Sti#4 (2) **START** 0019739

SEP 27 1991

ENGINEERING DATA TRANSMITTAL

1. EDT 152781

2. To: (Receiving Organization) Tank Farms Environmental Engineering	3. From: (Originating Organization) Tank Farms Environmental Engineering	4. Related EDT No.:
5. Proj./Prog./Dept./Div.: WT/TFEE	6. Cog./Prog. Engr.: D. L. Halgren	7. Purchase Order No.:
8. Originator Remarks: For original release.		9. Equip./Component No.:
		10. System/Bldg./Facility: 242-S Evaporator
11. Receiver Remarks: none		12. Major Assm. Dwg. No.:
		13. Permit/Permit Application No.:
		14. Required Response Date: 9/30/91

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Impact Level	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-WM-EV-071	ALL	0	242-S EVAPORATOR STEAM CONDENSATE SAMPLING AND ANALYSIS PLAN	3	1	1	1

16. KEY

Impact Level (F)	(Reason for Transmittal (G)	(Disposition (H) & (I)
1, 2, 3, or 4 see MRP 5.43 and EP-1.7	1. Approval 4. Review 2. Release 5. Post-Review 3. Information 6. Dist. (Receipt Acknow. Required)	1. Approved 4. Reviewed no/comment 2. Approved w/comment 5. Reviewed w/comment 3. Disapproved w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Impact Level for Required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.
1	1	Cog./Proj. Eng.	D L Halgren	9/25/91	R1-51						
1	1	Cog./Proj. Eng. Mgr.	[signature]	9/25/91	R1-51						
1	1	QA	[signature]	9/26/91	14-16						
5		Safety									

18.	19.	20.	21. DOE APPROVAL (if required)
[signature] 9/25/91 Signature of EDT Originator / Date	[signature] 9/25/91 Authorized Representative for Receiving Organization / Date	[signature] 9/25/91 Cognizant/Project Engineer's Manager / Date	Ltr. No. [] Approved [] Approved w/comments [] Disapproved w/comments

MAR 1992 RECEIVED EDMC

BD-7400-172-2 (2/89) (EF) GEF097
Engineering Data Transmittal

9312753002

BD-7400-172-1 (02/89)

SUPPORTING DOCUMENT

1. Total Pages 14

2. Title	3. Number	4. Rev No.
242-S EVAPORATOR STEAM CONDENSATE SAMPLING AND ANALYSIS PLAN	WHC-SD-WM-EV-071	0

5. Key Words

Liquid effluent sampling, analysis, 242-S, U-14 ditch

6. Author

Name: D. L. Halgren

[signature]

Signature

Organization/Charge Code 77300

7. Abstract

There are four contributors to the 242-S Evaporator liquid effluent that is discharged to the 216-U-14 ditch. 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.

9. Impact Level 3

10. Authorized Manager's Name

J. A. Eacker

[signature]

Authorized Manager's Signature

Specify Distribution Limit ~~2500~~ External

11. RELEASE STAMP

RELEASED

DISTRIBUTION LIMITS

☐ INTERNAL ONLY

☐ SPONSOR LIMITED

☒ EXTERNAL

DATE: SEP 27 1991

#4

WHC-SD-WM-EV-071
Rev. 0

242-S EVAPORATOR STEAM CONDENSATE SAMPLING AND ANALYSIS PLAN

September 25, 1991

Tank Farms Environmental Engineering

TABLE OF CONTENTS

1.0 OBJECTIVES

Sampling and analysis of the 242-S Evaporator wastestream is based on the following objectives.

- Support process design of wastewater treatment projects, as necessary.
- Confirm the stream characteristics will not change over time.
- Collect data to confirm the conclusions in the 242-S Evaporator Stream-Specific Report (WHC 1990).

All changes to the sampling and analysis plan shall be considered a class III change per the Hanford Tri-Part Agreement.

