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DMSA Characterization/Remediation Project

Sampling and Analysis Plan

Issued February 27, 2001

Prepared by WESKEM, LLC

DMSA Characterization/Remediation Project

Sampling and Analysis Plan

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DMSA Characterization/Remediation Project
Sampling and Analysis Plan

1.0 Introduction

This Sampling and Analysis Plan (SAP) encompasses the sampling and analyses of multiple items, areas, and waste streams within the DOE Material Storage Area (DMSA) Characterization/Remediation Project to be implemented by WESKEM, LLC and its agents as subcontracted by Bechtel Jacobs Company, LLC (BJC). The reader is referred to other project-specific plans and documents for additional information.

This plan differs from typical SAPs in that all the items to be sampled, analyzed and characterized are not fully identified at the writing of this plan. Part of the work scope for this project is to identify those items as the work progresses, to determine the contaminants of concern, and to arrange for sampling and analyses within the process established under the contract and the project work release. This plan includes details of sampling and analyses that are known at this time. For the items not yet identified, this plan defines the process to be employed to communicate between project field personnel and the WESKEM Data and Characterization organization personnel. For each of the 160 DMSAs, addenda to this SAP will be written, documenting sampling and analytical contracting requirements. Since some of the DMSAs encompass large areas, the addenda may be divided into multiple planning and contracting efforts. The format for the addenda is shown in Attachment 1. Each addendum will be issued as a separate document.

Project plans include the mobilization of a field support lab, which is expected to be in operation by September 1, 2001. The field support lab is expected to perform radiological analyses. This SAP (Revision 0) does not address analyses at that field support lab.

WESKEM is responsible for all sample management activities up to and including the shipment of the samples to the fixed based laboratories. Site sample management consists of those activities associated with site data collection and sample tracking to provide thoroughly documented and technically defensible data from each sampling event.

2.0 Sampling Scope

The purposes of the sampling are to gather information for Nuclear Criticality Safety (NCS) determinations, safety standards determination, to monitor health and safety conditions, and to identify safe and compliant storage requirements (i.e., characterization). It is expected that some analyses may occur at commercial labs depending upon Paducah United States Enrichment Corporation (USEC) lab capabilities and BJC Sample Management Office (SMO) contracting choices. If that is the case, then radiological screening analyses (rad screens) of samples to be shipped may occur at the USEC lab to provide information for transportation and notifications to the commercial labs.

This plan defines the general sampling methodology, the analytical requirements, and the quality control sampling strategy. Sampling and data collection as defined in this plan will ensure that the Data Quality Objectives (DQO) process is implemented, that requirements in *Test Methods for Evaluating Solid Wastes* (SW-846) are met, and that the data collected will meet the goals in *Quality Assured Data* (W-171-PWOS). The Data Quality Objectives process to be followed for the various sampling classes is discussed in Appendix A.

3.0 Sample Planning

Sample planning will be in accordance with the DOE DQO process. Appendix A summarizes the DQO process to be employed for this project.

Sample planning and sample management activities will be documented using the Paducah Project Environmental Measurements (PEMS) databases. The following summarize the use of Paducah PEMS for all sample classes except IH sampling (see Sampling Classes, Section 5.0)

- The BJC will provide a project specific Paducah Project Environmental Measurement System (Paducah PEMS) database to the WESKEM via the BJC network. This project specific Paducah PEMS database will be used for Sample and Data Management activities.

- WESKEM will use project specific Paducah PEMS for sample scheduling, collection, and tracking each sample and associated data from point of collection through final data reporting. Paducah PEMS tracking includes field forms, chain-of-custody records, verification, assessment, validation, if applicable, and hard copy data packages and electronic data deliverables (EDD). The *Paducah PEMS User's Guide*, BJC/PAD-34, will be used by WESKEM to obtain information about the Paducah PEMS system and the relationships with other databases within the Paducah DOE Integrated Data System.

