

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-423/85-42

Docket No. 50-423

License No. CPPR-113 Category C

Licensee: Northeast Nuclear Energy Company

P.O. Box 270

Hartford, Connecticut 06101

Facility Name: Millstone Nuclear Power Station, Unit 3

Inspection At: Waterford, Connecticut

Inspection Conducted: August 5-9, 1985

Inspectors: R. K. Struckmeyer  
R. K. Struckmeyer, Radiation Specialist

9/17/85  
date

A. A. Weadock  
A. A. Weadock, Radiation Specialist

9/17/85  
date

Approved by: M. M. Shanbaky  
M. M. Shanbaky, Chief, PWR  
Radiation Safety Section

9/20/85  
date

Inspection Summary: Inspection on August 5-9, 1985 (Report No. 50-423/85-42)

Areas Inspected: Routine, announced, pre-operational inspection of the chemistry and radioactive effluent control programs. Areas reviewed included: organization and staffing, training and qualification program, facilities and equipment, and plans and procedures. The inspection involved 76 inspector hours on-site by two NRC region-based inspectors.

Results: No violations were identified.

8509300305 850924  
PDR ADOCK 05000423  
Q PDR

## DETAILS

### 1. Individual Contacted

\*G. Basileco - Engineer, Stone and Webster Engineering Company  
R. Beckman - Instrument Specialist  
M. Brown - I&C Supervisor  
\*F. Casella - NRC Resident Inspector  
G. Dodge - Service Engineer, KAMAN Instruments  
\*R. Enoch - Assistant I&C Supervisor  
\*M. Gentry - Assistant Startup Supervisor  
R. Gresbach - Startup Engineer  
T. Lane - Startup Engineer  
\*R. Langer - Assistant Chemistry Supervisor  
D. Miller - Startup Manager  
D. Powers - Startup Engineer  
T. Rebelowski - NRC Sr. Resident Inspector  
\*W. Romberg - Station Superintendent  
\*R. Sachatello - Radiation Protection Supervisor  
A. Stengel - Startup Engineer  
H. Thompson - Startup Engineer  
M. Venable - Startup Engineer  
\*J. Waters - Chemistry Supervisor

\* Denotes those present at exit meeting on August 9, 1985.

### 2. Status of Previously Identified Items

(Open) Inspector Followup Item (50-423/85-19-01): Status of Radiation Monitoring System (RMS). All but four monitors have been turned over, and most have been field tested. Integrated system (Phase II) testing has not yet begun. Monitor status is given in Attachment 1 to this report.

(Open) Inspector Followup Item (50-423/85-19-02): Status of RMS procedure development. Development of these procedures is continuing. Their status is given in Attachments 2 and 3.

### 3. Organization and Staffing

The inspectors reviewed the licensee's organization with respect to staffing and management structure in the areas of chemistry and radioactive effluent control. The licensee's chemistry department is responsible for in-plant chemistry and radiochemistry, as well as for analyses related to liquid and gaseous radioactive effluents. The organization parallels that of Units 1 and 2.

An Assistant Chemistry Supervisor for Unit 3 reports to the Station Chemistry Supervisor, who is responsible for all chemistry at Units 1, 2, and 3. The department also has a chemist and ten technicians, and plans to use five contractor technicians during start-up.

The inspectors reviewed the qualifications of Northeast Nuclear Energy Company (NNECO) chemistry technicians, and noted that one individual had not met all the criteria of ANSI N18.1. The licensee stated that this had been identified by an internal QA audit, and that appropriate restrictions had been placed on the technician, prohibiting him from doing radiochemical analyses as prescribed by the surveillance requirements of Technical Specifications, until he becomes qualified to all of the ANSI N18.1 criteria.

The inspectors reviewed the results of an INPO audit conducted April 8-12, 1985, and noted a recommendation that NNECO develop and implement a training and qualification program for chemistry personnel. Since that time the licensee has made plans for conducting a training program for NNECO chemistry technicians, and has hired three trainers specifically to conduct this program. These individuals are developing the lessons plans and course materials. Some specialized training has already been provided to technicians identified (by testing) as lacking certain skills (e.g., math), but plans for training of contractor technicians have not yet been formalized. Training of NNECO chemistry technicians, and training and qualifications of contractor technicians, will be reviewed in a subsequent inspection (50-423/85-42-01).

