



**Department of Energy**

Washington, DC 20585

November 18, 2015

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DNF SAFETY BOARD

The Honorable Joyce L. Connery  
Chairman  
Defense Nuclear Facilities Safety Board  
625 Indiana Avenue NW, Suite 700  
Washington, DC 20004

Dear Ms. Chairman:

Enclosed is the Department of Energy's (DOE) Office of Environmental Management evaluation in response to the Defense Nuclear Facilities Safety Board's (Board) August 21, 2015, letter regarding the Board's concerns that a Specific Administrative Control (SAC) has been removed from the preliminary design of Phase 1 of the Hanford Sludge Treatment Project (STP), also known as the Engineered Container Retrieval and Transfer System (ECRTS). Your letter requested a report that describes: 1) DOE's position on controlling River access and protecting public receptors from accidents during slurry transfer; and 2) the technical basis for this position.

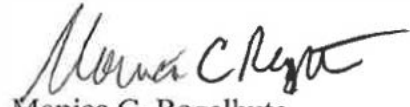
DOE believes that Revision 1 of the STP ECRTS Preliminary Documented Safety Analysis (PDSA) demonstrates adequate protection of the public and workers and that the SAC is not needed. As further described in the enclosed report, there is adequate protection for individuals at the Columbia River, based on the reduction in the potential radiological dose for a spray release accident that was used for the preliminary design, the short duration of each individual transfer, the unmitigated consequences associated with a spray release, and the controls identified in the PDSA to mitigate or prevent a spray release. The estimated time for retrieval of container CON-230, the bounding Material at Risk, is two hours throughout the life of the project (approximately one and one-half years). The unmitigated consequences to the Maximally Exposed Offsite Individual is estimated at 0.11 rem from the bounding seismically induced spray release. The unmitigated consequences to a receptor at the near river bank are estimated at 5.8 rem and 2.5 rem for the seismically induced spray release and operational spray release, respectively. In addition, a Safety Significant Seismic Design Criteria-2 seismic cutoff switch that would mitigate the spray release event is included in the control strategy.

In response to the Board's letter, the Richland Operations Office prepared the enclosed document, *Information Associated with Defense Nuclear Facilities Safety Board (DNFSB) Letter Dated August 21, 2015, on Sludge Treatment Project Site Boundary*, which provides DOE's position on controlling river access and protecting public receptors from accidents during slurry transfer, and the technical basis for this position.



If you have any further questions, please contact me or Mr. James Hutton, Deputy Assistant Secretary for Safety, Security, and Quality Programs, at (202) 586-5151.

Sincerely,

A handwritten signature in black ink, appearing to read "Monica C. Regalbuto". The signature is fluid and cursive, with a long horizontal stroke extending from the end.

Monica C. Regalbuto  
Assistant Secretary  
for Environmental Management

Enclosure

ENCLOSURE

Attachment  
15-NSD-0068\_RL

**INFORMATION ASSOCIATED WITH DEFENSE NUCLEAR FACILITIES SAFETY BOARD (DNFSB) LETTER DATED AUGUST 21, 2015, ON SLUDGE TREATMENT PROJECT SITE BOUNDARY**

**DNFSB ISSUE STATEMENT:** The DNFSB is concerned that a Specific Administrative Control (SAC) has been removed from the preliminary design of Phase 1 of the Hanford Sludge Treatment Project (STP), also known as the Engineered Container Retrieval and Transfer System (ECRTS). The SAC was originally included in the design to protect the public by controlling public access to portions of the Columbia River prior to and during slurry transfers of radioactive material. The U.S. Department of Energy (DOE) Richland Operations Office (RL) approved the removal of the SAC, and currently plans to control access to the River under emergency conditions only. Relying on emergency response would not adequately protect individuals located on the River in the event of a rapidly developing accident, such as a spray release. Such individuals could be exposed to a significant radiological dose. Pursuant to 42 U.S.C. § 2286b(d), the DNFSB requests a report within 45 days of receipt of their August 21, 2015, letter that describes 1) DOE's position on controlling River access and protecting public receptors from accidents during slurry transfers, and 2) the technical basis for this position.

**RESPONSE:**

1) DOE RL's position on controlling River access and protecting public receptors from accidents during slurry transfers.

Considering the complexities of items such as physical barriers, monitoring river traffic, regulatory issues associated with closing the river, the reduction in the potential radiological dose for a spray release accident that was used for the preliminary design, the short duration of each individual transfer (see discussion below), the unmitigated consequences associated with a spray release, and the controls identified in the Preliminary Documented Safety Analysis (PDSA) to mitigate or prevent a spray release, DOE-RL has determined that the event is adequately controlled and managed and the SAC is not required.

