

WP 12-VC1685

Revision 4

**Subatmospheric Grab
Sampling for Hydrogen,
Methane, and VOCs**

Technical Procedure

EFFECTIVE DATE: 11/30/10

Rick Salness
APPROVED FOR USE

TABLE OF CONTENTS

CHANGE HISTORY SUMMARY.....	3
INTRODUCTION.....	4
REFERENCES.....	4
EQUIPMENT.....	5
PRECAUTIONS AND LIMITATIONS	5
PREREQUISITE ACTIONS.....	6
PERFORMANCE	6
1.0 SAMPLE COLLECTION AND CANISTER HANDLING	6
1.1 Sample Canister Preparation.....	6
1.2 Subatmospheric Grab Sampling (No Purge Required).....	7
1.3 Subatmospheric Grab Sampling (From Sample Lines).....	10
1.4 Sample Canister Interim Storage.....	13
2.0 SAMPLE CANISTER DELIVERY AND SHIPMENT	13
2.1 Delivering Samples to Contract Laboratory	13
2.2 Shipping Samples via Commercial Carrier	14
Attachment 1 – Subatmospheric Grab Sampling Data Sheet.....	17
Attachment 2 – Subatmospheric Grab Sampling Assembly	18
Attachment 3 – Sample of Chain of Custody Record	19
Attachment 4 – Request for Analysis	20
Attachment 5 – Canister Sample Tag.....	21

CHANGE HISTORY SUMMARY

REVISION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES
4	11/30/10	Added wording to first bullet in the Precautions and Limitations on trainees Added new Step 1.3.4 Added a Note above Steps 1.3.14, 1.3.16, and 1.3.24

INTRODUCTION ¹

This procedure provides instructions for handling (receipt, storage, use, and shipping) sample canisters and obtaining subatmospheric grab samples for hydrogen methane and volatile organic compound (VOC) samples at the Waste Isolation Pilot Plant (WIPP) site.

Multiple sampling locations are used to quantify hydrogen and methane concentrations. These include 18 initial locations in each "filled" panel for Hazard Waste Disposal Units (HWDUs) 3-7. A "filled" panel is defined as a HWDU no longer to receive waste but not yet closed. The 18 sample locations will include two locations in each closed-room of a panel and each side of the two closure bulkheads. VOC analyses are required at the sample location in the exhaust side of Room 1 of each filled panel. The sample collected at this location will be analyzed for hydrogen, methane, and VOCs.

Samples may be collected at other locations as determined necessary.

Deviations from procedure will be considered variances. The Program Manager must preapprove variances. Variances are recorded in the project files. Unintentional deviations, equipment malfunctions, and other problems are nonconformances. Documentation of nonconformances will be handed according to requirements in WP 13-1.

Performance of this procedure generates the following record(s), as applicable. Any records generated are handled in accordance with departmental Records Inventory and Disposition Schedules.

- Attachment 1, Subatmospheric Grab Sampling Data Sheet
- Environmental Chain-of-Custody Record (Example Attachment 3)
- Request for Analysis (Example Attachment 4)

REFERENCES

BASELINE DOCUMENTS

- Hazardous Waste Facility Permit, Waste Isolation Pilot Plant, Permit No. NM4890139088-TSDF issued by the New Mexico Environment Department
- WP 12-VC.03, Hydrogen and Methane Monitoring Plan
- WP 12-VC.04, Quality Assurance Project Plan for Hydrogen and Methane Monitoring

- EPA CM TO-15, Determination of Volatile Organic Compounds (VOCs) in air collected in specially prepared canisters and analyzed by gas chromatography/mass spectrometry.

REFERENCED DOCUMENTS

- WP 13-1, Washington TRU Solutions LLC Quality Assurance Program Description
- WP 12-VC1684, VOC Sampling Operations
- Shipping Documents (shipping authorization and air bill)
- Canister Certification Sheets

EQUIPMENT

- Wrench, 9/16-inch open end
- Wrench, 1/2-inch open end
- Six-liter passivated stainless steel SUMMA canisters
- Sample Pump
- Subatmospheric Grab Sampling Assembly
- Air Compressor

PRECAUTIONS AND LIMITATIONS

- Individuals performing this procedure must be qualified per Qualification Card L-16, Volatile Organic Compound Sampling Operations or be a trainee working to Qualification Card L-16 under a qualified individual, excluding Radiological Control Technicians (RCTs).
- A RCT must perform Step 1.3.33.
- All tubing connections SHALL be kept capped or plugged at all times until final connections or disconnections are made.
- All equipment must be within calibration date prior to sampling event.
- Sampling frequencies are detailed in monitoring plan.

