AUG 14 1997

ENGINEERING DATA TRANSMITTAL

Page 1 of 2.

1. EDT 618026

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
Distribution	Environmental Compliance	N/a
5. Proj./Prog./Dept./Div.:	6. Design Authority/ Design Agent/Cog. Engr.:	7. Purchase Order No.:
222-S Laboratory Complex		N/A
8. Originator Remarks: Sampling and Analysis Plan, Waste Stream, Analysis, Liquid Waste, 222-S Laboratory		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: 222-S Laboratory
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15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Desig-nator	(G) Reason for Trans-mittal	(H) Origi-nator Dispo-sition	(I) Receiv-er Dispo-sition
1	HNF-SD-WM-ER-731	N/A	0	Sampling and Analysis Plan for Sampling of Liquid Waste Streams Generated by 222-S Laboratory Complex Operations.	EQ	1,2	1	

16. KEY

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E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 4. Review 2. Release 5. Post-Review 3. Information 6. Dist. (Receipt Acknow. Required)	1. Approved 4. Reviewed no/comment 2. Approved w/comment 5. Reviewed w/comment 3. Disapproved w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION
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(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN	(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN
1	1	Design Authority A. B. Benally See Page 2 - signatures	1	1	Facility Manager L. F. Perkins See page 2
1	1	Design Agent	1	1	Haz. Materials M. L. Martin See page 2
1	1	Cog.Eng. K. M. Meier See page 2			
1	1	Cog. Mgr. K. S. Tollefson See page 2			
1	1	QA L. P. Markel See page 2			
	1	Safety			
1	1	Env. A.B. Benally See page 2			

18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
K S Tollefson 8/12/97 Signature of EDT Originator Date	Authorized Representative for Receiving Organization Date	K S Tollefson 8/12 Design Authority/ Cognizant Manager Date	[ ] Approved [ ] Approved w/comments [ ] Disapproved w/comments

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EDT 635948 ~~EDT 622509~~

~~ENGINEERING CHANGE NOTICE~~

Page 2 of 2

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Proj. ECN

~~2. To: (Receiving Organization)~~	~~3. From: (Originating Organization)~~	~~4. Related EDT No.:~~
Distribution	222-S Environmental Compliance	N/A
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		13. Permit/Permit Application No.:
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(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
	HNF-SD-WM-ER-731 REV. 0		0	SAMPLING AND ANALYSIS PLAN FOR SAMPLING OF LIQUID WASTE STREAMS GENERATED BY 222-S LABORATORY COMPLEX OPERATIONS.	E Q			

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

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(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN	(G) Reason	(H) Disp.	(J) Name (K) Signature (L) Date (M) MSIN
		Design Authority	1	1	Facility Mgr. L. F. Perkins [signature] 8/8/97
		Design Agent	1	1	Haz. Mat. M. L. Martin [signature]
1	1	Cog.Eng. K. M. Meier Kirsten Meier 8/6/97			
1	1	Cog. Mgr. K. S. Tollefson [signature] 8/5/97			
1	1	QA L. P. Markel [signature] 8/7/97			
		Safety			
1	1	Env. A. B. Benally [signature] 8/5/97			

18.	19.	20.	21. DOE APPROVAL (if required) Ctrl. No.
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Sampling and Analysis Plan for Sampling of Liquid Waste Streams Generated by 222-S Laboratory Complex Operations

A. B. Benally
Waste Management of Hanford, Inc., Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

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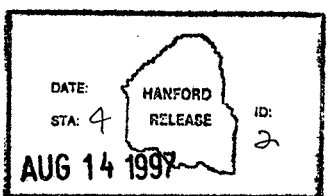

Release Stamp

Approved for Public Release

SAMPLING AND ANALYSIS PLAN FOR SAMPLING OF LIQUID WASTE STREAMS GENERATED BY 222-S LABORATORY COMPLEX OPERATIONS

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Waste Management Federal Services of Hanford, Inc.

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Los Alamos Technical Associates

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Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

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LIST OF TERMS

ALARA	As Low As Reasonably Achievable
HASQARD	Hanford Analytical Services Quality Assurance Requirements Documents
HMC	Hazardous Materials Control
IC	ion chromatograph
ICP	inductively coupled plasma
ISE	ion-specific electrode
LABQAP	222-S Laboratory Quality Assurance Plan
MSDS	Material Safety Data Sheets
N/A	not applicable
PC	Project Coordinator
QC	quality control
QS	Quality Systems
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SVOA	semivolatile organic analysis
TIC	total organic carbons
TSD	treatment, storage, or disposal
VOA	volatile organic analysis
WSFS	Waste Steam Fact Sheet

SAMPLING AND ANALYSIS PLAN FOR SAMPLING OF LIQUID WASTE STREAMS GENERATED

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) establishes the requirements and guidelines to be used by the Waste Management Federal Services of Hanford, Inc. personnel in characterizing liquid waste generated at the 222-S Laboratory Complex. The characterization process to verify the accuracy of process knowledge used for designation and subsequent management of wastes consists of three steps:

- To prepare the technical rationale and the appendix in accordance with the steps outlined in this SAP
- To implement the SAP by sampling and analyzing the requested waste streams
- To compile the report and evaluate the findings to the objectives of this SAP.

2.0 APPLICABILITY

This SAP applies to portions of the 222-S Laboratory Complex defined as Generator under the Resource Conservation and Recovery Act (RCRA). Any portion of the 222-S Laboratory Complex that is defined or permitted under RCRA as a treatment, storage, or disposal (TSD) facility is excluded from this document. This SAP applies to the liquid waste generated in the 222-S Laboratory Complex. Because the analytical data obtained will be used to manage waste properly, including waste compatibility and waste designation, this SAP will provide directions for obtaining and maintaining the information as required by WAC173-303.

