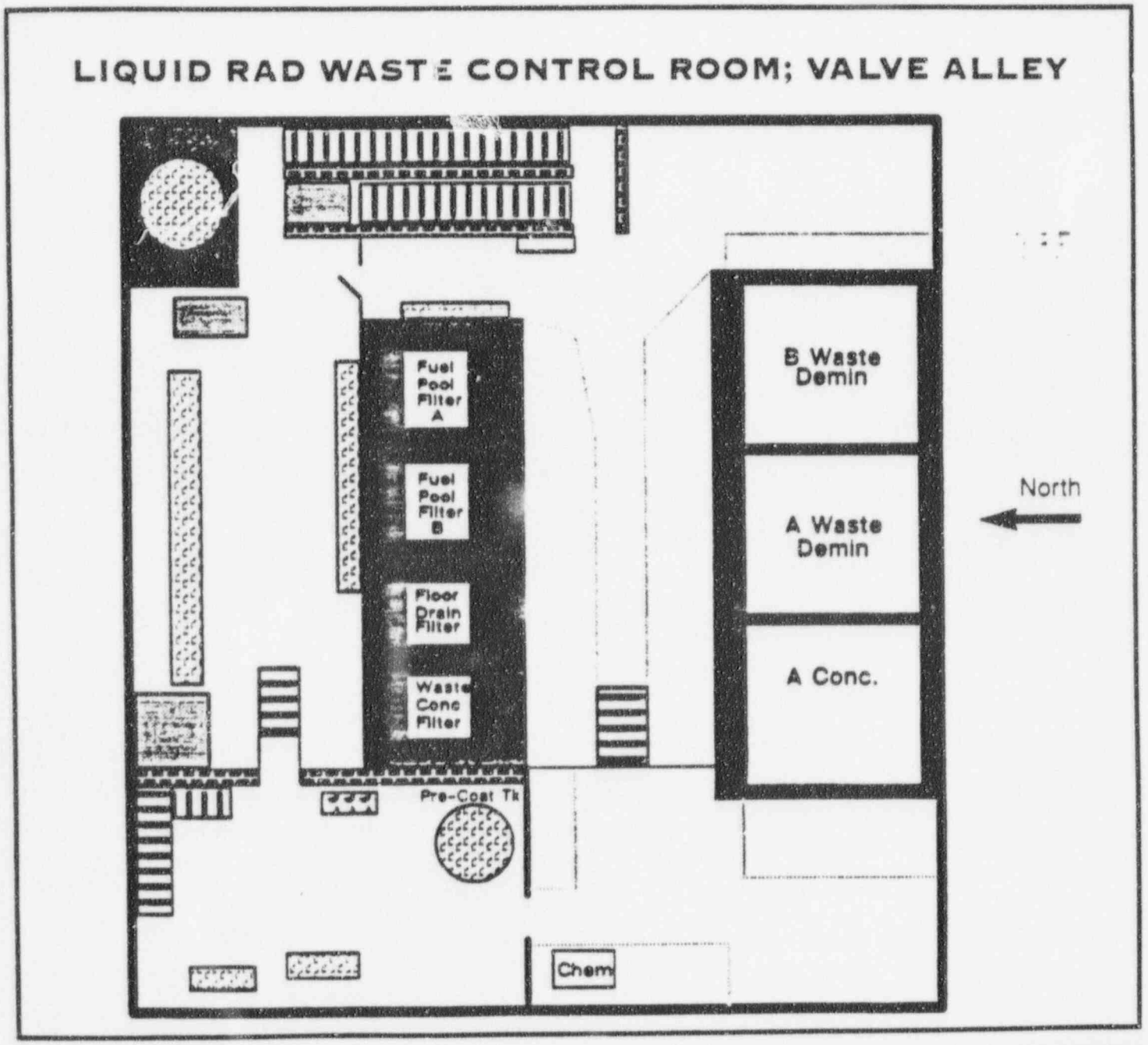
Periodically the sludge tanks and resin tank must be pumped to casks in solid radwaste. Hoses are always hooked up to the resin tank but must be temporarily run to the hose connections at the block

wall door to the sludge tanks. The access points to lower level as well as those areas that the transfer lines pass through are posted High Rad Area, NO Entry, Sludge/Resin Transfer in Progress (some access points are locked), until the transfer is complete, the lines flushed, and the dose rates verified.

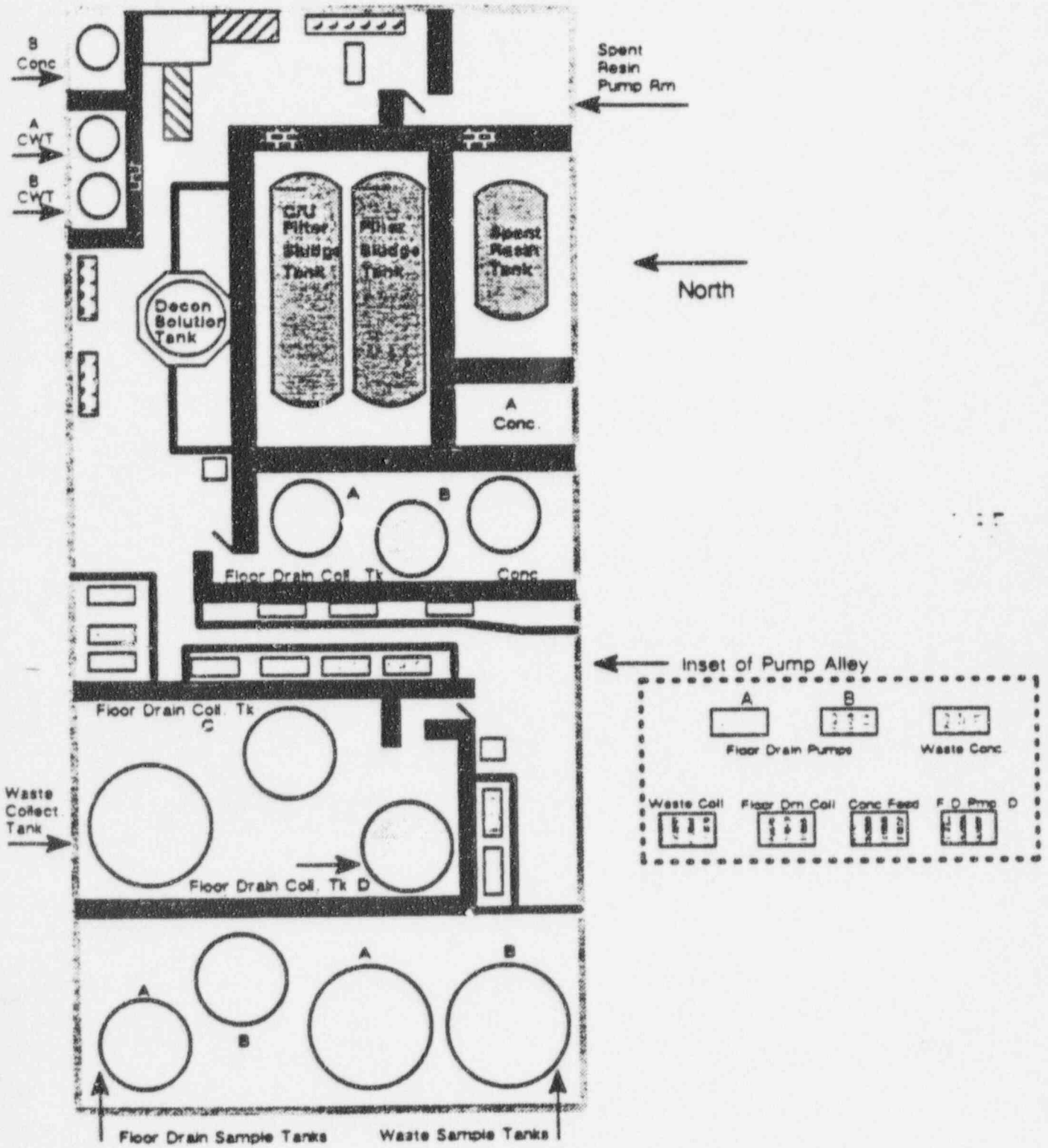
## RADWASTE ROOF

On the radwaste roof is the supply fan for solid radwaste (HVH-23) and the exhaust fans for both liquid (HVE-7A & B) and solid (HVE-12A & B) radwaste. The exhaust fans have hepa filters and furnace type pre-filters which must be changed out periodically. The interiors of the fans and duct work are moderately to highly contaminated and very dusty. Recent surveys showed 15K to 100K dpm/100cm2, but higher levels can be found on the internals in some areas. Because of the dusty nature of the contamination inside the fans the airborne potential is moderate to high.

