Supplemental West Area Characterization Report

Joslyn Manufacturing Company Site
Brooklyn Center, Minnesota

May 2001
Revised October 2001

BARR

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1.0 Introduction

The Joslyn Manufacturing Co. Site is a former wood-treating facility located in Brooklyn Center, Minnesota (Figure 1). Several site investigations and response actions have been implemented for the site in accordance with the May 1985 Response Order by Consent between Joslyn Manufacturing Co. (Joslyn) and the Minnesota Pollution Control Agency (MPCA [1985]) and the July 1989 Record of Decision (1989 ROD [MPCA, 1989]). Approximately 70 percent of the site has been remediated, deleted from the MPCA's Permanent List of Priority Sites and is being developed as industrial/commercial property. This portion is being considered for deletion from the U.S. EPA's National Priority List.

The 30 percent of the site that has not been deleted from the MPCA's Permanent List of Priority Sites is referred to as the West Area (Figure 2). The West Area is approximately 10 acres in area, and consists primarily of shallow-to-deep water marsh and with forested hills. Approximately 75 percent of the West Area is Minnesota DNR-regulated wetland and virtually all of the West Area is below the 100-year frequency flood level of Twin Lakes. The West Area is located adjacent to Twin Lakes to the west, residential property to the south, and railroad tracks to the north.

The West Area was removed from the delisting process because residual contamination was identified in the West Area soils during the site-wide release sampling (Earthtech, 1999). The release sampling, conducted by Earthtech for Real Estate Recycling (the developer of the delisted portion of the site), identified pentachlorophenol (PCP), polycyclic aromatic hydrocarbons (PAHs), and dioxin/furan in the top 3-feet of soil in portions of the West Area.

Previous investigations and response actions within the West Area are summarized in the "Sampling and Analysis Plan—Supplemental West Area Characterization" (Barr, 2000). In 1981, 1986, 1997, 1998 and 1999 investigations were conducted to address, or partially address, the West Area. Three areas of visibly contaminated soils were excavated from the West Area during site remediation—one in 1989, one in 1997, and the last in 1999. These investigation and remediation areas are shown in Figure 3. While the investigation conducted in 2000 and described in this report focused on surficial soil, sediment, and surface water, previous investigations and sample collection efforts have identified contaminants of concern in some of the subsurface soils within the West Area.

Dioxin/furan compounds were not identified as primary chemicals of concern in the 1989 ROD. However, soil samples collected during release sampling had been analyzed for dioxin/furan to

characterize the risk associated with limited exposure to residual soils in the context of future industrial/commercial land uses. For the West Area, where samples had been analyzed for PCP but not dioxin/furan, the MPCA developed a correlation between PCP and dioxin/furan, which was then used to estimate dioxin/furan concentrations for a limited risk assessment (MPCA, 1999). Using estimated dioxin/furan concentrations, the MPCA risk assessment staff concluded that the residual contamination in some of the West Area samples potentially exceeded industrial risk-based screening criteria.

The lack of dioxin/furan data was identified as a data gap that should be filled to better characterize the West Area. This and other data gaps were summarized in the 1999 report *Wetland Delineation and Identification of Data Gaps* (Data Gaps Report [Barr, 1999]). This Supplemental West Area Characterization Report provides a summary of the data that have been collected to fill the data gaps for the West Area that were identified in the Data Gaps Report.

The report consists of three sections, including this introduction (Section 1). Section 2 describes sample collection procedures. Section 3 describes the analytical results from the sampling activities and presents a preliminary discussion of the significance of these findings.

2.0 Investigative Activities

Soil, sediment, and surface water samples were collected to more completely characterize the West Area. The investigative activities completed for the West Area were outlined in the *Sampling and Analysis Plan* (SAP [Barr, 2000]). The sampling activities were developed to address site-specific data needs that were enumerated in the Data Gaps Report (Barr, 1999). The objective of the West Area investigative activities was to characterize the residual contamination in the surficial soil, surface water and sediment to determine whether additional action will be warranted to protect human health and the environment. This investigation did not include further characterization of soils below the surface. The chemicals of concern that were identified for characterizing potential risks and assessing potential remedial actions were PCP, PAHs, and dioxin/furan. Analytical parameters, methods, and detection limits are listed in Table 1.

Sampling activities were conducted within designated subareas that were defined in the SAP based on assessment of historical uses, the extent of filling, wetland classification, results of previous investigative activities, and discussions with the MPCA (Figure 3). In general, the subareas are consistent with those used during the 1999 release sampling to facilitate direct comparison of the results from the two sampling programs. Some of the larger subareas were further subdivided to better characterize the variability of soil chemistry within those areas. Appendix A contains a detailed description of each subarea.

2.1 Surficial Soil Sampling

Surficial soil samples were collected on October 6, 2000. Discrete surficial soil samples were collected from several locations within the subareas (Figure 4). Surficial soil samples were collected from zero to 6 inches below the surface, with the exception of West Areas 1 and 2. The surficial soil samples for West Area 1 (WA-1) and West Area 2 (WA-2) were collected from a depth of 0 to 18 inches to correspond with surficial soil samples collected in this area during the release sampling. The soil sample for West Area 3 (WA-3) was a composite of 7 subsamples. The sample for the northern one-third of West Area 6 (WA-6N) was a composite from 5 subsamples. The sample for the middle one-third of West Area 6 (WA-6Mid) was a composite from 5 subsamples. The sample for the southern one-third of West Area 6 (WA-6S) was a composite from 5 subsamples. The sample for the West Area 8 (WA-8) was a composite from 5 subsamples.

Discrete subsamples were acquired using pre-cleaned stainless steel hand tools. The composite samples were formed by placing equal amounts of the appropriate subsamples into a pre-cleaned stainless steel mixing bowl and thoroughly mixing the soil with a pre-cleaned stainless steel spoon. A portion of the soil from the mixing bowl was then selected and placed in the appropriate laboratory-supplied sample container and marked with a sample designation (i.e., WA-3). The composite surficial soil sample from WA-7M was split into two samples, one for standard analysis and the second for water leaching and analysis of the leachate. All applicable standard operating procedures for soil sample collections were followed during this field event (Barr, 2000). A portion of the soil at each discrete sampling location was also placed into jars and stored at 4°C for future recompositing and reanalysis, as necessary.

The composited surficial soil samples for each area were submitted to Columbia Analytical Services, inc. (CAS) via overnight shipment for analysis of the chemicals of concern. Soil and sediment samples were also analyzed for total organic carbon (TOC) and pH to evaluate the potential fate of the chemicals of concern within these materials. Samples collected from areas WA-1 and WA-2 were analyzed for TOC and pH only in accordance with the SAP.

After the laboratory results from the analysis of the composite samples were received and reviewed, it was determined that the results from West Area 6-Mid and 6-South were significantly different than the results from other areas to obtain duplicate results of the original analysis. The stored discrete samples for these two areas were composited and submitted to CAS and Severn Trent Services (STS). A water leach test (ASTM D 3987) was also conducted on the WA-6Mid and WA-6S samples submitted to CAS to help define the availability of the chemicals of concern to the ecological community.

2.2 Sediment Sampling

One composite sediment sample was collected on November 2, 2000 from the open water portion of West Area 7 (WA-7OW). A pre-cleaned piston sampler was used to collect five subsamples (Figure 4) from a depth interval of 0 to 6 inches. The subsamples were placed in a stainless-steel mixing bowl, mixed thoroughly, and the composite was divided into two equal parts. One part of the composite sediment sample was submitted to CAS for analysis of the chemicals of concern, while the other portion of the composite sample was submitted to CAS for a water leach test. A portion of each of the discrete subsamples was placed in laboratory-cleaned glass containers, labeled, and stored for future analysis if necessary.

2.3 Surface Water Sampling

One surface water sample was collected on November 2, 2000 from the open water portion of West Area (WA-7OW). Because the depth of water in this area was less than 1 foot, the sample was collected from just below the water surface by submerging a sample container (free of preservative) two inches below the water line and then filling all the sample jars.

2.4 Decontamination

All equipment used for sampling was new, disposable equipment or was decontaminated prior to use on-site and between subsampling locations. The composite sampling equipment was cleaned between sampling locations using an Alconox and water solution followed by a double de-ionized water rinse. Equipment cleaning was completed away from the sampling locations. Field personnel used disposable gloves while performing decontamination procedures, in accordance with standard operating procedures for decontamination (Barr 2000).

3.0 Results and Discussion

3.1 Analytical Results

The analytical results for the surficial soil samples are summarized in Table 2, including the results from this sampling and the results from the previous release sampling in areas WA-1, WA-2, WA-3, WA-4, and WA-5. Table 3 summarizes the analytical results for the sediment sample from West Area 7. Analytical results from the surface water sample for West Area 7 are summarized in Table 4. The water leach test results are summarized on Table 5. The laboratory analytical reports for the West Area sampling are in Appendix B.

3.2 Data Quality Assurance/Quality Control

A quality assurance and quality control review was conducted to assess the integrity of the sampling and analytical procedures performed on samples collected for the site. This review was performed in accordance with the Barr Engineering Standard Operating Procedure for data validation, which is based on the *National Functional Guidelines for Organic Data Review* (EPA, 1999). CAS, Alta Analytical Laboratories Inc. (a subcontract laboratory to CAS), and STS performed the analysis for the West Area samples.

3.2.1 Laboratory Procedures

Laboratory procedures were evaluated by examining precision and accuracy data, duplicate samples, laboratory split samples, internal standards, method blanks, and data package completeness.

3.2.1.1 Precision and Accuracy Data

The precision and accuracy data reviewed for the site included laboratory matrix spike and matrix spike duplicate data. The accuracy was evaluated by comparing laboratory percent recoveries from matrix spikes to laboratory control limits. Laboratory precision was evaluated using the percent recoveries from the matrix spikes and spike duplicates, and calculating the relative percent difference (RPD) according to the following equation:

$$RPD = \frac{\text{Amount in Spike 1} - \text{Amount in Spike 2}}{0.5(\text{Amount in Spike 1} + \text{Amount in Spike 2})} \times 100$$

All matrix spikes and matrix spike duplicates met all laboratory acceptance criteria.

3.2.1.2 Duplicate Results

One duplicate sample was collected and submitted to the laboratory with the project samples. The data were evaluated using positive values in both the sample and its masked duplicate and calculating the RPD of those values. The RPD calculations for the duplicate analytical results are included in Appendix C. Three dioxin/furan congeners analyzed in the sample WA-8 Duplicate displayed poor correlation (RPD >40 percent) with the WA-8 sample. The most likely cause of this variation is non-homogeneity between the soil sample and its duplicate. All other target compounds displayed acceptable correlation.

3.2.1.3 Laboratory Split Results

Including the recomposited samples at WA-6Mid and WA-6S, a total of three composite samples were split and submitted to two separate laboratories. The data from each separate analysis were evaluated using positive values in both the sample and each duplicate and calculating the RPD. The RPD calculations for the laboratory split analytical results are included in Appendix C. The two composites submitted for analysis on October 10, 2000 are referred to as Sample #1. The samples composited on January 8, 2001 and sent to CAS are referred to as Sample #2 and the samples composited on January 8, 2001 and sent to STS are referred to as Sample #3.

WA-6MID: Sample #2 and Sample #3 displayed acceptable correlation (RPD <40 percent) for five of eighteen of the target dioxin/furan congeners. In addition, the TCDD equivalent values had a RPD of 4.9 percent, showing overall good correlation. When compared to Sample #1, Sample #2 had ten of eighteen target dioxin/furan congeners and Sample #3 had fourteen of eighteen target dioxin/furan congeners with RPD values greater that 40 percent, indicating relatively poor precision. In general, Sample #1 had values lower than those in Sample #2 and Sample #3. The most likely cause of this variation is that Sample #1 was composited at a different date than Sample #2 and Sample #3, which were split from the same composite. Due to the sample matrix (lightweight and high organic content) potentially different weights of individual discrete samples could have been incorporated in the separate composites. Therefore, one of the split samples may have had a larger percentage of one of the discrete samples added at the second compositing event, which might have biased the values enough to explain the resulting variation.

WA-6S: Sample #2 and Sample #3 displayed acceptable correlation (RPD <40 percent) for six of eighteen of the target dioxin/furan congeners. The TCDD equivalent values for these two samples had a RPD of 9.2 percent. Sample #1 and Sample #2 displayed acceptable correlation (RPD <40 percent) for four of eighteen of the target dioxin/furan congeners. The TCDD equivalent values for these two samples had a RPD of 21.2 percent. Sample #1 and Sample #3 displayed acceptable correlation (RPD <40 percent) for four of eighteen of the target dioxin/furan congeners. The TCDD equivalent values for these two samples had a RPD of 12.0 percent. Overall these sample splits displayed good correlation.

3.2.1.4 Internal Standards

Internal standards were evaluated by calculating the percent recovery and comparing them to laboratory criteria. All internal standards fell within acceptable laboratory limits.

3.2.1.5 Method Blanks

Several dioxin/furan congeners were detected at low levels in all method blanks associated with this project. All sample values within five times the blank values were qualified as potential false positives.

3.2.1.6 Completeness

Data completeness is evaluated by comparing the analysis requested with the data package as received. The data was received complete.

3.2.2 QA/QC Review Conclusions

The variation in some of the laboratory split samples can most likely be tied to sampling procedures and the sample matrix. This data should be considered valid without qualification. All data met the data project requirements and are deemed acceptable for the purposes of this project, with the above qualifications.

3.3 Discussion

The results from sampling and analysis of the surficial soil within the West Area show significant differences in the results within the sub-areas. These results are not unexpected as the sub-areas were defined, in part, by the site operating history as observed by aerial photographs and summarized in the Data Gaps Report.

References

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Minnesota Pollution Control Agency (MPCA), 1999. Human Health Limited Risk Assessment for Closure of the Former Joslyn Manufacturing Co. Superfund Site, Brooklyn Center, Minnesota. March 1999.

EPA, 1999. National Functional Guidelines for Organic Data Review. EPA 540/R-99/008, October 1999.

Tables

Table 1
Analytical Parameters and Detection Limits

Parameter	EPA Method	Detection Limit Soil (mg/kg)	Detection Limit Water (ug/L)
General Chemistry			
Total Organic Carbon	9060	0.1	750
pH	150.1	NA	NA
SVOCs			
2-Chloronaphthalene	8270	0.005	0.003
2-Methylnaphthalene	8270	0.005	0.003
Acenaphthene	8270	0.005	0.003
Acenaphthylene	8270	0.005	0.003
Anthracene	8270	0.005	0.003
Benzo(a)anthracene	8270	0.005	0.003
Benzo(a)pyrene	8270	0.005	0.003
Benzo(b)fluoranthene	8270	0.005	0.003
Benzo(g,h,i)perylene	8270	0.005	0.003
Benzo(k)fluoranthene	8270	0.005	0.003
Chrysene	8270	0.005	0.003
Dibenz(a,h)anthracene	8270	0.005	0.003
Fluoranthene	8270	0.005	0.003
Fluorene	8270	0.005	0.003
Indeno(1,2,3-cd)pyrene	8270	0.005	0.003
Naphthalene	8270	0.005	0.003
Pentachlorophenol	8270	0.005	0.003
Phenanthrene	8270	0.005	0.003
Pyrene	8270	0.005	0.003
Dioxin/Furans		ng/kg	pg/L
2,3,7,8-TCDD	8290	1.0	12
1,2,3,7,8-Dioxin penta	8290	1.0	10
1,2,3,4,7,8-Dioxin, hexa	8290	1.0	15
1,2,3,6,7,8-Dioxin, hexa	8290	1.0	18
1,2,3,7,8,9-Dioxin, hexa	8290	1.0	16
1,2,3,4,6,7,8-Dioxin, hepta	8290	1.0	11
Dioxin octa	8290	1.0	4
2,3,7,8-TCDF	8290	1.0	8
1,2,3,7,8-Dibenzofuran, penta	8290	1.0	8
2,3,4,7,8-Dibenzofuran, penta	8290	1.0	8
1,2,3,4,7,8-Dibenzofuran, hexa	8290	1.0	7
1,2,3,6,7,8-Dibenzofuran, hexa	8290	1.0	7
1,2,3,7,8,9-Dibenzofuran, hexa	8290	1.0	7
2,3,4,6,7,8-Dibenzofuran, hexa	8290	1.0	7
1,2,3,4,6,7,8-Dibenzofuran, hepta	8290	1.0	14
1,2,3,4,7,8,9-Dibenzofuran, hepta	8290	1.0	14
Dibenzofuran octa	8290	5.0	4
Total TCDD	8290	5.0	13
Total PeCDD	8290	5.0	10
Total HXCDD	8290	5.0	18
Total HpCDD	8290	5.0	11
Total TCDF	8290	5.0	9
Total PeCDF	8290	5.0	8
Total HxCDF	8290	5.0	8
Total HpCDF	8290	5.0	15

Table 2
Analytical Results: Surficial Soil Samples

Location Date Lab Dup	B(a)P Potency Factor	Toxic Equivalency Factor	WA-1 12/4/98 Legend	WA-1 10/6/00 CAS	WA-2 12/4/98 Legend	WA-2 10/6/00 CAS	WA-3 12/4/98 Legend	WA-3 10/6/00 CAS	6WA-3 TOP 2/17/99 Legend
List 1 PAHs, mg/kg									
Benzo(a)anthracene	0.1		1.8	--	<0.33	--	0.44	0.14	<1.8
Chrysene	0.001		2.6	--	0.34	--	1.0	0.33	<1.8
Benzo(b)fluoranthene	0.1		7.2	--	0.90	--	2.4	0.48	<1.8
Benzo(k)fluoranthene	0.01		2.1	--	0.34	--	0.76	0.28	1.9
Benzo(a)pyrene	1		2.8	--	0.36	--	<0.33	0.17	<1.8
Indeno(1,2,3-cd)pyrene	0.01		0.65	--	<0.33	--	<0.33	0.24	<1.8
Dibenz(a,h)anthracene	1		<0.33	--	<0.33	--	<0.33	0.054	<1.8
B(a)P Equivalent			3.73	--	0.45	--	0.29	0.29	0.02
List 2 PAHs, mg/kg									
Acenaphthene			<0.33	--	<0.33	--	<0.33	<0.005	2.6
Anthracene			0.56	--	<0.33	--	1.3	0.11	<1.8
Fluoranthene			4.1	--	<0.33	--	<0.33	0.2 b	<1.8
Fluorene			<0.33	--	<0.33	--	<0.33	<0.005	<1.8
Naphthalene			<0.33	--	<0.33	--	<0.33	0.012	1.7 j
Pyrene			5.1	--	0.41	--	6.1	0.33	<1.8
Pentachlorophenol, mg/kg			4.2	--	2.3	--	880	39	55
Dioxins, ng/kg									
2,3,7,8-TCDD		1	7.8	--	6.5	--	--	9.61	--
1,2,3,7,8-Dioxin penta		1	63.4	--	51.7	--	--	256	--
1,2,3,4,7,8-Dioxin, hexa		0.1	177	--	218	--	--	561	--
1,2,3,6,7,8-Dioxin, hexa		0.1	1280	--	1000	--	--	10500	--
1,2,3,7,8,9-Dioxin, hexa		0.1	502	--	478	--	--	1920	--
1,2,3,4,6,7,8-Dioxin, hepta		0.01	32550 e	--	19920 e	--	--	251000	--
Dioxin octa		0.0001	267630 e	--	237280 e	--	--	465000	--
Furans, ng/kg									
2,3,7,8-TCDF		0.1	42.5	--	28.3	--	--	8.31	--
1,2,3,7,8-Dibenzofuran, penta		0.05	164	--	103	--	--	59.2	--
2,3,4,7,8-Dibenzofuran, penta		0.5	183	--	105	--	--	145	--
1,2,3,4,7,8-Dibenzofuran, hexa		0.1	1170	--	793	--	--	3050	--
1,2,3,6,7,8-Dibenzofuran, hexa		0.1	341	--	214	--	--	1770	--
2,3,4,6,7,8-Dibenzofuran, hexa		0.1	514	--	307	--	--	1440	--
1,2,3,7,8,9-Dibenzofuran, hexa		0.1	58.9	--	44.4 pr	--	--	286	--
1,2,3,4,6,7,8-Dibenzofuran, hepta		0.01	9640 e	--	8500 e	--	--	101000	--
1,2,3,4,7,8,9-Dibenzofuran, hepta		0.01	1110	--	686	--	--	7300	--
Dibenzofuran octa		0.0001	41080 qe	--	39420 e	--	--	618000	--
TCDD Equivalent			1043.31	--	742.85	--	--	5995.90	--
Carbon, total organic, %			--	4.97	--	1.31	--	2.90	--
pH, standard units			--	7.85	--	7.99	--	7.43	--

