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Distribution	300 Area Liquid Effluents Process Engineering	Date 10/11/94
Project Title/Work Order		EDT No. 600920
300 Area Treated Effluent Disposal Facility, Project L045H		ECN No.

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
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ENGINEERING DATA TRANSMITTAL

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1/2	1	Mgr. Low-Level Labs, R. R. Grabbe	R R Grabbe	10-19-94							
1/2	1	Ops. Mgr. L. W. Roberts L6-05		10/14/94							
1/2	1	PM&I W.E. Strohben H4-23		10/19/94							

18. ~~H. M. Knotek~~ C M Loll 10/14/94
Signature of EDT Originator — Date

19. D. W. Lindsey 10/14/94
Authorized Representative for Receiving Organization — Date

20. ~~D. W. Lindsey~~ 10/20/94
Cognizant Manager — Date

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APPROVED FOR PUBLIC RELEASE

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SUPPORTING DOCUMENT

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7. Abstract

THIS DOCUMENT IS THE INTERFACE BETWEEN THE 300 AREA LIQUID EFFLUENT PROCESS ENGINEERING (LEPE) GROUP AND THE WASTE SAMPLING AND CHARACTERIZATION FACILITY (WSCF), CONCERNING PROCESS CONTROL SAMPLES. IT CONTAINS A SCHEDULE FOR PROCESS CONTROL SAMPLES AT THE 300 AREA TEDF WHICH DESCRIBES THE PARAMETERS TO BE MEASURED, THE FREQUENCY OF SAMPLING AND ANALYSIS, THE SAMPLING POINT, AND THE PURPOSE FOR EACH PARAMETER.

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300 AREA TEDF SAMPLING SCHEDULE

1.0 INTRODUCTION

The 300 Area Treated Effluent Disposal Facility (TEDF) treats wastewater which is received from facilities located within the 300 Area. This wastewater is made up primarily of cooling water and steam condensates, used in building/equipment heating and cooling, and laboratory wastes from the various 300 Area facilities. The treatment process consists of three, primary treatment trains for removing constituents from the wastewater. Co-precipitation, ion exchange and ultra-violet oxidation are used to remove metals, specific metals and organics, respectively. The treated wastestream is then discharged to the Columbia River.

Process sampling and analysis is performed in order to monitor the incoming wastestream as well as the treatment activities performed at TEDF. The 300 Area TEDF Sampling Schedule designates the sampling points, frequencies, and analyses necessary to monitor, control, and evaluate parameters within the treatment process. This document describes the terminology and use of the schedule. The schedule constitutes the basis for programming and reporting analytical results from the Waste Sampling and Characterization Facility (WSCF) to the 300 Area TEDF via the Laboratory Information Management System (LIMS).

The Sample Set Identification (Appendix III) includes detailed information on the parameters to be monitored. A description of the information contained in Appendix III is given in Section 5.0, SAMPLING SCHEDULE DESCRIPTION.

2.0 300 AREA TEDF PROCESS CONTROL OBJECTIVES

The 300 Area TEDF Sampling Schedule provides detailed information on process control samples taken for the following purposes:

- Verify that the physical, chemical, and radiological properties of the 300 Area Process Sewer are within the TEDF acceptance criteria.
- To obtain data for monitoring and optimizing metals removal from the co-precipitation process
- To obtain data for monitoring and optimizing the mercury and silver removal efficiency of the ion exchange trains
- To obtain data for monitoring and optimizing the removal of organics in the UV Oxidation reactor
- To obtain data on the composition of sludge being produced by the co-precipitation and filter press systems
- To provide periodic verification of the contents of the process sump

Process Control Objectives (cont'd)

- To obtain data for the evaluation of a diverted TEDF effluent discharge.

3.0 SAMPLE DESCRIPTION

The sampling schedule identifies samples taken at the 300 Area TEDF for process control purposes. The samples are obtained using in-line, proportional samplers for composite sampling and direct taps on the process piping for grab samples. The following is a description of the sample, the location, and the reasoning behind both choices.

- A composite sample (WCS) will be taken just upstream of the waste collection sump #1, at the 300 Area Process Sewer (PS) flow measuring flume, via a proportional sampler (WW-M-13). This sample will be used to determine the properties of the combined PS prior to its collection at the waste collection sump. The sample will be used to verify that the PS wastestream meets the TEDF Waste Acceptance Criteria. It will also be used as a comparison for the various sampling points within TEDF. The sample is taken at the flow measuring flume, which sits approximately 100 yds south of the waste collection sump #1. This location provides the sampler with the true flow coming out of the 300 Area, thus, a flow-proportional sample can be obtained.

