U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 50-245/90-23
50-336/90-25
50-423/90-23

Docket Nos. 50-245
50-336
50-423

License Nos. DPR-21 Category C
DPR-65 C
NPF-49 C

Licensee: Northeast Nuclear Energy Company
P. O. Box 270
Hartford, Connecticut 06101

Facility Name: Millstone Nuclear Generating Station, Units 1, 2 and 3

Inspection At: Waterford, Connecticut

Inspection Conducted: October 1-5, 1990

Inspectors: R L Nimitz 11/15/90
R. L. Nimitz, CHP, Senior Radiation Specialist date

Approved by: for S. Shewhart 11/15/90
W. J. Pasciak, Chief, Facilities Radiation Protection Section date

Inspection Summary: NRC Inspection on October 1-5, 1990 (NRC Combined Inspection Report Nos. 50-245/90-23; 50-336/90-25; and 50-243/90-23).

Areas Inspected: This inspection was a routine, unannounced inspection of the radiological controls program at Millstone Station, Units 1, 2 and 3. Areas reviewed were the licensee's action on previous inspection findings, the organization and staffing of the station's radiological controls organization, external and internal exposure controls, ALARA, radioactive and contaminated material controls, radioactive source control and surveillance, and worker concerns.

Results: No violations were identified. The licensee implemented good radiological controls for the Unit 2 outage.

DETAILS

1.0 Individuals Contacted

1.1 Northeast Nuclear

*H. F. Haynes, Director, Unit 1
*F. Dacino, Director, Site Services
*J. Sullivan, Manager, Health Physics Operations
*C. Palmer, Manager, Health Physics Operations
*D. Hagan, Radiation Protection Supervisor, Unit 2
*S. Turosuski, Supervisor, Radioactive Materials
*R. Sachatello, Radiation Protection Supervisor, Unit 3
*J. Laine, Senior Scientist

1.2 NRC

W. Raymond, Senior Resident Inspector
*P. Habighorst, Resident Inspector
*W. Pasciak, Chief, Facilities Radiation Protection Section

*Denotes those individuals attending the exit meeting.

2.0 Purpose and Scope of Inspection

This inspection was a routine, unannounced radiation protection inspection. Areas reviewed were as follows:

-licensee action on previous findings
-organization, staffing and training
-external and internal exposure controls
-ALARA
-radioactive and contaminated material controls
-radioactive source control and surveillance
-worker concerns

3.0 Licensee Action on Previous Inspection Findings

3.1 (Closed) Unresolved Item (50-245/89-23-002) NRC to review the implementation of corrective actions for contaminated material shipped offsite. This item is discussed in Section 3.4.

3.2 (Closed) Violation (50-245/90-04-001) The licensee did not adhere to radiation protection procedures. The inspector reviewed the implementation of the licensee's corrective action documented in the licensee's April 10, 1990 letter. The violation involved personnel exiting radiologically controlled areas without frisking, use of an inadequate radiation work permit to control radiological work activities and failure to properly label a radioactive material container. The licensee modified the level 3 radiation worker training to discuss the identified contamination control problems.

The licensee also clearly labeled inside and outside doors as to the health physics access control requirements. The licensee also fenced in outside areas to provide better control of radiological activities outside station buildings. Regarding use of an inadequate radiation work permit, the licensee included the lessons learned in annual health physics training, the radiation work permit was revised to enhance the job planning process and establish essentially a work check list to be used for radiation work permit planning. Appropriate personnel were trained in the procedures. The licensee reviewed applicable procedures for air sampling and concluded the procedures were adequate. The licensee is currently developing a procedure for operation and use of HEPA filtered portable ventilation systems and vacuum cleaners. Regarding labeling of containers the licensee discussed the item with appropriate personnel and the licensee revised procedures to clarify the requirements for labeling of radwaste material containers. This item is closed.

3.3 (Closed) Unresolved Item (50-245/89-17-002) On August 19, 1989, a plant equipment operator failed to frisk out of the radiological controlled area by use of a personnel contamination monitor outside the Unit 1 Reactor.

