Suntrana Tipple PCB Cleanup Report

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Acronyms and Abbreviations

ACM	Asbestos Containing Materials
ADEC	Alaska Department of Environmental Conservation
ADNR MLW	Alaska Department of Natural Resources, Division of Mining, Land, and Water
bgs	below ground surface
Brice	Brice Environmental
Clarus	Clarus Environmental Services, LLC
EPA	Environmental Protection Agency
ft^2	square feet
mg/kg	milligram per kilogram
PCB	Polychlorinated Biphenyls
ppb	parts per billion
ppm	parts per million
QC	Quality Control
RPD	Relative Percentage Difference
SDI	Strategic Diagnostic Incorporated
SGS	SGS Environmental Laboratory

EXECUTIVE SUMMARY

The Alaska Department of Natural Resources, Division of Mining, Land and Water (ADNR MLW) has been working to remove the structures, debris, and hazardous material from a former coal mine town by the name of Suntrana, Alaska an abandoned mining site outside of Healy, Alaska. This work is being accomplished under the Abandoned Mine Lands Reclamation Fund. The goals of the fund are "restoration of land, water and the environment" and "protection of public health, safety and general welfare." One of the final phases of the removal action included the removal of soil that had been determined to be contaminated with polychlorinated biphenyls (PCBs). This report explains the planning, execution, and results of that effort.

Clarus Environmental Services (Clarus) was subcontracted by Brice Environmental Services (Brice) to develop a sampling plan that would identify the PCB-contaminated soil and assist in making removal decisions to meet Alaska Department of Environmental Conservation (ADEC) guidelines. Clarus was then to execute the plan by screening the soil, directing the excavation using the screening results, and analytical sampling of the removed, contaminated soil for disposal classification.

All soil found to be contaminated above the ADEC cleanup level of one part per million (ppm) PCB was removed from the site and shipped for proper disposal. Undisturbed soils at the extremes of the excavation were confirmed as "negative" [less than 1 parts per million (ppm) PCB] using on site sampling and analysis, and "contaminated" (1 ppm or greater PCB) soil was confirmed by analytical results. In addition, a sample was collected downgradient of the site to determine whether the surface material which moved on site from flooding earlier in the season was contaminated. That sample screened negative for PCB.

The contaminated soil was placed in supersacks for measurement and shipment to the disposal facilities. Soil was segregated by 1 - 49 ppm PCB and greater than 49 ppm PCB, as the soils were scheduled for disposal at two different facilities. In all, 81 samples including 7 duplicates were screened. As a result, 57 cubic yards of soil were determined to be over the ADEC cleanup level, removed from the ground, put directly into one cubic yard supersacks, analytically sampled and confirmed, and shipped off site. Out of the 57 sacks, 18 were classified as over 49 ppm PCB and 39 sacks as 1 – 49 ppm PCB. The certificates of disposal for the soil will be forwarded to ADNR when received.

Contaminated wood which had been identified and packaged in a previous investigation was added to the sacks of PCB contaminated soil that showed greater than 49 ppm PCB contamination and were shipped and disposed with the soil.

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1.0 PROJECT LOCATION AND HISTORY

1.1 Project Location and History

Suntrana is located approximately five miles southeast of Healy, Alaska on Healy Creek. Healy is a small town located 20 miles north of the entrance to Denali National Park at mile 248 on the George Parks Highway (figure 1) Suntrana is most recognizable by its tall, prominent tipple structure that used to haul coal to the top of the plant.

The Suntrana Coal Mine site was used to process, store, and load out coal by numerous companies from 1912 to 1983. It consisted of buildings, machinery, and structures that had been updated and/or replaced over the years. There were buildings for housing, maintenance, generators, and storage constructed of brick, metal, wood, or combinations of each. Due to the abandonment in 1983, most of the structures were dilapidated and/or vandalized. Hazardous substances on site included: Polychlorinated Biphenyls (PCBs) from transformers and ballasts, asbestos from insulation and braking parts, a range of oils and lubricants from machinery, and lead-based paint.

