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1	1	Cog./Proj. Eng	[signature]	01/06/92	N3-13	D. W. Fritz	[signature]	1-14-92		1	1
1	1	Cog./Proj. Eng. Mgr.	[signature]	8-Jan-92		J. E. Hyatt				3	
1	1	QA S. A. Brisbin	[signature]	1-16-92		J. A. Lerch				3	
3		Safety R. L. Martin				B. R. Powell, Jr.				3	
1	1	D. M. Nguyen	[signature]	1/7/92							
1	1	R. J. Bottenus	[signature]	1/14/92							
1	1	R. Szelmeczka	[signature]	1/17/92							

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[signature] 01/03/92 R.E. Bolls 1/3/92 Signature of EDT Originator / Date	[signature] R.J. Bottenus 1/14/92 Authorized Representative for Receiving Organization / Date	[signature] R.D. Pierce 8-Jan-92 Cognizant/Project Engineer's Manager / Date	Ltr No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments

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7. Abstract

This document presents the Sampling and Analysis Plan (SAP) for the T-Plant Facility, which has been identified as Tri-Party Agreement (TPA) Milestone M-17-12. The plan provides a thorough description of the facility, and identifies the responsible organizations for sampling. In addition, the plan identifies the sampling location, frequency, schedule, equipment and procedures, along with the sample designation, analysis, and handling processes utilized at T-Plant.

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T-PLANT FACILITY
216-T-4 WASTEWATER STREAM
SAMPLING AND ANALYSIS PLAN

January 17, 1992

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T-PLANT FACILITY 216-T-4 WASTEWATER STREAM SAMPLING AND ANALYSIS PLAN

1.0 INTRODUCTION

Section 13.1.4 of the May 21, 1991 proposed amendments to the Hanford Federal Facility Agreement and Consent Order, known as the Tri-Party Agreement (Ecology et al. 1989), requires that a sampling and analysis plan (SAP) be prepared for each of the thirty-three actively discharged liquid effluent streams at the Hanford Site. One of these streams is the 216-T-4 Wastewater Stream discharged to the 216-T-4-2 Ditch. The SAP for the 216-T-4 Wastewater Stream is presently identified as Tri-Party Agreement Milestone M-17-12; however, the milestone is expected to change to M-17-41A based on recent negotiations. A SAP is a document that can be amended by agreement among the U. S. Department of Energy (DOE), the Environmental Protection Agency (EPA), and the Washington State Department of Ecology (Ecology). Any amendment to this document can be considered a Tri-Party Agreement Class 3 change.

The liquid effluent sampling program, which includes the SAP, has been established to minimize the potential adverse effects on the environment of liquid effluent discharge to a soil column as a result of operations at the Hanford Site. As required by the Tri-Party Agreement Amendments, the sampling program will "provide a representative sampling of wastes discharged to the soil column, accounting for variations in volumes and contaminant concentrations due to operational practices, and considering all of the parameters known or suspected to be associated with each liquid effluent stream, influence of operational practice, raw water characteristics, and process knowledge." In general, a SAP documents the methods and frequency of sampling and the requirements for analysis to determine the constituents of a liquid effluent stream. The SAP includes the sampling methods necessary to meet the requirements for confirmatory measurements of negligible releases.

The sampling effort includes the collection of samples, their transport to an analytical laboratory, performance of analytical tests, and data reduction. The sampling program also involves quality assurance and quality control practices to ensure data traceability and acceptability. The quality assurance and quality control practices common to the sampling and analysis plans to be prepared for all 33 streams, are presented in the Liquid Effluent Sampling Quality Assurance Project Plan, WHC-SD-WM-QAPP-011, Rev. 0 (Nguyen 1990). The quality assurance project plan (QAPP) describes the means selected to implement the overall QA program requirements. The QAPP is intended to ensure that procedures, plans, and instructions are implemented and appropriate for the control of sampling activities that comply with DOE, EPA, and Ecology requirements.

This SAP has been developed in accordance with the Liquid Effluent Sampling QAPP and program objectives and guidance. This plan provides a method for obtaining a representative sample of the constituents of the T-Plant Facility 216-T-4 Wastewater Stream. The method considers the fluctuation of constituent concentration, flow rate, raw water characteristics, and process knowledge. All known or suspected constituents associated with the wastewater stream have been identified. This plan also includes an implementation schedule that addresses the frequency of sampling as well as the Quality Assurance details regarding sample collection, transport, analysis, and data reporting required in the Liquid Effluent Sampling QAPP.

This SAP for the 216-T-4 Wastewater Stream supports the T-Plant Wastewater Stream-Specific Report, WHC-EP-0342 Addendum 10 (Ayster 1990), which characterized the constituents of the liquid in accordance with the Washington (State) Administrative Code (WAC) 173-303 "Dangerous Waste Regulations" (Ecology 1990). The stream-specific report designates the T-Plant Wastewater stream as non-dangerous waste. This designation is based on both process knowledge and sampling data as compared to the listed dangerous wastes (WAC 173-303-080), dangerous waste criteria (WAC 173-303-100), and dangerous waste characteristics (WAC 173-303-090).

The objectives of the sampling program are explained in Section 2.0. Process knowledge and facility descriptions are presented in Section 3.0; the text along with illustrations and tables that summarize the stream composition and handling methods will give a broad view of the 216-T-4 Wastewater Stream sources and disposition. Sections 4.0 through 8.0 specify the sampling schedules and protocols that make up the sampling program, and references for the report are listed in Section 9.0.

2.0 SAMPLING OBJECTIVES

Objectives have been established for the liquid effluent sampling program and specific to the T-Plant Facility 216-T-4 Wastewater Stream Sampling and Analysis Plan.

2.1 Liquid Effluent Sampling Program Objectives

Objectives have been established to support the liquid effluent sampling program, which is designed to minimize the potential adverse effects on the environment of liquid effluent discharge to a soil column as a result of operations at the Hanford Site. The objectives for the program are:

1. Confirm the data reported in the stream specific reports and ensure the stream does not contain dangerous waste as defined in WAC 173-303, "Dangerous Waste Regulations."

2. Provide confirmatory data to support development of wastewater treatment projects or groundwater contamination studies.

3. Provide confirmatory data for the WAC 173-240, "Engineering Reports for Washington State Waste Discharge Permits" (Ecology 1990).

4. Provide sufficient data on chemical and radiological constituents to accurately calculate loading and rate of migration to support the assessment of impacts of continued discharge.

5. Supply sufficient data for All Known Available and Reasonable Treatment (or comparable Best Available Treatment) evaluations and liquid effluent treatment system design.

2.2 Sampling and Analysis Plan Objectives

The sampling objectives for this SAP were based on several guidance documents and program issues. The sampling and analysis plan for the T-Plant Facility 216-T-4 Wastewater Stream has been prepared to meet the following objectives:

1. Document the methods and frequency of sampling and the requirements for analysis to determine the constituents of the liquid effluent stream.

2. Provide sufficient data to verify a non-dangerous waste designation for the liquid effluent stream.

3. Provide quality assurance requirements specific to the liquid effluent stream not covered by the QAPP, as necessary.

2.3 Rationale for Sampling Objectives

Review of the T-Plant Wastewater Stream Specific Report (Ayster 1990) and the T-Plant Facility Effluent Monitoring Plan, WHC-EP-0481 (Moeller and Martin 1991), provided sufficient historical data and process knowledge for the designation of this waste stream as non-dangerous. The stream consists of greater than 99% steam condensate, compressor cooling water, and heating coil water. The administrative barriers and the engineering barriers reported in the documents referenced above provide adequate safeguards to ensure that no hazardous waste is anticipated to enter the 216-T-4 Wastewater Stream. In addition, no operational changes are anticipated that would adversely affect the classification of this wastewater stream.

Because no hazardous waste or otherwise regulated materials are disposed of in the 216-T-4 Wastewater Stream, there are no regulatory requirements applicable to this stream with the exception of the WAC-173-216 State Waste Discharge Permit (Ecology 1990). Because the permit process is not complete, there are presently no definitive guidelines regarding permit mandated sampling.

In summary, the rationale for the sampling objectives and analytes of interest in this sampling plan is to provide periodic confirmatory samples that will be used to verify the initial non-dangerous designation of the stream and to ensure that administrative controls are intact. Although RCRA protocol sampling is not required, it is followed because it supplies acceptable guidance for sampling and analysis activities.

3.0 SITE BACKGROUND

This section contains descriptions of the portions of the T-Plant Facility that have liquid effluents discharged to the 216-T-4 Wastewater Stream. The descriptions include the physical contributors to the stream for the facility.

3.1 T-Plant Facility

The T-Plant Facility is located in the 200 West Area of the Hanford Site, which is located in the south-central region of Washington State. The facility and ancillary systems (Figure 3-1) serve as the primary decontamination facility for the Hanford Site. The facility is operated for the U.S. Department of Energy (DOE) by the Westinghouse Hanford Company (Westinghouse Hanford).

3.1.1 Buildings, Structures and Ancillary Facilities

The original buildings at T-Plant were constructed in the mid-1940s to extract plutonium from production reactor fuel. The plant continued to perform this function until it was deactivated in 1956. Most of its original process equipment was subsequently removed. In 1957, T-Plant was placed in service as a beta-gamma decontamination facility and as a support complex for experiments and other operations requiring containment or isolation. It currently functions primarily as a decontamination facility (Hinckley 1985).

The T-Plant Facility consists of two primary decontamination buildings: 221-T and 2706-T. Building 221-T, which was built during 1943 to 1944, provides services in radioactive decontamination, reclamation, and decommissioning of process equipment contaminated with fission products and other highly-contaminated pieces of equipment. Building 2706-T, which was built during 1959 to 1960, serves as a radioactive decontamination facility for railroad equipment, buses, trucks, automobiles, railroad building equipment, and plant process equipment (Hinckley 1985). No liquid effluents from the 2706-T Building are discharged to the 216-T-4 Wastewater Stream.

Buildings, special facilities and areas in addition to the 221-T and 2706-T Buildings are the 214-T Chemical Storage Building, the 224-T, 271-T, 221-TA, and 2715-TA Buildings, and the 211-T Chemical Storage Area. The 214-T Building is used to store chemicals. Any liquid released in the 214-T Chemical Storage Building would drain to a blind sump and be disposed of as appropriate. The 224-T Building houses the Transuranic Waste Storage and Assay Facility (TRUSAF). The 271-T Building provides office space to Westinghouse Hanford staff supporting T-Plant operations and maintenance. The 221-TA Building houses the supply ventilation fans for the 221-T Building canyon. The 2715-T

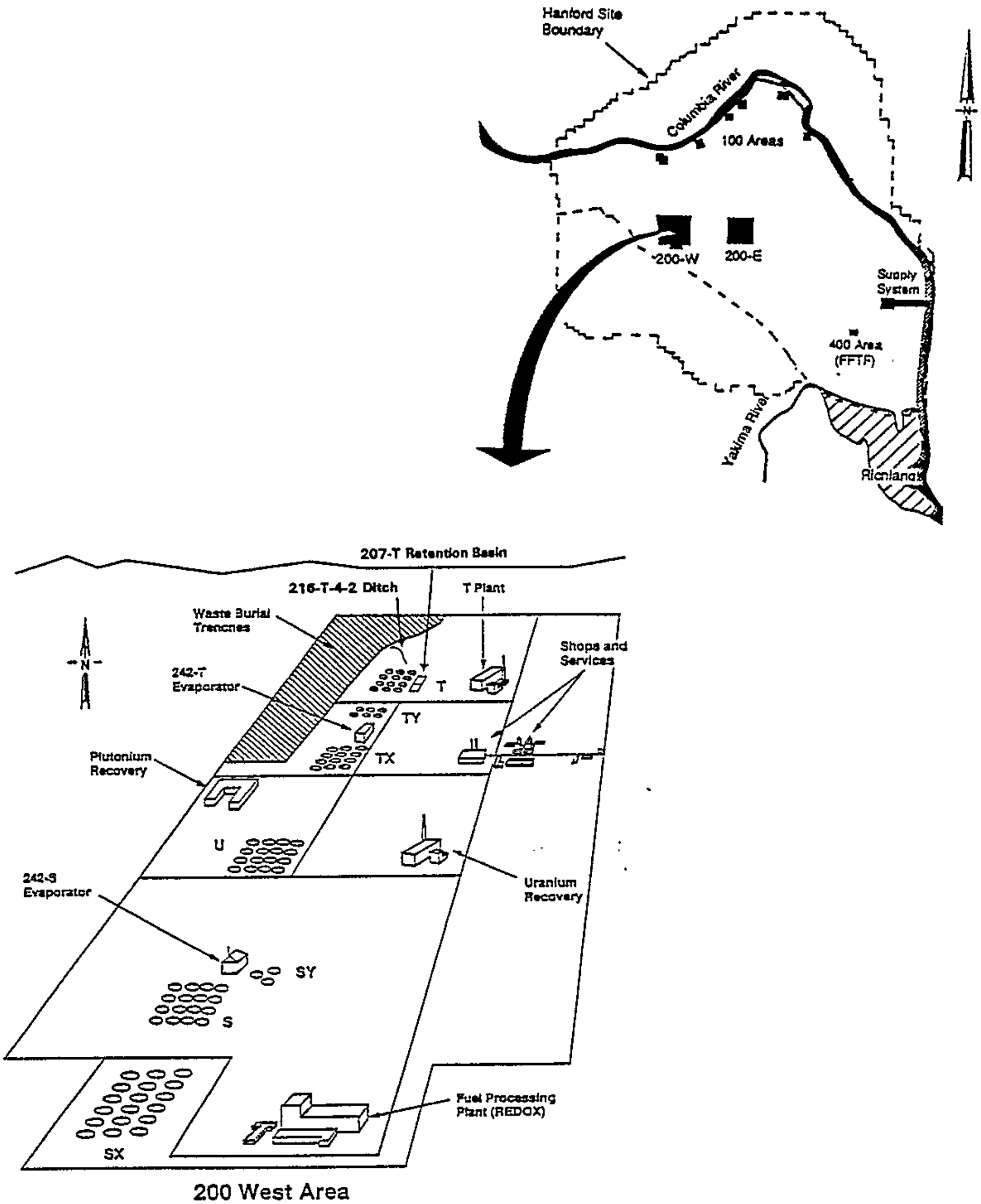


Figure 3-1. Location of T-Plant Buildings and Ancillary Structures in 200 West Area

Building is a paint shop. The 211-T Chemical Storage Area consists of a 90-day permitted pad that stores nonradioactive hazardous waste and a tank that stores NaOH. This tank is surrounded by a concrete berm which provides secondary containment. The T-Plant Facility is illustrated in Figure 3-2 and information on those buildings whose liquid effluents contribute to the 216-T-4 Wastewater Stream is summarized in Table 3-1.

