START

ENGINEERING CHANGE NOTICE

Page 1 of 3

1. ECN 601028

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.		4. Date
Supplemental [] Direct Revision [x] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	D. R. Herman, Utilities, S2-66 3-4069		8-5-93
	5. Project Title/No./Work Order No. SAP for the 284E Powerplant Process Wastewater	6. Bldg./Sys./Fac. No. 284E Powerplant	7. Impact Level 3EQ
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.) WHC-SD-WM-PLN-034, Rev 2	9. Related ECN No(s).	10. Related PO No.

11a. Modification Work	11b. Work Package No.	11c. Modification Work Complete	11d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out Blk. 11b) [X] No (NA Blks. 11b, 11c, 11d)		Cog. Engineer Signature & Date	Cog. Engineer Signature & Date

12. Description of Change

I. Page V, Corrected Ref. page number to G.1
II. Pave Vii, Remove accronym OSM, Insert HASMA Hanford Analytical Services Management
Changed accronym throught out document
III. Page C-1, Delete sent. starting Hanford Environmental.
Last sent. same parg. Change wording to S&ML will provide the sample containers and labels.
IV. Page D. 1, Second parg. 1st sent. Change to read Seven sample locations
Under Field Activity 2, 4th line down change oxygen to solids (changed throught out the document)

13a. Justification (mark one)	Criteria Change []	Design Improvement [x]	Environmental []
As-Found []	Facilitate Const. []	Const. Error/Omission []	Design Error/Omission []

13b. Justification Details

I thru VI and VIII thru XII. Changes made to meet Sampling and Mobile Labs procedures and to provide clarity.
VII. Changed because Raw water sample is for background purposes only.
XIII. Methods changed to conform with QAPP and availability of contracted labs.

14. Distribution (include name, MSIN, and no. of copies)

D. R. Herman	S2-66	1	J. S. Stair	S2-66	1
D. R. Speer	F1-48	1	A. Greenberg	S2-66	1
~~D. G. Farwick~~	H4-16	1	~~L. P. Diediker~~	T1-30	1
D. L. Flyckt	R3-45	1	C. D. Morrison-Beyer	S0-61	1
M. S. Hendrix	T6-08	1	W. A. White	A7-27	1
~~S. A. Brisbin~~	~~H4-16~~	1			
E. W. MILLER	H4-16		Central Files	L8-04	(2)

RELEASE STAMP

OFFICIAL RELEASE BY WHC (11)
DATE AUG 13 1993
Station #12

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1) 601028

15. Design Verification Required	16. Cost Impact				17. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes	Additional	[] $	Additional	[] $	Improvement	[]
[X] No	Savings	[] $	Savings	[] $	Delay	[]

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]		[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision

20. Approvals

Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog Engineer DRAlleman	8-12-93	PE	
Cog. Mgr. JSStein	8/12/93	QA	
QA Ed Miller	8-12-93	Safety	
Safety		Design	
Security		Environ.	
Environ.		Other	
Projects/Programs DHommer for DRSpeer	8-12-93	C. D. Morrison-Beyer CDMorrisonBeyer	8-12-93
Tank Waste Remediation System		M. S. Henddrix Michelle Hendrix	8-12-93
Facilities Operations		DEPARTMENT OF ENERGY	
Restoration & Remediation		Signature or Letter No.	
Operations & Support Services			
IRM		ADDITIONAL	
Other			

9412704.1160

V. Page D.3, 1st line delete " dye studies", insert "visual inspection" (changed through out document)
Delete sent starting with "Release dye into.
6th bullet, 1st sent. Insert after the word instruments if possible
VI. Page D.4, 4th bullet, 1st sent. Delete (24 hour ---a bailer, Insert "an appropriate collection device, i.e. dip sampler, stainless steel bucket" (Change reflected though out document)
VII. Page D-9, Second parg. Delete whole sent beginning with "A total of 12 samples"
D.2.4, 6th line down Delete whole sent. beginning with "A total of eight"
VIII. Page E-1, last parg. Insert after 1st sent. "Sample set will be taken for all Appendix IE and routine analytic listed in Table F-1.
IX. Page E.2, 3rd parg. last sent. Delete "at specified intervals before" "and after"
2nd parg. under E.1 Delete 1st 2 sentences beginning with "Samples"
X. Page E-3, under SAMPLE COLLECTION, 1st sent. delete " (24-hour composite." start new sent. " Samples will be"
1st parg. 3rd sent, insert at end of sent. "when required"
2nd parg. Delete 1st, 2nd, 3rd. sent. Insert " Samples taken at selected sampling locations will be collected directly from drainline sample taps or with an appropriate collection device, i.e. dip sampler, stainless steel bucket."
2nd parg. last sent. Delete "Likewise", start sent. "The drainline
XI. Page E-5, 3rd parg. 1st sent Delete "and recorded on a sample authorization form."
XII. Page E-6, 2nd parg. under E.4, Delete
XIII Page E-7, 1st parg. end of last sent. Delete "by overnight courier to designated analytical laboratory", Insert " in accordance with ELL 5.II, Shipping and Packaging and WHC-CM-2-14, Hazardous Materials Packaging and Shipping.
XIV. Page E-8, 3rd parg. Delete "(covered with clean plastic tape.)" Next sent. Rewrote sent. starting with "The glass" to Sample containers will be packaged in accordance with EII 5.11 and WHC-CM-2-14.
Next sent. Delete "self-sealing".
Next sent. Delete "(packaged in self-sealing bags"
Next sent. Delete "bubble wrap", Insert appropriate shoring material like vermiculite.
Last parg. 3rd sent. Delete "the" insert "a", Delete "field" insert "notebook"
Deleted rest of sent. continued on page E-9
Under E.8 1st line Delete "must" Insert on 2nd line after analysis "when required", Delete 3rd sentence.
XV. Page E-9, 4th parg. 1st sent Delete "must" Insert at end of sent "when required"
Next sent. Delete starting with "This requirement"
2nd sent. Delete "In addition, approximately 100 mil of the" Begin sent "Waste water---"
XVI. Page F-2, Add methods EPA 230.1 and 120.1 to Conductivity, Add EPA 310.2 to Alkalinity, Changed Total phenols to 9065, 9067, Added EPA 410.2, 3, 4 to (COD), Change Fluoride and Chloride to EPA 300.0, Change Sulfate to EPA 375.4, 300.90, 9036, Delete Sulfite, Change Nitrate to NO2 - NO3 and methods to EPA 353.1, 2, 3., Change Nitrite to Nitrite, Nitrate and methods to EPA 300.0.
Move whole line for Turbidity under Field Parameters.