- A grab sample (INF) will be taken from valve WW-V-463. This sample will be used to evaluate the solids/metals content prior to treatment in the co-precipitation process. WW-V-463 is a drain valve located on the combined discharge line from the influent feed pumps. This sample point allows for the evaluation of any settling or change in constituent levels which may have occured between the WCS #1 and holdup in the equalization tank.

- A grab sample (GFE) will be taken from valve WW-V-521. This sample will be used to evaluate the solids/metals removal of the co-precipitation process and to provide a comparison for the ion exchange train effluent sample. WW-V-521 is a drain valve located on the combined discharge line from the ion exchange feed pumps. This location is considerably downstream from the combined discharge from the gravity filters, and will provide a representation of the wastestream after treatment by the co-precipitation process. It also provides a representation of the wastestream prior to ion exchange so that this part of the process can be evaluated. The addition of sulfuric acid and mixing within the ion exchange tank occur upstream of this sampling point, however, the parameters of concern should not be affected by acid addition.

- Grab samples (IXE and UVI) will be taken from valve V-1381. The samples from this location will provide data to be used in evaluating the performance of the ion exchange train in removing selected metals from the wastestream. Sampling at this point will also provide a description of organics and nitrates prior to treatment in the UV Oxidation unit. This sampling point exists just after the wastestream leaves the ion exchange columns. Valve V-1381 is the drain valve for pressure indicator, WW-PIT-335.

Sample Description (cont'd)

- Grab samples (UVE) will be taken at valve, TW-V-583 or TW-V-584, to provide data on the efficiency of the uv oxidation reaction. TW-V-584 exists on a 3/4" line which taps directly off of the main process piping, just prior to the effluent tank. TW-V-583 is also located on a 3/4 " tap. This tap is directly off of the outfall line just after the effluent tank. Obviously, this sample point will only be used when TEDF is actually discharging to the river.

- Grab samples will be taken of the filter press product (FP), in order to determine parameters such as weight % solids, specific metals content, and radionuclide content. The sample will be taken out of one of the shipping drums immediately following a filter press run. The sample will then be dried prior to shipment to the laboratory.

- Grab samples will be taken from the process sump (PS) in order to periodically monitor the contents. Samples will be pulled via the bottle-on-a-string method from the process sump itself.

- A composite sample (ED) will be pulled from the effluent diversion line during an effluent diversion situation, via a proportional sampler (WW-M-8). This sample will be used to determine the makeup of the diverted wastestream. The sampler is activated by the operation of either of the effluent diversion pumps and it pulls a time-proportional sample as long as the diversion continues. It is located downstream of flow control valve, FCV-121. This sample is considered a special situation and the analysis will be negotiated on a case-by-case basis.

4.0 SAMPLING SCHEDULE UPDATE

300 Area Liquid Effluent Process Engineering (LEPE) originates and issues new or revised sample analysis requirements for process control samples through the 300 Area TEDF Sampling Schedule. LEPE shall review and revise this document as necessary via Engineering Change Notice (ECN).

LEPE engineers may originate non-routine sample analyses in order to supplement special process tests or laboratory studies. Non-routine analyses may also be requested for emergency situations. Non-routine analyses will be negotiated with Program Management and Integration (PM&I) and WSCF personnel, on a case-by-case basis.

5.0 DATA TRANSMISSION

The LIMS is the computer data transmission system over which analytical results are transferred by the laboratory (WSCF) to the TEDF. In addition, the LIMS contains the 300 Area TEDF Sampling Schedule data (sampling points and analysis routines) for use by WSCF personnel.

6.0 SAMPLING SCHEDULE DESCRIPTION

The following is a description of the general organization of the Sample Set Identification (Appendix III) and includes explanations of the various items which appear on the tables.

Sample Schedule Description (cont'd)

The specific items of the Sample Set Identification are described as follows:

1) Sample Identification - Identification of sample by code. Sample numbers will be initiated with the appropriate code and identified by the date of the sample, eg., GFE2091194 - second ion exchange influent sample of 09/11/94. Descriptions of the samping point codes appear in Appendix II.

2) Sampling Point Number - Location within the plant at which the sample was taken.

3) Parameter - Listing of parameters to be monitored. See Appendix I for definitions.

4) Sample Type - Either grab or composite.

4) Frequency - Indication of frequency at which sample is to be taken.

5) Sample Volume - Volume required by WSCF to perform the specified analysis.

6) Turnaround Time - The time required for the laboratory to perform the analayis and get results back to LEPE, once the sample is received.

7) Batching Frequency - Frequency at which WSCF will receive samples from TEDF.

