START

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ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 169266

Proj. ECN

2. ECN Category (mark one)		Supplemental	[]	Change ECN	[]	Supersedure	~~[X]~~ CML 2/1/92
Cancel/Void	[]	Direct Revision	[X]	Temporary	[]	Discovery	[]

3. Originator's Name, Organization, MSIN, and Telephone No. C. M. LOLL, Tank Farms Environmental Engineering, R1-51, 3-5039	4. Date November 17, 1992

5. Project Title/No./Work Order No. 242-A EVAPORATOR STEAM CONDENSATE SAMPLING AND ANALYSIS PLAN	6. Bldg./Sys./Fac. No. N/A	7. Impact Level 3EQ
8. Document Number Affected (include rev. and sheet no.) WHC-SD-WM-EV-079, REV. ~~2~~ 1 CML 11/18/92	9. Related ECN No(s). 169214	10. Related PO No.

11a. Modification Work [] Yes (fill out Blk. 11b) [X] No (NA Blks. 11b, 11c, 11d)	11b. Work Package Doc. No. N/A	11c. Complete Installation Work N/A Cog. Engineer Signature & Date	11d. Complete Restoration (Temp. ECN only) N/A Cog. Engineer Signature & Date

12. Description of Change

THE ENTIRE DOCUMENT, WHC-SD-WM-EV-079, REV. 1, IS BEING REPLACED WITH WHC-SD-WM-EV-079, REV. 2

APR 1994 RECEIVED EDMC

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

13b. Justification Details

TEXTUAL REVISIONS/FORMAT CHANGE BASED ON COMMENTS FROM ENVIRONMENTAL REGULATORS.

14. Distribution (include name, MSIN, and no. of copies) SEE ATTACHED DISTRIBUTION	RELEASE STAMP OFFICIAL RELEASE 5 DATE DEC 01 1992

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Engineering Change Notice

A-7900-013-1 (11/88)

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1) 169266

15. Design Verification Required	16. Cost Impact		17. Schedule Impact (days)
	ENGINEERING	CONSTRUCTION	
[] Yes	Additional [N/A] $	Additional [N/A] $	Improvement [N/A]
[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
N/A		

20. Approvals

Signature		Date	Signature		Date
OPERATIONS AND ENGINEERING			ARCHITECT-ENGINEER		
Cog./Project Engineer *	CMHall TFEE	11/17/92	PE		
Cog./Project Engr. Mgr. *	CMHall for G Bodin/Hekson	11/18/92	QA		
QA *	Tom Whelan	11/18/92	Safety		
Safety (POST REVIEW)*			Design		
Security			Other	Sampling/Mobile Labs Jeannette Hall for CD Morrison-Beyer	11/19/92
Proj. Prog./Dept. Mgr. *	[signature]	11/20/92		HASM Michelle Hendrix	11/19/92
Def. React. Div.			DEPARTMENT OF ENERGY		
Chem. Proc. Div.			*		
Def. Wst. Mgmt. Div.					
Adv. React. Dev. Div.			ADDITIONAL		
Proj. Dept.					
Environ. Div.	[signature]	11-19-92			
IRM Dept.					
Facility Rep. (Ops.)	RB Cole	11/19/92			
Other 242-A	[signature]	11/19/92			
	D. Ross	11/19/92			

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Engineering Change Notice (Page 2)

SUPPORTING DOCUMENT

1. Total Pages 26

2. Title	3. Number	4. Rev. No.
242-A evaporator steam condesate sampling and analysis plan	WHC-SD- WM-EV-079	2

5. Key Words

Liquid effluent sampling, analysis, 242-A Evaporator, steam condesate

6. Author

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Name (Type or Print)

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Signature

7C420 / A2D88

Organization/Charge Code

7. Abstract

The source, volumes and controls for the contributors to the 242-A Evaporator steam condensate effluent are described. The information is used to justify the sampling point and frequency for this stream. Sample collection methods, sample handling requirements, constituents for which the samples will be analyzed and the associated quantitation limits are specified in the plan.

APPROVED FOR PUBLIC RELEASE KMB 11/24/92

9. Impact Level

3EQ

10. RELEASE STAMP

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DATE DEC 01 1992

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RECORD OF REVISION	(1) Document Number WHC-SD-WM-EV-079	Page 1 ~~OF 1~~

(2) Title
242-A EVAPORATOR STEAM CONDENSATE SAMPLING AND ANALYSIS PLAN

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release (5) Cog. Engr.	Authorized for Release (6) Cog. Mgr.	Date
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0	EDT # 158702, 4/16/92			
RS 2	REV. 1 SUPERCEDED BY ECN #169266	Craig M[illegible]	[illegible] for G T Bedinger Telecon	11/18/92

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242-A EVAPORATOR STEAM CONDENSATE SAMPLING AND ANALYSIS PLAN

November 17, 1992

Tank Farms Environmental Engineering

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LIST OF FIGURES

ABBREVIATIONS & ACRONYMS

AMU	AQUEOUS MAKEUP
ASTM	AMERICAN SOCIETY FOR TESTING MATERIAL
BCE	B PLANT CHEMICAL SEWER
CBC	B PLANT COOLING WATER
CERCLA	COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION & LIABILITY ACT
CFR	CODE OF FEDERAL REGULATIONS
COC	CHAIN OF CUSTODY
COD	CHEMICAL OXYGEN DEMAND
DOE	U.S. DEPARTMENT OF ENERGY
DOT	DEPARTMENT OF TRANSPORTATION
DQO	DATA QUALITY OBJECTIVE
DST	DOUBLE SHELL TANKS
Ecology	WASHINGTON STATE DEPARTMENT OF ECOLOGY
ECWS	EMERGENCY COOLING WATER SYSTEM
EDMC	ENVIRONMENTAL DATA MANAGEMENT CENTER
EDTA	ETHYLENEDIAMINETETRAACETIC ACID
EMO	ENVIRONMENTAL MANAGEMENT OPERATIONS
EPA	U.S. ENVIRONMENTAL PROTECTION AGENCY
ESQA	ENVIRONMENTAL SERVICES QUALITY ASSURANCE
ETP	EFFLUENT TREATMENT PROGRAMS
gpm	GALLONS PER MINUTE
HEIS	HANFORD ENVIRONMENTAL INFORMATION SYSTEM
HPLC	HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY
HPT	HEALTH PHYSICS TECHNICIAN
HVAC	HEATING, VENTILATION, AND AIR CONDITIONING
ICP	INDUCTIVELY COUPLED PLASMA
LEMIS	LIQUID EFFLUENT MONITORING INFORMATION SYSTEM
MCL	MAXIMUM CONTAMINANT LEVEL
MCLG	MAXIMUM CONTAMINANT LEVEL GOAL
MSDA	MATERIAL SAFETY DATA SHEET
NCR	NONCONFORMANCE REPORT
OSM	OFFICE OF SAMPLING AND MANAGEMENT
PCB	POLYCHLORINATED BIPHENYL
psi	POUNDS PER SQUARE INCH
QA	QUALITY ASSURANCE
QAPjP	QUALITY ASSURANCE PROJECT PLAN
QAPP	QUALITY ASSURANCE PROGRAM PLAN
QC	QUALITY CONTROL
RCRA	RESOURCE CONSERVATION AND RECOVERY ACT
SAP	SAMPLING AND ANALYSIS PLAN
S&ML	SAMPLING AND MOBILE LABORATORIES
SD	SUPPORTING DOCUMENT
SDWS	SECONDARY DRINKING WATER STANDARDS
SML	SAMPLING AND MOBILE LABORATORY
SOW	STATEMENT OF WORK
TDS	TOTAL DISSOLVED SOLIDS
TFEE	TANK FARMS ENVIRONMENTAL ENGINEERING
TOC	TOTAL ORGANIC CARBON
TOX	TOTAL ORGANIC HALOGENS
TPA	TRI-PARTY AGREEMENT
VOA	VOLATILE ORGANIC ANALYSIS
WAC	WASHINGTON ADMINISTRATIVE CODE
WESF	WASTE ENCAPSULATION AND STORAGE FACILITY
WHC	WESTINGHOUSE HANFORD COMPANY
WM	WASTE MANAGEMENT