9413206.1461

Date Received: 8-5-93 KMB	# INFORMATION RELEASE REQUEST	Reference: WHC-CM-3-4

Complete for all Types of Release

Purpose		ID Number (include revision, volume, etc.)
[] Speech or Presentation	[] Reference	WHC-SD-WM-PLN-034, Rev. 2A
[] Full Paper (Check only one suffix)	[] Technical Report	List attachments. ECN 601028
[] Summary	[] Thesis or Dissertation	
[] Abstract	[] Manual	
[] Visual Aid	[] Brochure/Flier	
[] Speakers Bureau	[] Software/Database	Date Release Required
[] Poster Session	[x] Controlled Document	8-10-93
[] Videotape	[] Other	

Title Sampling and Analysis Plan for the 284E Powerplant Process Wastewater	Unclassified Category UC-	Impact Level 3E Q

New or novel (patentable) subject matter? [X] No [] Yes
If "Yes", has disclosure been submitted by WHC or other company?
[X] No [] Yes Disclosure No(s).

Information received from others in confidence, such as proprietary data, trade secrets, and/or inventions?
[X] No [] Yes (Identify)

Copyrights? [X] No [] Yes
If "Yes", has written permission been granted?
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[X] No [] Yes (Identify)

Complete for Speech or Presentation

Title of Conference or Meeting	Group or Society Sponsoring

Date(s) of Conference or Meeting	City/State	Will proceedings be published? [] Yes [] No Will material be handed out? [] Yes [] No

Title of Journal

CHECKLIST FOR SIGNATORIES

Review Required per WHC-CM-3-4	Yes	No	Reviewer - Signature Indicates Approval: Name (printed)	Signature	Date
Classification/Unclassified Controlled Nuclear Information	[]	[X]			
Patent - General Counsel	[]	[X]	OGC Memo 2/4/93		
Legal - General Counsel	[]	[X]	OGC Memo 2/4/93		
Applied Technology/Export Controlled Information or International Program	[]	[X]			
WHC Program/Project	[X]	[]	D. Sommers For D.C. Sofer	DR Herman	8-12-93
Communications	[]	[X]			
RL Program/Project	[]	[X]			
Publication Services	[X]	[]	P.S. Gregory	P S Gregory (Review Only)	8-12-93
Other Program/Project	[]	[X]			

Information conforms to all applicable requirements. The above information is certified to be correct.

	Yes	No
References Available to Intended Audience	[X]	]
Transmit to DOE-HQ/Office of Scientific and Technical Information	[]	[X]

Author/Requestor (Printed/Signature) Date
D. R. Herman DRHerman 8-12-93

Intended Audience
[] Internal [] Sponsor [X] External

Responsible Manager (Printed/Signature) Date
J. S. Stair JS Stair 8/12/93

INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP

Stamp is required before release. Release is contingent upon resolution of mandatory comments.

APPROVED FOR RELEASE — OFFICIAL DOCUMENT — Date 8/12/93

Date Cancelled	Date Disapproved

SUPPORTING DOCUMENT

1. Total Pages 77

2. Title
Sampling and Analysis Plan for the 284E Powerplant Process Wastewater

3. Number
WHC-SD-WHC-SD-WM-PLN-034

4. Rev No.
2A

5. Key Words
SAP, 284E Powerplant, Sampling Plan

APPROVED FOR PUBLIC RELEASE

KMB 8/12/93

6. Author
Name: D. R. Herman

DR Herman
Signature

Organization/Charge Code 55300/A2D92

7. Abstract
Pages changed as supplement to the Sampling and Analysis Plan (SAP) that establishes the guidelines for providing data to support a waste designation for each liquid effluent.

9413204.1463

8. ~~PURPOSE AND USE OF DOCUMENT - This document was prepared for use within the U.S. Department of Energy and its contractors. It is to be used only to perform, direct, or integrate work under U.S. Department of Energy contracts. This document is not approved for public release until reviewed.~~

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9. Impact Level 3EQ

10. RELEASE STAMP

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Station #12

RECORD OF REVISION	(1) Document Number WHC-SD-WM-PLN-034	Page 1

(2) Title
Sampling and Analysis Plan for the 284E Powerplant Process Wastewater Stream

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release (5) Cog./Proj. Engr.	(6) Cog./Proj. Mgr.	Date
	(7) EDT- 157741			
RS 2	Complete revision to document in accordance with ECN #175544	D. R. Herman D R Herman	E. Yusis E Yusis	5/18/93
2A RS	In accordance with ECN 601028	D.R. Herman D R Herman 8-12-93	J.S. Stair JS Stair	8-12-93

9413206.1464

A-7320-005 (12/89)