2.0 SITE BACKGROUND

2.1 PROCESS OVERVIEW

The 242-S Evaporator facility started operation in 1973, but has remained in a shutdown mode since 1980. The purpose of this facility was to reduce the volume of low-level, radioactive waste through evaporation and concentration.

In the original process, waste was heated using steam on the shell side of a reboiler. A portion of the heated waste would vaporize when it entered the vapor-liquid separator which was operated at a reduced pressure. Vapors from the separator were condensed using raw water on the tube side of the condenser. When sufficient concentration of the waste was achieved the slurry was discharged back to the tanks.

2.2 RECEIVING SITE

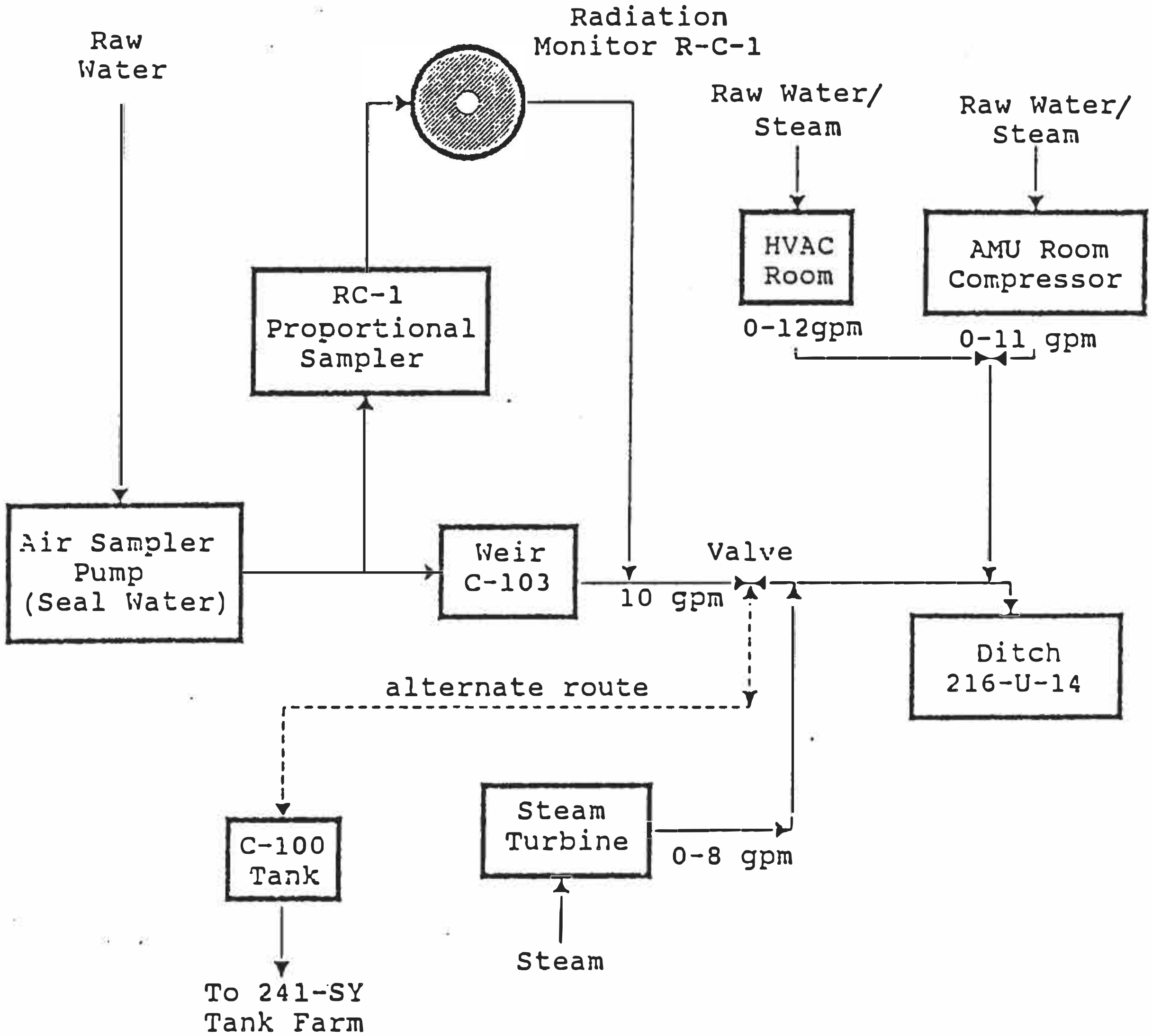
The 216-U-14 Ditch was constructed in 1944 as a percolation trench to dispose of low-level radioactive liquid effluent consisting of UO_3/U Plant wastewater and the 242-S Evaporator wastestream.