The licensee's Instrumentation and Controls (I&C) department is responsible for the procurement, calibration, and maintenance of all process, effluent, and radiation monitors in the facility. The department is headed by the I&C Supervisor, who reports to the Unit 3 Superintendent. An Assistant I&C Supervisor has been assigned the primary responsibility for the radiation monitor calibrations and development of procedures. Within the department there are twenty-four permanent technicians, and an additional twenty-five contractor technicians will be used during start-up operations.

The licensee stated that the NNECO (permanent) technicians have an average of 9½ years experience, and that approximately one-third come from the Navy, one-third from technical schools, and one-third from industry. The contractor technicians have or will have a minimum of five years experience, and will be required to pass a four-hour written examination administered by the licensee before being permitted to work at the facility. The training and qualifications of NNECO and contractor I&C technicians will be reviewed in a subsequent inspection (50-423/85-42-02).

A technician provided by the RMS vendor is currently on-site and will remain through start-up.

#### 4. Facilities and Equipment

The inspectors toured the facility including the chemistry laboratory, the counting room, the primary system and secondary system sampling stations, the liquid radwaste treatment system, the gaseous radwaste handling system, liquid and gaseous process and effluent monitors, and various ventil-

ation systems (with emphasis on the HEPA and charcoal filtration housings). Construction has been completed on all of these systems, and they have been turned over from the contractor to the licensee. The inspectors noted that virtually all necessary equipment for the Chemistry lab and counting room was installed and operable. The Ge(Li) detectors had been calibrated, but procedures for using them have not been completed. The primary and secondary sampling stations have been installed, and some component (Phase I) testing has been performed. The liquid and gaseous radwaste systems and the ventilation systems are also undergoing tests of various components. The inspectors accompanied licensee personnel on walk-downs of portions of these systems to verify that components were installed as described on Piping and Instrument Diagrams (P&IDs). The filter housings are ready to receive the various filtration components (HEPA, charcoal, and pre-filters), but these will not be installed until all painting and use of chemicals have been completed in areas served by these ventilations systems, in order to prevent their contamination prior to start-up.

The status of these systems will again be reviewed during a subsequent inspection (50-423/85-42-03).

#### 4.1 Radiation Monitoring System

The Radiation Monitoring System (RMS) was reviewed in NRC Inspection Report 85-19, which included a brief system description and reported the status in terms of operability and testing of equipment, and development of procedures. The licensee's Instrumentation and Control (I&C) group has responsibility for the testing, calibration, and maintenance of the RMS, and for development of surveillance procedures.

The purpose of this review of the RMS was to update the status of the licensee's progress in making the system operational, and to review monitor calibration procedures and data.

##### Operability

As of August 7, 1985, the operational status of the RMS was as depicted in Attachment 1. Most process, effluent, and area radiation monitors have been installed and tested individually; however, the integrated system tests (Phase II) have not yet been performed. The inspectors stated that the status of the RMS would again be examined during a subsequent inspection (50-423/85-19-01).

### Calibration

The inspectors reviewed the following procedures and calibration data to assess the adequacy of the licensee's RMS monitor calibration program:

GPIC 20.4, "Initial Startup of the KAMAN Liquid Radiation Monitor".

GPIC 20.03, "Initial Startup of the KAMAN Particulate and Gaseous Radiation Monitor".

GPIC 20.08, "KAMAN Science KMA HR RAD Monitor".

KAMAN Instrumentation Procedure 18-60, "Transfer Calibration".

Loop Calibration Report (LCR) 3LWC-065, "Liquid Regenerant Discharge to Circulation Water Control and Alarm".

LCR 3HVQ-049, "ESF Building Ventilation Outlet Radiation Monitor".

LCR T3319C1E29, "LWC Radiation Monitor".

LCR 3SSR-008, "Steam Generator Blowdown Monitor".

The licensee's calibration of the RMS monitors is performed by counting a secondary radioactive source which is provided by the vendor. The detector response to the source is then related to an energy dependence calibration conducted by the vendor by multiplying response by a derived calibration factor. The original energy dependence calibration conducted by the licensee is performed on a "generic" or "type" detector, not on the detector provided to the licensee.