CONTENTS

APPENDIXES

ABBREVIATIONS/ACRONYMS

ASTM	American Society for Testing and Materials
CFR	*Code of Federal Regulations*
COD	chemical oxygen demand
DOE	U.S. Department of Energy
Ecology	Washington State Department of Ecology
EDMC	Environmental Data Management Center
EDTA	ethylenediaminetetraacetic acid
EMO	Environmental Management Operations
EPA	U.S. Environmental Protection Agency
ESQA	Environmental Services Quality Assurance
HASM	Hanford Analytical Services Management
HEIS	Hanford Environmental Information System
HPLC	high-performance liquid chromatography
HPT	health physics technician
LEMIS	Liquid Effluent Monitoring Information System
Liquid Effluent QAPP	*Liquid Effluent Sampling Quality Assurance Program Plan*
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MSDA	material safety data sheets
NCR	Nonconformance Report
PCB	polychlorinated biphenyl
psi	pounds per square inch
QA	quality assurance
QC	quality control
RCRA	*Resource Conservation and Recovery Act of 1976*
SAP	Sampling and Analysis Plan
S&ML	Sampling and Mobile Laboratories
SDWS	Secondary Drinking Water Standards
TDS	total dissolved solids
TOC	total organic carbon
TOX	total organic halogens
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
VOA	volatile organic analysis
WAC	*Washington Administrative Code*
WHC	Westinghouse Hanford Company

C.0 RESPONSIBILITIES

The program manager will be responsible for coordinating this SAP with the other liquid effluent SAPs, prepared under the Tri-Party Agreement (Ecology et al. 1990), and for providing support and technical guidance to the facility manager.

The facility manager will be responsible for overall execution of the project and for environmental compliance. Responsibilities include planning, staffing, scheduling, and coordinating field activities.

The sampling and analysis task leader will be responsible for coordination of sampling and analysis activities, including scheduling operators and health physics technicians (HPT) to support the sampling team, reviewing field logs and sampling techniques, tracking sample chain of custodies and data, and seeing that analytical data are filed with the Environmental Data Management Center (EDMC). The task leader will also assist the facility manager with maintaining site-specific sampling schedules, authorizing changes to the sampling and analysis plan, and keeping management informed of potential impacts of schedule deviations on individual and program-wide schedules and budgets.

The sampling team, from Sampling and Mobile Laboratories (S&ML) or a qualified subcontractor, will coordinate directly with operations staff to determine when discharges will be occurring and to schedule sample collection accordingly. S&ML will provide the sample containers and labels.

Sampling and Mobile Laboratories shall do the following:

- Provide trained samplers for liquid effluent characterization sampling activities. One sampler shall have a WHC Certificate of Qualification from the S&ML group. A certificated sampler shall direct liquid effluent characterization sampling, packaging, and shipping.
- Prepare the plant liquid effluent characterization sampling procedure.
- Document sampling activities in a log book.
- Transport liquid effluent characterization samples to laboratory or shipping center.
- Initiate chain-of-custody documentation for liquid effluent characterization samples.
- Package liquid effluent characterization samples for shipping.
- Ensure copies of field logs and other sampling data sheets are forwarded to the plant cognizant engineer.

Protocol samples (hereafter called samples) meeting the quality assurance (QA) criteria of U.S. Environmental Protection Agency (EPA) SW-846 (EPA latest edition) criteria will be collected by S&ML or the designated sampling team. Protocol sample shall be collected according to an approved written procedure. The sampling procedure will comply with the requirement established in EPA SW-846, latest edition. The sampling team will make a written record of the sampling as discussed in Section E.3. Once the protocol or baseline samples are taken and analyzed, routine monitoring or process samples specific to the process will be identified.

The Hanford Analytical Services Management (HASM) or a qualified contractor will participate in the evaluation and selection of a laboratory or laboratories to perform the needed analysis. These laboratories must meet the criteria of this SAP and the Liquid Effluent QAPP (WHC 1992).

Environmental samples being sent from the Hanford Site must undergo a radiological screening analysis to monitor radiological activity exceeding the Hanford Site release limits. Arrangements will be made by S&ML with the 222-S Laboratory to meet this requirement.

Facility Quality Assurance shall do the following:

- Provide surveillance of the liquid effluent characterization sampling program.

- Audit/surveillances records and procedures.

Data resulting from sampling will undergo two levels of review and validation: within the laboratory and outside the laboratory. Initial data reduction, validation, and reporting at the laboratory will be carried out as described in the Liquid Effluent QAPP (WHC 1992). Completed data packages will be validated by HASM, a qualified individual designated by the facility manager, or a qualified subcontractor. The validated data will be stored and managed in a liquid effluent sampling database. Hard copies of validated data will be retained in the administrative record vault by EDMC.

The EPA and Washington State Department of Ecology (Ecology) will have a regulatory oversight role in this project so that the requirements of the Tri-Party Agreement (Ecology et al. 1990) are met. Staff from these regulatory agencies may choose to visit the Hanford Site, collect split samples during sampling, or visit the analytical laboratory to observe the work being performed.

D.0 SAMPLING LOCATIONS AND FREQUENCIES

D.1 FIELD APPROACH

Sampling locations were chosen based on process knowledge, the configuration of the waste water discharge piping, and probable accessibility. These sampling locations are also strategically located on the effluent streams from particular operations. The time of sample collection will be directly related to the various operations and a predetermined periodic, sampling schedule. The sampling team will coordinate with operations staff so that the samples are taken at the proper time during the discharges (as described below).

Seven sampling locations have been chosen based on the configuration of discharge lines from the different processes contributing to the overall discharge. A description of these processes and their waste water streams, a map (Figure B-1), and a flow schematic of the 284 E Powerplant area showing sampling locations (Figure B-2) are given in Section B. The seven sampling locations consist of an open concrete tank (sample location 1, the reservoir), three manholes (sample locations 2, 3, and 7), two drainline sample taps (sample locations 4 and 5), and one drainline sample tap (sample location 6). In order to sample mud drum blowdown separately from the other waste water sources, a drainline sample tap has been installed at sample location 6.

The field effort to characterize the 284 E Powerplant waste water has been phased into the following four sequential field activities.

- Field Activity 1 will confirm that proposed sample locations are accessible and appropriate for waste water stream sample collection.

- Field Activity 2 tasks will focus on two objectives over two sequential weeks: collecting field measurements and evaluating a combined discharge. During the first week, flow rates and field parameters (conductivity, pH and dissolved solids) will be measured for each of the major waste water streams and in the common discharge. These data will verify that changes in field parameters (specifically, conductivity) track batch discharges downstream.

