

Statement of Work for Analytical Services Provided to Westinghouse Hanford Company by the Pacific Northwest Laboratory Analytical Chemistry Laboratory

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

Approved for Public Release

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J. K. Perry

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Prepared for the U.S. Department of Energy
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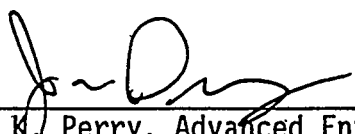
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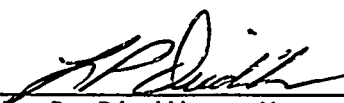
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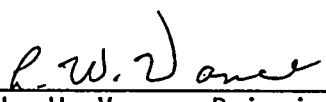
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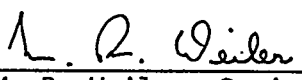
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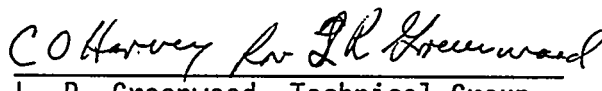
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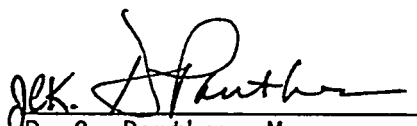
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ACRONYMS

RL	U.S. Department of Energy, Richland Operations Office
EIS/ODIS	Effluent Information System/Onsite Discharge Information System
EPA	Environmental Protection Agency
MDC	minimum detectable concentrations
TT	turnaround time
EM	Effluent Monitoring
PNL	Pacific Northwest Laboratory
SOW	Statement of Work
CFR	Code of Federal Regulations
WHC	Westinghouse Hanford Company
INEL	Idaho National Engineering Laboratory
QA	Quality Assurance

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1.0 PURPOSE

This Statement of Work (SOW) establishes the laboratory analytical criteria and requirements for the Fiscal Year 1995 radioactive airborne emissions measurement program for Westinghouse Hanford Company- (WHC-) managed facilities in the 300 and 400 Areas of the Hanford Site. This document supports radioactive airborne emissions measurement reporting requirements for WHC-managed facilities pursuant to U.S. Department of Energy (DOE) Order 5400.1, *General Environmental Protection Program*, DOE Order 5484.1, *Environmental Protection, Safety, and Health Protection Information Reporting Requirements*, Washington (State) Administrative Code (WAC) WAC 246-247, *Radiation Protection-Air Emissions*, and Code of Federal Regulations (CFR) 40 CFR, 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."

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2.0 REQUIREMENTS

2.1 REGULATORY REQUIREMENTS

In accordance with 40 CFR 61.94, the WHC Effluent Monitoring (EM) Group provides annual monitoring reports and dose calculation results to the U.S. Environmental Protection Agency (EPA) for radioactive airborne emissions from the Hanford Site. In support of this reporting activity, EM has developed a *Quality Assurance Project Plan* (WHC-EP-0528), which documents the quality assurance activities associated with collection and reporting of radioactive airborne emissions measurements data. WHC-EP-0528 includes the following requirements:

- EM shall prepare a SOW for WHC's radioactive airborne emissions measurement program
- EM shall identify analytical criteria and detection limits for laboratory radioanalytical services.

This document fulfills these requirements.

2.2 CONTRACTED ANALYTICAL LABORATORY

The Pacific Northwest Laboratory's Analytical Chemistry Laboratory will provide analytical services for the radioactive airborne emissions measurement program for WHC-managed facilities in the 300 and 400 Areas.

2.3 VARIANCES TO THE STATEMENT OF WORK

Variances to this SOW must be documented by PNL and approved or acknowledged by EM as unavoidable.

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3.0 REGULATORY REPORTING REQUIREMENTS

The radioactive airborne emissions measurement program sample data for WHC-managed facilities in the 300 and 400 Areas support a number of regulatory reporting requirements. This program supports the reports described in the following paragraphs.

