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Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

04-OES-0128

SEP 23 2004

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SEP 27 2004
EDMC

Ms. Jane A. Hedges
Cleanup Section Manager
Nuclear Waste Program
State of Washington
Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99352

Dear Ms. Hedges:

CONTAINED-IN DETERMINATION FOR ADDITIONAL SOIL CORES FROM TANK FARMS WORK

The U.S. Department of Energy, Richland Operations Office (RL) is requesting the State of Washington Department of Ecology (Ecology) grant a contained-in determination for residual soil core samples and associated laboratory waste generated during the examination of those core samples. These wastes result from a Pacific Northwest National Laboratory project examining soil cores taken adjacent to Hanford single-shell tank T-106 and are in addition to our contained-in determination request of May 21, 2003. Ecology authority to grant such requests is found in WAC 173-303-070(2)(c)(ii).

The attached contained-in determination request contains information gathered in accordance with the project Sampling and Analysis Plan (SAP) previously reviewed by Ecology. It includes a summary of data on the wastes; detailed tables of results for each sample; and a copy of the SAP for reference. Detailed laboratory reports and data validation documentation are available in the project files for Ecology examination if desired.

The analytical results indicate that no results above detection levels were observed. All levels calculated pursuant to WAC 173-340-740(3)(b)(iii) are met for the contaminants of concern. If you have any questions, please contact me, or your staff may contact Joel Hebdon, Director, Office of Environmental Services, on (509) 376-6657.

Sincerely,

Keith A. Klein
Manager

OES:ACM

Attachment

cc: See page 2

cc w/attach:
T. Aldridge, PNSO
F. W. Bond, Ecology
R. D. Enge, PNNL
S. Harris, CTUIR
D. A. Isom, Admin Record, Single Shell Tank, T-106, H6-08
R. Jim, YN
B. L. Becker-Khaleel, Ecology
D. Powaukee, NPT
J. J. Wallace, Ecology
R. W. Wilson, Ecology
Environmental Portal

REQUEST FOR "CONTAINED-IN" DETERMINATION FOR HANFORD SITE SOIL SAMPLES ANALYZED BY THE PACIFIC NORTHWEST NATIONAL LABORATORY

1.0 INTRODUCTION

Contaminated media (e.g., soil, groundwater, surface water) and debris may be determined to no longer contain dangerous waste codes if the contaminated media/debris fall below specific risk-based concentrations; better known as a "contained-in determination." The Washington State Department of Ecology (Ecology) has established these risk-based action levels in a policy memo dated February 19, 1993.

The following information supports a contained-in determination for F-listed constituents from soils, soil extracts, associated debris (e.g., personal protective equipment, miscellaneous solid waste), and analytical wastes generated from the investigation and evaluation of soil cores from Hanford Tank Farm unsaturated zone soil cores.

It is known that Hanford tank farms are permitted to store the specific listed waste constituents indicated below. Due to the leakage of some of these tanks, environmental media has come in contact with tank waste. However, the concentration of specific constituents, namely those included in waste codes F001-F005 specified below, do not exist above the risk-based action levels, and are therefore candidates for this contained-in determination. This determination would thus eliminate the need to manage the wastes as listed hazardous waste and reduce the costs associated with such management and disposal. Please note that the wastes will still be subject to normal waste management procedures under WAC 173-303 for designation of any other waste coding that may apply.

- F001 – 1,1,1-trichloroethane
- F002 – methylene chloride
- F003 – acetone, and methyl isobutyl ketone
- F004 – *o*-cresol and *p*-cresol
- F005 – methyl ethyl ketone

2.0 BACKGROUND

This investigation is a research effort to more fully understand the fate and transport of material in the unsaturated (vadose) zone beneath and adjacent to the Hanford tank farm storage tanks.

The soils included in the "contained-in" request are generated as a result of characterization and analyses of borehole soil samples taken from the unsaturated zone of the Hanford Site tank farms. The majority of the analyses and characterization activities will be performed in the 3720 and 325 Buildings located in the Hanford Site 300 Area.