- WESKEM will be responsible for populating the planning temp tables in Paducah PEMS and submitting the populated table back to the BJC for review and acceptance. Upon acceptance of the planning temp tables by the BJC, WESKEM will populate the real planned samples and samples sent tables and assign paragroups to the statement of work (SOW) import table. In addition, based on laboratory bottle requirements provided by the BJC, WESKEM will populate parameter group bottles and parameter group tables. BJC must accept Paducah PEMS before fieldwork may begin.

- WESKEM will enter project data as the project progresses. All field measurement and observation data will be entered into Paducah PEMS within three days of collection. BJC enters information related to the fixed based laboratory data packages and the tracking associated with the samples once the samples have been shipped to the laboratory and WESKEM has verified receipt of the samples. All waste sampling activities will be entered into Paducah PEMS by WESKEM and tracked by the Waste Project Identification Number.

- BJC will perform system backups daily.

- Security of Paducah PEMS and data used for the project is essential for the success of the project. All security precautions and procedures implemented are designed to minimize the vulnerability of the data to unauthorized access or corruption. Access to the project specific Paducah PEMS, changes to the project Paducah PEMS, the hard copy data files, and diskettes and tape backups is limited and is controlled by BJC.

4.0 Analytical Laboratory Contracting

Analytical laboratory contracting is the responsibility of the BJC SMO for all sampling classes except Industrial Hygiene (IH) sampling. (See Sampling Classes, Section 5.0.) WESKEM will contract the IH sample analytical laboratory. Throughout the remainder of this plan, a distinction will be made where IH sample management activities vary from sample management activities for other sampling classes. If no distinction is made, then that particular sampling activity is consistent for all sampling classes.

5.0 Sampling Classes

For this project, sampling classes have been identified according to the purpose for sample collection. The classes include NCS characterization, IH initial entry sampling and monitoring, HP initial entry sampling and monitoring, waste/material characterization (including waste produced), and radiological screening for sample shipments. Each class is discussed below.

5.1 NCS Determination Sampling (Characterization of Potentially Fissionable Material)

Some of the DMSAs in the scope of this project are Phase 2 DMSAs, which means that fissionable material may be present. Therefore, characterization work for potentially fissionable materials will be performed utilizing NCS criteria established in BJC procedures. Determination of the NCS status is the responsibility of the DMSA Inspector. The NCS status determination will be made by different approaches based on three scenarios, as described below. When NCS sampling is required, sampling requests will be documented on the form in Attachment 2 and submitted to the DMSA Data Coordinator.

5.1.1 Items Containing No Uncharacterized Material

DMSA procedures allow for NCS exemptions either by process knowledge (item or material is known and/or documented never to have been in the cascade process) or by observation (when all interior and exterior surfaces of an item can be observed and no uncharacterized material is seen.) Once the DMSA Inspector has exempted an item for either of the above reasons, other sampling of the material may occur. Sampling requests for other than NCS wipes will not be made until items have been exempted.

5.1.2 Items Containing Solid Material

If an item or material cannot be exempted, or if some interior surfaces cannot be observed, an assay sample (wipe) may be collected. Other wipe samples may be collected at the same time, but no sampling by other methods will occur until the assay results confirm that the solid does not contain material enriched to greater than one weight percent in Uranium-235. If the assay results show material enriched to greater than one weight percent in Uranium-235, then total Uranium will be analyzed by RL-7124 (gamma).

The NCS status of the items containing solid material may also be determined through assay analyses of a solid sample. Samples will be collected and marked Potentially Fissile (PF).

5.1.3 Liquids

The NCS status of liquids in this DMSA will be determined through assay analyses of the liquid. Samples will be collected and marked PF.

It is possible that some of the liquids may exist in multiple phases in their current containers. If that is the case, then each phase has the potential to have different levels of radiological constituents. Therefore, each phase will be sampled and its NCS status determined before the next lower phase can be sampled. The DMSA Inspector is the approval authority.