Table 3-1. Selected T-Plant Buildings, Structures, and Areas

Building	Date Built	Current Use
211-T (Area)	1943-44	Bulk liquid chemical receiving and storage, hazardous waste storage
221-T	1943-44	Radioactive decontamination, repair, and decommissioning of process equipment
224-T	1944	Storage and non-destructive assay of drums containing transuranic waste
221-TA	1943-44	Houses supply ventilation fans for 221-T Building canyon
271-T	1943-44	Offices and aqueous makeup units
2715-T	~1960	Paint shop

3.1.2 216-T-4-2 Ditch

The 216-T-4 Wastewater Stream, which is commonly referred to as the chemical sewer, discharges to the 216-T-4-2 Ditch. The 216-T-4-2 Ditch is actually the second ditch to receive effluents from the 216-T-4 Wastewater Stream. The original ditch is labeled on a concrete marker as the "216-T-4 Crib" and is located south of and running parallel to the newer ditch. The new ditch is 1,750 ft long and 6 ft wide at the bottom. Average depth of the ditch is 4 ft. The first 50 ft is common with the old 216-T-4 Crib. The side slope is 1:1.5. The new ditch was dug in May of 1972 when the 216-T-4 Crib had become contaminated to a maximum level of 20,000 cpm at the bottom of the ditch, which was also badly overgrown with aquatic plants, shrubs, and small willow trees. Disposal of effluents in the 216-T-4-2 Ditch is by evaporation and absorption into the soil.

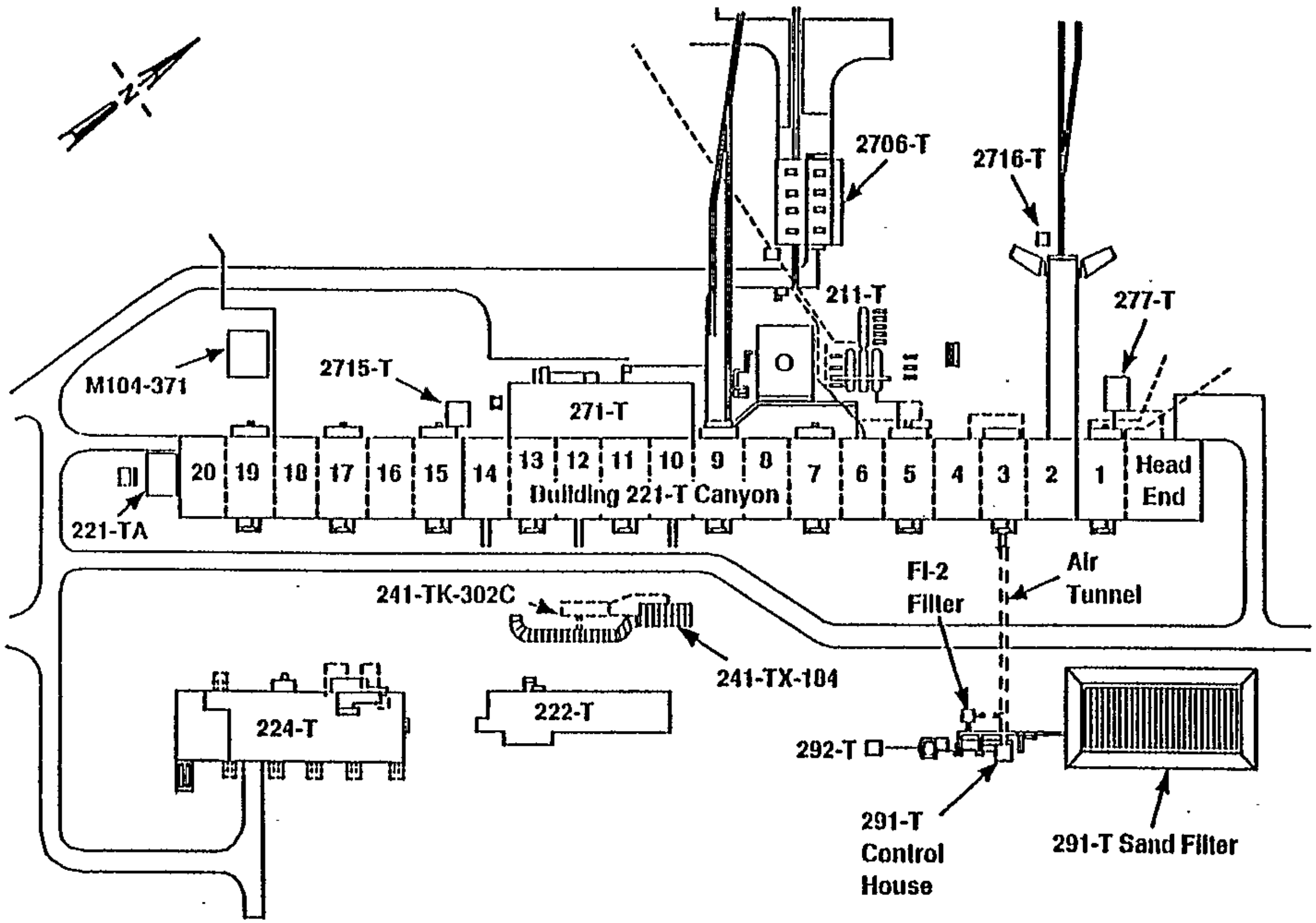


Figure 3-2. T-Plant Facilities

3.2 Contributors to the 216-T-4 Wastewater Stream

Specific contributors to the 216-T-4 Wastewater Stream can be grouped into three categories. These are effluent contributors that are (1) discharged directly to the 216-T-4-2 Ditch, (2) monitored by the chemical neutralization system prior to being discharged directly to the 216-T-4-2 Ditch, and (3) routed to the 207-T Retention Basin. Effluents discharged to the 207-T Retention Basin can be discharged to the 216-T-4-2 Ditch, as necessary. A flow diagram of the contributors is presented in Figure 3-3. Information on the contributors, including rate of discharge and potential contaminants, is summarized in Table 3-2.

3.2.1 Contributors Discharged Directly to the 216-T-4-2 Ditch

Liquid effluents from five contributors are discharged directly to the 216-T-4-2 Ditch. The contributors are liquid effluents from the (1) 221-T Building spent fuel storage secondary system cooling water, (2) 221-T Building steam condensate, (3) 271-T Building steam condensate, (4) 271-T Building compressor cooling water, and (5) liquid to the floor drain in the 2715-T Building.

3.2.1.1 221-T Building Spent Fuel Storage Secondary System Cooling Water

Approximately 76 Pressurized Water Reactor (PWR) Core 2 blanket fuel assemblies, which were used to power DOE's Shippingport Reactor located in Shippingport, Pennsylvania, are stored in Cell 2R of the canyon in the 221-T Building. The cell was modified to provide for storage of the fuel assemblies at the Hanford Site for up to 20 years. Cell 2R consists of a mixed cotton and asbestos layer between 2.5-ft and 3.5-ft thick layers of concrete. The 13-ft by 27.5-ft by 28-ft deep pool holds approximately 50,000 gal of water when filled to a depth of 19 ft. The fuel assemblies are stored in racks at one end of the pool. That end is covered by concrete blocks and the remainder of the pool is open to the canyon. This opening, plus a small ventilation flow exhausted to the ventilation tunnel, vents the surface of the pool.

Cooling of the pool water in Cell 2R is performed by a closed-loop refrigeration system. Because the fuel assemblies have been out of the reactor for many years, the heat load is relatively low. The refrigeration system, which is located in the 221-T Building pipe gallery, dumps heat to waste cooling water on the secondary side. This secondary side waste

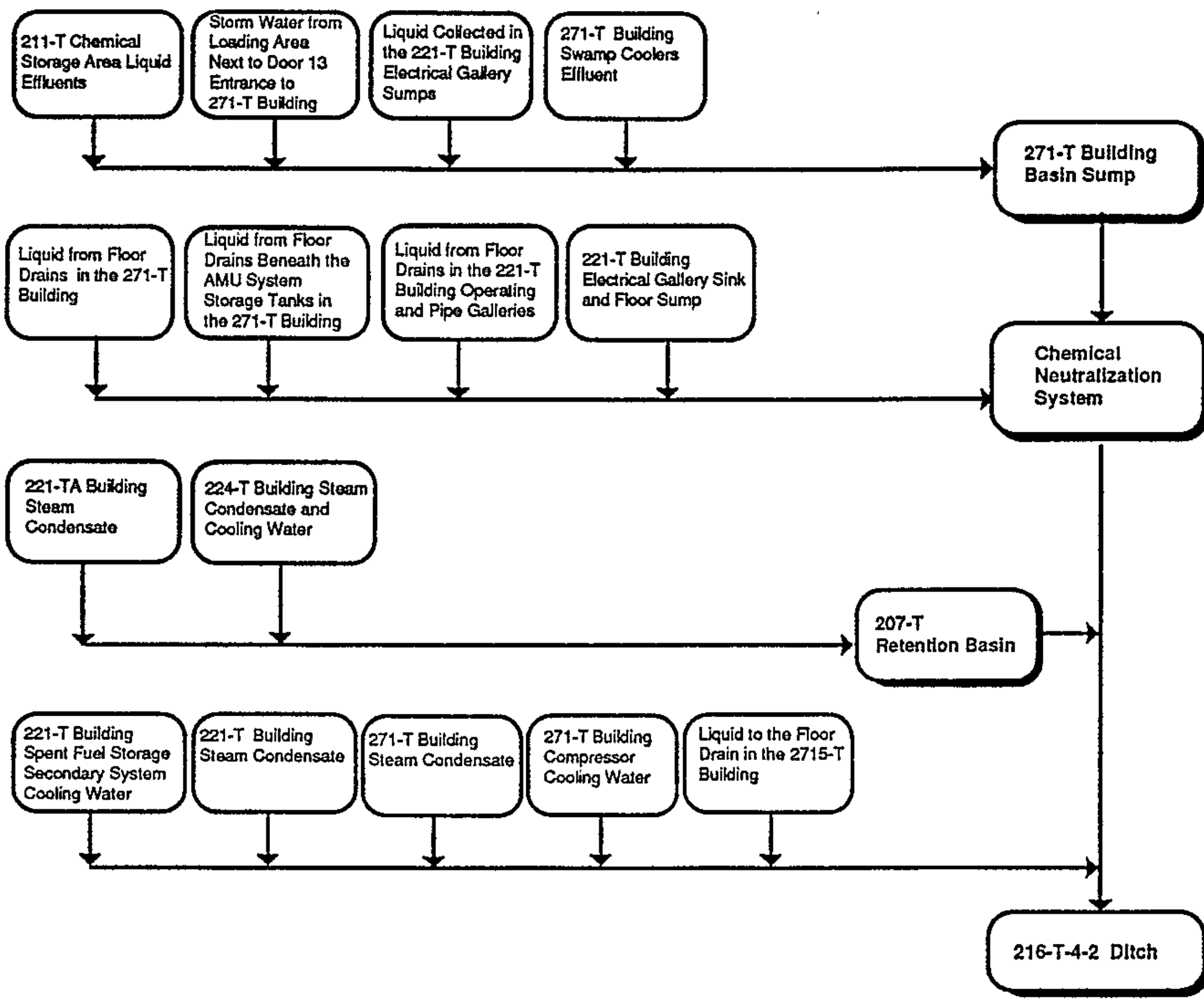


Figure 3-3. Flow Diagram of Contributors

Table 3-2. Summary of Wastewater Stream Contributors

Source	Rate of Discharge/Composition	Potential Contaminants	Stream Handling
221-T Building Spent Fuel Storage Secondary Cooling Water System	• 8,600 gal/day • Raw water supplied to secondary cooling system	Potentially contaminated with radioactive materials.	Discharged directly to 216-T-4-2 Ditch through header in Section 3 of 221-T Building. Scheduled to be eliminated.
221-T Building Steam Condensate	• 0 to 50 gal/day • Steam condensate	None.	Discharged directly to 216-T-4-2 Ditch through header in Section 15 of 221-T Building.
271-T Building Steam Condensate	• 0 to 500 gal/day • Steam condensate	None.	Discharged directly to 216-T-4-2 Ditch.
271-T Building Compressor Cooling Water	• 8,600 gal/day • Sanitary water used as compressor cooling water	None.	Discharged directly to 216-T-4-2 Ditch through header at southwest corner 271-T Building. Scheduled to be eliminated.
Liquid to the Floor Drain in the 2715-T Building	• 0 gal/day expected	Potential for inadvertent release of paints or volatile solvents during spills.	Floor drain empties to Manhole No. 2 discharging directly to 216-T-4-2 Ditch. Scheduled to be eliminated (capped).
211-T Chemical Storage Area Liquid Effluents	• 0 to 2 gal/day • Variable flow • Collected storm water	None. If a spill of hazardous nonradioactive chemicals were to occur, liquid would be cleaned up as a hazardous spill.	Liquid manually transferred to the 271-T Building basin sump, the chemical neutralization system, and then to the 216-T-4-2 Ditch through the header in Section 13 of the 221-T Building.
Storm Water from the Concrete Loading Area Next to the Door 13 Entrance to 271-T Building	• Variable flow • Storm water	None.	Effluents flow to the 216-T-4-2 Ditch via 271-T Building basin sump and chemical neutralization system.

Table 3-2. Summary of Wastewater Stream Contributors (cont.)

