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ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 169265

Proj. ECN

2. ECN Category (mark one)		Supplemental	[]	Change ECN	[]	Supersedure	[X] CML 12/1/92
Cancel/Void	[]	Direct Revision	[X]	Temporary	[]	Discovery	[]

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

5. Project Title/No./Work Order No. 242-A EVAPORATOR COOLING WATER SAMPLING AND ANALYSIS PLAN	6. Bldg./Sys./Fac. No. N/A	7. Impact Level 3EQ
8. Document Number Affected (include rev. and sheet no.) WHC-SD-WM-EV-078, REV. ~~2~~ 1 TEW 11/18/92	9. Related ECN No(s). 169215	10. Related PO No.

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

12. Description of Change

THE ENTIRE DOCUMENT, WHC-SD-WM-EV-078, REV. 1, IS BEING REPLACED WITH WHC-SD-WM-EV-078, REV. 2

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

13b. Justification Details

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

14. Distribution (include name, MSIN, and no. of copies) SEE ATTACHED DISTRIBUTION	RELEASE STAMP OFFICIAL RELEASE BY WHC DATE DEC 01 1992 Sta. 4 5

A-7900-013-2 (11/88) (EF) GEF095
Engineering Change Notice

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ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1) 169265

15. Design Verification Required	16. Cost Impact				17. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes	Additional	[N/A] $	Additional	[N/A] $	Improvement	[N/A]
[X] No	Savings	[] $	Savings	[] $	Delay	[]

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]		[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
N/A		

20. Approvals

Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog./Project Engineer * CM Hall	11/17/92	PE	
Cog./Project Engr. Mgr. * CM Hall for E Berlin per telecon	11/18/92	QA	
QA * Tom Whelan	11/18/92	Safety	
Safety (POST REVIEW)*		Design	11/19/92
Security		Other Sampling & Mobile Labs ~~[illegible]~~ for D Morrison-Beyer	
Proj. Prog./Dept. Mgr. * [illegible]	11/20/92		
Def. React. Div.			
Chem. Proc. Div.		HASM Michelle Hendrix	11/19/92
Def. Wst. Mgmt. Div.		DEPARTMENT OF ENERGY	
Adv. React. Dev. Div.		*	
Proj. Dept.			
Environ. Div. [illegible]	11-19-92	ADDITIONAL	
IRM Dept.			
Facility Rep. (Ops.) * [illegible]	11/19/92		
Other 242-A Ops [illegible] C [illegible]	11/19/92		
Process Eng [illegible]	11/19/92		

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SUPPORTING DOCUMENT

1. Total Pages 27

2. Title

242-A Evaporator cooling water sampling and analysis plan

3. Number

WHC-SD-WM-EV-078

4. Rev. No.

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5. Key Words

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6. Author

Craig M Loll

Name (Type or Print)

Craig M Loll

Signature

7C420 / A2D88

Organization/Charge Code

7. Abstract

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

APPROVED FOR PUBLIC RELEASE KMB 4/24/92

10. RELEASE STAMP

OFFICIAL RELEASE 5
BY WHC
DATE DEC 01 1992
Sta. 4

9. Impact Level

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RECORD OF REVISION	(1) Document Number WHC-SD-WM-EV-078	Page 1 ~~OF 1~~

(2) Title

242-A EVAPORATOR COOLING WATER SAMPLING AND ANALYSIS PLAN

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release (5) Cog. Engr.	(6) Cog. Mgr. Date
RS 1	(7) ORIGINAL DOCUMENT COMPLETELY REPLACED BY ECN # 169215	Craig M Hall	[illegible] 4/21/92
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RS 2	REV. 1 SUPERCEDED BY ECN 169265	CM Hall	CMHall for GTBerlin per Telecon 11/18/92

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242-A EVAPORATOR 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

A. SAMPLING OBJECTIVES

A.1 Introduction

This Sampling and Analysis Plan (SAP) is to establish the requirements and guidelines used by Westinghouse Hanford Company (WHC) in implementing an upgraded Liquid Effluent Sampling Program for the 242-A Evaporator cooling water effluent wastestream. The effluent contains liquids from process cooling condensers, air compressor cooling, ventilation system heating and cooling, steam turbine cooling and condensate, instrument/process air moisture removal, steam trap condensates, raw water filter changeouts and floor drains. The cooling water from the process condensers, which is monitored, is the only contributor which could contact potentially contaminated equipment. The effluent does not contain liquids from sanitary sources. Other non-process effluents which are not covered in this document are covered in the, 242-A Evaporator Steam Condensate Sampling and Analysis Plan, WHC-SD-WM-EV-079.

