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NORTHEAST NUCLEAR ENERGY COMPANY
A NORTHEAST UTILITIES COMPANY

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April 3, 1975

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Nuclear Regulatory Agency
Directorate of Licensing
Washington, D. C. 20545

Attention: Mr. A. Giambusso
Deputy Director of Reactor Projects

Reference: Provisional License DPR-21
Docket 50-245
Abnormal Occurrence No. AO-50-245/75-5

Dear Mr. Giambusso:

As defined by the Technical Specifications of the Millstone Nuclear Power Station, Section 1.0.A.5 and 6.6.B.1, Abnormal Occurrence Report Number AO-50-245/75-5 is enclosed.

Yours truly,

William G. Counsil

William G. Counsil
Plant Superintendent
Millstone Nuclear Power Station

WGC/ERF:el

cc: J.P. O'Reilly

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ABNORMAL OCCURRENCE REPORT

Report Number: AO-50-245/75-5

Report Date: April 3, 1975

Initial Report Date: March 27, 1975

Occurrence Date: March 27, 1975

Facility: Millstone Nuclear Power Station, Waterford, Connecticut

IDENTIFICATION OF OCCURRENCE:

An inadvertent injection of contaminated liquid into the condensate return system of the house heating boilers occurred on the report date. The results of the occurrence were contamination of the house heating steam piping for both Units 1 and 2; contamination of the boiler room floor and portions of the adjacent maintenance shop; contamination of a portion of the transformer yard outside of the boiler room; and an unmonitored release of contaminated liquid to the discharge canal.

CONDITIONS PRIOR TO OCCURRENCE:

The plant was operating at a steady state power level of 100%. The liquid radwaste concentrator was undergoing an attempted blowdown operation and the number three (3) house heating boiler was being manually placed in operation. The number 3 boiler was being placed in operation due to water level control problems with the number 2 boiler. The number 1 boiler was out of service for fire wall maintenance.

DESCRIPTION OF OCCURRENCE:

During the process of placing number 3 boiler on line, the deareating feed tank and surge tank, components of the condensate return/makeup system, overflowed to the floor of the house heating boiler room. A man, subsequently leaving the boiler room, detected shoe contamination on passing through a portal monitor. Health Physics was immediately notified and asked to survey the water on the boiler room floor. The water was found to be contaminated. The boiler was removed from service and health physics barriers established to limit the spread of contamination. Subject boiler, prior to shutdown, had been supplying heating steam to the Unit 2 heating system. In light of the fact that contamination could exist in Unit 2, a complete survey was initiated. To facilitate the survey, all Unit 2 construction workers were ordered to leave the site, after a complete radiological frisking.

Surveys of Unit 1 areas revealed an approximate 1200 square foot floor area contaminated to a level of approximately 80,000 dpm/100 cm^2.

Surveys of Unit 2 revealed contamination levels in the area of the heating steam condensate surge tank, on the 14'6" level, of 100,000

dpm/100 cm^2. In addition, the level of contamination in the area of the heating steam condensate recovery tank was 80,000 dpm/100 cm^2. Unit 2 heating steam piping was surveyed at 1 mr/hr general with local low points and traps reading 5 - 6 mr/hr. Areas of contamination were of minimal size. There were no personnel directly contaminated as a result of this occurrence, however, a total of 12 pairs of work shoes have not been returned to employees due to levels of fixed contamination.

DESIGNATION OF APPARENT CAUSE OF OCCURRENCE:

Contamination of the makeup water to the house heating boiler led to the contamination of the boiler room floor and adjacent floor area. The contaminated makeup water also led to contaminated steam being routed to the heating system of both Unit 1 and Unit 2. Average activity levels in the boiler makeup water system were determined to be 5.00×10^{-3} uCi/ml. The source of this contamination has been determined to be the following:

The radwaste concentrator concentrates high activity liquid waste by passing heating boiler steam through a coil bundle. This steam is also supplied to a ring sparger in the bottom of the concentrator which reduces the viscosity of the concentrate when in the hot standby mode. Condensate returns from the heating steam line to the concentrator and the coil bundles are collected in a condensate recovery tank within the radwaste building. Discharges from this tank are monitored for conductivity and returned to the heating boiler makeup system if less than 15 umhos/cm conductivity or to the radwaste floor drain system if greater than 15 umhos/cm conductivity. The conductivity cell, in addition to positioning two valves associated with the above two flow paths, provides conductivity indication to the radwaste operator and panel alarm annunciation at a level of 15 umhos/cm.

