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1 copy to Manell Hivesay
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11-12-03*

**RESULTS FROM LIMITED SCREENING FOR DIOXIN
PUGET PARK (SW HUDSON STREET SITE)
SEATTLE, WASHINGTON**

E-0290-6

Prepared for

Ms. Colleen Browne, Sr. Project Manager
Seattle Department of Parks and Recreation
800 Maynard Avenue South, Third Floor
Seattle, Washington 98134-1336

November 6, 2003

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Ms. Colleen Browne, Senior Project Manager
Seattle Department of Parks and Recreation
800 Maynard Avenue South, Third Floor
Seattle, Washington 98134

Subject: Results from Limited Screening for Dioxin
Puget Park (SW Hudson Street Site)
Seattle, Washington

Dear Ms. Browne:

Geo Group Northwest, Inc., has completed its limited screening work for the above referenced project site in Seattle, Washington. The screening was directed toward an evaluation of the potential presence of dioxin in the cement kiln dust (CKD) fills and other select media at the site. Our work was completed per our proposal dated September 12, 2003, and authorized by you on September 26, 2003.

PROJECT BACKGROUND INFORMATION

During a meeting on September 3, 2003, Mr. Dan Cargill of the Washington Department of Ecology (WDOE) requested that the CKD fills at the site be tested for the potential presence of dioxin. He stated that previous testing of CKD generated at the former Holnam cement plant had found dioxin, and dioxin had been identified as a contaminant in sediment in the Duwamish River (into which Puget Creek flows from the site). Any review of the remedial actions completed at the site would need to include an evaluation of the potential presence of dioxin at the site, according to Mr. Cargill.

After our discussion with the WDOE, Geo Group Northwest, Inc., discussed the WDOE concerns regarding dioxin at the project site with the Seattle Department of Parks and Recreation.

(Seattle Parks) and with Mr. John M. McFarland during a meeting later the same day. Following this meeting, we performed some research into the issue and obtained a copy of WDOE publication No. 98-320, "Washington State Dioxin Source Assessment," published in July 1998. In this publication, the WDOE reported that three samples of CKD and six samples of stack emissions collected from the Holnam cement plant during 1994 to 1996 were found to contain dioxin. The publication goes on to state that the CKD dioxin load from the Holnam plant "is quite small." However, the potential for dispersion of dioxin from the CKD is stated as "variable," due to the range of uses that the CKD has seen (e.g., agricultural, hazardous waste stabilization, soil stabilization, road bed fill, and engineered backfill in mining or construction).

CHARACTERISTICS OF DIOXIN

Dioxins are unintended byproducts formed during combustion of organic compounds in the presence of chloride (e.g., incineration of municipal and hospital waste, and chlorine bleaching of wood pulp). There exist over 200 different forms of dioxins and furans (a structurally similar group of compounds). The most toxic form of dioxin is 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). There exist 16 other forms of dioxins and furans that have been assigned toxicity values relative to 2,3,7,8-TCDD. These values are called toxic equivalency factors (TEFs).

A TEF of 1 is assigned to 2,3,7,8-TCDD, and the other forms are assigned values less than 1 dependent on their toxicity level relative to 2,3,7,8-TCDD. The TEFs are used to express a total toxicity of dioxins and furans in a material by multiplying the concentration of each form by its TEF and summing these products to arrive at a value called a "toxic equivalent," expressed as TEQ. The TEQ values are expressed in the same units as the concentration values from which they are derived (e.g., TEQ mg/kg).

SAMPLE COLLECTION ACTIVITIES

Geo Group Northwest, Inc., personnel were at the site during October 6, 7, and 8, 2003, to identify the sample collection locations and to collect the samples per the tasks outlined in our proposal. The sampling of the CKD fill was planned at our office before going to the project site. The planned sampling locations were selected by using procedures in the Washington Department of Ecology (WDOE) publication "Guidance on Sampling and Data Analysis

Methods" (Publication No. 94-49). In particular, we laid a grid over a map of the site and randomly selected three sampling locations (at nodes on the grid) on the Puget Park lobe and two locations in the McFarland lobe. The sampling locations determined in our office were then found in the field by using a compass, measuring tape, and scaled site plan.

During our field activities, we encountered several occasions where a sample could not be obtained at the selected location due to the presence of buried debris that prevented further excavation with the hand auger equipment. When these circumstances occurred, we selected an alternate location within the immediate vicinity of abandoned location, and then proceeded to perform the sampling at that location. In two instances (i.e., for samples #3 and #4), we were again unable to collect a sample, and selected a second alternate location further away (i.e., approximately 30 to 40 feet) from the original planned sampling location.

Table 1
CKD Fill Sampling Details

Sample Identification	Thickness of Soil Cap at Location (feet)	Depth of Sample below Base of Soil Cap (feet)	Depth of Sample below Ground Surface (feet)
#1	1.3	2.2	3.5
#2	0.7	3.3	4.0
#3	2.5	3.0	5.5
#4	2.0	2.0	4.0
#5	3.5	1.5	5.0
#6	1.0	2.5	3.5

Sample #2 was collected from a layer of dark grayish, fine-grained material that appeared distinctly dissimilar from the CKD that we observed and sampled elsewhere on the site. Based on its appearance and the observation of scattered chunks of dark debris (suspected to be foundry slag) in the material, we suspected that the material was not CKD, and we decided not to have the material tested with the CKD samples that we collected.

We also collected samples of the carbonate precipitate material located on the ground surface downslope from the Puget Park lobe, and we collected samples of the sediment in the bed of Puget Creek below the area where the carbonate precipitate is present.

A sample of the water seepage was collected from a pool of water located against one of the silt fences that is present between the gravel precipitation chamber and Puget Creek. This pool had approximate dimensions of two feet wide by six to eight feet long by six to eight inches deep. During our site work, we observed only a trace of water seepage flowing over the ground surface in the area of the gravel chamber. The amount and nature of flowing seepage was inadequate for collecting the two-liter sample volume required by the laboratory. For this reason, we collected the seepage water sample from the pool. The sampling locations are noted on Plate 1 - Sample Location Map, which is attached with this letter.

SAMPLE DELIVERY AND SAMPLE TESTING PROGRAM

The samples that were collected during our field activities for this limited screening were delivered to OnSite Environmental Laboratories (OnSite) in Redmond, Washington. Chain of custody documentation accompanied the samples from the time they were collected to the time they arrived at the laboratory.

pH Analysis

The five CKD fill samples were combined into one composite sample by OnSite and were analyzed for pH by using EPA Method 9045. OnSite is certified by the WDOE to perform the requested pH analysis.

Dioxin Analysis

The samples that were to be analyzed for dioxin were forwarded by OnSite to Triangle Laboratories (Triangle) in Durham, North Carolina. The five CKD fill samples were combined into one composite sample by Triangle before being analyzed. The samples were analyzed using EPA Method 8290. Triangle is certified by the WDOE to perform the requested analysis.

LABORATORY ANALYSIS RESULTS

pH Analysis Results

The sample of the CKD fills was reported by OnSite to have a pH level of 12.2. A copy of the laboratory analysis report for the pH testing is provided in Attachment A to this letter.

Dioxin Analysis Results

A summary of the dioxin analysis results for the solid and water samples is presented in Table 2 which is attached at the end of this letter. The solid sample results are tabulated in the units of picograms per gram (pg/g), which are equivalent to the units of parts per trillion. The water sample results are tabulated in the units of picograms per liter (pg/l), which are approximately equivalent to parts per quadrillion (as one liter of water is approximately 1,000 grams on a mass basis). A copy of the laboratory analysis report for the dioxin testing is provided in Attachment A to this letter.

As shown in Table 2, the analysis results by Triangle reported that the CKD, precipitate, and sediment samples contained multiple dioxin and furan analytes. The extended names for the abbreviations used for the dioxin and furan analytes are provided in the following box:

Abbreviation		Extended Name
PCDD	=	Polychlorodibenzo-p-dioxin
TCDD	=	Tetrachlorodibenzo-p-dioxin
PeCDD	=	Pentachlorodibenzo-p-dioxin
HxCDD	=	Hexachlorodibenzo-p-dioxin
HpCDD	=	Heptachlorodibenzo-p-dioxin
OCDD	=	Octachlorodibenzo-p-dioxin
PCDF	=	Polychlorodibenzofuran
TCDF	=	Tetrachlorodibenzofuran
PeCDF	=	Pentachlorodibenzofuran
HxCDF	=	Hexachlorodibenzofuran
HpCDF	=	Heptachlorodibenzofuran
OCDF	=	Octachlorodibenzofuran

The specific analytes that were reported as detected are noted below for each of the four samples that were tested. The analyte 2,3,7,8-TCDD was not detected in any of the samples.

CKD Fill

In the CKD sample, the analytes reported at quantitated concentrations above method reporting limits are the following:

- 1,2,3,4,6,7,8-HpCDD (7.9 pg/g)
- OCDD (69.2 pg/g)
- Total TCDD (0.89 pg/g)
- Total PeCDD (0.42 pg/g)
- Total HxCDD (3.3 pg/g)
- Total HpCDD (21.3 pg/g), note this includes the specific listed HpCDD above

Analytes reported present at estimated (noted below as "est.") or estimated maximum possible concentrations (noted below as "EMPC") are the following:

- 1,2,3,6,7,8-HxCDD (0.53 pg/g est.)
- 2,3,7,8-TCDF (0.56 pg/g EMPC)
- 2,3,4,7,8-PeCDF (0.27 pg/g EMPC)
- 1,2,3,4,7,8-HxCDF (0.42 pg/g est.)
- 1,2,3,4,6,7,8-HpCDF (2.0 pg/g est.)
- OCDF (3.3 pg/g est.)

Analytes reported as present at EMPCs but that were influenced by the presence of a co-eluting non-target analyte (that has contributed at least ten percent to the reported result) are the following:

- 1,2,3,7,8-PeCDF (4.4 pg/g EMPC)
- Total TCDF (21.1 pg/g EMPC), note this includes the specific listed TCDF above
- Total PeCDF (3.0 pg/g EMPC), note this includes the specific listed PeCDF above

Sediment

In the sediment sample, the analytes reported at quantitated concentrations above method reporting limits are the following:

- 1,2,3,4,6,7,8-HpCDD (251 pg/g)
- OCDD (2270 pg/g)
- 1,2,3,4,6,7,8-HpCDF (26.4 pg/g)
- OCDF (104 pg/g)
- Total PeCDD (0.43 pg/g)
- Total HxCDD (20.2 pg/g)
- Total HpCDD (493 pg/g), note this includes the specific listed HpCDD above
- Total HpCDF (88.9 pg/g), note this includes the specific listed HpCDF above

Analytes reported present at estimated (noted below as "est.") or estimated maximum possible concentrations (noted below as "EMPC") are the following:

- 1,2,3,6,7,8-HxCDD (2.3 pg/g est.)
- 1,2,3,7,8,9-HxCDD (1.1 pg/g est.)
- 2,3,7,8-TCDF (0.56 pg/g EMPC)
- 1,2,3,4,7,8-HxCDF (0.36 pg/g est.)
- 1,2,3,6,7,8-HxCDF (0.24 pg/g est.)
- 2,3,4,6,7,8-HxCDF (0.29 pg/g est.)
- 1,2,3,4,7,8,9-HpCDF (1.0 pg/g est.)

Analytes reported as present at quantitated concentrations or at EMPCs but that were influenced by the presence of a co-eluting non-target analyte (that has contributed at least ten percent to the reported result) are the following:

- 1,2,3,7,8-PeCDF (2.7 pg/g EMPC)
- Total TCDF (1.6 pg/g quantitated), note this includes the specific listed TCDF above
- Total PeCDF (0.98 pg/g quantitated), note this includes the specific listed PeCDF above
- Total HxCDF (14.3 pg/g quantitated), note this includes the specific listed HxCDF above

Carbonate Precipitate

In the precipitate sample, the analytes reported at quantitated concentrations above method reporting limits are the following:

- OCDD (33.9 pg/g)
- 2,3,7,8-TCDF (4.8 pg/g)
- Total TCDD (1.3 pg/g)
- Total HxCDD (3.0 pg/g)
- Total HpCDD (9.7 pg/g)
- Total HxCDF (2.8 pg/g)
- Total HpCDF (1.1 pg/g)

Analytes reported present at estimated (noted below as "est.") or estimated maximum possible concentrations (noted below as "EMPC") are the following:

- 1,2,3,6,7,8-HxCDD (0.41 pg/g est.)
- 1,2,3,7,8,9-HxCDD (0.52 pg/g est.)
- 1,2,3,4,6,7,8-HpCDD (4.8 est.)
- 2,3,4,7,8-PeCDF (0.99 pg/g est.)
- 1,2,3,4,7,8-HxCDF (0.46 pg/g est.)
- 1,2,3,6,7,8-HxCDF (0.25 pg/g est.)
- 2,3,4,6,7,8-HxCDF (0.25 pg/g est.)
- 1,2,3,4,6,7,8-HpCDF (0.85 pg/g EMPC)
- OCDF (1.9 pg/g est.)
- Total PeCDD (1.1 pg/g EMPC)

Analytes reported as present at quantitated concentrations or at EMPCs but that were influenced by the presence of a co-eluting non-target analyte (that has contributed at least ten percent to the reported result) are the following:

- 1,2,3,7,8-PeCDF (2.3 pg/g EMPC)
- Total TCDF (24.4 pg/g quantitated), note this includes the specific listed TCDF above
- Total PeCDF (3.2 pg/g quantitated), note this includes the specific listed PeCDF above

Water

In the seepage water sample, no target analytes were reported at concentrations above the method reporting limits. The analytes that were reported present at estimated (noted below as "est.") or estimated maximum possible concentrations (noted below as "EMPC") are the following:

- OCDD (21.3 pg/l est.), note this analyte was detected in the laboratory blank sample at an EMPC of 4.9 pg/l
- Total PeCDF (2.6 pg/l EMPC)

Expression of Laboratory Results in TEQs

The dioxin analysis results also were reported by the laboratory in the format of EPA Toxicity Equivalents (TEQs). Table 3, attached at the end of this letter, presents the TEQ calculations for the sample results. In summary, the total TEQ values reported for the samples were as follows:

- 1.1 TEQ pg/g for the CKD sample,
- 1.5 TEQ pg/g for the precipitate sample
- 6.2 TEQ pg/g for the solid sample, and - sediment - creek
- 4.1 TEQ pg/l for the water sample

EVALUATION OF FINDINGS

The results of the pH test on the composite sample of the CKD fills of 12.2 is within the range of pH values reported for previous relatively undegraded CKD samples collected from the site. Thus, the composite CKD sample analysis results for dioxins and furans are considered to be representative of the CKD fills present at the site.

We compared the laboratory analysis results to the Washington State Model Toxics Control Act (MCTA) regulatory criteria:

- Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals (EISC), and

- Priority Contaminants of Ecological Concern for Sites that Qualify for the Simplified Terrestrial Ecological Evaluation Procedure (PCEC).

These criteria are published in Washington Administrative Code (WAC) Chapter 173-340-900, Tables 749-2 and 749-3, respectively. The purpose of this comparison was to develop a preliminary understanding about how the reported analysis results compare to readily available numerical regulatory criteria that agencies such as the WDOE may refer to in a review of site remediation proposals.

The TEQ for the total dioxins (5.4 pg/g) detected in the sediment sample collected from the bed of Puget Creek exceeds the published EISC criteria of 2 pg/g for dioxin in soil. The total dioxin TEQ for the sediment sample also exceeds the PCEC criterion of 5 pg/g for dioxins in soil. The EISC criterion of 2 pg/g and the PCEC criterion of 3 pg/g for furans in soil were not exceeded in the sample, which has a TEQ of 0.8 pg/g for furans. The TEQs for the detected dioxins and furans in the CKD, precipitate, and water samples did not exceed these criteria.

Based on the results of the completed sampling and testing, it is the opinion of Geo Group Northwest, Inc., that the CKD fills and carbonate precipitate at the site do not contain dioxin or furan concentrations (on a TEQ basis) at levels that exceed the published EISC or PCEC criteria.

CONCLUSIONS AND RECOMMENDATIONS

Geo Group Northwest, Inc., has completed the sampling and testing of the CKD fills, carbonate precipitate, Puget Creek sediment, and water seepage consistent with the request and guidance provided by Mr. Dan Cargill of the WDOE.

Geo Group Northwest, Inc., recommends that discussion take place among Seattle Parks, Geo Group Northwest, and the WDOE, to review the project objective for a "No Further Action" (NFA) determination for the site and to identify the future steps that are needed to achieve the NFA objective, if possible.

We also recommend that a copy of this letter be presented to the WDOE, and that a meeting among Seattle Parks, Geo Group Northwest, and the WDOE be scheduled. The purpose of the meeting would be to discuss whether the existing plan to improve the drainage around the CKD

Geo Group Northwest, Inc.

November 6, 2003

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Ms. Colleen Browne - Seattle Department of Parks and Recreation

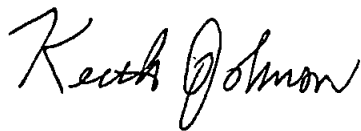
Page 11

fills, improve the existing soil cap on the CKD fills, and divert the water seepage (leachate) to the storm or sanitary sewer system is still a viable program for obtaining an NFA determination for the site.

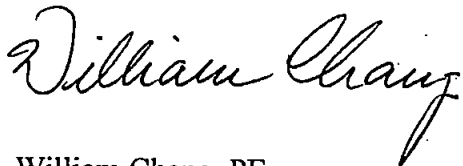
CLOSING

Geo Group Northwest, Inc., appreciates the opportunity to provide Seattle Parks with environmental consulting services for this project. Please call us if you have any questions regarding this letter.

Sincerely,
Geo Group Northwest, Inc.



Keith Johnson
Geologist



William Chang, PE
Principal

Attachments:

Table 2 - Laboratory Analysis Results - Reported in Concentrations

Table 3 - Toxicity Equivalents Calculations for Laboratory Analysis Results

Plate 1 - Sample Location Map

Attachment 1 - Laboratory Analysis Reports (excludes data backup from dioxin analysis)

Geo Group Northwest, Inc.