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

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

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

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

A.2 Objectives

The primary objectives of the SAP are to:

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

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

The secondary objectives are to:

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

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

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

A.3 Approach

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

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

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

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

The liquid effluent characterization samples shall also be used to provide a quality control check on the procedures and methods used in the existing routine monitoring sampling program. During the sampling for liquid effluent characterization samples, extra sample bottles shall be obtained and sent to the on-site process control laboratory for analysis. The process control laboratory shall run an analysis using the same list of analytes and procedures as for routine samples. The routine sampling results will be compared with the liquid effluent characterization sampling results for common analytes. Recurring significant differences in data (statistical differences in data at the 90% confidence interval) will be used as a basis for preparing a plan of corrective action to improve the existing routine sampling program. The existing routine samples are flow proportional composite samples taken by an automatic sampler to monitor the condenser cooling water contributions to the effluent wastewater stream before it is discharged to the environment. The condenser cooling water represents 99% of the total cooling water contributions to the 242-A Evaporator Facility liquid effluents. These samples have a very limited list of analytes to reduce the hold time between collection and laboratory results, so that the data can be used for process control.

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

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

B. SITE BACKGROUND

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

B.1 242-A Evaporator Facility Description

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

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

B.2 Stream Contributors

A total of ten contributors feed the 242-A Evaporator Cooling Water wastestream, in the following order of volume contribution to the stream.

1. Condenser cooling water (E-C-1, -2 and -3, approx. 2,650 gal/min)
2. Air compressor cooling water (estimated 5 gal/min)
3. Steam trap condensate (estimated 5 gal/min)
4. Emergency steam turbine cooling water (est. 5 gal/min, intermittent)
5. Emergency steam turbine condensate (est. 1 gal/hr, intermittent)
6. HVAC air washers (estimated 20 gal/year)
7. Water filter catch pan drainage (est. 10 gal/month)
8. HVAC room floor drains (est. less than 1 gal/d, intermittent)
9. Steam system relief valve discharges (est. less than 1 gal/d)
10. Compressed air receiver condensate (estimated 1-2 gal/d).

The compressed air dryer discharges have been discontinued. The steam heated air dryer was replaced by an electric dryer, eliminating steam condensate from this source, and the moisture removed from the air is now discharged back to the atmosphere rather than to the drain.

During evaporator processing operations, at least seven of the contributors are potentially adding liquid to the stream. During shutdown/maintenance the compressor cooling water is the only consistent contributor to the cooling water waste stream.

All the contributing streams consist of non-contact cooling water or steam condensate. The 242-A Evaporator process does not involve the intentional addition of hazardous constituents to the steam condensate stream or to any of its contributors. Tank Farm Operations limits the use of hazardous materials at its facilities by the use of administrative controls, ie., procedures which govern the use of such materials in the workplace.

B.2.1 Condenser Cooling Water

The purpose of the condensers is to condense vapors which were removed from the 242-A feed stream by the vapor-liquid separation process. This function is performed by passing the vapor from the separator through a series of three water cooled condensers, a series of deentrainers, and particle filters before the stream exits the facility. This process removes organic vapors and any radionuclide particulates which are part of the facility off-gas.

Vapors, from the vapor-liquid separator, enter the primary condenser for the first stage of cooling. The carbon steel primary condenser, roughly 17.5 ft long by 12 ft in diameter, consists of 2,950 carbon steel tubes, equally spaced, with outside diameters of 3/4" . Raw cooling water flows through the tubes of the condenser while the vapors travel around them. Condensed vapors drain out of the condenser into the condensate collection tank, C-100.