A. SAMPLING OBJECTIVES

A.1 Introduction

This Sampling and Analysis Plan (SAP) is to establish the requirements and guidelines used by Westinghouse Hanford Company (WHC) in implementing an upgraded Liquid Effluent Sampling Program for the 242-A Evaporator Steam Condensate effluent wastestream. The effluent contains steam condensates associated with the steam supply system, the process reboiler, and other process steam uses. It also contains liquids from the condensate sampler cooling, pump seal water, and drainage from water filter changeouts. The effluent is normally not contaminated, but is monitored due to potential contamination from its usage in process areas. The effluent does not contain liquids from sanitary sources.

The requirements in this document are in addition to the, Liquid Effluent Sampling Quality Assurance Program Plan (QAPP), WHC-SD-WM-QAPP-011. The QAPP (WHC, 1992) provides the Hanford Site guidelines and requirements for special high quality liquid effluent sampling activities, which include: overall scope and direction to the sampling activities, the control of samples, the laboratory analyses, the processing of data, the control of data, the quality assurance requirements, and corrective actions used in obtaining high quality data for the Liquid Effluent Sampling Program. The high quality data are obtained from controlled grab samples, called liquid effluent characterization samples, that are used to characterize the distribution of analytes in the effluent and to determine which analytes will require further monitoring in the future by the facility's existing routine monitoring program.

The SAP is a facility specific document for describing how the requirements of the QAPP (WHC, 1992) shall be implemented for activities occurring at the facility. The SAP provides a general description and identifies procedures that will be used to execute the work needed to implement the QAPP (WHC, 1992) requirements. In addition, the SAP describes how the liquid effluent characterization samples and data will be integrated with an existing liquid effluent monitoring program.

The routine monitoring program has been implemented to meet the requirements of the Westinghouse, Environmental Compliance Manual, WHC-CM-7-5. This manual establishes requirements and guidelines for WHC facility compliance with DOE orders and environmental regulations. The existing routine monitoring plans and procedures will not be altered unless the liquid effluent characterization sampling in this SAP has a significant discrepancy in analyte concentration data as compared to the data obtained from routine monitoring.

The QAPP (WHC, 1992) was written to allow each facility some flexibility in accommodating the Hanford Sit^ requirements. One primary reason for this flexibility is because of differences in procedures for surveying radiation sources at each facility. The SAP is to identify facility specific exceptions to the QAPP (WHC, 1992), which include changes to the required list of analytes. The QAPP (WHC, 1992) requirements for chain of custody, laboratory analysis, validation of data, control of records, and corrective actions shall not be modified by this SAP.

A.2 Objectives

The primary objectives of the SAP are to:

- Obtain several sets of known quality data to develop a long term sampling plan.

- Confirm the analyte concentration data reported in the stream specific reports and the conclusion that the stream does not contain dangerous waste as defined in Washington Administrative Code (WAC) 173-303, Dangerous Waste Regulations, as amended.

The secondary objectives are to:

- Provide highly quality controlled data for the evaluation of routine process sampling methods so that existing data can be evaluated and utilized.

- Provide solid waste loading data to support development of waste water treatment projects and groundwater remediation studies.

- Provide historical data for the Washington Administrative Code (WAC) 173-240 engineering reports and (WAC) 173-216 waste discharge permit applications.

A.3 Approach

This SAP has been structured to obtain high quality sampling data that will identify the types of contaminants found in the steam condensate liquid effluent stream from the 242-A Evaporator Facility. The data will come from liquid effluent characterization samples which are taken as grab samples. Quality controlled, verifiable methods shall be used in collecting the sample media, transporting the sample media, analysis of the media, the statistical evaluation of the analytical results, and the storing of sample records. All liquid effluent characterization sampling shall be performed according to a WHC approved written procedure. The procedure shall comply with the requirements of Test Methods for Evaluating Solid Waste, EPA SW-846, latest revision.

All personnel associated with collection of liquid effluent characterization samples, processing of the samples, processing of the data, and control of records shall comply with the procedures related to their responsibilities. The personnel shall sign a document verifying that they have read and understand the procedures. The signed documents shall become part of the training records.

Grab samples will be taken for liquid effluent characterization sampling because some constituents, such as volatile organics and ammonia, are unstable with time. Grab samples are used to minimize the holding time from sample collection to laboratory analyses to prevent a significant loss of these unstable analytes.

Liquid effluent characterization samples shall be obtained at least twice during the twelve months following approval of this Plan. In addition, liquid effluent characterization samples shall be obtained on the raw water supply system. These samples are to be analyzed for chemical constituents selected from Appendix A of the QAPP (WHC, 1992) that are of concern for designating dangerous waste characteristics and for preparation of Discharge Permits. Chemical analytes that are not found, will be eliminated from the list of analytes in future liquid effluent characterization samples. Chemical analytes found in both the effluent and raw water at equivalent concentration levels will also be eliminated from the list of analytes. The amended list shall be a Class 3 Change in accordance with the Hanford Tri-Party Agreement as stated in the QAPP (WHC, 1992). Chemical analytes found to be added by operations at the 242-A Evaporator Facility in significant measurable quantities shall be included in the list of analytes for the existing routine monitoring sampling program. The document used for determining significance in amending the routine list of analytes is Chapter 173-200 WAC, Water Quality Standards for Ground Waters of the State of Washington.

