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*\*\*Transmitted electronically\*\**

April 21, 2008

Mr. Randy Nattis  
On-Scene Coordinator  
U.S. Environmental Protection Agency  
61 Forsyth Street, SW 11<sup>th</sup> Floor  
Atlanta, Georgia 30303

**Subject: CLP Soil Sample Data Summary, Revision 1**  
**Columbia Organic Chemical Removal Action**  
**EPA ID No. SCD003343571**  
**EPA Contract No. EP-W-06-072**  
**Technical Direction Document (TDD) No. TO-4006-0006**  
**Document Control No.: RST-2-02-F-0512**

Dear Mr. Nattis:

Weston Solutions, Inc., under the Removal Support Team – 2 (RST-2) contract is submitting this electronic draft copy of the site soil sample data evaluation relative to the EPA Region 9 Preliminary Remediation Goals for residential soil for the Columbia Organic Chemical Removal Action in Columbia, Richland County, South Carolina.

Please contact me at (770) 325-7946 if you have any questions or comments regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read "P. I. Taylor", is written over a light blue horizontal line.

Paul I. Taylor  
RST-2 Project Manager  
Weston Solutions, Inc.

Enclosure

cc: Katrina Jones, EPA Project Officer  
Greg Harper, Region IV Removal Coordinator  
RST-2 File



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**Revision 1**  
**Columbia Organic Chemical Removal Action**  
**CLP Soil Sample Data Summary**

On February 7, 2008, Removal Support Team – 2 (RST-2) collected three soil samples and three field quality control (QC) samples from the Columbia Organic Chemical Company site in Columbia, Richland County, South Carolina. The three selected sample locations exhibited evidence of staining or other contamination from exposed and broken bottles or other containers unearthed during site excavation activities. Sample Grid 6A was collected from within the partially unearthed plastic bucket in Grid Square No. 6. The soil collected for this sample featured the dark green stain present in surrounding areas of the excavation. This sample was also designated as the matrix spike/matrix spike duplicate (MS/MSD) QC sample for the site sample set. Soil sample Grid 10A was collected from one of four broken bottle locations within excavated Grid Square No. 10. This location featured a dark, oily smear within the soil among abundant shards of glass and other debris. Another soil sample, Grid 15A, was collected from an area of broken glass bottles unearthed within Grid Square No. 15. This is the area that yielded a strong odor upon discovery during excavation and prompted a brief halt in site activities until proper air monitoring equipment was acquired. The soil at this location contained abundant glass shard debris, dark green staining, and dark, rust-colored caked material. The field duplicate QC sample, identified as Grid 26A, was collected from this location. In addition, RST-2 included one equipment rinsate blank and one soil trip blank sample with the site sample group. The samples were analyzed for the contract laboratory program (CLP) target compound list (TCL) volatile organic compounds, TCL semivolatile organic compounds, TCL organochlorine pesticides, TCL polychlorinated biphenyls (PCBs), target analyte list (TAL) metals, and cyanide.

**Volatile Organics Compounds**

Several volatile organic compounds were detected in site soil samples Grid 10A, Grid 15A, and Grid 26A. Their concentrations; however, were below the EPA Region 9 Preliminary Remediation Goals (PRGs) for residential soil.

In addition, cyclohexane was detected within the field QC equipment rinsate sample. This compound, however, was not detected in any of the site soil samples.

### **Semivolatile Organic Compounds**

Hexachlorobenzene (HCB) exceeded the EPA Region 9 PRG for residential soil of 300 micrograms per kilogram ( $\mu\text{g/kg}$ ) in soil samples Grid 6A (at 4,000  $\mu\text{g/kg}$ ) and Grid 15A (at 320 J  $\mu\text{g/kg}$ ). During the site removal assessment activities in December 2006, an elevated concentration of HCB was also detected in the surface soil sample for Grid Square No. 15, at 14,000  $\mu\text{g/kg}$ .

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene were not detected within site soil samples. The laboratory method detection limits (MDLs) for these compounds; however, were above their EPA Region 9 PRG values. These reported MDLs have been highlighted yellow in the attached Table 2.

### **Pesticides**

Organochlorine pesticide compounds 4,4'-DDE and 4,4'-DDT showed elevated concentrations exceeding their EPA Region 9 PRGs for residential soil values (1,700  $\mu\text{g/kg}$  and 1,700 $\mu\text{g/kg}$ , respectively) for soil sample Grid 10A at 2,300  $\mu\text{g/kg}$  4,4'-DDE and 2,800  $\mu\text{g/kg}$  4,4'-DDT.