8) Units - The units in which the lab results are to be reported. See Appendix I for definitions.

10) Desired Detection - The concentrations at which LEPE is interested in seeing results for the respective parameters. In general, these reflect permitting levels or the concentrations at which the parameters can be expected to be seen.

11) Notes - Describes any features or situations which require special attention. The notes are given at the end of Appendix III.

7.0 QUALITY ASSURANCE REQUIREMENTS

The analyses referenced within this sampling schedule shall conform to the minimum allowable quality assurance which the analytical laboratory (WSCF) can perform under the Hanford Analytical Sampling Quality Assurance Plan (HASQAP). LEPE and WSCF will determine precision, accuracy, reporting limits, and other quality control requirements for each analyte to meet the data quality needs of TEDF and be consistent with the requirements of HASQAP. The data is to be used by LEPE, primarily for evaluation of the specific treatment systems. The data will not be used to make any regulatory decisions nor will it be forwarded on to any regulatory agency without the explicit understanding that it is process control data and it is an engineering tool to aid in the operation of TEDF.

8.0 REFERENCES

WHC, 1992, Waste Acceptance Criteria For The 300 Area Process Sewer And The Treated Effluent Disposal Facility, SWU3-0-TEDF-2, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

APPENDIX I

DEFINITIONS AND ABBREVIATIONS

DEFINITIONS

A. Analysis

- TB (Total beta) - Measurement of beta energies ranging from 0.2 - 0.5 MeV. Efficiency of detector is calibrated using a Cs-137 standard.
- TA - Total alpha. Efficiency of detector is calibrated using an Am-241 standard.
- TIC (Tentatively Identified Compound) - Constituent is not part of the standard list of compounds, but would like chemist to identify whether it is there or not.
- TOC - Total organic carbon
- Solids % - Samples are centrifuged and the amount of solids is reported in volume percent.
- SpG - Specific gravity.
- TSS - Total Suspended Solids

B. UNITS

- pCi/L - Microcuries per liter
- µg/L - Micrograms per liter
- PPM - Part per million
- PPB - Part per billion
- % Solids - Weight percent solids

APPENDIX II

SAMPLE IDENTIFICATION

Process Control Samples

WCS - Waste Collection Sump sample

INF - Influent sample

ID - Influent Diversion sample

ED - Effluent Diversion sample

GFE - Gravity Filter Effluent sample

IXE - Ion Exchange Effluent sample

UVI - UV Oxidation Influent sample

UVE - UV Oxidation Effluent sample

FP - Filter Press sample

PS - Process Sump sample

APPENDIX III

SAMPLE SET IDENTIFICATION

SAMPLE IDENT.	SAMPLE PT. #	PARAMETER	SAMPLE TYPE	SAMPLE FREQ.	SAMPLE VOLUME	BATCHING FREQ.	TURNAROUND TIME	DESIRED DETECTION	UNITS	NOTES
WCS	WW-M-13	pH	COMPOSITE	2/MONTH	250 ml	-	48 HR	0.1 UNITS	NA	
		TSS	COMPOSITE	2/MONTH	250 ml	-	48 HR	1 PPM	PPM	
		TOC	COMPOSITE	2/MONTH	100 ml					
		Metals	COMPOSITE	2/MONTH	250 ml	-	48 HR			
		Al						70	µg/L	
		As						4	µg/L	
		Be						5	µg/L	
		Cd						0.8	µg/L	
		Cu						3	µg/L	
		Fe						100	µg/L	
		Pb						0.7	µg/L	
		Mn						10	µg/L	
		Ni						1	µg/L	
		Se						4	µg/L	
		Ag						2	µg/L	
		Zn						5	µg/L	
		Total Alpha	COMPOSITE	1/MONTH	1 L	-	48 HR	9	pCi/L	
		Total Beta	COMPOSITE	1/MONTH		-	48 HR	40	pCi/L	

SAMPLE IDENT.	SAMPLE PT. #	PARAMETER	SAMPLE TYPE	SAMPLE FREQ.	SAMPLE VOLUME	BATCHING FREQ.	TURNAROUND TIME	DESIRED DETECTION	UNITS	NOTES
INF	WW-V-463	Metals	GRAB	2/WEEK	250 ml	-	48 HR	70	µg/L	
		Al						70	µg/L	
		As						4	µg/L	
		Be						5	µg/L	
		Cd						0.8	µg/L	
		Cu						3	µg/L	
		Fe						100	µg/L	
		Pb						0.7	µg/L	
		Mg						10	µg/L	
		Ni						1	µg/L	
		Se						4	µg/L	
		Ag						2	µg/L	
		Zn						5	µg/L	
		Hg	GRAB	2/WEEK	100 ml	-	48 HR	0.1	µg/L	
		TSS	GRAB	2/WEEK	250 ml	-	48 HR	1	ppm	

