0049918

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

062596

APR 16 1998

98-EAP-236

Mr. Jerry Leitch, Chief
Radiation and Indoor Air Section
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101

Dear Mr. Leitch:

SUBMITTAL OF THE APPLICATION FOR APPROVAL OF SEDIMENT REMOVAL ACTIVITIES FROM THE N FUEL STORAGE BASIN

Enclosed is the subject application for approval in accordance with 40 Code of Federal Regulations (CFR), Part 61. This letter and its enclosure serve as the application for approval of conducting the activities. The application consists of the notice of construction prepared for the State of Washington Department of Health (DOH) on the same subject.

The purpose of the project described in the enclosure is to remove the sediment from the N Fuel Storage Basin that is located in the 105-N Reactor Building. Potentially, radioactive air emissions will be generated during activities. With approval from the U.S. Environmental Protection Agency, this letter will also serve as the notification of anticipated startup and notification of actual startup in accordance with 40 CFR 61.09.

Should you have any questions or comments, please contact Ms. Heather Trumble on (509) 376-7326 or Mr. Hector M. Rodriguez on (509) 376-6421.

Sincerely,

Heather Trumble

for P. M. Pak, Senior Project Manager
N Area Project

Enclosure

cc w/o encl:
T. E Logan, BHI

NOTICE OF CONSTRUCTION 062596
for the
Removal of Sediment from N Fuel Storage Basin

The following description, and any attachments and references, are provided to the State of Washington Department of Health, Division of Radiation Protection, Air Emissions & Defense Section as a notice of construction (NOC) in accordance with the Washington Administrative Code (WAC) 246-247, Radiation Protection - Air Emissions. The WAC 246-247-060, "Applications, registration and licensing", states "This section describes the information requirements for approval to construct, modify, and operate an emission unit. Any NOC requires the submittal of the information listed in Appendix A." Appendix A (WAC 246-247-110) lists the requirements that must be addressed. Each of these items is addressed below.

1. **Location:** The sediment is located in the North Cask Pit (NCP) of the fuel storage basin which is located in the 105 N Reactor Building in the 100-N Area of the Hanford Site. The sediment will be removed from the Pit, and solidified in the 105-N Building for disposal at the Environmental Restoration Disposal Facility (ERDF), which is located in the 200 Area.

2. **Responsible Manager:**

   Mr. P. M. Pak
   N Area Project Senior Project Manager
   U.S. Department of Energy
   Richland Operations Office
   Richland, Washington 99352

3. **Proposed Action:** The current and approved NOC, the *Radioactive Air Emissions Notice of Construction for the 105N Basin Stabilization,* DOE/RL-94-14 accounts for the sediment transfer into the North-Cask Pit, but does not address the removal of the sediment from the NCP. Therefore, the proposed activity of removing the sediment from the NCP for treatment, packaging, and final disposal is considered a modification to the approved NOC. This sediment removal activity has the potential to increase air emissions.

4. **SEPA:** SEPA not applicable.

5. **Chemical and Physical Processes:** The proposed activity to be conducted is to pump the sediment from the NCP into packaging containers for mixing with grout. After solidification, the containers will be transferred to ERDF for disposal. The following is a detailed description of this removal process.

   The process will begin by placing three process shields, consisting of 8" thick and 75" tall concrete rings, in the N Basin Transfer Bay. A sediment disposal liner will be placed

inside each of these process shields. A homogenization system will then be installed into the NCP. This system will use four pumps (with a total flow rate of 800 gpm) to recirculate and agitate the sediments into a homogenous slurry. A separate sediment removal pump located in the NCP will be used to transfer this sediment slurry into the disposal liners located in the process shields. The slurry will be transferred through sleeved and shielded hoses which connect to a fill head unit installed on the top of a liner. The fill head unit is connected to a HEPA filtered exhaust system to contain contamination inside the liner. A HEPA filtered cover will also be installed over the opening of the NCP to contain airborne contamination during sediment removal operations.

