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2	2	Cog.Eng. J. A. Lechelt *Jeanne Lechelt 8/9/00 R2-11*	1	1	J. W. Hunt *[signature] 8/9/00 R2-12*
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Management of the Polychlorinated Biphenyl Inventory in The Double-Shell Tank System

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MANAGEMENT OF THE POLYCHLORINATED BIPHENYL INVENTORY IN THE DOUBLE-SHELL TANK SYSTEM

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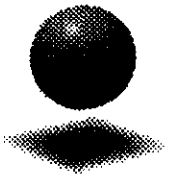

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Hanford Group, Inc.

Prepared for the U.S. Department of Energy
Office of River Protection

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TABLE OF CONTENTS

LIST OF TERMS

CHG	CH2M HILL Hanford Group, Inc.
DOE-ORP	U.S. Department of Energy, Office of River Protection
DQO	Data quality objective
DST	Double-shell tank
EPA	U.S. Environmental Protection Agency
FY	Fiscal year
PCB	Polychlorinated biphenyl
ppb	Parts per billion
ppm	Parts per million
RPP	River Protection Project
SST	Single-shell tank
TSCA	Toxic Substance Control Act
TFC	Tank Farm Contractor
%	Percent

DEFINITIONS OF TERMS AS USED IN THIS DOCUMENT

Aroclor: An Aroclor is any of several commercial polychlorinated biphenyl mixtures.

DST System: The DST system includes the double-shell tanks, catch tanks, double-contained receiver tanks (DCRT), the 204-AR unloading facility, and associated piping.

External Wastes: External wastes are from outside the DST system.

Internal Wastes: Internal wastes are from within the DST system.

DOE-ORP Facilities: DOE-ORP facilities are the DST system, the single-shell tanks and the vitrification plant.

MANAGEMENT OF THE POLYCHLORINATED BIPHENYL INVENTORY IN THE DOUBLE-SHELL TANK SYSTEM

1.0 INTRODUCTION

In May 2000, the U.S. Department of Energy, Office of River Protection (DOE-ORP) and the U.S. Environmental Protection Agency (EPA) held meetings to discuss the management of polychlorinated biphenyl (PCB) wastes in Hanford tanks. In late May, DOE-ORP notified the River Protection Project (RPP) Tank Farm Contractor (TFC) that wastes stored in the double-shell tank (DST) system are to be managed in compliance with the Toxic Substance Control Act (TSCA) (40 CFR 761) (Short 2000).

1.1 PURPOSE

This document presents the significant management features for PCB wastes in the DST system, discussed in Sections 2.0 through 4.0. Section 2.0 delineates the decision limits for acceptance of PCB wastes into and within the DST system. Section 3.0 briefly discusses the process for obtaining a baseline PCB inventory. The PCB inventory tracking system for waste transfers into and within the DST system is described in Section 4.0. The implementation of this PCB management plan is described in Section 5.0. Section 6.0 names the organizations responsible for implementation of the plans elements.

1.2 SCOPE

Wastes are stored at the Hanford Site on an interim basis until they can be treated, as necessary, for final disposal. The DST system is comprised of 28 underground tanks capable of holding approximately one million gallons each of radioactive waste. The DST system also includes catch tanks, double contained receiver tanks (DCRTs), the 204-AR unloading facility, and associated piping. Many of the tanks in the DST system receive waste transfers from within the DST system and from other Hanford facilities. Six of the DSTs are currently precluded from waste receipts because of their Watch List status.

In addition to the 28 tanks in the DST system, there are 149 single-shell tanks (SST). The SSTs do not receive new waste, but contain varying amounts and types of waste from past operation. The liquid wastes in SSTs are being systematically pumped to the DST system through the saltwell pumping program. All SST wastes, including the remaining liquids and solids, are ultimately destined to be retrieved, and will pass into and through the DST system on the way to treatment for final disposal.

Although PCB wastes may be found in other locations at Hanford, this document deals specifically with PCB wastes transferred into, out of, and within the DST system. Because they are DOE-ORP facilities and their wastes are destined to pass through the DST system, SSTs are also included in the discussions in this document.

