0021627

START

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 169211

Proj. ECN

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Cancel/Void	[]	Direct Revision	[x]	Temporary	[]	Discovery	[]

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C. M. LOLL, Tank Farms Environmental Engineering, R1-51, 3-5039

4. Date
April 28, 1992

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244-AR VAULT COOLING WATER SAMPLING AND ANALYSIS PLAN

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11b. Work Package Doc. No.
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11c. Complete Installation Work
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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-076, REV. 0, IS BEING REPLACED WITH WHC-SD-WM-EV-076, REV. 1

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

13b. Justification Details
INCORPORATION OF COMMENTS WHICH WERE NOT PRESENTED AT THE TIME OF ORIGINAL RELEASE.

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

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Engineering Change Notice

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

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1): 169211

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 [1 WK]

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 * Craig M Ladd	4/28/92	PE	
Cog./Project Engr. Mgr. * Joel Rasmussen	4/29/92	QA	
QA * [illegible]	4/29/92	Safety	
Safety (POST REVIEW)*		Design	
Security		Other	
Proj. Prog./Dept. Mgr. * S M Mangan	4/29/92		
Def. React. Div.			
Chem. Proc. Div.			
Def. Wst. Mgmt. Div.		DEPARTMENT OF ENERGY	
Adv. React. Dev. Div.		* C.V. Banks for J.C. Peschong C. V. Banks for J.C. Peschong	4.29.92
Proj. Dept.			
Environ. Div. J M Nichols	4/29/92	ADDITIONAL	4/29/92
IRM Dept.			
Facility Rep. (Ops.) * [illegible]	4/29/92		
Other RA Dodd Facility Cog Eng.	4/28/92		
J.E. Hyatt [illegible] Sci Sampling & Mobile Labs	4/29/92		

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SUPPORTING DOCUMENT

1. Total Pages 21 ~~20~~

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Liquid effluent sampling, analysis, 244-AR

6. Author

Name: C. M. Loll

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Signature

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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.

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

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9. Impact Level

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10. Authorized Manager's Name

J. A. Eacker

Joel A Eacker
Authorized Manager's Signature

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CHANGE CONTROL RECORD

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WHC-SD-WM-EV-076
REV. 1

244-AR VAULT COOLING WATER SAMPLING AND ANALYSIS PLAN

April 27, 1992

Tank Farms Environmental Engineering

TABLE OF CONTENTS

Acronyms/Abbreviations

COC	Chain-of-custody
CY	Calendar year
DQO	Data quality objective
DST	Double-shell tanks
ECWS	Emergency cooling water system
ETP	Effluent Treatment Programs
EDMC	Environmental Data Management Center
Ecology	Washington Department of Ecology
HEIS	Hanford Environmental Information System
ICP	Inductively coupled plasma
QA	Quality Assurance
QAPjP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation & Recovery Act
SAP	Sampling and Analysis Plan
S&ML	Sampling & Mobile Laboratory
SOW	Statement of work
SD	Supporting Document
TFEE	Tank Farms Environmental Engineering
TOC	Total organic carbon
TOX	Total organic halides
TPA	Tri-Party Agreement
VOA	Volatile organic analysis
WAC	Washington Administrative Code
WM	Waste Management
WHC	Westinghouse Hanford Company

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared for the 244-AR Vault Cooling Water effluent stream as required by the May 21, 1991 proposed amendments to the Hanford Federal Facility Agreement and Consent Order, (Ecology et al. 1989), otherwise known as the Tri-Party Agreement (TPA). In addition, Washington Department Of Ecology (Ecology) 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.

This SAP documents the methods and frequency of sampling and the requirements for laboratory analysis, in order to determine the constituents of the 244-AR Vault cooling water wastestream. It has been developed in accordance with the Liquid Effluent Sampling Quality Assurance Project Plan (QAPjP), WHC-SD-WM-QAPP-011 (latest revision). The QAPjP is intended to ensure that procedures are implemented and that the sampling and analysis work is performed to the proper level of control in order to meet the data quality objectives (DQO) which it describes. The SAP shall take precedence over the QAPjP in the implementation of specific responsibilities and methods, if discrepancies should exist.

2.0 OBJECTIVES

Sampling and analysis of 244-AR Vault wastestream is based on the following objectives.