The operator exited the radiological controlled area without frisking. The inspector's review indicated that the licensee issued a plant incident report for the event. The individual was counseled. The individual had been in the Unit 1 reactor clean-up pump room. Contamination levels, due to over flow of floor drains, measured about 30 mR/hr with an RO-2 survey meter. The licensee issued a memorandum on August 28, 1989, to all site personnel regarding the need for personnel to perform personnel monitoring and monitoring of equipment.

The recent generic corrective actions that the licensee had taken to enhance contamination control were placing signs on RCA exit doors to alert personnel of RCA requirements, the fencing in of RCA areas outside the buildings, the installation of video cameras to monitor egress points or stationing of personnel at RCA egress points. This item is closed.

3.4 (Closed) Violation (50-245/89-13-01) The licensee did not establish adequate contamination control procedures. This matter was reviewed during combined inspection (50-245/90-14; 50-336/90-15; 50-423/90-13). The licensee's Unit Site Director issued the Task Group Report recommendations to each unit director for review.

The licensee's radiological group obtained the recommendations and comments of each unit director and formulated a plan to implement the recommendations, as appropriate, of the contamination control task force.

A contamination control plan was established and implemented. The following has been accomplished:

-minimization of RCA access and egress points
-construction of RCA fencing
-installation of video monitoring of contamination control points
-approval of warehouse 9 for continued use as an uncondition release facility
-enhancement of contamination control procedures
-improvement in RCA boundary identification
-removal of laundry processing outside door 101
-purchase and use of additional personnel contamination monitors
-enhancement of control and monitoring of material leaving the RCA and the protected area
-vehicle egress monitoring at the protected area boundary
-secondary checking of clean trash

Improvements currently under review include establishment of an onsite clean tool warehouse, the establishment of a hot machine shop and expansion of health physics offices. This item is closed

3.5 (open) Unresolved Item (50-245/90-04-03) The licensee was not able to identify who was the radiation protection manager. Also, the responsibilities of all positions within the radiation protection organization did not appear to be well defined. The licensee revised procedure ACP-QA-1.02, Organization and Responsibilities, Revision 20, to add a description of the assistant Radiation Protection Supervisor-Operation's responsibilities.

The licensee is currently revising the procedure to incorporate responsibilities of the radiation protection manager.

3.6 (Closed) Follow-up Item (50-245/87-24-01; 50-336/87-27-01; 50-423/87-19-03) The licensee performed a detailed review of the calibration and surveillance of all station radiation monitors. The inspector's review of the licensee's report of the review indicated that the licensee had determined that several monitors apparently did not meet appropriate minimum requirements. The inspector reviewed the licensee's actions on each of the monitors. The licensee's review found that there were no requirements to document the performance of a periodic source check on the Unit 1 service water monitor. The check was being performed. The licensee revised procedures to include a requirement to perform the documentation. The licensee's review found a need to place criteria on allowable activity in the Unit 3 component cooling water system

to reduce service water sampling. However, this action was deemed unnecessary and no actions were taken with Unit 3 component cooling water monitors. The Unit 3 steam generator blowdown monitor had the wrong set point and operations procedures did not indicate that the steam generator blowdown surveillance was a Technical Specification (TS) requirement. The licensee revised the set point and operation procedures to reflect the surveillance was a TS requirement.

The licensee's review also found that the Unit 3 waste neutralizer sump monitor functional test failed to verify that the sump tanks discharge auto-closure actually worked. This condition existed since plant start-up. The auto-closure was found to subsequently work but was not periodically surveilled. The licensee's review indicated adequate compensatory measures were in-place to preclude inadvertent releases of radioactivity. The licensee issued a Licensee Event Report (89-018) for this item and revised procedures to require the auto-closure verification. The licensee plans to provide training on this event by December 31, 1990.

The licensee also found that procedures did not require a discharge permit to be issued for discharges from the waste neutralizer sump. The licensee revised procedures on August 29, 1990, to require a permit. Procedures did require sampling and analysis.