Other facilities may be used as required. Soil borehole samples are brought into the laboratory in core sections, opened, and visually inspected. Based on the visual inspection, sub-samples of the soil cores are taken for subsequent analysis. An example of the analytical work is identified in the sample analysis plan (SAP) contained in the "Site-Specific SST Phase 1 RFI/CMS Work Plan Addendum for WMA S-SX", HNF-4380, Rev 1A, dated 10/1/99. Additional wastes to be included in the contained-in determination include soil extracts, associated debris (e.g., personal protective equipment, miscellaneous solid waste, etc.), and analytical wastes generated from the investigation and evaluation of these soil cores.

Since the radioactive waste contained in the Hanford Site tank farms is designated as F-listed waste, all borehole soil samples which contacted tank waste and secondary wastes from the handling and analysis of these media would also designate as F-listed waste (F001 - F005). The borehole soil samples are also contaminated with radioactive constituents, and would therefore need to be managed as radioactive mixed waste (RMW).

3.0 CONTAINED-IN STRATEGY

The strategy for this contained-in determination was first presented to Ecology in a meeting on January 24, 2002. At that time, a path-forward was proposed whereby the contained-in would be granted if the concentration of listed organic constituents did not exceed concentration-based limits. This was agreed to. Subsequent to this meeting, a copy of the sample analysis plan (SAP) (attached) was submitted (April 2002) with a request for Ecology review and concurrence. The concentration-based limits are found in Appendix A (attached).

3.1 Sample Collection and Handling

Sample collection, handling, preservation and storage, and quality assurance/quality control measures were performed in accordance with the WAP utilizing SW-846 protocols. Analyses of the subsamples were performed using SW-846 Method 8260 (for VOA's) and Method 8270 (for SVOA's).

4.0 SAMPLING RESULTS

The analytical data from the subsampling and analyses of the media for the specific F-listed constituents is presented in Appendix A (attached). As anticipated, the soils do not contain the specific organic constituents at levels above the concentration-based limits specified.

5.0 CONTAINED-IN STRATEGY

Based on the data presented, it is requested that Ecology grant a contained-in determination for the specified vadose zone soil, soil extracts, associated debris (e.g., personal protective equipment, miscellaneous solid waste, etc.), and analytical wastes generated from the investigation and evaluation of soil cores from Hanford Tank Farm T-106 unsaturated zone soil cores for the following listed waste codes:

- F001 – 1,1,1-trichloroethane
- F002 – methylene chloride
- F003 – acetone, and methyl isobutyl ketone
- F004 – *o*-cresol and *p*-cresol
- F005 – methyl ethyl ketone

6.0 REFERENCES

Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, et seq.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended

Washington Department of Ecology, memorandum, Tom Eaton to Staff, "Contained-In Policy", 2/19/1993.

REQUEST FOR "CONTAINED-IN" DETERMINATION FOR HANFORD SITE SOIL SAMPLES ANALYZED BY THE PACIFIC NORTHWEST NATIONAL LABORATORY -

SUPPORTING DOCUMENTATION

Purpose –

Analytical data (summarily tabulated in Appendix A attached) obtained based on the previously agreed to strategy and sample analysis plan (SAP, Appendix B attached) are provided to obtain a contained-in determination. It is believed that there is sufficient supporting information included in the sample analytical data to justify a "contained-in" determination.

Background –

Currently, primary and secondary wastes including soil, soil leachate and laboratory debris, generated from characterization and investigation of borehole samples from Hanford Site tank farms are designated as hazardous "F-listed" waste based on designation requirements in the Dangerous Waste Regulations, Chapter 173-303 Washington Administrative Code (WAC). Successfully obtaining a "contained-in" determination for the soil cores would allow all residual core samples and analytical wastes from soil core analyses to be managed as non-F-listed pursuant to WAC 173-303-070 (2)(c)(ii). All wastes will continue to be appropriately designated for any other waste coding in accordance with WAC 173-303.

