

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report No. 50-309/90-27

Docket No. 50-309

License No. D?R-36 Priority - Category C

Licensee: Maine Yankee Atomic Power Company

83 Edison Drive

Augusta, Maine 04336

Facility Name: Maine Yankee Nuclear Generating Station

Inspection At: Wiscasset, Maine

Inspection Conducted: December 10-14 and December 21-22, 1990

Inspector:

R. L. Nimitz
R. L. Nimitz, CHP, Senior Radiation Specialist

1-4-91

date

Approved by:

W. J. Pasciak
W. J. Pasciak, Chief
Facilities Radiation Protection Section

1-11-91

date

Inspection Summary: The inspection conducted during the period December 10-14, 1990, was as a routine, announced inspection of the Radiological Controls Program. Areas reviewed were the licensee's action on previous inspection findings, radiological controls group organization and staffing, audits and assessments, radiological controls for plant operations with leaking fuel, planing for reactor control element assembly cutting and shipping, implementation of the Radiation Protection Improvement Plan, and plant tours.

The inspection conducted during the period December 21-22, 1990 was a special, reactive inspection to review the licensee's establishment and implementation of enhanced radiological controls for the increase in primary to secondary leakage of the Number 1 steam generator. The increase in leakage to the secondary side prompted an emergency shutdown of the reactor.

Results: No violations were identified. Weaknesses were identified in the licensee's training of radiation protection personnel, exposure controls and High Radiation Area access control. The licensee was found to have implemented effective radiological controls, for the secondary side of the plant, following the increase in steam generator tube leakage and subsequent plant shutdown. No personnel contaminations or unplanned exposures occurred on the secondary side of the plant. No unmonitored releases or releases in excess of Technical Specification limits occurred.

DETAILS

1. Persons Contacted

1.1 Maine Yankee

- * C. T. Frizzle, President, Maine Yankee Atomic Power Company
- * B. Bickford, Maintenance Manager, Acting Assistant Plant Manager
- #* R. Nelson, Manager, Technical Support
- #* G. Pillsbury, Assistant Manager, Technical Support
- * S. Nichols, Manager, Nuclear Engineering and Licensing
- #* D. Caristo, Section Head, Radiation Protection Operations
- * E. Heath, Section Head, Radiation Protection Programs
- * D. Sturniolo, Principal Radiological Engineer
- * R. Hayward, QA Supervisor
- # R. Blackmore, Plant Manager

1.2 NRC

- *C. Marschall, Senior Resident Inspector
- *R. Freudenberger, Resident Inspector

1.3 Others

- *P. Dostie, Maine State Nuclear Safety Inspector

The Inspector also contacted other personnel during the course of the inspection.

* Denotes those individuals attending the exit meeting on December 14, 1990.

Denotes those individuals attending the exit meeting on December 22, 1990.

2.0 Purpose of Inspection

The inspection conducted during the period December 10-14, 1990, was a routine, announced radiological controls inspection. The following matters were reviewed:

- licensee action on previous inspection findings
- organization and staffing of the radiological controls group
- audits, assessments
- radiation protection improvement plan
- radiological controls for leaking fuel
- radiological controls for control element assembly cutting and shipping
- routine radiological controls practices
- licensee action on NRC concerns discussed in the Systematic Assessment of Licensee Performance (SALP) Report, dated January 5, 1989 (SALP Report No. 50-309/87-99)

The inspection conducted during the period December 21-22, 1990, was a special, reactive inspection to review the licensee's establishment and implementation of enhanced radiological controls for the primary to secondary leak from the Number 1 steam generator. Items reviewed were:

- sequence of events and implementation of enhanced radiological controls
- contamination controls
- internal and external exposure controls
- High Radiation Area controls
- magnitude of effluent releases from the secondary side of the plant

3.0 Licensee Action on Previous Inspection

3.1 (Open) Unresolved (50-309/86-19-03):

The licensee's procedures did not reflect current practices for dealing with contaminated individuals. The procedure allows personnel to stand around while low level contamination, attributable to short lived radionuclides (e.g., radon daughters), decays away and a personnel contamination report is not completed. The licensee reviewed the radiological significance of this practice, concluded it represented no hazard, and subsequently revised procedures to require a personnel contamination form if radioactive contamination in excess of 100 corrected counts per minute remained on the individual. The inspector was unable, due to time constraints, to complete the review of this matter. The inspector had remaining questions in the areas of upper limits for allowable contamination prior to performing a skin dose evaluation and maximum allowable wait times prior to documenting a skin contamination occurrence.

3.2 (Closed) Inspector Follow-up Item (50-309/86-19-05):

The licensee's calibration source required that the radiation source to detector distance for calibration of radiation monitoring instruments be small as a result of weak calibration source strength. Also the licensee had no calibration assemblies for free-air calibration to provide mechanically precise positioning of the detector in the radiation field.

