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December 2, 2009

Mr. Steve Schoff
Minnesota Pollution Control Agency
Metro District Office
Site Remediation Section
520 Lafayette Road North
St. Paul, MN 55155-4194

Re: Southern Lot Soil Quality – Joslyn Manufacturing Site

Dear Mr. Schoff:

On behalf of Joslyn Manufacturing Company, this submittal presents information related to the background and current status of soil quality issues associated with two parcels of land located immediately south of that portion of the Joslyn Manufacturing & Supply Co. site known as the West Area in Brooklyn Center, Minnesota. The parcels are owned by Joslyn and are collectively known as the Southern Lots. As discussed in greater detail in the following paragraphs, soil quality in an area adjacent to the two parcels was investigated in 2003 and 2004. The parcels were first sampled in 2005. A second soil quality investigation was conducted on both parcels in 2009.

2003 West Area Remedial Investigation

As part of the 2003 remedial investigation of the West Area, soil samples were collected from four locations along a transect established just north of the property boundary between the West Area and what is now known as the north parcel of the Southern Lots. These samples were designated A-1 through A-4. Location A-1 fell within the WA-3 subarea of the West Area, locations A-2 and A-3 fell within the WA-6S subarea, and location A-4 fell within the WA-4 subarea (see Attachment A, "Figure 2 – Actual Sampling Locations" excerpted from the January 2005 data submittal related to the utility soil characterization). At all four locations, a soil sample was collected from the upper 6 inches of soil. At location A-3, additional soil samples were collected from three deeper intervals (0.5 – 1.5 ft bgs, 1.5 – 2.5 ft bgs, and 2.5 – 4.0 ft bgs). All soil samples were submitted for dioxin/furan analysis, polynuclear aromatic hydrocarbons (PAHs), pentachlorophenol (PCP), total organic carbon (TOC), and pH.

As shown in Table 1, analytical results indicated that the PAHs/PCP concentrations and pH values for the soil samples collected from all four locations along transect A were not of concern. The dioxin/furan concentrations (expressed as the Tetrachlorodibenzo-p-dioxin Toxicity Equivalent Quotient, or TCDD-TEQ) in samples collected from the 0 to 6-inch interval ranged from 40 ng/kg at A-1 to 229 ng/kg at A-4. At sampling location A-3, the TCDD-TEQ concentration ranged from 227 ng/kg at the ground surface to 106 ng/kg at 2.5 – 4 ft bgs.

2004 City Utility Soil Characterization

In conjunction with a City of Brooklyn Center street improvement project planned for the 4800 block of Twin Lake Avenue North, Joslyn conducted additional soil characterization in the vicinity of the Southern Lots in September 2004. A total of seven composite samples were prepared from soils collected from the 0 to 5 feet bgs interval at thirty-nine discrete boring locations located along Twin Lake Avenue North (see Attachment A, "Figure 2 – Actual Sampling Locations" excerpted from the January 2005 data submittal related to the utility soil characterization). The seven samples were analyzed for dioxin/furans and PCP.

Pentachlorophenol was not detected in any of the seven samples collected in 2004 and the TCDD-TEQ concentrations for all seven samples were reported to be less than 2 ng/kg (Table 2).

2005 Southern Lot Investigation

Because the TCDD-TEQ values observed for the 2003 "transect A" soil samples exceeded the MPCA's proposed Soil Reference Value (SRV) for residential land use scenarios of 20 ng/kg, the decision was made to consider assessing the soil quality on the Southern Lots, if access could be obtained. Joslyn ultimately purchased two parcels immediately south of the West Area that are now known as the "north parcel" and the "south parcel" (collectively, the Southern Lots). A work plan proposing a scope of soil sampling activities for these two parcels was originally submitted to MPCA in August 2004. Joslyn met with MPCA in September 2004 to discuss the proposed scope of work and this discussion led to the submittal of a revised work plan in January 2005. MPCA approved the revised work plan on January 11, 2005.

Initial sampling activities on the Southern Lots were conducted in March 2005. The purpose of the investigation was to determine TCDD-TEQ concentrations in the upper four feet of the areas of north and south parcels located within the 100-year flood plain of Middle Twin Lake. A total of ten four-foot-deep borings were advanced on the two parcels (see Attachment A, "Figure 1 – Residential Sampling Locations" excerpted from the May 2005 Report of Investigation Results – Residential Lots South of the West Area). The results of the 2005 soil investigation were submitted to MPCA in May 2005. As shown in Table 3, the TCDD-TEQ concentrations reported for the surficial soil samples collected from both parcels met the MPCA's residential SRV. Based upon these data, Joslyn proposed that the soil on the Southern Lots be managed through the use of institutional controls rather than remediation. The MPCA's July 2005 response included the conclusion that the upper four feet of soil on the north parcel would require remediation and a request that Joslyn conduct further sampling of the subsurface peat observed on the south parcel.

2009 Soil Investigation

Since 2005, Joslyn has continued planning the West Area remedy. Remediation of the soil on the north parcel has been included in these planning efforts. The need to better define the extent of potential soil excavation on the north parcel and the need to address the MPCA's July 2005 request for peat-specific soil quality data for the south parcel led to the development of a soil sampling work plan for the Southern Lots. The scope of the soil quality investigation on the Southern Lots was

described in a June 29, 2009 work plan letter submitted to you. You approved the proposed scope via e-mail on July 7, 2009.

A series of soil borings were advanced to a depth of four feet below ground surface on the north and south parcels at locations shown on the attached Figure 1. Logs for each boring are included in Attachment B. In accordance with the approved sampling plan, one composite sample was prepared from the soils recovered from the five Tier 1 sampling locations. A second composite sample was prepared from the seven Tier 2 boring locations. A third composite sample was prepared from the four Tier 3 boring locations. At each of the five boring locations advanced on the south parcel, the portion of the soil core determined to consist of organic soil or peat (based upon visual characterization) was segregated from the soil core and used to prepare a fourth composite sample (identified as the Tier 4 sample).

As shown on Table 4, the TCDD-TEQ concentration for the four composite samples ranged from 107 to 636 ng/kg. Analytical laboratory reports are included as Attachment C.

Conclusion

Based upon these data, we conclude that the Focused Feasibility Study currently in preparation for the West Area remedy should include provisions to excavate the area of the north parcel that falls below the 100-year floodplain elevation (853.1 ft msl) to a depth of 4 feet (a total of ~1200 cubic yards of soil) and manage the excavated soils as part of Operable Unit 5. The 2009 data for the Tier 4 composite peat sample reinforce the conclusion first made in 2005 that remedial action will not be required on the south parcel and that the 2009 data can be incorporated into a uniform environmental covenant for both parcels as appropriate.

Please contact me if you have any questions or concerns about this submittal.

Sincerely,

Dale W. Finnesgaard

Dale Finnesgaard, PE
Vice President

Enclosures (4)
DWF/jeh

cc: Carl Grabinski
Jim Payne
Carlos Stern

Tables

Table 1
Soil Quality Data - 2003 West Area Investigation
Joslyn Manufacturing and Supply Company Site
Brooklyn Center, Minnesota

Sys Loc Code	A-1	A-2	A-3 0-0.5'	A-3 0.5-1.5'	A-3 1.5-2.5'		A-3 2.5-4'	A-4
Sample Date	02/04/2003	02/04/2003	02/04/2003	02/04/2003	02/04/2003		02/04/2003	02/04/2003
Depth Interval	0-0.5	0-0.5	0-0.5	0.5-1.5	1.5-2.5	1.5-2.5	2.5-4	0-0.5
Depth Unit	ft	ft	ft	ft	ft	ft	ft	ft
Sample Type Code	N	N	N	N	N	FD	N	N
Chemical Name								
General Parameters								
Carbon, total organic	**0.44%**	**5.08%**	**9.63%**	**3.36%**	**0.51%**	**0.61%**	**0.65%**	**5.38%**
SVOCs								
2-Chloronaphthalene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	< 0.48 mg/kg
2-Methylnaphthalene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	< 0.48 mg/kg
Acenaphthene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	< 0.48 mg/kg
Acenaphthylene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	< 0.48 mg/kg
Anthracene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	< 0.48 mg/kg
Benzo(a)anthracene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	< 0.48 mg/kg
Benzo(a)pyrene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	< 0.48 mg/kg
Benzo(b)fluoranthene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	< 0.48 mg/kg
Benzo(g,h,i)perylene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	< 0.48 mg/kg
Benzo(k)fluoranthene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	< 0.48 mg/kg
Chrysene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	< 0.48 mg/kg
Dibenz(a,h)anthracene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	< 0.48 mg/kg
Fluoranthene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	**0.63 mg/kg**
Fluorene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	< 0.48 mg/kg
Indeno(1,2,3-cd)pyrene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	< 0.48 mg/kg
Naphthalene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	< 0.48 mg/kg
Pentachlorophenol	< 2.2 mg/kg	< 2.6 mg/kg	< 3.7 mg/kg	< 2.8 mg/kg	< 2.4 mg/kg	< 2.0 mg/kg	**18 mg/kg**	< 2.9 mg/kg
Phenanthrene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	< 0.48 mg/kg
Pyrene	< 0.36 mg/kg	< 0.42 mg/kg	< 0.61 mg/kg	< 0.47 mg/kg	< 0.40 mg/kg	< 0.33 mg/kg	< 0.39 mg/kg	**0.57 mg/kg**
Chlorinated Dioxins / Furans								
Dioxin TEQ (by method 4425)	**40 b ng/kg**	**194 ng/kg**	**227 ng/kg**	**189 ng/kg**	**56 * ng/kg**	**15 b* ng/kg**	**106 ng/kg**	**229 ng/kg**

Table 2
Soil Quality Data - 2004 City Utility Investigation
Joslyn Manufacturing and Supply Company Site
Brooklyn Center, Minnesota

Sys Loc Code	SA1-Comp	SA2-Comp	SA3-Comp	SA4-Comp	SA5-Comp	SA6-Comp	SA7-Comp
Sample Date	09/02/2004	09/02/2004	09/02/2004	09/02/2004	09/02/2004	09/02/2004	09/02/2004
Depth Interval	0-5	0-5	0-5	0-5	0-5	0-5	0-5
Depth Unit	ft	ft	ft	ft	ft	ft	ft
Chemical Name							
Herbicides							
Pentachlorophenol	< 0.0061 mg/kg	< 0.0062 mg/kg	<0.0067 h mg/kg	<0.0073 h mg/kg	<0.0050 h mg/kg	<0.0058 h mg/kg	<0.0056 h mg/kg
Chlorinated Dioxins / Furans							
2,3,7,8-Dioxin, tetra	< 1.0 ng/kg	< 1.0 ng/kg	<1.0 h ng/kg	<1.0 h ng/kg	< 1.0 ng/kg	< 1.0 ng/kg	**0.165 jEMPC ng/kg**
1,2,3,7,8-Dioxin penta	< 2.5 ng/kg	< 2.5 ng/kg	**0.280 hj ng/kg**	<2.5 h ng/kg	**0.214 j ng/kg**	**0.179 jEMPC ng/kg**	**0.317 j ng/kg**
1,2,3,4,7,8-Dioxin, hexa	< 2.5 ng/kg	< 2.5 ng/kg	**0.471 hjEMPC ng/kg**	**0.078 hj ng/kg**	**0.455 j ng/kg**	**0.313 jEMPC ng/kg**	**0.347 jEMPC ng/kg**
1,2,3,6,7,8-Dioxin, hexa	< 2.5 ng/kg	< 2.5 ng/kg	**1.277 hj ng/kg**	**0.306 hj ng/kg**	**1.255 j ng/kg**	**0.948 j ng/kg**	**1.206 j ng/kg**
1,2,3,7,8,9-Dioxin, hexa	< 2.5 ng/kg	< 2.5 ng/kg	**1.134 hj ng/kg**	**0.224 hjEMPC ng/kg**	**1.128 j ng/kg**	**1.003 j ng/kg**	**1.227 j ng/kg**
1,2,3,4,6,7,8-Dioxin, hepta	**132.713 ng/kg**	**46.878 ng/kg**	**39.439 h ng/kg**	**7.937 h ng/kg**	**35.232 ng/kg**	**27.327 ng/kg**	**29.941 ng/kg**
Dioxin octa	**1073.116 e ng/kg**	**341.913 ng/kg**	**280.959 h ng/kg**	**49.565 h ng/kg**	**294.493 ng/kg**	**244.150 ng/kg**	**228.059 ng/kg**
2,3,7,8-Dibenzofuran, tetra	< 1.0 ng/kg	< 1.0 ng/kg	<0.345 ng/kg	<1.0 h ng/kg	< 0.443 ng/kg	< 0.350 ng/kg	< 0.464 ng/kg
1,2,3,7,8-Dibenzofuran, penta	< 2.5 ng/kg	< 2.5 ng/kg	**0.149 hj ng/kg**	<2.5 h ng/kg	**0.158 j ng/kg**	< 2.5 ng/kg	< 2.5 ng/kg
2,3,4,7,8-Dibenzofuran, penta	< 2.5 ng/kg	< 2.5 ng/kg	**0.276 hj ng/kg**	<2.5 h ng/kg	**0.284 j ng/kg**	**0.342 j ng/kg**	**0.420 j ng/kg**
1,2,3,4,7,8-Dibenzofuran, hexa	< 2.5 ng/kg	< 2.5 ng/kg	**0.998 hj ng/kg**	**0.218 bhj ng/kg**	**0.635 jEMPC ng/kg**	**0.563 jEMPC ng/kg**	**0.605 j ng/kg**
1,2,3,6,7,8-Dibenzofuran, hexa	< 2.5 ng/kg	< 2.5 ng/kg	**0.430 hj ng/kg**	**0.120 hj ng/kg**	**0.521 j ng/kg**	**0.395 jEMPC ng/kg**	**0.654 j ng/kg**
1,2,3,7,8,9-Dibenzofuran, hexa	< 2.5 ng/kg	< 2.5 ng/kg	<2.5 h ng/kg	<2.5 h ng/kg	< 2.5 ng/kg	< 2.5 ng/kg	< 2.5 ng/kg
2,3,4,6,7,8-Dibenzofuran, hexa	< 2.5 ng/kg	< 2.5 ng/kg	**0.490 hj ng/kg**	**0.191 hj ng/kg**	**1.093 j ng/kg**	**1.000 j ng/kg**	**1.611 j ng/kg**
1,2,3,4,6,7,8-Dibenzofuran, hepta	**23.134 ng/kg**	**8.163 ng/kg**	**10.748 h ng/kg**	**1.736 hj ng/kg**	**14.027 ng/kg**	**9.191 ng/kg**	**10.379 ng/kg**
1,2,3,4,7,8,9-Dibenzofuran, hepta	< 2.5 ng/kg	< 2.5 ng/kg	**0.958 hj ng/kg**	**0.159 hj ng/kg**	**0.677 j ng/kg**	**0.581 j ng/kg**	**0.512 j ng/kg**
Dibenzofuran octa	**98.848 ng/kg**	**32.620 ng/kg**	**35.586 h ng/kg**	**5.404 h ng/kg**	**49.653 ng/kg**	**31.620 ng/kg**	**41.648 ng/kg**
TEQ_{DF} WHO05, non-detects at zero for the detection limit [1]	**1.91 a ng/kg**	**0.663 ng/kg**	**1.43 a ng/kg**	**0.196 a ng/kg**	**1.38 a ng/kg**	**1.00 a ng/kg**	**1.56 a ng/kg**
TEQ_{DF} WHO05, non-detects at half of the detection limit [2]	**5.01 a ng/kg**	**3.76 ng/kg**	**2.07 a ng/kg**	**2.53 a ng/kg**	**2.03 a ng/kg**	**1.68 a ng/kg**	**1.75 a ng/kg**
Dibenzofuran penta, Total	**15.470 ng/kg**	**12.721 ng/kg**	**14.947 h ng/kg**	**2.689 h ng/kg**	**19.191 ng/kg**	**17.687 ng/kg**	**45.684 ng/kg**
Dibenzofuran tetra, Total	**7.500 ng/kg**	**3.380 ng/kg**	**6.025 h ng/kg**	**0.743 h ng/kg**	**5.075 ng/kg**	**4.683 ng/kg**	**14.857 ng/kg**
Dibenzofuran, hepta, Total	**87.233 ng/kg**	**8.163 ng/kg**	**40.598 h ng/kg**	**6.008 h ng/kg**	**46.088 ng/kg**	**30.598 ng/kg**	**35.417 ng/kg**
Dibenzofuran, hexa, Total	**37.516 ng/kg**	**17.675 ng/kg**	**18.083 h ng/kg**	**3.107 h ng/kg**	**11.080 ng/kg**	**15.554 ng/kg**	**23.924 ng/kg**
Dioxin penta, Total	< 2.5 ng/kg	**1.022 ng/kg**	**2.301 h ng/kg**	**0.143 h ng/kg**	**1.884 ng/kg**	**1.071 ng/kg**	**2.930 ng/kg**
Dioxin tetra, Total	< 1.0 ng/kg	< 1.0 ng/kg	**0.459 h ng/kg**	<1.0 h ng/kg	**0.375 ng/kg**	**0.517 ng/kg**	**0.840 ng/kg**
Dioxin, hepta, Total	**273.906 ng/kg**	**97.446 ng/kg**	**73.431 h ng/kg**	**15.335 h ng/kg**	**69.897 ng/kg**	**57.529 ng/kg**	**70.534 ng/kg**
Dioxin, hexa, Total	< 2.5 ng/kg	**10.032 ng/kg**	**10.030 h ng/kg**	**1.877 h ng/kg**	**10.448 ng/kg**	**8.627 ng/kg**	**12.559 ng/kg**

Table 3
Soil Quality Data - 2005 Southern Lot Investigation
Joslyn Manufacturing and Supply Company Site
Brooklyn Center, Minnesota

Sys Loc Code	RES1-SI1	RES1-SI2	RES1-SI3		RES2-SI1	RES2-SI3	RES2-SI4
Sample Date	03/04/2005	03/04/2005	03/04/2005		03/04/2005	03/04/2005	03/04/2005
Depth Interval	0-0.5				0-0.5	0.5-1.5	1.5-4
Depth Unit	ft				ft	ft	ft
Sample Type Code	N	N	N	FD	N	N	N
Chemical Name							
Chlorinated Dioxins / Furans							
2,3,7,8-Dioxin, tetra	< 1.0 ng/kg	< 1.0 ng/kg	**2.725 EMPC ng/kg**	< 1.0 ng/kg	< 1.0 ng/kg	< 1.0 ng/kg	< 0.992 ng/kg
1,2,3,7,8-Dioxin, penta	**0.642 j ng/kg**	**1.956 j ng/kg**	**4.333 ng/kg**	**5.957 ng/kg**	< 2.5 ng/kg	< 2.5 ng/kg	< 2.481 ng/kg
1,2,3,4,7,8-Dioxin, hexa	**1.944 j ng/kg**	**7.194 ng/kg**	**77.327 ng/kg**	**102.864 ng/kg**	**0.232 j ng/kg**	**0.285 j ng/kg**	< 2.481 ng/kg
1,2,3,6,7,8-Dioxin, hexa	**7.813 ng/kg**	**62.854 ng/kg**	**390.921 * ng/kg**	**719.823 * ng/kg**	**0.660 j ng/kg**	**0.911 j ng/kg**	**2.830 j ng/kg**
1,2,3,7,8,9-Dioxin, hexa	**5.529 ng/kg**	**25.329 ng/kg**	**58.555 * ng/kg**	**122.937 * ng/kg**	**0.490 j ng/kg**	**0.708 j ng/kg**	< 2.481 ng/kg
1,2,3,4,6,7,8-Dioxin, hepta	**248.611 ng/kg**	**2656.809 ng/kg**	**16540.965 ng/kg**	**36059.420 ng/kg**	**21.136 ng/kg**	**29.226 ng/kg**	**145.291 ng/kg**
Dioxin octa	**1843.382 e ng/kg**	**19942.814 e ng/kg**	**271822.016 e* ng/kg**	**570865.629 e* ng/kg**	**145.517 ng/kg**	**193.481 ng/kg**	**1002.516 e ng/kg**
2,3,7,8-Dibenzofuran, tetra	< 1.0 ng/kg	**7.499 ng/kg**	**6.097 ng/kg**	**6.274 ng/kg**	< 1.0 ng/kg	< 1.0 ng/kg	< 0.992 ng/kg
1,2,3,7,8-Dibenzofuran, penta	< 2.5 ng/kg	**0.969 j ng/kg**	**33.480 ng/kg**	**37.517 ng/kg**	< 2.5 ng/kg	< 2.5 ng/kg	< 2.481 ng/kg
2,3,4,7,8-Dibenzofuran, penta	< 2.5 ng/kg	**1.930 j ng/kg**	**27.610 ng/kg**	**31.845 ng/kg**	< 2.5 ng/kg	< 2.5 ng/kg	< 2.481 ng/kg
1,2,3,4,7,8-Dibenzofuran, hexa	**2.945 jEMPC ng/kg**	**11.841 ng/kg**	**246.71 ng/kg**	**300.766 ng/kg**	**0.464 j ng/kg**	**0.458 j ng/kg**	**0.572 jEMPC ng/kg**
1,2,3,6,7,8-Dibenzofuran, hexa	**0.923 jEMPC ng/kg**	**3.356 ng/kg**	**47.883 ng/kg**	**60.483 ng/kg**	< 2.5 ng/kg	< 2.5 ng/kg	< 2.481 ng/kg
1,2,3,7,8,9-Dibenzofuran, hexa	< 2.5 ng/kg	< 2.5 ng/kg	< 2.5 ng/kg	**15.142 ng/kg**	< 2.5 ng/kg	< 2.5 ng/kg	< 2.481 ng/kg
2,3,4,6,7,8-Dibenzofuran, hexa	**2.278 j ng/kg**	**2.871 ng/kg**	**64.604 ng/kg**	**48.965 ng/kg**	< 2.5 ng/kg	< 2.5 ng/kg	< 2.481 ng/kg
1,2,3,4,6,7,8-Dibenzofuran, hepta	**73.351 ng/kg**	**441.851 ng/kg**	**4050.639 ng/kg**	**6750.237 ng/kg**	**4.831 ng/kg**	**6.755 ng/kg**	**37.458 ng/kg**
1,2,3,4,7,8,9-Dibenzofuran, hepta	**5.477 ng/kg**	**37.704 ng/kg**	**311.2 ng/kg**	**524.085 ng/kg**	**0.469 j ng/kg**	**0.486 jEMPC ng/kg**	< 2.481 ng/kg
Dibenzofuran octa	**360.604 ng/kg**	**2142.915 ng/kg**	**20242.349 e* ng/kg**	**42579.379 * ng/kg**	**15.455 ng/kg**	**22.554 ng/kg**	**250.824 ng/kg**
TEQ $_{DF}$ WHO05, non-detects at zero for the detection limit [1]	**6.53 a ng/kg**	**52.6 a ng/kg**	**401 a ng/kg**	**772 a ng/kg**	**0.497 a ng/kg**	**0.663 a ng/kg**	**2.52 a ng/kg**
TEQ $_{DF}$ WHO05, non-detects at half of the detection limit [2]	**7.61 a ng/kg**	**53.3 a ng/kg**	**401 a ng/kg**	**772 a ng/kg**	**3.08 a ng/kg**	**3.25 a ng/kg**	**5.34 a ng/kg**
Dioxin tetra, Total	< 1.0 ng/kg	**19.906 ng/kg**	**26.967 ng/kg**	**22.178 ng/kg**	< 1.0 ng/kg	< 1.0 ng/kg	**1.339 ng/kg**
Dioxin penta, Total	**3.711 ng/kg**	**37.399 ng/kg**	**288.515 ng/kg**	**257.642 ng/kg**	< 2.5 ng/kg	< 2.5 ng/kg	**3.001 ng/kg**
Dioxin, hexa, Total	**46.092 ng/kg**	**296.388 ng/kg**	**2399.680 ng/kg**	**3720.876 ng/kg**	**4.277 ng/kg**	**6.053 ng/kg**	**22.031 ng/kg**
Dioxin, hepta, Total	**442.846 ng/kg**	**4597.630 ng/kg**	**31891.597 * ng/kg**	**74784.606 * ng/kg**	**38.794 ng/kg**	**53.523 ng/kg**	**275.698 ng/kg**
Dibenzofuran tetra, Total	**0.673 ng/kg**	**43.011 ng/kg**	**22.011 ng/kg**	**24.997 ng/kg**	< 1.0 ng/kg	< 1.0 ng/kg	**1.049 ng/kg**
Dibenzofuran penta, Total	**9.554 ng/kg**	**13.972 ng/kg**	**167.055 ng/kg**	**186.219 ng/kg**	**0.897 ng/kg**	**1.735 ng/kg**	**4.747 ng/kg**
Dibenzofuran, hexa, Total	**75.446 ng/kg**	**289.357 ng/kg**	**4021.176 ng/kg**	**6064.566 ng/kg**	**5.641 ng/kg**	**8.013 ng/kg**	**41.508 ng/kg**
Dibenzofuran, hepta, Total	**329.597 ng/kg**	**2052.993 ng/kg**	**21606.141 ng/kg**	**37127.903 ng/kg**	**18.030 ng/kg**	**23.520 ng/kg**	**238.014 ng/kg**

RES1-SI2: Composite prepared from fill located between 6" and top of peat. This varied by boring location from 33 to 42 inches below ground surface.

