

1.0 PURPOSE AND NEED FOR AGENCY ACTION

The U.S. Department of Energy's (DOE) Office of River Protection (ORP) needs to collect engineering and technical information on 1) the physical response and behavior of a Phase I grout fill in an actual tank, 2) field deployment of grout production equipment and 3) the conduct of component closure activities for single-shell tank (SST) 241-C-106 (C-106). Activities associated with this Accelerated Tank Closure Demonstration (ATCD) project include placement of grout in C-106 following retrieval, and associated component closure activities. The activities will provide information that will be used in determining future closure actions for the remaining SSTs and tank farms at the Hanford Site. This information may also support preparation of the Environmental Impact Statement (EIS) for Retrieval, Treatment, and Disposal of Tank Waste and Closure of Single-Shell Tanks at the Hanford Site, Richland, Washington (Tank Closure EIS). Information will be obtained from the various activities associated with the component closure activities for C-106 located in the 241-C tank farm (C tank farm) under the *Resource Conservation and Recovery Act of 1976* (RCRA) and the Hanford Federal Facility Agreement and Consent Order (HFFACO) (Ecology et al. 1989). The impacts of retrieving waste from C-106 are bounded by the analysis in the Tank Waste Remediation System (TWRS) EIS (DOE/EIS-0189), hereinafter referred to as the TWRS EIS. DOE has conducted and continues to conduct retrieval activities at C-106 in preparation for the ATCD Project.

For major federal actions significantly affecting the quality of the human environment, the *National Environmental Policy Act of 1969* (NEPA) requires that federal agencies evaluate the environmental effects of their proposed and alternative actions before making decisions to take action. The President's Council on Environmental Quality (CEQ) has developed regulations for implementing NEPA. These regulations are found in Title 40 of the Code of Federal Regulations (CFR), Parts 1500-1508. They require the preparation of an Environmental Assessment (EA) that includes an evaluation of alternative means of addressing the problem and a discussion of the potential environmental impacts of a proposed federal action. An EA provides analysis to determine whether an EIS or a finding of no significant impact should be prepared.

1.1 BACKGROUND

In 1997, DOE issued the Record of Decision (ROD) for the TWRS EIS (62 FR 8693), hereinafter referred to as the TWRS ROD. In the TWRS ROD, DOE selected the Phased Implementation alternative as the preferred alternative for the management and disposal of mixed, radioactive, and hazardous tank waste stored at Hanford.

The TWRS EIS and the Site-Wide RCRA Permit (WA7890008967) identified three closure alternatives for the tank farms: clean closure, modified clean closure, and landfill closure. The TWRS EIS did not analyze alternatives for closure nor did the TWRS ROD make closure decisions. Closure as a landfill was chosen as the representative closure method to provide a single and consistent method for comparison of the TWRS EIS waste treatment and disposal alternatives. A description of landfill tank closure is presented in the TWRS EIS, Appendix B, Section 5.0, and supporting data are found in the Closure Technical Data Package for the Tank Waste Remediation System Environmental Impact Statement (WHC-SD-WM-EV-107).

The TWRS ROD concluded that insufficient information existed to make a decision on the approach for final closure of the SST farms. In the TWRS ROD, DOE committed to preparing appropriate additional NEPA documentation before making decisions on final closure of the tank farms. The Tank Closure EIS will address the final closure of the tanks, associated equipment, and soils.

The Washington State Department of Ecology (Ecology) regulates the SSTs as treatment, storage, and disposal (TSD) units. The entire SST system will be closed in accordance with provisions of “Dangerous Waste Regulations,” Washington Administrative Code (WAC) 173-303, the HFFACO, and the Site-Wide RCRA permit, as modified. Under DOE Order 435.1, DOE approval also is required for classifying residual waste remaining in C-106 after retrieval and for approval of disposal of the residual waste as low-level waste as part of a tank farm closure action.

1.1.1 Cleanup Strategy

DOE has developed a cleanup strategy that is designed to reduce risk while protecting the health and safety of workers, the public, and the environment (DOE/RL-2002-47). The strategy draws upon recommendations in the Environmental Management Top-to-Bottom Review (DOE 2002) and ideas developed in the Hanford Cleanup, Constraints, and Challenges Team (C3T) process. The goal of the strategy is to integrate the planning and program goals and objectives of the environmental cleanup mission with the objectives and commitments of the HFFACO, and contractor requirements.