The licensee evaluated the source to detector distance and provided detailed charts describing the acceptable distances and radiation dose rates. The licensee also constructed a metal calibration table for positioning detectors. The licensee also evaluated the source to pocket dosimeter calibration distance and did not identify any concerns. This item is closed.

3.3 (Closed) Unresolved Item (50-309/87-08-05):

The licensee's airborne radioactive material sampling and analysis program did not provide for real-time monitoring of on-going work activities and did not provide for timely assessment of airborne radioactive material sample analysis in the field.

Also, the program did not provide selected sample collection and analysis guidance in order to ensure appropriate lower limits of detection of airborne radioactivity concentrations were met, and did not evaluate peak concentrations of airborne radioactivity while workers were working in steam generators.

The inspector's review indicated that the licensee has instituted enhanced real time air monitoring, especially as a result of operations with leaking fuel elements, the licensee established procedures for rapid counting of air samples to provide timely estimates of airborne radioactivity concentrations, and the licensee revised procedures for steam generator work to provide for evaluation of real time airborne radioactivity concentrations. The licensee also evaluated previous airborne radioactivity sample results associated with previous steam generator work activities and did not identify any concerns.

The licensee also established procedures to provide airborne radioactivity sample collection and analysis requirements in order to ensure that appropriate lower limits of detection were met. The licensee also established controls to preclude airborne radioactivity samples from becoming back-logged and not counted. This was accomplished by requiring local counting and purchase of additional counting equipment. This item is closed.

3.4 (Closed) Unresolved Item (50-309/88-12-03):

The licensee will submit a 10 CFR 20.302 submittal to provide details as to what will be done with areas of soil, located within the protected area, which exhibited trace radioactive contamination. The licensee submitted a 10CFR 20.302 submittal for approval to allow in-place disposal of the slightly contaminated soil. This submittal, made on October 18, 1990, was approved by the NRC.

The licensee also performed extensive contamination surveys of the backyard areas to identify any other contaminated areas. The licensee subsequently removed the radwaste building roof, which was contaminated, and installed a new roof. The licensee also excavated soil associated with a chromate leak and excavated contaminated asphalt associated with an outdoor liquid radwaste spill. No other contaminated areas were found. The licensee plans to dispose of the material as radwaste. This item is closed.

3.5 (Closed) Unresolved Item (50-309/88-22-01):

NRC to review the licensee's evaluation and corrective actions associated with the apparent misplacement of personnel dosimetry worn by a worker on November 24, 1988.

This matter was reviewed during NRC Inspection No. 50-309/90-03 but the evaluation provided by the licensee at that time was unclear and the inspector could not understand the evaluation or the licensee's conclusions stemming from the evaluation. The licensee subsequently re-evaluated the circumstances associated with the event and concluded that there was no unplanned radiation exposure received by the worker and no applicable personnel radiation exposure limits were exceeded.

The licensee's review, however, did identify several areas for improvement. These included procedures to govern complex dosimetry placement, stop work criteria in procedures, technician training and use of satellite logs to recover pertinent information. To address these items, the licensee established multi-dosimetry use procedures to provide guidance for use and placement of multi-dosimetry. The licensee also established stop-work criteria to provide guidance for stop-work for unusual concerns. The licensee has been using satellite log books. This item is closed.

3.6 (Closed) Violation (50-309/90-11-01)

The licensee did not perform adequate surveys to ensure compliance with 10 CFR 20.101 and 10 CFR 20.202. The inspector reviewed this matter with respect to the licensee's corrective actions outlined in an August 22, 1990, letter (MN-90-80) to the NRC. The licensee implemented the corrective actions outlined in the letter to the NRC. The corrective actions outlined therein included; stopping of the on-going work, processing of dosimetry, interviews of personnel, generation of a radiological incident report (RIR), calculation of affected worker doses, discussions regarding the incident at the end of shift turnover meetings, forwarding of the RIR to training, establishment of a radiation work permit check list for planning radiological work activities, and revision of survey procedures to ensure trenches are surveyed. The RIR was closed with a presentation made to the ALARA committee.

The licensee submitted the RIR to training for inclusion in recertification training. The substance of the RIR will be incorporated into early 1991 recertification training (lesson plan ST-GIN-06, Industry Radiological Event). Training in the the event is on-going. The licensee has revised the outage plan to provide for training of lead valve workers on survey meters. This item is closed.

3.7 (Closed) Violation (50-309/90-11-02):

The licensee did not perform adequate surveillance of workers while they worked in High Radiation Areas (HRA) as required by Technical Specification 5.12.1. The inspector reviewed this matter with respect to the corrective actions outlined in the licensee's August 22, 1990 letter, (MN-90-80) to the NRC.