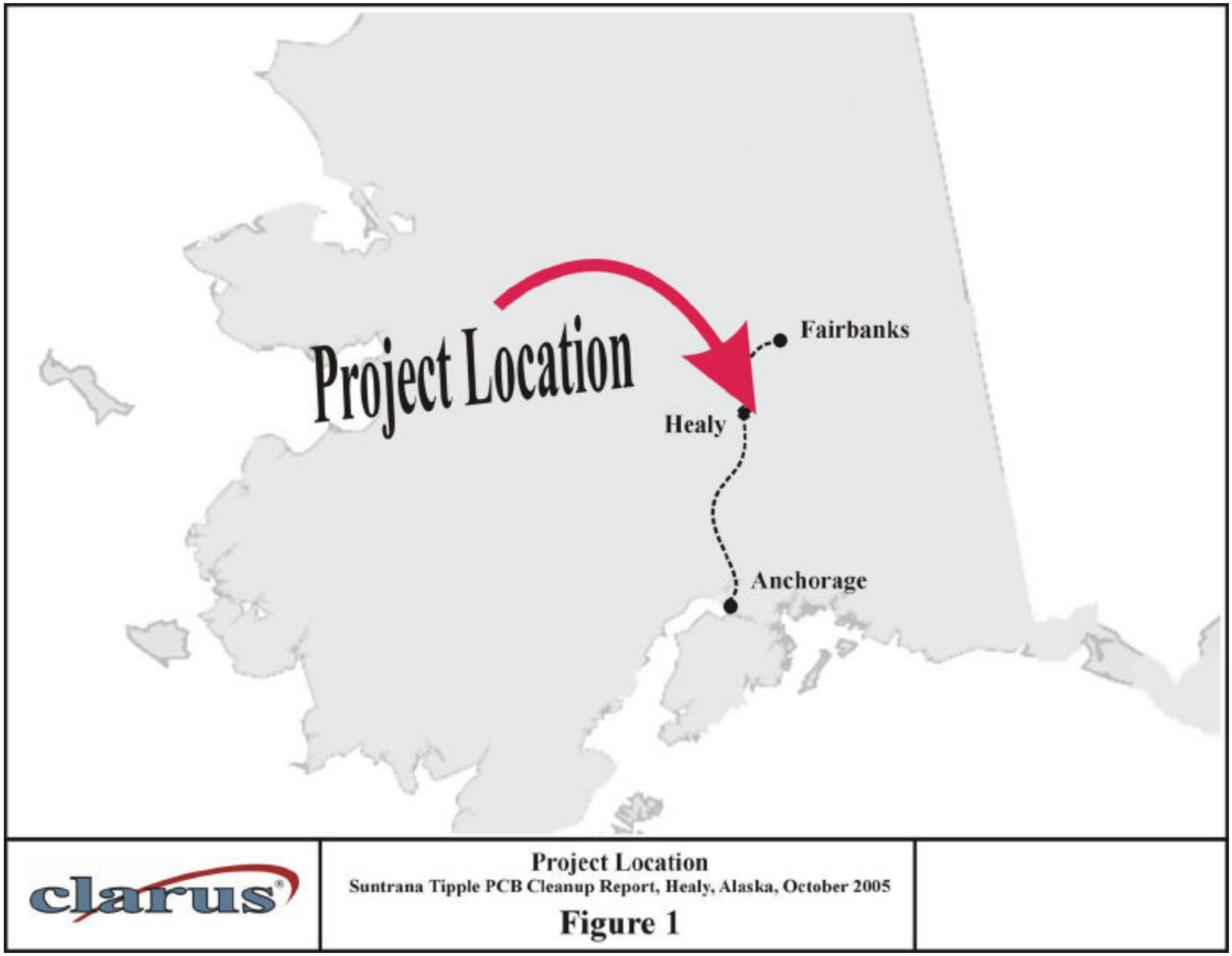
1.2 Site Description

The coal facility at Suntrana is located in a river basin next to Healy Creek. The basin provides approximately a mile of generally flat grade perpendicular to the creek with steep climbs of terrain out of either side. This basin is a collection point for rain and storm waters from nearby canyons and creeks. Heavy rainfall flooded this site more than once in the past year and washed out the Healy Haul Road which lies north of the tipple structure. The basin of Healy Creek possesses a silty, sandy bottom with layers of organic soil and coal. Alders, Birch, and other shrubbery flourish in this moist basin.

1.3 Previous Investigations

ADNR MLW contracted Nortech, an environmental and engineering consulting firm, to create a Hazardous Materials Assessment Report in 2002 for this defunct coal mining site under ADNR MLWs Abandoned Mine Lands Reclamation Program. A corrective action plan was prepared to investigate, demolish, and dispose of the remaining equipment, buildings, and facilities at this site.

Two of the stated goals of the Abandoned Mine Lands Reclamation Fund are "restoration of land, water and the environment" and "protection of public health, safety and general welfare." These goals were implemented by Nortech during the project through identification and removal of dilapidated structures and the associated contamination. Asbestos-containing materials (ACM), lead-based paint, mercury-containing materials, fuel storage tanks, oil and lubricant containing equipment, petroleum-contaminated soil, PCB-containing transformers, and PCB-contaminated soil were removed in previous projects by September 2004. As an earlier phase of the 2005 work, the last of the buildings and structures were demolished and removed in early August with the exception of the Grizzly, Main Conveyor, and Tipple Structure prior to sampling and remediation at this site.

