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# Decision Plan: Filling of the Hanford Site Single-Shell Waste Tanks

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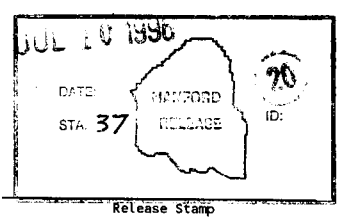
Abstract: This document describes the process for deciding what inert material Hanford Site waste tanks will be filled with if the tank farms are closed as landfills.



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# DECISION PLAN: FILLING OF THE HANFORD SITE SINGLE-SHELL WASTE TANKS

June 1996

G. F. Boothe

Westinghouse Hanford Company
Richland, Washington

## CONTENTS

# DECISION PLAN: FILLING OF THE HANFORD SITE SINGLE-SHELL WASTE TANKS

## 1.0 STATEMENT OF DECISION

The draft *Tank Waste Remediation System (TWRS) Environmental Impact Statement* (DOE/EIS 1996) addresses the question of what to do with the waste in Hanford Site single-shell and double-shell tanks. The preferred alternative is to remove 99% of the tank waste, which would be vitrified for on-site or off-site disposal. The question of tank farm closure is not addressed, although for purposes of impact assessment, it is assumed that the farms would be closed as landfills.

The *Decision Document For Function 4.2.4, Dispose Waste* (WHC 1996a) addresses what is to be done with the immobilized waste, and more importantly here, how the tank farms will be closed. Closure options include clean closure, landfill closure and, modified closure. The document screens out all options except landfill closure, because the other options are not consistent with the current planning basis or the EIS. The closure options will be addressed in a supplement to the TWRS EIS.

This document assumes that the tank farms will be closed as landfills. Thereby, the tanks will remain in place and must be filled with inert material to eliminate voids and prevent subsidence. The question addressed by this document is: **With what material should Hanford Site Waste tanks be filled?** The purpose of this document is to describe exactly how a decision will be made regarding the fill material.

Fill materials that might be adequate for tank closure have already been identified (WHC 1995) and will be evaluated in an Alternatives Generation Analysis (AGA) in 1996. These materials include gravel, grout, concrete, and hybrid (a concrete which is a combination of gravel and grout).

## 2.0 DECISION STRATEGY

The decision regarding what fill will be used for the tanks under the landfill closure option will be addressed by the closure supplement to the TWRS EIS.

## 3.0 DECISION CRITERIA

The following criteria for evaluating fill material will be used in the EIS supplement.

- Material properties of fill. That is, which fill material best prevents future voids and subsidence?

- Public risk mitigation for each type of fill. That is, which fill material results in the least off-site dose from disposal system leakage?
- Occupational risk from each fill alternative. That is, in filling the tanks, which fill results in the least occupational dose and risk from accidents?
- Dollar cost of each fill alternative.
- Regulatory acceptability of each fill alternative.

Each of these criteria are discussed below, relative to their feasibility and adequacy for use in the decision-making process. Performance measures in each of these categories will be developed to provide a basis for decision making.

## 3.1 MATERIAL PROPERTIES

Material properties of gravel, grout, and hybrid are discussed by Baxter (WHC 1996b). Models will be developed to evaluate deformations and stresses in tanks, soils, and the engineered barrier for the types of fill.

## 3.2 PUBLIC RISK MITIGATION

Assuming that an engineered barrier is constructed over the waste tanks to prevent surface contamination and spread, the most significant long-term risk to the public from tank disposal systems is through the groundwater pathway (DOE/EIS 1996). A study will be made to determine if groundwater concentrations are sensitive to the use of different fill materials.

## 3.3 OCCUPATIONAL RISK

The doses incurred by workers for three types of filling operations (gravel, grout/concrete, and hybrid) have been estimated and will be discussed in the AGA. The differences in the doses are primarily due to the need to install or modify risers for gravel slinging.

In the case of filling operations, the doses incurred by workers are roughly proportional to other, nonradiological risks, such as accident frequency. This is because the doses are proportional to the man-hours required and the complexity of the work. Therefore, the doses and the performance measures derived from them should be good indices of the overall occupational risk.

## 3.4 COSTS

The estimated costs for fill options, including design costs, material costs, equipment costs, and labor, will be developed in the AGA.

### 3.5 REGULATORY ACCEPTABILITY

Irrespective of an objective evaluation of the risks and costs of the various fill alternatives, there may be objections to a given fill material based on regulatory issues or concerns. For example, grout or hybrid materials may be viewed as non-retrievable, and therefore not amenable to future retrieval action should it prove warranted from the results of performance monitoring. On the other hand, gravel may be viewed as providing insufficient immobilization of the residual waste. Regulatory acceptability of fill options will be dealt with in the negotiations with the State regarding the approval of the final closure plan for tank farms. For now, it is assumed that all identified fill options are acceptable. Performance measures for regulatory acceptability are not appropriate.

## 4.0 REQUIRED INFORMATION

The following information is required for finalization of the performance measures relative to the types of fill material.

- The differences in structural properties of fill materials regarding the ability to prevent voids and future subsidence.
- The differences in performance of fill materials with respect to migration of contaminants and potential public risk.
- The occupational doses (person-rem) incurred by performing each alternative.
- The cost of performing each alternative.
- Resolution of regulatory acceptability issue.

## 5.0 DECISION TIME FRAME

Although closure of tank farms will not occur until after the retrieval project, there may be a need to decide on what type of fill will be used before retrieval begins. This is because the decision on fill may have an impact on the scope of the retrieval project. If gravel (or possibly hybrid) is used as fill, some of the ancillary equipment in the tanks must be removed because it would inhibit the uniform dispersal of gravel. It is assumed here that removal of such equipment would be within the scope of retrieval. If grout or concrete is used as fill, all instrument trees and other ancillary equipment could be left in the tanks, since grout or concrete would flow around such equipment.

## 6.0 CONSTRAINTS

As mentioned previously, the subject decision is constrained by a TWRS EIS supplement for tank farm closure. It is assumed here that closure as landfill will be the selected alternative.

## 7.0 CURRENT PLANNING BASIS AND ASSUMPTIONS

As already stated, the planning basis for the subject decision is that tank farms will be closed as landfills under the provisions of Washington Administrative Code (WAC) 173-303-610(2)(a), WAC 173-303-640(8), and DOE Orders.

## 8.0 REFERENCES

DOE/EIS, 1996, *Tank Waste Remediation System Environmental Impact Statement*, DOE/EIS-0189D, prepared by the U. S. Department of Energy and the Washington State Department of Ecology, Richland, Washington.

WHC, 1995, *Closure Technical Data Package for the Tank Waste Remediation System Environmental Impact Statement*, WHC-SD-WM-EV-107, Rev 0, Westinghouse Hanford Company, Richland, Washington.

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WHC, 1996b, *Structural Models for Closure of Single-Shell Tanks*, WHC-SD-WM-ES-372, 1996, Westinghouse Hanford Company, Richland, Washington.