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Facility Effluent Monitoring Plan for the 300 Area Fuels Fabrication Facility

Prepared for the U.S. Department of Energy
Office of Environmental Restoration
and Waste Management

Westinghouse
Hanford Company Richland, Washington

Hanford Operations and Engineering Contractor for the
U.S. Department of Energy under Contract DE-AC06-87RL10930

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FACILITY EFFLUENT MONITORING PLAN FOR THE 300 AREA FUELS FABRICATION FACILITY

ABSTRACT

A facility effluent monitoring plan is required by the U.S. Department of Energy in DOE Order 5400.1 for any operations that involve hazardous materials and radioactive substances that could impact employee or public safety or the environment. This document is prepared using the specific guidelines identified in* A Guide for Preparing Hanford Site Facility Effluent Monitoring Plans, WHC-EP-0438.** *This facility effluent monitoring plan assesses effluent monitoring systems and evaluates whether they are adequate to ensure the public health and safety as specified in applicable federal, state, and local requirements.*

This facility effluent monitoring plan is the first annual report. It shall ensure long-range integrity of the effluent monitoring systems by requiring an update whenever a new process or operation introduces new hazardous materials or significant radioactive materials. This document must be reviewed annually even if there are no operational changes, and it must be updated as a minimum every three years.

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*General Environmental Protection Program, *DOE Order 5400.1, U.S. Department of Energy, Washington, D.C., 1988.*

**A Guide for Preparing Hanford Site Facility Effluent Monitoring Plans, *WHC-EP-0438, Westinghouse Hanford Company, Richland, Washington, 1991.*

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LIST OF TERMS

ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CFR	Code of Federal Regulations
DCG	derived concentration guides
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
Ecology	Washington State Department of Ecology
EDE	effective dose equivalent
EDL	Engineering Development Laboratory
EPA	U.S. Environmental Protection Agency
FEMP	facility effluent monitoring plan
HEPA	high-efficiency particulate air (filter)
NESHAP	"National Emission Standards for Hazardous Air Pollutants"
NPDES	"National Pollution Discharge Elimination System"
OSM	Office of Sample Management
PCE	perchloroethylene
PNL	Pacific Northwest Laboratory
QA	quality assurance
QAPP	quality assurance project plan
QI	Quality Instruction
QR	Quality Regulation
RCRA	*Resource Conservation and Recovery Act of 1976*
RCW	Revised Code of Washington
RL	U.S. Department of Energy Field Office, Richland
TCE	trichloroethylene
TLD	thermoluminescent dosimeter
TSD	treatment, storage, and/or disposal
WAC	Washington Administrative Code
WATS	Waste Acid Treatment System
Westinghouse Hanford	Westinghouse Hanford Company

METRIC CONVERSION CHART		
1 inch	=	2.54 centimeters
1 foot	=	30 centimeters
1 gallon	=	3.8 liters
1 ton	=	0.9 metric tons

$$1\ ^{\circ}F = \left(\frac{9}{5}\ ^{\circ}C\right) + 32$$

1 Btu/h = 2.930711 E-01 watts
(International Table)

300 AREA FUELS FABRICATION FACILITY EFFLUENT MONITORING PLAN

1.0 INTRODUCTION

The U.S. Department of Energy (DOE) issued DOE Order 5400.1, *General Environmental Protection Program* (DOE 1988a), which requires each site, facility, or process that uses, generates, releases, or manages significant pollutants of radioactive and hazardous materials to have an environmental monitoring plan consisting of a facility effluent monitoring plan (FEMP) and an environmental surveillance plan. On the Hanford Site, the 300 Area may release radionuclides to the environment. This FEMP for the 300 Area Fuels Fabrication Facility has been prepared to ensure that these releases are monitored and the quantities released measured. The Westinghouse Hanford Company (Westinghouse Hanford) 300 Area Fuels Fabrication Facility is affected by these requirements.

This plan was developed as a result of the *Facility Effluent Monitoring Plan Determination for 300 Area Facility*, WHC-EP-0441 (WHC 1991). The 300 FEMP determination evaluated the airborne emissions and liquid effluent of the following areas/buildings:

- 303-F Acid and Caustic Pumphouse
- 303-K Radioactive Mixed Waste Storage Facility
- 303-M Uranium Oxidation Facility
- 304 Uranium Concretion Facility
- 311 Tank Farms
- 313 N Fuels Manufacturing Support Facility
- 333 N Fuels manufacturing Facility
- 334 N Fuels Process Sewer Monitoring Facility
- 334-A Waste Acid Storage Building
- Pipe trenches
- French drains.

This evaluation determined the degree to which Westinghouse Hanford must monitor the 300 Area Fuels Fabrication Facility airborne and liquid effluents. This FEMP is developed for routine and upset conditions as required by the DOE, U.S. Environmental Protection Agency (EPA), and Washington State requirements.

The 300 Area fuels facilities are subject to the DOE 5400 series of orders, because of their potential release of radioactivity in liquid effluents. These orders require that radioactive effluents to the environment be as low as reasonably achievable (ALARA) and utilize the best available control technology to control effluents.

The effluents must be monitored to ensure that regulatory requirements are met, and a monitoring plan and procedures must be in place to ensure that policies are implemented.

1.1 POLICY

DOE Order 5400.1 (DOE 1988a) requires a FEMP for each facility that contains hazardous materials that could impact public employee safety and the environment. This order requires a FEMP for measuring and monitoring the effluents from the facilities and from the effluent data to calculate the effects of those operations on the environment and the public health.

The objective of the 300 Area Fabrication Facilities Fuels FEMP is to demonstrate compliance with federal, state, and local regulatory requirements, confirm that the facility adhere to DOE environmental protection policies, and support the DOE-Westinghouse Hanford environmental management decisions.

DOE Order 5400.1 (DOE 1988a) requires that environmental monitoring programs meet the requirements of Chapter IV in the order and be implemented no later than 36 mo after the effective date of the order. The order requires that a written environmental monitoring plan be prepared for each site, facility, or process that uses, generates, releases, or manages significant pollutants or hazardous materials.

1.2 PURPOSE

The primary purpose of this 300 Area Fuels Fabrication Facilities FEMP is to ensure that the effluents emanating from the Westinghouse Hanford-controlled fuel fabrication facility in the 300 Area during shutdown are properly monitored and evaluated for compliance with DOE orders and regulatory requirements of federal, state, and local agencies.

The effluent monitoring program provides monitoring that collects representative samples, performs analysis within stringent quality control requirements, and evaluates the data through the use of comparative analysis with recognized standards and accepted environmental models.

1.3 SCOPE

The scope of this FEMP includes plans to ensure that representative samples are collected, valid analytical results obtained, and proper documentation maintained of the radioactive and nonradioactive liquid effluents from the 313 and 333 Buildings and their adjacent facilities. The plan provides for monitoring the radioactive and chemical effluents that may be discharged during routine and/or upset conditions.

1.4 DISCUSSION

The Fuels Fabrication Facility in the Hanford 300 Area supported the production reactors from the 1940's until they were shut down in 1987. Prior to 1987 the Fuel Fabrication Facility released both airborne and liquid radioactive effluents. In January 1987 the emission of airborne radioactive effluents ceased with the shutdown of the fuels facility. The release of liquid radioactive effluents have continued although decreasing significantly from 1987 to 1990, as shown in Table 1-1.

Table 1-1. 300 Area N-Fuels Fabrication Facility Environmental Releases - 1986-1989. (2 sheets)

	Month	Airborne release		Released to process sewer				
		NOx (lb)	Radio-isotopes (Ci)	Nitrate (lb)	Nitrite (lb)	Fluoride (lb)	Copper (lb)	Uranium (lb)
1986	Jan	NA		10,266		435	56	68
	Feb	NA		9,469		267	28	27
	Mar	10,591	^{99}Tc 2.0 E-04	9,062		298	37	30
	April	1,763		8,757		328	76	44.4
	May	1,867	^{234}U 6.1 E-05	13,163		357	42	46.7
	June	2,062		11,769		340	56	44.7
	July	2,084	^{235}U 4.8 E-06	10,825		285	49	50.3
	Aug	1,127		2,498		97	7	27.4
	Sept	2,163	^{238}U 3.4 E-05	9,405		186	7	16.8
	Oct	793		3,298	0	159	6	6.6
	Nov	1,415		6,730	736	139	23	8.3
	Dec	1,649		9,011	1,015	161	24	28.5
	Total	25,514	3.0 E-04	104,253	1,751	3,052	411	398.7
1987	Jan	14		475	146	42	3	4.7
	Feb	0		205	0	20	3	3.3
	Mar	OS		217	0	49	8	2.5
	April	OS		288	0	54	4	2.2
	May	OS		146	0	18	3	1
	June	84		60	0	0.3	1	7.7
	July	OS		12.5	0	0.4	0.4	1.2
	Aug	OS		10	0	0.1	0.2	0.9
	Sept	OS		14	0	0.1	0.3	0.9
	Oct	OS		19.1	0	0.3	0.3	1.1
	Nov	OS		16.5	0	0	0.1	0.63
	Dec	OS		16.5	1.1	0.3	0.2	3.02
	Total	98		1479.6	147.1	184.5	23.5	29.15
1988	Jan	OS		17.4	0.5	0	0.2	0.46
	Feb	OS		24.3	0	0	0.2	0.89
	Mar	OS		20.2	0	0	0.17	0.66
	April	OS		33.6	0	3.1	0.47	1.03
	May	13		80.9	0	25.7	10	0.8
	June	68.7		50.2	0	16.3	9.9	1.4

Table 1-1. 300 Area N-Fuels Fabrication Facility Environmental Releases - 1986-1989. (2 sheets)

	Month	Airborne release		Released to process sewer				
		NOx (lb)	Radio-isotopes (Ci)	Nitrate (lb)	Nitrite (lb)	Fluoride (lb)	Copper (lb)	Uranium (lb)
1988	July	32.7		4.5	0	7	0.5	0.2
	Aug	43.7		4	0	0.4	0.6	0.7
	Sept	17		11.9	0	1.1	0.9	0.04
	Oct	15.2		2	0	0	0.25	0.05
	Nov	88.5		4.3	0	0.03	0.25	0.02
	Dec	27.8		2.1	0	0.3	0.2	0
	Total	306.6		255.4	0.5	53.93	23.64	6.25
1989	Jan	48.5		1.4	0	0.5	0.1	0
	Feb	35.5		1.5	0	1	0.1	0.01
	Mar	29.2		1.4	0	0.3	0.2	0
	April	23		1.4	0	0.2	0.1	0
	May	33.7		0.09	0	0.4	0.2	0
	June	34.2		0.23	0	0.36	0.13	0
	July	14.5		0.1	0	0.3	0.23	0
	Aug	5.1		0.06	0	0.91	0.28	0
	Sept	OS		0.03	0	0.2	0.06	0
	Oct	OS		0.7	0	0.1	0.1	0
	Nov	OS		0.3	0	0.1	0.1	0
	Dec	OS		0.01	0	0	0.06	0
	Total	223.7		7.22	0	4.37	1.66	0.01
1990	Jan	OS		0.57	0	0	0.08	0
	Feb	OS		0.03	0	0	0.06	0
	Mar	OS		0.02	0	0	0.1	0
	April	OS		0	0	0.07	0.09	0.01
	May	OS		0	0	0.06	0.05	0
	June	OS		0	0	0.18	0.05	0
	July	OS		0	0	0	0.07	0
	Aug	OS		0	0	0.08	0.05	0.03
	Total	-		0.62	0	0.39	0.55	0.04

OS = Monitoring system out of service.
NA = Not Available.

There are, however, a variety of ways for radioactive liquid effluents to be discharged to the environment. Uranium contamination can be carried from the buildings trenches to the process sewer and to the environment by leaching of the uranium from surfaces or contaminated systems within a work area.

Nonradioactive effluents were released to the atmosphere and process sewer during the operation of the 300 Area Fuels Fabrication Facilities. The atmospheric release ended in September 1990 when engineering development work ceased. The chemicals released to the process sewer from 1956 to 1989 included acids, bases, nitrate ions, fluorides and copper. These releases ended in 1990 as shown in Table 1-1.

Some process and waste chemicals shown in Table 1-2 are stored in the Fuels Fabrication Facility. The probability is low for these materials to enter the effluent stream because of existing administrative and engineering controls.

For the reasons stated above, this FEMP is limited to the potential radioactive liquid discharged occurring from the 313 and 333 Buildings of the Fuels Fabrication Facilities and their adjacent facilities.

1.4.1 Radionuclide Effluent Releases

The 300 Area Fuels Fabrication Facility, prior to January 1987, released airborne radionuclides from the Extrusion Press-Cut Off Saw Exhaust located in the 333 Building. The radionuclides released to the atmosphere were: ^{99}Tc and $^{234,235,236,238}U$. The annual airborne releases when the facilities were operated were in the order of 0.1 to 0.4 mCi.

The 300 Area liquid releases containing radionuclides originated in the 303-M, 313, and 333 Buildings flowed into the process sewer. The radionuclides released were primarily the isotopes of uranium. In 1985 and 1986 during facility operation, 440 and 400 lb, respectively, of dissolved uranium were released to the process sewer.

In January 1987, the 300 Area Fuels Fabrication Facility was shut down and the emission of airborne radioactivity ceased. However, the release of uranium to the process sewer continued, decreasing significantly each year from 1987 to 1990, as shown in Table 1-1. The release of dissolved uranium to the process sewer in 1990 was 0.04 lb versus 400 lb the last year the facility operated.

There is a possibility for a potential release of liquid effluents containing radionuclides to the process sewer. Uranium contamination may be carried to the process sewer as a result of water or other liquids being used in the plant and being discharged to the process sewer with the dissolved uranium being leached from pipe joints and cracks in the system.

1.4.2 Nonradioactive Chemical Effluent Releases

Nonradioactive chemicals were released to the atmosphere and to the process sewer during operation of the 300 Area Fuels Facility. However, the

closure of the N Fuels Fabrication Facility has ended the discharge of airborne effluents and the liquid effluents are intermittent.

The atmospheric emissions were nitrous oxides released from the Chemical Bay Exhaust. The release of nitrous oxides ended in September 1990 when engineering development work ceased.

The release of nonradioactive chemicals to the process sewer originated from 303 Uranium Oxide facility, the 313 Fuels Fabrication Support Facility, and the 333 Fuels Fabrication Facility. The discharges of liquids from routine operations has ended and the discharges are now intermittent from water sources such as rain water, air cooling water, steam condensate, and cleanup solutions.

The chemicals released to the process sewer from 1956-1989 were acids and bases, as well as nitrate, fluoride, and copper ions. The release of these chemicals ended in spring of 1990 as shown in Table 1-1.

Some process chemicals remains in the 300 Area Fuels complex. They are stored in the facilities shown in Table 1-2. However, there is very little potential that these materials will enter the liquid effluent stream because of Westinghouse Hanford administrative and engineering controls.

1.5 FACILITY EFFLUENT MONITORING PLANS RESPONSIBILITIES

To effectively implement the FEMP, the organization and responsibilities of Westinghouse Hanford management are identified in Section 12.0, Quality Assurance. The FEMP identifies the N Reactor Fuels Supply Manager as having overall responsibility for direction of sampling and test activities. The specific responsibilities of the N Reactor Fuel Supply Direct Staff, the manager, Operations Hazardous and Radiological Waste Control, and Reactor Engineering groups are spelled out in the quality assurance program.

The organization and responsibilities of the supporting organizations in implementing the FEMP are identified in Section 12.2.2. These organizations are the Office of Sample Management, 300/400 Area Environmental Protection, 300 Area Facilities Health and Safety, and N Reactor Quality Assurance.

Samples taken as a result of the FEMP will be shipped to approved Westinghouse Hanford laboratories or approved laboratory contractor as shown in Section 12.2.3, Analytical Laboratories.

1.6 DEFINITIONS

Accuracy - The degree of agreement of measurement with an accepted reference or true value.

Adequate - Able to monitor the facility effluents with in a reasonable degree of error.

Table 1-2. Process and Waste Chemicals in 300 Area Fuels Facilities.

Material	Location	Amount
Sulfamic acid	313 Building	94 lb
Dowfrost*	313 Building	165 gal
Indicating Silica Gel	313 Building	104 lb
Propane	313 Building	324 lb
Silicon	313 Building	450 lb
Purolite C-100-H	333 Building	50 lb
Sodium Carbonate	334-A	230 lb
Potential Hazardous		
Waste	Location	Amount
Caustic waste pH 10.2	331 Tank Farm	1,100 gal
Waste acid pH 2.6	Tank 5 Waste Acid Treatment System	12 gal
Caustic waste pH 10.3	Tank 2 Waste Acid Treatment System	1,200 gal

*Dowfrost is a trademark of Dow Chemical Company.

Administrative Control Values - Contractor-imposed radionuclide and hazardous material release limits usually based upon ALARA goals for protection of the public.

Authorities - Any governmental agencies or recognized scientific bodies which by their charter define regulations or standards dealing with radiation protection and hazardous material.

Bias - A consistent under or over estimation of a true value.

Calibrate - Adjustment of the system and the determination of system accuracy using one or more sources traceable to the National Bureau of Standards (NBS).

Check Source - The use of a source to determine if the detector and all electronic components of the system are operating correctly.

Composite Sampling - This includes both noninterrupted sampling and repetitive sequential collection of small samples obtained automatically at intervals short enough to yield a representative sample for the entire sampling period.

Continuous Monitoring - The real time measurement of liquid, gaseous, and/or airborne effluents and contaminants using a in-situ measurement system.

Continuous Sampling - Includes both non-interrupted sampling and repetitive sequential sampling to obtain a representative sample.

Contractor - A company or entity that has entered into a prime contract to operate a Hanford Site facility or perform a function for U.S. Department of Energy Field Office, Richland (RL).

Dangerous Waste - Washington State designation for solid wastes specified in Washington Administrative Code (WAC) 173-303-070 through 173-303-103 (WAC 1989a) as dangerous or extremely hazardous waste.

Derived Concentration Guides (DCG) - The concentration of a radionuclide in air or water that, under conditions of continuous exposure for 1 yr by one exposure mode, would result in an effective dose equivalent of 100 mrem. The DCGs do not consider decay products when the parent radionuclide is the cause of the exposure. The DCGs are listed in DOE Order 5400.5 Chapter III (DOE 1990a) and in individual contractor safety manuals.

Detector - Any device for converting radiation flux to a signal suitable for observation and measurement.

Discharge Point or Effluent Discharge Point - The point at which an effluent or discharge enters the environment from the facility in which it was generated.

Effluent - Any treated or untreated air emission or liquid discharge at a DOE site or from a DOE facility.

Effluent Monitoring - Measurement of liquid and gaseous effluents for the purpose of characterizing and quantifying contaminants, assessing radiation exposures to members of the public, providing a means to monitor and/or control effluents at or near the point of discharge, and demonstrating compliance with applicable standards and permit requirements.

Effluent Sampling - The continuous or intermittent collection and analysis of effluent samples for the purpose of characterizing and quantifying contaminants, assessing radiation exposures to members of the public, providing a means to control effluents at or near the point of discharge, and demonstrating compliance with applicable standards and permit requirements.

Environmental Control Limits - Contractor limits based upon permit limits and contractor policies as derived from DOE requirements.

Effective Dose Equivalent - Effective dose equivalent (EDE) is the summation of the products of the dose equivalent received by specified tissues of the body and a tissue-specific weighting factor. This sum is a risk equivalent value and can be used to estimate the health-effects risk of the exposed individual. The tissue-specific weighting factor represents the fraction of the total health risk resulting from uniform whole-body irradiation that would be contributed by that particular tissue. The EDE includes the committed EDE from internal disposition of radionuclides and the EDE due to penetrating radiation from sources external to the body; it is expressed in unit of rem (or sievert).

Environmental Occurrence - Any sudden or sustained deviation (categorized as emergencies, unusual occurrences, or off-normal occurrences) from a regulated or planned performance at a DOE operation that has environmental protection and compliance significance. Typical occurrences of interest to this document include failure of primary or secondary facility effluent monitoring equipment or a monitored/unmonitored release of regulated materials exceeding administrative control values.

Environmental Surveillance - The collection and analysis of samples, or direct measurements, of air, water, soil foodstuffs, biota, and other media and their environs for the purpose of determining compliance with applicable standards and permit requirements, assessing radiation exposures to members of the public, and assessing the effects, if any, on the local environment.

Extremely Hazardous Waste - Washington State designation for waste specified in WAC 173-303-070 through 173-303-103 (WAC 1989a).

Hazardous Materials - The DOE term for nonradioactive hazardous substances as specified by EPA in 40 Code of Federal Regulations (CFR) 302 (EPA 1989a).

Hazardous Waste - Solid wastes designated by 40 CFR 261 (EPA 1989b), and regulated as hazardous wastes by the EPA or Washington State in WAC 173-303 (WAC 1989a). This term includes dangerous waste, extremely hazardous wastes, and toxic dangerous waste.

In Line - A system where the detector assembly is adjacent to or immersed in the total effluent stream.

In Line Monitor - A system in which a detector or other measuring device is placed in the effluent stream for the purpose of performing measurements on the effluent stream.

Inventory at Risk - The quantity of radioactive and/or nonradioactive hazardous material present in a facility with the potential to enter a gaseous or liquid effluent stream.

Isokinetic - A condition that exists when the velocity of air entering a sampling probe held in an airstream is identical to the velocity axis of flow of the airstream being sampled at that point.

Mixed Waste - Waste containing both radioactive and hazardous components regulated by the *Atomic Energy Act of 1954* and the *Resource Conservation and Recovery Act of 1976* (RCRA), respectively.

Monitoring - The use of instruments, systems, or special techniques to measure liquids, gaseous, and/or airborne effluents or contaminants.

Normal Operations - A plant operating condition where all processes and safety control devices are operating as designed.

Occurrence Notification Center - The single point of contact for reporting occurrences (emergencies, unusual occurrences, and off-normal occurrences) that affect DOE facilities on the Hanford Site.

Off Line Monitoring - Methods where an aliquot is withdrawn from the effluent stream for collection or conveyance to a detector or instrument.

Onsite - Location within a facility that is controlled with respect to access by the general public.

Out-of-Specification Condition - A condition that is outside the operating parameter(s) established for airborne emissions and liquid discharges.

Plate Out - A thermal, electrical, chemical, or mechanical action that results in a loss of material by deposition on surfaces between sampling point and detector.

Precision - The dispersion around a central point, usually represented as a variance, or standard deviation.

Primary Calibration - The determination of the electronic system accuracy when the detector is exposed in a known geometry to radiation from sources of known energies and activity levels traceable to the NBS.

Quality Assurance - All those planned and systematic actions necessary to provide adequate confidence that a system or component will perform satisfactorily in service.

Radioactive Component - Refers only to the actual radionuclides dispersed or suspended in the waste substance.

Reportable Quantities - That quantity of hazardous substances as listed in 40 CFR 302.4 (EPA 1989a) which, if released, requires notification as per 40 CFR 302. These quantities also provide the criteria for requiring FEMPs with respect to nonradioactive hazardous substances.

Representative Sample - A sample taken to depict the characteristics of a lot or population as accurately as possible.

Response Time - The time interval from a step change in the input concentration at the instrument inlet to a reading of 90% (nominally equivalent to 2.2 time constants) of the ultimate recorded output.

Secondary Calibration - The determination of the response of a system with an applicable source whose effect on the system was established at the time of a primary calibration.

Sensitivity - The minimum amount of contaminant that can repeatedly be detected by an instrument.

System - The entire assembled equipment excluding only the sample collecting pipe.

Significant - The concentration of radioisotope which is equivalent or greater than 1 mrem of exposure offsite per year.

Shutdown Condition - A plant condition where all processes involving radioactive and/or hazardous materials are inactive and otherwise stable.

Source Term - The amount, activity, or concentration of a hazardous or radioactive material in a facility effluent stream at the point of discharge that is available to exposure personnel either within the facility or beyond the site boundary.

Standby - That condition in which a reactor facility is neither operable nor declared excess, and the documentation authorization exists to maintain the reactor for possible future operation [DOE Order 5480.6 (DOE 1986a)].

Toxic Dangerous Wastes - State of Washington designation for wastes which meet the criteria specified in WAC 173-303-101 (EPA 1989a).

Upset Condition - Any one condition that is outside the normal process operating parameters or an unusual plant operating condition where one material confinement/containment barrier or an engineered control has failed.

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2.0 300 AREA N FUELS FABRICATION FACILITY DESCRIPTION

The N Reactor Fuels Fabrication facility is located in the 300 Area of the Hanford Site, which is located in south central Washington State, as shown in Figure 2-1. The 300 Area facilities are shown in Figure 2-2.

The N Fuel Fabrication facility consists of eight buildings, a tank farm, and associated pipe trenches and drains. The structures are located on the north side of the 300 Area. The buildings are metal frame and sheet metal construction and primarily one level although 313 and 333 Buildings have mezzanine type structures.

The 300 Area Fuels Fabrication facility has been in operation since 1944 with some structures being added in the 1950's and 1960's. The following sections provide information on each of the facilities.

2.1 333 N FUELS FABRICATION FACILITY

The primary N Reactor Fuels Fabrication activities were conducted in the 333 Building. The fuel fabrication operation produced N Reactor fuel from 1961 to December 1986 when operations were stopped.

The Fuel Fabrication Facility used a variety of mechanical, chemical and electrical processes in the conversion of uranium billets and assorted components into finished fuel assemblies for irradiation at N Reactor.

The finished fuel assemblies were a tube-in-tube design with metallic uranium core surrounded by a thin Zircaloy-2 cladding as shown in Figure 2-3. Two main types of elements were fabricated: one with the inner and outer fuel elements enriched to 0.95% ^{235}U and one with the inner fuel element enriched to 0.95% ^{235}U and the outer fuel element enriched to 1.25% ^{235}U. Small amounts of depleted, natural, and other-enrichment uranium fuels were also processed. The maximum enrichment, 2.1% ^{235}U, occurred in the mid-1960's. Associated activities, such as copper casting, chemical waste treatment, uranium recovery, calcination of uranium chips and fines to oxides, beryllium/ Zircaloy-2 alloy scrap concretion, and uranium scrap packaging were performed in the 313, the 303-M, and the 304 Buildings.

The fuel fabrication process flow diagram for the 333 Building is presented in Figure 2-4. The acids produced from component cleaning, acid copper removal, chemical milling, prebraze cleaning, preweld cleaning, and final bright etch were treated in the 300 Area Waste Acid Treatment System (WATS).

The 333 N Fuels Fabrication operation was shut down in December 1986, the airborne effluents have ceased and the air monitoring equipment is shutdown. A list of the airborne release points appears in Section 16.3. The liquid effluents from the process equipment have ended; however, steam condensate water, air conditioning water, and rainwater are still discharged to the process trench via the process sewer.

Figure 2-1. The Hanford Site.

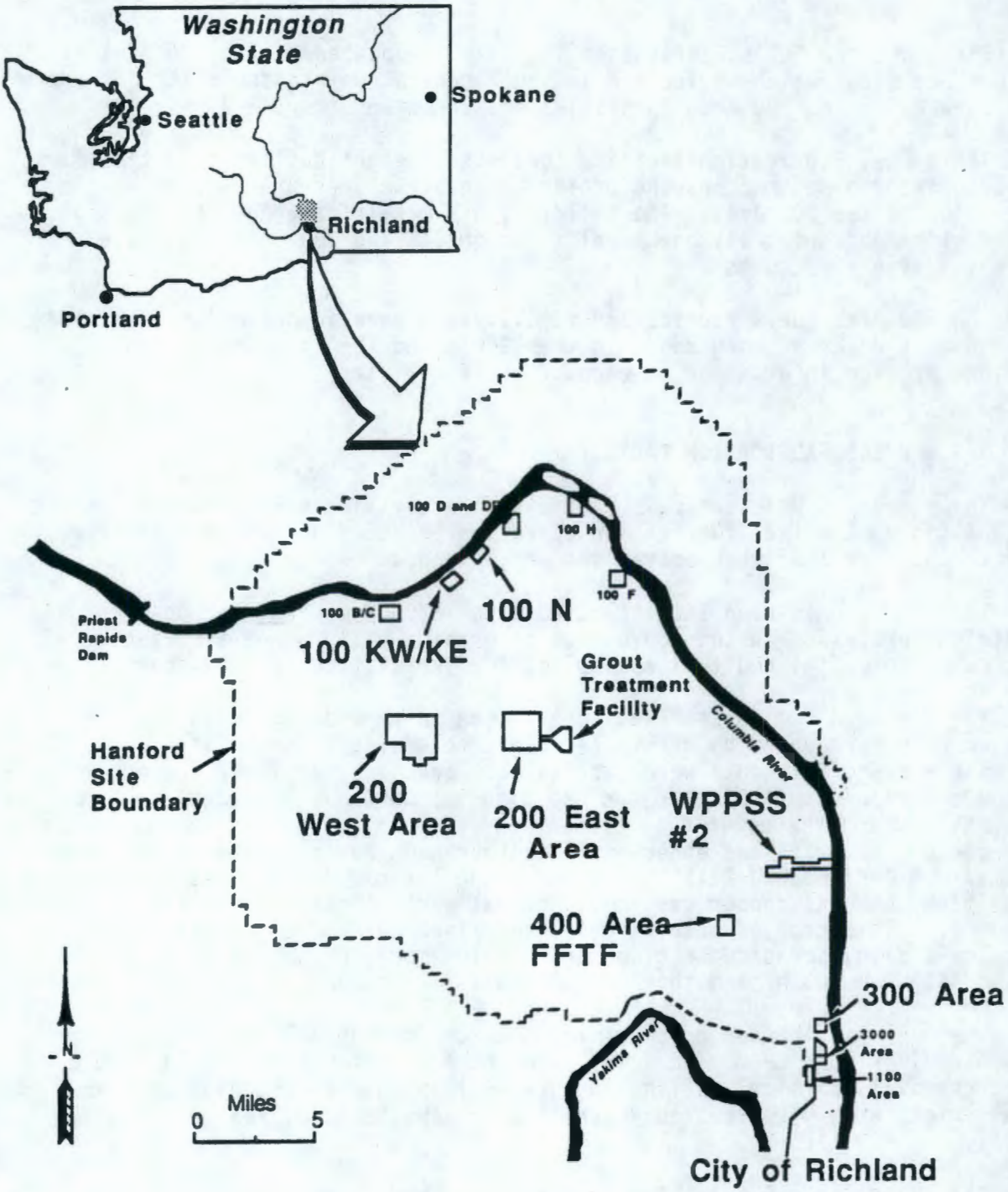


Figure 2-2. 300 Area Fuels Fabrication Facility.