RES1-SI3: Composite prepared from peat located immediately below fill, down to a maximum depth of 48 inches. This thickness varied by boring location from 6 to 15 inches.

12/4/2009
P:\Mpls\23 MN\27\2327110\WorkFiles\DATA MGMT\Dioxin Data\Joslyn_ResI and ResII 2005 Soil Data_112309.xls

Table 4
Soil Quality Data - 2009 Southern Lot Investigation
Joslyn Manufacturing and Supply Company Site
Brooklyn Center, Minnesota

Sys Loc Code	T1-Comp	T2-Comp	T3-Comp	T4-1
Sample Date	07/29/2009	07/29/2009	07/29/2009	07/29/2009
Depth Interval	0-4	0-4	0-4	0-4
Depth Unit	ft	ft	ft	ft
Chemical Name				
General Parameters				
Carbon, total organic	**19.30%**	**7.15%**	**5.75%**	**28.80%**
Chlorinated Dioxins / Furans				
2,3,7,8-Dioxin, tetra	**2.26 ng/kg**	**0.913 j ng/kg**	**0.610 jEMPC ng/kg**	< 0.167 ng/kg
1,2,3,7,8-Dioxin penta	**10.8 ng/kg**	**8.07 ng/kg**	**4.47 ng/kg**	**3.57 j ng/kg**
1,2,3,4,7,8-Dioxin, hexa	**34.7 ng/kg**	**26.7 ng/kg**	**12.6 ng/kg**	**5.78 ng/kg**
1,2,3,6,7,8-Dioxin, hexa	**794 e ng/kg**	**471 ng/kg**	**108 ng/kg**	**169 ng/kg**
1,2,3,7,8,9-Dioxin, hexa	**123 ng/kg**	**83.6 ng/kg**	**35.1 ng/kg**	**25.4 ng/kg**
1,2,3,4,6,7,8-Dioxin, hepta	**32900 ng/kg**	**17300 ng/kg**	**5360 ng/kg**	**10100 ng/kg**
Dioxin octa	**234000 e ng/kg**	**132000 ng/kg**	**44700 ng/kg**	**97400 ng/kg**
2,3,7,8-Dibenzofuran, tetra	**1.49 EMPC ng/kg**	**4.26 ng/kg**	**0.772 j ng/kg**	< 0.558 ng/kg
1,2,3,7,8-Dibenzofuran, penta	**5.34 P ng/kg**	**11.8 P ng/kg**	**2.12 jEMPC ng/kg**	**1.67 j EMPCP ng/kg**
2,3,4,7,8-Dibenzofuran, penta	**6.18 ng/kg**	**10.6 ng/kg**	**1.52 j ng/kg**	**0.471 j ng/kg**
1,2,3,4,7,8-Dibenzofuran, hexa	**170 ng/kg**	**154 P ng/kg**	**22.5 ng/kg**	**28.0 ng/kg**
1,2,3,6,7,8-Dibenzofuran, hexa	**27.7 ng/kg**	**36.5 ng/kg**	**5.82 ng/kg**	**4.64 j ng/kg**
1,2,3,7,8,9-Dibenzofuran, hexa	**4.38 P ng/kg**	**10.2 P ng/kg**	**2.15 j ng/kg**	< 1.37 ng/kg
2,3,4,6,7,8-Dibenzofuran, hexa	**70.0 ng/kg**	**66.3 P ng/kg**	**14.1 ng/kg**	**13.7 ng/kg**
1,2,3,4,6,7,8-Dibenzofuran, hepta	**7540 ng/kg**	**4310 ng/kg**	**1120 ng/kg**	**1880 ng/kg**
1,2,3,4,7,8,9-Dibenzofuran, hepta	**529 ng/kg**	**331 ng/kg**	**71.2 ng/kg**	**119 ng/kg**
Dibenzofuran octa	**63000 ng/kg**	**32400 ng/kg**	**7640 ng/kg**	**15400 ng/kg**
TEQ $_{DF}$ WHO05, non-detects at zero for the detection limit [1]	**636 a ng/kg**	**367 a ng/kg**	**107 a ng/kg**	**183 a ng/kg**
TEQ $_{DF}$ WHO05, non-detects at half of the detection limit [2]	**636 a ng/kg**	**367 a ng/kg**	**107 a ng/kg**	**183 a ng/kg**
Dioxin tetra, Total	**75.7 ng/kg**	**42.0 ng/kg**	**16.5 ng/kg**	**62.5 ng/kg**
Dioxin penta, Total	**256 ng/kg**	**101 ng/kg**	**52.3 ng/kg**	**1230 ng/kg**
Dioxin, hexa, Total	**2930 ng/kg**	**1610 ng/kg**	**523 ng/kg**	**8710 ng/kg**
Dioxin, hepta, Total	**39000 ng/kg**	**23700 ng/kg**	**6560 ng/kg**	**15300 ng/kg**
Dibenzofuran tetra, Total	**53.2 ng/kg**	**56.2 ng/kg**	**18.8 ng/kg**	**4.18 ng/kg**
Dibenzofuran penta, Total	**244 ng/kg**	**239 ng/kg**	**64.9 ng/kg**	**21.3 ng/kg**
Dibenzofuran, hexa, Total	**1390 ng/kg**	**1290 ng/kg**	**264 ng/kg**	**233 ng/kg**
Dibenzofuran, hepta, Total	**7960 ng/kg**	**4880 ng/kg**	**1100 ng/kg**	**1820 ng/kg**

Data Qualifiers/Footnotes	
Qualifier	**Definition**
--	Not analyzed/not available.
a	Estimated value, calculated using some or all values that are estimates.
b	Potential false positive value based on blank data validation procedures.
c	Coeluting compound.
e	Estimated value, exceeded the instrument calibration range.
h	EPA recommended sample preservation, extraction or analysis holding time was exceeded.
I	Indeterminate value based on failure of blind duplicate data to meet quality assurance criteria.
j	Reported value is less than the stated laboratory quantitation limit and is considered an estimated value.
p	Relative percent difference is >40% (25% CLP pesticides) between primary and confirmation GC columns.
pp	Small peak in chromatogram below method detection limit.
r	The presence of the compound is suspect based on the ID criteria of the retention time and relative retention time obtained from the examination of the chromatograms.
R	Rejected, associated value is unusable.
s	Potential false positive value based on statistical analysis of blank sample data.
U	Not detected.
*	Estimated value, QA/QC criteria not met.
**	Unusable value, QA/QC criteria not met.
AT	Sample chromatogram is noted to be atypical of a petroleum product.
DLND	Not detected, detection limit not determined.
DNF	Did not flash
EMPC	Estimated maximum possible concentration.
FD	Field duplicate sample.
N	Normal sample.
NA – (Not applicable)	NA indicates that a fractional portion of the sample is not part of the analytical testing or field collection procedures.
ND	Not detected.
TIC	Tentatively identified compound
BQA	Barr-applied project specific qualifier: extraction and/or analyses conducted using an alternative method and/or procedure.
BQC	Barr-applied project specific qualifier: plant shut down.
BQD	Barr-applied project specific qualifier: equipment malfunction.
BQE	Barr-applied project specific qualifier: equipment adjustment.
BQM	Barr-applied project specific qualifier: manual measurement.
BQN	Barr-applied project specific qualifier: unable to be sampled or measured due to various reasons.
BQP	Barr-applied project specific qualifier: atypical chromatographic pattern.
BQQ	Barr-applied project specific qualifier: some aspect of QA/QC was not met.
BQR	Barr-applied project specific qualifier: location was re-sampled.
BQS	Barr-applied project specific qualifier: data is considered suspect.
BQT	Barr-applied project specific qualifier: summed value not displayed due to insufficient field length.
BQU	Barr-applied project specific qualifier: historical qualifier - definition unknown.
BQV	Barr-applied project specific qualifier: estimated value.
BQX	Barr-applied project specific qualifier: see notes for qualifier definition.
BQZ	Barr-applied project specific qualifier: data is considered unusable.

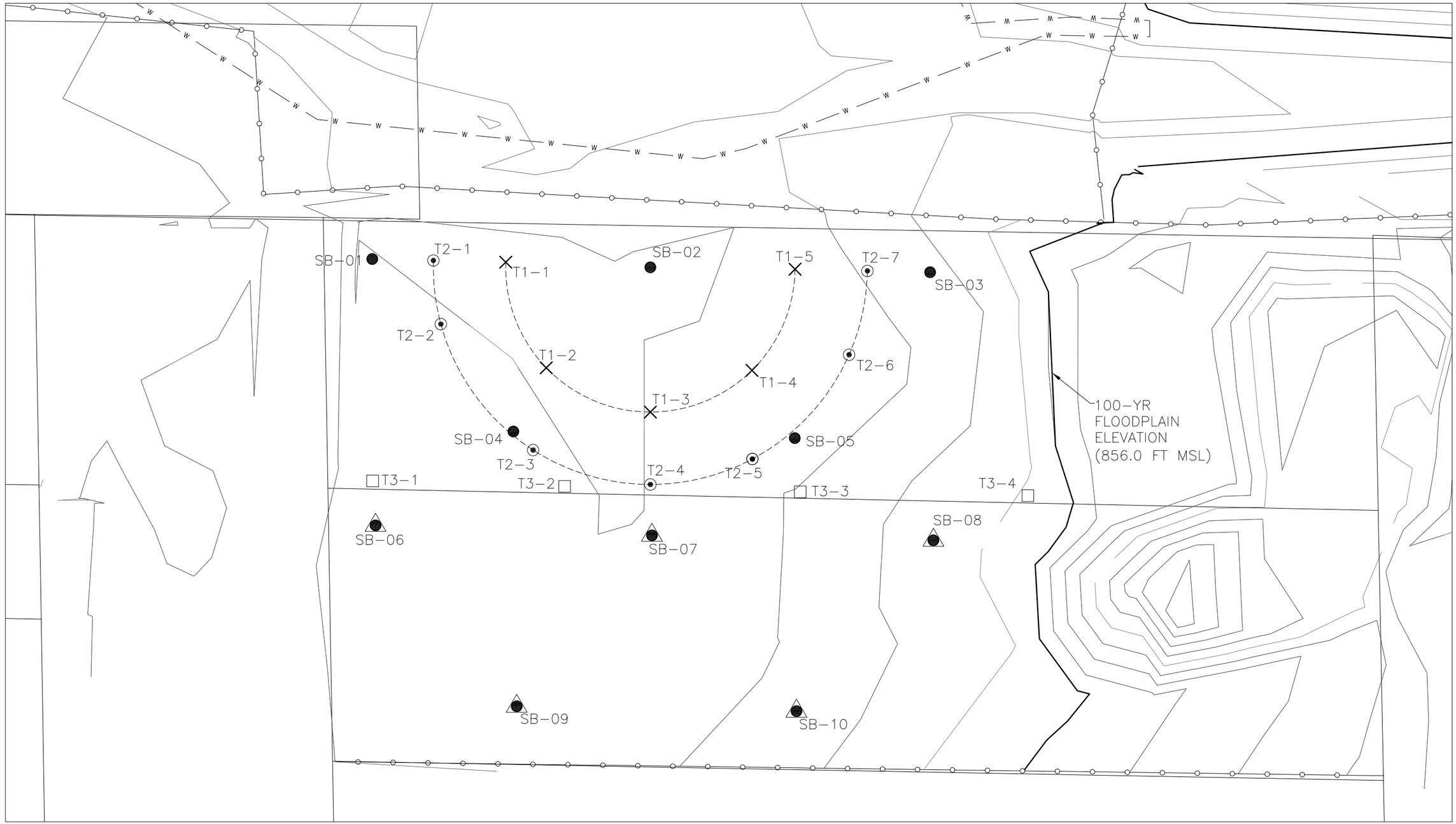
1 Total TEQ_{DF} equivalents calculated using zero for the detection limit on the non detected compounds.

2 Total TEQ_{DF} equivalents calculated using half of the detection limit on the non detected compounds.

	Site Conc.	Toxicity Equivalency Factor (WHO05)[q]	TEQ_{DF}
2,3,7,8-TCDD	0.000	1	0.000
1,2,3,7,8-Dioxin penta	0.000	1	0.000
1,2,3,4,7,8-Dioxin, hexa	0.000	0.1	0.000
1,2,3,6,7,8-Dioxin, hexa	0.000	0.1	0.000
1,2,3,7,8,9-Dioxin, hexa	0.000	0.1	0.000
1,2,3,4,6,7,8-Dioxin, hepta	0.000	0.01	0.000
Dioxin octa	0.000	0.0003	0.000
2,3,7,8-TCDF	0.000	0.1	0.000
1,2,3,7,8-Dibenzofuran, penta	0.000	0.03	0.000
2,3,4,7,8-Dibenzofuran, penta	0.000	0.3	0.000
1,2,3,4,7,8-Dibenzofuran, hexa	0.000	0.1	0.000
1,2,3,6,7,8-Dibenzofuran, hexa	0.000	0.1	0.000
2,3,4,6,7,8-Dibenzofuran, hexa	0.000	0.1	0.000
1,2,3,7,8,9-Dibenzofuran, hexa	0.000	0.1	0.000
1,2,3,4,6,7,8-Dibenzofuran, hepta	0.000	0.01	0.000
1,2,3,4,7,8,9-Dibenzofuran, hepta	0.000	0.01	0.000
Dibenzofuran octa	0.000	0.0003	0.000
	Total TEQ_{DF} =		0.000

q Van den Berg, et al., The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds. ToxSci Advance Access published July 7, 2006.

Figures



LEGEND

- ● 2005 SAMPLING LOCATIONS
- △ 2009 SAMPLING LOCATIONS
- × 2009 30FT RADIUS SAMPLING LOCATIONS (COMPILED INTO 1 COMPOSITE PER RADIUS)
- ◉ 2009 45FT RADIUS SAMPLING LOCATIONS (COMPILED INTO 1 COMPOSITE PER RADIUS)
- □ LOCATION OF 2009 NORTH/SOUTH PARCEL BOUNDARY SAMPLING LOCATIONS (PEAT INTERVAL COMPILED INTO ONE 4-POINT COMPOSITE)

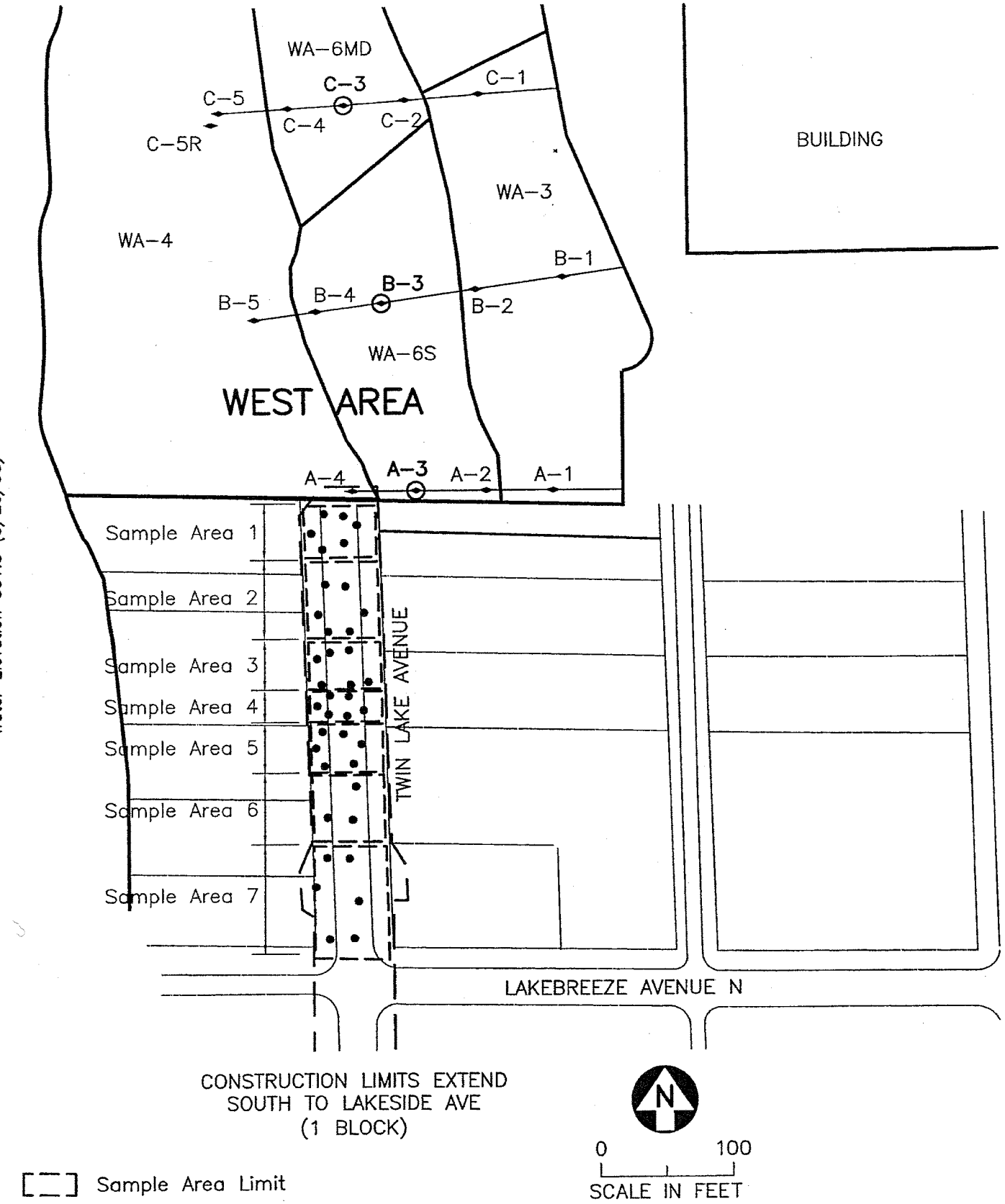
N

0 20 40

SCALE IN FEET

Figure 1
SOIL SAMPLING LOCATIONS
Southern Lots
Joslyn Manufacturing
Brooklyn Center, Minnesota

Attachment A

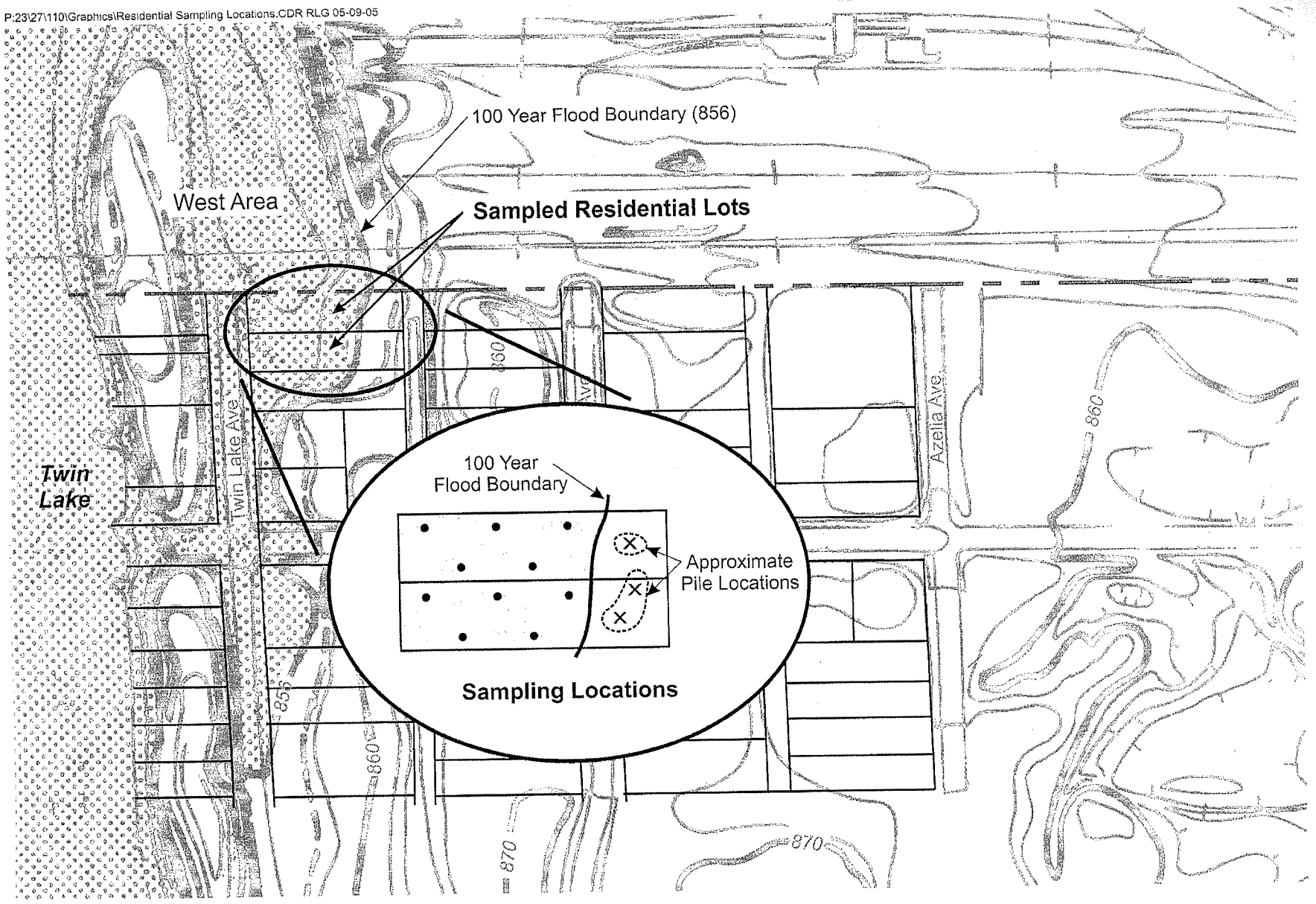


Twin Lake
Water Elevation 851.8 (5/26/98)