Vapors leaving the primary condenser are routed to the inter- and after-condensers, in series. These two heat exchanger units use raw water which runs through the carbon steel tubes of inter-condenser first, and then the after-condenser. The process condensate from these condensers also drains to the C-100 collection tank. After passing through all three condensers, any remaining vapors pass through a series of deentrainers and particle filters before exiting the facility.

Raw water is supplied from the 200 East Area power plant to provide cooling to the three evaporator process condensers and other contributors. The primary condenser uses a nominal 2,500 gpm (3,500 gpm, maximum), while 150 gal/min flow through the inter- (E-C-1) and after- (E-C-1) condensers in series. The flow from the condensers comes together into a single used raw water line that is monitored for radiation level. The condenser cooling water system is a hard-piped, closed system. No chemicals are introduced into the water by this cooling process. The condenser system is designed so that any leaks which develop in the condensers, between the process stream and the cooling water, will be prevented from contaminating the cooling water. This is performed by keeping the cooling water line pressure higher than the pressure on the waste stream side. If a leak were to occur, cooling water would be forced into the waste stream, rather than the reverse.

An in-line radiation monitor (RC-2) and a proportional sampler (RC2-1) are located downstream of the condensers. The used cooling water effluent from the condensers flows into a 24 inch diameter pipe where it is combined with the other eight contributors to the overall 242-A Evaporator cooling water stream. This combined effluent is then routed to the 216-B-3 Pond System.

