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ENGINEERING DATA TRANSMITTAL

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6. Author

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Signature

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7. Abstract

This document presents the 300 Area Process Sewer sampling and analysis plan (SAP). The plan describes sampling methods, locations, frequency, analytes, and stream source.

Samples from the Process Sewer were characterized in the fall of 1991. The characterization data were used as a basis for treatment plant design and were submitted to regulators. Draft and final SAPs for that activity were not released as WHC documents. The unreleased SAPs have been sent to archives and are linked with this SAP for traceability.

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9. Impact Level 3 ESQ

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300 Area Process Sewer Sampling and Analysis Plan

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ABBREVIATIONS/ACRONYMS

DOE	U.S. Department of Energy
Ecology	Washington State Department of Ecology
EDMC	Environmental Data Management Center
EPA	U.S. Environmental Protection Agency
ETP	Effluent Treatment Programs
FEMP	Facility Effluent Monitoring Plan
HASM	Hanford Analytical Services Management
HEIS	Hanford Environmental Information System
HPT	Health Physics Technician
LEMIS	Liquid Effluent Monitoring Information System
NPDES	National Pollutant Discharge Elimination System
OSS	Operations Support Services
QAPP	Quality Assurance Program Plan
QA/QC	Quality Assurance/Quality Control
S&ML	Sampling and Mobile Laboratories
SAP	Sampling and Analysis Plan
TEDF	Treated Effluent and Disposal Facility
WAC	Washington Administrative Code
WHC	Westinghouse Hanford Company

A. SAMPLING OBJECTIVES

A.1 Introduction

This Sampling and Analysis Plan (SAP) describes the field activities and methods associated with collection of process wastewater samples from the process wastewater stream in the Hanford 300 Area. Sampling location and frequencies are specified in this SAP, as are protocols for containerizing the samples and transporting them to the analytical laboratories. Detailed procedures for sample collection are provided in Westinghouse Hanford Company's (WHC) Environmental Investigations and Site Characterization Manual, WHC-CM-7-7 (WHC, 1992a), Section EII 5.8.

The remaining sections of this SAP include the following:

- Section B--Site Background
- Section C--Responsibilities
- Section D--Sample Location and Frequency
- Section E--Sample Identification
- Section F--Sampling Equipment and Procedures
- Section G--Sampling Handling and Analysis

The SAP is to be used in conjunction with the Liquid Effluent Sampling Quality Assurance Program Plan (QAPP) WHC-SD-WM-QAPP-011 (WHC, 1992b), Process and Analytical Laboratory Procedures, and Environmental Investigations and Site Characterization Manual, WHC-CM-7-7 (WHC, 1992a). The QAPP provides the Hanford Site guidelines and requirements for special high quality liquid effluent sampling activities, which include: overall scope and direction to the sampling activities, the control of samples, the laboratory analyses, the processing of data, the control of data, the quality assurance requirements, and corrective actions used in obtaining high quality data for the Liquid Effluent Sampling Program.

In the summer of 1991, CH2M HILL developed a SAP for the 300 Area process wastewater in support of the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement (TPA 1990)) regulatory requirements. The SAP was prepared and submitted, and CH2M HILL completed sampling of the process wastewater in October of 1991 for WHC. The resulting Characterization Report was drafted, reviewed, and finalized by March of 1992 to meet the Tri-Party Agreement schedule milestone. Previous characterization activities identified key constituents of the process sewer wastewater. Chemical data for the process wastewater are presented in the 300 Area Process Wastewater Stream-Specific Report WHC-EP-0342 (WHC, 1990a) and Hanford 300 Area Process Wastewater Characterization and Data Report WHC-SD-L-045H-DP-001, Rev. 0 (WHC, 1992c).

Continued characterization is now required to monitor those constituents. The Operations Support and Services Division (OSS) has the responsibility for this continued process wastewater sampling effort in the 300 Area.

The mean daily flow rate of the process wastewater stream is currently in the range of 795 liters per minute (lpm), down from a mean of 4,540 lpm in mid-1990. This reduction in flow is the result of a continuing waste minimization program to reduce process wastewater discharges. Further reductions through 1994 are planned. After December 1994 process sewer effluent will be sent to the Treated Effluent Disposal Facility (TEDF) rather than the disposal trenches. The TEDF will treat the effluent so that it will meet the requirements to be specified in the National Pollutant Discharge Elimination System (NPDES) permit. The TEDF as currently designed consists of coprecipitation, clarification, filtration, ion exchange, and ultra violet (UV) oxidation. The clarified solids will be dewatered in a filter press. The dewatered sludge will be disposed at appropriate disposal facilities on the Hanford site. The treated effluent will be discharged to the Columbia River upstream of the 300 Area.

A.2 Objectives

Overall objectives for the SAP are to provide for continuing characterization of the 300 Area process wastewater to the process sewer. This information will then be used to:

- Support the NPDES permit process.
- Provide characterization for TEDF secondary waste disposal.
- Provide additional records of the quality and content of effluent discharges to the 300 Area process trench.
- Provide evidence that the upstream facilities are meeting the waste acceptance criteria for the TEDF.
- Provide baseline effluent performance monitoring for the TEDF.

The sampling program is based on addressing these objectives and has been tailored on the basis of available information (300 Area Process Wastewater Stream-Specific Report, WHC-EP-0342 (WHC, 1990a)) and Hanford 300 Area Process Wastewater Characterization and Data Report, WHC-SD-L-045H-DP-001, Rev. 0 (WHC, 1992c). The results of this sampling program should provide reproducible and representative wastewater characterization data. Any revision to this document will be managed as a Class 3 change to the Tri-Party Agreement.

A.3 Approach

This SAP has been structured to obtain high quality sampling data that will identify the types of contaminants found in the liquid effluent streams from the 300 Area. The data will come from liquid effluent characterization samples, transportation of the sample media, analysis of the media, the statistical evaluation of the analytical results, and the storing of sample records. All liquid effluent characterization sampling work shall be performed according to approved written procedures. The procedures shall comply with the requirements of Test Methods for Evaluating Solid Waste, EPA SW-846, 3rd Edition, November 1990 (EPA 1990), and/or Methods for Chemical Analysis of Water and Wastes (EPA, 1983).