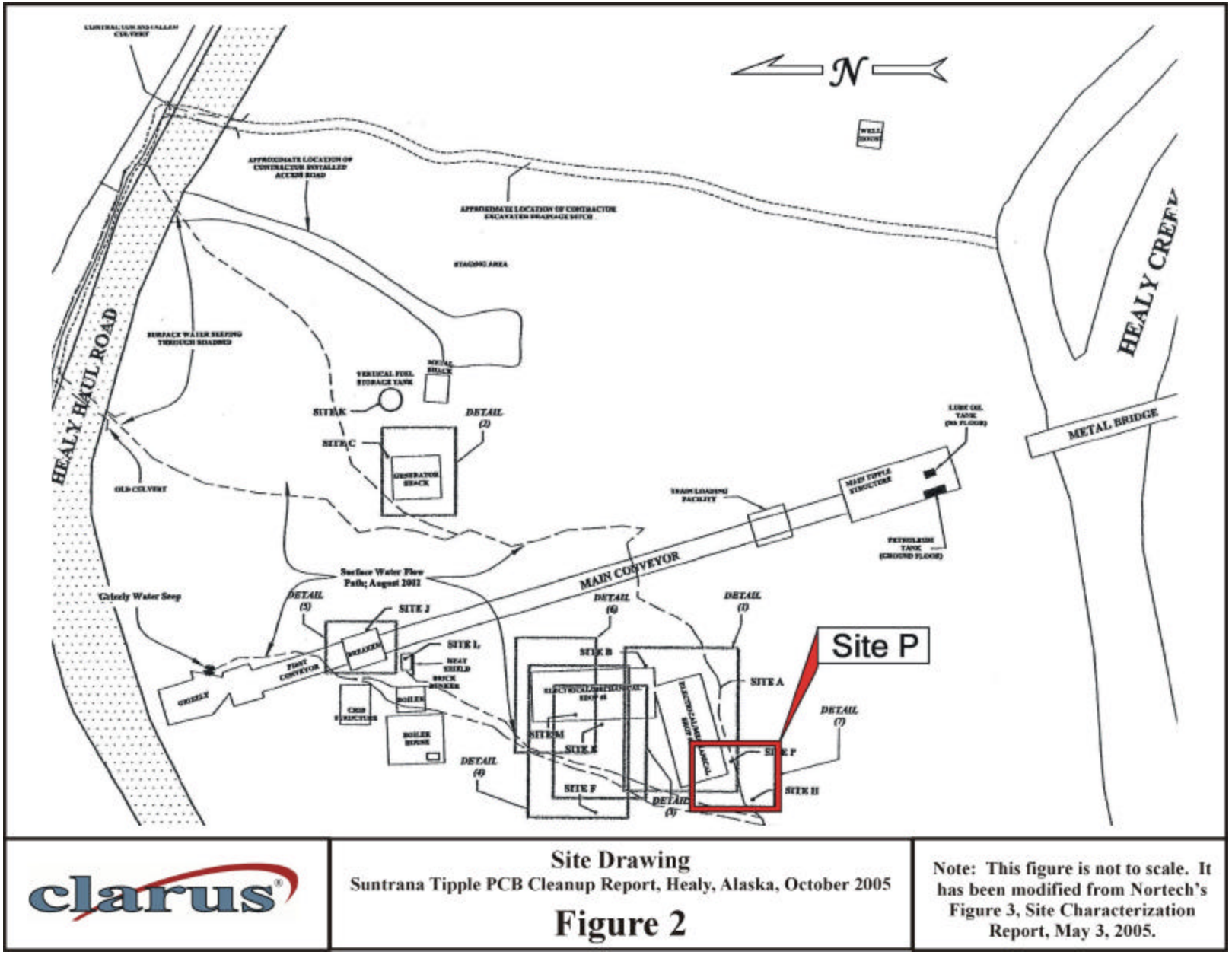

Project Location
Fairbanks
Healy
Anchorage
clarus
Project Location
Suntrana Tipple PCB Cleanup Report, Healy, Alaska, October 2005
Figure 1

The Suntrana coal facility is bordered on the north, east, and west by the foothills of the Alaska Range, and the south by Healy Creek. Nortech and ADNR MLW originally divided the areas into sites, and the area of concern for this remediation was given the name "Site P". For consistent reference, this will continue to be the name of this site. Site P lies about 200 feet west of the main conveyor (figure 2). The sampling area occupies approximately 150 square feet (ft^2) within this site. (See photographic log at Appendix A.)

Site P was an area where a PCB release was discovered at the end of the 2004 field season. Not included in Nortech's assessment report in 2002, a drum was discovered that had previously been thought to be an empty drum, and was scheduled for removal as non-hazardous solid waste. Upon closer investigation during the execution of the corrective action plan in 2004, the drum was discovered to still contain fluid that had visibly leaked on to the deck and the ground below it. Analytical tests confirmed the fluid in the drum to be 75% Aroclor 1260, a common PCB used in transformers, and PCB-contaminated soil beneath the drum at 7 parts per million (ppm). Nortech revisited the site in October of 2004 to characterize this release and to estimate the cost of remediation. Nortech took nine surface, two subsurface, and three water samples for analytical testing. In addition, Nortech cut up the contaminated wood from the deck and placed it in a plastic bag which was left on site and posted fence and warning signs around the area of concern. Nortech's site map, sampling locations, and screening data were used as the starting point for determining location, size, and sampling plan for the contaminated area. Noertech's report concluded that the contamination would be within a shape of an approximate 10 foot radius and 4-5 feet deep. The properties of PCBs being insoluble and tend to adhere to surface soil, indicated that the depth of the contamination would be fairly shallow.

1.4 2005 Remediation Objectives

The remediation objective for this project was to remove and properly dispose of PCB-contaminated soil that was equal to or greater than 1 ppm (mg/kg), and to dispose of the previously-bagged contaminated wood. The clean up standard set forth by Table A1 of 18 AAC 75.341 for PCB in soil is 1 ppm.


N
HEALY HAUL ROAD
HEALY CREEK
METAL BRIDGE
MAIN CONVEYOR
Site P
SITE A
SITE B
SITE C
SITE F
SITE H
SITE J
SITE L
SITE M
DETAIL (1)
DETAIL (2)
DETAIL (3)
DETAIL (4)
DETAIL (5)
DETAIL (6)
DETAIL (7)
Grizzly Water Seep
Surface Water Flow Path; August 2001
OLD CULVERT
STAGING AREA
clarus
Site Drawing
Suntrana Tipple PCB Cleanup Report, Healy, Alaska, October 2005
Figure 2
Note: This figure is not to scale. It has been modified from Nortech's Figure 3, Site Characterization Report, May 3, 2005.