TABLE 2

LABORATORY ANALYSIS RESULTS - REPORTED IN CONCENTRATIONS

Puget Park (SW Hudson Street Site), Seattle, Washington

E-0290-6

Sample ID	Method Blank (SAND)	SCRN-1,3, 4,5,6 (composite)	SCRN-7	SCRN-8	Method Blank (WATER)	SCRN-9
Date Collected	--	10/6/03 to 10/8/03	10/8/03	10/8/03	--	10/8/03
Sample Media	Sand	CKD	Sediment	Precipitate	Water	Water
Reporting Units	pg/g	pg/g	pg/g	pg/g	pg/l	pg/l
2,3,7,8-TCDD	(0.2)	(0.2)	(0.2)	(0.1)	2.0 J	(1.5)
1,2,3,7,8-PeCDD	(0.2)	(0.2)	(0.2)	(0.2)	3.8 J	(1.7)
1,2,3,4,7,8-HxCDD	(0.2)	(0.3)	(0.3)	(0.2)	[2.3] J	(1.7)
1,2,3,6,7,8-HxCDD	(0.2)	0.53 J	2.3 J	0.41 J	[1.8] J	(1.5)
1,2,3,7,8,9-HxCDD	(0.2)	(0.3)	1.1 J	0.52 J	[2.5] J	(1.7)
1,2,3,4,6,7,8-HpCDD	(0.2)	7.9	251	4.8 J	(1.6)	(2.1)
OCDD	(0.4)	69.2	2270	33.9	[4.9] J	21.3 JB
2,3,7,8-TCDF	(0.1)	[0.56] J	[0.48] J	4.8	[1.6] J	(1.4)
1,2,3,7,8-PeCDF	(0.09)	[4.4] JX	[2.7] JX	[2.3] JX	[3.1] J	(1.0)
2,3,4,7,8-PeCDF	(0.1)	[0.27] J	(0.2)	0.99 J	3.0 J	(1.3)
1,2,3,4,7,8-HxCDF	(0.1)	0.42 J	0.36 J	0.46 J	[2.7] J	(0.9)
1,2,3,6,7,8-HxCDF	(0.1)	(0.2)	0.24 J	0.25 J	[2.1] J	(0.9)

TABLE 2

LABORATORY ANALYSIS RESULTS - REPORTED IN CONCENTRATIONS

Puget Park (SW Hudson Street Site), Seattle, Washington

E-0290-6

Sample ID	Method Blank (SAND)	SCRN-1,3, 4,5,6 (composite)	SCRN-7	SCRN-8	Method Blank (WATER)	SCRN-9
Reporting Units	pg/g	pg/g	pg/g	pg/g	pg/l	pg/l
2,3,4,6,7,8-HxCDF	(0.1)	(0.2)	0.29 J	0.25 J	[1.7] J	(0.9)
1,2,3,7,8,9-HxCDF	(0.1)	(0.2)	(0.2)	(0.1)	3.2 J	(1.1)
1,2,3,4,6,7,8-HpCDF	(0.1)	2.0 J	26.4	[0.85] J	[2.2] J	(1.4)
1,2,3,4,7,8,9-HpCDF	(0.2)	(0.4)	1.0 J	(0.2)	[2.1] J	(1.7)
OCDF	(0.3)	3.3 J	104	1.9 J	5.0 J	(2.7)
TOTAL TCDD	(0.2)	0.89	(0.2)	1.3	2.0	(1.5)
TOTAL PeCDD	(0.2)	0.42	0.43	[1.1]	3.8	(1.7)
TOTAL HxCDD	(0.2)	3.3	20.2	3.0	[14.1]	(1.6)
TOTAL HpCDD	(0.2)	21.3	493	9.7	(1.6)	(2.1)
TOTAL TCDF	(0.1)	[21.1] X	1.6 X	24.4 X	[1.6]	(1.4)
TOTAL PeCDF	(0.10)	3.0 X	0.98 X	3.2 X	3.0	[2.6]
TOTAL HxCDF	(0.1)	3.7	14.3 X	2.8	3.2	(1.0)
TOTAL HpCDF	(0.2)	4.5	88.9	1.1	[4.3]	(1.6)
TOTAL DIOXINS	(0.6)	95.11	2783.63	49.0	19.0	21.3
TOTAL FURANS	(0.4)	35.6	209.78	33.4	17.1	2.6
TOTAL DIOXIN + FURAN	(1.0)	130.71	2993.41	82.4	36.1	23.9

TABLE 2

LABORATORY ANALYSIS RESULTS - REPORTED IN CONCENTRATIONS

Puget Park (SW Hudson Street Site), Seattle, Washington

E-0290-6

Notes:

Analysis performed using EPA Method 8290.

Units of picograms per gram are denoted as pg/g; units of picograms per liter are denoted as pg/l.

Please note that 1,000 pg/l approximately equals 1 pg/g (one liter water equals approximately 1 kg).

Results reported in parentheses () are the method detection limit where the analyte was not detected.

Results reported in brackets [] are estimated maximum probable concentrations where the analyte was detected at too low a concentration to be quantitated.

B = Detected in the laboratory method blank as well as the field sample; result may involve contribution of background laboratory contamination to the field sample.

J = Estimated value (analyte concentration is below the range of the calibration curve).

X = Result influenced by the presence of a diphenyl ether (DPE) peak that is at least ten percent of the total analyte peak intensity.

TABLE 3

TOXICITY EQUIVALENTS CALCULATIONS FOR LABORATORY ANALYSIS RESULTS

Puget Park (SW Hudson Street Site), Seattle, Washington

E-0290-6

Sample ID		Method Blank (SAND)	SCRN-1,3, 4,5,6 (composite)	SCRN-7	SCRN-8	Method Blank (WATER)	SCRN-9	Regulatory Criteria PCEC EISC					
Date Collected		--	10/6/03 to 10/8/03	10/8/03	10/8/03	--	10/8/03						
Sample Media		Sand	CKD	Sediment	Precipitate	Water	Water	Soil	Soil				
Reporting Units	TEF	Conc. (pg/g)	TEQ (pg/g)	Conc. (pg/g)	TEQ (pg/g)	Conc. (pg/g)	TEQ (pg/g)	Conc. (pg/l) *	TEQ (pg/l) *	Conc. (pg/l) *	TEQ (pg/l) *	Conc. pg/g	Conc. pg/g
2,3,7,8-TCDD	1	(0.2)	0.2	(0.2)	0.2	(0.2)	0.2	(0.1)	0.1	2.0	2	(1.5)	1.5
1,2,3,7,8-PeCDD	0.5	(0.2)	0.1	(0.2)	0.1	(0.2)	0.1	3.8	1.9	(1.7)	0.85		
1,2,3,4,7,8-HxCDD	0.1	(0.2)	0.02	(0.3)	0.03	(0.3)	0.03	(0.2)	0.02	[2.3]	0.23	(1.7)	0.17
1,2,3,6,7,8-HxCDD	0.1	(0.2)	0.02	0.53	0.053	2.3	0.23	0.41	0.041	[1.8]	0.18	(1.5)	0.15
1,2,3,7,8,9-HxCDD	0.1	(0.2)	0.02	(0.3)	0.03	1.1	0.11	0.52	0.052	[2.5]	0.25	(1.7)	0.17
1,2,3,4,6,7,8-HpCDD	0.01	(0.2)	0.002	7.9	0.079	251	2.51	4.8	0.048	(1.6)	0.016	(2.1)	0.021
OCDD	0.001	(0.4)	0.0004	69.2	0.0692	2270	2.27	33.9	0.0339	[4.9]	0.0049	21.3	0.0213
2,3,7,8-TCDF	0.1	(0.1)	0.01	[0.56]	0.056	[0.48]	0.048	4.8	0.37	[1.6]	0.16	(1.4)	0.14
1,2,3,7,8-PeCDF	0.05	(0.09)	0.005	[4.4]	0.22	[2.7]	0.14	[2.3]	0.12	[3.1]	0.16	(1.0)	0.05
2,3,4,7,8-PeCDF	0.5	(0.1)	0.05	[0.27]	0.14	(0.2)	0.1	0.99	0.5	3.0	1.5	(1.3)	0.65
1,2,3,4,7,8-HxCDF	0.1	(0.1)	0.01	0.42	0.042	0.36	0.036	0.46	0.046	[2.7]	0.27	(0.9)	0.09
1,2,3,6,7,8-HxCDF	0.1	(0.1)	0.01	(0.2)	0.02	0.24	0.024	0.25	0.025	[2.1]	0.21	(0.9)	0.09
2,3,4,6,7,8-HxCDF	0.1	(0.1)	0.01	(0.2)	0.02	0.29	0.029	0.25	0.025	[1.7]	0.17	(0.9)	0.09
1,2,3,7,8,9-HxCDF	0.1	(0.1)	0.01	(0.20)	0.02	(0.20)	0.02	(0.10)	0.01	3.2	0.32	(1.1)	0.11

TABLE 3

TOXICITY EQUIVALENTS CALCULATIONS FOR LABORATORY ANALYSIS RESULTS

Puget Park (SW Hudson Street Site), Seattle, Washington

E-0290-6

Sample ID		Method Blank (SAND)		SCRN-1,3, 4,5,6 (composite)		SCRN-7		SCRN-8		Method Blank (WATER)		SCRN-9		Regulatory Criteria PCEC EISC	
Reporting Units	TEF	Conc. (pg/g)	TEQ (pg/g)	Conc. (pg/g)	TEQ (pg/g)	Conc. (pg/g)	TEQ (pg/g)	Conc. (pg/g)	TEQ (pg/g)	Conc. (pg/l) *	TEQ (pg/l) *	Conc. (pg/l) *	TEQ (pg/l) *	Conc. pg/g	Conc. pg/g
1,2,3,4,6,7,8-HpCDF	0.01	(0.1)	0.001	2.0	0.02	26.4	0.264	[0.85]	0.0085	[2.2]	0.022	(1.4)	0.014		
1,2,3,4,7,8,9-HpCDF	0.01	(0.2)	0.002	(0.4)	0.004	1.0	0.01	(0.2)	0.002	[2.1]	0.021	(1.7)	0.017		
OCDF	0.001	(0.3)	0.0003	3.3	0.0033	104	0.104	1.9	0.0019	5.0	0.005	(2.7)	0.0027		
TOTAL PCDD		(0.6)	0.4	95.11	0.6	2783.63	5.4	49.0	0.4	19.0	4.6	21.3	2.9	5	2
TOTAL PCDF		(0.4)	0.11	35.6	0.55	209.78	0.8	33.4	1.1	17.1	2.8	2.6	1.25	3	2
TOTAL TEQ		(1.0)	0.5	130.71	1.1	2993.41	6.2	82.4	1.5	36.1	7.4	23.9	4.1		

Notes:

TEF = Toxicity Equivalence Factor; TEQ = Toxicity Equivalent; Conc. = Concentration.

Units of picograms per gram are denoted as pg/g; units of picograms per liter are denoted as pg/l.

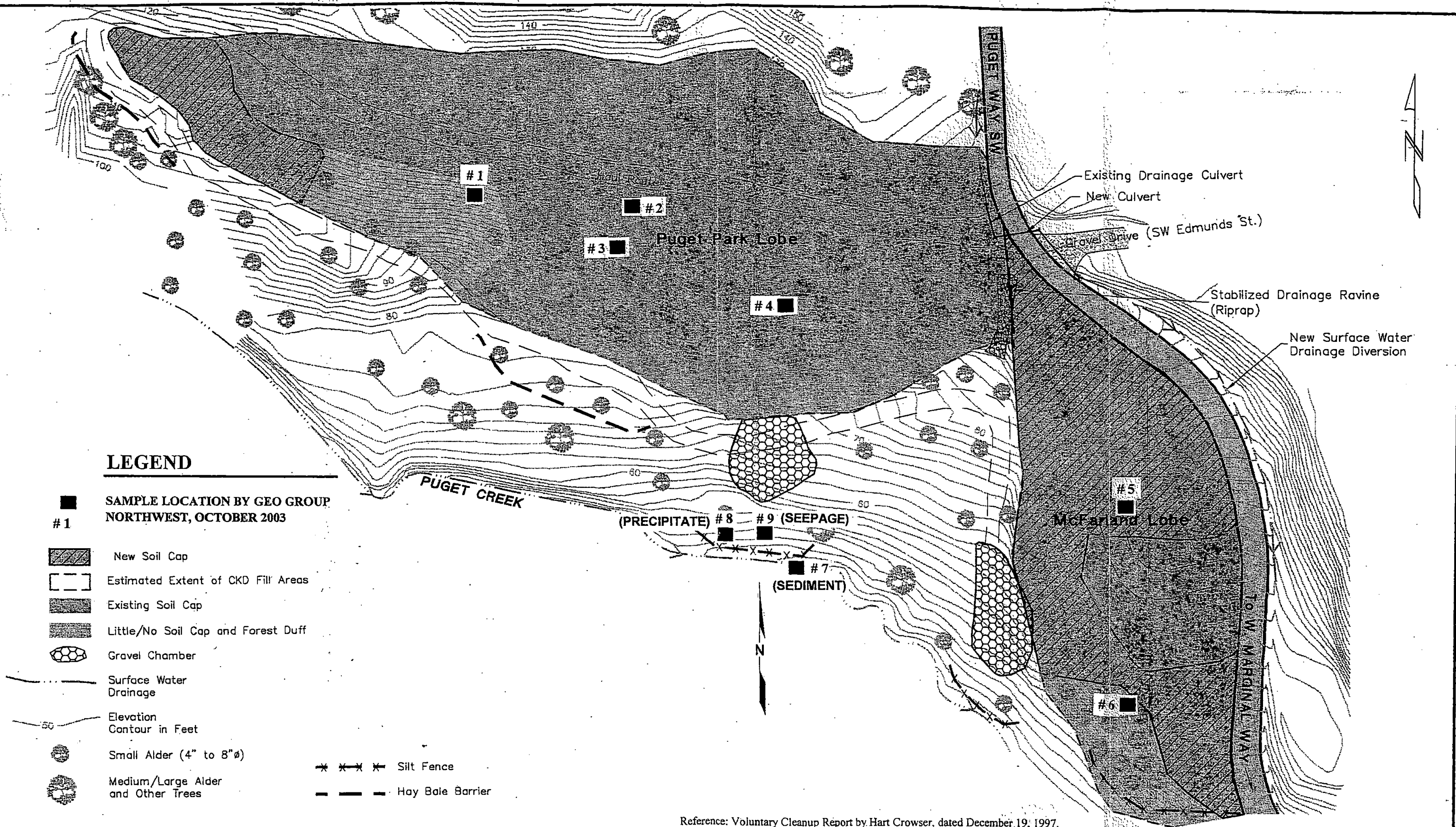
*** Please note that 1,000 pg/l approximately equals 1 pg/g (as one liter of water equals approximately 1 kg).**

Results reported in parentheses () are the method detection limit where the analyte was not detected.

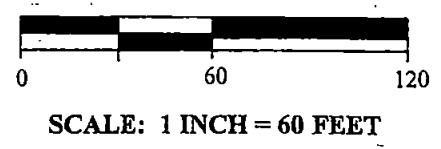
Results reported in brackets [] are estimated maximum probable concentrations where the analyte was detected at too low a concentration to be quantitated.

Concentrations exceeding the cited regulatory criteria are shown in **bold text**.

Regulatory Criteria: PCEC = Washington State Model Toxics Control Act (MTCA) Priority Contaminants of Ecological Concern; EISC = Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals (cited values are for wildlife only; no values are available for plants or soil biota). These criteria are interpreted by Geo Group Northwest, Inc., to be equivalent to TEQ pg/g.



Reference: Voluntary Cleanup Report by Hart Crowser, dated December 19, 1997.



GEO Group Northwest, Inc. Geotechnical Engineers, Geologists, & Environmental Scientists		SAMPLE LOCATION MAP SEATTLE DEPT. OF PARKS AND RECREATION PUGET PARK (SW HUDSON STREET SITE) SEATTLE, WASHINGTON			
SCALE: 1" = 60'	DATE: 10/13/03	MADE: KJ	CHKD: WC	JOB NO: E-0290-6	PLATE 1



**OnSite
Environmental Inc.**

Analytical Testing and Mobile Laboratory Services

October 23, 2003

Keith Johnson
GEO Group Northwest, Inc.
13240 NE 20th Street, Suite 12
Bellevue, WA 98005

Re: Analytical Data for Project E-0290-6
Laboratory Reference No. 0310-070

Dear Keith:

Enclosed are the analytical results and associated quality control data for samples submitted on October 9, 2003.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,



David Baumeister
Project Manager

Enclosures

Date of Report: October 23, 2003
Samples Submitted: October 9, 2003
Laboratory Reference: 0310-070
Project: E-0290-6

Case Narrative

Samples were collected on October 6, 7, and 8, 2003, and received by the laboratory on October 9, 2003. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a footnote reference and will be included on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

pH by EPA 9045C Analysis

Please note that the pH value reported is considered to be an estimated result because it exceeded our standard calibration range.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: October 23, 2003
Samples Submitted: October 9, 2003
Laboratory Reference: 0310-070
Project: E-0290-6

pH
EPA 9045C

Date Extracted: 10-9-03
Date Analyzed: 10-9-03

Matrix: Solid

Client ID	Lab ID	pH (@ 25°C)	Flag
SCRN-1,3,4,5,6	10-070-1,3,4,5,6 Comp.	12.2	E



Data Qualifiers and Abbreviations

- A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.
- B - The analyte indicated was also found in the blank sample.
- C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.
- D - Data from 1:____ dilution.
- E - The value reported exceeds our calibration range and is an estimate.
- F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.
- G - Insufficient sample quantity for duplicate analysis.
- H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.
- I - Compound recovery is outside of the control limits.
- J - The value reported was below the practical quantitation limit. The value is an estimate.
- K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.
- L - The RPD is outside of the control limits.
- M - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.
- O - Hydrocarbons outside the defined gasoline range are present in the sample.
- P - The RPD of the detected concentrations between the two columns is greater than 40.
- Q - Surrogate recovery is outside of the control limits.
- S - Surrogate recovery data is not available due to the necessary dilution of the sample.
- T - The sample chromatogram is not similar to a typical _____.
- U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.
- W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.
- X - Sample extract treated with a silica gel cleanup procedure.
- Y - Sample extract treated with an acid cleanup procedure.
- ND - Not Detected at PQL
- PQL - Practical Quantitation Limit
- RPD - Relative Percent Difference

CASE NARRATIVE

**Analysis of Samples for the Presence of
Polychlorinated Dibenzo-*p*-Dioxins and Dibenzofurans by
High-Resolution Chromatography / High-Resolution Mass Spectrometry**

Method 8290 Rev. 0 (9/94)

Date:	October 22, 2003
Client ID:	Onsite Environmental
P.O. Number:	
TLI Project Number:	61304A

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Rev. 11/19/97
WWW.TriangleLabs.com

Overview

The sample and associated QC samples were extracted and analyzed according to procedures described in EPA Method 8290 Rev. 0 (9/94). Any particular difficulties encountered during the sample handling by Triangle Laboratories will be discussed in the QC Remarks section below. This report contains results from only the 8290 dioxin/furan analysis of the water sample.

Quality Control Samples

A laboratory method blank, identified as the TLI Blank, was prepared along with the sample.

Laboratory control spike (LCS) and laboratory control spike duplicate (LCSD) samples are extracted and analyzed along with each batch of samples. A report summarizing the analyte recoveries and relative percent differences for these samples is included in the data package.

Quality Control Remarks

This release of this particular set of Onsite Environmental analytical data by Triangle Laboratories was authorized by the Quality Control Chemist who has reviewed each sample data package following a series of inspections/reviews. When applicable, general deviations from acceptable QC requirements are identified below and comments are made on the effect of these deviations upon the validity and reliability of the results. Specific QC issues associated with this particular project are:

Sample receipt: One water sample and eight water samples were received from Onsite Environmental at 8.0°C in good condition on October 14, 2003 and stored in a refrigerator at 4°C. The client's chain-of-custody did not indicate whether or not chemical preservatives were utilized prior to shipment for the water sample.

Sample Preparation Laboratory: None

Mass Spectrometry: None

Data Review: None

Other Comments: No 2,3,7,8-substituted target analytes were detected in the method blank above the target detection limit (TDL).

The analytical data presented in this report are consistent with the guidelines of EPA Method 8290 Rev. 0 (9/94). Any exceptions have been discussed in the QC Remarks section of this case narrative with emphasis on their effect on the data. Should Onsite

Environmental have any questions or comments regarding this data package, please feel free to contact one of our Project Scientists at (919) 544-5729.