Source	Rate of Discharge/Composition	Potential Contaminants	Stream Handling
Liquid Collected in the 221-T Building Electrical Gallery Sumps	• 0 to 20 gal/day • Housekeeping and maintenance liquids	Potentially contaminated with radioactive materials.	When full, sumps located in each of the 18 sections of the 221-T Building electrical gallery are sampled for radioactive material and manually pumped to the 271-T Building basin sump if no radioactive material is present.
271-T Building Swamp Coolers Effluent	• 0 to 100 gal/day • Sanitary Water	None.	Effluents flow to the 216-T-4-2 Ditch via 271-T Building basin sump and chemical neutralization system.
Liquid from Floor Drains in the 271-T Building	• 0 to 10 gal/day • Housekeeping and maintenance liquids	Potentially contaminated with radioactive materials.	Routed directly to chemical neutralization system catch tank.
Liquid from Floor Drains Located Beneath the AMU System Product Storage Tanks in the 271-T Building	• 0 gal/day expected	Caustic, permanganate, potentially contaminated with radioactive materials. Third floor AMU storage tanks are empty and scheduled to be removed.	Currently routed directly to chemical neutralization system catch tank. Drains scheduled to be capped; contributor to be eliminated.
Liquid from Floor Drains in the 221-T Building Operating and Pipe Galleries	• 0 to 1 gal/day • Housekeeping and maintenance liquids, primarily sanitary water from testing showers	Potentially contaminated with radioactive materials.	Routed directly to chemical neutralization system catch tank.
221-T Building Electrical Gallery Sink and Floor Sump	• Variable flow • Housekeeping and maintenance liquids	Potentially contaminated with radioactive materials.	Sump pump transfers sump contents to the chemical neutralization system catch tank.
221-TA Building Steam Condensate	• 0 to 20 gal/day • Steam condensate	None.	Effluent is routed to the 207-T Retention Basin.
224-T Building Steam Condensate and Cooling Water	• 0 to 50 gal/day • Steam condensate and cooling water	None.	Effluent is routed to the 207-T Retention Basin.

cooling water does not mix with the pool water on the primary side nor with the refrigerant in the refrigeration system. Only multiple leaks in the refrigeration system could result in the contamination of secondary side waste cooling water with primary side pool water. The secondary side waste cooling water is discharged directly to the 216-T-4-2 Ditch through a header located in Section 3 of the 221-T Building. The average daily discharge is estimated to be 8,600 gal. Part of the secondary side waste cooling water system is open in the pipe gallery, which is a Radiological-Controlled Area (RCA). Because an RCA has the potential to be contaminated with radioactive materials, the cooling water has the potential to contain the same contaminants. This stream is scheduled to be eliminated.

3.2.1.2 221-T Building Steam Condensate

The 221-T Building is made of reinforced concrete and is 850 ft long by 68 ft wide by 74 ft high and covers an area of 57,800 ft^2. The building consists of the canyon with railroad tunnel access, three galleries, one crane way, and a "head-end" facility. Figure 3-4 illustrates a cutaway view of the 221-T Building.

There are steam lines in the pipe gallery of the 221-T Building. The steam is used to heat the galleries in the building and assist in transferring (steam jetting) aqueous solutions using jumper lines. Steam condensate collected is discharged directly to the 216-T-4-2 Ditch from a header in the pipe gallery located in Section 15 of the building. The volume of steam condensate discharged is estimated to range from 0 to 50 gal/day, depending on steam requirements.

3.2.1.3 271-T Building Steam Condensate

The 271-T Building is the original bismuth phosphate office and support facility and is located adjacent to the 221-T Building. The building is 160 ft long, 48 ft wide, and 54 ft high. The building is constructed of 1-ft-thick concrete blocks with reinforcing steel beams. The building consists of three floors and a basement. The basement contains the compressor room, fan room for ventilation, machine shops, riggers' loft, service elevator, and various offices and store rooms. The first floor contains a chemical makeup room where three storage tanks, a maintenance shop, and a health physics office are located. The second floor consists mainly of offices, a lunchroom, restrooms, and the service elevator. The third floor consists of offices, restrooms, an elevator, and storage tanks for nitric acid, which are now unused. The nitric acid tanks were part of the aqueous makeup unit (AMU) system. The third floor also provides access into the craneway and crane cab.

Steam is used to heat the 271-T Building and can be used for a steam jet transfer from the 271-T Building basin sump to the chemical neutralization system if the sump pump fails. Steam condensate collected is discharged directly to the 216-T-4-2 Ditch. The volume

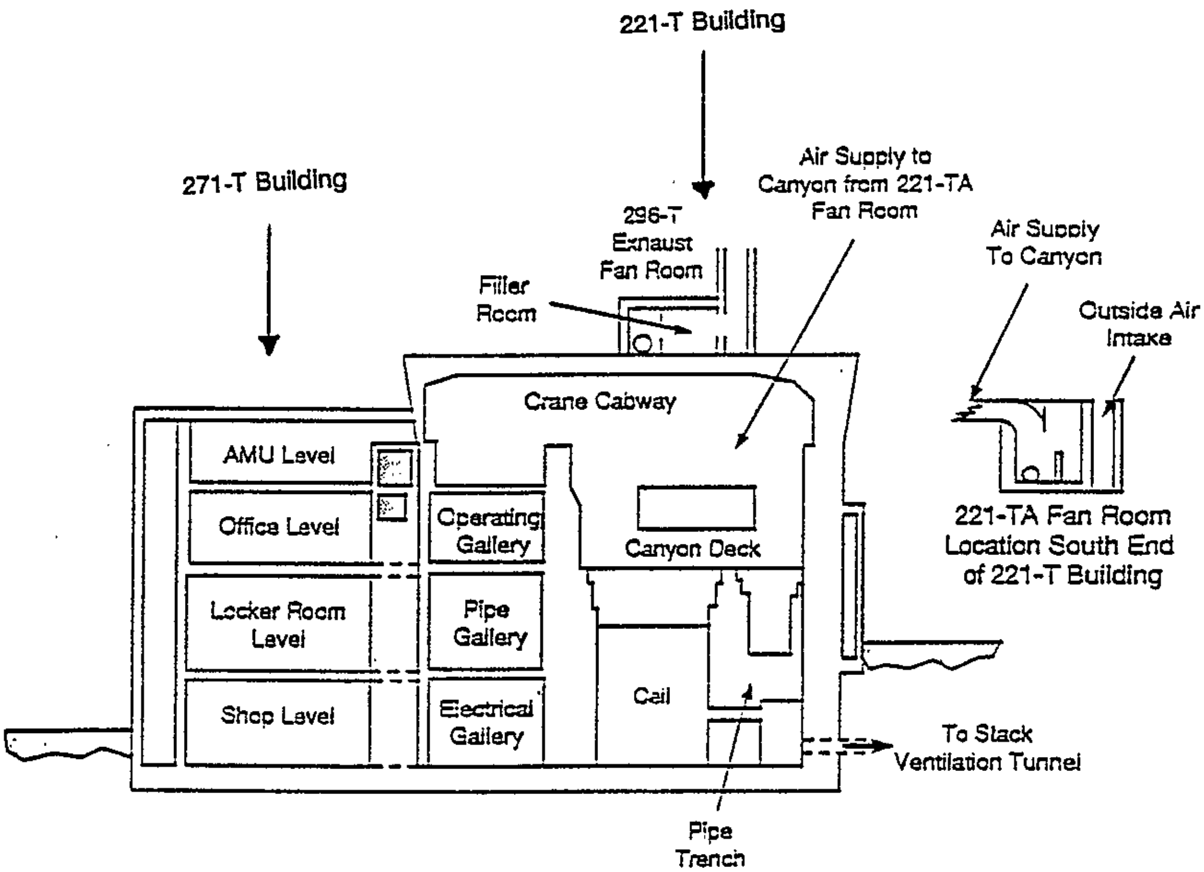


Figure 3-4. Cutaway View of the 221-T and 271-T Buildings

of steam condensate discharged is estimated to range from 0 to 500 gal/day, depending on steam requirements. Building heating requirements are seasonally dependent.

3.2.1.4 271-T Building Compressor Cooling Water

Raw water is used to cool the two air compressors that supply compressed air for the T-Plant Facility. The effluent is discharged through a header at the southwest corner of the 271-T Building. The average daily discharge of compressor cooling water is estimated to be 8,600 gal, when the compressors are operating. This stream is scheduled to be eliminated.

3.2.1.5 Liquid to the Floor Drain in the 2715-T Building

The 2715-T Building is a metal shed used by maintenance as a paint shop in support of T-Plant activities. The building is located adjacent to and west of the 221-T Building. The 2715-T Building has a center floor drain that empties to Manhole Number 2 discharging directly to the 216-T-4-2 Ditch. Lines leading from the building to the manhole are 6-in. and 12-in. vitrified clay pipe. The estimated flow rate from this contributor is 0 gal/day during routine operations. This stream is scheduled to be eliminated by capping the drain.

3.2.2 Contributors Monitored by the Chemical Neutralization System Prior to Being Discharged to the 216-T-4-2 Ditch

Liquid effluents from eight contributors will be monitored by the chemical neutralization system prior to being discharged directly to the 216-T-4-2 Ditch. The chemical neutralization system is located in Section 11 of the electrical gallery of the 221-T Building and is composed of two principal components. These components are a 500-gal catch tank and the automatic pH neutralization system. Liquid from the catch tank will be processed automatically in 200-gal batches to a pH ranging from 5 to 10. Following treatment, the liquid is discharged to the 216-T-4-2 Ditch through a header located in Section 12 of the electrical gallery in the 221-T Building. The chemical neutralization system will be operational following completion of a readiness review. Until the readiness review has been completed, current practice is to route the effluent from the catch tank to the 271-T Building basin sump, which pumps the liquid to the 216-T-4-2 ditch.

Four contributors are routed to the 271-T Building basin sump prior to being pumped via a 2-in. stainless steel line to the chemical neutralization system catch tank. Contributors routed to the 271-T Building basin sump are the (1) liquid effluents from the 211-T Chemical Storage Area, (2) storm water runoff from the concrete pit loading area next to the Door 13 entrance into the 271-T Building, (3) liquid collected in the 221-T Building electrical gallery sumps, and (4) 271-T Building swamp coolers effluent.

Four contributors are routed directly to the chemical neutralization system catch tank and discharged to the 216-T-4-2 Ditch through the header located in Section 12 of the electrical gallery in the 221-T Building. These contributors routed directly to the catch tank are (1) liquid from floor drains in the 271-T Building, (2) liquid from floor drains on the first and third floors of the 271-T Building located beneath the AMU system product storage tanks, (3) liquid from the floor drains in the 221-T Building operating and pipe galleries, and (4) liquid draining from a sink to a floor sump in the south end of the 221-T Building electrical gallery.

3.2.2.1 211-T Chemical Storage Area Liquid Effluents

Liquid from the 211-T Chemical Storage Area is one contributor routed to the 216-T-4-2 Ditch via the 271-T Building basin sump and the chemical neutralization system. The 211-T Chemical Storage Area, located north of the 271-T Building and adjacent to the 221-T Building, is a chemical receiving area. Bulk liquid chemicals are received in tank cars (or trucks) and stored in four above-ground storage tanks until needed. These tanks were used to store nitric acid, sodium hydroxide, and low-level radioactive waste. All of the horizontal tanks in the 211-T Chemical Storage Area are scheduled to be removed. Three tanks are currently empty. The fourth contains a heel of low-level radioactive waste, which will not be discharged to the 216-T-4 Wastewater Stream.

A new sodium hydroxide distribution system has been installed in the 211-T Chemical Storage Area. The new system includes a vertical 8,000-gal storage tank and a facility for unloading tank trucks into the storage tank. The storage tank is located in a concrete area bermed to collect all 8,000 gal. The concrete is lined with a chemical-resistant coating. The unloading area is a concrete pad with a partial berm that is sloped to drain to a blind sump; that is, a sump with no drain.

The 211-T Chemical Storage Area also contains a cement pad with a berm, coated with a chemically resistant material, for storage (<90 d) of hazardous nonradioactive waste in drums. The pad is sloped to a sump. This area is surrounded by a chain-link fence, covered with a metal roof, secured with a locked gate, and marked with appropriate warning signs.

Liquid collected in the sump is pumped to the 271-T Building basin sump via a 1-in. stainless steel line. The sump does not pump automatically. The liquid collected under normal conditions is storm water.

3.2.2.2 Storm Water from the Concrete Loading Area Next to the Door 13 Entrance into the 271-T Building

A second contributor routed to the 271-T Building basin sump is storm water from the concrete loading area north of the Door 13 entrance to the building. The liquid draining to the basin sump from the concrete loading area is storm water. The building opening to the area is a roll-up door.

3.2.2.3 Liquid Collected in the 221-T Building Electrical Gallery Sumps

The 221-T Building electrical gallery is provided with blind sumps at each of the 18 sections of the gallery. These sumps collect liquids from the floor that result from housekeeping and maintenance activities. These sumps have no drains; when full, a sump is sampled for radioactive material and manually pumped to the 271-T Building basin sump if no radioactive material is present. In the event that radioactive contaminants are present, the liquid is not sent to the 216-T-4 Wastewater stream. The liquid volume collected in the 221-T Building electrical gallery sumps and discharged to the 216-T-4 Wastewater Stream is estimated to range from 0 to 20 gal/day. The electrical gallery is an RCA. This contributor has the potential to be contaminated with radioactive material.

3.2.2.4 271-T Building Swamp Coolers Effluent

Swamp coolers are used to cool the air in the 271-T Building during the summer. The swamp coolers use sanitary water and the effluent is not expected to contain either radioactive or hazardous materials. The effluent is routed to the 271-T Building basin sump and then to the chemical neutralization system prior to being discharged directly to the 216-T-4-2 Ditch. The effluent flow rate is seasonally dependent and is estimated to average 100 gal/day.

3.2.2.5 Liquid from Floor Drains in the 271-T Building

Four contributors are routed directly to the chemical neutralization system catch tank. One such contributor is the liquid from floor drains in the 271-T Building. Liquid from the floor drains in the 271-T Building is routed directly to the chemical neutralization system catch tank via a 3-in. stainless steel and polyvinyl chloride (PVC) pipe. Liquid to the floor drains occurs infrequently during maintenance activities. The liquid would not be expected to contain either radioactive or hazardous materials under normal conditions. The volume of liquid received from the floor drains is estimated to range from 0 to 10 gal/day. The floor drains are in an RCA. This contributor has the potential to be contaminated with radioactive material.

3.2.2.6 Liquid from Floor Drains Located Beneath the AMU System Product Storage Tanks in the 271-T Building

Liquid from the floor drains located beneath the AMU system product storage tanks on the first and third floors of the 271-T Building is routed directly to the chemical neutralization system catch tank. Following pH monitoring, and neutralization, if necessary, the liquid is discharged directly to the 216-T-4-2 Ditch. Lines carrying the effluent include the original building, PVC and stainless steel piping. The tanks on the third floor are empty and scheduled to be removed. The tanks on the first floor hold caustic and permanganate. These drains are in an RCA. The contributor has the potential to be contaminated with radioactive material; however, no effluent is expected (0 gal/day) during normal conditions.