Table 2
Analytical Results: Surficial Soil Samples

Location Date Lab Dup	B(a)P Potency Factor	Toxic Equivalency Factor	7WA-3 TOP 2/17/99 Legend	8WA-3 TOP 2/17/99 Legend	WA-4 12/4/98 Legend	WA-5 12/4/98 Legend	WA-6 TOP 2/17/99 Legend	WA-6MID 10/6/00 ALTA
List 1 PAHs, mg/kg								
Benzo(a)anthracene	0.1		<5.1	<0.66	<0.33	<0.33	<3.9	--
Chrysene	0.001		<5.1	<0.66	0.41	<0.33	3.1 j	--
Benzo(b)fluoranthene	0.1		<5.1	<0.66	0.78	<0.33	<3.9	--
Benzo(k)fluoranthene	0.01		5.4	1.3	<0.33	<0.33	4.0	--
Benzo(a)pyrene	1		<5.1	<0.66	0.42	<0.33	<3.9	--
Indeno(1,2,3-cd)pyrene	0.01		<5.1	<0.66	<0.33	<0.33	<3.9	--
Dibenz(a,h)anthracene	1		<5.1	<0.66	<0.33	<0.33	<3.9	--
B(a)P Equivalent			0.05	0.01	0.50	ND	0.04	--
List 2 PAHs, mg/kg								
Acenaphthene			<5.1	<0.66	<0.33	<0.33	<3.9	--
Anthracene			<5.1	<0.66	<0.33	<0.33	<3.9	--
Fluoranthene			<5.1	<0.66	<0.33	<0.33	3.4 j	--
Fluorene			<5.1	<0.66	<0.33	<0.33	<3.9	--
Naphthalene			<5.1	1.1	<0.33	<0.33	3.5 j	--
Pyrene			<5.1	<0.66	<0.33	<0.33	2.1 j	--
Pentachlorophenol, mg/kg			30	20	<0.33	<0.33	49	--
Dioxins, ng/kg								
2,3,7,8-TCDD		1	--	--	<0.1	0.56 emj	--	1100
1,2,3,7,8-Dioxin penta		1	--	--	0.44 emj	4.2 j	--	20000
1,2,3,4,7,8-Dioxin, hexa		0.1	--	--	1.6 j	12.1	--	144000
1,2,3,6,7,8-Dioxin, hexa		0.1	--	--	5.0	45.1	--	168000 e
1,2,3,7,8,9-Dioxin, hexa		0.1	--	--	3.9 j	33.3	--	96900
1,2,3,4,6,7,8-Dioxin, hepta		0.01	--	--	125	1310	--	6540000 e
Dioxin octa		0.0001	--	--	968	11330 e	--	52000000 e
Furans, ng/kg								
2,3,7,8-TCDF		0.1	--	--	0.92 j	1.7 emj	--	1340
1,2,3,7,8-Dibenzofuran, penta		0.05	--	--	0.56 j	3.8 j	--	8600
2,3,4,7,8-Dibenzofuran, penta		0.5	--	--	0.70 j	5.1	--	16800
1,2,3,4,7,8-Dibenzofuran, hexa		0.1	--	--	3.7 j	33.0	--	62500
1,2,3,6,7,8-Dibenzofuran, hexa		0.1	--	--	1.3 j	10.0	--	17500
2,3,4,6,7,8-Dibenzofuran, hexa		0.1	--	--	2.0 emj	16.2	--	34900
1,2,3,7,8,9-Dibenzofuran, hexa		0.1	--	--	<0.06	2.1 prj	--	23600
1,2,3,4,6,7,8-Dibenzofuran, hepta		0.01	--	--	40.1	357	--	1210000 e
1,2,3,4,7,8,9-Dibenzofuran, hepta		0.01	--	--	2.2 j	24.1	--	79700
Dibenzofuran octa		0.0001	--	--	111	961	--	4840000 e
TCDD Equivalent			--	--	4.44	40.99	--	168785
Carbon, total organic, %			--	--	--	--	--	26
pH, standard units			--	--	--	--	--	--

Table 2
Analytical Results: Surficial Soil Samples

Location Date Lab Dup	B(a)P Potency Factor	Toxic Equivalency Factor	WA-6MID 10/6/00 STL	WA-6MID 10/6/00 CAS	WA-6N 10/6/00 CAS	WA-6S 10/6/00 ALTA	WA-6S 10/6/00 STL	WA-6S 10/6/00 CAS	WA-7 2/17/99 Legend
List 1 PAHs, mg/kg									
Benzo(a)anthracene	0.1		--	1.4	0.22	--	--	0.17	<0.66
Chrysene	0.001		--	2.7	0.31	--	--	0.48	<0.66
Benzo(b)fluoranthene	0.1		--	6.1	0.6	--	--	0.94	<0.66
Benzo(k)fluoranthene	0.01		--	2.7	0.24	--	--	0.43	0.81
Benzo(a)pyrene	1		--	2.3	0.24	--	--	0.56	<0.66
Indeno(1,2,3-cd)pyrene	0.01		--	11	1.1	--	--	0.71	<0.66
Dibenz(a,h)anthracene	1		--	0.77	0.094	--	--	0.16	<0.66
B(a)P Equivalent			--	3.96	0.43	--	--	0.84	0.01
List 2 PAHs, mg/kg									
Acenaphthene			--	0.063	0.048	--	--	<0.05	<0.66
Anthracene			--	3.1	0.44	--	--	0.38	<0.66
Fluoranthene			--	3.6	0.55	--	--	0.29	<0.66
Fluorene			--	0.065	0.055	--	--	<0.05	<0.66
Naphthalene			--	0.2	<0.005	--	--	0.061	0.70
Pyrene			--	3.6	0.48	--	--	0.49	<0.66
Pentachlorophenol, mg/kg			--	120 e	0.72	--	--	120	1.1
Dioxins, ng/kg									
2,3,7,8-TCDD		1	2000	1330	7.18	262	430	466	--
1,2,3,7,8-Dioxin penta		1	29000	14100	61.6	5880	8000 e	5760	--
1,2,3,4,7,8-Dioxin, hexa		0.1	180000	79600	233	22900	26000	29700	--
1,2,3,6,7,8-Dioxin, hexa		0.1	210000	105000	627	95300	110000	112000	--
1,2,3,7,8,9-Dioxin, hexa		0.1	140000	60400	328	35900	28000	31900	--
1,2,3,4,6,7,8-Dioxin, hepta		0.01	4400000 ej	430000	16400	2930000 e	2300000 e	1870000	--
Dioxin octa		0.0001	7000000 ej	2030000	117000	23500000 e	4900000 ej	1800000	--
Furans, ng/kg									
2,3,7,8-TCDF		0.1	1300 e	1120	4.75	124	130	114	--
1,2,3,7,8-Dibenzofuran, penta		0.05	10000	6600	28.8	893	1000	722	--
2,3,4,7,8-Dibenzofuran, penta		0.5	8600	12500	60.8	2290	1300	1840	--
1,2,3,4,7,8-Dibenzofuran, hexa		0.1	79000	54300	239	30900	37000 e	30400	--
1,2,3,6,7,8-Dibenzofuran, hexa		0.1	22000	14200 (1)	101	8490	8900 e	12600 (1)	--
2,3,4,6,7,8-Dibenzofuran, hexa		0.1	12000	17700	123	13900	5200	13500	--
1,2,3,7,8,9-Dibenzofuran, hexa		0.1	3600	21000	110	3270	500	3730	--
1,2,3,4,6,7,8-Dibenzofuran, hepta		0.01	1100000 ej	151000	4230	1240000 e	1200000 ej	958000	--
1,2,3,4,7,8,9-Dibenzofuran, hepta		0.01	91000 j	12700	286	65500	88000 j	63500	--
Dibenzofuran octa		0.0001	3400000 ej	504000	17700	7900000 e	3200000 ej	920000	--
TCDD Equivalent			157540	63532	499.83	73905	67393	59763	--
Carbon, total organic, %			--	24.8	2.51	21.7	--	21.4	--
pH, standard units			--	6.21	7.58	--	--	6.01	--

Table 2
Analytical Results: Surficial Soil Samples

Location Date Lab Dup	B(a)P Potency Factor	Toxic Equivalency Factor	WA-8 10/6/00 CAS	WA-8 10/6/00 CAS DUP
List 1 PAHs, mg/kg				
Benzo(a)anthracene	0.1		0.36	0.26
Chrysene	0.001		0.59	0.43
Benzo(b)fluoranthene	0.1		0.6	0.45
Benzo(k)fluoranthene	0.01		0.41	0.32
Benzo(a)pyrene	1		0.37	0.29
Indeno(1,2,3-cd)pyrene	0.01		0.57	0.42
Dibenz(a,h)anthracene	1		0.091	0.068
B(a)P Equivalent			0.57	0.44
List 2 PAHs, mg/kg				
Acenaphthene			0.01	0.007
Anthracene			0.89	0.11
Fluoranthene			0.64	0.46
Fluorene			0.068	0.007
Naphthalene			0.025	0.006
Pyrene			0.62	0.43
Pentachlorophenol, mg/kg			0.83	0.71
Dioxins, ng/kg				
2,3,7,8-TCDD		1	1.41	2.76
1,2,3,7,8-Dioxin penta		1	15.3	22.1
1,2,3,4,7,8-Dioxin, hexa		0.1	381	72.1
1,2,3,6,7,8-Dioxin, hexa		0.1	495	82.5
1,2,3,7,8,9-Dioxin, hexa		0.1	81.8	98.5
1,2,3,4,6,7,8-Dioxin, hepta		0.01	10100	10400
Dioxin octa		0.0001	120000	102000
Furans, ng/kg				
2,3,7,8-TCDF		0.1	9.91	13.3
1,2,3,7,8-Dibenzofuran, penta		0.05	63.2	70.5
2,3,4,7,8-Dibenzofuran, penta		0.5	123	138
1,2,3,4,7,8-Dibenzofuran, hexa		0.1	458	554
1,2,3,6,7,8-Dibenzofuran, hexa		0.1	149	186 (1)
2,3,4,6,7,8-Dibenzofuran, hexa		0.1	1410	206
1,2,3,7,8,9-Dibenzofuran, hexa		0.1	302	197
1,2,3,4,6,7,8-Dibenzofuran, hepta		0.01	4250	4740
1,2,3,4,7,8,9-Dibenzofuran, hepta		0.01	437	460
Dibenzofuran octa		0.0001	12200	12800
TCDD Equivalent			571.13	405.81
Carbon, total organic, %			1.32	1.08
pH, standard units			7.32	7.28

Table 3
Analytical Results: Sediment Samples

Location Date Dup	WA-7M 10/6/00	WA-70W SOIL 11/2/00
List 1 PAHs, mg/kg		
Benzo(a)anthracene	0.11	1.9
Chrysene	0.19	2.8
Benzo(b)fluoranthene	0.24	1.5
Benzo(k)fluoranthene	0.17	1.3
Benzo(a)pyrene	0.14	1
Indeno(1,2,3-cd)pyrene	0.17	0.69
Dibenz(a,h)anthracene	0.025	0.17
B(a)P Equivalent	0.20	1.53
List 2 PAHs, mg/kg		
Acenaphthene	0.006	0.061
Anthracene	0.098	1.1
Fluoranthene	0.27	6.3
Fluorene	0.01	0.17
Naphthalene	0.01	0.071
Pyrene	0.22	5.5
Pentachlorophenol, mg/kg	1.9	2.3
Dioxins, ng/kg		
2,3,7,8-TCDD	21.2	5.29
1,2,3,7,8-Dioxin penta	240	43.8
1,2,3,4,7,8-Dioxin, hexa	902	180
1,2,3,6,7,8-Dioxin, hexa	4480	1360
1,2,3,7,8,9-Dioxin, hexa	2100	406
1,2,3,4,6,7,8-Dioxin, hepta	127000	30000
Dioxin octa	1530000	210000
Furans, ng/kg		
2,3,7,8-TCDF	80.5	39.8
1,2,3,7,8-Dibenzofuran, penta	360	136
2,3,4,7,8-Dibenzofuran, penta	752	349
1,2,3,4,7,8-Dibenzofuran, hexa	2590	1010
1,2,3,6,7,8-Dibenzofuran, hexa	1050	315
2,3,4,6,7,8-Dibenzofuran, hexa	1350	449
1,2,3,7,8,9-Dibenzofuran, hexa	1090	392
1,2,3,4,6,7,8-Dibenzofuran, hepta	34400	10800
1,2,3,4,7,8,9-Dibenzofuran, hepta	2390	1040
Dibenzofuran octa	22700	34800
TCDD Equivalent	3812.62	1088.45
Carbon, total organic, %	36.7	4.28 h
pH, standard units	6.13	7.02

Table 4
Analytical Results: Water Samples

Location Date Dup	WA-70W WATER 11/2/00
List 1 PAHs, ug/L	
Benzo(a)anthracene	0.005
Chrysene	0.009
Benzo(b)fluoranthene	0.007
Benzo(k)fluoranthene	0.004
Benzo(a)pyrene	0.003
Indeno(1,2,3-cd)pyrene	0.005
Dibenz(a,h)anthracene	<0.003
B(a)P Equivalent	0.004
List 2 PAHs, ug/L	
Acenaphthene	0.02
Anthracene	0.017
Fluoranthene	0.019 b
Fluorene	0.02
Naphthalene	0.027 b
Pyrene	0.015 b
Pentachlorophenol, ug/L	<0.50
Dioxins, ng/L	
2,3,7,8-TCDD	<0.00191
1,2,3,7,8-Dioxin penta	<0.00675
1,2,3,4,7,8-Dioxin, hexa	<0.00562
1,2,3,6,7,8-Dioxin, hexa	0.0128 j
1,2,3,7,8,9-Dioxin, hexa	<0.00541
1,2,3,4,6,7,8-Dioxin, hepta	0.28
Dioxin octa	3.45
Furans, ng/L	
2,3,7,8-TCDF	<0.00417
1,2,3,7,8-Dibenzofuran, penta	<0.00317
2,3,4,7,8-Dibenzofuran, penta	<0.00298
1,2,3,4,7,8-Dibenzofuran, hexa	0.0136 j
1,2,3,6,7,8-Dibenzofuran, hexa	0.00989 j
2,3,4,6,7,8-Dibenzofuran, hexa	<0.00501
1,2,3,7,8,9-Dibenzofuran, hexa	<0.00735
1,2,3,4,6,7,8-Dibenzofuran, hepta	0.125
1,2,3,4,7,8,9-Dibenzofuran, hepta	<0.00688
Dibenzofuran octa	0.334
TCDD Equivalent	0.008
Carbon, total organic, %	11.9
pH, standard units	7.30

Table 5
Analytical Results: Soil -Water Leach Samples

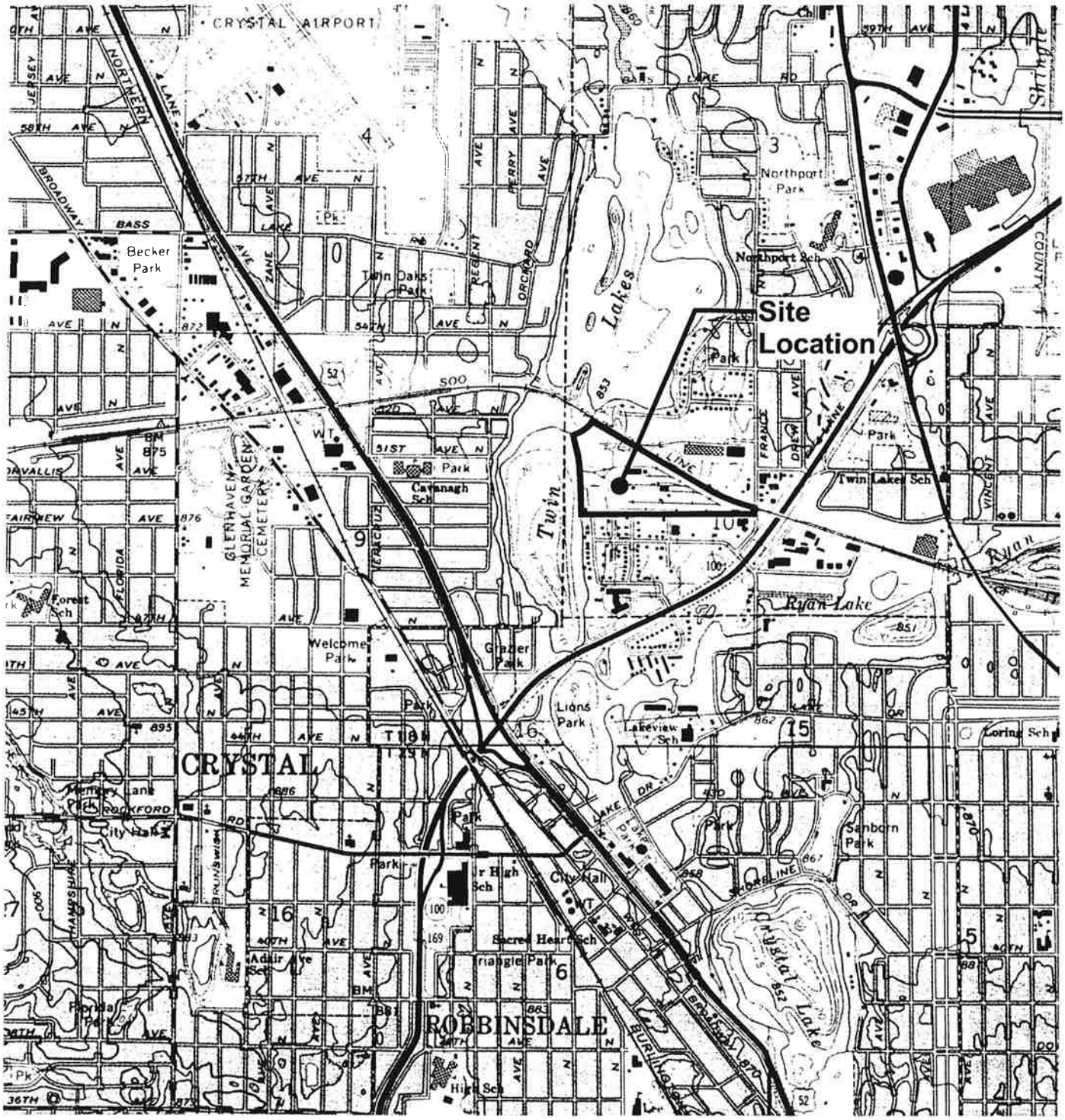
Location Date Dup	WA-70W LEACH 11/2/00	WA-6MID Leach 10/6/00	WA-6S Leach 10/6/00
List 1 PAHs, ug/L			
Benzo(a)anthracene	0.018	--	--
Chrysene	0.033	--	--
Benzo(b)fluoranthene	0.01	--	--
Benzo(k)fluoranthene	0.006	--	--
Benzo(a)pyrene	0.005	--	--
Indeno(1,2,3-cd)pyrene	0.005	--	--
Dibenz(a,h)anthracene	<0.003	--	--
B(a)P Equivalent	0.008	--	--
List 2 PAHs, ug/L			
Acenaphthene	0.57	--	--
Anthracene	0.22	--	--
Fluoranthene	0.41	--	--
Fluorene	0.42	--	--
Naphthalene	50	--	--
Pyrene	0.26	--	--
Pentachlorophenol, ug/L	<0.50	--	--
Dioxins, ng/L			
2,3,7,8-TCDD	<0.000875	0.0103	<0.00366
1,2,3,7,8-Dioxin penta	<0.00115	0.132	0.048
1,2,3,4,7,8-Dioxin, hexa	<0.00159	0.687	0.243
1,2,3,6,7,8-Dioxin, hexa	<0.00172	1.71	1.26
1,2,3,7,8,9-Dioxin, hexa	<0.00155	0.857	0.432
1,2,3,4,6,7,8-Dioxin, hepta	<0.00550	53.700 e	39.600 e
Dioxin octa	0.0302	519.000 e	313.000 e
Furans, ng/L			
2,3,7,8-TCDF	<0.00118	0.0217	<0.00445
1,2,3,7,8-Dibenzofuran, penta	<0.00126	0.144	0.018
2,3,4,7,8-Dibenzofuran, penta	<0.00121	0.26	0.03
1,2,3,4,7,8-Dibenzofuran, hexa	<0.000690	1.1	0.412
1,2,3,6,7,8-Dibenzofuran, hexa	<0.000686	0.674 (1)	1.650 (1)
2,3,4,6,7,8-Dibenzofuran, hexa	<0.000784	0.467	0.189
1,2,3,7,8,9-Dibenzofuran, hexa	<0.00114	0.426	0.0575
1,2,3,4,6,7,8-Dibenzofuran, hepta	<0.00101	17.900 (1)	23.900 e(1)
1,2,3,4,7,8,9-Dibenzofuran, hepta	<0.00156	1.24	0.843
Dibenzofuran octa	<0.00659	78.600 e	95.300 e
TCDD Equivalent	0.000003	1.66	1.17
Carbon, total organic, %	1.8	--	--
pH, standard units	--	--	--

4/30/01 11:26 AM
P:\23\27\110\LIMS\8_WA_pahdioxin_022801.xls

Data Qualifiers and Footnotes

--	Not analyzed.
j	Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.
b	Potential false positive based on blank data validation procedure.
h	EPA sample extraction or analysis holding time was exceeded.
p	Small peak in chromatogram below method detection limit.
e	Estimated value, exceeded the instrument calibration range.
q	Quantiative interference.
pr	Poorly resolved peak.
em	Estimated maximum concentration (below PQL).
(1)	Maximum potential concentration

Figures



0 2000

Scale in Feet

Figure 1

SITE LOCATION
JOSLYN MANUFACTURING COMPANY
Brooklyn Center, Minnesota

PROPERTY LINE

FORMER LTU SOIL DIKE

W-301 W-201 W-101

W-2

W-104

WEST AREA

LAKE TWIN

FORMER LAND TREATMENT UNIT (LTU)

CENTERLINE RAILROAD

W-10

WICKES FURNITURE DISTRIBUTION CENTER

W-254

U-7N

W-251

U-8

VAULT

U-4

W-300SP

W-255

U-6N

W-252N

W-253

U-5

W-113

U-3 P-3

P-5 W-9

W-209 P-4

W-7

BUILDING

W-6N

P-2

W-U2A P-1

W-112

U-1A

EXISTING BUILDING

E. LINE OF GOVT LOT 2

SE CORNER OF GOVT LOT 2

FRANCE AVE. N.