2.3 STREAM CONTRIBUTORS

Wastewater from 242-S Evaporator exits the building in two separate pipelines that combine about 100 feet west of the main building. Contributors in the main pipeline are the air sample pump seal water and steam condensate from the standby steam turbine. Steam condensate from the HVAC room and cooling water from the compressors in the AMU room make up the wastewater in the smaller drain line that joins the main line. The combined line then runs northwest to the 216-U-14 ditch. The configuration of the stream contributors are depicted in Figure 2-1.

242-S EVAPORATOR WASTE STREAM CONFIGURATION

Figure 2-1



The contributing streams all consist of non-contact cooling water or steam condensate. Waste is no longer processed in the building so the stream will not be contaminated. It is not designated as a dangerous waste stream.

2.3.1 HVAC STEAM CONDENSATE

The HVAC system conditions air for use in the 242-S building. The use of heating and cooling equipment is seasonal based on the outside ambient air temperature. Heating or cooling the air is required to provide the proper temperature for occupied areas as well as protect equipment. Incoming air is heated using steam heaters and air washers are used to provide evaporative cooling.

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.

An air washer sprays raw water 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.

Flow rate from this contributor can vary from 0 to a design maximum of 12 gpm. Any flow from this contributor is intermittent and dependent upon season 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 was used for waste processing. No activities are carried out in the HVAC room that would cause the introduction of contaminants to the streams.

2.3.2 STEAM TURBINE CONDENSATE

To assure safe working conditions the 242-S building is maintained at a slight negative pressure by the building ventilation system. A steam driven turbine is used as a backup power source for the electric fan motor used to provide the ventilation. The steam turbine is activated whenever there is a power outage at the building and during any maintenance to the electric motor.

The steam is supplied from the 200 West Area Powerhouse and the drain is hard piped to the main drain line. The condensate is not in proximity to any waste processing or chemical handling. There is no path for introduction of hazardous constituents.

Flow contributions from this contributor range from 0 to a design maximum of 8 gpm during operation. The average flow rate would be less than 1 gpm since operation of the turbine is very sporadic other than the monthly maintenance operational check.

2.3.3 AIR SAMPLE PUMP SEAL WATER

The purpose of the air sample pump is to draw air samples from various areas of the 242-S Evaporator facility to identify abnormal levels of airborne radioactive material. The rooms that air samples are currently withdrawn from include the condenser room, aqueous makeup room, clothes change room, and the control room. The air line from each of these rooms has an in-line continuous air monitor that houses a beta-gamma radiation detector. When the detector indicates a pre-determined level above background radiation levels, then an alarm is activated. This alarm identifies to personnel a radioactive airborne concern in the room in question.

Raw water is used in the air-sampler pump to maintain a positive water seal within the pump. The raw water is supplied from the Columbia River via the 200 West Area Powerhouse. After leaving the vacuum pump, the water flows through a 500-gal flow-measuring weir where samples can be taken with the R-C-1 sample system.

From the flow-measuring weir, the stream flows out a 4-in. diameter pipe to a two-way diversion valve. This valve diverts stream flow to the 216-U-14 Ditch during normal operations. The valve is also capable of diverting the flow to the C-100 tank (located in the 242-S Evaporator condenser room) in the case of an upset condition.