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

The liquid effluent characterization samples include both grab and composite samples. Volatile organic contaminants are collected as grab samples because of their tendency to volatilize over time when exposed to the atmosphere. Composite samples are used to collect samples with constituents that vary with time or are in low concentrations.

Liquid effluent characterization samples to be analyzed for physical parameters, inorganics, and organics shall be obtained at least twice during the 12 months following approval of this Plan. Each month composite samples will be collected and analyzed for radioactivity. The semi-annual samples may be collected at any interval during the year. The facilities with the largest contribution to the process sewer are in continuous operation.

Potable water samples were collected and analyzed by CH2M Hill (WHC-SD-L-045H-DP-001, Rev. 0, 1992) in 1991. Potable water will not be analyzed under this SAP. Samples collected are to be analyzed for chemical constituents selected from Table 8-1 of the QAPP that are known or suspected to be associated with the waste stream. The samples will also be analyzed for contaminants of concern for designating dangerous waste characteristics and for preparation of Discharge Permits. If suspected contaminants are not detected in the samples they will be eliminated from the analyte list in the future. Chemicals, identified by process knowledge, found to be added by facility operations in significant measurable quantities shall be added to the analyte list. The amended list shall be a Class 3 change in accordance with the Hanford Tri-Party Agreement as stated in the QAPP.

B. SITE BACKGROUND

B.1 Facility Description

The Hanford Reservation is a U.S. Department of Energy (DOE) facility located in southeastern Washington (see Figure B-1). The 300 Area is located in the southeastern portion of the Hanford Reservation, adjacent to the Columbia River, in southeastern Washington State. A variety of office buildings, research laboratories, and support facilities (e.g., warehouses and shops) are located in the 300 Area.

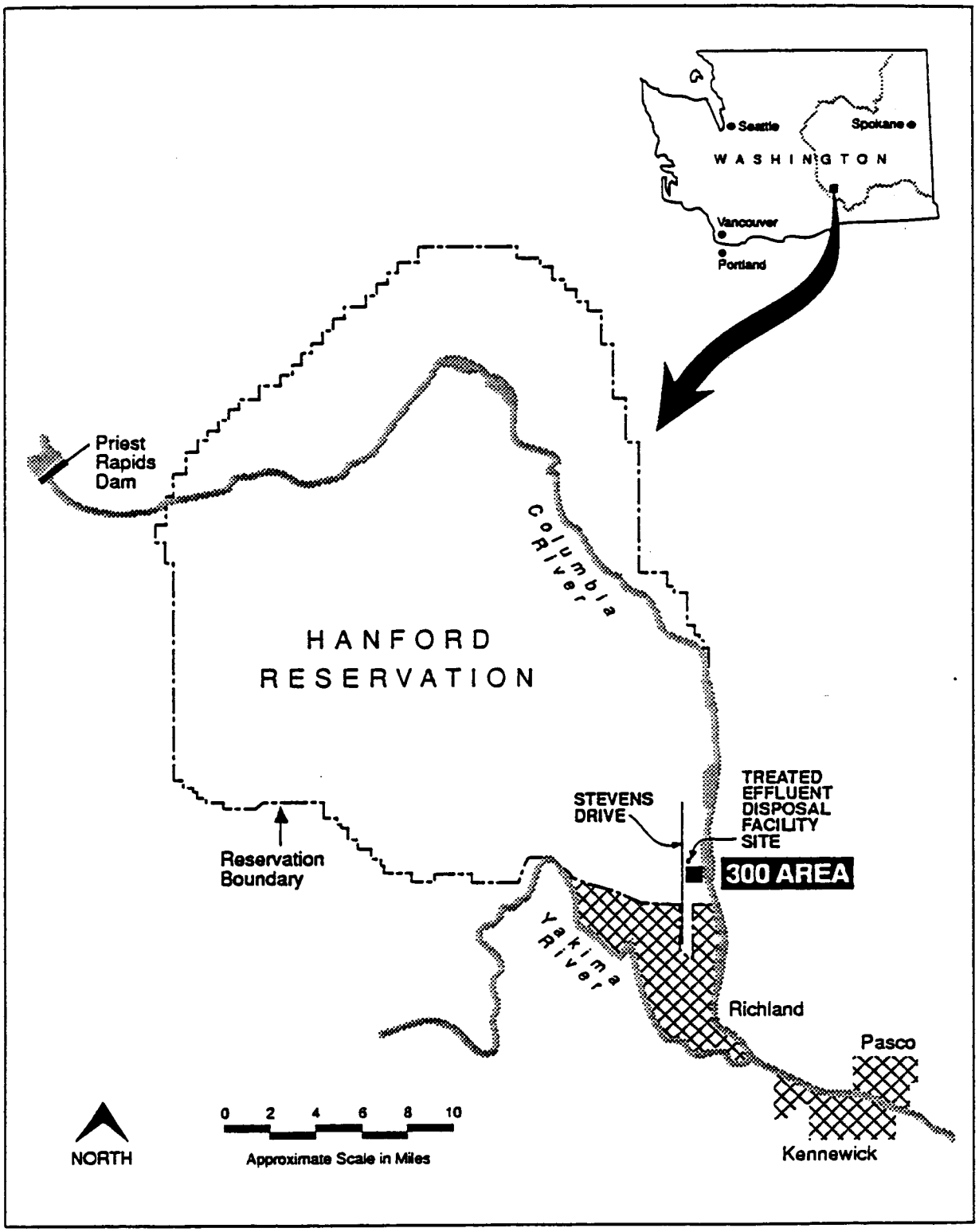


Figure B-1
LOCATION OF THE HANFORD SITE AND THE 300 AREA

Process wastewater from 46 facilities is directed to a process sewer. The process sewer waste stream consists primarily of equipment cooling water, steam condensate, water treatment plant waste streams, and laboratory-generated wastewater. Based on previous characterization data, WHC has determined that the process wastewater stream is not designated as a dangerous waste under Washington Administrative Code (WAC) 173-303. Potable water from the 300 Area water supply system is used for equipment cooling and accounts for a large percentage of the total wastewater flow. Sanitary wastewater is routed through a separate sewer and discharged to a septic system, however plans have been established to route this waste to the City of Richland treatment plant.

