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Page 1 of 2

1. ECN 608876

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Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
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Conceptual Design Report	[]	Installation Procedure	[]	Component Index	
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Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]		[]
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Cog. Mgr. * R.D. Gustavson	12/14/94	QA	
QA *	12/14/94	Safety	
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DOUBLE SHELL TANK
WASTE ANALYSIS PLAN

By

Charles H. Mulkey
Joseph M. Jones
WESTINGHOUSE HANFORD COMPANY

December 15, 1994

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ABBREVIATIONS & ACRONYMS

CFR	CODE OF FEDERAL REGULATIONS
DOE	U.S. DEPARTMENT OF ENERGY
DQO	DATA QUALITY OBJECTIVE
DSC	DIFFERENTIAL SCANNING CALORIMETER
DST	DOUBLE SHELL TANKS
Ecology	WASHINGTON STATE DEPARTMENT OF ECOLOGY
EPA	U.S. ENVIRONMENTAL PROTECTION AGENCY
ETF	EFFLUENT TREATMENT FACILITY
LDR	LAND DISPOSAL RESTRICTION
QA	QUALITY ASSURANCE
QC	QUALITY CONTROL
SD	SUPPORTING DOCUMENT
TCLP	*TOXICITY CHARACTERISTIC LEACHING PROCEDURE*
TCP	TANK CHARACTERIZATION PLAN
TPA	TRI-PARTY AGREEMENT
TSD	TREATMENT, STORAGE, DISPOSAL
TWAP	TANK WASTE ANALYSIS PLAN
TWRS	TANK WASTE REMEDIATION SERVICES
USQ	UNREVIEWED SAFETY QUESTION
WAC	WASHINGTON ADMINISTRATIVE CODE
WAP	WASTE ANALYSIS PLAN
WHC	WESTINGHOUSE HANFORD COMPANY
WM	WASTE MANAGEMENT (WHC)
WTEC	WASTE TANKS ENVIRONMENTAL COMPLIANCE

INTRODUCTION

PURPOSE

This Waste Analysis Plan (WAP) provides the plan for obtaining information needed for the safe waste handling and storage of waste in the Double Shell Tank (DST) System. In particular it addresses analysis necessary to manage waste according to Washington Administrative Code (WAC) 173-303 and Title 40, Parts 264 and 265 of the Code of Federal Regulations (CFR). Regulatory, safety, and operational issues are addressed by establishing waste acceptance criteria and procedures.

The DST System WAP uses the Compatibility (Carothers 1994) and Safety Screening (Babad 1994) DQO's as the basis for determining data needs for safe storage and mixing of wastes. Waste acceptance into the DST System is controlled by the approval of wastes as documented in waste profile sheets and information submitted with each waste shipment. Analyses of wastes already in the DST System are obtained via the tank specific Tank Characterization Plans (TCPs) required by milestone #44 of the Tri-Party Agreement. TCPs shouldl combine analyses required by this WAP with the requirements from other pertinent DQOs and WAPs and result in a comprehensive tank specific sampling plan which should reduce costs by eliminating duplicative sampling.

SCOPE

This plan applies to all Dangerous wastes as regulated by Washington Administrative Code (WAC) 173-303 which are shipped and/or contained in the DST System. Many of these wastes also have radioactive constituents as defined by the Atomic Energy Act of 1954 and are called mixed wastes. Any requirements or information contained within this plan that relate solely to the radioactive constituent of wastes are outside the scope of the Hanford Facility RCRA Permit, but are included for the sake of completeness. Modifications or deletions of these requirements (those dealing strictly with radioactivity issues) may be conducted outside the scope of this WAP. This WAP is not intended to address DQO requirements other than those contained in Carothers 1994 and Babad 1994.

1.0 FACILITY DESCRIPTION

The DST System is a waste management unit within the Hanford Facility. The DST System is being operated under interim status and this allows the storage and treatment of dangerous wastes. Storage is the principal function of the DST System, although some waste treatment also occurs. The treatment consists primarily of chemical adjustments to the waste to prevent excessive corrosion of tank wastes. Since the waste stored in the DST System also has a radioactive component, it is considered "mixed waste".

1.1 PROCESS AND ACTIVITIES

The function of the DST System is to store mixed waste until it can be processed for final disposal in another TSD unit. Chapters 2 and 4 of the Double-Shell Tank System Dangerous Waste Permit Application (DOE/RL-91) contain a discussions of the DST System and the processes and activities associated with waste receipt and storage.

Due to limited storage capacity and system design, it has been necessary to aggregate waste received by the DST System. Due to system design it is not practical to separate wastes in different tanks by waste code. There is limited separation of wastes based upon organic content and level of radioactivity but this has been independent of waste code. This has resulted in the assignment of the same waste codes to all the tanks in the DST System.

Wastes in the DSTs are monitored and treated as necessary to maintain the high alkalinity. This treatment primarily consists of adding sodium hydroxide or potassium hydroxide to the waste in order maintain the waste within operational corrosion control specifications. This provides an excess of hydroxide which minimizes corrosion and lengthens the useful life of the tanks. The hydroxide concentration of each batch of waste accepted into the DST System is determined prior to transfer in order to ensure it meets the process limit described in Section 2.0. Qualitatively, the other major constituents of the mixed waste are sodium salts of nitrate, nitrite, phosphate, carbonate and sulfate. Some calcium and potassium salts are also present. Complexed waste contains the chelating agents ethylene diamine tetraacetic acid (EDTA) and hydroxy ethylene diamine triacetic acid (HEDTA). There may also be detectable non-halogenated organic solvent contamination such as acetone or methyl isobutyl ketone. The mixed waste in the tanks may exhibit trace amounts of heavy metals such as lead, chromium and cadmium.

Stratification and segregation has occurred in the tanks as existing and newly precipitated solids have settled out. The consistency of the waste ranges from liquid supernate to thick sludge, with hard saltcake also forming in the tank. The sludge is mostly formed by solids that precipitate when the hydroxide, nitrate, and nitrate concentrations of the waste are adjusted to meet DST storage specifications. The different consistencies of waste are not always readily distinguished as separate distinct layers, but are blended throughout the vertical profile of the tank waste.

The DST System also generates solid waste from sampling, maintenance, and operational activities. The waste (typically tank monitoring and pumping equipment, protective clothing, sampling equipment, etc) either contains or came into contact with the dangerous wastes stored in the tanks. The solid waste is designated and stored in accordance with WAC 173-303. Ultimately the solid waste is disposed in accordance with WHC-EP-0063, "Hanford Site Solid Waste Acceptance Criteria". Since solid waste disposal is not done in the DST System, characterization and disposal of solid wastes generated by the DST System is outside the scope of this WAP.

The following sections contain more information on waste acceptance into the DST System and the type of activities which occur in the DST System.

1.1.1 Waste Acceptance Criteria And Waste Transfers Into the DST System

All waste transfers into the DST System must be pre-approved and must meet set waste acceptance criteria. The approval process requires an evaluation of the waste based on information contained in waste profile sheets and is summarized in Table 1-2. Table 1-3 contains an itemization of the information required for the evaluation and Sections 1.1.1.1 through 1.1.1.7 of this document discuss these requirements in more detail. TWRS may also require the submittal of additional information needed to address regulatory and operational concerns. The waste stream profile sheet provides a method of assuring that receipt of the waste will not conflict with regulatory and operational issues. Approval of the waste stream profile sheet does not authorize actual shipment of the waste but does approve the waste in a generic sense.