A radiation monitor is in place as part of the R-C-1 sampling system. This detector is used to identify any potential leaks of radioactive material into the wastestream. If radiation is detected by this gamma monitor above a pre-determined setpoint (currently 800 counts per second), then a signal is sent to the two-way diversion valve to cause the flow to be diverted to the C-100 tank. This prevents discharge of the stream to the 216-U-14 Ditch until the radiation contamination has been identified and the cause of the contamination corrected.

This stream contributes between 6 and 10 gpm to the overall stream flow. The average flow rate is estimated at 7 gpm. This stream will be eliminated by September 1992. The current air sample pump will be replaced with an electric pump that does not require seal water. This action will maintain the needed radiation monitoring in the building while eliminating the second largest contributor to the effluent.

2.3.4 AIR COMPRESSOR COOLING WATER

Many of the monitoring instruments, including level and pressure indicators, use compressed instrument air to function. Compressed air is also used in other equipment and processes. A supply of compressed air is essential for proper operation of the 242-S facility.

There are two air compressors installed in the AMU room of 242-S that supply compressed instrument and process air to the facility and for surrounding single and double shell tank farms including SY farm. During normal operation one of the compressors is on-line and the other acts as the backup. The drain line from the compressors consolidates one consistent and several small, intermittent contributors then joins the drain line from the HVAC room.

The air compressors require cooling water to keep the equipment at the proper operating temperature. Insufficient cooling water would allow the reciprocating parts to overheat and be damaged. The cooling water used is raw water from Columbia River that is supplied from the 200 West Area Powerhouse. The water is hard piped from the supply to the drain where it joins the other contributors. Cooling water discharge is an estimated 10 gpm based on design and is consistent even when the two compressors switch operating status.

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

The air compressor stream consists of water that is not in proximity to any waste or hazardous materials. There are no accessible sample points available. There are plans under way to replace the existing compressors with ones that have closed loop cooling. A temporary compressor, with closed loop cooling, has been moved to the building and is expected be in service by the end of September 1991. The subsequent shut down of the existing compressors will eliminate the cooling water stream and leave only the small intermittent discharge from the receiver and dryer.

3.0 RESPONSIBILITIES

Sampling will be performed by technicians from the Sampling & Mobile Laboratories group. The technicians have training and experience necessary to perform protocol sampling. Sampling will be done using a modified bailer method.

The Office of Sample Management (OSM) is responsible for selection of a laboratory to perform the needed analyses. This laboratory must meet the criteria of this Sample and Analysis Plan and the Liquid Effluent Sampling Quality Assurance Project Plan (QAPP) (WHC 1991).

Data from the analyses will be validated by the OSM or a qualified contractor. Validation will be performed as described in the QAPP (WHC 1991).

Tank Farm Environmental Engineering will receive the validated data package.

4.0 SAMPLING LOCATION AND FREQUENCY

4.1 LOCATION

Total stream composition data is the most valuable in meeting the objectives stated in Section 1.0. Depending on the streams that are discharging at the time of sampling the total composition may be determined by sampling from one of two places. If the compressor cooling water and air sample seal water have been eliminated the intermittent discharge of the steam turbine would be the only significant contributor as long as the HVAC system was not being used. In this case the sample will be taken from the steam turbine condensate line in the steam turbine building during the routine operation of the steam turbine for maintenance. If any other contributor is discharging to the ditch the sample will be taken at the point of discharge to the ditch. These sampling points are appropriate to determine the most representative composition of the stream.

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.

4.2 FREQUENCY

Three samples will be taken within one year following approval of this document to provide a baseline characterization . A protocol sample of the 242-S Evaporator wastestream will be taken once each year thereafter. This sample frequency is justified as this stream is a low priority, non-dangerous waste stream. 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 elimination of one of the major contributors the two samples will be taken to assess any changes to the overall stream.