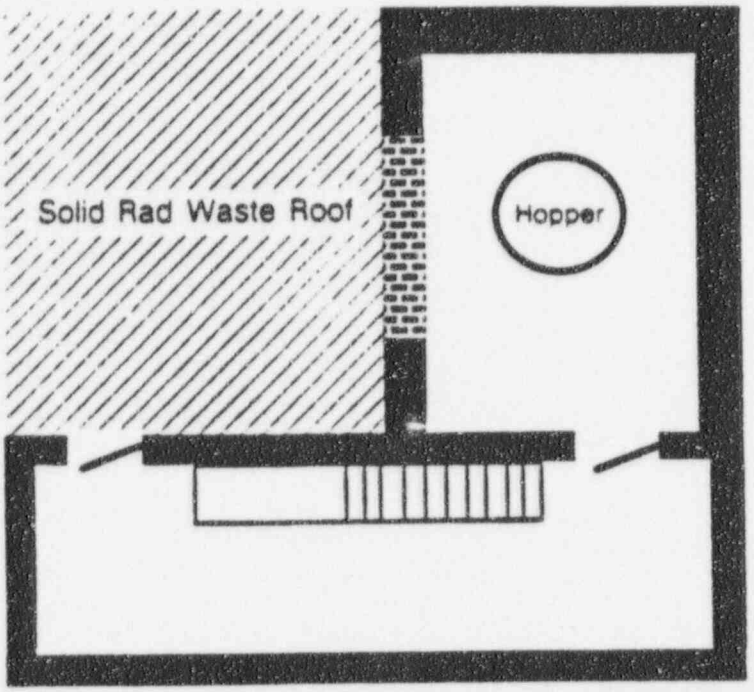
The hopper, centrifuge, and measuring tank rooms contain equipment that is no longer used. They are locked Tech Spec High Rad Areas.



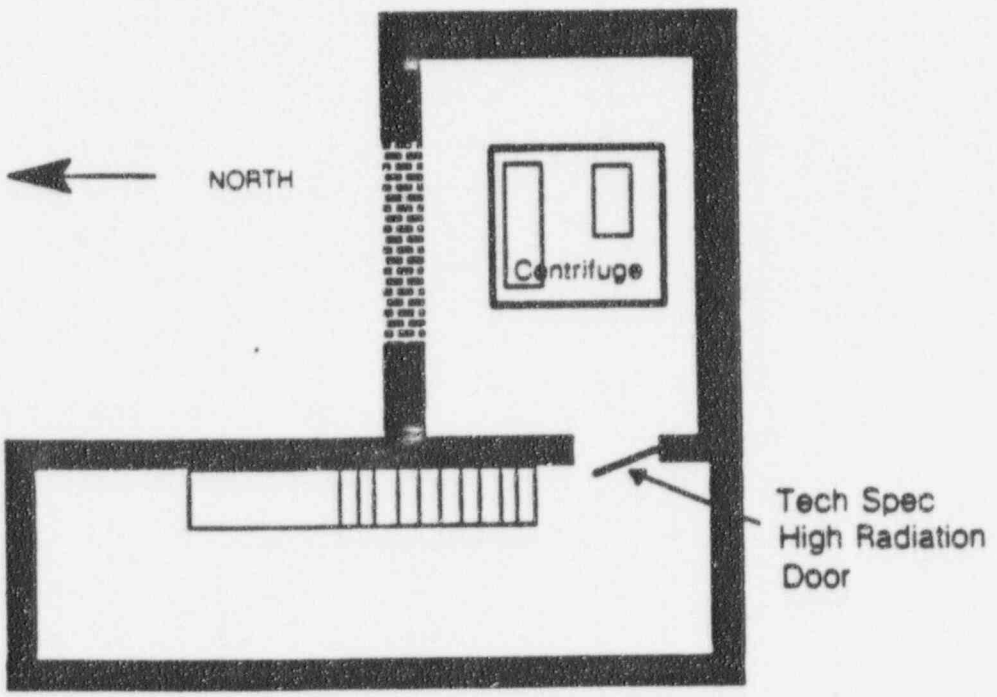
# LOWER LEVEL RAD WASTE



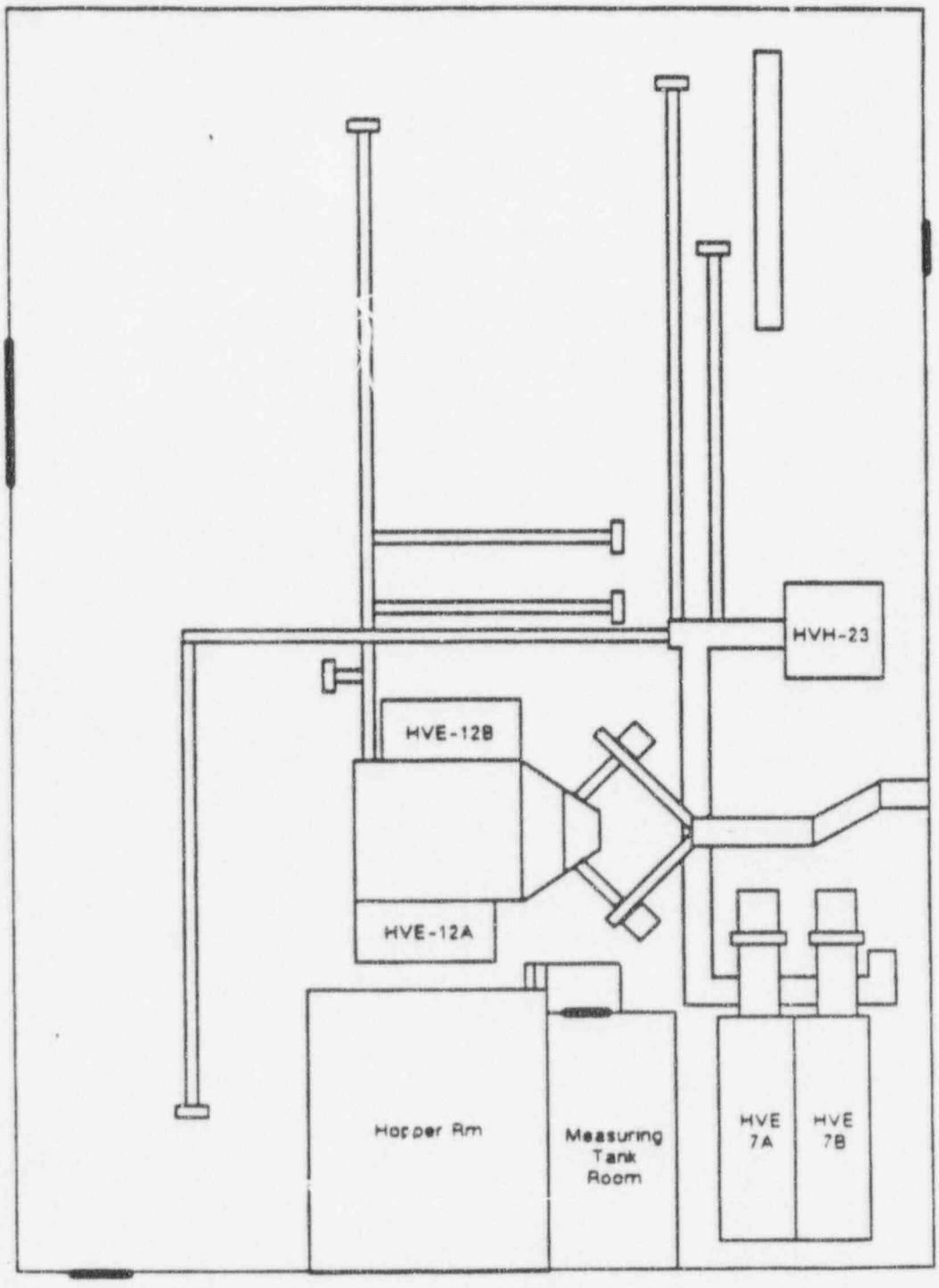
## RAD WASTE HOPPER AREA 26'2"