B.2 Stream Description

Pacific Northwest Laboratories (PNL) and WHC each operate facilities in the 300 Area (listed in Table B-1 that contribute to the common process wastewater discharged to the process trenches. A calibrated flume, located in the second-to-the-last manhole before the process trenches, shows an average wastewater flow of approximately 795 lpm entering the 300 Area process. The largest contributors (estimated to be $\geq$ 38 lpm) to the discharge are buildings 306W, 314, 320, 324, 325, 326, 329, 331, 337HB, 384, 3100, and 3720. Together, they discharge the majority of the process wastewater flow. Sources of wastewater include heating, ventilation, stormwater, and air conditioning (HVAC), sinks, floor drains, and equipment cooling water. A detailed description of each effluent contributor can be found in the 300 Area Process Sewer Engineering Study to Identify Flow and Constituent Reduction, WHC-SD-XE07-ES-003, Rev. 0 (WHC, 1990b). This document contains pre-minimization flow estimates, one-line pipe diagrams, and identifies the number and location of process sewer connections from WHC and PNL buildings in the 300 Area.

Potential sources of dangerous or regulated materials are prevented from entering the effluent stream by using administrative and engineering controls. All facilities contributing to the 300 Area wastewater utilize engineered and administrative controls to prevent discharge of dangerous or regulated materials to their effluent stream. These controls include lock and tag procedures, source reduction (minimization), spill prevention, employee training in hazardous communications, material safety data sheets, waste handling, and emergency response practices. In addition, a waste acceptance criteria document based on the TEDF design source term has been has been issued to further control constituent levels in process wastewater flowing to the process trenches.

In addition to administrative controls, facilities with a potential for exceeding the TEDF design source term and environmental discharges standard are required to monitor discharges. As directed by DOE Order 5400.1, Facility Effluent Monitoring Plans (FEMP) were written for several 300 Area PNL and WHC facilities. In order to meet the FEMP requirements, PNL effluent monitoring systems for the 324, 325, 327, and 3720 buildings are being upgraded. PNL will be responsible for monitoring their own wastewater streams. WHC and PNL facilities that did not require FEMPs have very little or no impact on the environment. FEMP determinations were executed to select which facilities were required to have monitoring plans. Not all facilities with FEMPs require additional monitoring for liquid effluents. Some FEMPs may identify additional air monitoring requirements, but no monitoring requirements for discharges to the process sewer. Table B-1 identifies facilities with FEMPs that are operational and have requirements for liquid effluent monitoring.

Table B-1. 300 Area Contributors to the Process Sewer

*Building	Occupant	Building Title
303F	WHC	Pump House
303J	WHC	Material Storage Building
304	WHC	Uranium Concretion Facility
305	WHC	Energy Test Facility
305B	PNL	Hazardous Waste Storage Facility
306E	WHC	Development, Fabrication, and Test Lab
306W	PNL	Materials Development Laboratory
309	WHC	SP-100 GES Facility
311	WHC	Tank Farm
313	WHC	N Fuels Manufacturing Facility
314	PNL	Engineering Development Laboratory
318	PNL	Radiological Calibrations Laboratory
320	PNL	Physical Science Laboratory
321	WHC	Hydromechanical Laboratory/Office
+ 324	PNL	Waste Technology Engineering Laboratory
+ 325	PNL	Applied Chemistry Laboratory
326	PNL	Material Science Laboratory
+ 327	PNL	Post Irradiation Test Laboratory
329	PNL	Chemical Science Laboratory

Table B-1. 300 Area Contributors to the Process Sewer

*Building	Occupant	Building Title
331	PNL	Life Sciences Laboratory I
331J	PNL	Incinerator
333	WHC	N Fuels Fabrication Facility
334	WHC	Process Sewer Monitoring Facility
336	PNL	High Bay Testing Facility
337	PNL	Technical Management Center
337B	WHC	High-bay and Service Wing
338	WHC	Maintenance Building
340	WHC	Waste Neutralization Facility
382	WHC	Pump House
382 A,B,C	WHC	Water Storage Tanks
384	WHC	Powerhouse
3706	WHC	Communication and Documentation Services
3707C	WHC	Safeguards and Security Maintenance Shop
3707D	WHC	Offices
3708	PNL	Radioanalytical Laboratory
3709	WHC	Paint Shop
3709A	WHC	300 Area Fire Station
3713	WHC	Carpenter Shop
3714	PNL	Organic Chemistry Laboratory
3717	WHC	Machine Shop/Storage Area
3717B	WHC	Standards Laboratory
+ 3720	PNL	Environmental Science Laboratory
3730	PNL	Gamma Irradiation Facility
3745A	PNL	Electron Accelerator Facility
3745B	PNL	Positive Ion Accelerator Facility
3746A	PNL	Radiological Physics Laboratory

* Due to continuing minimization, some buildings may be eliminated from the list.
\+ Facilities with FEMPs that include plans for liquid effluent monitoring.

B.3 Trench Description

The 300 Area process trenches have been used for disposal of process water from facilities at the 300 Area since 1975. As shown in Figure B-2, the trenches are located in the northern part of the 300 Area and are designated as the 316-5 process trenches. The liquid effluent disposal facility consists of two parallel trenches approximately 370 meters long and oriented in a north-south direction. The trenches are approximately 3.4 meters deep, 3.0 meters wide at the bottom, and 9 to 11 meters wide at the top. The use of the west trench has been discontinued. All process sewer effluent is to the east trench.

