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December 21, 2017

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Subject: 30-Day Written Report of Legacy Contamination Identification

References: Docket No. 70-143: SNM License 124

Pursuant to the requirements of 10 CFR 20.2203(a)(3)(ii), Nuclear Fuel Services, Inc. (NFS), hereby submits the attached written report regarding radiological contamination in a legacy radiological work process building.

If you or your staff have any questions, require additional information, or wish to discuss this matter further, please contact me at (423) 743-1705, or Mr. Randy Shackelford, Nuclear Safety and Licensing Manager, at (423) 743-2504. Please reference our unique document identification number (21G-17-0232) in any correspondence concerning this letter.

Sincerely,

NUCLEAR FUEL SERVICES, INC.

Richard J. Freudenberger, Director
Safety and Safeguards

RKR/lah-pj

Attachment: 30-Day Report of Legacy Contamination Identification

ZETZ
NMSS

Copy:

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ATTACHMENT

30-Day Report of Legacy Contamination Identification

(3 pages to follow)

30-Day Report of Legacy Contamination Identification

1. The date, time, and exact location of the event

On November 24, 2017, Nuclear Fuel Services, Inc. (NFS), Erwin, TN, identified transferable contamination in overhead surfaces in the tool room of Building 120 (B120), the NFS Maintenance shop. This building is inside the Protected Area and known to have fixed radioactive contamination but has been an uncontrolled area for contamination control purposes. The maximum transferable contamination level identified was 16,791 dpm/100cm² alpha. The transferable alpha contamination action level is 200 dpm/100cm² for uncontrolled areas per Table 4-7 of SNM-124.

2. Radiological or chemical hazards involved, including isotopes, quantities, and chemical and physical form of any material released

Radiological survey data collected in the overhead surfaces obtained on November 24, 2017, through November 28, 2017, identified a mean alpha transferable contamination value of 2,052 dpm/10cm² and a maximum value of 16,791 dpm/100cm² transferable alpha contamination. Gamma Spectroscopy Analysis of a large area wipe characterized the transferable contamination as containing 48% Th-232, 24% U-235 and 28% U-238 activity.

3. Actual or potential health and safety consequences to the workers, the public, and the environment, including relevant chemical and radiation data for actual personnel exposures to radiation or radioactive materials or hazardous chemicals produced from licensed materials (e.g. level of radiation exposure, concentration of chemicals, and duration of exposure).

There were no actual health or safety consequences to the workers, the public, or the environment.

An analysis of potential inhalation doses that could occur from long term occupancy in the room was performed. The results of this analysis indicated less than 1.00 mrem Committed Effective Dose Equivalent (CEDE) potential exposure.

An analysis of potential ingestion doses that could occur from entry into the contaminated area was performed using Activity and Internal Dose Estimates (AIDE) software which indicated less than 1.00 mrem CEDE potential exposure.

Once the overhead contamination was identified in B120, personnel surveys were performed on all maintenance mechanics and supervisors with no contamination identified.

Once the overhead contamination was identified in B120, bioassay urine samples were performed for all maintenance mechanics and supervisors. All bioassay samples results were below the internal dosimetry "Recording Levels" action level indicating no measurable exposures occurred.

4. **The sequence of occurrences leading to the event, including degradation or failure of structures, systems, equipment, components, and activities of personnel relied on to prevent potential accidents or mitigate their consequences.**

Facility records maintained per 10 CFR 70.25(g)(3) indicate B120 was constructed in 1957. B120 is known to contain fixed radioactive contamination and is posted with this information. The building was primarily used for maintenance of plant facilities including radioactively contaminated equipment. During its history, a portion of the building housed a high-enriched uranium process and a lathe that was used to turn uranium/thorium ingots. In the 1980's satellite maintenance areas were developed and B120 was decontaminated and treated as an uncontaminated area.

In November 2017, Maintenance personnel initiated a housekeeping project in this area including removal of some legacy electrical conduit. Subsequent radiological surveys identified the conduit contaminated up to 1,248 dpm/100cm² transferable alpha contamination which led to the discovery of the legacy contamination in the overhead areas of the building.

The area with transferable contamination was limited to the upper elevations of the room, primarily on horizontal surfaces. Once identified, the area was controlled as a contaminated area.

5. **The probable cause of the event, including all factors that contributed to the event and the manufacturer and model number (if applicable) of any equipment that failed or malfunctioned.**

The probable cause of the event was inadequate decontamination, remediation, and controls in the 1980's which led to an inappropriate release of the area from contamination controls. Routine surveys since then failed to identify the transferable contamination because the contamination is limited to the upper elevations of the room, only present from approximately 10 feet to the approximately 13 foot high ceiling, and was inaccessible for routine contamination surveys. This elevated area is not routinely accessed.

6. **Corrective Actions taken or planned to prevent occurrence of similar or identical events in the future and the results of any evaluations or assessments.**

The event was entered into the corrective action program for evaluation and development of corrective actions.

On November 24, 2017, the area was surveyed and the overhead of the B120 tool room was posted as a contamination area. This action restored compliance with the NFS contamination control program requirements as described in SNM-124.

Follow up investigative surveys of the area (i.e., floors, lockers, and equipment) indicated maximum contamination levels at 160 dpm/100cm² alpha with an average of 38

dpm/100cm² alpha. Historical survey data was evaluated for a period of approximately three (3) years for the entire Maintenance shop. This data consisted of approximately 3,600 smears with an average of 3.29 dpm/100cm² alpha. Both the investigative and historical survey data indicate the transferable alpha contamination is well below the action level of 200 dpm/100cm² alpha for uncontrolled areas per Table 4-7 of SNM-124. The combination of the investigative contamination surveys and review of the historical survey data indicated that no contamination had been spread from the overhead contaminated area.

For a transportability review and evaluation, transferable contamination surveys were performed on overhead surfaces of other legacy buildings that previously housed radioactive material processes. Results of these surveys did not identify other buildings with uncontrolled transferable contamination above SNM-124 Table 4-7 values.

Following additional characterization for other safety hazards, such as heavy metals and asbestos in B120, a work task will be generated to remediate, decontaminate, and/or encapsulate residual contamination. This task is expected to be completed in 2018. In the interim, the area will continue to be controlled as a contaminated area.

7. **If the event involved an area or equipment with an approved Integrated Safety Analysis, whether the event was identified and evaluated in the Integrated Safety Analysis.**

Not applicable.

8. **The extent of exposure of individuals to radiation or radioactive materials.**

No measurable exposures occurred.