TWIN LAKE AVE. N.

ALLEY

LAKEVIEW AVE. N.

ALLEY

AZELIA AVE. N.

N

0 200

SCALE IN FEET

Former Land Treatment Ur
(LTU) Limits

RJW M:\CAD\2327110\10883_4.dwg 200.00 07/24/2000 17:38:48

Figure 2
SITE MAP
Joslyn Manufacturing
Brooklyn Center, Mi

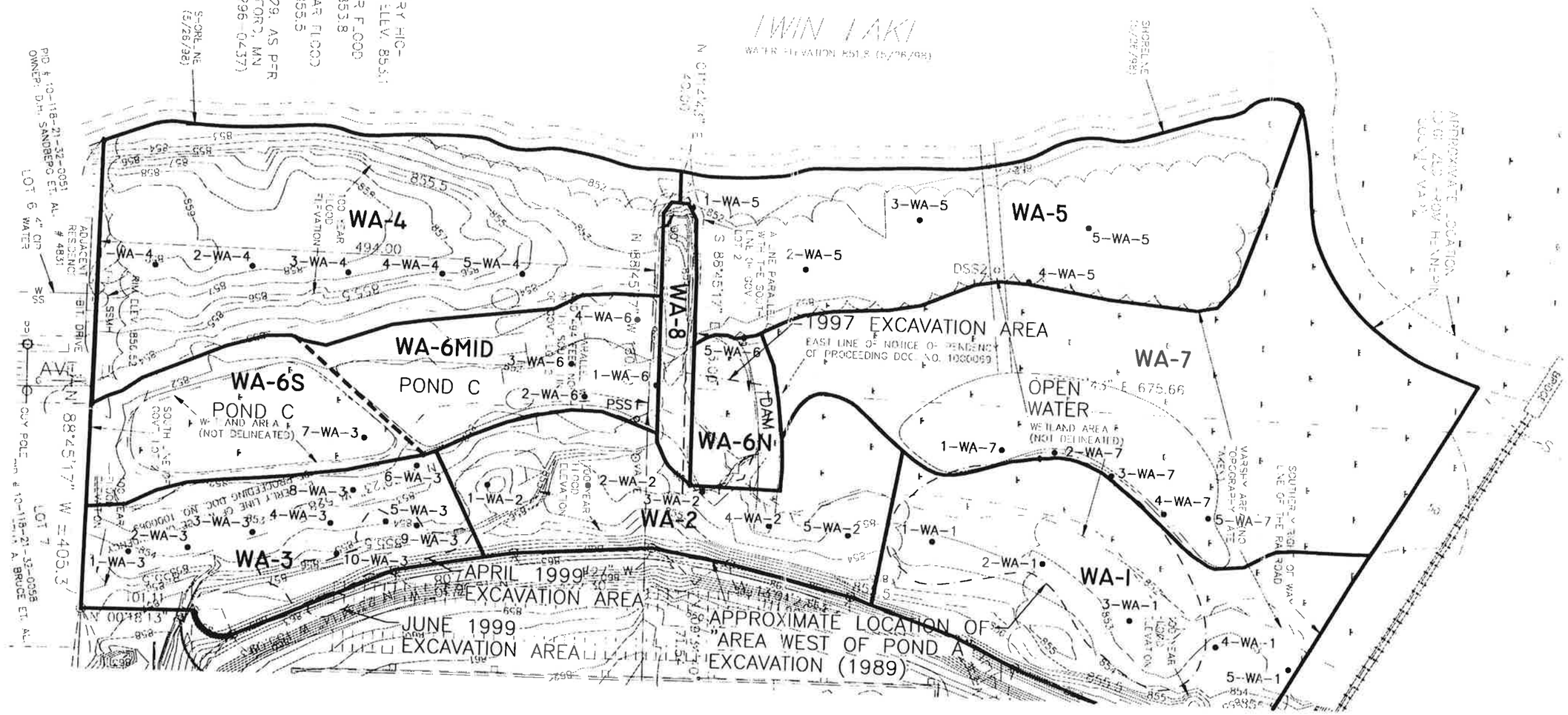


Figure 3
WEST AREA
SAMPLING SUBAREAS
Joslyn Manufacturing Co. Site
Brooklyn Center, Minnesota

PVJ W:\cad\2327110\12745_3.dwg Plot at 100 05/01/2001

PW M:\CAD\2327110\14682_1.DWG Plot at 100 05/01/2001 08:09:18

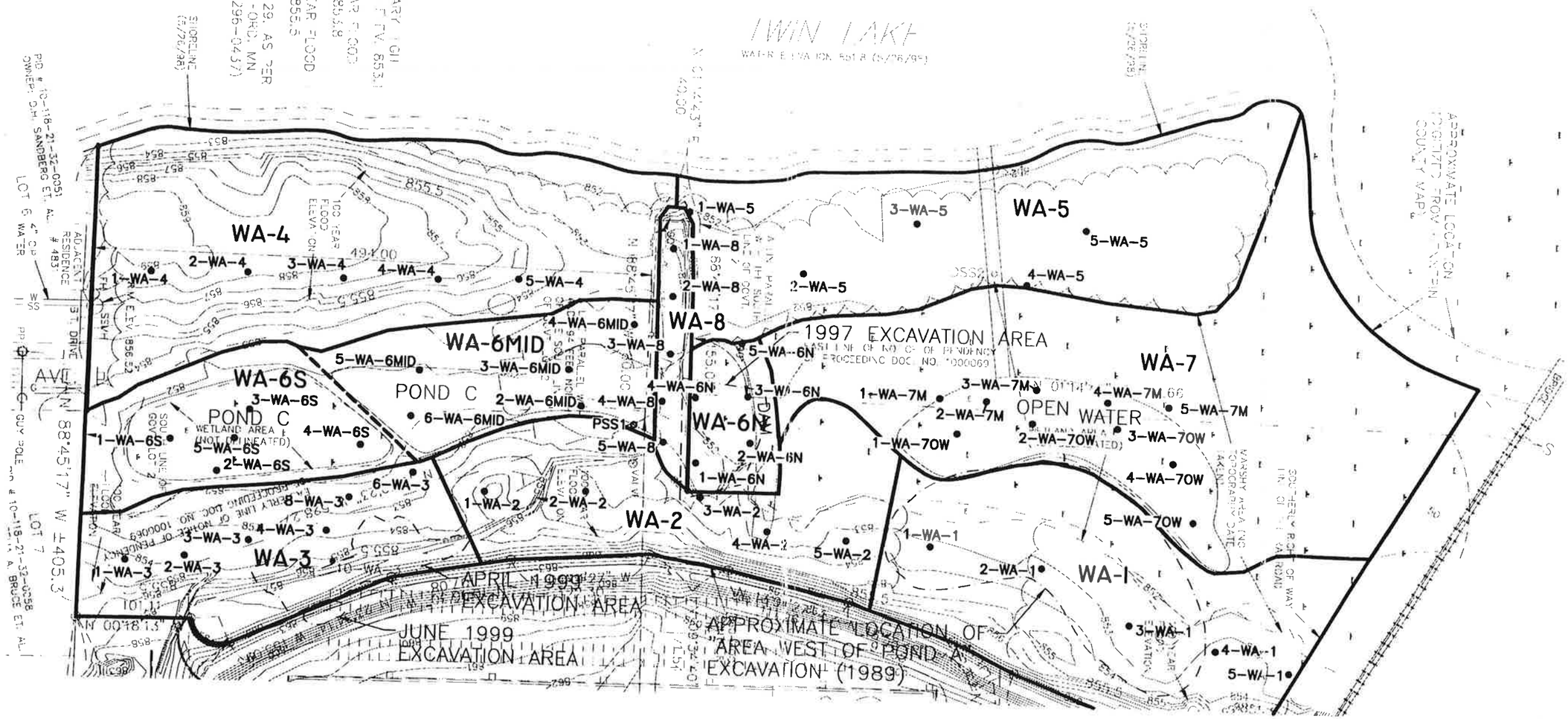


Figure 4
WEST AREA SOIL AND SEDIMENT SAMPLING LOCATIONS
Joslyn Manufacturing Co. Site
Brooklyn Center, Minnesota

Appendices

Appendix A

Detailed Description of the West Areas-Area/Subarea

Appendix A
Detailed Description of Area/Subareas

West Area 1

West Area 1 (WA-1) – This is an upland area on the north end of the eastern edge of the West Area. This is an area that was filled during site operation. In 1989, the "Area West of Pond A" was excavated and backfilled with soil obtained onsite. Sample WA-1 from the 1999 Release sampling characterizes PCP, PAH, and dioxin/furan concentrations in the surficial soils in this area.

West Area 2

West Area 2 (WA-2) – This is an upland area in the central portion of the eastern edge of the West Area. This area was filled during wood treating operations. Sample WA-2, from the 1999 release sampling, characterizes PCP, PAH, and dioxin/furan concentrations in the surficial soils in this area.

West Area 3

West Area 3 (WA-3) – This is an upland area in the southern portion of the eastern edge of the West Area. This area was filled during wood treating operations. Subsequent excavation activities have also been completed in this area.

West Area 4 and West Area 5

West Area 4 (WA-4) and West Area 5 (WA-5) – These areas are along the western edge of the West Area. WA-4 is on the southern end and is largely an upland area. WA-5 is on the northern end and is largely a forested wetland. Neither area appears to have been affected by wood treating activities. The former ice chute is largely within WA-5. However, previous sampling for PCP and PAH in the former ice chute indicated that the ice chute was not impacted by the site. Samples WA-4 and WA-5 from the 1999 release sampling characterize the PCP, PAH, and dioxin/furan concentrations in the surficial soil in these two areas.

West Area 6

West Area 6 (WA-6) – This area approximates the location of Former Pond C and is located in the center of the southern portion of the West Area. Former Pond C received wastewater (steam condensate with lubricating oil contamination from the early 1940s to approximately 1950). During

Appendix B

Laboratory Reports

Columbia Analytical Services INC.
An Employee-Owned Company

December 20, 2000

Service Request No: K2008629

Marti Harding-Smith
Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Re: 23/27-110Y2K461

Dear Marti:

Enclosed are the results of the sample(s) submitted to our laboratory on November 3, 2000. For your reference, these analyses have been assigned our service request number K2008629.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions. My extension is 3358.

Respectfully submitted,

Columbia Analytical Services, Inc.

Lynda A. Huckestein
Client Services Manager

LAH/afs

317 South 13th Avenue • P.O. Box 479 • Kelso, Washington 98626 • Telephone 360/ 577-7222 • Fax 360/636-1068

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
B	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
E	The reported value is estimated because of the presence of matrix interference.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.
*	The duplicate analysis not within control limits. See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a chromatographic interference.
X	See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Company	**Service Request:**	K2008629
Project:	23/27-110Y2K461	**Date Collected:**	11/2/00
Sample Matrix:	Soil	**Date Received:**	11/3/00

Total Solids

Prep Method:	NONE	Units:	Percent
Analysis Method:	160.3M	Basis:	WET
Test Notes:			

Sample Name	Lab Code	Date Analyzed	Result	Result Notes
WA-70W Soil	K2008629-002	11/8/00	52.5	

Approved By: _____ Date: 12/21/2000

Total Solids/042095

08629TS.AB1 - Total Solids 12/21/00

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Co.	**Service Request:**	K2008629
Project:	23/27-110Y2K461	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA

Inorganic Parameters

Sample Name: Method Blank — Basis: Dry

Lab Code: K2008629-MB

Test Notes:

Analyte	Units	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Carbon, Total Organic	PERCENT	ASTM D4129-82M	0.05	0.01	1	NA	12/15/00	ND	

Approved By: _____ Date: 12/15/00

0002VOET.PW2 - MB 12/15/00

00007

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Co.	**Service Request:**	K2008629
Project:	23/27-110Y2K461	**Date Collected:**	11/2/00
Sample Matrix:	Water	**Date Received:**	11/3/00

Inorganic Parameters

Sample Name: WA-70W Water Leach
Lab Code: K2008629-003
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Carbon, Total Organic	mg/L (ppm)	415.1	0.5	1	NA	11/17/00	1.8	

Approved By: _____ Date: 11/17/00

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
Sample Matrix: Water

Service Request: K2008629
Date Collected: 11/2/00
Date Received: 11/3/00

Pentachlorophenol (PCP)

Prep Method: EPA 3510B
Analysis Method: 8151M
Test Notes:

Units: ug/L (ppb)
Basis: NA

Sample Name	Lab Code	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
WA-70W Water	K2008629-001	0.50	1	11/9/00	11/20/00	ND	
Method Blank	K001109-WB	0.50	1	11/9/00	11/20/00	ND	

Approved By: M Carlin Date: 11/28/00

1A/052595

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Co.	**Service Request:**	K2008629
Project:	23/27-110Y2K461	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA

Pentachlorophenol

Sample Name:	Method Blank	Units:	ug/Kg (ppb)
Lab Code:	K001116-SB	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Pentachlorophenol	EPA 3550A	8151M	5.0	1	11/16/00	11/23/00	ND	

Approved By: _____ Date: 11/30/00

1S22/052595

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
Sample Matrix: Soil

Service Request: K2008629
Date Collected: 11/2/00
Date Received: 11/3/00

Polynuclear Aromatic Hydrocarbons

Sample Name: WA-70W Soil
Lab Code: K2008629-002
Test Notes: D

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3541	SIM	50	10	11/14/00	12/7/00	71	
2-Methylnaphthalene	EPA 3541	SIM	50	10	11/14/00	12/7/00	120	
Acenaphthylene	EPA 3541	SIM	50	10	11/14/00	12/7/00	ND	
Acenaphthene	EPA 3541	SIM	50	10	11/14/00	12/7/00	61	
Fluorene	EPA 3541	SIM	50	10	11/14/00	12/7/00	170	
Phenanthrene	EPA 3541	SIM	50	10	11/14/00	12/7/00	680	
Anthracene	EPA 3541	SIM	50	10	11/14/00	12/7/00	1100	
Fluoranthene	EPA 3541	SIM	250	50	11/14/00	12/7/00	6300	
Pyrene	EPA 3541	SIM	250	50	11/14/00	12/7/00	5500	
Benz(a)anthracene	EPA 3541	SIM	50	10	11/14/00	12/7/00	1900	
Chrysene	EPA 3541	SIM	250	50	11/14/00	12/7/00	2800	
Benzo(b)fluoranthene	EPA 3541	SIM	50	10	11/14/00	12/7/00	1500	
Benzo(k)fluoranthene	EPA 3541	SIM	50	10	11/14/00	12/7/00	1300	
Benzo(a)pyrene	EPA 3541	SIM	50	10	11/14/00	12/7/00	1000	
Indeno(1,2,3-cd)pyrene	EPA 3541	SIM	50	10	11/14/00	12/7/00	690	
Dibenz(a,h)anthracene	EPA 3541	SIM	50	10	11/14/00	12/7/00	170	
Benzo(g,h,i)perylene	EPA 3541	SIM	50	10	11/14/00	12/7/00	520	
2-Chloronaphthalene	EPA 3541	SIM	5	1	11/14/00	12/9/00	ND	

Approved By: Carol C. Helms Date: DEC 12 2000

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
Sample Matrix: Water

Service Request: K2008629
Date Collected: 11/2/00
Date Received: 11/3/00

Polynuclear Aromatic Hydrocarbons

Sample Name: WA-70W Water
Lab Code: K2008629-001
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3510C	SIM	0.003	1	11/9/00	12/1/00	0.027	B
2-Methylnaphthalene	EPA 3510C	SIM	0.003	1	11/9/00	12/1/00	0.015	B
Acenaphthylene	EPA 3510C	SIM	0.003	1	11/9/00	12/1/00	ND	
Acenaphthene	EPA 3510C	SIM	0.003	1	11/9/00	12/1/00	0.020	
Fluorene	EPA 3510C	SIM	0.003	1	11/9/00	12/1/00	0.020	
Phenanthrene	EPA 3510C	SIM	0.003	1	11/9/00	12/1/00	0.026	B
Anthracene	EPA 3510C	SIM	0.003	1	11/9/00	12/1/00	0.017	
Fluoranthene	EPA 3510C	SIM	0.003	1	11/9/00	12/1/00	0.019	B
Pyrene	EPA 3510C	SIM	0.003	1	11/9/00	12/1/00	0.015	B
Benz(a)anthracene	EPA 3510C	SIM	0.003	1	11/9/00	12/1/00	0.005	
Chrysene	EPA 3510C	SIM	0.003	1	11/9/00	12/1/00	0.009	
Benzo(b)fluoranthene	EPA 3510C	SIM	0.003	1	11/9/00	12/1/00	0.007	
Benzo(k)fluoranthene	EPA 3510C	SIM	0.003	1	11/9/00	12/1/00	0.004	
Benzo(a)pyrene	EPA 3510C	SIM	0.003	1	11/9/00	12/1/00	0.003	
Indeno(1,2,3-cd)pyrene	EPA 3510C	SIM	0.003	1	11/9/00	12/1/00	0.005	
Dibenz(a,h)anthracene	EPA 3510C	SIM	0.003	1	11/9/00	12/1/00	ND	
Benzo(g,h,i)perylene	EPA 3510C	SIM	0.003	1	11/9/00	12/1/00	0.006	
2-Chloronaphthalene	EPA 3510C	SIM	0.04	1	11/9/00	12/18/00	ND	

Approved By: Carol A. Haines Date: DEC 19 2000

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
Sample Matrix: Water

Service Request: K2008629
Date Collected: NA
Date Received: NA

Polynuclear Aromatic Hydrocarbons

Sample Name: Method Blank
Lab Code: KWG2005132-3
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3510C	SIM	0.003	1	11/9/00	11/30/00	0.008	
2-Methylnaphthalene	EPA 3510C	SIM	0.003	1	11/9/00	11/30/00	0.003	
Acenaphthylene	EPA 3510C	SIM	0.003	1	11/9/00	11/30/00	ND	
Acenaphthene	EPA 3510C	SIM	0.003	1	11/9/00	11/30/00	ND	
Fluorene	EPA 3510C	SIM	0.003	1	11/9/00	11/30/00	ND	
Phenanthrene	EPA 3510C	SIM	0.003	1	11/9/00	11/30/00	0.010	
Anthracene	EPA 3510C	SIM	0.003	1	11/9/00	11/30/00	ND	
Fluoranthene	EPA 3510C	SIM	0.003	1	11/9/00	11/30/00	0.006	
Pyrene	EPA 3510C	SIM	0.003	1	11/9/00	11/30/00	0.004	
Benz(a)anthracene	EPA 3510C	SIM	0.003	1	11/9/00	11/30/00	ND	
Chrysene	EPA 3510C	SIM	0.003	1	11/9/00	11/30/00	ND	
Benzo(b)fluoranthene	EPA 3510C	SIM	0.003	1	11/9/00	11/30/00	ND	
Benzo(k)fluoranthene	EPA 3510C	SIM	0.003	1	11/9/00	11/30/00	ND	
Benzo(a)pyrene	EPA 3510C	SIM	0.003	1	11/9/00	11/30/00	ND	
Indeno(1,2,3-cd)pyrene	EPA 3510C	SIM	0.003	1	11/9/00	11/30/00	ND	
Dibenz(a,h)anthracene	EPA 3510C	SIM	0.003	1	11/9/00	11/30/00	ND	
Benzo(g,h,i)perylene	EPA 3510C	SIM	0.003	1	11/9/00	11/30/00	ND	
2-Chloronaphthalene	EPA 3510C	SIM	0.04	1	11/9/00	12/18/00	ND	

Approved By: Carol C. Harries Date: DEC 19 2000

1S22/020597p

Appendix A
Laboratory QC Results

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
LCS Matrix: Soil

Service Request: K2008629
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 12/15/00

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name: Lab Control Sample
Lab Code: K2008629-LCS
Test Notes:

Basis: Dry

Analyte	Units	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
pH	pH UNITS	9045C	6.06	5.99	99	85-115	
Carbon, Total Organic	PERCENT	TM D4129-8	1.16	1.07	92	85-115	

Approved By: _____ Date: 12/15/00

LCS/52595
08629WET.PW2 - LCS 12/15/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
Sample Matrix: Water

Service Request: K2008629
Date Collected: 11/2/00
Date Received: 11/3/00
Date Extracted: NA
Date Analyzed: 11/15/00

Matrix Spike Summary
Inorganic Parameters

Sample Name: WA-70W Water
Lab Code: K2008629-001MS
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Carbon, Total Organic	mg/L (ppm)	415.1	1.0	50.0	11.9	64.8	106	85-115	

Approved By: _____ Date: 11/17/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
Sample Matrix: Water

Service Request: K2008629
Date Collected: 11/2/00
Date Received: 11/3/00
Date Extracted: 11/9/00
Date Analyzed: 11/20/00