Based on the above review, the inspector concluded the licensee appears to have taken acceptable corrective action for the above matters.

The above open item is closed.

However, unresolved item (50-423/90-23-01) will be opened to evaluate the circumstances surrounding the incorrect alarm set point on the Unit 3 steam generator blowdown monitor and the circumstances surrounding the failure to test the auto-closure feature of the Unit 3 waste neutralizer sump monitor.

4.0 Organization, Staffing, Training and Qualification

The inspector reviewed the organization and staffing of the licensee's radiation protection organization. The licensee's Technical Specifications for Unit 1, 2 and 3 and applicable procedures were used as acceptance criteria.

The inspector also reviewed the qualifications and training of members of the Radiological Controls Organization with respect to criteria contained in Technical Specifications. The licensee's performance in this area was evaluated by review of documentation and discussions with cognizant personnel.

The inspector's review in this area focused on the qualification and training of contractor radiological controls personnel hired to augment the organization during the unit 2 outage. The inspector also reviewed the adequacy and effectiveness of the performance of these personnel during review of work activities.

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

The following matters were identified and discussed with the licensee:

-The licensee established a well defined radiation protection organization to support the Unit 2 outage. Job descriptions for lead radiation protection technicians were identified. Also special control point instructions were established as well as special instructions for High Radiation Area Access Point door monitoring personnel.

-Radiation Protection Supervisors appeared to be spending a good deal of time in the radiological controlled area observing plant conditions and on-going work activities.

-The inspector's selective review of personnel qualifications indicated personnel were qualified in accordance with Technical Specification requirements.

-The licensee established and implemented a defined training and qualification program for contractor radiation protection personnel. The inspector's review of on-going work activities did not identify any performance deficiencies.

-The licensee's training group provides plant systems training for radiological controls personnel including radiological hazards of systems operations.

-The licensee has provided special ALARA training for steam generator work activities and reactor coolant pump seal replacement.

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

-Although there is a training program for radwaste supervisory personnel, there is no defined training program for other supervisory personnel and managers. The licensee is currently developing this program.

-There was no defined training, qualification program for decontamination personnel.

-The licensee provides training of personnel in new procedures during continuing training. However, there was no method in place

to ensure that personnel review safety significant procedure changes prior to performing tasks associated with those procedures.

The licensee initiated a review of these matters.

5.0 ALARA

The inspector reviewed selected aspects of the licensee's ALARA Program. The review was with respect to criteria contained in the following:

-Regulatory Guide 8.8, Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations will be As Low As Is Reasonably Achievable;

-Regulatory Guide 8.10, Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As is Reasonably Achievable;

-NUREG/CR-3254, Licensee Programs for Maintaining Occupational Exposure to Radiation As Low As Is Reasonably Achievable;

-NUREG/CR-4254, Occupational Dose Reduction and ALARA at Nuclear Power Plants; Study on High-Dose Jobs, Radwaste Handling and ALARA Incentives.

The evaluation of the licensee's performance was based on discussions with cognizant personnel, review of documentation, and independent observation during tours of the facility including observation of on-going work activities in Unit 2 containment.

Within the scope of the review, no violations were identified. The inspector's observations indicated good efforts were being made by the licensee to reduce occupational radiation exposure of personnel.

The following observations were made:

-The licensee installed and used video cameras to review on-going work activities in High Radiation Areas.

-Work activities received good ALARA planning.

- ow dose rate waiting areas and up-to-date radiation surveys were conspicuously posted in Unit 2 containment.

-Job specific ALARA requirements were posted at the Unit 2 containment radiation protection check points.

-In 1986, the licensee identified a number of initiatives to reduce occupational exposure at the station. Thirteen short-term initiatives and nine long term initiatives were identified. The

licensee identified lead persons for the initiatives and has been providing management with quarterly status reports of the initiatives. The initiatives to reduce exposure included snubber reduction, cobalt reduction, decontamination improvement, utilization of robotics, and work practices review. Inspector discussions with cognizant personnel indicated the initiatives are being implemented.

