STAR

ENGINEERING CHANGE NOTICE

Page 1 of 2

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Proj. ECN

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12. Description of Change

THE ENTIRE DOCUMENT, WHC-SD-WM-EV-076, REV. 1, IS BEING REPLACED WITH WHC-SD-WM-EV-076, REV. 2

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13a. Justification (mark one)	Criteria Change	[X]	Environmental	[]	Facilitate Const.	[]	
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13b. Justification Details

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ENGINEERING CHANGE NOTICE

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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

OPERATIONS AND ENGINEERING	Signature	Date	ARCHITECT-ENGINEER	Signature	Date
Cog./Project Engineer *	TFE CMKell	11/17/92	PE		
Cog./Project Engr. Mgr. *	CMKell for GT Berlinger Telecon	11/18/92	QA		
QA *	TM Whelan	11/18/92	Safety		
Safety (POST REVIEW)*			Design		
Security			Other	Sampling & Mobile Labs Jeanette Hyatt for CD Mensek-Beyer	11/19/92
Proj. Prog./Dept. Mgr. *		11/20/92			
Def. React. Div.			HASM	Michelle Hendrix	11/19/92
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Adv. React. Dev. Div.			*		
Proj. Dept.					
Environ. Div.		11-19-92	ADDITIONAL		
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INFORMATION RELEASE REQUEST

References: WHC-CM-3-4

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Author/Requestor (Printed/Signature): C. M. Loll — Date: 11/17/92

Responsible Manager (Printed/Signature): G. T. Berlin — Date: 11/19/92

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Liquid effluent sampling, analysis, 244-AR	Craig M Loll Name (Type or Print) Craig M Loll Signature 7C420 / A2D88 Organization/Charge Code

7. Abstract

There are two main contributors to the 244-AR Vault liquid effluent that is discharged to the 216-B-3 Pond. The source, volumes and controls for these 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

RECORD OF REVISION	(1) Document Number WHC-SD-WM-EV-076	Page 1 ~~OF 1~~

(2) Title
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244-AR VAULT 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 244-AR Vault cooling water effluent wastestream. The effluent contains liquids from building heating and cooling, vessel ventilation heating steam condensate, and air compressor cooling water. 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 (WHC 1992). 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 (COC), 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.

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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 liquid effluents from the 244-AR Vault 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 procedures 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 244-AR Vault 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 grab samples taken by a trained facility operator to monitor all the effluent wastewater stream before it is 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 244-AR Vault 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.

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B. SITE BACKGROUND

This section contains a brief facility description of the 244-AR Vault, a description of its processes and the resulting wastewater discharges, and the receiving site, the 216-B-3 Pond System.

B.1 244-AR Vault Facility Description

The 244-AR Vault 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 2-3).

The 244-AR Vault is a canyon-type structure with three below-grade cells containing four waste storage tanks. Two of the cells contain a single tank each, with a nominal volume of 50,000 gallons per tank. The third cell contains two tanks, each with a volume of 5,000 gallons. All four tanks have mixing, cooling, and discharge pump capabilities. The facility layout is shown in Figure 2-1.

244-AR Vault is currently in standby operational mode. Prior to December 1991, 244-AR Vault was planned to be used as an interim storage facility for neutralized current acid waste (NCAW) going to the pretreatment plant. Subsequent to December 1991 it is uncertain as to the mission of the 244-AR Vault. The final decision is expected in August 1993 based on TPA milestone M-02-03. The facility will remain in standby until a final decision on its use in the pretreatment system is made.

Historically, 244-AR Vault was used for a similar interim storage purpose in the transfer of tank waste to B Plant for removal of cesium and strontium. Waste from tank sluicing was stored and treated in the 244-AR Vault tanks prior to transfer to B Plant.

B.2 Stream Description

In the present standby mode of operation the only contributors to the stream are from the HVAC system cooling and heating, and a standby air compressor. Additional contributors from the closed-loop cooling system for the tanks would become active if 244-AR were used in the pretreatment system. The closed-loop cooling contributors will not be described in this section since the current operational status is expected to continue for the sampling detailed in this plan. If the facility does become active, this plan will be updated to include the additional contributors.

The liquid effluent wastestream consists entirely of non-contact steam condensate and cooling water. Hard piping of contributors from the source to discharge point provides a control against the inadvertent addition of hazardous material/waste to this effluent stream. In addition, there are no hazardous materials presently used at this facility, with the exception of occasional household cleaning agents. The only contaminants which are expected to be present are those found in the original source and traces of corrosion products from the piping system such as zinc, copper, nickel, chromium and lead. The current stream contributors are illustrated in Figure 2-2, and are described in the following subsections.

