



February 14, 2013

Document Control Room
U.S. Nuclear Regulatory Commission
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**RE: Reportable Occurrence # 24
Reactor Building Flood - Ruptured Fire Suppression Line
University of Michigan / Ford Nuclear Reactor
Reactor License R-28 / Docket 50-2
Technical Specification (Section 1.0 / Item 8)**

Decommissioning Branch / Materials Safety Branch:

In accordance with the University of Michigan (U-M) – Ford Nuclear Reactor (FNR) technical specifications [Section 6.7(2)(a)], the U-M is submitting this reportable occurrence report for a flooding event that occurred within the facility on Monday evening, January 28, 2013 at approximately 20:00 hours. The FNR (License R-28 / Docket 50-2) is a non-power reactor in the final stages of decommissioning (final status survey) and is currently an empty and gutted building. No licensed radioactive material was known to be released from the restricted area as a result of this event.

The U-M believes this flooding event may be a reportable occurrence as defined in the Technical Specifications (Section 1.0 / Definitions / 'Reportable Occurrence' / Item 8): *'Conditions arising from natural or man-made events that affect or threaten to affect the safe operation of the facility.'*

A NRC Region III Materials Safety inspector happened to be at the U-M the night of the flood and observed U-M staff handling the event at the FNR facility the next morning (Tuesday, January 29, 2013). That inspector reported his findings back to the Region III offices. In addition, the U-M Radiation Safety Officer notified the NRC Decommissioning Project Manager at NRC headquarters in Washington, D.C. about the flood event on Tuesday morning, January 29th.

On January 28th, a four inch fire suppression line ruptured in Room 2111 on the second floor of the reactor building. We believe the break occurred due to freeze/thaw weather experienced over the previous week, added to the lack of heat in the facility as the decommissioning process had removed all mechanical systems. Room 2111 is located over the north area of the reactor building first floor.

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The rupture caused extensive flooding of the north portion of the first floor, the open area beneath the first floor where the reactor pool had been removed, and the reactor basement. The volume of water released from the fire suppression line was estimated to be 150,000 - 200,000 gallons and was based on an approximate flow rate of 4,000 - 5,000 gallons per minute for approximately 40 minutes. The time is estimated from the time it took for water to flow under the door separating the structure from the adjacent Phoenix Lab where workers noted it, to the time when maintenance staff actually turned off the water. A more accurate estimate of the total volume of water released was not possible because the fire suppression line was not metered.

Water from the ruptured fire suppression line was channeled by cutout areas of the first floor slab to the basement. The slab cutouts were created by the removal of imbedded piping earlier in the decommissioning process. The bulk of the water escaped through cuts in the first floor and basement floor slab where soil beneath the reactor building was exposed. No water was intentionally pumped-out into the sanitary sewer system from the FNR building, however, water did drain from the FNR basement into the connecting Phoenix building basement tunnel, eventually finding its way to the Phoenix sanitary sewer system and Phoenix retention tank pit area.

Soil / sediment from the exposed soils on the first floor & basement floor slab pipe trenches of the FNR was washed into the lower levels of the FNR basement and the base of the reactor pool / hold-up tank area.

It should be noted that a comprehensive final status survey was conducted by a decommissioning contractor between November 26 – December 12, 2012 and confirmatory FSS surveys were conducted by the NRC / ORAU consultants the week of December 3, 2012. No residual radioactivity above the established gross beta DCGL (5125 dpm/100 cm²) for structural surfaces was discovered during these FSS activities.

A comprehensive radiological survey was conducted after the flooding event using a final status survey (FSS) approach (survey scans, static readings, and swipes). The radiological survey revealed no contamination within the facility. The survey was conducted on all floor levels impacted by the flood water (2nd floor, 1st floor, and basement). A contamination survey conducted in the Phoenix basement tunnel also revealed no contamination. The swipes were counted using a liquid scintillation counter (LSC) and/or gas proportional counter (GPC) and no counts statistically above background were noted.

In addition, 3 water and 2 sediment/soil samples were collected from the impacted FNR basement and reactor pool hold-up tank area and analyzed using a sensitive HPGe gamma spectrometer. The HPGe system is calibrated to the same geometry (500 ml plastic bottles) as the samples counted. No contamination was identified in the water or soil/sediment samples. The minimum detectable activity (MDA) for the primary FNR sourced radionuclides of

interest (Co-60, Ag-108m, and Cs-137) in the water and soil/sediment samples were less than 0.1 pCi/ml and less than 0.1 pCi/g, respectively.

A ground water sample was collected on February 12, 2013 from a monitoring well located at the front (south end) of the Phoenix building. The screen length in this monitoring well is 5 feet (10-slot PVC). The perched water under the FNR and Phoenix buildings flows in a north-to-south direction. The static water level of this monitoring well was 38.88 feet below the top of the well casing, which corresponds to a groundwater elevation of 808.26 feet. This sample was analyzed using the HPGe gamma spectrometer. No reactor sourced contaminant isotopes were detected. The MDA was less than 0.1 pCi/ml for Co-60, Ag-108m and Cs-137.

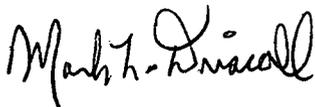
It should also be noted that the expandable plug inserted into the foundation drain tile pipe located in the east wall of the FNR basement did not leak any of the flood water or sediment into the truncated drain tile pipe. In addition, when the drain tile plug was carefully removed, no water or sediment came into the FNR basement through the drain tile pipe.

After a post-flood follow-up conference call with the NRC decommissioning branch staff on February 13, 2013, a decision was made to obtain and analyze an additional four sediment / soil samples from the pipe trenches and near the former sump area. Split samples in these strategic locations will be collected so the NRC can have independent analyses of the samples conducted by the ORAU staff.

In accordance with Section 6.7 / Item #2 ('Non-Routine Reports') of the FNR Technical Specifications, corrective action to prevent recurrence of this flooding event included turning off the water to the fire suppression line in question and assessing other water lines within the FNR building. There is currently only one active water line in the FNR building; that line is located in the 1st floor stairwell, and the temperature in that area has never dropped below 36 degrees Fahrenheit in the past 4 years.

Thank you for your time and consideration with respect to this report. Please do not hesitate to contact me at OSEH / Radiation Safety Service (734) 647-2251 or 764-6200) should you have any questions or comments regarding this report or the flooding event.

Sincerely,



Mark L. Driscoll
Director / Radiation Safety Officer
OSEH / Radiation Safety Service

cc: Terry Alexander
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FNR Decommissioning Files