Figure 2

ACTUAL SAMPLING LOCATIONS
Brooklyn Center, Minnesota

P:23\27\110\Graphics\Residential Sampling Locations.CDR RLG 05-09-05



N

0 200 400

Approximate Scale in Feet

X Pile Composite Sample Collection Location

• Soil Composite Sample Location
(5 boreholes per parcel)

Figure 1

RESIDENTIAL SAMPLING LOCATIONS
Joslyn Manufacturing Co. Site
Brooklyn Center, Minnesota

Attachment B

LOG OF Boring SB-T1-1

SHEET 1 OF 1

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None Organic Organic	Moist			0-0.5': Brown, fine to medium-grained silty sand.	
			None Organic Organic	Moist			0.5-2.1': Brown to light brown, fine to coarse-grained sand with klinker, styrofoam and plastic.	
					SP			
2			None None None	Moist			2.1-3.2': Tan, fine to medium grained-sand, predominantly medium-grained.	2
			None Organic Organic	Moist			3.2-3.7': Black peat with organics, no shells.	
					PT			
4							End of Boring - 4 feet	4

Barr Engineering Co.
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Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-T1-2

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None None None	Moist	SP		0-1.75': Mixture of fine to coarse-grained sand and dump material - clay pottery, toothpaste tube, klinker, glass and cement.	
			None Organic Organic	Moist	PT		1.75-4': Black peat with shells starting at 43", organic material present.	
2								2
4							End of Boring - 4 feet	4

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Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-T1-3

SHEET 1 OF 1

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None Organic Organic	Moist			0-0.6': Brown, fine-grained sand.	
			None Organic Organic	Moist			0.6-0.9': Tan, fine to medium-grained.	
			None None None	Moist	SP		0.9-2.1': Brown to rust colored, fine to medium-grained sand with debris - glass, klinker.	
2			None Organic Organic	Moist				2
					PT		2.1-4': Black peat with shells starting at 38".	
4							End of Boring - 4 feet	4

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Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-T1-4

SHEET 1 OF 1

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None Organic None None None None	Moist Moist	SP		0-0.25': Brown, fine to medium-grained sand. 0.25-1.7': Tan to light brown, fine to medium-grained.	
2			None Organic Organic	Moist	PT		1.7-4': Black peat with organic shells present 29-39".	2
4							End of Boring - 4 feet	4

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Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-T1-5

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None Organic Lt Organic	Moist			0-0.3': Brown, silty sand fine to medium-grained.	
			None None None	Moist	SP		0.3-0.8': Tan, fine to medium-grained sand.	
			None Organic Organic	Moist			0.8-3.8': Black, peat with trace sand.	
2					PT			2
			None Organic Organic	Moist				
					SP		3.8-4': Gray, fine to coarse-grained, predominantly medium-grained.	
4							End of Boring - 4 feet	4

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Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-T2-1

SHEET 1 OF 1

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None Organic Organic	Moist			0-0.8': Brown, fine to medium-grained sand with organics. Root from 6-10".	
			None Organic	Moist			0.8-1.4': Brown to reddish-brown, fine to coarse-grained sand predominantly fine to medium-grains present, mixed with glass and brick fragment klinker.	
			None None	Moist	SP		1.4-3.1': Tan to light brown fine to medium-grained sand, no odor.	
2								2
			None Organic	Moist	PT		3.1-4': Black peat with organic weave.	
4							End of Boring - 4 feet	4

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Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-T2-2

SHEET 1 OF 1

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None Organic None	Moist			0-0.5': Grayish-brown, fine to coarse grained sand, predominantly fine to medium-grained sand (70%).	
			None None None	Moist			0.5-2.4': Reddish-brown, fine to coarse-grained sand with predominantly fine to medium-grained sand (~20% cg), Klinker and glass fragments, clay pot fragments.	
					SP			
2								2
			None None Organic	Moist			2.4-2.5': Gray fine to medium-grained sand.	
							2.5-4': Black peat with organics, cohesive organic weave.	
			None Organic Organic	Moist	PT			
4							End of Boring - 4 feet	4

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Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-T2-3

SHEET 1 OF 1

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None None None	Moist	SP		0-0.4': Tan to light brown, fine to medium-grained sand.	
			None None None	Moist			0.4-1.8': Fine to coarse sand with debris including glass, klinker and cement.	
2			None Organic Organic	Moist	PT		1.8-3.9': Black peat with organic material, shells present in bottom 1" of material.	2
4							End of Boring - 4 feet	4

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Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-T2-4

SHEET 1 OF 1

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None Organic None	Moist	SM-SP		0-0.3': Brown silty sand mixed with mulch, ~50% sand and 50% silt.	
			None Lt Organic None	Moist			0.3-1.3': Light brown fine to medium grained-sand, predominantly medium-grained sand.	
			None None None	Moist	SP		1.3-1.75': Light brown medium to coarse-grained sand, subrounded grains.	
			None None None	Moist			1.75-2.3': Tan to light brown, fine to medium-grained sand.	
2								2
			None Organic Lt Organic	Moist	PT		2.3-4': Black peat with organics, shells present at 32" and below, no sand observed.	
4							End of Boring - 4 feet	4

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Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-T2-5

SHEET 1 OF 1

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None None None	Moist	SP		0-1.7': Light brown, fine to medium-grained sand.	
			None None None	Moist			1.7-2': Light brown, fine to medium-grained sand with brick fragments.	
2			None Organic Organic	Moist	PT		2-4': Black, disturbed peat, with sand mixed in, organic material present.	2
4							End of Boring - 4 feet	4

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Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-T2-6

SHEET 1 OF 1

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None Organic Organic	Moist			0-0.5': Brown, fine to medium-grained silty sand, predominantly fine-grained.	
			None None None	Moist	SP		0.5-1.2': Tan, fine to medium-grained sand.	
			None Organic Organic	Moist			1.2-3.5': Black peat with organic shells.	
2								2
			None Organic Organic	Moist	PT			
			None Organic None	Moist				
					OC		3.5-3.9': Gray organic silty/clay with medium to high plasticity.	
4							End of Boring - 4 feet	4

Barr Engineering Co.
4700 W 77th St. Suite 200
Edina, MN 55435
Telephone: 952-832-2600
Fax: 952-862-2601

Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-T2-7

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None None Organic	Moist	SP		0-0.4': Grayish brown fine to medium grained sand.	
			None None Lt Organic	Moist			0.4-1': Light brown fine to medium-grained sand, predominantly medium	
			None Organic Organic	Moist	PT		1-2.9': Black peat with organics, shells present from 18-32".	
2								2
			None None None	Moist	OC		2.9-4': Gray organic silt/clay with speckled rust color, medium to high plasticity.	
4							End of Boring - 4 feet	4

Barr Engineering Co.
4700 W 77th St. Suite 200
Edina, MN 55435
Telephone: 952-832-2600
Fax: 952-862-2601

Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-T3-1

SHEET 1 OF 1

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None Organic Organic	Moist	SP		0-0.5': Brown, fine to medium-grained sand, predominantly medium-grained sand, contains organics.	
			None None None	Moist			0.5-2.3': Brown, fine to coarse-grained sand, predominantly fine to medium-grained, 15-29" contains ~10% coarse grained, contains klinker, glass, pottery and tile/piping.	
2								2
			None Organic Organic	Moist	PT		2.3-4': Black peat with organics, no sand or shells.	
4							End of Boring - 4 feet	4

Barr Engineering Co.
4700 W 77th St. Suite 200
Edina, MN 55435
Telephone: 952-832-2600
Fax: 952-862-2601

Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-T3-2

SHEET 1 OF 1

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None Organic Organic	Moist			0-0.7': Brown, fine to medium-grained sand with organics.	
			None None None	Moist	SP		0.7-1.75': Tan to light brown, fine to coarse grained sand, predominantly fine to medium-grained. At 11", 1" thick medium to coarse-grained layer (larger grain size than most of unit), 5% fines, strong rust discoloration from 16-21".	
			None Organic Organic	Moist	PT		1.75-4': Black peat with organics, shells below 35".	
2								2
4							End of Boring - 4 feet	4

Barr Engineering Co.
4700 W 77th St. Suite 200
Edina, MN 55435
Telephone: 952-832-2600
Fax: 952-862-2601

Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-T3-3

SHEET 1 OF 1

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None Organic Lt Organic	Moist	SP		0-0.5': Brown, fine to medium-grained sand with organics.	
			None None None	Moist			0.5-1.75': Light brown, fine to medium-grained sand, predominantly medium-grained sand, 5% fines.	
2			None None Lt Organic	Moist			1.75-2.2': Dark brown, fine to coarse-grained sand, predominantly medium-grained sand, rust colored from 25-27".	2
			None None None	Moist			2.2-2.3': Gray silt observed at contact of peat.	
					PT		2.3-4': Black peat with organics, shells present below 39".	
4							End of Boring - 4 feet	4

Barr Engineering Co.
4700 W 77th St. Suite 200
Edina, MN 55435
Telephone: 952-832-2600
Fax: 952-862-2601

Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-T3-4

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None Organic Lt Organic	Moist	SP		0-2': Light brown to brown, fine to medium-grained sand with organics present.	
2			None Lt Organic Lt Organic None Organic Organic	Moist Moist			2-2.2': Tan, fine to medium-grained sand, 5% fines. 2.2-4': Black peat with ~10% fine-grained sand within matrix, trace sand from 39-48" bgs, no shells.	2
					PT			
4							End of Boring - 4 feet	4

Barr Engineering Co.
4700 W 77th St. Suite 200
Edina, MN 55435
Telephone: 952-832-2600
Fax: 952-862-2601

Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-06-2009

SHEET 1 OF 1

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None Sl Organic Lt Organic	Moist	SP		0-0.25': Brown fine to medium grained sand, predominantly medium grained.	
			None None Lt Organic	Moist			0.25-1.9': Tan to light brown with speckled rust colored fine to medium-grained sand, rust color more prevalent below 15".	
2			None Organic Organic	Moist	PT		1.9-4': Black, peat with organics, shells present at 44".	2
4							End of Boring - 4 feet	4

Barr Engineering Co.
4700 W 77th St. Suite 200
Edina, MN 55435
Telephone: 952-832-2600
Fax: 952-862-2601

Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-07-2009

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None Organic Organic None None None	Moist Moist	SP		0-0.25': Brown, fine to medium-grained sand, predominantly medium-grained sand. 0.25-1.75': Tan to light brown with speckled rust color, fine to medium-grained sand, ~5% fines.	
2			None Organic Organic	Moist	PT		1.75-4': Black peat with organics, shells present from 37-48" bgs.	2
4							End of Boring - 4 feet	4

Barr Engineering Co.
4700 W 77th St. Suite 200
Edina, MN 55435
Telephone: 952-832-2600
Fax: 952-862-2601

Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-08-2009

SHEET 1 OF 1

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None Organic Organic	Moist			0-0.75': Brown, fine to medium-grained sand with organics.	
			None Organic Organic	Moist	SP		0.75-2.4': Tan to light brown, fine to medium-grained sand, predominantly medium-grained sand, trace to 5% fines.	
2								2
			None None Lt Organic None Organic Organic	Moist Moist	PT		2.4-2.5': Gray, fine to medium-grained sand, predominantly medium grained sand. 2.5-4': Black peat with organics and trace sand, shells present below 38".	
4							End of Boring - 4 feet	4

Barr Engineering Co.
4700 W 77th St. Suite 200
Edina, MN 55435
Telephone: 952-832-2600
Fax: 952-862-2601

Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-09-2009

SHEET 1 OF 1

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None Organic Organic	Moist			0-0.5': Brown, fine to medium-grained silty sand with organics.	
			None None	Moist	SP		0.5-2.1': Tan, speckled rust colored sand, fine to medium-grained, predominantly medium-grained.	
2			None Organic Organic	Moist	PT		2.1-4': Black peat with organic shells present starting at 43'.	2
4							End of Boring - 4 feet	4

Barr Engineering Co.
4700 W 77th St. Suite 200
Edina, MN 55435
Telephone: 952-832-2600
Fax: 952-862-2601

Remarks:

Additional data may have been collected in the field which is not included on this log.

LOG OF Boring SB-10-2009

SHEET 1 OF 1

Client Joslyn
Project Name Joslyn
Number 23/27-110
Location Brooklyn Center, Minnesota

Drill Contractor Matrix
Drill Method Geoprobe
Drilling Started 7/29/09 Ended 7/29/09
Logged By AMD2/LCM

Elevation --
Total Depth 4.0

DEPTH FEET	SAMP. LENGTH & RECOVERY	SAMP. NUMBER	Discoloration-Odor-Sheen	Moisture	ASTM	LITHOLOGY	DESCRIPTION	DEPTH FEET
			None Organic Organic	Moist			0-0.5': Brown, fine to medium-grained silty sand with organics.	
			None Organic Organic	Moist	SP		0.5-2.7': Tan, speckled rust colored sand, fine to medium-grained, predominantly medium-grained, ~5% fines.	
2								2
			None Organic Organic	Moist	PT		2.7-4': Black peat with organics, shells present at 40".	
4							End of Boring - 4 feet	4

Barr Engineering Co.
4700 W 77th St. Suite 200
Edina, MN 55435
Telephone: 952-832-2600
Fax: 952-862-2601

Remarks:

Additional data may have been collected in the field which is not included on this log.

Attachment C

August 13, 2009 Service Request No: E0900587

Michael Dupay
Barr Engineering
4700 West 77th Street
Minneapolis, MN 55435

Laboratory Results for: Joslyn Site/23/27-1102009448

Dear Michael:

Enclosed are the results of the sample(s) submitted to our laboratory on July 31, 2009. For your reference, these analyses have been assigned our service request number **E0900587**.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided.
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 items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report. In accordance to the NELAC 2003 Standard, a statement on the estimated uncertainty of measurement of any quantitative analysis will be supplied upon request.

Please contact me if you have any questions. My extension is 2957. You may also contact me via email at JFreemyer@caslab.com.

Respectfully submitted,

Columbia Analytical Services, Inc.

Jane Freemyer
Project Manager; GC/HRMS

Page 1 of _____

Columbia Analytical Services INC

Certificate of Analysis

19408 Park Row, Suite 320, Houston, TX 77084
Phone (713)266-1599 Fax (713)266-0130
www.caslab.com

An Employee Owned Company

COLUMBIA ANALYTICAL SERVICES, INC

Client:	Barr Engineering	**Service Request No.:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Received:**	07/31/09
Sample Matrix:	Soil		

CASE NARRATIVE

All analyses were performed in adherence to the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier II. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

Six soil samples were received for analysis at Columbia Analytical Services on 07/31/09. The remaining samples on the coc were placed on 'hold' status and are archived in the freezer at -20°C. Freezing the soil sample extends the holding time from 30-days to one year.

The samples were received at 0°C in good condition and are consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Data Validation Notes and Discussion

B flags – Method Blanks

The Method Blank EQ0900289-01/U132365 contained low levels of OCDD at or below the Method Reporting Limit (MRL).

The Method Blank EQ0900291-01/U132415 contained low levels of 1234678-HpCDD, OCDD and 1234678-HpCDF at or below the Method Reporting Limit (MRL).

The associated compounds in the samples are flagged with 'B' flags.

Y flags – Labeled Standards

Samples that had recoveries of labeled standards outside the acceptance limits are flagged with 'Y' flags on the Labeled Compound summary pages. In all cases, the signal-to-noise ratios are greater than 10:1, making these data acceptable.

MS/DMS

EQ0900289: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of an MS/DMS for this extraction batch.

EQ0900291: Laboratory Control Spike/Duplicate Laboratory Control Spike (LCS/DLCS) samples were analyzed and reported in lieu of an MS/DMS for this extraction batch.

Approved by_____**Date** 08/17/09

Xiangqiu Liang, Laboratory Director

C flags – 2378-TCDF Confirmation

Confirmation of the TCDF compound: When 2378-TCDF is detected on the DB-5 column, confirmation analyses are performed on a second column (DB-225.) The results from both the DB-5 column and the DB-225 column are included in this data package.

The valid result for the 2378-TCDF compound is reported from the confirmation column.

The confirmation results have been included on the Total TEQ summary pages.

MRL

Four samples, T2-Comp, T1-Comp, T3-Comp and T4-1, required dilutions due to the presence of elevated levels of target analytes. The undiluted and diluted results were combined into one Total TEQ summary report for each sample. This reports a 'Total' result that includes the most appropriate concentration found for the associated target analyte.

The 1234678-HpCDD was slightly over-range for one sample; Line A-U. The test results are flagged as 'E.' Dilutions less than 1:5 are not routinely performed by CAS-Houston, because the HRMS instrument is linear above the calibration range. No further corrective action was required.

E flags

When OCDD and/or OCDF exceed the upper method calibration limit (MCL), Method 8290 Section 7.9.3 advises the chemist to "report the measured concentration and indicate that the value exceeds the MCL." We use 'E' flag on the Form 1 results to indicate a compound has exceeded the MCL.

K flags

EMPC - When the ion abundance ratios associated with a particular compound are outside the QC limits, samples are flagged with a 'K' flag. A 'K' flag indicates an estimated maximum possible concentration for the associated compound.

Detection Limits

Detection limits are calculated for each congener in each sample by measuring the height of the noise level for each quantitation ion for the associated labeled standard. The concentration equivalent to 2.5 times the height of the noise is then calculated using the appropriate response factor and the weight of the sample. The calculated concentration equals the detection limit.

Approved by_____**Date** 08/17/09

Xiangqiu Liang, Laboratory Director

The TEQ Summary results for each sample have been calculated by CAS/Houston to include:

- The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-Like Compounds (M. Van den Berg et al., Toxicological Sciences 93(2):223-241, 2006)
- 2378-TCDF from the DB-225 column, when confirmation required
- Non-detected compounds are not included in the 'Total'

Approved by_____**Date**_____

Xiangqiu Liang, Laboratory Director

Client: Barr Engineering **Service Request:** E0900587
Project: Joslyn Site/23/27-1102009448

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
E0900587-001	SBA1-U	7/29/09	09:00
E0900587-002	SBA1-L	7/29/09	09:05
E0900587-003	SBA2-U	7/29/09	09:30
E0900587-004	SBA2-L	7/29/09	09:35
E0900587-005	SBA3-U	7/29/09	09:45
E0900587-006	SBA3-L	7/29/09	09:50
E0900587-007	SBA4-U	7/29/09	09:55
E0900587-008	SBA4-L	7/29/09	10:00
E0900587-009	SBA5-U	7/29/09	10:20
E0900587-010	SBA5-L	7/29/09	10:25
E0900587-011	Line A-U	7/29/09	10:30
E0900587-012	Line A-L	7/29/09	10:35
E0900587-013	T2-Comp	7/29/09	12:30
E0900587-014	T1-Comp	7/29/09	14:00
E0900587-015	T4-1	7/29/09	14:45
E0900587-016	T3-Comp	7/29/09	15:30

Laboratory Certifications
2009-2010

STATE/PROGRAM	AGENCY	CERTIFICATION ID	EXP DATE
ARIZONA	AZ-DHS	AZ0725	05/26/10
ARKANSAS	ADEQ	09-048-0	06/16/10
CALIFORNIA	CA-ELAP	2452	02/28/11
FLORIDA/NELAP	FL-DOHS	E87611	06/30/10
HAWAII	HI-DOH	N/A	06/30/10
ILLINOIS/NELAP	IL-EPA	002122	10/06/09
LOUISIANA/NELAP	LELAP	03048	06/30/10
MAINE	ME-DOHS	2008031	06/05/10
MICHIGAN	MIDEQ	9971	06/30/10
MINNESOTA	MDH	048-999-427	03/25/10
NEVADA	NDEP	TX014112009A	07/31/10
NEW JERSEY	NJDEP	TX008	06/30/10
NEW MEXICO	NMED-DWB	N/A	06/30/10
NEW YORK/NELAP	NY-DOH	11707	03/31/10
NFESC/NAVY	NFESC	N/A	01/09/10
OKLAHOMA	OKDEQ	D9925, 9962	08/31/09
OREGON/NELAP	ORELAP	TX200002-006	03/24/10
TENNESSEE	TNDEC	04016	06/30/10
TEXAS/NELAP	TCEQ	T104704216-09-TX	06/30/10
UTAH/NELAP	UTELCP	COLU2	06/30/10
SOIL IMPORT PERMIT	USDA	P330-09-00067	03/27/12
WASHINGTON/NELAP	WA-Ecology	C1855	11/14/09
WEST VIRGINIA	WVDEP	347	06/30/10

Abbreviations, Acronyms & Definitions

Cal	Calibration
Conc	CONCentration
Dioxin(s)	Polychlorinated dibenzo-p-dioxin(s)
EDL	Estimated Detection Limit
EMPC	Estimated Maximum Possible Concentration
Flags	Data qualifiers
Furan(s)	Polychlorinated dibenzofuran(s)
g	Grams
ICAL	Initial CALibration
ID	IDentifier
Ions	Masses monitored for the analyte during data acquisition
L	Liter (s)
LCS	Laboratory Control Sample
DLCS	Duplicate Laboratory Control Sample
MB	Method Blank
MCL	Method Calibration Limit
MDL	Method Detection Limit
MRL	Method Reporting Limit
mL	Milliliters
MS	Matrix Spiked sample
DMS	Duplicate Matrix Spiked sample
NO	Number of peaks meeting all identification criteria
PCDD(s)	Polychlorinated dibenzo-p-dioxin(s)
PCDF(s)	Polychlorinated dibenzofuran(s)
ppb	Parts per billion
ppm	Parts per million
ppq	Parts per quadrillion
ppt	Parts per trillion
QA	Quality Assurance
QC	Quality Control
Ratio	Ratio of areas from monitored ions for an analyte
% Rec.	Percent Recovery
RPD	Relative Percent Difference
RRF	Relative Response Factor
RT	Retention Time
RRT	Relative Retention Time
SDG	Sample Delivery Group
S/N	Signal-to-Noise ratio
TEF	Toxicity Equivalence Factor
TEQ	Toxicity Equivalence Quotient

Data Qualifier Flags – Dioxin/Furans

- **B** Indicates the associated analyte is found in the method blank, as well as in the sample.

- **C** Confirmation of the TCDF compound: When 2378-TCDF is detected on the DB-5 column, confirmation analyses are performed on a second column (DB-225). The results from both the DB-5 column and the DB-225 column are included in this data package. The results from the DB-225 analyses should be used to evaluate the 2378-TCDF in the samples. The confirmed result should be used in determining the TEQ value for TCDF.

- **E** Indicates an estimated value – used when the analyte concentration exceeds the upper end of the linear calibration range.

- **J** Indicates an estimated value – used when the analyte concentration is below the method reporting limit (MRL) and above the estimated detection limit (EDL).

- **K** EMPC - When the ion abundance ratios associated with a particular compound are outside the QC limits, samples are flagged with a 'K' flag. A 'K' flag indicates an estimated maximum possible concentration for the associated compound.

- **U** Indicates the compound was analyzed and not detected.

- **Y** Samples that had recoveries of labeled standards outside the acceptance limits are flagged with 'Y'. In all cases, the signal-to-noise ratios are greater than 10:1, making these data acceptable.