2.0 PCB WASTE ACCEPTANCE LIMITS

In May 2000, DOE-ORP notified the TFC, CH2M HILL Hanford Group, Inc. (CHG), of the need to manage PCBs in the DST system (Short 2000). In June 2000, CHG notified potential waste generators of restrictions on acceptance of wastes containing PCBs (Wood 2000) into the DST system. As an interim measure to ensure that no new PCB wastes are introduced into the DST system until this management plan is implemented, the compatibility program document (Fowler 2000) has been updated to reflect the waste acceptance criteria as presented in Short (2000). The compatibility program is used to prescreen all waste transfers into or within the DST system.

The criteria for acceptance of waste into the DST system are based on whether the proposed waste transfers are from within the DST system (internal waste) or are from outside the DST system (external waste). Section 2.1 is the criteria for acceptance of waste external to the DST system. Section 2.2 is the waste acceptance criteria for transfers within the DST system.

2.1 PCB WASTE ACCEPTANCE CRITERIA FOR EXTERNAL WASTES ENTERING THE DST SYSTEM

Waste acceptance criteria relating to PCBs for wastes entering the DST system are in the process of development. Pending final agreement on PCB waste acceptance criteria between DOE-ORP and EPA, the waste acceptance criteria listed in this section shall be met for external waste entering the DST system (Short 2000, Wood 2000). Until the agreement is finalized, waste can be accepted if it contains no PCBs, it is from the 222-S or 325 laboratories, it is saltwell pumping liquid, or by approval of DOE-ORP. Section 2.1.1 lists the general requirements for wastes entering the DST system and Section 2.1.2 is the specific criteria for external waste.

2.1.1 General Requirements

Wastes that do not fall within the criteria below require approval by DOE-ORP prior to acceptance.

(1) The waste shall be characterized for total PCBs.

(2) If a sample contains > 0.5% solids by weight, separate analyses are required for both solids and liquids.

(3) The analysis for PCBs shall use approved EPA standard methods or an alternative procedure approved by EPA.

(4) The incoming waste shall meet specified limits irrespective of any dilution (i.e., waste shall not have been diluted to meet the limits).

(5) Waste cannot be accepted into the DST system if the transfer would cause the receiving tank to exceed the PCB inventory concentration limit of 25 parts per million (ppm) (solid or liquid). No transfers will be allowed into a tank where the inventory limit would be exceeded by the transfer. If a tank is found to exceed the limit, no transfers of waste containing PCBs in excess of the limit will be allowed. It is allowable to transfer waste with a PCB concentration below the limit into a tank that exceeds the limit.

2.1.2 Criteria for Acceptance of External Waste

Wastes that do not fall within the criteria below require approval by DOE-ORP prior to acceptance.

(a) The waste contains PCBs and is unregulated by TSCA. In order for the waste to be considered unregulated, there shall be documentation that it meets an exemption. The documentation shall include:

- The PCB source,
- PCB concentration at time of release,
- The date of release,
- Documentation that it was generated prior to April 1, 1978, and
- The PCB concentration is currently less than 45 ppm (liquid and solid).

OR

(b) The waste is regulated by TSCA as remediation wastes and is:

- Less than 45 ppm in the solid phase, and
- Less than 200 parts per billion (ppb) in the liquid phase.

OR

(c) The waste contains no PCBs. In order to demonstrate that no PCBs are present, the PCB concentration shall be:

- Less than 1 ppm for solids and
- Less than 0.5 ppb for liquids.

2.2 PCB WASTE ACCEPTANCE CRITERIA FOR TRANSFERS WITHIN THE DST SYSTEM

The following is the waste acceptance criteria for transfers within the DST system (Short 2000, Wood 2000). Wastes that do not fall within the criteria below require approval by DOE-ORP prior to acceptance. Until there is an agreement in place between EPA and DOE-ORP, internal waste transfers are authorized by DOE-ORP (Short 2000).

(1) Transfers between DSTs shall have credible PCB concentration estimates or other appropriate inventory controls.