Surrogate Recovery Summary
Pentachlorophenol (PCP)

Prep Method: EPA 3510B
AnalysisMethod: 8151M

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery 4-Bromo-2,6-dichlorophenol
WA-70W Water	K2008629-001		85
Batch QC	K2008625-002		98
Batch QC	K2008625-002MS		89
Batch QC	K2008625-002DMS		95
Lab Control Sample	K001109-WL		87
Method Blank	K001109-WB		99

CAS Acceptance Limits: 40-100

Approved By: M Eulu Date: 11/28/00

SUR1/052595
08629PHC.ES1 - SUR 11/27/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Barr Engineering Co.	**Service Request:**	K2008629
Project:	23/27-110Y2K461	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Extracted:	11/9/00
		Date Analyzed:	11/20/00

Matrix Spike/Duplicate Matrix Spike Summary
Pentachlorophenol (PCP)

Sample Name:	Batch QC	Units:	ug/L (ppb)
Lab Code:	K2008625-002MS, K2008625-002DMS	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Pentachlorophenol (PCP)	EPA 3510B	8151M	0.50	10	10	ND	7.4	8.3	74	83	33-128	11	

Approved By: M Cutler Date: 11/28/00

DMS/052595

08629PHC.ES1 - DMS 11/27/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
LCS Matrix: Water

Service Request: K2008629
Date Collected: NA
Date Received: NA
Date Extracted: 11/9/00
Date Analyzed: 11/20/00

Laboratory Control Sample Summary
Pentachlorophenol (PCP)

Sample Name: Lab Control Sample
Lab Code: K001109-WL
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Pentachlorophenol (PCP)	EPA 3510B	8151M	10	7.1	71	41-115	

Approved By: _____ Date: 11/28/00

LCS/52595
08629PHC.ES1 - LCS 11/27/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
Sample Matrix: Water

Service Request: K2008629
Date Collected: 11/2/00
Date Received: 11/3/00
Date TCLP Performed: 11/9/00
Date Extracted: 11/13/00
Date Analyzed: 11/22/00

Surrogate Recovery Summary
Toxicity Characteristic Leaching Procedure (TCLP)
Chlorinated Phenols
EPA Methods 1311 and Modified 8151

Sample Name	Lab Code	Percent Recovery 4-Bromo-2,6-dichlorophenol
WA-70W Water Leach	K2008629-003	90
WA-70W Water Leach	K2008629-003MS	89
Method Blank	K001109-LB	91

CAS Acceptance Limits: 40-100

Approved By: _____ Date: 11/30/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Barr Engineering Co.	**Service Request:**	K2008629
Project:	23/27-110Y2K461	**Date Collected:**	11/2/00
Sample Matrix:	Soil	**Date Received:**	11/3/00
		Date Extracted:	11/14/00
		Date Analyzed:	11/21-12/7/00

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons

Prep Method:	EPA 3541	Units:	PERCENT
Analysis Method:	SIM	Basis:	NA

Sample Name	Lab Code	Test Notes	Percent Recovery		
			Fluorene-d10	Fluoranthene-d10	Terphenyl-d14
WA-70W Soil	K2008629-002		97	78	104
Batch QC	K2008608-006		70	76	83
Batch QC	K2008608-006MS		74	78	70
Batch QC	K2008608-006DMS		83	86	77
Lab Control Sample	KWG2005214-3		86	87	83
Method Blank	KWG2005214-4		85	80	95
CAS Acceptance Limits:			37-122	49-118	30-140

Approved By: Carol C. Hawkins Date: DEC 12 2000

SUR3/111397p
08629SVM.AY1 - SUR 12/12/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Barr Engineering Co.	**Service Request:**	K2008629
Project:	23/27-110Y2K461	**Date Collected:**	NA
LCS Matrix:	Soil	**Date Received:**	NA
		Date Extracted:	11/14/00
		Date Analyzed:	11/21/00

Laboratory Control Sample Summary
Polynuclear Aromatic Hydrocarbons

Sample Name:	Lab Control Sample	Units:	ug/Kg (ppb)
Lab Code:	KWG2005214-3	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Acenaphthene	EPA 3541	SIM	490	400	82	30-116	
Pyrene	EPA 3541	SIM	490	470	96	25-129	
Benzo(a)pyrene	EPA 3541	SIM	490	450	92	29-129	

Approved By: Carol C. Harvey Date: DEC 12 2000

LCS/080797p
08629SVM.AY1 - LCS 12/12/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
Sample Matrix: Water

Service Request: K2008629
Date Collected: 11/2/00
Date Received: 11/3/00
Date Extracted: 11/14/00
Date Analyzed: 11/30/00

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons

Prep Method: EPA 3510C
Analysis Method: SIM

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery		
			Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14
WA-70W Water Leach	K2008629-003		84	72	104
Lab Control Sample	KWG2005204-1		87	78	97
Lab Control Sample	KWG2005204-2		83	74	94
Method Blank	KWG2005204-3		88	72	102
CAS Acceptance Limits:			36-105	21-98	37-126

Approved By: Carol C. Haines Date: DEC 12 2000

SUR3/111397p
08629SVM.AY3 - SUR 12/12/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
LCS Matrix: Water

Service Request: K2008629
Date Collected: NA
Date Received: NA
Date Extracted: 11/14/00
Date Analyzed: 11/30/00

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary
Polynuclear Aromatic Hydrocarbons

Sample Name: Lab Control Sample
Lab Code: KWG2005204-1, KWG2005204-2
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	True Value LCS	True Value DLCS	Result LCS	Result DLCS	Percent Recovery LCS	Percent Recovery DLCS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Acenaphthene	EPA 3510C	SIM	0.33	0.33	0.27	0.24	82	73	28-116	12	
Pyrene	EPA 3510C	SIM	0.33	0.33	0.30	0.28	91	85	32-130	7	
Benzo(a)pyrene	EPA 3510C	SIM	0.33	0.33	0.27	0.26	82	79	47-130	4	

Approved By: Carol C. Hevine Date: DEC 12 2000

DLCS/080797p
08629SVM.AY3 - DLCS 12/12/00

ALTA

December 1, 2000

Alta Batch I.D.: 9399

Ms. Lynda Huckestein
Columbia Analytical Services
1317 South 13th Avenue
Kelso, WA 98626

Dear Ms. Huckestein,

Enclosed are the results for the one aqueous sample and one soil sample received at Alta Analytical Laboratory on November 10, 2000. This work was authorized under your Purchase Order #K2008629. These samples were analyzed using EPA Method 8290 for tetra to octa chlorinated dioxins and furans. A standard turnaround time was requested for this work.

The soil sample contained extremely high levels of dioxins and furans. Results given the "*" qualifier were taken from a diluted extract. This sample also contained chlorinated diphenylethers. These compounds may interfere with chlorinated dibenzofurans. Results given the "D" qualifier should be considered the maximum possible concentration due to possible diphenylether interference.

The following report consists of a Sample Inventory (Section I), Analytical Results (Section II) and the Appendix. The Appendix contains a copy of the chain-of-custody, a list of data qualifiers and abbreviations, our current certifications and copies of the raw data (if requested).

If you have any questions regarding this report please feel free to contact me.

Sincerely,

William J. Luksemburg
President
Alta Analytical Laboratory

Alta Analytical Laboratory Inc.
5070 Robert J. Mathews Parkway
El Dorado Hills, CA 95762
FAX (916) 933-0940
(916) 933-1640

ALTA

PCDD & PCDF
EPA METHOD 8290

Sample ID:	WA-70W-WATER			**Lab ID:**	9399-001
Project:	General Analytical HRMS			**QC Set**	1,151
Matrix:	Aqueous	**Date Received:**	11/10/00	**%Solids:**	NA
Sample Amount:	1.004 L	**Date Extracted:**	11/27/00	**Units:**	pg/L
[a] **TEQ (Min-Max):**	11.5 - 21.2				

Compound	Conc.	DL [b]	EMPC [c]	MDL [d]	Qualifier
2,3,7,8-TCDD	ND	1.91		0.711	
1,2,3,7,8-PeCDD	ND	6.75		2.53	
1,2,3,4,7,8-HxCDD	ND	5.62		2.76	
1,2,3,6,7,8-HxCDD	12.8			1.46	A
1,2,3,7,8,9-HxCDD	ND	5.41		2.49	
1,2,3,4,6,7,8-HpCDD	280			2.97	
OCDD	3450			6.93	
2,3,7,8-TCDF	ND	4.17		0.243	
1,2,3,7,8-PeCDF	ND	3.17		5.42	
2,3,4,7,8-PeCDF	ND	2.98		4.42	
1,2,3,4,7,8-HxCDF	13.6			4.24	A
1,2,3,6,7,8-HxCDF	9.89			2.43	A
2,3,4,6,7,8-HxCDF	ND	5.01		3.06	
1,2,3,7,8,9-HxCDF	ND	7.35		1.80	
1,2,3,4,6,7,8-HpCDF	125			2.02	
1,2,3,4,7,8,9-HpCDF	ND	6.88		3.62	
OCDF	334			4.39	
Total TCDD	ND	1.91			
Total PeCDD	ND	6.75			
Total HxCDD	68.5				
Total HpCDD	535				
Total TCDF	ND	4.17			
Total PeCDF	35.8				
Total HxCDF	178				
Total HpCDF	418				

00045

ALTA

PCDD & PCDF
EPA METHOD 8290

Method Blank		Date Extracted:	11/16/00	Lab ID:	MB001
Matrix:	Solid	Sample Amount:	10 g	QC Set:	1.127
TEQ (Min-Max):	0 - 0.353			Units:	pg/g

Compound	Conc.	DL [b]	EMPC[c]	MDL [d]	Qualifier
2,3,7,8-TCDD	ND	0.0840		0.0889	
1,2,3,7,8-PeCDD	ND	0.0953		0.262	
1,2,3,4,7,8-HxCDD	ND	0.239		0.820	
1,2,3,6,7,8-HxCDD	ND	0.240		0.818	
1,2,3,7,8,9-HxCDD	ND	0.236		0.528	
1,2,3,4,6,7,8-HpCDD	ND	0.145		0.347	
OCDD	ND	0.404		2.03	
2,3,7,8-TCDF	ND	0.128		0.0940	
1,2,3,7,8-PeCDF	ND	0.213		0.294	
2,3,4,7,8-PeCDF	ND	0.181		0.245	
1,2,3,4,7,8-HxCDF	ND	0.0724		0.270	
1,2,3,6,7,8-HxCDF	ND	0.0716		0.201	
2,3,4,6,7,8-HxCDF	ND	0.0751		0.273	
1,2,3,7,8,9-HxCDF	ND	0.101		0.297	
1,2,3,4,6,7,8-HpCDF	ND	0.0936		0.232	
1,2,3,4,7,8,9-HpCDF	ND	0.128		0.295	
OCDF	ND	0.438		0.512	
Total TCDD	ND	0.0840			
Total PeCDD	ND	0.0953			
Total HxCDD	ND	0.239			
Total HpCDD	ND	0.145			
Total TCDF	ND	0.128			
Total PeCDF	ND	0.197			
Total HxCDF	ND	0.0789			
Total HpCDF	ND	0.109			

00047

ALTA

PCDD & PCDF
EPA METHOD 8290

OPR RESULTS
Lab ID: OPR001
Matrix: Solid

Date Received: NA
Date Extracted: 11/16/00
Sample Amount: 10 g

QC Set: 1.127
Units: ng/mL

Compound	Spike Conc.	Conc. Found	OPR Limits
2,3,7,8-TCDD	10.0	8.47	7 - 13
1,2,3,7,8-PeCDD	50.0	46.3	35 - 65
1,2,3,4,7,8-HxCDD	50.0	47.9	35 - 65
1,2,3,6,7,8-HxCDD	50.0	48.7	35 - 65
1,2,3,7,8,9-HxCDD	50.0	51.3	35 - 65
1,2,3,4,6,7,8-HpCDD	50.0	50.4	35 - 65
OCDD	100	107	70 - 130
2,3,7,8-TCDF	10.0	10.1	7 - 13
1,2,3,7,8-PeCDF	50.0	51.3	35 - 65
2,3,4,7,8-PeCDF	50.0	53.7	35 - 65
1,2,3,4,7,8-HxCDF	50.0	48.2	35 - 65
1,2,3,6,7,8-HxCDF	50.0	54.6	35 - 65
2,3,4,6,7,8-HxCDF	50.0	54.4	35 - 65
1,2,3,7,8,9-HxCDF	50.0	52.2	35 - 65
1,2,3,4,6,7,8-HpCDF	50.0	51.2	35 - 65
1,2,3,4,7,8,9-HpCDF	50.0	50.1	35 - 65
OCDF	100	103	70 - 130

ALTA

PCDD & PCDF
EPA METHOD 8290

Sample ID:	WA-70W-SOIL			**Lab ID:**	9399-002
Project:	General Analytical HRMS			**QC Set:**	1.127
Matrix:	Soil	**Date Received:**	11/10/00	**%Solids:**	58.2
Sample Amount:	17.71 g	**Date Extracted:**	11/16/00	**Units:**	pg/g
[a] **TEQ (Min-Max):**	1050 - 1050				

Compound	Conc.	DL [b]	EMPC [c]	MDL [d]	Qualifier
2,3,7,8-TCDD	5.29			0.0889	
1,2,3,7,8-PeCDD	43.8			0.262	
1,2,3,4,7,8-HxCDD	180			0.820	
1,2,3,6,7,8-HxCDD	1360			0.818	
1,2,3,7,8,9-HxCDD	406			0.528	
1,2,3,4,6,7,8-HpCDD	30000			0.347	*
OCDD	210000			2.03	*
2,3,7,8-TCDF	39.8			0.0940	
1,2,3,7,8-PeCDF	136			0.294	
2,3,4,7,8-PeCDF	349			0.245	
1,2,3,4,7,8-HxCDF	1010			0.270	
1,2,3,6,7,8-HxCDF	315			0.201	
2,3,4,6,7,8-HxCDF	449			0.273	
1,2,3,7,8,9-HxCDF	392			0.297	
1,2,3,4,6,7,8-HpCDF	10800			0.232	*
1,2,3,4,7,8,9-HpCDF	1040			0.295	*
OCDF	34800			0.512	*
Total TCDD	264				
Total PeCDD	844		934		
Total HxCDD	7620				
Total HpCDD	53900				*
Total TCDF	706				D
Total PeCDF	3990				D
Total HxCDF	20100				D
Total HpCDF	50900				*

00051

SECTION II.

ALTA

PCDD & PCDF
EPA METHOD 8290

Method Blank | **Date Extracted:** 11/27/00 | **Lab ID:** MB001
Matrix: Aqueous | **Sample Amount:** 1.000 L | **QC Set** 1,151
TEQ (Min-Max): 0 - 5.60 | **Units:** pg/L

Compound	Conc.	DL [b]	EMPC[c]	MDL [d]	Qualifier
2,3,7,8-TCDD	ND	1.39		0.711	
1,2,3,7,8-PeCDD	ND	1.74		2.53	
1,2,3,4,7,8-HxCDD	ND	3.75		2.76	
1,2,3,6,7,8-HxCDD	ND	4.15		1.46	
1,2,3,7,8,9-HxCDD	ND	3.70		2.49	
1,2,3,4,6,7,8-HpCDD	ND	2.98		2.97	
OCDD	ND	12.3		6.93	
2,3,7,8-TCDF	ND	2.00		0.243	
1,2,3,7,8-PeCDF	ND	2.09		5.42	
2,3,4,7,8-PeCDF	ND	1.98		4.42	
1,2,3,4,7,8-HxCDF	ND	1.66		4.24	
1,2,3,6,7,8-HxCDF	ND	1.54		2.43	
2,3,4,6,7,8-HxCDF	ND	1.86		3.06	
1,2,3,7,8,9-HxCDF	ND	2.74		1.80	
1,2,3,4,6,7,8-HpCDF	ND	2.13		2.02	
1,2,3,4,7,8,9-HpCDF	ND	3.10		3.62	
OCDF	ND	13.4		4.39	
Total TCDD	ND	1.39			
Total PeCDD	ND	1.74			
Total HxCDD	ND	3.86			
Total HpCDD	ND	2.98			
Total TCDF	ND	2.00			
Total PeCDF	ND	2.04			
Total HxCDF	ND	1.90			
Total HpCDF	ND	2.56			

00055

ALTA

PCDD & PCDF
EPA METHOD 8290

OPR RESULTS
Lab ID: OPR001
Matrix: Aqueous

Date Received: NA
Date Extracted: 11/27/00
Sample Amount: 1.000 L

QC Set: 1,151
Units: ng/mL

Compound	Spike Conc.	Conc. Found	OPR Limits
2,3,7,8-TCDD	10.0	8.74	7 - 13
1,2,3,7,8-PeCDD	50.0	49.5	35 - 65
1,2,3,4,7,8-HxCDD	50.0	54.8	35 - 65
1,2,3,6,7,8-HxCDD	50.0	51.4	35 - 65
1,2,3,7,8,9-HxCDD	50.0	50.5	35 - 65
1,2,3,4,6,7,8-HpCDD	50.0	45.2	35 - 65
OCDD	100	101	70 - 130
2,3,7,8-TCDF	10.0	10.4	7 - 13
1,2,3,7,8-PeCDF	50.0	50.3	35 - 65
2,3,4,7,8-PeCDF	50.0	51.2	35 - 65
1,2,3,4,7,8-HxCDF	50.0	49.0	35 - 65
1,2,3,6,7,8-HxCDF	50.0	51.7	35 - 65
2,3,4,6,7,8-HxCDF	50.0	49.2	35 - 65
1,2,3,7,8,9-HxCDF	50.0	51.7	35 - 65
1,2,3,4,6,7,8-HpCDF	50.0	52.0	35 - 65
1,2,3,4,7,8,9-HpCDF	50.0	53.1	35 - 65
OCDF	100	103	70 - 130

DATA QUALIFIERS & ABBREVIATIONS

A	The amount detected is below the Method Calibration Limit.
B	This compound was also detected in the blank.
C	The amount detected is less than five times the Method Quantitation Limit.
D	The amount reported is the maximum possible concentration.
E	The detection limit was raised above the Method Quantitation Limit due to chemical interferences.
F	This result has been confirmed on a DB-225 column.
G	This result has been confirmed on a SP-2331 column.
H	The signal-to-noise ratio is greater than 10:1.
I	Chemical Interference

Conc.	Concentration
D.L.	Detection Limit
NA	Not applicable
S/N	Signal-to-noise
*	See Cover Letter
ND	Not Detected
MPC	Maximum Possible Concentration

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

Columbia Analytical Services INC.
An Employee-Owned Company
1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222 • FAX (360) 636-1068

DATE _____ PAGE _____ OF _____

PROJECT NAME _____ # _____
PROJECT MANAGER Lynda Hackstein
COMPANY/ADDRESS _____
_____
_____ PHONE _____
SAMPLERS SIGNATURE _____

ANALYSIS REQUESTED

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX	NUMBER OF CONTAINERS	Dioxins/Furans															REMARKS
WA-70W-Water				H2O		1															
WA-70W-Soil				S		1															

RELINQUISHED BY:
Signature
Printed Name
Firm
11/8/00 330
Date/Time

RECEIVED BY:
Signature
Printed Name
ALTA
Firm
11-10-00 / 1128
Date/Time

TURNAROUND REQUIREMENTS
___ 24 hr. ___ 48 hr. ___ 5 day
✓ Standard (10-15 working days)
___ Provide Verbal Preliminary Results
___ Provide FAX preliminary Results
Requested Report Date _____

REPORT REQUIREMENTS
___ I. Routine Report + LQS
✓ II. Report (includes DUP.MS. MSD, as required, may be charged as samples)
___ III. Data Validation Report (includes All Raw Data)
___ IV. CLP Deliverable Report

INVOICE INFORMATION:
P.O.# 208629
Bill To _____

SAMPLE RECEIPT:
Shipping VIA: _____
Shipping #: _____
Condition: _____
Lab No: K208629

RELINQUISHED BY:
Signature
Printed Name
Firm
Date/Time

RECEIVED BY:
Signature
Printed Name
Firm
Date/Time

SPECIAL INSTRUCTIONS/COMMENTS:
Sent to ALTA

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator

400-05

Attachment 10.B.1

SAMPLE LOG-IN CHECKLIST

ALTA Project No.: 9399 **Client/Protocol No.** NA

1. Date Samples Arrived: 11-9-00 Initials: BK Location: WR-1			
2. Time / Date logged in: 11-10-00 / 11:29 Initials: JJ Location: M-1			
3. Samples Arrived By: (circle) FedEx (UPS) World Courier Other:			
4. Shipping Preservation: (circle) Ice / (Blue Ice) / Dry Ice / None Temp °C 1			
	YES	**NO**	**NA**
5. Shipping Container(s) Intact"? If not, describe condition in comment section.	X		
6. Shipping Container(s) Custody Seals Present?	X		
Intact? If not intact, describe condition in comment section.	X		
7. Shipping Documentation Present? (circle) (Shipping Label) Airbill	X		
Tracking Number 17 973 6546147986120			
8. Sample Custody Seal(s) Present? No. of Seals_____ or Seal No._____		X	
Intact? If not intact, describe condition in comment section.			X
9. Sample Container Intact? If no, indicate sample condition in comment section.	X		
10. Chain of Custody (COC) or other Sample Documentation Present?	X		
11. COC/Documentation Acceptable? If no, complete COC Anomaly Form.	X		
12. Shipping Container (circle): ALTA (Client) Retain or (Return) or Disposed			
13. Container(s) and/or Bottle(s) Requested?		X	
14. Sample Control Check In/Out Log Completed? (HRMS Only)	X		
15. Drinking Water Sample? (HRMS Only) If yes, Acceptable Preservation? Y or N			
Preservation Info From? (circle) COC or Sample Container or None Noted			X
16. Number of Samples Received: ~20			