The liquid effluent characterization samples shall also be used to provide a quality control check on the procedures and methods used in the existing routine monitoring sampling program. During the sampling for liquid effluent characterization samples, extra sample bottles shall be obtained and sent to the on-site process control laboratory for analysis. The process control laboratory shall run an analysis using the same list of analytes and procedures as for routine samples. The routine sampling results will be compared with the liquid effluent characterization sampling results for common analytes. Recurring significant differences in data (statistical differences in data at the 90% confidence interval) will be used as a basis for preparing a plan of corrective action to improve the existing routine sampling program.

The existing routine samples are flow proportional composite samples taken by an automatic sampler to monitor all the steam condensate contributors before they are discharged to the environment. These samples have a very limited list of analytes to reduce the hold time between collection and laboratory results, so that the data can be used for process control.

The routine samples are collected, transported, and analyzed according to existing procedures at Hanford. These existing procedures shall not be modified unless a plan of corrective action determines that the existing routine monitoring program needs to be improved.

This Sampling and Analysis Plan (SAP) has been prepared for the 242-A Evaporator Steam Condensate effluent stream as required by the September 9, 1991, amendments to the Hanford Federal Facility Agreement and Consent Order, (Ecology et al. 1989), otherwise known as the Tri-Party Agreement (TPA). In addition, "Consent Order No. ED-91NM-177, For the Permitting of Liquid Effluent Discharges Under the Washington Administrative Code (WAC) 173-216," requires the submittal of SAP's for the permitting of effluent wastewater streams.

B. SITE BACKGROUND

This section contains a brief facility description of the 242-A Evaporator Facility, a description of its processes and the resulting wastewater discharges, and the receiving site, the 216-B-3 Pond System.

B.1 242-A Evaporator Facility Description

The 242-A Evaporator Facility is located in south-central Washington,along the east border of the 200 East Area of the Hanford Site. The 216-B-3 Pond System is located just east of the 200 East Area boundary fence (see Figure 2-2).

The 242-A Evaporator is the primary waste concentrator for Hanford Site low-level, radioactive, hazardous wastes that are stored in underground double-shell tanks (DST). The 242-A Evaporator uses evaporative concentration to reduce the volume of wastes, thus reducing the number of tanks required for storage. The facility receives a mixed waste stream which it separates into two streams: the concentrated slurry, which contains essentially all of the radionuclides and inorganic constituents, and the process condensate which contains volatile organic materials, and a minimal amount of radionuclides.

B.2 Stream Contributors

A total of eleven contributors have fed the 242-A Evaporator Steam Condensate wastestream, during waste processing in the past. As part of the Waste Tank commitment to waste minimization some of these contributors have been eliminated, however, they are all discussed in detail in the following subsections.

The configuration of the 242-A Evaporator Steam Condensate wastestream during waste processing is shown in Figure 2-1. There are no active contributors to this wastestream during shutdown/maintenance mode.

All of the contributors to the steam condensate wastestream are deposited in the flow measuring weir (TK-C-103), which signals a sampler to pull a sample for compositing, after a certain volume of water has passed over the weir. An in-line radiation monitor is also in place as part of the R-C-1 sampling system. During steam condensate discharges from the 242-A Facility, a portion of the discharge is routed from the flow measuring weir across a radiation detector. The detector is used to identify potential radioactive contamination of the steam condensate wastestream and monitors continuously except for several minutes each hour when the line is flushed with raw water.

From the flow measuring weir, the stream flows to a two-way diversion valve. This valve diverts stream flow to the 207-A Steam Condensate Retention Basins during normal operations. If radiation levels, detected by the R-C-1 gamma monitor, indicate possible contamination in the steam condensate, then a diversion valve is automatically activated which diverts the flow to the 241-AW-102 double-shell tank. This prevents discharge of the stream to the 207-A retention basins until the radioactive contamination has been identified and the cause of the contamination corrected.

During normal operations the steam condensate flows into one of three cells at the 207-A Retention Basins, until it has been filled to capacity (it takes approximately 24 hours to fill a single cell during full operation). At that time the steam condensate flow is diverted to one of the two remaining cells. At the same time that a cell is being filled, the proportional sampler (R-C-1) is obtaining a sample from the measuring weir (TK-C-103), and compositing it in a large plastic carboy. Once a cell has been filled, the composite sample is immediately sent to the 222-S Laboratory for radionuclide analysis as an indication of process control. If the analytical results are within set radionuclide limits the steam condensate from the filled cell is discharged to the 216-B-3 Pond System (located northeast of the 200 East Area). The process of filling a cell, diverting to the next cell, analyzing and discharging the first cell is performed in a rotation between all three basins.

The steam condensate wastestream results in a discharge of approximately 60 gal/min to the 207-A Retention Basins and the 216-B-3 Pond, while waste processing activities are being performed.

The 242-A Evaporator process does not involve the intentional addition of hazardous constituents to the steam condensate stream or to any of its contributors. Waste Tank Facility Operations limits the use of hazardous materials within its facilities by the use of administrative controls, ie., procedures which govern the use of such materials in the workplace.

B.2.1 Reboiler Steam Condensate

Steam is required in order to heat waste liquids for evaporation and concentration. Steam pressure is reduced in several stages to the necessary pressure (from 225 psig to 10 psig) before it enters the 16-in.-dia feed line to the reboiler. The heat transfer efficiency of the steam is improved by saturating the steam with filtered raw water before it is used for non-contact heating in the reboiler. Although the reboiler steam is pressurized, and a leak in the reboiler is expected to introduce steam into the process waste stream and not contaminate the steam, there is a potential for contamination of the steam to occur. For this reason the steam condensate is monitored and sampled for radioactive contamination before it is discharged. After passing through the reboiler, the steam condensate is discharged to the flow measuring weir, TK-C-103.

A continuous sample stream of steam condensate discharge is drawn from the weir and is pumped through a radiation monitor (R-C-1) to detect radioactive contamination of the waste stream. A portion of the return sample stream from this monitor is also diverted to a proportional sampler for further radionuclide analysis.

From the weir, the steam condensate flows to the 207-A Steam Condensate Retention Basins. It is held until the composite samples are analyzed to determine that there is no radioactive contamination.