3.1 RADIONUCLIDE AIR EMISSIONS REPORT FOR CLEAN AIR ACT

EM prepares this report to document the airborne emissions of radionuclides from the Hanford Site and the resultant effective dose equivalent to any member of the public from those emissions. This report complies with the reporting requirements of 40 CFR 61.

3.2 ANNUAL ENVIRONMENTAL RELEASES

EM prepares this annual report to fulfill the effluent discharge reporting requirements of DOE Order 5400.1 and to summarize the compliance status of effluent releases from WHC facilities with respect to the administrative control value guidelines given in WHC-CM-7-5, *Environmental Compliance Manual*.

3.3 HANFORD SITE ENVIRONMENTAL REPORT

PNL compiles and publishes this report annually for the DOE Richland Operations Office (RL) in compliance with DOE Order 5400.1.

3.4 EFFLUENT INFORMATION SYSTEM/ONSITE DISCHARGE INFORMATION SYSTEM

EM transmits this report to Idaho National Engineering Laboratory (INEL) for inclusion in the DOE Effluent Information System/Onsite Discharge Information System (EIS/ODIS) database. This report complies with the requirements of DOE Order 5484.1.

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4.0 ANALYTICAL LABORATORY SERVICES AND DATA QUALITY OBJECTIVES

4.1 REQUIRED ANALYTICAL AND DATA HANDLING SERVICES

PNL's Analytical Chemistry Laboratory provides the following analytical and data handling services when analyzing airborne effluent samples:

4.1.1 Analytical Services Requirements

Analytical services shall meet the analytical requirements listed in Tables 1 through 6.

4.1.2 Quality Assurance Program

PNL shall implement a Quality Assurance (QA) Program that meets the applicable requirements of 40 CFR 61, Appendix B, Method 114, Section 4.0.

4.1.3 Quality Control Program

Quality control test results and laboratory intercomparison scores shall be provided upon request; the tests shall include accuracy, precision, and background.

4.1.4 Data Access

EM shall have access to all raw data upon request.

4.1.5 Review and Approval

Upon request, WHC shall be permitted to review and approve the QA program.

4.1.6 Samples Preservation

Weekly particulate samples for the 340 Tank Vent Stack (340-NT-EX) shall be saved and composited for quarterly specific radionuclide analyses. The composited samples shall be analyzed for ^{90}Sr , $^{239,240}\text{Pu}$, and ^{137}Cs in accordance with 40 CFR 61, Appendix B, Method 114. Table 3.1 presents the sample and analysis criteria for this stack.

4.1.7 Analytical Data

PNL analytical data shall meet a minimum completeness criteria of 90% (i.e., 90% of samples analyses for each stack shall meet the minimum requirements established in this document).

4.1.8 Analytical Results

Analytical results shall be expressed in the units shown for the respective minimum detectable concentrations (MDC) in Tables 1 through 6.

4.1.9 Results Transmission

PNL shall transmit sample analysis results to EM in an electronic format that can be downloaded into the Environmental Release Summary (ERS) Database. Table 7 lists parameters for reporting data via the ERS Database.

Table 1. Sample and Analysis Criteria for the 306 Facility

306 Facility, 306U-Laboratory Stack							
Sample and Analysis Criteria							
Sample Size	Type of Analysis	Precision ^a	Accuracy ^b	Samples/yr (delivery frequency)	MDC ^c ($\mu\text{Ci/cc}$)	TT (days)	Unit Price (\$)
Nominal 2 cfm for period of collection, unless otherwise indicated	gross α and gross β	<20%	75-125%	12 (1/month)	2.0 E-15 and 1.9 E-14	14	65

^aHASQAP (DOE/RL-94-55), Table 11.3 states that duplicate analyses should have <20% relative percent difference when the results are >5 times the minimum detectable activity.

^bHASQAP (DOE/RL-94-55), Table 11.3 states that the sample spike should agree within 75-125% of the true value.

^cMDCs shall be as low as reasonably attainable but shall not exceed the values specified in the table.

Table 2. Sample and Analysis Criteria for the 308 Facility.