Name: _____ Date Samples Reconciled: _____
(Signature Required for LCMS Only)

Comments:

00063

ALTA

Section I: Sample Inventory Report

Date Received: 11/17/00

Alta Lab. ID	Client Sample ID
9448-001	WA-70N LEACHATE

ALTA

PCDD & PCDF
EPA METHOD 8290

Method Blank | Date Extracted: 11/27/00 | Lab ID: MB001
Matrix: Aqueous | Sample Amount: 1.000 L | QC Set: 1,151
TEQ (Min-Max): 0 - 5.60 | | Units: pg/L

Compound	Conc.	DL [b]	EMPC [c]	MDL [d]	Qualifier
2,3,7,8-TCDD	ND	1.39		0.711	
1,2,3,7,8-PeCDD	ND	1.74		2.53	
1,2,3,4,7,8-HxCDD	ND	3.75		2.76	
1,2,3,6,7,8-HxCDD	ND	4.15		1.46	
1,2,3,7,8,9-HxCDD	ND	3.70		2.49	
1,2,3,4,6,7,8-HpCDD	ND	2.98		2.97	
OCDD	ND	12.3		6.93	
2,3,7,8-TCDF	ND	2.00		0.243	
1,2,3,7,8-PeCDF	ND	2.09		5.42	
2,3,4,7,8-PeCDF	ND	1.98		4.42	
1,2,3,4,7,8-HxCDF	ND	1.66		4.24	
1,2,3,6,7,8-HxCDF	ND	1.54		2.43	
2,3,4,6,7,8-HxCDF	ND	1.86		3.06	
1,2,3,7,8,9-HxCDF	ND	2.74		1.80	
1,2,3,4,6,7,8-HpCDF	ND	2.13		2.02	
1,2,3,4,7,8,9-HpCDF	ND	3.10		3.62	
OCDF	ND	13.4		4.39	
Total TCDD	ND	1.39			
Total PeCDD	ND	1.74			
Total HxCDD	ND	3.86			
Total HpCDD	ND	2.98			
Total TCDF	ND	2.00			
Total PeCDF	ND	2.04			
Total HxCDF	ND	1.90			
Total HpCDF	ND	2.56			

ALTA

PCDD & PCDF
EPA METHOD 8290

OPR RESULTS
Lab ID: OPR001
Matrix: Aqueous

Date Received: NA
Date Extracted: 11/27/00
Sample Amount: 1.000 L

QC Set: 1.151
Units: ng/mL

Compound	Spike Conc.	Conc. Found	OPR Limits
2,3,7,8-TCDD	10.0	8.74	7 - 13
1,2,3,7,8-PeCDD	50.0	49.5	35 - 65
1,2,3,4,7,8-HxCDD	50.0	54.8	35 - 65
1,2,3,6,7,8-HxCDD	50.0	51.4	35 - 65
1,2,3,7,8,9-HxCDD	50.0	50.5	35 - 65
1,2,3,4,6,7,8-HpCDD	50.0	45.2	35 - 65
OCDD	100	101	70 - 130
2,3,7,8-TCDF	10.0	10.4	7 - 13
1,2,3,7,8-PeCDF	50.0	50.3	35 - 65
2,3,4,7,8-PeCDF	50.0	51.2	35 - 65
1,2,3,4,7,8-HxCDF	50.0	49.0	35 - 65
1,2,3,6,7,8-HxCDF	50.0	51.7	35 - 65
2,3,4,6,7,8-HxCDF	50.0	49.2	35 - 65
1,2,3,7,8,9-HxCDF	50.0	51.7	35 - 65
1,2,3,4,6,7,8-HpCDF	50.0	52.0	35 - 65
1,2,3,4,7,8,9-HpCDF	50.0	53.1	35 - 65
OCDF	100	103	70 - 130

00069

ALTA

PCDD & PCDF
EPA METHOD 8290

Sample ID:	WA-70N LEACHATE			**Lab ID:**	9448-001
Project:	General Analytical HRMS			**QC Set:**	1.151
Matrix:	Aqueous	**Date Received:**	11/17/00	**%Solids:**	NA
Sample Amount:	0.950 L	**Date Extracted:**	11/27/00	**Units:**	pg/L
[a] **TEQ (Min-Max):**	0.0302 - 3.17				

Compound	Conc.	DL [b]	EMPC [c]	MDL [d]	Qualifier
2,3,7,8-TCDD	ND	0.875		0.711	
1,2,3,7,8-PeCDD	ND	1.15		2.53	
1,2,3,4,7,8-HxCDD	ND	1.59		2.76	
1,2,3,6,7,8-HxCDD	ND	1.72		1.46	
1,2,3,7,8,9-HxCDD	ND	1.55		2.49	
1,2,3,4,6,7,8-HpCDD	ND	5.50		2.97	
OCDD	30.2			6.93	A
2,3,7,8-TCDF	ND	1.18		0.243	
1,2,3,7,8-PeCDF	ND	1.26		5.42	
2,3,4,7,8-PeCDF	ND	1.21		4.42	
1,2,3,4,7,8-HxCDF	ND	0.690		4.24	
1,2,3,6,7,8-HxCDF	ND	0.686		2.43	
2,3,4,6,7,8-HxCDF	ND	0.784		3.06	
1,2,3,7,8,9-HxCDF	ND	1.14		1.80	
1,2,3,4,6,7,8-HpCDF	ND	1.01		2.02	
1,2,3,4,7,8,9-HpCDF	ND	1.56		3.62	
OCDF	ND	6.59		4.39	
Total TCDD	ND	0.875			
Total PeCDD	ND	1.15			
Total HxCDD	ND	1.62			
Total HpCDD	ND	5.50			
Total TCDF	ND	1.18			
Total PeCDF	ND	1.24			
Total HxCDF	ND	0.808			
Total HpCDF	ND	1.25			

00071

APPENDIX

Bureau of Reclamation - Mid-Pacific Region — (MP-470, Res-1.10)

Commonwealth of Kentucky — (Certificate No. 90063)

Commonwealth of Virginia

State of Alaska — (Certificate No. OS-00197)

State of Arizona Department of Health Services — (Certificate No. AZ0058)

State of Arkansas Department of Health — (Approval granted through CA certification)

State of Arkansas Department of Pollution Control

State of California — (Certificate No. 1640)

State of Connecticut — (Certificate No. PH-0182)

State of Florida — (Certificate No. 87456)

State of Nevada — (Certificate No. CA413)

State of New York Department of Health — (Certificate No. 11411)

State of North Carolina — (Certification No. 06700)

State of North Dakota Department of Health — (Certificate No. R-078)

State of Oregon

State of Pennsylvania — (Certificate No. 68-490)

State of South Carolina — (Certificate No. 87002001)

State of Tennessee — (Certificate No. 02996)

State of Utah — (Certificate No. E-201)

State of Wisconsin — (Certificate No. 998036160)

State of Wyoming — (Ref: 8ES-LB)

U.S. Army Corps of Engineers

U.S. EPA Region 5

Washington Department of Ecology — (Certification No. C091)

1-17-97

Columbia Analytical Services INC.
An Employee-Owned Company

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222 • FAX (360) 636-1068

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

DATE 11/15/00 PAGE 1 OF 1

PROJECT NAME _____ #

PROJECT MANAGER Lynda Hinckley

COMPANY/ADDRESS _____

_____

_____ PHONE _____

SAMPLERS SIGNATURE _____

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX	NUMBER OF CONTAINERS	ANALYSIS REQUESTED: DIOXINS	REMARKS
WA-70W Leachate							

RELINQUISHED BY:

Signature _____

Printed Name _____

Firm _____

Date/Time 11/15/00 3:00

RECEIVED BY:

Signature _____

Printed Name K. FUSS

Firm ALTA

Date/Time 11-17-00

TURNAROUND REQUIREMENTS

____ 24 hr ____ 48 hr. ____ 5 day

____ Standard (10-15 working days)

____ Provide Verbal Preliminary Results

____ Provide FAX preliminary Results

Requested Report Date _____

REPORT REQUIREMENTS

____ I. Routine Report

____ II. Report (includes DUP.MS. MSD, as required, may be charged as samples)

____ III. Data Validation Report (includes All Raw Data)

____ IV. CLP Deliverable Report

INVOICE INFORMATION:

P.O.# 200829

Bill To _____

SAMPLE RECEIPT:

Shipping VIA: _____

Shipping #: _____

Condition: _____

Lab No: 10200829

RELINQUISHED BY:

Signature _____

Printed Name _____

Firm _____

Date/Time _____

RECEIVED BY:

Signature _____

Printed Name _____

Firm _____

Date/Time _____

SPECIAL INSTRUCTIONS/COMMENTS:

Batch w/ previous samples from this Project

Sent to ALTA

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator

400-05

Appendix B
Chain of Custody Documentation

SEVERN TRENT SERVICES

STL Sacramento
880 Riverside Parkway
West Sacramento, CA 95605-1500

Tel: 916 373 5600
Fax: 916 371 8420
www.stl-inc.com

January 31, 2001

STL SACRAMENTO PROJECT NUMBER: G1A090202
PO/CONTRACT:

Marti Harding-Smith
Barr Engineering Co.
8300 Norman Center Drive
Suite 300
Minneapolis, MN 55437-1026

Dear Ms. Harding-Smith,

This report contains the analytical results for the samples received under chain of custody by STL Sacramento on 1/9/01. These samples are associated with your 23/27-110Y01463 project.

All applicable quality control procedures met method-specified acceptance criteria, except as noted on the following page.

If you have any questions, please feel free to call me at (916) 374-4362.

Sincerely,

Diana Brooks
Project Manager

CASE NARRATIVE

STL SACRAMENTO PROJECT NUMBER G1A090202

SOLID, 8290, Dioxins/Furans, HRGC/HRMS

Due to very high levels seen in sample WA-6MID, the data is reported from two sets of dilutions. The tetra through hexa data is taken for a 50X dilution and the hepta through octa from a 100X dilution.

The 13C-1,2,3,4,6,7,8-HpCDF, 13C-1,2,3,4,6,7,8-HpCDD and 13C-OCDD are out of ratio and therefore the target analytes which are quantitated against these internal standards are flagged with a "JA" qualifier to denote them as estimated. Also all but the 1,2,3,4,7,8,9-HpCDF still exceed the upper calibration limit and are also flagged with an "E" qualifier. The out of ratio internal standards are due to the level of dilution required to analyze this sample. Further dilution is not possible without post spiking the sample and this would not improve the reported results. The non-diluted sample was used to confirm the 2,3,7,8-TCDF and this value exceeded the upper calibration limit and is also flagged with an "E" qualifier.

Sample WA-6S as with sample WA-6MID used the non diluted, a 50X and 100X dilution for reporting results. Tetra through hexa and octa were taken from the non diluted sample, the heptas from the 100X and the octas form the 50X. Again several of the isomers exceeded the upper calibration limit, but are not saturated. These analytes are flagged with an "E" qualifier. The isomers flagged with an "E" in the non-diluted sample are confirmed in the 50X dilution. Also due to the degree of the dilution the 13C-HpCDF and 13C-OCDD are out of ratio and the corresponding native are flagged as estimated with a "JA" qualifier.

There were no other anomalies associated with this project.

Chain of Custody

BARR
4700 West 77th Street
Minneapolis, MN 55435-4803
(612) 832-2600

Project Number: 23127-110 Y01 4613

№ 14367

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Number of Containers/Preservative: General (Unpreserved)	Total No. Of Containers	Remarks/ Analysis Required:
1. WA-6m!D	10/6/00			X					2	2	TOC Dioxin/Furan
2. WA-65	10/6/00			X					2	2	↓ 8290
3.											
4.											
5.											
6.											
7.											
8.											
9.											
10.											
11.											
12.											
13.											GC
14.											
15.											
16.											

Number of Containers/Preservative: Volatile Organic (Unpres.); Volatile Organic (Pres.); Semivolatile Organic; Total Metals (HNO_3); Dissolved Metals (HNO_3); General (Unpreserved); Cyanide (NaOH, Asc. Acid); Nutrients (H_2SO_4); Oil and Grease (H_2SO_4); TOC (H_2SO_4); Sulfide (Zn Acetate); Dioxin; Whirlpak/Bacteria; Total Phenol (H_2SO_4); (HCL)/DRO, 1L Glass; Lugols, Amber glass; Formalin, Glass

Project Manager: DER

Project Contract: WA-d SWANSON

Laboratory: SVL

Sampled By: —

Remarks:

Relinquished By: [signature] Date 1/8/01 Time 15:15

Relinquished By: Date Time

Received by: [signature] Date 1-9-01 Time 1335

Received by: Date Time

Samples Shipped VIA ☐Air Freight ☐Fed. Exp. ☐Sampler ☐Other

Air Bill Number:

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

STL-Sacramento

BARR ENGINEERING CO.

Client Sample ID: WA-6MID

Trace Level Organic Compounds

Lot-Sample #...: G1A090202-001 Work Order #...: DTEX41AA Matrix.....: SOLID
Date Sampled...: 01/08/01 Date Received..: 01/09/01
Prep Date.....: 01/15/01 Analysis Date..: 01/22/01
Prep Batch #...: 1015231
Dilution Factor: 1

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	2000		pg/g	SW846 8290
1,2,3,7,8-PeCDD	29000		pg/g	SW846 8290
1,2,3,4,7,8-HxCDD	180000		pg/g	SW846 8290
1,2,3,6,7,8-HxCDD	210000		pg/g	SW846 8290
1,2,3,7,8,9-HxCDD	140000		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDD	4400000 E,JA		pg/g	SW846 8290
OCDD	7000000 E,JA		pg/g	SW846 8290
2,3,7,8-TCDF	1300 CON,E		pg/g	SW846 8290
1,2,3,7,8-PeCDF	10000		pg/g	SW846 8290
2,3,4,7,8-PeCDF	8600		pg/g	SW846 8290
1,2,3,4,7,8-HxCDF	79000		pg/g	SW846 8290
1,2,3,6,7,8-HxCDF	22000		pg/g	SW846 8290
2,3,4,6,7,8-HxCDF	12000		pg/g	SW846 8290
1,2,3,7,8,9-HxCDF	3600		pg/g	SW846 8290
1,2,3,4,6,7,8-HpCDF	1100000 E,JA		pg/g	SW846 8290
1,2,3,4,7,8,9-HpCDF	91000 JA		pg/g	SW846 8290
OCDF	3400000 E,JA		pg/g	SW846 8290

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	96	(40 - 135)
13C-1,2,3,7,8-PeCDD	88	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	90	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	134	(40 - 135)
13C-OCDD	108	(40 - 135)
13C-2,3,7,8-TCDF	110	(40 - 135)
13C-1,2,3,7,8-PeCDF	101	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	92	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	104	(40 - 135)

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

E Estimated result. Result concentration exceeds the calibration range.

JA The analyte was positively identified, but the quantitation is an estimate.

CON Confirmation analysis.

QC DATA ASSOCIATION SUMMARY

G1A090202

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	SOLID	SW846 8290		1015231	1015092
	SOLID	ASTM D 2216-90		1016329	1016183
002	SOLID	SW846 8290		1015231	1015092
	SOLID	ASTM D 2216-90		1016329	1016183

LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

Client Lot #...: G1A090202 Work Order #...: DTM0T1AC Matrix.....: SOLID
LCS Lot-Sample#: G1A150000-231
Prep Date.....: 01/15/00 Analysis Date..: 01/19/01
Prep Batch #...: 1015231
Dilution Factor: 1

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	METHOD
2,3,7,8-TCDD	20.0	20.3	pg/g	101	SW846 8290
1,2,3,7,8-PeCDD	100	112	pg/g	112	SW846 8290
1,2,3,4,7,8-HxCDD	100	102	pg/g	102	SW846 8290
1,2,3,6,7,8-HxCDD	100	105	pg/g	105	SW846 8290
1,2,3,7,8,9-HxCDD	100	104	pg/g	104	SW846 8290
1,2,3,4,6,7,8-HpCDD	100	104	pg/g	104	SW846 8290
OCDD	200	202	pg/g	101	SW846 8290
2,3,7,8-TCDF	20.0	21.0	pg/g	105	SW846 8290
1,2,3,7,8-PeCDF	100	98.3	pg/g	98	SW846 8290
2,3,4,7,8-PeCDF	100	96.6	pg/g	97	SW846 8290
1,2,3,4,7,8-HxCDF	100	102	pg/g	102	SW846 8290
1,2,3,6,7,8-HxCDF	100	103	pg/g	103	SW846 8290
2,3,4,6,7,8-HxCDF	100	116	pg/g	116	SW846 8290
1,2,3,7,8,9-HxCDF	100	109	pg/g	109	SW846 8290
1,2,3,4,6,7,8-HpCDF	100	96.9	pg/g	97	SW846 8290
1,2,3,4,7,8,9-HpCDF	100	101	pg/g	101	SW846 8290
OCDF	200	200	pg/g	100	SW846 8290

INTERNAL STANDARD	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	93	(40 - 135)
13C-1,2,3,7,8-PeCDD	88	(40 - 135)
13C-1,2,3,6,7,8-HxCDD	90	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDD	97	(40 - 135)
13C-OCDD	112	(40 - 135)
13C-2,3,7,8-TCDF	97	(40 - 135)
13C-1,2,3,7,8-PeCDF	106	(40 - 135)
13C-1,2,3,4,7,8-HxCDF	89	(40 - 135)
13C-1,2,3,4,6,7,8-HpCDF	104	(40 - 135)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Columbia Analytical Services INC.
An Employee-Owned Company

February 9, 2001 Service Request No: K2100168

Marty Harding-Smith
Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

RECEIVED
FEB 12 2001
BARR
ENGINEERING CO.

Re: 23/27-110Y01463

Dear Marty:

Enclosed are the results of the sample(s) submitted to our laboratory on January 9, 2001. For your reference, these analyses have been assigned our service request number K2100168.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please note that the analysis for Dioxins was performed at Alta Analytical Systems.

Please call if you have any questions. My extension is 3358.

Respectfully submitted,

Columbia Analytical Services, Inc.