C. RESPONSIBILITIES

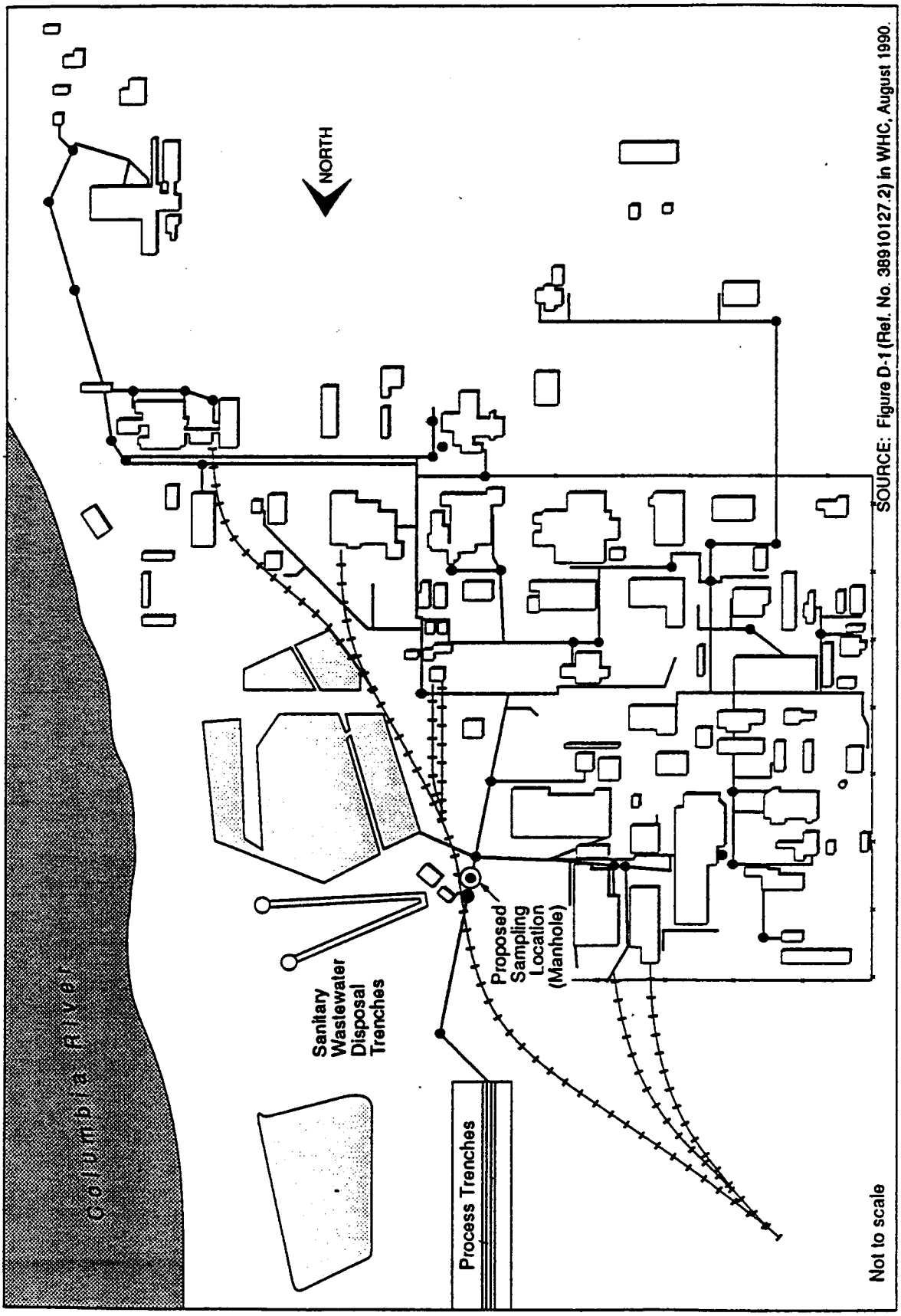
The organizations listed below have the following responsibilities for implementation of this SAP.

Operational Support Services

- Provides Person in Charge (PIC)/operator support as required during liquid effluent characterization sampling including sampler setup.
- Coordinates radiation monitoring support.
- Selects grab sample time and coordinates with sampling personnel and appropriate facility personnel.

Health and Safety

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



SOURCE: Figure D-1 (Ref. No. 38910127.2) in WHC, August 1990.

Figure B-2
PROCESS SEWER AND TRENCHES

Sampling and Mobile Labs (S&ML)

- Provide trained samplers for liquid effluent characterization sampling activities. At least one sampler shall have a WHC Certificate of Qualification from the Sample and Mobile Laboratories. A certified sampler shall direct liquid effluent characterization sampling and packaging.

- Document sampling activities in a record log book.

- Transport liquid effluent characterization samples to laboratory or shipping center.

- Initiate Chain of Custody documentation for liquid effluent characterization samples.

- Package liquid effluent characterization samples for shipping.

- Ensure copies of field logs and other sampling data sheets are filed with 300 TEDF process engineering.

Quality Assurance (QA)

- Provide surveillance of the liquid effluent characterization sampling program.

- Audit records and procedures.

Hanford Analytical Services Management (HASM)

- Establish analytical laboratory contracts.

- Ensure laboratories perform analyses in accordance with all required QA procedures.

- Provide data validation.

Process Engineering

- Maintain the Sampling and Analysis Plan.
- Initiate scheduling of personnel required for sampling.
- Provide technical support for sampling activities.
- Review chain of custody activities.
- Review liquid effluent characterization sampling data for completeness and consistency.
- Ensure liquid effluent characterization sampling data and flow information are transferred to ETP for filing with Environmental Data Management Center (EDMC).

Effluent Treatment Programs

- Determines whether samples will be analyzed by Test Methods for Evaluating Solid Waste (EPA, 1990) and/or Methods for Chemical Analyses of Water and Waste, EPA-600/4-79-020 (EPA, 1983) or Guidelines Establishing Test Procedures For The Analysis of Pollutants, (40 CFR 136).