The calibration documentation listed above was complete and work was performed in compliance with licensee procedures. The inspectors noted, however, that licensee calibration procedures contained no acceptance criteria to evaluate detector response to the source. The response is used in a ratio to derive a new calibration factor to link detector response with the primary energy dependence curve. The inspectors stated that apparently no evaluation of detector efficiency was being performed in the calibration.

The licensee stated that detector efficiency was being evaluated by performing the three point linearity check included in the calibration procedures. Additionally, for the ion chamber type area radiation monitors, a "keep alive" check source is included with the monitor and response to this source is evaluated by the licensee.



The inspectors noted that no evaluation or accept/reject criteria for ion chamber response to the "keep alive" source was currently included in the calibration procedure. The inspectors also noted that a linearity check by itself may not be an adequate indicator of detector response; detector efficiency could decrease linearly and not be noted by the licensee.

The adequacy of the licensee's RMS calibration procedures is considered unresolved pending additional investigation of this area (50-423/85-42-04).

#### 5.0 Plans and Procedures

The inspectors discussed with the licensee the procedures for pre-operational testing of liquid and gaseous radwaste systems, ventilation systems, and radiation monitoring system. The inspectors noted that virtually all procedures for individual component (Phase I) testing had been written and approved, and that roughly half of the prescribed tests had been performed. Procedures for integrated system (Phase II) testing have been written and approved for the following systems: primary system sampling station, gaseous radwaste processing system and ventilation systems (for those which may contain radioactivity during normal operations). Those under development include: liquid radwaste system, charcoal and HEPA filter tests, and radiation monitoring system.

Approximately 70 percent of chemistry procedures, including those for most laboratory analyses, liquid and gaseous tritium sampling, primary and secondary sample sink operation, and liquid waste sample sink operation have been written and approved. Chemistry is also responsible for developing and implementing about 24 to 26 Surveillance Procedures, all of which were still in various stages of development at the time of this inspection.

The inspectors reviewed the current status of Radiation Monitoring System (RMS) surveillance procedures, for operation, testing, and calibration of RMS units that are expected to be addressed by Technical Specifications. Attachments 2 and 3 depict the status of these procedures as of August 8, 1985.

The status of the following procedures will continue to be followed in subsequent inspections of this area:

- Chemistry analytical and surveillance procedures (50-423/85-42-05).
- RMS surveillance procedures (50-423/85-19-02).
- Phase II start-up procedures for liquid and gaseous radwaste systems and ventilation systems (50-423/85-42-06).
- Filtration system (HEPA and charcoal) surveillance testing (50-423/85-42-07).

#### 6.0 Exit Interview

The inspector met with the licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on August 9, 1985, and summarized the purpose and scope of the inspection and the inspection findings.

At no time during this inspection was written material provided to the licensee by the inspector.

# ATTACHMENT 1

## Radiation Monitoring System Status

<u>Instrument Number (Mark No.)</u>	<u>Turned Over</u>	<u>Field Tested</u>	<u>Communications Loop Established</u>	<u>Comments</u>
<u>Ventilation/Gas Monitors</u>				
3HVRRE10A/B				1-2 mos. before testing
3HVRRE19A/B				1-2 mos. before testing
3HVRRE11A/B	X	X	X	
3HVRRE12A/B	X	X	X	
3HVRRE13A/B	X	X	X	
3HVRRE14A/B	X	X		
3HVRRE15A/B	X	X	X	
3HVRRE16A/B	X	X	X	
3HVRRE17A/B	X	X	X	
3HVRRE18A/B	X	X		
3HVCRE91A/B	X	X		Communications estab- lished in 1 port only
3CMSRE22A/B	X	X		
3HVZRE09A/B				Mounting plates missing
3HVQRE49A/B	X	X		



## ATTACHMENT 1, Continued

## Radiation Monitoring System Status

<u>Instrument Number (Mark No.)</u>	<u>Turned Over</u>	<u>Field Tested</u>	<u>Communications Loop Established</u>	<u>Comments</u>
<hr/> Liquid Process Monitors <hr/>				
3CHSRE69	X	X		
3CCPRE31	X	X		
3CNARE47	X	X		Conductivity meter failed
3DASRE50	X	X		
3LWSRE70	X	X		
3LWCRE65	X	X	X	
3CNDRE07	X	X	X	
3SSRRE08	X	X		
3SWPRE60A/B	X	X		
3GWSRE48				
3ARCRE21	X	X		
3MSSRE75	X	X		
3MSSRE76	X			Connector failed, to be replaced
3MSSRE77	X	X		Communications estab- lished in 1 port only
3MSSRE78	X	X		Communications estab- lished in 1 port only
3MSSRE79	X			Connector failed, part on order

