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ENGINEERING DATA TRANSMITTAL

Page 1 of 1

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

Author/Requestor (Printed/Signature): D. L. Halgren — Date: 3/17/92

Responsible Manager (Printed/Signature): Joel A Eacker — Date: 4/13/92

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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.

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Authorized Manager's Signature

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244-AR VAULT COOLING WATER SAMPLING AND ANALYSIS PLAN

March 11, 1992

Tank Farms Environmental Engineering

TABLE OF CONTENTS

1.0 INTRODUCTION

This Sampling and Analysis Plan 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. In addition, Washington Department Of Ecology (WDOE) 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, WHC-SD-WM-QAPP-011, Rev. 1 (WHC, 1992). The QAPP 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 which it describes. The SAP shall take precedence over the QAPP 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 approved sampling and analysis plan shall be considered a class 3 change per the Hanford Tri-Party Agreement.

3.0 SITE BACKGROUND

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 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.

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.

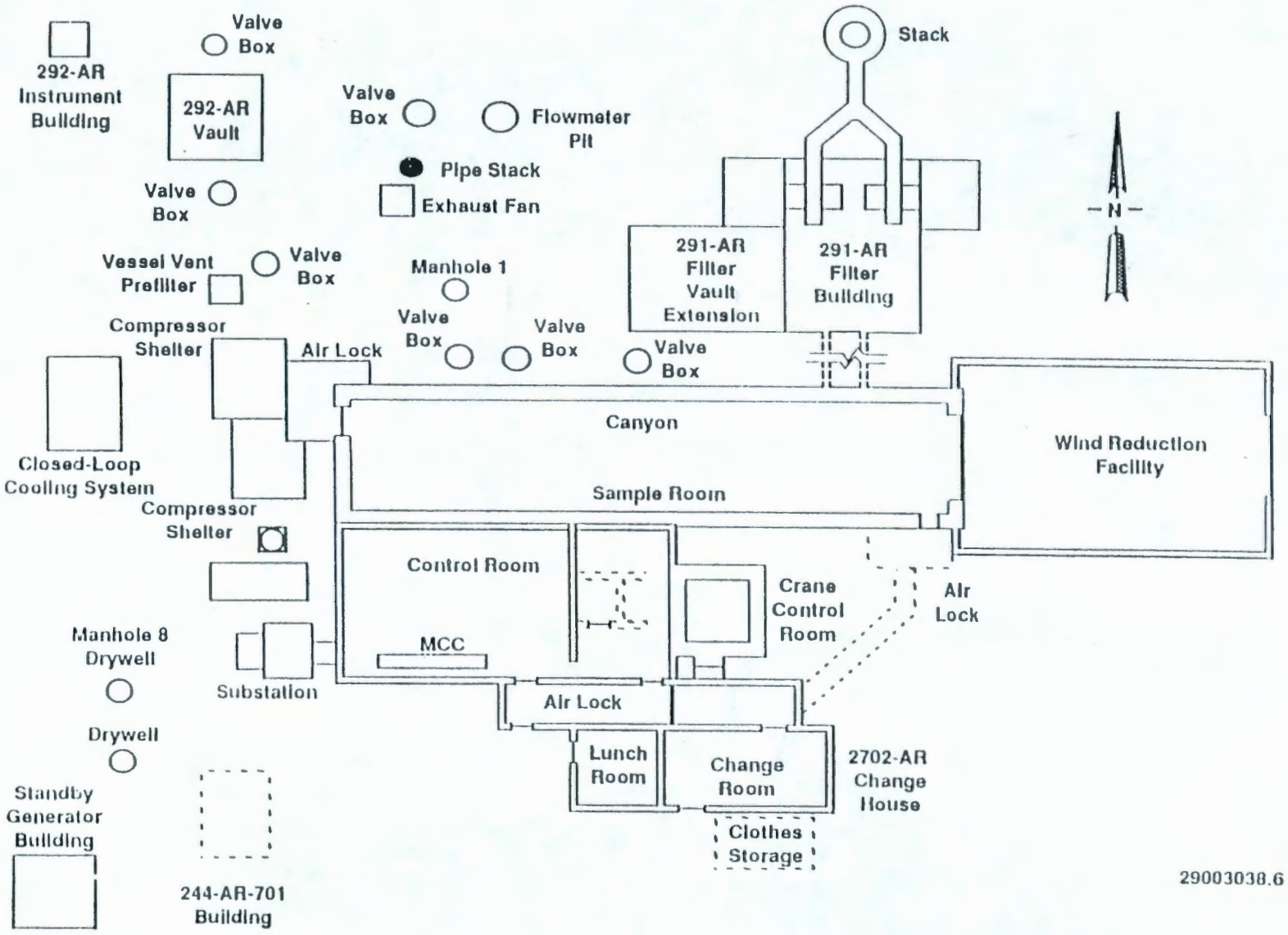

Figure 2-1. The 244-AR Vault Facility Layout.