A C3T team was established to develop an initiative to accelerate tank waste retrieval, treatment, and closure of the tank farms with the objective of more rapidly reducing long-term health and environmental risks. The C3T process for accelerated tank closure has contributed to the development of the ATCD Project. The ATCD Project will help identify the technical and regulatory framework under which tank closures are conducted. DOE and Ecology recognize that this initial demonstration does not constitute final closure.

The ATCD Project will accomplish component closure actions for C-106 located in C tank farm in the 200 East Area of the Hanford Site. The ATCD will address the first phase of closure of the tank only, and not the surrounding soils or ancillary equipment. Waste will be retrieved from the tank in accordance with the HFFACO Milestone M-45-00, which may be found at www.hanford.gov/tpa/tpahome.htm. The retrieved waste will be stored in double-shell tanks (DSTs) at the Hanford Site for future treatment and disposal. Any residual waste remaining in the tank will be stabilized. The tank will be monitored post closure.

1.1.2 Previous Evaluations of Tank Retrieval and Closure Activities

An analysis of alternatives for the management and disposal of mixed, radioactive, and hazardous tank waste currently stored at Hanford was conducted in the TWRS EIS (DOE/EIS-0189). That analysis included the evaluation of impacts associated with tank waste retrieval and the treatment and disposal of retrieved tank waste. Several retrieval technologies were identified that could be used including hydraulic sluicing (past practice sluicing), a robotic arm using sluicing liquids (including alkali and acid solutions instead of water [DOE/EIS-0189, Appendix

B, Section B.9.2]), mechanical retrieval, robotic crawler, and pneumatic retrieval. From among these technologies, DOE selected hydraulic sluicing and robotic arm-based retrieval for detailed analysis in the TWRS EIS. However, as indicated in the TWRS EIS, the other retrieval technologies could “be used to retrieve tank waste during any of the ex situ alternatives.” The *Supplement Analysis for the Tank Waste Remediation System* (DOE/EIS-0189-SA3) determined that program changes including the use of alternative retrieval technologies (e.g., a crawler based system) for retrieving waste did not require further analysis. The impacts of tank waste retrieval options are not evaluated in this EA because the retrieval actions are bounded by the TWRS EIS and are not part of the ATCD Project. Tank fill alternatives for the ATCD Project were evaluated in *Tank Alternative Closure Demonstration Project Alternative Generation and Analysis* (RPP-12194). A summary of this report can be found in Appendix C. A preliminary engineering study on closure of C-106 also was conducted to develop cost estimates for tank closure actions (RPP-12331).

1.2 TANK SELECTION

DOE completed preliminary screening of potential closure demonstration tanks in December 2001. The tanks considered included some currently scheduled for retrieval technology demonstrations (C-104, S-112, and S-102), C-106 (partially retrieved by hydraulic sluicing), or other tanks in AX, B, C, S, T, or U farms with low residual waste volumes. Low-volume tanks were considered candidates because of the limited space in DSTs in which retrieved waste would be stored until the Waste Treatment Plant begins operation.

As part of the C3T initiative, a tank selection process for the ATCD Project was undertaken in 2002. The C3T team developed a specific set of criteria for selecting candidate tanks that could be moved into an accelerated closure demonstration project. The primary tank selection criteria included: accelerated risk reduction, chance for success, ease of implementation, data availability, and implementation cost and schedule.

Based upon these criteria the C, S, and AX tank farms were identified as having tanks that could be closed under the ATCD Project. The tank selection criteria in the *Approach for the Accelerated Tank Closure Demonstration Project* (RPP-11085) identified C-106 and the C tank farm 200-series tanks as candidates for possible closure demonstrations. The objective of the ATCD Project is component closure actions for C-106 only.