For Triangle Laboratories, Inc.,

Released by,

Kenneth Warley

Kenneth Warley

Report Preparation Chemist

The total number of pages in the data package is : 125 .

Method 8290 Sample Calculations:

Analyte Concentration

The concentration or amount of any analyte is calculated using the following expression.

$$C_{(\alpha)} = \frac{A_{\alpha} * Q_{\beta}}{A_{\beta} * RRF_{(\alpha)} * W}$$

Where:

- $C_{(\alpha)}$ = concentration or amount of a given analyte
- A_{α} = integrated current for the characteristic ions of the analyte
- A_{β} = integrated current of the characteristic ions of the corresponding internal standard
- Q_{β} = amount of internal standard added to the sample before extraction
- $RRF_{(\alpha)}$ = mean analyte relative response factor from the initial calibration
- W = sample weight or volume

Detection Limits

The detection limit reported for a target analyte that is not detected or presents an analyte response that is less than 2.5 times the background level is calculated by using the following expression. The area of the analyte is replaced by the noise level measured in a region of the chromatogram clear of genuine GC signals. The detection limits represent the maximum possible concentration of a target analyte that could be present without being detected.

$$DL_{(\alpha)} = \frac{2.5 * H * Q_{\beta}}{H_{\beta} * RRF_{(\alpha)} * W}$$

Where:

- $DL_{(\alpha)}$ = estimated detection limit for a target analyte
- 2.5 = minimum response required for a GC signal
- H = sum heights of the noise
- H_{β} = sum of peak heights of the characteristic ions of the corresponding internal standard
- Q_{β} = amount of internal standard added to the sample before extraction
- $RRF_{(\alpha)}$ = mean analyte relative response factor from the initial calibration
- W = sample weight or volume

Data Flags

In order to assist with data interpretation, data qualifier flags are used on the final reports. Please note that all data qualifier flags are subjective and are applied as consistently as possible. Each flag has been reviewed by two independent Chemists and the impact of the data qualifier flag on the quality of the data discussed above. The most commonly used flags are:

A '**B**' flag is used to indicate that an analyte has been detected in the laboratory method blank as well as in an associated field sample. The '**B**' flag is used only when the concentration of analyte found in the sample is less than 20 times that found in the associated blank. This flag denotes possible contribution of background laboratory contamination to the concentration or amount of that analyte detected in the field sample.

An '**E**' flag is used to indicate a concentration based on an analyte to internal standard ratio which exceeds the range of the calibration curve. Values which are outside the calibration curve are estimates only.

An '**I**' flag is used to indicate labeled standards have been interfered with on the GC column by coeluting, interferent peaks. The interference may have caused the standard's area to be overestimated. All quantitations relative to this standard, therefore, may be underestimated.

A '**J**' flag is used to indicate a concentration based on an analyte to internal standard ratio which is below the calibration curve. Values which are outside the calibration curve are estimates only.

A '**PR**' flag is used to indicate that a GC peak is poorly resolved. This resolution problem may be seen as two closely eluting peaks without a reasonable valley between the peak tops, overly broad peaks, or peaks whose shapes vary greatly from a normal distribution. The concentrations or amounts reported for such peaks are most likely overestimated.

A '**Q**' flag is used to indicate the presence of QC ion instabilities caused by quantitative interferences.

An '**RO**' flag is used to indicate that a labeled standard has an ion abundance ratio that is outside of the acceptable QC limits, most likely due to a coeluting interference. This may have caused the percent recovery of the standard to be overestimated. All quantitations versus this standard, therefore, may be underestimated.

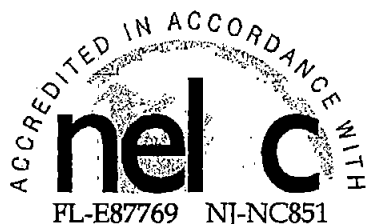
An '**S**' flag indicates that the response of a specific PCDD/PCDF isomer has exceeded the normal dynamic range of the mass spectrometer detection system. The corresponding signal is saturated and the reported analyte concentration is a 'minimum estimate'. When the '**S**' qualifier is used in the reporting of 'totals', there is saturation of one (not

necessarily from a specific isomer) or more saturated signals for a given class of compounds. Results for saturated analytes are reported as greater than the upper calibration limit.

A 'U' flag is used to indicate that a specific isomer cannot be resolved from a large, co-eluting interferent GC peak. The specific isomer is reported as not detected as a valid concentration cannot be determined. The calculated detection limit, therefore, should be considered an underestimated value.

A 'V' flag is used to indicate that, although the percent recovery of a labeled standard may be below a specific QC limit, the signal-to-noise ratio of the peak is greater than ten-to-one. The standard is considered reliably quantifiable. All quantitations derived from the standard are considered valid as well.

An 'X' flag is used to indicate that a polychlorodibenzofuran (PCDF) peak has eluted at the same time as the associated diphenyl ether (DPE) and that the DPE peak intensity is at least ten percent of the total PCDF peak intensity. Total PCDF values are flagged 'X' if the total DPE contribution to the total PCDF value is greater than ten percent. All PCDF peaks that are significantly influenced by the presence of DPE peaks are either reported as "estimated maximum possible concentration (EMPC) values without regard to the isotopic abundance ratio, or are included in the detection limit value depending on the analytical method.



TRIANGLE LABORATORIES, INC.

LIST OF CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Primary NELAP Certificate: Florida Department of Health, #E87769; SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 613, 2,3,7,8-TCDD AND Method 1613, PCDD/PCDF & totals; RCRA, Methods 8280/8290, PCDD/PCDF & totals; CAA, TO-9A, all dioxins/furans AND TO-13A, semi-volatiles. Expires June 30, 2004.

Primary NELAP Certificate: State of New Jersey, Department of Environmental Protection. ID #NC851. CAA, Methods 0023A and MM5 (Sampling Train). **Secondary NELAP Certificate:** SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 1613, PCDD/PCDF & totals; RCRA, Method 8290, PCDD/PCDF & totals. Expires September 30, 2003. *Renewal pending.*

State of Alabama, Department of Environmental Management. Laboratory ID # 40950. 2,3,7,8 TCDD (Dioxin) in drinking water. Expires 31 July 2004.

State of Alaska, Department of Environmental Conservation. Certificate number NC140-03. 2,3,7,8- TCDD (Dioxin) in drinking water. Expires December 21, 2003.

State of Arizona, Department of Health Services. Certificate #AZ0423. Drinking Water for Dioxin, Dioxins in Waste Water and Solid or Hazardous Waste. Expires May 25, 2004.

State of Arkansas, Department of Environmental Quality. Pulp/paper, soil, water, and Hazardous Waste for Dioxin/Furans. Expires 11 February 2004.

Secondary NELAP Certificate: State of California, Department of Health Services, Certificate No. 03213CA. SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 1613, PCDD/PCDF & totals; Hazardous Waste, Methods 8280/8290, PCDD/PCDF & totals. Expires 28 February 2004.

State of Colorado, Department of Public Health and Environment. SDWA, Dioxin by EPA 1613. Expires April 30, 2004.

State of Connecticut, Department of Health Services. Registration # PH-0117. SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 1613, PCDD/PCDF & totals; RCRA, Methods 8280/8290, PCDD/PCDF & totals. Expires September 30, 2003.

Delaware Health and Social Services. Dioxin Certification waived for out-of-state laboratories; accept home-state Certifications.

Primary NELAP Certificates: **Florida Department of Health, #E87769;** SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 613, 2,3,7,8-TCDD AND Method 1613, PCDD/PCDF & totals; RCRA, Methods 8280/8290, PCDD/PCDF & totals; CAA, TO-9A, all dioxins/furans AND TO-13A, semi-volatiles. Expires June 30, 2004.

Georgia Department of Environmental Quality. SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 613, 2,3,7,8-TCDD AND Method 1613, PCDD/PCDF & totals; RCRA, Methods 8280/8290, PCDD/PCDF & totals; CAA, TO-9A, all dioxins/furans AND TO-13A, semi-volatiles; reciprocity based on **FL-DOH NELAP Certificate**. Certificate # 953, expires June 30, 2004.

Hawaii Department of Health. Certified for Dioxin under the Safe Drinking Water Act. "Accepted" status for regulatory purposes. Expires June 30, 2004.

Idaho Department of Health and Welfare. Dioxin in drinking water, EPA Method 1613. Expires December 31, 2003.

Secondary NELAP Certificate: **Illinois Environmental Protection Agency.** Accreditation Number #200007, Certificate #000666; **Drinking Water**, Method 1613, 2,3,7,8-TCDD; **Wastewater, Organic**, Methods 1613 and 613; **Hazardous and Solid Waste, Organic**, Methods 8280A and 8290. Expires 30 September 2003.

Indiana Department of Health. Dioxin in drinking water, EPA method 1613. Lab ID # C-NC-01. Expires July 31, 2004.

Secondary NELAP Certificate: **State of Kansas, Department of Health and Environment.** Cert. # E-10215. SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 1613, PCDD/PCDF; RCRA, Methods 8280/8290, PCDD/PCDF & totals. Expires 31 January 2004.

Commonwealth of Kentucky, Department for Environmental Protection. Lab ID #90060. 2,3,7,8 TCDD (Dioxin) in drinking water. Expires December 31, 2003.

Secondary NELAP Certificate: **State of Louisiana Department of Environmental Quality.** Certificate # 01979. CAA, TO-9A and TO-13A; CWA, Method 1613 PCDDs/PCDFs; RCRA, Methods 8280A & 8290 PCDDs/PCDFs; Misc. Methods 1613, 8280A & 8290. Expires 30 June 2004.

Secondary NELAP Certificate: **State of Louisiana Department of Health & Hospitals.** Dioxin (2,3,7,8-TCDD) in Drinking Water. Certificate # LA030007. Expires December 31, 2003.

Maine Department of Human Services. Certification #: NC140. SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 1613, PCDD/PCDF. Expires May 30, 2004.

Maryland Department of Health and Mental Hygiene. Certification # 235, SOC 2 (Dioxin). Extended, expires 31 December 2003.

Commonwealth of Massachusetts, Department of Environmental Protection, does not require Certification for Drinking Water Dioxin/Furan analysis.

State of Michigan, Department of Environmental Quality. 2,3,7,8 TCDD by Method 1613. Expires 31 July 2003. *Renewal pending.*

Minnesota Department of Health. The certification program in MN does not include dioxins/furans for CWA, SDWA or RCRA. See U.S. EPA Region V.

Mississippi State Department of Health. Dioxin in drinking water. No expiration date.

Montana Department of Health and Environmental Services. CERT0019. Dioxin in drinking water. Expires December 31, 2003.

State of Nebraska Department of Health. Reciprocal certification through the North Carolina Department of Health and Human Services and Florida DOH NELAP Certification. SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 613, 2,3,7,8-TCDD AND Method 1613, PCDD/PCDF & totals; RCRA, Methods 8280/8290, PCDD/PCDF & totals; CAA, TO-9A, all dioxins/furans AND TO-13A, semi-volatiles. Expires July 31, 2004.

State of Nevada, Department of Conservation and Natural Resources. Lab Certificate No. NC-00140-2003-66, expires July 31, 2003. CWA, Method 1613, PCDD/PCDF & totals, expires July 31, 2003. *Renewal pending.*

State of Nevada, Department of Human Resources. Lab Certificate No. NC-00140-2003-66, expires July 31, 2003. SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water, expires July 31, 2003. *Renewal pending.*

Primary NELAP Certificate: State of New Jersey, Department of Environmental Protection. ID #NC851. CAA, Methods 0023A and MM5 (Sampling Train). **Secondary NELAP Certificate:** SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 1613, PCDD/PCDF & totals; RCRA, Method 8290, PCDD/PCDF & totals. Expires September 30, 2003. *Renewal pending.*

State of New Mexico, Environment Department. Safe Drinking Water Act; 2,3,7,8-TCDD by Method 1613. Expires 30 June 2003. *Renewal pending.*

Secondary NELAP Certificate: New York State Department of Health, LAB ID #11026. Potable Water, 2,3,7,8-TCDD, EPA 1613, Serial # 19927; Non-Potable Water, 2,3,7,8-TCDD, EPA 1613, Serial # 19928. Expires 1 April, 2004.

State of North Carolina, Department of Health and Human Services. Certificate # 37751. Dioxin in drinking water. Expires July 31, 2004.

North Dakota State Department of Health and Consolidated Laboratories. Certificate # R-076. Dioxins/Furans in drinking water, non-potable water, solid and hazardous wastes; reciprocal recognition of FL-DOH NELAP Accreditation and Scope. Expires June 30, 2004.

Ohio EPA. Ohio does not offer out-of-state lab certifications; certification by EPA Region 5 is honored.

Oklahoma Department of Environmental Quality. Laboratory #9951. 2,3,7,8 TCDD (Dioxin). Expires August 31, 2004.

Secondary NELAP Certificate: Oregon Environmental Laboratory Accreditation Program. Certificate No:-279313938. SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 1613, PCDD/PCDF & totals; RCRA, Methods 8280/8290, PCDD/PCDF & totals; CAA, TO-9A, all dioxins/furans AND TO-13A, semi-volatiles. Expires January 31, 2004.

Secondary NELAP Certificate: Commonwealth of Pennsylvania, Department of Environmental Protection. Environmental Laboratory Registration # 68-1484. Lab ID No. 68-1975. SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water. Expires March 31, 2004.

State of South Carolina, Department of Health and Environmental Control. Certificate number #99040001 (Other parameters). Dioxin/Furans by method 1613B - Safe Drinking Water Act; 2,3,7,8-TCDD for Drinking Water, and Organic extractables for Solid and Hazardous Waste. Reciprocal certification with New York. Expires June 03, 2001. Certificate # 99040002 Solid Hazardous Waste- Dioxins/Furans by 8280A and 8290. Expires August 31, 2001. **Renewal pending.*

State of Tennessee. Department of Environment and Conservation. ID #02992. Dioxin in Drinking water. Expires February 20, 2005.

Texas Natural Resource Conservation Commission. Certification Number: TX264-2002A. SDWA: Chemistry, Dioxin (2378-TCDD), EPA 1613. Expires January 31, 2004.

U.S. Army Corps of Engineers. Validated to perform EPA SW-846, Method 8290, water and solids. Validation expires May 2, 2004.

Department of the Navy, Naval Facilities Engineering Service Center (NFESC). Letter of Acceptance for analysis of water and solids by Methods 8280 and 8290. Expires June 30, 2003. *Renewal pending.*

U.S. EPA Region V. 2,3,7,8 TCDD (Dioxin) in drinking water by method 1613B. Expires February 03, 2006. [Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin]

U.S. EPA Region VIII, for the State of Wyoming. EPA Method 1613 for Dioxin in drinking water. Expires 20 October 2003.

Secondary NELAP Certificate: State of Utah, Department of Health. ID # TRIA, Account # 9195445729 SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 1613, PCDD/PCDF & totals; RCRA, Methods 8280/8290, PCDD/PCDF & totals. Expires June 30, 2004.

Commonwealth of Virginia, Department of General Services, Division of Consolidated Laboratory Services. ID # 00341. 2,3,7,8-TCDD (Dioxin) in drinking water, EPA Method 1613B. Expires June 30, 2004.

State of Washington, Department of Ecology. Lab Accreditation Number C067. Scope of Accreditation applies to Dioxins (PCDDs/PCDFs) by EPA methods 1613, 8280, and 8290 in potable and non-potable water. Expires September 11, 2003.

State of West Virginia, Department of Health. Certificate No. 9923(C). 2,3,7,8-TCDD (Dioxin) in drinking water, SOC III. Expires December 31, 2003.

State of West Virginia, Department of Environmental Protection. Certificate No. 327. Dioxins/Furans, Methods 8280A/8290/1613B. Expires December 31, 2003.

State of Wisconsin, Department of Natural Resources. Laboratory ID Number 999869530. Certified for 2,3,7,8-TCDD (Dioxin) in drinking water and for PCDD/PCDF. Expires August 31, 2004.

State of Wyoming, see U.S. EPA Region VIII above.

PHARMACEUTICAL

Drug Enforcement Agency (DEA). Registration number RT0195835. Controlled substance registration for schedules 1,2,3,3N,4,5. Expires November 30, 2003.

N.C. Department of Human Resources. Registration number NC-PT 0000 0031. North Carolina controlled substances registration for schedules 1, 2, 2N, 3, 3N, 4, 5, 6. Expires October 31, 2003.

Food & Drug Administration (FDA) Registration. ID #'s 001500 1053481(ATL). Annual registration of drug establishment. Current for 2003.

OTHER

Clinical Laboratory Improvement Amendments (CLIA) Registration. ID # 34D0705123. Department of Health & Human Services, Health Care Financing Administration. Certificate for the Acceptance of Human Specimens for the purposes of performing laboratory examinations or procedures - Chemistry, Toxicology, HCFA. Expires May 30, 2005.

U.S. Department of Agriculture Soil Permit. Permit No. S-56724. Under the authority of the Federal Plant Pest Act, permission is granted to receive foreign soil samples for use in laboratory analysis. Expires March 31, 2007.

U.S. EPA Large Quantity Hazardous Waste Generator. EPA ID #NCR000137232. Permit indicates that the laboratory is a large generator of hazardous waste. No expiration date.

U.S. Fish and Wildlife Permit. Number LE027890-1. Authorization to import/export wildlife and/or wildlife products. Expires April 30, 2004.



Triangle Laboratories, Inc.

DOCUMENT CONTROL

CHAIN OF CUSTODY RECORD

Page 1 of 1



14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

Laboratory Reference #: 0310-070

Subcontract Laboratory: TRIANGLE LABS

Phone #: _____

Project Manager: David Baumeister

Date/Time: _____

Project Number: E-0290-6

Contact Person: _____

Project Name: PUGET PARK

OSE #	Sample ID	Date Sampled	Matrix	# Jars	Analysis Requested	Comments/Special Instructions
1	SCRN-1	10/6/03	SOLID	1	DIOXINS 8290 *	PLEASE COMPOSITE THESE FIVE SAMPLES
2	-2	10/7/03			*	
3	-3				*	
4	-4				*	
5	-5				*	
6	-6	10/8/03				
7	-7					
8	-8					
9	-9		W	2		
Relinquished by: <u>[Signature]</u> date: <u>10/13/07</u> Company: <u>OSE</u> Relinquished by: _____ date: _____ Company: _____ Relinquished by: _____ date: _____ Company: _____ Received by: _____ date: _____ Company: _____ Received by: _____ date: _____ Company: _____ Received by: <u>Duane Fay</u> date: <u>10-14-03</u> Company: <u>Triangle Labs</u> date: <u>10:35</u> * NOTES: <u>Composite #1-5</u>						

TRIANGLE LABORATORIES, INC.
SAMPLE TRACKING AND PROJECT MANAGEMENT FORM

-----ADMINISTRATIVE INFORMATION-----

TLI Proj#: 61304-A	Samples: 1	TurnAround.: 18 Day(s)
Prod Code: D01001	Matrix.: Water	Hold Time.: 30 Day(s)
DetectLim: 10 ppq	Type...: B	Start Date.: 10/14/03
	Recvd...: 10/14/03	Ship By....: 10/30/03
		DWL Due Dt.: 10/21/03

Analyte List.: Tetra - Octa

Method.....: Method 8290: Tetra-Octa
Client Proj...: E-0290-6
Client.....: Onsite Environmental (ONS04)
P.O. No.....: Collect Dt/Tm: 10/08/03
Contact.....: David Baumeister Phone.....: 425-883-3881
Proj. Mgr.....: Fax.....: 425-885-4603
Sample Origin:

-----SPECIAL INSTRUCTIONS / QA REQUIREMENTS-----

TEF.....: EPA Prespike Standard: n/a
Extraction Exp....: 11/07/03

-----REPORTING REQUIREMENTS-----

Reporting Format: Report Option II

See MILES for Instructions/Communications.