## RAD WASTE CENTRIFUGE AREA 38'8"



# RAD WASTE ROOF



# REPORT TO NORTHEAST UTILITIES SYSTEM ON THE INVESTIGATION INTO CERTAIN CONCERNS RELATED TO THE MILLSTONE UNIT 1 RADWASTE FACILITY

## Index of NU Documents

1. Memorandum, dated 3-23-79, from _____ (IE) to NRC, enclosing IE Information Notice No. 79-07, Rupture of Radwaste Tanks.

2. Letter, dated 3-29-79, from _____ (NU) to _____ (NRC) enclosing LER 79-06/04T-0 re: projected liquid waste discharges.

3. Memorandum, dated 10-19-79, from _____ (IE) to NRC re: IE Circular No. 79-21, Prevention of Unplanned Releases.

4. Letter, dated 11-16-79, from _____ (NU) to _____ (NRC) enclosing report concerning radioactivity contained in one of the waste processing tanks.

5. Letter, dated 5-2-80, from _____ (NU) to _____ (NRC) re: Millstone Nuclear Power Station, Unit No. 1 Low Level Radioactive Waste Disposal, enclosing Proposed Process Control Program.

6. IE Circular No. 80-18, 10 C.F.R. 50.59 Safety Evaluations for Changes, dated 8-22-80, re: Radioactive Waste Treatment Systems.

7. Memorandum, dated 3-24-81, from _____ (NU) to _____ re: Health Physics Appraisal enclosing response letter concerning "Significant Appraisal Findings" and "Notice of Violation."

8. Radiation Work Permits for A Concentrator dated 1981.

9. Radiation Work Permits for Spent Resin Tank Room dated 1982-1990.

10. Memorandum, dated 6-2-83, from _____ (NU) to Distribution re: the formation of a Unit 1 Radwaste Task Force.

11. Radiation Work Permits for A & B CWT Tank Room dated 1983.

12. Memorandum, dated 7-7-83, from _____ to Radwaste Task Force re: Radwaste Task Force Report WPA.

13. Meeting Minutes of Radwaste Task Force, dated 9-13-83, re: separation of unit into six areas.

14. Memorandum, dated 11-15-83, from _____ (NU) to Distribution re: Radwaste Task Force Meeting Notes for 11-14-83 re: A & B Concentrators.

15. Memorandum, dated 2-1-84, from _____ (NU) to Distribution re: Radwaste Task Force Meeting Minutes for 1-25-84 re: solid radwaste modifications.

16. Job Order 184-103, dated 2-13-84, re: retube B Concentrator.

17. Radiation Work Permits for Filter Sludge Tank Room dated 1984.

18. Project Description, dated 7-15-85, re: Upgrading of Piping and Instrumentation Diagrams and Supporting Documents.

19. System Description, dated 6-86, re: Solid Radwaste System.

20. Plan for Spent Resin Tank Room Floor Clearing with Scavenger Robot, by _____, 1986.

21. Controlled Routing 6895-1, INPO Finding RP.9-1, dated 1-7-88. INPO Evaluation, Management Action Plan re: Control of Contamination At Its Source.

22. Memorandum, dated 12-30-87, from _____ (NU) to _____ re: Areas of Improvement in Unit 1 Radwaste (JPA 87-218).

23. Radiation Survey of Tank Rooms dated 1-88.

24. Controlled Routing Activity Update Sheet, dated 1-7-88, re: Controlled Routing 6895-S, enclosing INPO Finding OE.4-1 and 6-88 Status Update of 1987 INPO Evaluation.

25. Radiation Work Permit for Filter Sludge Tank Room, 1988.

26. Letter, dated 2-19-88, from _____ (NU) to NRC enclosing Licensee Event Report 88-001-00 re: Inadvertent Discharge of Unsampled Floor Drain Sample Tank 'B.'

27. Memorandum, dated 2-23-88, from _____ (NU) to _____ re: JPA 87-218, Decontamination of Radwaste Tank Rooms.

28. Memorandum, dated 3-9-88, from _____ to _____ re: JPA 88-015, Solid Radwaste Transfer System.

29. Memorandum, dated 3-15-88, from _____ (NU) to _____ re: 1987 INPO Finding RP.9-1.

30. Memorandum, dated 7-18-88, from _____ (NU) to _____ re: Controlled Routing 6895-I, RP.9-1 Radwaste Bldg. Material Condition.

31. Memorandum, dated 8-29-88, from _____(NU) to _____ re: NUSCO Audit A60492, Radioactive Material Handling Department Activities.

32. Memorandum, dated 9-30-88, from _____ (NU) to _____ re: Controlled Routing 7162 NUSCO Audit A60492, Radioactive Material Handling Department Activities, Finding F04.

33. Memorandum, dated 10-3-88, from _____ (NU) to _____ _____re: NUSCO Audit A60492, Radioactive Material Handling Department Activities, Controlled Routing 7162.

34. Memorandum, dated 10-26-88, from _____. (NU) to _____ re: NUSCO Audit A60492, Radioactive Material Handling Department Activities.

35. Controlled Routing 7162, dated 11-3-88, re: NUSCO Audit A60492, Radioactive Material Handling Department Activities.

36. Memorandum, dated 12-16-88, from _____. (NU) to _____re: Late Response to Audit A60492, Radioactive Material Handling Department Activities.

37. Memorandum, dated 12-21-88, from _____ (NU) to _____ re: Response to Audit A60492 (CR 7162).

38. Memorandum, dated 12-21-88, from _____ (NU) to _____ re: Additional Responses to Audit A60492.

39. Memorandum, dated 1-10-89, from _____(NU) to _____ re: NUSCO Audit A60492 (NOA # 9818-0) (NEO-542).

40. Memorandum, dated 1-10-89, from _____ (NU) to _____ re: Response to Audit A60492, Radioactive Material Handling Department Activities.

41. Memorandum, dated 1-17-89, from _____ (NU) to _____ re: Controlled Routing 6895-I, JPA 87-218, 1987 INPO Finding RP.9-1, Unit 1 Radwaste Improvement Status Report.

42. Radiation Survey of A Concentrator Room dated 1-25-89.

43. Memorandum, dated 1-26-89, from _____ (NU) to _____ re: Transmittal of Radwaste Department Audits.

44. Memorandum, dated 3-31-89, from _____ (NU) to _____ re: Controlled Routing 6895-I, 1987 INPO Finding RP.9-1, Radioactive Contamination Control.

45. Radiation Work Permit for Filter Sludge Tank Room, dated 2-1-89.

46. Memorandum, dated 2-27-89, from _____ (NU) to _____, re: JPA 87-218 Decontamination of Radwaste Tank Rooms.

47. Memorandum, dated 3-20-89, from _____ (NU) to _____, re: JPA 87-218 Decontamination of Radwaste Tank Rooms.

48. Memorandum, dated 3-31-89, from _____ (NU) to _____, re: CR 6895-I; 1987 INPO Finding RP.9-1, Radioactive Contamination Control.