  Assuming the first week's activities confirm that changes in field parameters result from batch waste water discharges, then in the second week an attempt will be made to stagger the discharges so that they arrive at sample location 7 at the same time. Field parameters will be used to verify that two sets of waste water samples were taken during the coincided batch discharges; these samples will be analyzed for a full set of chemical parameters (40 CFR 264, Appendix IX). Chemical results from this chemical sampling, in conjunction with waste stream data, should identify a subset of chemical analytes that are neither expected nor detected in the waste water process streams. These nondetected analytes will not be quantified in successive sampling.

- Field Activity 3 will extend sampling frequency to twice in FY 1993 and twice in FY 1994. Chemical analyses will be limited to the expected or detected analytes identified in Field Activity 2.
- Field Activity 4 will extend sampling frequency to four sequential quarters. Chemical analyses will be limited to the same subset of analytes identified during the initial chemical characterization sampling in Field Activity 2.

Table D-1 details the specific tasks to be performed during each of the four field activities. The following discussions describe the rationale for the phased approach and for the proposed locations and frequencies.

D.2 FIELD ACTIVITIES

The field effort consists of 4 Field Activities to evaluate the effectiveness of this sampling scheme (see Table D-1 for sampling details).

Field Activity 1, 2, and 3 will be performed during 1993 and 1994 to fully characterize the effluent waste stream. Field Activity 4 will be implemented after full characterization and validation of the effluent waste stream.

D.2.1 Field Activity 1

Because of the age of the facility, some of the available drawings did not adequately indicate whether certain manholes were tied to the discharge lines that need to be sampled. Consequently, some of the chosen sampling locations need to be checked before samples can be taken. A visual inspection will be performed to verify that the sample location is a strategic point on the waste water discharge (e.g., is the manhole chosen for sampling actually located on the discharge line in question?).

Field Activity 1 consists of conducting a visual inspection in the sewer line to see if the manhole selected as sample location 2 is tied to the discharge line in question. Access to sample locations 3 and 7 will be verified.

D.2.2 Field Activity 2

A review of existing data (see Appendix 2) indicated that variations in constituent concentrations could be tracked by measuring the conductivity of the waste water discharges. In other words, higher chemical constituent concentrations appear to result in higher conductivities. This finding is consistent with knowledge of the waste water streams that discharge from the 284 E Powerplant area. These waste water discharges would be expected to have concentrations of salts and solids above background levels. Assuming that the waste water constituents are fairly consistent from discharge to discharge (a reasonable assumption given the nature of the discharges), the magnitude of

Table D-1. Field Activities and Sampling Frequencies.
4 sheets

Field activity	Data/samples collected[a]/frequencies
Field activity 1	• Conduct visual inspection to verify the source of waste water for sample location 2 (see Figure B-2 and Table E-1). • Verify access to sample locations 3 and 7.
Field activity 2, Week 1	• Measure flow and field parameters[b] only for 7 days. No samples will be collected for chemical analyses. • Collect flow data. • At sample locations 1, 2, 3, and 7 (the reservoir and manholes), use DataSonde* 3 dataloggers or similar equipment to collect continuous field parameter[b] data every 30 minutes. • At sample locations 4, 5, and 6 (drainline sample taps), use portable field instruments if possible to collect manual measurements of field parameters[b] every 15 to 30 minutes from 1 hour before batch waste water discharge begins, continuing through to 1 hour after the batch waste water discharge ends. If the sample tap is on a continuous discharge (e.g., sample location 4), then samples should be taken every hour. Drainline sample taps should be opened for 1 minute prior to taking the manual measurement (see Section E.1). • Coordinate with the operations manager to determine when batch waste water discharges will occur and how long they will last. • Examine the field parameter[b] data at the end of the week to see if each waste water batch discharge can be detected by its conductivity and if each batch discharge can be detected at sample location 7 by its conductivity.
*DataSonde is a registered trademark of Hydrolab Corporation	

Table D-1. Field Activities and Sampling Frequencies.
4 sheets

Field activity	Data/samples collected[a]/frequencies
Field activity 2, Week 2	• Measure flow and field parameters[b] for 7 days, as in Field Activity 2, Week 1. Measure these concurrently with the sampling described below. • Determine which waste water batch discharges can be detected at sample location 7 using conductivity. Those batch waste water discharges that cannot be detected at sample location 7 will be sampled individually (i.e., at sample locations 2, 3, 4, 5, and 6, as needed) for the chemical analysis. • Coordinate directly with operations staff at 282 E Reservoir, 283 E Water Treatment Plant, and 284 E Powerhouse to discharge all continuous and batch waste water discharges so that the batch discharges reach sample location 7 at the same time. The time lag needed for the waste water to travel through the piping system can be figured out based on the results of Field Activity 2, Week 1. This combined discharge is the waste water discharge pulse that will be sampled at sample location 7. • Collect waste water samples using an appropriate collection device, i.e., dip sampler, stainless steel bucket, 1 hour before the pulse or waste water discharge continuing until 1 hour after the end of each pulse or waste water discharge. Analyze samples collected for one hour before and for one hour after the pulse or waste water discharge for routine parameters only (indicated with an R in Table F-1). Analyze samples collected during the pulse for all the parameters listed in Appendix IX (40 CFR 264). • Take two rounds of samples during the week. • Review the analytical results to determine which parameters are of interest and the location of the sources of interest.