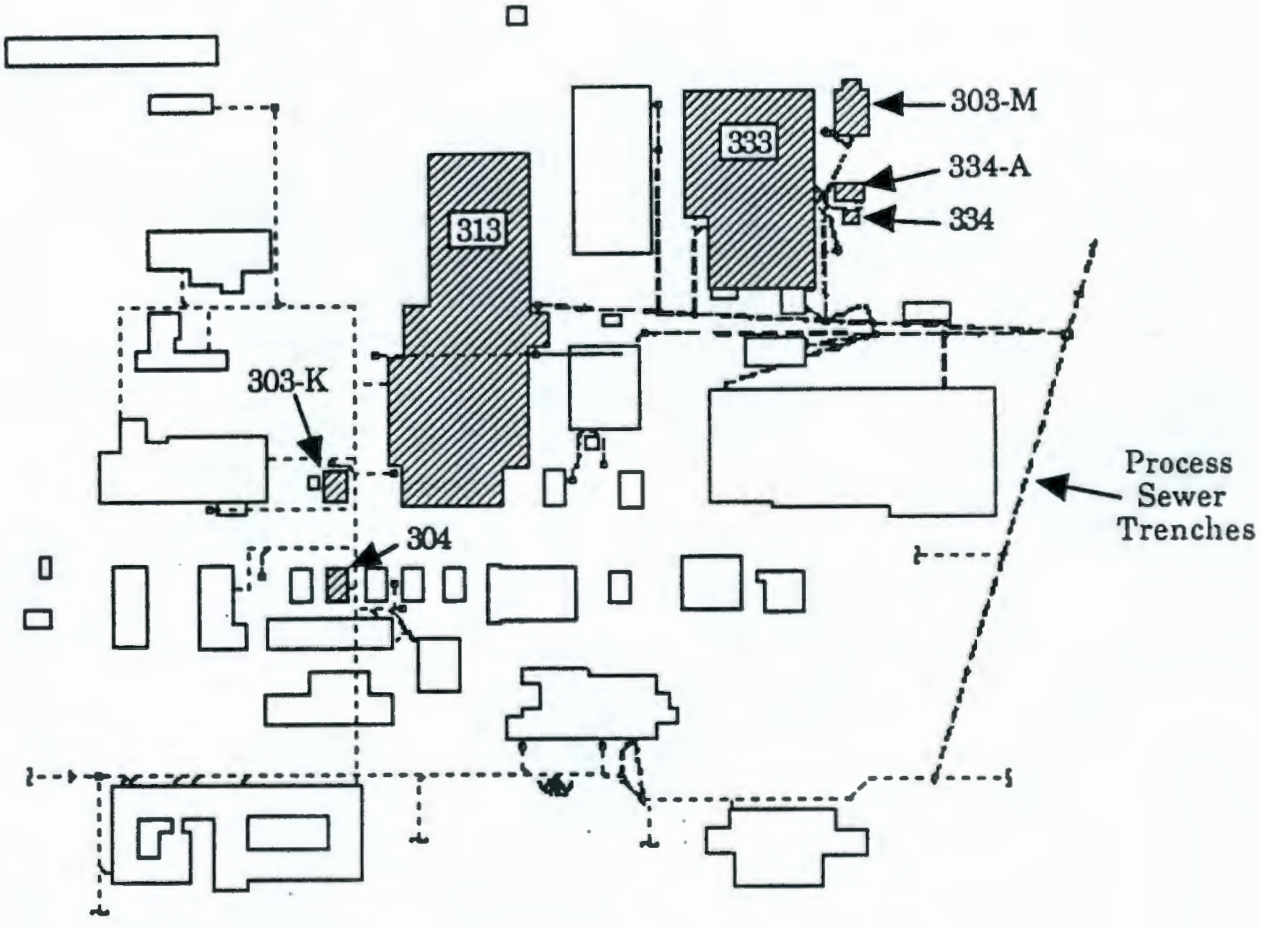
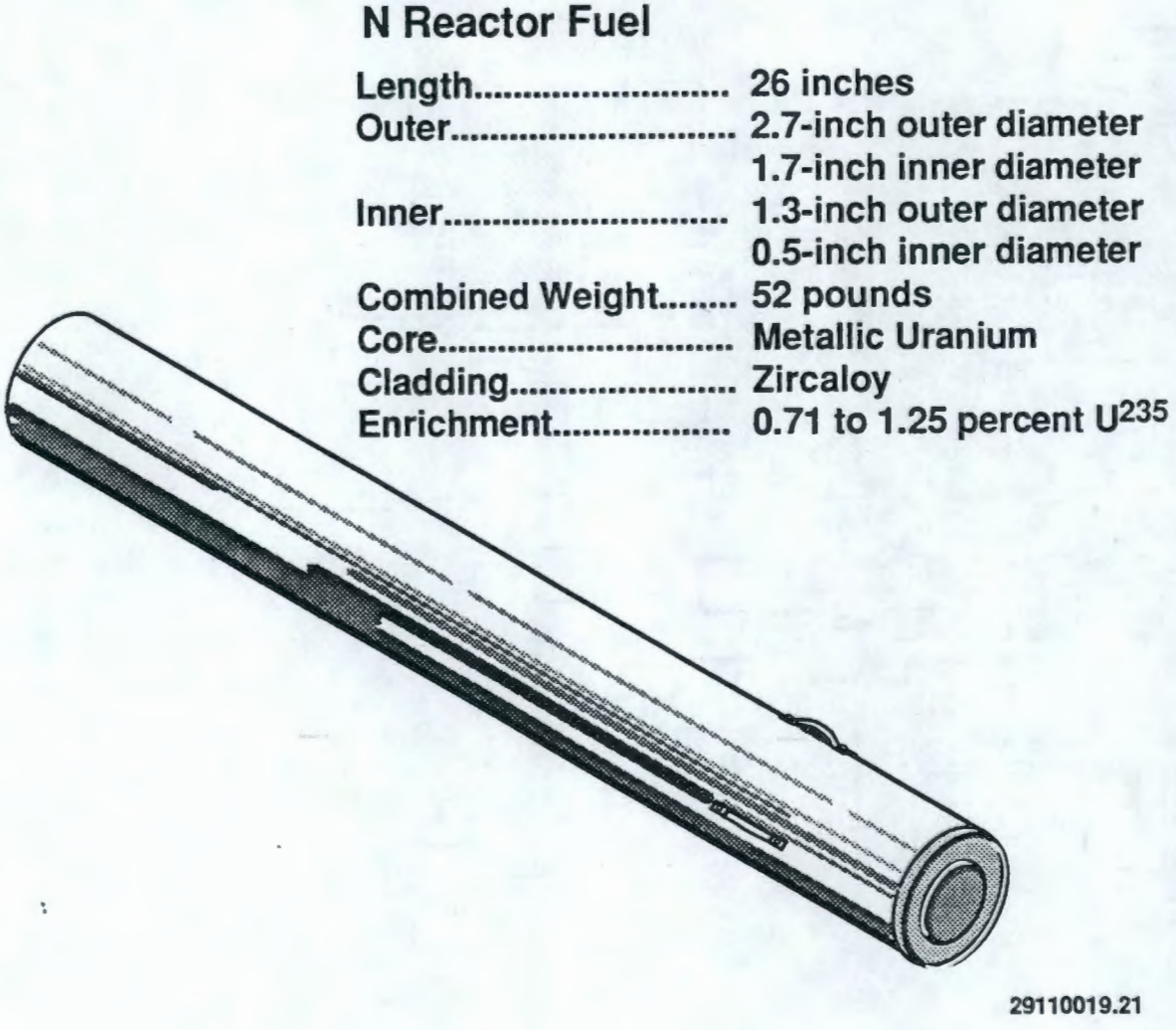


Figure 2-3. Typical N Reactor Fuel Assembly.



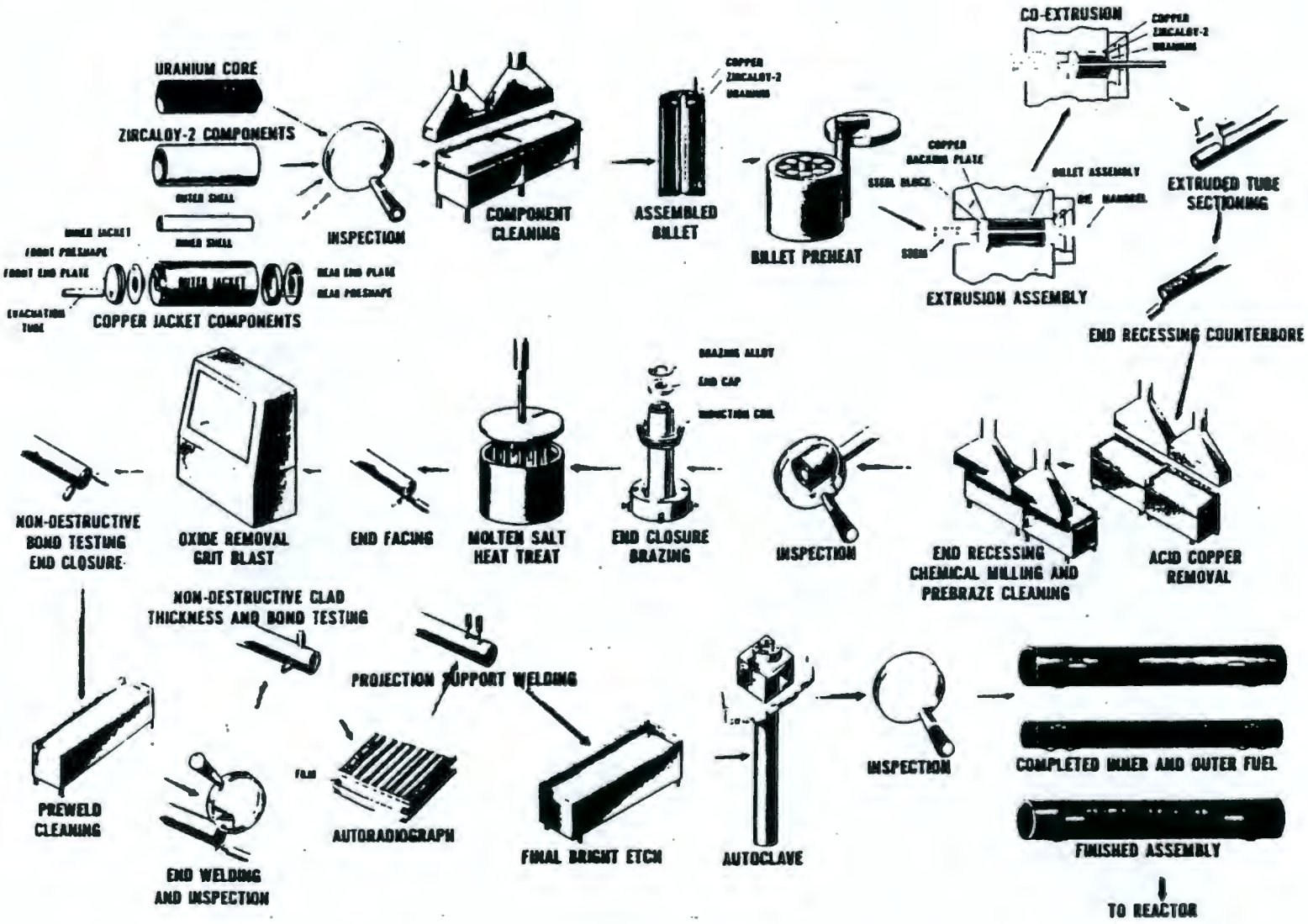


Figure 2-4. Fuel Element Fabrication Process.

2.2 313 N FUELS FABRICATION SUPPORT FACILITY

The 313 N Fuels Fabrication Support Facility contains the Uranium Laboratory, Copper Casting, Centrifuge Tank, Uranium Recovery, Filter Press, Sutton Extrusion Press, Engineering Development Laboratory, training rooms, and staff offices. The processes were shutdown in September 1990.

The 313 Building was used primarily to treat uranium bearing acid in the waste acid treatment system. The recovered uranium was then recycled to form new uranium billets.

The acid stream with recoverable amounts of uranium was neutralized separately from the acid stream without recoverable amounts of uranium. The determination of whether or not the uranium was recoverable was based on the concentration of copper. If elevated levels of copper were present, the uranium was not recovered. The processes used in the 313 Building neutralized the waste acid streams and removed solid materials, including precipitates, through the use of a filter press for the uranium-bearing acids and through the combined use of a centrifuge and filter press for nonrecoverable uranium-bearing acids. After removal of solids, the waste streams were combined in Tanks 40 and 50 in the 311 Tank Farm. The solids with recoverable amounts of uranium were placed in 30-gal drums and shipped to the Feed Materials Production Center in Fernald, Ohio, for recovery of the uranium. Solid precipitates from nonrecoverable uranium-bearing acids from the centrifuge were containerized and shipped to the 200 Area for final disposal.

The drainage trenches in the 313 Building are covered with cast-iron alloy metal grates. The north trench is stainless-steel lined. The trenches were plugged in 1987. Before this date, they were connected with the process sewer. In 1985 the process sewer under the floor on the west side of the building was found to have been leaking into the ground for an undetermined period of time. Therefore, the soil under the west side of the building will likely be contaminated with uranium, copper, and other substances.

2.3 303-F BUILDING

Since 1953 the 303-F Building contained a number of chemical pumps, including two for sodium hydroxide, two for nitric acid, and one for trichloroethylene (TCE) and perchloroethylene (PCE). The south room contained equipment used to make up solutions containing sodium carbonate, sodium silicate, sodium phosphate, sodium nitrate, sodium dichromate, and sodium hydroxide for aluminum cleaning, stripping, and anodizing processes performed in the 313 Building from 1953 to 1971.

With the installation of Tank 50 (311 Tank Farm) in November 1985, two pumps, two cartridge filters, and two sample ports were installed. They were used to recirculate and filter solutions in Tanks 40 and 50 and to transfer solutions between Tanks 40 and 50 or to Tank 5 in the 313 Building.

The chemicals have been removed from the building and the pumps and lines drained.

2.4 303-K RADIOACTIVE MIXED WASTE STORAGE FACILITY

The 303-K Facility was designed and constructed in 1943. The facility is a concrete block building with a poured concrete ceiling. The building is approximately 48 ft by 27 ft with a mid building concrete block wall dividing the building into two separate rooms. Outside, the storage area consists of two concrete pads, two asphalt pads and a gravel area. The north room of the 303-K Facility originally had one roof exhaust fan. The fan was used from 1953 to 1977 while decontaminating aluminum spacers and equipment. The roof vent fan was replaced with a high-efficiency particulate air (HEPA) filter exhaust system in 1977 and was used until the fall of 1982. The HEPA exhaust system was only turned on at the end of the curing operation for the concreted billets of recyclable scrap uranium chips and fines or if hydrogen levels indicated a billet fire had occurred. Air was discharged horizontally from the exhaust system approximately 13 ft above ground (2 ft above the roof). The flow rate of the exhaust system is unknown and there are no records of the HEPA filter efficiency tests. The HEPA exhaust system has not been used since the concrete curing operation was discontinued in 1982.

During the aluminum spacer decontamination operation from 1953 to 1971, the chemicals and contaminants were removed via the process sewer. Discharges were from two sinks, a wash table, and the floor trench. During the concretion curing operation from 1977 to 1982, steam condensate, sink and water-fountain drain from Building 3707-G, and any cleanup water would have entered the process sewer via the floor trench drain. Flow rates are unknown. After 1982, the only known liquid discharge was steam condensate until 1988 when the steam was shut off and the floor trench drain was plugged. Surface run-off from precipitation entered the process sewer through the drain on the north concrete pad from 1953 until the drain was sealed in 1989.

The outdoor concrete, gravel, and asphalt storage pads associated with the 303-K Facility have been used since 1953 for storage of radioactive and mixed wastes. The outside storage area is approximately 4,590 ft^2. In 1987 a fence was constructed around the perimeter of the facility to control access into the area. At the present time, solid wastes are stored on the outside storage areas in U.S. Department of Transportation (DOT)-specified drums and 4 ft x 4 ft x 8 ft burial boxes.

The facility no longer discharges either airborne or liquid effluents to the environment.

2.5 303-M URANIUM OXIDE FACILITY

The 303-M Uranium Oxide Facility is adjacent to the 333 N Fuels Manufacturing Facility and consists of one building, an adjacent outdoor drum storage area, and a small filter building. The 303-M Uranium Oxide Facility stored and treated recycled material generated during the Hanford Site fuel fabrication processes. The fuel fabrication waste material consisted of pyrophoric saw fumes and lathe turnings, known as chips, that are composed of slightly enriched uranium and Zircaloy-2. The wastes were calcinated to remove their pyrophoric properties and eliminate the possibility for spontaneous combustion during transportation.

The 303-M Uranium Oxide Facility operated from 1983 to 1987 for the calcination of wastes generated by Westinghouse Hanford and previous operators. The facility ceased operations in 1987.

There were two waste storage areas at the facility. The waste storage area inside the building measures 430 ft^2; the 1,500-ft^2 waste storage area outside the building consists of a bermed concrete pad and is located on the west side of the 303-M Building. Storage of waste is in water-filled 30-gal steel drums. Waste was stored on the outdoor drum-storage pad. Occasionally, the inside drum storage area was utilized for waste storage.

The 303-M Uranium Oxide Facility was used to store and treat radioactive mixed waste, consisting of fines and chips of solid material, generated during the manufacture of reactor fuel elements. Fines were created when uranium tube extrusions were sawed into fuel elements. Chips were generated when fuel elements are machined to length. The chips and fines are composed of slightly-enriched uranium and Zircaloy-2, a zirconium alloy.

The uranium fuel fabrication waste is pyrophoric in nature and was transported to the 303-M Oxide Facility in 30-gal drums. The drums were filled with water to prevent spontaneous combustion of the chips and fines. The drums were stored either on the outdoor storage pad or within the building prior to processing.

To treat the waste, the waste was dewatered and the size of the chips was reduced in a mechanical chopper. The chopped chips and fines were then hand-packaged into combustible containers or loaders in five-pound batches.

The calcination unit consisted of three 30-gal drums placed in a water bath. Water surrounded the drums to a point just below the tops of the drums, and water continuously flowed past the drums to promote cooling. A 5-lb batch of chips was placed into one of the 30-gal drums, and the chips were ignited using a hand-held propane torch. The treatment process oxidizes the waste to uranium oxide (U_3O_8), zirconium oxide (ZrO_2) to render the waste nonpyrophoric. The oxidation reaction is allowed to go almost to completion before another 5-lb batch of fines was added. Chips and fines were added alternately until the drum is full. When a 30-gal drum was full of treated material, it was allowed to cool and was sealed. Drums filled with materials which were originally received from Building 306 were returned to that building. Drums filled with material originally received from Buildings 313 or 333 were either shipped offsite for uranium recovery or were disposed of onsite.

All waste storage, preparation, and treatment activities occur in concrete-bermed areas where process wastewater was collected into one of two drains. The collected wastewater drains to the filter hut sump and was pumped through a particulate filter to remove waste solids. The filtered water was then discharged into the 300 Area process sewer, which was routed to the 316-5 process trenches.

Each calcination unit was equipped with a ventilation system hood which collects the air heated by the oxidation reaction (off gas) and passes it through baghouse and HEPA filters to prevent atmospheric contamination by

uranium. The facility air pressure was kept below atmospheric pressure to prevent inadvertent leakage of airborne uranium from the facility.

The facility was cleaned out and closed in 1989. The airborne release point has been shut down and the facility drained of all liquids.

2.6 304 URANIUM CONCRETION FACILITY

The 304 Facility was designed and constructed in 1952. The main building is metal and measures approximately 26 ft by 48 ft. The ceiling of the facility has exposed steel trusses (girders). There are sliding metal doors at each end of the building and windows on the east side. The building has no interior insulation or wallboard. The floor area has a drainage trench, a floor drain, and a sump area. The change room is metal with a concrete floor and measures approximately 12 ft by 16 ft. The doors are located in the north and west walls and a window is located on the east side of the change room. The interior walls and ceiling of the change room are covered with wallboard and are insulated. In addition, there is an outside storage area on the north side of the facility. The storage area is a concrete pad surrounded by asphalt and measures approximately 22 ft by 19 ft.

Until late 1989, the steel walls of the main building were not sealed to the concrete wall base and there were numerous small holes in the walls. During concretion operations 304 Building floor was washed down daily. When the building floors were washed down, splashing against the steel walls may have carried contamination out of the building. In addition, there was no berm at the north and south doors to stop wash down water from leaving the building. The north fenced pad does not have a berm to contain spills or precipitation. In past years, several layers of asphalt have been placed over old asphalt and gravel areas to prevent the spread of uranium contamination.

The latest asphalt was added in 1988 on all four sides of the building. In early 1989, uranium contaminated areas on the asphalt were covered with two layers of PPG Industries enamel paint.

In late 1989, to prevent future contamination outside the building, the holes and joints in the building walls were sealed with the following:

- Butvar Aqueous Dispersion BR
- Dow Corning 3-6548 Silicone RTV Foam, Part A and B
- DAP Acrylic Latex Caulk with Silicone.

During the history of the 304 Facility, several exhaust and vent systems have been used. The original system was composed of three roof vents powered by 2,050 ft^3/min electric fans. This system was used during the pilot plant operations (1952 to the mid 1960's). The electricity was disconnected to the fans in 1971. When the building had molten metal furnaces (1952 to the late 1950's), the furnace cooling air was exhausted through a 6-in.-diameter exhaust pipe on the west side of the building. The exhaust pipe is still in place, but is sealed off in the sump (formerly a furnace pit).

The first fume exhaust system was a 1,900 ft^3/min exhauster and was used for acid and nitrous oxide fumes from the nickel plating operations (late 1950's to mid 1960's). No monitoring capabilities existed on this exhaust system.

The present cyclone precipitator exhaust system replaced the plating operation exhaust system in 1971. Both exhausters were located on the concrete pad outside the east side of the building. The flow rate, manufacturer, and efficiency of the present cyclone exhaust system is unknown. The exhaust system was used to remove cement dust from the operators work area when bags of cement were being emptied and the concrete mixer was in operation. After the air passed through the cyclone precipitator, it was discharged vertically approximately 12 ft above ground level. The discharge was continuously sampled for uranium particulates when the precipitator was in service.

In addition to the exhaust systems described previously, the building contained a 10,000 ft^3/min evaporative (swamp) cooler. Until approximately 1985, the swamp cooler was used to cool the building during hot weather. The swamp cooler is located on the concrete pad outside the southeast corner of the building.

The 304 Building contains four drains that enter the process sewer. A floor drain near the cement mixer discharges to the sump where fines settle out. The sump has a removable screened standpipe, about 16 in. high, that overflows into an underground drain line to the process sewer on the east side of the building. A water line discharges directly into the overflow pipe below the screen and was used when the concretion process was in operation. This flowing water, flow rate unknown, helped prevent plugging of the P-trap with concrete. Three other drains enter the main underground drain; they are as follows:

- A drain from the east side floor trench
- A drain from the sink in the southwest corner of the building
- An overflow drain from the outside steam condensate quench sump on the east side of the building.

The operations at the 304 Facility have varied since it began operation. The building was initially used to house pilot plants for lead-dip canning aluminum-clad uranium cores and electroplating uranium cores with nickel. Two furnaces containing molten lead and aluminum-silicon alloy were located in the sump area on the west side of the building. From the mid-1960's to 1971, the building was used for storing engineering equipment and product chemicals. Beginning in 1972, the facility was used to treat low level radioactive mixed waste, recyclable scrap uranium generated during the fuel fabrication process or development activities, and uranium titanium alloy chips and fines.

The 304 Facility was designed with a drainage trench and sump to remove liquids resulting from spills, leaks, and/or daily operations. Standard spill-response procedures inside the building included washing the spilled

waste to the sump where the fines would settle out. The wastewater was drained into the 300 Area process sewer and the fines were shoveled from the sump and concreted.

2.7 311 TANK FARM

The recoverable and nonrecoverable uranium-bearing effluents from the 313 Building were combined in above-ground tanks (Tanks 40 and 50) in the 311 Tank Farm. The effluents were eventually transferred to tanker trucks and disposed of in 200 Area or were given to offsite treatment, storage, and/or disposal (TSD) contractors for disposal, if the effluents were below radioactive release limits. The tanks received approximately 420,000 gal of waste per year.

Tank 40 was installed in 1953 and was used for storage of nitric acid until 1973. Since 1973 Tank 40 was used to store neutralized waste prior to disposal.

Tank 50 was installed in 1985 and was also used to store neutralized waste prior to disposal. Tank 50 has been used four times (1986 and 1987) for decanting wastes when the centrifuge was out of service.

Raw materials consisting of degreasing solvents (TCE and PCE) were also stored in a 10,000-gal tank at the 311 Tank Farm. This tank was cleaned by Northwest Enviro Services and removed in 1987 by Kaiser Engineers Hanford. From 1954 to 1975 the tank contained TCE and from 1975 to 1986 it contained PCE.

In addition to waste Tanks 40 and 50, the 311 Tank Farm contains a 4,000-gal tank used to store nitric acid and two 10,000-gal tanks used to store sodium hydroxide. The tanks were emptied in 1991 and no longer contain nitric acid or sodium hydroxide.

2.8 334 PROCESS SEWER MONITORING FACILITY

Two monitoring stations are installed in the process sewers from the 333 N Fuels Monitoring Facility and the 313 N Fuels Fabrication Support Facility to detect any unusual acid or caustic discharges. Each monitoring station is equipped with a water eductor and sequential sampler in Building 334 to take weekly samples for chemical analysis and a pH meter with high-level and low-level alarms. The sampler was removed in September 1990, but the pH meters remain in service. The pH alarm trip points are pH 4.0 and 12.5 for the 333 Building. The alarms will enunciate in Building 333. One monitoring station monitors the discharges from the 333, 334-A, 303-M, and 3720 Buildings. The other station monitors discharge from 313, 303-F, and the 311 Tank Farm.

There are two buildings that are not monitored by the two process sewer monitoring stations, Buildings 303-K and 304. These two buildings are in the process of being closed and no effluents are released to the environment.

2.9 334-A WASTE ACID STORAGE BUILDING

The 334-A Building was completed in late 1974, and placed in use in January 1975. For 4 mo in 1973 a underground tank and Tank 4 in the 334 Tank Farm were used to collect acid waste to await transfer to the 313 Building for neutralization. The underground tank began to leak in August 1973 and was removed during construction of the 334-A Building. The waste acids were discharged directly into the process sewer until the 334-A Building was installed in December 1974. In 1974, three tanks (Tanks A, B, and C) were installed in the 334-A Building fuel fabrication process in the 333 Building. Tank A, with a capacity of 360 gal, was used as an in-line settling tank. Tanks B and C, with a capacity of 2,000 gal each, were used for storage. In August 1984 the piping to Tank A was disconnected, and all wastes were routed directly to Tank B or C. From 1984 to 1988 Tank A was used to store solutions and solids remaining from activities that occurred prior to the disconnect. In 1988 the tank was cleaned and its polyvinyl chloride liner was removed. The tanks in the 334-A Building received approximately 210,000 gal of waste acids per year. These waste acids consisted of hydrofluoric, nitric, and sulfuric acids with copper, zirconium, chromium, and uranium in solution. Following storage, the acids were pumped from the 334-A Building to the south end of the 313 Building for neutralization.

From 1975 to 1986 Tank 4 in the 334 Tank Farm was used as an overflow tank for the tanks in the 334-A Building. Tank 4 was usually empty. In January 1986, due to equipment problems in the 313 Building, waste acid solutions were transferred to Tank 4. Shortly after the transfer, Tank 4 developed holes near the top of the tank and was taken out of service. In the late summer of 1986 Tank 4 was removed by Westinghouse Hanford personnel, cleaned, and buried in the 200 Area Burial Grounds.

In the early 1980's, in an effort to reduce sludge build-up, the waste stream from 333 Building was separated into copper-bearing and Zr-2 bearing streams, which were directed to Tanks B and C, respectively. All wastes were removed from Tanks B and C in 1990.

3.0 ORDERS, REGULATIONS, AND STANDARDS GOVERNING EFFLUENT MONITORING

The DOE, EPA, and Washington State have issued orders, regulations, and guidance on the monitoring of effluents. The following sections are intended to briefly summarize the requirements for effluent monitoring. To ensure full compliance with the regulations and industry guidance, the specific regulation or guidance document shall be consulted. The applicable regulations and standards are listed in Table 3-1. Westinghouse Hanford is currently reviewing this FEMP for compliance to applicable regulations and comments will be incorporated into future revisions. This review will be completed by January 1992.