49. Memorandum, dated 5-22-89, from _____ (NU) to Distribution re: Beneficial Suggestion, Decon. Solution Tank Modification.

50. Radiation Surveys of Centrifuge & Hopper Rooms dated 1989-1990.

51. Beneficial Suggestion, dated 8-3-89, _____, re: Reduction of Salt Water to Liquid Radwaste, Reduction of Unnecessary Activity Discharged to L.I.S, and Memorandum, dated 8-11-89, from _____to _____, re: Beneficial Suggestion.

52. Memorandum, dated 8-16-89, from _____ (NU) to _____ re: Mobile Radwaste Processing System Safety Evaluation (CR 7507).

53. Invoice No. 2894, dated 9-26-89, from East Coast Environmental Service Corp. to NU for Work Order 7410 (leaking sulfuric acid tank into drums and stored drums).

54. Memorandum, dated 11-28-89, from _____ (NU) to _____, and _____re: Radwaste Review Committee Meeting No. 89-3, enclosing subject meeting notes.

55. Invoice No. 3289, dated 1-15-90, from East Coast Environmental Service Corp. to NU for Work Order 7760 (pump out sulfuric acid tank).

56. Invoice No. 3290, dated 1-15-90, from East Coast Environmental Service Corp. to NU for Work Order 7791 (removed empty piping).

57. Invoice No. 3292, dated 1-16-90, from East Coast Environmental Service Corp. to NU (caustic disposal).

58. Invoice No. 3291, dated 1-16-90, from East Coast Environmental Service Corp. to NU (dispose of empty tanks).

59. Memorandum, dated 2-7-90, from _____ (NU) to _____Re: Replacement of Flex Hoses With Hard Piping in Radwaste Systems (CR 7692, Rev. 0).

60. Memorandum, dated 2-13-90, from _____ (NU) to _____ re: Control Routing 7692, Revision 0, Use of Flexible Hose in Radwaste Systems.

61. Controlled Routing Activity Update Sheet, Controlled Routing 7692, dated 2-15-90 re: Use of Flexible Hose in Radwaste Systems.

62. Memorandum, dated 2-20-90, from _____ (NU) to _____ re: Use of Flexible Hose in Radwaste Systems.

63. Design Change Notice, DMI-P-0006-90, dated 3-22-90, re: Radwaste Chemical Addition System Removal.

64. Fax Cover Sheet, dated 4-2-90, from East Coast Environmental Service Corp. to _____ (NU) re: P.O. # 873915.

65. Work Order MI 90 02430, Removal of Chem Addition System, job completion dated 4-3-90.

66. Memorandum, undated, from _____ (NU) to _____re: East Coast Environmental Proposal for Removing the Acid and Caustic Systems.

67. Memorandum, dated 4-3-90, from _____ (NU) to _____ re: Controlled Routing 6895-I, 1987 INPO Finding RP.9-1, Radioactive Contamination Control.

68. Letter, dated 4-10-90, from _____(NU) to _____ (NRC) re: Response to Notice of Violation Combined Inspection Report Nos. 50-245/90-04, 50-336/90-05, 50-423/90-05.

69. PDCR Evaluation Form, dated 4/12/90, re: Removal of Radwaste Chemical System.

70. ALARA Design Review Evaluation Sheet, completion date 6-14-90, re: Radwaste H: Radiation Tech. Spec. Screens.

71. PDCR Evaluation Form, MP-1-90-063, System 313, dated 6-20-90, re: Radwaste Hi Radiation Tech. Spec. Screens.

72. ALARA Job Estimate for C CWT Bottoms Removal dated 7-30-90.

73. Memorandum, dated 8-14-90, from _____ (NU) to _____ re: NUSCO Audit A60504, Radwaste Shipments.

74. Memorandum, dated 8-16-90, from _____ to _____ re: Water Leaks Through Roof/Ceiling Cracks of the Radwaste Building Elevation 14'-6'.

75. Letter, dated 8-22-90, from _____ (NU) to NRC re: Reply to Notice of Violation EA 90-111).

76. Memorandum, dated 8-30-90, from _____ (NU) to _____ _____ re: Interim Report on Methane Generation of Ecodex Filter Media Waste.

77. Letter, dated 11-21-90, from _____ (NU) to NRC enclosing Licensee Event Report 90-017-00 re: Main Steam Line Radiation Monitor Hi-Hi Setpoint Set Nonconsecutive - Due to Procedure Error.

78. Annual Report, pp. 4 & 6, dated 2-15-91, re: Plant Design Change.

79. Letter, dated 7-19-91, from _____ (NU) to NRC enclosing Licensee Event Report 91-021-00 re: Inadequate Recirculation Time for Decontamination Solution Tank.

80. Radiation Survey of Floor Drain Collector Tank Room dated 7-29-91.

81. ALARA Exposure Controls Summary, dated 7-29-91, re: "C" Concentrated Waste Tank Bottoms.

82. Memorandum, dated 7-30-91, from _____ (NU) to _____ _____ re: Commitment to Process and Dispose of Solidified Evaporator Bottoms of the "C" Concentrated Waste Tank.

83. Memorandum, dated 8-26-91, from _____ (NU) to _____ _____ re: Status Report on Commitment to Process and Dispose of Solidified Evaporator Bottoms in the "C" Concentrated Waste Tank.

84. ALARA Job Checklist, dated 8-91, re: "C" Concentrated Waste Tank Bottoms Removal.

85. Memorandum, dated 10-1-91, from _____ (NU) to _____ _____re: Status Report on Commitment to Process and Dispose of Solidified Evaporator Bottoms in the "C" Concentrated Waste Tank.

86. Memorandum, dated 10-9-91, from _____ (NU) to _____ _____re: Recommendation Concerning the Liquid Radwaste Condensate Transfer Line.

87. Memorandum, dated 10-29-91, from _____ (NU) to _____ _____ re: Evaluation of the East Floor Drain Sump Area in Lower Level Liquid Radwaste.

88. Radiation Survey Figure No. 17, dated 12-19-91, Lower Level Rad Waste, Pre/Post Hydrolazing Survey of East Sump.

89. Memorandum, dated 12-30-91, from _____ (NU) to _____ _____ re: Evaluation of the Hydrolazing Efforts on the East Lower Level Radwaste Sump.

90. Work Order MI 91 12121, re: "B" Concentrator Preheater Removal, work completion date 1-22-92.

91. ALARA Progress Review, dated 2-12-92, re: CWT Bottoms Removal.

92. Memorandum, dated 2-18-92, from _____ to _____, re: Reduce Radwaste Burial Volume by Eliminating Unnecessary Producers of Liquid Radwaste.

93. ALARA Progress Review, dated 3-11-92, re: CWT Bottoms Removal.

94. PDCR Work Orders and Other Documents re: Removal of "B" Concentrator Auxiliary Equipment dated 1990-1992.

95. ALARA Job Estimate, dated 4-1-92, re: "C" Concentrated Waste Tank Bottoms Removal.

96. Memorandum, dated 4-14-92, from _____ (NU) to _____ _____ re: Radwaste Accomplishments and Goals Update.

97. PEP Phase II Completion Report, dated 6-4-92, to NRC (Action Plan Development Summary).

98. Graph, dated 8-24-92, "C" Concentrated Waste Tank Cleanup - Present Exposure.

99. Memorandum, dated 8-31-92, from _____ (NU) to _____ re: Five Year Business Plan Item G (NOA 10449 Rev. 2) (reduce radioactive effluent releases).

100. A Plan to Reduce Low Level Radioactive Waste Generation Targeted Toward Bettering INPO Averages at Millstone & Connecticut Yankee dated 10-1-92.

101. Memorandum, dated 10-14-92, from _____ (NU) to _____ _____ re: Recommendation Regarding "A" Concentrator Steam Pipe Source Term Reduction.