Approval for actual waste shipment will require the completion of transfer specific information and documentation. Usual requirements for each transfer include but are not limited to 1) analytical data which is representative of each particular shipment, 2) treatment of the waste to meet DST corrosion specifications and 3) certification that the waste conforms to the information on the waste profile sheet. A summary of the limits which are usually placed on waste transfers is contained in Table 1-4. These limits may change on a case by case basis.

TWRS may require the sampling and analysis of waste shipments at any time in order to substantiate that the waste's composition matches the designation on the profile sheet and/or accompanying shipping papers. TWRS may also require additional information to address operational and regulatory issues.

1.1.1.1 Waste Profile Sheet

Each person or organization which wants to send a waste to the DST System completes a waste profile sheet as part of the pre-approval process for the waste shipment. DST System personnel (TWRS Engineering and TWRS WTEC) will use the information contained in the profile sheets to evaluate the generic acceptability and to meet the regulatory requirement for a detailed analysis of the waste. Waste stream profile sheets are required for either a single shipment of a waste or multiple transfers of the same waste stream.

Waste profile sheets can be completed by using detailed chemical and physical analysis of a representative samples of the waste and/or by applying existing knowledge of the same or similar waste. The latter type of information is generally called "process knowledge" and must be documented as specified in the waste profile sheet instructions. The acceptability of information used to fill out the profile sheets is at the discretion of TWRS Engineering and TWRS WTEC.

In order to keep waste profile sheets current, they will be valid for only one year from date of their approval. Additionally the waste shipper must provide written certification with each waste shipment, that the composition of the waste matches the information on the profile sheet. If a profile sheet has not been approved or the certification is not made, then the waste cannot be accepted into the DST System. A summary of the waste stream approval process is contained in Table 1-2. Actual waste transfers will usually be required to meet all the requirements listed in

Table 1-4 (Summary of Typical Requirements for Each Waste Transfer). Specific issues associated with waste acceptance are discussed in the following sections.

WAC Section 173-303-300, General Waste Analysis, requires the facility owner or operator to obtain a detailed analysis of a dangerous waste that is sufficient to manage the waste in accordance to WAC 173-303. The key parameters which were determined to be necessary to meet this requirement were identified and are contained in the waste profile sheets. A sample waste profile sheet is included as Appendix A.

1.1.1.2 List of Applicable Waste Codes

The requirement for waste codes helps prevent the acceptance of a waste that has not been approved for storage in the DST System. As part of the waste acceptance process, waste codes listed on the profile sheet will be compared to those listed in the DST Part A Dangerous Waste Permit Application. This can be particularly beneficial in tracking the LDR requirements which DST waste must meet.

1.1.1.3 Certification that the Waste Conforms to Waste Stream Profile Data Sheet

The generator certification that the waste conforms to a waste profile sheet is used to verify that the waste composition has not changed from that previously approved. If the certification is not given then a new waste profile sheet must be submitted and approved or a the old profile sheet modified prior to shipment of the waste to the DST System. Additional analyses may also be necessary to confirm the composition of the waste.

1.1.1.4 Certification as to LDR applicability

Wastes are not treated to meet LDR standards (WAC 173-303-140 and 40 CFR Part 268) in the DST System. The information furnished by the waste shipper will be kept and used to supply information on the applicability of LDR requirements when the waste is shipped to another TSD unit.

1.1.1.5 Waste Transfer Documentation

The generator must supply documentation with each waste transfer. This information is normally supplied by waste transfer data sheets. This documentation is used track waste transfers into and within the DST System and are discussed further in Section 2.8 of the Double-Shell Tank System Dangerous Waste Permit Application. The waste transfer data documentation must include at least the following information:

- Waste description
- Sending facility and receiving facility
- Date(s) of transfer/shipment
- Authorizing signature for shipment
- Volume of transfer including flush volumes

- Volume of waste expected to be received by the DST System
- Material balances
- Applicable dangerous waste codes and LDRs

1.1.1.6 Waste Compatibility

The mixing or commingling of potentially incompatible waste types on the Hanford Facility must be addressed prior to any waste transfer into the DST System. The "Data Quality Objectives for the Waste Compatibility Program" (WHC-SD-WM-DQO-001) presents a sampling plan and strategy that will be implemented in order to avoid unsafe waste transfers into and within the DST System. The primary decision for waste compatibility is either to allow or not allow a waste transfer. A secondary decision is to determine what mitigation measures would keep a transfer from falling outside of the normal safety and operation parameters described by the primary decision rules. The goal is to prevent incidents which could result from improper waste management.

Prior to shipment of any waste stream from the generator to the DST System or waste transfer within the DST System, the waste is sampled and analyzed as necessary to obtain information on potential compatibility problems. A waste compatibility assessment is then performed using the analytical data to determine whether to allow or not to allow the waste transfer based on the criteria presented in the "Data Quality Objectives for the Waste Compatibility Program." The assessment considers both chemical compatibility and operating concerns.

1.1.1.7 Copy of the Generator's WAP on File

Having a copy of the DST customer's WAP (or its equivalent) on file identifies the waste analysis that DST customers have agreed to supply and provides an indication of the quality of data used to fill out the waste profile sheets. This plan should describe the procedures used to obtain a representative sample of the waste and in general meet the requirements stated in WAC 173-303-300. Part 2 of EPA's guidance manual for waste analysis (EPA, 1994) contains a discussion of the different elements which should be incorporated into an analysis plan. TWRS Engineering and TWRS WTEC will use the DST customers analysis plan to help assess the validity of information on the waste profile sheets during their evaluation of the waste. Insufficient documentation on the part of the DST customer will lead to the imposition of additional analytical requirements for each waste shipment.

1.1.2 Waste Storage and Transfer Within The DST System

Section 1.1.2.1 discusses activities relating to the storage of waste in the DSTs. Section 1.1.2.2 discusses waste transfers within the DST System.

1.1.2.1 Waste Storage

The contents of the waste in the DST Tanks is thought to remain relatively stable when compared to changes which can occur due to transfers. The composition of any particular DST may change due factors such as evaporation and radioactive decomposition. These changes are considered to be relatively minor when compared to changes which can occur during transfers. Analysis for parameters identified in the Safety Screening DQO (Babad 1994) as required by the TPA should serve to verify that the wastes are being stored in a safe manner. Other analyses such as those concerning corrosion, are also taken periodically.

1.1.2.2 Waste Transfers Within The DST System

Compatibility is considered to be the major issue associated with transfers from an operational view. This issue is addressed by TWRS Engineering conducting a compatibility assessment prior to authorization of the transfer. Carothers, 1994 has identified the parameters which need to be evaluated for the compatibility assessment. The assessment will use existing process knowledge and/or analytical data. Analytical data on all the tanks will be obtained when the tanks are sampled as required by Tri-Party Agreement (TPA) Milestone M-44.

1.1.3 Waste Transfers Out Of The DST System

Currently waste transfers out of the DST system are limited to sending some waste to the 242-A Evaporator where water and other volatile liquids are separated from the rest of the waste. The non-volatile component is returned to the DST System for further storage. The final destination of the waste in the DSTs is anticipated to be vitrification but this could change as new technologies are developed. It is anticipated that any TSD facility which receives DST waste will have its own waste acceptance criteria. Prior to its shipment to another facility, the DST waste will have to meet that facilities waste acceptance criteria.