While aldrin was not detected within soil sample Grid 15A, the duplicate soil sample, Grid-26A, showed aldrin at an elevated concentration of 130 J $\mu\text{g/kg}$ . This concentration exceeded the EPA Region 9 PRG for residential soil of 29 $\mu\text{g/kg}$ .

Dieldrin exceeded the EPA Region 9 PRG for residential soil of 30  $\mu\text{g/kg}$  in three of the four soil samples: soil sample Grid 10A at 140  $\mu\text{g/kg}$ , soil sample Grid 15A at 380 J  $\mu\text{g/kg}$ , and soil sample Grid 26A at 280 J  $\mu\text{g/kg}$ .

Heptachlor epoxide and toxaphene were not detected within site soil samples except sample Grid 6A with 1.90 J  $\mu\text{g/kg}$  heptachlor epoxide. The laboratory MDLs for these compounds; however, were above their EPA Region 9 PRG values. These reported MDLs have been highlighted yellow in the attached Table 3.

### **PCBs**

No PCBs were detected in any of the site soil samples.

### **TAL Metals & Cyanide**

Antimony exceeded the EPA Region 9 PRG for residential soil of 31 milligrams per kilogram ( $\text{mg/kg}$ ) in two soil samples: sample Grid 6A at 120 J  $\text{mg/kg}$  and sample Grid 10A at 350 J  $\text{mg/kg}$ . During the site removal assessment activities in December 2006, elevated concentrations of antimony were also reported for site soil samples collected from Grid Squares Nos. 3, 4, and 5.

Arsenic exceeded the EPA Region 9 PRG for residential soil of 0.39 mg/kg in all four soil samples; however, the expected naturally occurring arsenic concentration levels for this area range from 0.1 to 8.5 mg/kg. Only soil sample Grid 10A showed arsenic reported at a concentration above this background concentration at 32 mg/kg.

Copper and iron concentrations in soil sample Grid 10A (at 3,400 mg/kg copper and 110,000 J mg/kg iron) also exceeded the EPA Region 9 PRGs for residential soil with copper PRG at 3,100 mg/kg and iron PRG at 23,000 mg/kg. In addition, while soil sample Grid 15A showed iron concentration within the Region 9 PRG for residential soil value of 16,000 mg/kg, the duplicate sample, identified as Grid 26A, also showed an iron concentration above the PRG at 24,000 mg/kg.

Lead exceeded the EPA Region 9 PRG for residential soil of 400 mg/kg in soil sample Grid 10A at 730 mg/kg.

A summary of the soil sample data is presented in the following Tables 1, 2, 3, and 4.

**TABLE 1**  
**SUMMARY OF VOLATILE ORGANIC CHEMICALS**  
**SOIL SAMPLE DATA**

COLUMBIA ORGANIC CHEMICAL COMPANY  
COLUMBIA, RICHLAND COUNTY, SOUTH CAROLINA

Compound	EPA Region 9 Residential Soil PRGs	Grid 6A	Grid 10A	Grid 15A	Grid 26A *
<b>Volatile Organics (VOA) (µg/kg)</b>					
(m- and/or p-) Xylene	270,000 <sup>a</sup>	4.9 U	12 U	<b>12</b>	<b>2.0 J</b>
1,2,4-Trichlorobenzene	62,000	4.9 U	12 UJ-	6.7 UJ-	<b>19 J-</b>
Bromodichloromethane	820	4.9 U	12 U	<b>4.6 J</b>	<b>1.2 J</b>
Bromoform	62,000	4.9 U	12 U	<b>4.2 J</b>	5.0 U
Dibromochloromethane	1,100	4.9 U	12 U	<b>39</b>	<b>8.5</b>
Ethyl Benzene	400,000	4.9 U	12 U	<b>4.4 J</b>	5.0 U
o-Xylene	270,000 <sup>a</sup>	4.9 U	12 U	<b>14</b>	<b>3.1 J</b>
Tetrachloroethene (PCE)	480	4.9 U	<b>11 J</b>	<b>33</b>	<b>14</b>
Toluene	520,000	4.9 U	12 U	<b>15</b>	<b>3.5 J</b>
Trichloroethene (TCE)	53	4.9 U	12 U	<b>26</b>	<b>12</b>

**Notes:**

PRG = Preliminary Remediation Goal

\* = Duplicate sample of Grid 15A

µg/kg = Microgram per kilogram

a = Total xylenes

U = Constituent was undetected at or above the reporting limit.

Bold = Value highlighted in bold is a concentration above the reporting limit.

J = Estimated value based on QC data; bias cannot be determined

UJ- = Constituent was undetected at or above the reporting limit; estimated value based on QC data is biased low.

