

CCP-TP-056

Revision 4

CCP HSG Performance Demonstration Plan

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PRINTED NAME

APPROVED FOR USE

RECORD OF REVISION

Revision Number	Date Approved	Description of Revision
0	05/15/2002	Initial Revision.
1	06/03/2002	Made correction in Attachment 1, Low Concentration from <1500 ppmv to <150 ppmv. Clarified that systems can still be used even though the PDP scoring has not been reported.
2	03/04/2004	Revised sections 3.4, 3.7, and 4.3. Removed Attachments 5 and 6.
3	05/05/2004	Revised Attachment 4 in response to the certification audit at LLNL. Minor Revision.
4	11/16/2006	Revised to implement the Waste Isolation Pilot Plant Hazardous Waste Facility permit requirements resulting from the Section 311/Remote-Handled (RH) Permit Modification Request (PMR).

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1.0 PURPOSE

The purpose of the U.S. Department of Energy (DOE) Carlsbad Field Office (CBFO) Headspace Gas (HSG) Performance Demonstration Program (PDP) is to demonstrate the capability of each participating Central Characterization Project (CCP) measurement facility to meet the data quality objectives (DQOs) stated in the CCP-PO-001, *CCP Transuranic Waste Characterization Quality Assurance Project Plan for Volatile Organic Compound (VOC) HSGs*. DOE CBFO utilizes the PDP as part of the assessment and approval process for measurement equipment performing characterization activities for transuranic (TRU) waste.

After initial acceptable performance is demonstrated through the PDP process, the characterization process will begin operating under normal conditions, as long as operations meet the procedurally-specified checks prescribed for the equipment. For subsequent PDPs, once the CCP receives the scoring results, corrective actions will be initiated, as warranted, based on these results.

1.1 Scope

This procedure provides the required elements to complete a HSG PDP, and report PDP results.

2.0 REQUIREMENTS

2.1 References

Baseline Documents

- CBFO-94-1012, *U.S. Department of Energy Carlsbad Field Office, Quality Assurance Program Document (QAPD)*
- *Waste Isolation Pilot Plant Hazardous Waste Facility Permit, issued to the Waste Isolation Pilot Plant, NM4890139088-TSDF, Attachment B, Waste Analysis Plan (WAP), New Mexico Environment Department*

Referenced Documents

- DOE/CAO-95-1076, *Performance Demonstration Program Plan for Analysis of Simulated Headspace Gases*
- CCP-PO-001, *CCP Transuranic Waste Characterization Quality Assurance Project Plan*
- CCP-PO-002, *CCP Transuranic Waste Certification Plan*

- CCP-QP-002, *CCP Training and Qualification Plan*
- CCP-QP-008, *CCP Records Management*

2.2 Training

2.2.1 Personnel performing this procedure will be trained in accordance with CCP-QP-002, *CCP Training and Qualification Plan*.

2.3 Equipment List

2.3.1 None.

2.4 Precautions and Limitations

2.4.1 Acceptable performance in accordance with the PDP must be demonstrated by the participating facility prior to the shipment and disposal of waste at Waste Isolation Pilot Plant (WIPP). Facilities will be evaluated periodically, as specified in DOE/CAO-95-1076, *Performance Demonstration Program Plan for Analysis of Simulated Headspace Gases*.

2.5 Prerequisite Actions

2.5.1 **IF** claims of identical analytical systems are made, **THEN** submit documentation to the Site Project Manager (SPM) who will submit it to the DOE HSG PDP Coordinator identifying the systems and addressing each of the criteria used to define identical systems (See DOE/CAO-95-1076 for further details).

2.6 Definitions

2.6.1 None.

NOTE

Positions described in this procedure are the HSG Operator, SPM, Vendor Project Manager (VPM), the Facility Records Custodian, and the CCP Records Custodian.

3.0 RESPONSIBILITIES

3.1 HSG Operator

3.1.1 Performs HSG analyses of TRU and TRU-mixed waste for disposal at the WIPP in accordance with approved CCP operating procedures applicable to the instrument.

3.1.2 Completes electronic and hard copy of the forms for results provided by the PDP Coordinator.

3.1.3 Completes Batch Data Reports (BDRs) in accordance with the approved CCP procedure applicable to the instrument.

3.2 Independent Technical Reviewer (ITR)

3.2.1 Reviews BDRs in accordance with methods and procedures that have been approved for CCP use.

NOTE

DOE CBFO's Standards Preparation Contractor (SPC) prepares and distributes the PDP samples and is responsible for conducting confirmatory analysis on each gas mixture.