3.0 OBJECTIVES

This SAP provides the conditions, information and methods for grouping similar waste streams together and for choosing a particular waste stream from each group for sampling and analysis. The SAP's objective is to verify the designation process and to ensure that waste is managed properly. The grouping of liquid waste streams minimizes the cost of testing and exposure to personnel. The SAP provides the specific requirements for creating

periodic sampling and analysis events. The implementation of the SAP is described in the appendix. For each sampling event, another updated appendix is prepared and added to this SAP.

4.0 WASTE STREAM GROUPINGS

Waste streams produced within the 222-S Laboratory Complex were grouped based on chemical similarities, pH range, compatibility, and waste management pathways. This resulted in seven waste stream groups:

- Group 1: Acidic aqueous waste
- Group 2: Basic aqueous waste
- Group 3: Neutral aqueous waste
- Group 4: Acidic aqueous waste with miscible organics
- Group 5: Basic aqueous waste with miscible organics
- Group 6: Neutral aqueous waste with miscible organics
- Group 7: Organic liquid.

As new analytical procedures are developed and/or existing procedures which have been suspended, are resumed, the associated waste streams are evaluated and placed into one of the waste stream groups. Periodically all liquid waste streams will be evaluated, at which time the information, provided in the attached spreadsheet, is updated and a waste stream from each waste stream group is selected for sampling and analysis. The technical rationale for the selection and the updated spreadsheets are then added to this document as an additional appendix.

Sections 4.1 through 4.3 specify how individual liquid waste streams from the 222-S Laboratory Complex's analytical operations are divided into different waste stream groups. In addition to the seven groups, an eighth grouping (oxidizing/reducing aqueous waste), for which currently no waste streams exist at the 222-S Laboratory Complex, is also defined.

4.1 DEFINITION: AQUEOUS WASTE

The matrix of an aqueous waste is water. The analytes and constituents contained in this waste are inorganic. The pH can vary from neutral to extremely corrosive. However, the waste stream will not display the characteristic of ignitability nor will it contain specified concentration of miscible organics above one weight percent.

4.1.1 Group 1: Acidic Aqueous Waste

Acidic aqueous waste is defined the same as *Aqueous Waste*, however the pH range will be approximately 6 or less.

4.1.2 Group 2: Basic Aqueous Waste

Basic aqueous waste is defined the same as *Aqueous Waste*, however the pH range will be approximately 8 or greater.

4.1.3 Group 3: Neutral Aqueous Waste

Neutral aqueous waste is defined the same as *Aqueous Waste*, however the pH range will be approximately 6 to 8.

4.1.4 Group 8: Oxidizing/Reducing Aqueous Waste

Aqueous waste streams at any pH range could contain oxidizers or reducers from the analytical process. Currently no analytical waste streams at the 222-S Laboratory Complex are associated with this group.

At present, the waste streams from the analytical methods at the 222-S Laboratory Complex that have oxidizers added during the analysis process, are not categorized as oxidizers. It has been determined that the oxidizing/reducing capacity of the reagent has been eliminated during the analytical process that generates the waste. Therefore, even though the analysis calls for the use of an oxidizer/reducer, the final waste stream does not exhibit any trace of such a reagent.

4.2 DEFINITION: AQUEOUS WASTE WITH MISCIBLE ORGANICS

The matrix of an aqueous waste with miscible organics is water. The analytes and chemical constituents contained in this waste are inorganic and organic. The organic constituents cannot be separated by physical means from the aqueous matrix. The pH can be in any range, from neutral to extremely corrosive. Because of the nature of some organics, the waste stream could display the characteristic of ignitability.

4.2.1 Group 4: Acidic Aqueous Waste With Miscible Organics

Acidic aqueous waste with miscible organics is defined the same as *Aqueous Waste With Miscible Organics*, however the pH range will be approximately 6 or less.

4.2.2 Group 5: Basic Aqueous Waste With Miscible Organics

Basic aqueous waste with miscible organics is defined the same as *Aqueous Waste With Miscible Organics*, however the pH range will be approximately 8 or greater.

4.2.3 Group 6: Neutral Aqueous Waste With Miscible Organics

Neutral aqueous waste with miscible organics is defined the same as *Aqueous Waste With Miscible Organics*, however the pH range will be approximately 6 to 8.

4.3 GROUP 7: ORGANIC LIQUID

An organic liquid has a matrix that is organic in nature such as an alcohol, ketone, alkane, and so forth. Any inorganic constituent in this liquid exists only as colloid or covalent bond and cannot be physically separated from the organic matrix. The measurement of pH is not applicable. Ignitability is a typical characteristic of this group, although not all waste streams meet the flashpoint criteria for ignitability. For waste streams at the 222-S Laboratory Complex, a liquid waste stream with 30 percent or less of reagent water is considered an organic stream.

5.0 SELECTION PROCESS OF REPRESENTATIVE WASTE STREAMS

Several criteria are evaluated for choosing a representative stream for a particular group of waste streams for sampling and analysis. The following factors are individually assessed and a conclusion is drawn on the sum of the results:

- Frequency of waste generation
- Complexity of chemical constituent(s)
- Multiple waste streams generated from an analytical procedure
- Any unusual or unique waste stream attributes
- Waste stream was not analyzed previously.

Where an equivalent radiological and non-radiological waste stream is generated by an analytical procedure and placed into the same waste stream group, the non-radiological waste stream will be selected to ensure ALARA principles are implemented.