2.0 PROJECT OBJECTIVES

2.1 Project Responsibilities

Clarus was responsible for sampling, screening, and directing excavation to successfully remove contaminated soils above 1 ppm PCB. Clarus was also responsible for segregating the contaminated soil as 1 – 49 ppm or greater than 49 ppm for proper disposal. Brice was responsible for equipment and operators to remove and containerize soil. Clarus was responsible for collecting samples to be analyzed at the laboratory for confirmation of PCB level to accompany shipment of contaminated soil supersacks to final treatment/landfill facility. SGS Environmental Services was responsible for laboratory analysis. Clarus was responsible for confirmation screening of soil left in the ground to confirm it was less than 1 ppm before backfilling. Brice was responsible for backfilling with clean soil to complete remediation. Emerald Alaska Inc. was responsible for transportation of contaminated soil and delivering it to final disposal sites.

2.2 Field Screening and Equipment Protocols

Field screening was accomplished using a Strategic Diagnostic Inc. (SDI) PCB 12T Soil Test Kit. SDI's test kit is an immunoassay-designed kit that returns data in 1 to 2 hours with detection levels from 0.5 to 500 ppm.

Field sampling involved collecting a sample, methanol extraction, serial dilutions, and placement into an antibody-coated test tube where it competes with conjugate and photo-active substrates for binding sites to produce a PCB concentration-specific color. This color is compared to a known standard of identical dilution and treatment with a differential photometer. The standards and customized dilution series were created by SDI for the client-specific action levels of one and 50 parts per million. The action level of 1 ppm for soil removal involved a single dilution, whereas the 50 ppm determination for disposal classification required three dilutions; 1ppm to 10 ppm to 50 ppm. If the photometer had a positive reading, it indicated that the sample had more color than the standard, and therefore possessed a lower PCB concentration. Conversely, if the value was zero or negative, the sample contains the same or more PCB than the standard. Therefore, if the sample was diluted three times, as stated above, and has the same or less color than the 1 ppm standard, it is contains 50 ppm or greater PCB concentration.

The balance used to weigh out 10 grams of soil to start the screening analysis came with a 200 gram calibration weight and was checked and recalibrated, if necessary, before every run of samples. Two standards were prepared for every run of samples to compare to each other in the differential photometer to insure reproducibility and perform internal calibration within quality control limits of the photometer (± 0.03). The standards were switched between the two wells in the photometer until stabilized at a reading closest to zero. Once this occurs, the standard in the right well is discarded and samples are evaluated in comparison to the standard in the left well. Specific results for this procedure are presented in Appendix B.

Soil was sampled using stainless steel spoons and placed into plastic bowls. Both spoons and bowls were disposed of after a single use. For the surface samples, a shovel was used to get to a

depth below redeposited sand from recent floodwaters. This was the only instrument that was reused and it was decontaminated after each use using water, detergent, and a brush. During sampling, observations were noted for odor, depth below ground surface (bgs), type of soil (sand, clay, sand and clay, etc.), and any other observations. Sample sites were measured and marked with flags at each depth. Sample IDs and observations were written on sample bowls at the time the sample was taken from ground.

2.3 Excavated Soil Contamination Classification

Soil was screened and classified into one of three categories:

Negative: Soil screened at less than 1 ppm. These samples would have a positive reading against the standard at the 1 ppm dilution level.

Contaminated 1-49 ppm: Soil screened over 1 ppm but below 50 ppm. These samples would have a zero or negative reading against the standard at the 1 ppm dilution level, but a positive reading at the 50 ppm dilution level.

Contaminated over 50 ppm: Soil screened at grater than 50 ppm. These samples would have a zero or negative reading against the standard at both the 1 and 50 ppm dilution levels.

Soil classified as "contaminated" was dug from the ground and placed directly into supersacks marked with contamination classification (1- 49 ppm/ Over 50 ppm) and sequential number. For example, the first sack of 1- 49 ppm PCB was labeled "#1, 1- 49" and the first sack of over 50 ppm PCB was labeled "#1, over 50".

In addition to the soil, there were small amounts of other contaminated debris. The debris consisted of mostly wood, some plastic, and a piece of cable. Not having the equipment to "wipe test" or test the surface of these materials, all pieces suspected of contamination were considered "contaminated over 50 ppm." Emerald Services was contacted and the waste profile for disposal purposes was changed to include 5-10% debris. All debris was disposed of with the soil, in the supersacks. The contaminated debris volume was estimated to be three cubic yards.

2.4 Laboratory Analytical Tests

Laboratory analytical samples were gathered at a rate of one per every 10 cubic yards of PCB contaminated soil for classification for disposal. Samples were collected in 4 oz. amber glass jars with Teflon coated lids. The approved preservation instructions for PCB analytical sampling is to keep at 4 degrees Celsius during a hold time of no more than 14 days. The first sample was acquired on August 28th and all samples were iced and delivered on September 1st to be analyzed by method 8082 for PCB. Analytical results correlated well with the screening results. Analytical results are shown in Appendix C.

3.0 FIELD ACTIVITIES

The design of the sampling grid was taken from The Environmental Protection Agency (EPA)'s "Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup", May 1986, EPA-560/5-85-017. This design uses a known radius of a spill to layout sampling points of equidistance in a grid to verify a site that has been remediated. Using statistical results, this design maximizes the probability of finding PCB contaminated soil above the action level. EPA recommends a 19 point grid for spills similar in size to that of Site P, estimated to have an 11 ft. radius. Figure 3 shows the initial 19 point grid and the equations used to determine distance between the points of the equilateral layout.