SAMPLE IDENT.	SAMPLE PT. #	PARAMETER	SAMPLE TYPE	SAMPLE FREQ.	SAMPLE VOLUME	BATCHING FREQ.	TURNAROUND TIME	DESIRED DETECTION	UNITS	NOTES
GFE	WW-V-521	Metals	GRAB	2/WEEK	250 ml	-	48 HR			
		Al						70	µg/L	
		As						4	µg/L	
		Be						5	µg/L	
		Cd						0.8	µg/L	
		Cu						3	µg/L	
		Fe						100	µg/L	
		Pb						0.7	µg/L	
		Mg						10	µg/L	
		Ni						1	µg/L	
		Se						4	µg/L	
		Ag						2	µg/L	
		Zn						5	µg/L	
		Hg	GRAB	2/WEEK	100 ml	-	48 HR	0.1	µg/L	
		TSS	GRAB	2/WEEK	250 ml	-	48 HR	1	ppm	
IXE	V-1381	Hg	GRAB	2/WEEK	100 ml	-	48 HR	0.1	µg/L	
		Ag	GRAB	2/WEEK	250 ml	-	48 HR	2	µg/L	
		TSS	GRAB	2/WEEK	250 ml	-	48 HR	1	ppm	
UVI	V-1381	TOC	GRAB	1/24 HR	100 ml	2/WEEK	48 HR	1	ppm	
		Bis (2-ethylhexyl) pthalate	GRAB	1/24 HR	1 L	2/WEEK	48 HR	2	µg/L	
		VOA	GRAB	1/24 HR	2 x 40 ml	2/WEEK	48 HR			
		Chloroform						1	µg/L	
		Acetone						5	µg/L	

SAMPLE IDENT.	SAMPLE PT. #	PARAMETER	SAMPLE TYPE	SAMPLE FREQ.	SAMPLE VOLUME	BATCHING FREQ.	TURNAROUND TIME	DESIRED DETECTION	UNITS	NOTES
UVE	WW-V-583	TOC	GRAB	1/24 HR	100 ml	2/WEEK	48 HR	1	ppm	
		Bis (2-ethylhexyl) phthalate	GRAB	1/24 HR	1 L	2/WEEK	48 HR	2	µg/L	
		VOA	GRAB	1/24 HR	2 x 40 ml	2/WEEK	48 HR			
		Chloroform						5	µg/L	
		Acetone						5	µg/L	
PS		TSS	GRAB	1/WEEK	250 ml	-	48 HR	1	ppm	
		TOC	GRAB	1/WEEK	100 ml	-	48 HR	1	ppm	
FP	SL-M-1	% Solids	GRAB	2/MONTH	250 ml	-	48 HR		NA	1
		TOC	GRAB	2/MONTH	100 ml	-	48 HR			
		TCLP	GRAB	2/MONTH	500 ml	-	48 HR			
		GEA	GRAB	2/MONTH		-	48 HR			
		Total Alpha	GRAB	2/MONTH		-	48 HR		pCi/L	
		Total Beta	GRAB	2/MONTH		-	48 HR		pCi/L	

SAMPLE IDENT.	SAMPLE PT. #	PARAMETER	SAMPLE TYPE	SAMPLE FREQ.	SAMPLE VOLUME	BATCHING FREQ.	TURNAROUND TIME	DESIRED DETECTION	UNITS	NOTES
OUT	WW-M-9	pH	COMPOSITE	2/MONTH	250 ml	-	48 HR	0.1 UNITS	NA	
		TSS	COMPOSITE	2/MONTH	250 ml	-	48 HR	1 PPM	PPM	
		TOC	COMPOSITE	2/MONTH	100 ml					
		Metals	COMPOSITE	2/MONTH	250 ml	-	48 HR			
		Al						70	µg/L	
		As						4	µg/L	
		Be						5	µg/L	
		Cd						0.8	µg/L	
		Cu						3	µg/L	
		Fe						100	µg/L	
		Pb						0.7	µg/L	
		Mn						10	µg/L	
		Ni						1	µg/L	
		Se						4	µg/L	
		Ag						2	µg/L	
		Zn						5	µg/L	
		TOC	COMPOSITE	2/MONTH	100 ml	-	48 HR	1	ppm	

[1]Estimated sampling frequencies were included for these sample points to allow the Laboratories to approximate sample load. Actual sampling frequencies will be determined by LEPE.
↓ - Analysis for this parameter is run off of sample volume for parameter above it.