- Ensure that the vacuum/pressure gauge has adequate battery power prior to use.

PREREQUISITE ACTIONS

- Ensure that sample canisters are cleaned and certified as indicated by certification tag prior to use.

PERFORMANCE

NOTE

The signing of Environmental Chain-of-Custody (COC) Record (Example Attachment 3) demonstrates the verification of sample and canister identification (ID).

NOTE

Sample canisters may be stored in the underground prior to sampling in secured areas to aid in process efficiency. The custody documentation will apply the same as any other custody transfer.

1.0 SAMPLE COLLECTION AND CANISTER HANDLING

1.1 Sample Canister Preparation

NOTE

Duplicate sampling will be conducted once for each monthly set of samples at panel location 1 Exhaust. Duplicate will be analyzed for VOCs, hydrogen, and methane.

- 1.1.1 Obtain certified clean sample canister(s), assigned COC(s), and Request for Analysis (RFA[s]) from storage area.
- 1.1.2 Record date and time, and sign "Received By" line on COC.
- 1.1.3 Inspect each sample canister for the following conditions:
 - [A] Certification tag attached
 - [B] Sample canister valve fully closed/sealed
 - [C] Tubing cap installed on sample canister valve
- 1.1.4 **IF** any conditions identified in Step 1.1.3 are **NOT** as specified, **THEN** return sample canister for exchange.

- 1.1.5 Assign a sample number to each canister from the sample canister log.
- 1.1.6 Attach canister Sample Tag(s) to canister(s), as applicable.
- 1.1.7 Record the following on Attachment 1:
- Date
 - Sample Location
 - Sample Type
 - Sample Number
 - Canister Serial Number
 - Mass Flow Controller Number
 - Mass Flow Calibration Expiration Date
 - Vacuum/Pressure Gauge Number
 - Vacuum/Pressure Gauge Calibration Expiration Date
- 1.1.8 Prior to leaving the equipment storage area, ensure that the installed Sampling equipment is within calibration due date.

NOTE

Store voided canisters in the out-of-service cabinet and tag to prevent future use until they are shipped for cleaning and certification.

- 1.2 Subatmospheric Grab Sampling (No Purge Required).
-

NOTE

Steps 1.2.1 through 1.2.14 can be performed in location other than sampling location.

NOTE

Vacuum/pressure gauge reads in hg units. Vacuum is shown as negative in hg on the gauge. Vacuum readings shall be interpreted as absolute value (positive) where results are defined as vacuum.

- 1.2.1 Ensure particulate filters are installed in filter housing.
- 1.2.2 Ensure valves 1 and 2, on sampling assembly, are open.
- 1.2.3 Plug in power cords for mass flow controller and sample pump.
- 1.2.4 Ensure mass flow controller is set to 2.0 lpm.
- 1.2.5 Activate sample pump.

1.2.6 Close sampling assembly valve 1.

NOTE

If at any time during the sampling events sample criteria is not achieved, VOC Team Leader or Cognizant Manager must be notified, sample voided, and sampling equipment deactivated.

- 1.2.7 Set metering valve to a flow rate between 0.8 and 1.2 lpm, using mass flow controller, and record on Attachment 1.
- 1.2.8 Deactivate sampling pump.
- 1.2.9 Close valve 2 on sampling assembly.
- 1.2.10 Attach sample canister to the sample outlet port.
- 1.2.11 Turn on vacuum/pressure gauge.
- 1.2.12 Open canister and record initial vacuum reading on Attachment 1.
- 1.2.13 If vacuum reading is below 24 in. hg., void the canister and **GO TO** Step 1.1.
- 1.2.14 Close canister valve.
- 1.2.15 Attach sampling assembly to desired sampling port as applicable.
- 1.2.16 Open sampling assembly valve 1.
- 1.2.17 Open the valve on the sample canister to initiate sample collecting, and record time on Attachment 1.
- 1.2.18 Allow the sample canister to draw air in between 7 and 2 in. hg., as indicated by vacuum/pressure gauge, and record on Attachment 1.
- 1.2.19 Close valve on sample canister, and record collection end time on Attachment 1.
- 1.2.20 Close sampling assembly valve 1.
- 1.2.21 Open canister valve to verify final canister vacuum.
- 1.2.22 Close canister valve.