1.2 IDENTIFICATION/ CLASSIFICATION AND QUANTITIES OF HAZARDOUS WASTES MANAGED IN DST'S

The types of waste received by DSTs can be separated into two primary groups. One of these groups is 1) old waste that was generated during actual operation of units such as the PUREX Plant and B Plant and 2) cleanup waste generated from the on-going Hanford Site cleanup activities. The old waste was generated when the Hanford Site was operated as part of the National Defense Operation and is no longer being generated. Waste from past operations has been stored in Single-Shell Tanks (SSTs) and will be shipped to DSTs as the SSTs are emptied. The new waste is primarily a dilute aqueous waste generated by unit closures, laboratories, and various other cleanup activities. Chapter 3 of the *Double -Shell Tank System Dangerous Waste Permit Application* (DOE-RL, 1991) contains descriptions of the types of waste received by the DST System.

The DSTs are used to treat and store waste on an interim basis, until the waste from the DSTs can be treated as necessary for final disposal. The DSTs also store waste before the waste is

treated at the 242-A Evaporator. The DST waste is classified as low-level mixed, high-level mixed, or transuranic mixed waste. Waste management activities, including the transfer of supernate feed to and slurry return from the evaporator, have resulted in the mixing or commingling of the various types of waste. The mixed waste in the tanks can be qualitatively described based on generator stream data and DST samples analyses.

Stratification and segregation has occurred in the tanks as existing and newly precipitated solids have settled out. The consistency of the waste ranges from liquid supernate to thick sludge, with hard saltcake also forming in the tank. The sludge is formed by solids that precipitate when the pH of the waste is adjusted to meet DST storage specifications. The different consistencies of waste are not always readily distinguished as separate distinct layers, but are blended throughout the vertical profile of the tank waste. The waste does not readily undergo violent chemical change and react violently when mixed with water or air, or when heated. The DST waste is ultimately a stable aqueous slurry of dissolved salts that does not exhibit the characteristic of reactivity.

Current and projected waste volumes are assessed monthly and published in the Tank Farm Surveillance and Waste Status Summary Report (WHC-EP-0182-74 for May, 1994). The actual volume of waste sent to the DST System is variable and depends on current activities.

1.3 Description of the DST System

The DST System currently includes 28 tanks, 6 tanks in the waste transfer vaults, 1 tank in a transfer building, 5 double-contained receiver tanks, and ancillary equipment such as diversion boxes waste transfer pipelines and miscellaneous associated equipment. Up to 6 new tanks may be included in future construction. Table 1.1 and Section 2.1.3 of the DST System Dangerous Waste Permit Application provide further descriptions of these tanks. The DST System provides both interim and long term storage of waste. Eventually the waste stored in the DST System will be retrieved and treated as necessary for final disposal. The tanks in the DST System are shown on the Tank Table (pages 3-4). The information presented in Table 1.1 includes tank numbers, locations, design capacities, and operational dates. A diagram depicting the layout of the tank system locations in the 200 East and West Areas is provided in DOE-RL-91.

Table 1-1: TANK TABLE

Tank Number	Location	Design Capacity (gallons)	Operation Date
1. There are twenty-four 1,200,000-gallon non-aging DSTs in four tank farms.			
241- AN Tank Farm # 101,102, 103, 104, 105, 106, 107	200 East Area	1,200,000	9/81
241-AP Tank Farm # 101, 102, 103, 104, 105, 106, 107, 108	200 East Area	1,200,000	10/86
241-AW Tank Farm 101, 102, 103,104,105, 106	200 East Area	1,200,000	8/80
241-SY- Tank Farm 101, 102, 103	200 West Area	1,200,000	4/77
2. The proposed Multi-Function Waste Tanks Facility (MWTF) will consist of six DSTs in two tank farms.			
241-HN Tank Farm # 101, 102, 103, 104	200 East Area	1,160,000	12/98
241-SN Tank Farm # 101, 102	200 West Area	1,160,000	2/98

Tank Number	Location	Design Capacity (gallons)	Operation Date
3. There are four aging waste DSTs in two tank Farms.			
241-AY Tank Farm 101, 102	200 East Area	1,000,000	101 in 4/71 102 In 4/76*
241-AZ Tank Farm 101, 102	200 East Area	1,000,000	11/76
4. There are six tanks in the waste transfer vaults in two tank farms.			
244-AR Tank farm # 001, 002, 003, 004	200 East Area	43,000 for # 001, 002 4,785 for # 003, 004	1977
244-CR Tank Farm # 003, 011,	200 East Area	14,660 for # 003 45,000 for # 011	1946
5. There is one 800-gallon tank in a transfer building.			
241-EW-151	200 East Area Vent Station	800	11/55*
6. There are five double-contained receiver tanks.			
244 Tanks # BX, TX, U, A, S	200 East Area for BX 200 West Area for TX, U, A, and S	31,000 for BX, TX, U 16,280 for A 20,280 for S	1983 for BX 12/81 for TX 1987 for U, S 1975 for A

Table 1-2: SUMMARY OF WASTE STREAM APPROVAL PROCESS

STEP	ACTION
1	Waste shipper submits a completed waste stream profile sheet and the information listed in Table 1-3 to TWRS Engineering and TWRS WTEC.
2	TWRS Engineering and TWRS WTEC evaluate the waste for conformance to safety, regulatory and operational considerations and notifies waste shipper of decision. If the waste acceptance is conditional, the stated additional requirements must be met prior to final waste acceptance and waste transfer.
3	Waste shipper submits any required additional information
4	TWRS Engineering and TWRS WTEC determine the acceptability of waste for transfer and notifies waste shipper of decision.
5	Waste shipper receives notification of waste acceptability and schedules transfer.

Table 1-3: INFORMATION REQUIRED PRIOR TO WASTE ACCEPTANCE APPROVAL FOR WASTE SHIPMENTS INTO THE DOUBLE-SHELL TANK SYSTEM

INFORMATION REQUIREMENT	REGULATORY REQUIREMENT	RATIONALE
A completed waste stream profile sheet with sufficient analytical information and any relevant historical data and background information on waste contents..	WAC 173-303-300 Item (2)	Information required to determine suitability of waste to storage in the DST System. Information will be used to evaluate the waste for safety, regulatory, and operational considerations.
List of applicable dangerous waste codes	WAC 173-303-070 WAC 173-303-380 (2)(a) WHC-CM-7-5 (7.6.2.2)	The DST System can only legally accept waste with the codes listed in its Part A, Form 3, Dangerous Waste Permit Application.
Notification of newly generated waste and statement on whether or not the waste has characteristically changed since it was last received by the DST System	WAC 173-303-300 (4)(a)(b)	Verifies that the waste characteristics have not changed from previously submitted information.
Certification as to the applicability of any Land Disposal Restrictions (LDR) regulations and identification of the required treatment standards.	40 CFR 268.7 (a)(2) WAC 173-303-140	Tracks applicability of LDR requirements.