- Provide data on chemical and radiological constituents to calculate loading and rate of migration to support the impact assessment of continued discharge.
- Provide data for Best Available Treatment - Economically Achievable evaluations and liquid effluent treatment system design, if needed.
- Provide data to support dangerous waste designation for the liquid effluents, if needed.

All changes to the sampling and analysis plan <u>after approval</u> shall be considered a class III change per the Hanford Tri-Party Agreement.

3.0 SITE BACKGROUND

This section contains a brief facility description of the 244-AR Vault, a description of the processes and the resulting wastewater discharges, and the receiving site, the 216-B-3 Pond System. The 244-AR Vault Facility is located along the east border of the 200 East Area of the Hanford Site, located in south-central Washington. The 216-B-3 Pond System is located just east of the 200 East Area boundary fence (see Figure 2-3).

3.1 FACILITY DESCRIPTION

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.

3.2 STREAM DESCRIPTION

In the present standby mode of operation the only contributors to the stream are from the HVAC system and air compressors. The individual contributors are described in the following sections.

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. Current stream contributors are illustrated in Figure 2-2.

Figure 2-1 244-AR Vault Layout

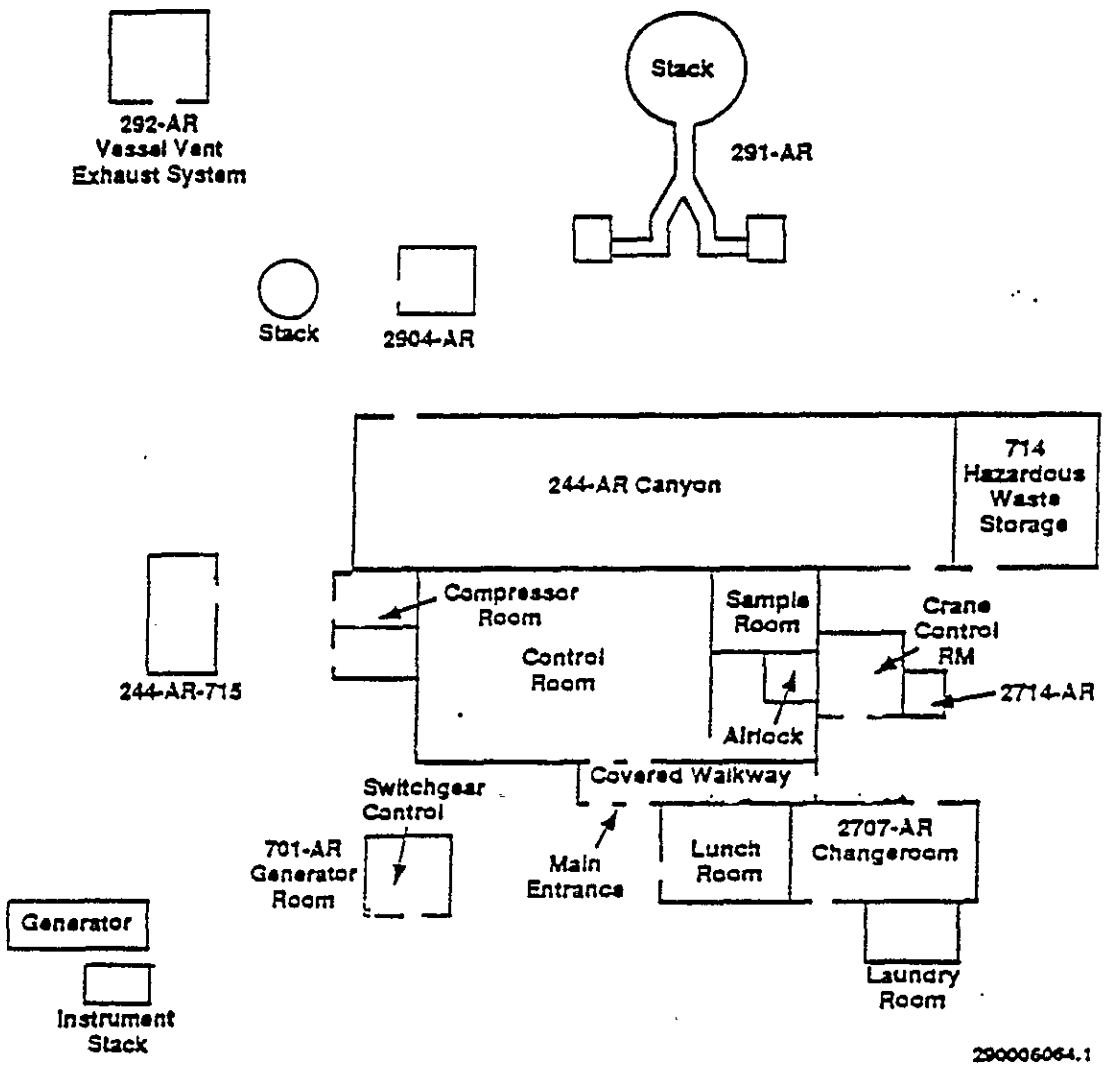
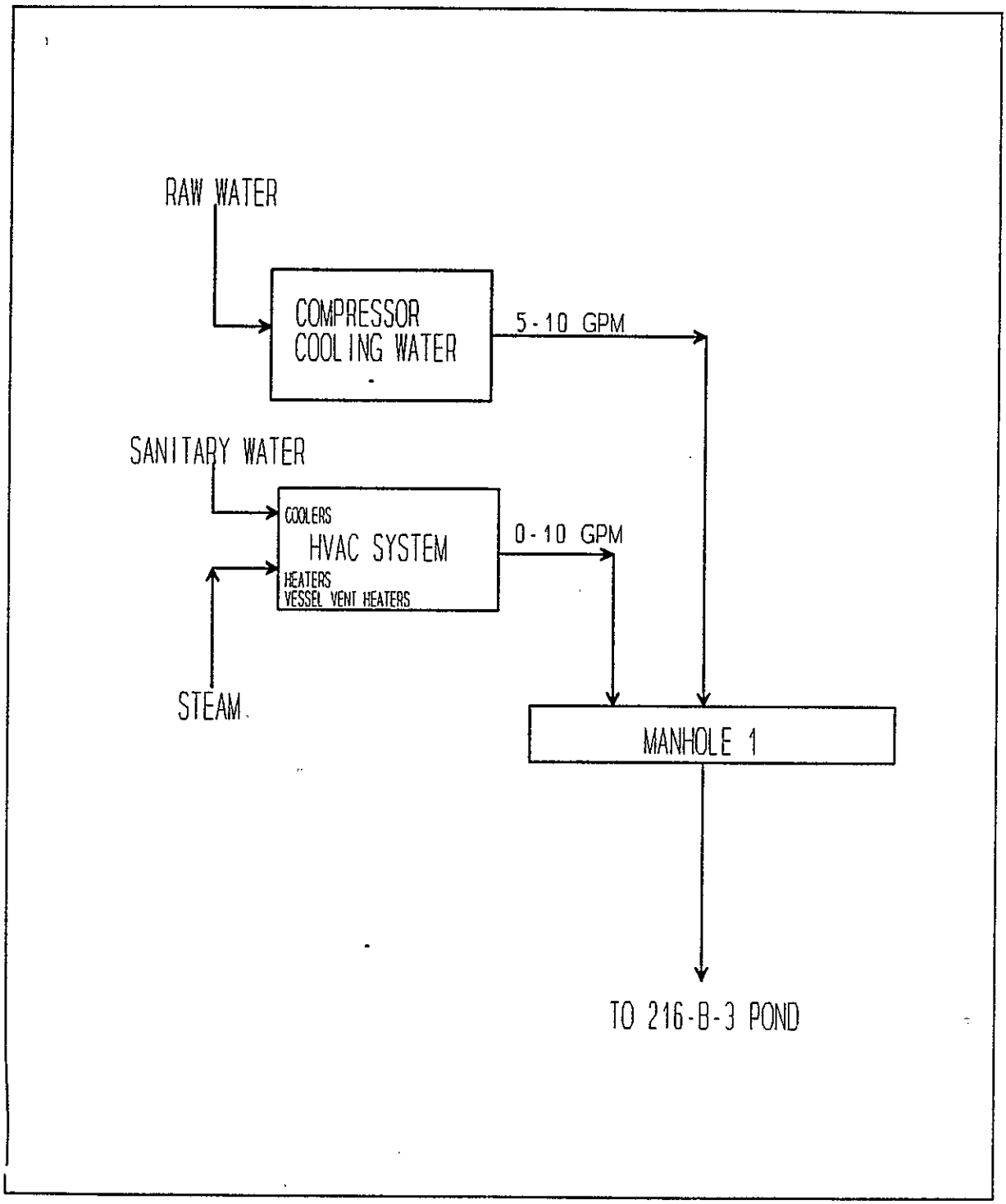