Figure 2-1. STEAM CONDENSATE WASTESTREAM CONFIGURATION

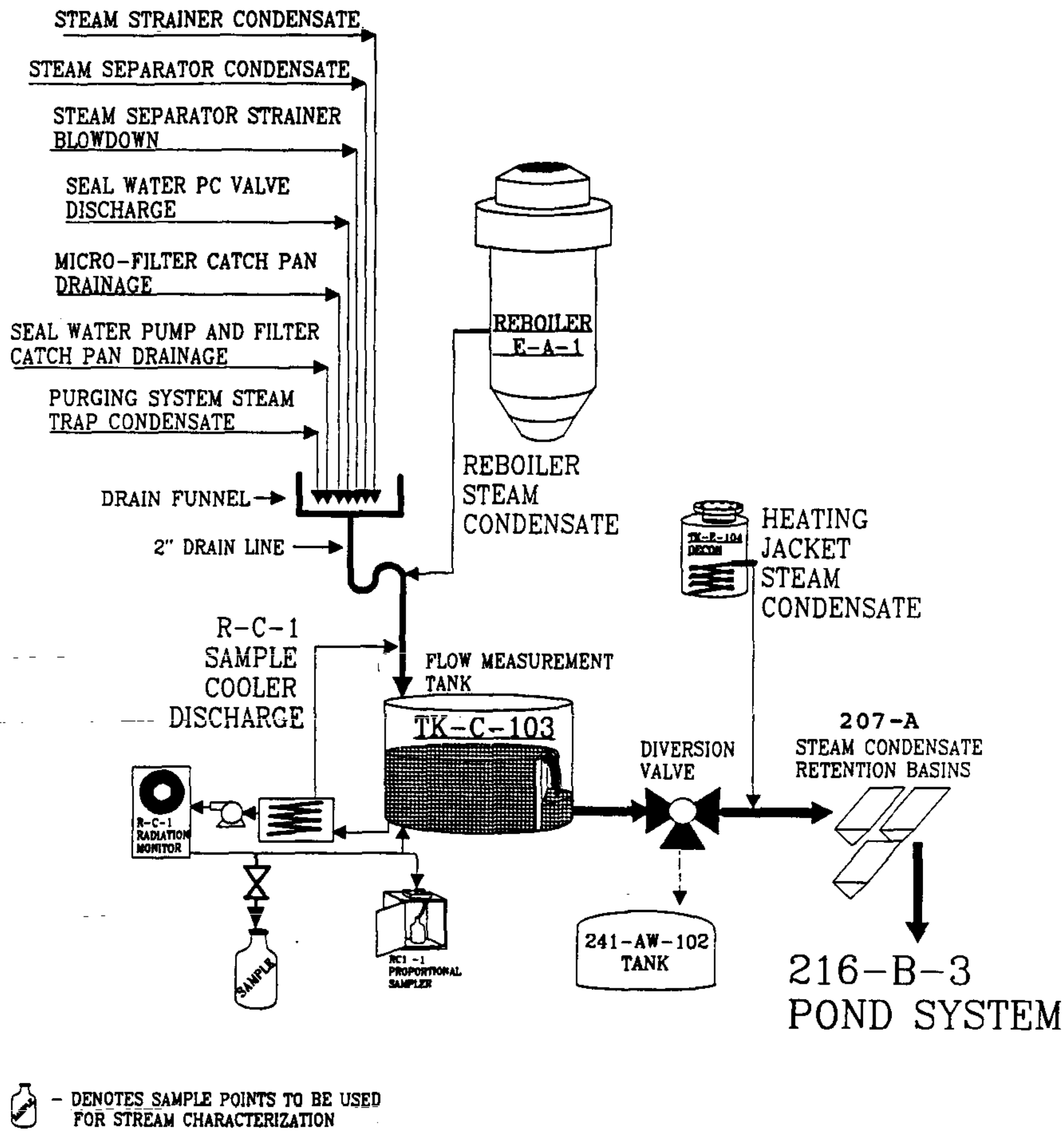
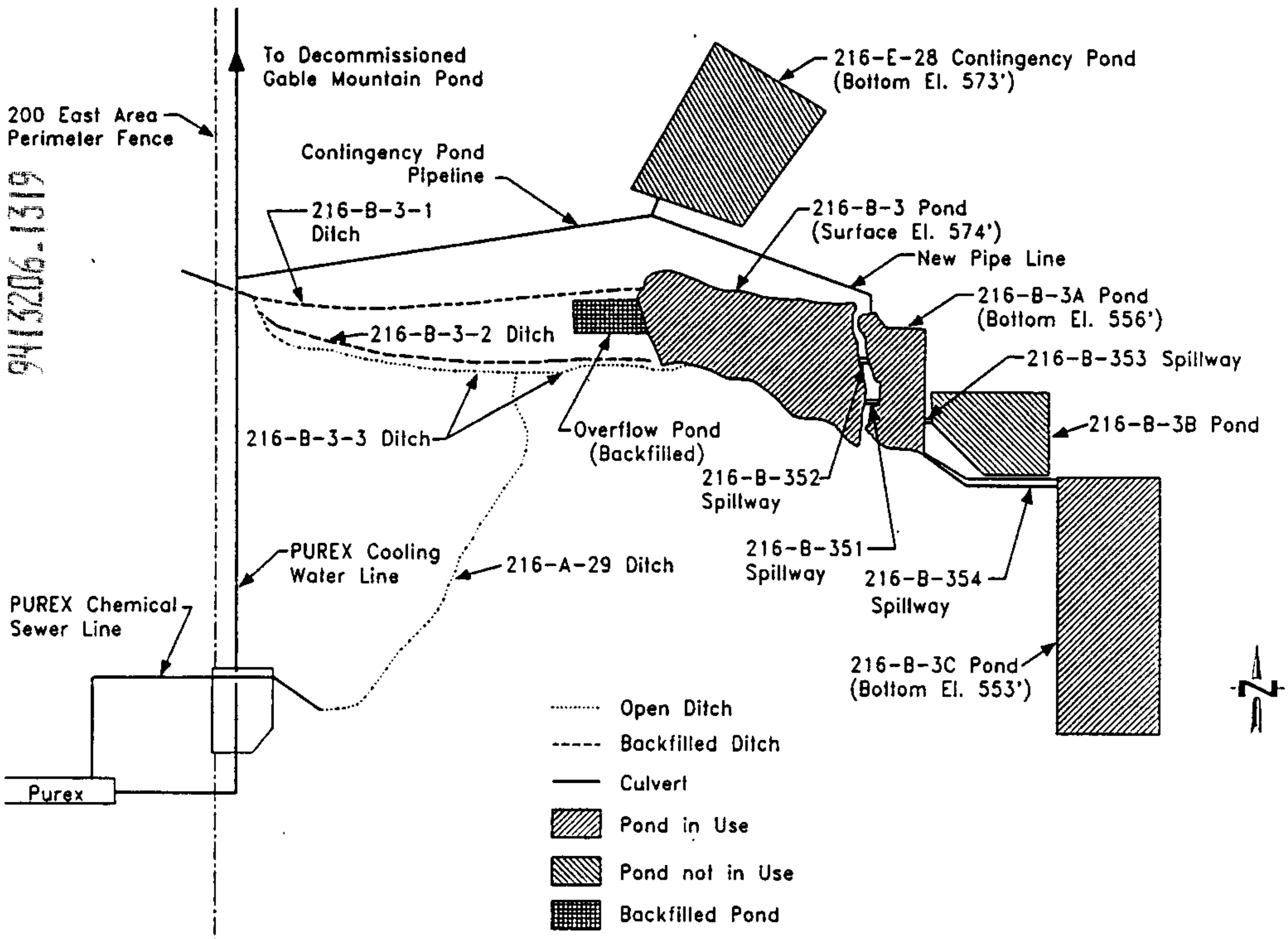