5.0 SAMPLING EQUIPMENT AND PROCEDURES

Sampling from the end of the discharge pipe will be done by the modified bailer method. The samples will be collected in the bailer and then used to fill the appropriate bottles. Steam turbine condensate samples will be taken directly from the condensate line by opening a valve and collecting the diverted flow and filling all required sample bottles. Sampling procedure details will be developed when the stream condition under the future configuration is evaluated. The sampling will be performed by technicians trained in all phases of RCRA protocol including sampling techniques, preservation, labeling and documentation.

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.

A field blank will be prepared during each sampling activity. Field blanks will be prepared using the required container for ICP metals and volatile organic analysis (VOA). The bottles will be preserved as specified for these analyses. Each bottle will be opened in the field and filled with pure organic-free reagent water. The blanks will then accompany the samples for transport, handling and analysis.

In addition to a field blank a trip blank will be taken during each sampling activity. Trip blanks will be prepared using the required container for ICP metals and volatile organic analysis (VOA). The bottles 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 will be taken for the volatile organics analysis for each sampling activity. The duplicates will be taken by the same method and handled in the same fashion.

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 container with teflon[1] lined cap, no preservative for Ion Chromatograph anions and pH
    - a. chloride
    - b. fluoride
    - c. nitrate
    - d. sulfate

- 250 ml plastic container with teflon lined cap, pH<2 by nitric acid preservative for Inductive Coupled Plasma Metals.

- 500 ml plastic container with teflon lined cap, pH<2 by nitric acid preservative for mercury.

- 40 ml amber glass container with septum cap (teflon lined), for Volatile Organics, ; The volatiles will be taken in duplicate.

---

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

- 1 liter amber glass container with teflon lined cap for Semi-volatile organics.

- 1 liter plastic container with teflon lined cap preserved with 2 ml nitric acid, for gross alpha and beta.

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

Each sample or sample preparation shall be labeled with the assigned sample number or a unique laboratory number. Labels shall be filled out and affixed to the containers at the time of sampling. The labels shall include at least the following information:

- an unique sample identification number
- as belonging to WHC

The samples shall be cleaned and surveyed. 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, and signatures of personnel responsible for observations. The Sampling and Mobil Laboratories group will control and maintain the logbooks.

Sample data is sent to the Environmental Data Management Center (EDMC) and a note will be sent to the regulators stating that the data is available at the EDMC. The data will be part of the administrative record for the associated Tri-Party agreement milestone.

6.0 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. Packaging and shipping requirements are specified in the Environmental Investigations and Site Characterization Manual (WHC 1989).

Traceability of samples obtained during the sampling activity will be controlled as specified in QAPP (WHC 1991). 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. Once a 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 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 1991). 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 the OSM for approval. The approved laboratory procedures shall describe data reduction, verification, and reporting.

The constituents to be analyzed for are based on previous sampling and the information needed to meet the sampling objectives. Each sample will be analyzed for the constituents listed in the table below. Quality assurances objectives including the analytical method, precision, accuracy and completeness shall be as detailed in the QAPP (WHC 1991). These limits may be adjusted and the proposed laboratory prior to final approval of the contract or work order.

SAMPLE ANALYTE LIST

CHEMICAL ANALYSIS

Inorganic

arsenic	mercury
aluminum	nickel
antimony	selenium
barium	silver
beryllium	vanadium
cadmium	zinc
chromium	chloride
cobalt	nitrate
copper	nitrite
lead	fluoride

Organic

VOA
Semi-VOA
TOC

PHYSICAL

pH
TDS

RADIOCHEMICAL ANALYSIS

alpha
beta

REFERENCES

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

WHC, 1989, Environmental Investigations and Site Characterization Manual, WHC-CM-7-7, Section 5.11, Westinghouse Hanford Co., Richland, Washington.

WHC, 1990, Hanford Site Stream-Specific Reports, WHC-EP-0345, Addendum 29, Westinghouse Hanford Co., Richland, Washington.

WHC, 1991, Liquid Effluent Sampling Quality Assurance Project Plan, WHC-EP-0499, Westinghouse Hanford Co., Richland, Washington.