3.1 U.S. DEPARTMENT OF ENERGY ORDER 5400 SERIES REQUIREMENTS FOR A FACILITY EFFLUENT MONITORING PLAN

The DOE has issued orders for the monitoring and reporting of effluents from its facilities. Two predominant orders that have been issued are DOE Order 5400.1, *General Environmental Protection Program* (DOE 1989a) and DOE Order 5400.5, *Radiation Protection of the Public and the Environment* (DOE 1990a). In addition to these two orders the DOE has published the *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance*, DOE/EH-0173T (DOE/EH 1991). The following is a summary of these orders and the Regulatory Guide.

3.1.1 General Environmental Protection Program

The purpose of DOE Order 5400.1 (DOE 1988a) is to ensure compliance with the applicable federal, state, and local environmental protection laws and regulations, executive orders, and internal departmental policies.

Chapter I describes the methods of requesting exemptions from environmental protection standards and lists the mandatory environmental protection standards for DOE facilities.

The General Environmental Protection Program in Chapter II, Parts 4 and 5, requires an annual site environmental report and a report on radioactive effluents, onsite discharges, and unplanned releases. The order states that the environmental report is to contain information on radioactive effluent data, environmental sampling for radioactivity and reporting on the potential doses to the public. The annual report should also contain nonradiological program information from effluent data and environmental sampling from nonradiological pollution. The report must also contain information on groundwater monitoring and Quality Assurance.

Chapter III requires RL to develop specific environmental protection programs for each facility or group of facilities. The plans must provide the environmental protection goals and objectives for complying with the environmental laws and/or regulations.

Table 3-1. Applicable Regulations and Standards. (2 sheets)

Agency/Originator	Regulation No.	HA	HL	RA	RL	Summary/Application
U.S. Department of Energy, (DOE) Washington, D.C.	DOE Order 5400.1, 1988 General Environmental Protection Program	X	X	X	X	Outlines effluent monitoring requirements
	DOE Order 5400.5, 1990 Radiation Protection of the Public and Environment			X	X	Protects public/environment from radiation associated with DOE operations
	DOE Order 5480.4, 1989 Environmental Protection, Safety, and Health Protection Standards	X	X	X	X	Sets requirements for the application of the mandatory environmental protection, safety, and health (ES&H) standards; lists reference ES&H standards
	DOE Order 5484.1, 1981 Environmental Protection, Safety, and Health Protection Information Reporting Requirements	X	X	X	X	Sets requirements for reporting information having environmental protection, safety and health protection significance
	DOE Order 5820.2A, 1988 Radioactive Waste Management	X	X	X	X	Sets radioactive waste management requirements
U.S. Environmental Protection Agency, (EPA) Washington, D.C.	40 CFR 61, 1989 National Emission Standards for Hazardous Air Pollutants	X		X		Sets national emission standards for hazardous air pollutants (NESHAP)
	Subpart A General Provisions	X				Regulates hazardous pollutants
	Subpart H National Emission Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities			X		Sets emissions standards/monitoring requirements for radionuclides
	40 CFR 122, 1983 EPA Administered Permit Programs: The National Pollutant Discharge Elimination System		X			Governs release of nonradioactive liquids
	40 CFR 141.16, 1989 Safe Drinking Water Act (National Interim Primary Drinking Water Regulations)				X	Sets maximum contaminant levels in public water systems
	40 CFR 191, 1985 Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes				X	Regulates radioactive waste disposal
	40 CFR 261, 1989 Identification and Listing of Hazardous Waste		X			Identifies and lists hazardous wastes
	40 CFR 302.4, 1980 Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA): Designation, Reportable Quantities and Notification	X	X	X	X	Designates hazardous materials, reportable quantities, notification process

Table 3-1. Applicable Regulations and Standards. (2 sheets)

Agency/Originator	Regulation No.	HA	HL	RA	RL	Summary/Application
EPA (continued)	40 CFR 355, 1987 Superfund Amendments and Reauthorization Act of 1986 (SARA): Emergency Planning and Notification	X	X			Identifies threshold planning quantities for extremely hazardous substances
	40 CFR 403-471, 1990 Effluent Guidelines and Standards		X			Sets pretreatment standards for wastewater discharged to Public-Owned Treatment Works (POTW)
American National Standards Institute, (ANSI) New York, New York	N 13.1 - 1969* Guidance to Sampling Airborne Radioactive Materials in Nuclear Facilities			X		Sets standards for effluent monitoring systems
	N 42.18*, 1974 Specification and Performance of On-site Instrumentation for Continuously Monitoring Radioactivity in Effluents			X	X	Recommendations for the selection of instrumentation for the monitoring of radioactive effluents
Washington State Department of Ecology, (Ecology) Olympia, Washington	WAC 173-216, 1989 State Waste Discharge Permit Program		X			Governs discharges to ground and surface waters
	WAC 173-220, 1988 National Pollutant Discharge Elimination system Permit		X		X	Governs wastewater discharges to navigable waterways; controls NPDES permit process
	WAC 173-240, 1990 Submission of Plans and Reports for Construction of Wastewater Facilities		X			Controls release of nonradioactive liquids
	WAC 173-303, 1989 Dangerous Waste Regulations		X			Regulates dangerous wastes; prohibits direct release to soil columns
	WAC 173-400, 1976 General Regulations for Air Pollution Sources	X				Sets emissions standards for hazardous air pollutants
Benton-Franklin Walla-Walla Counties Air Pollution Control Authority, (APCA) Richland, Washington	General Regulation 80-7, 1980	X				Regulates air quality

HA = hazardous airborne.
HL = hazardous liquid.
RA = radioactive airborne.
RL = radioactive liquid.
*Refers to standards that are referenced in the DOE and EPA regulations.

Chapter IV requires an environmental monitoring program for measuring and monitoring effluents from DOE operations and for surveillance through measurement, monitoring, and calculation of the effects on the public and the environment. Since each DOE facility is unique, the specific environmental monitoring program shall be determined for each facility on a case-by-case basis, consistent with regulatory requirements, DOE directives, and the degree of environmental assurance that is required at a particular site.

Chapter IV, Part 4 requires an environmental monitoring plan for each site, facility, or process that uses, generates, or releases significant pollutants or hazardous material.

Part 5 of this chapter identifies the general requirements for effluent monitoring to be conducted and the general program objectives to be achieved to verify compliance with applicable federal, state, and local regulations and DOE orders.

Chapter IV, Part 6 requires a meteorological monitoring program to support the environmental monitoring program activities. This required program is currently conducted by Pacific Northwest Laboratory (PNL).

Chapter IV, Part 7 requires that radiation and radioactive materials discharged from DOE facilities comply with the requirements of 40 CFR Part 61, "National Emission Standards for Hazardous Air Pollutants" (EPA 1989c). The DOE has established standards under the *Atomic Energy Act of 1954* for those radioactive materials not regulated under the *Clean Air Act of 1977*.

Chapter IV, Part 8 requires nonradiological monitoring for air emissions under Section 118 of the *Clean Air Act of 1977* which specifically addresses the control of airborne pollution from federal facilities. An ambient air quality monitoring program may be required during operation but not during standby to determine the highest concentrations where public health or other concerns should be considered.

The monitoring of liquid effluents is required under the *Clean Water Act of 1977* under Section 402, entitled "National Pollution Discharge Elimination System" (NPDES) program. In addition to the NPDES permitted facilities, DOE must satisfy monitoring requirements under RCRA, the applicable regulations under 40 CFR Part 260-280 (EPA 1989d) and Washington State under WAC 173-303 (WAC 1989a).

Chapter IV, Part 9 requires a groundwater monitoring plan to be developed and implemented for DOE activities that do affect or have the potential to affect groundwater quality.

Part 10 of Chapter IV requires a Quality Assurance program consistent with DOE Order 5700.6B (DOE 1990b) and an independent data verification program.

The DOE Order 5400.1 (DOE 1988a) states that the monitoring of nonradiological liquid effluents comes under the requirements of the *Clean Water Act of 1977* for NPDES permits and under RCRA for the monitoring of solid waste, which can be a liquid, under 40 CFR Part 260-280 (EPA 1989d) and/or Washington State dangerous waste rules in WAC 173-303 (EAC 1989a).

3.1.2 Radiation Protection of the Public and the Environment

The purpose of DOE Order 5400.5 (DOE 1990a) is to establish the standards and requirements for facility operations with respect to protection of the members of the public and the environment against undue risk.

Chapter I, Part 5a limits the radiation dose to members of the public to 100 mrem EDE in a year and to the applicable limits of EPA and Washington State regulations. Additional controls on the release of liquid wastes are set by DOE to reduce the potential of radioactive contamination to natural resources, such as land, ground and surface water, and ecosystems.

Chapter I, Parts 8a and 8b, require a demonstration of compliance based on calculations that make use of the information obtained from the monitoring and surveillance program. The ability to detect, quantify, and adequately respond to the unplanned release of radioactive material to the environment also relies on the in-place effluent monitoring, monitoring of the environmental transport, and diffusion conditions and assessment capabilities. The DOE requires analysis of the collected data, analysis of the pertinent information, and a report on any release in a timely manner.

Chapter I, Part 10 requires that calculations of dose to the public from exposures resulting from both routine and unplanned activities be performed by the use of standard EPA and DOE dose conversion factors or analytical models prescribed in the applicable regulations.

It is the policy of DOE to provide a level of protection for persons consuming water from a public drinking water system to meet the standards in 40 CFR Part 141 (EPA 1988a). These systems shall not cause persons consuming water to receive a effective dose of greater than 4 mrem in a single year.

The DOE Order 5400.5 (DOE 1990a) requires that field elements develop an ALARA program to minimize the dose to the public that considers factors such as, maximum dose to the public, collective dose to the population, alternative processes, and the societal costs and impacts.

The DOE Order 5400.5 Chapter II, Part 6 requires that the radiation dose limit for a member of the public be demonstrated by measurements and calculations to evaluate the potential doses.

Chapter II, Part 6, Subpart A states the general requirement for effluent monitoring as part of the environmental monitoring plan prescribed in DOE Order 5400.1 (DOE 1988a). The specific requirement for radiological monitoring, effluent monitoring and environmental surveillance and their respective schedules of implementation are prescribed in the DOE 5400 series which deals with radiological effluent monitoring and environmental surveillance.

Chapter II, Parts 7 and 8 identify the reporting and recordkeeping requirements of DOE Orders 5400.1 (DOE 1988a) and 5484.1 (DOE 1981). These require the notification of the relevant program office and the Deputy Assistant Secretary for Environment of the actual or the potential exposures

of members of the public that could result in an EDE of greater than 10 mrem in a year or not meeting any other requirement specified in the order or any other legally applicable limit.

3.1.3 Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance, DOE/EH-0173T (DOE/EH 1991)

The purpose of the regulatory guide is to specify the necessary elements for effluent monitoring and environmental surveillance of radioactive materials at DOE facilities for compliance with both applicable federal regulations and DOE policy.

Section 1.1.1 requires that all DOE sites develop and maintain documentation concerning their environmental protection programs in the form of environmental monitoring plans. These required plans shall clearly describe how the regulatory guide's minimum requirements will be met and how the compliance will be ensured.

Section 2.0, which covers liquid effluent monitoring, states that all liquid effluent streams from DOE facilities be evaluated and their potential for release of radionuclides be assessed. The results of the assessment provides the basis for the FEMP and is documented in the site environmental monitoring plan to show:

- Effluent monitoring locations used for providing the quantitative effluent release data for each outfall
- Procedures and equipment used to perform the extraction and measurement
- Frequency and analysis required for each extraction and or sampling location
- Minimum detection level and accuracy
- Quality assurance components
- Effluent outfall alarm settings and bases.

Section 2.2 recommends that the system performance consider the following:

- The selection or modification of a liquid effluent monitoring system shall be based on a careful characterization of the sources, pollutants, sample collection system, and final release points.
- The standard further recommends that for continuous effluent monitoring/sampling, all the data received should be used when performing statistical analyses.

- When it is not technically feasible to monitor continuously, continuous proportional sampling and analyses can be used as an alternative to continuous monitoring.

- Continuous monitoring and sampling systems shall be calibrated before use, and recalibrated any time they are subject to maintenance, modification or system changes that may affect equipment calibration. As a minimum, the system shall be recalibrated annually and routinely checked with known sources to demonstrate that the system is functioning properly.

The general design criteria that should be considered when operating a liquid effluent sampling system are:

- The location of the sampling and monitoring systems

- Use of a pump in areas where it is necessary to provide a uniform continuous flow in the main sample line

- A redundant sample collection system of one of the following alternatives to permit continued sampling during replacement or servicing:

  - Substitute sample transport system

  - Capability for rapid shutdown for repairs

  - An alternate method for estimating releases when the system does not operate.

- Location of sample ports in liquid effluent lines sufficiently downstream from the last feeder line to allow complete mixing of liquid and design of the sample port to allow intake of a proportional part of the liquid effluent stream

- Capability to determine the effluent stream and sample-line flows within an accuracy of ±10%

- Design the system to minimize deformation and sedimentation and to prevent freezing of sample effluent lines.

When batch tanks are used to collect liquid effluents prior to their release to the environment, three factors should be considered:

- Recirculating tank lines to assure representative sample

- Sedimentation or sludge formation

- Adequate mixing of the sample volume to ensure the tanks are homogeneous.

Section 3.0, which covers airborne effluent monitoring, requires that all airborne emissions from DOE facilities be evaluated and their potential for

release be assessed and evaluated. The results of the evaluation should provide the basis for the site's airborne effluent monitoring plan to show the following:

- Effluent monitoring extraction locations
- Procedures and equipment
- Frequency and analyses
- Minimum detection level and accuracy
- Quality assurance concerns
- Investigations
- Alarm levels.

The criteria listed in Table 3-2, are used to establish the airborne emission monitoring program for DOE controlled sites. The Table 3-2 criteria are based on the projected EDE (mrem) in 1 yr to a member of the public. The guide states that the airborne monitoring program should be commensurate with the importance of the sources during routine operation and from potential accidents with respect to their contribution to the public dose or contamination to the environment.

The following is a summary of other agencies effluent monitoring criteria. The referenced documents shall be consulted as necessary.

3.2 U.S. ENVIRONMENTAL PROTECTION AGENCY REGULATORY REQUIREMENTS FOR EFFLUENT MONITORING

3.2.1 National Emission Standards for Radionuclide Emissions from U.S. Department of Energy Facilities

Air emission monitoring and reporting is not required for the 300 Area N Reactor Fuel Fabrication Facilities under 40 CFR Part 61 Subpart H, "National Emissions Standards for Emission of Radionuclides" (EPA 1989c) from DOE facilities because all the ventilation in the fuels area has been secured and isolated.

Complete details of this EPA regulation are found in 40 CFR Subpart H 61.90-61.96.

3.2.2 U.S. Environmental Protection Agency National Pollution Discharge Elimination System Permit Requirements

The monitoring of nonradioactive liquid effluents from the 300 Area is required by the *Clean Water Act of 1977* under the NPDES. The requirements for the NPDES permit are in the permit itself and contained in 40 CFR Part 423 (EPA 1990a). However, the liquid effluent from Buildings 313 and 333 does not require a separate NPDES permit because they terminate in the process sewer which does not discharge directly to the Columbia River.

Table 3-2. Regulation Guide Table.

Calculated maximum dose from emissions in a year to members of the public H_E mrem (EDE)	Minimum emission monitoring criteria*
$H_E \geq 1$	(1) Continuously monitor emission points that could contribute ≥0.1 mrem/yr. (2) Identify radionuclides that contribute ≥ 10% of the dose. (3) Determine accuracy of results (±% accuracy and % confidence level). (4) Conduct a confirmatory environmental survey annually. or Monitor at the receptor: (1) Continuously sample air at the receptor. (2) Collect and measure radionuclides contributing ≥ 1 mrem EDE above background. (3) Establish sampler density sufficient to estimate dose to critical receptor given typical variability of meteorological conditions. (4) Obtain prior approval from EPA.
$0.1 < H_E < 1$	(1) Continuously monitor emission points that could contribute ≥ 0.1 mrem/yr. (2) Identify radionuclides that contribute 10% or more of the dose. (3) Conduct confirmatory effluent monitoring at emission points where possible. (4) Conduct a confirmatory environmental survey every few years.
$H_E < 0.1$	(1) Take periodic confirmatory measurement. (2) Test to determine need to monitor by calculating dose (H_E) for normal operation, assuming that the emission controls are inoperative. (3) Conduct a confirmatory environmental survey at least every 5 yr.

*Permission for the use of alternative criteria may be obtained through EH, who will coordinate the request with EPA headquarters to obtain EPA concurrence, where applicable. Coordination with EPA regional offices should be accomplished through DOE Program Office authority.

3.2.3 U.S. Environmental Protection Agency Reportable Quantities Under 40 Code of Federal Regulations Part 302

The *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) identifies the reportable quantities for hazardous substances and sets forth the notification requirements for the release of these substances. This regulation identifies and lists reportable quantities for hazardous substances designated under Section 311(b)(2)(A) of the *Clean Water Act of 1977*.

3.3 WASHINGTON STATE REGULATORY REQUIREMENTS

The Washington State has regulatory requirements for the emission of radionuclides under the "Ambient Air Quality Standard and Emission Limits for Radionuclides" in WAC-173-480 (WAC 1986). The state has regulatory authority for water quality standards for groundwater under WAC-173-200 (WAC 1987) and has regulatory authority for hazardous wastes in its *Dangerous Waste Regulations* in WAC-173-303 (WAC 1989a).

3.3.1 Ambient Air Quality Standard and Emission Limits for Radionuclides Under WAC 173-480 (WAC 1986)

The purpose of this administrative rule is to define the maximum allowable levels of radionuclides in the ambient air and to control emissions from specific sources.

The most significant part of the state's radionuclide emission rules in WAC 173-480-060 (WAC 1986) with respect to the Hanford Site is WAC 173-480-060(2). The rule states that the addition to, enlargement, modification, replacement, and/or alteration of any process or emission unit or the replacement of air pollution control equipment which will significantly change potential radionuclide emissions or significantly change the dose equivalent will require the proposed project to utilize the best available radionuclide control technology.

The WAC 173-480-070 (WAC 1986) "Emission Monitoring and Compliance Procedures" requires that the dose equivalents to members of the public shall be calculated using the Department of Social and Health Services-approved sampling procedures, Department of Social and Health Services-approved models or other approved procedures. Compliance with this standard shall be determined by calculating the dose to members of the public at a point of maximum annual air concentrations in an unrestricted area where a member of the public may be located.

3.3.2 Water Quality Standards for Groundwater Under WAC 173-200 (WAC 1987)

The Washington State standards for groundwater apply to all groundwaters of the state that occur in a saturated zone or stratum beneath the surface of

land or below a body of surface water. The goal of the state's regulations is to maintain the highest quality of the state's groundwater and to protect it for existing and future uses.

Under WAC 173-200-040 (WAC 1987), the state has developed maximum contaminant concentrations for the protection of the groundwater for a variety of beneficial uses. The state has determined that drinking water is the beneficial use generally requiring the highest quality of groundwater.

Groundwater concentration limits shall not exceed the values stated for the specific contaminants found in WAC 173-200-050, Table 1, Groundwater Quality Criteria (WAC 1987).

3.3.3 Dangerous Waste Regulations Under WAC 173-303 (WAC 1989a)

Westinghouse Hanford operates facilities in the 100, 200 East, 200 West, 300, 400, and 1100 Areas. The areas comply with the *Dangerous Waste Regulations* and annually provides effluent monitoring reports for those areas.

Westinghouse Hanford monitors the airborne and liquid effluent release paths in the 300 Area for a variety of contaminants. The Fuels Fabrication Facility is not monitored for airborne effluents because they are in cold shutdown.

The liquid discharges from the 300 Area Fuels Fabrication Facility has essentially been eliminated since it ceased operation in 1987 and was placed in cold shutdown in 1989. Table 8-3 lists the materials discharged to the process sewer since 1986.

3.4 BENTON-FRANKLIN-WALLA WALLA COUNTIES AIR POLLUTION CONTROL AUTHORITY

3.4.1 General Regulation

The Benton-Franklin-Walla Walla Counties Air Pollution Control Authority under Chapter 70.94 Revised Code of Washington (RCW) (RCW 1974), is charged with responsibilities for the conduct of a regional program of air pollution, prevention and control. Section 400-100, Registrations and General Reporting, list the source categories that must be registered with the Air Pollution Control Authority. Because the 300 Area Fuel Fabrication Facilities are shut down and the ventilation systems isolated, thereby removing the pollutant source, this regulation does not apply.

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4.0 IDENTIFICATION AND CHARACTERIZATION OF EFFLUENT STREAMS

During operations, the 300 Area N Fuels Fabrication Facilities released radionuclides and nonradioactive chemicals to the air and water environment. Since the facilities were placed on standby in January 1987 and the engineering development work ended in September 1990, there have been no airborne emissions. However, there remains the potential for liquid effluents containing uranium and hazardous waste and the potential that liquid effluents may enter the process sewer from cooling water from air conditioning, storm runoff, steam condensate and cleaning solutions.

Liquid effluents from the facilities 313 and 333 Buildings occur intermittently and may contain low levels of uranium. These effluent streams discharge to the process sewer.

4.1 RADIONUCLIDE EFFLUENT RELEASES

The 300 Area Fuel Facility, prior to January 1987, released airborne radionuclides from the Extrusion Press-Cut Off Saw Exhaust located in the 333 Building. The radionuclides released to the atmosphere were: ^{99}Tc and $^{234,235,238}U$. The annual airborne releases when the facilities operated were in the order of 0.1 to 0.4 mCi.

The 300 Area liquid releases containing radionuclides originated in the 303-M, 313, and 333 Buildings and flowed into the process sewer. The radionuclides released were primarily the isotopes of uranium. In 1985 and 1986 during plant operation, 440 and 400 lb respectively, of dissolved uranium were released to the process sewer.

In January 1987 the 300 Area Fuel Facility was shut down and the emission of airborne radioactivity ceased. However, the release of uranium to the process sewer continued, decreasing significantly each year from 1987 to 1990 as shown in Table 1-1. The release of dissolved uranium to the process sewer in 1990 was only 0.04 lb versus 400 lb the last year the facility operated.

The potential release of liquid effluents containing radionuclides to the process sewer can still occur by way of storm water carrying uranium contamination to the process sewer. Uranium contamination may be carried to the process sewer as a result of water or liquids being used in the plant and being discharged to the process sewer with the dissolved uranium being leached from pipe joints and cracks in the system.

4.2 NONRADIOACTIVE CHEMICAL EFFLUENT RELEASES

Nonradioactive chemicals were released to the atmosphere and to the process sewer during operation from the 300 Area Fuels Facility. However, with the closure of the N Fuels Fabrication Facility, the discharge of airborne effluents and the liquid effluents are intermittent.

The atmospheric releases were nitrous oxides released from the Chemical Bay Exhaust. The release of nitrous oxides ended in September 1990 when engineering development work ceased.

The release of nonradioactive chemicals to the process sewer originated from the 303-M Uranium Oxide facility, the 313-N Fuels Manufacturing Support Facility, and the 333 N Fuels Manufacturing Facility. The discharges of liquids from routine operations has ended and the discharges are now intermittent from water, air conditioning, and cleanup.

The chemicals released to the process sewer from 1956 through 1989 were acids and bases, as well as nitrate ions, fluorides and copper. The release of these chemicals ended in spring of 1990, Table 1-1.

There remains in the fuels complex hazardous material and some hazardous waste that is stored in the facilities, as shown in Table 1-2; however, there is very little potential that these materials will enter the liquid effluent stream.

4.2.1 Summary of Effluent Components

The release of uranium to the air ended in January 1987 with the closure of the 300 Area Fuel Fabrication Facility. The release of nonradioactive chemicals to the air ceased in September 1990 with the end of engineering development work in the chemical bays. The release of dissolved uranium to the process sewer from routine discharges ceased in March 1989 and the release of acids, bases, nitrate, nitrite, fluoride, and copper ended in September 1990.

4.3 AIRBORNE EFFLUENT RELEASE STREAMS

No airborne effluent streams have been identified.

4.4 LIQUID EFFLUENT RELEASE STREAMS

There are two main liquid effluent release points from the 300 Area Fuels Fabrication Facility. The liquid effluents from the N Fuels Fabrication Facility come from two main sources, the 313 and the 333 Buildings. There is a process sewer from each of these buildings, which run into the main 300 Area process sewer, which discharges to the process trenches. These sections of the process sewer are described in Section 5.2.

4.4.1 313 Process Sewer

The 313 Building is served by one branch of the process sewer. The source of the liquid effluents is primarily the 313 Building. It also is the process sewer for the 303-F and 3716 Buildings, the 311 Tank Farm and the pipe trenches west of the railroad tracks. The chemical area contains many of the effluent collection tanks and chemical holding and mixing tanks. This branch is monitored from the 334 Building.

4.4.2 333 Process Sewer

The 333 Building is served by another branch of the process sewer. The source for effluents to this sewer include the 333, 303-M, 334, 334-A, and 3720 Buildings. The primary source for this branch are the chemical processing tanks in the 333 Building, 3720 Building of PNL, the 334 Tank Farms and the pipe trenches east of the railroad tracks. The sources for these effluents included leakage of tanks and pumps, dripping of contents being transferred between tanks, and overflow of tank contents. This process is no longer in use and the systems are currently dry. This branch of the sewer is also monitored at the 334 Building. The water used to monitor this sewer is returned to the 333 sewer along with the water used to monitor the 313 process sewer branch upstream of the sampling point. The PNL activities in 3720 Building are still in operation.

4.4.3 311 Tank Farms

The 311 Tank Farm contains five tanks. Tank 40 is a 4,000-gal stainless steel tank that was installed in 1953 and was used for the storage of nitric acid until 1973 when it was converted to neutralized waste storage. Tank 40 was last used in 1989 and is currently empty and is awaiting tank clean-out. Tank 50 is a 5,000-gal stainless steel tank and was installed in November 1985 to store neutralized waste before shipment and has been occasionally used for decanting wastes when the centrifuge was out of service. The 311 Tank Farm also contains a nitric acid tank and two sodium hydroxide storage tanks.

Tank 40 is empty and Tank 50 contains 1,100 gal of neutralized waste (pH 10.2). The nitric acid tank is empty and awaiting cleaning. The two sodium hydroxide tanks contain 10,600 gal of 50% sodium hydroxide.

The tank valves in the 311 Tank Farm are closed, the area is bermed, and there is a conductivity leak detection system. If liquids are found in the berm after a rainfall, the pH is checked before release to the process sewer.

4.4.4 313 N Fuels Manufacturing Support Facility

The 313 Building contains the Extrusion Press, a chemical treatment bay, Extrusion Treatment, two laboratories, known as the Hot Laboratory and the Engineering Development Laboratory (EDL), the WATS, a Radon Counting Laboratory, and offices for the supporting staff and management. As of December 19, 1990 the only two areas still in use are: the two engineering laboratories and the Radon Counting Laboratory. The training area and offices continue to be used by Westinghouse Hanford personnel.

Liquid effluents are no longer routinely discharged from this facility. However, there is still a potential for liquids to enter the process trench from cooling water from air conditioning, steam condensate, drinking fountains, cleaning, and storm water.

4.4.5 Pipe Trenches

Pipe trenches are located in the 333 Building. These trenches carried liquid wastes to the process sewer and ultimately dumped into the process trench which is adjacent to the Columbia River. A pipe trench extends from the 334 Tank Farm on the east side of the 333 Building, through the 333 Building, to the 311 Tank Farm, through the 303-F Building and up to the 313 Building. It was used to hold piping to the following:

- Supply sulfuric and nitric acid to the 333 Building from the 334 Tank Farm
- Supply nitric acid and sodium hydroxide to the 313 Building from the 311 Tank Farm
- Transfer waste acids from the 333 Building to the 334-A Building for storage
- Transfer waste acids from the 334-A and 333 Buildings to the 313 Building for treatment
- Transfer treated waste from the 313 Building to the 311 Tank Farm.

On the east side of the railroad tracks the pipe trench drains into the 333 process sewer. On the west side of the tracks the pipe trench is in a bermed area with leak detection systems.

All of the acid-bearing piping is empty and the caustic and treated waste piping is within the bermed area.

The only routine liquids entering the pipe trench and reaching the process sewer are storm runoff and the 334 Building sewer sampling system discharge.

The pipe trenches are no longer in use with the exception of the sampling liquid in the 334 Building.

4.4.6 French Drains

Storm water runoff from the roadways and rooftops from the 300 Area facilities is collected into French drains. French drains are located at various locations in the 300 Fuels Area. For example, one French drain is located north of the 333 Building and another is located north of the 313 Building. The runoff to the French drains is currently not monitored.

5.0 EFFLUENT RELEASE POINT DESCRIPTION

5.1 AIR RELEASE POINTS

All process related airborne effluent release points in the N Fuels Fabrication Facility have ceased operation. The facility discontinued emissions to the air in September 1990. A detailed description of the airborne effluent release points can be found in the 300 Area N Fuels Fabrication Facility FEMP Determination. There are no longer any active airborne effluent discharge points for the 300 Area Fuels Fabrication Facility.

5.2 LIQUID EFFLUENT RELEASE POINTS

There are two liquid effluent release points from the N Fuels Fabrication Facility. These two release points are the process sewers from the 313 and 333 Buildings. These two release pathways have continuous composite samplers; however, they are unable to function at the low flows currently being discharged. A detailed description appears in Sections 5.2.1 and 5.2.2.

5.2.1 313 Building Process Sewer

The 313 Building is shown in Figure 5-1. A full description of the activities which occurred in this building can be found in Section 2.2. The process sewer is the liquid drain from this building. The storage ares and Engineering Development Laboratory have floor trenches that discharged directly into the process sewer. There are no routine discharges, and the trenches are scheduled to be filled with concrete in fiscal year 1992. There is no access to the process sewer from the bermed areas in the waste treatment facility. A typical interior process sewer trench, with the cover grating in place, is shown in Figure 5-2 (the trench shown is in the 333 Building). These liquids collected in a sump in the building. When the sump reached a preset level, a pump activated and pumped the liquid to the exterior process sewer trench. The liquids that enter the process sewer are sampled at the 334 Building, shown in Figure 5-3.