J- = Estimated value based on QC data; biased low

**TABLE 2**  
**SUMMARY OF SEMI VOLATILE ORGANIC CHEMICALS**  
**SOIL SAMPLE DATA**

**COLUMBIA ORGANIC CHEMICAL COMPANY**  
**COLUMBIA, RICHLAND COUNTY, SOUTH CAROLINA**

Compound	EPA Region 9 Residential Soil PRGs	Grid 6A	Grid 10A	Grid 15A	Grid 26A*
<b>Semi Volatile Organics (SVOA) (µg/kg)</b>					
1,2,4,5-Tetrachlorobenzene	18,000	380 U	330 U	<b>3,200</b>	<b>1,600</b>
2,4,5-Trichlorophenol	6,100,000	380 U	330 U	710 U	<b>110 J</b>
2,4,6-Trichlorophenol	6,100	380 U	330 U	<b>2,200</b>	<b>590</b>
Benzo(a)anthracene	620	380 U	330 UJ-	710 UJ-	590 U
Benzo(a)pyrene	62	380 U	330 UJ-	710 UJ-	590 U
Benzo(b)flouranthene	620	380 U	330 UJ-	710 UJ-	590 U
Dibenzo(a,h)anthracene	62	380 U	330 UJ-	710 UJ-	590 U
Hexachlorobenzene (HCB)	300	<b>4,000</b>	330 U	<b>320 J</b>	<b>200 J</b>
Hexachlorobutadiene	6,200	380 U	330 U	<b>240 J</b>	590 U
Hexachloroethane	35,000	380 U	330 U	<b>390 J</b>	590 U
Indeno(1,2,3-cd)pyrene	620	380 U	330 UJ-	710 UJ-	590 U

**Notes:**

PRG = Preliminary Remediation Goal

\* = Duplicate sample of Grid 15A

µg/kg = Microgram per kilogram

U = Constituent was undetected at or above the reporting limit.

Bold = Value highlighted in bold is a concentration above the reporting limit.

J = Estimated value based on QC data; bias cannot be determined.

UJ- = Constituent was undetected at or above the reporting limit; estimated value based on QC data, biased low.

Yellow Shading = Constituent was undetected at or above the reporting limit; however, the reporting limit was above the PRG.

Gray Shading = Constituent is elevated above the EPA Region 9 Residential Soil PRG.

TABLE 3  
SUMMARY OF ORGANOCHLORINE PESTICIDES  
SOIL SAMPLE DATA

COLUMBIA ORGANIC CHEMICAL COMPANY  
COLUMBIA, RICHLAND COUNTY, SOUTH CAROLINA

Compound	EPA Region 9 Residential Soil PRGs	Grid 6A	Grid 10A	Grid 15A	Grid 26A*
<b>Organochlorine Pesticides (µg/kg)</b>					
4,4'-DDD	2,400	3.7 U	<b>370</b>	<b>160 J</b>	75 U
4,4'-DDE	1,700	3.7 U	<b>2,300</b>	200 U	140 U
4,4'-DDT	1,700	3.9 U	<b>2,800</b>	<b>320 J</b>	190 U
Aldrin	29	2.2 U	<b>9.3 J</b>	12 U	<b>130 J</b>
alpha-BHC	90	2.5 U	16 U	12 U	74 U
alpha-Chlordane	NA	16 U	<b>1,100</b>	<b>560 J</b>	280 U
beta-BHC	320	2.4 U	16 U	140 U	98 U
delta-BHC	NA	1.9 U	16 U	810 U	<b>470 J</b>
Dieldrin	30	3.7 U	<b>140</b>	<b>380 J</b>	<b>280 J</b>
Endosulfan I (alpha)	NA	1.9 U	19 U	62 U	<b>99 J</b>
Endosulfan II (beta)	NA	3.7 U	18 U	<b>250 J</b>	71 U
Endosulfan Sulfate	NA	12 U	32 U	210 U	140 U
Endrin	18,000	3.7 U	<b>28 J</b>	280 U	290 U
Endrin aldehyde	NA	3.7 U	32 U	<b>320 J</b>	460 U
Endrin Ketone	NA	3.7 U	32 U	98 U	150 U
gamma-BHC (Lindane)	440	1.9 U	<b>7.6 J</b>	90 U	120 U
gamma-Chlordane	NA	<b>13</b>	<b>1,200</b>	<b>300 J</b>	<b>370 J</b>
Heptachlor	110	3.0 U	<b>9.7 J</b>	43 U	17 U
Heptachlor epoxide	53	<b>1.90 J</b>	80 U	310 U	100 U
Methoxychlor	310,000	<b>26</b>	160 U	310 U	110 U
Toxaphene	440	190 U	1600 U	1200 U	980 U

**Notes:**

PRG = Preliminary Remediation Goal

\* = Duplicate sample of Grid 15A

µg/kg = Microgram per kilogram

U = Constituent was undetected at or above the reporting limit.