3.2.2.7 Liquid from Floor Drains in the 221-T Building Operating and Pipe Galleries

Liquid from the operating and pipe galleries in the 221-T Building is routed to the 216-T-4-2 Ditch via the chemical neutralization system. The operating gallery is approximately 760 ft long and 14 ft wide. Nine stairwells provide access into the operating gallery. This gallery is the control center for remote operation of canyon equipment. Section 2 is the PWR Core II operating station. Various panel control boards are located in Sections 5 through 15. However, only the control panels in Sections 5, 11, and 15 are in use. The other control panels have been out of service since the shutdown of the bismuth phosphate process. Sections 16 through 19 contain the lunchroom and offices of the decontamination and decommissioning operations personnel. The office adjacent to Section 19 contains panel controls for canyon air, water, steam, and lights along with power controls for the centrifuge run-in station. The office adjacent to Section 18 contains controls for the pump run-in station.

The pipe gallery is 760 ft long and 14 ft wide. It can be entered through nine stairwells. The pipe gallery contains most of the nonradioactive chemical, process, and utility piping. The pipe gallery is divided into four areas to meet requirements for present fuel storage pool, and also the main power supply for the compressor/condenser units and the ion-exchange column. Sections 2 through 15 are used for material storage. The maintenance dock is located adjacent to the Section 17 stairwell.

Most of the floor drains in the operating gallery have been plugged. Liquid from those floor drains that are not plugged is routed to the pipe gallery via 3-in. stainless steel lines. Together with liquid collected by the pipe gallery floor drains, the liquid is routed to the chemical neutralization system catch tank via 3-in. stainless steel and PVC lines. The volume of liquid collected from these drains is estimated to range from 0 to 10 gal/day. Most is from routine testing of safety showers, which use sanitary water. The operating and pipe galleries are RCAs. This contributor has the potential to be contaminated with radioactive materials.

3.2.2.8 221-T Building Electrical Gallery Sink and Floor Sump

In the south end of the electrical gallery there is a utility sink that drains to a floor sump nearly underneath the sink. In the sump, there is a sump pump that transfers the liquid from the sump into the piping from the operations and pipe gallery floor drains, which drains to the chemical neutralization system catch tank. The south end of the electrical gallery was used as a maintenance electrical shop laboratory. The lab is no longer located in this location. No activities associated with radioactive or hazardous materials are performed in the area. The electrical gallery is an RCA. This contributor has the potential to be contaminated with radioactive materials.

3.2.3 Contributors Routed to the 207-T Retention Basin

Liquid effluents from two contributors are routed to the 207-T Retention Basin. These effluents can be discharged to the 216-T-4-2 Ditch. The 207-T Retention Basin is a concrete retention pool with outer dimensions measuring 247 ft by 123 ft. The pool is divided into two equal portions with dimensions of 106 ft by 105 ft. Liquid can be contained to a level of approximately 6.5 ft. The basin can retain approximately a million gallons of liquid. The basin is located approximately 1,500 ft west of the 221-T Building. From 1944 to 1976, the basin received process or evaporator cooling water from the 221-T, 224-T, and 242-T Buildings. Presently the basin receives liquid effluent from 221-TA and 224-T Buildings. To discharge the liquid to the 216-T-4-2 Ditch, manual valves have to be opened. Due to limited effluent received by the basin under current operating conditions at T-Plant, no effluent has been sent to the ditch for several years. The basin is illustrated in Figure 3-5.

Contributors routed to the 207-T Retention Basin are the (1) 221-TA Building steam condensate and (2) 224-T Building steam condensate cooling water. The 224-T Building is the TRUSAF.

3.2.3.1 221-TA Building Steam Condensate

The 221-TA Building houses two supply ventilation fans for the 221-T Building canyon. A preheater, air filter, evaporative cooler, and reheat coil are also located in the building to condition the air supply flowing into the canyon. Steam is used for the preheater and reheater coil that heat the 221-T Building canyon area. Steam condensate from the building is discharged directly to the 207-T Retention Basin. The average daily discharge is estimated to be 10 gal, ranging from 0 to 20 gal/day.

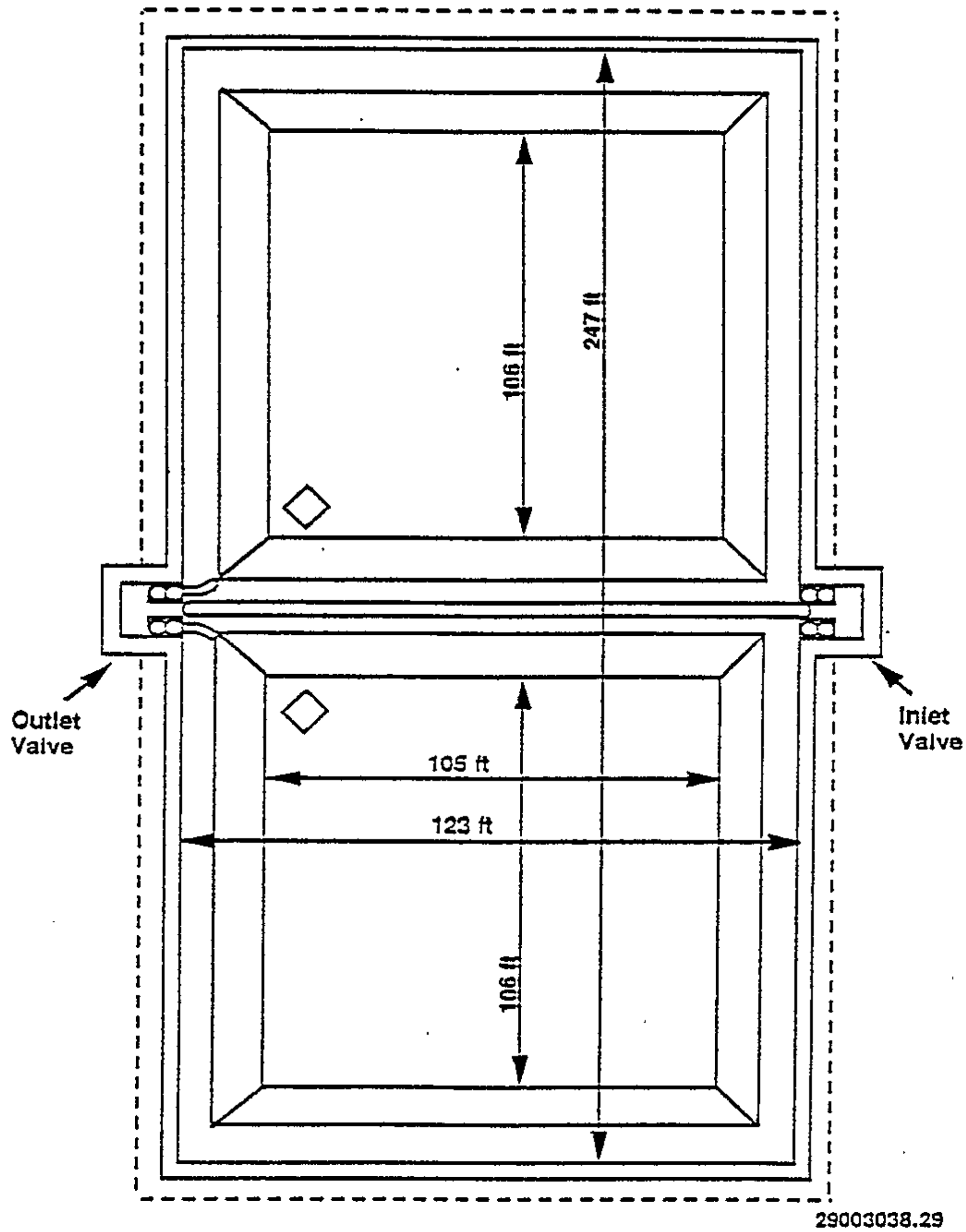


Figure 3-5. Diagram for the 207-T Retention Basin

3.2.3.2 224-T Building Steam Condensate and Cooling Water

Originally, operations in the 224-T Building purified plutonium nitrate by the lanthanum fluoride process. The building remained inactive following phase-out of the bismuth phosphate plants until the early 1970s. At that time, the building was modified for storage of plutonium scrap in liquid and solid forms. In 1984, the 224-T Building was targeted to house the transuranic waste storage and assay operation. The removal of plutonium scrap from the 224-T Building was completed in 1985 and the building was officially designated as the Transuranic Waste Storage and Assay Facility. The TRUSAF operation consists of nondestructive assay (NDA) and nondestructive examination (NDE) of newly generated contact-handled transuranic (CH-TRU) solid waste. These analyses are used to overview sealed, certified CH-TRU solid waste packages in order to verify general compliance with the Waste Isolation Pilot Plant Waste Acceptance Criteria requirements. All waste packages determined to be acceptable are placed in controlled designated storage areas.

Steam is used for building heating. Sanitary water is also used for the building's hot water heater and for cooling water in the fan room, which houses the evaporative cooler used for cooling the building. Steam condensate cooling water from the building is discharged directly to the 207-T Retention Basin. The maximum daily discharge is estimated to be 250 gal. The average daily discharge ranges from 0 to 50 gal.

4.0 RESPONSIBILITIES

The Environmental Protection Programs group will act as Project Manager for the overall sampling program and will act as a liaison between T-Plant and the regulators. The T-Plant Facility Manager is responsible for the sampling and analysis of the wastewater generated by the facility. In this regard, the facility manager (or designee) is responsible for:

- The completion and accuracy of this Sampling and Analysis Plan.
- Proper execution of the Sampling and Analysis Plan.
- Confirming the proper 216-T-4 Wastewater Stream waste designation.

The following assignments are made to assist the facility manager in the execution of his or her responsibilities.

The T-Plant Facility Manager (or designee) will act as the Sampling Task Leader as defined in WHC-SD-WM-QAPP-011 and is responsible for:

- Evaluating final data packages against data quality objectives (DQO) set for these samples.
- Overseeing the sampling activities. Specific tasks include ensuring the correct sample point is used, assisting and cooperating with the sampling team to ensure facility safety guidelines are not compromised, ensuring appropriate equipment and skilled personnel are available for sampling, and ensuring all field work is done according to established procedures.
- Assisting with the wastewater stream designation process.
- Reporting data results and maintaining a data file containing this Sampling and Analysis Plan, sampling logs, wastewater flow records, analytical results, and resulting reports.
- Requesting systems audits.
- Developing, initiating, and tracking corrective actions (if needed).

The Office of Sample Management (OSM) is responsible for:

- Identifying and approving the contract laboratory to perform chemical analysis for this sampling and analysis plan.

- Monitoring the contract laboratory for quality performance.

- Acting as an interface between the facility manager and the contract laboratory. Receiving laboratory data packages.

- Verifying that all laboratory results requested are received to ensure they are complete.

- Validating contract laboratory data packages.

The RCRA/CERCLA sampling team (Westinghouse Hanford Sampling and Mobile Laboratory) is responsible for:

- Ensuring samples are representative.

- Taking adequate blanks and other quality control samples as defined by SW-846, Chapter 1 (EPA 1986), and the specific details found in each analytical procedure.

- Maintaining accurate and complete sampling logs.

- Initiating a proper chain of custody (COC) for each sample.

- Ensuring samples are properly packaged and shipped.

The Sampling Task Leader shall be responsible for scheduling operators and health physics technicians (HPTs) to support the sampling team; reviewing data logs and sampling; surveilling chain of custody of samples and data; and ensuring analytical data is filed with the Environmental Data Management Center (EDMC). The T-Plant Sampling Task Leader shall prepare a data file on weekly composites in their offices and shall be responsible for maintenance of the file as quality records. The data in the file will include sampling logs, process flow records, analytical results, and calculations.

All protocol samples (non-routine samples that are to meet the quality assurance criteria of SW-846) will be collected (and preserved if required) by personnel trained to desk instruction T032 A-01 450 F, "Sampling Performed for RCRA Analysis" (Appendix 2). Sampling team members for protocol samples shall have training in environmental sampling as discussed in WHC-CM-7-7, EII 1.7, "Indoctrination, Training, and Qualification."

The sampler shall make a written record of the sampling as required by procedure EII 1.5 (WHC-CM-7-7). The data shall include the sample number, time, date, location, flow information, and observations as a minimum. Copies of the written record shall be submitted to the T-Plant Sampling Task Leader. Originals will remain in controlled notebooks assigned to the Westinghouse Hanford Sampling and Mobile Laboratory (S&ML) personnel.

The chain of custody for protocol samples shall be maintained per EII 5.1 (WHC-CM-7-7) by the original sampler or member of the sampling team to the laboratory or point of shipping. A copy of the COC form is faxed to OSM before the sample is shipped. When the contracted laboratory's custodian receives the samples, he/she will complete the Westinghouse Hanford COC form and fax a copy to OSM. The completed COC will be provided to OSM with the data package. Completed chain of custody forms for protocol samples will be held by the OSM. OSM personnel will arrange for an approved onsite or offsite laboratory to do the analysis. This laboratory must meet the criteria of this Sample and Analysis Plan and the Liquid Effluent Sampling QAPP. Validation of protocol samples in the first year of sampling will be performed by OSM to "Level B" in accordance with Section 2.0, "Data Validation for RCRA Analyses," of WHC-CM-5-3, Sample Management and Administration, or by another qualified organization using the same or equivalent procedures. The results of the first year sampling will be evaluated and validation of samples may be reduced to "Level A" validation in subsequent years if appropriate. OSM will forward a copy of the data to T-Plant Sampling Task Leader and will be responsible for ensuring the data are properly prepared for public release and transmitted to the EDMC.

Protocol sampling will be performed by Westinghouse Hanford S&ML in accordance with written desk instructions and procedures as discussed above. Westinghouse Hanford S&ML samplers take responsibility for all phases of sampling for the samples they have drawn, including sample preservation, collection, storage, and shipment to the pre-arranged laboratory for analysis.

T-Plant Occupational Health Physics technicians will survey and release the sample containers per WHC-CM-4-10, Section 11.0. Westinghouse Hanford S&ML personnel will deliver the radionuclide screening samples, taken at each sampling point to classify the total activity of the samples for shipping purposes, to the 222-S Laboratory. Sampling personnel will package the samples correctly, prepare papers to ship the samples to the analytical laboratory, and deliver the samples to Westinghouse Hanford shipping after total activity screening has been completed by 222-S Laboratory personnel. The laboratory will use an internal Westinghouse Hanford method, LA-508-113, "Low-Level Alpha and Beta in Large Volume Water Samples," to measure total activity in the sample. The results are compared to release limits in WHC-CM-4-10, Section 11.0, "Control and Storage of Radioactive

Materials and Equipment." Handling and shipping of the samples will meet the requirements of Environmental Investigation Instruction 5.11, "Sample Packaging and Shipping."