INFORMATION REQUIREMENT	REGULATORY REQUIREMENT	RATIONALE
Appropriate waste transfer documentation in the form of waste manifests or transfer data sheets that include information such as: ■ Waste description ■ Sending facility and receiving facility ■ Date(s) of transfer/shipment ■ Authorizing signature for transfer ■ Volume of transfer including flush volumes ■ Volume of waste received at the DST System ■ Material balances ■ Applicable dangerous waste codes and LDRs	WAC 173-303-380 (1)(a) WAC 173-303-380 (2)(b) WHC-CM-7-5 (7.8.2.1 (8)(c))	Confirms identity of waste as a last check before actual receipt of waste.
Waste Compatibility Assessment	WAC 173-303-395	Helps prevent compatibility problems associated with mixing waste that reacts with each other. The compatibility DQO is the basis for this evaluation.
Copy of the waste shipper's current WAP or equivalent sampling plan on file with DST System personnel	WAC 173-303-300 (5)(e)	Evaluates the acceptability of the data furnished by the waste shippers.

Table 1-4: SUMMARY OF TYPICAL DST WASTE ACCEPTANCE LIMITS*

PARAMETER	LIMIT
Waste Stream Profile Sheet	Must be Current
Compatibility	An evaluation by TWRS Engineering must show that the waste is compatible with the waste contained in the receiving DST.
Hydroxide	>0.01 M and < 8.0 M
Nitrate and Nitrite	Nitrate< 5.5 M and >0.11M Nitrite <1.0 M
pH	Must be above pH 8.0 for transfer to the 204-AR unloading facility and above pH 12.0 for transfer directly into a DST.
Plutonium	Total plutonium in each waste transfer cannot exceed 0.5 grams/gallon and 200 grams/transfer.
Waste Composition	Must conform to the information contained in the approved waste stream profile sheet.
Waste Codes	Waste codes assigned to waste stream must be listed in the current version of the DST System Part A, Form 3, Dangerous Waste Permit Application.

*Requirements actually imposed may vary on a case by case basis.

Table 1-5 INFORMATION REQUIRED PRIOR TO WASTE TRANSFERS WITHIN THE DOUBLE-SHELL TANK SYSTEM

INFORMATION REQUIREMENT	REGULATORY REQUIREMENT	RATIONALE
Waste Compatibility Assessment	WAC 173-303-395	Helps prevent compatibility problems associated with mixing waste that reacts with each other. The compatibility DQO is the basis for this evaluation.
Appropriate waste transfer documentation in the form of waste manifests or transfer data sheets that include information such as: ■ Tanks involve with the transfer ■ Date(s) of transfer/shipment ■ Authorizing signature for transfer ■ Expected volume of transfer including flush volumes ■ Material balances ■ Change in applicable dangerous waste codes and LDR requirements	WAC 173-303-380 (1)(a) WAC 173-303-380 (2)(b) WHC-CM-7-5 (7.8.2.1) (8)(c))	Confirms identity of waste as a last check before actual receipt of waste.

2.0 WASTE ANALYSIS PARAMETERS

This section discusses the selection of analytical parameters based on WAC 173-303-300 (5)(a) and Part 2.2 of the EPA WAP guidance manual.

2.1 CRITERIA FOR PARAMETER SELECTION

Analytical requirements were selected on the basis of knowledge required for the safe handling and storage of the waste within the DST System for operational compliance, including any operational issues. Prescribed analytes relevant to these issues are those are included in the waste profile sheets. WAC 173-303, the EPA 1994, Carothers 1994, and Babad 1994 were all used to develop the waste profile sheet. A summary of the Carothers 1994 and Babad 1994 and their data requirements are presented in Appendix B and Appendix C respectively.

2.1.1 Waste Identification

A prerequisite step in proper waste management is to adequately address whether wastes being considered for management within the DST System fall within the scope of this facility's permit. This includes identifying any hazardous wastes in accordance with regulatory and permit requirements and applicability of any Land Disposal Restricted wastes.

2.1.2 Identification of Incompatible Wastes

The next step is to ensure that the facility has sufficient information about the wastes to properly manage the wastes once they are accepted. This includes identifying incompatible wastes. These safety issues are primarily related to prevention of unwanted chemical reactions which create a catastrophic situation such as a fire , explosion, large chemical release.

2.1.3 Operational Considerations

Sufficient information must be available to ensure that incoming wastes streams meet operational acceptance limits. DST operational issues primarily relate to the segregation and compatibility of the waste within the DST System. These operating specifications are limits and controls imposed upon a process or operation which, if violated, could jeopardize the safety of personnel; and could damage equipment, facilities, the environment, or adversely affect product quality. Operating specifications have been established from operating experience, process knowledge, tests and calculations and are specified in waste transfer operating procedures. Some of the parameters are qualitative and directly applicable to maintaining the integrity of the tanks within the DST System.

2.2 PARAMETER SELECTION PROCESS

The requirements for safe handling and storage of the wastes managed in the DST System have been identified through the application of the DQO process and in accordance with the EPA 1994. Carothers 1994 and Babad 1994 have been identified as the basis for development of the data requirements presented in this WAP and contain the analytical requirements, the rationale for analyte selection, the nature and extent of the analytes required, and the method by which the

sampling and analyses will be conducted for addressing safety and operational issues. WAC 173-303, 40 CFR 264, 40 CFR 265, and EPA 1994 were reviewed to determine the regulatory requirements.

Issues were separated into those dealing with accepting wastes from sources outside of the DST System and those concerning waste movement within the DST System. The information used to determine waste acceptance criteria for waste from outside the DST System is summarized Table 1-3. Information required for waste transfers within the DST System is summarized in Table 1-5.

Data needs and analytical requirements change over time and are triggered by many factors. These factors include 1) data requirements become better defined, 2) additional information becomes available, and 3) regulatory requirements may change. Waste profile sheets will be modified to reflect these changes.

2.3 RATIONALE FOR PARAMETER SELECTION

Parameters were selected based upon compliance with regulatory requirements and issues relating to the operation of the DST System. EPA 1994 was used as the basis for identifying the regulatory requirements. Carothers 1994 and Babad 1994 identify the analytes required to address safety and operational issues associated with waste management in the DST System. The rationale for selecting these analytes is provided in these documents.

2.4 SPECIAL PARAMETER SELECTION

Wastes contained in the DST System have been designated as ignitable and reactive wastes but do not typically exhibit these characteristics. The compatibility assessment conducted by TWRS Engineering serves to prevent safety issues such as excess heat generation, toxic gas generation, and explosions.

3.0 SELECTION OF SAMPLING PROCEDURES

This section discusses the sampling methods and procedures which shouldl be used. In general there will be two different types of samples taken. These are 1) samples taken by the DST Customer in support of waste designation and acceptance analyses and 2) those taken in double shell tanks in support of safety evaluations, operations, and other issues. Sampling of DSTs will usually be in accordance with requirements contained in the pertinent DQOs, WAPs, TCPs and/or other document which specifies sampling and analysis parameters.

3.1 SAMPLING STRATEGIES

Sampling strategies must ensure that a representative sample is obtained. The strategies for both types of samples are discussed in Sections 3.1.1 and 3.1.2.