Figure 2-2. 216-B-3 Pond System



B.2.2 Steam Condensate From Heating Jackets

Tanks E-101 and E-104 are equipped with jackets that allow the contents of the tanks to be maintained at desired temperatures. The jackets use steam to heat the tank contents to a desired temperature before performing a flush with the solutions in the tanks. The steam condensate from the heating jackets would join the steam condensate wastestream below the flow measurement weir, and be discharged to the 207-A Retention Basins. The discharge joins the steam condensate wastestream below the flow measurement weir because the weir is in a radiation zone and the tanks are in a non-radiation zone. Tank E-101 is no longer used. Tank E-104 is still functional, however, its use is not anticipated in the near future.

B.2.2.1 Tank E-101 (discontinued)

Tank E-101 is the eluant tank in which an $NaNO_3$ solution was prepared and kept for the purpose of flushing and regenerating the resin in the Evaporator's ion exchange column. This column is used to remove strontium and cesium from the process condensate. The original ion exchange resin was replaced with a resin that does not require regeneration. Since the resin change, tank E-101 has been isolated from other facility systems, and future use of the tank is not anticipated.

B.2.2.2 Tank E-104

Tank E-104 is the decontamination tank. The decontamination system is used to remove radiative waste constituents from the evaporator vessel, C-A-1, and associated equipment and piping. Decontamination is performed to reduce radiation exposures to operating personnel during maintenance activities and increase the efficiency of the system through chemical cleaning. The system has been used infrequently in the past to clean deentrainment pads in the evaporator vessel, C-A-1, and to decontaminate the vessel for extended maintenance periods. The primary chemicals used in the decontamination process are citric and nitric acid. A sodium hydroxide solution is also prepared in the tank for neutralization purposes. The chemical solutions are either made-up at a different facility and transferred to the tank by tank truck or drum, or they are made-up in the tank using reagents and raw water. The decontamination solution is then heated in the tank and pumped to the location being decontaminated.

The decontamination solution is heated in TK-E-104 by a heating jacket on the tank, with a 22 square-foot heat exchange surface. The heating jacket uses non-contact steam provided from the facility's steam system at 10 psig. Steam condensate from the heating jacket escapes the system via a steam trap and drains to the main effluent line which carries the other contributors from the C-103 measurement weir to the 207-A Retention Basins. Steam condensate flow from the E-104 tank, during operation, is estimated at 2 gpm.

Decontamination operations are rarely performed (on an as need basis). They are performed when work needs to be done in the waste processing areas and the radiation levels need to be lowered in order to protect workers. The last decontamination was performed in 1989 to support the latest upgrade project to the 242-A Evaporator Facility. It is not anticipated as to when the next decontamination will occur. Steam condensate from the TK-E-104 heating jackets contributes an inconsequential amount to the overall steam condensate wastestream.

B.2.3 Purging System Steam Trap Condensate

Densities and liquid levels of waste solutions which are being processed within the 242-A Evaporator, specifically within the vapor-liquid separator and the recirculation line, are monitored continuously by a weight factor system. In order to keep the weight factor instruments running properly it is necessary to purge them periodically. Purging is performed by blowing air or steam through the instruments to clear out any material which collects within them. The steam supply for the purge system has a steam trap which collects steam condensate and discharges it to a 3/4" drain line. This drain line then discharges the condensate to the condenser room drain funnel on the 2" drain line leading to the C-103 Flow Measurement Tank.

B.2.4 Vacuum Pump Seal Water (no longer discharges)

The air-sampler pump draws air samples from various areas of the 242-A Evaporator facility to identify abnormal levels of airborne radioactive material. The rooms that air samples are currently withdrawn from include the evaporator room, ion exchange column room, pump room, loading dock room, and the loadout and hot equipment storage room.

The vacuum pump on the air sampler no longer contributes to the steam condensate wastestream. The water seal pump which previously used raw water to maintain a positive seal within the pump has been replaced. The replacement pump uses a mechanical seal which requires no raw water for operation. The original air sample pump discharged used raw water at a rate of approximately 5 gpm.

B.2.5 Steam Strainer Condensate

Steam, via the steam ejector system, is used to create vacuum that moves process vapors from the vapor-liquid separator through the condenser system. On the steam supply line for this ejector system is a steam strainer which collects solid particles which have been entrained in the steam. The particles collect in the bottom of the strainer and periodically a valve is opened to clean out the strainer. The 3/4" blowdown line from the strainer discharges into a drain funnel, in the condenser room. From the funnel the wastestream is piped directly to TK-C-103. There is no existing maintenance program for blowing down the steam strainer, so it is performed infrequently. The solids which collect in the steam strainer are primarily piping corrosion products such as zinc, copper, nickel, chromium and lead.

B.2.6 Steam Separator Condensate

Downstream from the steam strainer is a steam separator. The separator is present in the line just before the steam ejector system for the purpose of eliminating any condensate from the steam line. The steam runs through a series of baffles which knock condensate out of the steam line. The condensate drains to a steam trap where it collects and then is discharged. From this point the condensate flows into the drain funnel in the condenser room which drains into the main steam condensate line to TK-C-103. Steam separator is estimated to contribute 1/2 gpm of steam condensate to the overall wastestream.

B.2.7 Steam Separator Strainer Blowdown

The condensate from the steam separator goes through a strainer before it enters the steam trap. This strainer removes any particles within the condensate which might collect in the steam trap and either plug or damage it. Condensate from blowdown of the steam separator strainer also flows into the condenser room drain funnel, where a 2-in. drain line delivers it to the main condensate line to Tank C-103. The blowdown on this strainer is basically performed on the same frequency as the blowdown on the steam strainer (B.2.5),and consists of the same corrosion products as found in the steam strainer.