3.3 Site Project Manager (SPM)

3.3.1 Ensures personnel involved in the PDP have received training in accordance with Section 2.4 of DOE/CAO-95-1076.

3.3.2 Reviews PDP results prior to submission to CBFO.

3.3.3 Coordinates correspondence with DOE HSG PDP Coordinator and CBFO.

3.3.4 Serves as CCP primary contact for administration and reporting PDP samples and results.

3.3.5 Takes corrective action in the event a deficiency is identified during the PDP.

3.3.6 Transmits results to PDP Coordinator.

3.3.7 Reviews BDRs generated during the PDP in accordance with approved CCP procedures.

3.4 Facility Records Custodian

3.4.1 Receives, processes, and transmits PDP BDRs and PDP data (electronic format and hard copy) to CCP Records in accordance with CCP-QP-008, *CCP Records Management*.

3.5 CCP Records Custodian

3.5.1 Receives BDRs and PDP data (electronic format and hard copy) from the Facility Records Custodian.

3.5.2 Provides the SPM the original PDP data (electronic format and hard copy) for transmittal to the PDP Coordinator.

NOTE

Either the VPM or a designee may complete the steps in Section 3.6. Both are **NOT** required.

3.6 Vendor Project Manager (VPM) or Designee

3.6.1 Receives canisters, verifies canister numbers and pressure, accepts delivery, and completes Chain of Custody (COC) forms.

3.6.2 Provides the canisters to the HSG Operator under the COC process.

3.6.3 Notifies the DOE HSG PDP Coordinator and SPM of problems and/or discrepancies identified in the Acceptance Process.

3.6.4 Tracks the 28-day time period required for submittal of the results to the DOE HSG PDP Coordinator.

4.0 PROCEDURE

4.1 Registering PDP Systems

SPM

4.1.1 Provide the DOE HSG PDP Coordinator with the name, telephone number, fax number, and address of the contact person(s) responsible for administrative communications for the HSG PDP.

4.1.2 Provide the DOE HSG PDP Coordinator with an address suitable for delivery by freight and express package service of the PDP samples.

NOTE

For a CCP facility that operates two or more identical analytical systems, only one system needs to participate in a PDP cycle. The facility shall rotate participation in consecutive PDP cycles. Each individual system must participate in the PDP at least once every three years. Therefore, if a CCP facility has more than three identical systems, PDP analyses must be conducted and the data reported for more than one system during some of the HSG PDP cycles. The criteria outlined in DOE/CAO-95-1076 will be used for guidance.

NOTE

The facility will be notified by the DOE HSG PDP Coordinator two weeks in advance of the PDP.

4.2 Sample Receipt

VPM or Designee

4.2.1 Upon receipt of the canisters, locate the delivery/COC form.

4.2.2 Verify the canisters received match those listed on the COC form both by serial number and physical description.

4.2.3 Verify canisters have **NOT** leaked by comparing pressure on receipt to recorded shipping pressure.

4.2.4 **IF** a discrepancy exists,
THEN perform the following:

[A] Notify the DOE HSG PDP Coordinator and SPM immediately.

[B] Accept delivery by noting discrepancies on the COC form and signing it.

[C] Await further instructions from the DOE HSG PDP Coordinator.

4.2.5 **IF** there are discrepancies,
THEN indicate receipt by signing the COC form.

NOTE

Completion of the COC form establishes the validated time of sample receipt (VTSR), which starts the 28-day clock for submittal of the test results.

NOTE

Copies must be returned within 24 hours.

[A] Return copies of the COC form to both the SPC and DOE HSG PDP Coordinator.

[B] Provide canisters to the HSG Operator for analysis.

4.3 Analysis of PDP Samples

NOTE

All analytical records and documentation generated during the performance of PDP analyses are QA records and must meet the relevant requirements in CCP-PO-001 and CCP-PO-002, *CCP Transuranic Waste Certification Plan*.

NOTE

At present, CCP uses three types of HSG sampling equipment – the Single Sample Manifold HSG Sampling System, the Automated Manifold System, and the Automatic Summa Canister Sampling System. The Automated Manifold System can analyze PDP samples as if the PDP sample came from a drum. The quality control (QC) checks and daily operational checks are appropriate.