- **ND** Indicates concentration is reported as 'Not Detected.'

- **S** Peak is saturated; data not reportable.

- **P** Indicates chlorodiphenyl ether interference present at the retention time of the target compound.

- **Q** Lock-mass interference by chlorodiphenyl ether compounds.

CAS/HOU - Form Production, Peer Review & Project Review Signatures

SR# Unique ID: E0900587 Confirmation

First Level – Data Processing – to be filled by person generating the forms

Date	08/10/09	Person 1	LL (-013, -014, -015, -016)
Date		Person 2	

Second Level – Data Review – to be filled by person doing peer review

Date	8/11/09	Primary Data Reviewer	QC (013-016)
Date		Secondary Data Reviewer	

Project Level – Review – to be filled by person doing project compliance review

Date	08/14/09	Reviewer	

CAS/HOU - Form Production, Peer Review & Project Review Signatures

SR# Unique ID: EQ900587

First Level - Data Processing - to be filled by person generating the forms

Date	08/11/09	Person 1	(013-016)
Date		Person 2	

Second Level - Data Review – to be filled by person doing peer review

Date	8/13/09	Primary Data Reviewer	(QC 013-016)
Date		Secondary Data Reviewer	

Project Level - Review - to be filled by person doing project compliance review

Date	08/14/09	Reviewer	

CAS/HOU - Form Production, Peer Review & Project Review Signatures

SR# Unique ID: EQ800587

First Level - Data Processing - to be filled by person generating the forms

Date	08/13/09	Person 1	MC (013DL-016DL)
Date		Person 2	

Second Level - Data Review – to be filled by person doing peer review

Date	08/13/09	Primary Data Reviewer	
Date		Secondary Data Reviewer	

Project Level - Review - to be filled by person doing project compliance review

Date	08/14/09	Reviewer	

Columbia Analytical Services INC

Analytical Results

19408 Park Row, Suite 320, Houston, TX 77084
Phone (713)266-1599 Fax (713)266-0130
www.caslab.com

An Employee Owned Company

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1030
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	Line A-U	**Units:**	ng/Kg
Lab Code:	E0900587-011	**Basis:**	Dry
		Percent Solids:	48.9

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/4/09 2249
Prep Method:	Method	**Date Extracted:**	7/31/09
Sample Amount:	10.230g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104301	**Blank File Name:**	U132365
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104294

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	0.198	2.00			1
1,2,3,7,8-PeCDD	**3.49**	J	0.299	5.00	1.78	1.000	1
1,2,3,4,7,8-HxCDD	**9.30**		0.535	5.00	1.11	0.998	1
1,2,3,6,7,8-HxCDD	**42.1**		0.437	5.00	1.29	1.000	1
1,2,3,7,8,9-HxCDD	**24.8**		0.478	5.00	1.28	1.008	1
1,2,3,4,6,7,8-HpCDD	**1190**	E	1.17	5.00	1.04	1.000	1
OCDD	**11000**	BE	0.891	10.0	0.89	1.000	1
2,3,7,8-TCDF	**2.42**	C	0.136	2.00	0.83	1.001	1
1,2,3,7,8-PeCDF	**4.56**	J	0.293	5.00	1.52	1.000	1
2,3,4,7,8-PeCDF	**3.66**	JK	0.286	5.00	1.85	1.022	1
1,2,3,4,7,8-HxCDF	**35.9**		0.895	5.00	1.23	1.000	1
1,2,3,6,7,8-HxCDF	**11.2**		0.835	5.00	1.15	1.003	1
1,2,3,7,8,9-HxCDF	**1.20**	J	1.03	5.00	1.19	1.035	1
2,3,4,6,7,8-HxCDF	**15.8**		0.946	5.00	1.31	1.015	1
1,2,3,4,6,7,8-HpCDF	**308**		1.94	5.00	1.04	1.000	1
1,2,3,4,7,8,9-HpCDF	**31.2**		2.56	5.00	1.06	1.034	1
OCDF	**1230**		0.720	10.0	0.89	1.004	1
Total Tetra-Dioxins	**14.4**		0.198	2.00	0.68		1
Total Penta-Dioxins	**34.6**		0.299	5.00	1.56		1
Total Hexa-Dioxins	**239**		0.437	5.00	1.21		1
Total Hepta-Dioxins	**2010**		1.17	5.00	1.04		1
Total Tetra-Furans	**23.2**		0.136	2.00	0.79		1
Total Penta-Furans	**75.6**		0.286	5.00	1.65		1
Total Hexa-Furans	**573**		0.835	5.00	1.19		1
Total Hepta-Furans	**995**		1.94	5.00	1.04		1

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1030
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	Line A-U	**Units:**	Percent
Lab Code:	E0900587-011	**Basis:**	Dry
		Percent Solids:	48.9

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/4/09 2249
Prep Method:	Method	**Date Extracted:**	7/31/09
Sample Amount:	10.230g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104301	**Blank File Name:**	U132365
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104294

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1000	610.925	61		40-135	0.77	1.007
13C-1,2,3,7,8-PeCDD	1000	514.820	51		40-135	1.54	1.160
13C-1,2,3,6,7,8-HxCDD	2500	1696.201	68		40-135	1.25	0.993
13C-1,2,3,4,6,7,8-HpCDD	2500	1544.119	62		40-135	1.06	1.069
13C-OCDD	5000	2640.004	53		40-135	0.88	1.151
13C-2,3,7,8-TCDF	1000	673.605	67		40-135	0.77	0.979
13C-1,2,3,7,8-PeCDF	1000	558.740	56		40-135	1.58	1.124
13C-1,2,3,4,7,8-HxCDF	2500	1522.215	61		40-135	0.52	0.972
13C-1,2,3,4,6,7,8-HpCDF	2500	1303.845	52		40-135	0.44	1.044
37Cl-2,3,7,8-TCDD	800	601.249	75		40-135	NA	1.008

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1030
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	Line A-U	**Units:**	ng/Kg
Lab Code:	E0900587-011	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method

Analyte Name	Result	DL	Dilution Factor	TEF	TEF - Adjusted Concentration
2,3,7,8-TCDD	ND	0.198	1	1	
1,2,3,7,8-PeCDD	**3.49**	0.299	1	1	3.49
1,2,3,4,7,8-HxCDD	**9.30**	0.535	1	0.1	0.930
1,2,3,6,7,8-HxCDD	**42.1**	0.437	1	0.1	4.21
1,2,3,7,8,9-HxCDD	**24.8**	0.478	1	0.1	2.48
1,2,3,4,6,7,8-HpCDD	**1190**	1.17	1	0.01	11.9
OCDD	**11000**	0.891	1	0.0003	3.30
2,3,7,8-TCDF	**1.60**	0.159	1	0.1	0.160
1,2,3,7,8-PeCDF	**4.56**	0.293	1	0.03	0.137
2,3,4,7,8-PeCDF	**3.66**	0.286	1	0.3	1.10
1,2,3,4,7,8-HxCDF	**35.9**	0.895	1	0.1	3.59
1,2,3,6,7,8-HxCDF	**11.2**	0.835	1	0.1	1.12
1,2,3,7,8,9-HxCDF	**1.20**	1.03	1	0.1	0.120
2,3,4,6,7,8-HxCDF	**15.8**	0.946	1	0.1	1.58
1,2,3,4,6,7,8-HpCDF	**308**	1.94	1	0.01	3.08
1,2,3,4,7,8,9-HpCDF	**31.2**	2.56	1	0.01	0.312
OCDF	**1230**	0.720	1	0.0003	0.369
		Total TEQ			37.9

2005 WHO TEFs, ND = 0

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1030
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	Line A-U	**Units:**	ng/Kg
Lab Code:	E0900587-011	**Basis:**	Dry
Run Type:	Reanalysis	**Percent Solids:**	48.9

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/5/09 2031
Prep Method:	Method	**Date Extracted:**	7/31/09
Sample Amount:	10.230g	**Instrument Name:**	E-HRMS-04
		GC Column:	DB-225
Data File Name:	P203585	**Blank File Name:**	P203583
ICAL Date:	03/16/09	**Cal Ver. File Name:**	P203581

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDF	**1.60**	J	0.159	2.00	0.75	1.001	1

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDF	1000	714.267	71		40-135	0.76	1.059
37Cl-2,3,7,8-TCDD	800	793.543	99		40-135	NA	0.987

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1035
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	Line A-L	**Units:**	ng/Kg
Lab Code:	E0900587-012	**Basis:**	Dry
		Percent Solids:	42.5

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/4/09 2336
Prep Method:	Method	**Date Extracted:**	7/31/09
Sample Amount:	10.181g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104302	**Blank File Name:**	U132365
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104294

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	0.183	2.31			1
1,2,3,7,8-PeCDD	ND	U	0.241	5.78			1
1,2,3,4,7,8-HxCDD	ND	U	0.522	5.78			1
1,2,3,6,7,8-HxCDD	ND	U	0.426	5.78			1
1,2,3,7,8,9-HxCDD	ND	U	0.466	5.78			1
1,2,3,4,6,7,8-HpCDD	**11.8**		0.498	5.78	1.12	1.000	1
OCDD	**117**	B	1.01	11.6	0.88	1.000	1
2,3,7,8-TCDF	ND	U	0.118	2.31			1
1,2,3,7,8-PeCDF	ND	U	0.175	5.78			1
2,3,4,7,8-PeCDF	ND	U	0.171	5.78			1
1,2,3,4,7,8-HxCDF	ND	U	0.288	5.78			1
1,2,3,6,7,8-HxCDF	ND	U	0.269	5.78			1
1,2,3,7,8,9-HxCDF	ND	U	0.331	5.78			1
2,3,4,6,7,8-HxCDF	ND	U	0.305	5.78			1
1,2,3,4,6,7,8-HpCDF	**3.03**	J	0.665	5.78	1.14	1.000	1
1,2,3,4,7,8,9-HpCDF	ND	U	0.878	5.78			1
OCDF	**10.6**	JK	0.609	11.6	1.03	1.004	1
Total Tetra-Dioxins	**1.79**	J	0.183	2.31	0.70		1
Total Penta-Dioxins	ND	U	0.241	5.78			1
Total Hexa-Dioxins	**1.31**	J	0.426	5.78	1.16		1
Total Hepta-Dioxins	**19.6**		0.498	5.78	1.08		1
Total Tetra-Furans	**1.35**	J	0.118	2.31	0.85		1
Total Penta-Furans	**0.531**	J	0.171	5.78	1.76		1
Total Hexa-Furans	**2.61**	J	0.269	5.78	1.29		1
Total Hepta-Furans	**8.38**		0.665	5.78	1.14		1

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1035
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	Line A-L	**Units:**	Percent
Lab Code:	E0900587-012	**Basis:**	Dry
		Percent Solids:	42.5

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/4/09 2336
Prep Method:	Method	**Date Extracted:**	7/31/09
Sample Amount:	10.181g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104302	**Blank File Name:**	U132365
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104294

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1000	676.630	68		40-135	0.78	1.007
13C-1,2,3,7,8-PeCDD	1000	573.846	57		40-135	1.58	1.160
13C-1,2,3,6,7,8-HxCDD	2500	1896.388	76		40-135	1.26	0.993
13C-1,2,3,4,6,7,8-HpCDD	2500	1686.321	67		40-135	1.07	1.069
13C-OCDD	5000	3110.607	62		40-135	0.89	1.151
13C-2,3,7,8-TCDF	1000	763.072	76		40-135	0.78	0.979
13C-1,2,3,7,8-PeCDF	1000	610.765	61		40-135	1.58	1.124
13C-1,2,3,4,7,8-HxCDF	2500	1688.142	68		40-135	0.52	0.973
13C-1,2,3,4,6,7,8-HpCDF	2500	1437.244	57		40-135	0.44	1.044
37Cl-2,3,7,8-TCDD	800	650.579	81		40-135	NA	1.008

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1035
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	Line A-L	**Units:**	ng/Kg
Lab Code:	E0900587-012	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method

Analyte Name	Result	DL	Dilution Factor	TEF	TEF - Adjusted Concentration
2,3,7,8-TCDD	ND	0.183	1	1	
1,2,3,7,8-PeCDD	ND	0.241	1	1	
1,2,3,4,7,8-HxCDD	ND	0.522	1	0.1	
1,2,3,6,7,8-HxCDD	ND	0.426	1	0.1	
1,2,3,7,8,9-HxCDD	ND	0.466	1	0.1	
1,2,3,4,6,7,8-HpCDD	**11.8**	0.498	1	0.01	0.118
OCDD	**117**	1.01	1	0.0003	0.0351
2,3,7,8-TCDF	ND	0.118	1	0.1	
1,2,3,7,8-PeCDF	ND	0.175	1	0.03	
2,3,4,7,8-PeCDF	ND	0.171	1	0.3	
1,2,3,4,7,8-HxCDF	ND	0.288	1	0.1	
1,2,3,6,7,8-HxCDF	ND	0.269	1	0.1	
1,2,3,7,8,9-HxCDF	ND	0.331	1	0.1	
2,3,4,6,7,8-HxCDF	ND	0.305	1	0.1	
1,2,3,4,6,7,8-HpCDF	**3.03**	0.665	1	0.01	0.0303
1,2,3,4,7,8,9-HpCDF	ND	0.878	1	0.01	
OCDF	**10.6**	0.609	1	0.0003	0.00318
		Total TEQ			0.187

2005 WHO TEFs, ND = 0

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1230
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T2-Comp	**Units:**	ng/Kg
Lab Code:	E0900587-013	**Basis:**	Dry
		Percent Solids:	74.0

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/7/09 1058
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.508g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104367	**Blank File Name:**	U132415
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104361

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	**0.913**	J	0.0564	1.29	0.69	1.001	1
1,2,3,7,8-PeCDD	**8.07**		0.0995	3.22	1.58	1.000	1
1,2,3,4,7,8-HxCDD	**26.7**		0.0798	3.22	1.18	0.998	1
1,2,3,6,7,8-HxCDD	**471**		0.0736	3.22	1.25	1.000	1
1,2,3,7,8,9-HxCDD	**83.6**		0.0740	3.22	1.25	1.008	1
1,2,3,4,6,7,8-HpCDD	**16600**	BE	2.49	3.22	1.04	1.001	1
OCDD	**148000**	BE	0.360	6.43	0.94	1.000	1
2,3,7,8-TCDF	**11.1**	C	0.0589	1.29	0.76	1.001	1
1,2,3,7,8-PeCDF	**11.8**	P	0.170	3.22	1.63	1.001	1
2,3,4,7,8-PeCDF	**10.6**		0.158	3.22	1.58	1.023	1
1,2,3,4,7,8-HxCDF	**154**	P	1.03	3.22	1.25	1.000	1
1,2,3,6,7,8-HxCDF	**36.5**		0.963	3.22	1.30	1.003	1
1,2,3,7,8,9-HxCDF	**10.2**	P	1.12	3.22	1.26	1.035	1
2,3,4,6,7,8-HxCDF	**66.3**	P	1.01	3.22	1.29	1.015	1
1,2,3,4,6,7,8-HpCDF	**4550**	BE	1.17	3.22	1.05	1.000	1
1,2,3,4,7,8,9-HpCDF	**331**		1.48	3.22	1.05	1.034	1
OCDF	**41500**	EP	0.351	6.43	0.89	1.004	1
Total Tetra-Dioxins	**42.0**		0.0564	1.29	0.76		1
Total Penta-Dioxins	**101**		0.0995	3.22	1.53		1
Total Hexa-Dioxins	**1610**		0.0736	3.22	1.26		1
Total Hepta-Dioxins	**23700**		2.49	3.22	1.04		1
Total Tetra-Furans	**56.2**		0.0589	1.29	0.75		1
Total Penta-Furans	**239**		0.158	3.22	1.59		1
Total Hexa-Furans	**1290**		0.963	3.22	1.26		1
Total Hepta-Furans	**4880**		1.17	3.22	1.05		1

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1230
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T2-Comp	**Units:**	Percent
Lab Code:	E0900587-013	**Basis:**	Dry
		Percent Solids:	74.0

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/7/09 1058
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.508g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104367	**Blank File Name:**	U132415
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104361

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1000	724.424	72		40-135	0.78	1.008
13C-1,2,3,7,8-PeCDD	1000	534.918	53		40-135	1.54	1.160
13C-1,2,3,6,7,8-HxCDD	2500	1954.383	78		40-135	1.24	0.993
13C-1,2,3,4,6,7,8-HpCDD	2500	1501.473	60		40-135	1.07	1.069
13C-OCDD	5000	2568.677	51		40-135	0.90	1.153
13C-2,3,7,8-TCDF	1000	771.283	77		40-135	0.78	0.979
13C-1,2,3,7,8-PeCDF	1000	662.064	66		40-135	1.58	1.124
13C-1,2,3,4,7,8-HxCDF	2500	2010.900	80		40-135	0.52	0.973
13C-1,2,3,4,6,7,8-HpCDF	2500	1529.987	61		40-135	0.44	1.045
37Cl-2,3,7,8-TCDD	800	677.002	85		40-135	NA	1.008

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1230
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T2-Comp	**Units:**	ng/Kg
Lab Code:	E0900587-013	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method

Analyte Name	Result	DL	Dilution Factor	TEF	TEF - Adjusted Concentration
2,3,7,8-TCDD	**0.913**	0.0564	1	1	0.913
1,2,3,7,8-PeCDD	**8.07**	0.0995	1	1	8.07
1,2,3,4,7,8-HxCDD	**26.7**	0.0798	1	0.1	2.67
1,2,3,6,7,8-HxCDD	**471**	0.0736	1	0.1	47.1
1,2,3,7,8,9-HxCDD	**83.6**	0.0740	1	0.1	8.36
1,2,3,4,6,7,8-HpCDD	**17300**	34.6	80	0.01	173
OCDD	**132000**	20.6	80	0.0003	39.6
2,3,7,8-TCDF	**4.26**	0.0860	1	0.1	0.426
1,2,3,7,8-PeCDF	**11.8**	0.170	1	0.03	0.354
2,3,4,7,8-PeCDF	**10.6**	0.158	1	0.3	3.18
1,2,3,4,7,8-HxCDF	**154**	1.03	1	0.1	15.4
1,2,3,6,7,8-HxCDF	**36.5**	0.963	1	0.1	3.65
1,2,3,7,8,9-HxCDF	**10.2**	1.12	1	0.1	1.02
2,3,4,6,7,8-HxCDF	**66.3**	1.01	1	0.1	6.63
1,2,3,4,6,7,8-HpCDF	**4310**	34.7	80	0.01	43.1
1,2,3,4,7,8,9-HpCDF	**331**	1.48	1	0.01	3.31
OCDF	**32400**	19.5	80	0.0003	9.72
		Total TEQ			367

2005 WHO TEFs, ND = 0

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1230
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T2-Comp	**Units:**	ng/Kg
Lab Code:	E0900587-013	**Basis:**	Dry
Run Type:	Dilution	**Percent Solids:**	74.0

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/10/09 1954
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.508g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104400	**Blank File Name:**	U132415
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104397

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	7.59	103			80
1,2,3,7,8-PeCDD	ND	U	11.3	257			80
1,2,3,4,7,8-HxCDD	**32.1**	JK	9.69	257	1.00	0.998	80
1,2,3,6,7,8-HxCDD	**399**		8.83	257	1.22	1.000	80
1,2,3,7,8,9-HxCDD	**122**	J	8.97	257	1.09	1.008	80
1,2,3,4,6,7,8-HpCDD	**17300**	B	34.6	257	1.04	1.000	80
OCDD	**132000**	B	20.6	514	0.90	1.000	80
2,3,7,8-TCDF	ND	U	6.93	103			80
1,2,3,7,8-PeCDF	ND	U	9.54	257			80
2,3,4,7,8-PeCDF	ND	U	9.01	257			80
1,2,3,4,7,8-HxCDF	**135**	J	30.0	257	1.36	1.000	80
1,2,3,6,7,8-HxCDF	**38.0**	J	28.1	257	1.08	1.003	80
1,2,3,7,8,9-HxCDF	ND	U	33.5	257			80
2,3,4,6,7,8-HxCDF	**85.9**	J	30.4	257	1.14	1.015	80
1,2,3,4,6,7,8-HpCDF	**4310**	B	34.7	257	1.05	1.000	80
1,2,3,4,7,8,9-HpCDF	**430**		43.8	257	1.04	1.034	80
OCDF	**32400**		19.5	514	0.89	1.004	80

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1230
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T2-Comp	**Units:**	Percent
Lab Code:	E0900587-013	**Basis:**	Dry
Run Type:	Dilution	**Percent Solids:**	74.0

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/10/09 1954
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.508g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104400	**Blank File Name:**	U132415
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104397

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1390	1317.292	95		40-135	0.80	1.007
13C-1,2,3,7,8-PeCDD	1890	1221.865	65		40-135	1.60	1.161
13C-1,2,3,6,7,8-HxCDD	3210	3235.253	101		40-135	1.26	0.992
13C-1,2,3,4,6,7,8-HpCDD	4170	3407.649	82		40-135	1.07	1.068
13C-OCDD	9800	7431.767	76		40-135	0.90	1.150
13C-2,3,7,8-TCDF	1300	1299.280	100		40-135	0.80	0.980
13C-1,2,3,7,8-PeCDF	1520	1280.758	85		40-135	1.59	1.125
13C-1,2,3,4,7,8-HxCDF	3130	3219.796	103		40-135	0.52	0.972
13C-1,2,3,4,6,7,8-HpCDF	4100	3220.639	79		40-135	0.45	1.044
37Cl-2,3,7,8-TCDD	800	9.616	96		40-135	NA	1.008

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1230
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T2-Comp	**Units:**	ng/Kg
Lab Code:	E0900587-013	**Basis:**	Dry
Run Type:	Reanalysis	**Percent Solids:**	74.0

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/7/09 2153
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.508g	**Instrument Name:**	E-HRMS-04
		GC Column:	DB-225
Data File Name:	P203631	**Blank File Name:**	P203627
ICAL Date:	03/16/09	**Cal Ver. File Name:**	P203625

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDF	**4.26**		0.0860	1.29	0.75	1.001	1

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDF	1000	757.524	76		40-135	0.75	1.059
37Cl-2,3,7,8-TCDD	800	790.765	99		40-135	NA	0.987

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:		**Service Request:**	
Project:	NA	**Date Collected:**	NA
Sample Matrix:		**Date Received:**	NA
Sample Name:		**Units:**	
Lab Code:		**Basis:**	
Run Type:		**Percent Solids:**	

Analytical Method:
Prep Method:

Analytical Method:		**Date Analyzed:**	
Prep Method:		**Date Extracted:**	
Sample Amount:		**Instrument Name:**	
		GC Column:	
Data File Name:		**Blank File Name:**	
ICAL Date:		**Cal Ver. File Name:**	

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor	Date Analyzed	Date Extracted

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor

Labeled Compounds	Spike Conc.()	Conc. Found ()	%Rec	Q	Control Limits	Ion Ratio	RRT

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1400
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T1-Comp	**Units:**	ng/Kg
Lab Code:	E0900587-014	**Basis:**	Dry
		Percent Solids:	65.6

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/7/09 1145
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.283g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104368	**Blank File Name:**	U132415
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104361