102. QSD Audit Report, dated 11-24-92, "Radwaste/PCP," Audit A60559, concerning shipment of radioactive waste and other material.

103. Memorandum, dated 11-29-92, from _____ (NU) to List D re: Radwaste Volume Goals.

104. Memorandum, dated 12-10-92, from _____ (NU) to _____ _____ re: Significant Need for Modification of Spent Resin and Filter Sludge Systems in Liquid Radwaste.

105. ALARA Progress Review, dated 1-25-93, re: CWT Bottoms Removal.

106. Memorandum, dated 1-25-93, from _____ to _____ concerning C Concentrated Waste Tank.

107. ALARA Progress Review, dated 1-25-93, re: CWT Bottoms Removal.

108. Memorandum, dated 2-2-93, from _____ (NU) to _____ re: INPO Findings Action Plans.

109. Memorandum, dated 2-6-93, from _____ (NU) to Distribution re: 1992 Exposure Summary.

110. ALARA Exposure Post Job Review, dated 2-16-93, re: "C" Concentrated Waste Tank Bottoms Removal.

111. Action Plan to Reduce Liquid Radwaste dated 2-19-93.

112. Memorandum, dated 3-4-93, from _____ (NU) to _____ re: Radwaste Turnover.

113. Memorandum, dated 3-5-93, from _____ (NU) to Distribution re: Concentrated Waste Tank Post Job Review.

114. Memorandum, dated 3-17-93, from _____ (NU) to _____ re: Cost Analysis for the Removal of the MP-1 'B' Concentrator.

115. Memorandum, undated (1993), from _____ (NU) to _____ _____ re: Radwaste Accomplishments and Goals, HAR 93089.

116. ALARA Exposure Estimate (Draft), dated 4-10-93, re: Enter Filter Sludge Tank Room and Adjust/Replace FST Hoses.

117. ALARA Progress Review, dated 4-12-93, re: Filter Sludge Tank Hoses.

118. ALARA Suggestion, dated 4-19-93, submitted by _____re: entry into the Filter Sludge Tank Room.

119. Memorandum, dated 6-8-93, from _____ (NU) to _____ _____ re: Cleanup Filter Sludge Tank Decant Line Replacement.

120. Project Notes, dated 7-30-93, re: entry into the Filter Sludge Tank Room.

121. Memorandum, dated 9-15-93, from _____ (NU) to _____ _____re: INPO Finding CY.5-1 (1992), Liquid Radwaste, CR 8597B.

122. Controlled Routing Activity 8597B, due date 9-15-93, re: INPO Finding CY.5-1 (1992) Liquid Radwaste, Action Item 2.

123. Hand-written Summary of Low Level Radwaste Event dated 12-13-93 (Sludge Spill).

124. Letter, dated 3-23-94, from _____ (NU) to NRC re: Integrated Safety Assessment Program Update Report.

125. Memorandum, dated 6-1-94, from _____ (NU) to 700 Series Copy Holder re: Cancellation of MP 709.1, Rev. 1, "Hydro-Lasing Interior of Piping Systems," and MP709.2, Rev. 0, "Hydro-Lasing Interior of Radwaste Tanks."

126. Memorandum, dated 6-1-94, from _____ (NU) to 700 Series Copy Holder re: Cancellation of MP 750.1, Rev. 2, "Aqua-Chem Radwaste Evaporator."

127. Memorandum, dated 9-21-94, from _____ (NU) to _____ re: MP#1 Radwaste Systems Operating Status (Ops Crit. Drawings and System Drawing Updates).

128. Plant Information Report, dated 10-24-94, re: Filter Sludge Tank Leak.

129. Radiation Survey Figure No. 17, dated 11-3-94, re: LLRW Sludge Tank Room Entry With Robot.

130. Radiation Survey of Filter Sludge Tank Room dated 11-4-94.

131. NCR, dated 11-8-94, re: Filter Sludge Tank Leak.

132. NCR and Jumper Device Control Sheet for Filter Sludge Tank Leak Repairs dated 11-8-94.

133. Memorandum, dated 11-18-94, from _____ (NU) to Millstone Operations Department Managers re: Liquid Radioactive Waste Management Program, enclosing Controlled Routing Activity 8597E re: INPO Finding CY-5.1 (1992) Liquid Radwaste Action Item 5.

134. Memorandum, dated 12-9-94, from _____ to _____ re: condition of pipes in radwaste pipe chase (including photos).

135. QAS Audit Report (QAS-94-4403), dated 12-14-94, "Radwaste/Process Control Program," Audit A24046, A/R 94004380 re: Storage/PCP Audit.

136. Memorandum, dated 12-14-94, from _____ (NU) to _____ and _____ re: SNRB Audit A24046, "Radwaste/Process Control Program."

137. Memorandum, dated 1-24-95, from _____ to _____, re: Decon Solution Tank Discharge Filter Size Adjustment - per phone conversation.

138. Memorandum, dated 2-2-95, from _____ (NU) to _____ re: East Floor Drain Sump Area in Lower Level Liquid Radwaste.

139. Memorandum, dated 2-9-95, from _____ to _____ re: Installation of a counter on the turbine building a/c sump pump.

140. Memorandum, dated 2-17-95, from _____ to _____ re: Maintenance of 1-LRF-63B (B FDST Discharge Valve).

141. Memorandum, dated 2-24-95, from _____ to _____ re: "catch tank" for sate water and soapy water to reduce Curies 30%, reducing media usage as well.

142. Memorandum, dated 3-17-95, from _____ to _____ re: Update on "D" FDCT.

143. MCP Managers Zone Inspection Report, Attachment 3, Manager: _____, dated 3-27-95.

144. ACR attachment concerning increase in curies discharged to L.I.S. as a result of inattention to regular roof gutter cleaning, dated 4-20-95.

145. Memorandum, dated 4-26-95, from _____ to _____ re: Proposals on Liquid Radwaste Issues.

146. Memorandum dated Spring/Summer, 1995, re: Equipment Processing Requirements and Specifications for Millstone Unit 1 Liquid Radwaste.

147. Memorandum dated 5-3-95, from _____ to _____ re: EPRI Report Comments.

148. Memorandum, dated 5-11-95, from _____ to EWR Approval Committee Members, re: General Overview (w/attachments).

149. Memorandum, dated 5-17-95, from _____ to _____ re: Financial Justification of DST Header Modifications in the Reactor Building.

150. Memorandum, dated 5-17-95, from _____ to _____ re: Replacing Waste Collector Filter with (Charcoal) Equa-Flex System -- Eliminating use of Ecodex.

151. Memorandum, dated 5-18-95, from _____ to _____l re: Lease-purchase Option for Obtaining Equa-Flex Vessels to Process Waste Collector Water, Eliminating Use of Ecodex.

152. Memorandum, dated 5-31-95, from _____ to _____ re: Justification for DST Header Modification (Rx.Bld.) and DST to FDST Tie-in Mod. (LLRW).

153. Memorandum, dated 8-9-95, from _____ to _____ re: Equa-Flex Vessel Installation Prior to the '95 Outage.

154. Memorandum, dated 8-9-95, from _____ re: Decant Line Clean-out Valve Installation.

155. Memorandum, dated 8-10-95, from _____ to _____ re: Radwaste Projects.

156. Memorandum, dated 8-10-95, from _____ to _____ re: Placement of a Conductivity Cell in Floor Drain Header to Track Salt Water.

157. Memorandum, dated 8-16-95, from _____ to _____ re: Liquid Radwaste.

158. Memorandum, dated 8-16-95, from _____ to _____ re: _____ to _____ Memo about Installation of Equa-Flex Vessel for Radwaste.

159. Memorandum, dated 8-30-95, from _____ to _____ re: Filter Sludge Tank.

160. Graphs showing Daily Filter Sludge Tank Level for June 1994 through July 1995.

161. Note, dated 9-95, from _____ files to _____ re: NRC inspection.

162. Radiation Survey of Tank Rooms dated 9-21-95.

163. Letter, dated 10-18-95, from _____ (NU) to NRC re: Action Plans for Radwaste Observations in NRC Inspection Report, enclosing requested plans and summary of commitments.