The inspector's review indicated the licensee implemented the corrective actions outlined therein. These included stopping of the on-going work activity, writing of a radiological incident report, and revision of applicable procedures to define radiation surveillance. The licensee issued immediate guidance, via memorandum, and subsequently revised applicable procedures to provide clear guidance as to what constitutes surveillance. Radiation protection technicians were trained in the procedure revision. This item is closed.

3.8 (Closed) Violation (50-309/90-11-03)

The licensee did not provide instructions to workers in order to allow them to minimize their radiation exposure as required by 10 CFR 19.12. The inspector reviewed this matter with respect to the corrective actions outlined in the licensee's August 22, 1990, letter (MN-90-80) to the NRC. The licensee implemented the corrective actions outlined therein. These included stopping of on-going work, conduct of worker briefings regarding the need for good communication, revision of procedures to identify work party leaders who will be responsible for the conduct of work under the radiation work permit, revision of the pre-job briefing form to better define a change in work scope, and inclusion of the incident description in the re-training programs.

The inspector review found that the licensee's program provides for briefing of work party members at the initial issuance of the radiation work permit and at the start of each shift since the permit must be re-issued each shift.

The inspector noted that there did not appear to be adequate administrative controls to ensure personnel, who are assigned to a specific work task, after the completion of the initial pre-job briefing, are provided the appropriate briefing. The licensee subsequently revised procedures to provide additional guidance, to personnel, for performance of pre-job briefings, for those individuals who did not receive the initial pre-job briefing. This item is closed.

3.9 (Closed) Violation (50-309/90-11-04)

Personnel did not adhere to radiation protection procedures. A radiation work permit that was issued did not include worker stay times as required by procedures. Also, a worker did not wear a respirator as required by the radiation work permit (RWP). Adherence to RWPs is required by procedures. The inspector reviewed these matters with respect to the corrective actions outlined in the licensee's August 22, 1990, letter (MN-90-80) to the NRC. The licensee implemented the corrective actions outlined in the letter.

The corrective actions included discussion of the event at the shift turnover meeting, inclusion of the event in night orders to appropriate staff, revision of applicable procedures to specify stay time and development of a special radiation work permit (RWP) for venting and draining operations. The RWP procedure now requires a special procedure for venting and draining operations. The licensee established general operations procedure guidance for venting and draining of systems.

The licensee also provided for scheduling of radiological controls support, for work planning, and also developed a radiation protection plan of the week to cover the planned work. This item is closed.

3.10 (Closed) Unresolved Item (50-309/86-11-06):

NRC to review the training of chemistry personnel to support post-accident sampling and analysis activities. There appeared to be a limited number of personnel trained on post-accident sampling system (PASS) procedures. Also, only one chemistry individual was qualified to use self-contained breathing apparatus. These devices would possibly be required during performance of post-accident chemistry activities. There were only three individuals trained on PASS procedures. The inspector's review indicated that in October 1990, the licensee qualified all chemistry personnel to ensure that personnel could wear self-contained breathing apparatus (SCBAs). The licensee also trained and qualified all chemistry staff (eight personnel) on the PASS procedures. These individuals are included in retraining cycles for PASS procedures. The inspector noted that chemistry personnel were not included in requalification training for use of SCBAs. The licensee initiated procedure revisions to include chemistry personnel in SCBA requalification training.

The inspector noted that the licensee qualified additional personnel in PASS procedures eight months (October 1990) after the original concern of limited numbers of trained chemistry personnel was identified (March 1990). The inspector noted that a chemistry sampling operation during post-accident conditions (e.g., core damage assessment) could result in about 5 rem whole body dose and about a 50 rem dose to the extremity. The inspector noted that the delay in the licensee's qualification of personnel indicated a lack of sensitivity on the licensee's part in the doses that could be received by personnel (under worst case situations) and the potential for insufficient trained staff to support PASS operations. The licensee's representatives indicated it takes about three days to qualify an individual on PASS procedures. The inspector's review indicated that the situation (potential lack of sufficient numbers of trained personnel for PASS operations) was not evaluated by management. This item is closed.

3.11 (Open) Unresolved Item (50-309/86-11-07):

Licensee to provide information demonstrating that fan flows, used for calculating effluent releases, are appropriate flows. The licensee was unable to provide the inspector sufficient information to demonstrate that appropriate fan flows were used. Various licensee groups were reviewing fan and effluent flows. The licensee compared various fan flows to total flow readings available from the primary vent stack flow transmitter/pitot tube flow measuring system and concluded that the flow out the primary vent stack was reasonable. However, the licensee could not provide data demonstrating that the flow transmitter/pitot tube arrangement in the primary vent stack was properly calibrated. The licensee committed to review this matter and provide information, by June 1, 1991, demonstrating that appropriate flows are used for effluent release calculations. This matter remains open.