Table 1
Anticipated Number of NCS Samples

Sampling Purpose	Analytes	Analytical Method	Turnaround Time	Sample Type	Anticipated Number of Samples per Week		
					March	April, May	June, July, August
NCS Determinations	% U-235	AS-7300	48 hours	Wipes	100	200	300
	% U-235 Total Uranium	AS-7300 RL-7124	48 hours	Liquids			
	% U-235 Total Uranium	AS-7300 RL-7124	48 hours	Solids			

5.2 IH Sampling

Some IH sampling will occur for safety standard determinations. This sampling will occur during initial entry and the data will be used to determine safety standards and controls for later work. Other IH sampling will occur for monitoring and documentation of personnel (breathing zone) and area work conditions. IH sample media will be filters, wipes, and air (SUMMA canisters). Other samples will be collected for direct reading/monitoring. That direct reading/monitoring sampling is outside the scope of this plan. The reader is referred to the project Environmental, Safety and Health (ES&H) Plan for more details. IH sampling requests will be documented on the form in Attachment 3 and submitted to the DMSA Data Coordinator.

5.3 Health Physics (HP) Sampling

Some HP sampling will occur for safety standard determination before work begins (wipe and air sampling). At the discretion of the project Radiological Control Technician (RCT), wipe and air samples may be collected during the project and analyzed for the purpose of health physics personnel monitoring. Samples will be collected by the project RCT. The reader is referred to the DMSA-specific Radiological Control Plans for more information. HP sampling requests will be documented on the form in Attachment 4 and submitted to the DMSA Data Coordinator.

5.4 Waste/Material Characterization

The purpose of waste characterization sampling is to determine the regulatory status of the waste and requirements for safe and compliant storage. This will include sampling of waste generated as a result of the DMSA Characterization/Remediation project. The sample media may be solid, liquid (oil or aqueous) or water. Also included in this category is data gathered from wipe sampling floors or equipment surfaces to identify the presence of PCB contamination. Anticipated analytical groups are shown below. Specific analytes (contaminants of concern) from these groups will be determined during the DQO process for the items/materials.

- Anions Fluorides
- Asbestos

- Dioxins/Furans
- Herbicides/Pesticides
- Polychlorinated Biphenyls (PCBs)
- Toxicity Characteristic Leaching Procedure (TCLP) Metals
- Bulk Metals (oil matrix)
- Volatile Organic Analyses (VOAs)
- Semivolatile Organic Analyses (SVOAs)
- Full Radiological Analyses (gross alpha/beta, rad alpha/beta, % Uranium-235, and isotopic)
- Total Organic Carbon (TOC, Used for SVOA blanks)
- Corrosivity
- Ignitability (Flash Point)

The applicable Subject Matter Expert, at the request of the Field Superintendent, will make waste characterization sampling requirement decisions. There will also be input from other personnel, as applicable. Determination of sampling methodology, contaminants of concern, and required analyses will be documented on the forms shown in Attachment 5. The form will be provided to the WESKEM DMSA Data Coordinator to begin the lab contracting process through the BJC SMO as defined in WESKEM's contract with BJC.

5.5 Radiological Screening

Samples to be analyzed at offsite or commercial laboratories require rad screen analyses for laboratory notification and Department of Transportation (DOT) decisions. Analyses will be performed at the USEC laboratory using USEC method RL-7119, rad alpha/beta. The analytical laboratory will be contracted through the BJC SMO.

6.0 Sampling Methodology

The following discussion of sampling methodology will serve as a guide to sampling strategy determinations to be made by the applicable Subject Matter Expert. These decisions are part of the DQO process, and will be documented on the Sampling Request forms, Attachment 5.

6.1 Sampling Location

Samples collected from an item or items should, in most cases, be representative.

Grab samples may be random or judgmental. Random grab samples are appropriate if potential contamination is expected to be randomly distributed on the item or within the container. Judgmental grab samples are appropriate to identify contamination at specific areas, and may produce results that reflect "hot spots", and are not necessarily representative of the item/container as a whole.

Composite samples will be representative of the waste by volume, mass and surface area. Following are two examples of representative composite sampling:

- If two drums contain the same waste material, but one is full and the other is half full, then the composite aliquot from the full drum should be twice the volume of the composite aliquot from the half-full drum.