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	**2.26**		0.105	1.48	0.75	1.001	1
1,2,3,7,8-PeCDD	**10.8**		0.125	3.71	1.56	1.000	1
1,2,3,4,7,8-HxCDD	**34.7**		0.189	3.71	1.21	0.998	1
1,2,3,6,7,8-HxCDD	**794**	E	0.175	3.71	1.25	1.000	1
1,2,3,7,8,9-HxCDD	**123**		0.176	3.71	1.29	1.008	1
1,2,3,4,6,7,8-HpCDD	**27400**	BE	5.75	3.71	1.04	1.000	1
OCDD	**189000**	BE	0.694	7.41	0.95	1.000	1
2,3,7,8-TCDF	**7.48**	CK	0.0865	1.48	0.62	1.001	1
1,2,3,7,8-PeCDF	**5.34**	P	0.183	3.71	1.53	1.000	1
2,3,4,7,8-PeCDF	**6.18**		0.171	3.71	1.48	1.022	1
1,2,3,4,7,8-HxCDF	**170**		1.17	3.71	1.25	1.000	1
1,2,3,6,7,8-HxCDF	**27.7**		1.10	3.71	1.21	1.003	1
1,2,3,7,8,9-HxCDF	**4.38**	P	1.28	3.71	1.10	1.035	1
2,3,4,6,7,8-HxCDF	**70.0**		1.15	3.71	1.22	1.015	1
1,2,3,4,6,7,8-HpCDF	**7430**	BE	1.94	3.71	1.05	1.000	1
1,2,3,4,7,8,9-HpCDF	**529**		2.47	3.71	1.05	1.034	1
OCDF	**71200**	EP	0.528	7.41	0.90	1.004	1
Total Tetra-Dioxins	**75.7**		0.105	1.48	0.74		1
Total Penta-Dioxins	**256**		0.125	3.71	1.55		1
Total Hexa-Dioxins	**2930**		0.175	3.71	1.25		1
Total Hepta-Dioxins	**39000**		5.75	3.71	1.04		1
Total Tetra-Furans	**53.2**		0.0865	1.48	0.70		1
Total Penta-Furans	**244**		0.171	3.71	1.57		1
Total Hexa-Furans	**1390**		1.10	3.71	1.27		1
Total Hepta-Furans	**7960**		1.94	3.71	1.05		1

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1400
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T1-Comp	**Units:**	Percent
Lab Code:	E0900587-014	**Basis:**	Dry
		Percent Solids:	65.6

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/7/09 1145
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.283g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104368	**Blank File Name:**	U132415
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104361

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1000	706.676	71		40-135	0.77	1.007
13C-1,2,3,7,8-PeCDD	1000	520.647	52		40-135	1.54	1.160
13C-1,2,3,6,7,8-HxCDD	2500	1909.287	76		40-135	1.26	0.993
13C-1,2,3,4,6,7,8-HpCDD	2500	1378.282	55		40-135	1.06	1.069
13C-OCDD	5000	2698.701	54		40-135	0.90	1.153
13C-2,3,7,8-TCDF	1000	753.082	75		40-135	0.78	0.979
13C-1,2,3,7,8-PeCDF	1000	658.762	66		40-135	1.58	1.124
13C-1,2,3,4,7,8-HxCDF	2500	1951.475	78		40-135	0.52	0.972
13C-1,2,3,4,6,7,8-HpCDF	2500	1529.950	61		40-135	0.44	1.044
37Cl-2,3,7,8-TCDD	800	665.951	83		40-135	NA	1.008

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1400
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T1-Comp	**Units:**	ng/Kg
Lab Code:	E0900587-014	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method

Analyte Name	Result	DL	Dilution Factor	TEF	TEF - Adjusted Concentration
2,3,7,8-TCDD	**2.26**	0.105	1	1	2.26
1,2,3,7,8-PeCDD	**10.8**	0.125	1	1	10.8
1,2,3,4,7,8-HxCDD	**34.7**	0.189	1	0.1	3.47
1,2,3,6,7,8-HxCDD	**708**	15.8	80	0.1	70.8
1,2,3,7,8,9-HxCDD	**123**	0.176	1	0.1	12.3
1,2,3,4,6,7,8-HpCDD	**32900**	78.2	80	0.01	329
OCDD	**234000**	14.3	80	0.0003	70.2
2,3,7,8-TCDF	**1.49**	0.310	1	0.1	0.149
1,2,3,7,8-PeCDF	**5.34**	0.183	1	0.03	0.160
2,3,4,7,8-PeCDF	**6.18**	0.171	1	0.3	1.85
1,2,3,4,7,8-HxCDF	**170**	1.17	1	0.1	17.0
1,2,3,6,7,8-HxCDF	**27.7**	1.10	1	0.1	2.77
1,2,3,7,8,9-HxCDF	**4.38**	1.28	1	0.1	0.438
2,3,4,6,7,8-HxCDF	**70.0**	1.15	1	0.1	7.00
1,2,3,4,6,7,8-HpCDF	**7540**	62.4	80	0.01	75.4
1,2,3,4,7,8,9-HpCDF	**529**	2.47	1	0.01	5.29
OCDF	**63000**	12.6	80	0.0003	18.9
		Total TEQ			628

2005 WHO TEFs, ND = 0

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1400
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T1-Comp	**Units:**	ng/Kg
Lab Code:	E0900587-014	**Basis:**	Dry
Run Type:	Dilution	**Percent Solids:**	65.6

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/10/09 2042
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.283g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104401	**Blank File Name:**	U132415
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104397

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	10.8	119			80
1,2,3,7,8-PeCDD	ND	U	10.6	296			80
1,2,3,4,7,8-HxCDD	**47.4**	J	17.3	296	1.23	0.999	80
1,2,3,6,7,8-HxCDD	**708**		15.8	296	1.22	1.000	80
1,2,3,7,8,9-HxCDD	**173**	J	16.0	296	1.34	1.008	80
1,2,3,4,6,7,8-HpCDD	**32900**	B	78.2	296	1.03	1.001	80
OCDD	**234000**	BE	14.3	593	0.89	1.000	80
2,3,7,8-TCDF	ND	U	8.58	119			80
1,2,3,7,8-PeCDF	ND	U	9.92	296			80
2,3,4,7,8-PeCDF	ND	U	9.37	296			80
1,2,3,4,7,8-HxCDF	**164**	J	20.0	296	1.15	1.000	80
1,2,3,6,7,8-HxCDF	ND	U	18.7	296			80
1,2,3,7,8,9-HxCDF	ND	U	22.3	296			80
2,3,4,6,7,8-HxCDF	**91.3**	J	20.3	296	1.33	1.015	80
1,2,3,4,6,7,8-HpCDF	**7540**	B	62.4	296	1.06	1.000	80
1,2,3,4,7,8,9-HpCDF	**620**		78.8	296	1.10	1.034	80
OCDF	**63000**		12.6	593	0.90	1.005	80

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1400
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T1-Comp	**Units:**	Percent
Lab Code:	E0900587-014	**Basis:**	Dry
Run Type:	Dilution	**Percent Solids:**	65.6

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/10/09 2042
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.283g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104401	**Blank File Name:**	U132415
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104397

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1410	1459.133	104		40-135	0.80	1.007
13C-1,2,3,7,8-PeCDD	1920	1427.321	74		40-135	1.55	1.161
13C-1,2,3,6,7,8-HxCDD	3290	3488.251	106		40-135	1.26	0.992
13C-1,2,3,4,6,7,8-HpCDD	4550	3578.771	79		40-135	1.06	1.068
13C-OCDD	9260	8189.591	88		40-135	0.90	1.150
13C-2,3,7,8-TCDF	1330	1466.599	110		40-135	0.78	0.980
13C-1,2,3,7,8-PeCDF	1520	1512.890	100		40-135	1.60	1.125
13C-1,2,3,4,7,8-HxCDF	3210	3499.284	109		40-135	0.52	0.972
13C-1,2,3,4,6,7,8-HpCDF	4100	4098.920	100		40-135	0.45	1.044
37Cl-2,3,7,8-TCDD	800	10.740	107		40-135	NA	1.008

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1400
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T1-Comp	**Units:**	ng/Kg
Lab Code:	E0900587-014	**Basis:**	Dry
Run Type:	Reanalysis	**Percent Solids:**	65.6

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/7/09 2230
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.283g	**Instrument Name:**	E-HRMS-04
		GC Column:	DB-225
Data File Name:	P203632	**Blank File Name:**	P203627
ICAL Date:	03/16/09	**Cal Ver. File Name:**	P203625

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDF	**1.49**	K	0.310	1.48	0.61	1.001	1

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDF	1000	583.545	58		40-135	0.75	1.059
37Cl-2,3,7,8-TCDD	800	818.715	102		40-135	NA	0.987

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:		**Service Request:**	
Project:	NA	**Date Collected:**	NA
Sample Matrix:		**Date Received:**	NA
Sample Name:		**Units:**	
Lab Code:		**Basis:**	
Run Type:		**Percent Solids:**	

Analytical Method:
Prep Method:

Analytical Method:		**Date Analyzed:**	
Prep Method:		**Date Extracted:**	
Sample Amount:		**Instrument Name:**	
		GC Column:	
Data File Name:		**Blank File Name:**	
ICAL Date:		**Cal Ver. File Name:**	

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor	Date Analyzed	Date Extracted

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor

Labeled Compounds	Spike Conc.()	Conc. Found ()	%Rec	Q	Control Limits	Ion Ratio	RRT

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1445
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T4-1	**Units:**	ng/Kg
Lab Code:	E0900587-015	**Basis:**	Dry
		Percent Solids:	43.1

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/7/09 1233
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.545g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104369	**Blank File Name:**	U132415
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104361

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	0.167	2.20			1
1,2,3,7,8-PeCDD	**3.57**	J	0.214	5.50	1.49	1.000	1
1,2,3,4,7,8-HxCDD	**5.78**		0.395	5.50	1.31	0.998	1
1,2,3,6,7,8-HxCDD	**169**		0.364	5.50	1.26	1.000	1
1,2,3,7,8,9-HxCDD	**25.4**		0.366	5.50	1.26	1.008	1
1,2,3,4,6,7,8-HpCDD	**7790**	BE	4.62	5.50	1.04	1.000	1
OCDD	**99600**	BE	0.745	11.0	0.89	1.000	1
2,3,7,8-TCDF	**0.539**	CJP	0.147	2.20	0.73	1.001	1
1,2,3,7,8-PeCDF	**1.67**	JKP	0.318	5.50	1.93	1.001	1
2,3,4,7,8-PeCDF	**0.471**	J	0.296	5.50	1.68	1.023	1
1,2,3,4,7,8-HxCDF	**28.0**		1.26	5.50	1.26	1.000	1
1,2,3,6,7,8-HxCDF	**4.64**	J	1.18	5.50	1.18	1.003	1
1,2,3,7,8,9-HxCDF	ND	U	1.37	5.50			1
2,3,4,6,7,8-HxCDF	**13.7**		1.23	5.50	1.27	1.015	1
1,2,3,4,6,7,8-HpCDF	**1700**	BE	2.14	5.50	1.05	1.000	1
1,2,3,4,7,8,9-HpCDF	**119**		2.72	5.50	1.06	1.035	1
OCDF	**16000**	E	0.503	11.0	0.89	1.004	1
Total Tetra-Dioxins	**62.5**		0.167	2.20	0.76		1
Total Penta-Dioxins	**1230**		0.214	5.50	1.57		1
Total Hexa-Dioxins	**8710**		0.364	5.50	1.26		1
Total Hepta-Dioxins	**15300**		4.62	5.50	1.04		1
Total Tetra-Furans	**4.18**		0.147	2.20	0.68		1
Total Penta-Furans	**21.3**		0.296	5.50	1.61		1
Total Hexa-Furans	**233**		1.18	5.50	1.30		1
Total Hepta-Furans	**1820**		2.14	5.50	1.05		1

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1445
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T4-1	**Units:**	Percent
Lab Code:	E0900587-015	**Basis:**	Dry
		Percent Solids:	43.1

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/7/09 1233
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.545g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104369	**Blank File Name:**	U132415
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104361

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1000	702.411	70		40-135	0.76	1.008
13C-1,2,3,7,8-PeCDD	1000	517.099	52		40-135	1.56	1.160
13C-1,2,3,6,7,8-HxCDD	2500	1914.971	77		40-135	1.25	0.993
13C-1,2,3,4,6,7,8-HpCDD	2500	1422.766	57		40-135	1.05	1.069
13C-OCDD	5000	2938.259	59		40-135	0.89	1.152
13C-2,3,7,8-TCDF	1000	731.582	73		40-135	0.79	0.979
13C-1,2,3,7,8-PeCDF	1000	635.688	64		40-135	1.60	1.124
13C-1,2,3,4,7,8-HxCDF	2500	1973.736	79		40-135	0.52	0.973
13C-1,2,3,4,6,7,8-HpCDF	2500	1470.068	59		40-135	0.44	1.044
37Cl-2,3,7,8-TCDD	800	671.166	84		40-135	NA	1.008

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1445
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T4-1	**Units:**	ng/Kg
Lab Code:	E0900587-015	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method

Analyte Name	Result	DL	Dilution Factor	TEF	TEF - Adjusted Concentration
2,3,7,8-TCDD	ND	0.167	1	1	
1,2,3,7,8-PeCDD	**3.57**	0.214	1	1	3.57
1,2,3,4,7,8-HxCDD	**5.78**	0.395	1	0.1	0.578
1,2,3,6,7,8-HxCDD	**169**	0.364	1	0.1	16.9
1,2,3,7,8,9-HxCDD	**25.4**	0.366	1	0.1	2.54
1,2,3,4,6,7,8-HpCDD	**10100**	28.0	30	0.01	101
OCDD	**97400**	9.10	30	0.0003	29.2
2,3,7,8-TCDF	ND	0.558	1	0.1	
1,2,3,7,8-PeCDF	**1.67**	0.318	1	0.03	0.0501
2,3,4,7,8-PeCDF	**0.471**	0.296	1	0.3	0.141
1,2,3,4,7,8-HxCDF	**28.0**	1.26	1	0.1	2.80
1,2,3,6,7,8-HxCDF	**4.64**	1.18	1	0.1	0.464
1,2,3,7,8,9-HxCDF	ND	1.37	1	0.1	
2,3,4,6,7,8-HxCDF	**13.7**	1.23	1	0.1	1.37
1,2,3,4,6,7,8-HpCDF	**1880**	34.6	30	0.01	18.8
1,2,3,4,7,8,9-HpCDF	**119**	2.72	1	0.01	1.19
OCDF	**15400**	8.07	30	0.0003	4.62
		Total TEQ			183

2005 WHO TEFs, ND = 0

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1445
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T4-1	**Units:**	ng/Kg
Lab Code:	E0900587-015	**Basis:**	Dry
Run Type:	Dilution	**Percent Solids:**	43.1

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/10/09 2129
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.545g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104402	**Blank File Name:**	U132415
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104397

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	4.64	66.0			30
1,2,3,7,8-PeCDD	ND	U	7.18	165			30
1,2,3,4,7,8-HxCDD	ND	U	4.18	165			30
1,2,3,6,7,8-HxCDD	**179**		3.81	165	1.36	1.000	30
1,2,3,7,8,9-HxCDD	**53.2**	J	3.87	165	1.16	1.008	30
1,2,3,4,6,7,8-HpCDD	**10100**	B	28.0	165	1.04	1.000	30
OCDD	**97400**	B	9.10	330	0.90	1.000	30
2,3,7,8-TCDF	ND	U	4.26	66.0			30
1,2,3,7,8-PeCDF	ND	U	5.05	165			30
2,3,4,7,8-PeCDF	ND	U	4.77	165			30
1,2,3,4,7,8-HxCDF	**31.2**	JK	19.1	165	1.43	1.000	30
1,2,3,6,7,8-HxCDF	ND	U	17.9	165			30
1,2,3,7,8,9-HxCDF	ND	U	21.3	165			30
2,3,4,6,7,8-HxCDF	**25.3**	J	19.4	165	1.18	1.015	30
1,2,3,4,6,7,8-HpCDF	**1880**	B	34.6	165	1.05	1.000	30
1,2,3,4,7,8,9-HpCDF	**154**	J	43.7	165	1.05	1.034	30
OCDF	**15400**		8.07	330	0.88	1.004	30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1445
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T4-1	**Units:**	Percent
Lab Code:	E0900587-015	**Basis:**	Dry
Run Type:	Dilution	**Percent Solids:**	43.1

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/10/09 2129
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.545g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104402	**Blank File Name:**	U132415
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104397

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1430	1273.651	89		40-135	0.78	1.007
13C-1,2,3,7,8-PeCDD	1920	1170.691	61		40-135	1.58	1.161
13C-1,2,3,6,7,8-HxCDD	3250	2992.571	92		40-135	1.27	0.993
13C-1,2,3,4,6,7,8-HpCDD	4390	3124.884	71		40-135	1.07	1.068
13C-OCDD	8470	6984.650	82		40-135	0.90	1.150
13C-2,3,7,8-TCDF	1370	1286.590	94		40-135	0.79	0.979
13C-1,2,3,7,8-PeCDF	1560	1234.335	79		40-135	1.59	1.125
13C-1,2,3,4,7,8-HxCDF	3160	3030.028	96		40-135	0.53	0.972
13C-1,2,3,4,6,7,8-HpCDF	4240	3556.048	84		40-135	0.45	1.044
37Cl-2,3,7,8-TCDD	800	29.063	109		40-135	NA	1.007

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1445
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T4-1	**Units:**	ng/Kg
Lab Code:	E0900587-015	**Basis:**	Dry
Run Type:	Reanalysis	**Percent Solids:**	43.1

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/7/09 2307
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.545g	**Instrument Name:**	E-HRMS-04
		GC Column:	DB-225
Data File Name:	P203633	**Blank File Name:**	P203627
ICAL Date:	03/16/09	**Cal Ver. File Name:**	P203625

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDF	ND	U	0.558	2.20			1

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDF	1000	565.098	57		40-135	0.75	1.059
37Cl-2,3,7,8-TCDD	800	819.035	102		40-135	NA	0.987

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:		**Service Request:**	
Project:	NA	**Date Collected:**	NA
Sample Matrix:		**Date Received:**	NA
Sample Name:		**Units:**	
Lab Code:		**Basis:**	
Run Type:		**Percent Solids:**	

Analytical Method:
Prep Method:

Analytical Method:		**Date Analyzed:**	
Prep Method:		**Date Extracted:**	
Sample Amount:		**Instrument Name:**	
		GC Column:	
Data File Name:		**Blank File Name:**	
ICAL Date:		**Cal Ver. File Name:**	

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor	Date Analyzed	Date Extracted

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor

Labeled Compounds	Spike Conc.()	Conc. Found ()	%Rec	Q	Control Limits	Ion Ratio	RRT

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1530
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T3-Comp	**Units:**	ng/Kg
Lab Code:	E0900587-016	**Basis:**	Dry
		Percent Solids:	77.2

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/7/09 1321
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.895g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104370	**Blank File Name:**	U132415
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104361

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	**0.610**	JK	0.146	1.19	0.63	1.000	1
1,2,3,7,8-PeCDD	**4.47**		0.240	2.97	1.61	1.000	1
1,2,3,4,7,8-HxCDD	**12.6**		0.320	2.97	1.26	0.998	1
1,2,3,6,7,8-HxCDD	**108**		0.296	2.97	1.25	1.000	1
1,2,3,7,8,9-HxCDD	**35.1**		0.297	2.97	1.24	1.008	1
1,2,3,4,6,7,8-HpCDD	**4240**	BE	3.55	2.97	1.04	1.000	1
OCDD	**47500**	BE	0.400	5.94	0.90	1.000	1
2,3,7,8-TCDF	**2.05**	C	0.0759	1.19	0.67	1.001	1
1,2,3,7,8-PeCDF	**2.12**	JK	0.176	2.97	1.79	1.000	1
2,3,4,7,8-PeCDF	**1.52**	J	0.164	2.97	1.61	1.022	1
1,2,3,4,7,8-HxCDF	**22.5**		0.932	2.97	1.24	1.000	1
1,2,3,6,7,8-HxCDF	**5.82**		0.874	2.97	1.24	1.003	1
1,2,3,7,8,9-HxCDF	**2.15**	J	1.02	2.97	1.33	1.035	1
2,3,4,6,7,8-HxCDF	**14.1**		0.911	2.97	1.29	1.015	1
1,2,3,4,6,7,8-HpCDF	**1020**	BE	1.26	2.97	1.04	1.000	1
1,2,3,4,7,8,9-HpCDF	**71.2**		1.60	2.97	1.03	1.034	1
OCDF	**7940**	E	0.365	5.94	0.89	1.004	1
Total Tetra-Dioxins	**16.5**		0.146	1.19	0.81		1
Total Penta-Dioxins	**52.3**		0.240	2.97	1.56		1
Total Hexa-Dioxins	**523**		0.296	2.97	1.23		1
Total Hepta-Dioxins	**6560**		3.55	2.97	1.04		1
Total Tetra-Furans	**18.8**		0.0759	1.19	0.86		1
Total Penta-Furans	**64.9**		0.164	2.97	1.61		1
Total Hexa-Furans	**264**		0.874	2.97	1.26		1
Total Hepta-Furans	**1100**		1.26	2.97	1.04		1

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1530
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T3-Comp	**Units:**	Percent
Lab Code:	E0900587-016	**Basis:**	Dry
		Percent Solids:	77.2

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/7/09 1321
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.895g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104370	**Blank File Name:**	U132415
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104361

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1000	721.291	72		40-135	0.77	1.007
13C-1,2,3,7,8-PeCDD	1000	524.218	52		40-135	1.56	1.160
13C-1,2,3,6,7,8-HxCDD	2500	1916.147	77		40-135	1.25	0.993
13C-1,2,3,4,6,7,8-HpCDD	2500	1398.464	56		40-135	1.07	1.069
13C-OCDD	5000	2898.781	58		40-135	0.89	1.151
13C-2,3,7,8-TCDF	1000	765.598	77		40-135	0.78	0.979
13C-1,2,3,7,8-PeCDF	1000	641.579	64		40-135	1.57	1.124
13C-1,2,3,4,7,8-HxCDF	2500	1970.036	79		40-135	0.51	0.972
13C-1,2,3,4,6,7,8-HpCDF	2500	1428.437	57		40-135	0.44	1.044
37Cl-2,3,7,8-TCDD	800	679.643	85		40-135	NA	1.008

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1530
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T3-Comp	**Units:**	ng/Kg
Lab Code:	E0900587-016	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method

Analyte Name	Result	DL	Dilution Factor	TEF	TEF - Adjusted Concentration
2,3,7,8-TCDD	**0.610**	0.146	1	1	0.610
1,2,3,7,8-PeCDD	**4.47**	0.240	1	1	4.47
1,2,3,4,7,8-HxCDD	**12.6**	0.320	1	0.1	1.26
1,2,3,6,7,8-HxCDD	**108**	0.296	1	0.1	10.8
1,2,3,7,8,9-HxCDD	**35.1**	0.297	1	0.1	3.51
1,2,3,4,6,7,8-HpCDD	**5360**	5.70	30	0.01	53.6
OCDD	**44700**	3.92	30	0.0003	13.4
2,3,7,8-TCDF	**0.772**	0.315	1	0.1	0.0772
1,2,3,7,8-PeCDF	**2.12**	0.176	1	0.03	0.0636
2,3,4,7,8-PeCDF	**1.52**	0.164	1	0.3	0.456
1,2,3,4,7,8-HxCDF	**22.5**	0.932	1	0.1	2.25
1,2,3,6,7,8-HxCDF	**5.82**	0.874	1	0.1	0.582
1,2,3,7,8,9-HxCDF	**2.15**	1.02	1	0.1	0.215
2,3,4,6,7,8-HxCDF	**14.1**	0.911	1	0.1	1.41
1,2,3,4,6,7,8-HpCDF	**1120**	18.7	30	0.01	11.2
1,2,3,4,7,8,9-HpCDF	**71.2**	1.60	1	0.01	0.712
OCDF	**7640**	4.39	30	0.0003	2.29
		Total TEQ			107