Bold = Value highlighted in bold is a concentration above the reporting limit.

J = Estimated value based on QC data; bias cannot be determined.

Gray Shading = Constituent is elevated above the EPA Region 9 Residential Soil PRG.

NA = Not listed

Yellow Shading = Constituent was undetected at or above the reporting limit; however, the reporting limit was above the PRG.

**TABLE 4**  
**SUMMARY OF TARGET ANALYTE LIST METALS AND CYANIDE**  
**SOIL SAMPLE DATA**

**COLUMBIA ORGANIC CHEMICAL COMPANY**  
**COLUMBIA, RICHLAND COUNTY, SOUTH CAROLINA**

<b>Compound</b>	<b>EPA Region 9 Residential Soil PRGs</b>	<b>Grid 6A</b>	<b>Grid 10A</b>	<b>Grid 15A</b>	<b>Grid 26A*</b>
<b>TAL Metals (mg/kg)</b>					
Aluminum	76,000	<b>1,800</b>	<b>54,000</b>	<b>4,100</b>	<b>5,200</b>
Antimony	31	<b>120 J</b>	<b>350 J</b>	0.47 R	<b>0.56 J</b>
Arsenic	0.39	0.61 R	<b>32</b>	<b>4.1</b>	<b>5.0</b>
Barium	5,400	<b>8.2 J</b>	<b>330</b>	<b>39</b>	<b>22 J</b>
Beryllium	150	0.030 R	<b>0.64 J</b>	<b>0.050 J</b>	0.070 R
Cadmium	37	<b>0.21 J+</b>	<b>8.0 J+</b>	<b>1.8 J+</b>	<b>2.2 J+</b>
Calcium	NA	<b>160 J</b>	<b>21,000</b>	<b>120 J</b>	<b>160 J</b>
Chromium	210	<b>36 J+</b>	<b>91 J+</b>	<b>11 J+</b>	<b>15 J+</b>
Cobalt	900	<b>0.19 J</b>	<b>10</b>	<b>0.29 J</b>	<b>0.78 J</b>
Copper	3,100	<b>5.5</b>	<b>3,400</b>	<b>78</b>	<b>73</b>
Cyanide	1,200	<b>76 J</b>	5.0 UJ	<b>12 J</b>	<b>10 J</b>
Iron	23,000	<b>16,000 J</b>	<b>110,000 J</b>	<b>16,000 J</b>	<b>24,000 J</b>
Lead	400	<b>9.5 J-</b>	<b>730 J-</b>	<b>18 J-</b>	<b>32 J-</b>
Magnesium	NA	<b>25 J</b>	<b>760 J</b>	<b>33 J</b>	<b>39 J</b>
Manganese	1,800	<b>29 J</b>	<b>880 J</b>	<b>34 J</b>	<b>47 J</b>
Mercury	23	<b>0.46 J+</b>	<b>2.9 J+</b>	<b>2.7 J+</b>	<b>0.95 J+</b>
Nickel	1,600	<b>3.6 J</b>	<b>51</b>	<b>3.6 J</b>	<b>5.9</b>
Potassium	NA	<b>110 J</b>	<b>800 J</b>	<b>190 J</b>	<b>210 J</b>
Selenium	390	0.61 R	<b>2.7 J-</b>	<b>0.90 J-</b>	0.84 R
Silver	390	<b>0.86 J</b>	<b>35 J</b>	<b>1.0 J</b>	<b>0.69 J</b>
Sodium	NA	25 UJ	<b>900 J</b>	<b>48 J</b>	<b>64 J</b>
Thallium	5.2	0.24 UJ	5.0 U	0.60 UJ	0.80 UJ
Vanadium	78	<b>7.3</b>	<b>37</b>	<b>9.6</b>	<b>12</b>
Zinc	23,000	<b>120 J-</b>	<b>5,800 J-</b>	<b>32 J-</b>	<b>56 J-</b>

**Notes:**

PRG = Preliminary Remediation Goal

\* = Duplicate sample of Grid 15A

TAL = Target Analyte List

mg/kg = Milligram per kilogram

Bold = Value highlighted in bold is a concentration above the laboratory method detection limit.

Gray Shading = Constituent is elevated above the EPA Region 9 Residential Soil PRG.

J = Estimated value based on QC data; bias cannot be determined.

R = Rejected value based on QC data; analyte reported as potential false positive.

J+ = Estimated value based on QC data; biased high.

NA = Not listed

UJ = Constituent was undetected at or above the reporting limit; estimated value based on QC data, bias cannot be determined.

J- = Estimated value based on QC data; biased low

U = Constituent was undetected at or above the reporting limit.