Figure 2-1. COOLING WATER WASTESTREAM CONFIGURATION

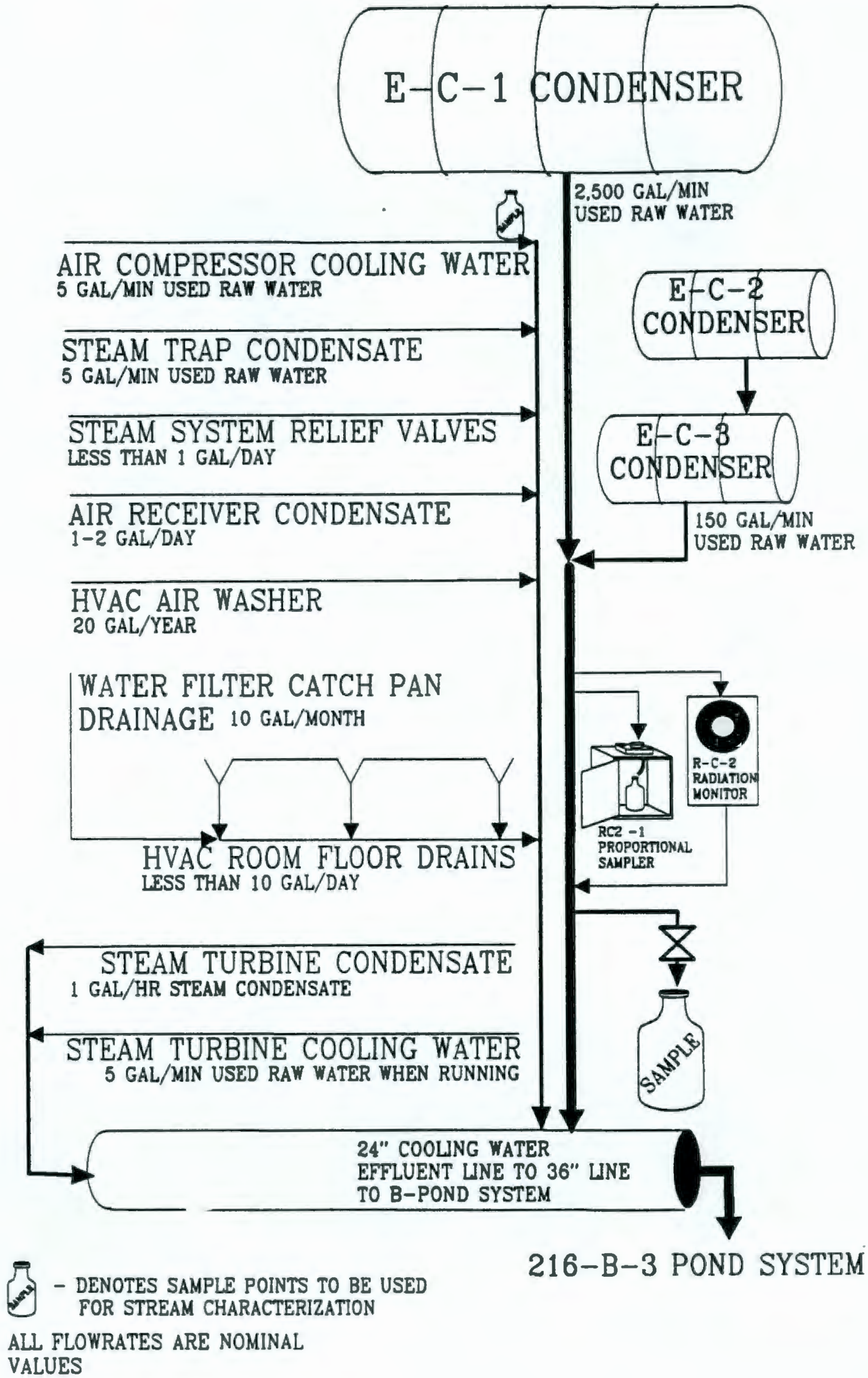
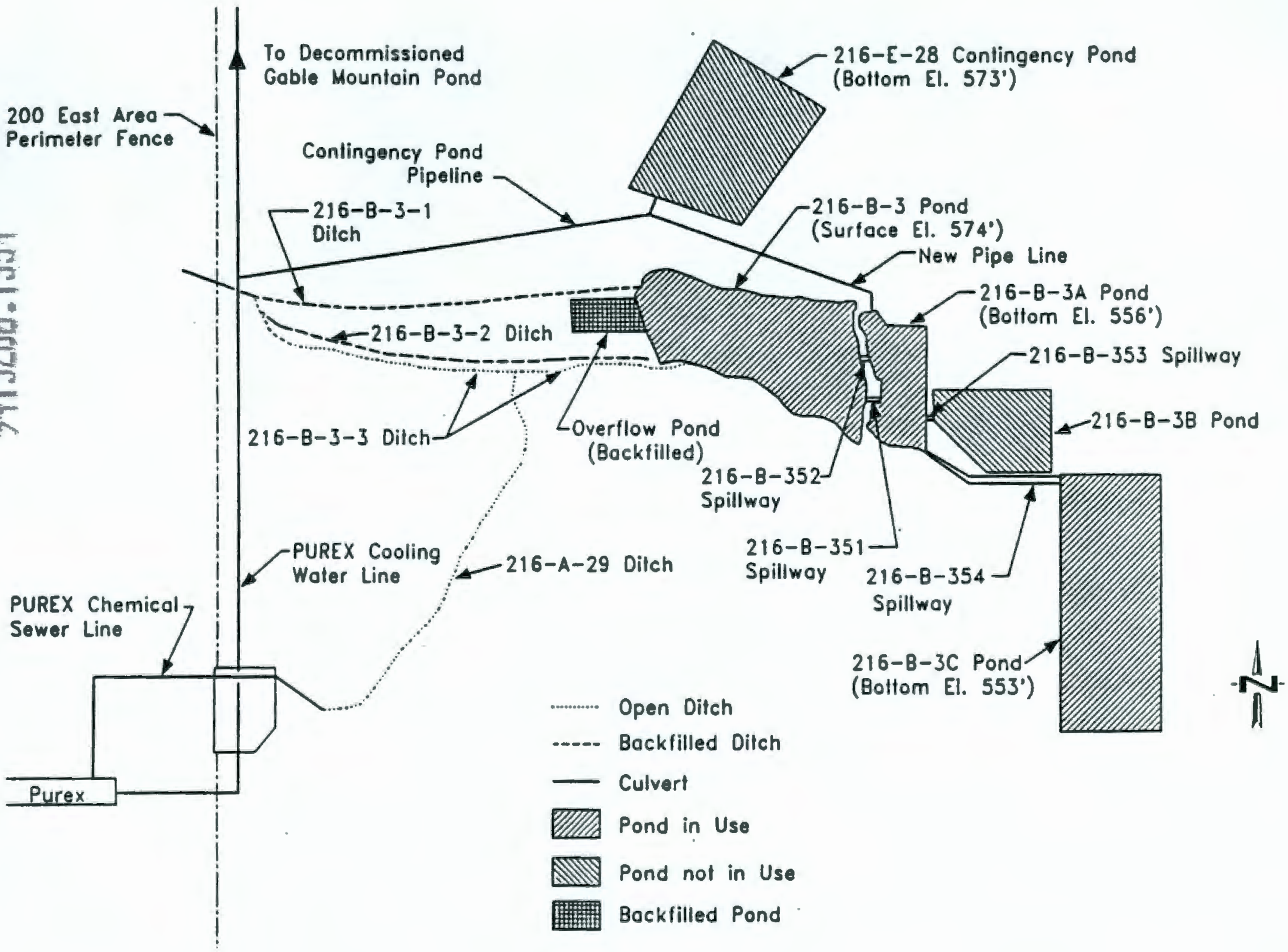