The appendix provides the defined requirements for representative waste streams in a given time period.

5.1 FREQUENCY

The laboratory information system (for example, LABCORE) provides the information on how many samples, including quality control (QC) samples are analyzed for a particular method over a specific time period. For the spreadsheets presented in the appendix, the number of analyzed samples, including blanks, duplicates and spikes, are combined over a period covering several months.

When choosing a representative waste stream, consideration needs to be given to the volume of waste generated. The more complex the waste stream, the more analytical tests have to be performed, and the more sample volume needed. The frequency number is the sum of the number of determinations, including analysis of QC samples, conducted in a specific time period. In order to ensure sufficient waste volume for analysis, 20 determinations per month generally provide sufficient sample volume.

5.2 COMPLEXITY INDICATOR

To properly manage a waste stream, it is important to understand the chemical composition of the stream. The Waste Stream Fact Sheet (WSFS) lists the added reagents in the column "Constituents of Waste Generated". To reach a better understanding of the chemical composition of a waste stream, the reagents involved should be evaluated. The complexity of the waste is a result of the number of reagents added to that stream. However, if all the reagents were salts of one and the same metal, the complexity would not be as high as if the salts were from several metals. In an attempt to define and formulate the complexity, the following indicator method was developed to calculate a "Complexity Indicator":

- Count the reagents, which are listed on the WSFS under "Constituents of Waste Generated", excluding "Reagent Water" and those reagents listed as "N/A". This is a line-by-line count of the number of reagents added, and provides the first number.

- Count the unique analytical sets in the waste stream. An analytical set would be an analyte molecule or ion such as chloride, ethanol or silver. Hydroxyl [OH^-] and hydronium [H_3O^+] ions are excluded, as well as any "N/A"s listed on the WSFS. For example: The waste stream contains nitrate, nitrite,

sulfate, ethanol, sodium, potassium. The count is 6. This provides the second number.

- Multiply these two numbers. The product is the Complexity Indicator for that particular waste stream.

5.3 MULTIPLE WASTE STREAMS

Some analytical procedures generate multiple waste streams which are assigned to different waste stream groups. By analyzing the multiple streams of one procedure, the proper separation of the individual streams can be verified.

5.4 UNUSUAL WASTE STREAMS

The waste stream of an unusual analytical procedure creating a unique type of waste would be of interest for analysis. At present, such stream is not created at the 222-S Laboratory Complex, but would be given a priority in a future selection process.

5.5 WASTE STREAM NOT PREVIOUSLY ANALYZED

As sampling is periodically repeated, previously sampled and analyzed waste streams will be excluded from the selection process. This will ensure the largest number of different waste streams to be analyzed.

6.0 TECHNICAL RATIONALE FOR CHOOSING REPRESENTATIVE WASTE STREAMS

Two spreadsheets are presented in the appendix. Each consist of information on liquid waste streams generated from analytical methods approved for operations at the 222-S Laboratory Complex. Both spreadsheets provide the same information sorted differently: (1) Resumed Methods, sorted numerically, (2) Resumed Methods, sorted in order of Frequency and Complexity. The selected waste streams are shown in *italics*. These spreadsheets provide the following information:

- The table is divided into seven groupings of waste streams as discussed earlier. The liquid waste streams generated from the methods are placed into the 7 different groups. Each waste stream is uniquely identified by listing its waste

stream number as identified on the WSFS (for example, stream 3 of 4 is listed as "3/4") in the column "Waste Stream #".

- The column "Reagent Count" provides the first number used for calculating the Complexity Indicator.
- The column "Analytical Sets" provides the second number used for calculating the Complexity Indicator.
- The column "Complexity Indicator" lists the product from the "Reagent Count" and the "Analytical Sets" columns.
- The assigned waste code designations are abbreviated for the spreadsheets only. For the characteristic codes the leading characters were dropped, (for example, "D002" is listed as "2", "D010" is listed as "10") and placed in the "Waste Designation" column. The characteristic codes are identified in WAC 173-303-090. The listed waste codes F001 through F005 are applied to any waste contacted by Tank Farm material.
- The "Frequency" column documents the amount of samples and QC samples analyzed for a specific time period as defined in the introduction of the associated appendix.

For methods approved for operation, representative waste streams will be tested using an ongoing process. By analyzing waste streams with more complex chemical composition within a group first, waste streams with less complex chemical composition are covered.

The appendix provides a detailed discussion on the selection process for each chosen liquid waste stream and tables that list the unique analytical sets and the proposed analytical methods to analyze for the waste constituents.

7.0 SAMPLING

The Hazardous Materials Control (HMC) personnel will perform waste sampling in accordance with the Hanford Analytical Services Quality Assurance Requirements Documents (HASQARD) (DOE/RL-96-68) and the 222-S Laboratory Quality Assurance Plan (LABQAP) (Markel 1997).

HMC will be taking one sample from each selected waste stream from the associated appendix of this procedure. In addition, HMC will generate a composite sample consisting of proportional aliquot/fractions of the original samples from waste stream groups 1-6, to

reflect a representative sample as it would be transferred to the interim status TSD 219-S tank system.

For each sample to be taken the sampler will obtain a unique identification number (sample number). The sampler will homogenize the waste in the original waste container. Methods to be used may include stirring with a magnetic stirrer or hand agitation. A sufficient amount of sample will be withdrawn from the homogenized waste, using a method applicable to the waste type, such as pipet. All sampling equipment and sample containers will be handled in accordance with HASQARD and LABQAP to ensure interferences with the chemical composition of the waste is minimized or completely avoided.