- For an individual item samples should represent that item as a whole. For example, if a wooden pallet is stained over one-fourth of its surface, then the one-fourth of the sample should be from stained wood and the remaining three-fourths from unstained wood.

6.2 Sample Collection Techniques

Sample collection techniques depend upon the media and matrix of the material being sampled. Refer to section 9.0 References for WESKEM sampling procedures. The following techniques are applicable:

Table 2
Sample Collection Techniques

Media	Contamination Distribution	Sample Type	Collection Technique
Solids, small particles	Homogeneous	Grab	Scoop, auger
Solids, small particles	Non-homogeneous	Composite	Scoop, auger
Solids, large pieces	Homogeneous	Grab	Size-reduced by snips or scissors
Solids, large pieces	Non-homogeneous	Composite (or judgmental grab)	Size-reduced by snips or scissors
Sludge	Homogeneous	Grab	Scoop or coliwasa
Sludge	Non-homogeneous (multiple phases)	Composite	Coliwasa or scoop after mixing
Liquids	Homogeneous (Single phase)	Grab	Coliwasa, Bacon bomb, thief, dipper
Liquids	Non-homogeneous (Multiple phases)*	Composite	Coliwasa
Impermeable surface solids	Homogeneous	Grab	Wipe
Impermeable surface solids – hot spot determination	Homogeneous or Non-homogeneous	Judgmental grab	Wipe

* Phases will be separated in the field and submitted as separate samples.

6.3 Tamper Indicator Devices (TIDs)

TIDs will be placed on drum(s)/container(s), if applicable, after sampling is complete. The TID numbers will be documented in the Sampling Log.

7.0 Split Sampling

Split sample requests from external agencies may be made through the BJC Project Management. BJC Project Management will contact BJC SMO to request rad screening, to coordinate sample return, and to create a SOW so that the analytical data received from the external agency can be managed and archived. Project samplers will collect both samples. Unless guidance is given otherwise, the following apply:

- Split samples will be collected at the same time to ensure consistent sampling conditions.
- If the material matrix is a liquid, samples may be collected sequentially. Care should be taken to ensure representativeness of the samples.
- If the material matrix is a solid, then sample material should be placed in a stainless steel bowl and thoroughly mixed. Then the replicate split samples should be collected from the material in the bowl.
- Split samples may be relinquished to the external agency, or upon request, may be held by WESKEM until rad screens have been completed.

A complete narrative of the sampling event will be recorded in the field log, including the names of observers, participants in the sampling event, and the agencies they represent.

8.0 Sample Preservation

Waste samples are preserved by maintaining the samples at 4 Celsius, $\pm$ 2. Quality Control samples are preserved as described in SW-846.

9.0 Sample Shipments

WESKEM shall ship samples (when appropriate) to a laboratory that has been contracted and accepted by the BJC SMO (or by WESKEM for IH samples.)

Samples to be analyzed at offsite or commercial laboratories require rad screen analyses for laboratory notification and Department of Transportation (DOT) decisions. Rad screens will be performed by USEC Analytical Laboratory, via the BJC SMO. In accordance with DOE requirements, external rad wipe samples will be collected from the shipping containers by WESKEM.

The laboratory accepting samples for analysis must be notified of the rad screen results and provide either written or verbal acceptance to allow the shipment of the samples to their facility. The notification to the laboratory will be performed by WESKEM and a copy will be provided to the BJC SMO for all sampling classes except IH. For IH samples, documentation of laboratory notification and acceptance will be maintained by WESKEM.

Samples will be refrigerated and held under chain of custody until shipment is made. All sample shipments will be made by WESKEM in accordance with DOT hazardous materials regulations and according to WESKEM procedures as accepted by BJC. Sample shipment will be as described in W-121-PWOS, Shipping Analytical Samples.

10.0 Quality Assurance

10.1 Quality Control Samples

Quality control samples will be tracked and will be collected at a rate which implements the requirements in W-171-PWOS, *Quality Assured Data.* Refer to W-156-PWOS, *Collection of Field Quality Control Samples,* for the definitions of the types of samples discussed below.