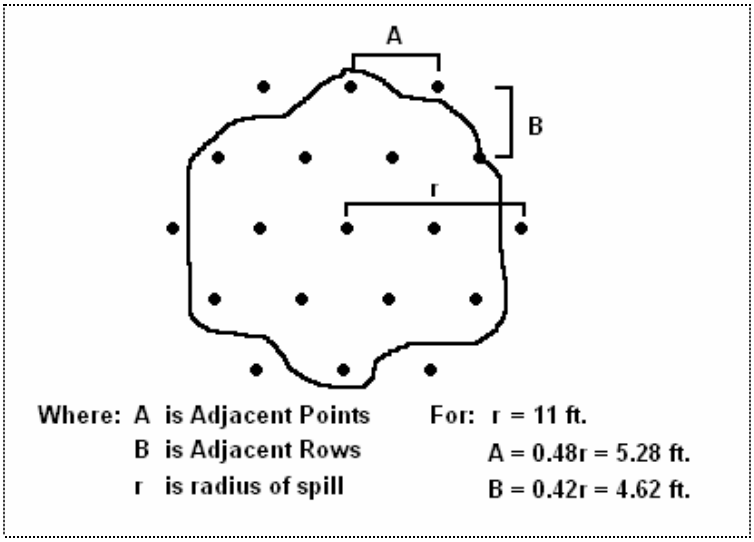


Figure 3 - Construction of Sampling Grid Points

All sampling was done on this grid pattern in the X and Y plane with the exception of one background sample (Sample # BKG) taken 25 ft. to the north, and one sample (Sample # 0827-26) taken 10 ft. to the west. Sample 0827-26 was taken after original 19 samples to see if sands washed downgradiant to the west carried with it a measurable concentration of PCB.

Positioning of the 19 point sampling grid was accomplished by using Nortech's previous sampling markers (a few of which were still present) and the previous laboratory analyses. The epicenter of the release was estimated from measurements and the center point of the new sampling grid was established. To encompass the surface contamination after the first 19 samples were screened, the original grid was expanded to the northwest. This was accomplished by measuring from the original grid and creating more points in the same equilateral pattern.

After the surface contamination was determined, 12 inches of soil was removed and placed into super sacks. The next set of samples was taken at the same X and Y coordinates 12 inches bgs. These samples retained their original sample number and a suffix was attached indicating the depth bgs. Therefore, Sample # 0830-09-24 was taken on August 30th, at 09 original X, Y coordinate, and 24 inches below grade surface.

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4.0 SCREENING, ANALYSIS, AND QUALITY CONTROL SUMMARY

4.1 Screening Results

The following table represents the results of field screening for sample points where PCB concentrations were greater than one ppm. Complete screening results are presented in Appendix C.

Table 1 - PBC-Containing Sample Points

	PCB concentration (ppm)		
Sample ID	**<1**	**1-49**	**>50**
0826-07-05		✓	
0829-07-12	✓		
0826-08-05		✓	
0829-08-12			✓
0830-08-24	✓		
0826-09-05		✓	
0829-09-12			✓
0830-09-24		✓	
0831-09-36	✓		
0827-22-00	✓		
0830-22-12		✓	
0830-22-24		✓	
0831-22-36	✓		
0826-13-05		✓	
0830-13-12			✓
0830-13-24			✓
0831-13-36	✓		
0831-13-48	✓		
0828-28-06		✓	
0830-28-12	✓		
0827-23-04		✓	
0830-23-12		✓	
0830-23-24	✓		
0827-17-05		✓	
0830-17-12		✓	
0830-17-24		✓	
0831-17-36	✓		
0828-29-06		✓	
0830-29-12	✓		
0827-24-03		✓	
0830-24-12	✓		
0830-24-24		✓	
0831-24-36	✓		

Table 1 - PBC-Containing Sample Points

	PCB concentration (ppm)		
Sample ID	**<1**	**1-49**	**>50**
0827-25-03		✓	
0830-25-12		✓	
0830-25-24		✓	
0831-25-36	✓		
0827-30-08		✓	
0830-30-12		✓	
0830-30-24	✓		
0827-31-06		✓	
0830-31-12	✓		