Table D-1. Field Activities and Sampling Frequencies.
4 sheets

Field activity	Data/samples collected[a]/frequencies
Field activity 3	• Measure field parameters at the seven sampling locations during sampling events. • Collect waste water samples from the sources of interest determined in Field Activity 2, Week 2 (sample location 7 and other sample locations, as discussed above). • Use the appropriate sample collection methodology for the type of location (tank, manhole, drainline sample tap) and sample type (24-hour composite or grab[c]). • Collect samples twice in FY 1993 and twice in FY 1994 (i.e., four rounds of samples) during a single pulse and/or batch waste water discharge each week (coordinated by the sample team with operations staff as described above). • Samples collected for 1 hour before and for 1 hour after each pulse or batch waste water discharge will be analyzed for routine parameters (designated with an R in Table F-1) only. Samples collected during the pulse or batch waste water discharge will be analyzed for routine parameters, and Appendix IX parameters (40 CFR 264). • Examine the results to determine which sources of interest need further study. Any parameters not detected during Field Activity 2 and 3 will be eliminated from the parameters list for Field activity 4.
Field activity 4	• Measure field parameters at the seven sampling locations during sampling events. • Collect one set of waste water samples once per quarter (for example, January, April, July, and October) for 1 year at the same locations used in Field Activity 3 and using the same collection methods.

Table D-1. Field Activities and Sampling Frequencies.
4 sheets

Field activity	Data/samples collected[a]/frequencies
Field activity 4 (continued)	• Samples collected 1 hour before and 1 hour after a pulse or batch waste water discharge will be analyzed for any previously detected (in Field Activity 2 and/or 3) routine parameters only. Samples collected during the pulse or batch waste water discharge will be analyzed for previously detected routine parameters (as described above) and a subset of previously detected (in Field Activity 2 and/or 3) Appendix IX (40 CFR 264) parameters.

[a]Sample location 6 is the preferred location for sampling mud drum blowdown before it is mixed with other waste water streams.
[b]Field parameters consist of conductivity, pH, and dissolved solids.
[c]At manhole locations (1, 2, 3, 6, and 7) grab samples are volatile organics, sulfide, total organic halogens (TOX), and onsite radiation screen samples. At sample tap locations (4, 5, and 6) grab samples are collected for all the parameters listed in Table F-1.

the change in conductivity for a given waste water discharge is expected to be consistent from discharge to discharge over time. Therefore, tracking conductivity should provide a reliable indicator parameter for tracking overall changes in the other constituents of the discharges.

D.2.2.1 Week 1

Because individual waste water discharges should have different conductivity magnitudes and different batch discharge cycles, the individual batch waste water discharges should be able to be monitored by measuring conductivity downstream, after several of the discharges come together. Field Activity 2, Week 1 evaluates the effects of the various waste water discharges on conductivity close to the discharge point (sample locations 2, 4, 5, and 6) and at the "end of pipe" near the 216 B Ditch (sample location 7). Sample location 3 is an intermediate location within the powerhouse discharge. Sample location 1 is the background sample location.

In Field Activity 2, Week 1, waste water flow and field parameters (conductivity, pH, and dissolved solids) will be measured for one week during routine operations of the powerplant area. This set of measurements will be used to verify whether conductivity can be used to track the batch discharges. Flow and the field parameters will be measured at, or near, the points of waste water generation (sample locations 5, and 6) when batch discharges occur. These results will be compared to measurements taken at the "end of pipe" location (sample location 7). If a change in conductivity for each of the waste water discharges can be detected at sample location 7, then subsequent samples would be justifiably taken from sample location 7 for end-of-pipe samples. Sample locations whose associated discharges cannot be detected and measured at the "end of pipe" would be sampled separately.

During the above evaluation, field parameters will be measured continuously using a data logger (e.g., DataSonde* 3) at sample locations 1, 2, 3, and 7, where the probe can be continuously submerged. At the other locations, measurements will be taken manually every 30 minutes when batch discharges occur, because data loggers cannot be used at these locations. The sampling team will coordinate with operations to find out when the batch discharges that must be manually monitored will occur. In the case of the manual monitoring, measurements will be taken one hour before, during, until one hour after batch waste water discharges take place (see Table D-1).

D.2.2.1 Week 2

Analysis of the field measurements (flow, conductivity, pH, and dissolved solids) should show when the batch discharges were occurring, how long it took a given batch discharge to reach a downstream sampling location, and if the batch discharge can be tracked by conductivity at a downstream sampling location. The field measurements will be evaluated to determine if conductivity can be used as an indicator parameter. The sample locations for

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to take a sample for laboratory analysis. The constituents for laboratory analysis would be chosen based on the results of the long term sampling in Field Activities 3 and 4.

Field Activity 3 of the sampling plan examines the variability of the field measurements, flow, and detected constituents in the combined waste water stream. The extent of anomalies, if detected, will be observed by collecting samples and analyzing them for routine analysis parameters (see Table F-2) as well as a corroborative subset of 40 CFR 264 Appendix IX constituents. The samples will be taken before, during, and after process pulses. Other sample locations may also need to be sampled (see Field Activity 2, Week 2). The results then will be evaluated; additional chemical constituents may be removed from the analysis list based on this evaluation.

Field parameters will continue to be taken at sample locations 1, 2, 3, 4, 5, 6, and 7 during Field Activity 3 so that conductivity can be used to trace when each of the individual waste waters are discharged.

D.2.4 Field Activity 4

Field Activity 4 continues the waste water evaluation after characterization is completed. Samples will be collected quarterly and analyzed for designated routine analytes and constituents and the subset of Appendix IX (40 CFR 264) constituents that results from Field Activity 3. Samples will be collected on different days of the week and different weeks in the month to randomize the analytical data. Other sample locations may also need to be sampled (see Field Activity 2, Week 2). Field parameters will continue to be taken at sample locations 1, 2, 3, 4, 5, 6, and 7 during Field Activity 4 so that conductivity can be used to trace when each of the individual waste waters discharged. As previously stated, this sampling plan is designed to meet the objectives listed in Section A.1.

E.0 SAMPLE COLLECTION, IDENTIFICATION, AND HANDLING

Proposed sample locations are listed in Table E-1.

Table E-1. Sample Locations[a].