Figure 2-2 244-AR Vault Cooling Water Configuration



216-B-3 Pond System

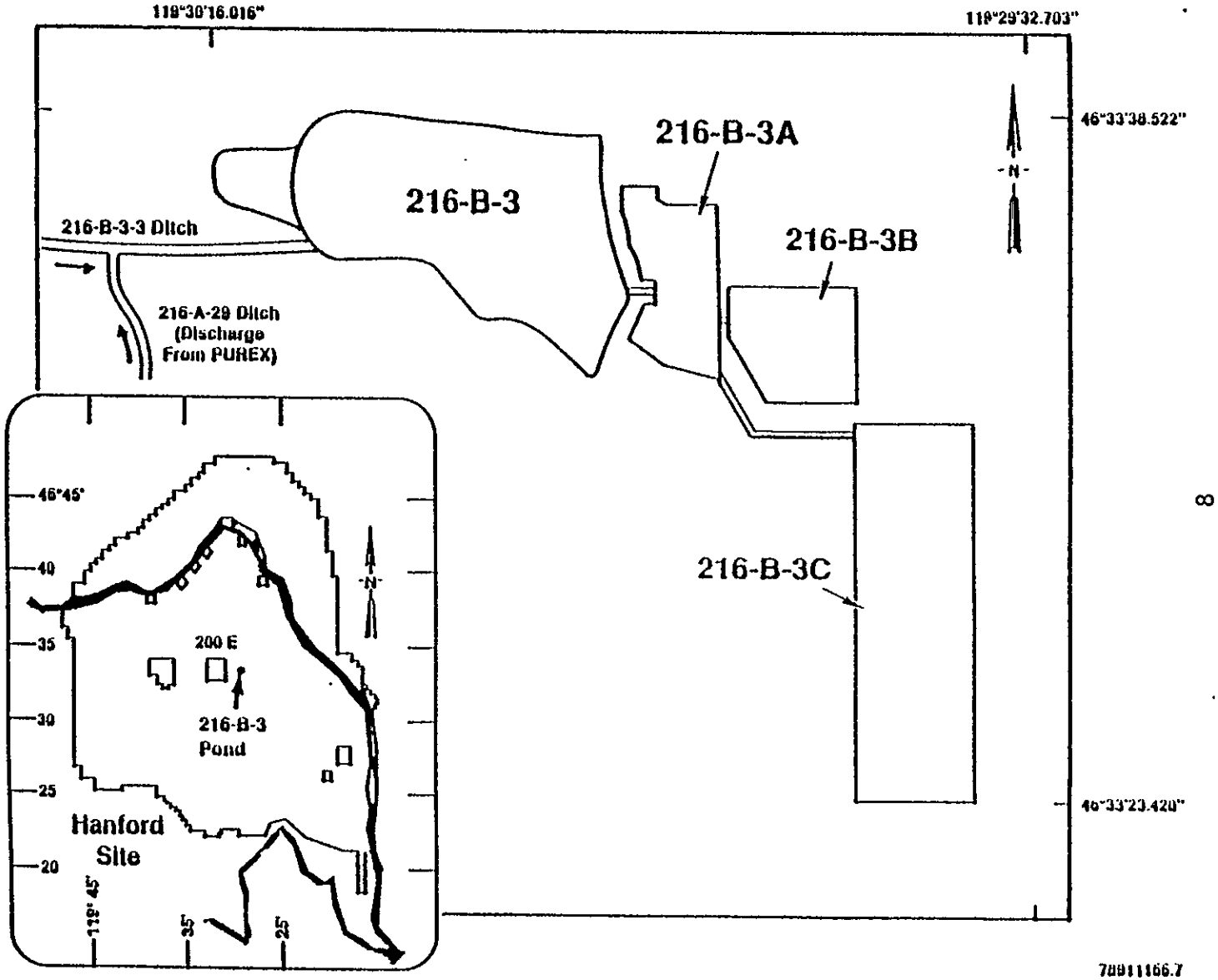


Figure 2-3 216-B-3 Pond System

3.2.1 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 steam consumption ratings of the equipment.

All equipments associated with the steam condensate are separated from the operating 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.