Samples from the cores, listed below, were submitted for analytical analysis pursuant to the SAP for the purpose of obtaining a "contained-in" determination.

Sample Core (Borehole)	Location (Near tank)
C4105	T-106
C4104	T-106

Summary -

Analytical results for all F-listed constituents-of-concern, and carbon tetrachloride, are either non-detectable (comment code **ND**) or reported due to laboratory blank contamination (comment code **B**). These values are on the order of 12.5 to 8000 times lower than the lowest clean-up standards.

Conclusion –

Based on the fact that analytical data demonstrates the concentrations of all F-listed constituents-of-concern, and carbon tetrachloride, are below risk based clean-up standard limits, a contained-in determination of "does not contain" is substantiated.

Appendix A

Soil Core Constituents-of-Concern Table

Sample # **S03044-6** Core: **Near T-106**

Code	Constituent	CAS RN	LDR Treat. Std. (ppb)	Universal Treatment Std. (ppb)	Groundwater Protection Level* (ppb)	Analytical Results (ppb)	Detection Level (ppb)	SW-846 Method
F001	1,1,1-Trichloroethane	*71-55-6*	6000	6000	20000	**ND**	5	8260
F002	Methylene Chloride	*75-09-2*	30000	30000	500	**5.6 B**	5	8260
F003	Acetone	*67-64-1*	160000	160000	5556000	**ND**	20	8260
F003	Methyl Isobutyl Ketone	*108-10-1*	33000	33000	NA	**ND**	10	8260
F004	*o*-Cresol	*95-48-7*	5600	5600	2778000	**ND**	330	8270
F004	*p*-Cresol	*106-44-5*	5600	5600	NA	**ND**	330	8270
F005	Methyl Ethyl Ketone	*78-93-3*	36000	36000	33333000	**ND**	10	8260
- - -	Carbon Tetrachloride	*56-23-5*	6000	6000	38890	**ND**	0.25 MDL	8260

Sample # **S03044-11** Core: **Near T-106**

Code	Constituent	CAS RN	LDR Treat. Std. (ppb)	Universal Treatment Std. (ppb)	Groundwater Protection Level* (ppb)	Analytical Results (ppb)	Detection Level (ppb)	SW-846 Method
F001	1,1,1-Trichloroethane	*71-55-6*	6000	6000	20000	**ND**	5	8260
F002	Methylene Chloride	*75-09-2*	30000	30000	500	**5.6 B**	5	8260
F003	Acetone	*67-64-1*	160000	160000	5556000	**ND**	20	8260
F003	Methyl Isobutyl Ketone	*108-10-1*	33000	33000	NA	**ND**	10	8260
F004	*o*-Cresol	*95-48-7*	5600	5600	2778000	**ND**	330	8270
F004	*p*-Cresol	*106-44-5*	5600	5600	NA	**ND**	330	8270
F005	Methyl Ethyl Ketone	*78-93-3*	36000	36000	33333000	**ND**	10	8260
- - -	Carbon Tetrachloride	*56-23-5*	6000	6000	38890	**ND**	0.25 MDL	8260

Sample # **S03044-21** Core: **Near T-106**

Code	Constituent	CAS RN	LDR Treat. Std. (ppb)	Universal Treatment Std. (ppb)	Groundwater Protection Level* (ppb)	Analytical Results (ppb)	Detection Level (ppb)	SW-846 Method
F001	1,1,1-Trichloroethane	*71-55-6*	6000	6000	20000	**ND**	5	8260
F002	Methylene Chloride	*75-09-2*	30000	30000	500	**5.2 B**	5	8260
F003	Acetone	*67-64-1*	160000	160000	5556000	**ND**	20	8260
F003	Methyl Isobutyl Ketone	*108-10-1*	33000	33000	NA	**ND**	10	8260
F004	*o*-Cresol	*95-48-7*	5600	5600	2778000	**ND**	330	8270
F004	*p*-Cresol	*106-44-5*	5600	5600	NA	**ND**	330	8270
F005	Methyl Ethyl Ketone	*78-93-3*	36000	36000	33333000	**ND**	10	8260
- - -	Carbon Tetrachloride	*56-23-5*	6000	6000	38890	**ND**	0.25 MDL	8260

* Derived in accordance with WAC 173-340-747

Comment Codes: **ND** = Not Detected, **J** = Estimated value - result less than reporting limit, **B** = Blank contamination (at the lab).