164. Millstone Nuclear Power Station, Unit No. 1, Waste Processing Event, dated 10-19-95.

165. Liquid Radwaste Remediation Project Report for week ending 10-20-95.

166. Liquid Radwaste Remediation Project Weekly Report dated 10-27-95.

167. Memorandum, dated 10-30-95, from _____ (NU) to _____ _____ re: Unit One Liquid Radwaste Characterization Field Notes.

168. Proposal for the Remediation of the Unit One Liquid and Solid Radwaste Facilities dated 11-1-95.

169. Radwaste Remediation Project Proposal dated 11-2-95.

170. Radwaste Remediation Project Weekly Report dated 11-3-95.

171. Radwaste Remediation Project Weekly Report dated 11-10-95.

172. Radwaste Remediation Project Weekly Report dated 11-18-95.

173. Radwaste Remediation Project Weekly Report dated 11-25-95.

174. Memorandum, dated 11-27-95, from _____ to _____, re: Start-up issues.

175. Radwaste Remediation Project Weekly Report dated 12-2-95.

176. Radwaste Remediation Project Weekly Report dated 12-9-95.

177. Millstone Nuclear Power Station, Unit Nos. 1, 2 & 3, Response to a Request for Additional Information, NRC Inspection 50-245/95-35; 50-336/95-35; 50-423/95-35, dated 12-13-95.

178. Radwaste Remediation Project Weekly Report dated 12-16-95.

179. Radwaste Remediation Project Weekly Report dated 12-23-95.

180. Radwaste Remediation Project Weekly Report dated 12-30-95.

181. Radwaste Remediation Project Weekly Report dated 1-6-96.

182. Millstone Nuclear Power Station, Unit No. 1, Reply to a Notice of Violation, Inspection Report Nos. 50-245/95-31; 50-336/95-31, and 50-423/95-31, dated 1-10-96.

183. Radwaste Remediation Project Weekly Report dated 1-13-96.

184. Radwaste Remediation Project Weekly Report dated 1-20-96.

185. Radwaste Remediation Project Weekly Report dated 1-27-96.

186. Liquid Radwaste Remediation Project Weekly Report dated 2-3-96.

187. Millstone Nuclear Power Station, Waste Prevention Committee Charter.

188. Northeast Utilities Performance Reward Plans, Performance Incentive Programs, and Management Incentive Plan Programs (1992 - 1996).

189. Unit 1 ALARA Goals and Actual Exposure Levels dated 1985-1995.

190. Millstone Nuclear Power Station, Unit 1, Systems Familiarization Manual.

191. Decant Line Replacement Project documents.

192. Millstone Station, Material Condition Program Manual.

193. Millstone Unit 1 Degraded Material Condition of the Liquid Radwaste System Root Cause Evaluation (March 1996).

194. 1988 Videotape of Filter Sludge Tank Room, Spent Resin Tank Room and Floor Drain Collector Tank.

195. 1994 Videotape of Filter Sludge Tank Room.

196. 1995 Videotape of Radwaste Facility.

197. Millstone Nuclear Power Station, Unit 2, Reply to Notice of Violation, dated 12-16-94, from Inspection Reports 50-245/94-32, 50-336/94-31, 50-423/94-29.

198. Millstone Nuclear Power Station, Unit 2, Reply to Notice of Violation, dated 7-7-95, from Inspection Reports 50-245/95-19, 50-336/95-19, 50-423/95-19.

199. Millstone Nuclear Power Station, Health Physics Operations Procedure, Routine Survey Frequency RPM 1.5.1, Revision 2, dated 8-10-95.

200. Northeast Utilities, Nuclear Group Policy, 4.1, 4.2, 4.3, 4.4, 4.5, 5.1

201. Northeast Utilities, Millstone Unit 1 Operating Survey Matrices (1992-1995).

202. Millstone Nuclear Power Station Unit 1, Radwaste Facility Radiation Surveys (1990-1995).

203. Radwaste Remediation Project Weekly Reports, dated 2-10-96 through August 19, 1996.

204. Northeast Utilities Nuclear Group, Millstone Station, and Unit 1 Organizational Charts (April 1994/January 1995).

# REPORT TO NORTHEAST UTILITIES SYSTEM ON THE INVESTIGATION INTO CERTAIN CONCERNS RELATED TO THE MILLSTONE UNIT 1 RADWASTE FACILITY

## Index of NRC Documents

1. Inspection Report 50-245/89-04, dated 5-11-89

2. Inspection Report 50-245/89-09, dated 5-19-89, pp. 3-4 (External Exposure Control, Internal Exposure Control; Control of Radioactive Materials and Contamination, Surveys and Monitoring; and Maintaining Occupational Exposures ALARA).

3. Inspection Reports 50-245/89-15, 50-336/89-14, 50-423/89-10, dated 7-7-89 (inspection of the effluent, transportation and solid radioactive waste programs, no violations or deviations were noted).

4. Systematic Assessment of Licensee Performance Report 88-99, dated 10-2-89, p.13 (Radiological Controls); and NU Response to Inspection Report 89-80, dated 11/8/89, p.2 (Maintenance Inspection).

5. Notice of Violation, dated 2-23-90, from NRC to Niagara Mohawk Power Corporation, Nine Mile Point, re: Flooding in Radwaste Storage Area (including Augmented Inspection Team Report of 10-2-89 and Enforcement Conference Report of 1-2-90).

6. Systematic Assessment of Licensee Performance Report 88-99, dated 4-10-90, p.8; and ISAP, dated 4-30-90, pp.17-20 -- (EOP Related Systems).

7. Letter, dated 4-10-90, from _____ (NRC) to _____ (NU) re: Systematic Assessment of Licensee Performance, Final Combined Report Numbers. 50-245/88-99; 50-336/88-99 (enclosing only page 13 of report re: radiological housekeeping weaknesses).

8. Inspection Report 50-245/90-08, dated 5-30-90 (inspection of circumstances surrounding shipment of waste irradiated hardware, two violations in the area of radwaste and transportation).

9. Enforcement Conference Report 50-245/90-08, dated 6-25-90 (violations in the area of radwaste and transportation of radioactive materials).

10. Mid Systematic Assessment of Licensee Performance Report 50-245/90-80, dated 7-5-90, p.3 (involving housekeeping activities and radiation monitors (Rad Waste Volume chart attached)).

11. Inspection Report 50-245/90-07, dated 7-6-90, p.5 (Update of Final Safety Analysis Report; Maintenance Surveillance).

12. Notice of Violation and Proposed Imposition of Civil Penalty, dated 7-23-90, (Inspection Report 50-245/90-08) (involving the shipment of a package containing irradiated waste).

13. Inspection Reports 50-245/90-14, 50-336/90-15, 50-423/90-13, dated 8-24-90 (inspection of radiological controls program, one non-cited violation was identified during the inspection involving failure to post a radioactive materials storage area, including areas identified for improvement).

14. Inspection Reports 50-245/90-15, 50-336/90-16, 50-423/90-14, dated 9-5-90 (inspection of transportation and solid radioactive waste programs, no violations or deviations were noted, however, two items were identified which warrant licensee followup actions concerning the processing of long-stored evaporator bottoms and the identification of the radioactive contents and activity in a stored drum).

15. Inspection Reports 50-245/91-07, 50-336/91-10, 50-423/91-08, dated 5-2-91 (inspection of radiological controls during a Unit 1 refueling outage, one violation was identified involving two examples of failure to follow radiation protection procedures as required by Technical Specification 6.11).

16. Systematic Assessment of Licensee Performance Report 89-99, dated 5-26-91, pp. 7-8 (involving plant operations with strengths in staff and safety, with some minor exceptions involving operator response to transients and equipment failures, management involvement, and improvements to EOPs); p. 19 (involving solid radwaste transportation, liquid and gaseous effluent controls, radiological environmental monitoring program with strengths in radiological controls program, effective external exposures controls, management involvement and control).