1.2.23 Remove sample canister.

1.2.24 Record time and date of removal on the Sample Tag on Attachment 1.

NOTE

Filters will require RCT analysis when samples are collected from areas that are closed from mine ventilation (e.g., GAC system, closed room).

1.2.25 Remove particulate filters and place in individually labeled Petrie dishes, as required.

1.2.26 Record N/A on the following lines of Attachment 1:

- Flow Rate
- Purge Time
- Volume Purged

1.2.27 Print, sign, and date Attachment 1.

1.2.28 Perform one of the following:

- [A] If additional samples are to be collected, GO TO Step 1.2.
- [B] If sampling is complete, proceed to Step 1.2.29.

1.2.29 After each required location has been sampled, transfer filters to RCTs for analysis, as applicable.

1.2.30 RCT, analyze the primary filter, and perform one of the following:

- [A] If the filter is less than minimum detectable activity (MDA) alpha and beta/gamma, proceed to Step 1.2.31.
- [B] If the primary filter is greater than MDA for alpha and beta/gamma, control filter, and analyze the secondary filter.
- [C] If secondary filter is less than MDA for alpha and beta/gamma, proceed to Step 1.2.31.
- [D] If both filters are above MDA, contact Radiological Technology to determine equipment disposition.

1.2.31 Complete the RCT section on Attachment 1.

- 1.2.32 Print, sign, and date the RCT signature line on Attachment 1.
- 1.2.33 After filters have been released, transfer sample canister for sample storage.
- 1.3 Subatmospheric Grab Sampling (From Sample Lines)
 - 1.3.1 Ensure particulate filters are installed in filter housing.
 - 1.3.2 Ensure valves 1 and 2 on sampling assembly are open at beginning of sampling event.
 - 1.3.3 Attach sampling assembly to desired sample line at filter housing and sample pump intake line at mass flow controller.
 - 1.3.4 If performing field duplicate sampling, remove cap from T-fitting and install flex tubing onto sample assembly.
 - 1.3.5 Plug in power cords for mass flow controller and sample pump.
 - 1.3.6 Activate sample pump.
 - 1.3.7 Set purge flow rate between 1 and 3 lpm using mass flow controller, and record flow rate on Attachment 1.
 - 1.3.8 Close sampling assembly valve 1.

NOTE

If at any time during the sampling events sample criteria are not achieved, VOC Team Leader or Cognizant Manager must be notified, sample voided, and sampling equipment deactivated.

- 1.3.9 Set metering valve to a flow rate between 0.8 and 1.2 lpm using mass flow controller, and record on Attachment 1.

NOTE

The metering valve must be set at a rate less than the setting for the mass flow controller (e.g., metering valve set at 0.9 lpm while mass flow controller set at 1.0 lpm).

- 1.3.10 Deactivate sampling pump.
- 1.3.11 Close valve 2 on sampling assembly.
- 1.3.12 Attach sample canister to the sample outlet port.

1.3.13 Turn on Vacuum/Pressure Gauge

NOTE

For field duplicate sampling Steps 1.3.14 and 1.3.15 will be performed for each canister individually.

1.3.14 Open canister and record initial vacuum reading on Attachment 1. If vacuum reading is below 24 in. Hg, void the canister and return to Subsection 1.2.

1.3.15 Close canister valve.

NOTE

Field duplicate sampling information will be recorded on same Attachment 1 as the parent sample in sequential order.

1.3.16 Open both sampling assembly valves.

1.3.17 Activate sampling pump to begin purging process.

1.3.18 Time the purge to ensure that twelve liters of air are drawn through the sample line using the mass flow indicator, then perform the following as applicable.

Flow rate	1.0 lpm	1.5 lpm	2 lpm	2.5 lpm	3 lpm
Purge time needed	12 minutes	8 minutes	6 minutes	5 minutes	4 minutes

[A] If the purge is successful, record volume purged on Attachment 1, and proceed to Step 1.3.18.

[B] If a line cannot be purged, connect air compressor to the line and attempt to clear any obstruction.

[C] If the line is cleared, repeat Step 1.3.5.

[D] If the line cannot be cleared, secure equipment, and stop this procedure for this location, GO TO WP 12-VC1684, and perform Section 1.0, Sample Line Inspection. If line is repaired, return to this procedure and restart sampling process.