Each sample and composite is recorded, as to the source and amount of waste sample taken. A Chain of Custody record or equivalent is required, sample identification, sample collection date and time, sample collection location (that is, original waste stream container), date of sample receipt at the lab and date(s) of sample preparation and analysis in accordance with the requirements in HASQARD and LABQAP.

8.0 ANALYSIS

The chemical constituents of a selected waste stream are analyzed by an appropriate analytical method as discussed in the associated appendix of this document. Analytical procedures equivalent to SW-846 methods or any deviations in accordance with HASQARD and LABQAP are acceptable for analysis. An analytical method will be selected for analysis that is appropriate for the particular waste stream; for example, to minimize interferences.

In some cases, an analytical method is not available at the 222-S Laboratory Complex. In such cases, another qualified (as described below) laboratory will perform the necessary analytical procedure. Analytical services contracted to perform the analyses for the waste samples have to fulfill the following requirements:

- Follow the requirements as outlined in HASQARD and LABQAP
- Use the recommended analytical methods, or have any substituting method validated and approved by 222-S qualified personnel before using the replacement method.

8.1 QUALITY ASSURANCE/QUALITY CONTROL

While creating analytical data of any type, it is necessary to proceed with a consistent degree of precision, accuracy, reproducibility, correctness and completeness. Therefore, for maximum effectiveness and efficiency QC samples shall be performed routinely. The results from QC samples indicate impediments in the analytical process possibly due to instrument, method or matrix interferences. Professional judgement should be used for applying QC limits to matrices like sludge, multi-phased samples, and so forth. Detailed information can be found in HASQARD and LABQAP.

9.0 DATA COLLECTION, REDUCTION/REPORTING, AND DATA REVIEW

9.1 DATA COLLECTION

The chemist is responsible for reviewing the data on analytical batch against the requirements of this document and acceptable QC criteria. If the data does not correlate to the procedure WSFS, the chemist shall take appropriate corrective action (i.e., revise procedure, or evaluate method).

If the concentrations detected in the waste stream are less than the upper bound percent listed on the WSFS, the designation process is confirmed. If the concentrations detected in the waste stream are exceeding the range provided on the WSFS, the cause needs to be investigated. The following should be asked to find the cause of the discrepancy:

- Have all calculations been performed correctly?
- Were problems encountered during the analytical process? Were the problems due to matrix interferences?
- Are byproducts from the analytical reaction contributing to the concentrations of the analytical set?
- Does the WSFS need to be re-evaluated or revised?

9.2 REDUCTION/REPORTING

Data reduction may be performed manually or using computer programs. This will be typically be performed by chemist or PC. Guidance on reduction and reporting can be found in HASQARD/LABQAP..

The data deliverable shall include at a minimum:

- Project/Method
- Custody record, RSA
- Result Summary, with analytical units and appropriate number of significant figures.
- Narrative
- QC sample summary with analytical units and appropriate number of significant figures.

9.3 DATA REVIEW

Quality Systems (QS) personnel will review the analytical report.

10.0 RECORDKEEPING

Because of accurate record keeping, the final designated waste can be traced back to its original container, and from there back to the originator (analyst) and the location of generation (hood). Record keeping occurs in accordance with WAC 173-303-210 (3)(b). At a minimum the following information shall be part of the permanent records:

- Sample source and sampling date
- Sampling procedure used
- Identification of the lab performing the analysis
- Analysis date and analysis method used
- The analytical results for the detected analytes or the reporting limits for non-detected analytes, with the analytical units and appropriate number of significant figures.

10.1 RECORDS

The analytical report generated as a result of activities as described in this section will be managed in accordance with applicable Records Inventory and Disposition Schedules.

11.0 HEALTH AND SAFETY

The Occupational Safety and Health Administration requires that Material Safety Data Sheets (MSDSs) be provided to customers by any manufacturer of chemicals. The MSDSs are a good source of information for safety, handling, and spill cleanup. Before chemicals are used, the person handling them should be familiar with the information provided by the particular vendor in the MSDS. If the required MSDS is not available, contact the Analytical Services Standards Laboratory.

Personnel handling chemicals must read labels carefully, check for engineered barriers for shielding from chemical splashes, and use proper personal protective equipment to protect themselves from chemical contact.

Personnel handling radioactive substances must apply the as low as reasonably achievable (ALARA) principles of time, distance and shielding to minimize exposure, and use the appropriate engineering devises and personal protective equipment to avoid contamination.

Safety hazard recognition sheets are filled out for all methods including general safety, method specific hazards, and hazardous chemical lists and cautions.

Refer to WHC-CM-1-10, Safety Manual; WHC-CM-1-11, Industrial Hygiene Manual; WHC-CM-4-40, Industrial Hygiene Manual; HSRCM-1, Hanford Site Radiological Control Manual; and WHC-SD-CP-HSP-001, Westinghouse Hanford Company Chemical Hygiene Plan (Sant 1995) for additional safety instructions.

12.0 REFERENCES

DOE/RL-96-68, Hanford Analytical Services Quality Assurance Requirements Documents, (HASQARD), Richland Operations Office, Richland, Washington.

EPA SW-846, *Test Methods for Solid Wastes*, U. S. Environmental Protection Agency, Washington, D. C.

Markel, L., 1997, *222-S Laboratory Quality Assurance Plan*, HNF-SD-CP-QAPP-016, Rust Services for Fluor Daniel Hanford, Inc., Richland, Washington.

Sant, W. H., 1995, *Westinghouse Hanford Company Chemical Hygiene Plan*, WHC-SD-CP-HSP-001, Westinghouse Hanford Company, Richland, Washington.