Completed by: Dionne Taylor DATE: 10-14-03
Reviewed by: Craig S. L. / DS DATE: 10/14/03 (PMGT0197)

Time: 10:55

PRDPERC v4.04

Page: 1

Sample	Init.	NaOH Adj.	H2SO4 Adj.													
#	crd	TLI_Number..	Customer.Sample.Id.....	pH...	mL..	pH.1.	mL...	pH.2.	Appearance.	Color.....	Odor...	Vol.	Entered.By.....	Date....	Time....	S
002	364-93-9A	SCRN-9		7.00	n/a	n/a	n/a	n/a	clear	tan	none	0	woodhouse	10/22/03	10:55:25	F

*** End of Report ***

61304A

Extraction

Type: Soxhlet / Jar / Sep Funnel / Cont LL / ASE / Waste Dilution / Solid Phase / SonicationS.O.P: 161 Version: 19

Time On: _____

Est. Time _____

Off: _____

Solvents/Acids	Lot Numbers
<u>MeCl₂</u>	<u>030958</u>

Comments / Observations: Blank & L250) were HPLC water Lot # 030969
Sample 364-93-9A was clear, Tan, no odor and pH 7
Samples 364-95-1A+2A was cloudy, Tan, no odor and pH 7 } BK# 10/16/03
All other samples were clear, no color, no odor and pH 7

Concentration

Type: Rotovap / KD / SpeedvacAnalyst(s): M. GonzalezS.O.P: DSP 124 Version: 15 Logged in by: ME

Solvent Exchange	Lot Number
<u>Heptane</u>	<u>032584</u>

Tridecane Lot # F7 125-3106

Division: 20%/80% 50%/50% 5ml/20ml (for lipid determination)
 (Process 20%)

Comments / Observations: _____

Cleanup

S.O.P: DSP260 Version: 16 Analyst: MR 10/20/03
 S.O.P: _____ Version: _____ Analyst: _____
 S.O.P: _____ Version: _____ Analyst: _____

MeCl ₂ /Hept Solutions	
2% ID:	<u>CU8PL-21-42-3</u>
20% ID:	<u>CU8PL-21-42-2</u>
6% ID:	

If DSP 280 needed complete the following areas:

Glasswool Lot #: _____ Heptane Lot#: _____

Sodium Sulfate Lot #: _____

Acid Coated Silica Gel Lot #: _____

50g used for: _____ 100g used for: _____

Comments / Observations: _____

Transfers

Analyst(s): MR
10/21/03S.O.P: DSP272 Version: 11Division: 90%/10% NA

Solvent	Lot Number
<u>Heptane</u>	<u>034549</u>

Comments: NA

Method: 8290Matrix: WaterExt. Date: 10/16/03Analyst: Bryant Harrison

Project-Sample ID / TLI ID			Gross Weight		Sample Size	Concentration			Chemist
			Before	After	g / ml	ug/ml	ug/ml	ug/ml	Spike #
						ug/ml	ug/ml	ug/ml	Spike ID
						ug/ml	ug/ml	ug/ml	" Exp.
						ug/ml	ug/ml	ug/ml	" Date
						ug/ml	ug/ml	ug/ml	" Time
						ug/ml	ug/ml	ug/ml	Concen.
						ug/ml	ug/ml	ug/ml	Volume
61302	1	TLI Blank	1550	500	1000	0.1	20	0.01	Any Left
									Yes/No
61302	2	364-91-1A	1550	500	1050				N/A
61302	3	TLI LCS	1550	500	1000				Yes/No
61302	4	TLI LCSD	1550	500	1000				N/A
61304 A	2	364-93-9A	1550	500	1050				Yes/No
61306	2	364-95-1A	1530	500	1030				N/A
61306	3	364-95-2A	1540	500	1040				Yes/No
61306	4	364-95-3A	1530	500	1030				N/A
									ME
									10.17.03
									Yes/No
									Yes/No
									Yes/No
									Yes/No
									Yes/No
									Yes/No

6) Divide / Lipid Determ. 7) Solvent Exchange 8) Cleanup (DSP260 / DSP280 /) 9) Transfer () Other:

TRIANGLE LABORATORIES, INC.
Transfer Chain-of-Custody Form
Project 61304-A

Transfer From: DWLL5 To: DMS5

	Initials..	Date.....	Time...
Released by:	<u>MK</u>	<u>10/2/03</u>	<u>10:45</u>
Accepted by:	<u>TT</u>	<u>10/21/03</u>	<u>11:45</u>

MILES.ID.....	TLI_No.....	Cust.Id.....
61304-A -002	364-93-9A	SCRN-9

-----XfrCOC (Rev 11/01/94)-----
Additional comments or instructions:

TRIANGLE LABORATORIES, INC.

Method: Method 8290: Tetra-Octa
 Required Detection Limit: 10 ppq

HR GC/HRMS ANALYSIS

PROJECT: 61304A

SAMPLE INFORMATION

RS Conc

1ST COLUMN

2ND COLUMN

20 µl @ 100.0 PG/µl

TLI

GC/MS FILENAME

CONFIRM

CONFIRM FILENAME

USF-RS 100

USF-RS 100

ANALYSIS

#.crd

SAMPLE ID

CLIENT

COLUMN: DB5

COLUMN:

VOLUME 20.0

INIT. TFF

COMMENTS

SAMPLE ID

SOLN ID

DATE

85912 10/21/93

Batched w/
61302

364-93-9A

02

SCRN-9

T635184

↓

↓

Comments:

Type: B

Spike File: SPMIT22S

Amt of Extract: 100%

REV 03/07/95 (PSTMF 6)

Triangle Laboratories, Inc.
Run Log

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	GC Descriptor
705-112	DB5	3203133	702	2.0uL	UDB505	UDB505
					Signature: <u>Cashner</u> Date: <u>10/21/03</u>	

Filename	Date*	Time*	Project #	Triangle Labs ID	Client Sample ID	332	Operator/Date	Auto-sampler Location	Sequence Verified	Comments**
S036138	10/21/03									Ending Resplot. TFF 10/21/03
S036139	↓	1040	—	8610	Rtchk	140	TFF 10/21/03	1	10/21/03	
S036140	↓	1128	—	8500B	8200/10/13 Concal 10	1.1 E6	↓	2	↓	Good 8200 T=30 TFF 10/21/03
41	↓	1242	61288	TU Bnk	TU Blank	1.0 E6	↓	1		
42	↓	1334	↓	36477-1	S031007A	1.1 E6	↓	2		
43	↓	1422	↓	36477-1MS	S031007AMS	1.2 E6	↓	3		
44	↓	1509	↓	36477-1MSD	S031007AMSD	9.8 E6	↓	4		
45	↓	1552	↓	TU LCS	TU LCS	1.2 E6	↓	5		
46	↓	1645	61288	TU LCS	TU LCS	9.1 E6	↓	6		
47	↓	17:33	61320	365-10-1	S031014A1	1.3 E6	↓	7		
48	↓	18:20	↓	↓ -2	S031014A2	1.7 E6	17 E6	8		
↓ 49	↓	19:08	61320	365-10-3	S031014A3	1.5 E6	↓	9		
S036150	↓	19:56	61302	TU Bnk	TU Blank	1.4 E6	↓	10		

* Transcribed from chromatographic data

** Dated initials required

ConCal Due: _____

Page: 3

Triangle Laboratories, Inc.
Run Log

<u>Instrument ID</u>	<u>Column Type</u>	<u>Column ID</u>	<u>Plot Name</u>	<u>Inj. Vol.</u>	<u>Acquisition</u>	<u>GC Descriptor</u>
<u>705-112</u>	<u>DB5</u>	<u>3203133</u>	<u>T02</u>	<u>2.0ul</u>	<u>11DB5US</u>	<u>11DB5US</u>
					<u>Colinda July 11</u>	<u>10/21/03</u>
					Signature	Date

[illegible]

* Transcribed from chromatographic data
** Dated initials required

5/1/03
syr1/sop/hmunlog.doc (07/29/2003)

ConCal Due: _____

Page: 4

Triangle Laboratories, Inc.
Run Log

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	GC Descriptor
<u>707-108</u>	<u>DB-5</u>	<u>321165</u>	<u>T02</u>	<u>2.0/1</u>	<u>NDBJUS</u>	<u>NDBJUS</u>
					<u>B. Chilton</u>	<u>10/21/03</u>
					Signature	Date

Filename	Date*	Time*	Project #	Triangle Labs ID	Client Sample ID	332	Operator/Date	Auto-sampler Location	Sequence Verified	Comments**
T035163	10/21/03	01:19	—	8500B	1613/8290 Concal 100	7.6 E5	VOL 10/21/03	1		good for 1613/8290 VOL 10/21/03 T-D
T035164		02:22	—	8541P	PL-100	7.2 E6		1	TF 10/21/03	clean VOL 10/21/03
T035165		03:09	61321	365-11-1A	11375	4.1 E5		2		
T035166		03:57	61322	365-12-1	11393	4.0 E5		3		
T035167		04:45	61324	365-14-1A	PMJ0355-DIAN	3.5 E5		4		
T035168		05:33	61325	365-15-1	203100134-1	5.0 E5		5		
T035169		06:20	61325	365-15-2	203100134-2	4.7 E5		6		
T035170		07:08	61332A	365-22-1A	EE VOL 10/21/03 203100 MEL03-12677	4.6 E5		7		
T035171		07:56	61332A	365-22-2A	MEL03-12678	4.6 E5		8		
T035172		08:44	61318	365-8-1A	F03100428-0015	4.0 E5		9		
T035173	✓	09:31	61318	365-8-2	F03100436-0010	4.0 E5	✓	10		
T035174	10/21/03	10:19	61318	365-8-3	F03100443-0010	4.2 E5	VOL 10/21/03	11		
T035175	↓	11:33	—	8610	R+CHC	15.0	TF 10/21/03	1		ending respot. TF 10/21/03

* Transcribed from chromatographic data

** Dated initials required

ConCal Due: _____

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Triangle Laboratories, Inc.
Run Log

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	GC Descriptor
<u>70T-108</u>	<u>DB5</u>	<u>3211015</u>	<u>TP2</u>	<u>2.0ul</u>	<u>NDB5US</u>	<u>NDB5US</u>
<u>Chamara Outlets</u> 10/21/03 Signature _____ Date _____						

Filename	Date*	Time*	Project #	Triangle Labs ID	Client Sample ID	332	Operator/ Date	Auto-sampler Location	Sequence Verified	Comments**
T035176	10/21/03	1221	—	8500B	8200/1013 Concal 10	5.8 ES	UF 6/21/03	2		Good 8200/1013B T-20 UF 10/21/03
77		1334	61257	OPR	OPR	5.6 ES		1	✓ 10/21/03	
78		1421		TU Blank	TU Blank	5.6 ES		2		
79		1509		364-461A	ASH-40ACE DF	6.0 ES		3		
80		1557		↓ -2A	ASH-40BC EDF	4.7 ES		4		
81		1640	61257	364-463	ASH-402CE DF	5.6 ES		5		
82		17:32	61258	364-471A	WTCU9WEC93 BP	5.3 ES		6		
83		18:20	61273	364-62-1	I.P. Pine Bluff/10-708	8.4 ES		7		
84		19:07	61304A	364-93-9A	SCRN-9	4.8 ES		8		
85		19:56	61306	364-95-1A	03-A157661-8	4.3 ES		9		
86		20:43	↓	↓ -2A	03-A157662-8	5.6 ES		10		
87		21:29	61306	364-95-3A	03-A157663-8	6.1 ES		11	✓	
T035188		22:19	—	8500B	8200/1013 Concal 10	6.1 ES		12	✓ 10/21/03	good for F/B MIT 3 & 1613B

* Transcribed from chromatographic data
** Dated initials required

ConCal Due: _____

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SAMPLE
DATA

TRIANGLE LABORATORIES, INC.
LAB CONTROL SPIKE RECOVERY ANALYSIS AND COMPARISON

Project: 61304 - A

Matrix: WATER

Method: 8290

Isomer	S036150	S036152	S036153		Relative Percent Difference
	ID: TLI Blank Sample (pg/l)	ID: TLI LCS With Spike (pg/l)	ID: TLI LCSD Spike Dup (pg/l)	Percent Recovery	
2378-TCDD	2.0	304	313	75.6	2.87
12378-PeCDD	3.8	1780	1810	88.8	1.68
123478-HxCDD	[2.3]	1930	1970	96.3	2.16
123678-HxCDD	[1.8]	1890	1860	94.3	1.60
123789-HxCDD	[2.5]	2020	2020	101	0.0
1234678-HpCDD	ND	1850	1840	92.4	0.65
OCDD	[4.9]	3630	3770	90.6	3.68
2378-TCDF	[1.6]	350	357	87.2	1.82
12378-PeCDF	[3.1]	1630	1650	81.3	1.22
23478-PeCDF	3.0	1680	1790	83.9	6.12
123478-HxCDF	[2.7]	1910	1980	89.2	3.40
123678-HxCDF	[2.1]	1980	2000	95.4	1.01
234678-HxCDF	[1.7]	2030	2070	99.0	0.98
123789-HxCDF	3.2	1990	2010	102	0.90
1234678-HpCDF	[2.2]	1890	1970	99.1	4.46
1234789-HpCDF	[2.1]	1830	1840	94.3	0.33
OCDF	5.0	3450	3580	91.5	3.76

ND: Not Detected

NA: Not Applicable

[.]: EMPC Value

MILES 4.22.16

GRY_PSUM v1.11

Processed By: 

Date: 10/22/03

Percent Recovery QC Limits: 70 to 130 percent.

Relative Percent Difference QC Limits: +/- 20 percent.

Nominal Spike Levels:

TCDD/TCDF...: 0.4 ng

PeCDD/PeCDF: 2.0 ng

HxCDD/HxCDF: 2.0 ng

HpCDD/HpCDF: 2.0 ng

OCDD/OCDF...: 4.0 ng

Triangle Laboratories, Inc.®

2445 S. Alston Ave. • Durham, North Carolina 27713

Phone: (919) 544-5729 • Fax: (919) 544-5491

Printed: 11:44 10/22/2003

TRIANGLE LABORATORIES, INC.
Sample Results for Project 61304A
Method MIT3 Analysis (DB-5)

Page 1
10/22/2003

Data File	S036150	T035184	S036152	S036153
Sample ID	TLI Blank	SCRN-9	TLI LCS	TLI LCSD
Units	pg/l	pg/l	pg/l	pg/l
Extraction Date	10/16/2003	10/16/2003	10/16/2003	10/16/2003
Analysis Date	10/21/2003	10/21/2003	10/21/2003	10/21/2003
Instrument	S	T	S	S
Matrix	WATER	WATER	WATER	WATER
Extraction Type				
=====				
Analytes				
2378-TCDD	2.0 J	(1.5)	304	313
12378-PeCDD	3.8 J	(1.7)	1780	1810
123478-HxCDD	(2.3) J	(1.7)	1930	1970
123678-HxCDD	(1.8) J	(1.5)	1890	1860
123789-HxCDD	(2.5) J	(1.7)	2020	2020
1234678-HpCDD	(1.6)	(2.1)	1850	1840
OCDD	(4.9) J	21.3 JB	3630	3770
2378-TCDF	(1.6) J	(1.4)	350	357
12378-PeCDF	(3.1) J	(1.0)	1630	1650
23478-PeCDF	3.0 J	(1.3)	1680	1790
123478-HxCDF	(2.7) J	(0.9)	1910	1980
123678-HxCDF	(2.1) J	(0.9)	1980	2000
234678-HxCDF	(1.7) J	(0.9)	2030	2070
123789-HxCDF	3.2 J	(1.1)	1990	2010
1234678-HpCDF	(2.2) J	(1.4)	1890	1970
1234789-HpCDF	(2.1) J	(1.7)	1830	1840
OCDF	5.0 J	(2.7)	3450	3580
TOTAL TCDD	2.0	(1.5)		
TOTAL PeCDD	3.8	(1.7)		
TOTAL HxCDD	(14.1)	(1.6)		
TOTAL HpCDD	(1.6)	(2.1)		
TOTAL TCDF	(1.6)	(1.4)		
TOTAL PeCDF	3.0	(2.6)		
TOTAL HxCDF	3.2	(1.0)		
TOTAL HpCDF	(4.3)	(1.6)		
Other Standards Percent Recovery Summary (% Rec)				
37C1-TCDD	58.8	72.7	67.8	56.0
Other Standards Percent Recovery Summary (% Rec)				
13C12-PeCDF 234	94.3	110	101	90.8
13C12-HxCDF 478	75.8	84.6	80.6	77.5
13C12-HxCDD 478	88.3	83.4	93.1	85.2
13C12-HpCDF 789	77.0	93.0	77.8	70.8
Other Standards Percent Recovery Summary (% Rec)				
13C12-HxCDF 789	75.3	79.6	78.9	75.2
13C12-HxCDF 234	75.4	83.9	81.2	76.8
Internal Standards Percent Recovery Summary (% Rec)				
13C12-2378-TCDF	59.7	74.8	68.3	57.7
13C12-2378-TCDD	70.0	86.6	81.9	67.8

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Printed: 11:41 10/22/2003

Data File	S036150	T035184	S036152	S036153
Sample ID	TLI Blank	SCRN-9	TLI LCS	TLI LCSD
Units	pg/l	pg/l	pg/l	pg/l
Extraction Date	10/16/2003	10/16/2003	10/16/2003	10/16/2003
Analysis Date	10/21/2003	10/21/2003	10/21/2003	10/21/2003
Instrument	S	T	S	S
Matrix	WATER	WATER	WATER	WATER
Extraction Type				
Internal Standards Percent Recovery Summary (% Rec)				
13C12-PeCDF 123	85.8	93.4	98.7	85.5
13C12-PeCDD 123	90.7	98.3	98.3	89.7
13C12-HxCDF 678	75.0	97.2	81.6	76.4
13C12-HxCDD 678	81.3	78.5	85.4	81.6
13C12-HpCDF 678	73.0	84.4	76.7	71.4
13C12-HpCDD 678	80.3	96.8	81.1	78.0
13C12-OCDD	89.9	85.0	93.9	81.8
(Estimated Maximum Possible Concentration), (Detection Limit).				



Triangle Laboratories, Inc.