308 Facility, 308-TRIGA Stack							
Sample and Analysis Criteria							
Sample Size	Type of Analysis	Precision ^a	Accuracy ^b	Samples/yr (delivery frequency)	MDC ^c ($\mu\text{Ci/cc}$)	TT (days)	Unit Price (\$)
Nominal 2 cfm for period of collection, unless otherwise indicated	gross α and gross β	<20%	75-125%	4 (1/wk)*	2.0 E-15 and 1.9 E-14	14	65

*Samples are collected weekly for one month per calendar year.

^aHASQAP (DOE/RL-94-55), Table 11.3 states that duplicate analyses should have <20% relative percent difference when the results are >5 times the minimum detectable activity.

^bHASQAP (DOE/RL-94-55), Table 11.3 states that the sample spike should agree within 75-125% of the true value.

^cMDCs shall be as low as reasonably attainable but shall not exceed the values specified in the table.

Table 3.1. Sample and Analysis Criteria for the 340 Facility.

340 Facility, 340-NT-EX Stack							
Sample and Analysis Criteria							
Sample Size	Type of Analysis	Precision ^a	Accuracy ^b	Samples/yr (delivery frequency)	MDC ^c (µCi/cc)	TT (days)	Unit Price (\$)
nominal 3 cfm for period of collection, unless otherwise indicated	gross α and gross β	<20%	75-125%	26 (1/2 wks)	2.0 E-15 and 1.9 E-14	14	65
	¹³¹ I			4 (1/wk)*	2.1 E-13	14	35
	⁹⁰ Sr ^d			4 (1/quarter)	1.9 E-14	60	175
	gamma spec (¹³⁷ Cs) ^d			4 (1/quarter)	1.9 E-14	60	35
	^{239,240} Pu ^d			4 (1/quarter)	2.0 E-15	60	175

*Samples are collected weekly for one month per calendar year.

^aHASQAP (DOE/RL-94-55), Table 11.3 states that duplicate analyses should have <20% relative percent difference when the results are >5 times the minimum detectable activity.

^bHASQAP (DOE/RL-94-55), Table 11.3 states that the sample spike should agree within 75-125% of the true value.

^cMDCs shall be as low as reasonably attainable but shall not exceed the values specified in the table.

^dSample analyses for the specified radionuclide shall be performed quarterly on a composite of the particulate samples collected during each quarter of the calendar year.

Table 3.2. Sample and Analysis Criteria for the 340 Facility.

340 Facility, 340-DECON Stack							
Sample and Analysis Criteria							
Sample Size	Type of Analysis	Precision ^a	Accuracy ^b	Samples/yr (delivery frequency)	MDC ^c (μCi/cc)	TT (days)	Unit Price (\$)
nominal 2 cfm for period of collection, unless otherwise indicated	gross α and gross β	<20%	75-125%	26 (1/2 wks)	2.0 E-15 and 1.9 E-14	14	65

^aHASQAP (DOE/RL-94-55), Table 11.3 states that duplicate analyses should have <20% relative percent difference when the results are >5 times the minimum detectable activity.

^bHASQAP (DOE/RL-94-55), Table 11.3 states that the sample spike should agree within 75-125% of the true value.

^cMDCs shall be as low as reasonably attainable but shall not exceed the values specified in the table.

Table 3.3. Sample and Analysis Criteria for the 340 Facility.

340 Facility, 340-B-BLDG Stack							
Sample and Analysis Criteria							
Sample Size	Type of Analysis	Precision ^a	Accuracy ^b	Samples/yr (delivery frequency)	MDC ^c (μCi/cc)	TT (days)	Unit Price (\$)
nominal 2 cfm for period of collection, unless otherwise indicated	gross α and gross β	<20%	75-125%	4 (1/quarter)	2.0 E-15 and 1.9 E-14	14	65

^aHASQAP (DOE/RL-94-55), Table 11.3 states that duplicate analyses should have <20% relative percent difference when the results are >5 times the minimum detectable activity.

^bHASQAP (DOE/RL-94-55), Table 11.3 states that the sample spike should agree within 75-125% of the true value.