B.2.1 HVAC Steam Condensate

Steam coil heaters are used on a seasonal basis to provide the proper temperature for occupied areas as well as protect equipment. The steam heaters function by blowing air over steam filled coils in the heater. Condensate that is formed in the closed coils is discharged through a steam trap into a drain line. Drain lines from all the heaters in the HVAC room combine in one pipe leaving the room.

There are several steam traps in the lines feeding the steam heaters. These traps are in the control room and drain to sample pit. The flow rate from this contributor varies from 0 to a maximum of 10 gpm based on steam consumption ratings of the equipment.

All equipment associated with the HVAC steam condensate are separated from the process operations portion of 244-AR. Dangerous waste or hazardous materials are not present in the HVAC and control rooms and the areas are not subject to spills.

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B.2.2 HVAC Cooling Water

An evaporative cooler is used on a seasonal basis to provide the proper temperature for personnel occupied areas as well as protect equipment. In the HVAC coolers, water is sprayed into the air stream and the subsequent evaporation and saturation cools the air to the desired temperature. Any water not evaporated is collected at the bottom of the washer and a pump recycles it to the sprayer. The only effluent from the washer is an overflow drain line. The overflow drain line joins the steam condensate drain lines and flows to the sample pit.

Flow rate from this contributor can vary from 0 to an estimated maximum of 10 gpm. Any flow from this contributor is intermittent and dependent upon seasonal temperatures. All equipment and lines are in a room separate from the area of the facility that is used for waste processing. No activities are carried out in the HVAC room that would cause the introduction of contaminants to the streams.

B.2.3 Vessel Vent Steam Condensate

The vessel vent system provides controlled ventilation of the canyon vessels. When 244-AR is in operating mode the ventilation serves two purposes, it vents the purge air from the tanks, and keeps them at a relative negative pressure to provide additional contamination control.

Steam condensate comes from a steam heater in the filter vault which heats the exiting airstream as it passes through. Heating the exhaust air protects the HEPA and other downstream ventilation equipment by preventing moisture from condensing on them. The steam condensate is the only contributor from this system.