17. Inspection Reports 50-245/91-22, 50-336/91-26, 50-423/91-23, dated 10-2-91 (inspection of radwaste and transportation programs, no violations or deviations noted).

18. Inspection Reports 50-245/91-25, 50-336/91-24, 50-423/91-20, dated 11-4-91, pp.1, 10-11 (inspection of radiological controls, no violations identified, but administrative controls for access to high radiation area key lockers appeared to need enhancement).

19. Inspection Report 92-04, dated 3-9-92 (Attachment 1 - Safety Evaluations Reviewed).

20. Inspection Reports 50-245/92-18, 50-336/92-20, 50-423/92-18, dated 7-13-92, pp.11-12 (inspection of radiological controls and ALARA efforts).

21. Inspection Reports 50-245/92-26, 50-336/92-28, 50-423/92-22, dated 11-27-92, and Notice of Violation (inspection of radiological controls, radioactive waste handling, and radioactive waste transportation program; one non-cited violation involving failure to post certain high radiation areas within containment).

22. Inspection Report 50-245/92-33, dated 3-3-93, pp.7-8 (Main Steam Line Radiation Alarm, Operations Control of Out of Service Equipment).

23. Inspection Reports 50-245/93-12, 50-336/93-08, 50-423/93-09, dated 4-23-93 (inspection of radiological controls, no safety concerns or violations were identified with strengths in radiological controls and technical support).

24. Inspection Reports 50-245/94-15, 50-336/94-13, 50-423/94-13, dated 4-6-94 (inspection of radioactive liquid and gaseous effluent control programs).

25. Inspection Reports 50-245/94-16, 50-336/94-15, 50-423/94-14, dated 4-7-94 (inspection of radiological controls was generally good with three licensee-identified violations of radiation protection procedures reviewed, but no violations cited in accordance with 10 C.F.R. 2, Appendix B).

26. Systematic Assessment of License Performance Report 93-99, dated 8-26-94, pp.12-13 (Performance Analysis - Plant Support, including radiological controls (ALARA), emergency preparedness, security, chemistry, fire protection and housekeeping controls).

27. Inspection Reports 50-245/95-30, 50-336/95-30, 50-423/95-30, dated 8-4-95 (inspection of radiation protection program, no safety concerns or violations noted with generally effective programs for radiation protection observed and maintaining occupational exposures ALARA at Unit 1 and 3, although weaknesses in ALARA program at Unit 2 and in the housekeeping program at Unit 1).

28. Inspection Reports 50-245/95-35, 50-336/95-35, 50-423/95-35, dated 9-11-95 (inspection of radwaste and transportation of radioactive materials programs, no safety concerns or violations noted with generally effective program, although one significant weakness was identified involving the material condition of the radwaste systems especially at unit 1 and to a lesser extent Units 2 and 3).

29. Letter dated 11-13-95, from NRC to NU, regarding Action Plans for Radwaste Observations in NRC Inspection Report Action Plans, Inspection Reports 50-245/95-35, 50-336/95-35, 50-423/95-35.

30. Inspection Reports 50-245/95-81, 50-336/95-81, 50-423/95-81 dated 11-17-95 (inspection of safety assessment and independent oversight functions with strengths in actions to improve the problem identification (ACR) and commitment tracking (AITTS) processes; improvement needed in corrective action processes (ACR and AITTS), and more experience needed in the Improving Station Performance program).

31. Notice of Violation (Inspection Reports 50-245/95-31, 50-336/95-31, 50-423/95-31) dated 12-7-95 (involving the degradation of equipment at Unit 1).

32. Notice of Violation and Inspection Reports 50-245/95-38, 50-336/95-38, 50-423/95-38 dated 12-18-95 (safety inspection of plant operations, radiological controls, maintenance, surveillance, security, outage activities, licensee self-assessment, and plant safety-related periodic reports; violation in corrective actions).

33. Letter from NRC to NU dated 1-29-96 (involving NRC meeting on January 17-18, 1995 re: nuclear safety performance of operating reactors, fuel facilities and other materials licensees and citing various NRC concerns about Millstone's performance).

34. Inspection Reports 50-245/96-03, 50-336/96-03, 50-423/96-03, dated 2-15-96 (inspection of radwaste protection and radwaste programs, one violation noted involving the failure to conduct operations in Unit 1 liquid radwaste in accordance with the Unit Updated Final Safety Analysis Report and without analyzing these changes in accordance with 10 C.F.R. 50.59).

35. NRC Inspection Procedure No. 83 750, Occupational Radiation Exposure.

36. Inspection Reports 50-245/94-32, 50-336/94-31, 50-423/94-29, and Notice of Violation, dated 11-9-94, re: announced radiological controls inspection.

37. Inspection Reports 50-245/94-37, 50-336/94-35, 50-423/94-33, dated 1-13-95, re: announced radiological controls inspection.

38. Inspection Reports 50-245/95-19, 50-336/95-19, 50-423/95-19, and Notice of Violation, dated 6-2-95, re: announced radiological controls inspection.

39. Letter from _____, (NRC) to _____ (NU) dated 9-7-95, responding to NU's response to NRC Notice of Violation from Inspection Report 50-245/95-19.

**REPORT TO NORTHEAST UTILITIES SYSTEM**
**ON THE INVESTIGATION INTO CERTAIN CONCERNS**
**RELATED TO THE**
**MILLSTONE UNIT 1 RADWASTE FACILITY**

**INDEX OF ADVERSE CONDITION REPORTS (ACRs)**
**AND PLANTS INCIDENT REPORTS (PIRs)**
**RELATED TO LIQUID RADWASTE SYSTEM**

1. ACR # 01316, effective date 2-21-95, "Plugged Roof Gutters Prevent Roof Drainage, Cause Water To Drain Through Floor Drains Into Radwaste."

2. ACR # 01390, effective date 2-21-95, "Spent Fuel Pool Resin Spilled When Transfer Hose Was Disconnected After It Clogged."

3. ACR # 01399, effective date 2-21-95, "CCW Heat Exchanger Cleaning Introduced Salt Water Into Radwaste System Via Floor Drains."

4. ACR # 01418, effective date 2-21-95, "Transfer Water Valve Leaked By Causing The Resin Storage Tank To Overflow."

5. ACR # 01535, effective date 2-21-95, "While Dewatering Spent Resin - The Waste Temp. In The Liner Raised From 90 To 310F."

6. ACR # 02130, effective date 2-21-95, "Doghouse Over Radwaste Building Exhaust Fan HVE-7B May Be Overheating Belts And Degrading Grease."

7. ACR # 02334, effective date 2-21-95, "Low Set Point On Waste Collector Tank Low Level Limit Switch."

8. ACR # 02567, effective date 2-21-95, "Drywell Floor Drain Sump Has Oil In It From MSIV's."

9. ACR # 02816, effective date 2-21-95, "Temporary Vacuum Pump Used To Dry Rad Material Shipping Cask Blows Fuse - Pump Removed From Service."

10. ACR # 02920, effective date 2-21-95, "Controlled Drawings Do Not Match As-Built; Radwaste System."

11. ACR # 03392, effective date 2-21-95, "House Heating Boiler Condensate Receiver Tanks Vents Isolated In Radwaste Building."

12. ACR # 03706, effective date 2-21-95, "Discharged High Activity Water From Waste Sample Tanks - Discharge Within Limits."

13. ACR # 03781, effective date 2-21-95, "About 20 Gal. Of Salt Water Spilled Down Floor Drains During Maintenance On RBCCW Heat Exchanger."

14. ACR # 04187, effective date 2-21-95, "Specified Aluminum Flanges May Not Withstand Fuel Pool Cooling, Condensate and Radwaste System Pressures."