B.2.8 Seal Water Pressure Control Valve Discharge

Raw water is used in the Evaporator's process pumps to maintain a positive water seal within the pump. When excessive pressure is present in the supply to these pumps, the raw water is released by a pressure control valve. If the seal water pressure exceeds 150 lb/in^2 (gauge), the seal water pressure control valve opens to bleed water to a 1/2" line. This valve remains open until the pressure is below 150 lb/in^2 (gauge). The discharge from this stream flows into the condenser room drain funnel, which is hardpiped to tank C-103, the flow-measurement weir. The actuation of this control valve is not a normal operating condition. If this valve were ever to activate, the maximum flowrate is estimated to be 3 gpm.

B.2.9 Micro-Filter Catch Pan Drainage

Two deentrainment pads are present in the vessel ventilation system in order to protect the high efficiency particulate air (HEPA) filters from water vapor and small particles which could damage the filters. The two pads consist of stainless steel mesh, each, several inches thick. Periodically, the solids buildup on the pads gets too high, and it is necessary to spray them down. Raw water is used in spray washers to rinse the pads. In order to keep the spray washers operating properly, and to keep small particles from plugging the nozzles, the raw water which is used in them is passed through a micro filter. This filter must be cleaned periodically, and the blowdown from the micro-filter drains to a catch pan which in turn drains to the condenser room drain funnel and the 2" drain line.

B.2.10 Seal Water Pumps and Filter Catch Pan Drainage

The pumps which supply seal water at the specified pressure, to the process pumps, sit over catch pans to catch any raw water leakage. The catch pans discharge to the condenser room drain funnel, the 2" drain line, and finally, the measuring weir. There are also two water filters within the pump seal water system which discharge to the catch pans during filter flushes. The contribution from these contributors and the micro-filter drainage in B.2.9 is estimated as less than a gallon/day.

B.2.11 R-C-1 Sampler/Monitor Cooler Raw Water Discharge

Raw water is used to cool the sample container (composite) in the R-C-1 proportional sampler. The steam condensate which collects in the measuring weir (C-103), can be very hot and must be cooled before going to the sampler. Once the raw water passes through the sample cooler it drains into the main condensate line to Tank C-103. The sample cooler only runs during evaporator operation. The used raw water discharge from the sample cooler is estimated at 5-10 gpm.

B.3 216-B-3 Pond System

Steam condensate from the 242-A Facility, which has been sampled and found to be uncontaminated with radionuclides is released from the 207-A Steam Condensate Retention Basins, to the 216-B-3 Pond System. The 216-B-3 Pond System consists of a series of four earthen, unlined, interconnected ponds and the 216-B-3-3 Ditch. This network of ditches and ponds receives miscellaneous wastewater effluents from several of the processing facilities on the Hanford Site, including the 242-A Evaporator Facility.

All of the wastewater effluents being discharged to the B Pond System travel through the 216-B-3-3 Ditch. The 242-A steam condensate is hardpiped to the head end of the 216-B-3-3 Ditch, where it is discharged to the ditch, along with the other streams from the various facilities. This ditch is approximately 3,700 feet long, 30 ft wide at ground level, 6 ft wide at the bottom, and 6 to 12 ft deep.

Water discharged to the 216-B-3-3 Ditch flows directly into the 216-B-3 Pond System. The first pond, or lobe, is the 216-B-3 Pond. It was placed into service in 1945, and covers a surface area of approximately 35 acres, anywhere from 2 to 20 ft deep. Overflow from the first lobe runs into the second lobe, 216-B-3A, or A lobe. This lobe covers approximately 11 acres, and ranges in depth from 2 to 5 feet. Overflow from A lobe runs into the C lobe, which has a designed surface area of 41 acres. This lobe has eight, parallel trenches, approximately 8 to 14 ft wide and 4 ft deep, cut into the bottom of it to increase percolation into the soil. At the present time, water covers about 1/3 the trench area within the lobe.

Flow between the ponds is via galvanized, corrugated, steel pipes, and is controlled by downward-opening slide gates. A network of groundwater monitoring wells has been established around the B Pond System to measure water levels, obtain groundwater samples, and evaluate aquifer properties. Liquid levels within the ponds are measured with staff gages, and the flowrate in the 216-B-3-3 Ditch is measured with a flume and flowmeter and recorded on a stripchart. The pond liquid levels, gate settings, and cumulative flowmeter readings are recorded daily.

C. RESPONSIBILITIES

The responsibility descriptions below are related to activities occurring at the 242-A Evaporator Facility. Overall responsibilities covering other areas are the same as found in the QAPP (WHC, 1992).

Tank Farm Environmental Engineering

- o Prepare the Sampling and Analysis Plan.
- o Insure procedures are updated to support the sampling activities.
- o Provide the Sampling Task Leader.
- o Initiate scheduling of personnel required for sampling.
- o Provide technical support for sampling activities.
- o Review data logs and sampling activities.
- o Surveil chain of custody activities.
- o Review liquid effluent characterization sampling data for completeness and consistency.
- o Ensure liquid effluent characterization sampling data and flow information are transferred to the Effluent Treatment Programs (ETP) for filing with Environmental Data Management Center (EDMC).
- o File routine sample data at the Plant and the EDMC.
- o Coordinate with the sample team, OSM, and Tank Farms Waste Treatment Engineering, the dates for sampling activities, based on the restart of waste processing operations.

The data in files shall include copies of field notes, sampling logs, process flow records, analytical results, and validation calculations.

Tank Farm Operations

- o Approve Sampling And Analysis Plan.
- o Provide a trained operator for escort during liquid effluent characterization sampling.
- o Provide sampling and transportation of routine samples.
- o Complete sample log sheets for routine samples.

Tank Farms Health Physics

- o Provide a Health Physics Technician (HPT) for radiation surveying of liquid effluent characterization sample packages.
- o Provide the Radiation Work Permit (RWP) instructions for zone entry.
- o Verify radiation worker training requirements of sampling personnel.

Sampling and Mobile Laboratories

- o Approve Sampling And Analysis Plan.
- o Provide trained samplers for liquid effluent characterization sampling activities. One sampler shall have a WHC Certificate of Qualification from the Sampling & Mobile Laboratory organization. Certificated sampler shall direct liquid effluent characterization sampling, packaging and shipping.
- o Prepare the Plant liquid effluent characterization sampling and packaging procedure.
- o Document sampling activities in a log book.
- o Transport liquid effluent characterization samples to laboratory or shipping center.
- o Initiate "Chain of Custody" documentation for liquid effluent characterization samples.
- o Package liquid effluent characterization samples for shipping.
- o Ensure copies of field logs and other sampling data sheets are filed with sample task leader.

