

Attachment G

Sampling and Analysis Plan
Sampling and Analysis Plan
For the Containers of Potentially F and U Listed Hazardous Waste

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1.0 Purpose and Scope

The purpose of this document is to describe the sampling and analysis plan and the characterization approach for the identified containers, which are now suspected to contain listed Resource Conservation and Recovery Act (RCRA) waste. The waste consists of environmental media, debris, and sludge.

Most of the stored waste is contained in 55-gallon containers; however, volume size ranges from B-25 boxes to 5-gallon pails. This plan defines the sampling methodology, identifies waste profiles/populations to be sampled, the basis for determining the number of samples, the number of samples to be taken, the analytical requirements, the quality control of samples and use of data.

The containers will be characterized in approximately 75 populations based on the generation source, location, and/or the activity or task that caused the waste to be generated. This will allow the populations to be characterized by statistical sampling in accordance with SW-846. Population-specific analytical Statements of Work will be developed to implement the goals defined in the following sections of this Plan and will be submitted to the Cabinet for review and approval. Data from the characterization of the waste according to this Plan will be used to make "contained-in" determinations for the containers.

2.0 Background

The environmental media, which is comprised of soil, sediments, water, and sludge, were generated from auger cuttings, borings, and excavation tasks to investigate or clean up spills and releases in various locations at the PGDP. The waste also consists of debris that was generated as a result of performing those tasks. The debris may include, but is not limited to, personal protective equipment (PPE), plastic, absorbents, concrete, construction materials, and grout.

3.0 Contaminants of Concern

The contaminants of concern for this Plan are total, (i.e., bulk), TCE and TCA.

4.0 Sampling and Analytical Strategy

Sampling and analysis protocols for conducting all environmental media and associated debris sampling will be in accordance with the United States Environmental Protection Agency's (USEPA) sampling and analysis protocol as defined in SW-846, 3rd edition, or the most recent edition.

All characterization of populations will be based on sampling a statistically sound subset of the population as outlined in SW-846, Chapter 9. The containers to be sampled will be randomly selected.

Soil and other environmental media matrices are assumed to be homogeneous within each container. In addition, any contamination is assumed to be uniformly distributed. These assumptions are based on the nature of the waste matrices, as well as, the typical nature of waste at the PGDP site. Based on these assumptions, the sample collection methodology will be by grab sampling.

The waste debris that can be directly associated with a specific population of environmental media will be characterized using the data generated by sampling that population of environmental media, i.e. debris will be assumed to contain TCE and/or TCA at the source levels as the environmental media with which it is associated. If TCE or TCA in the media are below the contained-in levels, the associated debris will be assumed to be

below the contained-in levels. PPE, plastic and other debris that cannot be directly associated with a specific population of media will be sampled and analyzed for total TCE and TCA to determine the possibility of contamination with TCE and/or TCA. The sampling protocol will be designed to be matrix-specific, and includes composite sampling, grid sampling, or other methodologies consistent with the guidance outlined in SW-846, 3rd edition, or the most recent edition

5.0 Sample Shipment

All sample shipments will be made in accordance with DOT hazardous materials regulations.

6.0 Analyses and Data Reporting Schedule

Applicable contracting documents will require analyses to be completed and data supplied within a standard 30-day turnaround time.

7.0 Quality Assurance and Quality Control

The Data Quality Objective (DQO) process was applied for each population in this project, and the output is presented in Appendix 1 of this document.

7.1 Quality Goals

The following quality goals are applicable for the population-specific sampling and analyses events:

- Representativeness will be measured by evaluating the Relative Percent Difference (RPD) between the sample and field sample duplicate. A maximum RPD value of 20% will be used as a standard. If this standard is exceeded, then a determination will be made as to the usability of the data, taking into consideration such parameters as the magnitude of the exceedance, the number of samples in the population, and the average result for the population .
- Completeness goals for the number of measurements required for a data set will be 100 percent. In order to ensure that an adequate number of data points are obtained, a contingency of 20 percent will be added to the number of data points required in order to evaluate a population. The number of data points required, including the 20 percent contingency, are shown in Appendix 1.

7.2 Chain of Custody and Sample Management

Analytical samples will be maintained under chain of custody. Samples to be shipped offsite will be refrigerated and held under chain of custody until shipments are made.

7.3 Documentation

Sampling personnel will document fieldwork in a sampling logbook. Sampling logbooks are quality records. The logbook(s) will be maintained as a quality assurance record in accordance with site procedures.

7.4 Quality Control Samples

One equipment rinseate sample will be collected after the collection of every twentieth sample, at a minimum. Likewise, trip blanks for volatiles analyses will be collected at the same rate.