D. SAMPLING LOCATION AND FREQUENCIES

D.1 Sampling Location

The 300 Area process wastewater will be sampled from the third-to-the-last manhole before the wastewater enters the existing process trenches. The manhole is located approximately 460 meters upstream of the process trenches and over 15 meters downstream of the second-to-last manhole or junction box where incoming wastewater streams join the main sewer line northeast of Building 306E. A manhole containing a flow measurement flume was installed downstream of the sampling manhole in December 1992. The location of the sampling point is shown in Figure D-1. This manhole effectively represents the "end-of-pipe," because no other incoming flows are contributed to the sewer beyond this point.

End of pipe sampling will provide characterization data that may be used in the NPDES permit application and for groundwater impact assessments. The data will also assist in confirming that the selected treatment technology is appropriate.

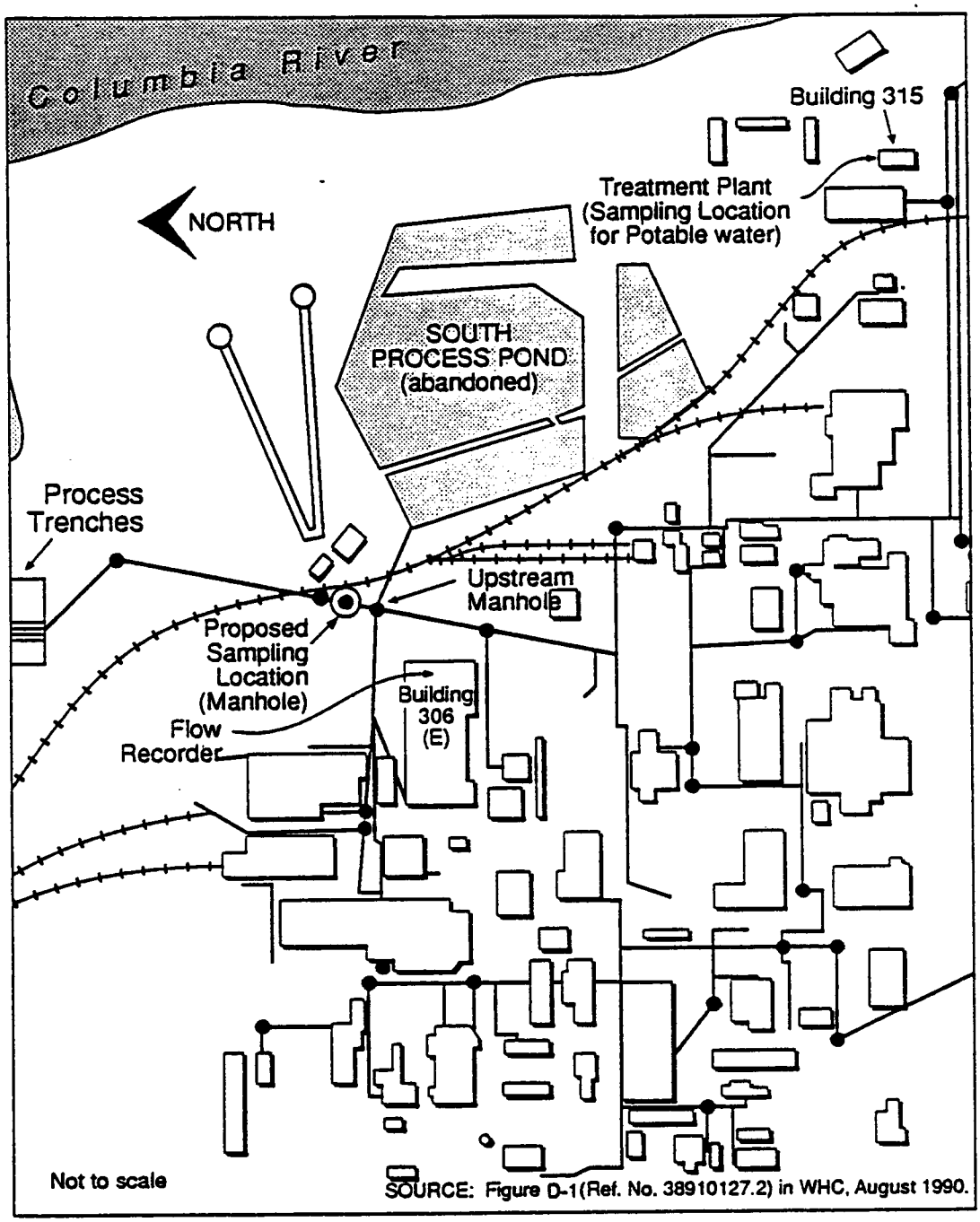
Since 1989, several sets of characterization samples have been collected at the end-of-pipe by different organizations. In the winter of 1989/1990 samples were collected by R. W. Beck and Associates (300 Area Sanitary and Process Waste Study) for the City of Richland. The data was used to determine the feasibility of the City of Richland treating the process sewer waste. In the summer of 1991 CH2M HILL collected characterization samples for WHC to provide data for TEDF design and to meet a Tri-Party Agreement milestone. In the summer of 1992 the State of Washington Department of Ecology also collected samples at the end-of-pipe. End-of-pipe sampling will allow for comparison of existing data with data obtained in the future and will provide characterization data to meet the objectives of this SAP.

Flow weighted composite and grab samples will be obtained from the manhole, which is continuously monitored with a calibrated flume and a flow meter. The signal from the flow meter and calibrated flume will be used to control an automated composite sampler so that flow-weighted composite samples can be collected. A description of the sample type and analytes of interest is presented in Table D-1.

D.2 Sampling Frequencies

The administrative controls guiding disposal practices in the generating facilities are not relaxed to accommodate changes in scope of work being performed in the facilities. Therefore, the waste stream is not expected to vary during the year. Full characterization sampling (monthly composite samples will be analyzed for radioactivity) of the process will occur semi-annually at an unspecified interval. The sample collection dates will be coordinated by ETP according to the waste stream interim compliance schedule.