4.0 Organization and Staffing

The inspector reviewed the organization and staffing of the radiological controls group. The review was with respect to criteria contained in applicable Technical Specifications.

Within the scope of the review, no violations were identified. The following matters were discussed with the licensee's representatives:

- The licensee filled the position of Radiological Control Section Head. The individual meets the qualification requirements of Technical Specifications.
- The licensee completely split the responsibilities of the radiation protection/chemistry technicians to eliminate their requirements to maintain qualification in both radiation protection and chemistry discipline. The radiation protection technicians now only do limited chemistry if needed. In addition, the radiation protection technicians will not be required to be fire brigade trained after January 1991.
- The licensee hired six additional radiological control technicians. These individuals will be used to support implant radiation protection activities. Currently the individuals are in training and are expected to be fully trained and qualified. The individuals have previous radiological controls experience. In addition qualification for two additional radiation protection technicians has been completed. The radiation protection technician staff has increased from 14 to 20 technicians. The inspector noted that about 9,000 hours of technician overtime was needed in 1990. This equates to about four additional positions.
- The licensee has added positions for an Instrument and Source Specialist, and a radiological engineer. Total radiation protection staff (including technicians) has increased to about 34 individuals from a previous level of about 24. Attachment A provides the current radiological controls organizational structure.
- The radiation protection technicians training program has been revised to ensure technicians understand their responsibility.
- Radiation Protection technicians have been assigned to contamination control and exposure control. One radiation protection technician has been assigned to upgrade the health physics information system.
- The ALARA coordinator has been moved to the radiation protection operations area.

Based on the above information, the inspector concluded that the licensee has taken significant actions to enhance the capabilities of the radiological controls organization to support on-going plant activities.

No violations were identified.

5.0 Radiological Controls Audits and Assessment

The inspector reviewed selected audits, assessments and job observations made by the licensee. The review was with respect to applicable procedure and Technical Specification requirements.

Within the scope of this review, no violations were identified. the following was identified:

- The inspector reviewed audit report Number MY-90-03A. The audit was performed during the 1990 refueling outage. Plant representatives requested that additional areas be scheduled for review. Technical Specialists were used during the audit. The audit was considered performance based. Corrective action requests were issued and responded to as required.
- The inspector reviewed various surveillances. Inspector review indicated the surveillances were of good quality and findings were immediately brought to managements attention.
- The licensee established an extensive data base for use in trending findings, including radiological controls findings. The licensee recently initiated a comprehensive review of all findings and currently provides a bi-annual evaluation of the findings to the Nuclear Safety Oversight and Review Committee and the President of Maine Yankee.

The licensee's QA group plans future quality verification efforts based on the results of the evaluation of the trended data. For example, because of the success of the full time QA Radiological Controls Assessor, the licensee's preliminary plans are to use an assessor during the next refueling outage.

- The licensee continues to use the radiological incident reporting system to track radiological incidents. The licensee is currently reviewing and revising the program.

6.0 Radiological Controls Program Improvements

The NRC's Systematic Assessment of Licensee Performance (SALP), dated January 5, 1989, (SALP Report No. 50-309/87-99) for the Maine Yankee Atomic Power Company, identified a number of programmatic weaknesses needing licensee attention. To address the programmatic weaknesses, the licensee established a Radiation Protection Improvement Plan.

The following initiatives to improve the quality and effectiveness of the Radiological Controls Program were noted.

- The licensee established a two year plan to upgrade all elements of the Radiological Controls Program. A schedule, with milestones, has been established. A special committee oversees the implementation of the improvement plan.
- The licensee has completed the upgrade of the radioactive material source control program. The program includes a program description and implementing procedures.
- The licensee enhanced the radwaste program. The process control program was reviewed and the licensee implemented the use of a radwaste computer.
- There are 10 areas remaining to be upgraded.

The recent licensee initiatives to enhance the various elements of the radiological controls program included the following:

Training and Qualifications

- The site radiation protection program was recently re-accredited by INPO.
- For each technical specialist in the radiation protection support section, the licensee is developing a qualification plan.
- The licensee is enhancing the re-certification program by placing more emphasis on practical factors for re-certification, in the area of job specific training, for radiation protection technicians.
- The licensee is developing a program and procedures for use of engineering controls to reduce airborne radioactivity and spread of contamination.
- The licensee initiated training of all station personnel on contamination controls. The training on work practices was one day and used mock-ups to enhance personnel contamination control knowledge. Personnel with three or more contaminations went through the course. Also departments with a perceived high rate of personnel contaminations will be sent to the program.