1.3.19 Open the valve on the sample canister(s) to initiate sample collecting, and record time on Attachment 1.

- 1.3.20 Allow the sample canister(s) to draw air in to between 7 and 2 in. Hg as indicated by vacuum/pressure gauge, and record ending vacuum on Attachment 1.
- 1.3.21 Close valve on sample canister(s), and record collection end time on Attachment 1.
- 1.3.22 Deactivate sample pump.
- 1.3.23 Close both sampling assembly valves.

NOTE

For field duplicate sampling Steps 1.3.24 and 1.3.25 will be performed for each canister individually.

- 1.3.24 Open canister valve to verify final canister vacuum.
- 1.3.25 Close canister valve.
- 1.3.26 Remove sample canister(s).
- 1.3.27 Record time and date of removal on the Sample Tag(s) on Attachment 1.
- 1.3.28 Remove particulate filters and place in individually labeled petrie dishes.
- 1.3.29 Remove sample assembly.
- 1.3.30 Cap sample location inlet line.
- 1.3.31 Print, sign, and date Attachment 1.
- 1.3.32 Perform one of the following:
 - [A] If additional samples are to be collected, return to Subsection 1.2.
 - [B] If sampling is complete, proceed to Step 1.3.32.
- 1.3.33 After each required location has been sampled, transfer filters to RCTs for analysis.

1.3.34 RCT, analyze the primary filter, and perform one of the following:

- [A] If the filter is less than MDA alpha and beta/gamma, proceed to Step 1.3.34.
- [B] If the primary filter is greater than MDA for alpha and beta/gamma, control filter, and analyze secondary filter.
- [C] If secondary filter is less than MDA for alpha and beta/gamma, proceed to Step 1.3.34.
- [D] If both filters are above MDA, contact Radiological Technology to determine equipment disposition.

1.3.35 Complete the RCT Section of Attachment 1.

1.3.36 Print, sign, and date the RCT signature line of Attachment 1.

1.3.37 After filters have been released, transfer sample canister for sample storage.

1.4 Sample Canister Interim Storage

1.4.1 Return the following to the VOC Monitoring storage area:

- Filled sample canister(s)
- Attachment 1
- COC
- RFA

1.4.2 Place filled sample canister(s) in "Canisters Ready for Shipment" locker.

1.4.3 Record date and time, and sign "Relinquished By" line of COC.

NOTE

Shipping of voided canisters does not require a Request for Analysis or a COC. Voided canisters will be shipped separately as general freight or directly delivered to the contract laboratory.

