START

0034406

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 169264

Proj. ECN

2. ECN Category (mark one)	Supplemental	[]	Change ECN	[]	Supersedure	[X]	cmk 12/1/92
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. 241-A TANK FARM COOLING WATER 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-077, REV. ~~2~~ 1 cmk 11/18/92	9. Related ECN No(s). 169216	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-077, REV. 1, IS BEING REPLACED WITH WHC-SD-WM-EV-077, REV. 2

FEB 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)

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Engineering Change Notice

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1): 169264

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 * CM Hall	11/17/92	PE	
Cog./Project Engr. Mgr. * CM Hall for G Bertin per Fax	11/18/92	QA	
QA * JOM Wheelan	11/18/92	Safety	
Safety (POST REVIEW)*		Design	11/19/92
Security		Other Sampling: Mobile Lab: Kenneth Hyatt for CD Morrison-Beyer	
Proj. Prog./Dept. Mgr. *	11/20/92	HASM: Michelle Hendrix	11-19-92
Def. React. Div.			
Chem. Proc. Div.			
Def. Wst. Mgmt. Div.		DEPARTMENT OF ENERGY	
Adv. React. Dev. Div.		*	
Proj. Dept.			
Environ. Div.	11-19-92	ADDITIONAL	
IRM Dept.			
Facility Rep. (Ops.) *	11-19-92		
Other	11/19/92		
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5. Key Words	6. Author
Liquid effluent sampling, analysis, 241-A tank farm, cooling water	Craig M Loll Name (Type or Print) Craig M Loll Signature 7C420 A2D88 Organization/Charge Code

7. Abstract

There is one main contributor to the 241-A Tank Farm liquid effluent that is discharged to the 216-B-3 Pond. The source, volumes and controls for this, as well as the various, intermittent contributors are described 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.

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9. Impact Level

3EQ

10. RELEASE STAMP

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RECORD OF REVISION	(1) Document Number WHC-SD-WM-EV-077	Page 1

(2) Title

241-A TANK FARM COOLING WATER SAMPLING AND ANALYSIS PLAN

CHANGE CONTROL RECORD

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WHC-SD-WM-EV-077, Rev 2

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Rev. 2

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241-A TANK FARM COOLING WATER SAMPLING AND ANALYSIS PLAN

November 16, 1992

Tank Farms Environmental Engineering

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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

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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 241-A Tank Farm Cooling Water Effluent. The effluent contains liquids from process ventilation cooling, air compressor cooling, emergency cooling and facility floor drains. The cooling water from the process ventilation condensers, which is monitored, is the only contributor used in a facility process area. The liquid effluent wastestream from 241-A Tank Farm (TF) 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 Site 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.

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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 cooling water contributions to the liquid effluents from the 241-A Tank Farm 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 shall be taken for the liquid effluent characterization 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 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 the condenser cooling water contributions to the effluent wastewater stream before it is discharged to the environment. The condenser cooling water represents the largest contribution to this effluent stream. 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 241-A Tank Farm Cooling Water 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.1 241-A Tank Farm Facility Description

The 241-A Tank Farm Complex is located in south-central Washington, along the east border of the 200 East Area of the Hanford Site. The facility of discussion consists of four, 1 million gallon tanks and their auxiliary systems, to which high-heat producing, high-level radioactive waste was sent and stored during metals processing campaigns at the Hanford Site.

Each of the 241-AY and -AZ Tank Farms, also known as the "aging waste" tank farms, has two underground double-shell tanks (DST) equipped with above-ground monitoring and control facilities. These DSTs are used for safe storage of high-level radioactive waste. The primary tank is 75 ft in diameter and the secondary tank is 80 ft in diameter. The dome is 45 ft 9 in. high at the dome center. Each tank has an internal steam coil. Although all four aging-waste tanks are equipped to store aging waste, only the two 241-AZ tanks currently contain aging waste. The 241-AY tanks, which contain other wastes, were completed in 1970. Tank 102-AZ was completed in 1974 and tank 101-AZ was finished in 1977. An aerial view of the tanks showing the position of the tanks relative to each other and the surrounding area is shown in Figure 2-1.

