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Statement of Work for Services Provided by the Waste Sampling and Characterization Facility for Effluent Monitoring

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SERVICES PROVIDED BY THE WSCF FOR EFFLUENT MONITORING

1.0 SCOPE OF SERVICES

This document defines the services the Waste Sampling & Characterization Facility (WSCF) shall provide Effluent Monitoring (EM) throughout the calendar year for analysis. The internal memo contained in Appendix A identifies the samples EM plans to submit for analysis in CY-1995. Analysis of effluent (liquid and air discharges) and environmental (air, liquid, animal, and vegetative) samples is required using standard laboratory procedures, in accordance with regulatory and control requirements cited in *Quality Assurance Program Plan for Radionuclide Airborne Emissions Monitoring* (especially Appendix G) (WHC 1993), *Quality Assurance Project Plan for Facility Effluent Monitoring Plan Activities* (WHC 1994), and *Operational Environmental Monitoring Program Quality Assurance Project Plan* (WHC 1992a), *Hanford Analytical Services Quality Assurance Plan* (DOE 1994). Should changes to this document be necessary, WSCF or EM may amend it at any time with a jointly approved internal memo.

2.0 REGULATORY REPORTING REQUIREMENTS

It is essential for the WSCF to meet the due dates specified. The analytical data required by those due dates are necessary to maintain compliance with environmental release reporting commitments mandated by regulatory agencies and the U.S. Department of Energy (DOE). Variances to technical criteria or due dates in this document must be documented by the WSCF and approved or acknowledged by EM.

2.1 Radionuclide Air Emissions Report for the *Clean Air Act of 1977*

This report documents radionuclide air emissions from the Hanford Site and the resulting effective dose equivalent to any member of the public from those emissions. This report complies with the reporting requirements of the *Code of Federal Regulations*, Title 40, "Protection of the Environment," Part 61, "National Emissions Standards for Hazardous Air Pollutants," Subpart H, "National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities."

2.2 Environmental Releases Report

The purpose of this report is to fulfill the effluent discharge reporting requirements of DOE Order 5400.1 (DOE 1988) and to summarize the compliance status of effluent releases from Westinghouse Hanford Company (Westinghouse Hanford) facilities with respect to the administrative control value guidelines given in WHC-CM-7-5, *Environmental Compliance*.

2.3 Hanford Site Environmental Report

Pacific Northwest Laboratory annually compiles and publishes this report for DOE, in compliance with DOE Order 5400.1 (DOE 1988).

2.4 Effluent Information System-Onsite Discharge Information System Report

Each year Westinghouse Hanford transmits this report electronically to Idaho National Engineering Laboratory in Idaho Falls for inclusion in the Effluent Information System/Onsite Discharge Information System (EIS/ODIS) database, in compliance with DOE Order 5484.1 (DOE 1983).

2.5 Near-Facility Operational Environmental Monitoring Report

Westinghouse Hanford publishes this report annually. The report provides a yearly summary of sampling and analysis of soil, vegetation, ambient air, etc. near Westinghouse Hanford facilities.

3.0 WSCF SERVICES AND DATA QUALITY OBJECTIVES

WSCF shall provide the following analytical services when analyzing low-level environmental and effluent samples from EM.

3.1 Sample and Analysis Requirements

All services necessary shall be provided to complete the analytical requirements listed in Tables 1 through 4. Analyses shall be performed in accordance with applicable requirements and procedures contained in the references listed in section 1.0 above. Analytical results shall be expressed in the units shown for the respective minimum

detectable concentrations (MDC) in the tables. (By **September 30th** of each year, EM will provide updated analytical requirements to WSCF that identify the analytes to be measured in samples from the various effluent streams, Appendix A for CY-1995 information.)

3.2 Composite Sample Requirements

Air emission composite samples for the first three quarters shall be reported to EM within the second month following the end of the sampling quarter. All monthly liquid samples shall be reported to EM within 45 days after the end of the sampling month.