3.1.1 Sampling Strategies taken by the DST Customers

Generally waste shipped to the DST System will be segregated and be in some type of large container (tank, pit, vault, etc) before it is analyzed. Since the volume is defined, grab sampling is usually the appropriate sampling approach. The DST Customers analysis plan should specify each type of sample and the number of samples to be taken. The plan should make sure that an adequate number of samples are taken to determine check the waste's actual composition. If the Customer's analysis plan does not require any particular sampling approach, then the following strategy should be employed:

1) Determine if the waste is layered
2) Determine the number of available sampling locations
3) For each discreet layer and available sample location determine the depth of the layer and divide the waste into cubic foot increments.
4) Assign a number to each specific increment
5) Determine the number of samples necessary such that any analysis of a waste shipment will be within the range indicated on the Profile Sheet. Usually at least three samples should be used to check analyte variability.
6) Use a random number generator and the number of available sample locations to actually select the sampling locations.

3.1.2 Sampling Strategies for samples taken Within the DST System

Sampling procedures will follow those specified in the appropriate (usually Compatibility and/or Safety Screen) DQO or TCP. In the event that no specific sampling procedure has been specified in the appropriate DQO or TCP, then a stratified random sampling approach should be used. This approach consists of the following steps:

1) Use existing knowledge to determine if the waste in the tanks is layered. If there is no knowledge to the contrary assume only one layer exists.
2) Determine the number of sampling locations available by multiplying the depth of the waste (in feet) by the number of risers available for sampling.
3) Assign a discreet number to each of the sample locations determined in step # 2.

4) Determine the number of samples necessary to obtain a 95% confidence interval at the mean concentration of the analytes of concern confidence limits. If there is no information available to determine this, at least three samples from each waste layer.
5) Use a random number generator to determine which risers are to be used and the depth of each sample. Sample depths must ensure that at least on sample is taken from each known waste layer.

3.2 SELECTION OF SAMPLING EQUIPMENT

The sampling equipment used will vary according to the particular situation. If sampling equipment has been specified in either a pertinent DQO, TCP, or analysis plan, then the specified equipment should be used. If no sampling equipment has been specified, in either a pertinent DQO, TCP, analysis plan, or other document, then a weighted bottle or core sampler should be used for sampling wastes which exceed two feet in depth and a Coliwasa used for all other samples.

3.3 MAINTAINING AND DECONTAMINATING FIELD EQUIPMENT

All equipment used to collect and transport samples must be free of all contamination which could alter test results. All equipment used to obtain and contain samples must be clean. Acceptable cleaning procedures for sample bottles and equipment include, but are not limited to, washing with soap or solvent, and steam cleaning. After cleaning, cleaning residues must be removed from all equipment which could come into contact with the waste. One method to remove these residues would be a solvent (acetone or other suitable solvent) rinse followed by a final rinse with deionized water. Equipment must be cleaned before use for another sampling event

After completion of sampling, equipment should be cleaned as indicated above. If decontamination of the equipment is not feasible, the sampling equipment should be properly packaged and sent to a TSD for proper disposal.

3.4 SAMPLE PRESERVATION AND STORAGE

Sample preservation shall follow those procedures set forth for the specific analysis which has been identified. Preservation shall be in accordance with the methods stated in SW-846 or any of the test methods adopted by the Hanford Site. In general, samples need to be cooled and kept at 4°C and shipped to the appropriate laboratory as soon as practical. No preservation method will be used when there are valid concerns for personnel protection because the radioactivity is too high.

3.5 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

The Quality Assurance/ Quality Control (QA/QC) procedures will vary according to the particular situation. Generally QA/QC requirements for sampling will be divided between paperwork requirements such as a chain-of-custody and sampling and analysis activities . This section addresses sampling QA/QC requirements and analytical QA/QC is discussed in Section 4.0

A chain-of-custody procedure is required for all sampling identified by this plan. At a minimum, the chain-of-custody must include 1) description of waste collected, 2) names and signatures of samplers, 3) date and time of collection and number of containers in the sample, and 4) names and signatures of persons involved in transferring the samples.

QA/QC for sampling consists primarily of checking for contamination through the use of blanks. These are explained in EPA 1994. If QA/QC procedures for blanks and duplicates have been specified in either a pertinent DQO, sampling, or analysis plan, then the procedures specified in the DQO/plan should be followed. If requirements for blanks and duplicates have not been specified, then the following requirements should be met for every sampling event.

1) Check for field contamination by taking at least one field blank per sampling day.
2) Check for sampling equipment contamination by taking at least one equipment blank per sampling event.
3) Check for overall replicability of results by taking either at least one set of field duplicates or require that the laboratory conduct a duplicate spike on at least one sample.

Whenever blanks and duplicates are taken, they must be treated as if they are actual samples. This includes but is not limited to, any preservation and storage techniques.

3.6 HEALTH AND SAETY PROTOCOLS

The safety and health protocol requirements established for the Hanford Site must be followed for all sampling activities required by this WAP.

4.0 LABORATORY SELECTION AND TESTING AND ANALYTICAL METHODS

This section discusses laboratory selection and the types of acceptable analytical methods.

4.1 LABORATORY SELECTION

Laboratory selection is limited since only a few laboratories are equipped to handle mixed waste due to the special equipment and procedures which must be used to minimize personnel exposure. The preferred laboratory will be one of the laboratories on the Hanford Site but in some cases an off-site laboratory may be used. Laboratory selection will be dependent upon laboratory capability, nature of the sample, timing requirements, and cost. In most cases Analytical Services Program Management and Integration group will actually select the laboratory. At a minimum the selected laboratory must have the following:

1) A comprehensive QA/QC program (both qualitative and quantitative)
2) Technical analytical expertise
3) An effective information management system.

These requirements will be met if the selected laboratory follows the pertinent requirements contained in the *Hanford Analytical Services Quality Assurance Plan (DOE/RL 1994)*. The selected laboratory can also meet these requirements by having some other type of QA/QC program as long as equivalent data quality is achieved.

4.2 TESTING AND ANALYTICAL METHODS

Testing and analytical methods will be dependent upon the analysis being sought and the reason for needing the information. In general, analyses will be conducted by 1) DST Customers for use in filling out waste profile sheets, and 2) TWRS Engineering for determining compatibility, safety and operating information. Analytical methods will be selected from those which are routinely used by the various Hanford analytical laboratories. These methods will in some cases deviate from SW-846 and ASTM accepted specifications for holding times, sample preservation, and other specific analytical procedures. These deviations are discussed in *Analytical Methods for Mixed Waste Analyses at the Hanford Site* (DOE/RL 1994) and are related to due to radioactivity and other Hanford Site issues.

DST Customers are expected to obtain analyses to 1) fill out information on the profile sheets if no process knowledge on a particular constituent is available, and 2) confirm suspected process knowledge, if needed. It is the DST Customer's responsibility to select the method which best suits his needs. The methods used must be spelled out in the analysis plan which is submitted to the TWRS WTEC.

The sampling of waste already in the DST System will follow the methods specified by pertinent DQOs such as the Safety Screening and Compatibility DQOs. If analytical methods have not been specified in a pertinent DQO, analysis plan, TWAP, or TCP, then TWRS Engineering and TWRS WTEC have the responsibility for selecting the appropriate method.

5.0 WASTE RE-EVALUATION FREQUENCIES

Waste re-evaluation is separated into two distinct groups: 1) waste received by the DST System and 2) waste already in the DST System. Periodic re-evaluation of the wastes received by the DST System is discussed in Section 5.1 and the re-evaluation of waste already in the DST System is discussed in Section 5.2

5.1 RE-EVALUATION OF WASTES RECEIVED BY THE DST SYSTEM

Wastes are initially evaluated for acceptance into the DST System when the profile sheet is evaluated. Most waste acceptances will be conditional, pending the submittal of analytical data for each batch transferred. This data along with other information will be evaluated against established limits prior to actual receipt of the waste. Each transfer of waste into the DST System will require a written certification by the DST Customer that the waste being shipped conforms to the information on the approved profile sheet. If this certification is not made, or the waste does not conform to the information on the profile sheet then the waste will not be accepted prior to a re-evaluation of the waste by TWRS Engineering and TWRS WTEC.