Figure 2-2. 216-B-3 Pond System



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B.2.2 Air Compressor Cooling Water

Process and instrument air are used to operate valves, samplers, and weight-factor instruments. A supply of compressed air is essential for proper operation of the 242-A facility.

There are two air compressors installed in the 242-A Evaporator building that supply compressed instrument and process air to the facility. These compressors are designed to deliver 100 scfm of air at 100 psig. During normal operation one of the compressors is on-line and the other acts as the backup. The failure of one compressor will cause the backup to automatically kick on. The compressors automatically cycle so that the run time is split between them. One compressor is usually running, keeping the air receiver, and the air lines at a specific pressure.

Each compressor is cooled with a water jacket, which requires a single pass of cooling water to keep the equipment at the proper operating temperature. The cooling water flow is controlled by a solenoid valve which only delivers cooling water to a compressor when it is operating. There is also a temperature sensor on the cooling water, which will activate an interlock, shutting down the compressor and the cooling water if the temperature is too high. The source of the cooling water is raw water from the Columbia River that is supplied from the 200 East Area Powerhouse. The compressor cooling water is hard piped from the supply to the drain. The drain line from the compressors dumps into a 4" drain line along with several intermittent contributors, including the drain line from the HVAC room. The 4" line drains directly into the 24" cooling water line which leads out to B Pond. The compressor cooling water has a maximum design flowrate of 10 gpm. The estimated discharge rate for an operating compressor is closer to 5 gpm. This discharge is continuous since one of the compressors is always operating.

Other contributors from the air supply system include blowdown from the moisture separator and the air receiver. The source of the water in the blowdown is water vapor from the air that condenses as the air is compressed. The condensate from this equipment drains via an air trap to the 4" drain line. Flow contributions from these sources are intermittent and small (estimated 1-2 gal/day) when they occur. The air receiver is discussed more in depth in Section B.2.3.

B.2.3 Compressed Air Receiver Condensate

The air receiver or air storage tank is a steel upright tank with a volume of 125 cubic feet. The tank has a pressure relief valve set at 125 psig, a pressure gage, a moisture trap, and a drain valve. After instrument air leaves the aftercooler (with moisture separator), it enters the receiver tank. Any moisture which remains in the air after the drying process, collects in the moisture trap and is periodically drained. The contribution of all the moisture condensate from the air supply system to the cooling water line is estimated at 1-2 gal/day.

The air compressor discharges consist of wastewater that is not in proximity to any waste or hazardous materials. An accessible sample point exists where the compressor cooling water lines empty into a 4" drain line with the smaller contributors mentioned above.

B.2.4 Compressed Air Dryer Discharges (No longer discharging)

Instrument air is required for instruments which are sensitive to moisture. A 1 1/2" line from the process air manifold provides the instrument air. As part of the latest upgrades to the 242-A facility, an electric air dryer has replaced the steam heated air dryer which had previously been in place. The air dryer removes the moisture from the air using activated alumina absorbent. It has two columns which cycle automatically. One column removes moisture, while the other is being regenerated (dried).

The heating coils which are now used to remove the moisture from the columns, are electric, rather than steam heated. The steam heated coils formerly discharged a small amount of steam condensate. The elimination of steam heating has eliminated this discharge. In addition, the previous air dryer collected and discharged the moisture removed from the air, into the cooling water wastestream. The new air dryer blows the moisture back into the atmosphere, as a vapor, eliminating another small contribution to the cooling water wastestream.