3.3 Year-End Data Reporting Due Dates

The due dates for submission of year-end analysis results to EM on weekly samples collected up through December 31st are: (Note these dates currently apply to 222-S.)

- Air emission data . . . . . **February 17, 1996**
- Liquid effluent data . . . . . **February 24, 1996**
- Environmental data (pond vegetation and sediment) . . . . . **March 17, 1996**

The analysis results from any weekly sample collected on or after January 1st of the succeeding new year will be applied to that year.

3.4 Laboratory Procedures

Use laboratory analytical procedures that are:

- In compliance with EPA Method 114, Section 4.0, "Quality Assurance Methods," 40 CFR Part 61, Appendix B (specifically, 4.4 and 4.5), and applicable requirements and procedures contained in the references listed in Section 1.0 above.

- In compliance with Chapter 6.0 of the "Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance" document (DOE 1991).

- Appropriate to the sample medium and size and the analysis requirements listed in Tables 1 through 4.

3.5 Completeness of Analytical Data

Completeness of analytical data such that:

- WSCF produces a minimum of 90% usable analytical data, for all EM-related samples received.

3.6 Quality Control

WSCF shall participate in the U.S. DOE Environmental Measurements Laboratory (EML) inter-comparison program, as required per DOE 1991. WSCF shall participate in all U.S. EPA laboratory inter-comparison programs, applicable to the analyses being performed. Quality control (QC) test results shall be provided quarterly. EML and EPA laboratory inter-comparison results shall be provided annually.

The QC tests shall be for accuracy, precision, completeness (see section 3.5 above), and background. Accuracy shall be within $\pm 25\%$ at the 95% confidence interval, WHC 1992a. All tests shall be in accordance with applicable requirements and procedures contained in the references listed in Section 4.0. EM will provide a minimum sample volume of 4 L for the performance of radiological quality control tests.

3.7 Access to Raw Data

As needed, EM shall have access to all available raw data related to EM samples. WSCF shall provide analysis printouts upon request (i.e. GEA list of peaks identified data).

3.8 Counting Error & Minimum Detectable Concentration

Provide the counting error associated with each analytical result.

WSCF shall ensure that the sample's MDC does not exceed the values specified in Tables 1 through 3 when the nominal sample volume is provided. WSCF will not be accountable for maintaining the MDC limits when samples less than the nominal sample volume are provided. When sample sizes are less than or greater than the nominal volumes specified in Tables 1 through 3, EM may adjust the MDCs for samples by multiplying the specified MDC by the ratio of the actual sample size and the nominal sample size.

3.9 Routine Electronic Transfer of Analytical Data

Routinely and electronically transmit analytical data to EM. WSCF shall electronically transmit all calendar-year 1995 data to EM by **February 24, 1996.**

3.10 Archiving of Samples

Ambient air monitoring samples shall be archived upon the completion of the total α and β analysis. Archived ambient air samples will collected bi-annually by the Site Surveillance Radiological Control Organization. These samples can be identified as the samples with the Nxxx series EDP codes.

Effluent air samples, samples received in white air sample envelopes with EDP Code listed in the Appendix, shall be archived until composited for quarterly analyses.

Backup record and effluent CAM air samples shall not be analyzed but shall be archived until **June 30, 1996.** These samples can be identified as the samples received in white envelopes stamped "Archive Only", which are not listed in the Appendix.

3.11 Analysis Costs

The sample analysis costs provided in Tables 1 through 3 are estimated and may fluctuate due to changes in prices and workscope. Adjustments made to sample analysis costs shall have the concurrence of EM.

4.0 REFERENCES

Clean Air Act of 1977, 42 USC 7401 et seq.

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

DOE, 1983, *Environmental Protection, Safety and Health Protection Information Reporting Requirements*, DOE Order 5484.1, U.S. Department of Energy, Washington D.C.

DOE, 1991, *Environmental Regulatory Guide for Radiological Effluent monitoring and Environmental Surveillance*, DOE/EH-0173T, U.S. Department of Energy, Washington D.C.