The procedure to analyze PDP samples using the Single Sample Manifold HSG Sampling System requires adaptation by the operator. The sample can not be delivered to the gas chromatography/mass spectrometry (GC/MS) from a drum but rather is injected in the same manner as a continuing calibration verification (CCV) sample. The Online Control Standard (OCS) and OCS duplicate should be collected. Also, blank collection is necessary. The CCV report and daily checks should be completed according to existing procedures.

All HSG procedures require some additional adaptation. For instance, the Thermal Conditioning Unit (TCU) and Drum Age Criteria (DAC) requirements do not apply to the PDP sample analysis process. These adaptations shall be documented in the BDRs. Any questions should be directed to the SPM.

The BDRs should be adapted as necessary by the operator, and any adaptations shall be documented in the BDRs. A hard copy of the data sheets supplied by the DOE HSG PDP Coordinator will be attached to the BDRs.

NOTE

Attachment 1, Blind Audit Sample Concentration Ranges by Class, lists suggested concentration limits for various classes for VOCs in PDP samples. The listed concentration maximums are for guidance purposes only.

HSG Operator

- 4.3.1 Analyze the contents of each canister in quadruplicate using the methods and procedures that have been approved for CCP use.
- 4.3.2 Record data on Performance Demonstration Program Report Form HSG Analysis - Volatiles Form.
- 4.3.3 Record data into the electronic media provided by the PDP coordinator.

4.3.4 Provide the following information on both the electronic and hardcopy version of the report from the PDP Coordinator:

NOTE

The system shall be identified by a number that is permanently fixed to the system (e.g., a serial number or U.S. Government property identification number) so that movement of a system from one site to another can be tracked by the documentation of the system number used here.

- [A] Identification of the reporting measurement facility and the system (equipment) on which the samples were analyzed.
- [B] Identification of the PDP distribution cycle for which the data are being reported.
- [C] Identification of the canister by the serial number from the COC form.
- [D] Any additional identification assigned to the canister by the measurement facility.
- [E] Identification of the procedure (including revision number) used for the analysis of each analyte (the procedure number is entered in the "Method ID" column on the form provided by the PDP Coordinator, an example of which is shown in Appendix B of DOE/CAO-95-1076).
- [F] Identification of the replicate number corresponding to the analytical data.
- [G] Identification and concentration for each target compound or analyte identified.
- [H] Identification and estimated concentration for any tentatively identified compounds (TICs) found.
- [I] Date and time of analysis.
- [J] Identification of the analyst performing the PDP analysis.
- [K] Comments, if applicable.

4.3.5 Initiate BDRs in accordance with the procedures that have been approved for CCP use.

NOTE

Data review checklists are completed by checking the Pass, Fail, or N/A block as appropriate. If an item is not applicable for the PDP, an explanation is given in the comment block.

HSG ITR

4.3.6 Process BDRs in accordance with the procedures that have been approved for CCP use.

4.3.7 Submit BDRs to the Facility Records Custodian.

Facility Records Custodian

4.3.8 Submit BDRs and PDP data to CCP Records in accordance with CCP-QP-008.

CCP Records Custodian

4.3.9 Forward original PDP data (electronic format and hardcopy) to the SPM for further processing.

SPM

4.3.10 Review BDRs in accordance with methods and procedures that have been approved for CCP use.

4.3.11 Submit PDP data (both electronic format and hardcopy) to the DOE HSG PDP Coordinator within 28 days of the VTSR.

4.4 Corrections To Data

HSG Operator/ITR

4.4.1 Notify the SPM in writing, with explanation of error immediately.

SPM

4.4.2 Notify the DOE HSG PDP Coordinator.

4.5 Requesting An Extension

HSG Operator/ITR

4.5.1 **IF** PDP analyses will **NOT** be reported within the 28 days, **THEN** notify the SPM immediately by voice or e-mail, **AND** follow up in writing **PRIOR** to the due date.

SPM

- 4.5.2 Notify DOE CBFO and the DOE HSG PDP Coordinator, **AND** request an extension in accordance with Section 4.2 of the DOE/CAO-95-1076.

NOTE

The SPM will be notified by either DOE CBFO or the DOE HSG PDP Coordinator if the system fails to satisfactorily analyze the PDP samples.

NOTE

When PDP samples have been run and the results are off for scoring, the HSG equipment is in normal operation – as long as operations are meeting the procedurally-specified checks prescribed for the equipment.