7.0 ALARA

The inspector reviewed the licensee's program to reduce radiation exposure to as low as reasonably achievable. The review was with respect to criteria contained in applicable procedures and NRC regulatory guides. Within the scope of this review, no violations were identified. The following matters were noted:

- The licensee finalized the 1991 dose goal. This includes a 1991 exposure budget for each department. The present goal was 475 person-rem. About 430 person-rem, of the 475, is projected for the outage. The 1990 aggregate exposure was about 640 person-rem, a refueling outage year. The licensee's entire goals are based on looking at station three year averages.
- The licensee's average aggregate radiation exposure for the last two outage years (1988 and 1990) was 697 person-rem. The current yearly goal for 1991, an outage year is 475 person-rem. This is a 220 person-rem reduction (a 30% reduction) over previous outage years with about the same work scope. The licensee is currently developing an action plan to meet the goal. Initiatives under review include chemical decontamination, hot spot reduction, identification and reduction of cobalt in the plant. Also, a new department (the planning department) was established in November 1990. A radiological controls individual will be assigned to the outage planning group.
- The licensee has been looking at lessons learned from the 1990 outage to reduce exposure. For example, previous work on the low pressure coolant injection pump (P12A) resulted in 8 person-rem. Implementation of lessons learned resulted in a final aggregate exposure of about 3.5 person-rem (about 50% of initial work) for similar work.
- The licensee is attempting to reduce radiation protection technician dose. For example, as a result of the fuel leakage problems, the licensee adjusted survey frequencies to allow for reduced personnel exposure. Remote monitoring was used to minimize technician exposure.
- The licensee is checking the secondary side of the plant. Two areas, the steam generator blowdown demineralizer and the component cooling water pump are radiologically controlled.
- The licensee installed PAL filters in the letdown pre-filter and will install PAL filters in the fuel pool clean-up system.
- The licensee has established job specific files for each radiological work task for review by ALARA.

- Inspector review of ALARA committee meeting minutes indicated an apparent high sensitivity by station management to reduce radiation exposure.

8.0 Contamination Control

The inspector reviewed selected elements of the contamination control program. The review was with respect to criteria contained in applicable procedures and standard industry practices. Within the scope of this review, no violations were identified. The following matters were noted:

- The licensee performed extensive decontamination of the station including floors and walls. The licensee is currently painting floors with a new protective paint.
- About 11% of the licensee's facility is contaminated. The total square foot of floor space in the radiological controlled area is 63,000 (not including containment). Currently the station has (as of December 18, 1990) about 6,900 square foot of contaminated area. The licensee has established a goal of 6,500 feet by the end of 1990 (~10 1/2 %).
- To maintain areas clean, the licensee is using containment devices to minimize contamination.
- The licensee performed extensive clean-up of the backyard areas to remove stored radwaste.
- As of December 12, 1990, the licensee has experienced 525 personnel contaminations as compared to a licensee determined industry PWR average of 110. The licensee has performed extensive evaluation of the contamination events to better understand the personnel contamination events. The licensee has developed primary root causes and has initiated action to improve contamination control.

Most contamination events were attributed to small hot particles of cobalt-60 on the order of about 0.01 microcuries. About 43 hot particle contamination events, in 1990, resulted in radiation exposure of the skin in excess of 100 millirem. The maximum was 1.6 rem to the skin of a worker's leg in April 1990. The frequency of personnel contaminations has decreased in 1990. In the third quarter of 1990 there were two hot particle contaminations and currently only two in the fourth quarter to date.

Based on the above review and observations, the inspector concluded that the licensee is focusing efforts on reduction of personnel contaminations.

9.0 Control Element Assembly Cutting

The inspector reviewed the licensee's planning and preparation for cutting of control element assemblies (CEAs) and shipping pieces of the CEAs (end caps) offsite for failure analysis. The inspector reviewed the licensee's efforts with respect to applicable regulatory requirements and recently issued NRC Information Notices.

The inspector's review indicated the following:

- The licensee experienced failure of CEA element end caps. The problem was corrected by switching to another type CEA. The licensee identified three CEAs with missing end caps. The licensee could not account for all element pellets. The pellets do not present a radiological hazard in that the material comprising the pellets is not highly radioactive. The licensee plans to cut off the lower and upper 15 inches of several CEA fingers including center and outer fingers. The end caps of the fingers measure about 2,000 R/hr on contact.
- The licensee's ALARA group has been closely working with cognizant licensee engineering personnel to review the planned work. Procedures for the cutting and shipping are under development. The licensee's ALARA group will review the procedures. The licensee is reviewing the operation with respect to NRC Information Notice No. 90-33, Sources of Unexpected Occupational Radiation Exposure at Spent Fuel Pools.
- The licensee plans to complete the cutting in the spent fuel pool in an area next to the fuel cask lay down area. The licensee is reviewing contamination controls, potential dose rates to personnel on the spent fuel pool bridge, and the potential for radioactive gas to be released when the CEAs are cut.