Duplicate samples will be obtained on a one-to-twenty ratio. If the sample was a composite sample, the duplicate will be collected from the same composited material.

7.5 Preservation

Sample preservation will be noted on the Chains of Custody. Waste samples will be preserved by maintaining the samples at 4° Celsius, $\pm 2^\circ$. Quality Control Samples will be preserved as described in SW-846, 3rd edition or the most recent edition.

7.4 Tamper Indicator Device

All samples will be secured with a tamper indication device (TID) and removed only upon receipt at the contracted laboratories by approved laboratory personnel.

8.0 Data Review and Use

8.1 Data Review

Following receipt of analytical data, the data will be reviewed. That review will include one hundred percent verification and assessment. Verification includes electronic and document reviews of specified data quality checks. Assessment includes qualitative and quantitative evaluation of the data to determine its limitations and usability for decision-making. Verification and assessment requirements are outlined in site-specific procedures. Quantitative evaluation of the data will be consistent with the requirements found in SW-846, Chapter 9. Qualitative evaluation of the data will be consistent with site-specific procedures.

Data assessment must be completed and documented before data can be used for “contained-in” decision-making purposes. The data assessment will be peer reviewed by qualified personnel and the data review and evaluation will be appropriately documented according to site-specific procedures. The documentation will be managed according to site-specific records management protocol. Electronic data and metadata will be protected (e.g. read only files, electronic file back-ups) and archived according to site-specific protocol.

8.2 Statistical Evaluation of the Data

Statistical evaluation of the data will include distribution and goodness-of-fit evaluations using industry-standard statistical tools (e.g. Shapiro-Wilkes or comparable) per SW-846, Chapter 9. If necessary, the data will be transformed to produce a normal distribution prior to calculating the standard deviation and variance. In addition, calculations will be performed to determine if a sufficient number of samples were collected according to the methodology in SW-846, Chapter 9. If these calculations establish (in accordance with SW-846, Chapter 9) that the number of samples or data points were not statistically sound to make a final characterization, the number of additional samples to be collected will be evaluated.

8.3 Data Use

Statistical calculations will be performed, where appropriate, to determine an eighty percent (two-tailed) confidence interval, consistent with SW-846 guidance. The population will be characterized according to

the upper confidence level (UCL). Statistical evaluations will be applicable whenever at least two data points exist for a population and whenever at least one of the sample results for TCE or TCA yields a concentration that exceeds the laboratory reporting limit. In cases where such statistical calculations are performed, the following proxy values will be utilized:

Data Point Qualifier Flag	Proxy Value
No Flag	Reported Value
"U" (Undetect) Qualifier	Half of the Laboratory Reporting Limit

A minimum, maximum, average and upper 80% confidence level (two-tailed) will be calculated for data sets where not all results are below the laboratory reporting limit.

The contamination level for a population will be based on the upper 80% confidence level unless all results are below the laboratory reporting limit or unless all containers in the population were sampled. In cases where the results are below the laboratory reporting limit then the population will be characterized at the reporting limit. In the case where all containers in the population were sampled then each container will be characterized according to its own result.

9.0 Reporting

A summary report will be prepared annually showing the number of containers characterized, the number of containers sampled, and the data results, including the minimum, maximum, average and the UCL₈₀ for the population.

10.0 Acronyms

BJC	Bechtel Jacobs Company
DOE	Department of Energy
DQO	Data Quality Objectives
PPE	Personal Protective Equipment
RCRA	Resource Conservation and Recovery Act
OREIS	Oak Ridge Environmental Information System
SAP	Sampling and Analysis Plan
SMO	Sample Management Office
TCA	1,1,1-Trichloroethane
TCE	Trichloroethene
TSCA	Toxic Substances Control Act
UCL	Upper Confidence Limit
WAC	Waste Acceptance Criteria