## ATTACHMENT 1, Continued

## Radiation Monitoring System Status

<u>Instrument Number (Mark No.)</u>	<u>Turned Over</u>	<u>Field Tested</u>	<u>Communications Loop Established</u>	<u>Comments</u>
Area Monitors				
3RMSRE16	X	X		
3RMSRE17	X	X	X	
3RMSRE18	X	X	X	
3RMSRE19	X	X	X	
3RMSRE20	X	X		
3RMSRE21	X	X	X	
3RMSRE22	X	X	X	Temporary fix, part on order
3RMSRE24	X	X	X	
3RMSRE25	X	X	X	
3RMSRE28	X	X	X	
3RMSRE29	X	X	X	
3RMSRE31	X	X		Communications estab- lished in 1 port only
3RMSRE32	X	X		Communications estab- lished in 1 port only
3RMSRE33	X	X		Missing part
3RMSRE34	X	X		
3RMSRE35	X	X		Communications estab- lished in 1 port only
3RMSRE36	X	X	X	
3RMSRE37	X	X	X	

## ATTACHMENT 1, Continued

## Radiation Monitoring System Status

<u>Instrument Number (Mark No.)</u>	<u>Turned Over</u>	<u>Field Tested</u>	<u>Communications Loop Established</u>	<u>Comments</u>
Area Monitors				
3RMSRE04*	X			
3RMSRE05*	X			
3RMSRE41*	X			
3RMSRE42*	X			
3RMSRE01	X	X		Communications estab- lished in 1 port only
3RMSRE02	X	X		Communications estab- lished in 1 port only
3RMSRE03	X	X		Communications estab- lished in 1 port only
3RMSRE06	X	X	X	
3RMSRE07	X	X	X	
3RMSRE08	X	X	X	
3RMSRE09	X	X	X	
3RMSRE10	X	X	X	
3RMSRE11	X	X	X	
3RMSRE12	X	X	X	
3RMSRE13	X	X	X	
3RMSRE14	X	X	X	
3RMSRE15	X	X		
3RMSRE38	X	X	X	
3RMSRE52	X			

\*Category 1E Monitors

## ATTACHMENT II

### RMS Surveillance Procedure Summary

<u>Procedure Number</u>	<u>Monitor Identification</u>	<u>Status/Comment</u>
3449B01	3HVR-RE19A/B SLCRS Part/Gas Cal. Proc.	Draft
3450F01	3CND-RE07 Waste Neut. Sump Rad. Monitor Cal.	Draft
3450J01	3LWC-RE65 Regen. Evap. Rad. Monitor Cal.	Draft
3450K01	3SSR-RE08 S/G Blowdown Rad. Monitor Cal.	Draft
3449J01	3HVQ-RE49 ESF Part & Gas Rad. Monitor Cal.	Draft
3449H01	3RMS-RE04/05 Cont. HR Inter. 51'4" CTMT. Cal. Proc.	Draft
3449G01	3HVC-RE16A/B Control Bldg. Inlet Cal. Proc.	Draft
3449A11	3HVR-RE10A/B Vent Part/Gas 66'6" Aux Bldg. Oper. Test	In Development
3449B11	3HVR-RE19A/B SLCRS Part/Gas Oper. Test	In Development
3449D11	3SWR-RE60A/B Cont. Recirc. Cool Outlet Oper. Test	Draft
3449E11	3RMS-RE41/42 Fuel Drop Monitor 51'4" Oper. Test	In Development
3449G11	3HVC-RE16A/B Control Bldg. Inlet Oper. Test	Draft
3449H11	3RMS-RE04/05 Cont. HR Inter. 51'4" CTMT. Oper. Test	Draft
3450F11	3CND-RE07 Waste Neut. Sump Rad. Monitor Oper. Test	Draft
3450G11	3DAS-RE50 Turb. Weldg. Floor Drains Rad. Monitor Oper. Test	Draft
3450H11	3LWS-RE70 Liquid Waste Rad. Monitor Oper. Test	Draft
3450J11	3LWC-RE65 Regen. Evap. Rad. Monitor Oper. Test	Draft