B.2.5 Emergency Steam Turbine Condensate and Cooling Water

To assure safe working conditions the 242-A building is maintained at a slight negative pressure by the building ventilation system. Following the loss of electricity to the normal ventilation (HVAC) system, steam drives an emergency turbine that maintains safe ventilation (and pressure differentials) in the various facility zones. The steam turbine is activated whenever there is a power outage at the building and during any maintenance to the primary fans.

The steam is supplied from the 200 East Area Powerhouse. The various steam condensate and cooling water contributions from the emergency turbine drain to a sump in the floor of the turbine building. The sump gravity drains through a 2 inch drain line to the 24 inch, main drain line, which discharges to the 216-B-3-3 Ditch.

The design maximum discharge for steam condensate from the turbine is 8 gpm. The actual discharge of steam turbine condensate is estimated at 1 gal/hr, continuously. The steam turbine is continuously in contact with steam in order to keep it warm. A steam trap allows continuous drainage of steam condensate from the supply line to the sump, whether the turbine is operational, or not. When the turbine is operational, the exiting steam exhausts through a vent, and the condensate from the vent drains to the sump.

A monthly functional test (approx. 10 hr of run time) is performed on the steam turbine. The turbine also activates during maintenance activities on the electric fan.

In addition to the steam condensate, there is a small contribution of cooling water from the emergency steam turbine. Lubricant oil is used to cool and lube the bearings in the turbine. The lube oil is pumped through simple heat exchanger where one-pass, non-contact cooling water, flowing at about 5 gal/min, removes the heat from the oil. This cooling water then flows to the sump that the steam condensate from the turbine collects in, and from this point the combined stream drains to the main drain line which empties into the 216-B-3-3 Ditch. The cooling water stream is controlled by a solenoid valve which only opens when the steam turbine is in operation.

B.2.6 HVAC Air Washers

The incoming air for the building ventilation is cooled by raw water. The air flows through a vessel containing a series of baffles while raw water is sprayed into the vessel and gravity drains down, over the baffles. Heat is absorbed by the cooler, raw water, and it drains to a small reservoir where it collects and is pumped back to the top of the washer. The reservoir is kept full by the addition of more raw water. An overflow from the reservoir drains to the HVAC room floor drains and is hard-piped to a 10" drain funnel in the aqueous makeup (AMU) room. The two air washer systems are drained, cleaned and inspected annually, contributing about 20 gallons of water to the wastestream. The air washer system is a closed system which does not use any hazardous chemicals and is not susceptible to spills of such materials.

B.2.7 Water Filter Catch Pan Drainage

Raw water for the process vent system deentrainment pads and de-superheater is strained and filtered in the heating, ventilation, and air conditioning (HVAC) room. The HVAC room is located on the second floor of the 242-A building. It houses the ventilation intake fans for the entire building. Steam lines for the building heating, the raw water main for the building, and some fire protection lines, all run through the HVAC room. Runoff from two filters is collected in a catch pan with a drain in the bottom, set on the floor of the HVAC room. The catch pans collect raw water and oversized particles from the raw water filters during filter changes. Changes are performed as necessary. An estimate of the frequency of the filter changes is about once per month with each change contributing approximately 10 gallons of raw water to the cooling water wastestream. There are no chemicals or hazardous materials stored or regularly used in the HVAC room and no chemicals are purposely introduced to the stream at this point. The wastewater from the catchpans should be unchanged from the raw water source it came from.

B.2.8 HVAC Room Floor Drains

Three floor drains exist in the HVAC room. Leaks or the runoff from maintenance work on the water or steam systems would flow to the floor drains. Contributions to the 242-A Evaporator Cooling Water wastestream from these floor drains is periodic in nature. The steam and water systems present in the HVAC room are uncontaminated. There are no chemicals or hazardous materials stored in, or regularly used in the HVAC room, nor does floor drain runoff have an opportunity to come in contact with such materials. The contribution from this stream is estimated at less than 1 gal/day, however, this is not a routine contributor and the flowrate is not measurable.