Appendix A (cont.)

Soil Core Constituents-of-Concern Table

Sample # **S03072-5** Core: **Near T-106**

Code	Constituent	CAS RN	LDR Treat. Std. (ppb)	Universal Treatment Std. (ppb)	Groundwater Protection Level* (ppb)	Analytical Results (ppb)	Detection Level (ppb)	SW-846 Method
F001	1,1,1-Trichloroethane	*71-55-6*	6000	6000	20000	**ND**	5	8260
F002	Methylene Chloride	*75-09-2*	30000	30000	500	**12**	5	8260
F003	Acetone	*67-64-1*	160000	160000	5556000	**11 J,B**	20	8260
F003	Methyl Isobutyl Ketone	*108-10-1*	33000	33000	NA	**ND**	10	8260
F004	*o*-Cresol	*95-48-7*	5600	5600	2778000	**ND**	330	8270
F004	*p*-Cresol	*106-44-5*	5600	5600	NA	**ND**	330	8270
F005	Methyl Ethyl Ketone	*78-93-3*	36000	36000	33333000	**ND**	10	8260
- - -	Carbon Tetrachloride	*56-23-5*	6000	6000	38890	**ND**	0.14 MDL	8260

Sample # **S03072-9** Core: **Near T-106**

Code	Constituent	CAS RN	LDR Treat. Std. (ppb)	Universal Treatment Std. (ppb)	Groundwater Protection Level* (ppb)	Analytical Results (ppb)	Detection Level (ppb)	SW-846 Method
F001	1,1,1-Trichloroethane	*71-55-6*	6000	6000	20000	**ND**	5	8260
F002	Methylene Chloride	*75-09-2*	30000	30000	500	**14**	5	8260
F003	Acetone	*67-64-1*	160000	160000	5556000	**13 J,B**	20	8260
F003	Methyl Isobutyl Ketone	*108-10-1*	33000	33000	NA	**ND**	10	8260
F004	*o*-Cresol	*95-48-7*	5600	5600	2778000	**ND**	330	8270
F004	*p*-Cresol	*106-44-5*	5600	5600	NA	**ND**	330	8270
F005	Methyl Ethyl Ketone	*78-93-3*	36000	36000	33333000	**ND**	10	8260
- - -	Carbon Tetrachloride	*56-23-5*	6000	6000	38890	**ND**	0.15 MDL	8260

Sample # **S03072-14** Core: **Near T-106**

Code	Constituent	CAS RN	LDR Treat. Std. (ppb)	Universal Treatment Std. (ppb)	Groundwater Protection Level* (ppb)	Analytical Results (ppb)	Detection Level (ppb)	SW-846 Method
F001	1,1,1-Trichloroethane	*71-55-6*	6000	6000	20000	**ND**	5	8260
F002	Methylene Chloride	*75-09-2*	30000	30000	500	**15**	5	8260
F003	Acetone	*67-64-1*	160000	160000	5556000	**21 J,B**	20	8260
F003	Methyl Isobutyl Ketone	*108-10-1*	33000	33000	NA	**ND**	10	8260
F004	*o*-Cresol	*95-48-7*	5600	5600	2778000	**ND**	330	8270
F004	*p*-Cresol	*106-44-5*	5600	5600	NA	**ND**	330	8270
F005	Methyl Ethyl Ketone	*78-93-3*	36000	36000	33333000	**ND**	10	8260
- - -	Carbon Tetrachloride	*56-23-5*	6000	6000	38890	**ND**	0.16 MDL	8260

* Derived in accordance with WAC 173-340-747

Comment Codes: **ND** = Not Detected, **J** = Estimated value - result less than reporting limit, **B** = Blank contamination (at the lab).