In addition to protocol sampling, routine effluent samples are obtained from the wastewater stream by HPTs as directed by Environmental Protection. Process sampling is completed by Westinghouse Hanford staff who are trained to procedure WHC-IP-0692, Section 11.03.02. The sampling and laboratory analysis methods currently used are not covered by the requirements of this SAP.

5.0 SAMPLING LOCATION, FREQUENCY, AND SCHEDULE

5.1 Sampling Location

Routine sampling is performed from the ditch near the pipe outflow. Protocol samples may be taken there or at Manhole Number 4. Figure 5-1 shows the outflow, this manhole, and the stream sources. These locations were selected to ensure that the sample includes all effluent contributors to the discharge to the 216-T-4-2 Ditch and is representative of the entire stream. Two locations were identified in order to provide a viable sampling point during conditions of extreme cold and/or snow when the outflow pipe may not be accessible or times of low flow where the manhole sampling point may not be viable. This manhole is the second-most downstream position where a sample may be taken and accurately represents the wastewater quality as it is discharged to the ditch. The 207-T Retention Basin is currently not discharging to the 216-T-4-2 Ditch. The 207-T Retention Basin will to be sampled for the constituents discussed in Section 8.0 if the effluent is to be sent to the 216-T-4-2 Ditch.

5.2 Sampling Frequency and Schedule

The frequency of sampling will be four times per year for the first year and two times per year thereafter. The schedule of sampling the first year will be two samples during the period of November-March and two samples during the period April-October. In subsequent years, one sample per each period will be taken on alternate years. The analyses performed on these samples are discussed in Section 8.0. Explanation of the rationale for the frequency and scheduling of samples is given below.

The wastewater stream is a mixture of sanitary water, raw water, and steam condensate. There are no known hazardous or toxic materials being added to the effluent as a result of routine operations. The basic assumption is that the composition of the effluent is essentially constant over time. There is, however, a potential for significant variation in the flow (amount) during the year. This is because the flow rate is largely dependent upon the amount of steam being used and the corresponding volume of steam condensate generated. In the colder months of the year (November-March), the volume of condensate is greater than in the warmer months of the year (April-October). Thus, it was decided that a stratified random sampling methodology, as discussed in Chapter 9 of SW-846 (EPA 1986), was appropriate. Two samples from each of the two time stratum (November-March and April-October) were identified as the minimum needed to make an estimate of sample variability between strata. The two samples from each stratum will be chosen at random from a list of all workdays in the time period.

9 3 1 2 7 5 3 0 0 6 6

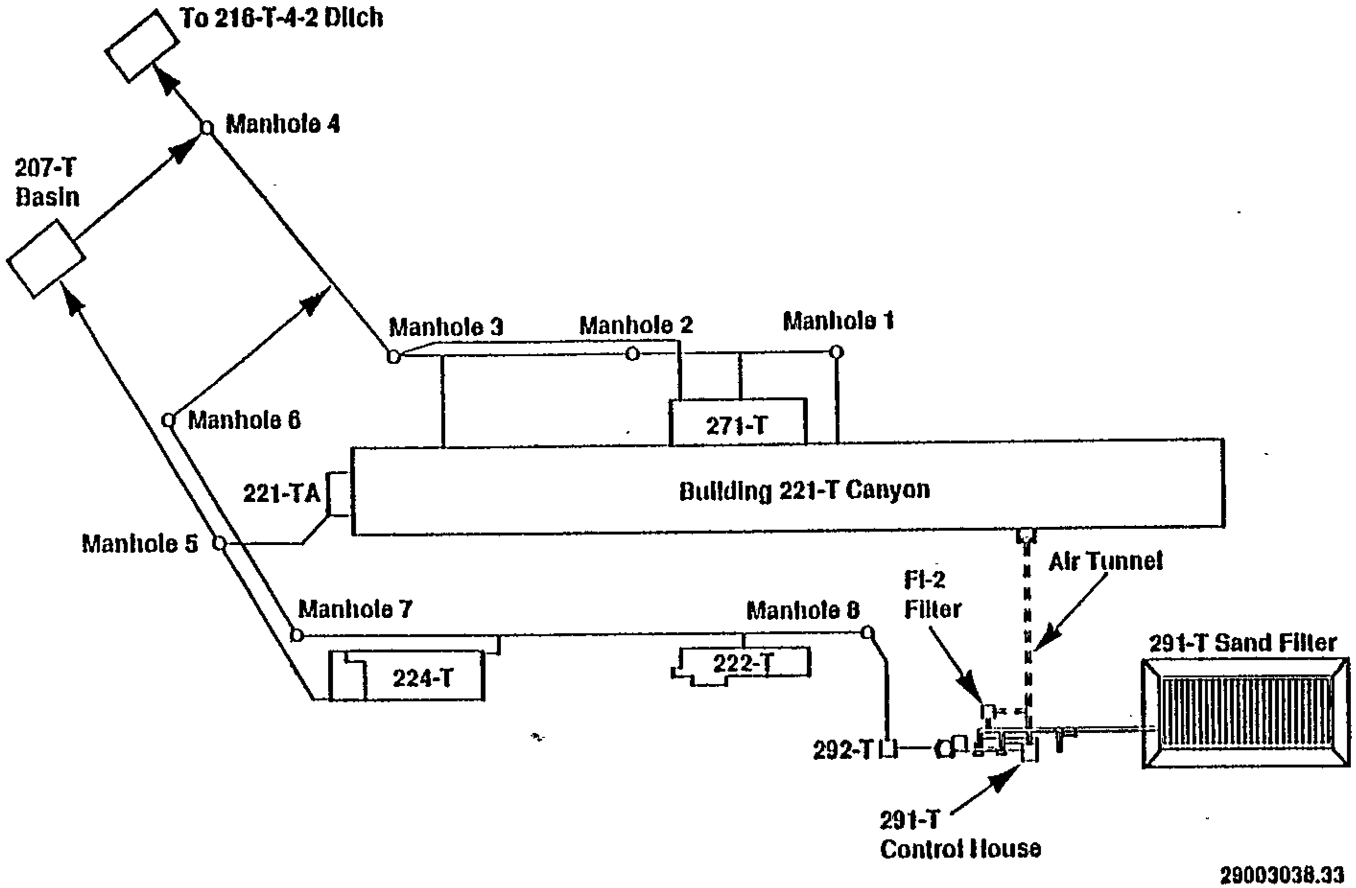


Figure 5-1. Piping Diagram for Liquid Effluents Discharged to the 216-T-4 Wastewater Stream

Protocol sampling will be initiated within three months of approval of this plan by the regulators and a contract laboratory by OSM. The results of the first year's sampling will be evaluated and subsequent sampling will be performed on each period on alternate years unless there is evidence of significant differences between the streams as evidenced in the analytical results of the first year.

The sampling scheme is designed to ensure representative samples by following SW-846 (EPA 1986) sampling and analytical protocol. This protocol requires that a sufficient number of samples be taken, in a random manner, over a sufficient time period to characterize the variability or uniformity of the stream. Grab samples will be collected on a random time basis. The sampling will be randomized by randomly choosing one of the workdays of the period to be sampled. The process is repeated to select a second sample date. All sampling events are predicated on the assumption that there is sufficient effluent wastewater being discharged to allow a sample to be taken. If insufficient flow is available for sampling, another date will be selected.

Field duplicate samples, field blanks, trip blanks, and equipment blanks and other Quality Control (QC) samples will be taken during each sampling event as defined in the referenced procedures and Section 10 of the Liquid Effluent Sampling QAPP. A sample of the T-Plant sanitary and raw water supply (the major components of the effluent stream) also will be taken during each protocol sampling event and analyzed for the full set of analytes listed in Section 8.0. The duplicate samples, blanks, and other QC samples will be evaluated per Section 2 of WHC-CM-5-3. The sanitary and raw water samples will provide information on initial water quality for water used in T-Plant processes and allow assessment of the impact of T-Plant uses on the water quality.

Routine effluent samples will continue to be taken from the 216-T-4-2 Ditch. The samples shall comply with Westinghouse Hanford Procedure WHC-IP-0692, "Collection of Surface Water Samples" at a frequency and schedule as listed in Table 5-1.

Table 5-1. Routine Effluent Samples, Analytes, and Procedures

Analysis	Frequency/Schedule	WHC Procedure
pH	Weekly	WHC-CM-7-4, Section 9; LA-212-102
Temperature	Weekly	WHC-CM-7-4, Section 9; WHC-IP-0692
gross alpha (filt)	Monthly (composite of weekly samples)	WHC-CM-7-4, Section 4; LA-508-113
gross alpha (solids)	Monthly (composite of weekly samples)	WHC-CM-7-4, Section 4; LA-508-113
gross beta (filt)	Monthly (composite of weekly samples)	WHC-CM-7-4, Section 4; LA-508-113
gross beta (solids)	Monthly (composite of weekly samples)	WHC-CM-7-4, Section 4; LA-508-113
gamma (filt)	Monthly (composite of weekly samples)	WHC-CM-7-4, Section 4; LA-548-121
gamma (solid)	Monthly (composite of weekly samples)	WHC-CM-7-4, Section 4; LA-548-121
Strontium (filt)	Monthly (composite of weekly samples)	WHC-CM-7-4, Section 4; LA-220-103
Strontium (solid)	Monthly (composite of weekly samples)	WHC-CM-7-4, Section 4; LA-220-103
Nitrate	Quarterly	WHC-CM-7-4, Section 4; LA-553-101
Tritium	Quarterly	WHC-CM-7-4, Section 4; LA-218-111

6.0 SAMPLE DESIGNATION

6.1 Protocol Sample Labeling

Labels for protocol samples shall be furnished by the sampling team from the S&ML Unit. The labels will require the following information to be recorded by a member from the sampling team: identification of the sampler; a unique sample identification number; date and time the sample was collected; the place the sample was collected; preservative type added or "none"; and analyses to be performed on the aliquot. In addition, each bottle shall be identified with the bottle lot number and individual bottle number. Sample numbers will be assigned by OSM using the Hanford Environmental Information System (HEIS).

6.2 Routine Effluent Sample Labeling

A unique sample number shall be provided for each sample. Currently, the routine monitoring samples drawn by the Westinghouse Hanford Site Surveillance/Health and Safety Group are labeled with a preprinted stick-on label that contains the following information: sample type, sample location, sample name, sample analyses, sampling date, a space for the sampling time, charge code, and authorization initials. The HPTs fill in the sample time and temperature of sample at the time of sampling. The information on the label is described in WHC-IP-0692, Section 11.03.02 and WHC-CM-7-4, Section 4.7, "Sample Containers and Labels."

7.0 SAMPLING EQUIPMENT AND PROCEDURES

7.1 Protocol Samples

A. Equipment

At present, two equivalent sampling locations exist. Sampling at either location will provide a representative sample. Samples may be obtained from Manhole Number 4 by use of a weighted bottle, dipper, or bailer apparatus. These sampling devices are described in Volume 2, Chapter 9 of SW-846. Samples could be obtained at the discharge location into the ditch by use of a dipper as described in Volume 2, Chapter 9 of SW-846.

Preventive maintenance on protocol sampling equipment will be performed by the S&ML Unit as required. No flow monitoring equipment is used for this wastewater stream. All flow rates provided in this report are estimates. Several of the contributors are seasonally dependent (i.e., storm water).

Sample bottles shall be new commercially available certified precleaned glass or plastic bottles as appropriate. The sample shall be drawn only with a new precleaned bottle. The sample volumes and number of containers are prescribed by the contract analytical laboratory and are subject to change; however, representative examples for the analytes of interest are provided in Section 8.0, Tables 8-1 and 8-2 and the final selection is expected to be similar. The bottle type, preservatives, and sample volume are listed below.

a. 125 ml plastic container, no preservative for Ion Chromatography of anions (Cl^-, $NO_2^=$, NO^-_3, SO_4^-, F^-) and pH determination.

b. 250 ml plastic container, pH <2 by nitric acid preservative for metals determined by method 6010. A second 250-ml container preserved as above for mercury by method 7470.

c. 250 ml plastic container, pH <2 by sulfuric acid preservative for Total Organic Carbon (TOC).

d. 250 ml glass container with a tetrafluoroethylene lined septum cap, pH <2 by sulfuric acid preservative for Total Organic Halogens (TOX). Containers for Total Organic Halogens shall be filled without bubble formation and without leaving a head space.

e. 125 ml glass container for Total Dissolved Solids (TDS).

f. 125 ml glass container, pH <2 with sulfuric acid preservative for ammonia.

g. 1 liter plastic container, pH <2 with nitric acid, for gross alpha and beta.

h. 1 liter plastic container, pH <2 with nitric acid, for gamma, radium, uranium.

i. 1 liter plastic container, pH >9 with zinc acetate and sodium hydroxide for H_2S.

j. 40 ml brown glass vial with a tetrafluoroethylene lined septum cap, 0.008% $Na_2S_2O_3$ for volatile organic compounds (VOC).

B. Procedures

The protocol sampling procedures have been discussed in Section 4.0 and are summarized in Table 7-1. These documents are based on recommended practices found in SW-846, Volume 2, Chapter 9.

Corrective Action requirements are those identified in Section 14.0, "Corrective Actions" of the Liquid Effluent Sampling QAPP. Document control will be performed in accordance with Section QR 6.0 of WHC-CM-4-2, "Quality Assurance Manual", Rev. 0.

7.2 Routine Effluent Samples

The routine effluent samples shall be collected by technicians from the Site Surveillance/Health and Safety Group trained to Westinghouse Hanford Procedure WHC-IP-0692, "Collection of Surface Water Samples." The wastewater stream sample consists of two 1-liter aliquots.

The samples are collected by a dipper from the outflow ditch. The samples are labeled with a sample tag containing the information discussed in Section 6.2. The samples are then taken to the designated onsite laboratory for analysis via the methods listed in Table 5-1.

A Data Sheet is filled out at the time of sampling and contains date, time, and the sampler's initials. The completed Data Sheet is delivered to the 222-S Laboratory, who in turn sends the documentation and results to Environmental Assurance (EA). The data sheet is filed by EA with the completed analytical results from the laboratory. Data that has been validated is incorporated into quarterly and annual reports by EA.