- One trip blank will be collected for each cooler containing VOA analyses samples.
- Field equipment blanks will be collected at a rate of 5%, which will be tracked by the DMSA Data Coordinator.
- Field equipment blanks for SVOAs analyses will be Total Organic Carbon (TOC).
- Field equipment blanks for PCBs will be wipes.
- Field equipment blanks for radiochemistry analyses (isotopic) will be wipes or water, depending upon the matrix of the waste being sampled.
- Duplicate samples will be collected at a rate of 5%, which will be tracked by the DMSA Data Coordinator.

10.2 Data Quality Goals

The following are applicable for the project:

- Precision goals for replicate analyses are as stated in SW-846. Precision will be evaluated during data assessment.
- Accuracy will be evaluated by review of the laboratory comments concerning matrix spike and matrix spike duplicate recoveries.
- Representativeness will be measured by evaluating the results for replicate samples. Section 6.1 discusses appropriate sampling methodology to ensure representativeness.
- Completeness goals for sampling and analyses are 100 percent.
- Comparability is applicable to some IH and HP samples, where background data exists. If unexpected results are obtained (i.e., significantly different from existing data), then the usability of the data will be evaluated during data assessment. For most waste/material characterization, little or no historical data will be available, and an evaluation of comparability will be non-applicable.

10.3 Chain of Custody

Analytical samples will be maintained under chain of custody. For all sampling classes other than IH, the chains of custody will be produced using the DMSA Paducah Project Environmental Measurements System (PEMS) database. Copies of the chains of custody will be submitted to the BJC SMO upon delivery to the analytical laboratory.

For IH samples, the chains of custody will be produced using the Oak Ridge PEMS database. Copies of the chains of custody will be maintained with the project files. Refer to WESKEM procedure W-150-PWOS, *Sample Chain-of-Custody.*

10.4 Documentation

Sampling personnel will document fieldwork in a sampling logbook as described procedure W-151-PWOS, *Waste Logbooks*. Sampling logbooks are quality records and are managed as described in W/PAD-01-006, *Quality Assurance Plan for DMSA Characterization/Remediation Support Project.* Excerpts will be included in the Characterization Reports as applicable.

The Waste Characterization Request forms (Attachments 1- 5) will provide documentation of sample planning for the DQO process. See Appendix A, Data Quality Objectives.

11.0 Data Review and Use

11.1 Data Review

Following receipt of analytical data, the data will be reviewed as described in W-171-PWOS, *Quality Assured Data.* That review will include verification and assessment. In addition, some data will be validated. Refer to W/PAD-005, *DMSA Characterization/Remediation Data Management Plan,* for data verification, validation, and assessment processes and procedures. Data review goals are shown below.

- All data sets will receive 100 percent verification (electronic and document reviews of specified data quality checks) following the guidance in *Quality Assured Data* (W-171-PWOS).
- All data sets will receive 100 percent assessment (qualitative and quantitative evaluation for usability) following the guidance in *Quality Assured Data* (W-171-PWOS).
- Formal validation will be evaluated as the project progresses to meet the requirements in *Quality Assured Data* (W-171-PWOS).

11.2 Data Use

For characterization of populations where subsets of the population are sampled, statistical evaluation of the data will be applied using the guidance in *Test Methods for Evaluating Solid Wastes* (SW-846). The results of these evaluations and the criteria used will be documented. For radiochemistry evaluations, the error will be added to the reported result to provide a statistical upper bound. For NCS determinations, the use of data is specified in BJC procedure PA-3003, *NCS Characterization, Movement, Storage, and Disposition of Fissionable Material within Paducah DOE Material Storage Areas.*

Unless specifically exempted, data assessment must have been completed and documented before data can be used for decision-making. All data obtained for other than IH monitoring must have been loaded into the Paducah Oak Ridge Environmental Information System (OREIS) database prior to release to external agencies or companies. Final reports (other than IH data) will incorporate only data that resides in Paducah OREIS.

