

## APPENDIX G

### Former Toxaphene Tank Farm Interim Corrective Measure Work Plan and Addendum

(see separate file due to size)



Richard E. Dunn, Director

Land Protection Branch  
2 Martin Luther King, Jr. Drive  
Suite 1054, East Tower  
Atlanta, Georgia 30334  
404-657-8600

August 13, 2021

**Sent via email and USPS**

Mr. Tim Hassett  
Project Manager  
Hercules, LLC  
500 Hercules Road  
Wilmington, DE 19808-1599

Ms. Molly Matthews  
Director of Operations  
DRT America, Inc.  
2801 Cook Street  
Brunswick, Georgia 31520

RE: Addendum to Former Toxaphene Tank  
Farm Interim Corrective Measures Work  
Plan  
Hercules/Pinova - Brunswick Facility  
HW Facility Permit No. HW-52(D&S)  
EPA ID# GAD004065520

Dear Mr. Hassett and Ms. Matthews:

The Georgia Environmental Protection Division (EPD) has reviewed the *Addendum to Former Toxaphene Tank Farm Interim Corrective Measures Work Plan* dated August 11, 2021. No comments were noted during the review. Therefore, the addendum to the work plan is approved.

Please keep us informed as to when the field work is scheduled so that we may oversee the implementation. Should you have any questions, please contact Penny Gaynor at (470) 938 3364 or [Penny.Gaynor@dnr.ga.gov](mailto:Penny.Gaynor@dnr.ga.gov).

Sincerely,

*James Sliwinski*

James Sliwinski  
Unit Coordinator  
Remedial Sites Unit 3

File: Hercules, Brunswick 216-0060 (G)

11 August 2021

Ms. Penny Gaynor  
Hazardous Waste Corrective Action Program  
Land Protection Branch  
Georgia Environmental Protection Division  
2 Martin Luther King, Jr. Dr. SE  
Suite 1054, East Tower  
Atlanta, GA 30334

**Subject: Addendum to Former Toxaphene Tank Farm Interim Corrective Measures (ICM) Work Plan  
Hercules/Pinova Facility, Brunswick, Georgia  
Hazardous Waste Permit 52 (D&S)-2  
EPA ID No 0040655520**

Dear Ms. Gaynor:

Hercules LLC (“Hercules”) is in the process of implementing *in situ* solidification (“ISS”) as an interim corrective measure (“ICM”) to address impacted soils at the former toxaphene tank farm (“TTF”) present at an industrial facility located at 2801 Cook Street in Brunswick, Georgia (the “Brunswick facility”). The former TTF is located within an area designated as solid waste management unit no. 6 (“SWMU No. 6”) at the Brunswick facility. The ICM is being performed pursuant to a work plan titled *Revised Interim Corrective Measure Work Plan SWMU 6 – Former Toxaphene Tank Farm* (the “ICM Work Plan”) that Geosyntec Consultants, Inc. (“Geosyntec”) prepared on behalf of Hercules and that Hercules submitted to the Georgia Department of Natural Resources, Environmental Protection Division (“EPD”) on 9 October 2020. EPD approved the ICM Work Plan by letter dated October 22, 2020.

As presented in Section 1.3 of the ICM Work Plan, toxaphene-impacted surface soils that are located within SWMU No. 6 but outside of the area of the former TTF were proposed to be excavated and consolidated within the former TTF area for solidification with the soils in the former TTF. The projected extent of the soils to be excavated and consolidated in the former TTF area for treatment using ISS was shown on Figure 3 of the ICM Work Plan using soil sampling results and information available at the time of the submission of the ICM Work Plan. After submission of the ICM Work Plan, Geosyntec collected additional soil samples in SWMU No. 6 to delineate the extent of the proposed excavation areas. The purpose of this letter addendum to the ICM Work Plan is to provide EPD with the analytical results from the additional soil samples and to confirm the extent of soils

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within SWMU No. 6 that are proposed to be excavated and consolidated in the former TTF area for solidification.