On an annual basis, updated profile sheets must be submitted by the DST Customers for evaluation by TWRS Engineering and TWRS WTEC. In addition to the annual review, there will be periodic checks of waste shipments. The checks may consist of document review, analysis of a sample of the waste, or other activity which would provide an indication of whether or not a waste shipment actually conformed to the profile sheet on file.. It is the responsibility of TWRS Engineering and TWRS WTEC to determine when the periodic checks will be conducted. There will be no exceptions to the annual review of the waste profile sheets or the review of additional information whenever there are indications that a waste does not conform to the profile sheet on file with TWRS.

5.2 RE-EVALUATION OF WASTES WITHIN THE DST SYSTEM

Waste already within the DST System is expected to remain relatively stable when there are no transfers into or out of the DST tanks. Evaluations of waste for compatibility and safety issues is required prior to all transfers into a DST Tank. These evaluations will address the concerns contained in the Compatibility and Safety Screening DQOs. TWRS Engineering will be responsible for these evaluations.

In addition to the evaluation which occurs prior to waste transfers, waste in the DST tanks will be checked for corrosion specifications at least every 2 years or as determined by TWRS Engineering. There will also be periodic analyses for parameters identified in the Safety Screening DQO. These periodic checks of the waste in the DSTs will help ensure the continued safe storage of the waste.

6.0 SPECIAL PROCEDURAL REQUIREMENTS

The following sections describe the special procedural requirements which are associated with wastes in the DST System.

6.1 PROCEDURES FOR RECEIVING WASTES GENERATED OFF -SITE

The DST System does not accept waste generated off the Hanford Site.

6.2 PROCEDURES FOR IGNITABLE, REACTIVE, AND INCOMPATIBLE WASTES

The DST System is permitted to store both reactive and ignitable wastes but the waste in the tanks generally does not exhibit these characteristics. These issues are addressed along with other compatibility issues during the compatibility assessment which is conducted prior to all transfers into and within the DST System.

6.3 PROVISIONS FOR COMPLYING WITH LDR REQUIREMENTS

The LDR requirements are addressed by requiring that DST Customers identify any LDR requirements which are applicable to their waste streams on the Waste Profile Sheet and on waste shipment information. Due to the DST System's capabilities, there is no treatment or segregation of wastes for LDR concerns and requirements. LDR requirements for waste currently in and for all waste shipped to the DST System will be summarized and these requirements will imposed on the waste shipped out of the DST System.

6.4 DEVIATIONS FROM THE REQUIREMENTS OF THIS PLAN

The TWRS WTEC may approve deviations from this plan if special circumstances arise which make this prudent. These deviations must be documented in writing with a copy to be retained by the TWRS WTEC.

7.0 REFERENCES

40 CFR 264 EPA, 1994, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities", *Code of Federal Regulations*, as amended.

40 CFR 265 EPA, 1994, "Interim Status Standards For Owners And Operators of Hazardous Waste Treatment, Storage and Disposal Facilities", *Code of Federal Regulations*, as amended.

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DOE-RL, 1991, *Double Shell Tank Part B Dangerous Waste Permit Application*, DOE/RL-90-39, as amended, U.S. Department of Energy Richland Field Office, Richland, Washington.

DOE, 1994, Hanford Analytical Services Quality Assurance Plan, DOE/RL-94-55, U.S. Department of Energy, Richland Operations, Richland Washington.

DOE-RL, 1994b, *Analytical Methods for Mixed Waste Analysis at the Hanford Site*, DOE/RL-94-55, U.S. Department of Energy Richland Field Office, Richland, Washington.

EPA, 1994, *Waste Analysis At Facilities That Generate, Treat, Store, And Dispose Of Hazardous Wastes, A Guidance Manual*, PB94-963603, OSWER 9938.4-03, U.S. Environmental Protection Agency, Washington D.C.

EPA, 1992, *Test Methods For Evaluation Solid Waste*, SW-846, 3rd Edition, U.S. Environmental Protection Agency, Washington, D.C.

Ecology, EPA, and DOE, 1994, *Hanford Federal Facility Agreement and Consent Order*, 2 vols, as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, U.S. Department of Energy, Olympia, Washington.

Halgren, D. L., 1991, *Double-Shell Tank Waste Analysis Plan*, WHC-SD-EV-053, Rev. 1, Westinghouse Hanford Co., Richland, Washington.

WAC 173-303, 1993, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.

WHC, 1993, *Hanford Site Solid Waste Acceptance Criteria*, WHC-EP-0063, Revision 4,Westinghouse Hanford Co., Richland, Washington.

APPENDIXES

APPENDIX A

WASTE PROFILE SHEETS

WASTE STREAM PROFILE SHEET

Follow attached instructions when filling out this Profile Sheet

I. WASTE SHIPPER INFORMATION

1. DST Customer (Waste Shipper/Generator): _____
2. Contact _____
3. Phone _____
4. Mail Stop _____

II. GENERAL WASTE INFORMATION

1. Waste Generator _____
2. Waste Stream Name _____
3. Process Generating Waste
   _____
   _____
   _____
4. Anticipated Volume including any flush water _____
5. Anticipated shipping frequency _____
6. Method of shipment (rail car, truck pipeline) _____
7. Was analytical data used to fill out this profile sheet? ____ Yes ___ No
   If yes, site document which was used as the basis for sampling and analysis (i.e. sampling or waste analysis plan) and attach a complete copy of the latest results.

   _____

III WASTE STREAM COMPOSITION

List all major constituents including 40 CFR 261 Appendix VII hazardous constituents

1. Component	2. Concentration Range (units)	3. Average % Must Total 100%	4. Basis for Composition
	____ to ____		
	____ to ____		
	____ to ____		
	____ to ____		
	____ to ____		

IV. PHYSICAL PROPERTIES

1. Physical state at 70° F (circle all applicable)

   Liquid Semisolid Solid

   Slurry Sludge Gas

2. Viscosity at 70°F ____ < 10 mPa s ____ > 10 mPa s

3. Is waste multilayered? Yes _____ No _____
   If yes describe and quantify each layer:

   1. (Top) _____ %
   2. _____ %
   3. (Bottom) _____ %

4. Suspended Solids: _____ < 1% ____ between 1% and 10% _____ > 10%
5. Flash Point: _____ > 200 °F _____ between 100 & 200 °F _____ < 100 °F
6. Color _____

V. SPECIFIC ANALYSIS OF WASTE

Fill in the following chart giving maximum, minimum, or averages for each specific analyte. Also state whether this information is based on process knowledge or actual analytical data.