5.2.2 333 Building Process Sewer

The 333 Building is shown in Figure 5-4. This building housed most of the N Reactor fuel fabrication activities. The Fuel Fabrication Facility, used a variety of mechanical, chemical and electrical processes in the conversion of uranium billets and assorted components into finished fuel assemblies for irradiation at N Reactor. A full description of the processes which went on in this building can be found in Section 2.2. The process sewer is the liquid drain from this building. Within the building most of the work areas were provide with the capability to drain liquids which were spilled during the course of routine operations. This spills drained across the floor until they reached the process sewer trenches within the building.

Figure 5-1. 313 N Fuels Manufacturing Support Facility.

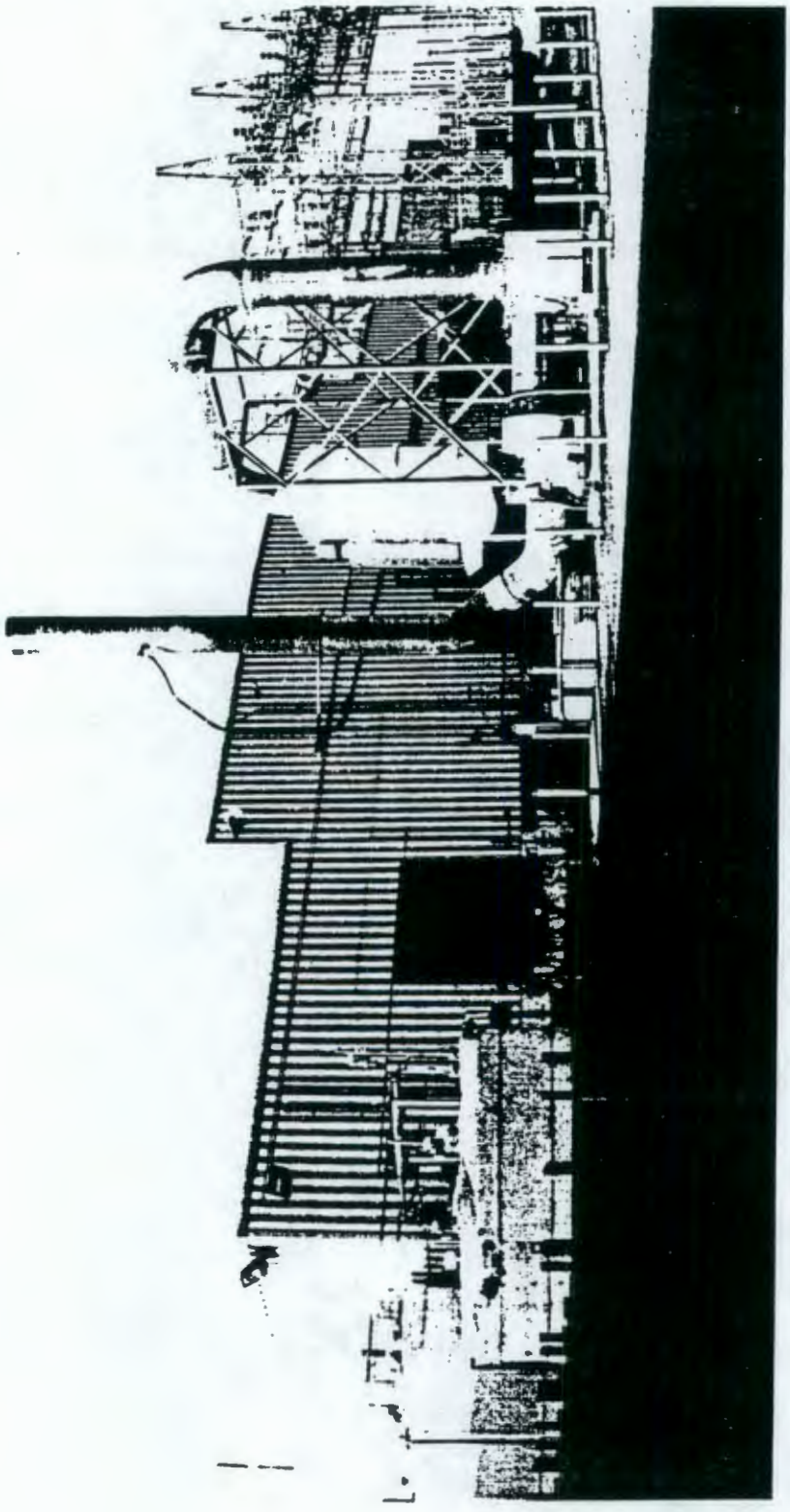


Figure 5-2. Typical Building Floor Trench.

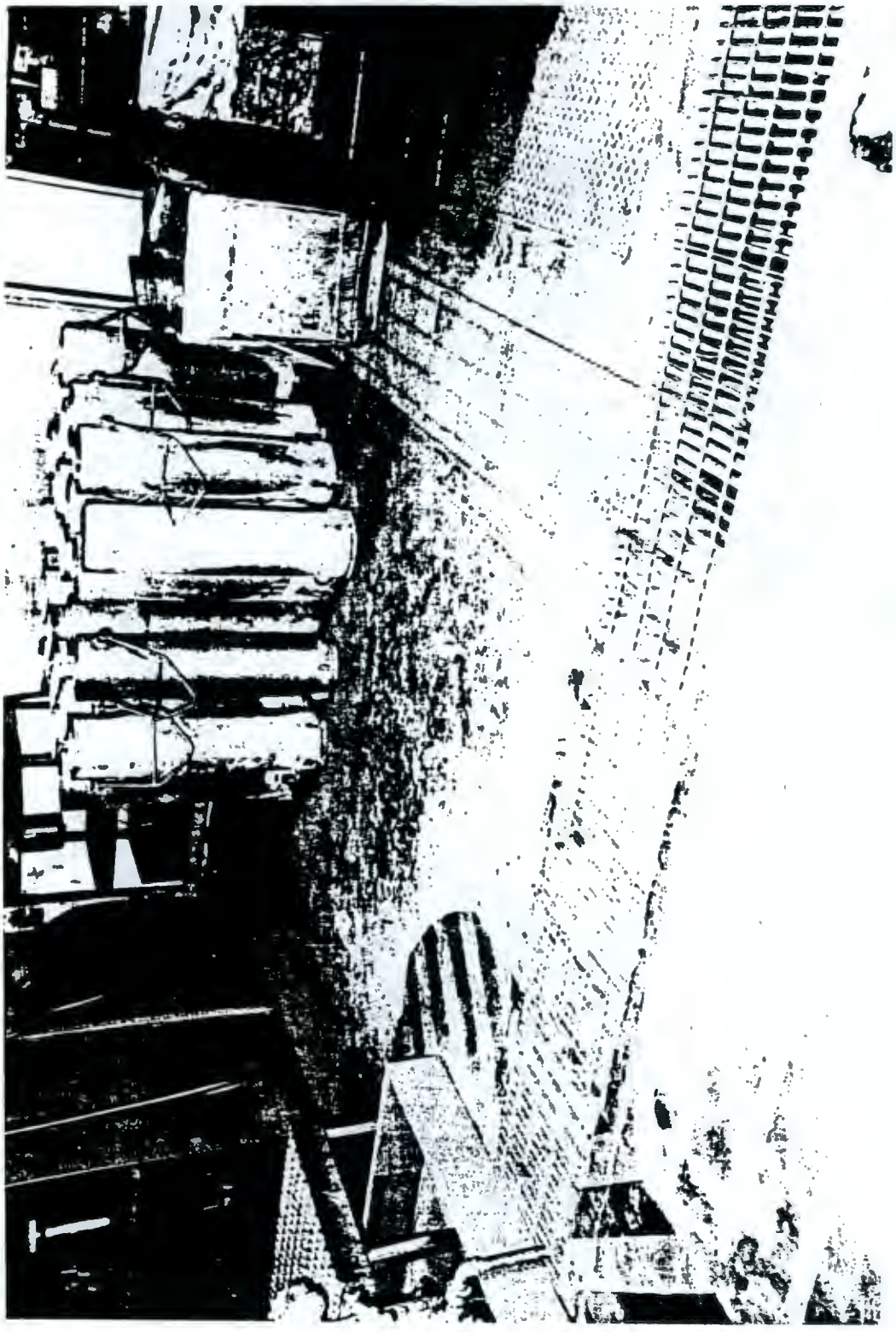


Figure 5-3. 334 Process Sewer Monitoring Facility.

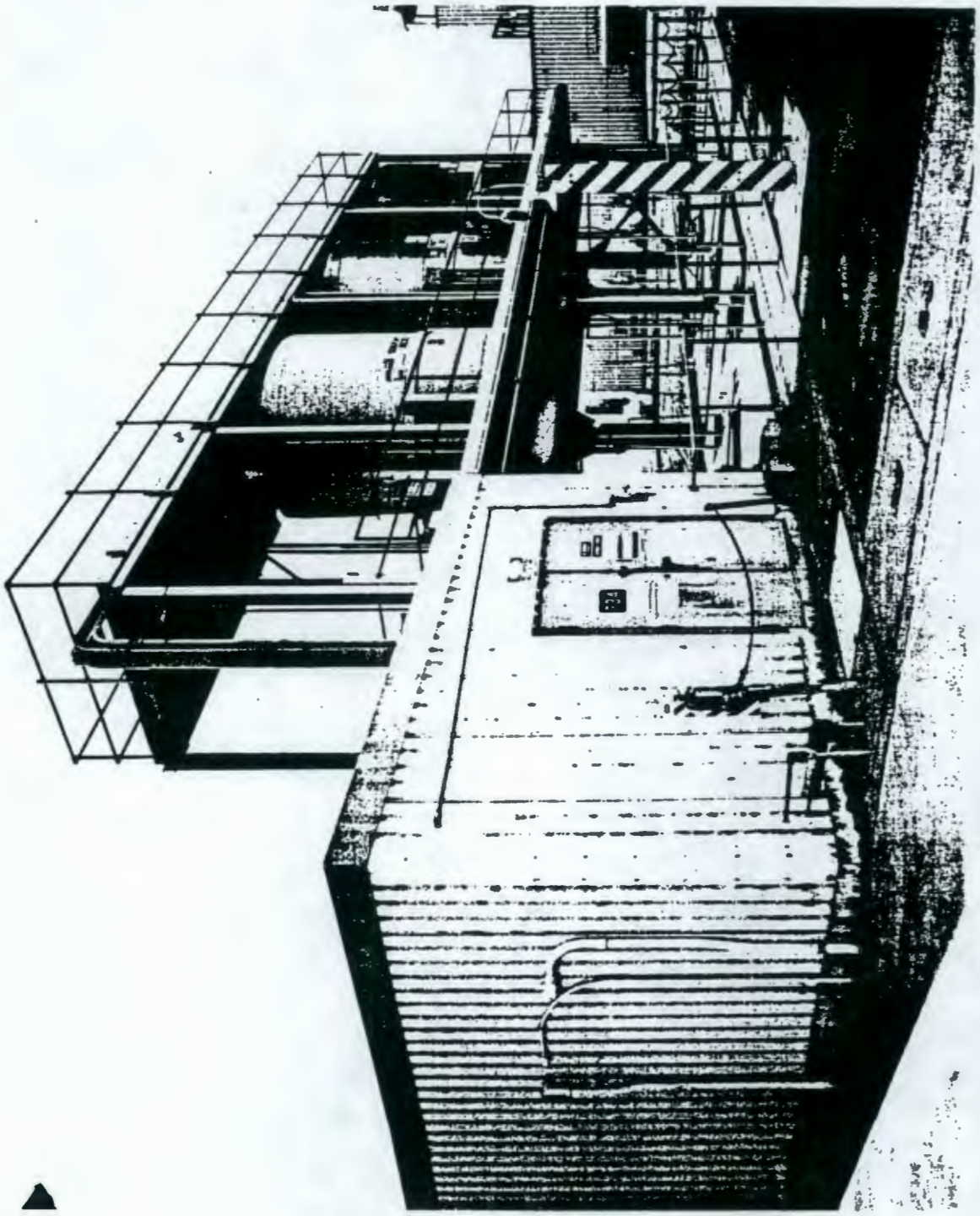
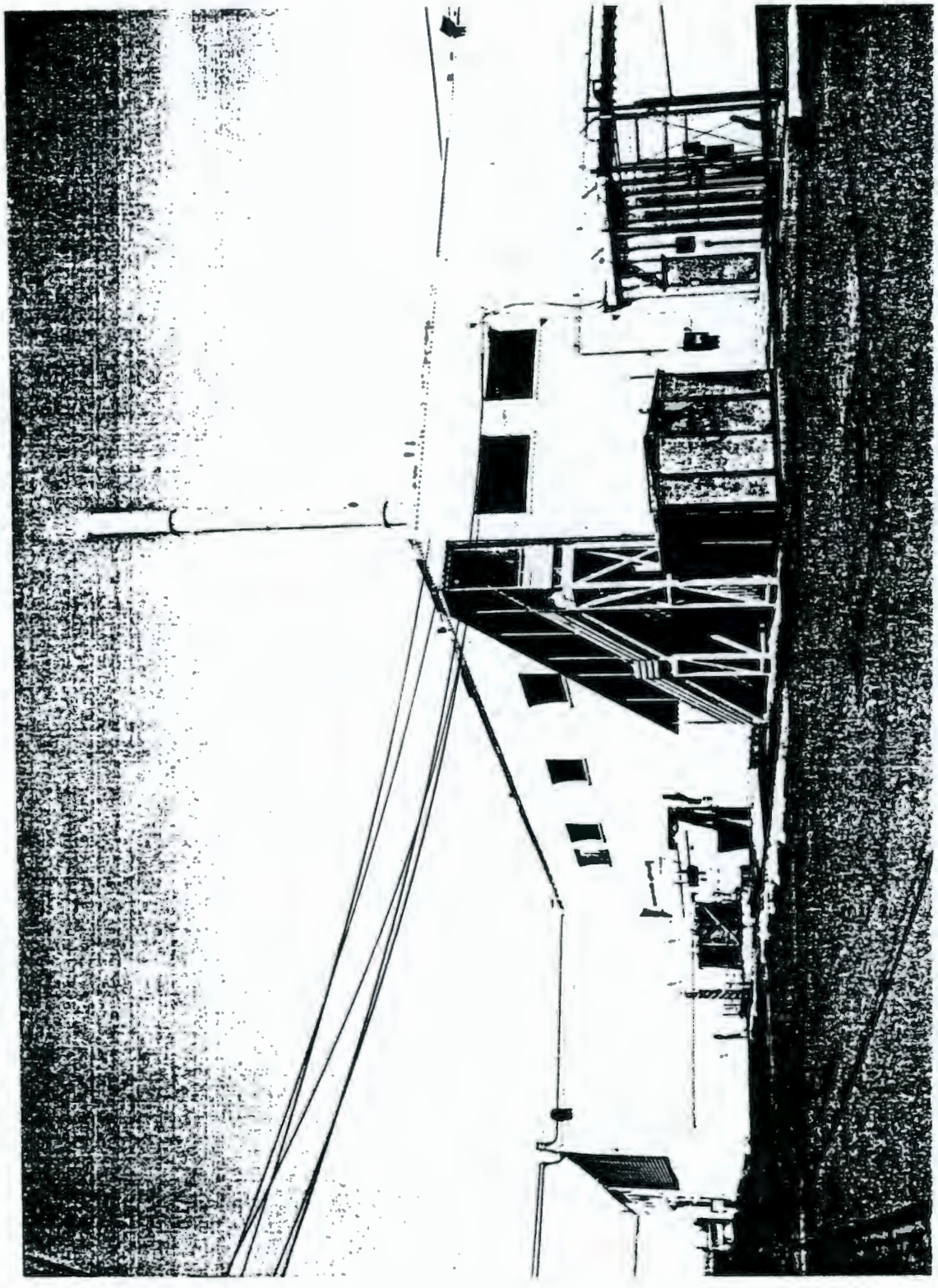


Figure 5-4. 333 N Fuels Manufacturing Facility.



A view of an exterior process sewer trench, with its cover in place, is shown in Figure 5-5. This view is typical of the process sewer trenches from both buildings.

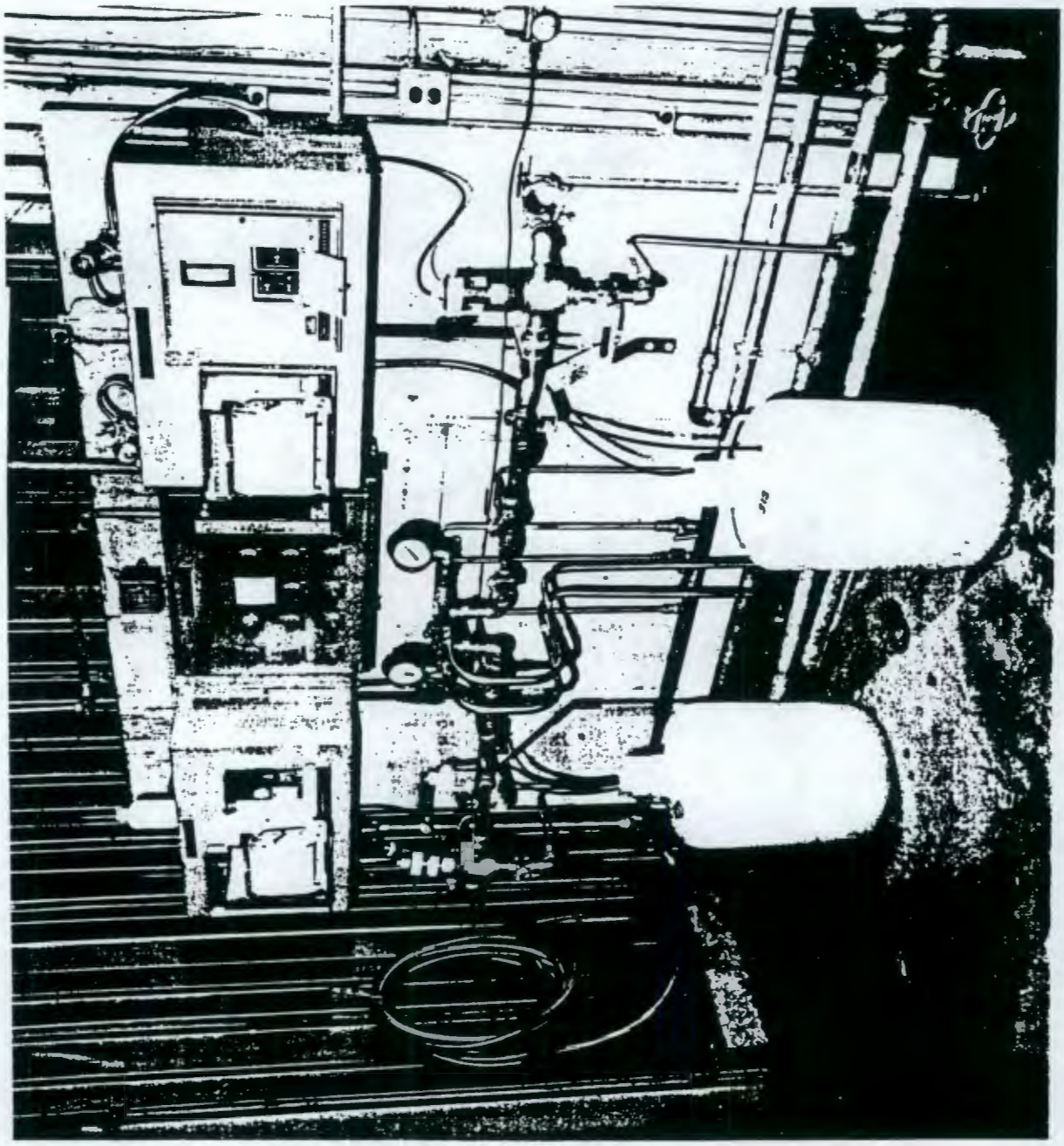
The process trenches also provided a space for running piping required by many of the processes. This provided an opportunity to lay the piping without interfering with work space and causing a hazard. The process trenches on the west side of the railroad tracks provided for containing any liquids which may have leaked from the piping. On the east side of the railroad tracks the pipe trench drains into the 333 process sewer.

The process sewers are sampled at the 334 Building. A full description of this building can be found in Section 2.8. There are two monitoring stations in this building. These stations can be seen in Figure 5-6. Each monitoring station is equipped with an off-line sampling system consisting of a water eductor and sequential sampler to take weekly samples for chemical analysis and a pH meter with high- and low-level alarms. This alarm is connected to horns and red lights in both the 334 and 333 Buildings.

Due to the extremely low flows in the process sewers, off-line monitoring system is currently inoperative. The intakes for the monitoring stations do not reach the water in the sewer. A weir or dam is necessary for the water to deepen enough to monitor the effluent stream and the current off-line system will have to be replaced with a much simpler system. This weir will not interfere with the flow of the effluent stream, but will provide the capability to once again obtain representative samples of the stream.

Figure 5-5. Typical Exterior Process Sewer Trench.

Figure 5-6. Process Sewer Sampling Stations.



6.0 N FUELS FABRICATION FACILITY EFFLUENT MONITORING/SAMPLING SYSTEM DESIGN

N Fuels Fabrication Facility liquid effluents are routinely sampled to obtain the data necessary for determining regulatory compliance. Liquid effluent streams with the potential for containing contaminants are sampled for radioactivity, pollutants and other hazardous material.

6.1 AIRBORNE EMISSION SAMPLING SYSTEM DESIGN

Currently, there are no airborne emissions from the N Fuels Fabrication Facility; therefore, there is no airborne sampling equipment in operation.

6.2 LIQUID EFFLUENT SAMPLING SYSTEM DESIGN

There is one liquid effluent sampling system in use at the N Fuels Fabrication Facility. This system draws water from the 313 Building process sewer and the 333 Building process sewer. An eductor draws water from the building process sewers into the 334 Building. A small aliquot is drawn from the educted stream. The stream passes through a continuous pH recorder. The sample is collected on a weekly basis or until a 20-L sample has been collected. The collected water is removed for analysis. The streams from the eductors are returned to the 333 process sewer upstream from the location at which they are drawn to assure that any contamination of pH problems, which may be caused by the sampling system are detected.

A complete listing of the physical dimensions and equipment installed at each effluent monitoring point is given in Section 16.3, Release Point Specifications.

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7.0 300 AREA FUELS FABRICATION EFFLUENT MONITORING

Liquid effluents are monitored for the 333 Fuels Fabrication Building and the 313 Fuels Fabrication Support Building and their associated facilities. The 333 process sewer sampler will detect chemical discharges from the following areas: 333, 334, 334-A, 303-M, 3720 (PNL) Buildings; the 334 Tank Farm and the pipe trenches east of the railroad tracks. The 313 process sewer sampler will detect chemical discharges from the following areas: 313, 303-F, and 3716 Buildings; the 311 Tank Farm and the pipe trenches west of the railroad tracks. To monitor the pH in the process sewers, process water flows through eductors and the eductors suck water from the process sewers through a pH meter. The effluent is passed though separate pH meters and sampling systems. Each meter has a continuous strip chart recorder. After the water has passed through the monitoring system it is returned to the 333 process sewer, upstream from where the sample is are drawn. There are no chemicals directly associated with this facility. The 334 Building has only one release point. The sampled water and eductor water used in the pH monitoring process is released to a trench, which drains to the 333 process sewer. The review of the pH monitoring data for 1989 and 1990 showed that the instantaneous values from the recorders do not show a pH below 2.0 or above 12.5 from N Fuels Fabrication processes. However, the charts did show instantaneous high pH values as a result of PNL's activities in the 3720 Building. A review of the weekly average pH records of the liquids released to the process sewer showed that the pH has not gone below 6.8 or above 8.5 in the last 2 yr.

This system currently does not function reliably due to the low volumes being discharged from 300 Area Fuels Fabrication Facility.

Uranium sampling is required because of residual uranium fines left in areas of the 313 and 333 Buildings. There is concern that water may wash these fines into the concrete trenches and then into the process sewer trenches. These trenches then flow into the 300 Area Process Trenches. The 300 Area trenches are monitored for radioactivity by compositing weekly. The water is normally sampled for radioactivity (minimum detection limits: 20 pCi/L alpha and 40 pCi/L beta) and a broad spectrum of heavy metals.

A network of 10 close-in automatic sampling stations were installed on the various legs of the process sewer system during 1988. This system is no longer operational.

One source of water is the air conditioners for the 333 and 313 Buildings. The water used is single pass; therefore, nearly a 1 Mgal of water is used annually. Also rainwater can drain into the trenches from the outside areas.

One source of possible uranium in-leakage is also cracks in the trenches. Uranium present in the cracks when the facility was operational may have leached from the cracks at a later time if acid solutions are present.

The current sampler is not adequate and a replacement should be considered.

7.1 INSTRUMENT DESCRIPTION

7.1.1 Air Sampling Equipment

No air sampling equipment is in use and there are no potential airborne releases at the present time.

7.1.2 Liquid Sampling Equipment

The water sampling equipment is located in two man holes and monitored in the 334 Building. Each separate trench is sampled for pH on a continuous basis. There is a pH meter for each trench and each has a strip chart recorder. There are also 5-gal carboys under each sampler with two tubes (about 0.25 in. in diameter) leading to them. The large sampling pipes (about 1 in. in diameter) have windows in them. The windows are approximately half full. There is evidently not enough water running through the trenches to adequately sample for dissolved uranium. A dam or weir needs to be built to increase the water depth so an aliquot sampler could be used.

Presently, the compositing component diverts a small aliquot from the stream. The aliquots are collected in the sample bottle and the size of the aliquot adjusted to assure the proper sample size for the required monitoring frequency.

7.2 INSTRUMENT SPECIFICATIONS

Detailed instrument and physical dimensions of effluent release points are given in Section 16.3.

7.2.1 Liquid Flow Monitoring Equipment

The outfall is not currently equipped with instrumentation that will determine the total flow. The installation of the dam or weir to enhance sampling capability will provide for flow monitoring capability. The sampler has instrumentation for determining the flow rate and computing the proportional sample to be taken from the liquid effluent.

7.2.2 Sample Collection Equipment

Sample collection equipment provides representative samples from the trenches and sampling lines/equipment are constructed from materials that will not contribute to contamination, react with any possible constituents, or in any other way degrade the integrity of the sample.

7.2.3 Calibration Requirements

Current procedure requires instrument calibration annually. Instrument calibrations are performed in accordance with Westinghouse Hanford procedures

and American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME) standards. Laboratory instruments are calibrated in accordance with the laboratory quality assurance QA requirements.

7.3 ALTERNATE MONITORING AND ASSESSMENT METHODS

7.3.1 Alternate Liquid Effluent Monitoring and Assessment Method

The liquid effluent sampling system consists of continuous composite samplers and grab samples. Flow of the liquid effluent discharge is monitored by a continuous flow recorder. The continuous composite sampler samples the effluent discharge stream prior to discharge.

In the event that the continuous composite samplers fails, grab samples would be taken daily and composited until the automatic samplers can be repaired. If the flow totalizers fails on the smaller discharges, spares are readily available and the totalizers will be immediately replaced.

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8.0 HISTORICAL MONITORING/SAMPLING DATA FOR EFFLUENT STREAMS

8.1 NORMAL CONDITIONS

The 313 Fuels Fabrication building was constructed in the 1940's and was used to manufacture fuel for the eight single-pass production reactors. The production of B Reactor and D Reactor fuel began in June 1944. The 313 Fuels Fabrication Building eventually provided support to all nine production reactors. The production of single-pass reactor fuel ended in 1971. The 333 Building fuels fabrication facility began producing N Reactor fuel in 1961. Both facilities ceased production of N Reactor fuel in December of 1986. They are currently in the cold shutdown mode.

Since 1986 the Fuels Fabrication Facility has been eliminating possible effluent release points and the potential effluents that may be released. The release of airborne radioactivity ceased in 1986. The EDL continued to release NO_x until it ceased operation in 1990.

The data listed in Tables 8-1 and 8-2 reflect the yearly radiological and nonradiological airborne effluent releases from the 300 Area Fuels Fabrication Facility. This data represents information collected during the last year of fuels fabrication and is representative of previous years operational data.

The average flow rate for the cut-off saw exhaust and the 333 Building chemical bay exhaust was 3,800 ft^3/min and 27,000 ft^3/min respectively. The average liquid effluent flow rate to the trenches from all the fuels fabrication facilities was 430 gal/min. Presently, there are no operations occurring in the fuels fabrication facility that would cause airborne effluents to be discharged to the environment. The current estimate of the liquids flowing from the 313, 333, and 334 Buildings is 2.5 gal/min, 2.1 gal/min and 4.0 gal/min, respectively. This liquid is primarily from water from the building cooling system, steam condensate, and the 334 Building water eductors.

Table 1-1 summarizes the airborne and liquid effluent releases for the 300 Area Fuels Fabrication Facilities from 1986 to August 1990.

8.2 UPSET CONDITIONS

A review of the known spills that have occurred in Buildings 313 and 333 that are listed in DOE/RL-90-11, Revision 0, *Waste Acid Treatment Closure Plan* (DOE/RL 1990), does not indicate that a previous upset condition will have an impact in these buildings especially during shutdown.

The continuous removal of material and isolating components since 1986 from the fuels fabrication facility continue to reduce the risk of a creditable upset condition. Therefore, this subsection (upset conditions) of the 300 Area Fuels Fabrication Facility FEMP is considered to be nonapplicable.