2005 WHO TEFs, ND = 0

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1530
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T3-Comp	**Units:**	ng/Kg
Lab Code:	E0900587-016	**Basis:**	Dry
Run Type:	Dilution	**Percent Solids:**	77.2

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/10/09 2217
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.895g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104403	**Blank File Name:**	U132415
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104397

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	2.74	35.7			30
1,2,3,7,8-PeCDD	ND	U	3.15	89.2			30
1,2,3,4,7,8-HxCDD	**17.7**	J	3.44	89.2	1.32	0.998	30
1,2,3,6,7,8-HxCDD	**103**		3.13	89.2	1.19	1.000	30
1,2,3,7,8,9-HxCDD	**45.5**	J	3.18	89.2	1.28	1.008	30
1,2,3,4,6,7,8-HpCDD	**5360**	B	5.70	89.2	1.05	1.000	30
OCDD	**44700**	B	3.92	178	0.90	1.000	30
2,3,7,8-TCDF	ND	U	2.00	35.7			30
1,2,3,7,8-PeCDF	ND	U	3.36	89.2			30
2,3,4,7,8-PeCDF	ND	U	3.18	89.2			30
1,2,3,4,7,8-HxCDF	**25.8**	J	4.50	89.2	1.16	1.000	30
1,2,3,6,7,8-HxCDF	**8.16**	J	4.21	89.2	1.11	1.003	30
1,2,3,7,8,9-HxCDF	ND	U	5.03	89.2			30
2,3,4,6,7,8-HxCDF	**23.5**	J	4.57	89.2	1.41	1.015	30
1,2,3,4,6,7,8-HpCDF	**1120**	B	18.7	89.2	1.08	1.000	30
1,2,3,4,7,8,9-HpCDF	**95.9**		23.7	89.2	1.19	1.034	30
OCDF	**7640**		4.39	178	0.88	1.004	30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1530
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T3-Comp	**Units:**	Percent
Lab Code:	E0900587-016	**Basis:**	Dry
Run Type:	Dilution	**Percent Solids:**	77.2

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/10/09 2217
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.895g	**Instrument Name:**	E-HRMS-03
		GC Column:	DB-5
Data File Name:	P104403	**Blank File Name:**	U132415
ICAL Date:	07/02/08	**Cal Ver. File Name:**	P104397

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1390	1291.894	93		40-135	0.78	1.007
13C-1,2,3,7,8-PeCDD	1920	1174.526	61		40-135	1.57	1.161
13C-1,2,3,6,7,8-HxCDD	3250	3057.368	94		40-135	1.26	0.993
13C-1,2,3,4,6,7,8-HpCDD	4460	3185.122	71		40-135	1.08	1.068
13C-OCDD	8620	7178.636	83		40-135	0.91	1.150
13C-2,3,7,8-TCDF	1300	1290.576	99		40-135	0.79	0.979
13C-1,2,3,7,8-PeCDF	1560	1213.971	78		40-135	1.57	1.125
13C-1,2,3,4,7,8-HxCDF	3160	3114.612	98		40-135	0.52	0.972
13C-1,2,3,4,6,7,8-HpCDF	4390	3705.172	84		40-135	0.45	1.044
37Cl-2,3,7,8-TCDD	800	29.434	110		40-135	NA	1.007

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	7/29/09 1530
Sample Matrix:	Soil	**Date Received:**	7/31/09
Sample Name:	T3-Comp	**Units:**	ng/Kg
Lab Code:	E0900587-016	**Basis:**	Dry
Run Type:	Reanalysis	**Percent Solids:**	77.2

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/7/09 2343
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.895g	**Instrument Name:**	E-HRMS-04
		GC Column:	DB-225
Data File Name:	P203634	**Blank File Name:**	P203627
ICAL Date:	03/16/09	**Cal Ver. File Name:**	P203625

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDF	**0.772**	J	0.315	1.19	0.75	1.001	1

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDF	1000	591.059	59		40-135	0.75	1.059
37Cl-2,3,7,8-TCDD	800	843.490	105		40-135	NA	0.988

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:		**Service Request:**	
Project:	NA	**Date Collected:**	NA
Sample Matrix:		**Date Received:**	NA
Sample Name:		**Units:**	
Lab Code:		**Basis:**	
Run Type:		**Percent Solids:**	

Analytical Method:
Prep Method:

Analytical Method:		**Date Analyzed:**	
Prep Method:		**Date Extracted:**	
Sample Amount:		**Instrument Name:**	
		GC Column:	
Data File Name:		**Blank File Name:**	
ICAL Date:		**Cal Ver. File Name:**	

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor	Date Analyzed	Date Extracted

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor

Labeled Compounds	Spike Conc.()	Conc. Found ()	%Rec	Q	Control Limits	Ion Ratio	RRT

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ng/Kg
Lab Code:	EQ0900289-01	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/4/09 1858
Prep Method:	Method	**Date Extracted:**	7/31/09
Sample Amount:	10.000g	**Instrument Name:**	E-HRMS-01
		GC Column:	DB-5
Data File Name:	U132365	**Blank File Name:**	U132365
ICAL Date:	07/31/09	**Cal Ver. File Name:**	U132363

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	0.126	1.00			1
1,2,3,7,8-PeCDD	ND	U	0.101	2.50			1
1,2,3,4,7,8-HxCDD	ND	U	0.182	2.50			1
1,2,3,6,7,8-HxCDD	ND	U	0.173	2.50			1
1,2,3,7,8,9-HxCDD	ND	U	0.178	2.50			1
1,2,3,4,6,7,8-HpCDD	ND	U	0.238	2.50			1
OCDD	**2.23**	J	0.288	5.00	0.89	1.000	1
2,3,7,8-TCDF	ND	U	0.108	1.00			1
1,2,3,7,8-PeCDF	ND	U	0.0623	2.50			1
2,3,4,7,8-PeCDF	ND	U	0.0601	2.50			1
1,2,3,4,7,8-HxCDF	ND	U	0.134	2.50			1
1,2,3,6,7,8-HxCDF	ND	U	0.132	2.50			1
1,2,3,7,8,9-HxCDF	ND	U	0.161	2.50			1
2,3,4,6,7,8-HxCDF	ND	U	0.143	2.50			1
1,2,3,4,6,7,8-HpCDF	ND	U	0.179	2.50			1
1,2,3,4,7,8,9-HpCDF	ND	U	0.227	2.50			1
OCDF	ND	U	0.362	5.00			1
Total Tetra-Dioxins	ND	U	0.126	1.00			1
Total Penta-Dioxins	ND	U	0.101	2.50			1
Total Hexa-Dioxins	ND	U	0.173	2.50			1
Total Hepta-Dioxins	ND	U	0.238	2.50			1
Total Tetra-Furans	ND	U	0.108	1.00			1
Total Penta-Furans	ND	U	0.0601	2.50			1
Total Hexa-Furans	ND	U	0.132	2.50			1
Total Hepta-Furans	ND	U	0.179	2.50			1

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	Percent
Lab Code:	EQ0900289-01	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/4/09 1858
Prep Method:	Method	**Date Extracted:**	7/31/09
Sample Amount:	10.000g	**Instrument Name:**	E-HRMS-01
		GC Column:	DB-5
Data File Name:	U132365	**Blank File Name:**	U132365
ICAL Date:	07/31/09	**Cal Ver. File Name:**	U132363

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1000	689.976	69		40-135	0.76	1.008
13C-1,2,3,7,8-PeCDD	1000	760.404	76		40-135	1.58	1.167
13C-1,2,3,6,7,8-HxCDD	2500	1700.578	68		40-135	1.22	0.992
13C-1,2,3,4,6,7,8-HpCDD	2500	1549.192	62		40-135	1.05	1.069
13C-OCDD	5000	2903.306	58		40-135	0.90	1.152
13C-2,3,7,8-TCDF	1000	735.752	74		40-135	0.82	0.979
13C-1,2,3,7,8-PeCDF	1000	731.360	73		40-135	1.57	1.129
13C-1,2,3,4,7,8-HxCDF	2500	1598.948	64		40-135	0.52	0.972
13C-1,2,3,4,6,7,8-HpCDF	2500	1697.986	68		40-135	0.44	1.045
37Cl-2,3,7,8-TCDD	800	678.132	85		40-135	NA	1.008

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ng/Kg
Lab Code:	EQ0900291-01	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/6/09 1756
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.000g	**Instrument Name:**	E-HRMS-01
		GC Column:	DB-5
Data File Name:	U132415	**Blank File Name:**	U132415
ICAL Date:	07/31/09	**Cal Ver. File Name:**	U132413

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	ND	U	0.0670	1.00			1
1,2,3,7,8-PeCDD	ND	U	0.0800	2.50			1
1,2,3,4,7,8-HxCDD	ND	U	0.112	2.50			1
1,2,3,6,7,8-HxCDD	ND	U	0.107	2.50			1
1,2,3,7,8,9-HxCDD	ND	U	0.110	2.50			1
1,2,3,4,6,7,8-HpCDD	**1.14**	J	0.273	2.50	0.91	1.000	1
OCDD	**2.26**	JK	0.220	5.00	1.18	1.000	1
2,3,7,8-TCDF	ND	U	0.108	1.00			1
1,2,3,7,8-PeCDF	ND	U	0.0765	2.50			1
2,3,4,7,8-PeCDF	ND	U	0.0738	2.50			1
1,2,3,4,7,8-HxCDF	ND	U	0.0782	2.50			1
1,2,3,6,7,8-HxCDF	ND	U	0.0770	2.50			1
1,2,3,7,8,9-HxCDF	ND	U	0.0939	2.50			1
2,3,4,6,7,8-HxCDF	ND	U	0.0832	2.50			1
1,2,3,4,6,7,8-HpCDF	**0.395**	JK	0.222	2.50	1.24	1.000	1
1,2,3,4,7,8,9-HpCDF	ND	U	0.282	2.50			1
OCDF	ND	U	0.213	5.00			1
Total Tetra-Dioxins	ND	U	0.0670	1.00			1
Total Penta-Dioxins	ND	U	0.0800	2.50			1
Total Hexa-Dioxins	ND	U	0.107	2.50			1
Total Hepta-Dioxins	**2.51**		0.273	2.50	0.91		1
Total Tetra-Furans	ND	U	0.108	1.00			1
Total Penta-Furans	ND	U	0.0738	2.50			1
Total Hexa-Furans	ND	U	0.0770	2.50			1
Total Hepta-Furans	ND	U	0.222	2.50			1

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	Percent
Lab Code:	EQ0900291-01	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/6/09 1756
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.000g	**Instrument Name:**	E-HRMS-01
		GC Column:	DB-5
Data File Name:	U132415	**Blank File Name:**	U132415
ICAL Date:	07/31/09	**Cal Ver. File Name:**	U132413

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1000	646.861	65		40-135	0.76	1.007
13C-1,2,3,7,8-PeCDD	1000	757.130	76		40-135	1.60	1.167
13C-1,2,3,6,7,8-HxCDD	2500	1549.136	62		40-135	1.29	0.992
13C-1,2,3,4,6,7,8-HpCDD	2500	1419.633	57		40-135	1.08	1.069
13C-OCDD	5000	2611.598	52		40-135	0.91	1.152
13C-2,3,7,8-TCDF	1000	669.133	67		40-135	0.79	0.978
13C-1,2,3,7,8-PeCDF	1000	740.419	74		40-135	1.65	1.129
13C-1,2,3,4,7,8-HxCDF	2500	1580.967	63		40-135	0.53	0.972
13C-1,2,3,4,6,7,8-HpCDF	2500	1662.723	67		40-135	0.45	1.045
37Cl-2,3,7,8-TCDD	800	627.928	78		40-135	NA	1.008

Comments:

Columbia Analytical Services INC

Accuracy and Precision

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Barr Engineering Company
Project: Joslyn Site/23/27-1102009448
Sample Matrix: Soil

Service Request: E0900587
Date Analyzed: 8/ 5/09

Lab Control Sample Summary
Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method: 8290
Prep Method: Method

Units: ng/Kg
Basis: Dry

Extraction Lot: 92275

	Lab Control Sample EQ0900289-02			Duplicate Lab Control Sample EQ0900289-03					
Analyte Name	**Result**	**Expected**	**% Rec**	**Result**	**Expected**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
2,3,7,8-TCDD	**20.4**	20.0	102	**20.6**	20.0	103	79 - 128	1	20
1,2,3,7,8-PeCDD	**42.7**	50.0	85	**43.2**	50.0	86	78 - 126	1	20
1,2,3,4,7,8-HxCDD	**50.2**	50.0	100	**49.6**	50.0	99	71 - 130	1	20
1,2,3,6,7,8-HxCDD	**47.2**	50.0	94	**47.9**	50.0	96	80 - 128	2	20
1,2,3,7,8,9-HxCDD	**49.8**	50.0	100	**48.3**	50.0	97	70 - 130	3	20
1,2,3,4,6,7,8-HpCDD	**50.5**	50.0	101	**51.3**	50.0	103	70 - 130	2	20
OCDD	**101**	100	101	**101**	100	101	80 - 130	0	20
2,3,7,8-TCDF	**20.5**	20.0	103	**20.1**	20.0	101	73 - 126	2	20
1,2,3,7,8-PeCDF	**51.8**	50.0	104	**53.0**	50.0	106	71 - 130	2	20
2,3,4,7,8-PeCDF	**43.6**	50.0	87	**44.2**	50.0	88	72 - 121	1	20
1,2,3,4,7,8-HxCDF	**49.8**	50.0	100	**50.4**	50.0	101	74 - 129	1	20
1,2,3,6,7,8-HxCDF	**54.6**	50.0	109	**54.6**	50.0	109	73 - 128	0	20
1,2,3,7,8,9-HxCDF	**47.4**	50.0	95	**44.8**	50.0	90	70 - 130	5	20
2,3,4,6,7,8-HxCDF	**48.3**	50.0	97	**48.4**	50.0	97	71 - 125	0	20
1,2,3,4,6,7,8-HpCDF	**40.2**	50.0	80	**40.4**	50.0	81	70 - 130	1	20
1,2,3,4,7,8,9-HpCDF	**43.3**	50.0	87	**42.4**	50.0	85	78 - 130	2	20
OCDF	**99.9**	100	100	**104**	100	104	70 - 130	4	20

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Analyzed:**	8/ 7/09
Sample Matrix:	Soil		

Lab Control Sample Summary
Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Units:**	ng/Kg
Prep Method:	Method	**Basis:**	Dry
		Extraction Lot:	92470

	Lab Control Sample EQ0900291-02			% Rec
Analyte Name	**Result**	**Expected**	**% Rec**	**Limits**
2,3,7,8-TCDD	**21.6**	20.0	108	79 - 128
1,2,3,7,8-PeCDD	**45.4**	50.0	91	78 - 126
1,2,3,4,7,8-HxCDD	**49.6**	50.0	99	71 - 130
1,2,3,6,7,8-HxCDD	**49.9**	50.0	100	80 - 128
1,2,3,7,8,9-HxCDD	**50.9**	50.0	102	70 - 130
1,2,3,4,6,7,8-HpCDD	**49.1**	50.0	98	70 - 130
OCDD	**100**	100	100	80 - 130
2,3,7,8-TCDF	**21.3**	20.0	107	73 - 126
1,2,3,7,8-PeCDF	**52.4**	50.0	105	71 - 130
2,3,4,7,8-PeCDF	**49.0**	50.0	98	72 - 121
1,2,3,4,7,8-HxCDF	**49.9**	50.0	100	74 - 129
1,2,3,6,7,8-HxCDF	**57.2**	50.0	114	73 - 128
1,2,3,7,8,9-HxCDF	**50.2**	50.0	100	70 - 130
2,3,4,6,7,8-HxCDF	**50.1**	50.0	100	71 - 125
1,2,3,4,6,7,8-HpCDF	**42.3**	50.0	85	70 - 130
1,2,3,4,7,8,9-HpCDF	**47.7**	50.0	95	78 - 130
OCDF	**105**	100	105	70 - 130

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Lab Control Sample	**Units:**	ng/Kg
Lab Code:	EQ0900289-02	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/5/09 1144
Prep Method:	Method	**Date Extracted:**	7/31/09
Sample Amount:	10.000g	**Instrument Name:**	E-HRMS-01
		GC Column:	DB-5
Data File Name:	U132384	**Blank File Name:**	U132365
ICAL Date:	07/31/09	**Cal Ver. File Name:**	U132377

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	**20.4**		0.0481	1.00	0.80	1.001	1
1,2,3,7,8-PeCDD	**42.7**		0.0435	2.50	1.55	1.000	1
1,2,3,4,7,8-HxCDD	**50.2**		0.116	2.50	1.21	0.998	1
1,2,3,6,7,8-HxCDD	**47.2**		0.110	2.50	1.27	1.000	1
1,2,3,7,8,9-HxCDD	**49.8**		0.113	2.50	1.25	1.008	1
1,2,3,4,6,7,8-HpCDD	**50.5**		0.120	2.50	1.06	1.000	1
OCDD	**101**		0.397	5.00	0.92	1.000	1
2,3,7,8-TCDF	**20.5**		0.0404	1.00	0.76	1.001	1
1,2,3,7,8-PeCDF	**51.8**		0.0307	2.50	1.57	1.001	1
2,3,4,7,8-PeCDF	**43.6**		0.0296	2.50	1.50	1.023	1
1,2,3,4,7,8-HxCDF	**49.8**		0.0769	2.50	1.23	1.001	1
1,2,3,6,7,8-HxCDF	**54.6**		0.0757	2.50	1.26	1.004	1
1,2,3,7,8,9-HxCDF	**47.4**		0.0924	2.50	1.24	1.036	1
2,3,4,6,7,8-HxCDF	**48.3**		0.0818	2.50	1.25	1.017	1
1,2,3,4,6,7,8-HpCDF	**40.2**		0.306	2.50	1.01	1.000	1
1,2,3,4,7,8,9-HpCDF	**43.3**		0.388	2.50	1.02	1.034	1
OCDF	**99.9**		0.331	5.00	0.89	1.004	1
Total Tetra-Dioxins	**20.4**		0.0481	1.00	0.80		1
Total Penta-Dioxins	**42.7**		0.0435	2.50	1.55		1
Total Hexa-Dioxins	**147**		0.110	2.50	1.21		1
Total Hepta-Dioxins	**50.5**		0.120	2.50	1.06		1
Total Tetra-Furans	**20.5**		0.0404	1.00	0.76		1
Total Penta-Furans	**95.4**		0.0296	2.50	1.57		1
Total Hexa-Furans	**200**		0.0757	2.50	1.23		1
Total Hepta-Furans	**83.5**		0.306	2.50	1.01		1

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Lab Control Sample	**Units:**	Percent
Lab Code:	EQ0900289-02	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/5/09 1144
Prep Method:	Method	**Date Extracted:**	7/31/09
Sample Amount:	10.000g	**Instrument Name:**	E-HRMS-01
		GC Column:	DB-5
Data File Name:	U132384	**Blank File Name:**	U132365
ICAL Date:	07/31/09	**Cal Ver. File Name:**	U132377

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1000	618.300	62		40-135	0.79	1.008
13C-1,2,3,7,8-PeCDD	1000	642.141	64		40-135	1.61	1.167
13C-1,2,3,6,7,8-HxCDD	2500	1774.359	71		40-135	1.26	0.992
13C-1,2,3,4,6,7,8-HpCDD	2500	1473.149	59		40-135	1.07	1.069
13C-OCDD	5000	2457.088	49		40-135	0.90	1.152
13C-2,3,7,8-TCDF	1000	696.008	70		40-135	0.78	0.979
13C-1,2,3,7,8-PeCDF	1000	679.585	68		40-135	1.60	1.129
13C-1,2,3,4,7,8-HxCDF	2500	1665.773	67		40-135	0.52	0.971
13C-1,2,3,4,6,7,8-HpCDF	2500	1639.855	66		40-135	0.44	1.045
37Cl-2,3,7,8-TCDD	800	605.247	76		40-135	NA	1.009

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Lab Control Sample	**Units:**	ng/Kg
Lab Code:	EQ0900291-02	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/7/09 0154
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.000g	**Instrument Name:**	E-HRMS-01
		GC Column:	DB-5
Data File Name:	U132425	**Blank File Name:**	U132415
ICAL Date:	07/31/09	**Cal Ver. File Name:**	U132413

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	**21.6**		0.0790	1.00	0.77	1.001	1
1,2,3,7,8-PeCDD	**45.4**		0.0711	2.50	1.57	1.000	1
1,2,3,4,7,8-HxCDD	**49.6**		0.0964	2.50	1.19	0.998	1
1,2,3,6,7,8-HxCDD	**49.9**		0.0916	2.50	1.24	1.000	1
1,2,3,7,8,9-HxCDD	**50.9**		0.0943	2.50	1.31	1.008	1
1,2,3,4,6,7,8-HpCDD	**49.1**		0.165	2.50	1.01	1.000	1
OCDD	**100**		0.384	5.00	0.89	1.000	1
2,3,7,8-TCDF	**21.3**		0.0448	1.00	0.77	1.001	1
1,2,3,7,8-PeCDF	**52.4**		0.0513	2.50	1.60	1.001	1
2,3,4,7,8-PeCDF	**49.0**		0.0494	2.50	1.57	1.023	1
1,2,3,4,7,8-HxCDF	**49.9**		0.0658	2.50	1.24	1.000	1
1,2,3,6,7,8-HxCDF	**57.2**		0.0648	2.50	1.24	1.003	1
1,2,3,7,8,9-HxCDF	**50.2**		0.0790	2.50	1.27	1.036	1
2,3,4,6,7,8-HxCDF	**50.1**		0.0700	2.50	1.29	1.016	1
1,2,3,4,6,7,8-HpCDF	**42.3**		0.322	2.50	1.03	1.000	1
1,2,3,4,7,8,9-HpCDF	**47.7**		0.409	2.50	0.99	1.034	1
OCDF	**105**		0.316	5.00	0.91	1.004	1
Total Tetra-Dioxins	**21.6**		0.0790	1.00	0.77		1
Total Penta-Dioxins	**45.4**		0.0711	2.50	1.57		1
Total Hexa-Dioxins	**150**		0.0916	2.50	1.19		1
Total Hepta-Dioxins	**49.1**		0.165	2.50	1.01		1
Total Tetra-Furans	**21.3**		0.0448	1.00	0.77		1
Total Penta-Furans	**101**		0.0494	2.50	1.60		1
Total Hexa-Furans	**207**		0.0648	2.50	1.24		1
Total Hepta-Furans	**90.1**		0.322	2.50	1.03		1

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Lab Control Sample	**Units:**	Percent
Lab Code:	EQ0900291-02	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/7/09 0154
Prep Method:	Method	**Date Extracted:**	8/3/09
Sample Amount:	10.000g	**Instrument Name:**	E-HRMS-01
		GC Column:	DB-5
Data File Name:	U132425	**Blank File Name:**	U132415
ICAL Date:	07/31/09	**Cal Ver. File Name:**	U132413