B.2.9 Steam Trap Condensate and Relief Valve Discharges

Steam is used in the HVAC system to heat incoming air for the building heating. During non-operational mode the demand for HVAC steam is seasonal. During waste processing, incoming air is heated to keep the evaporator room warm (around 100 $^{\circ}$F). Several steam traps, required for the removal of steam condensate from the steam lines, are located within the HVAC room. These steam-traps are automatically actuated by a buildup of condensate within them, and they empty into the HVAC room drain lines. While waste processing is occurring, these steam traps produce an estimated 5 gpm of steam condensate, which contributes to the cooling water stream.

Relief valves associated with the steam system are located within the HVAC room. The actuation of these relief valves is not a normal operating condition and rarely occurs. When a relief valve does activate, the majority of the steam exits via a flue or stack, while condensing steam contributes to the cooling water wastestream. This steam condensate is expected to be cleaner than raw water. This contribution cannot be measured, however, based on the infrequency of valve activation the discharge from this source is estimated at below 1 gal/day.

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 processing facilities on the Hanford Site, including the 242-A Evaporator Facility.

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

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

Flow between the ponds is via galvanized, corrugated, steel pipes, and is controlled by downward-opening slide gates. A network of groundwater monitoring wells has been established around the B Pond System to measure water levels, obtain groundwater samples, and evaluate aquifer properties.

Liquid levels within the ponds are measured with staff gages, and the flowrate in the 216-B-3-3 Ditch is measured with a flume and flowmeter and recorded on a stripchart. The pond liquid levels, gate settings, and cumulative flowmeter readings are recorded daily. When the 242-A Evaporator Facility is processing waste, the cooling water waste stream is the largest wastewater contributor to the 216-B-3 Pond System.

C. RESPONSIBILITIES

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

Tank Farm Environmental Engineering

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

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

Tank Farm Operations

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

Tank Farms Health Physics

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

Sampling and Mobile Laboratories

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

Quality Assurance (QA)

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

D. SAMPLING LOCATION AND FREQUENCY

D.1 Sampling Location

Samples for characterization of this effluent wastestream, will be drawn from two locations. Sampling of the condenser cooling water will be performed at a 1/2" sample port downstream from the intake for the RC2-1 proportional sampler, located in the condenser room. Sampling of the compressor cooling water will be performed at the point where the cooling water discharges to a funnel floor drain in the AMU room.

Because of the piping design of the 242-A Evaporator facility, sampling of the combined wastestream, as is being done at other facilities, is not possible. Several of the contributors enter the 24" discharge line at different points, below the grade level of the facility. Sampling the combined stream could be performed at the expense of digging up the 24" discharge line, at some point east of the facility, and installing a manhole with sampling capabilities. A preliminary estimate for the cost of installing a manhole and sampling capabilities is $50,000.

Based on the overall characteristics of this stream and knowledge of the uses and sources of the wastewater, however, it is possible to sample two of the contributors and obtain representative data on the overall liquid effluent wastestream. Sampling the condenser and compressor cooling waters would provide representative data on the overall effluent wastestream. Sampling these two contributors can be justified for several reasons.

Together, the condenser (2,650 gal/min, during operation mode) and compressor (5 gal/min., continuously) cooling waters represent over 99.5% of the total flow of the cooling water effluent wastestream. Although the compressor cooling water contribution is still negligible in comparison to the condenser cooling water, it represents the only consistent contribution to the overall effluent while the Evaporator is in shutdown/standby mode. If there were no contributions from these two streams there would be no measurable flow for this effluent wastestream.

The discharges from the other contributors are intermittent, and when they are discharging, they are negligible in terms of measurable flow. Sampling these contributors would be very difficult based on the fact that they do not provide enough discharge for the sample volumes which are required, or would require unusually long sample periods in which to obtain the required amount. This revision of the SAP provides realistic discharge rates from the contributors, based upon process knowledge.

There are also no accessible locations to draw samples from these contributors since they are hard-piped to the 24" discharge line, which runs beneath the facility. There is no point at which end-of-the pipe samples can be taken, either. The combined cooling water wastestream joins the effluent from another facility before discharging to the 216-B Pond System. At the very least, additional facility modifications would be required in order to sample all the contributors.