A flag marker will be pre-installed inside each disposal liner to mark the level to which the sediment will be filled. A video camera will be used to verify this sediment level and the operator will stop the filling operation. A dewatering line in each disposal liner will be available if the sediment level should exceed this desired level.

Service water will be added to the liner to the required level before adding the solidification chemicals. A screw conveyer will be used to carry the cement mixture to the fill head and into the disposal liner. A set of mixing blades is pre-installed inside each liner. A motor located on the fill head unit turns these mixing blades stirring the sediment, water and cement material into a homogenous mixture. The blades continue to turn until the cement mixture sets up enough to ensure that no material will settle out or float to the top of the liner. At this point the hydraulic motor is stopped and the fill head is removed. A steel lid similar to a barrel lid is then put in place and the liner will be ready to be lifted with a crane using the disposable rigging slings that come with the liners.

The sediment removal process will be conducted in a batch operation filling three and then solidifying three liners at a time. A flatbed trailer will be loaded with the three solidified liners and delivered to ERDF for disposal while the next batch of three liners is being processed.

6. **Process Controls:** In addition to the HEPA filters used during the sediment removal process, the proposed controls for this removal activity are to utilize the existing HEPA filtered ventilation system for the 105 N-Basin during the entire process. This HEPA ventilation system is described in the *Radioactive Air Emissions Notice of Construction for the 105N Basin Stabilization,* DOE/RL-94-14.

7. **Drawings of Controls:** Not applicable.

8. **Radionuclides of Concern:** See Attachment.

9. **Monitoring:** The monitoring of the activities will be consistent with the approved monitoring plans established for the 116-N stack that is the exhaust stack for the 105-N Basin. Periodic confirmatory measurements are performed for the 116-N stack, which includes operating a record sampler, continuously, with the filters being changed biweekly, and once a month the filters are sent to a qualified laboratory for analysis.

10. **Annual Possession Quantity:** The estimated maximum source term associated with these activities is shown in the Attachment.

11. **Physical Form:** Particulates.

12. **Release Form:** Particulates.

13. **Release Rate:** See Attachment.

14. **Location to the MEI:** The MEI is 9,030 meters to the west northwest of the boundary (see the attached CAP-88 model run for details).

15. **TEDE to the MEI:** The sediment removal activity from the N fuel storage basin represents a potential unabated annual offsite dose of 8.79E-03 mrem/yr. It should be noted that the other activities described in the NOC will have been completed prior to initiating sediment removal; specifically, the debris handling and removal activity, sediment pumping to the NCP and the hydroscrubbing of the basin. Additionally, the plasma torch cutting activity was deleted from the original work scope and was not performed. The total abated offsite dose from this activity is 4.40E-06 mrem/yr[1].

    The radionuclide inventory, release fractions, CAP-88 dose factors, and calculated doses are shown in the Attachment.

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[1] The treatment factor for a HEPA filtered stack of at least 99.95% efficiency is established in WHC-EP-0498, *Unit Dose Calculation Methods and Summary of Facility Effluent Monitoring Plan Determinations*, November 1991. This value is 1/1-0.995 = 2,000. To determine the abated dose for the sediment removal activity, multiply 1/2000 or 5.00E-04 by the unabated dose (8.79E-03 mrem/yr).

16. **Cost Factor:** HEPA filters are commonly accepted as BARCT.

17. **Duration or Lifetime:** The sediment removal activity is expected to take approximately 35 days with completion by July 1998.

18. **Standards:** Not applicable for an insignificant modification.

19. **Conditions/Clarifications (for regulator use):**

Approval:

A. W. Conklin, WDOH — Date

for Heather Trumble
P. M. Pak, DOE/RL — 4/14/98 Date

D. V. Snyder
DOE/RL-EAP — 4/15/98 Date

Attachment:

Radionuclide Inventories, Release Fractions, and Annual Doses

The information presented below is summarized from ERC committed calculation 0100N-CA-V0008, *Air Emissions Calculation for Removal of Contaminated Material from 105-N Basin*, Revision 0, March 1998.