3.2.2 HVAC COOLING WATER

An evaporative cooler is used on a seasonal basis to provide the proper temperature for occupied areas as well as protect equipment. In the 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. The drains are hard piped and provide no access for sampling. 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.

3.2.3 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, vents the purge air from the tanks and keeps them at a relative negative pressure to provide additional contamination control.

The steam condensate comes from a steam heater in the filter vault. Heating the exhaust air prevents moisture from condensating and protects the HEPA and other downstream ventilation equipment. The only effluent in this system is the condensate from the steam heater. In the heater the steam is maintained at a higher pressure than the exhaust air. This provides another control to assure the condensate would not become contaminated even if the heater coil were to get a leak. The maximum flow rate from this system is 5 gpm based on the design maximum steam consumption.

3.2.4 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, is not currently functional but it is scheduled to be repaired. There is also a planned upgrade to this compressor that would provide closed loop cooling. If the backup compressor is repaired and returned to service before the closed loop cooling is installed it would contribute about 10 gpm of cooling water when it operated.

The compressed air after cooler reduces the temperature of the air 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.

3.3 RECEIVING SITE DESCRIPTION

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 this first lobe runs into the second lobe, 3A. This lobe covers approximately 11 acres and is about 2.0 ft deep. Overflow from 3A runs into the 3C Pond, 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.

4.0 RESPONSIBILITIES

Sampling will be performed by technicians from the Sampling & Mobile Laboratories (S&ML) group. All sampling will meet the quality assurance requirements of SW-846 (the latest promulgated version). The sampling group technicians have the proper training and experience necessary to perform protocol sampling. This includes training in sample security, preservation and shipping, and maintaining a field logbook.

A laboratory will be selected by Effluent Treatment Programs (ETP), or its designee, to perform analysis of samples taken under the Hanford liquid effluent program. This laboratory must meet the criteria of this Sampling and Analysis Plan and the Liquid Effluent Sampling QAPjP (latest revision). ETP, or its designee, shall coordinate sample shipment to the selected laboratory with the sampling group. Data from the analyses will be validated by a qualified contractor chosen by ETP. Data will be validated according to the approved WHC procedure.

Tank Farm Environmental Engineering (TFEE) is responsible for preparation and maintenance of this plan. Any revisions required by changes to the process, sampling method or parameters to be analyzed will be initiated by TFEE.

The TFEE engineer appointed by the manager as responsible for liquid effluents will be the sampling task leader. Responsibilities include scheduling the sampling according to the frequency established in this document, ensuring that appropriate equipment and personnel will be available for the sampling and that sampling is done according to established procedures.

TFEE will receive the validated data package and ensure that the data is filed with the Environmental Data Management Center (EDMC). TFEE is responsible to evaluate the data for any significant changes from previous sampling activities or expected results.

5.0 SAMPLING LOCATION AND FREQUENCY

5.1 LOCATION

Total stream composition data is the most valuable in meeting the objectives stated in Section 1.0. The contributors to this stream are not used in waste processing operations, are not used in areas subject to hazardous materials spills and are 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 sample pit (manhole 1) adjacent to the 2904-AR building north of the canyon building. Grab samples are justified for this stream since the contributors are consistent in source, flowrate and operation. The only possible variation would be seasonal, as the HVAC steam heaters and evaporative coolers are operated on a seasonal basis. This will be addressed through sample event scheduling but does not affect the justification for grab sampling. Based on this justification only combined stream grab samples will be taken.

5.2 FREQUENCY

Four samples will be taken within one year following approval of this document to provide a baseline characterization. Baseline samples shall be at least one month apart, with at least on sample in the first quarter (CY) and at least one in the third quarter. Unless the baseline suggests otherwise, a protocol sample of the 244-AR Vault wastestream will be taken once each year thereafter. 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.

6.0 SAMPLING EQUIPMENT AND PROCEDURES

Sampling of the 244-AR effluent from the sampling pit will be done using the dipper method as described in SW-846. 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. A formal sampling procedure for this stream is being developed by TFEE and the S&ML. The procedure will be completed prior to the first sampling. The sampling will be performed by technicians trained in all phases of RCRA protocol, according to the requirements of SW-846, including sampling techniques, preservation, labeling and documentation. There is not preventive maintenance required for this sampling equipment.

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.

Field blanks, trip blanks and duplicate samples will be used as part of the QC program for this sampling activity. The QC samples will be taken as described in the QAPjP, Section 10.0, and the information below.