(2) Waste cannot be transferred within the DST system if the transfer would cause the receiving tank to exceed the PCB inventory concentration limit of 25 ppm (solid or liquid). No transfers will be allowed into a tank where the inventory limit would be exceeded by the transfer. If a tank is found to exceed the limit, no transfers of waste containing PCBs in excess of the limit will be allowed. It is allowable to transfer waste with a PCB concentration below the limit into a tank that exceeds the limit.

(3) PCB analysis shall be in accordance with Section 2.1.1, "General Requirements".

3.0 CREATION OF A BASELINE PCB INVENTORY

A baseline PCB inventory is needed to manage PCBs in the DST system. Because all SST wastes (not just the saltwell pumping liquids) will eventually move into and through the DST system, the PCB baseline inventory for SSTs will also be established. A PCB characterization plan (Nguyen 2000) will be issued concurrently with this document and provides the strategy for selecting and prioritizing tanks for PCB analysis. Plans for sampling and analysis for PCBs per Short (2000) include:

- Archived samples will be used to the greatest extent possible.
- Samples taken for other purposes, such as characterization and waste compatibility, will be analyzed for PCBs on an opportunistic basis.
- Tanks will not be sampled if the only purpose is to analyze for PCBs.

Data quality objectives (DQOs) will specify the requirements for sample handling and analysis. A DQO document is scheduled to be issued by October 31, 2000. The Hanford laboratories will begin analysis for PCB in early fiscal year (FY) 2001. The laboratories may require modification to current methods or new methods in order to meet the stringent EPA concentration limits for PCBs.

At this time, the wastes from only a few tanks have been analyzed for PCBs (13 DSTs and 1 SST). Those analyses were for individual Aroclors, rather than total PCB. All Aroclor values were less than detection limits. Hence, there is no current data on total PCB for any of the 177 tanks. The PCB data obtained from the upcoming analysis will be used to populate the baseline inventory database.

The baseline tank inventory is calculated using the reported values. The PCB in solids is reported on a weight per weight basis (wet). The dry weight basis will be calculated. The PCB in liquids is reported on a weight per volume basis. The total tank PCB inventory can be calculated using the tank volume of solids and liquids. PCBs in solids and liquids will be tracked separately in the baseline inventory. The baseline PCB inventory will be used as the basis for the PCB Inventory Tracking System (Section 4.0).

4.0 PCB INVENTORY TRACKING SYSTEM

The PCB Inventory Tracking System tracks the PCB wastes in the DST system. This includes tracking of external wastes as they are introduced into the DST system, the transfer of wastes from one tank to another within the DST system, and the transfer of wastes out of the DST system (to the Evaporator or for treatment for final disposal).

The PCB Inventory Tracking System database will be populated with existing information and will grow as information for additional tanks becomes available. As additional information is obtained through sampling and analysis, the database will be updated to reflect it. The initial database and all changes to it will undergo peer review. Periodic audits will ensure the database is properly maintained.

The PCB Inventory Tracking System consists of a controlled database that resides on a network share drive (\\AP010\PCBINVNTRY). Most users will have read-only access. Several individuals will be trained to create, modify, and perform peer reviews and audits on the database. The database is defined and controlled according to *Configuration Management of the Polychlorinated Biphenyl Inventory Tracking System for Double-Shell Tanks* (Lechelt 2000).

The salient features of the PCB Inventory Tracking System include:

- As PCB concentration data become available for each tank, the data will be input into the baseline PCB Inventory Tracking System.
- The PCBs in all transfers of waste into, out of, and within the DST system will be tracked.
- Separate database elements (e.g., fields in a record or worksheets in a workbook) will be used for listing:
  - Tank number.
  - The as-found PCB concentration reported for each tank.
  - The amount of water or solids in the waste.
  - The density and/or specific gravity of the waste.
  - The PCB concentrations in solids calculated on a dry weight basis for each tank.
  - The PCB concentrations in liquids reported or calculated on a weight per volume basis for each tank.
  - The volume of solids in each tank.
  - The volume of liquids for each tank.
  - The weighted average of PCBs in solids and liquid for each tank.
  - The total PCB inventory calculated for each tank.
  - References for the elements above.