The inspector's review indicated the licensee appeared to be performing good planning and preparation for cutting CEA elements and shipping the pieces. The licensee was sensitive to the radiological hazards involved.

10.0 Enhanced Radiological Controls Following Increase in Steam Generator Tube Leakage

The licensee had been experiencing a small amount of primary to secondary steam generator tube leakage since start-up from the 1990 refueling outage. Since the potential for radioactivity to be transported (via main steam lines) to the turbine building, a non-radiological controlled area, was present, the licensee was closely monitoring the potential radiological impact on local turbine building environments affected by the leakage. The licensee, as a precaution, had posted the steam generator blowdown demineralizer (1-6) as a Radioactive Materials Area. The licensee had also posted the primary component cooling filters.

On the early morning hours of December 17, 1990, the licensee noted an increase in primary to secondary leakage as initially indicated by the air ejector monitor.

The inspector reviewed the following matters with respect to the identification of increased leakage:

- Control Room operations personnel response to the apparent increased leakage
- Radiological controls personnel response to the apparent increased leakage
- Control, monitoring and magnitude of radioactive releases
- Establishment of radiological controls for access to secondary systems

The inspector interviewed the plant shift supervisor on shift during the early morning hours of December 17, 1990, interviewed cognizant radiological controls and chemistry personnel, and reviewed applicable log books. The inspector's review indicated the following:

- The licensee's control room operations personnel displayed a conservative approach and response, from a radiological controls perspective, to the increase in leakage. This was indicated by the following:
 - frequent calculation of primary to secondary leakage
 - notification of appropriate management personnel
 - isolation of systems to prevent and mitigate offsite releases
 - the call in of additional personnel to assist in responding to the increase in leakage
 - the direction to personnel to wear dosimetry on the secondary side of the station
- The licensee's radiological controls personnel expanded the radiological control area (RCA) to encompass the turbine building. Dosimetry and whole body frisking stations were moved out to the entrance of the turbine building. Access controls, including fence barriers and posting, were erected to preclude inadvertent access to the turbine building. Frisking was required prior to eating or drinking. As a result of some weaknesses in frisking noted by the resident inspectors security guards were placed at the exit from the turbine building RCA. The need to obtain a radiation work permit when working on all systems was implemented.

- With the exception of the steam generator blow down demineralizer, which exhibited an increase in radiation levels from less than 1mR/hr to about 300 μ R/hr, no significant changes in the external radiation environment were noted. Because the radioactivity transported to the secondary side had a relatively short half-life, it was decaying away rapidly.
- Inspector review indicated contamination was contained within systems and no personnel contaminations, unplanned exposures, unmonitored releases or releases in excess of Technical Specifications occurred associated with the contamination on the secondary side.

11.0 Review of Containment Work Activities

The inspector reviewed Containment work activities periodically during the inspection. The review focused on the licensee's efforts to repair the leaking steam generator tube in Number 1 steam generator. The following areas were reviewed:

- qualifications and training of radiation protection personnel
- posting, barricading and access control to Radiation, High Radiation and Airborne Radioactive Areas, as appropriate
- radioactive and contaminated material control
- radwaste storage
- contamination control
- housekeeping
- issuance and proper use of dosimetry
- internal and external exposure controls.

The reviews in this area were with respect to criteria contained in 10 CFR 20, Standards for Protection Against Radiation, applicable licensee procedures and standard industry practices.

Within the scope of the review, no violations were identified. The following positive observations were noted:

- The licensee has been closely monitoring for the presence of any alpha airborne radioactivity. The licensee has been reviewing contamination sample results also. This indicated a good sensitivity to the potential presence of alpha emitters associated with fuel cladding failure.
- The licensee performed extensive evaluation of the radiation fields in the steam generators and beta radiation protection afforded by protective clothing.

The following matters were brought to the licensee's attention:

- The licensee hired contractor radiological controls personnel to augment the staff during the outage. The licensee hired those individuals who had been at the station during the early 1990 refueling outage. This precluded the need to provide extensive training of the personnel because their initial training had not lapsed. The inspector's review however found that the personnel (radiological controls technicians) had not received any training, since their arrival, in new or revised procedures which may have been implemented since they were last at the station.

This matter was important because the licensee had revised procedures as a result of an unplanned exposure event which occurred during the 1990 outage. The licensee was unable to demonstrate that the technicians were cognizant of the new or revised procedures. The licensee immediately removed the personnel from their assigned tasks and provided them training on new and revised procedures. The circumstances surrounding this matter and the licensee's corrective actions on this matter are unresolved. (50-309/90-27-01)

- The inspector reviewed the personnel exposure control practices. The inspector found that the licensee completed appropriate documentation to document exposure increase authorizations. However, the licensee did not have a formal system to translate the authorized increase in exposure to a tracking document. The licensee's dosimetry personnel were informally subtracting a worker's previous quarterly and yearly exposure from allowable quarterly and yearly exposure limits in order to control accumulated exposure and attempt to make due with the computer's inability to handle previous exposure results.