Volatile organic analysis (VOA), semi-VOA and ICP metal field blanks will be prepared for each baseline sampling event. The bottles will be preserved as specified for these analyses. Each bottle will be opened in the field and filled with pure reagent water. The blanks will then accompany the samples for transport, handling and analysis.

A VOA trip blank will be prepared during each sampling activity. The bottle will be preserved as specified for these analyses. Each bottle will be filled and sealed then accompany the batch of containers to the sampling site. The blank will remain unopened in the field and return with the sample containers to the lab.

Duplicate samples of this stream constituents will be taken during one of the first two sampling events. The duplicate samples will be taken by the same method and handled in the same fashion. The sampling of the 244-AR effluent will be coordinated with the Tank Farm sampling activities so that there will be duplicate sampling for each of the first two batches. Additional duplicate sampling will be determined based on the results of the first two batches.

Sample bottles shall be new commercially available certified precleaned glass or plastic bottles. The sample volumes and number of containers are prescribed by the analytical laboratory and are subject to change. Tentative sample volumes for the samples are:

- 125 ml plastic containers with teflon[1] lined cap, no preservative for anions
- 500 ml plastic container with teflon lined cap, pH<2 by nitric acid preservative for Inductive Coupled Plasma Metals

[1] Teflon is a trademark of the DuPont de Nemours & Co, Wilmingtion, Delaware.

- 250 ml plastic containers with teflon lined cap, pH<2 by nitric acid preservative for Atomic Absorption Metals
- 500 ml plastic container with teflon lined cap, pH<2 by nitric acid preservative for mercury
- 40 ml amber glass containers with septum cap (teflon lined), for Volatile Organics
- 1 liter amber glass containers with teflon lined cap for Semi-volatile organics
- 250 ml amber glass container with teflon lined cap, pH<2 by sulfuric acid for TOC
- 500 ml plastic container with teflon lined cap for solids
- 250 ml plastic container for pH and conductivity
- 125 ml plastic container with teflon lined cap, pH<2 with sulfuric acid for ammonia
- 1 liter plastic container with teflon lined cap, pH>12 with sodium hydroxide for cyanide
- 1 liter plastic containers with teflon lined cap preserved with 2 ml nitric acid for alpha, beta, and radionuclides
- 1 liter glass containers for phenols

Containers for VOA, TOC, and TOX samples shall be filled without bubble formation and without leaving a head space.

Sample labels shall be filled out and affixed to the containers at the time of sampling. These labels will be supplied by the sampling team. The labels shall include at least the following information:

- sample identification number
- person collecting the sample
- date and time of sample collection
- place of sample collection
- any field observations, i.e., weather
- sample matrix, i.e., soil, water, etc.

A unique sample identification number shall be used for each sample. Sample numbers will be obtained from the Hanford Environmental Information System (HEIS) or an equivalent database.

The sample bottles shall be cleaned and radiologically surveyed for off-site release. The released sample containers shall then be bagged and re-bagged. The samples will be placed in a cooler containing ice. The cooler shall become part of the sample packaging and shall have tamper evident tape placed over its opening.

A logbook shall be maintained which contains information pertinent to the sampling activities. Entries are to contain the sample point, sample number, container volumes, date and time of collection, field measurements, any field observations, transportation information, and signatures of personnel responsible for observations. The S&ML group will control and maintain the logbooks.

Until a liquid effluent database accessible to the regulatory agencies is developed, sample data will be sent to the Environmental Data Management Center (EDMC) and the agencies will be notified accordingly. The data will be part of the administrative record for the associated Tri-Party agreement milestone.

7.0 SAMPLE HANDLING AND ANALYSIS

All samples will be handled and transported to the laboratory in a manner to ensure that the integrity of the samples will be protected. Sample handling documentation will be verified by S&ML. Packaging and shipping requirements are specified in Section EII 5.11 of the Environmental Investigations and Site Characterization Manual (WHC 1989).

Traceability of samples obtained during the sampling activity will be controlled as specified in the QAPjP, Section 6.0. A chain-of-custody (COC) form will be filled out for the samples at the time of sampling and will accompany each sample. A sample may consist of several containers. The COC will account for each container. 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 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 COC form using documented procedures.