-ALARA personnel are performing exposure tracking of on-going work activities. Aggregate exposure values are discussed at morning station meetings.

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

-Graffiti was observed on the 22 foot elevation of the Unit 2 containment. Application of graffiti in a radiological control area indicates lack of worker sensitivity to ALARA.

-The licensee's ALARA program procedures did not require ALARA review to be conducted for work whose aggregate exposure is less then 5 person-rem.

6.0 External and Internal Exposure Controls

The inspector toured the radiological controlled areas of the plant and reviewed the following elements of the license's external and internal exposure control program:

-posting, barricading and access control as appropriate, to Radiation, High Radiation, and Airborne Radioactivity Areas;

-High Radiation Area access point key control;

-control of radioactive and contaminated material;

-personnel adherence to radiation protection procedures, radiation work permits and good radiological control practices;

-use of personnel contamination control devices;

-use of dosimetry devices;

-use of respiratory protective equipment;

-adequacy of airborne radioactivity sampling to support ongoing work;

-timeliness of analysis of airborne radioactivity samples including supervisory review of sample results;

-installation, use and periodic operability verification of engineering controls to minimize airborne radioactivity;

-bioassays and personnel airborne radioactivity intakes;

-records and reports of personnel exposure;

-radioactive source inventory and control

-adequacy of radiological surveys to support pre-planning of work and on going work; and

-hot particle controls.

The review was with respect to criteria contained in applicable licensee procedures and 10 CFR 20, Standards for Protection Against Radiation.

The inspector independently reviewed on-going work activities including personnel entry into Unit 2 steam generators, Unit 2 steam generator sludge lancing activities, Unit 2 reactor vessel head work, and Unit 2 refueling activities.

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

The following observations were made:

-The licensee provided good High Radiation Area Access Control for the Unit 2 Outage. In addition, posting and barracading of radiological areas was good.

-The licensee implemented good radiological controls for steam generator work activities. The licensee performed good evaluations of radiation dose rates that personnel would be exposed to during Unit 2 steam generator work activities. Conservative control measures were used to maintain personnel radiation exposures within applicable administrative limits.

-The licensee used extensive engineering controls to maintain airborne radioactivity levels low for Unit 2 work activities. Continuous air monitors were used for real time air monitoring to alert personnel to airborne problems.

-The licensee was tracking and evaluating personnel contaminations (both skin and clothing). The licensee monitored the cause of each contamination and identified repeat offenders.

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

-The radiation work permits used to provide radiological control for work activities provided limited guidance to radiation protection

personnel regarding radiation protection coverage requirements. The permits principally served to inform workers of protective clothing requirements and dosimetry use requirements.

The licensee has recognized this matter as an area for enhancement. The licensee is revising the radiation work permit to include specific radiological controls coverage requirements.

The inspector noted that the licensee has provided memoranda with expanded guidance to radiation protection personnel regarding radiological controls requirements for Unit 1 steam generator work activities. This was considered a good initiative.

-There is no procedure that provides guidance regarding installation, operation, and surveillance of engineering controls (e.g., portable ventilation systems) used to minimize airborne radioactivity. The licensee has developed and is reviewing a draft procedure.

-The licensee's procedure for use of the Delmonox Breathing Air Supply System contains an illegible graph that is to be used for determination of proper air pressure to workers. Also, the graph appears to specify a breathing air hose length that is not permitted. The licensee initiated an immediate review of the matter. Subsequent inspection review of work activities where the breathing air supply was being used indicated air pressure and hose lengths were correct.

-The licensee installed general area radiation survey meters (ARMs) on the Unit 2 steam generator platforms to alert personnel in the event that a hot particle was inadvertently removed from the generators during eddy current testing. The alarms of the ARMs were set at different alarm set points (above background radiation levels). Also there were no periodic surveillances of the ARM and alarm set points to ensure they were working properly. The licensee initiated a review of this matter.

7.0 Worker Concerns (RI-90-A-137 item 2.b.)

7.1 General

On August 22, 1990, a worker contacted NRC Region I and expressed concern that the total radiation exposure received during a recent oil addition to the A Reactor Coolant Pump was much higher than expected and that no steps have been taken to reduce total radiation exposure during the oil addition.