The inspector found that the licensee's computer system was not capable of accounting for the previous exposure, the dosimetry personnel's practices were not proceduralized and previous exposure received by personnel was not identified on exposure tracking reports. On December 22, 1990, the inspector found one worker to have 569 millirems of previous quarterly exposure that was not accounted for in the licensee's tracking program. The dosimetry personnel had apparently failed to informally subtract the exposure from allowable limits.

This matter was immediately brought to the licensee's attention as a significant exposure control weakness. The inspector concluded that the licensee's exposure control system was not capable of ensuring that worker exposures did not exceed authorized administrative limits.

The licensee initiated an immediate review of all contractor exposure records to ensure that no other worker had previous exposure that was unaccounted for. The licensee also revised a dosimetry procedure (No. 9.1.12) on December 22, 1990, to require subtracting of previous exposure from authorized limits as an interim measure until the computer system is capable of performing this function. This matter and the licensee's evaluation results are an unresolved item and will be reviewed during a subsequent inspection. (50-309/90-27-02)

- At about 12:30 a.m. on December 22, 1990, the inspector observed that the licensee was controlling access to High Radiation Areas within the Containment by controlling access at the Containment personnel airlock. The inspector noted that the licensee implemented appropriate radiological surveillance as specified in Technical Specification 5.12.1. This surveillance was more than adequate for the majority of Containment.

However, the licensee's controls, at the airlock, did not prevent unauthorized access to High Radiation Areas located in Containment, that measured greater than 1000 mR/hr, as required by Technical Specification 5.12.2. The unlocked, unguarded reactor head laydown area, in Containment, allowed access to the reactor loop areas which exhibited areas greater than 1000 mR/hr. This matter was immediately brought to the attention of the Plant Shift Supervisor who subsequently restricted access to those personnel authorized to enter the loop areas or under escort by radiation protection personnel. Previous access to the Containment had been only by personnel authorized to enter the loop areas or by radiation protection personnel escorting workers, consequently no apparent violation was identified. The licensee subsequently erected the head lay down area access control fence, normally in place during refueling outages.

12.0 Plant Tours

The inspector toured the plant during the inspection. The following matters were brought to the licensee's attention:

- Radiological control signs and posting were of good quality with information surveys to radiological control areas posted. However, radiological control signs were observed on the floor at the 36' elevation of the Primary Auxiliary Building and the Primary Component Cooling filter areas on the 21' elevation of the Turbine Building. The signs were reposted.
- As a result of the fuel cladding failure, the licensee has initiated the use of general area, real time airborne radioactivity monitors. This was considered a good initiative. The inspector was informed that the alarms were set at 2,000 counts per minute (cpm) greater than background.

The inspector found that personnel did not understand what an alarm set point of 2000 cpm greater than background meant (i.e., what airborne radioactivity this corresponded to), and that the air monitor on the 12' elevation of the Primary Auxiliary Building was set at 19,000 cpm greater than background. The licensee reset the alarm set point and initiated a review of the inspector's comments.

- All potential exit doors from the radiological control area are not uniformly posted to inform personnel as to the specific radiological controls requirements needed to exit the RCA. The licensee posted non-routine doors as no exit and initiated a review of the inspector's comments.
- The licensee has designated part of the backyard area as a radiological control area. The area is well marked. However, the inspector observed unsecured extension cords exiting the boundary areas to the unrestricted area. The licensee initiated a review of this matter.
- The inspector observed that the wire door to the Gas Decay tank cubicle on the 36' elevation of the Primary Auxiliary Building was damaged. This area could exhibit radiation levels in excess of 1000 mR/hr and was a transient High Radiation Area. The damage could allow unauthorized entrance. At the time, the area was not a High Radiation Area. A repair request was issued but it was low priority and inconsistent with procedure guidance that High Radiation Area doors receive a higher priority. The licensee immediately revised the priority and repaired the door.
- The licensee installed over-fill protection on the resin storage tank. This consisted of a system to conduct over-fill to a radwaste sump. The radiation detector for the area was partially shielded. It was not clear that the detector would alert personnel of an inadvertent over-fill and higher radiation levels in the area. The licensee initiated a review of this matter.
- The inspector observed that a tool box, about 3.5 feet high was positioned against the TK 85 tank cubicle wall located in the radwaste building area, elevation 21 feet. The wall was about 6 feet high. The tool box could possibly provide for unauthorized access to the top of the wall and to a ladder located inside the wall which would allow access to the TK 85 tank cubicle. The cubicle is normally a locked High Radiation Area with radiation dose rates of up to 1-2 R/hr. The inspector brought this matter to the licensee's attention and the tool box was subsequently moved. The inspector noted that this was not a normal access to the cubicle and that access was provided via a normally locked doorway.