APPENDIX 1

Population Number	Project ID	Process Generating Waste	Total Number of Containers	Number of Env. Containers	Solid Env. Containers	Solid Env. Containers Data Points Required	Aq. Env. Containers	Aq. Env. Containers Data Points Required	Number of Non-env. Containers	Non-env. Data Points Required
001	WAG 3	SWMU 4 Soil boring 004-025,022,031,043,044,045,046,047,048,049,050,056,057,053,054,055	16	10	10	3	0	0	6	0
002	Data Gap RI	WAG 3/8/28 DGR1 SWMU 4,5,6,99	1	0	0	0	0	0	1	1
004	NSDD	NSDD Trenching and other related waste, decon water	43	17	14	3	3	2	26	0
010	C-400 debris	C-400-04 DMSA and other debris/soils removed from C-400, WM23 tank spill cleanup, C-400 soil NW corner, dirt/rock south side	92	65	65	5	0	0	27	0
011	C-745-K	UST 17 excavation in C-745-K South, UST 18, C-745-M	20	18	7	3	11	3	2	0
012	Phase I	phase I soils and materials, sample residuals, PPE, water	213	36	33	4	3	2	177	0
014	Ditch 2	Misc projects at ditch 2 (also 013)	3	2	2	2	0	0	1	0
015	Ditch 10 and 12	misc projects at outfall ditch 010 and 012, decon water etc from 001, 002, 010, 011, and 012,	5	2	2	2	0	0	3	0
017	Misc projects	unknown sources--suspect based on current guidance; contaminated trash--paper, plastic, PPE, gravel, sludge	106	36	25	4	11	3	70	0
019	C-403 Neut pit	neut pit cleanup--hypalon, PPE	8	0	0	0	0	0	8	3
023	Activated Carbon	activated carbon from sampling/treatment	3	0	0	0	0	0	3	2
024	WAG 23	WAG 23 samples waste/ other WAG 23 SWMU 1 waste	23	19	16	4	3	2	4	0
027	WAG 27	Wastewater from WAG 27 with TCE detections.	4	4	0	0	4	2	0	0

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028	WAG 22	WAG 22, C-749 investigation C-747--PPE, soil	87	19	19	4	0	0	68	0
029	WAG 15	WAG 15--PPE, plastic sheeting, decon water	3	2	1	1	1	1	1	0
030	SWMU 27	SWMU 27--soil sample residuals, PPE, plastic	3	1	1	1	0	0	2	0
032	Phase 3	Phase 3 from listed sources; drill cuttings, water	31	31	20	4	11	3	0	0
034	C-404	C-404, MW49 abandonment, PPE/Plastic/trash from leachate pit	20	14	13	3	1	1	6	0
035	WAG 6	WAG 6 decon water	2	2	0	0	2	2	0	0
036	Misc samples	Leachate samples from concrete, Solid lab waste from PCB lab, segregation of waste--CAS-6276 & CAS-9733, Soil and sed sample excess--routine, lab waste, solid--ER drillings	32	32	32	4	0	0	0	0
039	C-720	materials from C-720, grass/dirt from C-720, U-cont metal from sump pit	23	19	4	2	15	3	4	0
040	SWMU 11	materials/waste from SWMU 011	2	0	0	0	0	0	2	2
041	SWMU 4 RGA	RGA borings within SWMU 4; PPE, plastic	26	10	9	3	1	1	16	0
042	AZ-044	project AZ-044 (unrecognized project--unknown source)	22	2	2	2	0	0	20	0
046	C-612	filter cake/misc facility trash/spent resin, PPE	24	1	0	0	1	1	23	4
050	C-340	PCB cleanup--dirt, floorsweep, MgF2, transformer dike work, east side 340 sampling, RCRA/TSCA cleanup, excavation C-340 area 4&6, dirt from area 2 & 3	1446	1444	1441	14	3	2	2	0

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052	Outfalls suspect	o/f 001 and 003 samples	1	1	1	1	0	0	0	0
054	C-409	closure, drum sampling--RCRA testing waste	90	5	3	2	2	2	85	0
059	Phase 2	drill tailings from phase II, soil/mud	58	53	48	5	5	3	5	0
060	Ditch I1	Autosampler and excavated soil, yearly sed samples, outfall flume	1035	1020	1020	13	0	0	15	0
061	Unknown Tank Sludge	tank sludge from unknown sources, sludge tank cleanout stored C-746-H3	59	0	0	0	0	0	59	5
063	Phase 2 sump	Phase II sump clean out	9	0	0	0	0	0	9	3
067	NW Plume	borings "J", multiple soil borings, decon sludge, EW228 cuttings, SB32, SB31, SB27, SB30, MW247	49	49	49	5	0	0	0	0
068	Phase 4 RGA	RGA borings from phase 4--soil	121	108	108	6	0	0	13	0
075	Ditch 001	sump ditch 001 concrete and soil	23	23	23	4	0	0	0	0
077	O/F 2 lift station	chl and temp project sludge from 002 lift station, flume sludge	17	15	15	3	0	0	2	0
078	Lab waste	misc lab waste	37	12	12	3	0	0	25	0
079	O/F 010	outfall 010 sump lift station sludge	14	14	14	3	0	0	0	0
087	Phase 3 RGA	samples PZ-5G SB-07 etc., PZ 110, PZ117	90	90	11	3	79	6	0	0
092	OF 011/012 Inv	soil cuttings from OF 011 and 012 investigation	4	4	4	2	0	0	0	0
093	CDM UST site	MW-04A UST site--not enough information	1	1	1	1	0	0	0	0
102	SWMU 193/194	drill fluid and cutting PZ107; PPE, glass	3	1	0	0	1	1	2	0