-
- 4.6 Receipt of Scoring Reports and/or Approval Letter

SPM

- 4.6.1 Review and report scoring results and/or approval letter back to the HSG ITR, VPM, and HSG Operator.
- 4.6.2 Submit a copy of scoring results and/or approval letter to CCP Records.
- 4.6.3 **IF** notified that the HSG systems have failed, **THEN** perform the following:
- [A] Investigate the cause(s) of the failure(s) and take corrective action.
 - [B] Generate sufficient data to demonstrate that the same problem will not recur.
 - [C] Within 30 days of receipt of the scoring report, submit a report of corrective actions to the DOE CBFO addressing the above. This report also shall include an assessment of the impact of the facility's approval status for HSG analysis on waste characterization activities.

5.0 RECORDS

5.1 Records generated during the performance of this procedure are maintained as QA records in accordance with CCP-QP-008. The records are the following:

5.1.1 QA/Non-permanent

- [A] PDP BDR (generated in accordance with the approved CCP procedure applicable to the instrument)
- [B] PDP Report
 - [B.1] Transmittal Letter
 - [B.2] WIPP Waste Characterization Program Laboratory Performance Demonstration COC Form
 - [B.3] Performance Demonstration Program Report Form HSG Analysis - Volatiles Form
- [C] Scoring Reports
- [D] Approval Letter

Attachment 1 – Blind Audit Sample Concentration Ranges by Class

Canister Class	Concentrations of Target Analytes	Notes
Low Concentration VOC	<150 parts per million by volume (ppmv)	1, 2
High Concentration VOC	<1000 ppmv	1, 2
Special VOC	<1000 ppmv	1, 2
Blanks	<50% program required quantification limit (PRQL)	3

1. May contain VOC not on target list
2. May contain interferents or targets with known analytical problems
3. Pure dilution gas or zero air.

Attachment 2 – WIPP Waste Characterization Program Laboratory Performance Demonstration COC Form (EXAMPLE) – see Appendix A of DOE/CAO-95-1076

Delivery/Chain-of-Custody Record

Program Segment: Headspace Gas Analysis			
Sample Type: Single Blind, Standard Distribution			
Distribution Month/Year:			
Canister ID	Canister Volume & Units	Shipping Pressure & Units	Comments:
All entries of names in the sections below should be signatures!			
<u>Shipped By: (Name/Organization)</u>	<u>Date/Time</u>	<u>Received By: (Name/Organization)</u>	<u>Date/Time</u>
After completion to this point, return a copy to Shipper!			
<u>Relinquished By: (Name/Organization)</u>	<u>Date/Time</u>	<u>Received By: (Name/Organization)</u>	<u>Date/Time</u>
<u>Relinquished By: (Name/Organization)</u>	<u>Date/Time</u>	<u>Received By: (Name/Organization)</u>	<u>Date/Time</u>
<u>Relinquished By: (Name/Organization)</u>	<u>Date/Time</u>	<u>Received By: (Name/Organization)</u>	<u>Date/Time</u>
<u>Final Disposition By: (Name/Organization)</u>	<u>Date/Time</u>	<u>Disposition:</u>	

Attachment 3 – Performance Demonstration Program Report Form HSG Analysis – Volatiles Form – see Appendix B of DOE/CAO-95-1076

Instructions for completing Attachment 3:

- Concentrations of detected analytes are to be reported irrespective of the relationships of those concentrations to detection limits quoted or demonstrated for the program.
- Results for analytes listed in Attachment 4 that are undetected in the PDP samples shall be reported as they would be for WIPP sample analyses according to the PF procedures used (e.g. the ML and a U flag)
- Analytical reports shall be submitted for each canister received and may be submitted for laboratory blanks analyzed in association with the PDP samples
- The concentrations of all analytes that exceed the PRQL must be quantified even if multiple dilutions of the gas sample must be analyzed.
- All analytes detected at concentrations less than the PRQL must also be quantified and reported.
- There is **NOT** a requirement that concentrations of gases in the PDP samples be limited to any specific ratio range.

Record the following of each individual analysis on Attachment 3:

1. Lab Name/Equipment: Identification of the reporting PF and the system (equipment) on which the samples were analyzed. NOTE: The system shall be identified by a number that is permanently fixed to the system (e.g. a serial number of U.S. Government property identification number) so that movement of a system from one site to another can be tracked.
2. PDP Distribution: Identification of the PDP distribution cycle for which the data are being reported
3. Canister No: Identity of the canister by the serial number from the COC form and any additional identification assigned to the canister by the PF.
4. Method ID: Identification of the procedure (including revision number) used for the analysis of each analyte, and the replicate number corresponding to the analytical data
5. Result: Identity and concentration for each target compound or analyte identified
6. Flag: Data qualifying flags shall be used as follows:
 - B - Analyte detected in blank above the acceptable criteria
 - E - Analyte exceeds the calibration curve
 - J - Analyte less than PRQL, but greater than or equal to method detection limit
 - U - Analyte undetected
 - D - Analyte quantitated from a secondary dilution
7. Non-Listed Analyte: Identity and estimated concentration for any TICs found
8. Upon completion, analyst shall sign and date the record documenting the PDP analysis.
9. A MF staff member shall approve the report.
10. Data shall be reported to the DOE HSG PDP Coordinator both in electronic format and this form. This report shall also include a copy of the COC form(s) for the canisters, and documentation to support identical system(s) claims.