^cMDCs shall be as low as reasonably attainable, but shall not exceed the values specified in the table.

Table 4. Sample and Analysis Criteria for the 377 Facility.

377 FACILITY, 377-GEL Stack							
Sample and Analysis Criteria							
Sample Size	Type of Analysis	Precision ^a	Accuracy ^b	Samples/yr (delivery frequency)	MDC ^c ($\mu\text{Ci/cc}$)	TT (days)	Unit Price (\$)
nominal 2 cfm for period of collection, unless otherwise indicated	gross α and gross β	<20%	75-125%	12 (1/month)	2.0 E-15 and 1.9 E-14	14	65

^aHASQAP (DOE/RL-94-55), Table 11.3 states that duplicate analyses should have <20% relative percent difference when the results are >5 times the minimum detectable activity.

^bHASQAP (DOE/RL-94-55), Table 11.3 states that the sample spike should agree within 75-125% of the true value.

^cMDCs shall be as low as reasonably attainable, but shall not exceed the values specified in the table.

Table 5.1. Sample and Analysis Criteria for the Fast Flux Test Facility.

FFTF, FFTF-CB-EX Stack							
Sample and Analysis Criteria							
Sample Size	Type of Analysis	Precision ^a	Accuracy ^b	Samples/yr (delivery frequency)	MDC ^c ($\mu\text{Ci/cc}$)	TT (days)	Unit Price (\$)
nominal 2 cfm for period of collection, unless otherwise indicated	gross α and gross β	<20%	75-125%	52 (1/wk)	2.0 E-15 and 1.9 E-14	14	65
	¹³¹ I	<20%	75-125%	26 (1/2 wks)	2.1 E-13	14	35

^aHASQAP (DOE/RL-94-55), Table 11.3 states that duplicate analyses should have <20% relative percent difference when the results are >5 times the minimum detectable activity.

^bHASQAP (DOE/RL-94-55), Table 11.3 states that the sample spike should agree within 75-125% of the true value.

^cMDCs shall be as low as reasonably attainable but shall not exceed the values specified in the table.

Table 5.2. Sample and Analysis Criteria for the Fast Flux Test Facility.

FFTF, FFTF-RE-SB Stack							
Sample and Analysis Criteria							
Sample Size	Type of Analysis	Precision ^a	Accuracy ^b	Samples/yr (delivery frequency)	MDC ^c ($\mu\text{Ci/cc}$)	TT (days)	Unit Price (\$)
nominal 2 cfm for period of collection, unless otherwise indicated	gross α and gross β	<20%	75-125%	52 (1/wk)	2.0 E-15 and 1.9 E-14	14	65
	^{131}I	<20%	75-125%	26 (1/2 wks)	2.1 E-13	14	35

^aHASQAP (DOE/RL-94-55), Table 11.3 states that duplicate analyses should have <20% relative percent difference when the results are >5 times the minimum detectable activity.

^bHASQAP (DOE/RL-94-55), Table 11.3 states that the sample spike should agree within 75-125% of the true value.

^cMDCs shall be as low as reasonably attainable but shall not exceed the values specified in the table.

Table 5.3. Sample and Analysis Criteria for the Fast Flux Test Facility.

FFTF, FFTF-HT-TR Stack							
Sample and Analysis Criteria							
Sample Size	Type of Analysis	Precision ^a	Accuracy ^b	Samples/yr (delivery frequency)	MDC ^c ($\mu\text{Ci/cc}$)	TT (days)	Unit Price (\$)
nominal 2 cfm for period of collection, unless otherwise indicated	gross α and gross β	<20%	75-125%	52 (1/wk)	2.0 E-15 and 1.9 E-14	14	65

^aHASQAP (DOE/RL-94-55), Table 11.3 states that duplicate analyses should have <20% relative percent difference when the results are >5 times the minimum detectable activity.

^bHASQAP (DOE/RL-94-55), Table 11.3 states that the sample spike should agree within 75-125% of the true value.

^cMDCs shall be as low as reasonably attainable but shall not exceed the values specified in the table.