Analytical procedures for protocol samples shall meet the quality assurance requirements of SW-846 and of the Liquid Effluent Sampling QAPjP (latest revision). The Statement Of Work (SOW) for completing the analysis shall require the approved laboratories to have existing standard operating procedures and to submit any changes in their procedures during the contract term to ETP, or its designee, for approval. The SOW will describe the approval mechanism for any such changes. The approved laboratory procedures shall describe data reduction, verification, and reporting. Any necessary corrective action shall be as outlined in the QAPjP, Section 14.0.

The constituents to be analyzed for are listed in Table 1. The analyte list is based on 40 CFR 264, Appendix IX (EPA 1991) with some additional analytes included. Quality assurance objectives including the analytical method, precision, accuracy and completeness shall be as detailed in the QAPjP (latest revision). These criteria may be adjusted by agreement with the proposed laboratory prior to final approval of the contract or work order.

TABLE 1
SAMPLE ANALYTE LIST

- **Metals:** All metals listed in Appendix IX, as follows:

  - o **TOTAL METALS BY ICP:** EPA Method 3010/6010 - analyte list as specified in the method. Samples will be unfiltered unless turbid.

  - o **TOTAL METALS BY GRAPHITE FURNACE ATOMIC ABSORPTION:**
    antimony....3020/7041
    arsenic.....3020/7060
    chromium....3020/7191
    berillium...3020/7091
    cadmium.....3020/7131
    lead........3020/7421
    thallium....3020/7841
    mercury.....3020/7470 (cold vapor)

- **VOLATILE ORGANICS BY GAS CHROMATOGRAPHY - MASS SPECTROSCOPY (GC-MS) :** EPA Method 8240 (gc/ms - capillary column (purge and trap)). Include all analytes listed in the method.

- **SEMI-VOLATILE ORGANICS BY GAS CHROMATOGRAPHY - MASS SPECTROSCOPY (GC-MS):** EPA Method 8270 (gc/ms - capillary column). Include all analytes listed in the method.

- **POLYCHLORINATED BIPHENYLS GAS CHROMATOGRAPHY:** EPA Method 3510/8080 or 3520/8080 - clean-up via method 3620. This method is being requested to target PCB's; therefore the compound chosen for the surrogate spikes should be optimized for PCBs.

- **TOTAL RECOVERABLE OIL AND GREASE (GRAVIMETRIC, SEPARATORY FUMMEL EXTRACTION):** EPA Method 9070.

- **TOTAL ORGANIC CARBON (OXIDATION, INFRARED OR FLAME IONIZATION DETECTOR):** EPA Method 9060.

- **TOTAL ORGANIC HALOGENS (CARBON ADSORPTION, MICOCOULOMETRIC - TITRATION DETECTOR):** EPA Method 9020.

- **TOTAL PHENOLS:** EPA Method 420.

- **COMMON ANIONS BY COLUMN CHROMATOGRAPHY:** EPA Method 9056 of 300 series. Target all analytes specified by this method.

- **AMENABLE CYANIDE:**

- **AMMONIA:** EPA Method 350.5.

- **SECONDARY WATER QUALITY PARAMETERS AND OTHER PARAMETERS OF INTEREST:**
  - pH by EPA Method 9040.
  - Specific conductance/Total Dissolved Solids by EPA Method 9040.
  - Chemical Oxygen Demand by EPA Method 410.
  - Biological Oxygen Demand by EPA Method 405.1
  - Alkalinity by EPA Method 310.1.
  - Acidity by EPA Method 305.1.
  - Fecal coliforms by method SM 908C.
  - Total coliform by method SM 908A.

- **RADIOCHEMICAL ANALYSIS:**
  - Total Alpha and Beta by EPA Method 9310 (SW-846)
  - ^{241}Pu by EPA Method 00-07
  - ^{106}Ru and ^{137}Cs by gamma spectrometry
  - ^{90}Sr by EPA Method SR-05

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, 1986, Test Methods for Evaluating Solid Wastes, SW-846, 3rd edition, U.S. Environmental Protection Agency/Office of Solid Waste, Washington D. C.

EPA, 1991, Code of Federal Regulations, 40 CFR 264, Appendix IX, U.S. Environmental Protection Agency, 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 Project Plan, WHC-SD-WM-QAPP-011, Rev. 1, Westinghouse Hanford Co., Richland, Washington.

INFORMATION RELEASE REQUEST

References: WHC-CM-3-4

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