On March 27, 1975, the radwaste concentrator was undergoing a blowdown operation. Heating steam to the ring sparger was isolated, however, as determined later, the isolation valve leaked thus permitting high activity concentrate to pass to the condensate return tank in radwaste. The conductivity cell instrument loop was found to be mis-wired and thus permitted the high activity water to return to the heating boiler makeup system. This instrument loop had undergone maintenance work on January 27, 1975, and had not been properly wire checked on the completion of the work.

ANALYSIS OF OCCURRENCE:

Spillage of contaminated water on to the boiler room floor, from the boiler makeup deareating tank, occurred during manual startup of the #3 boiler for a period of approximately 30 minutes. This water was collected by a turbine building sump from the boiler room floor drain system. This turbine building sump is located in a clean area and is an unmonitored sump and discharges to the outfall via the storm drain system. Thus, an unfiltered and unmonitored release of contaminated water had occurred. Calculations on the magnitude of this release show the following:

Although the estimated overflow was no more than 1,000 gallons based on floor area and tankage, a more conservative approach has been taken knowing the maximum system makeup rate to the deareating feed tank of 100 gpm, and knowing that the spillage occurred for a 30 minute time period, a total

volume of 3,000 gallons of contaminated water was assumed discharged. The activity of the spilled water was analyzed to be 1.18×10^{-2} uCi/ml gross beta. By calculation, the total activity discharged was 1.34×10^{5} uCi. The discharge capacity of the turbine building sump pump is 50 gpm maximum. Release of the assumed 3,000 gallons of contaminated water would therefore take 60 minutes. Dilution flow, at the time of this release, provided by circulating water pumps, was 4.20×10^{5} gal/min. Based on a 60 minute release time, total dilution gallonage is 2.52×10^{7} gallons or 9.53×10^{10} ml. Average activity concentration at the point of release is therefore 1.40×10^{-6} uCi/ml. The average allowable daily discharge limit for Millstone 1 is 1.0×10^{-6} uCi/ml. Because of the conservative means of calculating the release, the PORC feels the actual release was less than the calculated value of 1.4×10^{-6} uCi/ml and should be viewed as the worst possible condition.

Subsequent surveys of the Unit 2 house heating piping system and components indicated contamination throughout, and proper radiological controls have been established while the cleanup work is in progress. All flush water and boiler drains are returning to the Unit 1 radwaste systems for processing.

CORRECTIVE ACTION:

The following immediate corrective actions have been accomplished:

1. The radwaste diversion valves were investigated and mis-wiring was corrected. The conductivity instrument loop was retested and proved properly functional. The instrument loop was then adjusted to modify the diversion valve operation such that all concentrator steam drains are diverted to radwaste regardless of conductivity.

2. The Unit 1 turbine building floor drain sump pump discharge was diverted to the radwaste floor drain system, in lieu of the storm drain system, to allow decontamination of the boiler room and adjacent floor areas.

3. Unit 2 turbine building and auxiliary floor drain sumps were isolated from normal discharge path, and all heating system flush water is being returned to the Unit 1 radwaste system.

4. Decontamination efforts, of the Unit 1 boiler room floor, are in progress. This effort will be complete as soon as all heating system piping is determined to be clean and system flushes are terminated.

5. Fill and drain, as well as steam cleaning, of the Unit 2 heating system piping and components is in progress. Activity levels have been reduced to barely above background. Local floor contamination, due to various heating system valve packing leaks, is in the process of being cleaned up.

6. Instructions have been issued to all plant supervision, by the Plant Superintendent, directing that sumps must be

sampled and if found to be contaminated, must be pumped to the Unit 1 radwaste systems.

7. Contaminated trap rock from the transformer yard is being collected in 55 gallon drums for ultimate disposal.

Extended term corrective action, consisting of engineering analysis of the auxiliary heating steam systems potential of contamination is being undertaken. Other systems with a similar type interface will be investigated. Results of this analysis, and any determined corrective action will be reported in a follow-up informational letter.

FAILURE DATA:

None

William G. Counsil

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Plant Superintendent
Millstone Nuclear Power Station