Table 8-1. 300 Area Fuel Fabrication Facility 1986 Airborne Radiological Environmental Releases.

Isotope	CI	Monitor type[1]	Sample point	MDA		Concentration		Type of analysis
				Ins.	Analytical	Average[2]	High[3]	
^{99}Tc	2.0 E-04	Continuous Isokentic	Stack Stack	NA	1.3 E-15 $\mu C/cm^3$ gross alpha	100 μCi Total for Year	NA	Alpha and beta
^{234}U	6.1 E-05	Gelman glass	Stack Stack		3 E-15 $\mu C/cm^3$ gross beta			
^{235}U	4.8 E-06	Fiber Type A Filter Paper	Stack Stack					
^{238}U	3.4 E-05		Stack					
			39 ft above ground (uranium cutoff saw exhaust A)					
Be		Continuous millipore Type HA Filter	Stack 34 ft above ground	NA	Same	NA		Alpha, beta, and beryllum analysis

[1]Real type, grab, in-line detector, isokinetic, etc.
[2]Year or other specified regulatory time limits.
[3]Highest Instantaneous Concentration-Not Available.
[4]Type of Radiation, radionuclide or chemical specific.
MDA = minimum detectable amount
NA = not applicable.

Table 8-2. 300 Area Fuels Fabrication Facility 1986 Airborne Nonradiological Releases.

Contaminant	Amount released	Monitoring type[1]	Sample point	MDA		Concentration		Type of analysis
				Inst	Analytical	Average[2]	High[3]	
NO_x	24,000 (lb)	In-line, continuous NO/NO_2 analyzer w/strip chart and totalizer	Chemical bay exhaust stack	NA		20 ppm	NA	Flow rate, total volume of air, and number of pounds NO_x discharged

[1]Real type, grab, in-line detector, isokinetic, etc.
[2]Year or other specified regulatory time limits.
[3]Highest instantaneous concentration-not available.
[4]Chemical specific.
MDA = minimum detectable amount
NA = not applicable
PPM = parts per million

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9.0 EFFLUENT MONITORING AND ANALYSIS

The DOE Order 5400.1 (DOE 1988a) requires a FEMP at all DOE facilities that release radioactive materials and chemicals to the environment in order to assure that DOE operations are in compliance with federal, state, and local requirements. This effluent monitoring and analysis plan was developed specifically for the 300 Area Fuels Fabrication Facility with the intention to monitor the liquid effluents and provide valid sample results during shutdown.

9.1 PURPOSE

The purpose of the 300 Area Fuels Fabrication Facility effluent monitoring and analysis program is to provide representative samples and accurate analysis of the facility's effluents to establish the proper documentation and reports. The documentation and recordkeeping will enable the facility to demonstrate that it meets applicable DOE orders and the regulations of federal and state agencies.

9.2 BACKGROUND

The 300 Area fuels facilities, (primarily the 333 and 313 Buildings), conducted an effluent monitoring program starting from the early to mid 1960's to 1990 in support of N Reactor fuel manufacturing.

The environmental sampling program evaluated radioactive and non-radioactive airborne emissions and liquid release to the environment.

The facilities were shut down in 1991. Effluent releases, airborne and liquid, dropped significantly in 1987. Airborne radioactivity releases were zero and NO_x emissions were reduced to <100 lb in 1987, increased to 306 lb in 1988, and then decreased to 223 lb in 1989. No releases were recorded after August of 1990 as shown in Table 1-1.

In 1986 the chemicals released to the process sewer included 104,253 lb of nitrate and almost 400 lb of dissolved uranium. The effluent releases were significantly reduced in the following years and in 1990 (through August) the total release was 0.62 lb of nitrates and 0.04 lb of dissolved uranium. However, due to the possibility of uranium leaching from pipes, trenches, etc. and this radioactivity being released to the process sewer by water discharge, the 300 Area Fuels Fabrication Facility the liquid effluent in the 313 and 333 Buildings be monitored.

9.3 SAMPLING SCHEDULE, FREQUENCY, AND STRATEGY

9.3.1 Air Sampling Schedule, Frequency, and Strategy

The fuels fabrication in Buildings 333 and 313 have suspended operations and airborne emissions have ceased. The building exhaust ventilation systems have been secured and the systems isolated.

Because there are no operations occurring which could create an airborne effluent discharge, air sampling is not required because the buildings are shut down.

9.3.2 Water Sampling, Schedule, and Frequency

As shown in Table 1-1, 300 Area Fuels periodically discharges small amounts of uranium. Therefore, to provide proper documentation on the 300 Area Fuels discharges, liquid effluent sampling will be performed on a quarterly basis. The samples will be taken to confirm that radioactive or other material is not being discharged and are not exceeding any regulatory limits. The liquid discharges originate from steam condensate, air conditioning cooling water, storm run off and cleaning solution. The sample location, frequency, sample size, sampling method and analytical requirements are given in Table 9-1.

9.4 SAMPLE ANALYSIS, DETECTION, AND ACCURACY

9.4.1 U.S. Department of Energy Analytical and Laboratory Guidelines

The analytical and laboratory procedures for the FEMP activities are identified in the *Quality Assurance Project Plan for the Facility Effluent Monitoring Plan Activities* (QAPP) (WHC 1991b). General requirements for laboratory procedures, data analyses, and statistical treatment are addressed in the QAPP. Detailed descriptions of these requirements are given in each FEMP.

The following elements are identified in *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance* (DOE 1991). Table 9-2 lists the applicable laboratory procedures. Table 9-3 shows the data analysis and statistical treatment methods.

9.4.2 Water Samples

Water samples will be obtained from the liquid effluent monitoring points shown in Table 9-1 to fulfill the DOE, EPA, and Washington State requirements for monitoring for radioactivity and various chemicals. The samples are then analyzed for the radionuclides and chemicals shown in Table 9-1. The table shows the location, reason for sampling, flow monitoring, frequency of sampling, analysis to be performed, sample size, and sampling method.

Tables 9-4 and 9-5 show the radionuclides and chemicals to be analyzed, sample type, sample size, analytical method, the minimum detectable concentration, and the accuracy of the method. The analytical methods used in this effluent monitoring plan are from EPA's SW-846 (EPA 1986), Westinghouse Hanford's 222-S Laboratory procedures, or contract laboratory procedures authorized by the Office of Sample Management (OSM).

Table 9-1. Liquid Effluent Monitoring Sampling and Analytical Requirements.

Location	Frequency of Sampling				Sample analysis/measurement	
	Reason for sampling	Radioactivity Chemicals	Radioactivity	Analysis	Chemical size/type	Sample method
N Fuels 313-N/333-N Process Trenches	Radioactivity OSRs	Monthly Monthly	Gross alpha and beta, gamma scan (0.05-2.0 MeV)	pH Conductivity cations and metals from ICP analysis	4-L grab	Grab sample

OSR = Operating Safety Requirements.

Table 9-2. Laboratory Procedures.

Sample identification system	To be provided when complete
Procedures preventing crosscontamination	Contained in 222-S Laboratory Analytical Procedures (identified in QAPP, WHC-EP-0446 Table 8-1)
Documentation of methods	Contained in 222-S Laboratory Analytical Procedures (identified in QAPP, WHC-EP-0446 Table 8-1)
Gamma emitting radionuclides	See QAPP Table 8-1
Calibration	See QAPP Table B-1
Handling of samples	See QAPP Table 8-1
Analysis method and capabilities	See QAPP Table 8-1
Gross alpha, beta, and gamma measurements	See QAPP Table 8-1
Direct gamma-ray spectrometry	See QAPP Table 8-1
Beta counters	See QAPP Table 8-1
Alpha-energy analysis	See QAPP Table 8-1
Radiochemical separation procedures	To be provided when available
Reporting of results	To be provided when available
Counter calibration	See Table B-1, QAPP
Intercalibration of equipment and procedures	To be provided when available
Counter background	Contained in 222-S Laboratory Analytical Procedures (QAPP, Table 8-1)
Quality Assurance	To be provided when available

QAPP = Quality Assurance Project Plan.

Table 9-3. Data Analyses and Statistical Treatment.

Element	Documentation
Summary of data and statistical treatment requirements	To be provided when available
Variability of effluent and environmental data	To be provided when available
Summarization of data and testing of outliers	To be provided when available
Treatment of significant figures	To be provided when available
Parent-decay product relationships	To be provided when available
Comparisons to regulatory or administrative control standards and control data	To be provided when available
Quality assurance	To be provided when available

Table 9-4. Radiochemical Analytical Methods and Limits for Liquid Effluents.

Radiochemical	Sample type	Sample size (L)	Analytical methods	Minimum detectable concentration (pCi/L)	Accuracy (±) (%)
Gross alpha	Water	4	9,310[a]	4	25
Gross beta	Water	4	9,310[a]	4	25
Gamma scan (0.05 - 3.0 MeV)	Water	4	LA-548-121[b]	8	25

[a]These procedures are SWA-846 procedures (EPA 1986).
[b]This procedure is a 222-S Laboratory procedure (WHC 1991c).

Table 9-5. Chemical Analytical Methods and Limits for Liquid Effluents.

Chemical	Sample type	Sample size	Analytical methods	Minimum detectable concentration	Accuracy (±)(%)
pH	Grab sample	250 ml	9,045	300 ppb	25
Conductivity	Grab sample	250 ml	9,050	10 ppb	25
Antimony	Grab sample	1 L	6,010	20 ppb	25
Arsenic	Grab sample	1 L	6,010	40 ppb	25
Barium	Grab sample	1 L	6,010	70 ppb	25
Cadmium	Grab sample	1 L	6,010	70 ppb	25
Chromium	Grab sample	1 L	6,010	60 ppb	25
Cobalt	Grab sample	1 L	6,010	10 ppb	25
Copper	Grab sample	1 L	6,010	10 ppb	25
Lead	Grab sample	1 L	7,421	2 ppb	25
Mercury	Grab sample	1 L	7,470	20 ppb	25
Nickel	Grab sample	1 L	6,010	50 ppb	25
Silver	Grab sample	1 L	6,010	70 ppb	25
Vandium	Grab sample	1 L	6,010	80 ppb	25
Zinc	Grab sample	1 L	6,010	20 ppb	25
Uranium	Grab sample	1 L	6,010	50 ppb	25

These procedures are SWA-846 (EPA 1986) procedures.

The accuracy of the analytical methods is determined as part of the overall calibration procedure and is checked on a daily basis through the use of calibration check sources, sample blanks, spiked samples, and split samples which are part of the overall laboratory quality control program.

9.5 CALIBRATIONS FOR SAMPLING AND ANALYSIS

9.5.1 Field and Laboratory Instruments

Field and laboratory instruments are initially calibrated and recalibrated on an annual basis. The instruments are calibrated by laboratory and instrument personnel in accordance with the plant's calibration program and the laboratory's calibration program.

9.6 EFFLUENT DATA CALCULATIONS

9.6.1 Water Samples

The liquid effluent discharge information and water samples are maintained and collected by the N-Reactor Fuel Supply personnel. 300/400 Area Environmental Protection obtains the discharge information from the operators and, in conjunction with laboratory results, determines the average and maximum concentration of the radionuclides discharged and also determines the annual discharge. Environmental Protection maintains a file on water sample calculations to allow the methods and data to be reviewed.

9.7 DATA VALIDATION AND VERIFICATION

9.7.1 Data Validation

Data validation is performed by Office of Sample Management by reviewing the sampling information provided by Health Physics, 300 Area Fuels Supply Operations, and the Analytical Laboratory. The sample collection data is reviewed for the correct sample number, sample volume, sampling time, flow rate, date sample started, date sampling ended, and date transported. The data is also reviewed to determine if the sampling was properly reviewed and signed off by the responsible supervisor.

The laboratory report is also reviewed by Office of Sample Management to ensure that the sample results sent by the laboratory are the result of analyzing the Fuels Fabrication Facilities Samples. The laboratory results are cross checked with the sample collection information to validate the sample to the results. The sample results or the report are reviewed for the correct sample identification location, type of sample, date of analysis, and review for the signature of the laboratory manager.

9.7.2 Data Verification

The verification of field and laboratory analytical data will be performed by maintaining a field and laboratory instrument verification program that contains the following elements. The calibration of field and laboratory instruments will have a program to verify the linearity of instrument calibration on an annual basis. The program will have a calibration check source reading that must be within the 95-percent confidence interval. The data verification program will also provide for sample blanks and spiked samples on a routine basis to ensure the analytical instrument being used maintains its linearity calibration curve within the 95-percent confidence interval.

Further data verification is also performed by the 300/400 Environmental Assurance Department in conducting its audit and appraisal program in accordance with WHC-CM-7-6, Section 9.13 (WHC 1989a).

9.8 SAMPLE SHIPPING AND CUSTODY

9.8.1 Sample Shipping

The various types of effluent samples from the Fuels Fabrication Facility are to be packaged and shipped from 300 Area to the various laboratories under the following packaging and shipping procedures:

- "Managing, Packaging, and Shipping Waste Samples," Procedure Number HRWC-03, *Hazardous and Radiological Waste Control*, WHC-NR-M-12 (WHC 1990).

The above procedure ensures that waste samples are packaged and shipped to either Hanford Site Laboratories or offsite laboratories meeting the packaging and shipping requirements of DOE, Nuclear Regulatory Commission, DOT, and Washington State regulatory requirements.

9.8.2 Sample Custody

Effluent samples from the Fuels Fabrication Facilities are transported from the area to the laboratory under an administrative chain of custody procedure entitled Sample Chain-of-Custody, Procedure Number HRWC-12 contained in the Hazardous and Radiological Waste Control Manual WHC-NR-M-12 (WHC 1990).

The purpose of the procedure is to create an accurate written record which can be used to trace the possession and handling of a sample for waste in the process of being characterized. This procedure fulfills Washington State requirements in the *Dangerous Waste Regulations* WAC 173-303 (WAC 1989a).

9.9 EFFLUENT MONITORING RECORDKEEPING

To ensure that all applicable recordkeeping requirements are met, two types of records must be kept. These two types of records are sample records

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9.9 EFFLUENT MONITORING RECORDKEEPING

To ensure that all applicable recordkeeping requirements are met, two types of records must be kept. These two types of records are sample records and result records. Sample records will assure that samples are taken in a timely manner and handled properly. Result records will assist in preparing environmental release reports as required by DOE, EPA, Washington State Department of Ecology (Ecology), and Westinghouse Hanford.

9.9.1 Sample Records

To ensure that all samples are taken in a timely and proper manner, records must be kept ensuring proper scheduling for sample taking. In addition, chain-of-custody records must be kept to ensure that the samples have not been altered or tampered with in any way. Because these records will be used to verify regulatory compliance, the regulations require that each sample have a record indicating collection, transfer, analysis, storage, and disposal. To facilitate the integration of the recordkeeping with the program implementation, the operations group of the 300 Area N-Reactor Fuel Supply department should be responsible for maintaining the records for the samples.

9.9.2 Result Records

The records of the results of sample analysis will be maintained by 300 Area Fuels Operations and 300/400 Area Environmental Protection. This group is responsible for preparing and issuing the yearly environmental release report for the 300 Area.

9.10 EFFLUENT REPORTS

Environmental Protection is responsible for preparing all reports required by DOE, EPA, and Ecology. The reports for DOE include occurrence notification reports as well as the annual release reports. These reports shall be produced in accordance with the requirements set forth in DOE 5400.1, Chapter II (DOE 1988a). Reports submitted to EPA and Ecology will be in the format requested by the respective agency.

9.11 EFFLUENT MONITORING PROCEDURES

The Facility Effluent Monitoring program is conducted by using approved procedures. Effluent monitoring sampling procedures used for the ongoing activities are shown in Table 9-6.

9.12 TRAINING

Training for sampling the liquid effluent portion of the effluent monitoring program is conducted for the N-Reactor Fuels Supply operations personnel who have the primary responsibility for conducting the liquid effluent portion of the sampling program. Retraining for the operators is conducted on an annual basis.

Training of analytical laboratory personnel is conducted by the manager of the 222-S Laboratory Westinghouse Hanford. If the analytical lab work is conducted by an offsite laboratory, the appropriate contract requirements maintained by the OSM apply.

9.13 AUDITS AND APPRAISALS

Audits and Appraisals are conducted for the FEMP according to DOE Order 5482.1B (DOE 1987). Audits and Appraisals are conducted for the Fuels Fabrication Facilities FEMP by the Environmental Assurance Department. The Environmental Assurance Department conducts functional appraisals, environmental audits, management appraisals, surveillance/compliance inspections, and environmental event reporting and noncompliance notifications. The Environmental Assurance program for carrying out the audits and appraisals is identified in the *Environmental Compliance Verification Program*, WHC-CM-7-6 (WHC 1989a).

9.14 QUALITY ASSURANCE

The Quality Assurance Project Plan for this 300 Area Fuels Fabrication Facility FEMP is in Section 12.0 of the plan and has been written on the basis of meeting the requirements of the EPA's QAMS-005/80 (EPA 1983), the QA requirements identified in EPA's SW-846 (EPA 1986), and the QA requirements identified in ANSI/ASME NQA-1 (ANSI/ASME 1986).

Table 9-6. 300 Area Fuels Fabrication.

Monitoring procedure	Responsible group	Procedure no.
Effluent Monitoring Administration	NRFS Operations	TBD
Liquid Effluent Sample Collection	NRFS Operations	TBD
Groundwater Sample Collection	NRFS Operations	3-50-3
Effluent Sample Tracking	Hazardous and Radiation Waste Control	TBD
Sample Packaging and Shipping Waste	Hazardous and Radiation Waste Control	WHC-NR-M-12 HRWC-03
Sample Chain of Custody	Hazardous and Radiation Waste Control	HRWC-12
Effluent Data Entry for Air and Water	Environmental Protection	TBD
Effluent Dose Calculations	Environmental Safety	TBD
Effluent Data Validation	OSM	TBD
Effluent Sample Recordkeeping and Reporting	300/400 Environmental Protection	TBD
Laboratory Analysis and Calibrations	222-S Laboratory/ Contract Laboratory	Analyte dependent (see Tables 9-4 and 9-5)

NRFS =
OSM = Office of Sample Management
TBD = to be determined.

10.0 NOTIFICATION AND REPORTING REQUIREMENTS

10.1 U.S. DEPARTMENT OF ENERGY ORDERS

10.1.1 General Environmental Protection Program

The DOE Order 5400.1 (DOE 1988a) provides the mandatory environmental standards and guidance for DOE operations to comply with all applicable environmental regulations. Chapter II of this order sets forth the requirements for environmental reports, environmental occurrences reports, annual reports, and effluent reports.

The specific requirements of this order include the following:

- **Notification of Environmental Occurrences**--Notifications of Headquarters Emergency Operations Center of significant nonroutine releases of pollutants or hazardous substances, and any releases requiring notification of EPA.
- **Office of Management and Budget Circular A-106**--Departmental reports of pollution abatement projects to be included in the 5-yr plan.
- **Annual Site Environmental Report**--Presents a summary of environmental data to characterize site environmental management performance.
- **Reports on Radioactive Effluent/Onsite Discharge/Unplanned Releases**--This includes radioactive effluent and onsite discharge data reports covering the previous calendar year.

10.1.2 Environmental Protection, Safety, and Health Protection Information Reporting Requirements

The DOE Order 5484.1 establishes the requirements and procedures for the investigation of occurrences having environmental protection, safety, or health significance. It provides the framework for efficient environmental and safety and health monitoring for DOE operations. Chapter II of this order identifies the classification criteria for occurrences with regard to their type (Types A, B, and C) and the reporting requirements for each type of investigation. Chapter III provides the effluent and environmental monitoring program requirements.

The specific requirements of this order include the following:

- **Type A, B, and C Investigation Reports**--A report of the findings for the type of investigation that is appropriate for the individual occurrence.

- **Environmental Monitoring Report**--Requires an annual report that summarizes and interprets the levels of radioactive and nonradioactive pollutants in the environs at DOE sites.

- **Quarterly Reports and Other Reports**--Requires quarterly reports with regards to occupational safety, property damage, radiation exposure, including occupational, exposure to visitors, preoperational environmental survey reports, and aircraft accident/incident reports.

- **Annual Reports**--This includes annual radiation exposure reports, annual industrial summary of fire and other property damage experience, and effluent and environmental monitoring reports.

- **Unusual Occurrence Reports**--This includes reports of unusual occurrences required in order to identify the full significance and potential impact of these occurrences.

10.1.3 Occurrence Reporting and Processing of Operations Information

The DOE Order 5000.3A (DOE 1990a) establishes a system for reporting the operations information for DOE facilities and for processing information appropriately for corrective actions. The specific requirements of this order include occurrence notification and reporting requirements, the reporting time limits, immediate and follow-up notification requirements depending upon the categorization of the occurrence.

10.1.4 Radiation Protection of the Public and the Environment

The DOE Order 5400.5 (DOE 1990a) establishes the standards and requirements for operations of DOE facilities with respect to protecting members of the public and the environment from undue risk from radiation. The reporting requirement of this order are found in Chapter II, Section 7.

10.2 ENVIRONMENTAL PROTECTION AGENCY REGULATIONS

There are a number of federal environmental regulations which are applicable to effluent monitoring activities. These regulations are promulgated under the authority of various environmental protection acts, the enforcement of which is the responsibility of the EPA. These regulations are published under Title 40 of the CFR.

10.2.1 Clean Air Act of 1977

The notification and reporting requirements of the *Clean Air Act of 1977* are covered under 40 CFR 61 Subpart H, "National Emission Standards for Hazardous Air Pollutants" (NESHAP) (EPA 1989c). The regulations provide for granting authority to the states for regulating airborne pollutants. The

Washington State has provided additional requirements, as set forth in WAC 173-400, *Washington Air Pollution Control Regulations* (WAC 1990a).

The specific requirements of this section include an annual report to be submitted to both EPA Headquarters and Regional Office which includes the results of monitoring as recorded in DOE's Environmental Information System and dose calculations for the previous calendar year.

10.2.2 Clean Water Act of 1977

The requirements of the *Clean Water Act of 1977* apply to discharges to surface waters. The regulations for this act are promulgated under a NPDES permit which is issued by the Washington State. The specific requirements for reporting and notifications can be found in the NPDES Permit issued to the Hanford Site by the EPA, Permit No. WA-000374-3 (Ecology 1981).

The specific requirements of this chapter are set forth in NPDES permit No. WA-000374-3 and include the following:

- **Routine Reporting**--This includes the monthly Discharge Monitoring Report submitted by the fourteenth day of the following month on EPA form No. 3320-1
- **Non-routine Reporting**--This includes 24-h notice of noncompliance and other noncompliance reports as required.

10.2.3 Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and Superfund Amendments and Reauthorization Act of 1986

The applicable requirements of CERCLA are promulgated under the regulations published in 40 CFR 302 (EPA 1989a). These regulations are designed to provide for the efficient, coordinated, and effective response to releases into the environment of hazardous substances, pollutants, or contaminants which may present imminent danger to public and environmental health. The notification requirements are spelled out in 40 CFR 302.6. This includes immediate notification of a release of a hazardous substance exceeding the Reportable Quantity value.

The requirements of *Superfund Amendments and Reauthorization Act of 1986* are promulgated in the regulations published under 40 CFR 355, "Emergency Planning and Notification," and 40 CFR 370 "Hazardous Chemical Reporting: Community Right-To-Know" (EPA 1990b). The sections establish the framework and responsibilities necessary for the development and implementation of applicable emergency response plans and establishes the reporting requirements to provide personnel with information regarding the hazardous properties of chemicals in their communities and places of work. The regulations published under Section 355 relate to emergency notification due to releases at a facility. The notification requirements for this action are spelled out in 40 CFR 355.40, Notification Requirements. The regulations in Section 370 deal

with worker and community right-to-know. The requirements for this section are listed in 40 CFR 370, Subpart B - Reporting Requirements.

Requirements of this section include the following:

- **Notification Requirements**--The immediate notification of the community emergency coordinator of any area likely to be affected by the release of a hazardous substance

- **Reporting Requirements**--This includes material safety data sheet reporting to the appropriate local authority and submission of tier I and tier II reports to the appropriate local authority.

10.2.4 Resource Conservation and Recovery Act of 1976

The requirements of RCRA apply to the generation, transport, and treatment, storage and disposal of hazardous materials. This act provides the states with authority to regulate hazardous substances. Washington State has promulgated additional regulations regarding these substances under WAC 173-303, *Dangerous Waste Regulations* (WAC 1989a).

Requirements includes the submission of biennial reports, exception reports, and any additional reports required by EPA upon their direction. Biennial reports must be submitted to the EPA Regional Administrator by March 1 of each even numbered year. Exception reports must be submitted to the EPA Regional Administrator within 35 or 45 d of the date the waste was accepted by the initial transporter.

10.3 WASHINGTON STATE/LOCAL REGULATIONS

10.3.1 National Pollutant Discharge Elimination System Permit Program

Under WAC 173-220 (WAC 1988), Washington State has promulgated its regulations pertaining to discharges to the surface waters of the state. In WAC 173-220 (WAC 1988), the state has promulgated regulations to oversee discharges of pollutants to the surface waters of the state. These regulations set forth requirements designed to further the objectives set forth under the *Federal Water Pollution Control Act of 1948* and RCW 90.48 (RCW 1945). The general reporting and notification requirements of this these regulations are set forth in WAC 173-220-210, "Monitoring, Recording and Reporting" (WAC 1988).

10.3.2 Dangerous Waste Regulations

Washington State has promulgated under Chapter 173-303 (WAC 1989a) of the WAC regulations to designate, oversee, and establish programs to control the production, use, and disposal of dangerous waste, hazardous waste, and extremely hazardous wastes within the state. These regulations are designed to protect the public health and the environment, and to encourage recycling

and related processes. The specific sections requiring notifications or reports are WAC 173-303-060, Notification and identification numbers, and WAC 173-303-220, Generator Reporting.

The specific requirements of this chapter include the following:

- **Notification identification Numbers**--This includes notification to the state of the intent to generate, transport, offer for transport, transfer a dangerous waste, or own or operate a dangerous waste TSD facility

- **Generator Reporting**--This includes annual reports and exception reports.

11.0 INTERFACE WITH ENVIRONMENTAL SURVEILLANCE PROGRAM

11.1 DESCRIPTION

The sitewide Environmental Monitoring Plan (EMP), as described in the *Management Plan for Facility Effluent Monitoring Plan Activities*, WHC-EP-0491, (WAC 1991c), consists of two distinct but related components: environmental surveillance conducted by PNL and effluent monitoring conducted by Westinghouse Hanford. The responsibilities for these two portions of the EMP are delineated in a memorandum of understanding (MOU 1989). Environmental surveillance, conducted by PNL, consists of surveillance of all environmental parameters to demonstrate compliance with regulations. Effluent monitoring includes both in-line and facility effluent monitoring as well as near-field (near-facility) environmental monitoring. Projected EDEs, reported in this FEMP, are the products of in-line effluent monitoring. Near-field monitoring is required by Part 0, "Environmental Monitoring," *Environmental Compliance Manual*, WHC-CM-7-5 (WHC 1988a) and procedures are described in *Operational Environmental Monitoring*, WHC-CM-7-4 (WHC 1989c).

11.2 PURPOSE

Near-field monitoring is used to determine the effectiveness of environmental controls in preventing the unplanned spread of contamination from facilities and sites operated by Westinghouse Hanford for DOE. Effluent monitoring and reporting, monitoring of surplus and waste management units, and monitoring near-field environmental media are, therefore, conducted by Westinghouse Hanford for the purposes of: controlling operations, determine the effectiveness of facility effluent controls, measuring the adequacy of containment at waste transportation and disposal units, detecting and monitoring upset conditions, and evaluating and upgrading effluent monitoring capabilities.

11.3 BASIS

Near-field environmental surveillance is conducted to (1) monitor employee protection; (2) monitor environmental protection; and (3) ensure compliance with local, state, and federal regulations. Compliance with parts of DOE Orders 5400.1, *General Environmental Protection Program* (DOE 1988a); 5400.5, *Radiation Protection of the Public and Environment* (DOE 1990a); 5484.1, *Protection, Safety, and Health Protection Information Reporting System* (DOE 1981); 5820.2A, *Radioactive Waste Management* (DOE 1988b); and DOE/EH-0173T, *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance* (DOE/EH 1991), are addressed through this activity.

11.4 MEDIA SAMPLED AND ANALYSES PERFORMED

Procedure protocols for sampling, analysis, data handling, and reporting are specified in WHC-CM-7-4 (WHC 1989a). Media include ambient air, surface

water, groundwater, external radiation dose, soil, sediment, vegetation, and animals at or near active and inactive facilities and/or waste sites. Parameters monitored include the following, as needed: pH, water temperature, radionuclides, radiation exposure, and hazardous constituents. Animals that are not contaminated, as determined by a field instrument survey, are released at the capture location.

11.5 LOCATIONS

Samples are collected from known or suspected effluent pathways (e.g., downwind of potential releases, liquid streams, or proximal to release points). To avoid duplication, Westinghouse Hanford relies upon existing sample locations where PNL has previously established sample sites (e.g., air samplers in the 300 Area). There are 38 air samplers (4 in the 100 Area and 34 in the 200/600 Areas), 35 surface water sample sites (22 in the 100 Area and 13 in the 200/600 Areas), 110 groundwater monitoring wells (20 in the 100 Area, 89 in the 200/600 Areas, and 1 in the 300/400 Areas), 299 external radiation monitor points (182 survey points and 41 thermoluminescent dosimeter (TLD) sites in the 100 Area, 61 TLD sites in the 200/600 Areas, and 15 TLD sites in the 300/400 Areas), 157 solid sample sites (32 in the 100 Area, 110 in the 200/600 Areas, and 15 in the 300/400 Areas), and 95 vegetation sample sites (40 in the 100 Area, 40 in the 200/600 Areas, and 15 in the 300/400 Areas). Animal samples are collected at or near facilities and/or waste sites. Specific locations of sample sites are found in WHC-CM-7-4 (WHC 1989a).