SAMPLE ANALYSIS PLAN - REV 2
FOR HANFORD SITE TANK FARM BOREHOLE AND CONE-PENETROMETER SOIL SAMPLES

Prepared by: _____

Samuel P. Juracich, Environmental Compliance Representative

Concurrence: _____

Harold T. Tilden, Environmental Policy Manager

Concurrence: _____

Michael J. Stephenson, Associate Operations Manager, ETD

Approval: _____

Clark W. Lindenmeier, Project Manager

SAMPLE ANALYSIS PLAN FOR HANFORD SITE TANK FARM BOREHOLE AND CONE-PENETROMETER SOIL SAMPLES

Purpose and Background

The purpose of this sample analysis plan (SAP) is to obtain sufficient information to successfully receive a "contained-in" determination from the Washington State Department of Ecology (Ecology) for "F-listed" soils, soil cores, drilling wastes, and laboratory wastes from the analysis of boreholes. These wastes are generated from the investigation of the unsaturated zone below Hanford Site underground storage tanks located in the 200 East and 200 West area tank farms. These investigations will provide information to better understand the fate and transport of material in the unsaturated (vadose) zone beneath and adjacent to the Hanford tank farm storage tanks.

Waste from drilling activities will be from the C, B, BX/BY, S/SX, U, T and TX/TY Hanford tank farms. The primary and secondary wastes will include soils, soil cores, soil leachate, drilling debris, and laboratory debris generated from characterization and investigation of borehole and cone penetrometer samples adjacent to and beneath Hanford tank farm tanks. Note: Specific cores will be identified in the packet that is submitted to Ecology. The waste within the tanks is currently designated as hazardous "F-listed" waste based on designation requirements in the Dangerous Waste Regulations, Chapter 173-303 Washington Administrative Code (WAC). A successful "contained-in" determination for the soil cores will allow all residual wastes including drill cuttings, core samples and analytical wastes from soil core analyses and borings to be managed as non-F-listed waste pursuant to WAC 173-303-070 (2)(c)(ii). All wastes will continue to be appropriately designated in accordance with WAC 173-303.

The F-listed constituents of concern from the Hanford Site tank farms include the following:

- F001: 1,1,1 - trichloroethane
- F002: methylene chloride
- F003: acetone, and methyl isobutyl ketone
- F004: o-cresol, and p-cresol
- F005: methyl ethyl ketone

In addition, carbon tetrachloride will be included in the analyses. Carbon tetrachloride is a constituent of interest in both groundwater and vadose zone investigations.

It is expected that the concentrations of F-listed volatile organic solvents in the vadose zone soil samples do not exceed groundwater protection clean-up levels identified in WAC 173-340-747; therefore, it is believed that these soils and associated samples are good candidates for a "contained-in" determination and subsequent regulatory relief from management as F-listed hazardous waste. The processes, parameters, and procedures for analyzing the soil samples for the F-listed constituents are identified below. Detailed descriptions of the complete borehole

characterization effort will not be discussed here, but may be found in site specific Remedial Investigation and Feasibility Study or Corrective Measures Study work plans.

I. Process Description

A. Processes and Activities that Generate the Wastes.

The soils to be included in the "contained-in" request are generated as a result of characterization and analyses of borehole soil samples taken from the unsaturated zone of the Hanford Site tank farms. The majority of the analyses and characterization activities will be performed in the Radiochemical Processing Laboratory (RPL) building located within the Hanford Site 300 Area. Other facilities may be used as required. Soil borehole samples are brought into the laboratory in core sections, opened, and visually inspected. Based on the visual inspection, sub-samples of the soil cores are taken for subsequent analysis.