Quality Assurance (QA)

- o Approve Sampling And Analysis Plan.
- o Provide surveillance of the liquid effluent characterization sampling program.

D. SAMPLING LOCATION AND FREQUENCY

D.1 Sampling Location

Sampling of the steam condensate wastestream will be performed at a grab sample port on the RC-1 radiation monitoring sample line. The RC-1 sample line draws a sample from the flow measurement weir, TK-C-103. The line runs through the RC-1 radiation monitor, where the sample stream is monitored for radiological contamination. The sample port is located on the return from the RC-1. This sample point includes all the contributors except the heating jacket discharge from the decontamination tank, TK-E-104. All the contributors to the steam condensate wastestream, except for the decontamination tank steam condensate, are located, and collected, in a radiation zone. The decontamination tank steam condensate is not in proximity to radioactive contamination so it combines with the other contributors after the collection weir and sampler/radiation monitor. There are no plans to use the heating jacket for this tank into the extended future, therefore, no samples will be taken of the heating jacket steam condensate.

The contributors to this stream consist exclusively of non-contact steam condensate and used raw water. Except for the catchpans they are hardpiped from source to sampling point and are not expected to vary in individual composition. Based on this knowledge of the contributors, individual contributor sampling will not provide additional useful data. Total stream composition data is the most valuable in meeting the objectives stated in Section A.2.

In addition to the effluent sampling, sampling will be coordinated at Tank Farms to provide raw water data. A raw water sample will be obtained from the raw water feed to the 242-A Facility (refer to the 242-A Evaporator Cooling Water Sampling and Analysis Plan, WHC-SD-WM-EV-078). The results from this sampling will be pooled with results from raw water sampling performed at the other Hanford facilities to create a raw water baseline. Once the overall composition of site raw water is dètermined, one location will be chosen to obtain any additional raw water samples.

D.2 Frequency

Two liquid effluent characterization samples shall be taken per year for the first two years, following the approval of this document to provide a baseline characterization. The SAP shall be revised based on the results of the baseline characterization sampling. The initial two steam condensate samples are to be taken during the first evaporation campaign, which is expected to take place in early 1993. The specific day and time for sampling will be based on the start-up schedule and determined by Waste Treatment Engineering. The third and fourth samples will be scheduled for the following year, provided waste processing is performed at the 242-A Evaporator Facility.

This sample frequency has been chosen because, over the course of two years, it will provide a broad time period for effluent data baseline to be drawn from. The composition of the 242-A Evaporator steam condensate wastestream is not expected to vary over time and the chosen frequency will verify this assumption. If there is a major change in stream configuration, such as elimination of one of the major contributors via facility modification, two samples will be taken to assess any changes to the overall stream.

In addition to the characterization samples, a routine sample shall be taken within a day of each characterization sample.

The raw water sample will be coordinated with one of the first two liquid effluent characterization samples.

The 242-A Evaporator Steam Condensate wastestream sampling shall be coordinated with other Tank Farm facility sampling events in order to minimize the amount of duplicates and field blanks to be taken.

E. SAMPLE IDENTIFICATION

E.1 Liquid Effluent Characterization Sample Labeling

Sample labels for liquid effluent characterization samples shall be furnished by the sampling team from the Sampling and Mobile Laboratories. The labels will require the following information to be recorded by a member from the sampling team: identification of the person in charge of collecting the sample; unique sample identification number; date and time the sample was collected; the place the sample was collected; the stream identification and sample matrix; the preservative added; and the analysis to be performed on the sample. The unique sample number shall be obtained from the Hanford Environmental Information System (HEIS).

In addition, each bottle shall be identified with a bar code sticker attached to the bottle by the bottle manufacturer. The bar code shall identify the bottle lot number and individual bottle number. In addition to identification numbers, the samples will require labeling to indicate potential hazards. All sample containers for the steam condensate must be labeled with a radiation sticker.

E.2 Routine Sample Labeling

The numbers on the label will be assigned by Tank Farm Operations per the sample schedule in Procedure TO-630-040, "SAMPLE/FILL/DRAIN 242-A STEAM CONDENSATE."

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The general numbering method is as follows:

ASC - (serial number)
ASC COMPOSITE - (serial number)

ASC = 242-A Evaporator sample designation for basin sample
ASC COMPOSITE = 242-A Evaporator monthly composite sample designation
Serial number = Sequential number provided by Tank Farm Operations

F. SAMPLING EQUIPMENT AND PROCEDURES

F.1 Liquid Effluent Characterization Samples

The liquid effluent characterization sampling activities will comply with a specific procedure prepared for the sampling of the 242-A Evaporator steam condensate effluent stream. This procedure will be based on recommended practices found in SW-846, Chapter 10, Sampling Methods (latest edition). The formal sampling procedure for this stream is being developed by TFEE and the S&ML and will be completed and issued prior to the first sampling event. The sampling procedure identifies specific requirements which include the following: sampling location, description of sampling equipment, containers, and reagents, safety precautions including personal protective equipment, and specific steps for collecting the samples. Sampling will be surveilled at random by a cognizant Quality Assurance person.

Sampling for liquid effluent characterization samples shall be through purged pipe taps into sample bottles. Sample bottles shall be new, commercially available, certified precleaned containers. The sample shall be drawn only with a new bottle. Sampling equipment shall not require maintenance and calibration procedures.

Preservative required for liquid effluent characterization samples will be vendor supplied and added to the containers in a laboratory environment prior to being taken to the field. The caps will be sealed to the containers with tamper evident tape.

The samples shall be cleaned and surveyed for surface radioactivity. The sample will be packaged in accordance with the, Environmental Investigations and Site Characterization Manual, WHC-CM-7-7, procedure EII 5.11 "Sample Packaging and Shipping." The samples will be placed in a cooler containing ice. The cooler shall become part of the sample packaging.

Field logs will be completed per the, Environmental Investigations and Site Characterization Manual, WHC-CM-7-7, procedure EII 1.5 "Field Logbooks" at the time of sampling by the sampling team. A field logbook shall be maintained which contains information pertinent to the sampling and the information shall be quality record documents.

Sampling event documentation that has been validated will be transferred to Work Control and Data Management for inclusion in the EDMC files and to be prepared for public release. Field measurements will be made for conductivity and pH at the time of sampling. The results of the field measurements are entered into the sampling logbook.

F.2 Routine Samples

The routine process sampling shall be completed by the Tank Farm Plant operators trained to comply with WHC Procedure TO-630-040, "SAMPLE/FILL/DRAIN 242-A STEAM CONDENSATE."

The samples will be labeled with a sample tag containing sample point identification, a unique sample number, date and time. The samples shall be taken to the designated on-site laboratory for analysis.