Location	Sample point
1	Open concrete reservoir, 282 E Reservoir
2	Manhole, outside 283 E Water Treatment Plant
3	Manhole downstream, 284 E Powerhouse combined effluent
4	Drainline sample tap, 2nd floor 284 E Powerhouse, continuous blowdown
5	Drainline sample tap, ground floor 284 E Powerhouse, water softener blowdown
6	Sample tap for sampling mud drum blowdown, behind 284 W Powerhouse, discharge from flash tank
7	Manhole, above discharge to 216 B ditch

[a]Locations shown on Figure B-2.

The sampling team will coordinate directly with operations staff to determine when discharge will be occurring and to schedule sample collection accordingly. Doing this will help determine when and if all the processes can be discharged at one time during Week 2 of Field Activity 2.

Waste water samples and field data will be collected as follows, based on available WHC information (see Table D-1 for more information).

- Field Activity 1--Perform a visual inspection to determine if sample location 2 is a valid sampling location, and verify access to manholes at sample locations 3 and 7 (one time activity).
- Field Activity 2, Week 1--Measure field parameters only (pH, conductivity, and dissolved solids) at four locations (sample locations 1, 2, 3, and 7) for 1 week. Flow monitoring equipment will be used to record flow data.
- Field Activity 2, Week 2--Samples for chemical analysis will be taken 1 hour before, during, and after each combined waste water discharge pulse. Sample set will be taken for all Appendix IX and routine analytic listed in Table F-1. Sampling will occur twice during the week. Samples collected before and after the pulse will be analyzed for routine parameters; samples collected during the pulse will be analyzed for all the analytes listed in Appendix IX (40 CFR 264). Flow data and field parameters will also be collected.

- Field Activity 3--Samples collected for chemical analysis will be taken before, during, and after the combined waste water discharge pulse. Samples collected before and after the pulse will be analyzed for routine parameters; samples taken during the pulse will be analyzed for all the analytes listed in Appendix IX (40 CFR 264). Field parameters will also be collected.

- Field Activity 4--Samples will be collected and analyzed as in Field Activity 3, except that the samples will be collected once per quarter for four quarters to verify the consistency of the discharge. Field parameters will also be collected.

Field parameters will be monitored continuously using a DataSonde* 3 or equivalent data logger (assuming there is sufficient water to submerge the data logger probe). The DataSonde 3 is a submersible, multiparameter water quality probe and data logger manufactured by Hydrolab Corporation. Equipment may require maintenance according to management instructions. The probes will be installed in the manholes so that flow is not obstructed. Confined space entry will comply with the *Industrial Safety Manual* (WHC 1988). Flow data will also be collected and recorded in the field logbook at those sample locations where it can be collected. Sample locations 4, 5 and 6 will be monitored manually for field parameters, during, and after batch waste water discharge using portable field monitoring equipment.

E.1 FIELD PARAMETER MEASUREMENTS

The DataSonde 3 or similar equipment will be used at four locations (see Table D-1) to continuously monitor pH, conductivity, and dissolved solids. The unit is designed to remain in service for extended periods of time. The DataSonde or similar equipment will be field calibrated and checked against standards according to the manufacturer's specifications at the beginning and end of Week 1 of Field Activity 2. Information from the self-contained data logger will be downloaded using a personal computer communications program to a field computer at the end of the week. Calibration measurements will be recorded in the bound field logbook.

Prior to sample collection, the drain line sample taps at 4 and 5 will be opened, and water will be discharged into a container for at least 1 minute to remove any debris or contaminants from the sample taps themselves. A clean cup or beaker will then be filled and used for field parameter measurements. Field parameters will be measured immediately after sample collection. The monitoring probes will be rinsed with a RO/DI American Society for Testing and Materials (ASTM) type II water prior to each measurement. The field meters used for these measurements will be calibrated in accordance with manufacturers' specifications using appropriate standard solutions. Field

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parameters and calibration measurements will be recorded in the bound field logbook. Refer to of the Liquid Effluent QAPP (WHC 1992) for QA procedures for calibrating field instruments.

E.2 SAMPLE COLLECTION

During Week 2 of Field Activity 2, samples will be collected at selected sample location(s) using dedicated samplers or similar equipment as specified in S&ML procedure. Sample locations will be selected on the basis of field parameter data collected during Week 1 of Field Activity 2. The manholes will be monitored for radiation prior to entry when required. Required confined space entry will comply with the *Industrial Safety Manual* WHC-CM-4-3 (WHC 1988).

Samples taken at selected sampling locations will be collected directly from drainline sample taps or with an appropriate collection device, i.e., dip sampler, stainless steel bucket. The drainline sample tap will be used to reduce the flow rate when collecting samples for volatile organic analysis to minimize aeration of the sample and possible volatilization of organic compounds.

Equipment decontamination procedures and the disposal of contaminated materials is discussed in Section E.4, Equipment Decontamination.

Field quality control samples will be collected as part of the field sampling effort. Field quality control samples may include equipment blanks, field blanks, trip blanks, and duplicate samples. The analytical schedule for the field quality control samples is shown in Table E-2. The frequency of quality control sample collection is described below and discussed further in the Liquid Effluent QAPP (WHC 1992).

- Field Duplicates--For each phase of sampling activity, a minimum of 5 percent of the total collected samples will be duplicated. Duplicate samples will be retrieved from the same sampling location using the same equipment and sampling technique and will be placed into two sets of identically prepared and preserved containers.

- Field Blanks--Field blanks will be transferred into a sample container at the site, and preserved with the reagent specified for the analytes of interest. Field blanks are used as a check on reagent and environmental contamination and will be collected at a minimum frequency of 5 percent of the total number of samples taken.

E.3 SAMPLE DESIGNATION AND FIELD DOCUMENTATION

Sample bottles will be tracked from the point of sample origin to the laboratory in accordance with a chain-of-custody system described in Section E.5, Sample Custody and Transport. A unique sample number will be obtained from HEIS.