Figure 2-1 244-AR Vault Layout

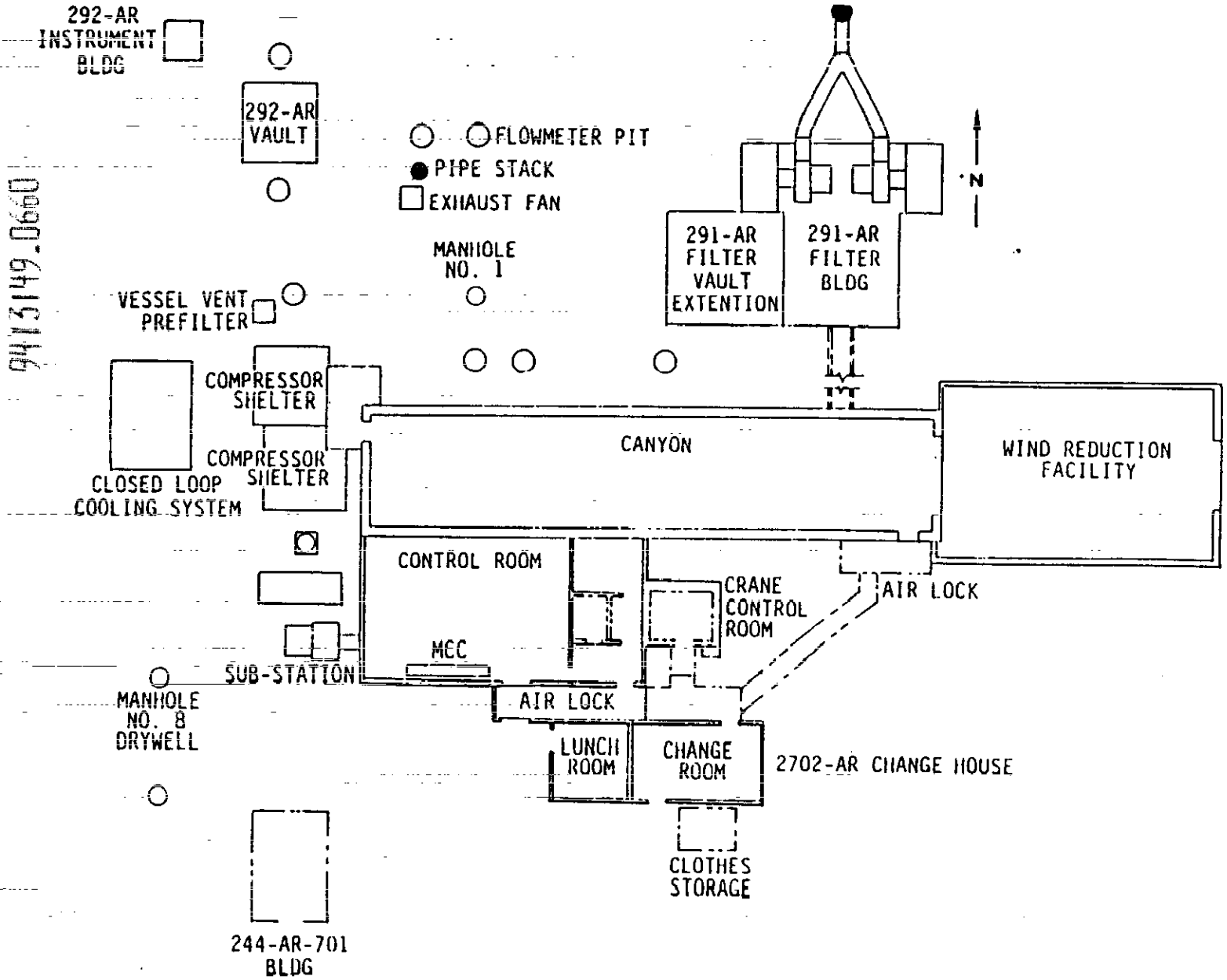

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Figure 2-2 244-AR Vault Cooling Water Configuration