WAC 173-303, 1990, "Dangerous Waste Regulations", *Washington Administrative Code*, as amended.

WHC-CM-1-10, *Safety Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-1-11, *Industrial Hygiene Manual*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-3-5, *Document Control and Records Management*, Westinghouse Hanford Company, Richland, Washington.

WHC-CM-4-40, *Industrial Hygiene Manual*, Westinghouse Hanford Company, Richland, Washington.

APPENDIX A

SAMPLING RATIONALE FOR AUGUST 1997

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APPENDIX A

SAMPLING RATIONALE FOR AUGUST 1997

A1.0 INTRODUCTION

This appendix was prepared for the sampling and analysis event for August 1997 of 222-S liquid wastes. For the evaluation of frequency, the amount of analyses performed in the time frame of December 1996 through April 1997 were combined. One representative stream was selected for sampling and analysis from each waste stream group. The attached spreadsheets show the updated information as of May 30, 1997.

A2.0 GROUP 1: ACIDIC AQUEOUS WASTE

Method:	LA-505-161, (ICP), stream 1 of 2
Frequency:	404
Complexity Indicator:	27
Multiple Waste Stream:	Yes, 2
Unusual/Unique Attributes:	No
Analyzed Previously:	No

Rationale: Waste stream LA-505-161 (1/2) was chosen because of the frequency rate of 404, the application of 8 waste code designations, the complexity indicator value of 27 and it does not come in contact with Tank Farm material. Another waste stream, LA-325-104 (1/2) has the highest complexity indicator value of 72, however, the frequency dropped down to 29 and the one waste code designation is due to corrosivity. The selected stream is representative of the grouping and best meets the selection criteria from Section 5.0.

Analytes of Concern	Proposed Analytical Method
Chloride, Nitrate	LA-533-105 (IC)
As, Ba, Cd, Cr, Pb, Se, Ag	LA-505-151/161 (ICP)
pH	LA-212-106 (pH)

A3.0 GROUP 2: BASIC AQUEOUS WASTE

Method:	LA-533-105, (IC), stream 2 of 2
Frequency:	1347
Complexity Indicator:	16
Multiple Waste Stream:	Yes, 2
Unusual/Unique Attributes:	No
Analyzed Previously:	No

Rationale: Waste stream LA-533-105 (2/2) was chosen because of the frequency rate of 1347, the complexity indicator value of 16 and it does not come in contact with Tank Farm material. Waste stream LA-211-104 (1/1) has a higher complexity (70), however, the frequency is only 31.

Analytes of Concern	Proposed Analytical Method
Sodium, Boron	LA-505-151/161 (ICP)
Bicarbonate, Carbonate	LA-342-100 (TIC)
pH	LA-212-106 (pH)

A4.0 GROUP 3: NEUTRAL AQUEOUS WASTE

Method:	LA-218-114, (^{3}H), stream 1 of 1
Frequency:	29
Complexity Indicator:	50
Multiple Waste Stream:	No
Unusual/Unique Attributes:	No
Analyzed Previously:	No

Rationale: Waste stream LA-218-114 (1/1) was chosen. This stream is one of four streams with waste generated in this time period. It is the only one with added reagents, and therefore, the only one with an assigned complexity indicator. The frequency is low, and analyses will only be possible when a sufficient amount of waste is generated.

Analytes of Concern	Proposed Analytical Method
Copper, Potassium, Sodium, Strontium, Silver	LA-505-151/161 (ICP)
Sulfide	non 222-S analysis
Iodine	non 222-S analysis
Nitrate	LA-533-105 (IC)
Carbonate	LA-342-100 (TIC)
pH	LA-212-106 (pH)

A5.0 GROUP 4: ACIDIC AQUEOUS WASTE WITH MISCIBLE ORGANICS

Method:	LA-220-101, (Sr-89/90), stream 3 of 4
Frequency:	176
Complexity Indicator:	16
Multiple Waste Stream:	Yes, 4
Unusual/Unique Attributes:	No
Analyzed Previously:	No

Rationale: Waste stream LA-220-101 (3/4) was chosen because of the frequency rate of 176 and the complexity indicator value of 16. Waste stream LA-220-104 (3/5) has a higher complexity (42), however, the frequency is only 20.

Analytes of Concern	Proposed Analytical Method
Nitrate	LA-533-105 (IC)
Carbonate	LA-342-100 (TIC)
Sodium	LA-505-151/161 (ICP)
pH	LA-212-106 (pH)

A6.0 GROUP 5: BASIC AQUEOUS WASTE WITH MISCIBLE ORGANICS

Method:	LA-378-103, (I-129), stream 2 of 2
Frequency:	38
Complexity Indicator:	81
Multiple Waste Stream:	Yes, 2
Unusual/Unique Attributes:	No
Analyzed Previously:	No

Rationale: Waste stream LA-378-103 (2/2) was chosen because of the complexity indicator of 81 and the frequency of 38, which is the highest for this waste stream grouping. Because the frequency is low, analyses will only be possible when a sufficient amount of waste is generated.

Analytes of Concern	Proposed Analytical Method
Ethanol	LA-523-405 (VOA)
Hydroxylamine	LA-533-105 (IC)
Palladium, Sodium	LA-505-151/161 (ICP)
Carbonate	LA-342-100 (TIC)
Nitrite/Nitrate, Chloride	LA-533-105 (IC)
Bisulfite	non 222-S analysis
pH	LA-212-106 (pH)

A7.0 GROUP 6: NEUTRAL AQUEOUS WASTE WITH MISCIBLE ORGANICS

Method:	LA-211-102, (OH-/H+), stream 1 of 1
Frequency:	64
Complexity Indicator:	130
Multiple Waste Stream:	No
Unusual/Unique Attributes:	No
Analyzed Previously:	No

Rationale: Waste stream LA-211-102 (1/1) was chosen because of the complexity indicator of 130 and the frequency of 64. The frequency should generate sufficient waste for the analyses. This stream was chosen over the stream from LA-212-106 (1/1) because of the higher complexity indicator.