PARAMETER	MINIMUM ((specify units)	MAXIMUM (specify units)	AVERAGE (specify units)	BASIS (Process Knowledge or Analysis)
Chloride (C)				
Cooling Curve (C)				
Cyanide (S)				
Energetics (C)				
Fluoride (C)				
Gas Composition (S)				
Hydroxide (C)				
Iron (S)				
Moisture, % (C,S)				
Nitrite (C)				
pH (C)				
Phosphate (C)				

PARAMETER	MINIMUM ((specify units)	MAXIMUM (specify units)	AVERAGE (specify units)	BASIS (Process Knowledge or Analysis)
Plutonium 239/240 (S,C)				
Separable Organic Layer (S)				
Sodium (C)				
Solids, % (C)				
Specific Gravity (C)				
Sulphate (C)				
Total alpha (S)				
Total Fuel Content (S)				
Total Organic Carbon (C,S)				
Uranium (S)				

VI. REACTIVITY AND STABILITY

1. What are the Reactivity Group Number(s) for this waste? (See Design and Development of Hazardous Waste Reactivity Testing Protocol, "EPA Document No. EPA-600/2-84-057, February 1984.)

   _____

2. Is this material stable? Yes _____ No _____

If no, explain: _____

3. Is this material shock sensitive? Yes _____ No _____
   If yes, explain: _____

VII. DANGEROUS WASTE INFORMATION

1. Is this waste a dangerous waste as defined by WAC 173-303? ___ Yes ___ No

2. If yes to # 22, List the applicable Hazardous and/or Dangerous Waste Number(s) and explain the basis for the number. For example if you assign D001, the reason for selection is that the flash point is less than 140°F.

Hazardous / Dangerous Waste Number	Reason for Selection

3. Is waste a mixed waste? Yes _____ No _____

4. List any CERCLA reportable quantities applicable to the waste (see 40 CFR 302.4).

Constituent	Reportable Quantity

VIII. LAND DISPOSAL RESTRICTION INFORMATION

Fill in the following information for ALL characteristic and listed EPA hazardous waste number(s) (See 40 CFR 268.41, 268.42, and 268.43 and WAC 173-303-140). To list additional waste numbers and categories, use an additional page and attach it to this profile sheet.

A. A restricted waste which requires treatmen to a performance based standard.

B. A restricted waste which has been treated to a performance based standard.

C. A restricted waste which requires treatment by a specified technology.

D. A restricted waste which has been treated by a specified technology

E. A restricted waste subject to a variance.

REF #	1. WASTE CODES	2. SUBCATEGORY Enter the subcategory description or enter none	3. APPLICABLE TREATMENT STANDARDS			4. HOW MUST THE WASTE BE MANAGED? Enter the appropriate letter (A-E) from above
			3A. Performance Based (check as applicable)		3B. Specified Technology Enter the 40 CFR 268.42 treatment code(s)	
			268.41(a)	268.43(a)	268.42	

IX SUPPLEMENTAL INFORMATION & ACCOUNTABILITY STATEMENT

32. Is there an attachment containing additional information? ___ No ___ Yes (list below)

    _____

33. I hereby certify that all information submitted in this and all attached documents contains true and accurate descriptions of this waste. Any sample which was analyzed or submitted was representative as defined in 40 CFR 261 Appendix I or by using an equivalent method. All relevant information regarding known or suspected hazards in the possession of the generator and/or waste shipper has been disclosed.

_____	_____	_____
Authorized Signature	Name and Title	Date

November 29,1994

Instructions for Filling Out Waste Profile Sheets

General

1. Supporting information which is used to fill out this profile sheet must be documented. Acceptable documentation includes analysis for individual parameters and written process descriptions which detail chemical input and output.

2. One profile Sheet needs to be completed for each discreet type of waste. Discreet type of waste is defined as a waste stream originating from the same source and/or process that has the same or very similar composition. Generally each tank or storage device will be a separate waste stream. If a group of containers has the same or very similar composition, then a single waste profile sheet may be used. Tank Farms Environmental Engineering (TFEE) has the final decision on what constitutes a discrete waste.

3. Answers must be made to all questions.

4. Answers must be completed in ink or typing.

5. Contact TFEE if there are any questions concerning the completion of the Profile Sheet.

6. A copy of the completed Profile Sheet should be retained for your records and the original sent to TFEE.

I Waste Shipper Information

1. Enter the name of the organization which is in charge of shipping the waste.

2. Enter the name of a person who is knowledgeable about the waste and to which questions can be directed.

3. Enter the phone number for the contact given in #2.

4. Enter the mail stop or mailing address for the contact given in #2.

II General Waste Information

1. Enter the name of the generator of the waste.

2. Enter the name given to the waste stream. Each waste stream must have a discreet name.

3. Describe the process which generated the waste.

4. Enter the anticipated volume of each waste shipment. This volume should include any flush water which will be shipped with the waste and should represent the total volume actually received.

5. Enter the anticipated shipping frequency.

6. Provide the method of waste shipment (rail-car, truck, pipeline)

7. State whether or not actual laboratory analytical data was used to fill out the profile sheet. If analytical data was used, then provide a reference for the document used as the basis for the analysis such as a Waste and/or Sampling Analysis Plan and attach a copy of the latest analytical results.

III Waste Stream Composition

1. In the component column, list all constituents of the waste which are equal to or greater than 1% by weight. For dangerous wastes, include the concentration of each constituents listed in Appendix VII of 40 CFR Part 261 for all applicable codes. For example if the waste has been designated as F005 because of toluene and benzene, then the concentrations of these two constituents need to be reported.

2. In the concentration column enter the maximum and minimum values for each constituent. Units must be included for each value. It is acceptable to report values as less than or greater than values, but the worst case scenario will be used as the basis for the evaluation.

3. Enter the expected average concentration of each reported constituent. The sum of the numbers must equal 100%.
4. For each component indicate whether the information furnished is based on process knowledge (PK), analytical Information (A), or a combination of the two (B).

IV Physical Properties

1. Indicate the physical state of the waste as it will be received by the DST System by circling one or more of the choices. For example, if the waste will consist of a combination of liquid and solids, then both liquids and solids should be circled.

2. Check the choice which best describes the viscosity of the waste.

3. Indicate whether there are multiple layers in the waste and give the approximate percent by volume of each layer. For example if a waste consists of 10 % solids which settle to the bottom and 90 % liquid then the yes box should be checked and liquid and 90% entered in line 1. Solids and 10% should be entered in line 3. It is permissible to enter ranges if the % of each layer is expected to vary.

4. Check the choice which best describes the amount of suspended solids in the waste. If there are no suspended solids then the <1% blank should be checked.

6. Indicate the expected color of the waste.

V Specific Analysis

Indicate the maximum, minimum, and average concentration for each parameter. Also indicate whether process knowledge or analytical information is being used as the basis for the information. A value for each parameter must be given. It is permissible to enter concentrations as less than or greater than values. A unit must be specified for each value.

VI Reactivity and Stability

1. Enter the reactivity group number(s) for the waste. The numbers and procedure for their determination are contained in EPA's document No. EPA-600/2-84-057 and titled *Design and Development of Hazardous Waste Reactivity Testing Protocol.*

2. Indicate whether or not the waste is stable. If it is unstable (can detonate, deteriorate, or otherwise spontaneously change) indicate what may happen.

3. Indicate whether or not the waste is shock sensitive. If it is shock sensitive, state the reason for this property and indicate what may happen if the waste is exposed to shock.

VII Dangerous Waste Information

1. Indicate whether or not the waste is a dangerous waste as defined by Washington Administrative Code 173-303.

2. If the waste is a dangerous waste, indicate the codes which are assigned to the waste and the reason for the application of the code. If the waste is not a dangerous waste enter NA in the first blank cell.