Lynda A. Huckestein
Client Services Manager

LAH/afs

Page 1 of 20

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
B	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
E	The reported value is estimated because of the presence of matrix interference.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.
*	The duplicate analysis not within control limits. See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a chromatographic interference.
X	See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Barr Engineering Co.
Project: 23/27-110Y01463
Sample Matrix: Soil

Service Request: K2100168
Date Collected: 10/6/00
Date Received: 1/9/01
Date Extracted: NA
Date Analyzed: 1/16/01

Duplicate Summary
Carbon, Total Organic

Sample Name: WA-6md (Soil)
Lab Code: K2100168-001DUP
Test Notes:

Units: PERCENT
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Carbon, Total Organic	NONE	ASTM D4129-82M	0.05	26.0	25.4	25.7	2	

M Modified

Approved By: _____ Date: 1/16/01

DUP/020597p
00168WET.PW1 - DUP 1/16/01

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Barr Engineering Co.
Project: 23/27-110Y01463
LCS Matrix: Soil

Service Request: K2100168
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 1/16/01

Laboratory Control Sample Summary
Carbon, Total Organic

Sample Name: Lab Control Sample
Lab Code: K2100168-LCS
Test Notes:

Units: PERCENT
Basis: Dry

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Carbon, Total Organic	NONE	ASTM D4129-82M	1.16	1.11	96	85-115	

M Modified

Approved By: CMMR Date: 1/16/01

00007

LCS/020597p
00168WET.PW1 - LCS 1/16/01

SAMPLE LOG-IN CHECKLIST

ALTA Project No.: 9737 **Client/Protocol No.** N/A

		YES	NO	NA
1.	Date Samples Arrived: 1-16-01 Initials: M.E Location: WR-1			
2.	Time / Date logged in: 1-17-01 1100 Initials: MC Location: R-1			
3.	Samples Arrived By: (circle) FedEx (UPS) World Courier Other:			
4.	Shipping Preservation: (circle) Ice (Blue Ice) / Dry Ice / None **Temp** °C 2			
5.	Shipping Container(s) Intact"? If not, describe condition in comment section.	X		
6.	Shipping Container(s) Custody Seals Present?	X		
	Intact? If not intact, describe condition in comment section.	X		
7.	Shipping Documentation Present? (circle) Shipping Label (Airbill) Tracking Number 1Z9736590148190231	X		
8.	Sample Custody Seal(s) Present? No. of Seals_____ or Seal No.		X	
	Intact? If not intact, describe condition in comment section.			X
9.	Sample Container Intact? If no, indicate sample condition in comment section.	X		
10.	Chain of Custody (COC) or other Sample Documentation Present?	X		
11.	COC/Documentation Acceptable? If no, complete COC Anomaly Form.	X		
12.	Shipping Container (circle): ALTA (Client) Retain or (Return) or Disposed			
13.	Container(s) and/or Bottle(s) Requested?		X	
14.	Drinking Water Sample? (HRMS Only) If yes, Acceptable Preservation? Y or N			X
	Preservation Info From? (circle) COC or Sample Container or None Noted			
15.	Number of Samples Received: N/A			

Name: _____ Date Samples Reconciled: _____
(Signature Required for LCMS Only)

Comments:

Attachment 10.B.2

ALTA

01011

OPR Results — **EPA METHOD 8290**

Matrix: Solid | QC Batch No.: 1328 | Lab Sample: 0-OPR001

Sample Size: 1 g | Date Extracted: 29-Jan-01 | Date Analyzed DB-5: 31-Jan-01 | Date Analyzed DB-225: NA

Analyte	Spike Conc	Conc. (ng/mL)	OPR Limits
2,3,7,8-TCDD	10.0	10.2	7 - 13
1,2,3,7,8-PeCDD	50.0	56.0	35 - 65
1,2,3,4,7,8-HxCDD	50.0	54.1	35 - 65
1,2,3,6,7,8-HxCDD	50.0	52.3	35 - 65
1,2,3,7,8,9-HxCDD	50.0	53.5	35 - 65
1,2,3,4,6,7,8-HpCDD	50.0	57.7	35 - 65
OCDD	100	110	70 - 130
2,3,7,8-TCDF	10.0	11.2	7 - 13
1,2,3,7,8-PeCDF	50.0	58.2	35 - 65
2,3,4,7,8-PeCDF	50.0	58.4	35 - 65
1,2,3,4,7,8-HxCDF	50.0	55.5	35 - 65
1,2,3,6,7,8-HxCDF	50.0	57.8	35 - 65
2,3,4,6,7,8-HxCDF	50.0	57.0	35 - 65
1,2,3,7,8,9-HxCDF	50.0	57.6	35 - 65
1,2,3,4,6,7,8-HpCDF	50.0	56.9	35 - 65
1,2,3,4,7,8,9-HpCDF	50.0	57.1	35 - 65
OCDF	100	107	70 - 130

	Labeled Standard	%R	LCL-UCL
IS	13C-2,3,7,8-TCDD	87.9	40 - 135
	13C-1,2,3,7,8-PeCDD	119	40 - 135
	13C-1,2,3,4,7,8-HxCDD	98.9	40 - 135
	13C-1,2,3,6,7,8-HxCDD	84.6	40 - 135
	13C-1,2,3,4,6,7,8-HpCDD	102	40 - 135
	13C-OCDD	80.4	40 - 135
	13C-2,3,7,8-TCDF	86.8	40 - 135
	13C-1,2,3,7,8-PeCDF	106	40 - 135
	13C-2,3,4,7,8-PeCDF	113	40 - 135
	13C-1,2,3,4,7,8-HxCDF	109	40 - 135
	13C-1,2,3,6,7,8-HxCDF	92.4	40 - 135
	13C-2,3,4,6,7,8-HxCDF	99.6	40 - 135
	13C-1,2,3,7,8,9-HxCDF	113	40 - 135
	13C-1,2,3,4,6,7,8-HpCDF	106	40 - 135
	13C-1,2,3,4,7,8,9-HpCDF	122	40 - 135
	13C-OCDF	86.0	40 - 135
CRS	37Cl-2,3,7,8-TCDD	83.3	40 - 135

Analyst: MS

Approved By: Robert S. Mitzel 05-Feb-2001 14:34

SECTION II.

ALTA

001015

Sample ID: WA-6S(SOIL) **EPA METHOD 8290**

Client Data		Sample Data		Laboratory Data			
Name:	Columbia Analytical Services	Matrix:	Soil	Lab Sample:	9737-002	Date Received:	16-Jan-01
Project:	N/A	Sample Size:	3.21 g	QC Batch No.:	1328	Date Extracted:	29-Jan-01
Date Collected:	6-Oct-00	%Solids:	32.0	Date Analyzed DB-5:	31-Jan-01	Date Analyzed DB-225:	1-Feb-01

Analyte	Conc. (pg/g)	DL [a]	EMPC [b]	MDL [c]	Qualifiers
2,3,7,8-TCDD	262			0.0889	
1,2,3,7,8-PeCDD	5880			0.262	
1,2,3,4,7,8-HxCDD	22900			0.820	
1,2,3,6,7,8-HxCDD	95300			0.818	
1,2,3,7,8,9-HxCDD	35900			0.528	*
1,2,3,4,6,7,8-HpCDD	2930000			0.347	E,B
OCDD	23500000			2.03	E,B
2,3,7,8-TCDF	124			0.0940	
1,2,3,7,8-PeCDF	893			0.294	
2,3,4,7,8-PeCDF	2290			0.245	
1,2,3,4,7,8-HxCDF	30900			0.270	B
1,2,3,6,7,8-HxCDF	8490			0.201	B
2,3,4,6,7,8-HxCDF	13900			0.273	B
1,2,3,7,8,9-HxCDF	3270			0.297	B
1,2,3,4,6,7,8-HpCDF	1240000			0.232	*E
1,2,3,4,7,8,9-HpCDF	65500			0.295	*
OCDF	7900000			0.512	E,B

	Labeled Standard	%R	LCL-UCL [d]	Qualifiers
IS	13C-2,3,7,8-TCDD	85.6	40 - 135	
	13C-1,2,3,7,8-PeCDD	123	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	99.4	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	96.9	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	88.7	40 - 135	
	13C-OCDD	93.0	40 - 135	
	13C-2,3,7,8-TCDF	80.1	40 - 135	
	13C-1,2,3,7,8-PeCDF	102	40 - 135	
	13C-2,3,4,7,8-PeCDF	114	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	117	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	99.1	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	102	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	108	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	103	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	132	40 - 135	
	13C-OCDF	88.8	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	81.0	40 - 135	

Totals				
Total TCDD	7890			
Total PeCDD	62000			
Total HxCDD	531000			
Total HpCDD	5240000			B
Total TCDF	7450			D
Total PeCDF	53400	53400		D
Total HxCDF	1060000			D
Total HpCDF	5940000			B

TEQ Data [e]

TEQ (Min-Max): 99200 - 99200

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. Toxic Equivalent Quotient (TEQ) based on International Toxic Equivalent Factors (ITEF).

Analyst: MS

Approved By: Robert S. Mitzel 05-Feb-2001 14:34

ALTA

OPR Results **EPA METHOD 8290**

Matrix:	Aqueous	QC Batch No.:	1293	Lab Sample:	0-OPR001
Sample Size:	1.000 L	Date Extracted:	18-Jan-01	Date Analyzed DB-5:	21-Jan-01
				Date Analyzed DB-225:	NA

Analyte	Spike Conc	Conc. (pg/L)	OPR Limits		Labeled Standard	%R	LCL-UCL
2,3,7,8-TCDD	10.0	7.40	7 - 13	IS	13C-2,3,7,8-TCDD	83.1	40 - 135
1,2,3,7,8-PeCDD	50.0	53.3	35 - 65		13C-1,2,3,7,8-PeCDD	85.2	40 - 135
1,2,3,4,7,8-HxCDD	50.0	56.0	35 - 65		13C-1,2,3,4,7,8-HxCDD	90.7	40 - 135
1,2,3,6,7,8-HxCDD	50.0	56.5	35 - 65		13C-1,2,3,6,7,8-HxCDD	81.2	40 - 135
1,2,3,7,8,9-HxCDD	50.0	56.9	35 - 65		13C-1,2,3,4,6,7,8-HpCDD	74.6	40 - 135
1,2,3,4,6,7,8-HpCDD	50.0	56.6	35 - 65		13C-OCDD	71.1	40 - 135
OCDD	100	116	70 - 130		13C-2,3,7,8-TCDF	81.6	40 - 135
2,3,7,8-TCDF	10.0	11.3	7 - 13		13C-1,2,3,7,8-PeCDF	76.3	40 - 135
1,2,3,7,8-PeCDF	50.0	60.2	35 - 65		13C-2,3,4,7,8-PeCDF	77.0	40 - 135
2,3,4,7,8-PeCDF	50.0	58.8	35 - 65		13C-1,2,3,4,7,8-HxCDF	98.0	40 - 135
1,2,3,4,7,8-HxCDF	50.0	55.6	35 - 65		13C-1,2,3,6,7,8-HxCDF	90.0	40 - 135
1,2,3,6,7,8-HxCDF	50.0	58.6	35 - 65		13C-2,3,4,6,7,8-HxCDF	88.2	40 - 135
2,3,4,6,7,8-HxCDF	50.0	60.0	35 - 65		13C-1,2,3,7,8,9-HxCDF	91.4	40 - 135
1,2,3,7,8,9-HxCDF	50.0	58.0	35 - 65		13C-1,2,3,4,6,7,8-HpCDF	89.4	40 - 135
1,2,3,4,6,7,8-HpCDF	50.0	54.0	35 - 65		13C-1,2,3,4,7,8,9-HpCDF	83.1	40 - 135
1,2,3,4,7,8,9-HpCDF	50.0	56.1	35 - 65		13C-OCDF	76.0	40 - 135
OCDF	100	101	70 - 130	CRS	37Cl-2,3,7,8-TCDD	89.6	40 - 135

Analyst: JMH

Approved By: Robert S. Mitzel 05-Feb-2001 14:34

Sample ID: WA-6S(LEACHATE) **EPA METHOD 8290**

Client Data		Sample Data		Laboratory Data			
Name:	Columbia Analytical Services	Matrix:	Aqueous	Lab Sample:	9737-004	Date Received:	16-Jan-01
Project:	N/A	Sample Size:	0.895 L	QC Batch No.:	1293	Date Extracted:	18-Jan-01
Date Collected:	6-Oct-00	%Solids:	0.487	Date Analyzed DB-5:	22-Jan-01	Date Analyzed DB-225:	NA

Analyte	Conc. (pg/L)	DL [a]	EMPC [b]	MDL [c]	Qualifiers
2,3,7,8-TCDD	ND	3.66		0.711	
1,2,3,7,8-PeCDD	48.0			2.53	
1,2,3,4,7,8-HxCDD	243			2.76	
1,2,3,6,7,8-HxCDD	1260			1.46	
1,2,3,7,8,9-HxCDD	432			2.49	
1,2,3,4,6,7,8-HpCDD	39600			2.97	B,E
OCDD	313000			6.93	B,E
2,3,7,8-TCDF	ND	4.45		0.243	
1,2,3,7,8-PeCDF	18.0			5.42	
2,3,4,7,8-PeCDF	30.0			4.42	
1,2,3,4,7,8-HxCDF	412			4.24	
1,2,3,6,7,8-HxCDF	1650			2.43	D
2,3,4,6,7,8-HxCDF	189			3.06	
1,2,3,7,8,9-HxCDF	57.5			1.80	
1,2,3,4,6,7,8-HpCDF	23900			2.02	D,E
1,2,3,4,7,8,9-HpCDF	843			3.62	
OCDF	95300			4.39	B,E

	Labeled Standard	%R	LCL-UCL [d]	Qualifiers
IS	13C-2,3,7,8-TCDD	68.5	40 - 135	
	13C-1,2,3,7,8-PeCDD	75.4	40 - 135	
	13C-1,2,3,4,7,8-HxCDD	80.1	40 - 135	
	13C-1,2,3,6,7,8-HxCDD	73.1	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDD	68.8	40 - 135	
	13C-OCDD	74.8	40 - 135	
	13C-2,3,7,8-TCDF	66.8	40 - 135	
	13C-1,2,3,7,8-PeCDF	66.3	40 - 135	
	13C-2,3,4,7,8-PeCDF	65.1	40 - 135	
	13C-1,2,3,4,7,8-HxCDF	94.9	40 - 135	
	13C-1,2,3,6,7,8-HxCDF	73.5	40 - 135	
	13C-2,3,4,6,7,8-HxCDF	81.0	40 - 135	
	13C-1,2,3,7,8,9-HxCDF	80.0	40 - 135	
	13C-1,2,3,4,6,7,8-HpCDF	79.3	40 - 135	
	13C-1,2,3,4,7,8,9-HpCDF	75.1	40 - 135	
	13C-OCDF	74.6	40 - 135	
CRS	37Cl-2,3,7,8-TCDD	83.6	40 - 135	

Totals				
Total TCDD	30.4			
Total PeCDD	600			
Total HxCDD	6470			
Total HpCDD	69100			
Total TCDF	255	262		D
Total PeCDF	3490	3490		D
Total HxCDF	24300			D
Total HpCDF	88200			D

TEQ Data [e]

TEQ (Min-Max): 1520 - 1520

a. Sample specific estimated detection limit.

b. Estimated maximum possible concentration.

c. Method detection limit.

d. Lower control limit - upper control limit.

e. Toxic Equivalent Quotient (TEQ) based on International Toxic Equivalent Factors (ITEF).

Analyst: JMH

Approved By: Robert S. Mitzel 05-Feb-2001 14:34

Bureau of Reclamation — Mid-Pacific Region — (MP-470, Res-1.10)

Commonwealth of Kentucky — (Certificate No. 90063)

Commonwealth of Virginia — (Certificate No. 00013)

Department of the Navy

State of Alaska, Department of Environmental Conservation — (Certificate No. OS-00197)

State of Arkansas, Department of Health — (Approval granted through CA certification)

State of Arkansas, Department of Environmental Quality

State of California — (Certificate No. 1640)

State of Connecticut — (Certificate No. PH-0182)

State of Florida — (Certificate No. 87456)

State of Louisiana, Department of Health and Hospitals — (Certificate No. LA000014)

State of Louisiana, Department of Environmental Quality

State of Mississippi — (Approval granted through CA certification)

State of Nevada — (Certificate No. CA413)

State of New York, Department of Health — (Certificate No. 11411)

State of North Carolina — (Certification No. 06700)

State of North Dakota, Department of Health — (Certificate No. R-078)

State of Oregon – (Certificate No. CA413)

State of Pennsylvania — (Certificate No. 68-490)

State of South Carolina — (Certificate No. 87002001)

State of Tennessee — (Certificate No. 02996)

State of Texas — (Certificate No. TX247-1000A

State of Utah — (Certificate No. E-201)

State of Washington – (Certification No. C091)

State of Wisconsin — (Certificate No. 998036160)

State of Wyoming — (USEPA Region 8 Ref: 8TMS-Q)

U.S. Army Corps of Engineers

U.S. EPA Region 5

Columbia Analytical Services INC.
An Employee-Owned Company

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222 • FAX (360) 636-1068

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

DATE 11/01 PAGE 1 OF 1

PROJECT NAME _____ #

PROJECT MANAGER Lynda Huckestein

COMPANY/ADDRESS P.O. Box 479
Kelso WA 98626

PHONE _____

SAMPLERS SIGNATURE _____

ANALYSIS REQUESTED

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX	NUMBER OF CONTAINERS	Dioxins (8290)	REMARKS
WA-Lmd (Soil)	10/6/00			Soil			
WA-LS (Soil)				Soil			
WA-Lmd (Leachate)				Leachate			
WA-LS (Leachate)				Leachate			

0110 23

RELINQUISHED BY:
Signature: Tracy Bowen
Printed Name: Bowen
Firm: CAS
Date/Time: 11/15/01 0900 hrs.

RECEIVED BY:
Signature: [illegible]
Printed Name: [illegible]
Firm: ALTA
Date/Time: 11-16-01 1100

TURNAROUND REQUIREMENTS
___ 24 hr ___ 48 hr. ___ 5 day
/ Standard (10-15 working days)
___ Provide Verbal Preliminary Results
___ Provide FAX preliminary Results
Requested Report Date _____

REPORT REQUIREMENTS
___ I. Routine Report
/ II. Report (includes DUP.MS. MSD, as required, may be charged as samples) + LCS
___ III. Data Validation Report (includes All Raw Data)
___ IV. CLP Deliverable Report

INVOICE INFORMATION:
P.O.# 2100168
Bill To _____

SAMPLE RECEIPT:
Shipping VIA: _____
Shipping #: _____
Condition: _____
Lab No: K2100168

RELINQUISHED BY:
Signature
Printed Name
Firm
Date/Time

RECEIVED BY:
Signature
Printed Name
Firm
Date/Time

SPECIAL INSTRUCTIONS/COMMENTS:
Batch QC ok (MB + LCS)
21 day TAT

Sent to ALTA

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator

400-05

Chain of Custody

BARR
4700 West 77th Street
Minneapolis, MN 55435-4803
(612) 832-2600

1C2100168

Project Number: 23/27-110/01463

№ 14368

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (NaOH, Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4)	Sulfide (Zn Acetate)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)		(HCL)/DRO, 1L Glass	Lugols, Amber glass	Formalin, Glass					Total No. Of Containers
1. WA-6mid	10/4a			X										2																2
2. WA-6S	10/4a			X										2																2
3.																														
4.																														
5.																														
6.																														
7.																														
8.																														
9.																														
10.																														
11.																														
12.																														
13.																														
14.																														
15.																														
16.																														

Project Manager: DER

Project Contract: Ward Swanson

Laboratory: CAS

Remarks/ Analysis Required:

TOC DIOXIN/FURAN
↓ ↓
TOTAL AND WATER LEACH DIOXIN FURAN FOR BOTH - 8290

Sampled By:

Remarks:

Relinquished By: [signature] Date 1/8/01 Time 15:15

Relinquished By: Date Time

Samples Shipped VIA ☐Air Freight ☐Fed. Exp. ☐Sampler ☐Other

Received by: [signature] Date 1/9/01 Time 0945

Received by: Date Time

Air Bill Number:

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Columbia Analytical Services INC.
An Employee-Owned Company

December 5, 2000

Service Request No: K2008014

Marti Harding-Smith
Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Re: 23/27-110Y2K461

Dear Marti:

Enclosed are the results of the sample(s) submitted to our laboratory on October 11, 2000. For your reference, these analyses have been assigned our service request number K2008014.

Please note that the dioxin analysis will be reported under separate cover with our service request K2008016.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions. My extension is 3358.

Respectfully submitted,

Columbia Analytical Services, Inc.

Lynda A. Huckestein
Client Services Manager

LAH/gep

1317 South 13th Avenue • P.O. Box 479 • Kelso, Washington 98626 • Telephone 360/ 577-7222 • Fax 360/636-1068

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
B	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
E	The reported value is estimated because of the presence of matrix interference.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.
*	The duplicate analysis not within control limits. See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a chromatographic interference.
X	See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
Sample Matrix: Soil

Service Request: K2008014
Date Collected: 10/6/00
Date Received: 10/11/00

Total Solids

Prep Method: NONE
Analysis Method: 160.3M
Test Notes:

Units: PERCENT
Basis: Wet

Sample Name	Lab Code	Date Analyzed	Result	Result Notes
WA-3	K2008014-003	10/12/00	87.3	
WA-6N	K2008014-004	10/12/00	77.0	
WA-6Mid	K2008014-005	10/12/00	30.9	
WA-6S	K2008014-006	10/12/00	33.5	
WA-7M	K2008014-007	10/12/00	12.8	
WA-8	K2008014-008	10/12/00	88.4	
Blind Dup	K2008014-009	10/12/00	90.1	

Approved By: _____ Date: 10/12/00

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
Sample Matrix: Soil

Service Request: K2008014
Date Collected: 10/6/00
Date Received: 10/11/00

Carbon, Total Organic

Prep Method: NONE
Analysis Method: ASTM D4129-82M
Test Notes:

Units: PERCENT
Basis: Dry

Sample Name	Lab Code	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
WA-1	K2008014-001	0.05	1	NA	10/25/00	4.97	
WA-2	K2008014-002	0.05	1	NA	10/25/00	1.31	
WA-3	K2008014-003	0.05	1	NA	10/25/00	2.90	
WA-6N	K2008014-004	0.05	1	NA	10/25/00	2.51	
WA-6Mid	K2008014-005	0.05	1	NA	10/25/00	24.8	
WA-6S	K2008014-006	0.05	1	NA	10/25/00	21.4	
WA-7M	K2008014-007	0.05	1	NA	10/25/00	36.7	
WA-8	K2008014-008	0.05	1	NA	10/25/00	1.32	
Blind Dup	K2008014-009	0.05	1	NA	10/25/00	1.08	
Method Blank	K2008014-MB	0.05	1	NA	10/25/00	ND	

M Modified.