2.0 SAMPLE CANISTER DELIVERY AND SHIPMENT

2.1 Delivering Samples to Contract Laboratory

2.1.1 Retrieve sample canister(s), respective COC(s), and RFA(s).

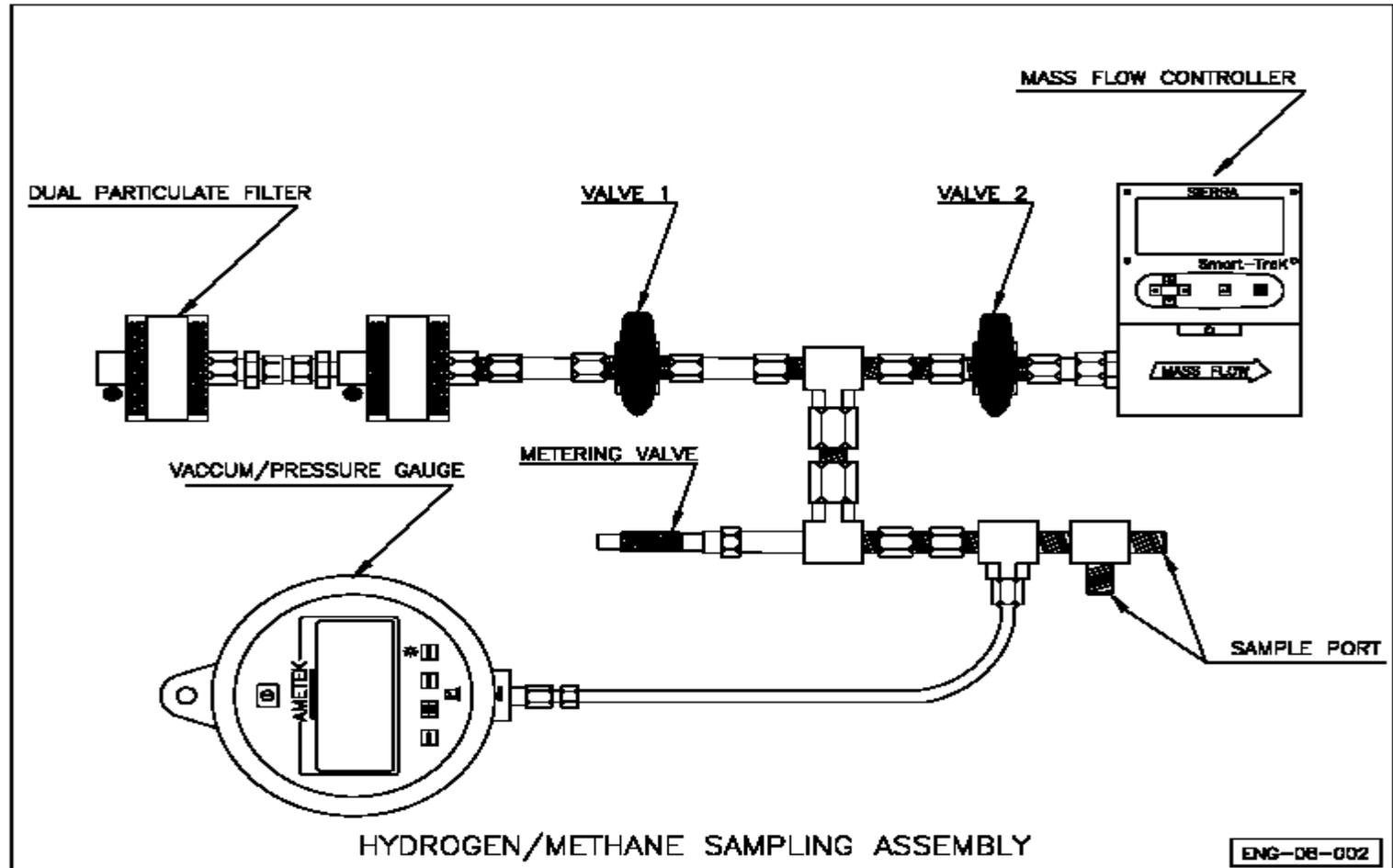
- 2.1.2 Record date and time, and sign "Received By" line of COC.
- 2.1.3 Record Control Number from Attachment 4, Request for Analysis on the COC.
- 2.1.4 Mark on Request for Analysis pressure "vacuum in Hg."
- 2.1.5 Obtain sturdy cardboard box and inner boxes, if necessary, for sample canister(s).
- 2.1.6 Ensure Sample Tag is connected to the correct sample canister and each canister is part of the intended shipment before placement in shipping container.
- 2.1.7 Place the canister(s) inside the box(es), leaving them accessible to inspection.
- 2.1.8 Give the following forms to VOC Program Manager or designee, for review:
 - COC(s)
 - Request for Analysis
 - Attachment 1(s)
- 2.1.9 Complete COC(s) and RFA(s) for sample canisters to be delivered.
- 2.1.10 Deliver samples to the laboratory.
- 2.1.11 Record date and time, and sign "Relinquished By" line of COC.
- 2.1.12 Return the following to Project Records Services files in accordance with the departments Records Inventory and Disposition Schedule:
 - Yellow copy of the COC
 - Yellow copy of Request for analysis
 - Attachment 1(s)
- 2.2 Shipping Samples via Commercial Carrier
 - 2.2.1 Retrieve sample canister(s) and respective COC(s).
 - 2.2.2 Record date and time, and sign "Received By" line of COC.
 - 2.2.3 Complete COC for sample canisters to be shipped.

- 2.2.4 Record Control Number from Request for Analysis on the COC.
- 2.2.5 Mark on Request for Analysis pressure "vacuum in hg."
- 2.2.6 Obtain sturdy cardboard box and inner boxes, if necessary, for sample canister(s).
- 2.2.7 Ensure Sample Tag is connected to the correct sample canister and each canister is part of the intended shipment before placement in shipping container.
- 2.2.8 Place the canister(s) inside the box(es), leaving them open.
- 2.2.9 Mark the outer box, and each inner box (if used), with the sample identification numbers in a manner that they can be read by all persons transporting the samples.
- 2.2.10 Place address label on the outermost box (as applicable).
- 2.2.11 Record the following on the Shipping Authorization:
- Sample numbers
 - COC numbers
 - Canister serial numbers
 - Sample pressure
- 2.2.12 Give the following forms to VOC Program Manager or designee, for review:
- COC
 - Request for Analysis
 - Attachment 1(s)
- 2.2.13 Transport shipping container(s) and shipping documents to the warehouse or designated shipping location.
- 2.2.14 Record date and time, and sign "Relinquished By" line of COC.
- 2.2.15 Have warehouse personnel verify contents, sign, date, and enter time, on the individual COC(s) as received.
- 2.2.16 Have warehouse personnel sign, date, and enter time on the COC(s) as "Relinquished By."