The aging waste tanks have a ventilation system and steam coils that are designed to allow heating the waste to maintain a desired liquid temperature or boiloff rate. The main purpose of the 241-A Tank Farm cooling condensers is to provide a cooling mechanism in this ventilation system to allow contaminated water vapors to be condensed and returned to the tank. Three shell and tube condensers are housed in the 241-A-401 Building located southeast of the tanks. The building is divided into the condenser cells, hot pipe gallery and the operating gallery where the raw water piping, instruments and controls are accessible.

B.2 Stream Description

The 241-A tank farm cooling water stream is made up of one major contributor, the condenser cooling water, and several smaller ones. The flow from all of the contributors merges at the warm water sump. This stream flow is then directed to the 216-B-3 Pond for soil column and evaporative disposal. The configuration of the contributors is illustrated in Figure 2-2. The following sections present a detailed description of each of the contributors.

B.2.1 Condenser Cooling Water

Exhaust gases from the aging-waste tank ventilation system are directed to the shell side of the condensers located in the 241-A-401 Building condenser facility. This contaminated vapor is maintained at a slight vacuum when compared with atmospheric pressure. Cooling water flows in the tube side of the condensers to allow heat transfer and the condensation of water vapors contained in the exhaust gases. The condensed water vapors are then returned to the aging-waste system.

The cooling water flowrate averages about 600 gal/min through the condensers, which represents over 98% of the total stream flow. The water is maintained at a positive pressure to ensure flow in the cooling water system. This pressure difference across the tubes (cooling water at the high pressure) precludes a leak of contaminants into the cooling water system. A leak would actually flow from the cooling water system into the condensed exhaust vapors of the ventilation system.

A proportional sampler is connected to the condenser cooling water discharge line in the 241-A-401 Building operating gallery as it flows into the warm water sump. A beta-gamma radiation monitor also exists on this line and is used to detect the presence of radionuclides in the stream. In the case of an alarm of this monitor, the wastestream flow to B-3 Pond is manually stopped and the emergency cooling water system (ECWS) is activated.

B.2.2 Emergency Cooling Water System

The ECWS is intended to provide cooling water to the condensers located in the 241-A-401 Building during an interruption of the raw water supply. The system involves the use of a closed-loop operation that includes a cooling tower as the source of heat removal capabilities. During operation of this system, cooling water from the condensers flows in the normal configuration to the warm water sump. The route of the cooling water is changed to then flow to the cooling tower. Evaporation and heat transfer to the air then occurs in the cooling tower and lowers the cooling water temperature. The cooling water is then returned to the cold sump where 90 gal/min of makeup water from a deep well is added to offset evaporation losses. The water from the cold water sump is then returned to the condensers for reuse in the system.

The contributors to the cooling water wastestream from the ECWS include the cold water sump overflow, makeup water bypass, ECWS blowdown, and the ECWS drain. The overflow line originates at the cold water sump and drains to the warm water sump. A bypass line exists to allow make-up water to be added directly to the warm water sump. The blowdown and drain lines originate from the warm water line to the cooling tower. Both of these lines drain to the warm water sump when in use. The use of the blowdown line leads to some discharge to B-3 Pond with makeup water brought in at the cold water sump.

The ECWS is normally inactive and during standard operation, makes no flow addition to the 241-A tank farm cooling water wastestream. The system is functionally tested on a frequency of once per month. Short-term raw water outages at a frequency of once or twice a year have occurred in the past, forcing operation of the ECWS. The system is also used once or twice a year to allow maintenance of the raw water system.

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B.2.3 Condenser Facility Floor Drain

The 241-A-401 Condenser Building floor drains discharge to the warm water sump. The Condenser Building discharges from drains in the operating gallery via a 4" drain line, to the warm water sump. Discharges to these drains consist of water from the service sink and safety shower. These contributions are sporadic in nature and attributes <1 gal/d on a normal basis. No hazardous materials or chemicals are stored or used in the 241-A-401 operating gallery. These drains discharge to the warm water sump via a 4" drain line.

B.2.4 Air Compressor Cooling Water

Many of the monitoring instruments in the 241-A Tank Farm, including level and pressure indicators, use compressed instrument air to function. Compressed air is also used in other equipment and processes. A supply of compressed air is essential for proper operation of the 241-A Tank Farm.

The air compressors require cooling water to keep the equipment at the proper operating temperature. Insufficient cooling water would allow the reciprocating parts to overheat and be damaged. The cooling water used is raw water from Columbia River that is supplied from the 200 East Area Powerhouse. If the raw water supply were interrupted sanitary water could be used for compressor cooling.