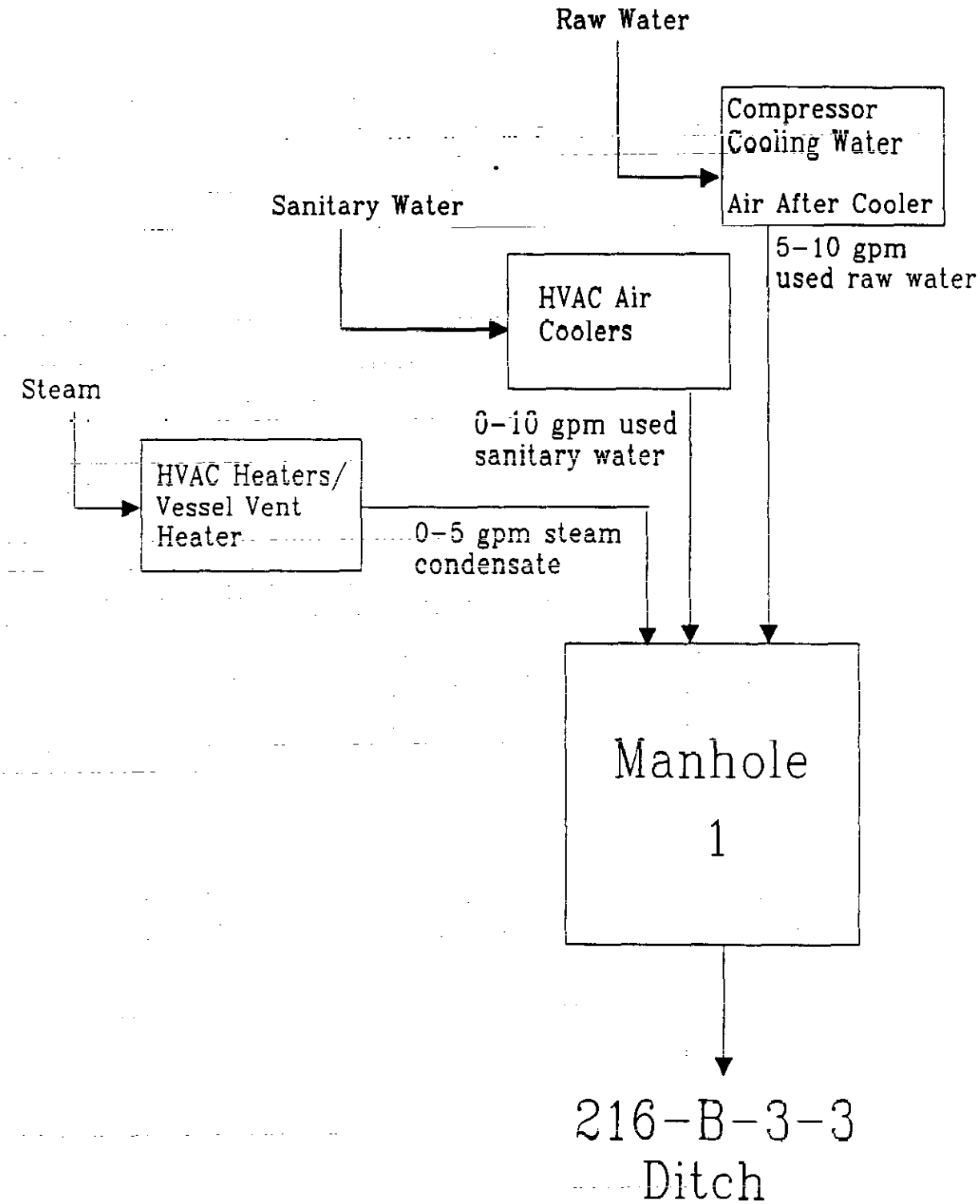
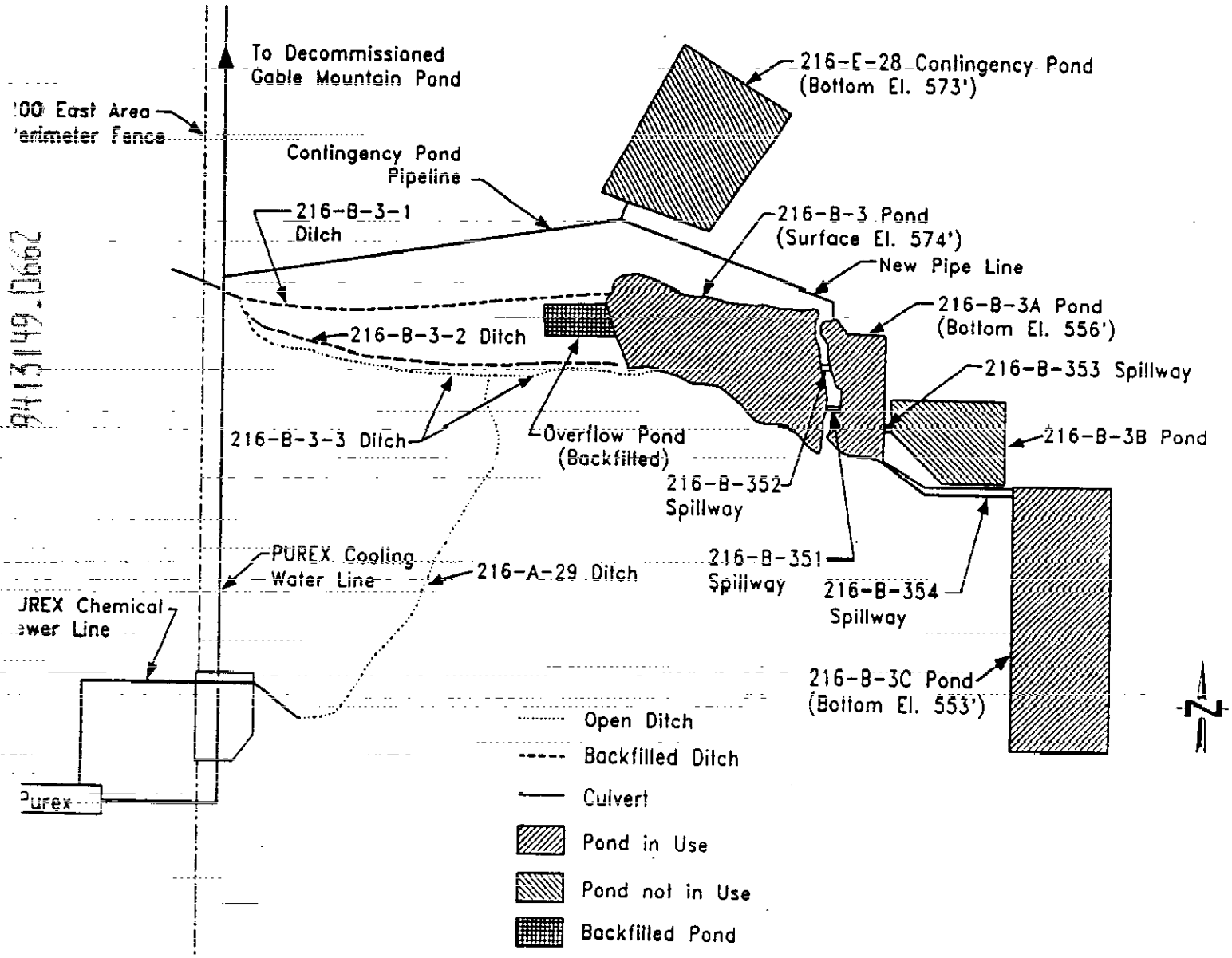