15. ACR # 04399, effective date 2-21-95, "Waste Surge Tank Pump Removed From System; Used As Replacement. Removal AWO Still Open."

16. ACR # 04699, effective date 2-21-95, "Blown Control Power Fuse For Radwaste Supply Fan HVH-23."

17. ACR # 04749, effective date 2-21-95, "Opened Wrong Valve During Liquid Discharge To Long Island Sound."

18. ACR # 04912, effective date 2-21-95, "Spent Fuel Pool FME Not Reconciled For AWO M1-94-04179 When AWO Disposed Of As Radwaste."

19. ACR # 05251, effective date 2-21-95, "Discrepancy Exists Between Design Drawing, CWD, And Ops. Distribution List."

20. ACR # 00932, effective date 11-9-95, "Material Condition Of Liquid Radwaste Facility Is Unacceptable."

21. ACR # 02135, effective date 11-9-95, "House Heating Boiler Blow Down Tank Periodically 'Dumps' Rusty Contaminated Water On Floor."

22. ACR # 02372, effective date 11-9-95, "Material Conditions Of Liquid Radwaste Facility Is Unacceptable."

23. ACR # 04488, effective date 11-9-95, "Liquid Oil Products Released From RCA Using Wrong Evaluation Process; S.A.M. vs. Geli Count."

24. ACR # 05860, effective date 11-9-95, "Conductor Found Out Of Lug On Terminal BF-5."

25. ACR # 05892, effective date 11-9-95, "As-Built Configuration Of Lighting In Radwaste Facility Does Not Match Design Drawings."

26. ACR # 05873, effective date 11-9-95, "Liquid Radwaste Clean Up Filter Sludge Tank Overflowed."

27. ACR # 05885, effective date 11-9-95, "Freeze Stat. Actuator For HVH-7 (Radwaste Supply Fan) Located Poorly."

28. ACR # 05902, effective date 11-9-95, "Conductor Cable Found Out Of Lug On Terminal DD2."

29. ACR # 05906, effective date 11-9-95, "Liquid Radwaste Flexible Hoses Not Kept Per Radwaste QA Program."

30. ACR # 07043, effective date 11-9-95, "Contaminated Dirt/Sand Found Outside Of RCA."

31. ACR # 07051, effective date 11-9-95, "Abandoned Radwaste Measuring Tank Partially Full And Unlabeled."

32. ACR # 07259, effective date 11-9-95, "Titles Differ On GRITS And CWD's For 3 Radwaste Drawings."

33. ACR # 07275, effective date 11-9-95, "Valve Lineup Error Caused Spent Resin To Be Pumped To Wrong Location."

34. ACR # 07293, effective date 11-9-95, "Floor Drain Cut But Uncapped Causing Spill To Floor Below."

35. ACR # 07793, effective date 11-9-95, "PMMS ID Number (RWC-1) Used For Radwaste Bldg. Overhead Crane And Hoist, And Floor Drain Collector Tank 'D'."

36. ACR # 08256, effective date 11-9-95, "Documentation For Design Qualification Of Aluminum Alloy 3003 150 lb. Pipe Flanges Does Not Exist."

37. ACR # 08681, effective date 11-9-95, "Potential Breach Of Secondary CNMT Via Dry Loop Seals To Rx Bldg. Floor Drain Sumps."

38. ACR # 08712, effective date 11-9-95, "Discrepancy Between P And ID And Field Installation On How Valve Operates; 1-LRC-28."

39. ACR # 08723, effective date 11-9-95, "Floor Drain Piping Separated At Steel/Fiberglass Joint."

40. ACR # 08739, effective date 11-9-95, "Radwaste Tanks Not Cleaned As Required By SP 671.4 - Surveillance Failed."

41. ACR # 09131, effective date 11-9-95, "Floor Drain Piping Exhibits Erosion Corrosion."

42. ACR # 09134, effective date 11-9-95, "Piping From Floor Drain Filter To Spent Resin Tank Has Hole In It."

43. ACR # 09147, effective date 11-9-95, "Drywell Equipment Drain Sump Pump Locks In Before Backup Pump Starts. Different Method Than Floor Drain."

44. ACR # 09164, effective date 11-9-95, "Excess Soap In Floor Drain During Decon. Led To Discharge At 100X Normal Activity And Lost Resin."

45. ACR # 09171, effective date 11-9-95, "CWD # 950 Does Not Reflect The Fuse Labeling In Radwaste Control Panel 2213."

46. ACR # 09195, effective date 11-9-95, "2 In Service Liq. Radwaste Drain Lines Have Holes; 1" FP-57B, 4" RWR-10."

47. ACR # 09197, effective date 11-9-95, "Liquid Radwaste Floor Drain Filter Flow Control Valve Fails Closed, Dwgs Show Fail Open."

48. ACR # 09409, effective date 11-9-95, "Maintenance Is Performed On Abandoned Equipment - Wastes Resources and Dose."

49. ACR # 09414, effective date 11-9-95, "Radwaste Drain Line Found In Poor Material Condition."

50. ACR # 09440, effective date 11-9-95, "AWO Released For Work Without Appropriate Set Point Changes Or PDCR."

51. ACR # 09450, effective date 11-9-95, "50541: Radwaste CAM Out Of Service, Required For Airborne Monitoring."

1. PIR # 1-90-25, effective date 4-15-89, "R.W. Effluent Rad. Monitor Alarms Out Of Spec."

2. PIR # 1-90-98, effective date 4-15-89, "Oil Spill By Solid Radwaste."

3. PIR # 1-91-120, effective date 4-9-91, "Radwaste Exhaust Ventilation Duct Contamination."

4. PIR # 1-91-131, effective date 4-9-91, "EEQ Barrier Violated."

5. PIR # 1-91-149, effective date 11-4-91, "Unplanned R.W. Liquid Discharge Due To Leakage Past A.O. Discharge Valves."

6. PIR # 1-92-068, effective date 11-4-91, "Improper Valve Line Up During 'A' Floor Drain Sample Tank Discharge."

7. PIR # 1-92-078, effective date 11-4-91, "Floor Drain Overflow On Turbine Bldg. 2M Level."

8. PIR # 1-92-081, effective date 11-4-91, "Service Water Chlorination."

9. PIR # 1-92-133, effective date 11-4-91, "Filter Sludge Pump Area Rad Monitor Alarm."

10. PIR # 1-93-058, effective date 11-10-92, "Excessive Soap In Radwaste Floor Drain System."

11. PIR # 1-93-094, effective date 7-1-93, "Drywell Equipment Sump Hi-Hi Level Alarm Failed."

12. PIR # 1-93-098, effective date 7-1-93, "Unplanned Monitored Release From 'B' FDST."

13. PIR # 1-93-178, effective date 7-1-93, "Sludge Spill Lower Level Radwaste."

14. PIR # 1-94-091, effective date 1-14-94, "Contaminated Leakage From Abandoned Drain Line."

15. PIR # 1-94-110, effective date 1-14-94, "Inadvertent Pumping of AWST To CST Prior To Tank Sampling."

16. PIR # 1-94-151, effective date 1-14-94, "480V Supply To Solid Radwaste Resin Drying Skid Failure."

17. PIR # 1-94-152, effective date 1-14-94, "'B' FDCT Level Indicator Stuck And 'B' FDCT Overflowed To 'D' FDCT."

18. PIR # 1-94-205, effective date 1-14-94, "Special Nuclear Material Stored In Under Vessel Sumps."

19. PIR # 1-94-209, effective date 1-14-94, "Loss Of Special Nuclear Material Accountability."

20. PIR # 1-94-477, effective date 5-12-94, "Pipe Chase Drains Plugged By The Liquid $N_2$ Tank."

21. PIR # 1-94-537, effective date 5-12-94, "Unauthorized Shielding."

22. PIP # 1-95-014, effective date 5-12-94, "Unable To Discharge Decon. Solution Tank Due To Contents."