7.2 Findings

The inspectors met with cognizant licensee personnel and discussed the addition of oil to the A Reactor Coolant Pump (RCP). The inspector reviewed applicable documentation including radiation

surveys and post-job critiques. The last addition was made on August 15, 1990. The licensee's ALARA personnel expected that the oil addition would result in an accumulated exposure of between 0.8 person-rem to 0.9 person-rem. This was about the exposure sustained when oil was last added on October 12, 1989 (0.871 person-rem).

The cumulative exposure estimate did not require a documented ALARA review. A pre-job meeting was held. At the pre-job meeting estimated radiation dose rates were discussed as well as activities to be performed, estimated stay time and heat stress requirements. The need to stay in low dose rate wait areas was discussed.

Because of high radiation dose rates in the area and heat stress concerns, the oil addition was to be completed by three crews. The first crew was to remove the deck grating above the A RCP, install a ladder to the oil reservoir fill area, stage tools and leave. The second crew was to go down the ladder and fill the oil reservoir. A third crew was to assist. However, apparently through miscommunication or error, the second crew removed the oil fill tube and removed the ladder when exiting the area. Since the original plan was to leave the oil fill tube in place so that additional oil could be added if needed, a re-entry into the area to re-install the fill tube was needed.

The total cumulation exposure as a result of re-installing the fill tube was 1.36 person-rem as compared to the original estimate of between 0.8 and 0.9 person-rem.

As a result of the problems encountered a post-job critique was held on August 16, 1990. The critique identified four recommendations which were subsequently documented in a memorandum to the Unit 2 Maintenance Manager to address the problems encountered. An action request was issued by the Station Director on September 4, 1990, to review the exposure control and ALARA options for RCP oil addition at power.

7.3 Conclusion

The inspector concluded that due to weaknesses in pre-planning and or personnel error in failing to follow initial plans additional exposure was sustained by personnel to fill the oil reservoir of the A RCP.

The inspector also concluded that the licensee recognized weaknesses in the performance of the task and initiated corrective actions to review and improve exposure control activities for RCP oil addition.

The following corrective actions were noted:

-As discussed above, the Station Director issued an action item to review and improve RCP and additions. This occurred about two weeks after the event.

-A post oil addition critique was held the day following the oil addition. Recommendations for corrective action were documented in an August 21, 1990 memorandum from the ALARA coordinator to the Unit 2 Maintenance Manager.

-The oil leak on the ARCP was located and repaired.

-The Maintenance Foreman overseeing the oil addition was counseled regarding the breakdown in communication.

-The licensee initiated design reviews to change out hard piping and install flexible piping for the RCP oil system to preclude leaking joints.

Based on the above, the concern that no steps were taken to reduce total radiation exposure during TCP oil addition is not substantiated. This concerns is closed.

9.0 Exit Meeting

The inspector met with licensee representatives (denoted in Section 1) on October 5, 1990. The inspector summarized the purpose, scope and findings of the inspection.

OUTSTANDING ITEMS FILE SINGLE DOCKET ENTRY FORM

REPORT HOURS

1. Operations ____
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7. Outages ____
8. Training ____
9. Licensing ____
10. QA ____
11. Other ____
12. Fire Protection/ Housekeeping ____

Docket No. 50-245

Originator R Nimit

Reviewing Supervisor W Pasciak

Item Number	Type	SALP Area	Area	Action Due Date (MM DD YY)	Updt/Clsout Rpt/	Date O/M/Clsd (MM DD YY)
89-23-02					90-23-C	1/0-0/1-90

Originator/Modifier

Resp Sec

Descriptive Title

Item Number	Type	SALP Area	Area	Action Due Date (MM DD YY)	Updt/Clsout Rpt/	Date O/M/Clsd (MM DD YY)
90-04-01					90-23-C	1/0-0/1-C