Table 7-1. Supporting Procedures for Sample Analysis Plan Protocol Sampling Activities

	Procedure/Section Number	Source Document
Field Logbooks	1.5	WHC-CM-7-7
Indoctrination, Training & Qualification	1.7	WHC-CM-7-7
Administration of Radiation Surveys	2.3	WHC-CM-7-7
Chain of Custody	5.1	WHC-CM-7-7
Field Documentation of Drilling, Well Development, and Sampling Equipment	5.4	WHC-CM-7-7
1706 KE Laboratory Decontamination of RCRA/CERCLA Sampling Equipment	5.5	WHC-CM-7-7
Sample Packaging and Shipping	5.11	WHC-CM-7-7
Onsite Packaging Systems	II2.7	WHC-CM-2-14
Offsite Packaging Systems	II2.8	WHC-CM-2-14
Onsite Routine Radioactive Shipments	IV1.4	WHC-CM-2-14
Offsite Shipping Procedures	IV3.0	WHC-CM-2-14
Sampling Performed for RCRA Analysis (Desk Instruction)	T032 A-01 450 F	Appendix B
Data Validation for RCRA Analysis	2.0	WHC-CM-5-3
Control and Storage of Radioactive Materials and Equipment	11.0	WHC-CM-4-10

8.0 SAMPLE ANALYSIS AND HANDLING

8.1 Protocol Sample Analysis

Protocol samples will be analyzed for the constituents identified in Tables 8-1 and 8-2 to confirm that the wastewater stream is not hazardous. The analytes and screening analyses chosen were based on constituents known or suspected to be associated with the wastewater stream and were determined after review of constituents detected during past characterization activities (including sampling results), assessment of process knowledge, and evaluation of chemicals stored in the plant.

Any analyte that had been detected in previous sampling or was considered a likely routine contributor to the wastewater stream was further considered. Any detected constituent or screening analysis that gave a positive result and was regulated by WAC-173-303 and/or 40 CFR 268 was included in the list of analytes. The indicated analyses include barium, cadmium, and TOX.

A second group of analytes was chosen to assist in the objective of providing data for calculation of soil loading and migration. These analytes are those listed in EPA's Primary and Secondary Drinking Water Standards (40 CFR Parts 141 and 143) and although they are not applicable to this wastewater stream, they supply target concentration limits and an indication of water quality being released.

A third group of analytes have no regulatory reference but have been detected in the 216-T-4 Wastewater Stream effluent and are included for purposes of providing data for calculation of soil loading. The analysis TOC was added because when considered together with the other data that will be generated, it provided a means to detect potential upsets or changes in the wastewater stream. The constituents from these three groups are listed in Table 8-1.

A fourth group of analytes was chosen in order to provide an additional level of assurance that the wastewater stream characterization performed in WHC-EP-0342 (Ayster 1990) was valid. This fourth group of analytes is listed in Table 8-2. Table 8-2 includes analysis for any constituent not included in Table 8-1 that is present in the SARA chemical inventory for T-Plant and/or is stored or used in an area from which a drain goes to the 216-T-4 Wastewater Stream. Also included in Table 8-2 are four volatile organic compounds that were found in a few of the blank samples associated with the sampling reported in WHC-EP-0342 (Ayster 1990). It is most likely that these compounds were the result of contamination during sampling or analysis; however, they will be analyzed for during the first year's sampling.

Table 8-1. Analytes of Interest for 216-T-4 Wastewater Stream Effluent

Analysis Name	Regulatory Reference	Analytical Procedure	Container	Container Size (ml)	Preservatives	Holding Time
Aluminum	1	6010[6]	P,G	1000	HNO_3 to pH <2	6 mo
Barium	1,3,4	6010	P,G	1000	HNO_3 to pH <2	6 mo
Boron	–	6010	P,G	1000	HNO_3 to pH <2	6 mo
Cadmium	1,3,4	6010	P,G	1000	HNO_3 to pH <2	6 mo
Calcium	–	6010	P,G	1000	HNO_3 to pH <2	6 mo
Copper	2	6010	P,G	1000	HNO_3 to pH <2	6 mo
Iron	2	6010	P,G	1000	HNO_3 to pH <2	6 mo
Magnesium	–	6010	P,G	1000	HNO_3 to pH <2	6 mo
Manganese	2	6010	P,G	1000	HNO_3 to pH <2	6 mo
Potassium	–	6010	P,G	1000	HNO_3 to pH <2	6 mo
Silicon	–	6010	P,G	1000	HNO_3 to pH <2	6 mo
Sodium	–	6010	P,G	1000	HNO_3 to pH <2	6 mo
Strontium	–	6010	P,G	1000	HNO_3 to pH <2	6 mo
Zinc	2,5 (as sulphate)	6010	P,G	1000	HNO_3 to pH <2	6 mo
pH	4	9040[6]	P,G	125	none	ASAP
TOC	–	9060[6]	P,G	250	Cool to 4°C, HCL or H_2SO_4 to pH <2	28 d
TOX	4	9020[6]	G[11]	250	cool to 4°C, H_2SO_4 to pH <2	7 d
TDS	2	160.1[7]	P,G	125	cool 4°C	48 hrs
Chloride	2	300.0[8]	P,G	125	none	28 d
Fluoride	1,2	300.0	P	125	none	28 d
Sulfate	2,5	300.0	P,G	125	cool 4°C	28 d
Nitrate	1	300.0	P,G	125	cool 4°C	48 h
Ammonia	5	350.3[7]	P,G	250	cool 4°C H_2SO_4 to pH <2	28 d
Gross Alpha	1	9310[6]	P,G	1000	HNO_3 to pH <2	6 mo

Table 8-1. Analytes of Interest for 216-T-4 Wastewater Stream Effluent

Analysis Name	Regulatory Reference	Analytical Procedure	Container	Container Size (ml)	Preservatives	Holding Time
Gross Beta	1	9310	P,G	1000	HNO_3 to pH <2	6 mo
Gamma	1	901.1[9]	P,G	1000	HNO_3 to pH <2	6 mo
Radium (total alpha emitting)	1	9315[6]	P,G	1000	HNO_3 to pH <2	6 mo
Uranium	5 (as nitrate)	00.07[10]	P,G	1000	HNO_3 to pH <2	6 mo

P = Plastic
G = Glass
[1] 40 CFR 141, National Primary Drinking Water Regulations (EPA)
[2] 40 CFR 143, National Secondary Drinking Water Regulations (EPA)
[3] 40 CFR 268, Land Disposal Restrictions (EPA)
[4] WAC 173-303, Dangerous Waste Regulations (Washington State)
[5] 40 CFR 302, Designation, Reportable Quantities and Notification
[6] Test Methods for Evaluating Solid Wastes, SW-846, Third Edition, US EPA/Office of Solid Waste and Emergency Response, 1986.
[7] EPA-600/4-79-020, Methods for the Chemical Analysis of Water and Wastes, US EPA, EMSL, 1979.
[8] EPA-600/4-84-017, The Determination of Inorganic Anions in Water by Ion Chromatography, US EPA, 1984.
[9] EPA-600/4-80-032, Prescribed Procedures for Measurement of Radioactivity in Drinking Water, US EPA, 1980.
[10] EPA-520/5-84-006, Eastern Environmental Radiation Facility (EERF) Radiochemistry Procedures Manual, US EPA, 1984.
[11] Tetrafluoroethylene lined cap required.

Table 8-2. Additional Analytes of Interest for 216-T-4 Wastewater Stream Effluent

Analysis Name	Regulatory Reference	Analytical Procedure	Container	Container Size (ml)	Preservatives	Holding Time
Zr	—	6010[6]	P,G	500 ml	HNO_3 to pH <2	6 mo
Hg	1,3,4,5	7470[6]	P,G	500 ml	HNO_3 to pH <2	28 d
Ti	—	6010	P,G	500 ml	HNO_3 to pH <2	6 mo
Nitrite	4,5 (as sodium salt)	300.0[7]	P,G	125 ml	cool to 4°C	48 h
Hydrogen Sulfide	4,5	9030[6]	P,G	1000 ml	cool to 4°C add Zn Acetate and NaOH to pH >9	7 d
VOCs Acetone 1-Butanol Dichloromethane Tetrahydrofuran 1,1,1 Trichloroethane (other volatile solvents)	3,4,5	8240[6]	G[8]	40 ml	cool to 4°C 0.008% $Na_2S_2O_3$	14 d

P = Plastic
G = Glass
[1] 40 CFR 141, National Primary Drinking Water Regulations (EPA)
[2] 40 CFR 143, National Secondary Drinking Water Regulations (EPA)
[3] 40 CFR 268, Land Disposal Restrictions (EPA)
[4] WAC 173-303, Dangerous Waste Regulations (Washington State)
[5] 40 CFR 302, Designation, Reportable Quantities and Notification
[6] Test Methods for Evaluating Solid Wastes, SW-846, Third Edition, US EPA/Office of Solid Waste and Emergency Response, 1986.
[7] EPA-600/4-84-017, The Determination of Inorganic Anions in Water by Ion Chromatography, US EPA, 1984.
[8] Tetrafluoroethylene lined septum cap required.

The analyses proposed in Tables 8-1 and 8-2 provide a means to detect the individual constituents of interest. The inclusion of a number of screening analyses (pH, TOC, TDS, TOX) will also provide a warning if there were to be a failure of engineered or administrative barriers. The use of these screening analyses is illustrated in Appendix A and provides a logical decision-making framework to indicate additional analyses. It is anticipated that the analytes and analyses proposed in Table 8-2 will only be performed during the first year (four samples). If the results of the first year of analyses confirm their absence, these analyses will be dropped.

Detection limits for the various constituents and screening analyses shall be consistent with the limits given in each applicable reference procedure.

The methods chosen and listed in Tables 8-1 and 8-2 for protocol samples are for the most part those called out in WHC-SD-WM-QAPP-011. In the case of the anions (Cl^-, F^-, $SO_4^=$, $PO_4^=$, NO_3^-, $NO_2^=$) the use of ion chromatography EPA Method 300.0 (EPA 1984b) allows all anions to be determined from one sample via one measurement versus six different analyses. Ion chromatography is an established methodology available in most analytical service laboratories. In addition, the methods cited for these analytes in the QAPP use various hazardous chemicals for the analysis, including mercury, barium, sulfuric acid, brucine, and diazomethane. Ion chromatography typically uses a benign carbonate buffer system for these analyses.

Similarly, the use of SW-846 Method 6010, "Inductively Coupled Plasma Atomic Emission Spectroscopy," will allow all of the metals identified in Tables 8-1 and 8-2 to be analyzed from one sample as compared to at least seven separate analyses if the QAPP is followed verbatim. Method 6010 is an EPA method that is commonly used by service laboratories.

8.2 Protocol Sample Handling

The handling and preparation of samples will comply with the procedures discussed in Section 5.0 and found in the Environmental Investigations and Site Characterization Manual, WHC-CM-7-7. The COC shall comply with the Procedure EII 5.1, "Chain of Custody." A COC form will be filled out and will accompany each protocol sample. A sample may consist of several containers. The COC will account for each container. 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," and supporting procedures listed in Table 7-1.

A COC form will be filled out at the time of bottle preparation (preservative addition and pre-labeling) and will accompany each sample. Once the sample has been drawn, it must be in the physical control or view of the custodian, locked in an area where it cannot 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 that 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, group, or sampler, and shall sign when releasing the samples to the designated receiver. The Liquid Effluent Sampling QAPP contains a copy of the COC form to be used. A private carrier used to transport the samples and COC documentation shall be bonded.

Field notes will be kept by sampling personnel that identify date, time, weather conditions, plant operational status, and any other relevant information from each sampling event. Field notes will be completed per guidance in Section 6.0 of the Liquid Effluent Sampling QAPP and EII 1.5, "Field Logbooks" (Table 7-1).

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

Analytical procedures for protocol samples shall meet the quality assurance requirements of SW-846. 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 quality control, calibration, data reduction, verification, and reporting in sufficient detail to ensure compliance with the Liquid Effluent Sampling QAPP.

The protocol samples will be routed to an approved Westinghouse Hanford participant contractor or subcontractor laboratory for analysis consistent with SW-846 requirements. 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. The established limits for accuracy and precision shall be consistent with SW-846 (or other applicable procedure) requirements. QC sample results will be reviewed against the laboratory or method specific acceptance criteria for accuracy and precision. 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. Acceptable data will be sent to the Westinghouse Hanford Environmental Data Management Center (EDMC) who transmit a copy to the regulators. The data will be part of the administrative record for Tri-Party Agreement milestones.

All sampling and analytical data and field notes will be maintained by the Sampling Task Leader as quality records. Copies of the Sample Analysis Request Form, Chain of Custody, activity screening results, and shipping papers are forwarded to OSM. The original shipping papers accompany the sample. Copies of the Sample Analysis Request Form and

Chain of Custody are returned to OSM from the laboratory after the samples are received. The original shipping papers are kept by the laboratory with the copies maintained by OSM.

8.3 Routine Effluent Samples

The handling of routine samples shall be according to the Westinghouse Hanford Procedure WHC-IP-0692, "Collection of Surface Water Samples." 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 procedure requires the use of COC and tamper evident tape.

The analyses and frequency of analyses performed on the routine wastewater stream samples are as indicated in Table 5-1. A Hanford-based laboratory, currently the 222-S Laboratory, performs the analysis using current approved procedures and quality assurance requirements. The data sheets from the onsite laboratory are retained by Environmental Assurance.

9.0 REFERENCES

Ayster, K. W. 1990. T-Plant Wastewater Stream-Specific Report. WHC-EP-0342, Addendum 10, Westinghouse Hanford Company, Richland, WA.

Ecology. 1990. Washington State Discharge Permit Program. WAC-173-216, Washington State Department of Ecology, Olympia, WA.

Ecology. 1990. Engineering Reports for Washington State Discharge Permits. WAC-173-240, Washington State Department of Ecology, Olympia, WA.

Ecology. 1990. Dangerous Waste Regulations. Washington Administrative Codes, Chapter 173-303-080, 090, 100, Washington State Department of Ecology, Olympia, WA.

Ecology, EPA, and DOE. 1989. Hanford Federal Facility Agreement and Consent Order. Washington State Department of Ecology, Olympia, WA.

EPA. 1987. Land Disposal Restrictions. Title 40, Code of Federal Regulations, Part 268 as amended, U. S. Environmental Protection Agency, Washington DC.

EPA. 1986. Test Methods for Evaluating Solid Waste. Physical/Chemical Methods, SW-846, U. S. Environmental Protection Agency, Washington DC.

EPA. 1985a. National Primary Drinking Water Standards. Title 40, Code of Federal Regulations, Part 141 as amended, U. S. Environmental Protection Agency, Washington DC.

EPA. 1985b. National Secondary Drinking Water Standards. Title 40, Code of Federal Regulations, Part 143 as amended, U. S. Environmental Protection Agency, Washington DC.

EPA. 1985c. EPA Designation, Reportable Quantities, and Notification Requirements for Hazardous Substances Under CERCLA. Title 40, Code of Federal Regulations, Part 302 as amended, U. S. Environmental Protection Agency, Washington DC.