Two air compressor are located in the 241-A-701 Building. The air compressor stream consists of water that is not in proximity to any waste or hazardous materials. No chemicals are added to the cooling water. Cooling water discharge is estimated at approximately 5-10 gpm and is consistent even when the two compressors switch operating status. One discharge line connects the compressor building with the warm water sump.

These compressors are scheduled to be replaced. The new compressors will have closed loop cooling, eliminating compressor cooling water discharge.

Other contributors to the compressor cooling water stream include blowdown from the air receiver and dryer. The source of the water in the blowdown is water vapor from the air that condenses as the air is compressed. Flow contributions from the blowdown sources are intermittent and small (<1 gpm) when they occur. The impact is negligible both in terms of water volume and contaminant increase.

B.3 216-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 (Figure 2-3). This network of ditches and ponds receives miscellaneous wastewater effluents from several of the processing facilities on the Hanford Site.

All of the wastewater effluents being discharged to the B-Pond System travel through the 216-B-3-3 Ditch. 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 varies 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.

Figure 2-1 241-AY and 241-AZ Tank Farms

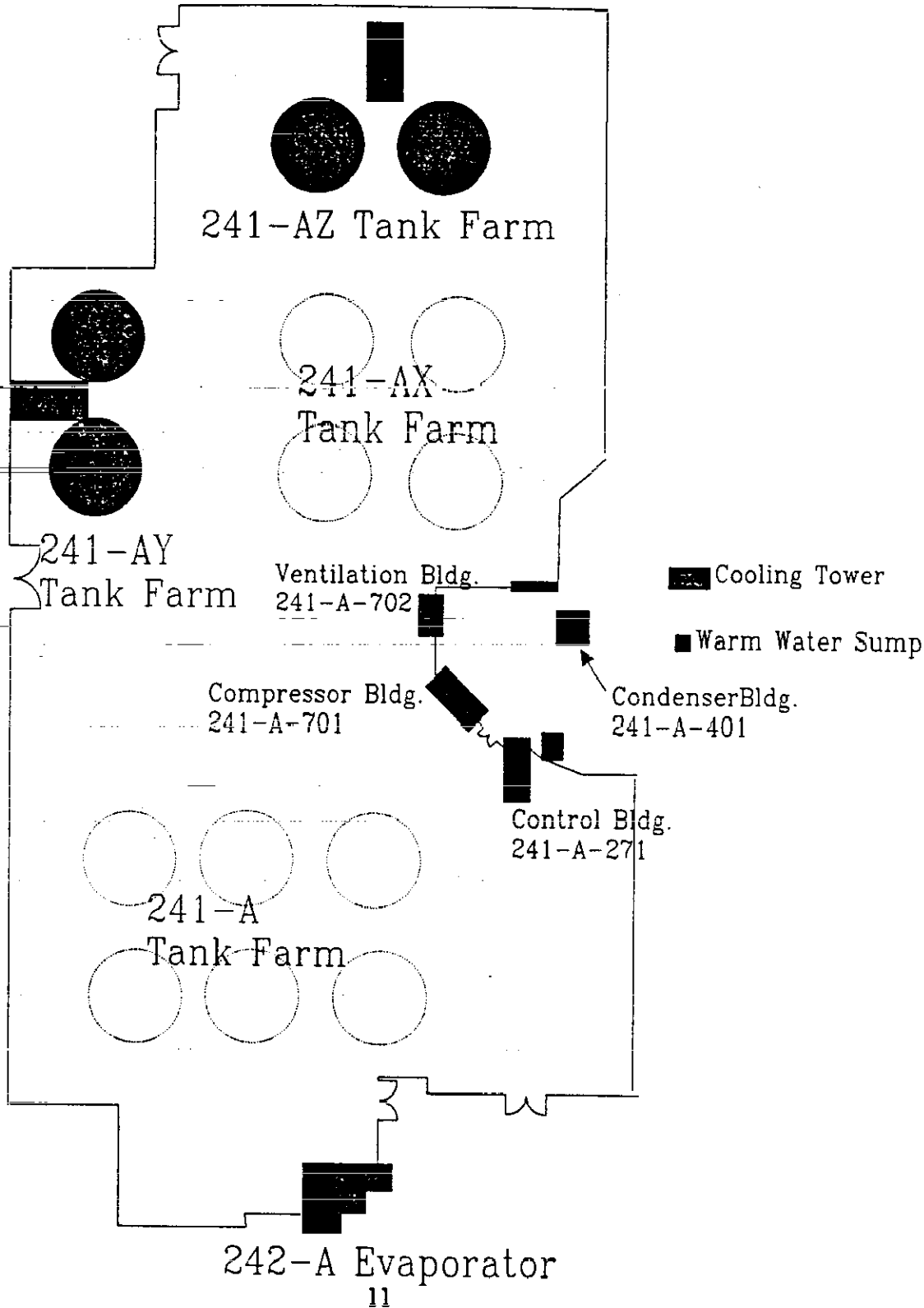


Figure 2-2 Cooling Water Stream Configuration

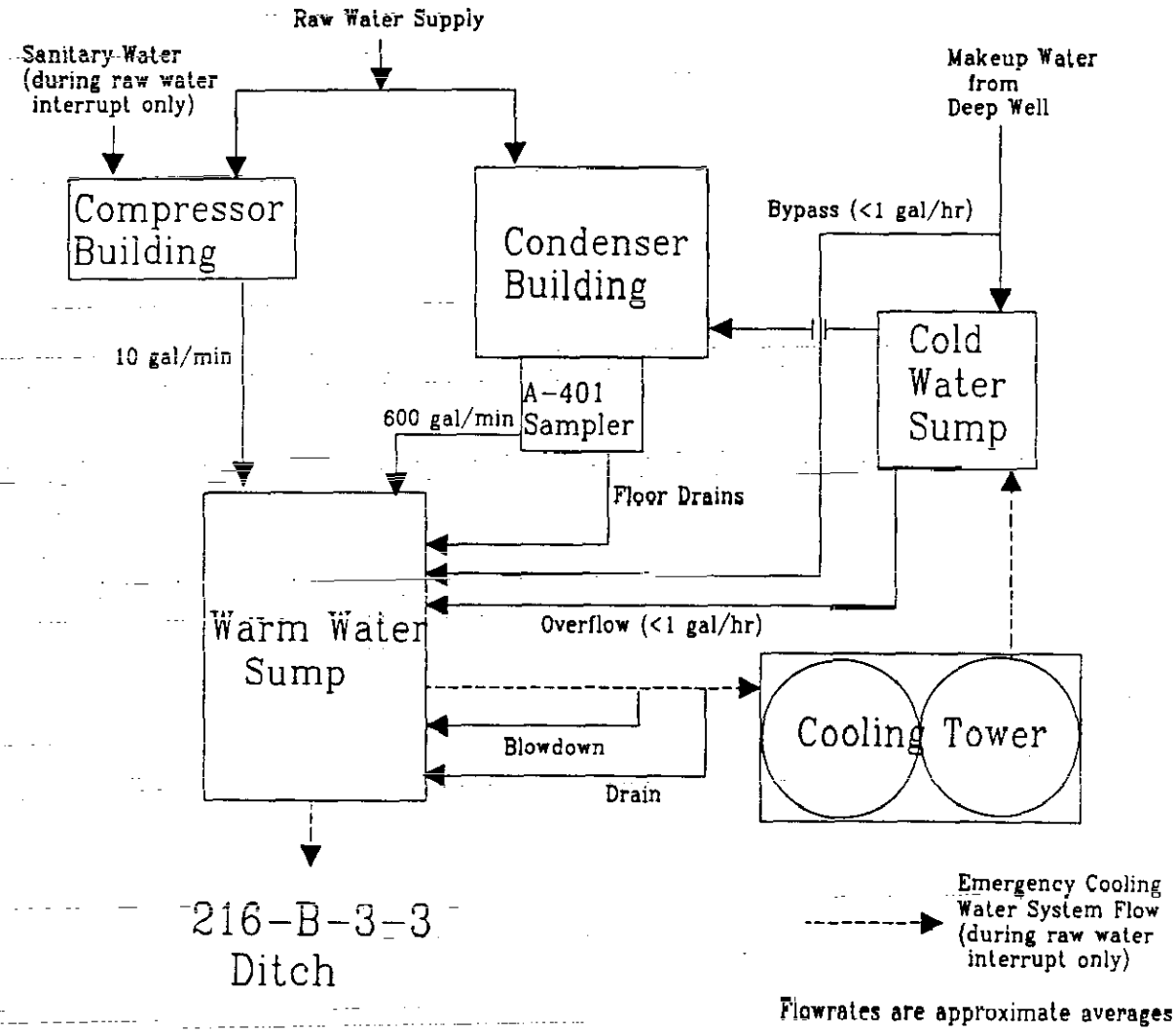
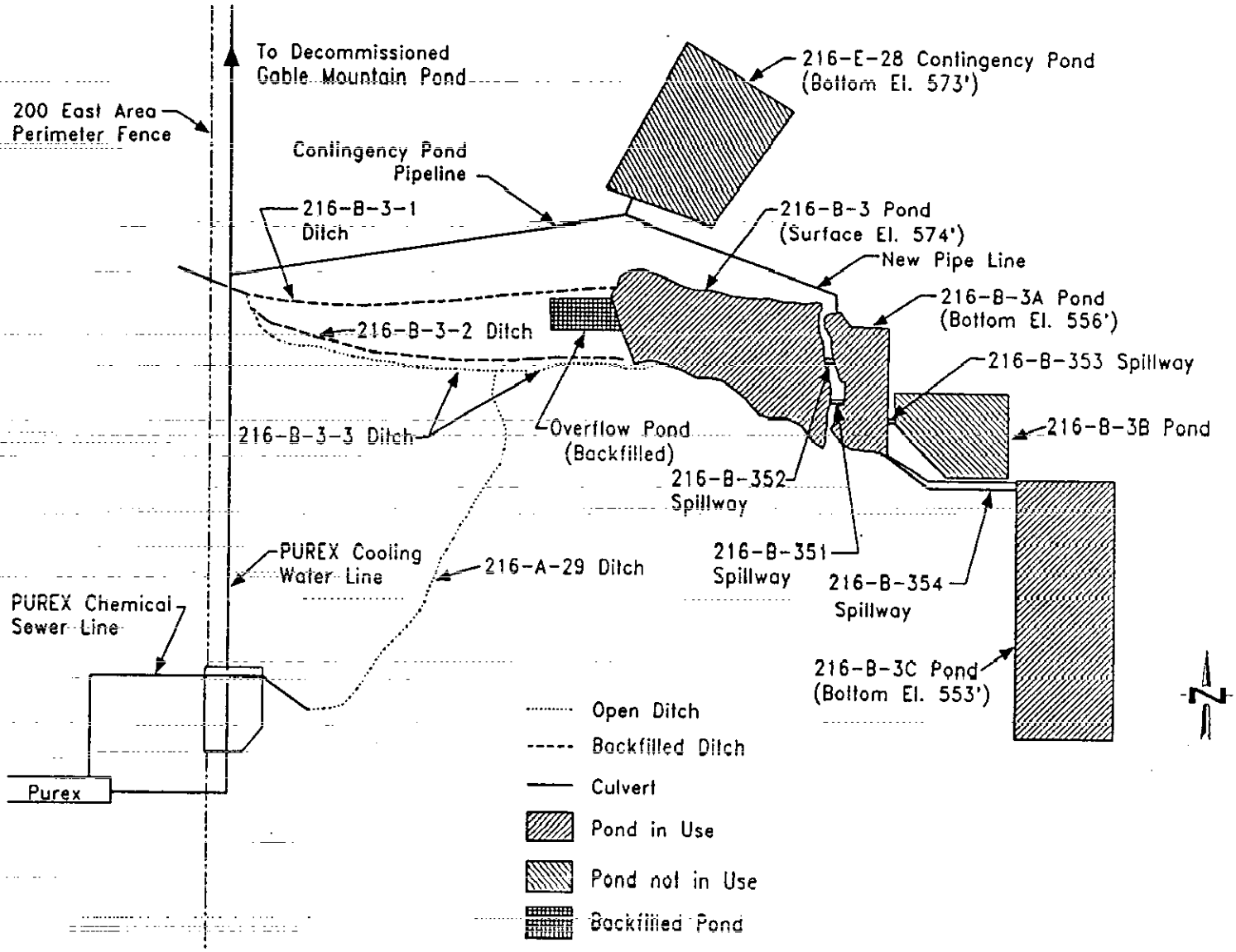


Figure 2-3 216-B-3 Pond System



C. RESPONSIBILITIES

The responsibility descriptions below are related to characterization sampling activities occurring at the 241-A Tank Farm Facility. Overall responsibilities covering other areas are the same as found in the QAPP (WHC, 1992).