## ATTACHMENT II, Continued

## RMS Surveillance Procedure Summary

<u>Procedure Number</u>	<u>Monitor Identification</u>	<u>Status/Comment</u>
3450K11	3SSR-RE08 S/G Blowdown Rad. Monitor Oper. Test	Draft
3449A01	3HVR-RE10A/B Vent Part/Gas 66'6" Aux Bldg. Cal. Proc.	Draft
3449C01	3CMS-RE22A/B CTMT Atmos. Part/Gas Cal.Proc.	Draft
3449C11	3CMS-RE22A/B CTMT Atmos. Part/Gas Oper.Test	In Development
3449D01	3SWP-RE60A/B TM Recirc. Cool Outlet Cal.Proc.	Draft
3449E01	3RMS-RE41/42 Fuel Drop Monitor 51'4" Cal.Proc.	Draft
3449E21	Fuel Pool Storage Criticality Monitor Cal.	PORC Approved-Rev.0, Rev.1 to be sub- mitted for PORC ap- proval on 8-23-85
3449E31	Fuel Pool Storage Crit. Monitor Oper. Test	Draft Rev.0 to be submitted for PORC approval 8-23-85
3449F01	3HVZ-RE09A/B Recom. Cub. A/B Exh. 7'6" Cal. Proc.	Draft
3449F11	3HVZ-RE09A/B Recom. Cub. A/B Exh. 7'6" Oper. Test	Draft
3449J11	3HVQ-RE49 ESD Part & Gas Rad. Monitor	In Development
3450D01	3MSS-RE75, 76, 77, 78 Main Stm. Rel. Line A-D Cal. Proc.	Draft
3450D11	3MSS-RE75, 76, 77, 78 Main Stm. Rel. Line A-D Oper. Test	Draft
3450E01	3MMS-RE79 Turb. Drv. Aux. FDW Pump Dsch. Cal. Proc.	Draft
3450E11	3MMS-RE79 Turb. Drv. Aux. Fdw. Pmp. Dsch. Oper. Test	Draft

ATTACHMENT II, Continued

RMS Surveillance Procedure Summary

<u>Procedure Number</u>	<u>Monitor Identification</u>	<u>Status/Comment</u>
3450G01	3DAS-RE50 Turb. Bldg. Floor Drains Rad. Monitor Cal.	Draft Rev.0 to be submitted for PORC approval 8-23-85
3450H01	3LWS-RE70 Liquid Waste Rad. Monitor Cal.	Draft



### ATTACHMENT III

#### RMS Generic Procedure Summary

<u>Generic No (GPIC)</u>	<u>I&amp;C Procedure No.</u>	<u>Monitor Identification</u>	<u>Status/Comment</u>
20.01	3490B01	Kaman Science (KMG-HRN) Radiation Monitor	Draft Rev. 0
20.02	3490B02	Kaman Science (KMG-HRH) Radiation Monitor	Draft Rev. 0
20.03	3490B03	Kaman Science (KMPG) Radiation Monitor	Approved * Rev. 0
20.04	3490B04	Kaman Science (KML) Radiation Monitor	Approved * Rev. 0 Draft Rev. 1
20.05	3490B05	Kaman Science (KMG) Radiation Monitor	Draft
20.06	3490B06	Kaman Science Hydrogen Vent Monitor	Draft
20.07	3490B07	Kaman Science Hydrogen Recombiner Monitor	In Development
20.08	3490B08	Kaman Science (KMA-HR) Radiation Monitor	In Review
20.09	3490B09	Kaman Science (KMA-MR) Radiation Monitor	In Review-May be deleted
20.10	3490B16	Kaman Science (KMA) Radiation Monitor	Approved * Rev. 0
20.11	3490B11	Kaman Science Fuel Failure Monitor	In Review
20.12	3490B12	Kaman Science Service Water Effluent Monitor	In Review
20.13	EC1-4	Eberline Radiation Monitor	In Development

\*Approval of these procedures is by the I&C Department Supervisor and the Startup Manager.