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1000	627.899	63		40-135	0.80	1.008
13C-1,2,3,7,8-PeCDD	1000	685.557	69		40-135	1.60	1.167
13C-1,2,3,6,7,8-HxCDD	2500	1492.993	60		40-135	1.27	0.992
13C-1,2,3,4,6,7,8-HpCDD	2500	1405.858	56		40-135	1.05	1.070
13C-OCDD	5000	2645.439	53		40-135	0.91	1.152
13C-2,3,7,8-TCDF	1000	691.266	69		40-135	0.80	0.979
13C-1,2,3,7,8-PeCDF	1000	684.739	68		40-135	1.59	1.130
13C-1,2,3,4,7,8-HxCDF	2500	1500.145	60		40-135	0.53	0.972
13C-1,2,3,4,6,7,8-HpCDF	2500	1585.233	63		40-135	0.44	1.045
37Cl-2,3,7,8-TCDD	800	607.441	76		40-135	NA	1.009

Comments:

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Lab Control Sample Dup	**Units:**	ng/Kg
Lab Code:	EQ0900289-03	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/5/09 1232
Prep Method:	Method	**Date Extracted:**	7/31/09
Sample Amount:	10.000g	**Instrument Name:**	E-HRMS-01
		GC Column:	DB-5
Data File Name:	U132385	**Blank File Name:**	U132365
ICAL Date:	07/31/09	**Cal Ver. File Name:**	U132377

Analyte Name	Result	Q	EDL	MRL	Ion Ratio	RRT	Dilution Factor
2,3,7,8-TCDD	**20.6**		0.0671	1.00	0.74	1.001	1
1,2,3,7,8-PeCDD	**43.2**		0.0405	2.50	1.61	1.000	1
1,2,3,4,7,8-HxCDD	**49.6**		0.129	2.50	1.27	0.999	1
1,2,3,6,7,8-HxCDD	**47.9**		0.123	2.50	1.20	1.000	1
1,2,3,7,8,9-HxCDD	**48.3**		0.126	2.50	1.23	1.008	1
1,2,3,4,6,7,8-HpCDD	**51.3**		0.0975	2.50	1.06	1.000	1
OCDD	**101**		0.396	5.00	0.87	1.000	1
2,3,7,8-TCDF	**20.1**		0.0388	1.00	0.79	1.001	1
1,2,3,7,8-PeCDF	**53.0**		0.0323	2.50	1.53	1.001	1
2,3,4,7,8-PeCDF	**44.2**		0.0312	2.50	1.52	1.023	1
1,2,3,4,7,8-HxCDF	**50.4**		0.104	2.50	1.22	1.000	1
1,2,3,6,7,8-HxCDF	**54.6**		0.102	2.50	1.23	1.003	1
1,2,3,7,8,9-HxCDF	**44.8**		0.124	2.50	1.19	1.036	1
2,3,4,6,7,8-HxCDF	**48.4**		0.110	2.50	1.22	1.016	1
1,2,3,4,6,7,8-HpCDF	**40.4**		0.316	2.50	1.04	1.000	1
1,2,3,4,7,8,9-HpCDF	**42.4**		0.401	2.50	1.04	1.034	1
OCDF	**104**		0.306	5.00	0.90	1.004	1
Total Tetra-Dioxins	**20.6**		0.0671	1.00	0.74		1
Total Penta-Dioxins	**43.2**		0.0405	2.50	1.61		1
Total Hexa-Dioxins	**146**		0.123	2.50	1.27		1
Total Hepta-Dioxins	**51.3**		0.0975	2.50	1.06		1
Total Tetra-Furans	**20.1**		0.0388	1.00	0.79		1
Total Penta-Furans	**97.2**		0.0312	2.50	1.53		1
Total Hexa-Furans	**198**		0.102	2.50	1.22		1
Total Hepta-Furans	**82.8**		0.316	2.50	1.04		1

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Barr Engineering Company	**Service Request:**	E0900587
Project:	Joslyn Site/23/27-1102009448	**Date Collected:**	NA
Sample Matrix:	Soil	**Date Received:**	NA
Sample Name:	Lab Control Sample Dup	**Units:**	Percent
Lab Code:	EQ0900289-03	**Basis:**	Dry

Polychlorinated Dibenzodioxins and Polychlorinated Dibenzofurans by HRGC/HRMS

Analytical Method:	8290	**Date Analyzed:**	8/5/09 1232
Prep Method:	Method	**Date Extracted:**	7/31/09
Sample Amount:	10.000g	**Instrument Name:**	E-HRMS-01
		GC Column:	DB-5
Data File Name:	U132385	**Blank File Name:**	U132365
ICAL Date:	07/31/09	**Cal Ver. File Name:**	U132377

Labeled Compounds	Spike Conc.(pg)	Conc. Found (pg)	%Rec	Q	Control Limits	Ion Ratio	RRT
13C-2,3,7,8-TCDD	1000	608.563	61		40-135	0.77	1.008
13C-1,2,3,7,8-PeCDD	1000	625.651	63		40-135	1.57	1.167
13C-1,2,3,6,7,8-HxCDD	2500	1828.753	73		40-135	1.26	0.992
13C-1,2,3,4,6,7,8-HpCDD	2500	1502.294	60		40-135	1.06	1.069
13C-OCDD	5000	2445.654	49		40-135	0.91	1.152
13C-2,3,7,8-TCDF	1000	700.586	70		40-135	0.78	0.979
13C-1,2,3,7,8-PeCDF	1000	651.807	65		40-135	1.56	1.129
13C-1,2,3,4,7,8-HxCDF	2500	1723.353	69		40-135	0.52	0.972
13C-1,2,3,4,6,7,8-HpCDF	2500	1707.187	68		40-135	0.44	1.045
37Cl-2,3,7,8-TCDD	800	593.167	74		40-135	NA	1.008

Comments:

Columbia Analytical Services INC

Chain of Custody

19408 Park Row, Suite 320, Houston, TX 77084
Phone (713)266-1599 Fax (713)266-0130
www.caslab.com

An Employee Owned Company

Chain of Custody

BARR
4700 West 77th Street
Minneapolis, MN 55435-4803
(952) 832-2600

COC 1 of 2

Project Number: 23/27-110209448
Project Name: Joslyn
№ 27955

Project Manager: John Hunt
Project Contact: Michael Dupay
Sampled by: Alec Danielson
Laboratory: CAS

	Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix:	Type: Grab	Type: Comp.	Type: QC	Number of Containers/Preservative — Water: Volatile Organics (Pres.) *1	Semivolatile Organics *2	Dissolved Metals (HNO_3)	Total Metals (HNO_3)	General (Unpreserved) *3	Cyanide (NaOH)	Nutrients (H_2SO_4) *4	Oil and Grease (H_2SO_4)	Sulfide (Zn Acetate)	Methane	Bacteria ($Na_2S_2O_3$)	DRO (HCl)	Soil: VOCs (2-oz tared MeOH) *1	GRO, BTEX (2-oz tared MeOH) *1	DRO (2-oz tared) - 25 grams	Metals (2-oz unpreserved)	SVOCs (2 or 4-oz unpres.) *2	% Moisture (plastic vial, unpres.)	Dioxins/Furans		Total No. Of Containers	Remarks
1.	SBA1-U	7-29-09	0900		X			X																				1		1	
2.	SBA1-L		0905		X			X																				1		1	
3.	SBA2-U		0930		X			X																				1		1	
4.	SBA2-L		0935		X			X																				1		1	
5.	SBA3-U		0945		X			X																				1		1	
6.	SBA3-L		0950		X			X																				1		1	Hold
7.	SBA4-U		0955		X			X																				1		1	
8.	SBA4-L		1000		X			X																				1		1	
9.	SBA5-U		1020		X			X																				1		1	
10.	SBA5-L		1025		X			X																				1		1	
11.	LineA-U		1030		X			X																				1		1	Analyze for Dioxins/Furans
12.	LineA-L		1035		X			X																				1		1	

Common Parameter/Container - Preservation Key
*1 - Volatile Organics = BTEX, GRO, TPH, Full List
*2 - Semivolatile Organics = PAHs, PCP, Dioxins, Full List, Herbicide/Pesticide/PCBs
*3 - General = pH, Chloride, Flouride, Alkalinity, TSS, TDS, TS, Sulfate
*4 - Nutrients = COD, TOC, Phenols, Ammonia Nitrogen, TKN

Relinquished By	On Ice?	Date	Time	Received by:	Date	Time
Alec Danielson	Y (N)	7-29-09	1700			
Relinquished By:	On Ice? Y N	Date	Time	Received by: Nicole Brown	Date 7/31/09	Time 0940

Samples Shipped VIA: ☐ Air Freight ☐ Federal Express ☐ Sampler ☐ Other
Air Bill Number: 9581 2060 3489 / cust. seal - front 0°C

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

Chain of Custody

BARR

4700 West 77th Street
Minneapolis, MN 55435-4803
(952) 832-2600

COC 2 of 2

Project Number 23/27-110.20.09.448

Project Name Joslyn

№ 27956

Project Manager: John Hunt

Project Contact: Michael Dupay

Sampled by: Alec Danielson

Laboratory: CA

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix:	Type: Grab	Type: Comp.	Type: QC	Number of Containers/Preservative — Water: Volatile Organics (Pres.) *1	Semivolatile Organics *2	Dissolved Metals (HNO_3)	Total Metals (HNO_3)	General (Unpreserved) *3	Cyanide (NaOH)	Nutrients (H_2SO_4) *4	Oil and Grease (H_2SO_4)	Sulfide (Zn Acetate)	Methane	Bacteria ($Na_2S_2O_3$)	DRO (HCl)	Soil: VOCs (2-oz tared MeOH) *1	GRO, BTEX (2-oz tared MeOH) *1	DRO (2-oz tared) - 25 grams	Metals (2-oz unpreserved)	SVOCs (2 or 4-oz unpres.) *2	% Moisture (plastic vial, unpres.)	Dioxins / Furans	Total No. Of Containers	Remarks
1. T2-Comp	7-29-09	1230		X			X																				1	1	Analyze for Dioxins / Furans
2. T1-Comp	↓	1400		X			X																				1	1	
3. T4-1		1445		X			X																				1	1	
4. T3-Comp		1530		X			X																				1	1	
5.																													
6.																													
7.																													
8.																													
9.																													
10.																													
11.																													
12.																													

Common Parameter/Container - Preservation Key

*1 - *Volatile Organics = BTEX, GRO, TPH, Full List*
*2 - *Semivolatile Organics = PAHs, PCP, Dioxins, Full List, Herbicide/Pesticide/PCBs*
*3 - *General = pH, Chloride, Flouride, Alkalinity, TSS, TDS, TS, Sulfate*
*4 - *Nutrients = COD, TOC, Phenols, Ammonia Nitrogen, TKN*

Relinquished By:	On Ice?	Date	Time	Received by:	Date	Time
Alec Danielson	(Y) N	7-29-09	1700			
Relinquished By:	On Ice? Y N	Date	Time	Received by:	Date	Time
				Thuol Bruon	7/31/09	0940

Samples Shipped VIA: ☐ Air Freight ☐ Federal Express ☐ Sampler ☐ Other

Air Bill Number: 958120603489 | cust. seal - front | 0°C

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

H:RLG\STDFORMS\Chain Of Custody Form RLG Rev. 07\01\05

Reset Form Print Form

Columbia Analytical Services, Inc.
Cooler Receipt Form

Client/Project: Barr Engineering / Joslyn Site Service Request: E0900587

Received: 07/31/09 Opened (Date/Time): 07/31/09 0940 By: NAB

1. Samples were received via? ☐*US Mail* ☑*Fedex* ☐*UPS* ☐*DHL* ☐*Courier* ☐*Hand Delivered*
2. Samples were received in: (circle) ☑*Cooler* ☐*Box* ☐ *Other*_____ ☐*NA*
3. Were custody seals present on coolers? ☑Y ☐N If yes, how many and where? 1 front
   If present, were custody seals intact? ☑Y ☐N If present, were they signed and dated? ☑Y ☐N
4. Is shipper's air-bill filed? ☐NA ☐Y ☑N If not, record air bill number: 958120603489

5. Temperature of cooler(s) upon receipt (°C): 0
6. If applicable, list Chain of Custody numbers: _____
7. Were custody papers properly filled our (ink, signed, etc.)? ☐NA ☑Y ☐N
8. Packing material used: ☐*Inserts* ☑*Bubble Wrap* ☐*Blue Ice* ☑*Wet Ice* ☐*Sleeves* ☐*Other*_____
9. Were the correct types of bottles used for the tests indicated? ☑Y ☐N
   Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* ☑Y ☐N

Sample ID	Bottle Count	Bottle Type	Out of Temp	Broken	Initials
			☐	☐	
			☐	☐	
			☐	☐	
			☐	☐	
			☐	☐	
			☐	☐	
			☐	☐	

10. Were all bottle labels complete (i.e. analysis, ID, etc.)? ☑Y ☐N
    Did all bottle labels and tags agree with custody papers? *Indicate in the table below.* ☐Y ☑N

Sample ID on Bottle	Sample ID on COC		Sample ID on Bottle	Sample ID on COC
SOA1-L	SBA1-L			

11. Additional notes, discrepancies, and resolutions:

_____

_____

_____

Sample Acceptance Policy

Custody Seals (desirable, mandatory if specified in SAP):

- ✓ On outside of cooler
- ✓ Seals intact, signed and dated

Chain-of-Custody documentation (mandatory):

- ✓ Properly filled out in ink & signed by the client
- ✓ Sign and date the coc for CAS/HOU upon cooler receipt
- ✓ Coc must list method number
- ✓ If no coc was submitted with the samples, complete a CAS/HOU coc for the client

Sample Integrity (mandatory):

- ✓ Sample containers must arrive in good condition (not broken or leaking)
- ✓ Sample IDs on the bottles must match the sample IDs on the coc
- ✓ The correct type of sample bottle must be used for the method requested
- ✓ The correct number of sample containers received must agree with the documentation on the coc
- ✓ The correct sample matrix must appear on the coc
- ✓ An appropriate sample volume or weight must be received

Temperature Preservatives (varies by sample matrix):

- ✓ Aqueous and Non-aqueous samples must be shipped and stored cold, at 0 to 6°C
- ✓ Tissue samples must be shipped and stored frozen, at -20 to -10°C
- ✓ Air samples can be shipped and stored at ambient temperature, ~23°C
- ✓ The sample temperature must be recorded on the coc
- ✓ Notify a Project Chemist if any samples are outside the acceptance temperature or have compromised sample integrity – the client must decide re: replacement sample submittal or continue with the analysis

Cooler Receipt Form, CRF (mandatory):

- ✓ Cooler receipt forms must be completed for each coc & SR#
- ✓ Sample integrity issues must be documented on the CRF
- ✓ A scan of the carrier and the airbill number must be recorded in CAS LIMS

Sample Integrity Issues/Resolutions (mandatory):

- ✓ Sample integrity issues are documented on the CRF and given to the Project Chemist for resolution with the client
- ✓ Client resolution is documented in writing (typically email or on the CRF) and filed in the project folder(s)

Preparation Information Benchsheet

Prep Run#: 92275 **Prep WorkFlow:** OrgExtDioxS(30) **Status:** Prepped
Team: Semivoa GCMS/AKODUR **Prep Method:** Method **Prep Date/Time:** 7/31/09 02:00 PM

#	Lab Code	Client ID	B#	Method /Test	pH	Matrix	Amt. Ext.	Sample Description
1	E0900545-001	AIR FILTER	.01	8290/PCDD PCDF		Filter	1.000g	blue air filter with brown dust
2	E0900557-001	0901784-02	.01	8290/PCDD PCDF		Soil	10.286g	tan sand
3	E0900557-002	0901784-03	.01	8290/PCDD PCDF		Soil	10.723g	wet tan sand
4	E0900557-003	0901784-10	.01	8290/PCDD PCDF		Soil	10.630g	tan sand
5	E0900573-011	Zone E-U	.01	8290/PCDD PCDF		Soil	10.905g	black dirt
6	E0900573-012	Zone E-L	.01	8290/PCDD PCDF		Soil	10.480g	dark brown soil with beige debris
7	E0900574-011	LineD-U	.01	8290/PCDD PCDF		Soil	10.206g	dark brown soil with plant debris
8	E0900574-012	LineD-L	.01	8290/PCDD PCDF		Soil	10.942g	dark brown soil with wood debris
9	E0900576-001	Line C-U	.01	8290/PCDD PCDF		Soil	11.819g	dark brown soil with wood debris
10	E0900576-002	Line C-L	.01	8290/PCDD PCDF		Soil	11.436g	dark brown soil with wood debris
11	E0900576-015	Line B-U	.01	8290/PCDD PCDF		Soil	11.039g	dark brown soil with wood debris
12	E0900576-016	Line B-L	.01	8290/PCDD PCDF		Soil	11.268g	dark brown soil with beige debris
13	E0900582-001	SS-55B	.01	8290/PCDD PCDF		Soil	12.700g	grey/tan wet sand
14	E0900582-002	SS-56B	.01	8290/PCDD PCDF		Soil	10.954g	red/brown clay
15	E0900582-003	SS-57B	.01	8290/PCDD PCDF		Soil	13.044g	damp grey/tan sand
16	E0900583-001	SS-55A	.01	8290/PCDD PCDF		Soil	12.989g	red/dark grey clay
17	E0900583-002	SS-56A	.01	8290/PCDD PCDF		Soil	10.083g	tan sand/dark grey clay mixture
18	E0900583-003	SS-57A	.01	8290/PCDD PCDF		Soil	10.566g	damp grey/tan sand
19	E0900587-011	Line A-U	.01	8290/PCDD PCDF		Soil	10.230g	dark brown soil with plant debris
20	E0900587-012	Line A-L	.01	8290/PCDD PCDF		Soil	10.181g	dark brown soil with beige debris
21	EQ0900289-01	MB		8290/PCDD PCDF		Solid	10.000g	
22	EQ0900289-02	LCS		8290/PCDD PCDF		Solid	10.000g	
23	EQ0900289-03	DLCS		8290/PCDD PCDF		Solid	10.000g	

Preparation Information Benchsheet

Prep Run#: 92275 **Prep WorkFlow:** OrgExtDioxS(30) **Status:** Prepped
Team: Semivoa GCMS/AKODUR **Prep Method:** Method **Prep Date/Time:** 7/31/09 02:00 PM

Spiking Solutions

Name:	8290 Matrix Working Standard	Inventory ID	8514	Logbook Ref:	D10-31-5A	Expires On:	02/27/2019

EQ0900289-02	100.00µL	EQ0900289-03	100.00µL

Name:	8290/1613B Cleanup Working Standard	Inventory ID	11104	Logbook Ref:	D10-55-1A/B	Expires On:	01/20/2010

E0900545-001	100.00µL	E0900557-001	100.00µL	E0900557-002	100.00µL	E0900557-003	100.00µL	E0900573-011	100.00µL	E0900573-012	100.00µL
E0900574-011	100.00µL	E0900574-012	100.00µL	E0900576-001	100.00µL	E0900576-002	100.00µL	E0900576-015	100.00µL	E0900576-016	100.00µL
E0900582-001	100.00µL	E0900582-002	100.00µL	E0900582-003	100.00µL	E0900583-001	100.00µL	E0900583-002	100.00µL	E0900583-003	100.00µL
E0900587-011	100.00µL	E0900587-012	100.00µL	EQ0900289-01	100.00µL	EQ0900289-02	100.00µL	EQ0900289-03	100.00µL		

Name:	8290 Internal Working Standard	Inventory ID	11297	Logbook Ref:	D10-57-1A	Expires On:	07/31/2014

E0900545-001	100.00µL	E0900557-001	100.00µL	E0900557-002	100.00µL	E0900557-003	100.00µL	E0900573-011	100.00µL	E0900573-012	100.00µL
E0900574-011	100.00µL	E0900574-012	100.00µL	E0900576-001	100.00µL	E0900576-002	100.00µL	E0900576-015	100.00µL	E0900576-016	100.00µL
E0900582-001	100.00µL	E0900582-002	100.00µL	E0900582-003	100.00µL	E0900583-001	100.00µL	E0900583-002	100.00µL	E0900583-003	100.00µL
E0900587-011	100.00µL	E0900587-012	100.00µL	EQ0900289-01	100.00µL	EQ0900289-02	100.00µL	EQ0900289-03	100.00µL		

Preparation Materials

Acetone 99.5% Minimum	C2-16-007 (7199)	Carbon, High Purity	C2-22-003 (9451)	Ethyl Acetate 99.9% Minimum EtOAc	C2-23-006 (9462)
Extraction Thimbles 43 x123 mm	(1577)	Glass Wool	C2-13-005 (7198)	Sulfuric Acid Reagent Grade H2SO4	C2-24-003 (9461)
Dichloromethane (Methylene Chloride) 99.9% MeCl2	C2-25-001 (9449)	Sodium Chloride Reagent Grade NaCl	C1-104-2 (3306)	Sodium Hydroxide Reagent Grade NaOH	C2-24-002 (9463)
Sodium Sulfate Anhydrous Reagent Grade Na2SO4	C2-19-006 (7201)	Tridecane (n-Tridecane)	C2-21-002 (9459)	Hexane (n-Hexane) 98.5% Minimum	C2-25-002 (9440)
Nonane (n-Nonane) 99%	C2-21-004 (9457)	Sand Reagent Grade	C1-99-1 (345)	Silica Gel Reagent Grade	C2-22-006 (9454)
Toluene 99.9% Minimum	C2-25-003 (9446)				

Preparation Steps

Step:	Extraction	Step:	Acid Clean	Step:	Silica Gel Clean	Step:	Final Volume
Started:	7/31/09 14:00	Started:	8/3/09 09:00	Started:	8/3/09 13:00	Started:	8/4/09 09:00
Finished:	7/31/09 17:30	Finished:	8/3/09 12:00	Finished:	8/3/09 17:00	Finished:	8/4/09 11:00
By:	AKODUR	By:	AKODUR	By:	AKODUR	By:	AKODUR

Preparation Information Benchsheet

Prep Run#: 92275 **Prep WorkFlow:** OrgExtDioxS(30) **Status:** Prepped
Team: Semivoa GCMS/AKODUR **Prep Method:** Method **Prep Date/Time:** 7/31/09 02:00 PM

Comments: _____

Reviewed By: Arthi Kodur Date: 8/6/09

Chain of Custody

Relinquished By: _____ Date: _____ Extracts Examined

Received By: _____ Date: _____ Yes No

Preparation Information Benchsheet

Prep Run#: 92470 **Prep WorkFlow:** OrgExtDioxS(30) **Status:** Prepped
Team: Semivoa GCMS/AKODUR **Prep Method:** Method **Prep Date/Time:** 8/3/09 02:00 PM