TOXICITY EQUIVALENTS REPORT

Onsite Environmental

TLI Project: **61304A**
 Client Sample: **TLI Blank**

Toxicity Equivalents Report
 Analysis File: **S036150**

Client Project:	E-0290-6	Date Received:	10/14/03	Spike File:	SPMIT32S
Sample Matrix:	WATER	Date Extracted:	10/16/03	ICal:	SF56023
TLI ID:	TLI Blank	Date Analyzed:	10/21/03	ConCal:	S036140
Sample Size:	1.000 L	Dilution Factor:	1	% Moisture:	n/a
Dry Weight:	n/a	Blank File:	S036150	% Lipid:	n/a
GC Column:	DB-5	Analyst:	TTF	% Solids:	n/a

Analytes	Conc. (pg/L)		TEF		Equivalent
2,3,7,8-TCDD	2.0	x	1.	=	2.0
1,2,3,7,8-PeCDD	3.8	x	0.5	=	1.9
1,2,3,4,7,8-HxCDD	[2.3]	x	0.1	=	0.23
1,2,3,6,7,8-HxCDD	[1.8]	x	0.1	=	0.18
1,2,3,7,8,9-HxCDD	[2.5]	x	0.1	=	0.25
1,2,3,4,6,7,8-HpCDD	{1.6}	x	0.01	=	0.016
1,2,3,4,6,7,8,9-OCDD	[4.9]	x	0.001	=	0.0049
TOTAL PCDD					4.6
2,3,7,8-TCDF	[1.6]	x	0.1	=	0.16
1,2,3,7,8-PeCDF	[3.1]	x	0.05	=	0.16
2,3,4,7,8-PeCDF	3.0	x	0.5	=	1.5
1,2,3,4,7,8-HxCDF	[2.7]	x	0.1	=	0.27
1,2,3,6,7,8-HxCDF	[2.1]	x	0.1	=	0.21
2,3,4,6,7,8-HxCDF	[1.7]	x	0.1	=	0.17
1,2,3,7,8,9-HxCDF	3.2	x	0.1	=	0.32
1,2,3,4,6,7,8-HpCDF	[2.2]	x	0.01	=	0.022
1,2,3,4,7,8,9-HpCDF	[2.1]	x	0.01	=	0.021
1,2,3,4,6,7,8,9-OCDF	5.0	x	0.001	=	0.0050
TOTAL PCDF					2.8

Total EPA TEFs, 1989a: 7.4 pg/L

[...] indicates that the value is that of an EMPC.
 {...} indicates that the value is that of a Detection Limit.

Onsite Environmental

TLI Project: 61304A
Client Sample: SCRN-9

Toxicity Equivalents Report
Analysis File: T035184

Client Project:	E-0290-6	Date Received:	10/14/03	Spike File:	SPMIT32S
Sample Matrix:	WATER	Date Extracted:	10/16/03	ICal:	TF53183
TLI ID:	364-93-9A	Date Analyzed:	10/21/03	ConCal:	T035176
Sample Size:	1.050 L	Dilution Factor:	1	% Moisture:	n/a
Dry Weight:	n/a	Blank File:	S036150	% Lipid:	n/a
GC Column:	DB-5	Analyst:	TTF	% Solids:	n/a

Analytes	Conc. (pg/L)		TEF		Equivalent
2,3,7,8-TCDD	{1.5}	x	1.	=	1.5
1,2,3,7,8-PeCDD	{1.7}	x	0.5	=	0.85
1,2,3,4,7,8-HxCDD	{1.7}	x	0.1	=	0.17
1,2,3,6,7,8-HxCDD	{1.5}	x	0.1	=	0.15
1,2,3,7,8,9-HxCDD	{1.7}	x	0.1	=	0.17
1,2,3,4,6,7,8-HpCDD	{2.1}	x	0.01	=	0.021
1,2,3,4,6,7,8,9-OCDD	21.3	x	0.001	=	0.0213
TOTAL PCDD					2.9
2,3,7,8-TCDF	{1.4}	x	0.1	=	0.14
1,2,3,7,8-PeCDF	{1.0}	x	0.05	=	0.050
2,3,4,7,8-PeCDF	{1.3}	x	0.5	=	0.65
1,2,3,4,7,8-HxCDF	{0.9}	x	0.1	=	0.09
1,2,3,6,7,8-HxCDF	{0.9}	x	0.1	=	0.09
2,3,4,6,7,8-HxCDF	{0.9}	x	0.1	=	0.09
1,2,3,7,8,9-HxCDF	{1.1}	x	0.1	=	0.11
1,2,3,4,6,7,8-HpCDF	{1.4}	x	0.01	=	0.014
1,2,3,4,7,8,9-HpCDF	{1.7}	x	0.01	=	0.017
1,2,3,4,6,7,8,9-OCDF	{2.7}	x	0.001	=	0.0027
TOTAL PCDF					1.25

Total EPA TEFs, 1989a: 4.1 pg/L

{...} Indicates that the value is that of a Detection Limit.

Onsite Environmental

TLI Project: **61304A**
Client Sample: **TLI Blank**

Method 8290 PCDD/PCDF Analysis (b)
Analysis File: **S036150**

Client Project:	E-0290-6	Date Received:	/ /	Spike File:	SPMIT32S
Sample Matrix:	WATER	Date Extracted:	10/16/2003	ICal:	SF56023
TLI ID:	TLI Blank	Date Analyzed:	10/21/2003	ConCal:	S036140
Sample Size:	1.000 L	Dilution Factor:	n/a	% Moisture:	n/a
Dry Weight:	n/a	Blank File:	S036150	% Lipid:	n/a
GC Column:	DB-5	Analyst:	TTF	% Solids:	n/a

Analytes	Conc. (pg/L)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	2.0			0.77	26:44	J_
1,2,3,7,8-PeCDD	3.8			1.73	30:56	J_
1,2,3,4,7,8-HxCDD	EMPC		2.3			J_
1,2,3,6,7,8-HxCDD	EMPC		1.8			J_
1,2,3,7,8,9-HxCDD	EMPC		2.5			J_
1,2,3,4,6,7,8-HpCDD	ND	1.6				J_
1,2,3,4,6,7,8,9-OCDD	EMPC		4.9			J_
2,3,7,8-TCDF	EMPC		1.6			J_
1,2,3,7,8-PeCDF	EMPC		3.1			J_
2,3,4,7,8-PeCDF	3.0			1.65	30:37	J_
1,2,3,4,7,8-HxCDF	EMPC		2.7			J_
1,2,3,6,7,8-HxCDF	EMPC		2.1			J_
2,3,4,6,7,8-HxCDF	EMPC		1.7			J_
1,2,3,7,8,9-HxCDF	3.2			1.15	34:40	J_
1,2,3,4,6,7,8-HpCDF	EMPC		2.2			J_
1,2,3,4,7,8,9-HpCDF	EMPC		2.1			J_
1,2,3,4,6,7,8,9-OCDF	5.0			0.80	41:04	J_

Totals	Conc. (pg/L)	Number	DL	EMPC	Flags
Total TCDD	2.0	1		3.7	---
Total PeCDD	3.8	1			---
Total HxCDD	EMPC			14.1	---
Total HpCDD	ND		1.6		---
Total TCDF	EMPC			1.6	---
Total PeCDF	3.0	1		6.2	---
Total HxCDF	3.2	1		9.6	---
Total HpCDF	EMPC			4.3	---

TLI Project: **61304A**
 Client Sample: **TLI Blank**

Method 8290 PCDD/PCDF Analysis (b)
 Analysis File: **S036150**

Internal Standards	Conc. (pg/L)	% Recovery	QC Limits	Ratio	RT	Flags
¹³ C ₁₂ -2,3,7,8-TCDF	1190	59.7	40%-135%	0.72	26:00	—
¹³ C ₁₂ -2,3,7,8-TCDD	1400	70.0	40%-135%	0.80	26:42	—
¹³ C ₁₂ -1,2,3,7,8-PeCDF	1720	85.8	40%-135%	1.52	29:55	—
¹³ C ₁₂ -1,2,3,7,8-PeCDD	1810	90.7	40%-135%	1.39	30:55	—
¹³ C ₁₂ -1,2,3,6,7,8-HxCDF	1500	75.0	40%-135%	0.48	33:25	—
¹³ C ₁₂ -1,2,3,6,7,8-HxCDD	1630	81.3	40%-135%	1.22	34:04	—
¹³ C ₁₂ -1,2,3,4,6,7,8-HpCDF	1460	73.0	40%-135%	0.39	36:16	—
¹³ C ₁₂ -1,2,3,4,6,7,8-HpCDD	1610	80.3	40%-135%	1.03	37:17	—
¹³ C ₁₂ -1,2,3,4,6,7,8,9-OCDD	3600	89.9	40%-135%	0.88	40:51	—

Surrogate Standards (Type B)	Conc. (pg/L)	% Recovery	QC Limits	Ratio	RT	Flags
¹³ C ₁₂ -2,3,4,7,8-PeCDF	1890	94.3	40%-135%	1.60	30:36	—
¹³ C ₁₂ -1,2,3,4,7,8-HxCDF	1520	75.8	40%-135%	0.48	33:19	—
¹³ C ₁₂ -1,2,3,4,7,8-HxCDD	1770	88.3	40%-135%	1.20	34:00	—
¹³ C ₁₂ -1,2,3,4,7,8,9-HpCDF	1540	77.0	40%-135%	0.40	37:46	—

Other Standard	Conc. (pg/L)	% Recovery	QC Limits	RT	Flags
³⁷ Cl ₄ -2,3,7,8-TCDD	118	58.8	40%-135%	26:44	—

Alternate Standards (Type B)	Conc. (pg/L)	% Recovery	QC Limits	Ratio	RT	Flags
¹³ C ₁₂ -1,2,3,7,8,9-HxCDF	1510	75.3	40%-135%	0.48	34:39	—
¹³ C ₁₂ -2,3,4,6,7,8-HxCDF	1510	75.4	40%-135%	0.49	33:53	—

Recovery Standards	Ratio	RT	Flags
¹³ C ₁₂ -1,2,3,4-TCDD	0.82	26:31	—
¹³ C ₁₂ -1,2,3,7,8,9-HxCDD	1.19	34:24	—

Data Reviewer:  10/22/2003

**OnSite****Environmental Inc.**14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • Fax: (425) 885-4603

Chain of Custody

Page 1 of 1

Company:
Geo Group Northwest, Inc.

Project Number:
E-0290-6

Project Name:
Puget Park

Project Manager:
Keith Johnson

Sampled by:
Keith Johnson/Wade Lassey

**Turnaround Request
(in working days)**

(Check One)

- ☐ Same Day ☐ 1 Day
- ☐ 2 Day ☐ 3 Day
- ☐ Standard (7 working days)
- ☒ Standard for dioxin, 1 day
(other) for pH

Laboratory Number: 10-070**Requested Analysis**See instructions below

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPP	NWTPP	NWTPP	Volatiles	Halogen	Semivol	PAHs b	PCBs b	Pesticide	Herbicide	Total RC	TCLP M	HEM by	VPH	EPH	pH	Diox	Hol	% Mois	
1	SCRN-1	10/6/03		Solid	2																	C	C		
2	SCRN-2	10/7/03																						X	
3	SCRN-3																					C	C		
4	SCRN-4																					C	C		
5	SCRN-5																					C	C		
6	SCRN-6	10/8/03																				C	C		
7	SCRN-7																						X		
8	SCRN-8																						X		
9	SCRN-9			Water	3																		X		

Signature

Company

Date

Time

Comments/Special Instructions:

Relinquished by

Keith Johnson

Geo Group Northwest

10/9/03

10:48

Received by

Kelly Allen

OnSite Env.

10/9/03

10:48

Relinquished by

Received by

Relinquished by

Received by

Reviewed by/Date

Reviewed by/Date

Analyze composite of samples 1,3,4,5,6 for pH and dioxin. Do not test these samples individually.

Analyze samples 7,8,9 individually. No analysis requested for sample 2.

Chro _____ Gram _____ final _____ rt ☐



**OnSite
Environmental Inc.**
Analytical Testing and Mobile Laboratory Services

October 29, 2003

Keith Johnson
GEO Group Northwest, Inc.
13240 NE 20th Street, Suite 12
Bellevue, WA 98005

Re: Analytical Data for Project E-0290-6
Laboratory Reference No. 0310-070

Dear Keith:

Enclosed are the analytical results and associated quality control data for samples submitted on October 9, 2003.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,



David Baumeister
Project Manager

Enclosures

CASE NARRATIVE

**Analysis of Samples for the Presence of
Polychlorinated Dibenzo-*p*-Dioxins and Dibenzofurans by
High-Resolution Chromatography / High-Resolution Mass Spectrometry**

Method 8290 Rev. 0 (9/94)

Date:	October 24, 2003
Client ID:	Onsite Environmental
P.O. Number:	E-0290-6
TLI Project Number:	61304

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Overview

The samples and associated QC samples were extracted and analyzed according to procedures described in EPA Method 8290 Rev. 0 (9/94). Any particular difficulties encountered during the sample handling by Triangle Laboratories will be discussed in the QC Remarks section below. This report contains results from only the 8290 dioxin/furan analyses of the three solid samples.

Quality Control Samples

A laboratory method blank, identified as the TLI Blank, was prepared along with the samples.

Laboratory control spike (LCS) and laboratory control spike duplicate (LCSD) samples are extracted and analyzed along with each batch of samples. A report summarizing the analyte recoveries and relative percent differences for these samples is included in the data package.

Quality Control Remarks

This release of this particular set of Onsite Environmental analytical data by Triangle Laboratories was authorized by the Quality Control Chemist who has reviewed each sample data package following a series of inspections/reviews. When applicable, general deviations from acceptable QC requirements are identified below and comments are made on the effect of these deviations upon the validity and reliability of the results. Specific QC issues associated with this particular project are:

Sample receipt: Eight solid samples and one water sample were received from Onsite Environmental at 8.0 °C in good condition on October 14, 2003 and stored in a refrigerator at 4°C. The client's chain-of-custody did not indicate whether or not chemical preservatives were used for the water sample prior to shipment.

Sample Preparation Laboratory: None

Mass Spectrometry: None

Data Review: None

Other Comments: No 2,3,7,8-substituted target analytes were detected in the method blank above the target detection limit (TDL).

Method 8290 contains separate criteria for beginning and ending continuing calibrations. When the ending calibration meets criteria established for the beginning calibration, the

average response factor from the initial calibration is used. When the ending calibration only meets the less stringent criteria specified for an ending calibration, the average of the response factor from the beginning and ending calibration is used for analyte and internal standard calculations. Affected samples are identified by the listing of both the beginning and ending calibration filename on the sample report.

The analytical data presented in this report are consistent with the guidelines of EPA Method 8290 Rev. 0 (9/94). Any exceptions have been discussed in the QC Remarks section of this case narrative with emphasis on their effect on the data. Should Onsite Environmental have any questions or comments regarding this data package, please feel free to contact one of our Project Scientists at (919) 544-5729.

For Triangle Laboratories, Inc.,

Released by,

Penny A. Brock

Penny A. Brock
Report Preparation Chemist

The total number of pages in the data package is : 207.

Method 8290 Sample Calculations:

Analyte Concentration

The concentration or amount of any analyte is calculated using the following expression.

$$C_{(\sigma)} = \frac{A_{\sigma} * Q_{\beta}}{A_{\beta} * RRF_{(\sigma)} * W}$$

Where:

- $C_{(\sigma)}$ = concentration or amount of a given analyte
- A_{σ} = integrated current for the characteristic ions of the analyte
- A_{β} = integrated current of the characteristic ions of the corresponding internal standard
- Q_{β} = amount of internal standard added to the sample before extraction
- $RRF_{(\sigma)}$ = mean analyte relative response factor from the initial calibration
- W = sample weight or volume

Detection Limits

The detection limit reported for a target analyte that is not detected or presents an analyte response that is less than 2.5 times the background level is calculated by using the following expression. The area of the analyte is replaced by the noise level measured in a region of the chromatogram clear of genuine GC signals. The detection limits represent the maximum possible concentration of a target analyte that could be present without being detected.

$$DL_{(\sigma)} = \frac{2.5 * H * Q_{\beta}}{H_{\beta} * RRF_{(\sigma)} * W}$$

Where:

- $DL_{(\sigma)}$ = estimated detection limit for a target analyte
- 2.5 = minimum response required for a GC signal
- H = sum heights of the noise
- H_{β} = sum of peak heights of the characteristic ions of the corresponding internal standard
- Q_{β} = amount of internal standard added to the sample before extraction
- $RRF_{(\sigma)}$ = mean analyte relative response factor from the initial calibration
- W = sample weight or volume

Data Flags

In order to assist with data interpretation, data qualifier flags are used on the final reports. Please note that all data qualifier flags are subjective and are applied as consistently as possible. Each flag has been reviewed by two independent Chemists and the impact of the data qualifier flag on the quality of the data discussed above. The most commonly used flags are:

A '**B**' flag is used to indicate that an analyte has been detected in the laboratory method blank as well as in an associated field sample. The '**B**' flag is used only when the concentration of analyte found in the sample is less than 20 times that found in the associated blank. This flag denotes possible contribution of background laboratory contamination to the concentration or amount of that analyte detected in the field sample.

An '**E**' flag is used to indicate a concentration based on an analyte to internal standard ratio which exceeds the range of the calibration curve. Values which are outside the calibration curve are estimates only.

An '**I**' flag is used to indicate labeled standards have been interfered with on the GC column by coeluting, interferent peaks. The interference may have caused the standard's area to be overestimated. All quantitations relative to this standard, therefore, may be underestimated.

A '**J**' flag is used to indicate a concentration based on an analyte to internal standard ratio which is below the calibration curve. Values which are outside the calibration curve are estimates only.

A '**PR**' flag is used to indicate that a GC peak is poorly resolved. This resolution problem may be seen as two closely eluting peaks without a reasonable valley between the peak tops, overly broad peaks, or peaks whose shapes vary greatly from a normal distribution. The concentrations or amounts reported for such peaks are most likely overestimated.

A '**Q**' flag is used to indicate the presence of QC ion instabilities caused by quantitative interferences.

An '**RO**' flag is used to indicate that a labeled standard has an ion abundance ratio that is outside of the acceptable QC limits, most likely due to a coeluting interference. This may have caused the percent recovery of the standard to be overestimated. All quantitations versus this standard, therefore, may be underestimated.

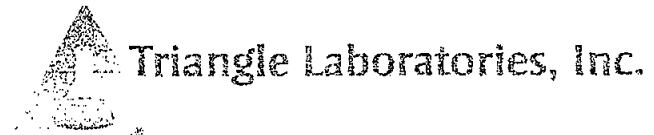
An '**S**' flag indicates that the response of a specific PCDD/PCDF isomer has exceeded the normal dynamic range of the mass spectrometer detection system. The corresponding signal is saturated and the reported analyte concentration is a 'minimum estimate'. When

the 'S' qualifier is used in the reporting of 'totals', there is saturation of one (not necessarily from a specific isomer) or more saturated signals for a given class of compounds. Results for saturated analytes are reported as greater than the upper calibration limit.

A 'U' flag is used to indicate that a specific isomer cannot be resolved from a large, co-eluting interferent GC peak. The specific isomer is reported as not detected as a valid concentration cannot be determined. The calculated detection limit, therefore, should be considered an underestimated value.

A 'V' flag is used to indicate that, although the percent recovery of a labeled standard may be below a specific QC limit, the signal-to-noise ratio of the peak is greater than ten-to-one. The standard is considered reliably quantifiable. All quantitations derived from the standard are considered valid as well.

An 'X' flag is used to indicate that a polychlorodibenzofuran (PCDF) peak has eluted at the same time as the associated diphenyl ether (DPE) and that the DPE peak intensity is at least ten percent of the total PCDF peak intensity. Total PCDF values are flagged 'X' if the total DPE contribution to the total PCDF value is greater than ten percent. All PCDF peaks that are significantly influenced by the presence of DPE peaks are either reported as "estimated maximum possible concentration (EMPC) values without regard to the isotopic abundance ratio, or are included in the detection limit value depending on the analytical method.