A data sheet will be filled out at the time of sampling and will contain the date, time, batch number totalizer reading and operator initials.

G. SAMPLE HANDLING AND ANALYSIS

G.1 Liquid Effluent Characterization Samples

Liquid effluent characterization samples will be analyzed for the following:

Analyte List	Method of Analysis
Sulfides	EPA method 9030
Semi-volatile organics (semi-VOA)	EPA method 8270
Volatile organics (VOA)	EPA method 8240
Total organic halides (TOX)	EPA method 9020
Herbicides	EPA method 8150
Organophosphorus Pesticides	EPA method 8140
Polychlorinated biphenyls (PCB) /organochlorine pesticides	EPA method 8080
Inductive coupled plasma metals (ICP)	EPA method 6010

Analyte List	Method of Analysis
Graphite furnace atomic absorption (AA) metals	
Arsenic	EPA method 7060
Lead	EPA method 7421
Mercury	EPA method 7470 (cold vapor)
Selenium	EPA method 7740
Tin	EPA method 7870
Total cyanide	EPA method 9010/9012
Hexavalent Chromium	EPA method 7196
Bromide	EPA method 320.1
Chloride	EPA method 325.1, .2, .3
Fluoride	EPA method 340.1, .2
Total oil and grease	EPA method 9070
Total phenols	EPA method 9065/9066/9067
Biological oxygen demand (BOD)	EPA method 405.1
Chemical oxygen demand (COD)	EPA method 410.1, .2, .3, .4
Total organic carbon (TOC)	EPA method 9060
Phosphorus	EPA method 365.2, .3
Nitrogen, nitrate, nitrite	EPA method 353.1, .2, .3
Ammonia	EPA method 350.1, .2
Total dissolved solids (TDS)	EPA method 160.1
Total suspended solids (TSS)	EPA method 160.2
Alkalinity	EPA method 310.1/310.2
pH	EPA method 9040
Conductivity	EPA method 9050
Total alpha/beta	WHC approved laboratory method
Radionuclides	WHC approved laboratory method
Plutonium-238, 239, 241	
Americium-241	
Strontium-89, 90	
Cesium-137	
Ruthenium-103	
Ruthenium-Rhodium-106	

The handling and preparation of samples will comply with the procedures found in the, Environmental Investigations and Site Characterization Manual, WHC-CM-7-7. When an analysis requires that a preservative be added to the sample bottle, the presevative is added in a clean laboratory environment prior to traveling to the sampling site. At the time of sample bottle preparation a chain of custody (COC) form will be initiated and will accompany the sample bottle into the field. A COC form will accompany each liquid effluent characterization sample, which may consist of several containers. The COC will account for each container. The sample bottles are stored in a cooler sealed with tamper evident tape and all custody transfers are noted on the bottle COC form.

Once a liquid effluent characterization sample has been drawn it must be in the physical control or view of the custodian, locked in an area where it can not be tampered with, or prepared for shipping with tamper-proof tape applied. Physical control includes being in the sight of the custodian, being in a room which will signal an alarm when entered, or locked in a cabinet.

When more than one person is involved in sampling, one person shall be designated and only that person signs as sampler. This person is the custodian until the samples are transferred to another location or group and shall sign when releasing the samples to the designated receiver.

The preparation of either a single or a group of samples for shipment to a laboratory shall comply with the procedure EII 5.11 "Sample Packaging and Shipping." Samples going off-site for analysis will conform to all federal regulations governing shipment.

The approved laboratory shall designate a sample custodian and a designated alternate responsible for receiving all samples. The sample custodian or his alternate shall sign and date all appropriate receiving documents at the time of receipt and at the same time initiate an internal Chain of Custody form using documented procedures. A continuous chain of custody will be maintained from the time of sampling until final disposition of all samples.

Liquid effluent characterization samples will be collected in commercially available, individually certified, precleaned containers. The certification of the precleaned condition shall accompany the bottle. The necessary containers, sample volumes, and preservatives for the analyses are identified per the QAPP (WHC, 1992).

Containers for volatiles and semi-volatiles shall be filled without bubble formation and without leaving a head space.

The samples shall not be analyzed for total and fecal coliform because there are no sanitary sewer connections. Ruthenium-103 and Ruthenium-Rhodium-106 are identified by the same analytical method which identifies strontium and cesium.

Due to radioactive shipment requirements and as low as reasonably achievable (ALARA) practices on site, the samples must be checked for total radioactive activity before being allowed off site. For this reason, very short holding times on analyses such as hexavalent chromium and BOD, may be violated.

The raw water sampling will be performed as described in WHC-SD-WM-EV-078, 242-A Evaporator Cooling Water Sampling and Analysis Plan.

The samples will be routed to an approved participant contractor or subcontractor laboratory for analysis. The data will be considered representative so long as at least 90 percent of the data points meet the established requirements in the laboratory contract for precision and accuracy. Data which does not meet this objective will be reviewed to determine whether the data can be used or whether corrective action should be taken. If necessary, corrective action will consist of repeating the sampling and analysis activity.

Data and record information that has been validated will be transferred to Work Control and Data Management for inclusion in the EDMC files and to an approved computer data file (LEMIS) when it becomes available.

G.2 Routine Samples

The handling of samples shall be according to the WHC Procedure TO-630-040, "SAMPLE/FILL/DRAIN 242-A STEAM CONDENSATE." The Procedure describes how the samples are prepared and labeled, how information is logged and how samples are transferred between the sampler and the laboratory.

The analyses performed on the routine samples will be for pH per EPA method 9040, and total alpha, total beta. A Hanford based laboratory, such as 222-S Laboratory, will perform the analyses using current approved procedures and Quality Assurance requirements.

REFERENCES

Ecology, EPA, and DOE, 1989, Hanford Federal Facility Agreement and Consent Order, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

EPA, 1990, Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition, Update I, U.S. Environmental Protection Agency/Office of Solid Waste, Washington D. C.

WHC, 1989, Environmental Investigations and Site Characterization Manual, WHC-CM-7-7, Section 5.11, Westinghouse Hanford Co., Richland, Washington.

WHC, 1992, Liquid Effluent Sampling Quality Assurance Program Plan, WHC-SD-WM-QAPP-011, Rev. 3, Westinghouse Hanford Co., Richland, Washington.

WHC, 1992, 242-A Evaporator Cooling Water Sampling And Analysis Plan, WHC-SD-WM-EV-078, Rev. 2, Westinghouse Hanford Co., Richland, Washington.

INFORMATION RELEASE REQUEST

References: WHC-CM-3-4

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Purpose			
[] Speech or Presentation		[] Reference	New ID Number: N/A
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