Figure 2-3 216-B-3 Pond System



In the heater, the steam is maintained at a higher pressure than the exhaust air. This pressure differential prevents the contamination of the steam system (and resulting steam condensate) from potentially contaminated exhaust air. If a leak were to occur in the heater, steam would enter the exhaust system rather than exhaust air entering the steam. The maximum flow rate from this system is 5 gpm based on the design maximum steam consumption.

B.2.4 Compressor Cooling Water

There are two air compressors in the air compressor building on the west side of the canyon building. The main compressor has closed-loop cooling and does not contribute to the 244-AR effluent. The backup, which requires cooling water, comes on to supply building instruments with air in the event the main compressor is not running. There is a planned upgrade which would replace the existing backup compressor with one using closed-loop cooling, eliminating compressor liquid effluent contributions altogether. If the backup compressor is repaired and returned to service before the closed-loop cooling is installed it would contribute about 5 gpm of cooling water when it operated.

The compressed air after cooler reduces the temperature of the air provided by the compressors prior to its use in the building. Raw water is used to cool the air in a heat exchanger. The after cooler effluent goes to the compressor cooling water line and to the sample pit. This effluent contributes 2 to 3 gpm consistently.

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. 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 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 of 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 characterization sampling activities occurring at the 244-AR Vault Facility. Overall responsibilities covering other areas are the same as found in the QAPP (WHC 1992).

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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.

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.

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 Laboratories organization. The certified 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.

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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

The contributors to this stream consist exclusively of non-contact steam condensate and cooling water. They are not used in waste processing operations, and are not subject to the introduction of hazardous materials. 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, so total stream composition data is the most valuable in meeting the objectives stated in Section A.2.

Liquid effluent characterization and routine samples of the combined stream will be obtained in the sample pit (manhole 1) adjacent to the 2904-AR building north of the canyon building. Flowrate for the overall liquid effluent waste stream will be determined from a notched weir located within this sample pit.

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 determined, one location will be chosen to obtain any additional raw water samples.

D.2 Frequency

Four liquid effluent characterization samples will be taken over two years, following approval of this document, to provide a baseline characterization. Baseline samples shall be scheduled so that the seasonal change in equipment operation (ie., HVAC heating vs. cooling), is accounted for. The SAP shall be revised based on the results of the baseline characterization sampling.

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

The contributors to the stream are consistent in the current operational mode and no change in operating status is expected. If there is a major change in stream configuration, such as additional contributors from an operating mode change, two samples will be taken to assess any changes to the overall stream.

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; the sample matrix; preservative added; date and time the sample was collected; the place the sample was collected; the stream identification; 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.

E.2 Routine Sample Labeling

The numbers on the label will be assigned by Tank Farm Operations per the sample schedule in WHC Procedure TO-080-320, "Sample 244-AR Vault Cooling Water."

The general numbering method is as follows:

CAR - (serial number)
CAR COMPOSITE - (serial number)

CAR = 244-AR Vault daily sample designation
CAR COMPOSITE = 244-AR Vault 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 244-AR Vault cooling water effluent stream. This procedure will be based on recommended practices found in SW-846, Chapter 10, Sampling Methods (latest revision). The formal sampling procedure for this stream is being developed by TFEE and the S&ML, and will be 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. Surveillance will be performed on sampling activities at random by a cognizant Quality Assurance person.

Sampling of the 244-AR effluent from the sampling pit may be done using the dipper method as described in SW-846, latest revision. In this method the sample pit cover will be removed and the cup lowered into the sample pit 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. There is not preventive maintenance required for this sampling equipment.

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 into 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 field logbook.

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F.2 Routine Samples

The routine process sampling shall be completed by the Tank Farm Facility operators trained to comply with WHC Procedure TO-080-320, "Sample 244-AR Vault Cooling Water."

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.

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

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Analyte List	Method of Analysis
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	
Tin-113	

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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, Ruthenium-Rhodium-106, and Tin-113, are identified using the same analytical method as is used on 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.

6.2 Routine Samples

The handling of samples shall be according to the WHC Procedure TO-080-320, "Sample 244-AR Vault Cooling Water." 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.

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