TRIANGLE LABORATORIES, INC.

LIST OF CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Primary NELAP Certificate: Florida Department of Health, #E87769; **SDWA**, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; **CWA**, Method 613, 2,3,7,8-TCDD AND Method 1613, PCDD/PCDF & totals; **RCRA**, Methods 8280/8290, PCDD/PCDF & totals; **CAA**, TO-9A, all dioxins/furans AND TO-13A, semi-volatiles. Expires June 30, 2004.

Primary NELAP Certificate: State of New Jersey, Department of Environmental Protection. ID #NC851. **CAA**, Methods 0023A and MM5 (Sampling Train). **Secondary NELAP Certificate:** **SDWA**, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; **CWA**, Method 1613, PCDD/PCDF & totals; **RCRA**, Method 8290, PCDD/PCDF & totals. Expires September 30, 2003. *Renewal pending.*

State of Alabama, Department of Environmental Management. Laboratory ID # 40950. 2,3,7,8 TCDD (Dioxin) in drinking water. Expires 31 July 2004.

State of Alaska, Department of Environmental Conservation. Certificate number NC140-03. 2,3,7,8- TCDD (Dioxin) in drinking water. Expires December 21, 2003.

State of Arizona, Department of Health Services. Certificate #AZ0423. Drinking Water for Dioxin, Dioxins in Waste Water and Solid or Hazardous Waste. Expires May 25, 2004.

State of Arkansas, Department of Environmental Quality. Pulp/paper, soil, water, and Hazardous Waste for Dioxin/Furans. Expires 11 February 2004.

Secondary NELAP Certificate: State of California, Department of Health Services, Certificate No. 03213CA. **SDWA**, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; **CWA**, Method 1613, PCDD/PCDF & totals; **Hazardous Waste**, Methods 8280/8290, PCDD/PCDF & totals. Expires 28 February 2004.

State of Colorado, Department of Public Health and Environment. **SDWA**, Dioxin by EPA 1613. Expires April 30, 2004.

State of Connecticut, Department of Health Services. Registration # PH-0117. **SDWA**, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; **CWA**, Method 1613, PCDD/PCDF & totals; **RCRA**, Methods 8280/8290, PCDD/PCDF & totals. Expires September 30, 2003.

Delaware Health and Social Services. Dioxin Certification waived for out-of-state laboratories; accept home-state Certifications.

Primary NELAP Certificates: **Florida Department of Health, #E87769;** SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 613, 2,3,7,8-TCDD AND Method 1613, PCDD/PCDF & totals; RCRA, Methods 8280/8290, PCDD/PCDF & totals; CAA, TO-9A, all dioxins/furans AND TO-13A, semi-volatiles. Expires June 30, 2004.

Georgia Department of Environmental Quality. SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 613, 2,3,7,8-TCDD AND Method 1613, PCDD/PCDF & totals; RCRA, Methods 8280/8290, PCDD/PCDF & totals; CAA, TO-9A, all dioxins/furans AND TO-13A, semi-volatiles; reciprocity based on **FL-DOH NELAP Certificate**. Certificate # 953, expires June 30, 2004.

Hawaii Department of Health. Certified for Dioxin under the Safe Drinking Water Act. "Accepted" status for regulatory purposes. Expires June 30, 2004.

Idaho Department of Health and Welfare. Dioxin in drinking water, EPA Method 1613. Expires December 31, 2003.

Secondary NELAP Certificate: **Illinois Environmental Protection Agency.** Accreditation Number #200007, Certificate #000666; **Drinking Water**, Method 1613, 2,3,7,8-TCDD; **Wastewater, Organic**, Methods 1613 and 613; **Hazardous and Solid Waste, Organic**, Methods 8280A and 8290. Expires 30 September 2003.

Indiana Department of Health. Dioxin in drinking water, EPA method 1613. Lab ID # C-NC-01. Expires July 31, 2003.

Secondary NELAP Certificate: **State of Kansas, Department of Health and Environment.** Cert. # E-10215. SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 1613, PCDD/PCDF; RCRA, Methods 8280/8290, PCDD/PCDF & totals. Expires 31 January 2004.

Commonwealth of Kentucky, Department for Environmental Protection. Lab ID #90060. 2,3,7,8 TCDD (Dioxin) in drinking water. Expires December 31, 2003.

Secondary NELAP Certificate: **State of Louisiana Department of Environmental Quality.** Certificate # 01979. CAA, TO-9A and TO-13A; CWA, Method 1613 PCDDs/PCDFs; RCRA, Methods 8280A & 8290 PCDDs/PCDFs; Misc. Methods 1613, 8280A & 8290. Expires 30 June 2004.

Secondary NELAP Certificate: **State of Louisiana Department of Health & Hospitals.** Dioxin (2,3,7,8-TCDD) in Drinking Water. Certificate # LA030007. Expires December 31, 2003.

Maine Department of Human Services. Certification #: NC140. SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 1613, PCDD/PCDF. Expires May 30, 2004.

Maryland Department of Health and Mental Hygiene. Certification # 235, SOC 2 (Dioxin). Expires September 30, 2003.

Commonwealth of Massachusetts, Department of Environmental Protection, does not require Certification for Drinking Water Dioxin/Furan analysis.

State of Michigan, Department of Environmental Quality. 2,3,7,8 TCDD by Method 1613. Expires 31 July 2003.

Minnesota Department of Health. The certification program in MN does not include dioxins/furans for CWA, SDWA or RCRA. See **U.S. EPA Region V.**

Mississippi State Department of Health. Dioxin in drinking water. No expiration date.

Montana Department of Health and Environmental Services. CERT0019. Dioxin in drinking water. Expires December 31, 2003.

State of Nebraska Department of Health. Reciprocal certification through the North Carolina Department of Health and Human Services and Florida DOH NELAP Certification. SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 613, 2,3,7,8-TCDD AND Method 1613, PCDD/PCDF & totals; RCRA, Methods 8280/8290, PCDD/PCDF & totals; CAA, TO-9A, all dioxins/furans AND TO-13A, semi-volatiles. Expires July 31, 2004.

State of Nevada, Department of Conservation and Natural Resources. Lab Certificate No. NC-00140-2003-66, expires July 31, 2003. CWA, Method 1613, PCDD/PCDF & totals, expires July 31, 2003.

State of Nevada, Department of Human Resources. Lab Certificate No. NC-00140-2003-66, expires July 31, 2003. SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water, expires July 31, 2003.

Primary NELAP Certificate: State of New Jersey, Department of Environmental Protection. ID #NC851. CAA, Methods 0023A and MM5 (Sampling Train). **Secondary NELAP Certificate:** SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 1613, PCDD/PCDF & totals; RCRA, Method 8290, PCDD/PCDF & totals. Expires June 30, 2003.

State of New Mexico, Environment Department. Safe Drinking Water Act; 2,3,7,8-TCDD by Method 1613. Expires 30 June 2003.

Secondary NELAP Certificate: New York State Department of Health, LAB ID #11026. Potable Water, 2,3,7,8-TCDD, EPA 1613, Serial # 19927; Non-Potable Water, 2,3,7,8-TCDD, EPA 1613, Serial # 19928. Expires 1 April, 2004.

State of North Carolina, Department of Health and Human Services. Certificate # 37751. Dioxin in drinking water. Expires July 31, 2004.

North Dakota State Department of Health and Consolidated Laboratories. Certificate # R-076. Dioxins/Furans in drinking water, non-potable water, solid and hazardous wastes; reciprocal recognition of FL-DOH NELAP Accreditation and Scope. Expires June 30, 2004.

Ohio EPA. Ohio does not offer out-of-state lab certifications; certification by EPA Region 5 is honored.

Oklahoma Department of Environmental Quality. Laboratory #9951. 2,3,7,8 TCDD (Dioxin). Expires August 31, 2004.

Secondary NELAP Certificate: Oregon Environmental Laboratory Accreditation Program. Certificate No:-279313938. SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 1613, PCDD/PCDF & totals; RCRA, Methods 8280/8290, PCDD/PCDF & totals; CAA, TO-9A, all dioxins/furans AND TO-13A, semi-volatiles. Expires January 31, 2004.

Secondary NELAP Certificate: Commonwealth of Pennsylvania, Department of Environmental Protection. Environmental Laboratory Registration # 68-1484. Lab ID No. 68-1975. SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water. Expires March 31, 2004.

State of South Carolina, Department of Health and Environmental Control. Certificate number #99040001 (Other parameters). Dioxin/Furans by method 1613B - Safe Drinking Water Act; 2,3,7,8-TCDD for Drinking Water, and Organic extractables for Solid and Hazardous Waste. Reciprocal certification with New York. Expires June 03, 2001. Certificate # 99040002 Solid Hazardous Waste- Dioxins/Furans by 8280A and 8290. Expires August 31, 2001. *Renewal pending.

State of Tennessee. Department of Environment and Conservation. ID #02992. Dioxin in Drinking water. Expires February 20, 2005.

Texas Natural Resource Conservation Commission. Certification Number: TX264-2002A. SDWA: Chemistry, Dioxin (2378-TCDD), EPA 1613. Expires January 31, 2004.

U.S. Army Corps of Engineers. Validated to perform EPA SW-846, Method 8290, water and solids. Validation expires May 2, 2004.

Department of the Navy, Naval Facilities Engineering Service Center (NFESC). Letter of Acceptance for analysis of water and solids by Methods 8280 and 8290. Expires June 30, 2003.

U.S. EPA Region V. 2,3,7,8 TCDD (Dioxin) in drinking water by method 1613B. Expires February 03, 2006. [Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin]

U.S. EPA Region VIII, for the State of Wyoming. EPA Method 1613 for Dioxin in drinking water. Expires 20 October 2003.

Secondary NELAP Certificate: State of Utah, Department of Health. ID # TRIA, Account # 9195445729 SDWA, Method 1613, 2,3,7,8-TCDD for Dioxin in Drinking Water; CWA, Method 1613, PCDD/PCDF & totals; RCRA, Methods 8280/8290, PCDD/PCDF & totals. Expires June 30, 2003.

Commonwealth of Virginia, Department of General Services, Division of Consolidated Laboratory Services. ID # 00341. 2,3,7,8-TCDD (Dioxin) in drinking water, EPA Method 1613B. Expires June 30, 2004.

State of Washington, Department of Ecology. Lab Accreditation Number C067. Scope of Accreditation applies to Dioxins (PCDDs/PCDFs) by EPA methods 1613, 8280, and 8290 in potable and non-potable water. Expires September 11, 2003.

State of West Virginia, Department of Health. Certificate No. 9923(C). 2,3,7,8-TCDD (Dioxin) in drinking water, SOC III. Expires December 31, 2003.

State of West Virginia, Department of Environmental Protection. Certificate No. 327. Dioxins/Furans, Methods 8280A/8290/1613B. Expires December 31, 2003.

State of Wisconsin, Department of Natural Resources. Laboratory ID Number 999869530. Certified for 2,3,7,8-TCDD (Dioxin) in drinking water and for PCDD/PCDF. Expires August 31, 2003.

State of Wyoming, see U.S. EPA Region VIII above.

PHARMACEUTICAL

Drug Enforcement Agency (DEA). Registration number RT0195835. Controlled substance registration for schedules 1,2,3,3N,4,5. Expires November 30, 2003.

N.C. Department of Human Resources. Registration number NC-PT 0000 0031. North Carolina controlled substances registration for schedules 1, 2, 2N, 3, 3N, 4, 5, 6. Expires October 31, 2003.

Food & Drug Administration (FDA) Registration. ID #'s 001500 1053481(ATL). Annual registration of drug establishment. Current for 2003.

OTHER

Clinical Laboratory Improvement Amendments (CLIA) Registration. ID # 34D0705123. Department of Health & Human Services, Health Care Financing Administration. Certificate for the Acceptance of Human Specimens for the purposes of performing laboratory examinations or procedures - Chemistry, Toxicology, HCFA. Expires May 30, 2005.

U.S. Department of Agriculture Soil Permit. Permit No. S-56724. Under the authority of the Federal Plant Pest Act, permission is granted to receive foreign soil samples for use in laboratory analysis. Expires March 31, 2007.

U.S. EPA Large Quantity Hazardous Waste Generator. EPA ID #NCR000137232. Permit indicates that the laboratory is a large generator of hazardous waste. No expiration date.

U.S. Fish and Wildlife Permit. Number LE027890-1. Authorization to import/export wildlife and/or wildlife products. Expires April 30, 2004.



Triangle Laboratories, Inc.

DOCUMENT CONTROL

CHAIN OF CUSTODY RECORD

Page 1 of 1



14648 NE 95th Street, Redmond, WA 98052 (425) 883-3881

Laboratory Reference #: 0310-070

Subcontract Laboratory: TRIANGLE LABS

Phone #: _____

Project Manager: David Baumeister

Date/Time: _____

Project Number: E-0290-6

Contact Person: _____

Project Name: PUGET PARK

OSE #	Sample ID	Date Sampled	Matrix	# Jars	Analysis Requested	Comments/Special Instructions
1	SCRN-1	10/6/03	SOLID	1	DIOXINS 8290 *	PLEASE COMPOSITE THESE FIVE SAMPLES
2	-2	10/7/03			*	
3	-3				*	
4	-4				*	
5	-5				*	
6	-6	10/8/03				
7	-7					
8	-8					
9	-9		W	2		
Relinquished by: <u>[Signature]</u>		date: <u>10/13/03</u>	Received by:		date:	* NOTES: Composite #1-5
Company: <u>OSI</u>		time: <u>-</u>	Company:		time:	
Relinquished by:		date:	Received by:		date:	
Company:		time:	Company:		time:	
Relinquished by:		date:	Received by: <u>Dorinda Fay</u>		date: <u>10-14-03</u>	
Company:		time:	Company: <u>Triangle Labs</u>		time: <u>10:35</u>	

TRIANGLE LABORATORIES, INC. -- LOG IN RECORD/CHAIN OF CUSTODY

Custody Seal : Absent Chain of Custody : Present Sample Tags : Absent Sample Tag Numbers: Not Listed on Chain of Custody SMO Forms : N/A				Sample Seals: Absent Container...: Intact				TLI Project Number 61304 Client: ONS04 - Onsite Environmental Project: E-0290-6				Book 364	
Ice Chest ICE PACKS Temp 8.0 C				Date Received 10/14/03		By <i>Deane</i>		Page 93					
				Carrier and Number		UPS							

TLI Number mr/H:CPM.	Client Sample ID Client COC ID	Matrix Location	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	DISPOSED Date/Init
364-93-1 *	SCRN-1 SCRN-1	C02	SUN	SUN							
364-93-2	SCRN-2 SCRN-2	C02									
364-93-3 *	SCRN-3 SCRN-3	C02									
364-93-4 *	SCRN-4 SCRN-4	C02									
364-93-5 *	SCRN-5 SCRN-5	C02									
364-93-6 *	SCRN-6 SCRN-6	C02									
364-93-7	SCRN-7 SCRN-7	C02	↓	↓							
364-93-8	SCRN-8 SCRN-8	C02	10-16-03	10-16-03							
364-93-9A	SCRN-9 SCRN-9	C02									
364-93-9B	SCRN-9 SCRN-9	C02									
* - composited											

Receiving Remarks: Ice packs arrived thawed. DT 10/14/03

Archive Remarks:

Form Revised 05/27/1997 -- Page 1 OF 1

TRIANGLE LABORATORIES, INC.
SAMPLE TRACKING AND PROJECT MANAGEMENT FORM

-----ADMINISTRATIVE INFORMATION-----

TLI Proj#: 61304- Samples: 43 ^{dec} _{10/14/03} TurnAround.: 18 Day(s)
Prod Code: D01011 Matrix.: Soil Hold Time.: 30 Day(s)
DetectLim: 1 ppt Type....: B Start Date.: 10/14/03
 Recvd...: 10/14/03 Ship By....: 10/30/03
 DWL Due Dt.: 10/21/03

Analyte List.: Tetra - Octa

Method.....: Method 8290: Tetra-Octa
Client Proj...: E-0290-6
Client.....: Onsite Environmental (ONS04)
P.O. No.....: Collect Dt/Tm: 10/06/03
Contact.....: David Baumeister Phone.....: 425-883-3881
Proj. Mgr....: Fax.....: 425-885-4603
 Sample Origin:

-----SPECIAL INSTRUCTIONS / QA REQUIREMENTS-----

TEF.....: EPA Prespike Standard: n/a
 Extraction Exp....: 11/05/03

-----REPORTING REQUIREMENTS-----

Reporting Format: Report Option II

See MILES for Instructions/Communications.

Completed by: Deanne Taylor, Dianne Taylor DATE: 10/14/03
Reviewed by: Craig S. Taylor, DCS DATE: 10/14/03 (PMGT0197)

ate: 10/24/03

TRIANGLE LABORATORIES, INC.