DOE, 1994, *Hanford Analytical Services Quality Assurance Plan*, DOE/RL-94-55 Revision 0, U.S. Department of Energy, Richland, Washington.

40 CFR 61, "National Emissions Standards for Hazardous Air Pollutants," Title 40, *Code of Federal Regulations*, Part 61, as amended, U.S. Environmental Protection Agency, Washington, D.C.

40 CFR 61, "Quality Assurance Methods," Title 40, *Code of Federal Regulations*, Part 61, as amended, Appendix B, U.S. Environmental Protection Agency, Washington, D.C.

WHC-CM-7-5, *Environmental Compliance*, Westinghouse Hanford Company, Richland, Washington.

WHC, 1993, *Quality Assurance Program Plan for Radionuclide Airborne Emissions Monitoring*, WHC-EP-0536 Revision 1, Westinghouse Hanford Company, Richland, Washington.

WHC, 1992a, *Operational Environmental Monitoring Program Quality Assurance Project Plan*, WHC-EP-0538 Revision 1, Westinghouse Hanford Company, Richland, Washington.

WHC, 1992b, *Quality Assurance Project Plan for Facility Effluent Monitoring Plan Activities*, WHC-EP-0446 Revision 1, Westinghouse Hanford Company, Richland, Washington.

WHC, 1994a, *Quality Assurance Project Plan for Facility Effluent Monitoring Plan Activities*, WHC-EP-0446 Revision 2, Westinghouse Hanford Company, Richland, Washington.

WHC, 1994b, *Quality Assurance Project Plan for Radioactive Airborne Emissions Data Compilation and Reporting*, WHC-EP-0528 Revision 1, Westinghouse Hanford Company, Richland, Washington.

WHC, 1994c, *Quality Assurance Program Plan for Radionuclide Airborne Emissions Monitoring*, WHC-EP-0536 Revision 1, Westinghouse Hanford Company, Richland, Washington.

Table 1. Ambient and Effluent Air Sample Analysis Criteria for WSCF

AMBIENT & EFFLUENT AIR SAMPLE ANALYSIS CRITERIA				
Nominal Volume of Air Sampled	**Type of Analysis**	**MDC[a] (μCi/mL)[b]**	**TT (days)**	**Unit Price ($)**
20,000 ft^3 (0.57 E+9 mL)	Total α and total ß	2.0 E-15 and 1.9 E-14	14	54.00
	Ag Zeolite (^{106}Ru)	3.4 E-13	30	200.00
TBD[c]	^{3}H	TBD[c]	30	150.00
262,000 ft^3 (7.42 E+9 mL)	^{90}Sr	1.9 E-14	60	200.00
	^{147}Pm	1.1 E-11	60	184.83
	$^{238,239,240}Pu$	2.0 E-15	60	275.00
	^{241}Am	1.9 E-15	60	250.00
	GEA[d] (^{137}Cs)	1.9 E-14	60	75.00
	^{212}Pb	6.3 E-12	60	100.00

MDC = Minimum Detectable Concentration
TT= Turnaround Time
TBD = To Be Determined
[a] MDC's shall be as low as reasonably attainable, but shall not exceed the values specified in the table. MDC values obtained from 40 CFR 61 Appendix E Table II.
[b] Unless other units of measure are indicated.
[c] To be determined upon selection of a sampling method.
[d] All positive GEA results shall be reported, with the exception of the short-lived ^{222}Rn and ^{220}Rn progeny.