Additionally, surveys to detect surface radiological contamination, scheduled in WHC-CM-7-4 (WHC 1989a), are conducted near and on liquid waste disposal sites (e.g., cribs, trenches, drains, retention basin perimeters, pond perimeters, and ditch banks), solid waste disposal sites (e.g., burial grounds and trenches), unplanned release sites, tank farm perimeters, stabilized waste disposal sites, roads, and firebreaks in the Operations Areas. There are 391 sites in the Operations Areas (100 in the 100 Area, 273 in the 200/600 Areas, and 18 in the 300/400 Areas) where radiological surveys are conducted.

11.6 PROGRAM REVIEW

The near-field monitoring program will be reviewed at least annually to determine that the appropriate effluents are being monitored and that the monitor locations are in position to best determine potential releases.

11.7 SAMPLER DESIGN

Sampler design (e.g., air monitors) will be reviewed at least biannually to determine equipment efficiency and compliance with current EPA and industry (e.g., ANSI and ASTM) standards.

11.8 COMMUNICATION

The operations and engineering contractor and the research and development contractor will compare and communicate results of their respective monitoring programs at lease quarterly and as soon as possible under upset conditions.

11.9 REPORTS

Results of the near-field environmental monitoring program are published in the document series WHC-EP-0145, *Westinghouse Hanford Company Environmental Surveillance Annual Report* (Schmidt et al. 1990). The radionuclide values in these reports are expressed in curies, or portions thereof, for each radionuclide per unit weight of sample (e.g., picocuries per gram) or in field instrument values (e.g., counts per minute) rather than EDE, which is calculated as the summation of the products of the dose equivalent received by specified tissues of the body and a tissue-specific weighting factor.

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12.0 QUALITY ASSURANCE

This section provides the N Fuels Fabrication Facility QA requirements for organizational structure, functional responsibilities, levels of authority, interfaces, and lines of communication for activities affecting the quality of work to meet the requirements for the FEMP. The 300 Area N Fuels Fabrication Facility FEMP complies with the requirements of the Quality Assurance Project Plan (QAPP), WHC-EP-0446 (WHC 1991b). The N Fuels Fabrication Facility FEMP QA is based on the requirements of the EPA guidelines contained in EPA QAMS 005/80, *Interim Guidance and Specification for Preparing Quality Assurance Project Plans* (EPA 1983), and the ANSI/ASME NQA-1 (ANSI/ASME 1986), *Quality Assurance Program Requirement for Nuclear Facilities.* The Westinghouse Hanford QA manual is responsive to the requirements outlined in DOE Order 5700.6B (DOE 1991) and the RL Order 5700.1A (DOE/RL 1983). The QA Manual forms the foundation of the Quality Assurance Program for Westinghouse Hanford operations.

12.1 PROJECT DESCRIPTION

The general objective of the FEMP is to have written environmental monitoring plans for each site, facility, or process that uses, generates, releases, or manages significant pollutant or hazardous materials. Monitoring is performed to evaluate the effectiveness of effluent treatment and control, for radioactive material inventory purposes, and to determine compliance with all DOE, EPA, state, and local requirements pertaining to effluent and pollutant releases to the environment. Monitoring is conducted in a manner that provides accurate measurements of liquid and airborne pollutants in effluents as a basis for the following:

- Determining compliance with applicable discharge and effluent control limits, including administrative limits designed to ensure compliance with facility operating limits, and effluent requirements or guides
- Evaluating the adequacy and effectiveness of containment and waste treatment and controls, as well as efforts towards achieving levels of radioactivity that are ALARA considering technical and economical constraints
- Compiling an annual inventory of the radioactive material released in effluent and onsite discharges.

12.2 PROJECT ORGANIZATION AND RESPONSIBILITIES

12.2.1 Project Management

The N Reactor Fuel Supply manager of the Westinghouse Hanford N Fuels Fabrication Facility has primary responsibility for effluent monitoring at the

N Fuels Fabrication Facility. An organizational chart is included as Figure 12-1. The responsibilities of key management personnel are described in the following paragraphs.

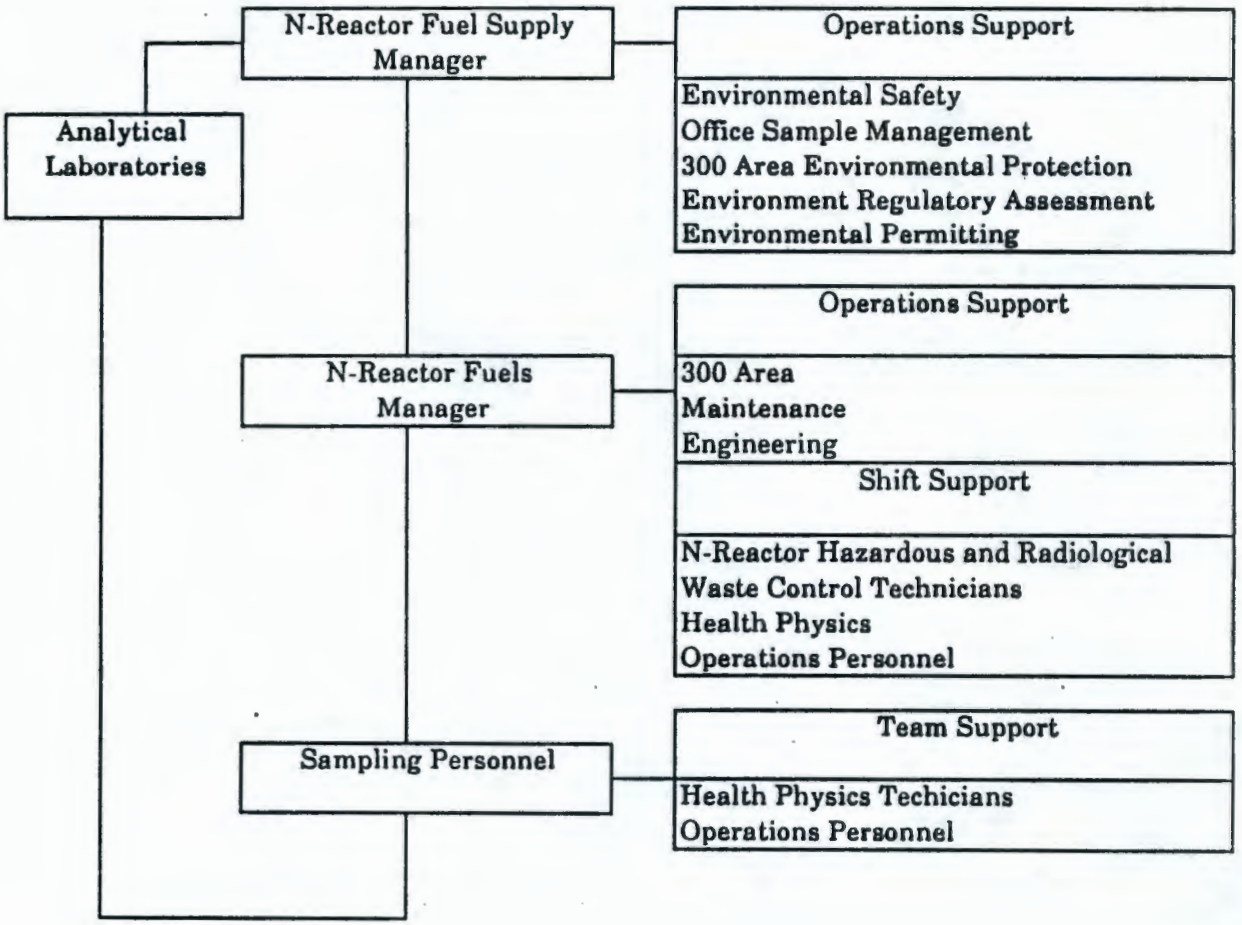
12.2.1.1 Operations Assessments/Environmental Safety. The Operations Assessments/Environmental Safety manager is responsible for the following:

- Prepare FEMP
- Ensure the FEMP is revised as process or regulatory changes occur and undergoes a formal review by June 1 of each year and is updated every 3 yr
- Ensure that airborne and liquid effluents and releases comply with the requirements of the FEMP
- Ensure that the quality control program, including periodic tests and measurements as required by this FEMP, are conducted at the required frequency
- Review FEMP
- Review analytical results and investigate those in excess of applicable limits
- Approve effluent monitoring reports
- Review the FEMP by June 1 of each year and the updated revision once every 3 yr
- Ensure that airborne and liquid effluents and releases comply with the requirement of the FEMP
- Ensure that the periodic tests and measurements required by this FEMP are conducted at the required frequency
- Ensure that the continuous emissions monitoring systems required by the provisions of this FEMP are maintained as required
- Identify the training requirements for their personnel to support requirements of the FEMP.

12.2.1.2 Operations/Hazardous and Radiological Waste. The Operations/Hazardous and Radiological Waste manager is responsible for the following:

- Calibrations, maintenance, and repair records for all continuous monitoring instruments required in the FEMP
- Data and time identifying each period that the FEMP monitoring equipment is out of service
- Reorder checks and applicable logs

Figure 12-1. Organizational Chart.



- Notify environmental protection of violations of environmental control limits set by the FEMP
- Preparation of written instructions to carry out FEMP requirements
- Ensuring that a copy of the complete chain-of-custody documentation is received with the laboratory sample data package
- Ensure that the continuous emission monitoring systems required by the provisions of this FEMP are maintained as required
- Collect and deliver effluent samples for analysis
- Ensure the sample is properly packaged, shipped and the appropriate chain-of-custody form accompanies each shipment
- Identify training requirements, arrange for training, and submit the FEMP training records for their personnel to the Centralized Training Records area per WHC-CM-1-3, MRP 6.4 (WHC 1989b)
- Establish and maintain chain-of-custody records for effluent monitoring samples
- Review analytical results and investigate those in excess of applicable limits
- Properly package all FEMP samples generated at N Reactor for shipment to laboratory for analysis
- Ensure that the sample is accompanied with sample collector's name, sample description, sample quantity, etc.
- Prepare a statement of work describing laboratory services required and shall secure the laboratory services
- Provide data validation which will include review of shipping information, chain-of-custody forms, holding time, calibration, quality control, and analytic identification and quantification
- Provide laboratory results to the FEMP coordinator
- After data validation, have the responsibility for entry of analytical laboratory data into the Hanford Environmental Information System (HEIS) computer database
- Shall assure that analytical results are accurate.

12.2.1.3 N Reactor Engineering. The N Reactor Engineering manager is responsible for the following:

- Approve the purchase or modification specifications for effluent sampling or monitoring equipment

- Ensure that the continuous emission monitoring systems required by the provisions of this FEMP are maintained as required
- Notify regulatory analysis of proposed construction of any new services of airborne emissions.

12.2.1.4 **300/400 Areas Environmental Protection.** The 300/400 Areas Environmental Protection manager is responsible for the following:

- Review the FEMP
- Review analytical results and investigate those in excess of applicable limits
- Review the FEMP annually by June 1 of each year
- Have primary authority for the enforcement of the FEMP
- Evaluate the reporting requirements concerning data
- Perform surveillances to ensure that the periodic tests and measurements required by this FEMP are conducted at the required frequency
- Perform surveillances to ensure that airborne emissions and releases comply with the requirement of the FEMP
- Identify training requirements for Environmental Protection personnel to support the FEMP.

12.2.1.5 **300 Area Facilities Health and Safety.** The 300 Area Facilities Health and Safety manager is responsible for the following:

- Protect N Fuels Fabrication workers from radionuclides and other dangerous substances in the environment
- Health Physics will perform periodic inspections of stack sampling and monitoring equipment.

12.2.1.6 **N Reactor Quality Assurance.** The N Reactor Quality Assurance manager is responsible for the following:

- Approve the purchase or modification specifications for effluent sampling or monitoring equipment
- Review the FEMP
- Perform periodic inspections to ensure that airborne and liquid effluent monitoring comply with the requirements of the FEMP
- Identify training requirements for QA personnel to support requirements of the FEMP.

12.2.1.7 Facility Operations, Operational Maintenance Support; 300 Area Maintenance. These managers are responsible for the following:

- Ensure that the sampling systems required by the provisions of this FEMP are maintained and calibrated periodically
- Identify training requirement for maintenance personnel to support requirement of the FEMP.

12.2.2 Supporting Organizations

Routine technical support to the N Reactor Fuels Supply Manager will be provided through several Westinghouse Hanford organizations.

12.2.2.1 OSM. The OSM provides data validation services and participate in the evaluation and selection of analytical laboratory subcontractors. The Westinghouse Hanford OSM shall:

- Transmit the laboratory sample data package, including original chain-of-custody documentation, to the N Reactor Operations Fuels Supply Manager
- Prepare a statement of work describing laboratory services required and shall secure the laboratory services
- Provide data validation which will include review of shipping information, chain-of-custody forms, holding time, calibration, quality control and analytic identification and quantification
- Provide laboratory results to the FEMP coordinator
- After data validation, have the responsibility for entry of analytical laboratory data into HEIS computer data base.

12.2.2.2 Analytical Laboratories. Analytical samples shall be shipped to a Westinghouse Hanford laboratory or approved contractor for chemical and/or radiological analysis. For contractors, the applicable quality requirements shall be part of the approved work order or procurement document established by the Office of Sample Management. Laboratories shall submit to OSM their analytical methods and Quality Assurance Program Plan for Westinghouse Hanford review and approval prior to use by the N Reactor Fuel Supply Manager. At the direction of the N Reactor Fuel Supply Manager, the services of alternate analytical chemical laboratories may be procured for split (performance audit) sample analysis.

12.2.2.3 Other Support Contractors. Procurement of services of other subcontractors to support any or all of the activities addressed in this FEMP may be initiated at the direction of the N Reactor Fuel Supply Manager. Such services shall be in compliance with standard Westinghouse Hanford procurement.

12.3 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT

The QA objectives for measurement applicable to FEMPs primarily relate to: the methods for chemical analysis, the detection limits and analytical precision and accuracy appropriate for the effluent monitoring at the N Fuels Fabrication Facility and obtaining representativeness, complete, and comparable effluent monitoring points. These objectives are provided for by the standard methods or agency approved procedures in Tables 9-1, 9-4, and 9-5.

12.3.1 Analytical Methods

Tables 9-1, 9-4, and 9-5 identify the analyses of interest and corresponding analytical reference methods. The list of analyses is developed from effluents being emitted by N Reactor Fuels Fabrication Facility during 1987 through 1990. Analytical methods are selected from those provided in Test Methods for Evaluating Solid Waste SW-846, for those analyses for which SW-846 (EPA 1986) methods exist. Remaining analyses specify standard methods selected from appropriate EPA guidance documents or appropriate Westinghouse Hanford analytical procedures. Where options have been suggested or implied, the more reliable methods have been selected.

12.3.2 Limits for Analytical Precision and Accuracy

The performance of the analytical laboratory or laboratories providing support to the FEMP monitoring program shall be subject to standard methods or agency approved procedures. In this version of the FEMP, these parameters are presented as target values. These values must be adjusted and/or confirmed by the Westinghouse Hanford OSM and the proposed laboratory prior to final approval of associated subcontractors or work orders. These target values have been developed from historically achievable values based on those negotiated and approved in previous analytical subcontracts for similar analysis at the Hanford Site, or are proposed on the basis of the level of performance that may routinely be expected for the methods indicated. The target values must be confirmed and /or adjusted to mutually satisfactory values and approved by Westinghouse Hanford and the proposed analytical laboratory in the process of subcontract or work order negotiation. Once the values are established as contractual requirement, Tables 9-1, 9-4, and 9-5 and this section of the FEMP shall be revised accordingly by the N Reactor Fuel Supply manager.

12.3.3 Representativeness, Completeness, and Comparability

Goals for data representativeness are addressed qualitatively by the specification of monitoring locations and intervals established by this FEMP. Objectives for completeness for FEMP monitoring shall require that the contractually or procedurally established requirements for precision and accuracy be at the 95-percent confidence interval. Failure to meet this criteria shall be documented in data summary reports and shall be considered in the validation process by OSM. Corrective action measures shall be initiated by OSM. Approved analytical procedures shall require the use of the

reporting techniques and units consistent with the EPA reference methods or other approved procedures listed in the FEMP to facilitate the comparability of data sets in terms of precision and accuracy.

12.4 SAMPLING PROCEDURES

12.4.1 Sampling Procedures

Sampling shall be performed using approved procedures. All effluent sampling performed in support of the FEMP shall be performed in a manner that provides representative measurements of the volume and concentration of airborne and liquid pollutants released to the environment.

12.4.2 Other Supporting Procedures

With the exception of the analytical chemistry procedures specified in Tables 9-1, 9-4, and 9-5, procedures to be used for direct support of FEMP monitoring activities are presented in Table 9-6, cross referenced to their source documents and the type of activities that they will typically support. Any additions or modifications to these procedures shall be addressed in the text of individual procedures.

12.5 SAMPLE CUSTODY

All samples obtained during the course of this FEMP monitoring effort shall be controlled by a chain-of-custody procedure. Laboratory chain-of-custody procedures shall be reviewed and approved by Westinghouse Hanford. Residual materials after completion of analysis shall be returned to N Reactor Hazardous and Radiological Waste Control. Chain-of-custody forms shall be initiated for returned residual samples as required by the approved procedures applicable within the participating laboratory. The chain-of-custody form shall include the following information:

- Sample Number
- Analysis requested
- Type of sample (water)
- Whether it is a composite, grab, or replicate sample
- Location of sample taken
- Data type (FEMP)
- Sample destination
- Requestors name, organization, and telephone number.

12.6 CALIBRATION PROCEDURES

Calibration of N Reactor Fuels Fabrication Facility measuring and test equipment, whether in existing inventory or purchased for this FEMP, shall be controlled as required by Quality Regulation (QR) 12.0, "Control of Measuring

and Test Equipment," Quality Instruction (QI) 12.1, "Acquisition and Calibration of Portable Measuring and Test Equipment," and QI 12.2 "Measuring and Test Equipment Calibration by User" (WHC 1988).

Calibration of N Reactor Fuels Fabrication Facility, participant contractor, or subcontractor laboratory analytical equipment shall be as defined by applicable standard methods (Tables 9-1, 9-4, and 9-5) and Westinghouse Hanford OSM approved analytical procedures and laboratory QAPP.

12.7 ANALYTICAL PROCEDURES

Analytical methods or procedures based on the reference methods identified in Tables 9-1, 9-4, and 9-5 and Section 12.4 shall be selected or developed and approved prior to use in compliance with appropriate N Reactor procedures, work orders, and/or procurement control requirements.

12.8 DATA REDUCTION, VALIDATION, AND REPORTING

12.8.1 Data Reduction and Data Package Preparation

Analytical laboratories shall be responsible for preparing a report summarizing the results of analysis and for preparing a detailed data package that includes information necessary to perform data validation to the extent indicated by the requirement set by OSM. Data reporting requirements and data package content shall comply with the appropriate requirements of EPA SW-846 (EPA 1986) and the contractor statement of work. These requirements shall be defined in work order or procurement documentation, subject to Westinghouse Hanford review and approval. Figure 12-2 presents the data reduction, validation, review, and reporting process in flow chart format.

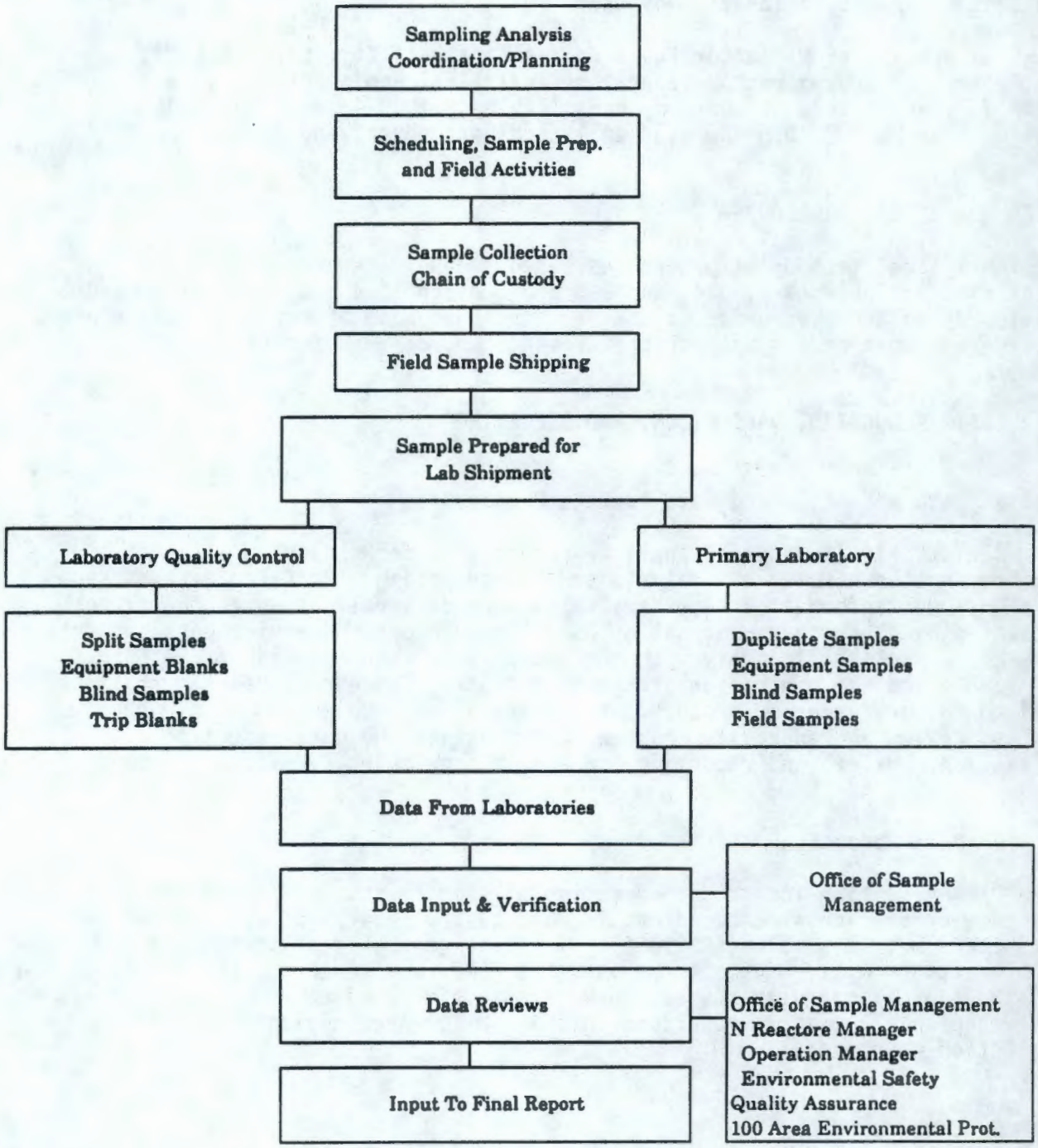
12.8.2 Data Reduction

Data reduction includes computation of summary statistics and their standard errors, confidence intervals, and test of analysis relative to the parameters met in SW-846 (EPA 1986). The data generated at the site and/or in the laboratory will be used to satisfy the FEMP requirements. The equations and the typical calculations sequence which is followed to reduce the data to the acceptable format is described in the OSM/300 Area environmental protection procedures.

12.8.3 Background Data

Background data produced for internal records and not reported as part of the analytical data could include the following: laboratory worksheets, laboratory notebooks, sample tracking system forms, instrument logs, standards records, maintenance records, calibration records, and associated quality control records. These sources shall be available for inspection during audits, and to determine the validity of data. Location of such filed data will be determined by the N Reactor Fuel Supply manager. Data from other

Figure 12-2. Data Reduction, Validation, Review, and Reporting Process.



sources shall not be used in analysis or reports until the N Reactor Fuel Supply manager can be assured that the data was collected and analyzed according to the data management plan and SW-846 (EPA 1986) procedures and protocols.

12.9 QUALITY CONTROL PROGRAM

FEMP samples shall be subject to in-process quality control measures in both field and laboratory. The quality control program shall contain the following quality control elements:

Field duplicate samples - In each sampling period, a minimum of 5% of the total collected samples shall be duplicated, or one duplicate shall be collected for every 20 samples, whichever is greater. Duplicate samples shall be retrieved from the same sampling location using the same equipment and sampling technique, and shall be placed into two identically prepared and preserved containers.

Field duplicates shall be analyzed independently as an indication of gross errors in sampling techniques. N Reactor Water Quality Supervisor will prepare the field duplicate sample bottles.

Split samples - At the N Reactor Water Quality Supervisors direction, field or field duplicate samples may be split in the field and sent to an alternate laboratory as a performance audit of the primary laboratory. Frequency shall be determined by the N Reactor Water Quality Supervisor.

Blind samples - At the N Reactor Water Quality Supervisor direction, blind reference samples may be introduced into any sampling round as a performance audit of the primary laboratory. Blind Sample type shall be coordinated with the 222-S Laboratory.

Field blanks - Field blanks consist of pure deionized distilled water, transferred into a sample container at the site and preserved with the reagent specified for the analytes of interest. Field blanks are used as a check on reagent and environmental contamination, and shall be collected at the same frequency as full duplicate samples.

Equipment blanks - Equipment blanks consist of pure deionized distilled water washed through decontaminated sampling equipment and placed in containers identical to these used for actual field samples. Equipment blanks are used to verify the adequacy of sampling equipment decontamination procedures, and shall be collected at the same frequency as field duplicate samples.

Trip blanks - Trip blanks consist of pure deionized distilled water added to one clear sample container, accompanying each batch of container shipped to the sampling activity. Trip blanks shall be returned unopened to the laboratory, and are prepared as a check on possible contamination originating from container preparation methods, shipment, handling, storage, onsite conditions. Requirement for trip blank preparation shall be included in

procurement document of work orders to the sample container supplier and/or prepared in compliance with standard Westinghouse Hanford procurement procedures.

Matrix and spike duplicate samples - Matrix spike and matrix spike duplicate samples require the addition of a known quantity of a representative analytes of interest to the sample to measure analytical accuracy. The spike and spike duplicate samples shall be created from replicates of a field sample. Replicate sample are separate aliquots removed from the same sample container in the laboratory. The selection of spike analytes, and concentrations shall be described in the laboratory quality assurance program. One sample shall be spiked per sampling batch, or one every 20 samples, whichever is greater.

Quality control reference samples - A quality control reference sample shall be prepared from an independent standard at a concentration other than that used for calibration, but within the calibration range. Reference samples are required as an independent check on analytical techniques and methodology, and shall be run with every analytical batch, or every 20 samples, whichever is greater. Other requirements specific to laboratory analytical equipment calibration are included in Section 12.6. The minimum requirement of this section shall be included in procurement documents or work orders in compliance with standard Westinghouse Hanford procedures as noted in Section 12.2.3.

12.10 PREVENTATIVE MAINTENANCE

Measurement and testing equipment used in the field and laboratory that may affect the quality of the analytical data shall be subject to preventive maintenance that ensures minimization of measurement system downtime. Field measuring equipment maintenance instructions shall be prepared by N Reactor Fuels Fabrication Facility and shall be as defined by the approved procedures governing such equipment. Laboratories shall be responsible for performing or managing the maintenance of items of analytical equipment. Maintenance requirements, spare part lists, and instructions shall be included in individual methods or in laboratory QA plans, subject to OSM Westinghouse Hanford review approval as noted in Section 12.2.3.

12.11 CORRECTIVE ACTION

Corrective action requests required as a result of surveillance or audit activity shall be documented and dispositioned as required by QR 15.0, "Control of Nonconforming Item;" QR 15.1, "Nonconforming Item Reporting;" QR 16.0, "Corrective Action;" QR 16.1, "Trending/Trend Analysis;" and QR 16.2, "Corrective Action Reporting" (WHC 1988). Primary responsibilities for nonconformance resolution and corrective action are assigned to the N Reactor Fuel Supply Manager. Copies of all surveillance, nonconformance, audit, and corrective action documentation shall be forwarded to the FEMP QA records. The FEMP QA records location shall be specified by the N Reactor Fuel Supply Manager.

12.12 QUALITY ASSURANCE REPORTS

As previously stated in Section 12.1, project activities shall be regularly assessed by surveillance and auditing processes. Surveillance, nonconformance, audit, and corrective action documentation shall be forwarded to the FEMP QA records on completion; records location shall be specified by a N Reactor Fuel Supply manager. Records management requirement applicable to subcontractor or participant contractor shall be defined in applicable procurement document or work orders as noted in Section 12.2.3.

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13.0 INTERNAL AND EXTERNAL REVIEWS

13.1 INTERNAL REVIEWS

Upon each revision of the FEMP, the revised version will be reviewed and by all affected organizations and by the Manager of N Reactor Fuel Supply. For the 300 Area Fuels Fabrication Facilities these groups and their responsibilities with regards to the FEMP follow this procedure and are found in the N Plant Administration Manual.

13.1.1 N Reactor Fuel Supply

The Manager, N Reactor Fuel Supply is responsible for reviewing and approving the FEMP and assuring compliance of applicable operating procedures with the requirements set forth in the FEMP. This position is also responsible for administrating the operational aspects of the FEMP and directing reviews and updates to the plan.

13.1.2 N Reactor Environmental Safety

The Manager of Environmental Safety is responsible for reviewing the FEMP and assuring that all environmental safety aspects of the FEMP comply with federal and state regulations and company policy. This position is responsible for assuring the FEMP is reviewed yearly and updated every 3 yr.