Sampling per this SAP will continue until the process wastewater treatment plant is operational. At that time, the SAP will be modified to meet TEDF and NPDES permit characterization requirements.



LEGEND

- Process wastewater sewer
- Manhole
- Fence

Figure D-1
SAMPLING LOCATION
IN THE 300 AREA

NOTE: Not all process sewer piping is shown.

Table D-1 Sample Parameters and Type	
Parameters	Sample Type
Volatile Organics, Semi-volatile Organics, Sulfide, Nitrate, Nitrite, Total and Fecal Coliform	Grab Samples
Other Parameters Total Organic Carbon (TOC), Cyanide, Alkalinity, Total Dissolved Solids (TDS) Total Suspended Solids (TSS)	24-Hour Composite
Radionuclides Alpha/Beta Activity	1-month Continuous Composite
Total Metals (by ICP) Ag, Al, As, B, Ba, Be, Ca, Cd, Cr, Co, Cu, Fe, K, Mg, Mn, Mo, Ni, Na, Pb, Sb, Se, Si, Sr, Tl, V, Zn	24-Hour Composite
Metals (by A.A.) As, Cd, Pb, Hg, Se	24-hour Composite
Organochlorine Pesticides and PCBs Organophosphorous Pesticides Chlorinated Herbicides	24-hour Composite
Onsite Radiation Screen	Grab, 24-hour, and 1-month Composite
Field Parameters pH, Specific conductance, Temperature, Residual Chlorine	During grab sample collection
Miscellaneous parameters as requested by ETP or OSS	24-hour composite
Additional composite days may be required to collect sufficient volume for MS/MSD samples if 2.5 liters is required per parameter by the laboratory.	

Field measurements for water temperature, pH, and specific conductance will be taken at the same time that the grab samples are collected. Samples will be taken twice annually as follows.

- Grab samples will be collected for volatile and semi-volatile organics, sulfide, nitrate, nitrite, and total and fecal coliform bacteria.

- 24-hour composite samples will be collected for total metals (by Inductively Coupled Plasma) and metals (by Atomic Absorption)

- 24-hour composite samples will be collected for sulfate, total organic carbon, cyanide, alkalinity, total dissolved solids, and total suspended solids.

- 24-hour composite samples will be collected for organochlorine pesticides and PCBs, chlorinated herbicides, and organophosphorus pesticides.

If requested by ETP or OSS, a non-routine 24-hour composite will be collected and analyzed for miscellaneous analytes of interest from Table 8-1 of the QAPP.

Continuous composite samples will be collected for alpha/beta activity and a gamma scan.

Grab samples will be collected during normal daytime working hours when activity levels in the upstream facilities are expected to be highest.

An onsite radiation screen sample will be obtained for each sampling. This sample must be screened for radiation to allow release of samples to the offsite laboratories. The radiation screen measures total activity and is not intended to determine which radioisotopes are present in the sample.

E. SAMPLE IDENTIFICATION

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

F. SAMPLING EQUIPMENT AND PROCEDURES

The process wastewater samples will be analyzed for organics, inorganics, and radionuclides plus the field parameters pH, specific conductance, and temperature. The required laboratory methods are provided in Table F-1.

Two ISCO™ 3710 FR refrigerated composite samplers will be used to collect wastewater samples. One ISCO™ sampler will be dedicated to monthly continuous sample collection for alpha and beta activity analysis. The other will be dedicated for all other composite sample collection requirements. Any of the dedicated units, when not in service, will be stored in a manner that will minimize their potential for contamination between sample events.

Each ISCO™ sampler's programmable peristaltic pump will be used to direct the sample to a refrigerated glass container inside the unit. The glass container selection based on the volume requirements of the laboratory doing the analyses. The ISCO™ unit is equipped with an AC-power converter and requires a 120-volt, 60-Hz power supply.

A Teflon™ suction line with attached stainless steel strainer is submerged in the flow at the bottom of the sampling manhole. The suction line will be routed to the ISCO™ 3710 FR sampler.

Process wastewater flow is currently monitored on a continuous basis at the manhole from which process wastewater samples will be collected. The flow recorder used for this purpose provides daily average, maximum, and minimum flow rates plus a strip chart showing flow rate versus clock time. A complete flow rate record for each compositing period will be obtained. The recording instruments are located inside at the midpoint of the east end of Building 306-E. The engineer in charge of the flow meter in the Utilities and Effluent Treatment Building 3707D should be contacted to obtain flow records from the flow recorder.

The flow meter in the manhole will be used to interface with the composite sampler. With this interface, the flow meter will be able to send a signal to the sampler so that flow-weighted compositing can occur.

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Table F-1
Analytical Requirements Per Quality Assurance Program Plan
(WHC-SD-WM-QAPP, Rev. 3)

Suggested Method Number	Alternate Method	Method Title[1]	Appendix IX Analysis[2]	Field/ Trip Blanks	Equipment Blanks	Comment	Justification
200.7[4,6]	6010[5]	Inductively Coupled Plasma (ICP) Atomic Emission Spectroscopy	X			Antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, iron, lead, molybdenum, nickel, potassium, selenium, silicon, silver, thallium, vanadium, zinc	Negotiated Agreement
200.7[4,6]	6010[5]	ICP Atomic Emissions Spectroscopy				Aluminum, manganese, magnesium, sodium	Water treatment plant design (WTP design)
206.2[4,6]	7060[5]	Atomic Absorption for Arsenic (Furnace Technique)	X			Lower detection limit than provided by 6010	Negotiated Agreement
213.2[4,6]		Cadmium Atomic Absorption (Furnace Technique)				Lower detection limit than provided by 6010	Negotiated Agreement
239.2[4,6]	7421[5]	Atomic Absorption for Lead (Furnace Technique)	X			Lower detection limit than provided by 6010	Negotiated Agreement
245.1[4,6]	7470[5]	Atomic Absorption for Mercury (Cold Vapor Technique)	X				Negotiated Agreement
270.2[4,6]	7740[5]	Atomic Absorption for Selenium	X				Negotiated Agreement
608[4,6]	8080[5]	Organochlorine Pesticides and PCBs (GC Analysis)	X				Negotiated Agreement
8140[5]		Organophosphorus Pesticides (GC Analysis)	X			For nine parameters	Negotiated Agreement
8150[5]		Chlorinated Herbicides (GC Analysis)	X			For three parameters	Negotiated Agreement
624[4,6]	8240[5]	GCMS for Volatile Organics	X	X	X	App. IX list for 52 parameters plus chlorodifluoromethane	Negotiated Agreement