1.3 BASIS FOR CONDUCTING THE ATCD PROJECT

DOE selected the Phased Implementation alternative in the TWRS EIS for management and treatment of mixed and radioactive tank waste in part because it afforded the ability to conduct demonstrations of various aspects of the TWRS program during Phase I. The TWRS ROD identified actions associated with the demonstration portion of the selected alternative. These actions included:

During the demonstration phase DOE will obtain data on SST residual characteristics, retrieval technologies, tank residual removal technologies and tank closure technologies. DOE will also further investigate technologies that have the potential to reduce uncertainties including evaluating alternative tank fill material for use during closure, demonstrating the

effectiveness and efficiency of waste retrieval with sluicing technology and evaluating a variety of other technologies through DOE complex-wide technology development programs.

The ATCD Project is expected to answer specific technical questions, including but not limited to, the following:

- How will the regulatory pathways for developing future Site-Wide RCRA permit modifications for tanks, tank farms, and tank systems closure be structured?
- How will the project develop, refine and display risk evaluation tools for component closure?
- What methods will be used to gather ATCD Project data in support of the development of a Tank Closure EIS?
- How may the tank waste be effectively characterized for radioactive and chemical constituents to meet regulatory/closure requirements?
- How should the Phase I tank fill grout be formulated, prepared, and placed to stabilize residual waste?

Information expected to be obtained and benefits derived from the ATCD Project would include the following:

- Collection and analysis of data needed to support decisions about closure of the remaining tanks and eventual closure of tank farms
- Reduction of the risk currently resulting from C-106 to workers, the public, and the environment
- Achievement of closure-related life-cycle cost savings
- Development and demonstration of closure criteria and component closure
- Demonstration of the tools (both technical and regulatory) for the closure process (e.g., internal tank residual measurement and characterization technologies, risk assessments, cost-benefit analyses, application of the HFFACO Appendix H process, and permitting process).

Technical and regulatory data obtained will contribute to an understanding of how to place grout in tanks, how to effectively manage the deployment of grout production equipment and identifying the resources that will be necessary for closure as well as the durations involved. During the planning and laboratory testing of grout formulations, information will also be obtained that will contribute to the evaluations in the Tank Closure EIS and to the subsequent decisions DOE will make concerning closure of tank farms and tank farm systems. This information will be developed to support the Tank Closure EIS and Record of Decision and will provide DOE critical information that is based on actual experience with the technical and regulatory issues that will affect tank farm closure.

1.4 TANK CLOSURE EIS

The draft EA for the ATCD Project was released in December of 2002 for public comment. In January 2003 DOE issued a Notice of Intent to prepare an Environmental Impact Statement for Retrieval, Treatment, and Disposal of Tank Waste and Closure of Single-shell Tanks at the Hanford Site, Richland, Washington (68 FR 03318). The proposed action to be evaluated along with alternatives is to remove waste from tanks, to the extent retrieval is technically and economically feasible, treat the waste through vitrification in the planned Waste Treatment Plant and/or one of several other treatment processes such as bulk vitrification, grout, steam reforming and sulfate removal, depending on waste type and waste characteristics. DOE proposes to package the waste for off-site shipment and disposal or onsite disposal. The tanks would be filled with materials to immobilize the residual waste and prevent long-term degradation of the tanks and discourage intruder access. DOE has developed several data packages that provide a range of technical information that will be used to support the evaluations to be conducted during the preparation of the EIS.

Elements being evaluated in the EIS as part of some alternatives are the options for conducting either landfill closure or a clean closure of Hanford tanks. Landfill closure would involve placement of grout layers in the tanks following retrieval while clean closure could involve the excavation of tanks and removing them along with surrounding soil. This demonstration project is consistent with the landfill option but would also permit clean closure if that were the selected option. If clean closure were selected as the preferred option in the Tank Closure ROD then the Phase I fill would enhance worker protection by stabilizing and shielding any residual waste in the bottom of the tank. This stabilization and shielding would mitigate potential releases during the excavation of the tank. This demonstration project does not undertake any actions that would affect DOE's ability to select either closure option in the future.

This ATCD Project is an interim action during preparation of the Tank Closure EIS. Information that is being developed in the planning and laboratory testing portions of the ATCD prior to field demonstration work will be available and may be used in the evaluations conducted in the preparation of the EIS.

This page intentionally left blank.