13.1.3 Safety Technical Support

The Manager of Safety Technical Support is responsible for reviewing the FEMP and assuring that the FEMP requirements are reflected in the Technical Specifications, Process Standards, and the N Reactor Administration Manual. This position is also responsible for assuring that all procedural changes meet the requirements set forth in the FEMP.

13.1.4 300 Area Environmental Protection

The Manager of 300 Area Environmental Protection is responsible for reviewing the FEMP to assure adherence to company policies and requirements, as well as assuring compliance with federal and state regulations.

13.1.5 300 Area Safety Assurance

The Manager of 300 Area Safety Assurance is responsible for reviewing the FEMP to assure compliance with applicable WHC rules and federal, state, and local regulations.

13.1.6 N Reactor Quality Assurance

The Manager of N Reactor Quality Assurance is responsible for reviewing the FEMP to assure that all the applicable company Quality Assurance requirements and guidelines are met.

13.2 EXTERNAL REVIEW

DOE Field Office, Richland

The RL is responsible for reviewing and approving the FEMP to assure that the plan complies with all applicable environmental protection laws, regulations, and directives. The RL is responsible for oversight, confirmation, independent verification of contractor programs, including the FEMP program, and performing program appraisals in connection with the FEMP.

14.0 COMPLIANCE ASSESSMENT

14.1 COMPARISON OF INSTRUMENT SPECIFICATIONS WITH REQUIRED STANDARD

The 300 Area Fuels Fabrication Facility is shutdown, the airborne effluent monitoring program is a sampling program with no direct monitoring instrumentation for the detection of radionuclides.

The standard that applies to the effluent monitoring instrumentation is ANSI N42.18-1980, *Specification and Performance of On-Site Instrumentation for Continuously Monitoring Radioactivity in Effluents* (ANSI 1980). However, presently there are no continuous monitoring of effluents at the Fuels Fabrication Facility. Consequently, the standard does not apply to the current fuels fabrication sampling methods.

The guiding DOE document for liquid effluents at 300 Area fuels is the *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance*, DOE/EH-0173T (DOE/EH 1991).

14.2 COMPARISON OF INSTRUMENT SPECIFICATIONS WITH MONITORING CRITERIA

The criteria for both monitoring and sampling instrumentation for radiological effluents are contained in the DOE/EH-0173T (DOE/EH 1991). The liquid effluent instrument criteria are contained in Section 2 and the airborne effluent sampling criteria are in Section 3.

14.2.1 Airborne Effluent Sampling Criteria

The release of airborne effluents has ended, therefore, no requirement exists for airborne sampling.

14.2.2 Liquid Effluent Sampling Criteria

The sampling system design criteria given in DOE/EH-0173T (DOE/EH 1991) states there are four basic liquid effluent sampling alternatives. They are the following:

- Off-line periodic-grab samples of waste streams taken periodically
- Off-line sequential-used when stream flow-rate is relatively constant
- Off-line proportional-known fraction of the effluent is constantly collected before laboratory analysis
- Off-line continuous-samples collected continuously at a known uniform rate.

The DOE/EH-0173T (DOE/EH 1991) criteria for sampling liquid effluents indicates the following be considered when operating a liquid effluent system.

- Location of sampling system.
- Use of sample pumps where it is necessary to provide a uniform continuous flow.
- A redundant sampling system or one of the following:
  - A substitute sample transport system
  - The capability to shut the system down for fast repair
  - An alternate system for estimating releases if the system is not operating.
- Location of sample lines such as to allow for complete effluent mixing and sample port design to ensure proportional sampling.
- Capability to determine effluent stream and sample line flows with an accuracy of $\pm$10%.

14.2.3 Liquid Effluent Sampling System Evaluation

Other liquid effluent considerations include the characteristics of the stream flow. The DOE/EH-0173T (DOE/EH 1991) states "variability in the flow rate of liquid effluents may be the most significant variable in sample calculations." It recommends that continuous monitoring of effluent streams be performed. However, if that is not feasible for a specific effluent stream, the extenuating circumstances shall be documented in the effluent monitoring plan.

The flow rate of liquids in the trenches have decreased significantly since the cessation of the fuel fabrication processes. The average flow rate in the last year (1986) of fuel fabrication was 533 gal/min (based upon 365 d/yr). The current estimate for the flow rate in the trenches is 2.5 gal/min and 2.1 gal/min for Buildings 313 and 333, respectively. This low flow rate is primarily steam condensate and water from the building coolers. Consequently, the reduced flow rate and the low probability on introducing either radiological or chemical elements into the process sewer from the fuels fabrication buildings, it is not prudent to use a continuous sampling system.

The sampling alternative that is recommended to be used is the off-line periodic grab sample. This alternative is consistent with sampling statements made in Section 2.3 of DOE/EH-0173T (DOE 1991) which states "...grab sampling is suitable for ensuring that previously determined release rates have not changed significantly..." Also, because of the flow rate of effluent introduction probability, the location of the sampling system is the one criteria that applies to the 300 Area Fuels Fabrication Facilities. It is recommended the trench sumps be the collection point.

14.3 COMPARISON OF INSTRUMENT SPECIFICATIONS WITH EFFLUENT CHARACTERISTICS

As noted in Section 14.1, there is no current continuous monitoring of effluents in the 300 Area Fuels Fabrication Facility. If there are changes in the status of the Fuel Fabrication Facility, the FEMP shall be reviewed and changes made accordingly.

The recommended effluent sampling system is appropriate for the shutdown status of the facility.

14.4 COMPARISON OF PROJECTED EFFLUENT CHARACTERISTICS WITH HISTORICAL DATA

When the Fuels Fabrication Facility was operating the airborne effluent, contained only isotopes of uranium and beryllium and the major chemical effluent was NO_x. Since the facilities are shutdown, airborne effluent discharges have been virtually eliminated. Liquid effluent releases have decreased by 99.5%.

Based on the status of the Fuels Fabrication Facility (current and projected), it is natural to anticipate the reduction of radionuclides and chemicals being discharged. Therefore, the recommended grab sampling method remains the most prudent.

14.5 COMPARISON OF EFFLUENT MONITORING CAPABILITIES WITH REGULATORY AND CONTRACTOR REQUIREMENTS

The effluent monitoring/sampling systems at the 300 Area Fuels Fabrication Facilities were compared to the following regulatory documents:

- 40 CFR 61, Subpart H (EPA 1989c)
- 40 CFR 61, Appendix B, Method 114 (EPA 1989c)
- DOE Order 5400.1 (DOE 1988a)
- DOE/EH-0173T (DOE/EH 1991)
- WAC 173-480-070 (WAC 1986).

The detailed results of these comparisons with the specific requirements of the documents are contained in Section 16.2. A summary of the major areas of noncompliance with the requirements is provided below.

The requirements of 40 CFR 61, Subpart H (EPA 1989c) does not apply because the Fuels Fabrication Facility is shutdown, ventilation systems secured and the source of airborne radioactive effluents removed.

The comparison with the requirements of DOE Order 5400.1 (DOE 1988a) identified weaknesses in areas of the annual Site Environmental Report, environmental monitoring general compliance, radiological monitoring and quality assurance and data verification.

The comparison with the DOE *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance* (DOE/EH 1991)

identified weakness in the assurance program for the sampling/monitoring activities; and the lack of timeliness in obtaining sample analysis results.

The comparison of the systems with the requirements of WAC 173-480-070 (WAC 1986) showed that all of the specific applicable requirements were met.

14.6 EXEMPTIONS

There are no exemptions to the standards nor are any anticipated.

14.7 SYSTEM UPGRADES REQUIRED FOR COMPLIANCE

Based on the review of the current effluent sampling alternatives performed in the preceding sections due to the low flow in the process trenches, a dam or weir should be installed to enhance the collection of liquid samples.

15.0 SUMMARY AND CONCLUSIONS

15.1 AIRBORNE EFFLUENT RELEASE POINT CONCLUSION

The measurement of 300 Area fuels fabrication facilities airborne releases as discussed in the Facility Effluent Monitoring Plan has been identified as a non issue because of the cessation of airborne effluent releases.

15.2 LIQUID EFFLUENT RELEASE POINT CONCLUSIONS

The liquid effluents from the Fuels Fabrication Facilities are monitored as outlined in the Facility Effluent Monitoring Plan, Tables 9-4 and 9-5. Composite samples will be obtained quarterly and analyzed as stated in Table 9-4 to ensure that effluents are not exceeding regulatory requirements.

15.3 COMPLIANCE ASSESSMENT

The compliance assessment in the Facility Effluent Monitoring. Plan shows the current effluent monitoring does not meet DOE orders, EPA regulations, or Washington State regulations. Sections 14.5 and 16.2 identify the shortcomings of program, which will be addressed as part of a future effluent monitoring corrective action program.

15.4 RECOMMENDATIONS

It is recommended that the 300 Area Fuels Fabrication Facility Effluent Monitoring Program be upgraded to meet the requirements of DOE, EPA, and Washington State. It is also recommended the 300 Area N Fuels Fabrication Facility FEMP be updated when the facility complies with DOE, EPA, and Washington State requirements.

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16.0 ATTACHMENTS

16.1 REFERENCES

ANSI, 1980, *Specification and Performance of On-Site Instrumentation for Continuously Monitoring Radioactivity in Effluents*, N42.18, American National Standards Institute, New York, New York.

ANSI/ASME, 1986, *Quality Assurance Program Requirements for Nuclear Facilities*, NQA-1-C-1986, American National Standards Institute and American Society of Mechanical Engineers, New York, New York.

Atomic Energy Act of 1954, as amended, 41 USC 2011.

Clean Air Act of 1977, as amended, 33 USC 7401.

Clean Water Act of 1977, as amended, 33 USC 1251.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980.

DOE, 1981, *Environmental Protection, Safety, and Health Protection Information Reporting Requirements*, DOE Order 5484.1, U.S. Department of Energy, Washington, D.C.

DOE, 1986a, *Safety of Department of Energy-Owned Nuclear Reactors*, DOE Order 5480.6, U.S. Department of Energy, Washington, D.C.

DOE, 1987, *Environment, Safety, Health, and Quality Assurance Appraisal and Surveillance Program*, DOE Order 5482.1B, U.S. Department of Energy, Washington, D.C.

DOE, 1988a, *General Environmental Protection Program*, DOE Order 5400.1, U.S. Department of Energy, Washington, D.C.

DOE, 1988b, *Radioactive Waste Management*, DOE Order 5820.2A, U.S. Department of Energy, Washington, D.C.

DOE, 1990a, *Radiation Protection of the Public and the Environment*, DOE Order 5400.5, U.S. Department of Energy, Washington, D.C.

DOE, 1990b, *Quality Assurance*, DOE Order 5700.6B, U.S. Department of Energy, Washington, D.C.

DOE, 1990c, *Occurrence Reporting and Processing of Operations Information*, DOE Order 5000.3A, U.S. Department of Energy, Washington, D.C.

DOE, 1991, *Quality Assurance*, DOE Order 5700.6C, U.S. Department of Energy, Washington, D.C.

DOE/RL, 1983, *Quality Assurance*, DOE/RL Order 5700.1A, U.S. Department of Energy Field Office, Richland, Richland, Washington.

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Ecology, 1981, *Authorization to Discharge Under the National Pollutant Discharge Elimination System*, NPDES Permit WA-000374-3, Washington State Department of Ecology, Olympia, Washington.

EPA, 1983, *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans*, QAMS-005/80, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1986, *Test Methods for Evaluating Solid Wastes*, SW-846, Third Edition, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

EPA, 1988, *National Primary Drinking Water Regulations*, Title 40, Code of Federal Regulations, Part 141, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1989a, "Designation, Reportable Quantities, and Notification," Title 40, Code of Federal Regulations, Part 302, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1989b, "Identification and Listing of Hazardous Waste," Title 40, Code of Federal Regulations, Part 261, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1989c, *National Emissions Standards for Hazardous Air Pollutants*, Title 40, Code of Federal Regulations, Part 61, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1989d, "Hazardous Waste Management System," Title 40, Code of Federal Regulations, Part 260, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1989e, "Emergency Planning and Notification," Title 40, Code of Federal Regulations, Part 355, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1990a, *Steam Electric Power Generating Point Source Category*, Title 40, Code of Federal Regulations, Part 423, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1990b, "Hazardous Chemical Reporting," Title 40, Code of Federal Regulations, Part 370, U.S. Environmental Protection Agency, Washington, D.C.

Federal Water Pollution Control Act of 1948, as amended, 33 USC 1251, et seq.

MOU, 1989, *Memorandum of Understanding*, Pacific Northwest Laboratory and Westinghouse Hanford Company, Richland, Washington.

RCW, 1945, *Water Pollution Control Act of 1945*, RCW 90.48, Revised Code of Washington, Olympia, Washington.

RCW, 1974, *Washington Clean Air Act*, RCW 70.94, Revised Code of Washington, Olympia, Washington.

Resource Conservation and Recovery Act of 1976, as amended, 42 USC 6901.

Schmidt, J. W., C. R. Huckfeldt, A. R. Johnson, and S. M. McKinney, 1990, *Westinghouse Hanford Company Environmental Surveillance Annual Report--200/600 Area*, WHC-EP-0145-2, Westinghouse Hanford Company, Richland, Washington.

Superfund Amendments and Reauthorization Act of 1986, as amended, Public Law 99-499, 42 USC 11001 et seq.

WAC, 1986, *Ambient Air Quality Standards and Emission Limits for Radionuclides*, WAC 173-480, Washington State Department of Ecology, Olympia, Washington.

WAC, 1987, *Water Quality Standards for Ground Waters of the State of Washington*, WAC 173-200, Washington State Department of Ecology, Olympia, Washington.

WAC, 1988, "National Pollutant Discharge Elimination System Permit Program," WAC 173-220, Washington State Department of Ecology, Olympia, Washington.

WAC, 1989a, *Dangerous Waste Regulations*, Washington Administration Code 173-303, as amended, Washington State Department of Ecology, Olympia, Washington.

WAC, 1990, *General Regulations for Air Pollution Control Sources*, WAC 173-400, Washington State Department of Ecology, Olympia, Washington.

WHC, 1988a, *Environmental Compliance Verification Program Manual*, WHC-CM-7-5, Westinghouse Hanford Company, Richland, Washington.

WHC, 1988b, *Quality Assurance Manual*, WHC-CM-4-2, Westinghouse Hanford Company, Richland, Washington.

WHC, 1989a, *Environmental Compliance Verification Program Manual*, WHC-CM-7-6, Westinghouse Hanford Company, Richland, Washington.

WHC, 1989b, *Management Regulations and Procedures*, WHC-CM-1-3, Westinghouse Hanford Company, Richland, Washington.

WHC, 1989c, *Operational Environmental Monitoring*, WHC-CM-7-4, Westinghouse Hanford Company, Richland, Washington.

WHC, 1990, *Hazardous and Radiological Waste Control Manual*, WHC-NR-M-12, Westinghouse Hanford Company, Richland, Washington.

WHC, 1991a, *Facility Effluent Monitoring Plan Determination for the 300 Area Facilities*, WHC-EP-0441, Westinghouse Hanford Company, Richland, Washington.

WHC, 1991b, *Quality Assurance Project Plan for the Facility Effluent Monitoring Plan Activities*, WHC-EP-0446, Westinghouse Hanford Company, Richland, Washington.

WHC, 1991c, *Management Plan for Facility Effluent Monitoring Plan Activities*, WHC-EP-0491, Westinghouse Hanford Company, Richland, Washington.

WHC, 1991d, *222-S Laboratory Procedures*, "Preparation of Sample Mounts for Gamma Energy Analysis," LA-548-121, Westinghouse Hanford Company, Richland, Washington.

16.2 CROSS REFERENCE INDEX

This section provides tables that highlight the applicable sections of the requirements documents. Table 16-1 lists the applicable sections of DOE Order 5400.1 (DOE 1988a). Table 16-2 covers 40 CFR 61, Subpart H (EPA 1989c). Table 16-3 provides the applicable information from EPA SW-846 (EPA 1986). Table 16-4 covers Section 2.0 of DOE/EH-173T (DOE/EH 1991). Tables 16-5 and 16-6 cover Sections 7.0 and 10.0, respectively of the same document. Table 16-7 covers WAC 173-400 (WAC 1990) and Table 16-8 covers WAC 173-480 (WAC 1986).

16.3 RELEASE POINT SPECIFICATIONS

16.3.1 Airborne Effluent Release Point Specifications

No airborne effluents are being released from these facilities. All release points have been deactivated and the equipment has been removed.

16.3.2 Liquid Effluent Release Point Specifications

16.3.2.1 313 Building Process Sewer. Grab samples for the 313 Building process sewer will be taken just east of the MO-052 trailer. This location was chosen because it is downstream from all 313 facility connections, but is still upstream from any 333 facility connections.

16.3.2.2 333 Building Process Sewer. Grab samples for the 333 Building process sewer will be taken just east of the MO-052 trailer. This location was chosen because it is downstream from all 333 facility connections, but is still upstream from any 313 facility connections.

Table 16-1. U.S. Department of Energy Order 5400.1. (5 sheets)

Section	Requirement	Yes	No	Remarks
Chapter 2 Sec. 4c	ANNUAL SITE ENVIRONMENTAL REPORT. All DOE facilities that conduct significant environmental protection programs shall prepare an Annual Site Environmental Report. Environmental reports covering the previous calendar year shall be prepared annually and distributed by June 1 to EH-1 (10 copies), appropriate PSOs, the Office of Scientific and Technical Information, the Environmental Protection Agency, and to other agencies and organizations, as appropriate.		No	Annual Site Environmental Reports are not submitted to EH-1 by June 1. However, effluent and environmental reports have been completed later in the year.
Chapter 2 Sec. 5A	REPORTS ON RADIOACTIVE EFFLUENT/ONSITE DISCHARGE/UNPLANNED RELEASES. Radioactive Effluent and Onsite Discharge Data Reports covering the previous calendar year shall be submitted to the Waste Information Systems Branch, EG&G Idaho, Inc., Idaho Falls, Idaho 83415, by April 1; a copy of the cover letter shall be sent to EH-1.	Yes		Radioactive effluent reports have been submitted to Waste Information Systems Branch, EG&G Idaho, Inc. by April 1.
Chapter 2 Sec. 5b	REPORTS ON RADIOACTIVE EFFLUENT/ONSITE DISCHARGE/UNPLANNED RELEASES. Unplanned releases of radioactive materials in effluents, such as spills, leaks, etc., whether onsite or offsite, also shall be reported to the Information System Branch, EG&G Idaho, Inc., on Form DOE F 5821.1. This is in addition to meeting the occurrence reporting requirements of DOE 5000.3A.	Yes		Reports on Radioactive Effluents/Onsite discharges/Unplanned Releases are submitted to Information System Branch, EG&G Idaho, Inc.

Section	Requirement	Yes	No	Remarks
Chapter 4 Sec. 4	ENVIRONMENTAL MONITORING PLANS. A written environmental monitoring plan shall be prepared for each site, facility, or process that uses, generates, releases, or manages significant pollutants or hazardous materials. The plan shall contain the rationale and design criteria for the monitoring program, extent and frequency of monitoring and measurements, procedures for laboratory analyses, quality assurance requirements, program implementation procedures, and direction for the preparation and disposition of reports. The plan shall be approved by the appropriate Head of Field Organization, or his or her designee. The plan shall be reviewed annually and updated as needed. The plan shall identify and discuss two major activities: (a) effluent monitoring and (b) environmental surveillance. The plan shall reflect the importance of monitoring as a critical element of an effective environmental protection program. The plan shall be reviewed annually and updated every 3 yr.	Yes		Westinghouse Hanford currently has an effluent monitoring program that is described in WHC-CM-7-3 (WHC 1988c) Effluent Monitoring Program-100 Areas. This program will be replaced with the 300 Area Fuels Fabrication Facility FEMP being developed for implementation by November 9, 1991.
Chapter 4 Sec. 5a2a	ENVIRONMENTAL MONITORING - GENERAL REQUIREMENTS. Effluent monitoring shall comply with applicable regulations and shall be conducted to provide representative measurements of the quantities and concentrations of pollutants in liquid and airborne discharges, and solid wastes. Monitoring Stations. Effluents from onsite waste treatment or disposal systems shall be monitored in accordance with applicable regulations. Influents to onsite waste treatment or disposal systems should be monitored as needed.		No	The current effluent monitoring program does not comply fully with the current DOE and EPA regulations. The 300 Area Fuels Fabrication Facility FEMP currently being developed will meet the current/applicable regulations.

Table 16-1. U.S. Department of Energy Order 5400.1. (5 Sheets)

Section	Requirement	Yes	No	Remarks
Chapter 4 Sec. 5a2c&d	Sample Analysis. Standard analyses shall be used to analyze samples whenever such methods are required by regulatory programs. Exemptions due to analytical problems or for non-routine analyses may be employed after receiving approval from the appropriate regulatory agency. Monitoring Data Recordkeeping. Auditable records shall be established in accordance with the requirements of DOE 5700.6B.	N/A		There are no analyses required by regulatory programs applicable to releases from the 300 Area Fuels Fabrication Facility.
Chapter 4 Sec. b1	Environmental Surveillance. Environmental surveillance shall be conducted to monitor the effects, if any, of DOE activities onsite and offsite environmental and natural resources. An environmental surveillance screening program shall be undertaken at DOE sites to determine the need for a permanent surveillance program. Environmental surveillance shall be designed to satisfy one or more of the following program objectives; (a) Verify compliance with applicable environmental laws and regulations; (b) Verify compliance with environmental commitments made in Environmental Impact Statements, Environmental Assessments, Safety Analysis Reports, or other official DOE documents; (e) Provide a continuing assessment of pollution abatement programs.	Yes		An environmental surveillance program is conducted by Westinghouse Hanford in the near field area adjacent to the 300 Area and PNL provides the Site environmental surveillance program.
Chapter 4 Sec. 7a	RADIOLOGICAL MONITORING. Airborne radiation and radioactive materials discharged from DOE facilities shall comply with the requirements of 40 CFR Part 61, "National Emission Standards for Hazardous Air Pollutants."	N/A		All airborne release points in the 300 Area Fuels Fabrication Facility have been deactivated. Therefore, this section is not applicable.

Section	Requirement	Yes	No	Remarks
Chapter 4 Sec. 8a1	NON-RADIOLOGICAL MONITORING. Air Monitoring - Emissions. Air emission monitoring shall be in accordance with the requirements of applicable Federal, State, and local regulations authorized by the *Clean Air Act of 1977* (42 U.S.C 7401, et. seq.). Section 118 of the Act specifically addresses the control of airborne pollution from federal facilities. Design of air quality monitoring programs should be undertaken with a thorough understanding of the complex framework of air quality management.	N/A		All airborne release points in the 300 Area Fuels Fabrication Facility have been deactivated. Therefore, this section is not applicable.
Chapter 4 Sec. 8a2	NON-RADIOLOGICAL MONITORING. Air Monitoring - Emissions. Where applicable, DOE facilities shall comply with monitoring requirements discussed in 40 CFR Part 60, which includes monitoring of fossil fuel combustion sources and associated test methods.	N/A		All airborne release points in the 300 Area Fuels Fabrication Facility have been deactivated. Therefore, this section is not applicable.
Chapter 4 Sec. 8a3	NON-RADIOLOGICAL MONITORING. Air Monitoring - Emissions. Large permanent facilities or modification to such facilities may require a Prevention of Significant Deterioration (PSD) permit prior to construction. In addition to pre- and most post-operational emission testing, the permit process may require up to a year of meteorological and ambient air quality monitoring. Monitoring shall conform to the EPA PSD monitoring regulations (40 CFR Part 58) which contain siting, quality assurance, and accuracy requirements.	N/A		All airborne release points in the 300 Area Fuels Fabrication Facility have been deactivated. Therefore, this section is not applicable.
Chapter 4 Sec. 8c1	NON-RADIOLOGICAL MONITORING. Water Monitoring - Effluents. Under the authority of the Clean Water Act (33 USC 1251, et. seq.), EPA has promulgated regulations for monitoring liquid effluent discharges. In the National Pollutant Discharge Elimination System (NPDES) established by section 402, the EPA Administrator, or States with approved programs.	Yes		The liquid effluent from 300 Area Fuels Fabrication Facility are being monitored as required by 40 CFR 302 (EPA 1989a) for hazardous waste and Westinghouse Hanford OSM requirements.

Table 16-1. U.S. Department of Energy Order 5400.1. (5 sheets)

Section	Requirement	Yes	No	Remarks
Chapter 4 Sec. 10a	QUALITY ASSURANCE AND DATA VERIFICATION. Quality Assurance. A quality assurance program consistent with DOE 5700.6B shall be established covering each element of environmental monitoring and surveillance programs commensurate with its nature and complexity. The quality assurance program shall include, but not be limited to, the following: (1) Organizational responsibility; (2) Program design; (3) Procedures; (4) Field quality control; (5) Laboratory quality control; (6) Human factors; (7) Recordkeeping; (8) Chain-of-custody procedures; (9) Audits; (10) Performance reporting; and (11) Independent data verification.		No	The current effluent monitoring program does not fully meet the elements of a QA program consistent with DOE 5700.6B (DOE 1986). However, the 300 Area Fuels Fabrication Facility FEMP is being developed with the intent of meeting these requirements. There is currently no data verification by an independent group. The QAPP that was developed for the Hanford Site will correct this deficiency.
Chapter 4 Sec. 10c	QUALITY ASSURANCE AND DATA VERIFICATION. DOE Laboratory Quality Assessment Program for Radioactive Material. All DOE and contractor laboratories that conduct analytical work in support of DOE environmental radiological monitoring programs for radioactive materials shall participate in the DOE interlaboratory quality assurance program coordinated by the DOE Environmental Measurements Laboratory, New York, New York. Guidelines and procedures for this program shall be issued annually by EH-1.	Yes		The current effluent monitoring program does not participate in the DOE interlaboratory quality assurance program coordinated by DOE Environmental Measurements Laboratory, NY, N.Y. However, Westinghouse Hanford does participate in the quality assurance program from Brookhaven National Laboratories and the Cincinnati Laboratories (Taft Engineering Laboratories).

Table 16-2. Subpart H-National Emission Standards for Emissions of Radionuclides Other than Radon from the U.S. Department of Energy Facilities. (5 sheets)

Section	Requirement	Yes	No	Remarks
61.93 Emission monitoring and test procedures	To determine compliance with the standard, radionuclide emissions shall be determined and effective dose equivalent values to members of the public calculated using EPA approved sampling procedures, computer models CAP-88 or AIRDOS-PC, or other procedures for which EPA has granted prior approval.	N/A		A FEMP Determination report has been completed for 300 Area Fuels Fabrication Facility. There are no active airborne release points. All airborne release points have been deactivated, therefore this section is not applicable.
61.93(b)	Radionuclide emission rates from point sources (stacks or vents) shall be measured in accordance with the following requirements or other procedures for which EPA has granted prior approval: (1) Effluent flow rate measurements shall be made using the following methods: (i) Reference Method 2 of Appendix A to part 60 shall be used to determine velocity and volumetric flow rates for stacks and large vents. (ii) Reference Method 2A of Appendix A to part 60 shall be used to measure flow rates through pipes and small vents. (iii) The frequency of the flow rate measurements shall depend upon the variability of the effluent flow rate. For variable flow rates, continuous or frequent flow rate measurements shall be made. For relatively constant flow rates only periodic measurements are necessary.	N/A		There are no active airborne release points. All airborne release points have been deactivated, therefore this section is not applicable.

Table 16-2. Subpart H-National Emission Standards for Emissions of Radionuclides Other than Radon from the U.S. Department of Energy Facilities. (5 sheets)

Section	Requirement	Yes	No	Remarks
61.93(b)(2)	Radionuclides shall be directly monitored or extracted, collected and measured using the following methods: (i) Reference Method 1 of Appendix A Part 60 shall be used to select monitoring or sampling sites. (ii) The effluent stream shall be directly monitored continuously with an in-line detector or representative samples of the effluent stream shall be withdrawn continuously from the sampling site following the guidance presented in ANSI N13.1-1969 "Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities" (including the guidance presented in Appendix A of ANSI N13.1) The requirements for continuous sampling are applicable to batch processes when the unit is in operation. Periodic sampling (grab samples) may be used only with EPAs prior approval. Such approval may be granted in cases where continuous sampling is not practical and radionuclides emission rates are relatively constant. In such cases, grab samples shall be collected with sufficient frequency so as to provide a representative sample of the emissions.	N/A		There are no active airborne release points. All airborne release points have been deactivated, therefore this section is not applicable.
61.93(b)(2)(iii)	Radionuclides shall be collected and measured using procedures based on the principles of measurement described in Appendix B, Method 114. Use of methods based on principles of measurement different from those described in Appendix B, Method 114 must have prior approval from the Administrator. EPA reserves the right to approve measurement procedures.	N/A		A FEMP Determination report has been completed for 300 Area Fuels Fabrication Facility. There are no active airborne release points. All airborne release points have been deactivated, therefore this section is not applicable.