Tank Farm Environmental Engineering

- Prepare the Sampling and Analysis Plan.
- Insure procedures are updated to support the sampling activities.
- Provide the Sampling Task Leader.
- Initiate scheduling of personnel required for sampling.
- Provide technical support for sampling activities.
- Review data logs and sampling activities.
- Surveil chain of custody activities.
- Review liquid effluent characterization sampling data for completeness and consistency.
- 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).
- File routine sample data at the Plant and the EDMC.

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

Tank Farm Operations

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

Tank Farm Health Physics

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

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Sampling and Mobile Laboratories

- Approve Sampling And Analysis Plan.
- Provide trained samplers for liquid effluent characterization sampling activities. One sampler shall have a WHC Certificate of Qualification from the Sampling & Mobile Laboratories organization. The certified sampler shall direct liquid effluent characterization sampling, packaging and shipping.
- Prepare the Plant liquid effluent characterization sampling and packaging 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 filed with sampling task leader.

Quality Assurance (QA)

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

D. SAMPLING LOCATION AND FREQUENCY

D.1 Sampling Location

Total stream composition data is the most valuable in meeting the objectives stated in Section A.2. The contributors to this stream are not used in waste processing operations, are not used in areas subject to hazardous materials spills and, through knowledge of the process, should remain unaltered from their common source. None of the contributors varies enough in quantity or characteristics to warrant sampling at the various sources. Individual contributor sampling would not provide additional useful data in meeting the stated objectives.

Grab samples of the combined stream can be obtained in the warm water sump. Grab samples are justified for this stream since the contributors are consistent in source, flowrate and operation. The only variation to the stream is when the ECWS is used. This will be addressed by taking samples under both operating conditions. The variation in operating conditions is not expected to contribute significantly to any difference in stream composition, however, the source of the ECWS makeup water is from a groundwater well, whereas, raw water comes from the river.

In addition to the effluent sampling locations, 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 determined, one location will be chosen to obtain any additional raw water samples.

D.2 Frequency

Two liquid effluent characterization samples shall be taken for each mode of operation per year for the first two years, following the approval of this document, to provide a baseline characterization. This means that two samples of the cooling water under normal operation (raw water cooling) and two samples of the cooling water during ECWS operation will be taken, each year. The SAP shall be revised based on the results of the baseline characterization sampling.

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 241-A Tank Farm cooling water wastestream is not expected to vary over time and the chosen frequency will verify this assumption. In addition, this wastestream is not expected to vary seasonally in composition and sampling will be performed to verify that assumption. Sampling will be performed to represent, both, summer and winter operation. 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 241-A Tank Farm Facility Cooling Water wastestream sampling shall be coordinated with other Tank Farm facility sampling events in order to minimize the amount of field duplicates and field blanks which have to be sampled and analyzed.

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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; sample matrix; 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 condenser cooling water 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-080-270, "Perform 241-A-401 Condenser Cooling Water Sampling."

The general numbering method is as follows:

CA8 - (serial number)
CA8 COMPOSITE - (serial number)

CA8 = 401-A Condenser cooling water daily sample designation
CA8 COMPOSITE = 401-A Condenser cooling water monthly composite sample designation
Serial number = Sequential number provided by Tank Farm Operations

F. SAMPLING EQUIPMENT AND PROCEDURES

F.1 Effluent Characterization Samples

The liquid effluent characterization sampling activities will comply with a specific procedure prepared for the sampling of the 241-A Tank Farm cooling water effluent stream. This procedure will be based on recommended practices found in SW-846, Chapter 10, Sampling Methods (latest edition). The procedure is being developed by TFEE and 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 of the 241-A effluent from the warm water sump may be done using the dipper method as described in SW-846, latest edition. In this method the sump cover will be removed and the cup lowered into the sump by a pole. When the cup has filled as much as possible, it is retrieved from the sample pit and the prescribed sample bottles are filled with the sampled liquid. This is repeated as necessary until all the sample bottles are full.

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 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 field 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-080-270, "Perform 241-A-401 Condenser Cooling Water Sampling."

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.

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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
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

Analyte List	Method of Analysis
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 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-080-270, "Perform 241-A-401 Condenser Cooling Water Sampling." 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, total alpha, and 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, 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.

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INFORMATION RELEASE REQUEST

References: WHC-CM-3-4

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Purpose

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