- 2.2.17 Record on COC the shipping document number of each shipping container for all sample canister(s) in that container.
- 2.2.18 Insert original COC copies with corresponding samples inside the box(es).
- 2.2.19 Tape the box(es) with clear packaging tape.
- 2.2.20 Place COC tape over packaging tape to prevent tampering.
- 2.2.21 Retain copy of shipping documents and copy of airbill, as applicable.
- 2.2.22 Return the following to Project Records Services files in accordance with the departments Records Inventory and Disposition Schedule:
- Yellow copy of the COC
 - Yellow copy of Request for Analysis
 - Attachment 1(s)
 - Copy of shipping documents
 - Copy of airbill

Attachment 2 – Subatmospheric Grab Sampling Assembly

Attachment 2 – Subatmospheric Grab Sampling Assembly



Note: Based on EPA CM TO-15

Attachment 3 – Sample of Chain of Custody Record

Environmental VOC Chain-of-Custody Record

No 4277

SAMPLE NUMBER _____
 Canister Serial No. _____
 Date of Receipt: _____ / _____ / _____
 Equipment Type: _____
 Cleaning Cert. Date: _____
 Storage Location: _____
 Installation Location: _____

C/C Control _____
 R/A Control No. _____
 Shipping Document No. _____
 Cal. Due Date: _____
 Date: _____ / _____ / _____
 Time: _____

1. Received By: _____
 Signature Date Time
 Relinquished By: _____
 Signature Date Time
 2. Received By: _____
 Signature Date Time
 Relinquished By: _____
 Signature Date Time

3. Received By: _____
 Signature Date Time
 Relinquished By: _____
 Signature Date Time
 4. Received By: _____
 Signature Date Time
 Relinquished By: _____
 Signature Date Time

5. Received By: _____
 Signature Date Time
 Relinquished By: _____
 Signature Date Time
 6. Received By: _____
 Signature Date Time
 Relinquished By: _____
 Signature Date Time

Performers responsible for data entry or step completion SHALL enter their printed names, signatures, and date below.

NAME (print)	SIGNATURE	DATE
_____	_____	_____
_____	_____	_____
_____	_____	_____

Remarks: _____

Completion of this step constitutes validation of this record and is found to be complete.

 Name (print) Signature Date

Attachment 4 – Request for Analysis

Waste Isolation Pilot Plant
 Washington TRU Solutions LLC
 P.O. Box 2078
 Carlsbad, NM 88221-2078

VOC Monitoring Program _____
 Purchase Order No. _____

R/A Control _____
 C/C Control No. _____
 Date Samples Shipped _____
 Lab Destination _____
 Laboratory Contact _____
 Send Lab Report To _____

 Date Report Required _____
 Project Contact _____
 Project Contact Phone No. _____

Serial No.	Sample No.	C-of-C No.	Sample Type	Sample Pressure	Preservative	Contract-Specific Testing	Special Instructions

TURNAROUND TIME REQUIRED: (Rush must be approved by appropriate Manager) NORMAL _____ RUSH _____ (Subject to rush surcharge)
 POSSIBLE HAZARD IDENTIFICATION: (Please indicate if sample(s) are hazardous materials and/or suspected to contain high levels of hazardous substances.)
 NONHAZRD _____ FLAMMABLE _____ SKIN IRRITANT _____ HIGHLY TOXIC _____ BIOLOGICAL _____ OTHER _____
 SAMPLE DISPOSAL (Please indicate disposition of sample following analysis.) RETURN TO CLIENT _____ DISPOSAL BY LAB _____
 (Please Specify)

FOR LAB USE ONLY
 RECEIVED BY _____ DATE/TIME _____

Attachment 5 – Canister Sample Tag

Sample Number: _____ Canister Serial Number: _____

Sample Location: _____

Date/Time Installed: _____

Performer's Printed Name: _____

Signature: _____

Date/Time Removed: _____

Performer's Printed Name: _____

Signature: _____