- For analytical data, the average of the primary and duplicate PCB analyses will be used, unless there is a reason they should not be averaged. If results are less than the detection limit, the detection limit will be treated as the upper bound.
- If analytical PCB concentrations are reported for two or more separate locations in a tank, the data will be averaged to determine an average tank concentration.
- In calculations used for tracking PCB inventory, concentrations and volumes of waste transfers are determined by the following:
  - For external waste entering the DST system, the maximum limit for PCB concentration on the Waste Stream Profile Sheets will be used as the concentration of PCBs to be transferred.
  - For transfers within the DST system, laboratory data, when available, will be used for the concentration of PCBs to be transferred.
  - The planned pre-transfer volume of waste will be used for the transferred volume, until the inventory reconciliation is completed.
  - The actual volume of waste transferred will be used, after inventory reconciliation is completed.
- Appropriate records will be maintained so that an independent reviewer can duplicate calculations and obtain consistent results.

5.0 IMPLEMENTATION OF THE PCB MANAGEMENT PLAN

The three main features for the management of PCBs in the DST system are discussed below. Assuming an appropriate level of funding is provided, this plan for the management of PCB wastes in the DST system will be implemented as follows.

(1) Define the criteria for waste acceptance into and within the DST system, as discussed in Section 2.0.

The *Tank Farm Waste Transfer Compatibility Program* (Fowler 2000) will act as the "gatekeeper" to ensure that only wastes meeting the criteria in Section 2.0 of this document will be allowed into the DST system. The interim restrictions on waste transfers are already in place in Rev. 3 of the compatibility program. A Waste Compatibility Assessment is used for every transfer of waste into and within the DST system. Early in FY 2001, the compatibility program will be updated to incorporate the waste acceptance criteria set forth in Section 2.0 of this document.

(2) Create a baseline PCB inventory, as discussed in Section 3.0.

Analysis for PCBs in archived and new samples will commence following issuance of *Characterization Plan for Establishing a PCB Baseline Inventory in Hanford Tanks* (Nguyen 2000), preparation of the DQO, and any procedural changes required in the laboratory.

(3) Create a PCB inventory tracking system, as discussed in Section 4.0.

The "backbones" of the PCB Inventory Tracking Database (i.e., a database populated by the very limited data available) is expected to be in place by the end of FY 2000. Concurrently, *Configuration Management of the Polychlorinated Biphenyl Inventory Tracking System for Double-Shell Tanks* (Lechelt 2000) is being prepared and is also expected to be issued by the end of FY 2000.

6.0 RESPONSIBILITIES

The responsibilities describe in this section are assigned to named organization. If an organization undergoes a name change (e.g., due to reorganization), the responsibility will remain with the organization, unless otherwise directed in writing. It is assumed that an appropriate level of funding to complete the work described below will be maintained.

Process Control is responsible to:

- Issue this document and subsequent revisions.
- Issue the document, *Configuration Management of the Polychlorinated Biphenyl Inventory Tracking System for Double-Shell Tanks* (Lechelt 2000).
- Prepare and maintain the PCB Inventory Tracking System database.
- Update the Tank Farm Waste Transfer Compatibility Program to incorporate the PCB waste acceptance criteria discussed in Section 2.0 of this document.

Requirements Planning & Support is responsible to:

- Define DQO requirements.
- Prepare and issue PCB DQO document.
- Update, as necessary, the Compatibility DQO (Mulkey et al. 1999).

Data Development & Interpretation is responsible to:

- Prepare and issue characterization plan for PCB baseline inventory (Nguyen 2000).
- Prepare and issue other PCB characterization plans, as necessary.
- Notify the laboratory of upcoming PCB analytical needs.

The 222-S Laboratory is responsible to:

- Develop/modify procedures for analysis of total PCB using EPA approved methods.
- Perform PCB analysis and report results in accordance with characterization plans.

7.0 REFERENCES

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DISTRIBUTION SHEET

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