2) Technical Basis for DOE RL's Position.

As identified above in the DNFSB Issue Statement and in the PDSA, the spray release is the bounding event. The following paragraphs provide additional supporting information.

Revision 0 of the PDSA required a SAC to control river access during operations or slurry transfers based on the consequences to an individual located at the near river bank from an unmitigated spray release. The spray leak analysis inputs and assumptions in Revision 1 were

revised to incorporate recent testing performed by the Pacific Northwest National Laboratory (PNNL) for the Waste Treatment Plant (WTP). These revisions did not change the quantity of sludge in Engineered Container (CON)-230 available for release. That is, the operational induced spray assumed a volume controlled by steel dividers of 6.7 m<sup>3</sup> whereas the seismically induced spray assumed 15.9 m<sup>3</sup> of sludge due to seismic action. As a result of these changes the dose consequences to all receptors, including an individual at the near river bank, due to an operational spray release were reduced to less than 5 rem. The consequences associated with the seismically induced spray release were also reduced. During the RL review and approval of Revision 1 to the ECRTS PDSA RL agreed that the SAC was not required. Given the time to transfer the bounding CON-230, less than two hours total, the facility controls, Safety Significant (SS) seismic switch and SS transfer piping, and the radiological dose consequences, the identified controls were determined to be adequate.

#### Revised Spray Leak Analysis:

In May of 2014 CH2M Hill Plateau Remediation Contractor (CHPRC) and RL identified three safety initiatives to be considered in the PDSA Revision 1, one of which was to evaluate conservatism in the spray leak analysis. The evaluation results of the spray leak inputs and assumptions were incorporated into the spray leak analysis and reanalyzed using CON-230 as the bounding Material at Risk. The reanalysis resulted in a decrease in the unmitigated consequences to the Maximally Exposed Offsite Individual (MOI) from 0.9 rem to 0.11 rem from the bounding seismically induced spray release. The unmitigated consequences to a receptor at the near river bank were also reduced from 46 rem to 5.8 rem and 2.5 rem for the seismically induced spray release (15.9 m<sup>3</sup>) and operational spray release (6.7 m<sup>3</sup>), respectively. The unmitigated spray release consequences to an individual located at the near river bank from the other Engineered Containers were well below 5 rem unmitigated.

Based on comments received from the DNFSB staff, the spray release methodology and revised analysis inputs and assumptions have been independently reviewed by PNNL staff. These individuals have been responsible for spray leak testing performed over the course of two years for the WTP. The results indicate agreement with the spray leak methodology and revised analysis inputs and assumptions in the PDSA Revision 1 as being reasonably conservative. RL review of the PNNL report is underway and a final a RL documented position will be provided in October of 2015.

#### Safety Significant Seismic Cutoff Switch:

In the development of the PDSA the control strategy of a SS Seismic Design Criteria (SDC)-2, seismic cutoff switch that would mitigate the spray release event was identified. The seismic cutoff switch is an engineered safety Structure, System and Component (SSC) which is preferred over administrative controls in the hierarchy of control selection. The seismic cutoff switch will have a Limiting Condition for Operation and associated surveillance to verify operability and if not operable, actions would require terminating any transfers until restored. An assumption used in the seismic event analysis was that the entire contents of CON-230 were available for release.

In reality, if the transfer line failed, any dose received by the collocated worker, MOI, or a receptor at the near bank of the river would be due to the residual waste and head pressure in the line. The transfer pump is a positive displacement pump and as such there is no spool/ramp down time to consider in the spray release. This control strategy was determined by RL to provide adequate protection for the worker, MOI and an individual located at the near bank of the river.

#### Time of Operation:

The retrieval process has been developed such that the actual time for the activity is controlled and is of a limited duration. The estimated time for retrieval of CON-230 is two hours and is expected to occur throughout the life of the project (approximately one and one-half years) as the material from CON-230 is layered with material from other Engineered Containers. In addition, a process restriction has set the maximum sludge transfer time as a General Service timer shuts down the pumping evolution after approximately 13 minutes. The time that sludge transfers would be occurring is estimated to be a total of nine hours over the one and one-half year project life and includes all types of sludge.

The reduction in dose consequence as a result of the revised spray leak methodology, the control strategy for the SS seismic cutoff switch, and the actual time the system will operate provide reassurance that adequate protection has been provided. The administrative control of closing the river was considered redundant and unnecessary to provide adequate protection.