PRDPERC v4.04

Time: 20:45

Percent Moisture/Solid Calculations

Page: 1

Project: 61304

Sample #	Empty crd R Vial.Wt	Wet Vial Weight...	Dry Vial Weight...	Entered.By.....	Date....	Time....	%Moist	%Solid	Valid Weight From.....To.....	Target Weight...
002	Y 22.0500	0.0000	0.0000	Taylor	10/15/03	12:07:49	22.1	78.0	12.3077-13.3333	12.8205
004	Y 22.3700	0.0000	0.0000	Taylor	10/15/03	12:07:49	22.4	77.6	12.3711-13.4021	12.8866
005	Y 39.5600	0.0000	0.0000	Taylor	10/15/03	12:07:49	39.6	60.4	15.8940-17.2185	16.5563

Percent Moisture/Solid Summary

TLI.MILES.ID....	TLI.Number..	Client.Id.Number.....	%Moist	%Solid	ExtretWt	DryWtEqu	RPD..
61304-002	364-93-1	SCRN-1	22.1	78.0	12.900	10.062	10.049
61304-004	364-93-7	SCRN-7	22.4	77.6	12.900	10.010	
61304-005	364-93-8	SCRN-8	39.6	60.4	16.700	10.087	

*** End of Report ***

Date: 10/17/03
Time: 12:26

TRIANGLE LABORATORIES, INC.
Wet Lab Extraction and Observations
Project: 61304

PRDPERC v4.04
Page: 1

Sample #	crd	TLI_Number..	Customer.Sample.Id.....	Init. NaOH Adj. pH...	H2SO4 Adj. mL...	pH.1. mL...	pH.2.	Appearance.	Color.....	Odor...	Vol.	Entered.By.....	Date....	Time....	S
002	364-93-1	SCRN-1		n/a	n/a	n/a	n/a	solid	gray	none	0	white	10/17/03	12:24:23	F
004	364-93-7	SCRN-7		n/a	n/a	n/a	n/a	sand	gray	none	0	white	10/17/03	12:24:23	F
005	364-93-8	SCRN-6		n/a	n/a	n/a	n/a	solid	brown	none	0	white	10/17/03	12:24:23	F

*** End of Report ***

61304

Extraction

Type: Soxhley / Jar / Sep Funnel / Cont LL / ASE / Waste Dilution / Solid Phase / SonicationS.O.P: DSP 105 Version: 19Time On: 14:00

Est. Time

Off: 6:00

Solvents/Acids Lot Numbers

Toluene 025777

Comments / Observations: Blank/LCS/LCSD are Sand (Lot# 53-10-74). 61302-A-002-004-Soil, brown, no odor; 605-007-Sand, gray, no odor; 61304-002-Solid, gray, no odor; 005-Sand, gray, no odor; 004-Solid, brown, no odor; 61305-002-Sludge, brown, no odor, Skw 10-16-03
005 LCSD 10-17-03 004 LCSD 10-16-03

Concentration

Type: Rotovap / KD / SpeedvacAnalyst(s): C. Lee 10/20/03S.O.P: 124 Version: 18 Logged in by: CL

Solvent Exchange Lot Number

Heptane 032584Tridecane Lot # PT-1-15-3106

Division: 20%/80% 50%/50% 5ml/20ml (for lipid determination)
 (Process 20%)

Comments / Observations: _____

Cleanup

S.O.P: DSP 280 Version: 4Analyst: M. Gonzalez

MeCl2/Hept Solutions

2% ID: CUSP1-21-43-1S.O.P: 260 Version: 16Analyst: L.P. 10/21/0320% ID: CUSP1-21-43-2

S.O.P: _____ Version: _____

Analyst: _____

6% ID: _____

If DSP 280 needed complete the following areas:

Glasswool Lot #: GW02-108D Heptane Lot #: 032584Sodium Sulfate Lot #: 034270Acid-Coated Silica Gel Lot #: SGA-836C

50g used for: 010 61302A 100g used for: 61302A 002/003

Comments / Observations: _____

Transfers

Analyst(s): M. GonzalezS.O.P: DSP 272 Version: 11Division: 90%/10%

Solvent Lot Number

Heptane 032584

Comments: _____

Method: 8290Matrix: SoilExt. Date: 10-16-03Analyst: S. White

Project-Sample ID / TLI ID			Gross Weight Before(g) After(g)		Sample Size g / mL	SPW 8629H USF-AIS 6/8/04 10/16/03 13:00 0.1 ug/mL 20 uL	SPW 8627E USF-MX 2/26/04 10/16/03 13:00 0.01 ug/mL 40 uL	SPW 8548U USF-C 3/17/04 10/20/03 13:20 0.1 ug/mL 20 uL	ug/mL uL	Chemist Spike # Spike ID " Exp. " Date " Time Concn. Volume
61302 A	1	TLI Blank	N/A		10.0	SPW	N/A	CR		Any Left Yes / No N/A
61302 A	2	364-91-2	288.8	276.3	12.4					Yes / No
61302 A	3	364-91-3	296.2	282.8	13.4					Yes / No
61302 A	4	364-91-4	290.4	266.7	23.6					Yes / No
61302 A	5	364-91-5	333.9		13.6		N/A			Yes / No
61302 A	6	364-91-5MS			13.6		SPW			Yes / No
61302 A	7	364-91-5MSD	292.8		13.6					Yes / No
61302 A	8	TLI LCS	N/A		10.0					Yes / No N/A
61302 A	9	TLI LCSD	N/A		10.0		SPW			Yes / No N/A
61304	2	364-93-1,3,4,5,6 Composite 364-93-1	968.5	955.6	12.9		N/A			Yes / No
61304	4	364-93-7	649.3	636.3	12.9					Yes / No
61304	5	364-93-8	439.1	422.3	16.7					Yes / No
61305	2	364-94-1	278.3	261.3	16.8	SPW	N/A	CR		Yes / No
61302A-010 clean up blank			NA	NA	3.0 mL	MB 8567I USF-AIS 2-24-04 10-20-03 16:10 0.1 ug/mL	NA	MB 8568U USF-C 3-17-04 10-20-03 16:10 0.1 ug/mL		Yes / No

Project-Sample ID / TLI ID			1	2	3	4	5	8A	3/4	8B	9	6		
61302 A	1	TLI Blank	SW	CH	CH	CH	CH	NA	NA	L.P. 10/21/03	run 10/21/03	N/A		
61302 A	2	364-91-2						MG 10.20.03	MG 10.20.03			run 10/21/03		
61302 A	3	364-91-3						MG 10.20.03	MG 10.20.03					
61302 A	4	364-91-4						NA	NA					
61302 A	5	364-91-5												
61302 A	6	364-91-5MS												
61302 A	7	364-91-5MSD										run 10/21/03		
61302 A	8	TLI LCS										N/A		
61302 A	9	TLI LCSD												
61304	2	364-93-1												
61304	4	364-93-7												
61304	5	364-93-8												
61305	2	364-94-1	10/16/03	10/21/03	10/21/03	10/21/03	10/21/03	NA	NA					
61302A-010 cleanup blank			NA					NA	MG 10.20.03	MG 10.20.03	L.P. 10/21/03	run 10/21/03	N/A	

1) Extraction 2) Spike after extraction 3) Add Tridecane 4) Concentrate {40mL / 10 mL / Tridecane} 5) Combine

6) Divide / Lipid Determ. 7) Solvent Exchange 8) Cleanup {DSP260 / DSP280 / } 9) Transfer () Other:

8B
A

TRIANGLE LABORATORIES, INC.
Transfer Chain-of-Custody Form
Project 61304

Transfer From: DWLH5 To: DMS5

	Initials..	Date.....	Time...
Released by:	<u>MW</u>	<u>10/21/03</u>	<u>2:45</u>
Accepted by:	<u>JIL</u>	<u>10/21/03</u>	<u>220</u>

MILES.ID.....	TLI_No.....	Cust.Id.....
61304- -002	364-93-1	SCRN-1
61304- -004	364-93-7	SCRN-7
61304- -005	364-93-8	SCRN-8

-----XfrCOC (Rev 11/01/94)---+
Additional comments or instructions:

TRIANGLE LABORATORIES, INC.

Method: Method 8290: Tetra-Octa

HR GC/HRMS ANALYSIS

Required Detection Limit: 1 ppt

PROJECT: 61304

SAMPLE INFORMATION

RS Conc

1ST COLUMN

2ND COLUMN

20 μ l @ 100.0 PG/ μ l

[illegible]

Comments: _____

Type: B

Spike File: SPMIT22S

Amt of Extract: 100%

--REV 03/07/95 (PSTMF 6)--+

Cashner 10/21/03
Signature Date

Filename	Date*	Time*	Project #	Triangle Labs ID	Client Sample ID	332	Operator/ Date	Auto- sampler Location	Sequence Verified	Comments**
T035176	10/21/03	1221	—	8500B	8200/1013 Conca/10	5.8 E5	TF 10/21/03	2		Good 8200/1013 T-30 TF 10/21/03
77		1334	61257	OPR	OPR	5.6 E5		1	V/L 10/21/03	
78		1421		TU Blank	TU Blank	5.6 E5		2		
79		1509		364-461A	ASH-40ACE DF	6.0 E5		3		
80		1557		↓ -2A	ASH-40BC EDF	6.1 E5		4		
81		1645	61257	364-46-3	ASH-402CE DF	5.6 E5		5		
82		17:32	61258	364-47-1A	WIC49WEC93 BP	5.3 E5		6		
83		18:20	61273	364-62-1	I.P. Pine Bluff/10-703	8.4 E5		7		
84		19:08	61304A	364-93-9A	SCRN-9	4.8 E5		8		
85		19:56	61306	364-95-1A	03-A157661-8	4.3 E5		9		
86		20:43		↓ -2A	03-A157662-8	5.6 E5		10		
87		21:29	61306	364-95-3A	03-A157663-8	6.1 E5		11	✓	
T035188	10/21/03	22:19	—	8500B	8200/1013 Conca/10	6.1 E5	✓	12	V/L 10/21/03	Good fw F/B MIT3 V/L 10/21/03 1613B

* Transcribed from chromatographic data

** Dated initials required

ConCal Due: _____

Page: 80

svr1/sop/hrrunlog.doc (07/29/2003)

Triangle Laboratories, Inc.
Run Log

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	GC Descriptor
<u>TOT-108</u>	<u>DB-5</u>	<u>3211615</u>	<u>T02</u>	<u>2.0 µl</u>	<u>NDBSUS</u>	<u>NDBSUS</u>
					<u>B. Chilton</u>	<u>10/21/03</u>
					Signature	Date

Filename	Date*	Time*	Project #	Triangle Labs ID	Client Sample ID	332	Operator/Date	Auto-sampler Location	Sequence Verified	Comments**
T035189	10/14/03	23:12		8610	BLANK	15%	NGL 10/21/03	1		Septum & Liner ✓ 10/21/03
T035190	10/21/03	00:05	61302A	TLI-BLANK	TLI-BLANK	5.4 ES	VLC 10/21/03	1	PaB 10/22/03	
T035191		01:53		364-91-2	SSD1	5.8 ES		2		
T035192		01:41		364-91-3	Duplicate	5.8 ES		3		
T035193		02:28		364-91-4	SSD2	6.9 ES		4		
T035194		03:16		361-91-5	SSD3	7.9 ES		5	PaB 10/22/03	
T035195		04:04		361-91-5MS	SSD3MS	7.1 ES		6		
T035196		04:51		361-91-5MSD	SSD3MSD	8.1 ES		7		
T035197		05:39		TLI-LCS	TLI-LCS	4.4 ES		8		
T035198		06:27		TLI-LCSD	TLI-LCSD	5.2 ES		9		
T035199		07:15	61302A	TLI-Cleanp Blank	TLI-Cleanp Blank	4.6 ES		10		
T035200	✓	08:02	61305	364-94-1	5009 Sludge	7.1 ES		11		
T035201	10/21/03	08:50	61304	364-93-1	SCRN-1	6.1 ES	VLC 10/22/03	12		

* Transcribed from chromatographic data

Dated initials required

ConCal Due: _____

Page: 81

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	GC Descriptor
70T-108	DB-5	3211615	T02	2.0 µl	NDBJUS	NDBJUS
					<u>BCH</u>	10/22/03
					Signature	Date

Filename	Date*	Time*	Project #	Triangle Labs ID	Client Sample ID	332	Operator/ Date	Auto- sampler Location	Sequence Verified	Comments**
T035202	10/22/03	0038	—	8500B	1613/8290 Canna 10.0	5.2 ES	VOL 10/22/03	13		GOOD Ending only Averaged. T/F 10/23/03
T035203	10/22/03	20:25	—	8500B	1613/8290 Canna 10.0	11.6 ES	VOL 10/22/03	1		Rec'd F/1613/8290 out N6 VOL 10/22/03
T035204	10/22/03	21:14	—	8610	RTCHU	18.0	VOL 10/22/03	1		
T035205	10/22/03	22:24		8500B	1613/8290 Canna 10.0	3.8 ES	VOL 10/22/03	1		good for 1613/8290 T-0
T035206	10/22/03	23:27	61211	BLANK	TL1-BLANK	3.3 ES		1	John 10/23/03	
T035207	10/23/03	00:15		363-99-1A	0305-13893-001	6.3 ES		2		
T035208		01:02		363-99-2A	0305-13893-002	4.9 ES		3		
T035209		01:50		363-99-3A	0305-13893-003	4.0 ES		4		
T035210		02:38		TL1-LLS	TL1-LLS	6.3 ES		5		
T035211		03:26	61211	TL1-LLS	TL1-LLS	6.1 ES		6		
T035212		04:13	61326B	365-1620	ER10-11-03	3.1 ES		7		
T035213		05:01	61333	365-23-1	I M50795-01 M/L (com)	5.3 ES		8		
T035214	10/23/03	05:49	61304	364-93-7	SCAN-7	6.0 ES	VOL 10/23/03	9	John 10/23/03	

* Transcribed from chromatographic data

** Dated initials required

ConCal Due: _____

Page: 82

Signature: *[Signature]*
Date: 10/13/03

Filename	Date*	Time*	Project #	Triangle	Client Sample ID	332	Operator/	Auto-sampler	Sequence	Comments**
T035215	10/23/03	08:50	61304	364-938	SCAN-8	7.0	Vol	10	JCH	
T035216		07:24	61311	365-14	IMS 0613-01-B	5.0		11		
T035217		08:12	61307A	364-9613	IMS 0753-23-C	6.7		12		
T035218		09:00	61307A	364-9624	IMS 0753-24-D	8.0		13		
T035219	10/23/03	09:45	—	8500B	1613/8240 Cond/100	6.0	Vol	14	JCH	Good ending only
T035220	10/23/03	11:34	—	8610	RTCHL	17%	Vol	1	JCH	Averaged 10/23/03
T035221	10/23/03	20:51	—	8610	RTCHL	23.0%	Vol	1		
T035222	10/23/03	22:15	—	8500B	1613/8240 Cond/100	1.2	Vol	1		
T035223	10/13/03	13:28	61332B	TL1-B/6m	TL1-B/6m	5.1		1		Good for MIT3 T-0
T035224	10/12/03	00:16	61332B	365-22-3	MR103-12739	7.0		2		
T035225		01:04		365-223MS	ME103-12739MS	6.4		3		
T035226		01:51		365-223MSD	MR103-12739MSD	6.5		4		
T035227	10/14/03	02:39	61332B	TL1-MS	TL1-LLS	5.7		5		

* Transcribed from chromatographic data
* Dated initials required

Concal Due:

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	GC Descriptor
70P-42	DB225	2182937	TT1	2.0 μ	DB225	DB225
Signature: <i>John G. H.</i>						Date: 10/23/03

Filename	Date*	Time*	Project #	Triangle Labs ID	Client Sample ID	332	Operator/ Date	Auto- sampler Location	Sequence Verified	Comments**
P033132	10/23/03	16:35	—	8610	RTCHK	25%	JSY 10/23/03	1		tailing VCL 10/23/03
P033133	10/23/03	20:56	—	8500B	1613/8290 Counsel 10.0	1.4 E6	VCL 10/23/03	1		Tailing badly. VCL 10/23/03
P033134	10/23/03	22:52	—	8610	RTCHK	6%	VCL 10/23/03	1		
P033135	10/24/03	00:21	—	8500B	1613/8290 Counsel 10.0	1.2 E6	VCL 10/24/03	1		good for full VCL metz 10/24/03
P033136	10/24/03	01:22	—	8591P	AS-100	1.3 E6		1		good clean VCL 10/24/03
P033137		03:11	61304	364-938	SCRN-8	1.0 E6		2	JSY 10/24/03	
P033138		03:56	61298A	364-875	Soil-SM	1.1 E6		2		
P033139		04:41	8698 EEVIL	8698	TCDF 5/150m2/3	—	10/24/03 VCL	3		
P033140	10/24/03	05:27	—	8700	Retcheck + 3TCDF	—	VCL 10/24/03	4		
P033141	10/24/03	10:43	—	8500B	8290/1613 Counsel 10	1.0 E6	JSY 10/24/03	1		fine all methods FIB. JSY 10/24/03

* Transcribed from chromatographic data
 ** Dated initials required

ConCal Due: _____

EE VCL 10/24/03



Triangle Laboratories, Inc.

SAMPLE DATA

TRIANGLE LABORATORIES, INC.
LAB CONTROL SPIKE RECOVERY ANALYSIS AND COMPARISON

Project: 61304
Matrix: SAND
Method: 8290

Isomer	T035190 ID: TLI Blank	T035197 ID: TLI LCS	T035198 ID: TLI LCSD		Relative	
	Sample (pg/g)	With Spike (pg/g)	Percent Recovery	Spike Dup (pg/g)	Percent Recovery	Percent Difference
2378-TCDD	ND	36.9	92.2	36.5	91.3	0.98
12378-PeCDD	ND	190	94.9	184	91.9	3.21
123478-HxCDD	ND	186	93.2	192	95.8	2.75
123678-HxCDD	ND	181	90.7	180	89.9	0.89
123789-HxCDD	ND	193	96.7	197	98.7	2.05
1234678-HpCDD	ND	187	93.6	182	91.0	2.82
OCDD	ND	414	104	393	98.3	5.64
2378-TCDF	ND	37.8	94.4	37.9	94.7	0.32
12378-PeCDF	ND	165	82.6	167	83.4	0.96
23478-PeCDF	ND	170	85.1	169	84.7	0.47
123478-HxCDF	ND	189	94.4	181	90.3	4.44
123678-HxCDF	ND	195	97.3	186	93.0	4.52
234678-HxCDF	ND	185	92.5	192	96.1	3.82
123789-HxCDF	ND	176	88.2	184	92.1	4.33
1234678-HpCDF	ND	218	109	215	107	1.85
1234789-HpCDF	ND	179	89.6	180	89.9	0.33
OCDF	ND	417	104	370	92.5	11.7

ND: Not Detected
NA: Not Applicable
[...]: EMPC Value

MILES 4.22.16
GRY_PSUM v1.11

Processed By: KL

Date: 10/24/03

Percent Recovery QC Limits: 70 to 130 percent.
Relative Percent Difference QC Limits: +/- 20 percent.