3. Indicate whether or not the waste is a mixed waste.

4. If any shipment of the waste will contain a reportable quantity of a chemical listed under CERCLA (see 40 CFR 302.4), identify the chemical and its reportable quantity. If no waste shipment will contain a reportable quantity, then enter NA in the first cell.

VIII Land Disposal Restriction Information

1. List all applicable waste codes. Each code must be placed on a separate line in a cell next to a reference number. If the waste is not a dangerous waste enter NA and proceed to Section VIII. If additional space is needed, continue the chart on an attachment.

2. Enter the appropriate subcategory or indicate none for each waste code.

3A. If a performance based standard applies to a waste code check the appropriate column.

3B. If a technological treatment has been specified for the waste code, enter the treatment code found in 40 CFR 268.42.

4. For each listed waste code, specify how the waste must be managed by entering the appropriate letter from the choices preceding the chart. If the waste has been treated to meet a standard (choices B or D), identify the treatment. If E is applicable, enter the date and type of variance which is applicable.

IX Supplemental Information and Accountability Statement

1.Indicate whether or not there are any attachments. If items are attached they should also be identified.

2.Have a knowledgeable person review and sign the profile sheet. The signature should be that of an Environmental Compliance Officer or other person who normally signs submittal to agencies and who understands the regulations.

APPENDIX B

WASTE COMPATIBILITY DQO

WASTE COMPATIBILITY DQO

The generic sampling and analysis program related to the potential incompatibility of wastes that may occur from waste transfers into and within the DST system is the subject of this DQO effort. This includes waste that has unique chemical and/or physical properties for which no historical data exists to judge compatibility with safety and operations decision rules, and applies primarily to liquid samples from SSTs to be salt well pumped in the near term. It also applies to tanks scheduled as receiver tanks from waste retrieval activities. The sampling of SST liquid wastes is limited to liquid in salt wells or surface liquid located below available risers. Until a generic sampling plan is developed, the number of liquid samples to be taken will be determined using a best engineering judgement approach by the Waste Compatibility Program based on criteria that were established in the DQO effort. The following table presents the analytes to be measured on liquid samples taken for waste compatibility evaluation. For some analytes, two alternative analytical methods are given. Alternative analytical methods for which no precision or accuracies were given are not included. The measurements of pump velocity, pipe diameter, and tank temperature are not measured in the laboratory or hot cell and were not included.

WASTE COMPATIBILITY DQO

Analyte or Measurement	Analytical Method	Notification Limit	Sample	Desired Accuracy and Precision*
Aluminum	ICP	none	Filtered liquid grab sample	
Americium-241	AEA	>0.10 μCi/g	Filtered liquid grab sample	
Carbonate	TIC	none	Filtered liquid grab sample	
Cesium-137	GEA	none	Filtered liquid grab sample	
Chloride	IC	none	Filtered liquid grab sample	
Cooling Curve	TBD	TBD	TBD	
Energetics	DSC/TGA; Adiabatic Calorimetry	net exothermic energy > 0	Filtered liquid grab sample	
Fluoride	IC	none	Filtered liquid grab sample	
Hydroxide	Titration	≥8M or ≤0.01M	Filtered liquid grab sample	
Iron	ICP	none	Filtered liquid grab sample	

Analyte or Measurement	Analytical Method	Notification Limit	Sample	Desired Accuracy and Precision*
Nitrate	IC	≥6,200 µg/mL	Filtered liquid grab sample	
Nitrite	IC; Spectrophotometric	≥2.53E+5 µg/mL or ≤460 µg/mL	Filtered liquid grab sample	
pH	Glass electrode	none	Filtered liquid grab sample	
Phosphate	IC; ICP[1]	none	Filtered liquid grab sample	
Plutonium-239/240	AEA	>0.84 µCi/mL	Filtered liquid grab sample	
Separable Organic Layer	Visual	separable layer present	Unfiltered liquid grab sample	
Sodium	ICP	none	Filtered liquid grab sample	
Specific Gravity	Specific gravity	none	Unfiltered liquid grab sample	
Strontium-90	Separation/β count	none	Filtered liquid grab sample	

Analyte or Measurement	Analytical Method	Notification Limit	Sample	Desired Accuracy and Precision*
Sulfate	IC	none	Filtered liquid grab sample	
Total Organic Carbon	TBD	none	Filtered liquid grab sample	
Viscosity	TBD	TBD	Unfiltered liquid grab sample	
Volume Percent Solids	TBD	none	Unfiltered liquid grab sample	
Weight Percent Water	Gravimetry; TGA	none	Filtered liquid grab sample	

APPENDIX C

TANK SAFETY SCREENING DQO

Tank Safety Screening Data Quality Objectives

This DQO effort defines the sampling and analytical requirements and decision logic necessary to determine if each of the 177 SSTs and DSTs, and other miscellaneous, high-activity underground storage tanks, is appropriately categorized with respect to four safety issues: ferrocyanide, organic, criticality, and flammable gas. To meet the sampling requirements of this DQO effort, a vertical profile of the waste is obtained from at least two widely-spaced risers. This vertical profile will be realized using core, auger, or grab samples. The safety screening DQO effort is comprised of four primary analytes measured for safety screening classification. Secondary analyses are performed if a non-Watch List tank exceeds the notification limit for total fuel content or total alpha. The safety screening analyses shall be applied to all core samples, DST RCRA samples, and all auger samples, except auger samples taken by the Flammable Gas Tank Safety Program to assess the flammable gas tank crust burn issue. The analytical requirements identified in the safety screening DQO effort are summarized in the following table.

TANK SAFETY SCREENING DQO

Analyte or Measurement	Analytical method	Notification Limit	Sample	Desired Accuracy and Precision*
Total Fuel Content (dry weight basis)[1]	DSC/TGA	>125 cal/g	Every half segment for salt cake and sludge waste types; Every quarter segment on Ferrocyanide Watch List tanks	
% Moisture[1]	TGA	>[(0.0932*DSC exotherm)- 10.7] weight %[2] or <17 weight %[3]	Every half segment for salt cake and sludge waste types.	
Total Alpha[1]	Alpha counting	being revised	Every half segment for sludge waste types; No analysis on salt cake waste types	
Gas Composition[1]	Gas-specific monitoring gauges; GC/MS	>25% of LFL for any flammable gas present	Tank dome space sampling or monitoring	
Iron, Manganese, U[4]	ICP/OES	none	Every half segment for salt cake and sludge waste types	
Plutonium-239/240[4]	Separation/AEA	none	Every half segment for salt cake and sludge waste types	

Analyte or Measurement	Analytical method	Notification Limit	Sample	Desired Accuracy and Precision*
Total Organic Carbon[4]	Persulfate oxidation; furnace oxidation on Ferrocyanide Watch List tanks	none	Every half segment for salt cake and sludge waste types	
Total Cyanide[4]	Micro distillation	none	Every quarter segment for sludge waste types; Every half segment for salt cake waste types	

1 Primary safety screening analyte
2 Applies if the tank is on the Ferrocyanide Watch List
3 Applies to tanks not on the Ferrocyanide Watch List
4 Secondary safety screening analyte. Analysis is performed if the total alpha notification limit is exceeded, or if a non-Watch List tank exceeds the total Fuel notification limit.