Table F-1
Analytical Requirements Per Quality Assurance Program Plan
(WHC-SD-WM-QAPP, Rev. 3)

Suggested Method Number	Alternate Method	Method Title[1]	Appendix IX Analysis[2]	Field/ Trip Blanks	Equipment Blanks	Comment	Justification
625[4,6]	8270[3]	GCMS for Semivolatile Organics (Capillary Column Techniques)	X		Required if collected as a grab sample using a beaker	For 112 parameters	Negotiated Agreement
335.2[4,6]	9010[3]	Cyanide	X			Provided by method 335.2– Total Cyanide (Titrimetric; spectrophotometric). For one parameter	Negotiated Agreement
376.2[4,6]	9030[3]	Sulfide	X			For one parameter	Negotiated Agreement
908C[5]	909[5]	Coliform (Total and Fecal)				Currently not available if radioactive	WTP design
353.3[4,6]	9200[3]	Nitrogen, Nitrate, Nitrite (Spectrophotometric, Cadmium Reduction)					WTP design
160.1[4,6]		Total Dissolved Solids (TDS)					WTP design
160.2[4,6]		Total Suspended Solids (TSS)					WTP design
310.1[4,6]	310.2[4,6]	Alkalinity (Titrimetric, pH 4.5)				Include if needed per Best Engineering Judgment	WTP design
354.1[4,6]		Nitrogen, Nitrite (Spectrophotometric)					WTP design
415.1[4,6]	9060[3]	Total Organic Carbon (TOC)				Include if needed per Best Engineering Judgment	WTP design

Table F-1
Analytical Requirements Per Quality Assurance Program Plan
(WHC-SD-WM-QAPP, Rev. 3)

Suggested Method Number	Alternate Method	Method Title[1]	Appendix IX Analysis[2]	Field/ Trip Blanks	Equipment Blanks	Comment	Justification
7		Carbon 14					As requested by ETP/OSS
7		Cesium 137					As requested by ETP/OSS
7		Technetium 99					As requested by ETP/OSS
7		Tritium					As requested by ETP/OSS
7		Gamma Scan				Required by QAPP, <60 pCi/l method	QAPP
7		Iodine 129					As requested by ETP/OSS
7		Cobalt 60					As requested by ETP/OSS
7		Total Alpha Total Beta				Required by QAPP, <60 pCi/l	As requested by ETP/OSS
7		Radium 228					As requested by ETP/OSS
7		Iron 59				Included in Gamma Scan	As requested by ETP/OSS
7		Cobalt 58				Included in Gamma Scan	As requested by ETP/OSS
7		Radium 226					As requested by ETP/OSS
7		Strontium 89/90					As requested by ETP/OSS
7		Americium 241					As requested by ETP/OSS
7		Nickel 63					As requested by ETP/OSS
7		Neptunium 237					As requested by ETP/OSS
7		Plutonium 241					As requested by ETP/OSS
7		Iodine 131 in H20					As requested by ETP/OSS

Table F-1
Analytical Requirements Per Quality Assurance Program Plan
(WHC-SD-WM-QAPP, Rev. 3)

Suggested Method Number	Alternate Method	Method Title[1]	Appendix IX Analysis[2]	Field/ Trip Blanks	Equipment Blanks	Comment	Justification
[7]		Nickel 59 in H20					As requested by ETP/OSS
[7]		Total Uranium					As requested by ETP/OSS
[7]		Plutonium 238/239/240/242					As requested by ETP/OSS
[7]		Uranium Isotopes					As requested by ETP/OSS
[7]		Radium Total					As requested by ETP/OSS
[7]		Europium 152/154/155				Included in Gamma Scan	

[1]A duplicate sample will be submitted for each analyte collected in the field.
[2]40CFR264 Appendix IX.
[3]Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846 (3rd Edition, Update 1, Nov. 1990). U.S. EPA/Office of Solid Waste and Emergency Response, Washinton, D.C.
[4]Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, U.S. Environmental Protection Agency/Environmental Monitoring and Support Laboratory, Cincinnati, Ohio. Also 40 CFR 136-Guidelines Establishing Test Procedures for the Analysis of Pollutants.
[5]Standard Methods for the Examination of Water and Wastewater, APHA-AWWA, WPCS, February 1989, 17th Edition.
[6]These methods should be used if the data are to be used to support the NPDES permit.
[7]Radionuclides will be analyzed by methods that meet or exceed EPA or Nuclear Regulatory Commission guidelines. Methods and requirements shall be defined by the laboratory prior to analysis.

Before sampling, the average process wastewater flow rate for the preceding days and weeks will be evaluated by Sampling and Mobile Laboratories technician and the OSS PIC/operator to select a sampling frequency and volume schedule for the ISCO™ sampler so that the selected compositing container will not be over- or under-filled in a compositing period. The OSS PIC/operator will also verify that the sampling technician has programmed the sampler correctly.

Sampling for liquid effluent characterization shall be directly from the automated sampler into the 9.5-liter glass container. The sampler is inside a shed with a padlocked door. The shed will be locked during the composite collection period to ensure that the sample is not tampered with. After completion of a composite sample, the collected wastewater will be transferred to individual parameter sample bottles.