Table 16-2. Subpart H-National Emissions Standards for Emissions of Radionuclides Other than Radon from the U.S. Department of Energy Facilities. (5 sheets)

Section	Requirement	Yes	No	Remarks
61.93(b)(2)(iv)	A quality assurance program shall be conducted that meets the performance requirements described in Appendix B, Method 114.	N/A		There are no active airborne release points. All airborne release points have been deactivated, therefore this section is not applicable.
61.93(b)(4)(i)	Radionuclides emission measurements in conformance with the requirements of paragraph (b) of this section shall be made at all release points which have a potential to discharge radionuclides into the air in quantities which could cause an effective dose equivalent in excess of 1% of the standard. All radionuclides which could contribute greater than 10% of the potential effective dose equivalent for a release point shall be measured. With prior EPA approval, DOE may determine these emissions through alternative procedures.	N/A		Radionuclide emission measurements in conformance with paragraph (b) are made at the significant effluent release points that have potential to release radionuclides. However, the measurements do not fully meet the intent or requirements of Subpart H. A FEMP Determination report has been completed for 300 Area Fuels Fabrication Facility. There are no active airborne release points. All airborne release points have been deactivated, therefore this section is not applicable.
61.93(b)(4)(ii)	To determine whether a release point is subject to the emission measurement requirements of paragraph (b) of this section, it is necessary to evaluate the potential for radionuclides emissions for that release point. In evaluation the potential of a release point to discharge radionuclides into the air for the purposes of this section, the estimated radionuclides release rates shall be based on the discharge of the effluent stream that would result if all pollution control equipment did not exist, but the facilities operations were otherwise normal.	N/A		There are no active airborne release points. All airborne release points have been deactivated, therefore this section is not applicable.

Table 16-2. Subpart H-National Emission Standards for Emissions of Radionuclides Other than Radon from the U.S. Department of Energy Facilities. (5 sheets)

Section	Requirement	Yes	No	Remarks
61.93(b)(5)(v)	A quality assurance program shall be conducted that meets the performance requirements described in Appendix B, Method 114.	N/A		There are no active airborne release points. All airborne release points have been deactivated, therefore this section is not applicable.
61.94(b) Compliance and reporting	In addition to the requirements of paragraph (a) of this section, an annual report shall include the following information: (1) The name and location of the facility. (2) A list of the radioactive materials used at the facility. (3) A description of the handling and processing that the radioactive materials undergo at the facility. (4) A list of the stacks or vents or other points where radioactive materials are released to the atmosphere. (5) A description of the effluent controls that are used on each stack, vent, or other release point and an estimate of the efficiency of each control device. (6) Distances from the points of release to the nearest residence, school, business or office and the nearest farms producing vegetables, milk, and meat. (7) The values used for all other user supplied input parameters for the computer models (e.g., meteorological data) and the source of these data. (8) A brief description of all construction and modifications which were completed in the calendar year for which the report is prepared, but for which the requirement to apply for approval to construct or modify was waived under 91.96 and associated documentation developed by DOE to support the waiver.	N/A		An Annual Effluent Report is completed each year; however, the report does not contain all of the information required in 40 CFR 61.94(b) Compliance and reporting. A FEMP Determination report has been completed for 300 Area Fuels Fabrication Facility. There are no active airborne release points. All airborne release points have been deactivated, therefore this section is not applicable.

Table 16-2. Subpart H-National Emission Standards for Emissions of Radionuclides Other than Radon from the U.S. Department of Energy Facilities. (5 sheets)

Section	Requirement	Yes	No	Remarks
61.94(c)	If the facility is not in compliance with the emission limits of 61.92 in the calendar year covered by the report, then the facility must commence reporting to the Administrator on a monthly basis the information listed in paragraph (b) of this section, for the preceding month. These reports will start the month immediately following the submittal of the annual report for the year in noncompliance and will be due 30 d following the end of each month. This increased level of reporting will continue until the Administrator has determined that the monthly reports are no longer necessary.	N/A		300 Area is in compliance with the emission limits of 40 CFR Part 61.92. A FEMP Determination report has been completed for 300 Area Fuels Fabrication Facility. There are no active airborne release points. All airborne release points have been deactivated, therefore this section is not applicable.
61.95 Recordkeeping requirements.	All facilities must maintain records documenting the source of input parameters including the results of all measurements upon which they are based, the calculations and/or analytical methods used to derive values for input parameters, and the procedure used to determine effective dose equivalent.	N/A		300 Area maintains records an documents to support the premise that 300 Area meets the requirements. A FEMP Determination report has been completed for 300 Area Fuels Fabrication Facility. There are no active airborne release points. All airborne release points have been deactivated, therefore this section is not applicable.

Table 16-3. Test Method 114 for Measuring Radionuclide Emissions from Stationary Sources. (4 sheets)

Section	Requirement	Yes	No	Remarks
4.0	Each facility required to measure their radionuclide emissions shall conduct a quality assurance program in conjunction with the radionuclide emission measurements. This program shall assure that the emission measurements are representative, and are of known precision and accuracy and shall include administrative controls to assure prompt response when emission measurements indicate unexpectedly large emissions. The program shall consist of a system of policies, organizational responsibilities, written procedures, data quality specifications, audits, corrective actions and reports. This quality assurance program shall include the following program elements:	N/A		All airborne release points have been deactivated, therefore this section is not applicable.
4.1	The organizational structure, functional responsibilities, levels of authority and lines of communications for all activities related to the emissions measurements program shall be identified and documented.	N/A		All airborne release points have been deactivated, therefore this section is not applicable.
4.2	Administrative controls shall be prescribed to ensure prompt response in the event that emission levels increase due to unplanned operations.	N/A		All airborne release points have been deactivated, therefore this section is not applicable.
4.3	The sample collection and analysis procedures used in measuring the emissions shall be described including where applicable:	N/A		The collection and analysis is described for the current program in WHC-CM-7-3 (WHC 1988c). All airborne release points have been deactivated, therefore this section is not applicable.
4.3.1	Identification of sampling sites and number of sampling points, including the rationale for site selections.	N/A		The sampling sites and number of sampling points, including rationale are documented. All airborne release points have been deactivated, therefore this section is not applicable.

Table 16-3. Test Method 114 for Measuring Radionuclide Emissions from Stationary Sources. (4 sheets)

Section	Requirement	Yes	No	Remarks
4.3.2	A description of sampling probes and representativeness of the samples.	N/A		The representativeness of the samples is documented. All airborne release points have been deactivated, therefore this section is not applicable.
4.3.3	A description of any continuous monitoring system used to measure emissions, including the sensitivity of the system, calibration procedures and frequency of calibration.	N/A		There is a description of the sensitivity of the effluent monitoring program in WHC-CM-7-3 (WHC 1988c) and the recently developed 300 Area Fuels Fabrication Facility FEMP. All airborne release points have been deactivated, therefore this section is not applicable.
4.3.4	A description of the sample collection systems for each radionuclide measured, including frequency of collection, calibration procedures and frequency of calibration.	N/A		There is a description of the sample collection systems in the 300 Area Fuels Fabrication Facility FEMP. All airborne release points have been deactivated, therefore this section is not applicable.
4.3.5	A description of the laboratory analysis procedures used for each radionuclide measured, including frequency of analysis, calibration procedures and frequency of calibration.	N/A		The laboratory analysis procedures are documented by Westinghouse Hanford at the 222-S Laboratory. All airborne release points have been deactivated, therefore this section is not applicable.
4.3.6	A description of the sample flow rate measurement systems or procedures, including calibration procedures and frequency of calibration.	N/A		There are calibration procedures and frequency of calibration. All airborne release points have been deactivated, therefore this section is not applicable.

Section	Requirement	Yes	No	Remarks
4.3.7	A description of the effluent flow rate measurement procedures, including frequency of measurements, calibration procedures and frequency of calibration.	N/A		No measurements of stack or vent flow rates exist. All airborne release points have been deactivated, therefore this section is not applicable.
4.4	The objectives of the quality assurance program shall be documented and shall state the required precision, accuracy and completeness of the emission measurement data including a description of the procedures used to assess these parameters. Accuracy is the degree of agreement of a measurement with a true or known value. Precision is a measure of the agreement among individual measurements of the same parameters under similar conditions. Completeness is a measure of the amount of valid data obtained compared to the amount of expected under normal conditions.	N/A		The accuracy and precision of the effluent measurements is documented in the WHC-CM-7-3 (WHC 1988c) and the 222-S Laboratory Procedures. All airborne release points have been deactivated, therefore this section is not applicable.
4.5	A quality control program shall be established to evaluate and track the quality of the emissions measurement data against preset criteria. The program should include where applicable a system of replicates, spiked samples, split samples, blanks and control charts. The number and frequency of such quality control checks shall be identified.	N/A		There is a quality control program covering radionuclide analysis at the 222-S Laboratory. All airborne release points have been deactivated, therefore this section is not applicable.
4.6	A sample tracking system shall be established to provide for positive identification of samples during collection, storage and analysis.	N/A		There is currently no sample tracking system. All airborne release points have been deactivated, therefore this section is not applicable.

Table 16-3. Test Method 114 for Measuring Radionuclide Emissions from Stationary Sources. (4 sheets)

Table 16-3. Test Method 114 for Measuring Radionuclide Emissions from Stationary Sources. (4 sheets)

Section	Requirement	Yes	No	Remarks
4.7	Periodic internal and external audits shall be performed to monitor compliance with the quality assurance program. These audits shall be performed in accordance with written procedures and conducted by personnel who do not have responsibility for performing any of the operations being audited.	N/A		There have been no periodic internal or external audits of the effluent monitoring system in the last 3 yr. All airborne release points have been deactivated, therefore this section is not applicable.
4.8	A corrective action program shall be established including criteria for when corrective actions will be taken and who is responsible for taking the corrective action.	N/A		There is no corrective action program that has been utilized routinely for the effluent monitoring program. All airborne release points have been deactivated, therefore this section is not applicable.
4.9	Periodic reports to responsible management shall be prepared on the performance of the emissions measurements program. These reports should include assessment of the quality of the data, results of audits and description of corrective actions.	N/A		There are no periodic reports to management concerning the effluent monitoring performance. All airborne release points have been deactivated, therefore this section is not applicable.
4.10	The quality assurance program should be documented in a quality assurance project plan which should address each of the above requirements.	N/A		The quality assurance program is documented in the 300 Area Fuels Fabrication Facility FEMP. All airborne release points have been deactivated, therefore this section is not applicable.

Table 16-4. Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance. (9 sheets)

Section	Requirement	Yes	No	Remarks
2a Liquid Effluent Monitoring	All liquid effluent streams should be evaluated and their potential for release of radioactive material assessed. Based on this assessment, decisions should be made regarding necessary effluent monitoring systems and the rationale should be documented in the Environmental Monitoring Plan.	Yes		The FEMP Determination examined and evaluated all liquid effluent streams for potential release of radioactive material and the results were used to determine necessary monitoring/sampling systems.
2b	Liquid effluents from DOE-controlled facilities that have the potential for radioactive contamination should be monitored in accordance with the requirements of DOE 5400.1 and DOE 5400.5.	Yes		The requirements for liquid effluent monitoring are met by the current sampling program and the FEMP required systems, and are also included within the QAPP developed for the Hanford Site.
2c	Facility operators should provide monitoring of liquid waste streams adequate to (1) demonstrate compliance with the requirements of DOE 5400.5, Chapter II, paragraphs 1a, 1d, 2a, and 3, (2) quantify radionuclides released from each discharge point, and (3) alert affected process supervisors of accidents in processes and emission controls.	Yes		The sampling programs provide the data necessary to meet the compliance requirements, document releases and provide indications of off normal releases.
2d	When continuous monitoring or continuous sampling is provided, the overall accuracy of the results should be determined (±% accuracy and the % confidence level) and documented in the Environmental Monitoring Plan.	Yes		The FEMP documents the accuracy of the continuous sampling systems.
2e	Provisions for monitoring of liquid effluents during an emergency should be considered when determining routine liquid effluent monitoring program needs.	Yes		The liquid effluent sampling points used were determined with consideration of emergency sampling needs.

Table 16-4. Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance. (9 sheets)

Section	Requirement	Yes	No	Remarks
2f	The selection or modification of a liquid effluent monitoring system should be based on a careful characterization of the sources(s), pollutant(s), (characteristics and quantities), sample-collection system(s), treatment system(s), and final release point(s) of the effluents.	Yes		The current review for needed modifications/improvements is covering these areas.
2g	For all new facilities or facilities that have been modified in a manner that could affect effluent release quantity or quality or that could affect the sensitivity of the monitoring or surveillance systems, a preoperational assessment should be made and documented in the Environmental Monitoring Plan to determine the types and quantities of liquid effluents to be expected from the facility and to establish the associated effluent monitoring needs of the facility.	Yes		The 300 Area Fuels Fabrication Facility FEMP assesses monitoring.
2h	The performance of the effluent monitoring systems should be sufficient for determining whether effluent releases of radioactive material are within the Derived Concentration Guides specified in DOE 5400.5 and to comply with the reporting requirements of Chapter II, paragraph 7, of that order.	Yes		Current systems are adequate to determine releases relative to DCGs.
2i	The required detection levels of the analysis and monitoring systems should be sufficient to demonstrate compliance with all regulatory requirements consistent with the characteristics of the radionuclides that are present or expected to be present in the effluent.	Yes		The analysis detection limits for samples taken are adequate to demonstrate regulatory compliance of releases.

Table 16-4. Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance. (9 sheets)

Section	Requirement	Yes	No	Remarks
2j	Sampling systems should be sufficient to collect representative samples that provide for an adequate record of releases from a facility, to predict trends, and to satisfy needs to quantify releases.	Yes		The systems used are adequate to collect representative samples of the effluents.
2k	Continuous monitoring and sampling systems should be calibrated before use and recalibrated any time they are subject to maintenance, modification, or system changes that may affect equipment calibration.		No	The continuous sampling systems in operation are not calibrated following maintenance or system modifications.
2l	Sampling and monitoring systems should be recalibrated at least annually and routinely checked with known sources to determine that they are consistently functioning properly.		No	The sampling systems are not routinely calibrated.
2m	Environmental conditions (e.g., temperature, humidity, radiation levels, dusts, and vapors) should be considered when location effluent monitoring systems to avoid conditions that will influence the operation of the system.	Yes		Locations of sample points considered the appropriate environmental conditions.
2n	Off-line liquid transport lines should be replaced if they become contaminated (to the point where the sensitivity of the system is affected) with radioactive materials or if they become ineffective in meeting the design basis within the established accuracy/confidence levels.	N/A		No indication of such levels of contamination have been observed.
2o	If continuous monitoring/sampling and recording of the effluent quantity (stream flow) is not feasible for a specific effluent stream, the extenuating circumstances should be documented in the Environmental Monitoring Plan.	N/A		Sampling appropriate to the requirement is feasible.

Table 16-4. Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance. (9 sheets)

Section	Requirement	Yes	No	Remarks
2p	Sampling/monitoring lines and components should be designed to be compatible with the chemical and biological nature of the liquid effluent.	Yes		The systems in use have lines that are compatible with the effluent and samples.
2q	The output signal instrumentation, monitoring system recorders, and alarms should be in a location that is continuously occupied by operations or security personnel.	N/A		No continuous monitor is on the system.
2r	To signal the need for corrective actions that may be necessary to prevent public or environmental exposures from exceeding the limits or recommendations given in DOE 5400.5, when continuous monitoring systems are required, they should have alarms set to provide timely warnings.	N/A		No continuous monitoring is performed.
2s	As they apply to the monitoring/sampling of liquid effluents, the general quality assurance program provisions described in Chapter 10 of this guide should be followed.		No	There are no documented audits on documented data management procedures as required by 40 CFR 61, Method 114.
3a Airborne Effluent Monitoring	All airborne emissions from each facility (DOE site) should be evaluated and their potential for release of radionuclides assessed. Based on its assessment, decisions should be made regarding necessary effluent monitoring systems and the rationale should be documented in the site Environmental Monitoring Plan. The potential for emissions should include consideration of the loss of emission controls while otherwise operating normally.	N/A		The FEMP Determination evaluated all airborne emissions and their potential for release of radioactive material. There are no active airborne release points in the 300 Area Fuels Fabrication Facility, therefore this section does not apply.

Table 16-4. Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance. (9 sheets)

Section	Requirement	Yes	No	Remarks
3b	Airborne emissions from DOE-controlled facilities that have the potential for causing doses exceeding 0.1 mrem (effective dose equivalent) to a member of the public under realistic exposure conditions from emissions in a year should be monitored in accordance with the requirements of DOE 5400.1 and DOE 5400.5.	N/A		Currently none qualify. There are no active airborne release points in the 300 Area Fuels Fabrication Facility, therefore this section does not apply.
3c	The criteria for monitoring listed in Chapter 3 of this guide should be used to establish the airborne emission monitoring programs for DOE-controlled sites.	Yes		The Regulatory Guide Chapter 3 criteria was used in developing the FEMP defined program.
3d	For all new facilities or facilities that have been modified in a manner that could affect effluent release quantity or quality or that could affect the sensitivity of monitoring or surveillance systems, a preoperational assessment should be made and documented in the site Environmental Monitoring Plan to determine the types and quantities of airborne emissions to be expected from the facility, and to establish the associated airborne emission monitoring needs of the facility.	N/A		There are no active airborne release points in the 300 Area Fuels Fabrication Facility, therefore this section does not apply.
3e	The performance of the airborne emissions monitoring systems should be sufficient for determining whether the releases of radioactive materials are within the limits or requirements specified in DOE 5400.5.	N/A		Not for all sample sites. Questions of representative samples exist for some of the sample sites.
3f	Sampling and monitoring systems should be calibrated before use and recalibrated any time they are subject to maintenance or modification that may affect equipment calibration.	N/A		Not for current sampling systems. Vacuum pump flow and exhaust flow not given by calibrated instruments.

Section	Requirement	Yes	No	Remarks
3g	Sampling and monitoring systems should be recalibrated at least annually and routinely checked with known sources to determine that they are consistently functioning properly.	N/A		There are no active airborne release points in the 300 Area Fuels Fabrication Facility, therefore this section does not apply.
3h	Provisions for monitoring of airborne emissions during accident situations should be considered when determining routine airborne emission monitoring program needs.	Yes		Provisions for sampling airborne emissions in emergency situations were considered.
3i	Diffuse sources (i.e., area sources or multiple point sources in a limited area) should be identified and assessed for their potential to contribute to public dose and should be considered in designing the site emissions monitoring and environmental surveillance program. Diffuse sources that may contribute a significant fraction (e.g., 10%) of the dose to members of the public resulting from site operations should be identified, assessed, documented, and verified annually.	N/A		The FEMP Determination considered diffuse sources in the determination of required sample locations. There are no active airborne release points in the 300 Area Fuels Fabrication Facility, therefore this section does not apply.
3j	Airborne emission sampling and monitoring systems should demonstrate that quantification of airborne emissions is timely, representative, and adequately sensitive.	N/A		Not timely when lab analysis takes weeks. Representative-not certain for system with long sample lines, no flow instrumentation, etc. There are no active airborne release points in the 300 Area Fuels Fabrication Facility, therefore this section does not apply.
3k	To the extent practicable, samples should be extracted from the effluents from a location and in a manner that provides a representative sample, using multiport probes if necessary.	N/A		With current low flows, cannot be assured. There are no active airborne release points in the 300 Area Fuels Fabrication Facility, therefore this section does not apply.

Table 16-4. Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance. (9 sheets)

Table 16-4. Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance. (9 sheets)

Section	Requirement	Yes	No	Remarks
3l	Where a significant potential (greater than once per year) exists for approaching or exceeding a large fraction of the emission standard (e.g., 20%), continuous monitoring should be required.	N/A		There are no active airborne release points in the 300 Area Fuels Fabrication Facility, therefore this section does not apply.
3m	The design of radioiodine monitors will be such that replacement of sorbent and filter should not disturb the geometry between the collector and detectors.	N/A		No radioactive iodine monitoring required-standby. There are no active airborne release points in the 300 Area Fuels Fabrication Facility, therefore this section does not apply.
3n	To signal the need for corrective actions that may be necessary to prevent public or environmental exposures exceeding the limits or recommendations given in DOE 5400.5, when continuous monitoring systems (as required by the criteria in Chapter 3) are required, they should have alarms set to provide timely warnings.	N/A		Potential does not exist. There are no active airborne release points in the 300 Area Fuels Fabrication Facility, therefore this section does not apply.
3o	As they apply to the monitoring of airborne emissions, the general quality assurance program provisions of Chapter 10 of this guide should be followed.	N/A		There are no documented audits or data management procedures as required by 40 CFR 61, Method 114. There are no active airborne release points in the 300 Area Fuels Fabrication Facility, therefore this section does not apply.
6a Laboratory Procedures	Laboratory procedures and practices should be documented in the site Environmental Monitoring Plan.	Yes		FEMP references the 222-S/Contract analysis procedures, as well as the QAPP developed for the Hanford Site.

Table 16-4. Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance. (9 sheets)

Section	Requirement	Yes	No	Remarks
6b	Each monitoring and surveillance organization should have a sample identification system that provides positive identification of samples and aliquots of samples throughout the analytical process. The system should incorporate a method for tracking all pertinent information obtained in the sampling process.	Yes		The samples are identified, labeled and entered into a log book. Chain-of-custody documentation is prepared and accompanies the samples.
6c	Each laboratory should establish and adhere to written procedures to minimize the possibility of cross-contamination between samples. High-activity samples should be kept separate from low-activity samples.	Yes		Laboratory procedure at 222-S establish cross contamination control and define requirements for handling samples based on activity.
6d	The integrity of samples should be maintained (i.e., minimize degradation of samples by using proper preservation and handling practices that are compatible with analytical methods).	Yes		222-S Laboratory procedures provide for proper handling and preservation of samples.
6e	Specific analytical methods should be identified, documented, and used to identify and quantify all radionuclides in the facility inventory or effluent that contribute 10% or more to the public dose or environmental contamination associated with the site.	Yes		The methods for analysis are documented in laboratory procedures, and in the QAPP developed for the Hanford Site.
6f	Standard analytical methods should be used for radionuclide analyses (when available). Any modification of standard methods should be documented.	Yes		The methods prescribed by procedures are EPA or other standard analyses.
6g	Methods, requirements, and necessary documentation should be specified in analytical contracts.	Yes		PNL Contract with IT Laboratories contain such specifications. These are also included within the QAPP developed for the Hanford Site.

Table 16-4. Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance. (9 sheets)

Section	Requirement	Yes	No	Remarks
6h	All sites that release or could release gamma-emitting radionuclides should have the capability (either in-house or outside) of having samples (routine, special, or emergency) analyzed by gamma-ray spectroscopy systems.	Yes		Gamma-ray spectroscopy is available when needed. The time to obtain the results, however ranges from 7 to 90 d.
6i	Counting equipment should be calibrated using, at a minimum, the calibration frequency recommendations of the manufacturers to obtain accurate results.	Yes		There are procedures in place which prescribe the calibrating requirements and frequency for the equipment used for analyses.
6j	Check sources should be counted periodically on all counters to verify that the counters are giving correct results.	Yes		Procedures for Quality Control prescribe check source counting requirements.
6k	Samples that are sent offsite for analysis or for laboratory intercomparison should be monitored for contamination and radiation levels and should be packaged in a manner that meets applicable transportation regulations and requirements.	Yes		Offsite Transport Requirements dictate procedures to be followed.
6l	As they apply to laboratory procedures, the general quality assurance program provisions of Chapter 10 of this guide should be followed.	Yes		Quality assurance and quality control are provided through audits and appraisals of laboratory and performance.
7a Data Analysis and Statistical Treatment	The statistical techniques used to support the concentration estimates, to determine their corresponding measures of reliability, and to compare radionuclide data between sampling and/or measurement points and times should be designed with consideration of the characteristics of effluent and environmental data.	Yes		The statistical techniques used are designed with the effluent characteristics and environmental data as considerations.

Table 16-5. Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance. (2 sheets)

Section	Requirement	Yes	No	Remarks
7b	Documented and approved sampling, samplehandling, analysis, and data management techniques should be used to reduce the variability of results.		No	Currently such procedures are not documented. They are included within the QAPP developed for the Hanford Site.
7c	The level of confidence in the data due to the radiological analyses should be estimated by analyzing blanks and spiked pseudosamples and by comparing the resulting concentration estimates to the known concentrations in those samples.	Yes		Laboratory analyses include analysis of blanks and of spiked samples for Quality Control.
7d	The precision of radionuclide analytical results should be reported as a range, a variance, a standard deviation, a standard error, and/or a confidence interval.	Yes		Analytical results of radionuclides are reported with identified error data.
7e	Data should be examined and entered into the data base promptly after analysis.	Yes		Data received is routinely reviewed and incorporated into the data base.
7f	Outliers should be excluded from the data only after investigation confirms that an error has been made in the sample collection, preparation, measurement, or data analysis process. As each data point is collected, it should be compared to previous data, because such comparison can help identify unusual measurements that require investigation or further statistical evaluation.	Yes		Procedures define the investigation requirements and process to be followed prior to exclusion of outlying data points.
7g	As they apply to data analysis and statistical treatment activities, the general quality assurance program provisions of Chapter 10 of this guide should be followed.		No	Audits of the program have not been performed.

Table 16-5. Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance. (2 sheets)

Section	Requirement	Yes	No	Remarks
8a Dose Calculations	Except where mandated otherwise (e.g., compliance with 40 CFR Part 61), the assessment models selected for all environmental dose assessments should appropriately characterize the physical and environmental situation encountered. The information used in dose assessments should be as accurate and realistic as possible.	Yes		The dose models are in accordance with 40 CFR 61 requirements.
8b	Complete documentation of models, input data, and computer programs should be provided in a manner that supports the annual site environmental report or other application.	Yes		Documentation of the programs has been provided by the model source, PNL.
8c	Default values used in model applications should be documented and evaluated to determine appropriateness to the specific modeling situation.	Yes		Documentation of default values is incorporated into the PNL provided model packages.
8d	When performing human foodchain assessments, a complete set of human exposure pathways should be considered, consistent with current methods, and should be documented supporting the site Environmental Monitoring Plan.	Yes		The foodchain assessment considered exposure pathways consistent with current methods.
8e	Surface- and groundwater modeling should be conducted as necessary to conform with the applicable requirements of the State government and the regional office of the EPA.	Yes		Modeling for surface and groundwater has been performed.
8f	The general quality assurance program provisions of Chapter 10 of this guide should be followed as they apply to performing calculations that assess dose impacts.		No	Audits of the program have not been performed as required.
9a Records and Reports	DOE officials and DOE Management and Operating Contractors should identify and comply with the relevant reporting requirements.	Yes		Relevant reporting requirements have been identified and compliance procedures developed.

Table 16-6. Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance. (2 sheets)

Section	Requirement	Yes	No	Remarks
9b	Timely notification of occurrences and information involving DOE and its contractors should be made to the appropriate DOE officials and to other responsible authorities.	Yes		Currently "timely" regarding an occurrence is related to notification after discovery/identification. Sample analysis time may delay discovery/identification greatly.
9c	Auditable records relating to environmental surveillance and effluent monitoring should be maintained. Calculations, computer programs, or other data handling should be recorded or referenced.	Yes		Materials are maintained which provide auditable records for the environmental program.
9d	As they apply to records and reporting activities, the general quality assurance program provisions of Chapter 10 of this guide should be followed.	Yes		Auditable records and reports are available.
10a Quality Assurance	A QA Plan should be prepared and included as a section of the Environmental Monitoring Plan and should cover the monitoring activities at each site, consistent with applicable elements of the 19-element format in ANSI/ASME NQA-1.	Yes		A QA Plan has been prepared and incorporated into the FEMP. The QAPP developed for the Hanford Site will provide this format.
10b	Periodic audits should be performed to verify compliance with operational procedures, QC procedures, and all aspects of the QA program.		No	Periodic audits have not been performed for compliance verification. The QAPP developed for the Hanford Site will correct this deficiency.
10c	Audits should be performed independently in accordance with written procedures or checklists by personnel who do not have direct responsibility for performing the activities being audited (i.e., supervisors cannot audit their own facilities).		No	No audits of the program have been performed.

Table 16-6. Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance. (2 sheets)

Section	Requirement	Yes	No	Remarks
10d	Audit results should be documented and reported to and reviewed by responsible management. Follow-up action should be taken where indicated.		No	Since audits have not been performed, no results are available.
10e	The elements of a QA program should be derived from the 18 criteria in ANSI/ASME NQA-1 and those stipulated in 10 CFR Part 50.	Yes		The elements of the program have been derived from the ANSI/ASME NQA-1 criteria.
10f	Radiation measuring equipment, including portable instruments, environmental dosimeters, in situ monitoring equipment, and laboratory instruments, should be calibrated with standards traceable to NIST calibration standards.	Yes		Calibration of radiation measuring equipment is performed in accordance with appropriate requirements.

Table 16-7. Chapter 173-400 General Regulations For Air Pollution Sources.

Section	Requirement	Yes	No	Remarks
WAC 173-400-105 (1) Records and Reporting	The owner or operator of a stationary source listed in a source category of WAC 173-400-100 shall upon notification by the director, maintain records on the type and quantity of emissions from the source and other information deemed necessary by the director to determine whether the source is in compliance with applicable emission limitations and control measures.	N/A		300 Area Fuels Fabrication Facility has no such facility.
173-400-120(6) Monitoring and Special Report	Emission inventory. The owner or operator of any air contaminant source shall submit an inventory of emissions from the source each year upon a form and according to instructions received from the U.S. Department of Ecology or cognizant local authority. The inventory may include stack and fugitive emissions of particulate matter, PM-10, sulfur dioxide, carbon monoxide, total reduced sulfur compounds (TRS), fluorides, lead, volatile organic compounds, and other contaminants, and shall be submitted when required no later than one hundred five days after the end of the calendar year.	N/A		300 Area Fuels Fabrication Facility has no such facility.

Table 16-8. Chapter 173-480 Ambient Air Quality Standards And Emission Limits For Radionuclides.

Section	Requirement	Yes	No	Remarks
WAC 173-480-070 EMISSION MONITORING AND COMPLIANCE PROCEDURES.	(1) The procedures specified in chapter 402-80 WAC shall be used to determine compliance with the standard. Radionuclide emissions shall be determined and dose equivalents to members of the public shall be calculated using department of social and health services approved sampling procedures, department of social and health services approved models, or other procedures, including those based on environmental measurements that department of social and health services has determined to be suitable.	N/A		There are no active airborne release points, therefore this section is not applicable.

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