12.0 References

Reference documents and procedures for the DMSA project are as follows:

- *Collection of Field Quality Control Samples* (W-156-PWOS)
- *Composite Sample Preparation* (W-159-PWOS)
- *DMSA Characterization/Remediation Data Management Plan* (W/PAD-005)
- *Quality Assurance Plan for DMSA Characterization/Remediation Support Project* (W/PAD-01-006)
- *Quality Assured Data* (W-171-PWOS)
- *Sample Chain-of-Custody* (W-150-PWOS)
- *Sampling Containerized Waste* (W-160-PWOS)
- *Shipping Analytical Samples* (W-121-PWOS)
- *Test Methods for Evaluating Solid Wastes* (EPA, SW-846)
- *Waste Logbooks* (W-151-PWOS)

13.0 Acronyms

Acronyms used in this document:

BJC	Bechtel Jacobs Company, LLC
DMSA	DOE Material Storage Area
DOT	Department of Transportation
DQO	Data Quality Objectives
ES&H	Environmental, Safety and Health
IH	Industrial Hygiene
NCS	Nuclear Criticality Safety
OREIS	Oak Ridge Environmental Information System
PCB	Polychlorinated Biphenyl
PEMS	Project Environmental Measurements System
PF	Potentially Fissile
RCT	Radiological Control Technician
SAP	Sampling and Analysis Plan
SMO	Sample Management Office
SVOA	Semivolatile Organic Analyses
TCLP	Toxicity Characteristic Leaching Procedure
TID	Tamper Indicator Device
TOC	Total Organic Carbon
USEC	United States Enrichment Corporation
VOA	Volatile Organic Analyses

Appendix A

Data Quality Objectives

This section summarizes the application of the seven steps of the Data Quality Objectives process for the project. Since this project will be ongoing and the application of the Data Quality Objectives process will be repeated throughout the project, this appendix does not give the results of the DQO process. Rather, it outlines the process to be applied for applicable Sampling Classes as described in Section 5.0. (Radiological Screening has been excluded from this process documentation.)

1.0 NCS Sampling

(Note: The NCS status determination process is defined in BJC procedures and will be implemented by the project NCS engineer.)

1.1 *Problem Statement:* Items or materials have been identified for which an NCS status must be determined.

1.2 *The Decision and Alternative Actions:* Determine whether material is enriched to > 1.0 weight percent Uranium-235. If material is enriched, implement NCS controls. If not, document as NCS-exempt. (Documentation: NCS Characterization Form, BJC DMSA procedure PA-3003, *NCS Characterization, Movement, Storage, and Disposition of Fissionable Material within Paducah DOE Material Storage Areas.*

1.3 *Inputs to the Decision:* Process knowledge based on source of the material and visual observation. Action level is 1.0 weight percent Uranium-235.

1.4 *Physical Boundaries:* No temporal boundaries. Spatial boundaries for sampling based on observation. Sample collection techniques based on media of material. (Documentation: Attachment 2 of this plan.)

1.5 *Decision Statement:* If the analytical result plus two times the sigma error is 1.0 weight percent Uranium-235 for both of the two independent samples, then declare the item NCS-exempt. Otherwise, implement NCS controls. (Documentation: NCS Characterization Form, BJC DMSA procedure PA-3003, *NCS Characterization, Movement, Storage, and Disposition of Fissionable Material within Paducah DOE Material Storage Areas.*)

1.6 *Decision Errors:* Decision errors are addressed by adding 2 sigma to the reported result. (Defined by BJC DMSA procedure PA-3003, *NCS Characterization, Movement, Storage, and Disposition of Fissionable Material within Paducah DOE Material Storage Areas*)

1.7 *Design Optimization:* Defined by procedure. (Documentation of sample requests: Attachment 2 of this plan.)

2.0 IH Sampling (Initial Entry)

1.1 *Problem Statement:* Insufficient data exists to determine safety controls and standards.

1.2 *The Decision and Alternative Actions:* Determine the level and type of PPE required for work in the area.

1.3 *Inputs to the Decision:* Process knowledge based on location, items in the area, and historical use of site. The action levels are various safety action levels.