#	Lab Code	Client ID	B#	Method /Test	pH	Matrix	Amt. Ext.	Sample Description
1	E0900557-004	0901784-11	.01	8290/PCDD PCDF		Soil	10.499g	tan sand
2	E0900557-005	0901784-22	.01	8290/PCDD PCDF		Soil	10.773g	very wet tan sand
3	E0900557-006	0901784-23	.01	8290/PCDD PCDF		Soil	10.159g	tan sand
4	E0900557-007	0901784-25	.01	8290/PCDD PCDF		Soil	10.140g	tan sand
5	E0900561-001	ASH-4-D-TCLP	.01	8290/PCDD PCDF		Solid	10.292g	black dirt
6	E0900578-001	AOC328T1TRENCHE4-S0.5	.01	8290/PCDD PCDF		Soil	10.618g	brown dirt with pebbles
7	E0900578-002	AOC328T1SBPH1-S02	.01	8290/PCDD PCDF		Soil	10.408g	brown dirt with pebbles
8	E0900578-003	AOC328T1SBPH1-S02B	.01	8290/PCDD PCDF		Soil	10.461g	brown dirt with pebbles
9	E0900578-004	AOC328T1SBPH2-S0.5	.01	8290/PCDD PCDF		Soil	10.344g	brown dirt with pebbles
10	E0900578-005	AOC328T3SB007-S04	.01	8290/PCDD PCDF		Soil	10.636g	reddish brown soil
11	E0900578-006	AOC328T3SBPH3-S0.5	.01	8290/PCDD PCDF		Soil	10.185g	brown dirt with pebbles
12	E0900578-007	AOC328T3SBPH4-S0.5	.01	8290/PCDD PCDF		Soil	10.735g	reddish brown very hard dirt in clumps
13	E0900587-013	T2-Comp	.01	8290/PCDD PCDF		Soil	10.508g	dark brown soil
14	E0900587-014	T1-Comp	.01	8290/PCDD PCDF		Soil	10.283g	dark brown soil
15	E0900587-015	T4-1	.01	8290/PCDD PCDF		Soil	10.545g	dark brown soil
16	E0900587-016	T3-Comp	.01	8290/PCDD PCDF		Soil	10.895g	dark brown soil
17	E0900592-001	SS58B	.01	8290/PCDD PCDF		Soil	11.225g	dark grey mud/tan sand mixture
18	E0900592-002	SS59B	.01	8290/PCDD PCDF		Soil	11.171g	grey sand with red streaks
19	E0900593-001	SS-58A	.01	8290/PCDD PCDF		Soil	11.098g	wet grey muddy sand
20	E0900593-002	SS-59A	.01	8290/PCDD PCDF		Soil	12.297g	grey sand with red streaks
21	EQ0900291-01	MB		8290/PCDD PCDF		Solid	10.000g	
22	EQ0900291-02	LCS		8290/PCDD PCDF		Solid	10.000g	
23	EQ0900291-03	AOC328T1SBPH1-S02 MS	.01	8290/PCDD PCDF		Solid	10.491g	
24	EQ0900291-04	AOC328T1SBPH1-S02 DMS	.01	8290/PCDD PCDF		Solid	10.988g	

Preparation Information Benchsheet

Prep Run#: 92470 **Prep WorkFlow:** OrgExtDioxS(30) **Status:** Prepped
Team: Semivoa GCMS/AKODUR **Prep Method:** Method **Prep Date/Time:** 8/3/09 02:00 PM

Spiking Solutions

Name:	8290 Matrix Working Standard	Inventory ID	8514	Logbook Ref:	D10-31-5A	Expires On:	02/27/2019

EQ0900291-02	100.00µL	EQ0900291-03	100.00µL	EQ0900291-04	100.00µL

Name:	8290/1613B Cleanup Working Standard	Inventory ID	11295	Logbook Ref:	D10-57-2A/B	Expires On:	08/04/2014

E0900557-004	100.00µL	E0900557-005	100.00µL	E0900557-006	100.00µL	E0900557-007	100.00µL	E0900561-001	100.00µL	E0900578-001	100.00µL
E0900578-002	100.00µL	E0900578-003	100.00µL	E0900578-004	100.00µL	E0900578-005	100.00µL	E0900578-006	100.00µL	E0900578-007	100.00µL
E0900587-013	100.00µL	E0900587-014	100.00µL	E0900587-015	100.00µL	E0900587-016	100.00µL	E0900592-001	100.00µL	E0900592-002	100.00µL
E0900593-001	100.00µL	E0900593-002	100.00µL	EQ0900291-01	100.00µL	EQ0900291-02	100.00µL	EQ0900291-03	100.00µL	EQ0900291-04	100.00µL

Name:	8290 Internal Working Standard	Inventory ID	11297	Logbook Ref:	D10-57-1A	Expires On:	07/31/2014

E0900557-004	100.00µL	E0900557-005	100.00µL	E0900557-006	100.00µL	E0900557-007	100.00µL	E0900561-001	100.00µL	E0900578-001	100.00µL
E0900578-002	100.00µL	E0900578-003	100.00µL	E0900578-004	100.00µL	E0900578-005	100.00µL	E0900578-006	100.00µL	E0900578-007	100.00µL
E0900587-013	100.00µL	E0900587-014	100.00µL	E0900587-015	100.00µL	E0900587-016	100.00µL	E0900592-001	100.00µL	E0900592-002	100.00µL
E0900593-001	100.00µL	E0900593-002	100.00µL	EQ0900291-01	100.00µL	EQ0900291-02	100.00µL	EQ0900291-03	100.00µL	EQ0900291-04	100.00µL

Preparation Materials

Acetone 99.5% Minimum	C2-16-007 (7199)	Carbon, High Purity	C2-22-003 (9451)	Ethyl Acetate 99.9% Minimum EtOAc	C2-23-006 (9462)
Extraction Thimbles 43 x123 mm	(1577)	Glass Wool	C2-13-005 (7198)	Sulfuric Acid Reagent Grade H2SO4	C2-24-003 (9461)
Dichloromethane (Methylene Chloride) 99.9% MeCl2	C2-24-005 (9448)	Sodium Chloride Reagent Grade NaCl	C1-104-2 (3306)	Sodium Hydroxide Reagent Grade NaOH	C2-24-002 (9463)
Sodium Sulfate Anhydrous Reagent Grade Na2SO4	C2-19-006 (7201)	Tridecane (n-Tridecane)	C2-24-001 (9460)	Hexane (n-Hexane) 98.5% Minimum	C2-25-002 (9440)
Nonane (n-Nonane) 99%	C2-21-004 (9457)	Sand Reagent Grade	C1-99-1 (345)	Silica Gel Reagent Grade	C2-27-007 (9456)
Toluene 99.9% Minimum	C2-24-006 (9445)				

Preparation Steps

Step:	Extraction	Step:	Acid Clean	Step:	Silica Gel Clean	Step:	Final Volume
Started:	8/3/09 14:00	Started:	8/5/09 09:00	Started:	8/6/09 08:00	Started:	8/6/09 08:00
Finished:	8/3/09 17:30	Finished:	8/5/09 12:00	Finished:	8/6/09 10:00	Finished:	8/6/09 10:00
By:	AKODUR	By:	AKODUR	By:	AKODUR	By:	AKODUR

Preparation Information Benchsheet

Prep Run#: 92470 **Prep WorkFlow:** OrgExtDioxS(30) **Status:** Prepped
Team: Semivoa GCMS/AKODUR **Prep Method:** Method **Prep Date/Time:** 8/3/09 02:00 PM

Comments: Note Silcia Clean was not done on 8/6/09 from 8-10 am. It was done on 8/5/09 was from 12p-5p
ak 8/7/09

Reviewed By: Arthi Kodur Date: 8/7/09

Chain of Custody

Relinquished By: _____ Date: _____ Extracts Examined

Received By: _____ Date: _____ Yes No

Nonconformity and Corrective Action Report

NONCONFORMITY

PROCEDURE (SOP or METHOD): 8290 SOLID

EVENT: ☐ Missed Holding Time ☐ QC Failure ☐ Lab Error (spilled sample, spiking error, etc.)
☐ Method Blank Contamination ☐ Login Error ☐ Project Management Error
☐ Equipment Failure ☐ Unacceptable PT Sample Result
☐ SOP Deviation ☒ Other (describe**):**

SAMPLES / PROJECTS / CUSTOMERS / SYSTEMS AFFECTED:

EQ0900291 – E0900587-013,-014,-015-,016: HPCDD/HPCDF LEVELS EXCEED UPPER CALIBRATION: DILUTIONS NEEDED

DETAILED DESCRIPTION: E0900587-013 1:80 E0900587-014 1:80

E0900587-015 1:30 E0900587-016 1:30

ORIGINATOR: JEREMIAH BECK DATE: 08/10/09

CORRECTIVE ACTION AND OUTCOME

Re-establishment of conformity must be demonstrated and documented. Describe the steps that were taken, or are planned to be taken, to correct the particular Nonconformity and prevent its reoccurrence. Include any Project Manager instructions here.

USE INTERNAL STANDARD TO DILUTE EXTRACTS

Is the data to be flagged in the Analytical Report with an appropriate qualifier? ☒ **No** ☐ **Yes**

APPROVAL AND NOTIFICATION

Supervisor Verification and Approval of Corrective Action Darren Biles Date: 08/10/09
Comments:

QA PM Verification and Approval of Corrective Action Andrew Biddle 08/14/09 Date: ____
Comments:

Customer Notified by ☐ Telephone ☐ Fax ☐ E-mail ☒ Narrative ☐ Not notified

Project Manager Verification and Approval of Corrective Action Date: Jane Freemyer 08/14/09
Comments:

(Attach record or cite reference where record is located.) Project folder archive

COLUMBIA ANALYTICAL SERVICES, INC.

Total Solids, (Gravimetric, Dried at 110 Deg C)

Group ID: 92958
Analyst: JDIAZ
Date Acquired: 7/31/09

Reviewed By: Arthi Kodur
Date Reviewed: 8/6/09

Lab Code	Client Sample Name	Test	Tare Weight	Wet Weight + Tare	Dry Weight + Tare	Percent Solids
E0900557-001	0901784-02	8290/Total Solids	13.0530g	21.6900g	21.0200g	92.2
E0900557-002	0901784-03	8290/Total Solids	13.0770g	25.7570g	23.4300g	81.6
E0900557-003	0901784-10	8290/Total Solids	13.1540g	20.2800g	19.7390g	92.4
E0900573-011	Zone E-U	8290/Total Solids	13.1030g	19.1700g	16.7410g	60.0
E0900573-012	Zone E-L	8290/Total Solids	13.1300g	17.5490g	15.2020g	46.9
E0900574-011	LineD-U	8290/Total Solids	13.1380g	18.3060g	16.2980g	61.1
E0900574-012	LineD-L	8290/Total Solids	13.1400g	18.1570g	15.1960g	41.0
E0900576-001	Line C-U	8290/Total Solids	13.1190g	17.0090g	15.7320g	67.2
E0900576-002	Line C-L	8290/Total Solids	13.1220g	18.7190g	16.4530g	59.5
E0900576-015	Line B-U	8290/Total Solids	13.0690g	18.8490g	15.7560g	46.5
E0900576-016	Line B-L	8290/Total Solids	13.1240g	18.8640g	16.5950g	60.5
E0900582-001	SS-55B	8290/Total Solids	13.1110g	35.4690g	30.3360g	77.0
E0900582-002	SS-56B	8290/Total Solids	13.1310g	30.3280g	26.7140g	79.0
E0900582-003	SS-57B	8290/Total Solids	13.0180g	21.0820g	19.9580g	86.1
E0900583-001	SS-55A	8290/Total Solids	13.0940g	21.8350g	19.7850g	76.5
E0900583-002	SS-56A	8290/Total Solids	13.0990g	18.7120g	17.3850g	76.4
E0900583-003	SS-57A	8290/Total Solids	13.1510g	21.8810g	20.7230g	86.7
E0900587-011	Line A-U	8290/Total Solids	13.0410g	17.8130g	15.3760g	48.9
E0900587-012	Line A-L	8290/Total Solids	13.1490g	19.0970g	15.6780g	42.5

COLUMBIA ANALYTICAL SERVICES, INC.

Total Solids, (Gravimetric, Dried at 110 Deg C)

Group ID:	93066		
Analyst:	AKODUR	**Reviewed By:**	Arthi Kodur
Date Acquired:	8/3/09	**Date Reviewed:**	8/7/09

Lab Code	Client Sample Name	Test	Tare Weight	Wet Weight + Tare	Dry Weight + Tare	Percent Solids
E0900557-004	0901784-11	8290/Total Solids	13.1120g	17.9470g	17.5110g	91.0
E0900557-005	0901784-22	8290/Total Solids	13.0930g	23.6210g	21.2870g	77.8
E0900557-006	0901784-23	8290/Total Solids	13.0280g	20.9710g	20.4080g	92.9
E0900557-007	0901784-25	8290/Total Solids	13.0670g	18.9820g	18.3660g	89.6
E0900561-001	ASH-4-D-TCLP	8290/Total Solids	13.1020g	18.0770g	16.6890g	72.1
E0900578-001	AOC328T1TRENCHE4-S0.5	8290/Total Solids	13.1200g	18.6970g	18.3390g	93.6
E0900578-002	AOC328T1SBPH1-S02	8290/Total Solids	13.1450g	20.4070g	19.9570g	93.8
E0900578-003	AOC328T1SBPH1-S02B	8290/Total Solids	13.1860g	18.9580g	18.5720g	93.3
E0900578-004	AOC328T1SBPH2-S0.5	8290/Total Solids	13.1060g	18.7880g	18.4300g	93.7
E0900578-005	AOC328T3SB007-S04	8290/Total Solids	13.0110g	17.4300g	16.9780g	89.8
E0900578-006	AOC328T3SBPH3-S0.5	8290/Total Solids	13.0780g	18.3950g	18.1550g	95.5
E0900578-007	AOC328T3SBPH4-S0.5	8290/Total Solids	13.1160g	18.0330g	17.7570g	94.4
E0900587-013	T2-Comp	8290/Total Solids	13.0630g	18.1800g	16.8520g	74.0
E0900587-014	T1-Comp	8290/Total Solids	13.1470g	16.9970g	15.6720g	65.6
E0900587-015	T4-1	8290/Total Solids	13.1590g	16.2070g	14.4740g	43.1
E0900587-016	T3-Comp	8290/Total Solids	13.0900g	18.4040g	17.1930g	77.2
E0900592-001	SS58B	8290/Total Solids	13.1930g	24.0300g	22.2440g	83.5
E0900592-002	SS59B	8290/Total Solids	13.0600g	21.0960g	19.9030g	85.2
E0900593-001	SS-58A	8290/Total Solids	13.1560g	23.8510g	21.9760g	82.5
E0900593-002	SS-59A	8290/Total Solids	13.1690g	22.0110g	20.8090g	86.4

Columbia Analytical Services INC

Chromatograms and Selected Ion Monitoring

19408 Park Row, Suite 320, Houston, TX 77084
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www.caslab.com

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Columbia Analytical Services INC

Continuing Calibration

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Columbia Analytical Services INC

Initial Calibration

19408 Park Row, Suite 320, Houston, TX 77084
Phone (713)266-1599 Fax (713)266-0130
www.caslab.com

An Employee Owned Company

1317 South 13th Avenue Kelso, Washington 98626 (360) 577-7222 (360) 636-1068 fax

Columbia Analytical Services INC.
An Employee - Owned Company

August 14, 2009 Analytical Report for Service Request No: K0906873

Michael Dupay
Barr Engineering
4700 West 77th Street
Minneapolis, MN 55435

RE: Joslyn/23/27-1102009448

Dear Michael:

Enclosed are the results of the samples submitted to our laboratory on July 31, 2009. For your reference, these analyses have been assigned our service request number K0906873.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.caslab.com. 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 items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3358. You may also contact me via Email at LHuckestein@caslab.com.

Respectfully submitted,

Columbia Analytical Services, Inc.

Lynda Huckestein
Client Services Manager

LH/ln

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

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 percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
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.
Kelso, WA
State Certifications, Accreditations, and Licenses

Program	Number
Alaska DEC UST	UST-040
Arizona DHS	AZ0339
Arkansas - DEQ	88-0637
California DHS	2286
Colorado DPHE	-
Florida DOH	E87412
Hawaii DOH	-
Idaho DHW	-
Indiana DOH	C-WA-01
Louisiana DEQ	3016
Louisiana DHH	LA050010
Maine DHS	WA0035
Michigan DEQ	9949
Minnesota DOH	053-999-368
Montana DPHHS	CERT0047
Nevada DEP	WA35
New Jersey DEP	WA005
New Mexico ED	-
North Carolina DWQ	605
Oklahoma DEQ	9801
Oregon - DHS	WA200001
South Carolina DHEC	61002
Utah DOH	COLU
Washington DOE	C1203
Wisconsin DNR	998386840
Wyoming (EPA Region 8)	-

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	Barr Engineering Company	**Service Request No.:**	K0906873
Project:	Joslyn	**Date Received:**	7/31/2009
Sample Matrix:	Soil		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), and Laboratory Control Sample (LCS).

Sample Receipt

Six soil samples were received for analysis at Columbia Analytical Services on 7/31/2009. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

General Chemistry Parameters

No anomalies associated with the analysis of these samples were observed.

Approved by _____ **Date** 8/17/09

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client : Barr Engineering Company
Project Name : Joslyn
Project Number : 23/27-1102009448
Sample Matrix : SOIL

Service Request : K0906873
Date Collected : 07/29/09
Date Received : 07/31/09

Carbon, Total Organic (TOC)

Prep Method : SOP
Analysis Method ASTM D4129-82M
Test Notes :

Units : Percent
Basis : Dry

Sample Name	Lab Code	MRL	Dilution Factor	Date Prepared	Date Analyzed	Result	Result Notes
Line A-U	K0906873-001	0.05	1	8/3/2009	08/06/09	20.1	
Line A-L	K0906873-002	0.05	1	8/3/2009	08/06/09	14.4	
T2-Comp	K0906873-003	0.05	1	8/3/2009	08/06/09	7.15	
T4-1	K0906873-005	0.05	1	8/3/2009	08/06/09	28.8	
T3-Comp	K0906873-006	0.05	1	8/3/2009	08/06/09	5.75	
Method Blank	K0906873-MB	0.05	1	NA	08/06/09	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client : Barr Engineering Company
Project Name : Joslyn
Project Number : 23/27-1102009448
Sample Matrix : SOIL

Service Request : K0906873
Date Collected : NA
Date Received : NA
Date Prepared : NA
Date Analyzed : 08/06/09

Duplicate Summary
Inorganic Parameters

Sample Name : BatchQC
Lab Code : K0906718-021DUP
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 (TOC)	SOP	ASTM D4129-82M	0.05	1.25	1.25	1.25	<1	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client : Barr Engineering Company
Project Name : Joslyn
Project Number : 23/27-1102009448
Sample Matrix : SOIL

Service Request : K0906873
Date Collected : NA
Date Received : NA
Date Prepared : NA
Date Analyzed : 08/06/09

Matrix Spike Summary
Inorganic Parameters

Sample Name : BatchQC
Lab Code : K0906718-021MS
Test Notes :

Units : Percent
Basis : Dry

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 (TOC)	SOP	ASTM D4129-82M	0.05	5.19	1.25	6.26	97	75-114	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client :	Barr Engineering Company	**Service Request :**	K0906873
Project Name :	Joslyn	**Date Collected :**	NA
Project Number :	23/27-1102009448	**Date Received :**	NA
Sample Matrix :	SOIL	**Date Prepared :**	NA
		Date Analyzed :	08/06/09

Laboratory Control Sample Summary
Inorganic Parameters

Sample Name :	Laboratory Control Sample	Units :	Percent
Lab Code :	K0906873-LCS	Basis :	Dry

Test Notes :

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Carbon, Total Organic (TOC)	SOP	ASTM D4129-82M	0.55	0.57	104	74-123	

KR906873

Chain of Custody

BARR
4700 West 77th Street
Minneapolis, MN 55435-4803
(952) 832-2600

COC 1 of 1

Project Manager: John Hunt
Project Contact: Michael Dupay
Sampled by: Alec Danielson
Laboratory: CAS

Project Number: 23/27-110209948
Project Name: Joslyn
№ 27957

Sample Identification	Collection Date	Collection Time	Matrix: Water	Matrix: Soil	Matrix:	Type: Grab	Type: Comp.	Type: QC	Number of Containers/Preservative — Water: Volatile Organics (Pres.) *1	Semivolatile Organics *2	Dissolved Metals (HNO_3)	Total Metals (HNO_3)	General (Unpreserved) *3	Cyanide (NaOH)	Nutrients (H_2SO_4) *4	Oil and Grease (H_2SO_4)	Sulfide (Zn Acetate)	Methane	Bacteria ($Na_2S_2O_3$)	DRO (HCl)	Soil: VOCs (2-oz tared MeOH) *1	GRO, BTEX (2-oz tared MeOH) *1	DRO (2-oz tared) - 25 grams	Metals (2-oz unpreserved)	SVOCs (2 or 4-oz unpres.) *2	% Moisture (plastic vial, unpres.)	TOC		Total No. Of Containers	Remarks
1. Line A-U	7-28-09	1030		X			X																				1		1	Analyze for TOC
2. Line A-L		1035		X			X																				1		1	
3. T2-Comp		1730		X			X																				1		1	
4. T1-Comp		1400		X			X																				1		1	Hold
5. T4-1		1445		X			X																				1		1	
6. T3-Comp		1530		X			X																				1		1	
7.																														
8.																														
9.																														
10.																														
11.																														
12.																														

Common Parameter/Container - Preservation Key
*1 - Volatile Organics = BTEX, GRO, TPH, Full List
*2 - Semivolatile Organics = PAHs, PCP, Dioxins, Full List, Herbicide/Pesticide/PCBs
*3 - General = pH, Chloride, Flouride, Alkalinity, TSS, TDS, TS, Sulfate
*4 - Nutrients = COD, TOC, Phenols, Ammonia Nitrogen, TKN

Relinquished By:	On Ice? Y N	Date	Time	Received by:	Date	Time
Alec Danielson	0 N	7-28-09	1700			
Relinquished By:	On Ice? Y N	Date	Time	Received by:	Date	Time
				[signature] CAS	7/29/09	0800

Samples Shipped VIA: ☐ Air Freight ☐ Federal Express ☐ Sampler ☐ Other _____
Air Bill Number:

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

H:RLG\STDFORMS\Chain Of Custody Form RLG Rev. 07\01\05

Columbia Analytical Services, Inc.
Cooler Receipt and Preservation Form

PC 424

Client / Project: Barr Service Request K09 06873

Received: 7/31/09 Opened: 7/31/09 By: Gjuell

1. Samples were received via? *US Mail* (*Fed Ex*) *UPS* *DHL* *GH* *GS* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA (Y) N If yes, how many and where? 1F
   If present, were custody seals intact? (Y) N If present, were they signed and dated? (Y) N
4. Is shipper's air-bill filed? If not, record air-bill number: 9581 2066 3456 NA Y N

5. **Temperature of cooler(s) upon receipt (°C):** 0.2
   Temperature Blank (°C): 5.9 (TB in Bwrap not near ice)
   Thermometer ID: 244
6. If applicable, list Chain of Custody Numbers:
7. Packing material used. *Inserts* *Baggies* (*Bubble Wrap*) *Gel Packs* (*Wet Ice*) *Sleeves* *Other* _____
8. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
9. **Did all bottles arrive in good condition (unbroken)?** *Indicate in the table below.* NA (Y) N
10. Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
11. Did all sample labels and tags agree with custody papers? *Indicate in the table below* NA (Y) N
12. **Were appropriate bottles/containers and volumes received for the tests indicated?** NA (Y) N
13. Were the pH-preserved bottles tested* received at the appropriate pH? *Indicate in the table below* (NA) Y N
14. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
15. **Are CWA Microbiology samples received with >1/2 the 24hr. hold time remaining from collection?** (NA) Y N
16. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

*Does not include all pH preserved sample aliquots received. See sample receiving SOP (SMO-GEN).

Additional Notes, Discrepancies, & Resolutions: _____