Analytes of Concern	Proposed Analytical Method
Phthalate	LA-523-406 (SVOA)
Sodium, Potassium, Barium, Silver	LA-505-151/161 (ICP)
Phosphate, dibasic Phosphate	LA-533-105 (IC)
Carbonate, Bicarbonate	LA-342-100 (TIC)
Ammonium	LA-631-001 (ISE)
Fluoride, Chloride, Nitrate	LA-533-105 (IC)
Oxalate	LA-533-105 (IC)
pH	LA-212-106 (pH)

A8.0 GROUP 7: ORGANIC LIQUIDS

Method:	LA-342-100, (TIC), stream 2 of 2
Frequency:	327
Complexity Indicator:	5
Multiple Waste Stream:	Yes, 2
Unusual/Unique Attributes:	No
Analyzed Previously:	No

Rationale: Waste stream LA-342-100 (2/2) was chosen because of the complexity indicator of 5 and the frequency of 327, both criteria being the highest for this waste stream group.

Analytes of Concern	Proposed Analytical Method
Ethanolamine	LA-523-405 (VOA)
Dimethylsulfoxide	LA-523-405 (VOA)
Tetraethylammonium Bromide	LA-523-405 (VOA)
Iodine	non 222-S analysis
Potassium	LA-505-151/161 (ICP)
Ethyl alcohol	LA-523-405 (VOA)

Table 1. Waste Stream Grouping Resumed Methods, Sorted Numerical.

Aqueous

Acidic Group 1	Waste Stream #	Reagent Count	Analytical Sets	Conplexity Indicator	Waste Designation XX = D0XX, X = D00X	Frequency
LA-220-101	1/4	1	1	1	2	176
LA-220-103	1/4	1	1	1	2	16
LA-220-104	2/5	1	1	1	2	20
LA-325-104	2/2	2	2	4	2	29
#LA-325-104	1/2	8	9	72	2	29
#LA-342-100	1/2	6	5	30	2,3,11	327
LA-344-105	1/2	2	2	4	2	40
LA-348-104	1/1	3	5	15	2,11	13
LA-355-131	1/1	7	8	56	2	
#LA-365-131	1/1	6	7	42	2	7
LA-365-132	2/3	3	2	6	2	
LA-438-101	1/3	2	1	2	2	72
LA-438-111	1/3	2	1	2	2	53
LA-438-112	1/1	1	1	1	2	
LA-504-101	1/1	1	1	1	2	121
LA-505-151	1/2	3	9	27	2,4,5,6,7,8,10,11	250
LA-505-151	2/2	3	9	27	2,4,5,6,7,8,10,11	250
LA-505-161	2/2	3	9	27	2,4,5,6,7,8,10,11	404
LA-505-161	***1/2***	***3***	***9***	***27***	***2,4,5,6,7,8,10,11***	***404***
LA-505-162	1/1	3	3	9	2	
LA-508-101	1/1	1	1	1	2	1900
LA-510-112	2/3	1	1	1	2	194
LA-510-116	2/2	2	2	4	2	13
LA-695-102	1/2	4	5	20	2	14
LA-925-008	1/4	1	1	1	2	43
LA-925-008	3/4	4	3	12	2	43
LA-925-009	1/2	3	3	9	2	116
LT-506-101	1/1	3	3	9	2	
LT-506-102	1/1	3	3	9	2	

Basic Group 2	Waste Stream #	Reagent Count	Analytical Sets	Conplexity Indicator	Waste Designation XX = D0XX, X = D00X	Frequency
LA-211-104	1/1	7	10	70	2,5,11	31
LA-211-105	1/1	6	8	48	2,11	
LA-220-101	2/4	4	4	16	2	
LA-438-101	2/3	1	1	1	2	72
LA-438-111	2/3	1	1	1	2	53
LA-533-105	***2/2***	***4***	***4***	***16***		***1347***
LA-533-105	1/2	4	4	16		1347

Neutral Group 3	Waste Stream #	Reagent Count	Analytical Sets	Conplexity Indicator	Waste Designation XX = D0XX	Frequency
LA-218-114	***1/1***	***5***	***10***	***50***	***11***	***29***
LA-218-115	1/1	0	0	0		20
LA-510-112	1/3	0	0	0		194
LA-510-115	1/1	0	0	0		3
LA-512-104	1/1	1	2	2		
LA-512-106	1/1	0	0	0		
LA-533-101	1/2	2	3	6		
LA-533-101	2/2	2	3	6		
LA-533-115	3/4	2	3	6		

Aqueous with Miscible Organics

Acidic Group 4	Waste Stream #	Reagent Count	Analytical Sets	Conplexity Indicator	Waste Designation XX = D0XX, X = D00X	Frequency
****LA-220-101***	***3/4***	***4***	***4***	***16***	***2***	***176***
*LA-220-103	3/4	4	4	16	2	16
*LA-220-104	4/5	4	4	16	2	20
LA-220-104	3/5	6	7	42	2,5,7	20
#LA-265-101	1/2	5	6	30	2,7	9
LA-365-132	1/3	4	4	16	2	
LA-533-114	1/1	3	3	9	WT02	
LA-533-115	2/4	6	6	36	2,7	
LA-542-104	1/1	6	7	42	2	
LA-544-134	1/1	6	7	42	2	
LA-622-102	1/2	3	5	15	2,11	
LA-695-103	1/2	6	6	36	2	
LA-933-141	1/2	5	6	30	2	
#LA-953-104	1/1	4	5	20	2	
LO-080-118	1/3	4	4	16	2	
LO-140-100	1/1	4	6	24	2	