Table 6.1. Sample and Analysis Criteria for the 437 Maintenance and Storage Facility (MASF).

MASF, 437-MN&ST Stack						
Sample and Analysis Criteria						
Sample Size	Type of Analysis	Precision ^a	Accuracy ^b	Samples/yr (delivery frequency)	MDC ^c (μ Ci/cc)	TT (days) Unit Price (\$)
nominal 2 cfm for period of collection, unless otherwise indicated	gross α and gross β	< 20 %	75-125 %	52 (1/wk)	2.0 E-15 and 1.9 E-14	14 65

^aHASQAP (DOE/RL-94-55), Table 11.3 states that duplicate analyses should have <20% relative percent difference when the results are >5 times the minimum detectable activity.

^bHASQAP (DOE/RL-94-55), Table 11.3 states that the sample spike should agree within 75-125% of the true value.

^cMDCs shall be as low as reasonably attainable but shall not exceed the values specified in the table.

Table 6.2. Sample and Analysis Criteria for the 437 Maintenance and Storage Facility (MASF).

MASF, 437-1-61 Stack							
SAMPLE AND ANALYSIS CRITERIA							
Sample Size	Type of Analysis	Precision ^a	Accuracy ^b	Samples/yr (delivery frequency)	MDC ^c ($\mu\text{Ci/cc}$)	TT (days)	Unit Price (\$)
nominal 2 cfm for period of collection, unless otherwise indicated	gross α and gross β	< 20 %	75-125 %	4 (1/wk)*	2.0 E-15 and 1.9 E-14	14	65

*Samples are collected weekly for one month per calendar year.

^aHASQAP (DOE/RL-94-55), Table 11.3 states that duplicate analyses should have <20% relative percent difference when the results are >5 times the minimum detectable activity.

^bHASQAP (DOE/RL-94-55), Table 11.3 states that the sample spike should agree within 75-125% of the true value.

^cMDCs shall be as low as reasonably attainable but shall not exceed the values specified in the table.

Table 7. Environmental Release Summary Reporting Parameters. (2 sheets)

EDP Code	File Title	Stack Code or Stream Code	Companion Files	R/N Warning Level Factor	Reportable Radionuclides
F002	340 Vault Tank Exhaust	340-NT-EX	F002 F017	1	alpha beta
F003	306 Facility	306E-ULAB	none	1	alpha beta
F006	308 E-8-9	308-TRIGA	F007	1	alpha beta
F007	308 E-8-9 ¹³¹ I	308-TRIGA	F006	1	¹³¹ I
F008	340 B Building	340-B-BLD	none	1	alpha beta
F009	340 Decontamination Facility	340-DECON	none	1	alpha beta
F010	377 Geotechnical Engineering Laboratory	377-GEL	none	1	alpha beta
F011	FFTF Combined Exhaust	FFTF-CB-E	F018	1	alpha beta
F012	FFTF Lower Reactor Service Building	FFTF-RESB	F016	1	alpha beta
F013	FFTF Reactor Heat Transport System	FFTF-HT-T	none	1	alpha beta
F014	437 Maintenance and Storage Facility	437-MN&ST	none	1	alpha beta
F016	FFTF Lower Reactor Service Building ¹³¹ I	FFTF-RESB	F012	1	¹³¹ I

Table 7. Environmental Release Summary Reporting Parameters. (2 sheets)

EDP Code	File Title	Stack Code or Stream Code	Companion Files	R/N Warning Level Factor	Reportable Radionuclides
F017	340 Vault Tank Exhaust ¹³¹ I Charcoal Cart	340-NT-EX	F002 F602	1	¹³¹ I
F018	FFTF Combined Exhaust ¹³¹ I	FFTF-CB-E	F011	1	¹³¹ I
F019	MASF 437-1-61	437-1-61	none	1	alpha beta
F602	340 Vault Tank Exhaust Quarterly, Composite	340-NT-EX	F002 F017	1	⁹⁰ Sr, ¹³⁷ Cs, ²³⁹ Pu, ²⁴⁰ Pu

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