The bottles will be labeled with these numbers. Also, each bottle will be identified with a bar code sticker attached to the bottle by the bottle manufacturer. The bar code will identify the bottle lot number and individual bottle number. Additional information recorded on the label will include:

- Time sample was collected to the nearest minute using a 24-hour clock (military time system)
- Analysis
- Preservative
- Sampler's initials and name printed
- Type and matrix of sample (i.e., grab or composite, water or waste water).

The sampling team shall maintain a written record of sampling activities and field observations in a bound field logbook. All logbook entries shall be completed in nonerasable black ball-point ink. Any required corrections to the information in the logbook will be made by drawing a line through the erroneous information, entering the correct information, and initialing and dating the change. The erroneous information should remain legible.

At a minimum, the following information should be noted in the bound field logbook:

- All information required under the Liquid Effluent QAPP (WHC 1992)
- Field observations (e.g., temperature, windy day, dusty day, raining)
- Sampling point and method
- Date, time, and sample identification number for each sample collected
- Type and matrix of sample being collected (i.e., grab or composite, water or waste water)
- Scheduled analyses for each sample collected
- Qualitative indication of sample turbidity and color
- Field parameter measurements, other sample survey information, and time they were measured

- Lot numbers and expiration dates for calibration solutions and gases
- Equipment manufacturer, model number, and serial number
- Names of sampling personnel and HPT
- Radiological screening results for each sample
- Deviations from procedure described in this SAP
- Daily signatures for each person making logbook entries
- Sketches, drawings, if appropriate
- Record of vehicle number used to transport the samples and the destination of the samples
- Chain-of-custody numbers cross referenced to sample identification numbers
- Any other pertinent information (e.g., note deviations from the intended sampling method).

All sampling personnel who enter data must sign and date each page of logbook entries. All changes to logbook entries must be initialed and dated. During field activities the field logbook will be kept under the control of the field team. Upon completion of the field effort, the field logbook will be managed in accordance with QR 17.0, "Quality Assurance Records" (WHC 1989).

E.4 EQUIPMENT DECONTAMINATION

All metal and glassware used in the sample collection that are not certified precleaned will be decontaminated prior to first use, then dedicated to a specific sampling point per WHC-CM-7-7, EII 5.5.

Field meter sensors (e.g., pH, dissolved oxygen [DO], and specific conductance probes) used to monitor the process waste water will be rinsed with deionized water after measurement.

At the end of each sampling event, all equipment exposed to the process waste water will be sent to the 1706 K-East RCRA cleaning facility where it will be decontaminated. This wash water will be disposed of according to applicable regulations.

E.5 SAMPLE CUSTODY AND TRANSPORT

Samples will be routed to the selected contractor or subcontractor laboratory for analysis consistent with the Liquid Effluent QAPP (WHC 1992). Samples of the 200 Area process waste water will be shipped in accordance with EII 5.11, "Shipping and Packaging" and WHC-CM-2-14, *Hazardous Materials Packaging and Shipping*.

All samples will be packaged for shipment in iced coolers. Radiological screening of a representative portion of each sample delivery group will be conducted by the laboratory in Building 222 S (see Section E.8 for more information on radiological screening). A chain-of-custody record will be generated at the time of bottle preparation and accompany the sample to the laboratory from the field. (A copy of a typical chain-of-custody record is provided in Appendix 1.) At a minimum, the following information will be provided on the chain-of-custody record by the sampling team:

- All information required in the Liquid Effluent QAPP (WHC 1992)
- Chain-of-custody number
- Project name and number
- Customer name
- Project manager
- Sampler's name and title
- Sample locations
- Sample identification
- Date and time of sample collection
- Type of sample (i.e., grab or composite)
- Requested analyses
- Number of containers
- Type of container, preservative, and sample volume
- Signatures of all persons having custody of the sample from collection until receipt by the laboratory
- Inclusive dates and times of sample possession
- Courier name and airbill number (remarks column)
- Corresponding sample authorization form number(s)
- Other remarks as required.

In addition, the laboratory identification number(s) will be entered on the chain-of-custody record by the laboratory sample custodian when the samples arrive at the laboratory. A copy of the signed chain-of-custody record with laboratory assigned identification numbers written in the appropriate column is faxed to HASM to verify sample receipt. The record copy is returned to HASM with the data package.

The chain-of-custody record will be completed in ink. Any required corrections to the information provided on the chain-of-custody record will be made by drawing a line through the erroneous information, entering the correct information, and initialing and dating the change. The erroneous information should remain legible. Any unused sections of the form will have zigzag lines drawn through them to indicate information is not missing.

The original signature copy of the chain-of-custody record will be enclosed in a self-sealing plastic bag with the offsite property control form and total activity report (see Section E.8) and secured to the inside of the cooler lid. Typical sample container packaging includes the following steps. Adhesive labels on the sample bottles will be completed in waterproof ink. In accordance with EII 5.11 and WHC-CM-2-14. Sample bottles will be placed in individual plastic bags to contain potential leakage and then placed in a cooler. Ice will be placed around the sample containers to keep samples cool during shipment to the laboratory. Remaining cooler space will be filled with an appropriate shoring material like vermiculite. A copy of the chain-of-custody record will be retained by the sample team leader and placed in the bound field logbook. The HPT in the shipping and receiving area of Building 1163 will monitor each cooler for alpha, beta, and radon radiation of the external packaging prior to release to a courier. Final sample package preparation will include:

- Sealing the drain plug and lid seam with waterproof tape
- Attaching a minimum of two chain-of-custody seals in a way that they would be broken if the cooler was opened
- Attaching a shipping label
- Attaching the WHC offsite property control form and the courier's shipping papers to the lid.

As an identifying measure, each cooler will be given a unique name written with waterproof ink on the top and side of the cooler. Each time a cooler changes possession, both the person relinquishing and the person accepting custody must sign and date the chain-of-custody record. As long as the custody record is sealed inside the sample cooler and chain-of-custody seals remain intact, representatives of courier companies will not be required to sign the custody record. Shipping papers provide documentation of custody for the courier company.