Basic Group 5	Waste Stream #	Reagent Count	Analytical Sets	Conplexity Indicator	Waste Designation XX = D0XX, X = D00X	Frequency
#LA-220-103	2/4	7	7	49	2,5,7	16
LA-220-104	1/5	3	3	9	2	20
LA-223-101	1/2	4	4	16	WT02	
LA-378-103	***2/2***	***9***	***9***	***81***	***2***	***38***
LA-533-111	1/1	3	4	12	7	
LA-533-112	1/1	5	6	30	WT02	
LA-533-115	4/4	9	9	81	2	
LA-631-001	1/1	9	9	81	2,11	29
LA-695-102	2/2	9	8	72	2,38	
LA-695-103	2/2	11	11	121	2,38	

Neutral Group 6	Waste Stream #	Reagent Count	Analytical Sets	Conplexity Indicator	Waste Designation XX = D0XX, X = D00X	Frequency
LA-211-102	***1/1***	***10***	***13***	***130***	***2,5,11***	***64***
LA-212-105	1/1	9	12	108	2,11	2
LA-212-106	1/1	9	12	108	2,11	426
LA-378-101	2/2	8	9	72	2	
LA-533-113	1/1	6	8	48	8	
LA-533-115	1/4	7	7	49	2	

Organic

Group 7	Waste Stream #	Conplexity Indicator	Waste Designation 1 = D001	Frequency
*LA-220-101	4/4	1	1	176
*LA-220-103	4/4	1	1	16
*LA-220-104	5/5	1	1	20
*LA-223-101	2/2	3	1	
*LA-265-101	2/2	2	1	9
****LA-342-100***	***2/2***	***5***	***1***	***327***
*LA-344-105	2/2	5	1	40
*LA-365-132	3/3	1	1	10
*LA-378-101	1/2	1	WP01,WT02	
*LA-378-103	1/2	1	WP01,WT02	38
*LA-438-101	3/3	2	1	72
*LA-438-111	3/3	2	1	53
*LA-510-112	3/3	1	1	194
*LA-510-116	1/2	1	WT02	13
*LA-523-133	1/2	1	WP01,WT02	
*LA-523-133	2/2	1	1	
*LA-622-102	2/2	4	1	
*LA-925-008	2/4	2	1	43
*LA-925-008	4/4	2	1	43
*LA-925-009	2/2	2	1	116
*LA-933-141	2/2	3	1	
*LO-080-118	3/3	4	1	
*LO-080-118	2/3	1	WT02, WP01	

Footnotes:
* = waste is lab packed
# = stream previously analyzed

Waste codes F001-F005 is applied to any waste contacted by Tank Farm material.

Table 2. Waste Stream Grouping Resumed Methods, Sorted in Order of Frequency and Complexity, 5/30/97.

Aqueous

Acidic Group 1	Waste Stream #	Reagent Count	Analytical Sets	Conplexity Indicator	Waste Designation XX = D0XX, X = D00X	Frequency
LA-505-161	2/2	3	9	27	2,4,5,6,7,8,10,11	404
LA-505-161	***1/2***	***3***	***9***	***27***	***2,4,5,6,7,8,10,11***	***404***
LA-508-101	1/1	1	1	1	2	1900
#LA-342-100	1/2	6	5	30	2,3,11	327
LA-505-151	1/2	3	9	27	2,4,5,6,7,8,10,11	250
LA-505-151	2/2	3	9	27	2,4,5,6,7,8,10,11	250
LA-510-112	2/3	1	1	1	2	194
LA-220-101	1/4	1	1	1	2	176
LA-504-101	1/1	1	1	1	2	121
LA-925-009	1/2	3	3	9	2	116
LA-438-101	1/3	2	1	2	2	72
LA-438-111	1/3	2	1	2	2	53
LA-925-008	3/4	4	3	12	2	43
LA-925-008	1/4	1	1	1	2	43
LA-344-105	1/2	2	2	4	2	40
#LA-325-104	1/2	8	9	72	2	29
LA-325-104	2/2	2	2	4	2	29
LA-220-104	2/5	1	1	1	2	20
LA-220-103	1/4	1	1	1	2	16
LA-695-102	1/2	4	5	20	2	14
LA-348-104	1/1	3	5	15	2,11	13
LA-510-116	2/2	2	2	4	2	13
#LA-365-131	1/1	6	7	42	2	7
LA-355-131	1/1	7	8	56	2	
LA-505-162	1/1	3	3	9	2	
LT-506-101	1/1	3	3	9	2	
LT-506-102	1/1	3	3	9	2	
LA-365-132	2/3	3	2	6	2	
LA-438-112	1/1	1	1	1	2	

Basic Group 2	Waste Stream #	Reagent Count	Analytical Sets	Conplexity Indicator	Waste Designation XX = D0XX, X = D00X	Frequency
LA-533-105	***2/2***	***4***	***4***	***16***		***1347***
LA-533-105	1/2	4	4	16		1347
LA-438-101	2/3	1	1	1	2	72
LA-438-111	2/3	1	1	1	2	53
LA-211-104	1/1	7	10	70	2,5,11	31
LA-211-105	1/1	6	8	48	2,11	
LA-220-101	2/4	4	4	16	2	