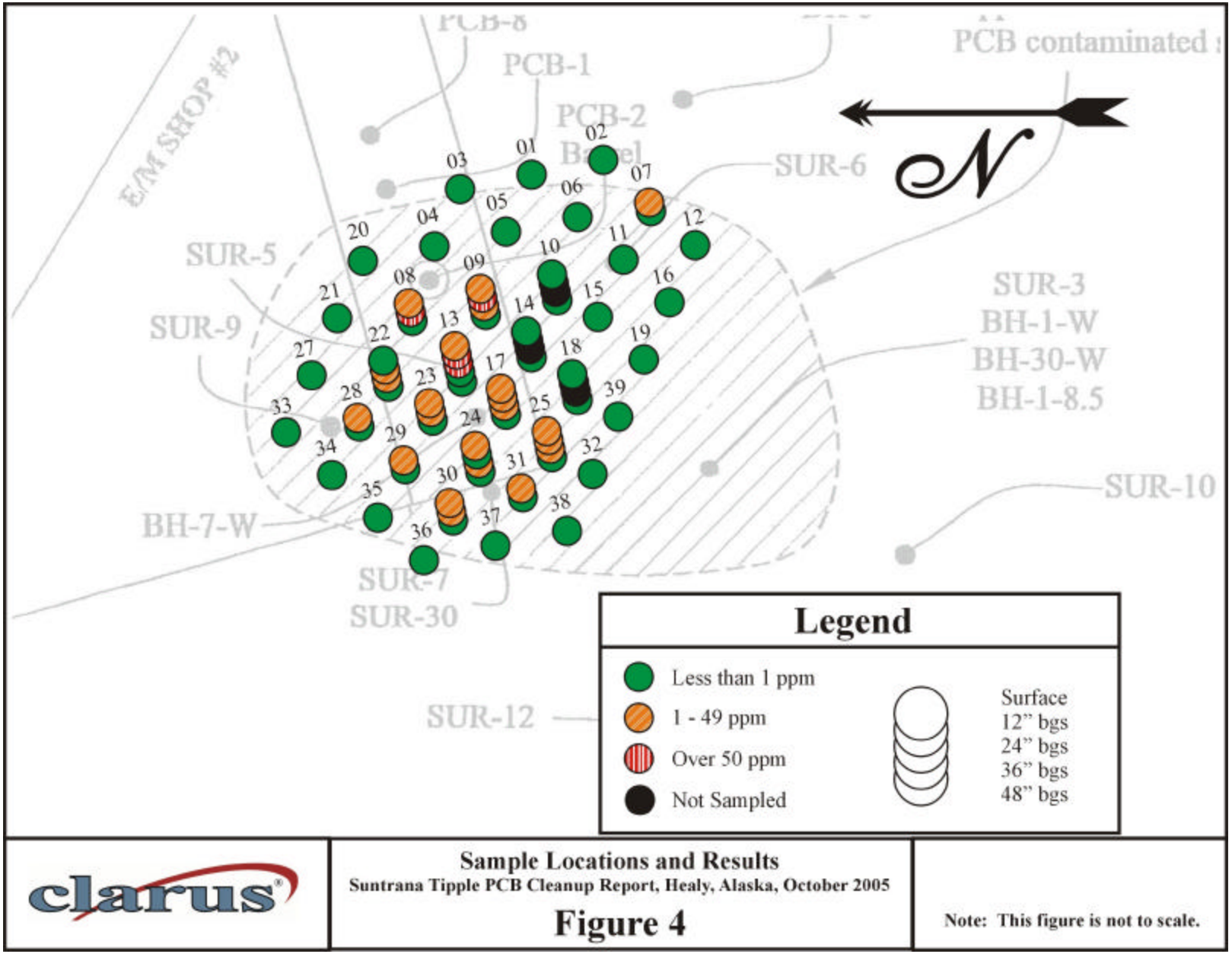
4.2 Screening Summary

Raw data is presented in Appendix C and includes sampling observations and values obtained from on site analyses.

Figure 4 delivers the conceptual result of contaminated soil and related depths. The figure shows an approximation of the sampling grid location and relates it to Nortech's characterization made in October of 2004. The faint map in the background is the map produced by Nortech and shows sampling points in addition to the electrical/mechanical shop that had been removed prior to screening in August of 2005. The sample numbers are shown above with concentration classifications for sampling locations at respective depths.

4.3 Confirmation Screening

Field screening determined that soils were negative (less than 1 ppm) for PCB at 36" bgs. Seven confirmation samples were run for the following reasons. Five samples were re-run from original soil after a drying period to insure water weight was not diluting the true PCB concentration. Samples were taken from the southern side at 36 inches where the surface had returned negative results to verify that the spill did not "pyramid" out at an angle (confirmation samples # 10, 14, and 18). Finally, a sample was collected at 48" bgs underneath sample #0831-13-36, where the concentration recorded the highest, to demonstrate that the PCB contamination did not penetrate deeper into the soil leaving behind a layer that was below cleanup levels, but be above cleanup levels a greater depth. All confirmation results came back negative for PCB revealing that the PCB concentration remaining in the ground is less than 1 ppm. Sampling #s 22 and 24 were the only points where digging was not ceased after a clean sample. Due to having adjacent contaminated samples on opposite sides, they were dug to 24" bgs and resampled. They then screened clean at 36" bgs consistent with adjacent sampling sites.


PCB-8
PCB-1
PCB-2
PCB contaminated
E/M SHOP #2
SUR-6
SUR-5
SUR-9
SUR-3
BH-1-W
BH-30-W
BH-1-8.5
SUR-10
BH-7-W
SUR-7
SUR-30
SUR-12
01
02
03
04
05
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20
21
22
23
24
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29
30
31
32
33
34
35
36
37
38
39
Legend
Less than 1 ppm
1 - 49 ppm
Over 50 ppm
Not Sampled
Surface
12" bgs
24" bgs
36" bgs
48" bgs
clarus
Sample Locations and Results
Suntrana Tipple PCB Cleanup Report, Healy, Alaska, October 2005
Figure 4
Note: This figure is not to scale.

4.4 Analytical Laboratory Results for Disposal Classification

Soil was segregated as less than 1, 1 – 50, and greater than 50 ppm PCBs based on the screening results. Laboratory samples were taken every ten yards of soil.

Table 2. - Analytical Sample Results

Sample ID	Analytical Result (mg/kg Aroclor – 1260)	Screening Result (ppm)
Sack #10, 1 - 50	11.900	1 – 49
Sack #20, 1 - 50	2.420	1 – 49
Sack #30, 1 - 50	6.100	1 – 49
Sack #38, 1 - 50	22.400	1 – 49
Sack #1, 50	785.000	> 50
Sack #10, 50	2,610.000	> 50
Sack #15, 50	221.000	> 50

Notes: Analytical data was reported in ppb. Results were converted to ppm to compare to screen results which have been discussed in ppm.