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106	Phase 2 contained	soil/rubber gaskets--phase 2 SI possibly contained in; sump waste, soil	20	4	4	2	0	0	16	0
110	Lab residuals/sampling waste	soils from test area, lab residuals from other projects, other sampling waste (PPE, plastic, paper)	76	22	22	4	0	0	54	0
111	WAG1 SWMU100	WAG 1 SWMU 100 MW 330 auger cuttings, sump clean out, other WAG 1 waste	47	47	46	5	1	1	0	0
112	CDM abandon	well abandonment CDM well purge water, well displacement water	13	12	8	3	4	2	1	0
116	Phase 1 contained	phase 1 MW144, MW145 with TCE totals below 39.2 ppm possibly contained in	275	267	244	8	23	4	8	0
118	Test Pit #5	"contents of drum with sludge (wet soil) from test pit #5	2	2	2	2	0	0	0	0
121	C-750 UST	C-750 UST soil. PPE, rinseate	15	12	12	3	0	0	3	0
121IMBR	C-750-C UST contained	rinseate from C-750-C UST closure--possibly contained in	1	1	0	0	1	1	0	0
125	WAG 1&7 sample	sample jars from WAG 1&7-- sample#'s listed on RFD 46110	1	1	1	1	0	0	0	0
129	C-746-Q	C-746-Q past water spill (SWMU 46A), PPE/Plastic/trash from C-746-Q	23	1	0	0	1	1	22	0
139	C-720 contained	contaminated water from C-720 below 39.2 ppm threshold possibly contained in	1	1	0	0	1	1	0	0
156	SWMU 136	bentonite from WAG 1 SWMU 136 MW304	73	72	69	5	3	2	1	0
161	Borings in SWMU	borings/wells in listed swmus	4	2	2	2	0	0	2	0

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173	WAG 22 contained	WAG 22 SWMU 2-15-1 borehole with data possibly contained in--soil	1	1	1	1	0	0	0	0
182	Switchyards contained	sludge/water from 540-A, 541-A grounding vault, pads/pigs/etc C-540-A possibly contained in	9	1	1	1	0	0	8	0
184	Lab Waste-no analytical	Misc lab waste--no analytical; both incinerable and non-incinerable solid samples	25	0	0	0	0	0	25	4
188	TCE removal	filter bags from carbon system--TCE removal previously located in C-400	1	0	0	0	0	0	1	1
189	LDR sampling	misc waste from LDR sampling; incinerable and non-incinerable debris	43	6	6	3	0	0	37	0
193	Switchyards non env	environmental and nonenvironmental media (or associated) from C-533, C-537, C-531	126	85	85	6	0	0	41	0
197	C-746-H3 spill	spill cleanup C-746-H3 tank # C-400-11; PPE; vermiculite	1	0	0	0	0	0	1	1
199	C-400 TCCLP det	PCB plastic and trash from C-400 with TCE TCCLP detection	6	0	0	0	0	0	6	3
205	PCB Carbon Filter	PCB cont carbon filters from PCB carbon filter system	2	0	0	0	0	0	2	2
208	Uranium Precipitate	Uranium Precipitate collection	293	0	0	0	0	0	293	8
D 145	MW66	C-747-A MW66--PPE	1	0	0	0	0	0	1	1
D 154	RGA wells	plastic from EW230, dirty plastic MW325, plastic--abandonment MW47-51 aband. MW9,12,15, aband PZ1G etc., aband. Z5, Z9;PPE	47	0	0	0	0	0	47	5
D 159	WAG 1&7	WAG 1&7 plastic; gravel, tyvek	15	0	0	0	0	0	15	3

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D 161	Borings in Swmu	Borings/wells in listed swmu's	12	0	0	0	0	0	12	3
D 36	Lab residuals	various projects--lab residuals with sample #'s (some without #'s)	1	0	0	0	0	0	1	1
D 54	C-409	PCB and uranium cont solid waste from C-409, 1-55 gal drum	1	0	0	0	0	0	1	1
D 59	Phase 2 PPE	PPE/Plastic/debris from Phase 2	8	0	0	0	0	0	8	3
D 68	Phase 4	Phase 4 petroleum absorbant pads, ppe/plastic from RGA/plume wells	54	0	0	0	0	0	54	5
D 82	C-746-R	epoxy resin coating from cement pad at C-746-R pad, hypalon/etc from R pad spills	8	0	0	0	0	0	8	3
S 146	Sludge C-416	sump cleanout C-416 decon pad--sludge	17	17	17	4	0	0	0	0

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