EPA. 1984a. Eastern Environmental Radiation Facility (EERF) Radiochemistry Procedures Manual. EPA-520/5-84-006, U. S. Environmental Protection Agency, Washington DC.

EPA. 1984b. The Determination of Inorganic Ions in Water by Ion Chromatography. EPA-600/4-84-017, U. S. Environmental Protection Agency, Washington DC.

EPA. 1980. Prescribed Procedures for Measurement of Radioactivity in Drinking Water. EPA-600/4-80-032, U. S. Environmental Protection Agency, Washington DC.

EPA. 1979. Methods for the Chemical Analysis of Water and Wastes. EPA-600/4-79-020, U. S. Environmental Protection Agency, Washington DC.

Hinckley, J. P. 1985. T-Plant Safety Analysis Report. SD-CP-SAR-007, Rev. 0, Chemical Processing Safety Analysis Group Rockwell International, Rockwell Hanford Operations, Richland, WA.

Moeller, M. P. and G. F. Martin. 1991. Facility Effluent Monitoring Plan for the T-Plant Facility. WHC-EP-0481, submitted to Westinghouse Hanford Company, Richland, WA.

Nguyen, D. M. 1991. Liquid Effluent Sampling Quality Assurance Project Plan. WHC-SD-WM-QAPP-011, Rev. 0, Westinghouse Hanford Company, Richland, WA.

WHC. 1991a. Hazardous Material Packaging and Shipping. WHC-CM-2-14, Westinghouse Hanford Company, Richland, WA.

WHC. 1991b. Control and Storage of Radioactive Materials and Equipment. WHC-CM-4-10, Section 11.0, Westinghouse Hanford Company, Richland, WA.

WHC. 1990a. Sample Management and Administration. WHC-CM-5-3, Westinghouse Hanford Company, Richland, WA.

WHC. 1990b. Collection of Surface Water Samples. WHC-IP-0692, Westinghouse Hanford Company, Richland, WA.

WHC. 1989. Environmental Investigations and Site Characterization Manual. WHC-CM-7-7, Westinghouse Hanford Company, Richland, WA.

WHC. 1988a. Radiation Protection. WHC-CM-4-10, Westinghouse Hanford Company, Richland, WA.

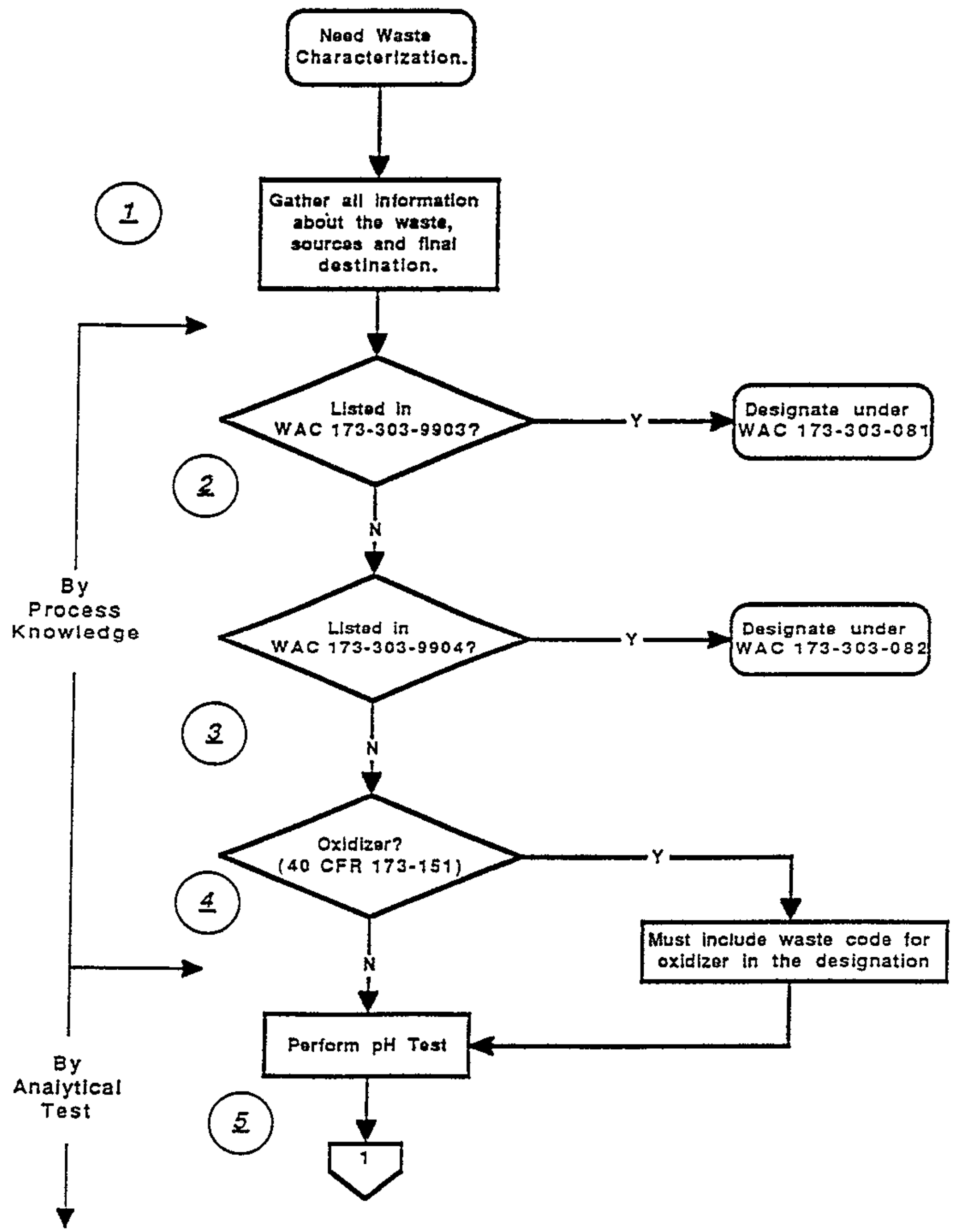
WHC. 1988b. Operational Environmental Monitoring. WHC-CM-7-4, Westinghouse Hanford Company, Richland, WA.

WHC. 1988c. Quality Assurance Manual. WHC-CM-4-2, Rev. 0, Westinghouse Hanford Company, Richland, WA.

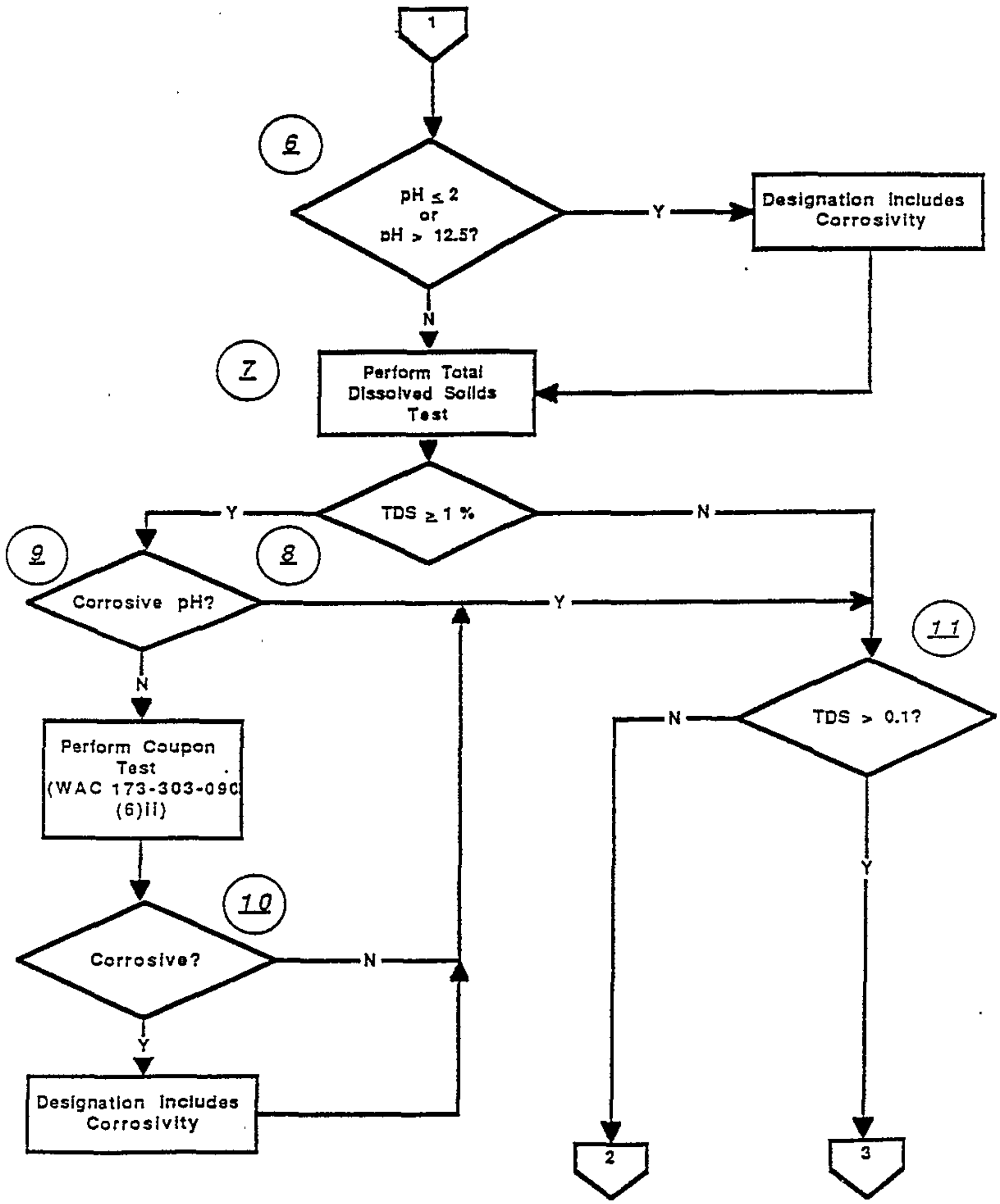
APPENDIX A

WASHINGTON STATE RCRA WASTE CHARACTERIZATION DECISION TREE

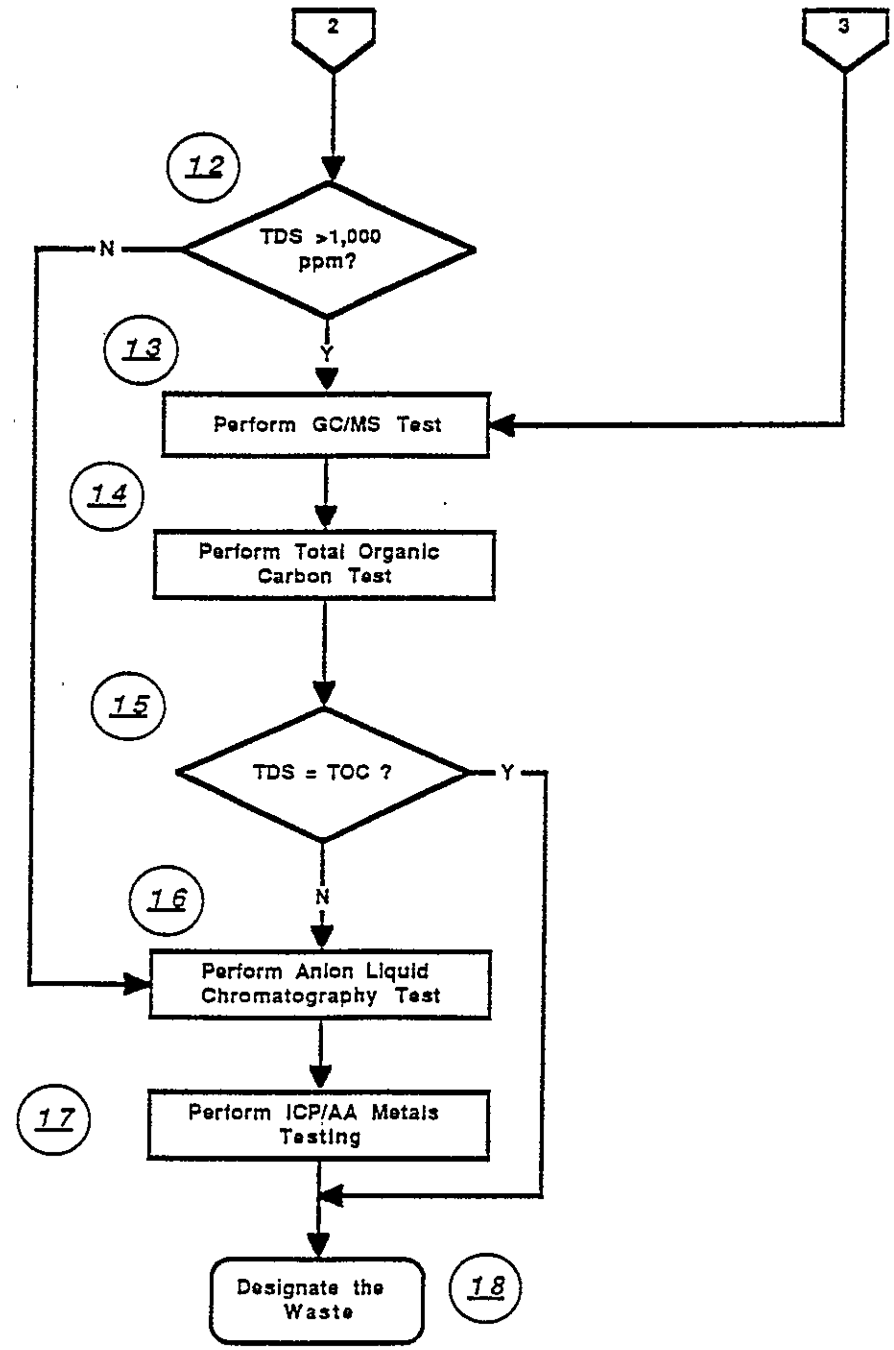
RCRA Waste Characterization Decision Tree



RCRA Waste Characterization Decision Tree (cont.)



RCRA Waste Characterization Decision Tree (cont.)



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Appendix A - Flowchart Explanation

1. Gather all the information available on the material to be sampled. Include information about what hazardous chemicals are used around the waste stream and could possibly be added to the waste.

2. Compare the materials which are eventually disposed of into the waste stream with the WAC 174-303-9903 list. If you are disposing of any listed material into the waste, you must designate your waste according to WAC 173-303-081.