All samples were collected into a 4 ounce (oz.) amber jar with Teflon coated lid using a disposable glove. Samples were put on ice immediately and under supervision of the sampler who personally delivered them to SGS Environmental Laboratory (SGS). Samples were held less than six days and arrived at SGS with a cooler temp of 2.7 degrees Celsius. SGS used EPA approved method 8082 to determine the concentration of PCB samples. Sample results are included as Appendix D.

4.5 Quality Control Measures and Summary

4.5.1 Field Quality Control Measures

Precision can be calculated by results from matrix spike and matrix spike duplicates, laboratory duplicates, and field duplicate analyses. For this site the field duplicates will be used to determine the relative percent difference (RPD) between the pair of analyses. This is a measure of analytical precision and can be calculated as follows:

$$RPD = \frac{(C_1 - C_2) \times 100\%}{(C_1 + C_2)/2}$$

Where: RPD = relative percent difference
C_1 = larger of the two observed values
C_2 = smaller of the two observed values

Acceptable RPD values were not set forth by the project manager, however, EPA and ADEC typically use 40% for single compound of interest. Duplicate samples were screened at a rate of at least one per ten samples. Table 3 shows duplicate pairs and results.

Table 3 - Quality Control Sample Results

Sample pair	Depth (inches)	Odor	Material	1 ppm Value	RPD (%)	50 ppm Value	RPD (%)
09	5	N	S	0.16		0.21	
09D	5	N	S	-0.11	1080	0.20	4.88
18	5	0	S	0.13		0.14	
18D	5	0	SC	0.13	0.00	0.22	44.44
29	6	N	S	-0.12		0.34	
29D	6	N	S	0.09	1400	0.53	43.68
37	5	0	S	0.20		-	
37D	5	0	S	0.19	5.13	-	
23	12	S	S	-0.19		0.27	
23D	12	S	S	0.02	247.06	0.39	36.36
13	24	S	SC	-0.12		-0.14	
13D	24	S	SC	-0.15	22.22	-0.04	111.11
17	36	0	SC	0.21		-	
17D	36	0	SC	0.25	17.39	-	

"1 ppm Value" is the reading from the differential photometer.
"Odor" legend: N = no odor, O = odor, S = strong odor.
"Material" legend: S = sand, SC = sandy clay.

A new sample from point # 17 was collected directly into a plastic weigh boat provided by SDI. This was to insure that the different type of plastic bowls were not absorbing PCBs and lowering the effective concentration in the soil that is tested. The RPD between 17-36B (out of the weigh boat) and 17-36 was 28.5%, and the RPD with the 17D-36 (duplicate) was 38.3%.

4.5.2 Calculation of Data Quality Indicators

Completeness is a data quality relation between the number of possible data points to valid data points. A 100% completeness was achieved due to every data point being valid.

4.5.3 Quality Control Summary

The value returned from the differential photometer has enough uncertainty that it is not linear with concentration. The screen is semi quantitative and calibrated to favor false positives over false negatives to adjust for this shortcoming. Out of 12 RPD values 2 were high and 2 were extremely high. This leaves 4 of 10 within acceptable parameters, and 2 right near the proposed goal of 40% RPD.

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5.0 CONCLUSIONS

Continual screening, a solid sampling layout, steady stream of quality data, and confirmation samples demonstrated that all soil contaminated over 1 ppm has been removed from Site P at the Suntrana Tipple abandoned coal facility. Furthermore, laboratory analytical data verified the accuracy of the PCB 12T Soil Test Kit and the method for screening soils at this site.

The previously-removed wood was assumed to be contaminated at levels greater than 49 ppm, and was packaged, shipped and disposed with the greater than 49 ppm soil.

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6.0 LIMITATIONS

All method, screening, assessment, safety, and sampling procedures were executed in a manner consistent with professional environmental practices accepted industry-wide. The existence of limitations is, however, inevitable. Clarus Environmental Services made assessments, recommendations, and decisions in real-time during this project and constructed this report based on that experience. It is important to understand that time, weather, human activities, and other natural processes can significantly change the appearance and characteristics of this site should conclusions by Clarus be used for future investigations.

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7.0 REFERENCES

Nortech. *Corrective Action and Site Characterization Report, Suntrana Tipple Remediation,* May 3, 2005.

ADEC. 2000. *Oil and Other Hazardous Substances Pollution Control Regulations 18AAC75, Articles 3 and 9*. Contaminated Sites Remediation Program

EPA. *Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup*, May 1986, EPA-560/5-85-017.

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Appendix A
Photographic Log

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Photo 1. Area of contamination upon arrival.

Photo 2. Lab setting where samples were screened.

Photo 3. Inclusive contaminated area dug to 12 inches bgs.

Photo 4. Inclusive contaminated area dug to 24 inches bgs.

Photo 5. Inclusive contaminated area dug to 36 inches bgs.

Photo 6. Loading supersacks with contaminated soil directly out of the ground. Notice conveyor structure in background. Bearing of picture is nearly due east.

Photo 7. Differential spectrophotometer containing standards for calibration.

Photo 8. Example of color-dependent concentration. The duplicates "0831-17 (and 17D)-36" have similar color whereas the standard, "STD 27" at 1ppm, is lighter. This shows the duplicate pair to contain **less** PCB than the 1 ppm standard.