Since the radioactive waste contained in the Hanford Site tank farms is designated as F-listed waste, and the fact that the borehole soil samples are contaminated with tank waste that has leaked, all borehole soils and secondary wastes are designated as F-listed waste (F001 through F005). The borehole soil samples are also contaminated with radioactive constituents, and therefore need to be managed as radioactive mixed waste (RMW).

B. Identification/Classification and Quantities of Hazardous Wastes Generated

Primarily, two waste classifications are generated from the described activities:

1) F-listed non-compactable radioactive mixed waste, including soil, soil leachate and other non-compactable material (e.g. drill casings),

2) F-listed compactable radioactive mixed waste, including gloves, wipers, and other laboratory debris.

Within the laboratory approximately five 55-gallon drums of waste per soil coring event is generated. At the drilling site, up to seventy-five 55-gallon drums of borehole and soil waste material is generated during each soil investigation. In addition, samples and wastes will be generated from cone-penetrometer "pushes". Wastes from each borehole or "push" will be segregated until the contained-in determination is made.

The soil core material, as well as samples from the cores, may be archived in the laboratory as "retrievable material" for an undetermined amount of time. The contained-in determination will apply to these materials at the time they are deemed waste.

C. Description of Hazardous Waste Management Units

Since this is a generator activity, there are no hazardous waste management units. Waste from both laboratory and field activities will be managed as "Waste Pending Analysis" (WPA) in <90-day accumulation areas per this agreement between PNNL,

CH2M HILL, and Ecology. WPA will be managed in accordance with the substantive requirements in WAC 173-303 and will be sampled in an expeditious manner according to WPA guidance. Following the "contained-in" determination, wastes will be managed appropriately based on the determination.

II. Selecting Analysis Parameters

A. Criteria and Rationale for Parameter Selection

This SAP deals specifically with the listed waste solvents found in F001 through F005. F-listed solvents that are known to have been submitted to the Hanford Site tank farms for storage include:

- 1,1,1-trichloroethane
- methylene chloride
- acetone
- methyl isobutyl ketone
- *o*-cresol
- *p*-cresol
- methyl ethyl ketone

In addition, carbon tetrachloride will also be included in the analysis due to the interest in groundwater and vadose zone investigations.

B. Special Parameter Selection Requirements

There are no special parameter selection requirements.

III. Field Sampling Plan

A. Sampling Strategies and Equipment

The sampling strategy is simple – three samples will be taken from each soil boring at the areas with the probability for the highest level of contamination. When the soil cores are brought into the laboratory, a Geologist/Geophysicist will perform a geologic assessment. The three sampling locations with the potential for the highest level of contamination will be determined based on professional judgement provided by the Geologist/Geophysicist, and are based on observed characteristics such as soil staining and shading and the use of radiological field screening instrumentation to assist with this decision. Due to the nature of the drilling methods, it is not possible for field duplicates to be taken.

There are three primary reasons why the analysis has been limited to three sub-samples from each core:

- The excessive value of the core material – borehole drilling is expensive, yields limited soil core material, and these core samples are the only near-tank samples in existence, and therefore, they have great value.

- As Low As Reasonably Achievable (ALARA) concerns – due to the high potential radiological dose associated with the soil cores, ALARA concerns are high (see III.D below).

- Analytical costs – due to the radiological nature of the samples, analytical costs are higher than normal; therefore, it is cost prohibitive to perform many analyses.

B. Sample Preservation and Storage

Soil borehole samples will be brought into the laboratory in core sections, opened, and visually inspected. Based on the visual inspection, sub-samples of the soil cores are taken for subsequent analysis. Analytical holding times will be met for the sub-samples (i.e., from the time the cores samples are opened). Holding times are not based on the date/time when the soil borehole samples are originally taken in the field. Due to a number of factors including logistics, ALARA, the visual inspection process, and the need to maintain core section integrity, it is not possible to meet a 14-day holding time that begins when the soil borehole core sections are originally taken from the field site.

Cores are preserved by refrigeration in accordance with the Work Plan. Analytical sub-samples will be preserved and stored as outlined in the applicable SW-846 methods.