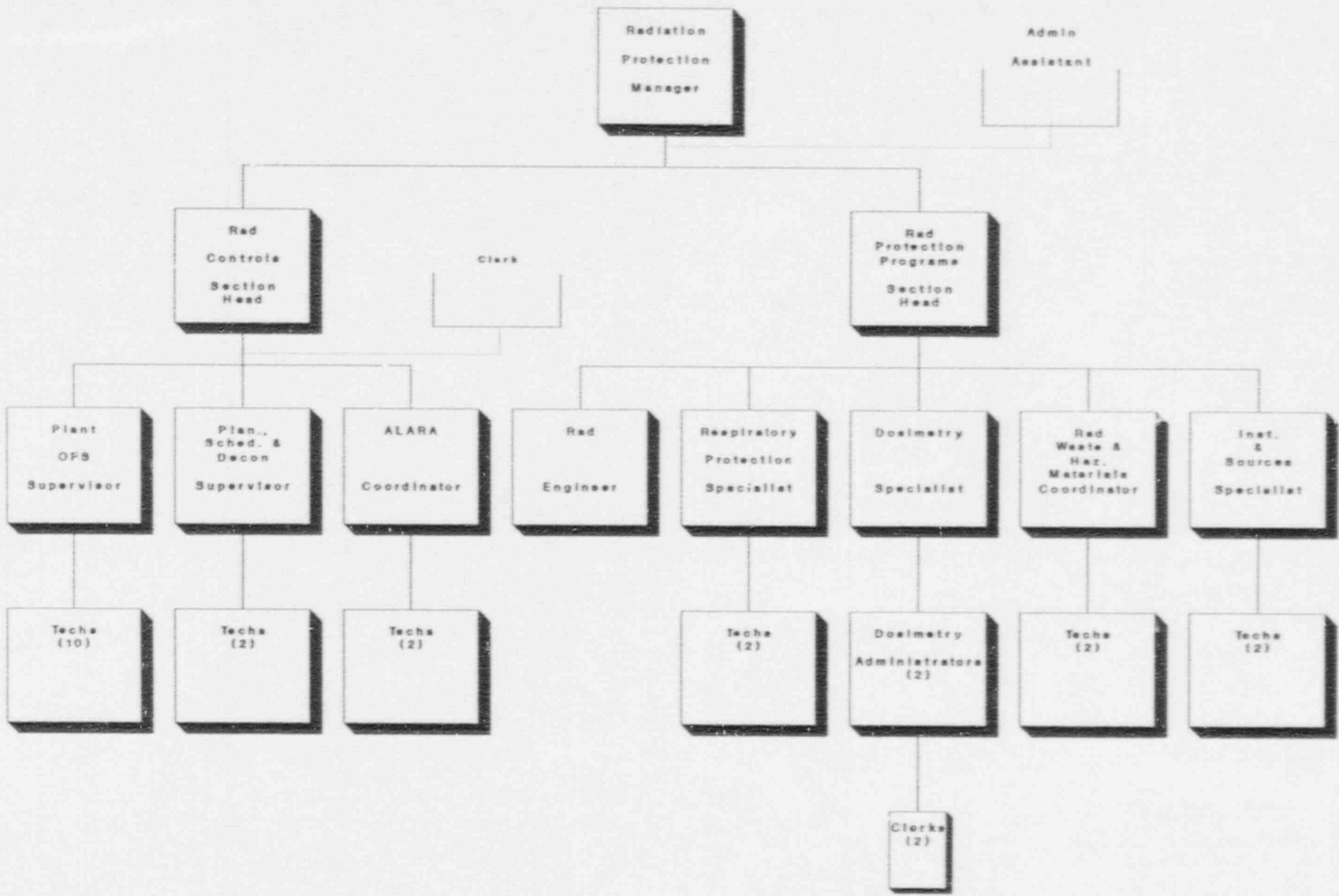
The inspector noted that the licensee did not apparently have a position on control of non-routine access points to normally locked High Radiation Areas. The inspector indicated that this matter remains unresolved pending evaluation of the licensee's position on control of non-routine access points to locked High Radiation Areas. (50-309/90-27-03)

13.0 Exit Meeting

The inspector met with licensee representatives, denoted in Section 1 of this report, at the conclusion of the inspection on December 14 and 22, 1990. The inspector summarized the purpose, scope and findings of the inspection. No written material was provided to the licensee.

MAINE YANKEE

RAD PROTECTION FUNCTIONAL ORGANIZATION



Revision 1