Approved By: _____ Date: 10/30/00

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Co.	**Service Request:**	K2008014
Project:	23/27-110Y2K461	**Date Collected:**	10/6/00
Sample Matrix:	Soil	**Date Received:**	10/11/00

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name:	WA-6N	Units:	ug/Kg (ppb)
Lab Code:	K2008014-004	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
2-Methylnaphthalene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
Acenaphthylene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	53	
Acenaphthene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	48	
Fluorene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	55	
Phenanthrene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	160	
Anthracene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	440	
Fluoranthene	EPA 3550B	SIM	25	5	10/18/00	11/27/00	550	
Pyrene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	480	
Benz(a)anthracene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	220	
Chrysene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	310	
Benzo(b)fluoranthene	EPA 3550B	SIM	25	5	10/18/00	11/27/00	600	
Benzo(k)fluoranthene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	240	
Benzo(a)pyrene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	240	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	25	5	10/18/00	11/27/00	1100	
Dibenz(a,h)anthracene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	94	
Benzo(g,h,i)perylene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	490	
2-Chloronaphthalene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
Pentachlorophenol	EPA 3550B	SIM	250	5	10/18/00	11/27/00	720	

Approved By: _____ Date: NOV 30 2000

1S22/020597p

00009

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Co.	**Service Request:**	K2008014
Project:	23/27-110Y2K461	**Date Collected:**	10/6/00
Sample Matrix:	Soil	**Date Received:**	10/11/00

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name:	WA-6S	Units:	ug/Kg (ppb)
Lab Code:	K2008014-006	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	61	
2-Methylnaphthalene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	110	
Acenaphthylene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	130	
Acenaphthene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	ND	
Fluorene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	ND	
Phenanthrene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	140	
Anthracene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	380	
Fluoranthene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	290	
Pyrene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	490	
Benz(a)anthracene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	170	
Chrysene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	480	
Benzo(b)fluoranthene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	940	
Benzo(k)fluoranthene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	430	
Benzo(a)pyrene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	560	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	710	
Dibenz(a,h)anthracene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	160	
Benzo(g,h,i)perylene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	380	
2-Chloronaphthalene	EPA 3550B	SIM	50	10	10/18/00	11/24/00	ND	
Pentachlorophenol	EPA 3550B	SIM	75000	250	10/18/00	11/27/00	120000	

Approved By: _____ Date: NOV 30 2000

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Co.	**Service Request:**	K2008014
Project:	23/27-110Y2K461	**Date Collected:**	10/6/00
Sample Matrix:	Soil	**Date Received:**	10/11/00

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name:	WA-8	Units:	ug/Kg (ppb)
Lab Code:	K2008014-008	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	25	
2-Methylnaphthalene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	33	
Acenaphthylene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	32	
Acenaphthene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	10	
Fluorene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	68	
Phenanthrene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	230	
Anthracene	EPA 3550B	SIM	25	5	10/18/00	11/27/00	890	
Fluoranthene	EPA 3550B	SIM	25	5	10/18/00	11/27/00	640	
Pyrene	EPA 3550B	SIM	25	5	10/18/00	11/27/00	620	
Benz(a)anthracene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	360	
Chrysene	EPA 3550B	SIM	25	5	10/18/00	11/27/00	590	
Benzo(b)fluoranthene	EPA 3550B	SIM	25	5	10/18/00	11/27/00	600	
Benzo(k)fluoranthene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	410	
Benzo(a)pyrene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	370	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	25	5	10/18/00	11/27/00	570	
Dibenz(a,h)anthracene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	91	
Benzo(g,h,i)perylene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	320	
2-Chloronaphthalene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
Pentachlorophenol	EPA 3550B	SIM	500	5	10/18/00	11/27/00	830	

NOV 30 2000

Approved By: _____ Date: _____

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
Sample Matrix: Soil

Service Request: K2008014
Date Collected: NA
Date Received: NA

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG2004723-7
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
2-Methylnaphthalene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
Acenaphthylene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
Acenaphthene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
Fluorene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
Phenanthrene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
Anthracene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
Fluoranthene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	13	
Pyrene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	10	
Benz(a)anthracene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
Chrysene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
Benzo(b)fluoranthene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
Benzo(k)fluoranthene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
Benzo(a)pyrene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
Dibenz(a,h)anthracene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
Benzo(g,h,i)perylene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
2-Chloronaphthalene	EPA 3550B	SIM	5	1	10/18/00	11/24/00	ND	
Pentachlorophenol	EPA 3550B	SIM	300	1	10/18/00	11/24/00	ND	

Approved By: LAX Date: NOV 30 2000

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
Sample Matrix: Soil

Service Request: K2008014
Date Collected: 10/6/00
Date Received: 10/11/00

Duplicate Summary

Total Solids

Prep Method: NONE
Analysis Method: 160.3M
Test Notes:

Units: PERCENT
Basis: Wet

Sample Name	Lab Code	Date Analyzed	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
WA-3	K2008014-003DUP	10/12/00	87.3	85.4	86.4	2	

Approved By: _____ Date: 10/12/00

TSOLIDS.XLT_DUP/09291998a

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
LCS Matrix: Soil

Service Request: K2008014
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 10/20/00

Laboratory Control Sample Summary
pH

Sample Name: Lab Control Sample
Lab Code: K2008014-LCS
Test Notes:

Units: pH UNITS
Basis: NA

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
pH	NONE	150.1	6.06	6.05	100	85-115	

Approved By: _____ Date: 10/30/00

LCS/020597p
08014WET.PW2 - LCS 10/30/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Barr Engineering Co.	**Service Request:**	K2008014
Project:	23/27-110Y2K461	**Date Collected:**	10/6/00
Sample Matrix:	Soil	**Date Received:**	10/11/00
		Date Extracted:	NA
		Date Analyzed:	10/25/00

Matrix Spike Summary
Inorganic Parameters

Sample Name:	WA-7M	Units:	PERCENT
Lab Code:	K2008014-007MS	Basis:	Dry
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Carbon, Total Organic	NONE	TM D4129-8	0.05	110	36.7	139	93	75-125	

Approved By: MMK Date: 10/30/00

MS/020597p
08014WET.PW1 - MS 10/30/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
Sample Matrix: Soil

Service Request: K2008014
Date Collected: 10/6/00
Date Received: 10/11/00
Date Extracted: 10/18/00
Date Analyzed: 11/24/00

Surrogate Recovery Summary
Base Neutral/Acid Semivolatile Organic Compounds

Prep Method: EPA 3550B
Analysis Method: SIM

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery 2-Fluorobiphenyl	2,4,6-Tribromophenol	Terphenyl-d14
WA-3	K2008014-003		73	85	117
WA-6N	K2008014-004		64	96	125
WA-6Mid	K2008014-005		42	48	77
WA-6S	K2008014-006		63	76	95
WA-7M	K2008014-007		43	58	82
WA-8	K2008014-008		71	83	122
Blind Dup	K2008014-009		68	81	118
WA-8	K2008014-008MS		76	90	120
WA-8	K2008014-008DMS		71	82	112
Lab Control Sample	KWG2004723-5		78	83	131 *
Method Blank	KWG2004723-7		66	43	161 *
CAS Acceptance Limits:			32-102	20-140	44-127

Approved By: _____ Date: NOV 30 2000

SUR3/111397p
08014SVM.AY1 - SUR 11/30/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Barr Engineering Co.
Project: 23/27-110Y2K461
LCS Matrix: Soil

Service Request: K2008014
Date Collected: NA
Date Received: NA
Date Extracted: 10/18/00
Date Analyzed: 11/24/00

Laboratory Control Sample Summary
Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: Lab Control Sample
Lab Code: KWG2004723-5
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Acenaphthene	EPA 3550B	SIM	240	180	75	29-109	
Pyrene	EPA 3550B	SIM	240	190	79	39-149	
Pentachlorophenol	EPA 3550B	SIM	240	170	71	10-120	

Approved By: _____ Date: NOV 30 2000

Fed Ex

Columbia Analytical Services Inc.
Cooler Receipt And Preservation Form

Project/Client Barr Work Order K20 0804

Cooler received on 10.11.00 and opened on 10.11.00 by LS

1. Were custody seals on outside of cooler? (YES) NO
   If yes, how many and where? 1 Front
2. Were seals intact and signature & date correct? (YES) NO
3. COC # ___ ___ ___ ___ ___
   Temperature of cooler(s) upon receipt: N/A ___ ___ ___ ___
   Temperature Blank: N/A ___ ___ ___ ___
4. Were custody papers properly filled out (ink, signed, etc.)? (YES) NO
5. Type of packing material present card board box, bubble wrap
6. Did all bottles arrive in good condition (unbroken)? (YES) NO
7. Were all bottle labels complete (*i.e.* analysis, preservation, etc.)? YES (NO)
8. Did all bottle labels and tags agree with custody papers? YES (NO)
9. *Were the correct types of bottles used for the tests indicated?* YES NO
10. Were all of the preserved bottles received at the lab with the appropriate pH? ~~YES NO~~
11. Were VOA vials checked for absence of air bubbles, and if present, noted below? ~~YES NO~~
12. Did the bottles originate from CAS/K or a branch laboratory? (YES) NO

Explain any discrepancies Rec'd sample for WA-7M NO ID on label written on lid

Samples that required preservation or received out of temperature:

Sample ID	Reagent	Volume	Lot Number	Bottle Type	Rec'd out of Temperature	Initials
All samples				40z.	X	LS

00027

CRFREV.DOC8/7/00

Columbia Analytical Services INC.
An Employee-Owned Company

November 13, 2000

Service Request No: K2008016

Marti Harding-Smith
Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Re: 23/27-110Y2K461

Dear Marti:

Enclosed are the results of the sample(s) submitted to our laboratory on October 11, 2000. For your reference, these analyses have been assigned our service request number K2008016.

Please note that the analysis for Dioxins was performed at Alta Analytical.

Please call if you have any questions. My extension is 3358.

Respectfully submitted,

Columbia Analytical Services, Inc.

Lynda A. Huckestein
Client Services Manager

LAH/cb

1317 South 13th Avenue • P.O. Box 479 • Kelso, Washington 98626 • Telephone 360/577-7222 • Fax 360/636-1068

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
B	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
E	The reported value is estimated because of the presence of matrix interference.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.
*	The duplicate analysis not within control limits. See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a chromatographic interference.
X	See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALTA

Section I: Sample Inventory Report

Date Received: 10/13/00

Alta Lab. ID	Client Sample ID
9240-001	WA-3
9240-002	WA-6N
9240-003	WA-6MID
9240-004	WA-6S
9240-005	WA-7M
9240-006	WA-8
9240-007	Blind Dupe

ALTA

PCDD & PCDF
EPA METHOD 8290

Method Blank		Date Extracted:	10/21/00	Lab ID:	MB001
Matrix:	Solid	Sample Amount:	10 g	QC Set:	1.045
TEQ (Min-Max):	0.140 - 0.586			Units:	pg/g

Compound	Conc.	DL [b]	EMPC[c]	MDL [d]	Qualifier
2,3,7,8-TCDD	ND	0.140		0.0889	
1,2,3,7,8-PeCDD	ND	0.156		0.262	
1,2,3,4,7,8-HxCDD	ND	0.344		0.820	
1,2,3,6,7,8-HxCDD	ND	0.346		0.818	
1,2,3,7,8,9-HxCDD	ND	0.322		0.528	
1,2,3,4,6,7,8-HpCDD	5.86			0.347	
OCDD	63.8			2.03	
2,3,7,8-TCDF	ND	0.175		0.0940	
1,2,3,7,8-PeCDF	ND	0.124		0.294	
2,3,4,7,8-PeCDF	ND	0.127		0.245	
1,2,3,4,7,8-HxCDF	ND	0.0737		0.270	
1,2,3,6,7,8-HxCDF	ND	0.0679		0.201	
2,3,4,6,7,8-HxCDF	ND	0.0875		0.273	
1,2,3,7,8,9-HxCDF	ND	0.119		0.297	
1,2,3,4,6,7,8-HpCDF	1.06			0.232	A
1,2,3,4,7,8,9-HpCDF	ND	0.556		0.295	
OCDF	6.51			0.512	A
Total TCDD	ND	0.140			
Total PeCDD	ND	0.156			
Total HxCDD	1.85		1.85		
Total HpCDD	17.0		17.0		
Total TCDF	ND	0.175			
Total PeCDF	ND	0.126			
Total HxCDF	ND		0.406		
Total HpCDF	4.18		4.18		

00007

ALTA

PCDD & PCDF
EPA METHOD 8290

OPR RESULTS
Lab ID: OPR001
Matrix: Solid

Date Received: NA
Date Extracted: 10/21/00
Sample Amount: 10 g

QC Set: 1,045
Units: ng/mL

Compound	Spike Conc.	Conc. Found	OPR Limits
2,3,7,8-TCDD	10.0	8.25	7 - 13
1,2,3,7,8-PeCDD	50.0	46.6	35 - 65
1,2,3,4,7,8-HxCDD	50.0	44.4	35 - 65
1,2,3,6,7,8-HxCDD	50.0	50.3	35 - 65
1,2,3,7,8,9-HxCDD	50.0	46.7	35 - 65
1,2,3,4,6,7,8-HpCDD	50.0	45.4	35 - 65
OCDD	100	116	70 - 130
2,3,7,8-TCDF	10.0	9.40	7 - 13
1,2,3,7,8-PeCDF	50.0	47.6	35 - 65
2,3,4,7,8-PeCDF	50.0	47.6	35 - 65
1,2,3,4,7,8-HxCDF	50.0	48.4	35 - 65
1,2,3,6,7,8-HxCDF	50.0	47.9	35 - 65
2,3,4,6,7,8-HxCDF	50.0	48.9	35 - 65
1,2,3,7,8,9-HxCDF	50.0	49.7	35 - 65
1,2,3,4,6,7,8-HpCDF	50.0	50.8	35 - 65
1,2,3,4,7,8,9-HpCDF	50.0	50.8	35 - 65
OCDF	100	99.6	70 - 130

ALTA

PCDD & PCDF
EPA METHOD 8290

Sample ID:	WA-6N			**Lab ID:**	9240-002
Project:	K2008016			**QC Set:**	1,045
Matrix:	Soil	**Date Received:**	10/13/00	**%Solids:**	78.1
Sample Amount:	13.04 g	**Date Extracted:**	10/21/00	**Units:**	pg/g
[a] **TEQ (Min-Max):**	590 - 590				

Compound	Conc.	DL [b]	EMPC [c]	MDL [d]	Qualifier
2,3,7,8-TCDD	7.18			0.0889	
1,2,3,7,8-PeCDD	61.6			0.262	
1,2,3,4,7,8-HxCDD	233			0.820	
1,2,3,6,7,8-HxCDD	627			0.818	
1,2,3,7,8,9-HxCDD	328			0.528	
1,2,3,4,6,7,8-HpCDD	16400			0.347	B
OCDD	117000			2.03	*,B
2,3,7,8-TCDF	4.75			0.0940	
1,2,3,7,8-PeCDF	28.8			0.294	
2,3,4,7,8-PeCDF	60.8			0.245	
1,2,3,4,7,8-HxCDF	239			0.270	
1,2,3,6,7,8-HxCDF	101			0.201	
2,3,4,6,7,8-HxCDF	123			0.273	
1,2,3,7,8,9-HxCDF	110			0.297	
1,2,3,4,6,7,8-HpCDF	4230			0.232	B
1,2,3,4,7,8,9-HpCDF	286			0.295	
OCDF	17700			0.512	B
Total TCDD	210				
Total PeCDD	1010				
Total HxCDD	8490				B
Total HpCDD	47100				B
Total TCDF	89.4				D
Total PeCDF	672				D
Total HxCDF	5550				D
Total HpCDF	19400				B,D

00011

ALTA

PCDD & PCDF
EPA METHOD 8290

Sample ID:	WA-7M			**Lab ID:**	9240-005
Project:	K2008016			**QC Set:**	1,045
Matrix:	Soil	**Date Received:**	10/13/00	**%Solids:**	11.2
Sample Amount:	90.34 g	**Date Extracted:**	10/21/00	**Units:**	pg/g
[a] **TEQ (Min-Max):**	5290 - 5290				

Compound	Conc.	DL [b]	EMPC [c]	MDL [d]	Qualifier
2,3,7,8-TCDD	21.2			0.0889	
1,2,3,7,8-PeCDD	240			0.262	
1,2,3,4,7,8-HxCDD	902			0.820	
1,2,3,6,7,8-HxCDD	4480			0.818	
1,2,3,7,8,9-HxCDD	2100			0.528	
1,2,3,4,6,7,8-HpCDD	127000			0.347	*,B
OCDD	1530000			2.03	*,B
2,3,7,8-TCDF	80.5			0.0940	
1,2,3,7,8-PeCDF	360			0.294	
2,3,4,7,8-PeCDF	752			0.245	
1,2,3,4,7,8-HxCDF	2590			0.270	
1,2,3,6,7,8-HxCDF	1050			0.201	
2,3,4,6,7,8-HxCDF	1350			0.273	
1,2,3,7,8,9-HxCDF	1090			0.297	
1,2,3,4,6,7,8-HpCDF	34400			0.232	*,B
1,2,3,4,7,8,9-HpCDF	2390			0.295	*
OCDF	227000			0.512	*,B
Total TCDD	559				
Total PeCDD	2560				
Total HxCDD	25400				B
Total HpCDD	239000				*
Total TCDF	1020				D
Total PeCDF	7910				D
Total HxCDF	47600				D,B
Total HpCDF	161000				*,B,D

ALTA

PCDD & PCDF
EPA METHOD 8290

Sample ID:	WA-8			**Lab ID:**	9240-006
Project:	K2008016			**QC Set:**	1,045
Matrix:	Soil	**Date Received:**	10/13/00	**%Solids:**	89.0
Sample Amount:	11.37 g	**Date Extracted:**	10/21/00	**Units:**	pg/g
[a] **TEQ (Min-Max):**	562 - 562				

Compound	Conc.	DL [b]	EMPC [c]	MDL [d]	Qualifier
2,3,7,8-TCDD	1.41			0.0889	
1,2,3,7,8-PeCDD	15.3			0.262	
1,2,3,4,7,8-HxCDD	381			0.820	
1,2,3,6,7,8-HxCDD	495			0.818	
1,2,3,7,8,9-HxCDD	81.8			0.528	
1,2,3,4,6,7,8-HpCDD	10100			0.347	B
OCDD	120000			2.03	*,B
2,3,7,8-TCDF	9.91			0.0940	
1,2,3,7,8-PeCDF	63.2			0.294	
2,3,4,7,8-PeCDF	123			0.245	
1,2,3,4,7,8-HxCDF	458			0.270	
1,2,3,6,7,8-HxCDF	149			0.201	
2,3,4,6,7,8-HxCDF	1410			0.273	
1,2,3,7,8,9-HxCDF	302			0.297	
1,2,3,4,6,7,8-HpCDF	4250			0.232	B
1,2,3,4,7,8,9-HpCDF	437			0.295	
OCDF	12200			0.512	B
Total TCDD	36.1				
Total PeCDD	177				
Total HxCDD	2760				
Total HpCDD	26400				
Total TCDF	56.3				
Total PeCDF	790				D
Total HxCDF	9000				B,D
Total HpCDF	17700				B,D

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ALTA

PCDD & PCDF
EPA METHOD 8290

Sample ID:	WA-3			**Lab ID:**	9240-001
Project:	K2008016			**QC Set:**	1,045
Matrix:	Soil	**Date Received:**	10/13/00	**%Solids:**	88.5
Sample Amount:	11.34 g	**Date Extracted:**	10/21/00	**Units:**	pg/g

[a] **TEQ (Min-Max):** 6840 - 6840

Compound	Conc.	DL [b]	EMPC [c]	MDL [d]	Qualifier
2,3,7,8-TCDD	9.61			0.0889	
1,2,3,7,8-PeCDD	256			0.262	
1,2,3,4,7,8-HxCDD	561			0.820	
1,2,3,6,7,8-HxCDD	10500			0.818	
1,2,3,7,8,9-HxCDD	1920			0.528	
1,2,3,4,6,7,8-HpCDD	251000			0.347	*,B
OCDD	465000			2.03	*,B
2,3,7,8-TCDF	8.31			0.0940	
1,2,3,7,8-PeCDF	59.2			0.294	
2,3,4,7,8-PeCDF	145			0.245	
1,2,3,4,7,8-HxCDF	3050			0.270	
1,2,3,6,7,8-HxCDF	1770			0.201	
2,3,4,6,7,8-HxCDF	1440			0.273	
1,2,3,7,8,9-HxCDF	286			0.297	
1,2,3,4,6,7,8-HpCDF	101000			0.232	*,B
1,2,3,4,7,8,9-HpCDF	7300			0.295	*
OCDF	618000			0.512	*,B
Total TCDD	92.7		92.9		
Total PeCDD	881				
Total HxCDD	28200				B
Total HpCDD	361000				*
Total TCDF	394				D
Total PeCDF	5730				D
Total HxCDF	131000				*
Total HpCDF	599000				*

00017

ALTA

PCDD & PCDF
EPA METHOD 8290

Method Blank		**Date Extracted:**	11/1/00	**Lab ID:**	MB001
Matrix:	Solid	**Sample Amount:**	2 g	**QC Set:**	1,079
TEQ (Min-Max):	0.0791 - 17.1			**Units:**	pg/g

Compound	Conc.	DL [b]	EMPC[c]	MDL [d]	Qualifier
2,3,7,8-TCDD	ND	3.73		0.0889	
1,2,3,7,8-PeCDD	ND	6.06		0.262	
1,2,3,4,7,8-HxCDD	ND	13.1		0.820	
1,2,3,6,7,8-HxCDD	ND	14.4		0.818	
1,2,3,7,8,9-HxCDD	ND	12.9		0.528	
1,2,3,4,6,7,8-HpCDD	ND	14.8		0.347	
OCDD	79.1			2.03	A
2,3,7,8-TCDF	ND	6.41		0.0940	
1,2,3,7,8-PeCDF	ND	6.83		0.294	
2,3,4,7,8-PeCDF	ND	6.54		0.245	
1,2,3,4,7,8-HxCDF	ND	3.74		0.270	
1,2,3,6,7,8-HxCDF	ND	3.19		0.201	
2,3,4,6,7,8-HxCDF	ND	3.96		0.273	
1,2,3,7,8,9-HxCDF	ND	5.41		0.297	
1,2,3,4,6,7,8-HpCDF	ND	6.64		0.232	
1,2,3,4,7,8,9-HpCDF	ND	8.84		0.295	
OCDF	ND	31.5		0.512	
Total TCDD	ND	3.73			
Total PeCDD	ND	6.06			
Total HxCDD	ND	13.5			
Total HpCDD	ND	14.8			
Total TCDF	ND	6.41			
Total PeCDF	ND	6.68			
Total HxCDF	ND	3.97			
Total HpCDF	ND	7.67			