Neutral Group 3	Waste Stream #	Reagent Count	Analytical Sets	Conplexity Indicator	Waste Designation XX = D0XX	Frequency
LA-510-112	1/3	0	0	0		194
LA-218-114	***1/1***	***5***	***10***	***50***	***11***	***29***
LA-218-115	1/1	0	0	0		20
LA-510-115	1/1	0	0	0		3
LA-533-101	1/2	2	3	6		
LA-533-101	2/2	2	3	6		
LA-533-115	3/4	2	3	6		
LA-512-104	1/1	1	2	2		
LA-512-106	1/1	0	0	0		

Aqueous with Miscible Organics

Acidic Group 4	Waste Stream #	Reagent Count	Analytical Sets	Conplexity Indicator	Waste Designation XX = D0XX, X = D00X	Frequency
****LA-220-101***	***3/4***	***4***	***4***	***16***	***2***	***176***
LA-220-104	3/5	6	7	42	2,5,7	20
*LA-220-104	4/5	4	4	16	2	20
*LA-220-103	3/4	4	4	16	2	16
#LA-265-101	1/2	5	6	30	2,7	9
LA-542-104	1/1	6	7	42	2	
LA-544-134	1/1	6	7	42	2	
LA-533-115	2/4	6	6	36	2,7	
LA-695-103	1/2	6	6	36	2	
LA-933-141	1/2	5	6	30	2	
LO-140-100	1/1	4	6	24	2	
#LA-953-104	1/1	4	5	20	2	
LA-365-132	1/3	4	4	16	2	
LO-080-118	1/3	4	4	16	2	
LA-622-102	1/2	3	5	15	2,11	
LA-533-114	1/1	3	3	9	WT02	

Basic Group 5	Waste Stream #	Reagent Count	Analytical Sets	Conplexity Indicator	Waste Designation XX = D0XX, X = D00X	Frequency
LA-378-103	***2/2***	***9***	***9***	***81***	***2***	***38***
LA-631-001	1/1	9	9	81	2,11	29
LA-220-104	1/5	3	3	9	2	20
LA-220-103	2/4	7	7	49	2,5,7	16
LA-695-103	2/2	11	11	121	2,38	
LA-533-115	4/4	9	9	81	2	
LA-695-102	2/2	9	8	72	2,38	
LA-533-112	1/1	5	6	30	WT02	
LA-223-101	1/2	4	4	16	WT02	
LA-533-111	1/1	3	4	12	7	

Neutral Group 6	Waste Stream #	Reagent Count	Analytical Sets	Conplexity Indicator	Waste Designation XX = D0XX, X = D00X	Frequency
LA-212-106	1/1	9	12	108	2,11	426
LA-211-102	***1/1***	***10***	***13***	***130***	***2,5,11***	***64***
LA-212-105	1/1	9	12	108	2,11	2
LA-378-101	2/2	8	9	72	2	
LA-533-115	1/4	7	7	49	2	
LA-533-113	1/1	6	8	48	8	

Organic

Group 7	Waste Stream #	Conplexity Indicator	Waste Designation 1 = D001	Frequency
****LA-342-100***	***2/2***	***5***	***1***	***327***
*LA-510-112	3/3	1	1	194
*LA-220-101	4/4	1	1	176
*LA-925-009	2/2	2	1	116
*LA-438-101	3/3	2	1	72
*LA-438-111	3/3	2	1	53
*LA-925-008	2/4	2	1	43
*LA-925-008	4/4	2	1	43
*LA-344-105	2/2	5	1	40
*LA-378-103	1/2	1	WP01,WT02	38
*LA-220-104	5/5	1	1	20
*LA-220-103	4/4	1	1	16
*LA-510-116	1/2	1	WT02	13
*LA-365-132	3/3	1	1	10
*LA-265-101	2/2	2	1	9
*LA-622-102	2/2	4	1	
*LO-080-118	3/3	4	1	
*LA-223-101	2/2	3	1	
*LA-933-141	2/2	3	1	
*LA-378-101	1/2	1	WP01,WT02	
*LA-523-133	1/2	1	WP01,WT02	
*LA-523-133	2/2	1	1	
*LO-080-118	2/3	1	WT02, WP01	

Footnotes:
* = waste is lab packed
# = stream previously analyzed

Waste codes F001-F005 is applied to any waste contacted by Tank Farm material.

DISTRIBUTION SHEET

To	From	Page 1 of 1
DISTRIBUTION	222-S LABORATORY	Date 08/12/97
Project Title/Work Order		EDT No. 618026
222-S LABORATORY/HANFORD ANALYTICAL SERVICES		ECN No. N/A

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
W. D. Adair	H6-21	1			
A. B. Benally	T6-50	5			
R. L. Bisping	N1-26	1			
T. H. Bushaw	T6-51	1			
R. P. Carter	S7-55	1			
C. E. Clark	A5-15	1			
P. K. Clark	S7-55	1			
J. E. Hyatt	T6-04	1			
L. P. Markel	T6-16	1			
M. L. Martin	T6-20	1			
K. M. Meier	T6-04	1			
A. G. Mishko	H6-23	1			
L. F. Perkins	H6-10	1			
J. R. Prilucik	T6-14	2			
D. L. Renburger	T3-03	1			
A. D. Rice	T6-06	1			
S. K. Shirley	T6-20	1			
K. S. Tollefson	T6-12	4			
S. J. Turner	T6-14	1			
D. B. Van Leuven	H6-10	1			
J. L. Westcott	T3-04	1			
J. A. Winterhalder	H6-21	1			
G. J. Williams	S7-22	1			
M. T. Yasdik	H6-10	1			