Radionuclide	Annual Possession Quantity (Ci/yr)	Release Fraction from DOE-HDBK-3010-94	Potential to Emit (Ci/yr)	CAP-88 Dose Factor (mrem/Ci)	Annual Potential Unabated Dose (mrem/yr)
^{241}Am	6.68e0	1.00e-4	6.68e-4	5.36e0	3.58e-3
^{242m}Am	1.30e-2.	1.00e-4	1.30e-6	5.16e0	6.71e-6
^{243}Am	4.90e-2	1.00e-4	4.90e-6	5.35e0	2.62e-5
^{137}Cs	3.94e1	1.00e-4	3.94e-3	1.66e-2	6.54e-5
^{137m}Ba*	3.70e-2	1.00e-4	3.70e-6	5.92e1	2.19e-4
^{60}Co	1.58e1	1.00e-4	1.58e-3	6.96e-2	1.10e-4
^{243}Cm	6.91e-3	1.00e-4	6.91e-7	3.59e0	2.48e-6
^{244}Cm	9.33e-1	1.00e-4	9.33e-5	2.83e0	2.64e-4
^{154}Eu	8.58e-1	1.00e-4	8.58e-5	5.35e-2	4.59e-6
^{155}Eu	4.91e-1	1.00e-4	4.91e-5	2.32e-3	1.14e-7
^{237}Np	2.17e-2	1.00e-4	2.17e-6	4.88e0	1.06e-5
^{238}Pu	1.17e0	1.00e-4	1.17e-4	3.24e0	3.79e-4
$^{239/240}$Pu	6.90e0	1.00e-4	6.90e-4	3.49e0	2.41e-3
^{241}Pu	2.83e2	1.00e-4	2.83e-2	5.51e-2	1.56e-3
^{242}Pu	1.14e-3	1.00e-4	1.14e-7	3.32e0	3.79e-7
^{90}Sr	3.22e1	1.00e-4	3.22e-3	4.66e-2	1.50e-4
^{90}Y*	3.20e-2	1.00e-4	3.20e-6	9.03e-2	2.89e-7
^{99}Tc	3.75e-3	1.00e-4	3.75e-7	9.87e-3	3.70e-9
^{232}Th	7.79e-9	1.00e-4	7.79e-13	3.36e0	2.62e-12
^{228}Ra*	7.80e-12	1.00e-4	7.80e-16	8.77e1	6.84e-14
^{228}Ac*	7.80e-12	1.00e-4	7.80e-16	1.60e2	1.25e-13
^{234}U	1.94e-2	1.00e-4	1.94e-6	1.31e0	2.55e-6
^{235}U	4.52e-4	1.00e-4	4.52e-8	1.25e0	5.64e-8
^{236}U	1.90e-3	1.00e-4	1.90e-7	1.24e0	2.36e-7
^{238}U	8.71e-3	1.00e-4	8.71e-7	1.17e0	1.02e-6
Total	**3.88e2**	**na**	**3.88e-2**	**na**	**8.79e-3**

Table Notes:

1. Radionuclide annual possession quantities are as presented in BHI Calculation 0100N-CA-N0038, *Characterization of Mixed Sediment in North Cask Pit and Basin Water*, Revision 0, February 1998.
2. Decay chain radionuclides (noted with an asterisk, above) are as presented in 0100N-CA-V0008, *Air Emissions Calculation for Removal of Contaminated Material from 105-N Basin*, Revision 0, March 1998.
3. The release fraction of 1.00E-4 is the same fraction used in BHI-00968, *Final Hazard Classification and Auditable Safety Analysis for the N Basin Segment*, Revision 0, December 1996, and supporting calculation BHI 0100N-CA-N0015, *Assessment of Accident Doses within the N Basin Structure*, Revision 1, December 1996, as derived from DOE-HDBK-3010-94. This factor is conservative because it assumes a spray leak event with the radioactive materials in solution. A more realistic assumption is a slurry source with a release fraction of 5.00 E-5.
4. The annual unabated dose is calculated by multiplying the activity of each radionuclide (Ci) by the release fraction (unitless) by the CAP-88 dose factor (mrem/Ci/year). The resulting values (mrem/yr) are summed to establish the total annual unabated dose.