Nominal Spike Levels:
TCDD/TCDF...: 0.4 ng
PeCDD/PeCDF: 2.0 ng
HxCDD/HxCDF: 2.0 ng
HpCDD/HpCDF: 2.0 ng
OCDD/OCDF...: 4.0 ng

Sample Results for Project 61304

10/24/2003

Method MIT3 Analysis (DB-5)

Data File	T035190	T035201	T035214	T035215
Sample ID	TLI Blank	SCRN-1	SCRN-7	SCRN-8
Units	pg/g	pg/g	pg/g	pg/g
Extraction Date	10/16/2003	10/16/2003	10/16/2003	10/16/2003
Analysis Date	10/22/2003	10/22/2003	10/23/2003	10/23/2003
Instrument	T	T	T	T
Matrix	SAND	SOLID	SOLID	SOLID
Extraction Type				
Analytes				
2378-TCDD	(0.2)	(0.2)	(0.2)	(0.1)
12378-PeCDD	(0.2)	(0.2)	(0.2)	(0.2)
123478-HxCDD	(0.2)	(0.3)	(0.3)	(0.2)
123678-HxCDD	(0.2)	0.53 J	2.3 J	0.41 J
123789-HxCDD	(0.2)	(0.3)	1.1 J	0.52 J
1234678-HpCDD	(0.2)	7.9	251	4.8 J
OCDD	(0.4)	69.2	2270	33.9
2378-TCDF	(0.1)	{0.56} J	{0.48} J	4.8
12378-PeCDF	(0.09)	{4.4} XJ	{2.7} XJ	{2.3} XJ
23478-PeCDF	(0.1)	{0.27} J	(0.2)	0.99 J
123478-HxCDF	(0.1)	0.42 J	0.36 J	0.46 J
123678-HxCDF	(0.1)	(0.2)	0.24 J	0.25 J
234678-HxCDF	(0.1)	(0.2)	0.29 J	0.25 J
123789-HxCDF	(0.1)	(0.2)	(0.2)	(0.1)
1234678-HpCDF	(0.1)	2.0 J	26.4	{0.85} J
1234789-HpCDF	(0.2)	(0.4)	1.0 J	(0.2)
OCDF	(0.3)	3.3 J	104	1.9 J
TOTAL TCDD	(0.2)	0.89	(0.2)	1.3
TOTAL PeCDD	(0.2)	0.42	0.43	{1.1}
TOTAL HxCDD	(0.2)	3.3	20.2	3.0
TOTAL HpCDD	(0.2)	21.3	493	9.7
TOTAL TCDF	(0.1)	{21.1} X	1.6 X	24.4 X
TOTAL PeCDF	(0.10)	3.0 X	0.98 X	3.2 X
TOTAL HxCDF	(0.1)	3.7	14.3 X	2.8
TOTAL HpCDF	(0.2)	4.5	88.9	1.1
Other Standards Percent Recovery Summary (% Rec)				
37C1-TCDD	78.6	87.0	62.7	80.4
Other Standards Percent Recovery Summary (% Rec)				
13C12-PeCDF 234	92.7	97.3	69.9	89.3
13C12-HxCDF 478	78.3	91.3	61.5	75.8
13C12-HxCDD 478	86.3	99.9	68.0	83.8
13C12-HpCDF 789	93.0	77.2	73.4	92.8
Other Standards Percent Recovery Summary (% Rec)				
13C12-HxCDF 789	76.5	81.4	57.6	77.0
13C12-HxCDF 234	75.0	85.9	58.4	75.6
Internal Standards Percent Recovery Summary (% Rec)				
13C12-2378-TCDF	73.8	82.7	56.2	76.6
13C12-2378-TCDD	79.2	89.4	61.8	81.6

Sample Results for Project 61304

10/24/2003

Method MIT3 Analysis (DB-5)

Data File	T035190	T035201	T035214	T035215
Sample ID	TLI Blank	SCRN-1	SCRN-7	SCRN-8
Units	pg/g	pg/g	pg/g	pg/g
Extraction Date	10/16/2003	10/16/2003	10/16/2003	10/16/2003
Analysis Date	10/22/2003	10/22/2003	10/23/2003	10/23/2003
Instrument	T	T	T	T
Matrix	SAND	SOLID	SOLID	SOLID
Extraction Type				

Internal Standards Percent Recovery Summary (% Rec)

13C12-PeCDF 123	91.4	101	68.2	85.2
13C12-PeCDD 123	94.3	96.2	70.3	82.0
13C12-HxCDF 678	75.0	95.2	63.2	78.6
13C12-HxCDD 678	84.6	92.6	66.0	85.4
13C12-HpCDF 678	85.2	80.5	67.1	84.0
13C12-HpCDD 678	95.0	82.5	79.3	99.8
13C12-OCDD	89.0	58.1	89.6	97.3

Sample Results for Project 61304

10/24/2003

Method MIT3 Analysis (DB-5)

Data File	T035197	T035198
Sample ID	TLI LCS	TLI LCSD

Units	pg/g	pg/g
Extraction Date	10/16/2003	10/16/2003
Analysis Date	10/22/2003	10/22/2003
Instrument	T	T
Matrix	SAND	SAND
Extraction Type		

Analytes		
2378-TCDD	36.9	36.5
12378-PeCDD	190	184
123478-HxCDD	186	192
123678-HxCDD	181	180
123789-HxCDD	193	197
1234678-HpCDD	187	182
OCDD	414	393
2378-TCDF	37.8	37.9
12378-PeCDF	165	167
23478-PeCDF	170	169
123478-HxCDF	189	181
123678-HxCDF	195	186
234678-HxCDF	185	192
123789-HxCDF	176	184
1234678-HpCDF	218	215
1234789-HpCDF	179	180
OCDF	417	370

Other Standards Percent Recovery Summary (% Rec)		
37Cl-TCDD	79.2	77.7

Other Standards Percent Recovery Summary (% Rec)		
13C12-PeCDF 234	86.4	83.4
13C12-HxCDF 478	75.7	80.0
13C12-HxCDD 478	82.3	88.2
13C12-HpCDF 789	71.7	72.3

Other Standards Percent Recovery Summary (% Rec)		
13C12-HxCDF 789	69.3	72.7
13C12-HxCDF 234	73.7	78.5

Internal Standards Percent Recovery Summary (% Rec)		
13C12-2378-TCDF	67.5	67.9
13C12-2378-TCDD	77.8	77.1
13C12-PeCDF 123	87.8	84.9
13C12-PeCDD 123	86.8	83.5
13C12-HxCDF 678	77.4	79.8
13C12-HxCDD 678	83.2	85.3
13C12-HpCDF 678	72.7	74.0
13C12-HpCDD 678	77.8	78.2
13C12-OCDD	59.9	60.5

(Estimated Maximum Possible Concentration), (Detection Limit).

TRIANGLE LABORATORIES, INC.
Sample Results for Project 61304
Method 8290X (DB-225)

Page 1
10/24/2003

=====
Data File P033137
Sample ID SCRN-8

Units pg/g
Extraction Date 10/16/2003
Analysis Date 10/24/2003
Instrument P
Matrix SOLID
Extraction Type

=====
Analytes
2378-TCDF 3.7

Internal Standards Percent Recovery Summary (% Rec)
13C12-2378-TCDF 69.3
=====



Triangle Laboratories, Inc.

TOXICITY EQUIVALENTS REPORT

Onsite Environmental

TLI Project: 61304
Client Sample: TLI Blank

Toxicity Equivalents Report
Analysis File: T035190

Client Project:	E-0290-6	Date Received:	10/14/03	Ical:	TF53183
Sample Matrix:	SAND	Date Extracted:	10/16/03	Spike File:	SPMIT32S
TLI ID:	TLI Blank	Date Analyzed:	10/22/03	1st CCal:	T035188
				End CCal:	T035202
Sample Size:	10.000 g	Dilution Factor:	1	% Moisture:	n/a
Dry Weight:	n/a	Blank File:	T035190	% Lipid:	n/a
GC Column:	DB-5	Analyst:	VSC	% Solids:	n/a

Analytes	Conc. (pg/g)		TEF		Equivalent
2,3,7,8-TCDD	{0.2}	x	1.	=	0.2
1,2,3,7,8-PeCDD	{0.2}	x	0.5	=	0.1
1,2,3,4,7,8-HxCDD	{0.2}	x	0.1	=	0.02
1,2,3,6,7,8-HxCDD	{0.2}	x	0.1	=	0.02
1,2,3,7,8,9-HxCDD	{0.2}	x	0.1	=	0.02
1,2,3,4,6,7,8-HpCDD	{0.2}	x	0.01	=	0.002
1,2,3,4,6,7,8,9-OCDD	{0.4}	x	0.001	=	0.0004
TOTAL PCDD					0.4
2,3,7,8-TCDF	{0.1}	x	0.1	=	0.01
1,2,3,7,8-PeCDF	{0.09}	x	0.05	=	0.005
2,3,4,7,8-PeCDF	{0.1}	x	0.5	=	0.05
1,2,3,4,7,8-HxCDF	{0.1}	x	0.1	=	0.01
1,2,3,6,7,8-HxCDF	{0.1}	x	0.1	=	0.01
2,3,4,6,7,8-HxCDF	{0.1}	x	0.1	=	0.01
1,2,3,7,8,9-HxCDF	{0.1}	x	0.1	=	0.01
1,2,3,4,6,7,8-HpCDF	{0.1}	x	0.01	=	0.001
1,2,3,4,7,8,9-HpCDF	{0.2}	x	0.01	=	0.002
1,2,3,4,6,7,8,9-OCDF	{0.3}	x	0.001	=	0.0003
TOTAL PCDF					0.11

Total EPA TEFs, 1989a: 0.5 pg/g

{...} indicates that the value is that of a Detection Limit.

Onsite Environmental

TLI Project: 61304
Client Sample: SCR-1

Toxicity Equivalents Report
Analysis File: T035201

Client Project:	E-0290-6	Date Received:	10/14/03	ICal:	TF53183
Sample Matrix:	SOLID	Date Extracted:	10/16/03	Spike File:	SPMIT32S
TLI ID:	364-93-1	Date Analyzed:	10/22/03	1st CCal:	T035188
				End CCal:	T035202
Sample Size:	12.900 g	Dilution Factor:	1	% Moisture:	22.1
Dry Weight:	10.049 g	Blank File:	T025190	% Lipid:	n/a
GC Column:	DB-5	Analyst:	VSC	% Solids:	77.9

Analytes	Conc. (pg/g)		TEF		Equivalent
2,3,7,8-TCDD	{0.2}	x	1.	=	0.2
1,2,3,7,8-PeCDD	{0.2}	x	0.5	=	0.1
1,2,3,4,7,8-HxCDD	{0.3}	x	0.1	=	0.03
1,2,3,6,7,8-HxCDD	0.53	x	0.1	=	0.053
1,2,3,7,8,9-HxCDD	{0.3}	x	0.1	=	0.03
1,2,3,4,6,7,8-HpCDD	7.9	x	0.01	=	0.079
1,2,3,4,6,7,8,9-OCDD	69.2	x	0.001	=	0.0692
TOTAL PCDD					0.6
2,3,7,8-TCDF	[0.56]	x	0.1	=	0.056
1,2,3,7,8-PeCDF	[4.4]	x	0.05	=	0.22
2,3,4,7,8-PeCDF	[0.27]	x	0.5	=	0.14
1,2,3,4,7,8-HxCDF	0.42	x	0.1	=	0.042
1,2,3,6,7,8-HxCDF	{0.2}	x	0.1	=	0.02
2,3,4,6,7,8-HxCDF	{0.2}	x	0.1	=	0.02
1,2,3,7,8,9-HxCDF	{0.2}	x	0.1	=	0.02
1,2,3,4,6,7,8-HpCDF	2.0	x	0.01	=	0.020
1,2,3,4,7,8,9-HpCDF	{0.4}	x	0.01	=	0.004
1,2,3,4,6,7,8,9-OCDF	3.3	x	0.001	=	0.0033
TOTAL PCDF					0.55

Total EPA TEFs, 1989a: 1.1 pg/g

[...] indicates that the value is that of an EMPC.
{...} indicates that the value is that of a Detection Limit.

Onsite Environmental

TLI Project: 61304
Client Sample: SCR-7

Toxicity Equivalents Report
Analysis File: T035214

Client Project:	E-0290-6	Date Received:	10/14/03	ICal:	TF53183
Sample Matrix:	SOLID	Date Extracted:	10/16/03	Spike File:	SPMIT32S
TLI ID:	364-93-7	Date Analyzed:	10/23/03	1st CCal:	T035205
				End CCal:	T035219
Sample Size:	12.900 g	Dilution Factor:	1	% Moisture:	22.4
Dry Weight:	10.010 g	Blank File:	T035190	% Lipid:	n/a
GC Column:	DB-5	Analyst:	VSC	% Solids:	77.6

Analytes	Conc. (pg/g)	TEF	Equivalent
2,3,7,8-TCDD	{0.2}	x 1. =	0.2
1,2,3,7,8-PeCDD	{0.2}	x 0.5 =	0.1
1,2,3,4,7,8-HxCDD	{0.3}	x 0.1 =	0.03
1,2,3,6,7,8-HxCDD	2.3	x 0.1 =	0.23
1,2,3,7,8,9-HxCDD	1.1	x 0.1 =	0.11
1,2,3,4,6,7,8-HpCDD	251	x 0.01 =	2.51
1,2,3,4,6,7,8,9-OCDD	2270	x 0.001 =	2.270
TOTAL PCDD			5.4
2,3,7,8-TCDF	[0.48]	x 0.1 =	0.048
1,2,3,7,8-PeCDF	[2.7]	x 0.05 =	0.14
2,3,4,7,8-PeCDF	{0.2}	x 0.5 =	0.1
1,2,3,4,7,8-HxCDF	0.36	x 0.1 =	0.036
1,2,3,6,7,8-HxCDF	0.24	x 0.1 =	0.024
2,3,4,6,7,8-HxCDF	0.29	x 0.1 =	0.029
1,2,3,7,8,9-HxCDF	{0.2}	x 0.1 =	0.02
1,2,3,4,6,7,8-HpCDF	26.4	x 0.01 =	0.264
1,2,3,4,7,8,9-HpCDF	1.0	x 0.01 =	0.010
1,2,3,4,6,7,8,9-OCDF	104	x 0.001 =	0.104
TOTAL PCDF			0.8

Total EPA TEFs, 1989a: 6.2 pg/g

[...] indicates that the value is that of an EMPC.
{...} indicates that the value is that of a Detection Limit.

Onsite Environmental

TLI Project: **61304**
Client Sample: **SCRN-8**

Toxicity Equivalents Report
Analysis File: **T035215**

Client Project:	E-0290-6	Date Received:	10/14/03	ICal:	TF53183
Sample Matrix:	SOLID	Date Extracted:	10/16/03	Spike File:	SPMIT32S
TLI ID:	364-93-8	Date Analyzed:	10/23/03	1st CCal:	T035205
				End CCal:	T035219
Sample Size:	16.700 g	Dilution Factor:	1	% Moisture:	39.6
Dry Weight:	10.087 g	Blank File:	T035190	% Lipid:	n/a
GC Column:	DB-5	Analyst:	VSC	% Solids:	60.4

Analytes	Conc. (pg/g)		TEF		Equivalent
2,3,7,8-TCDD	{0.1}	x	1.	=	0.1
1,2,3,7,8-PeCDD	{0.2}	x	0.5	=	0.1
1,2,3,4,7,8-HxCDD	{0.2}	x	0.1	=	0.02
1,2,3,6,7,8-HxCDD	0.41	x	0.1	=	0.041
1,2,3,7,8,9-HxCDD	0.52	x	0.1	=	0.052
1,2,3,4,6,7,8-HpCDD	4.8	x	0.01	=	0.048
1,2,3,4,6,7,8,9-OCDD	33.9	x	0.001	=	0.0339
TOTAL PCDD					0.4
2,3,7,8-TCDF	3.7	x	0.1	=	0.37
1,2,3,7,8-PeCDF	[2.3]	x	0.05	=	0.12
2,3,4,7,8-PeCDF	0.99	x	0.5	=	0.50
1,2,3,4,7,8-HxCDF	0.46	x	0.1	=	0.046
1,2,3,6,7,8-HxCDF	0.25	x	0.1	=	0.025
2,3,4,6,7,8-HxCDF	0.25	x	0.1	=	0.025
1,2,3,7,8,9-HxCDF	{0.1}	x	0.1	=	0.01
1,2,3,4,6,7,8-HpCDF	[0.85]	x	0.01	=	0.0085
1,2,3,4,7,8,9-HpCDF	{0.2}	x	0.01	=	0.002
1,2,3,4,6,7,8,9-OCDF	1.9	x	0.001	=	0.0019
TOTAL PCDF					1.11

Total EPA TEFs, 1989a: 1.5 pg/g

[...] indicates that the value is that of an EMPC.

{...} indicates that the value is that of a Detection Limit.

Onsite Environmental

TLI Project: **61304**
 Client Sample: **TLI Blank**

Method 8290 PCDD/PCDF Analysis (b)
 Analysis File: **T035190**

Client Project:	E-0290-6	Date Received:	/ /	ICal:	TF53183
Sample Matrix:	SAND	Date Extracted:	10/16/2003	Spike File:	SPMIT32S
TLI ID:	TLI Blank	Date Analyzed:	10/22/2003	1st CCal:	T035188
				End CCal:	T035202
Sample Size:	10.000 g	Dilution Factor:	n/a	% Moisture:	n/a
Dry Weight:	n/a	Blank File:	T035190	% Lipid:	n/a
GC Column:	DB-5	Analyst:	VSC	% Solids:	n/a

Analytes	Conc. (pg/g)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	ND	0.2				---
1,2,3,7,8-PeCDD	ND	0.2				---
1,2,3,4,7,8-HxCDD	ND	0.2				---
1,2,3,6,7,8-HxCDD	ND	0.2				---
1,2,3,7,8,9-HxCDD	ND	0.2				---
1,2,3,4,6,7,8-HpCDD	ND	0.2				---
1,2,3,4,6,7,8,9-OCDD	ND	0.4				---
2,3,7,8-TCDF	ND	0.1				---
1,2,3,7,8-PeCDF	ND	0.09				---
2,3,4,7,8-PeCDF	ND	0.1				---
1,2,3,4,7,8-HxCDF	ND	0.1				---
1,2,3,6,7,8-HxCDF	ND	0.1				---
2,3,4,6,7,8-HxCDF	ND	0.1				---
1,2,3,7,8,9-HxCDF	ND	0.1				---
1,2,3,4,6,7,8-HpCDF	ND	0.1				---
1,2,3,4,7,8,9-HpCDF	ND	0.2				---
1,2,3,4,6,7,8,9-OCDF	ND	0.3				---

Totals	Conc. (pg/g)	Number	DL	EMPC	Flags
Total TCDD	ND		0.2		---
Total PeCDD	ND		0.2		---
Total HxCDD	ND		0.2		---
Total HpCDD	ND		0.2		---
Total TCDF	ND		0.1		---
Total PeCDF	ND		0.10		---
Total HxCDF	ND		0.1		---
Total HpCDF	ND		0.2		---

Onsite Environmental

TLI Project: 61304
Client Sample: TLI Blank

Method 8290 PCDD/PCDF Analysis (b)
Analysis File: T035190

Internal Standards	Conc. (pg/g)	% Recovery	QC Limits	Ratio	RT	Flags
¹³ C ₁₂ -2,3,7,8-TCDF	148	73.8	40%-135%	0.71	26:14	—
¹³ C ₁₂ -2,3,7,8-TCDD	158	79.2	40%-135%	0.80	26:57	—
¹³ C ₁₂ -1,2,3,7,8-PeCDF	183	91.4	40%-135%	1.43	30:08	—
¹³ C ₁₂ -1,2,3,7,8-PeCDD	189	94.3	40%-135%	1.46	31:09	—
¹³ C ₁₂ -1,2,3,6,7,8-HxCDF	150	75.0	40%-135%	0.51	33:39	—
¹³ C ₁₂ -1,2,3,6,7,8-HxCDD	169	84.6	40%-135%	1.20	34:19	—
¹³ C ₁₂ -1,2,3,4,6,7,8-HpCDF	170	85.2	40%-135%	0.40	36:33	—
¹³ C ₁₂ -1,2,3,4,6,7,8-HpCDD	190	95.0	40%-135%	1.04	37:35	—
¹³ C ₁₂ -1,2,3,4,6,7,8,9-OCDD	356	89.0	40%-135%	0.89	41:15	—

Surrogate Standards (Type B)	Conc. (pg/g)	% Recovery	QC Limits	Ratio	RT	Flags
¹³ C ₁₂ -2,3,4,7,8-PeCDF	185	92.7	40%-135%	1.45	30:49	—
¹³ C ₁₂ -1,2,3,4,7,8-HxCDF	157	78.3	40%-135%	0.51	33:33	—
¹³ C ₁₂ -1,2,3,4,7,8-HxCDD	173	86.3	40%-135%	1.18	34:14	—
¹³ C ₁₂ -1,2,3,4,7,8,9-HpCDF	186	93.0	40%-135%	0.41	38:06	—

Other Standard	Conc: (pg/g)	% Recovery	QC Limits	RT	Flags
³⁷ Cl ₄ -2,3,7,8-TCDD	15.7	78.6	40%-135%	26:58	

Alternate Standards (Type B)	Conc. (pg/g)	% Recovery	QC Limits	Ratio	RT	Flags
¹³ C ₁₂ -1,2,3,7,8,9-HxCDF	153	76.5	40%-135%	0.51	34:55	—
¹³ C ₁₂ -2,3,4,6,7,8-HxCDF	150	75.0	40%-135%	0.51	34:08	—

Recovery Standards	Ratio	RT	Flags
¹³ C ₁₂ -1,2,3,4-TCDD	0.81	26:44	—
¹³ C ₁₂ -1,2,3,7,8,9-HxCDD	1.19	34:38	

Data Reviewer: *[Signature]* 10/24/2003