Attachment 3 – Performance Demonstration Program Report Form HSG Analysis –
Volatiles Form – see Appendix B of DOE/CAO-95-1076 (continued) (EXAMPLE)

LABORATORY NAME /									
PDP DISTRIBUTION (Mo/Yr)									
CANISTER No.									
SAMPLE ID									
DATE									
TIME									
	Method ID	Result (ppmv)	Flag(s)						
Acetone									
Benzene									
Bromoform									
1-Butanol									
Methyl Ethyl Ketone									
Carbon Tetrachloride									
Chlorobenzene									
Chloroform									
1,1-dichloroethane									
1,2-Dichloroethane									
1,1-Dichloroethene									
cis-1,2-Dichloroethene									
trans-1,2-dichloroethene									
Ethylbenzene									
Ethyl Ether									
Methanol									
Methylene Chloride									
Methyl Isobutyl Ketone									
1,1,2,2-Tetrachloroethane									
Tetrachloroethene									
Toluene									
1,1,1-Trichloroethane									
Trichloroethene									
1,1,2-Trichloro-1,2,2-Trifluoroethane									
m-Xylene									
o-Xylene									
p-Xylene									
Non-Listed or Alternate									
Non-Listed or Alternate									
*Rename Cell With Non-Listed or Alternate Method Analyte									
COMMENTS:									
ANALYST ID:									
APPROVAL:									
SIGNATURE			TITLE				DATE		

Attachment 4 – VOC Headspace Target Compound List and Program Required
Quantitation Limits

VOC	CAS Number	PRQL (PPMV)
1. Acetone	67-64-1	100
2. Benzene	71-43-2	10
3. Bromoform	75-25-2	10
4. n-Butanol	71-36-3	100
5. Carbon Tetrachloride ^a	56-23-5	10
6. Chlorobenzene ^a	108-90-7	10
7. Chloroform ^a	67-66-3	10
8. 1,1-Dichloroethane	75-34-3	10
9. 1,2-Dichloroethane ^a	107-06-2	10
10. 1,1-Dichloroethene ^a	75-35-4	10
11. Cis-1,2-Dichloroethene	156-59-2	10
12. Trans-1,2-Dichloroethene	156-60-5	10
13. Ethyl benzene	100-41-4	10 ^c
14. Ethyl ether	60-29-7	10
15. Methanol	67-56-1	100
16. Methylene chloride ^a	75-09-2	10
17. Methyl Ethyl ketone	78-93-3	100
18. Methyl isobutyl ketone	108-10-1	100
19. 1,1,2,2-Tetrachloroethane ^a	79-34-5	10
20. Tetrachloroethene	127-18-4	10
21. Toluene ^a	108-88-3	10
22. 1,1,1-Trichloroethane ^a	71-55-6	10
23. Trichloroethene	79-01-6	10
24. 1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	10
25. m-Xylene ^b	108-38-3	10
26. o-Xylene	95-47-6	10
27. p-Xylene ^b	106-42-3	10

PRQL = program required quantitation limit; ppmv = parts per million by volume

a Critical target compounds

b These xylene isomers cannot be resolved by gas chromatography/mass spectrometry, one of the analytical methods that may be employed

c The ethyl benzene PRQL is 20 ppmv for analyses conducted by Fourier transform infrared spectrometry

Based upon risk assessments, limits have been imposed on the disposal room average headspace gas (HSG) concentrations of the nine critical VOC. All other VOC are noncritical VOC analytes that have been identified as potentially present in the WIPP waste in sufficient quantities to be of quantitative interest for assignment of U.S. Environmental Protection Agency (EPA) hazardous waste numbers and/or are identified as hazardous constituents included in Title 40 CFR 261. Additional VOC may also be included in the PDP samples at the discretion of the DOE HSG PDP Coordinator; they are required to be reported as tentatively identified compounds (TICs).