1.4 *Physical Boundaries:* No temporal boundaries. Spatial boundaries for sampling based on observation and determination of areas with greatest likelihood for hazards. Sample collection techniques include both air samples and wipes. (Documentation: Attachment 3 of this plan.)

1.5 *Decision Statement:* If the analytical results exceed the safety standard action limits, then identify appropriate controls.

1.6 *Decision Errors:* The likelihood of decision errors are minimized by duplicates samples where appropriate. When analytical results approach the action limits, the ES&H representative will opt for more conservative controls.

1.7 *Design Optimization:* Definitive data for initial entry. (Documentation of sample requests: Attachment 3 of this plan.) Field data for ambient conditions monitoring.

3.0 HP Sampling (Initial Entry)

1.1 *Problem Statement:* Insufficient data exists to determine safety controls and standards (Initial Entry).

1.2 *The Decision and Alternative Actions:* Determine the level and type of PPE required for work in the area.

1.3 *Inputs to the Decision:* Process knowledge based on location and results of previous HP site characterization sampling. The action levels are identified by project RCTs.

1.4 *Physical Boundaries:* No temporal boundaries. Spatial boundaries for sampling based on observation and determination of areas with greatest likelihood for hazards. Samples collected are wipes. (Documentation: Attachment 4 of this plan.)

1.5 *Decision Statement:* If the analytical results exceed the applicable action limits, then identify appropriate controls.

1.6 *Decision Errors:* The likelihood of decision errors are minimized by duplicates samples where appropriate. When analytical results approach the action limits, the HP representative will opt for more conservative controls.

1.7 *Design Optimization:* Definitive data for initial entry. (Documentation of sample requests: Attachment 4 of this plan.) Field data for ambient conditions monitoring.

4.0 Waste/Material Characterization

Note: The steps below describe the process to be followed for items yet to be identified.

1.1 *Problem Statement:* Items and materials will be identified in the DMSAs that will require characterization.

1.2 *The Decision and Alternative Actions:* Determine regulatory category of the waste. Repackage and/or move the waste into compliant storage if required by the applicable regulation; otherwise, leave the material in place.

1.3 *Inputs to the Decision:* Process knowledge based on source, labeling and observation. Contaminants of concern determined by potential waste category (RCRA, TSCA, LLW, asbestos, etc.) (Documentation: Attachment 5 of this plan.) The action levels are specified in the applicable regulations.

1.4 *Physical Boundaries:* No temporal boundaries. Spatial boundaries for sampling based on observation and consideration of waste matrix. See sections 6.1 and 6.2. (Documentation: Attachment 5 of this plan.)

1.5 *Decision Statement:* If the analytical results exceed the applicable action limits, then the waste will be characterized as regulated and managed appropriately.

1.6 *Decision Errors:* The likelihood of decision errors are minimized by duplicates samples where appropriate. When a population is characterized by statistical sampling, the upper bound of the confidence interval (90 %, one-tailed) will be compared to the regulatory threshold. For radiochemical data, the error will be added to the reported result.

1.7 *Design Optimization:* To be determined for each item/material. (Documentation of sample requests: Attachment 5 of this plan.)

Attachments

Attachment 1
Sampling and Analysis Planning Addendum

Attachment 2
NCS
Sample and Laboratory Analysis Request

Attachment 3
IH
Sample and Laboratory Analysis Request

Attachment 4
HP
Sample and Laboratory Analysis Request

Attachment 5
Waste Characterization
Sample and Laboratory Analysis Request

Sampling and Analysis Plan Addendum
Analytical Parameters, Methods and Anticipated Number of Samples

DMSA Number _____

Sampling Purpose	Project ID	SOW	Analytes	Analytical Method	Number of Samples	Sample Type	Turnaround Time	Data Deliverable (Report Only or Level III)

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NCS Characterization Sample and Laboratory Analysis Request
DMSA Characterization/Remediation Project