Appendix B -
Information from Standards

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SDI PCB 12T Soil Test Kit Standard Information		
# used	# not used	Difference
2	1	0.02
3	4	-0.01
5	6	-0.01
7	8	0.03
10	9	0.01
12	11	0.01
14	13	0.01
15	16	0.02
17	18	-0.01
19	20	0.03
22	21	0
23	24	-0.01
27	28	0
29	30	0

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Appendix C -
Field Data/Observations

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Sample ID					Value				
Date	- # -	Depth (in.)	Odor	Material	1 ppm	Re-run	50 ppm	Re-Run	Notes
0826	01	5	0	S	0.27		0.31		
0826	02	5	0	S	0.19		0.20		
0826	03	5	0	SC	0.14		0.29		
0826	04	5	0	C	0.25		0.21		
0826	05	5	0	S	0.09		0.24		
0826	06	5	N	S	0.12		0.13		
0826	07	5	N	SC	-0.01		0.12		
0826	08	5	N	S	0.00		0.17		
0826	09	5	N	S	0.16		0.21		
0826	09D	5	N	S	-0.11	-0.10	0.20		
0826	10	5	0	S	0.18		0.22		
0826	11	5	N	S	0.25		0.23		
0826	12	5	N	SC	0.19		0.22		
0826	13	5	N	SC	-0.11		0.18		
0826	14	5	N	S	0.04		0.21		
0826	15	5	0	SC	0.09		0.11		
0826	16	5	0	SC	0.13		0.16		
0826	17	5	0	SC	-0.09		0.16		
0826	18	5	0	S	0.13		0.14		
0826	18D	5	0	SC	0.13		0.22		
0826	19	5	0	SC	0.32		0.35		
0826	BKG	5	0	S	0.25		0.30		
0827	20	4	0	S	0.45		-		
0827	21	4	0	SC	0.40		-		
0827	22	4	0	S	0.31		-		
0827	23A	2	0	SC	0.22		-		
0827	23B	4	0	C	-0.19		0.02		Organics
0827	24	3	0	C	-0.03		0.25		Organics
0827	25	3	0	SC	-0.01		0.07		
0827	26	1	0	S	0.28		-		
0828	27	6	0	SC	0.14		-		Organics
0828	28	6	0	C	-0.19		0.37		Organics
0828	29	6	N	S	-0.12		0.34		
0828	29D	6	N	S	0.09		0.53		
0828	30	8	N	S	-0.16		0.42		Organics
0828	31	6	0	S	-0.22		0.28		Organics
0828	32	10	N	S	0.40		-		
0829	33	3	0	SC	0.29		-		
0829	34	3	0	C	0.19		-		Very fine, wet clay
0829	35	4	S	S	0.22		-		
0829	36	5	0	S	0.13		-		
0829	37	5	0	S	0.20		-		
0829	37D	5	0	S	0.19		-		
0829	38	3	0	S	0.11		-		
0829	39	5	0	S	0.35		-		

Sample ID					Value				
Date	- # -	Depth (in.)	Odor	Material	1 ppm	Re-run	50 ppm	Re-Run	Notes
0829	07	12	S	S	0.08		-		Strong smell of mold
0829	08	12	S	SC	-0.20		-0.20		
0829	09	12	S	SC	-0.19		-0.20		
0830	22	12	S	SC	-0.02		0.42		
0830	13	12	S	S	-0.20		-0.20		
0830	28	12	N	S	0.30		0.50		
0830	23	12	S	S	-0.19		0.27		
0830	17	12	N	S	-0.12		0.38		
0830	29	12	0	S	0.22		0.41		
0830	24	12	N	SC	0.17		0.51		
0830	25	12	S	SC	-0.21		0.03		
0830	30	12	N	SC	-0.20		0.28		
0830	31	12	S	SC	0.07		-		
0830	23D	12	S	S	0.02		0.39		
0830	08	24	N	SC	0.09		-		
0830	09	24	S	SC	-0.12		0.19		Coal
0830	22	24	N	S	0.00		0.24		
0830	13	24	S	SC	-0.12		-0.14		
0830	13D	24	S	SC	-0.15		-0.04		
0830	23	24	0	SC	0.15		-		
0830	17	24	N	S	-0.15		0.15		Coal
0830	24	24	N	S	-0.03		0.30		Coal
0830	25	24	N	S	-0.17		0.07		Coal
0830	30	24	0	S	0.26		-		
0831	09	36	0	SC	0.33	0.31	-		Coal
0831	22	36	N	SC	0.29		-		
0831	13	36	S	SC	0.19	0.15	-		Coal
0831	17	36	0	SC	0.21		-		Coal
0831	24	36	0	SC	0.19		-		
0831	25	36	0	SC	0.17		-		Coal
0831	10	36	N	SC	0.18	0.14	-		Coal
0831	17D	36	0	SC	0.25		-		Coal
0831	14	36	0	SC	0.19	0.21	-		Coal
0831	18	36	N	SC	0.26	0.21	-		Coal
0831	13	48	N	SC	0.33				
0831	17B	36	0	SC	0.28				

Notes: "1 ppm Value" is the reading from the differential photometer at the 1 ppm dilution. "50 ppm Value" is the reading from the differential photometer at the 50 ppm dilution. "Odor" legend: N = no odor, O = odor, S = strong odor. "Material" legend: S = sand, SC = sandy clay.

Appendix D -
Analytical Data from SGS Environmental

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