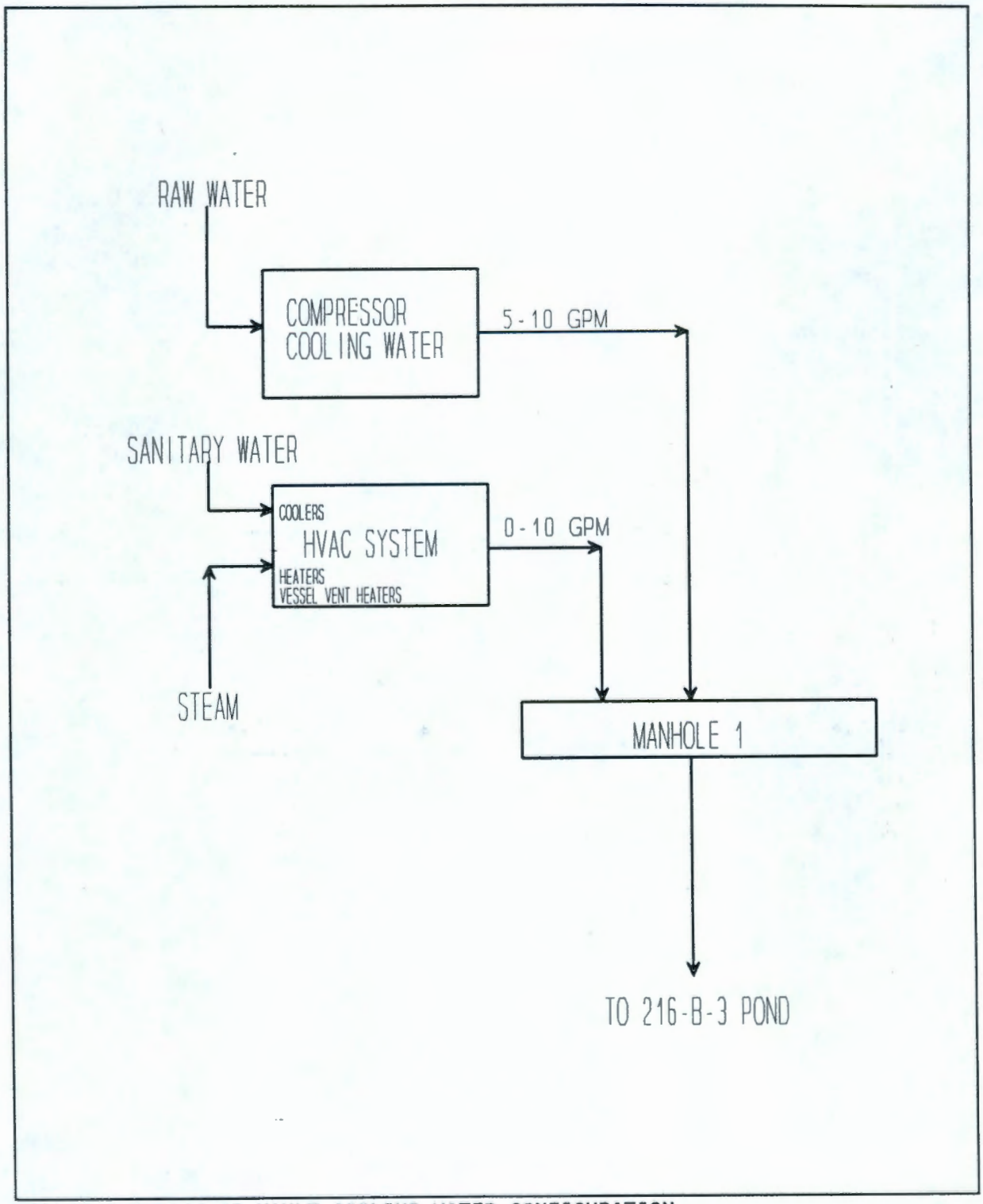

FIGURE 2.2 244-AR VAULT COOLING WATER CONFIGURATION

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 removes moisture 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. The 216-B-3-3 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. The cooling water wastestream is hard piped to the head end of the 216-B-3-3 Ditch, where it is discharged to the ditch, along with various other streams. 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.

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 (EPA 1986). The sampling group technicians have training and experience necessary to perform protocol sampling. This includes training in sample security, preservation and shipping.

A laboratory will be selected by Effluent Treatment Programs (ETP) to perform analysis of samples taken under the Hanford liquid effluent program. This laboratory must meet the criteria of this Sample and Analysis Plan and the Liquid Effluent Sampling Quality Assurance Project Plan (QAPP) (WHC 1992). ETP, or its designee, shall coordinate sample shipment to the selected laboratory with the sampling group. Data from the analyses will be validated by ETP or a qualified contractor. Validation will be performed as described in the QAPP (WHC 1992).

Data from the analyses will be validated by the ETP or a qualified contractor. Validation will be performed as described in the QAPP (WHC 1992).

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 QAPP, Section 10.0, and the information below.

For the first sampling activity an ICP metals, volatile organic analysis (VOA) and semi-VOA field blank will be prepared. Continuation of the ICP and semi-VOA field blanks will depend on the results of the sampling. VOA field blanks will be prepared for each sampling activity. 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. Duplicates will not include the pesticides and herbicides. 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.
- 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.
- 1 liter amber glass containers with teflon lined cap for pesticides.
- 1 liter amber glass containers with teflon lined cap for herbicides.