Table 2. Groundwater Monitoring and Liquid Effluent Sample Analysis Criteria for WSCF[a]

GROUNDWATER MONITORING & LIQUID EFFLUENT SAMPLE ANALYSIS CRITERIA				
Sample Size	**Type of Analysis**	**MDC[b] (μCi/mL)[c]**	**TT (days)**	**Unit Price ($)**
1.0 L	Total α and total ß	1.2 E-09 and 4.0 E-08	30	110.90
	^{90}Sr	4.0 E-08	30	200.00
	GEA[d] (^{137}Cs)	1.2 E-07	30	100.00
	Total U[e]	7.2 E-08 g U/mL	30	150.00
	$^{238,235,234}U$[e]	2.0 E-08	30	TBD
	^{3}H	8.0 E-05	30	150.00
	^{99}Tc	4.0 E-06	30	100.00
	^{241}Am	1.2 E-09	30	250.00
	$^{238,239,240}Pu$	1.2 E-09	30	300.00
	pH	NA	60	58.73
	NO_3	1.0 E-06 g/mL	60	46.52

MDC = Minimum Detectable Concentration
TT = Turnaround Time
TDB = To Be Determined.

[a] Liquid effluent samples shall be analyzed unfiltered, where as ground water samples shall be filtered and only the filtrate analyzed. The EDP codes for the liquid effluent samples are identified in memo 88420-94-130's Attachment.

[b] MDC's shall be as low as reasonably attainable, but shall not exceed the values specified in the table. MDC values obtained from 4% of the Derived Concentration Guidelines (DCG).

[c] Unless other units of measure are indicated.

[d] All positive GEA results shall be reported, with the exception of the short-lived ^{222}Rn and ^{220}Rn progeny.

[e] Total uranium analyses will be performed until an isotopic uranium analysis is established.

Table 3. Pond Vegetation and Sediment Sample Analysis Criteria for WSCF

POND VEGETATION AND SEDIMENT SAMPLE ANALYSIS CRITERIA				
Sample Size (dry weight) (g)	**Type of Analysis**	**MDC[a] (pCi/g)[b]**	**TT (days)**	**Unit price ($)**
500	^{90}Sr	10.00	60	250.00
500	GEA[c] (^{137}Cs)	0.20	60	100.00
500	$^{238,239,240}Pu$	1.00	60	350.00
500	Total U[d]	1.2 E-07 g U/ g Sample	60	300.80
500	$^{238,235,234}U$[d]	0.04	60	TBD

MDC = Minimum Detectable Concentration
TT = Turnaround Time
[a] MDC's shall be as low as reasonably attainable, but shall not exceed the values specified in the table.
[b] Unless other units of measure are indicated
[c] All positive GEA results shall be reported, with the exception of the short-lived ^{222}Rn and ^{220}Rn progeny.
[d] Total uranium analyses will be performed until an isotopic uranium analysis is established.

Table 4. Non-Routine Environmental Samples, Sample Analysis Criteria for WSCF[a]

NONROUTINE ENVIRONMENTAL SAMPLES, SAMPLE ANALYSIS CRITERIA				
Sample Size	**Type of Analysis**	**MDC[b]**	**TT (days)**	**Unit Price[c] ($)**
TBD	^{90}Sr	TBD	60	TBD
	GEA[d]	TBD	60	TBD
	$^{238,239,240}Pu$	TBD	60	TBD
	Total U[e]	TBD	60	TBD
	$^{238,235,234}U$[e]	TBD	60	TBD

MDC = Minimum Detectable Concentration
TT = Turnaround Time
TBD = To Be Determined

[a] Occasional nonroutine air, liquid, vegetation, and sediment samples may need analysis. WSCF can not accept the following types of nonroutine samples: animals, feces, nests, samples with an exposure rate > 1mR/h, and/or samples containing > 10 nCi of any alpha emitter.

[b] MDC values and units for nonroutine samples shall be dependent on sample type and commensurate with the values listed in Tables 1 through 3. MDC's shall be as low as reasonably attainable, but shall not exceed the values specified in the Tables 1 through 3.

[c] Cost for nonroutine samples shall be dependent on sample type and commensurate with the values listed in Tables 1 through 3.

[d] All positive GEA results shall be reported, with the exception of the short-lived ^{222}Rn and ^{220}Rn progeny.