Grab samples for volatile organic analysis must be collected with a dip sampler. In order to collect grab samples of the wastewater, a bailer or a dip sampler with stainless steel beaker attached will be used. If the beaker is used an equipment blank will be prepared and sent for analysis as indicated in Table F-1. An alternate method for other grab samples will use the sample pump on the ISCO™ sampler to pump wastewater from the manhole into the sample bottles. The discharge flowrate will be kept at approximately 100 ml/minute to minimize aeration of the sample and possible volatilization of organic compounds. For grab samples, wastewater will be poured directly from the sampling device (dip sampler or bailer) into a sample bottle. Sample bottles shall be new, commercially available, certified precleaned containers. The certificates of precleaned condition shall accompany the containers.

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

The outside of sample bottles shall be cleaned and surveyed for surface radioactivity prior to releasing them from the radiological control area. The samples will be packaged in accordance with "Environmental Investigations and Site Characterization Manual," procedure EII 5.11, "Sample Packaging and Shipping." The samples will be placed in a cooler containing ice. The cooler shall become part of the sample packaging.

Process wastewater temperature, pH, and specific conductance will be field monitored with a water quality meter(s). The unit(s) will be field calibrated before use and checked against appropriate standard solutions according to the manufacturer's recommendations at the beginning of each sampling event. Calibration measurements will be recorded in the field log book. Preventive maintenance for field equipment will be carried out in accordance with the manufacturer's recommended procedures and schedules. Spare parts should include batteries and replacement pH and conductivity probes. Refer to Section 7.0 and 12.0 of the Liquid Effluent Quality Assurance Program Plan WHC-SD-WM-QAPP-11 (WHC, 1992b) for quality assurance procedures concerning calibrating field instruments and preventive maintenance.

The ISCO™ sampler will be programmed to take samples per Processing and Analytical Laboratories Procedure L0-080-434 (to be written). This document is based on recommended practices found in SW-846, Chapter 9. The procedure will identify specific sampling requirements, which include the following: sample locations, description of the sampling equipment, containers and reagents, safety precautions personnel protective equipment, and specific steps for collecting the sample. The procedure will reference appropriate sections of WHC-CM-7-7.

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

Sampling event documentation that has been validated will be transferred to Work Control and Data Management for inclusion in the EDMC files and to be prepared for public release.

G. SAMPLE HANDLING AND ANALYSIS

The handling and preparation of samples will comply with the procedures found in the Environmental Investigations and Site Characterization Manual, WHC-CM-7-7 (1992a). A chain of custody form will be initiated at the time of sampling and will accompany each liquid effluent characterization sample. A sample may consist of several containers. The chain of custody 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."

Once a liquid effluent characterization sample has been drawn, it must be in the physical control or view of the custodian, located 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 which will signal an alarm when entered, or locked in a cabinet. When more than one person is involved in sampling, one person shall be designated and only that person signs as sampler. This person is the custodian until the samples are transferred to another location or group and shall sign when releasing the samples to the designated receiver.

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

Analytical procedures for liquid effluent characterization samples shall meet the Quality Assurance guidelines of SW-846, Appendix 9. 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 for approval. The approved laboratory procedures shall describe data reduction, verification, and reporting.

In addition to the QAPP lists, appropriate sample bottles will be used for the field quality control samples. Section 16, Glossary, of the QAPP, gives the definitions for the types of quality control samples that will be used.

The samples will be routed to an approved participant contractor or subcontractor laboratory for analysis consistent with Section 8.0 of the Liquid Effluent Quality Assurance Program Plan QAPP WHC-SD-WM-QAPP-011 (WHC, 1992b). The data will be considered representative so long as at least 90 percent of the data points meet the established requirements in the laboratory contract for precision and accuracy. Data which do not meet this objective will be reviewed to determine whether the data can be used or whether corrective action should be taken. The PIC or task leader will be responsible for developing, initiating, and tracking corrective action(s) if needed.

Data and record information that have been validated will be transferred to ETP for inclusion in the EDMC files and to an approved computer data file, Liquid Effluent Monitoring Information System (LEMIS), when it becomes available.

Equipment used to collect grab and composite samples of the process wastewater will be decontaminated per Westinghouse procedure WHC-CM-7-7, EII 5.5 at 1706 K east cleaning facility. If a field decontamination is needed, S&ML will follow WHC-CM-7-7, EII 5.4 and document it in the field log book.

H. REFERENCES

Beck 1990 R. W. Beck and Associates, 300 Area Sanitary and Process Waste Study, Seattle, Washington.

CH2M Hill 1991

Sampling and Analysis Plan for Characterization of the Hanford 300 Area Process Wastewater Stream.

EPA 1983 Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, U.S. Environmental Protection Agency/Office of Exploratory Research and Development, Cincinnati, Ohio.

EPA 1990 Test Methods for Evaluating Solid Waste - Physical/Chemical Methods, Rev I, Update 1, Nov. 1990, EPA SW-846, U.S. Environmental Protection Agency/Office of Solid Waste and Emergency Response, Washington D.C.

EPA 40 CFR

Guidelines Establishing Test Procedures For The Analysis of Pollutants, Code of Federal Regulations, Title 40, Part 136, Latest Edition.

TPA 1990 Ecology, EPA, and DOE, Hanford Federal Facility Agreement and Consent Order.

WHC 1990a 300 Area Process Wastewater Stream-Specific Report, WHC-EP-0342, Prepared for the U.S. Department of Energy, Richland Washington.

WHC 1990b 300 Area Process Sewer Engineering Study to Identify Flow and Constituent Reduction, WHC-SD-XE07-ES-003, Revision 0, Richland, Washington.

WHC 1992a Environmental Investigations and Site Characterization Manual, WHC-CM-7-7, Richland, Washington.

WHC 1992b Liquid Effluent Sampling Quality Assurance Program Plan, WHC-SD-WM-QAPP-011, Revision 3, Richland, Washington.

WHC 1992c Hanford 300 Area Process Wastewater Characterization Data Report, WHC-SD-L-045H-DP-001, Revision 0, Richland Washington.