HASM will telephone the laboratory each time a sample delivery group is shipped. The laboratory will be informed of the number of samples that will be arriving, the expected arrival time, and the analyses that will be required. Laboratory notification will be documented in a bound notebook.

The sample custodian receiving the samples at the laboratory shall sign and date the chain-of-custody record to acknowledge receipt of the samples. Once the samples are received at the laboratory, laboratory personnel will be responsible for maintaining internal logbooks and records that document sample custody throughout sample preparation and analysis. Further details on laboratory chain of custody are provided in the Liquid Effluent QAPP (WHC 1992). The sample team leader will transmit all shipping documentation (i.e., chain-of-custody record, total activity report and offsite property control form, courier and airbill number) by facsimile to HASM or a designee, within 24 hours of sample shipment. The laboratory will transmit by facsimile to HASM or a designee copies of the shipping documentation with the laboratory receipt signature within 24 hours of receiving the samples. HASM or the designee will inform the sample team leader that it was received.

E.6 SPLIT SAMPLES

EPA and Ecology may elect to collect split samples independent of the sampling effort described in this SAP. Advance written request will be needed to obtain proper clearance to these areas if EPA or Ecology exercises this option.

E.7 FIELD EQUIPMENT PREVENTIVE MAINTENANCE

Preventive maintenance for field equipment will be carried out in accordance with the manufacturer's recommended procedures and schedules. The manufacturer's operating and calibration guidelines for field instruments are available in the operations and maintenance manuals for the specific equipment. Spare parts can include batteries; replacement check valve and ball for bailers; and spare pH, dissolved oxygen, and conductivity probes. A suitable inventory of spare parts shall be maintained, as recommended by the manufacturer.

E.8 RADIOLOGICAL SCREENING

Environmental samples being sent from the Hanford Site undergo a radiological screening analysis when required to monitor for radiological activity exceeding the Hanford Site release limits. Arrangements will be made with the 222 S Laboratory to meet this requirement and to meet the shipping deadline.

A HPT will field-screen the samples prior to their leaving the sample area. Waste water sample from each sample point will be collected in plastic sample containers and delivered to the 222-S Laboratory. The analytical results (the Total Activity Report) will be transmitted from the laboratory by facsimile machine to a predetermined Hanford Site building, where the field sample team will pick it up. If the sample exhibits radioactivity at levels below the Hanford Site release limits, the sample team may take the samples (packaged in a cooler and ready for shipment, in accordance with applicable

Department of Transportation regulations, 49 CFR) to the Hanford Site Shipping and Receiving Office. The resident HPT in the shipping and receiving area will monitor the sample packaging for radiation prior to its release to an overnight courier. Copies of the total activity report and offsite property control form must accompany the chain-of-custody record in the cooler (see Section E.5). Copies of all three will be retained by the sample team leader and placed in the field logbook and sample file.

F.0 SAMPLE ANALYSIS

The chemical parameters for analysis include the groundwater monitoring list (40 CFR 264, Appendix IX) and water quality parameters as required by the Liquid Effluent QAPP (WHC 1992). Table F-1 lists proposed analytical parameters. Tables 3-1 through 3-7 in Appendix 3 list specific Appendix IX parameters and the target detection limits for these parameters. Table 3-7 lists target detection limits (based on EPA SW-846, latest edition) for the other parameters; the target detection limits may be redefined after final laboratory selection by HASM or designee. Actual detection limits depend on the nature of the matrix and will be reported for each parameter. The number of analytes may be reduced after a baseline is established (e.g., after the results of Week 2 of Field Activity 2 or Field Activity 3 are analyzed) during 1993 sampling events.

The analytical methodology will be based on standard EPA methods; the methodology has been identified in the Liquid Effluent QAPP (WHC 1992). Standard method references for the parameters are listed in Table F-1. The analytical quality control procedures will be per the individual EPA analytical method requirements and the Liquid Effluent QAPP (WHC 1992).

Table F-1. Sample Parameters, Holding Times, Containers, and Preservatives.
2 sheets

Parameter	R[a]	Method[b]
40 CFR 264 Appendix IX		
Total amenable cyanide		9010, 9012
Sulfide		9030
Metals[c]	R	SW 6010/7000 series
Volatile organics (Appendix IX) and ethylene glycol		SW 8240
Semivolatile organics (Appendix IX)		SW 8270
Pesticides/PCBs		SW 8080
Organophosphate pesticides		SW 8140
Chlorinated herbicides		SW 8150
Field Parameters		
pH	R	SW 9040
Conductivity	R	SW 9050, EPA 230.1, 120.1
Turbidity	R	EPA 180
Water Quality		
Total organic carbon (TOC)	R	SW 9060
Total organic halogens (TOX)		SW 9020
Alkalinity	R	EPA 310.1, 2
Total phenols		9065, 9067
Chemical oxygen demand (COD)	R	EPA 410.1, 2, 3, 4
Fluoride	R	EPA 300.0
Chloride	R	EPA 300.0
Sulfate	R	EPA 375.4, 300.0, 9036
NO_2 - NO_3	R	EPA 353.1, 2, 3

Table F-1. Sample Parameters, Holding Times, Containers, and Preservatives.
2 sheets

Parameter	R[a]	Method[b]
Water Quality (Continued)		
Nitrite, Nitrate	R	300.0
Ammonia	R	EPA 350.1, 2 or 3
Radiological		
Gross alpha/beta	R	[d]
Onsite rad. screen		

[a]R = Routine analysis parameter.
[b]Methods are from EPA SW-846 latest edition, EPA 1983, or APHA 1989.
[c]These parameters are sensitive to residual chlorine.
[d]Radionuclides will be analyzed by methods that meet or exceed EPA or Nuclear Regulatory Commission guidelines. Methods and requirements shall be defined by the laboratory prior to analyses.