Originator/Modifier

Resp Sec

Descriptive Title

Item Number	Type	SALP Area	Area	Action Due Date (MM DD YY)	Updt/Clsout Rpt/	Date O/M/Clsd (MM DD YY)
89-17-02					90-23-C	1/0-0/1-90

Originator/Modifier

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Descriptive Title

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(January 1987)

OUTSTANDING ITEMS FILE SINGLE DOCKET ENTRY FORM

REPORT HOURS

1. Operations ____
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3. Maintenance ____
4. Surveillance ____
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6. Sec/Safegrds. ____
7. Outages ____
8. Training ____
9. Licensing ____
10. QA ____
11. Other ____
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Docket No. 50-245

Originator [illegible]

Reviewing Supervisor [illegible]

Item Number	Type	SALP Area	Area	Action Due Date (MM DD YY)	Updt/Clsout Rpt/	Date O/M/Clsd (MM DD YY)
89-13-01					90-23-K	10-01-90

Updt/Clsout Rpt/: "Clsout" circled. Date O/M/Clsd: "Clsd" circled.

Originator/Modifier: ____ Resp Sec: ____

Descriptive Title: ____

Item Number	Type	SALP Area	Area	Action Due Date (MM DD YY)	Updt/Clsout Rpt/	Date O/M/Clsd (MM DD YY)
90-09-02					90-23-04	10-01-90

Originator/Modifier: ____ Resp Sec: ____

Descriptive Title: ____

Item Number	Type	SALP Area	Area	Action Due Date (MM DD YY)	Updt/Clsout Rpt/	Date O/M/Clsd (MM DD YY)
87-24-01					90-23-04	

Originator/Modifier: ____ Resp Sec: ____

Descriptive Title: ____

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7. Outages ____
8. Training ____
9. Licensing ____
10. QA ____
11. Other ____
12. Fire Protection/ Housekeeping ____

Docket No. 50-423

Originator Nimitz

Reviewing Supervisor Persh

Item Number	Type	SALP Area	Area	Action Due Date (MM-DD-YY)	Updt/Clsout Rpt/	Date O/M/Clsd (MM-DD-YY)
87-19-03				- -	90-23-04	10-01-90

Originator/Modifier:

Resp Sec:

Descriptive Title:

Item Number	Type	SALP Area	Area	Action Due Date (MM-DD-YY)	Updt/Clsout Rpt/	Date O/M/Clsd (MM-DD-YY)
90-23-01	UNR	RDP	RDP	12-30-90	- -	10-1 -90

Originator/Modifier: NIMITZ

Resp Sec:

Descriptive Title: Review alarm set points and auto-closure for effluent monitors

Item Number	Type	SALP Area	Area	Action Due Date (MM-DD-YY)	Updt/Clsout Rpt/	Date O/M/Clsd (MM-DD-YY)
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Originator/Modifier:

Resp Sec:

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OUTSTANDING ITEMS FILE SINGLE DOCKET ENTRY FORM

REPORT HOURS

1. Operations	____	7. Outages	____
2. Rad-Con	____	8. Training	____
3. Maintenance	____	9. Licensing	____
4. Surveillance	____	10. QA	____
5. Emerg. Prep.	____	11. Other	____
6. Sec/Safegrds.	____	12. Fire Protection/ Housekeeping	____

Docket No. 50-336

Originator Nimitz

Reviewing Supervisor Durr

Item Number	Type	SALP Area	Area	Action Due Date (MM DD YY)	Updt/Clsout Rpt/	Date O/M/Clsd (MM DD YY)
87-27-01				~~90-25-91~~	90-25-01	1/01-01/1-90

Originator/Modifier:

Resp Sec:

Descriptive Title:

Item Number	Type	SALP Area	Area	Action Due Date (MM DD YY)	Updt/Clsout Rpt/	Date O/M/Clsd (MM DD YY)
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Originator/Modifier:

Resp Sec:

Descriptive Title:

Item Number	Type	SALP Area	Area	Action Due Date (MM DD YY)	Updt/Clsout Rpt/	Date O/M/Clsd (MM DD YY)
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Descriptive Title:

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