- 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] Teflon is a trademark of the DuPont de Nemours & Co, Wilmingtion, Delaware.

- 1 liter glass containers for dioxans and furans.

Containers for VOA 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 pertinent field information.

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 have tamper evident tape placed over its opening.

A logbook shall be maintained which contains information pertinent to the sampling. 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 Sampling and Mobile Laboratories 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 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 the Sampling and Mobile Lab. 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 QAPP, Section 6.0. A chain-of-custody 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 chain-of-custody 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 chain-of-custody form using documented procedures.

Analytical procedures for protocol samples shall meet the quality assurance requirements of SW-846 and of the Liquid Effluent Sampling QAPP (WHC 1992). The Statement Of Work 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 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 QAPP, 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 QAPP (WHC 1992). 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

Arsenic	Chromium	Nickel
Aluminum	Cobalt	Potassium
Antimony	Iron	Selenium
Barium	Copper	Silver
Beryllium	Lead	Sodium
Cadmium	Mercury	Vanadium
Calcium	Magnesium	Zinc
	Manganese	

ANIONS

Chloride	Fluoride
Cyanide	Phosphate
Nitrate	Sulfate
Nitrite	

ORGANICS

VOA (all 8240 analytes)
Semi-VOA (all 8270 analytes)
TOC

PESTICIDE/HERBICIDE

Chlorinated Herbicides (all 8150 analytes)
Organochlorinated Pesticides (all 8080 analytes)
Organophosphorus Pesticides (all 8140 analytes)
Dioxin/Furans

OTHER

Ammonia	pH
Alkalinity	TDS
Conductivity	TSS
Phenols	

RADIOCHEMICAL

Alpha	^{241}Pu
Beta	^{106}Ru
^{137}Cs	^{90}Sr

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WHC, 1992, Liquid Effluent Sampling Quality Assurance Project Plan, WHC-SD-WM-QAPP-011, Rev. 1, Westinghouse Hanford Co., Richland, Washington.