[e] Total uranium analyses will be performed until an isotopic uranium analysis is established.

GLOSSARY

ACRONYMS

DOE	U.S. Department of Energy
EIS-ODIS	Effluent Information System-Onsite Discharge Information System
EM	Effluent Monitoring
EPA	U.S. Environmental Protection Agency
MDC	Minimum Detectable Concentration
TT	Turnaround Time
TBD	To Be Determined
WHC	Westinghouse Hanford Company

DEFINITION OF TERMS

Accuracy. The degree of agreement of a measurement with a true or known value.

Completeness. A measure of the amount of valid data obtained compared to the amount expected under normal conditions.

Precision. A measure of the agreement among individual measurements of the same parameters under similar conditions.

Turnaround time. Elapsed time, in days, from when a sample is received by the laboratory until the analysis results are reported to EM for that sample.

APPENDIX

Analytical Requirements for Effluent Sampling CY 1995

(Tables supersede those contained in Memo 88420-94-130)

Air Emissions
CY–1995 Sample Analyses per Year
(Performed by WSCF)

Facility	EDP Codes	Stack ID Number	Analysis									
			Total alpha/beta	GEA**	Sr–90	Pm–147	Pu–238	Pu–239/240	Am–241	Tritium	Pb–212	AgZ*
PUREX	A552	291–A–1	26	4	4	4	4	4	4			
	A568										12	
	A511											26
	A540	296–A–1	26					4	4			
	A542	296–A–2	4									
	A543	296–A–3	4									
	A545	296–A–5A	4									
	A546	296–A–5B	4									
	A547	296–A–6	4									
	A548	296–A–7	4									
	A549	296–A–8	4									
	A550	296–A–10	4									
	A544	296–A–14	4									
B–Plant	B691	291–B–1	26	4	4			4	4			
	B688	296–B–5	4									
	B748	296–B–10	26	4	4			4	4			
	B690	296–B–13	4									
East Tank Farms	E058	296–A–12	26									
	E052	296–A–13	26									
	E059	296–A–17	26	4	4			4	4	4		
	E028 & E027											52
	E060	296–A–18	26									
	E061	296–A–19	26									
	E197	296–A–20	26									
	E645	296–A–21	26	4	4			4	4			
	E643	296–A–22	26	4	4			4	4			
	E001 & E002											52
	E080	296–A–25	26	4	4			4	4			
	E297	296–A–26	26									
	E270	296–A–27	26	4	4			4	4	4		
	E933 & E934											52
	E272	296–A–28	26									
	E901	296–A–29	26	4	4			4	4	4		
	E903	296–A–30	26									
	E013	296–A–40	26	4	4			4	4	4		
	E028 & E029											52
	E015	296–A–41	26									
	E886	296–B–28	26	4	4			4	4			
	E069	296–C–5	26	4	4			4	4			
	E068	296–P–16	26	4	4			4	4			
	E120	296–P–17	26									
	E209	296–P–31	26									
	E301–399***	296–P–32	13	4	4			4	4			
222–S Lab	S264	296–S–16	26									
	S289	296–S–21	26					4	4			
S–Plant & U–Plant	S006	291–S–1	4									
	S032	296–S–2	4									
	S008	296–S–4	4									
	S004	296–S–6	4									
	S016	296–S–7W	26									
	U771	291–U–1	4									
T–Plant & TRUSAF	T785	291–T–1	26	4	4			4	4			
	T788	296–T–13	26									
	T783	296–T–11	26									
	T784	296–T–12	26									
West Tank Farms	W191	296–P–22	26									
	W190	296–P–23	22	4	4			4	4			
	W195	296–P–28	4	4	4			4	4			
	W301–399***	296–P–32	13	4	4			4	4			
	W111	296–S–15	26	4	4			4	4			
	W096	296–S–18	26									
	W880	296–S–22	26	4	4			4	4			
	W117	296–T–17	26									
	W882	296–T–18	26	4	4			4	4			
	W884	296–U–11	26	4	4			4	4			
Waste Comp.	W003	296–W–3	26									
WSCF	L110	696–W–1	26									
	L111	696–W–2	26									
Plutonium Finishing Plant	Z810	291–Z–1	26	4			4	4	4			
	Z813	296–Z–3	26	4				4	4			
	Z913	296–Z–5	26									
	Z802	296–Z–6	26									
	Z814	296–Z–14	26									
	Z915	296–Z–15	1									
		Totals	1339	96	88	4	8	104	104	16	12	234