C. Sampling Quality Assurance/Quality Control (QA/QC) Procedures

All sampling QA/QC will be in accordance with applicable SW-846 guidelines and the Work Plan. QA/QC will include, but is not limited to, the following: Sub-sample preservation, chain-of-custody, record keeping, SW-846 analytical method QA/QC, data handling/validation, and reporting.

D. Health and Safety Protocols

Policies and procedures contained in the Pacific Northwest National Laboratory (PNNL) Standards-Based Management System (SBMS) will be followed during laboratory analysis. Due to the high radiological doses associated with the soil core samples, the primary Health and Safety protocol for this effort is ALARA. It is necessary, for this reason, to limit the amount of worker exposure time to the soil core material, and yet, accomplish the tasks necessary. The characterization of the soil core material is the primary effort – in addition, sub-sampling for analytical determination of F-listed constituents is a part of this characterization.

IV. Selecting a Laboratory, and Laboratory Testing and Analytical Methods

A. Selecting a Laboratory

The selection of the laboratory will be for the quantitative analysis of the organic constituents of interest. Currently, PNNL has several approved analytical laboratories that are contracted for this type of work, a few of which can accommodate the radiological samples that will be submitted for analyses. The analytical laboratory will be selected based on this and the following criteria:

- comprehensive QA/QC program,
- technical expertise,
- analytical capability,
- ability to meet required analytical detection levels.

B. Selecting Testing and Analytical Methods

The following testing and analytical methods will be used:

- SW-846, Method 8260 – volatile organic analyses (VOA's) by gas chromatograph/mass spec (GC/MS).
- SW-846, Method 8270 – semi-volatile organic analyses (SVOA's) by GC/MS.

C. Analytical Detection Levels

The following analytical detection levels are required for the analyses performed:

F001 - 1,1,1-trichloroethane	5 ppb
F002 - methylene chloride	5 ppb
F003 - acetone	20 ppb
F003 - methyl isobutyl ketone	10 ppb
F004 - *o*-cresol	330 ppb
F004 - *p*-cresol	330 ppb
F005 - methyl ethyl ketone	10 ppb
- - - - carbon tetrachloride	<3.1 ppb

D. Laboratory Quality Control

- Quality Assurance Plan, Audits, Certifications, Precision and Accuracy – Contract laboratory QA/QC documentation meets the appropriate QA/QC requirements for this project. This documentation was evaluated prior to the time of lab selection and contract award and continues to be evaluated during the course of the contract. The data package for the specific analyses will be validated (see Data Review below) to SW-846 method requirements.

- Data Usability – Based on this SAP, validated data is usable for the contained-in determination of core material, archived samples, laboratory wastes, and borehole drilling wastes as described in the "Purpose" above.

- Data Review – Data validation of the data package is performed per SW-846 method requirements and includes:
  - Achieving analytical detection levels (above),
  - Data check for method blanks,
  - Data check for matrix spike recoveries, and
  - Data check for relative percent difference for matrix spike duplicates.

V. Selecting Re-Evaluation Frequencies

Each soil core receives its own characterization at the initial sampling. No re-evaluation will be necessary.

VI. Special Procedural Requirements

A. Procedures for Receiving Wastes from Off-site Generators

Not applicable.

B. Procedures for Ignitable, Reactive, and Incompatible Wastes

Not applicable.

C. Procedures to Ensure Compliance with Land Disposal Restriction (LDR) Requirements

Please note that the purpose of this SAP is to analyze and evaluate the soil cores for F-listed constituents only. All laboratory waste items will be appropriately managed as part of PNNL's overall Waste Management System. All applicable PNNL waste management policies and procedures will be followed for laboratory waste. All borehole materials generated in the field will be appropriately managed as part of the CH2M HILL waste management system. Subsequent to the "contained-in" determination, all waste materials will be appropriately designated in accordance with WAC 173-303 and will be managed in compliance with the LDR requirements.