3. Compare the process which produces the waste stream with the processes listed in WAC 173-303-9904. If your waste results from any of these processes, you must designate your waste according to WAC 173-303-082.

   Note: If you designate your waste by a list, you need not designate further according to WAC 173-303-070(3)(c) unless you have special knowledge that warrants further designation or you are required by WDOE to do a criteria designation.

4. The waste must be evaluated for ignitability according to WAC 173-303-080(5). Wastes that are predominantly water and will not burn need to be evaluated against 49 CFR 173.151 to determine if they should be classified as an oxidizer. If so, the final waste designation must include the codes for ignitability.

5. The pH test that is approved by WAC 173-303 is one using a pH meter.

6. If the tested pH is outside the parameters of 2 to 12.5 (pH can range from less than 1 to 14), the waste is corrosive. The final waste designation needs to include the waste code for corrosivity.

7. The reason for performing a Total Dissolved Solids (TDS) test is to find out the total concentration of chemicals dissolved in the water (assuming the waste is liquid).

8. If TDS is greater than 1% there is a possibility that it may be corrosive.

9. If the pH test has not already classified the waste as corrosive, the coupon test is called for.

10. If the coupon test results indicate the waste is corrosive, the final designation must include the waste code for corrosivity.

11. If waste TDS (assuming the waste is water) is less than 0.1%, you can be confident that the waste is not carcinogenic. By assuming all of the TDS is carcinogenic, a 0.1% cutoff is 10 times less than the regulatory threshold for carcinogens.

12. If waste TDS is less than 1,000 parts per million (ppm) you can be confident that the waste is not toxic due to organic chemicals. This is done by assuming all the TDS to be Toxic Category X and then comparing the resulting Equivalent Concentration to the graph in WAC 173-303-9906, "Toxic Dangerous Waste Mixtures Graph." You must still know the concentrations of the dissolved metals since some of them are regulated to very small concentrations.

13. The gas chromatograph/mass spectrograph (GC/MS) test gives a very good breakdown of organic chemicals in the waste. It not only gives chemical concentrations, but also identifies what the compounds are. This information is then compared to the EPA's regulation 40 CFR 302.4 (Spill Table) and The National Institute for Occupational Safety and Health's *Registry of Toxic Effects of Chemical Substances* (NIOSH Registry) for designating waste mixtures and toxic waste characteristics. GC/MS information is also compared with the International Agency for Research of Cancer's *Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans* to determine the carcinogenic designation.

14. The TOC test gives the percentage of carbon in the sample.

15. If TOC is roughly equal to TDS, then the conclusion can be made that organic chemicals account for all the dissolved solids in the sample and the inorganic tests can be bypassed.

16. Anion Liquid Chromatography gives the identities and concentrations of the anions (such a sulfate or nitrate) which must be paired with metal cations (metals must be converted to ions in order to dissolve in water).

17. Inductively Coupled Plasma (ICP) and Atomic Absorption (AA) spectroscopies give identities and concentrations for total metal content (both suspended and dissolved metals).

18. If the logic flow was correctly followed, you now possess enough information to designate a waste without having wasted analyses. This logic scheme is well suited to preliminary sampling to determine the analyses required to assign a correct designation to the waste or to interpret and follow up on data obtained through screening analyses.

APPENDIX B

SAMPLING PERFORMED FOR RCRA ANALYSIS

PROCESS LABORATORIES AND TECHNOLOGY (PLT)	Section	T032 A-01 450 F
	Page	Page 1 of 9
	Effective Date	July 6, 1990
DESK INSTRUCTIONS	Organization	Waste Sampling and Monitoring (WS&M)
TITLE:	Approved by	
SAMPLING PERFORMED FOR RCRA ANALYSIS	WS&M Manager/PLT Manager	

PURPOSE - This desk instruction defines the criteria and methodology to be used by Waste Sampling and Monitoring personnel when sampling materials for analyses performed in compliance with the Resource Conservation and Recovery Act of 1976 (RCRA) protocol. This instruction also includes criteria for sample custody and transport of samples to an assigned laboratory for analyses.

APPLICABILITY - The use of this desk instruction is limited to those sampling situations in which RCRA compliance is needed, and safe radiation levels and personnel trained in the necessary procedures are all present. This desk instruction is intended for use specifically while taking samples of process liquid effluents, containerized liquids, soil and water for hazardous waste characterization.

SAFETY - Sampling will be performed inside process buildings and in the field where unusual personnel hazards may be encountered. Environments in each facility may be different from one sampling time to the next. An operator(s) assigned to the facility and a Health Physics Technician (HPT) from the facility will be available as required each time sampling is performed. The radiation level will be established and the radiation level of the sample to be taken will be estimated prior to sampling. Direct contact with the samples during handling operations will be required. Therefore, care must be exercised to minimize radiation exposure to the sampling team as much as possible and in all cases avoid unacceptable radiation levels.

Radiation levels of samples taken will have dose levels established by the HPT covering the job. The dose levels must be within acceptable limits of the laboratory before the sample is to be delivered for analyses. Sample containers will be verified to have no smearable radionuclide contamination detectable.

Radiological conditions, Radiation Work Procedures, dress requirements, job safety items, and other pertinent procedures will be discussed with the cognizant field contact prior to sampling.

Samples will be transported to both onsite and offsite laboratories for analysis. Special requirements for transport of hazardous materials (radiological and chemical apply to each situation. The following provides definition of onsite and offsite shipments per MRP 5.20.

Offsite Shipment -- A shipment intended for transport outside the project boundary (south of the 1100 Area) or to any licensee other than Pacific Northwest Laboratory in the 3000 Area. Shipments to U.S. Testing and Advanced Nuclear Fuels are offsite shipments.

Onsite Shipment -- A shipment which is transported wholly within the Hanford Site boundaries between U.S. Department of Energy contractors.

1. Inter-area Shipment - A movement between Hanford Site Security Areas (e.g., 300, 200W, 200E, 100N, etc.).
2. Intra-area Shipment - A movement between buildings within a security area (e.g., 300, 200W, 200E, 100N, etc.) but not within the confinement boundaries of a building or facility.

Pre-Job Planning

1. Verify that a Sampling Authorization Form (SAF) has been completed and approved.
2. Verify sampling schedule with the Manager, Waste Sampling and Monitoring.
3. Initiate Chain-of-Custody
   - Record the following information on the Chain-of-Custody form:
     - Chain-of-Custody number
     - Cognizant individual from Office of Sample Management (OSM)
     - Sample location
     - Sample analysis and identification information from SAF including volume of sample
     - SAF number
4. If known hazardous constituents will be sampled a Hazardous Material Shipping Record (HMSR) may be required. Verify HMSR requirements and special hazardous materials packaging requirements on SAF, notify and schedule Transportation Logistics for sampling activities if a HMSR is required.

5. Equipment/Supplies Preparation

- Assemble equipment and supplies as specified on SAF.
- If samples are to be transported to offsite laboratories a special sample must be taken for radionuclide analysis. Prepare sample container for use in special radionuclide analysis.
- Withdraw sample containers specified on SAF from secured storage area.
- Verify sample containers have statements of certification to meet Environmental Protection Agency (EPA) Standards (Protocol A, B, or C as appropriate for sample being taken) for cleanliness.
- Prepare a label and a seal for each sample container.
- Prepare trip blank, equipment blanks, and splits/duplicate bottles as specified on SAF.
- Add preservatives to sample bottles as specified on SAF.
- Prepare ice chest(s).

6. Notebook Documentation

- Sampling Point and Method: This description must be precise and in sufficient detail that the sampling point can be relocated by another person soley from the written description. Also, photographs of the sampling point with visible points of reference are aids but can not be considered legal evidence. Method of sampling should include reference to meeting the intent of the SW-846 sampling method (e.g., dip sampler, etc.). Deviations from standard methods must be descriptive and the reason for the deviations recorded.
- Sample Identification: Each container filled will be identified in the notebook with a description of the container and the analyses to be performed. Record the precise time and date of sampling. Record description of sample, color, multiple phases, soils, liquid, etc.
- Transportation: Record the method of transportation vehicle number, and destination of the samples. Include holding overnight while radionuclide content is being determined.

- Record all sample survey information.

- Names of Other Participating in the Sampling: Include HPT's, operators, engineers, etc.

- Comments: This section is used to denote any deviations from expected sampling method or sampling operation. Observations made concerning anomalies (e.g., surrounding environment, plugged or inoperable sample valves, newly installed sample system) may be important in interpretation of data quality.

- Signatures: All samplers sign and date each page of notebook entries. All changes must be initialed.

- References: Record the Chain-of-Custody number in the notebook. Any applicable references to other documents (e.g., field notebooks, sampling plans, etc.) should be included.

Sampling

1. Review sampling activities, job requirements, and safety considerations with field contact.

2. Have HPT survey sampling area for radiation and contamination levels as required at the location.

3. Perform sampling and field analysis per approved SAF and appropriate EPA protocol.

4. Bring collected samples out of the sample collection area.

5. Have sample containers monitored for smearable contamination.

6. If smearable contamination is greater than 2200 dpm/100cm^2 beta-gamma or 200 dpm/200cm^2 alpha, and sample is not for volatile organics, decontaminate container or transfer sample to clean bottle and repeat Steps 5 & 6.

7. If sample is for volatile organics and smearable contamination is greater than 2200 dpm/100 cm^2 beta-gamma or 220 dpm/100 cm^2 alpha, decontaminate or resample.

8. Place tamper indicating seal on sample bottles.

9. Bag samples in plastic bags.

10. Place samples in ice chests. Verify that sufficient ice is present to keep samples cold until they are delivered to the laboratory.

<u>Chain-of-Custody Documentation</u>

Record the following on the Chain-of-Custody form:

- <u>Sample Collection Data</u>: Print name, mailing address and phone number of person(s) performing the sampling, date and time sample is collected.
- <u>Ice Chest No.</u>: Record ice chest number or write NA if not applicable.
- <u>Field Logbook and Page No.</u>: Record WHC-N-book number and page number.
- <u>SAF No.</u>: Record number from Sampling Authorization Form.
- <u>Remarks</u>: In certain cases, additional information on sample location or other comments may be helpful in data interpretation or evaluation. Enter all appropriate information as desired.
- <u>Bill of Lading No.</u>: Record offsite shipping paper numbers (i.e., HMSR, RSR, etc.). Shipping papers are required for offsite shipping. Record HMSR number in HMSR log book.
- <u>Method of Shipment</u>: Enter mode of transport and vehicle number.
- <u>Shipped To</u>: Enter the name of the laboratory and individual destined to receive the samples. Include address and phone number. Record this information on HMSR and offsite RSR.
- <u>Chain of Possession</u>: The sampler upon transferring custody of the sample to another individual will sign (printed and signature) in the "Relinquished by" block. The receiver will verify sample integrity (check evidence tags and/or inventory containers) and sign (printed and signature) in the "Received by" block and date/time the transfer was made. This step is repeated each time the sample changes custody.
- Original copy of Chain-of-Custody remains with the sample. A copy of the Chair-of-Custody form is to be made and sent to the Office of Sample Management.

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	Organization	Waste Sampling and Monitoring (WS&M)

<u>Onsite Sample Shipment</u> (Table 1)

Note: A HMSR may be required. See Step 4 in Pre-Job Planning section. If sample is destined for an offsite laboratory, see Offsite Sample Shipment section.

1. Place evidence tape (signed and dated by sampler) on ice chest.

2. Have HPT survey and obtain dose rate on each ice chest.

3. If sample is from a designated and approved non-radioactive exempt facility area no radioactive survey and RSR are required for shipment to onsite facilities.

4. If radiation level is <.5 mr/hr sample is to be transported with routine RSR.

5. If off-normal conditions are found, such as: sample form is different than specified on SAF, pH <2 or >12.5, and/or organics. Contact Manager, Waste Sampling and Monitoring before transporting samples.

6. If radiation level is >.5 mr/hr sample must be transported by a non-routine RSR. Contact Transportation Logistics to prepare necessary RSR prior to sample movement from sampling site.

<u>Offsite Sample Shipment</u> (Table 2)

Notes: A HMSR may be required. See Step 4 in Pre-Job Planning section.

The special sample identified in Step 5 in the Pre-Job Planning section is required to establish radiological information for offsite shipments. This sample is transported to the 222-S Laboratory in its own proper shipping container and with a unique Chain-of-Custody.

1. Place evidence tape (signed and dated by sampler) on ice chest.

2. If sample is from a designated and approved non-radioactive area/exempt facility no radioactive survey or RSR are required for transport to 100 Area for shipping.

3. If sample is from other than a designated non-radioactive area, have an HPT survey and obtain contact dose rate (222-S sample and offsite samples) on each ice chest.

4. If radiation level is <0.5 mr/hr, samples is to be transported with routine RSR to 222-S.

5. If off-normal conditions are found, such as: sample form is different than specified on SAF, pH <2 or >12.5, and/or organics. Contact Manager, Waste Sampling and Monitoring before transporting samples.

6. If radiation level is >.5 mr/hr, samples must be transported by a non-routine RSR. Contact Transportation Logistics to prepare the necessary RSR prior to sample movement to 222-S.

7. Have manager assure that 222-S radiological information is available.

8. Contact Transportation Logistics to prepare necessary RSR for to sample shipment from 222-S.

TABLE 1

ONSITE SHIPPING REQUIREMENTS

	Non-Radiation	<.5 mr	>.5 mr
Non-Hazardous Material	Nothing	Routine RSR	Non-Routine RSR
Hazardous Material	HMSR	Non-Routine RSR	Non-Routine RSR

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TABLE 2

OFFSITE SHIPPING REQUIREMENTS

	Non-Radiation	Radioactive
Non-Hazardous Material	Release	Offiste RSR
Hazardous Material	HMSR	HMSR Offsite RSR

References: WHC-CM-3-4

INFORMATION RELEASE REQUEST

ORIGINAL

Complete for all Types of Release

Purpose		New ID Number
☐ Speech or Presentation ☐ Full Paper ☐ Summary ☐ Abstract ☐ Visual Aid (Check only one suffix) ☐ Speakers Bureau ☐ Poster Session ☐ Videotape	☐ Reference ☒ Technical Report ☐ Thesis or Dissertation ☐ Manual ☐ Brochure/Flier ☐ Software/Database ☐ Controlled Document ☐ Other ______	Existing ID Number (include revision, volume, etc.) WHC-SD-WM-PLN-030 Rev. 0 If previously cleared, list ID number. Date Release Required 01-17-92

Title T-Plant Facility 216-T-4 Wastewater Stream Sampling and Analysis Plan

Unclassified Category UC-

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