None of the contributors are directly involved in the use of any hazardous materials within this facility. They are basically hard-piped, and travel a closed path from the raw water and steam sources they are derived from, to the effluent discharge pipe. The only contaminants which are expected to be present are those found in the water source and trace corrosion products from the piping system such as zinc, copper, nickel, chromium and lead.

The chosen sampling locations are the most feasible, from a facility standpoint,in providing representative composition data which meets the objectives stated in Section A.2. Sampling all of the contributors would incur additional costs and would not provide any more useful data in the characterization of this liquid effluent stream.

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. The sample will be taken at a sample port within the 242-A-81 Water Services Building, prior to any of the filters. 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

There will be four samples taken, over a two year period, at each sampling point (R-C-2 sampler, compressor water discharge) to provide a baseline characterization. The first two sampes at each location will be taken during the 242-A Evaporator start-up campaign, expected to occur in 1993. The third and fourth samples shall be taken the following year, provided the 242-A Evaporator Facility operates. The specific day and time for sampling will be based on the start-up schedule and determined by Waste Treatment Engineering. The SAP shall be revised based on the results of the baseline characterization sampling.

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

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

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

E. SAMPLE IDENTIFICATION

E.1 Liquid Effluent Characterization Sample Labeling

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

In addition to identification numbers, the samples will require labeling to indicate potential hazards. All sample containers for the condenser cooling water must be labeled with a radiation sticker.

E.2 Routine Sample Labeling

The numbers on the label will be assigned by Tank Farm Operations per the sample schedule in Procedure TO-630-060, "Sample Cooling Water From 2 Via Receiver Carboy RC-2."

The general numbering method is as follows:

ACW - (serial number)
ACW COMPOSITE - (serial number)

ACW = 242-A Evaporator cooling water sample designation
ACW COMPOSITE = 242-A Evaporator cooling water monthly composite sample designation.
Serial number = Sequential number provided by Tank Farm Operations

F. SAMPLING EQUIPMENT AND PROCEDURES

F.1 Liquid Effluent Characterization Samples

The liquid effluent characterization sampling activities will comply with a specific procedure prepared for the sampling of the 242-A Evaporator cooling water effluent stream. This procedure will be based on recommended practices found in SW-846, Chapter 10, Sampling Methods (latest edition). The formal sampling procedure for this stream is being developed by TFEE and the S&ML and will be completed and issued prior to the first sampling event.

The sampling procedure identifies specific requirements which include the following: sampling location, description of sampling equipment, containers, and reagents, safety precautions including personal protective equipment, and specific steps for collecting the samples. Surveillance will be performed on sampling activities at random by a cognizant Quality Assurance person.

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

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

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

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

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

F.2 Routine Samples

The routine process sampling shall be completed by the Tank Farm Plant operators trained to comply with WHC Procedure TO-630-060, "Sample Cooling Water From 2 Via Receiver Carboy RC-2."

The samples will be labeled with a sample tag containing sample point identification, a unique sample number, date and time. The samples shall be taken to the designated on-site laboratory for analysis. A data sheet will be filled out at the time of sampling and will contain the date, time, batch number totalizer reading and operator initials.

G. SAMPLE HANDLING AND ANALYSIS

G.1 Liquid Effluent Characterization Samples

Liquid effluent characterization samples will be analyzed for the following:

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

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

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

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

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

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

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

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

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

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

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

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

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

G.2 Routine Samples

The handling of samples shall be according to the WHC Procedure TO-630-060, "Sample Cooling Water From 2 Via Receiver Carboy RC-2." 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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Date Received: 6/29/93 7/26/93 KMB	INFORMATION RELEASE REQUEST	Reference: WHC-CM-3-4

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Title 242-A Evaporator Cooling Water Sampling and Analysis Plan	Unclassified Category UC-	Impact Level 3Q

New or novel (patentable) subject matter? [X] No [] Yes If "Yes", has disclosure been submitted by WHC or other company? [] No [] Yes Disclosure No(s).	Information received from others in confidence, such as proprietary data, trade secrets, and/or inventions? [X] No [] Yes (Identify)
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C. M. Loll / CM Loll 6/30/93

Intended Audience

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R. D. Gustavson R.D. Gustavson 6/30/93

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