* AgZ analysis includes Ru–106, Sn–113, Sb–125, and I–129.

** Minimum GEA analysis will be for Cs–137, Ru–106, and Sn–113. All positive GEA results shall be reported also.

*** EM will provide explicit instructions on the composited analyses of these samples.

Liquid Effluents
CY–1995 Sample Analyses per Year
(Performed by WSCF)

EDP Code	Stream Code	Analysis								
		Total alpha/beta	GEA*	Sr–90	Pu–238	Pu–239,240	Am–241	Total U	Tritium	Tc–99
H101	207–SL	12	12	12		12	12			
H103	2904–ZA	12	12		12	12	12			
H115	CA8	12	12	12		12	12			
H116	CAR	12	12	12		12	12			
H117	CBC	12	12	12						
H118	CSL	12	12	12	12	12	12	12	12	12
H108	ACW	12	12	12		12	12	12	12	
H110	ASC	12	12	12		12	12		12	
Sample Totals		**96**	**96**	**84**	**24**	**84**	**84**	**24**	**36**	**12**

* Minimum GEA analysis will be for Cs–137, Ru–106, and Sn–113. All radionuclides with positive GEA results shall be reported also.

Near–Field Monitoring*
CY–1995 Sample Analyses per Year
(Performed by WSCF)

Sample Media	Area	Analysis							
		Total alpha/beta	GEA**	Sr–90	Pu iso	U iso	Tritium	pH	Nitrate
Air	100	208							
	200	884							
	300	26							
	400								
Sample Totals		**1118**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Water	100								
	200	48	48	48	48	48	16	208	16
	300								
	400								
Sample Totals		**48**	**48**	**48**	**48**	**48**	**16**	**208**	**16**
Aquatic Vegitation	100								
	200		4	4	4	4			
	300								
	400								
Sample Totals		**0**	**4**	**4**	**4**	**4**	**0**	**0**	**0**
Aquatic Sediment	100								
	200		4	4	4	4			
	300								
	400								
Sample Totals		**0**	**4**	**4**	**4**	**4**	**0**	**0**	**0**
Non–Routine Samples	Soil		50	50	50	50			
	Vegitation		50	50	50	50			
	Animal		50	50	50	50			
Sample Totals		**0**	**150**	**150**	**150**	**150**	**0**	**0**	**0**

* All Near–Field Monitoring Samples are identified by the Nxxx or RMxxx series EDP codes. Specific EDP codes are not provided in this table since, no other samples share these EDP codes. These samples will be transproted in planchet holders, rather than air sample envelopes.

** Minimum GEA analysis will be for Co–60, Zn–65, Ru–106, Sb–125, Cs–134, Cs–137, CePr–144, Eu–154, and Eu–155. All radionuclides with positive GEA results shall be reported also.

Special Tank Farm Air Samples[1]
CY-1995 Sample Analyses per Year

(Performed by WSCF)

Sample Media	EDP Code	Composite Analyses[2]	
		GEA	Total alpha/beta
Air	J900-J999	TBD	TBD

1 These workplace air samples will require analysis for Effluent Monitoring purposes. They need only be archived, until Effluent Monitoring provides explicit instructions for compositing them and analyzing them.

2 These samples shall only be analyzed unpon compositing, including total alpha and beta analysis. The GEA will be performed prior to ashing to determine cesium content. The GEA will only be utilized to determine the cesium content of the samples, which would be lost during ashing.

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