DMSA Inspector / Requestor: _____ **Date:** _____

DMSA Inspector/Requestor				**DMSA Data Coordinator**	
DMSA Number	RFD or Unique Item Number	Item Description / Location	Media	Sample Number	Sample Date
			Solid/Liquid/Wipe		
			Solid/Liquid/Wipe		
			Solid/Liquid/Wipe		
			Solid/Liquid/Wipe		
			Solid/Liquid/Wipe		
			Solid/Liquid/Wipe		
			Solid/Liquid/Wipe		
			Solid/Liquid/Wipe		
			Solid/Liquid/Wipe		
			Solid/Liquid/Wipe		
			Solid/Liquid/Wipe		
			Solid/Liquid/Wipe		

IH Monitoring Sample and Laboratory Analysis Request
DMSA Characterization/Remediation Project

Project ES&H ISMS Coordinator / Requestor: _____ **Date:** _____

Project ES&H ISMS Coordinator / Requestor				**DMSA Data Coordinator**	
DMSA Number	Location / Item	Analyses Requested	Media	Sample Number	Sample Date
			Air / Filter / Wipe		
			Air / Filter / Wipe		
			Air / Filter / Wipe		
			Air / Filter / Wipe		
			Air / Filter / Wipe		
			Air / Filter / Wipe		
			Air / Filter / Wipe		
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			Air / Filter / Wipe		
			Air / Filter / Wipe		
			Air / Filter / Wipe		
			Air / Filter / Wipe		

HP Monitoring Sample and Laboratory Analysis Request
DMSA Characterization/Remediation Project

HP Representative / Requestor: _____ **Date:** _____

HP Representative / Requestor			**DMSA Data Coordinator**	
DMSA Number	Location / Item	Media	Sample Number	Sample Date
		Filter / Wipe		
		Filter / Wipe		
		Filter / Wipe		
		Filter / Wipe		
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		Filter / Wipe		
		Filter / Wipe		
		Filter / Wipe		

Waste/Material Characterization Sample and Laboratory Analysis Request DMSA Characterization/Remediation Project

Field Coordinator / Sample Requestor

Requestor: _____ Date: _____ Source DMSA number: _____ Staging location: _____

Waste description: (1 item or population per sheet)_____

_____

Potential material/source and process knowledge:_____

_____

RFD/Unique ID number (items/containers to be sampled): _____

Other items/containers to be characterized in this population (RFDs/Unique ID numbers): _____

Sample type: _____Random Grab _____Judgmental Grab (Location:_____)
_____Composite (single item/container) _____Composite (multiple items/containers) _____Sort/Segregate

Sampling device: _____Coliwasa _____Dipper _____Scoop _____Scissors/Snips
_____Auger _____Wipes _____Other

2
1

Field Coordinator / Sample Requestor | **DMSA Data Coordinator**

Mark number of samples in appropriate boxes

Matrix	PCB	TCLP Metal	VOA	SVOA	Full Rad	Asbes - tos	Herbs / Pests	Dioxins / Furans	Anions / Fluor	Rad Alpha / Beta	Flash Point	Corro-sivity	Other:	Sample Numbers	Project ID	SOW Number	Sample Date
Solids																	
Sludge																	
Liquids – aqueous																	
Liquids – oil		(Bulk)															
Wipes																	
Filter (IH samples)																	
Gas																	

Waste Characterization Group

DQO Concurrence: _____ Date: _____

Notes: _____

Sampling and Analysis Plan Distribution List

WESKEM Personnel:
Jerome Ellington, DMSA Project Manager
David Hayden, DMSA Project Field Superintendent
DMSA Inspectors
DMSA Field Coordinators
Michele Steinbeck, DMSA Data Coordinator
Judy White, Sampling Supervisor
Jan Buckmaster, Data and Characterization Manager
DMSA ES&H ISMS Coordinator
Jim Hylko, ES&H Manager
Chris Wagner, ES&H Coordinator
Earl Tyler, Quality Assurance Manager

Bechtel Jacobs Company:
Project NCS Engineer
Kelly Ausbrooks, Project Health Physicist
Jana White, Sample Management Office
Lisa Crabtree, Data Manager
Paducah Document Control Center (Kevil) (Record Copy)

SEC
Greg Carter, Paducah Location Manager