ALTA

PCDD & PCDF
EPA METHOD 8290

OPR RESULTS
Lab ID: OPR001
Matrix: Solid

Date Received: NA
Date Extracted: 11/1/00
Sample Amount: 2 g

QC Set: 1,079
Units: ng/mL

Compound	Spike Conc.	Conc. Found	OPR Limits
2,3,7,8-TCDD	10.0	8.69	7 - 13
1,2,3,7,8-PeCDD	50.0	48.7	35 - 65
1,2,3,4,7,8-HxCDD	50.0	47.6	35 - 65
1,2,3,6,7,8-HxCDD	50.0	49.3	35 - 65
1,2,3,7,8,9-HxCDD	50.0	48.7	35 - 65
1,2,3,4,6,7,8-HpCDD	50.0	41.9	35 - 65
OCDD	100	94.4	70 - 130
2,3,7,8-TCDF	10.0	9.41	7 - 13
1,2,3,7,8-PeCDF	50.0	45.2	35 - 65
2,3,4,7,8-PeCDF	50.0	45.3	35 - 65
1,2,3,4,7,8-HxCDF	50.0	47.0	35 - 65
1,2,3,6,7,8-HxCDF	50.0	47.4	35 - 65
2,3,4,6,7,8-HxCDF	50.0	44.8	35 - 65
1,2,3,7,8,9-HxCDF	50.0	49.7	35 - 65
1,2,3,4,6,7,8-HpCDF	50.0	48.6	35 - 65
1,2,3,4,7,8,9-HpCDF	50.0	50.5	35 - 65
OCDF	100	95.0	70 - 130

ALTA

PCDD & PCDF
EPA METHOD 8290

Sample ID:	WA-6MID			**Lab ID:**	9240-003
Project:	K2008016			**QC Set:**	1,079
Matrix:	Soil	**Date Received:**	10/13/00	**%Solids:**	33.3
Sample Amount:	5.9 g	**Date Extracted:**	11/1/00	**Units:**	pg/g
[a] **TEQ (Min-Max):**	58800 - 58800				

Compound	Conc.	DL [b]	EMPC [c]	MDL [d]	Qualifier
2,3,7,8-TCDD	1330			0.0889	
1,2,3,7,8-PeCDD	14100			0.262	
1,2,3,4,7,8-HxCDD	79600			0.820	
1,2,3,6,7,8-HxCDD	105000			0.818	
1,2,3,7,8,9-HxCDD	60400			0.528	
1,2,3,4,6,7,8-HpCDD	430000			0.347	*
OCDD	2030000			2.03	*,B
2,3,7,8-TCDF	1120			0.0940	
1,2,3,7,8-PeCDF	6600			0.294	
2,3,4,7,8-PeCDF	12500			0.245	
1,2,3,4,7,8-HxCDF	54300			0.270	
1,2,3,6,7,8-HxCDF	14200			0.201	D
2,3,4,6,7,8-HxCDF	17700			0.273	
1,2,3,7,8,9-HxCDF	21000			0.297	
1,2,3,4,6,7,8-HpCDF	151000			0.232	*
1,2,3,4,7,8,9-HpCDF	12700			0.295	*
OCDF	504000			0.512	*
Total TCDD	35000				
Total PeCDD	211000				
Total HxCDD	1630000				
Total HpCDD	1160000				*
Total TCDF	9880				D
Total PeCDF	92800				D
Total HxCDF	917000				D
Total HpCDF	786000				*

0023

ALTA

PCDD & PCDF
EPA METHOD 8290

Sample ID:	WA-6S			**Lab ID:**	9240-004
Project:	K2008016			**QC Set:**	1,079
Matrix:	Soil	**Date Received:**	10/13/00	**%Solids:**	27.9
Sample Amount:	7.35 g	**Date Extracted:**	11/1/00	**Units:**	pg/g

[a] **TEQ (Min-Max):** 59300 - 59300

Compound	Conc.	DL [b]	EMPC [c]	MDL [d]	Qualifier
2,3,7,8-TCDD	466			0.0889	
1,2,3,7,8-PeCDD	5760			0.262	
1,2,3,4,7,8-HxCDD	29700			0.820	
1,2,3,6,7,8-HxCDD	112000			0.818	
1,2,3,7,8,9-HxCDD	31900			0.528	
1,2,3,4,6,7,8-HpCDD	1870000			0.347	
OCDD	1800000			2.03	*,B
2,3,7,8-TCDF	114			0.0940	
1,2,3,7,8-PeCDF	722			0.294	
2,3,4,7,8-PeCDF	1840			0.245	
1,2,3,4,7,8-HxCDF	30400			0.270	
1,2,3,6,7,8-HxCDF	12600			0.201	D
2,3,4,6,7,8-HxCDF	13500			0.273	
1,2,3,7,8,9-HxCDF	3730			0.297	
1,2,3,4,6,7,8-HpCDF	958000			0.232	
1,2,3,4,7,8,9-HpCDF	63500			0.295	
OCDF	920000			0.512	*
Total TCDD	11800				
Total PeCDD	63100				
Total HxCDD	569000				
Total HpCDD	3020000				
Total TCDF	6690				D
Total PeCDF	61900				D
Total HxCDF	975000				D
Total HpCDF	6000000				D

ALTA

PCDD & PCDF
EPA METHOD 8290

Method Blank **Date Extracted:** 11/1/00 **Lab ID:** MB001

Matrix: Solid **Sample Amount:** 10 g **QC Set:** 1,080

TEQ (Min-Max): 0.00265 - 0.559 **Units:** pg/g

Compound	Conc.	DL [b]	EMPC[c]	MDL [d]	Qualifier
2,3,7,8-TCDD	ND	0.120		0.0889	
1,2,3,7,8-PeCDD	ND	0.195		0.262	
1,2,3,4,7,8-HxCDD	ND	0.375		0.820	
1,2,3,6,7,8-HxCDD	ND	0.401		0.818	
1,2,3,7,8,9-HxCDD	ND	0.364		0.528	
1,2,3,4,6,7,8-HpCDD	ND	0.511		0.347	
OCDD	2.65			2.03	A
2,3,7,8-TCDF	ND	0.336		0.0940	
1,2,3,7,8-PeCDF	ND	0.197		0.294	
2,3,4,7,8-PeCDF	ND	0.196		0.245	
1,2,3,4,7,8-HxCDF	ND	0.171		0.270	
1,2,3,6,7,8-HxCDF	ND	0.135		0.201	
2,3,4,6,7,8-HxCDF	ND	0.188		0.273	
1,2,3,7,8,9-HxCDF	ND	0.227		0.297	
1,2,3,4,6,7,8-HpCDF	ND	0.216		0.232	
1,2,3,4,7,8,9-HpCDF	ND	0.303		0.295	
OCDF	ND	1.25		0.512	
Total TCDD	ND	0.120			
Total PeCDD	ND	0.195			
Total HxCDD	ND	0.379			
Total HpCDD	ND	0.511			
Total TCDF	ND	0.336			
Total PeCDF	ND	0.197			
Total HxCDF	ND	0.176			
Total HpCDF	ND	0.256			

0027

ALTA

PCDD & PCDF
EPA METHOD 8290

OPR RESULTS
Lab ID: OPR001
Matrix: Solid

Date Received: NA
Date Extracted: 11/1/00
Sample Amount: 10 g

QC Set: 1,080
Units: ng/mL

Compound	Spike Conc.	Conc. Found	OPR Limits
2,3,7,8-TCDD	10.0	9.08	7 - 13
1,2,3,7,8-PeCDD	50.0	48.5	35 - 65
1,2,3,4,7,8-HxCDD	50.0	51.7	35 - 65
1,2,3,6,7,8-HxCDD	50.0	49.6	35 - 65
1,2,3,7,8,9-HxCDD	50.0	50.3	35 - 65
1,2,3,4,6,7,8-HpCDD	50.0	45.2	35 - 65
OCDD	100	93.6	70 - 130
2,3,7,8-TCDF	10.0	9.76	7 - 13
1,2,3,7,8-PeCDF	50.0	46.0	35 - 65
2,3,4,7,8-PeCDF	50.0	46.4	35 - 65
1,2,3,4,7,8-HxCDF	50.0	47.8	35 - 65
1,2,3,6,7,8-HxCDF	50.0	47.4	35 - 65
2,3,4,6,7,8-HxCDF	50.0	47.6	35 - 65
1,2,3,7,8,9-HxCDF	50.0	53.1	35 - 65
1,2,3,4,6,7,8-HpCDF	50.0	49.7	35 - 65
1,2,3,4,7,8,9-HpCDF	50.0	50.2	35 - 65
OCDF	100	99.9	70 - 130

ALTA

PCDD & PCDF
EPA METHOD 8290

Sample ID:	Blind Dupe			**Lab ID:**	9240-007
Project:	K2008016			**QC Set:**	1,080
Matrix:	Soil	**Date Received:**	10/13/00	**%Solids:**	90.7
Sample Amount:	5.62 g	**Date Extracted:**	11/1/00	**Units:**	pg/g

Compound	Conc.	DL [b]	EMPC [c]	MDL [d]	Qualifier
2,3,7,8-TCDD	2.76			0.0889	
1,2,3,7,8-PeCDD	22.1			0.262	
1,2,3,4,7,8-HxCDD	72.1			0.820	
1,2,3,6,7,8-HxCDD	82.5			0.818	
1,2,3,7,8,9-HxCDD	98.5			0.528	
1,2,3,4,6,7,8-HpCDD	10400			0.347	
OCDD	102000			2.03	
2,3,7,8-TCDF	13.3			0.0940	
1,2,3,7,8-PeCDF	70.5			0.294	
2,3,4,7,8-PeCDF	138			0.245	
1,2,3,4,7,8-HxCDF	554			0.270	
1,2,3,6,7,8-HxCDF	186			0.201	D
2,3,4,6,7,8-HxCDF	206			0.273	
1,2,3,7,8,9-HxCDF	197			0.297	
1,2,3,4,6,7,8-HpCDF	4740			0.232	
1,2,3,4,7,8,9-HpCDF	460			0.295	
OCDF	12800			0.512	
Total TCDD	32.5		42.5		
Total PeCDD	194				
Total HxCDD	2610				
Total HpCDD	24100				
Total TCDF	82.1				D
Total PeCDF	1060				D
Total HxCDF	8000				D
Total HpCDF	19800				D

00031

APPENDIX

CURRENT CERTIFICATIONS

ALTA

Bureau of Reclamation-Mid-Pacific Region---(MP-470, Res-1.10)

Commonwealth of Kentucky---(Certificate No. 90063)

Commonwealth of Virginia---(Certificate No. 00013)

State of Alaska, Department of Environmental Conservation---(Certificate No. OS-00197)

State of Arkansas, Department of Health---(Approval granted through CA certification)

State of Arkansas, Department of Environmental Quality---

State of California---(Certificate No. 1640)

State of Connecticut---(Certificate No. PH-0182)

State of Florida---(Certificate No. 87456)

State of Louisiana---(Certificate No. 98-33)

State of Mississippi---(Approval granted through CA certification)

State of Nevada---(Certificate No. CA413)

State of New York, Department of Health---(Certificate No. 11411)

State of North Carolina---(Certificate No. 06700)

State of North Dakota, Department of Health---(Certificate No. R-078)

State of Oregon---

State of Pennsylvania---(Certificate No. 68-490)

State of South Carolina---(Certificate No. 87002001)

State of Texas — (Certificate No. TX247-2000A)

State of Tennessee---(Certificate No. 02996)

State of Utah---(Certificate No. E-201)

State of Washington, Department of Ecology---(Certification No. C091)

State of Wisconsin---(Certificate No. 998036160)

State of Wyoming---(Ref: 8ES-LB)

U.S. Army Corps of Engineers

U.S. 5 EPA Region

May 2000

Table 3

Summary of Sampling and Analysis

West Area

Area Designation	Subsample Designation	Analysis	Comments
WA-1	1WA-1 2WA-1 3WA-1 4WA-1 5WA-1	TOC, pH	Sample subsample location as 1999 Release Sampling
WA-2	1WA-2 2WA-2 3WA-2 4WA-2 5WA-2	TOC, pH	Sample subsample location as 1999 Release Sampling
WA-3	1WA-3 2WA-3 3WA-3 4WA-4 5WA-3 6WA-3 7WA-3	PCP, PAHs, Dioxin/Furan, TOC, pH	Sample subsample location as 1999 Release Sampling plus two locations corresponding to previous point samples.
WA-6			
WA-6N	1WA-6N 2WA-6N 3WA-6N 4WA-6N 5WA-6N	PCP, PAHs, Dioxin/Furan, TOC, pH	
WA-6Mid	1WA-6Mid 2WA-6Mid 3WA-6Mid 4WA-6Mid 5WA-6Mid 6WA-6Mid	PCP, PAHs, Dioxin/Furan, TOC, pH	
WA-6S	1WA-6S 2WA-6S 3WA-6S 4WA-6S	PCP, PAHs, Dioxin/Furan, TOC, pH	
WA-7			
WA-7	1WA-7 2WA-7 3WA-7 4WA-7 5WA-7	PCP, PAHs, Dioxin/ Furan, TOC, pH	Sample to be split and analyzed be water leach and standard analysis. Surface water sample will be collected from open water in this area.
WA7-M	1WA7-M 2WA7-M 3WA7-M 4WA7-M	PCP, PAHs, Dioxin/Furan, TOC, pH	Sample to be split and analyzed be ~~water leach~~ and standard analysis. ↳ no, DWF 10/10/00

Columbia Analytical Services INC.
An Employee-Owned Company

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222 • FAX (360) 636-1068

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

DATE 10/ /00 PAGE 1 OF 1

PROJECT NAME #

PROJECT MANAGER Lynda Huckestein

COMPANY/ADDRESS

PHONE

SAMPLERS SIGNATURE

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX	NUMBER OF CONTAINERS	Dioxins 8290	REMARKS
WA-3	10/6			S			
WA-6N							
WA-6MS							
WA-6S							
WA-7M							
WA-8							
Blind Dup	↓			↓			

ANALYSIS REQUESTED

RELINQUISHED BY:
Signature
Printed Name
Firm
Date/Time 10/12/00 300

RECEIVED BY:
Signature
Printed Name ALTA
Firm
Date/Time 10/13/00 1100

TURNAROUND REQUIREMENTS
___ 24 hr ___ 48 hr. ___ 5 day
~~Standard~~ (10-15 working days)
___ Provide Verbal Preliminary Results
___ Provide FAX preliminary Results
Requested Report Date

REPORT REQUIREMENTS
___ I. Routine Report
~~II. Report~~ (includes DUP.MS. MSD, as required, may be charged as samples)
___ III. Data Validation Report (includes All Raw Data)
___ IV. CLP Deliverable Report

INVOICE INFORMATION:
P.O.# K2008016
Bill To

SAMPLE RECEIPT:
Shipping VIA:
Shipping #:
Condition:
Lab No: K2008016

RELINQUISHED BY:
Signature
Printed Name
Firm
Date/Time

RECEIVED BY:
Signature
Printed Name
Firm
Date/Time

SPECIAL INSTRUCTIONS/COMMENTS:
See attached for target compound list and detection limit requirements.

Sent to ALTA

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator

400-05

1200 8016

Chain of Custody

BARR
4700 West 77th Street
Minneapolis, MN 55435-4803
(612) 832-2600

Project Number: 23/27-110 Y2K 461

№ 13180

Project Manager: Dale Finnesgaard

Project Contract: Ward Swanson 00 4

Laboratory: CAS

Remarks/ Analysis Required:

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix: Other	Type: Grab	Type: Comp.	Type: QC	Volatile Organic (Unpres.)	Volatile Organic (Pres.)	Semivolatile Organic - PCP, PAH	Total Metals (HNO_3)	Dissolved Metals (HNO_3)	General (Unpreserved)	Cyanide (NaOH, Asc. Acid)	Nutrients (H_2SO_4)	Oil and Grease (H_2SO_4)	TOC (H_2SO_4), pH	Sulfide (Zn Acetate)	Dioxin	Whirlpak/Bacteria	Total Phenol (H_2SO_4)		(HCL)/DRO, 1L Glass	Lugols, Amber glass	Formalin, Glass				Total No. Of Containers	
1. WA-1	10/6/00			X			X											2		1										2	TOC, pH
2. WA-2	10/6/00			X			X											2												2	TOC, pH
1 3. WA-3	10/6/00			X			X				1									1										2	TOC, pH, PCP, PAHs Dioxin/Furan
2 4. WA-6N	10/6/00			X			X				1									1										2	TOC, pH, PCP, PAHs Dioxin/Furan
3 5. WA-6Mid	10/6/00			X			X				1									1										2	TOC, pH, PCP, PAHs Dioxin/Furan
4 6. WA-6S	10/6/00			X			X				1									1										2	TOC, pH, PCP, PAHs Dioxin/Furan
5 7. WA-7M	10/6/00			X			X				2									2										4	TOC, pH, PCP, PAHs Dioxin/Furan
6 8. WA-8	10/6/00			X			X				1									1										2	TOC, pH, PCP, PAHs Dioxin/Furan
7 9. Blind Dup.	10/6/00			X			X				1									1										2	TOC, pH, PCP, PAHs Dioxin/Furan
10.																															
11.																															
12.																															
13.																															
14.																															
15.																															
16.																															

Number of Containers/Preservative

Sampled By: Dale W. Finnesgaard

Remarks:

Relinquished By	Date	Time	Received by:	Date	Time
Dale W. Finnesgaard	10/10/00	11:00			
Relinquished By:	Date	Time	Received by:	Date	Time
Samples Shipped VIA ☐Air Freight ☐Fed. Exp. ☐Sampler ☐Other			Air Bill Number:		

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy; Pink - Lab Coordinator

Appendix C

RPD Calculations

Table C-2
RPDs for Laboratory Split Samples
West Area Investigation

	WA-6MID 10/6/00 Sample #2	WA-6MID 10/6/00 Sample #3	RPD	WA-6S 10/6/00 Sample #1	WA-6S 10/6/00 Sample #2	RPD
List 1 PAHs, mg/kg						
Benzo(a)anthracene	--	--		0.17	--	
Chrysene	--	--		0.48	--	
Benzo(b)fluoranthene	--	--		0.94	--	
Benzo(k)fluoranthene	--	--		0.43	--	
Benzo(a)pyrene	--	--		0.56	--	
Indeno(1,2,3-cd)pyrene	--	--		0.71	--	
Dibenz(a,h)anthracene	--	--		0.16	--	
B(a)P Equivalent	--	--		0.84	--	
List 2 PAHs, mg/kg						
Acenaphthene	--	--		<0.05	--	
Anthracene	--	--		0.38	--	
Fluoranthene	--	--		0.29	--	
Fluorene	--	--		<0.05	--	
Naphthalene	--	--		0.061	--	
Pyrene	--	--		0.49	--	
Pentachlorophenol, mg/kg	--	--		120	--	
Dioxins, ug/kg						
2,3,7,8-TCDD	1.1	2.0	58.1	0.466	0.262	56.0
1,2,3,7,8-PeCDD	20	29	36.7	5.76	5.88	2.1
1,2,3,4,7,8-HxCDD	144	180	22.2	29.7	22.9	25.9
1,2,3,6,7,8-HxCDD	168	210	22.2	112	95.3	16.1
1,2,3,7,8,9-HxCDD	96.9	140	36.4	31.9	35.9	11.8
1,2,3,4,6,7,8-HpCDD	6540	4400	39.1	1870	2930	44.2
OCDD	52000	7000	152.5	1800	23500	171.5
Furans, ug/kg						
2,3,7,8-TCDF	1.34	1.3	3.0	0.114	0.124	8.4
1,2,3,7,8-PeCDF	8.6	10	15.1	0.722	0.893	21.2
2,3,4,7,8-PeCDF	16.8	8.6	64.6	1.84	2.29	21.8
1,2,3,4,7,8-HxCDF	62.5	79	23.3	30.4	30.9	1.6
1,2,3,6,7,8-HxCDF	17.5	22	22.8	12.6	8.49	39.0
2,3,4,6,7,8-HxCDF	34.9	12	97.7	13.5	13.9	2.9
1,2,3,7,8,9-HxCDF	23.6	3.6	147.1	3.73	3.27	13.1
1,2,3,4,6,7,8-HpCDF	1210	1100	9.5	958	1240	25.7
1,2,3,4,7,8,9-HpCDF	79.7	91	13.2	63.5	65.5	3.1
OCDF	4840	3400	35.0	920	7900	158.3
TCDD Equivalent:	168.785	160.78	4.9	59.7635	73.90505	21.2
Organic Carbon, Total, %	26	--		21.4	21.7	1.4
pH, standard units	--	--		6.01	--	