Concurrent with the interim corrective measures being performed at the former TTF, Hercules initiated supplemental investigation activities at the Brunswick facility in April 2020 to delineate targeted areas to be addressed using interim corrective measures for sitewide soils. The removal management levels (“RMLs”) developed by the United States Environmental Protection Agency (“USEPA”) are being used as the preliminary action levels to identify potential target locations for the interim corrective measures for sitewide soils.<sup>1</sup> The USEPA RML for toxaphene in soils at industrial locations is 210 milligrams per kilogram (“mg/kg”). During the supplemental investigation activities, toxaphene was detected in soils above the RML in two general locations within SWMU No. 6. These locations are near the former TTF. Because the targeted areas are essentially co-located with the former TTF area within SWMU No. 6, they can be considered part of a single “area of contamination,” and the excavation, movement, and subsequent treatment of such soils within the former TTF (to the extent that they qualify as hazardous wastes) does not trigger permitting requirements, land disposal restrictions, or minimum technology requirements under the Area of Contamination Policy developed by USEPA (USEPA, 1996).

Following the initial delineation activities in April 2020 associated with addressing sitewide soils, Geosyntec collected additional soil samples from the unsaturated zone (above the groundwater table) on multiple occasions between September 2020 and May 2021 within SWMU No. 6. The sample locations are shown in **Figure 1**. As referenced above, there are two areas targeted for excavation; one larger area south of the former TTF and one smaller area west of the former TTF. The analytical results for toxaphene in soils for the area south of the former TTF are shown on **Table 1** and the analytical results for toxaphene in soils for the area west of the former TTF are shown on **Table 2**. In addition, the soil samples were analyzed for other analytes during the investigation activities consistent with the approach for the sitewide soils interim corrective measures as discussed with EPD. The summary of analytical results for these other analytes are shown on **Table 3**. These other analytes included polychlorinated biphenyls (“PCBs”) on an Aroclor-specific basis and various other organic and inorganic parameters. PCBs (Aroclor 1254) were detected in only one soil sample (soil sample SSD4-23, 0-2 feet below ground surface) at a concentration of 0.39 mg/kg, which is well below the corresponding RML for Aroclor 1254 of 44 mg/kg. Likewise, most of the other analytes were not

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<sup>1</sup> Hercules recognizes that the RMLs are preliminary targets for interim corrective measures for sitewide soils and that additional risk management/mitigation measures may be required to address sitewide soils. The planned excavation activities in SWMU No. 6 are designed to address soils as practicable within SWMU No. 6 in conjunction with implementation of ISS at the former TTF area.

detected and none were found at concentrations exceeded their respective RMLs. As the investigation activities progressed to assess the extent of toxaphene present in soils in the two target areas at concentrations above the corresponding RML, the soil samples were analyzed only for toxaphene because no other analytes had been detected at concentrations above the RMLs in previous soil samples. The laboratory analytical reports will be submitted under separate cover.

Based on the analytical results, the extent of planned soil excavations is shown on **Figure 1**. The area south of the former TTF is bounded by sample locations D4-30 and D4-40 to the south, by sample locations D4-32 and D4-25 to the west and the previously excavated boundary of SWMU No. 5 to the east. There is a depression area south of sample locations D4-38 and D4-37 that is submerged in water. The excavation area will extend as close to the water as possible without flooding the excavation. If possible, a confirmatory sidewall sample above the groundwater will be collected along the southern edge of the excavation. During the field sampling activities, the depth to the saturated zone was observed to increase generally from 2 feet to 4 feet below ground surface mainly due to changes in ground surface elevations. As indicated on **Figure 1**, some portions of the excavation will extend to four feet below ground surface and some portions will extend to two feet below ground surface or the saturated zone, whichever is encountered first. The second excavation area is a small area (approximately 67 square feet in size) identified around sample location D4-24C west of the TTF and is bounded by numerous soil samples (D4-23A, B, D, E and F). This smaller excavation will extend two feet below ground surface.

The excavated soils will be re-located via trucks directly to the former TTF, spread out across the area to be solidified, and subsequently solidified with the soils in the former TTF using ISS. The extents of the two excavated areas will be surveyed. The excavated areas will be subsequently backfilled with clean fill obtained from offsite sources. The excavated areas will be restored to pre-excavation conditions by placing either gravel or a vegetative top soil layer depending on what pre-excavation conditions were present. Because the excavated areas have been pre-delineated and/or are bounded by surface structures (or previously excavated areas in the case of SWMU No. 5), confirmation samples from the excavated areas will not be collected.

Based on the excavation dimensions described above and shown on **Figure 1**, the total soil volume to be excavated and consolidated for solidification in the former TTF is estimated to be approximately 620 cubic yards. The actual volumes of soils that are excavated and drawings showing the actual excavations as completed will be included in the construction completion report following the implementation of the ICM in the former TTF area.

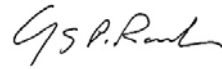
Ms. Penny Gaynor  
11 August 2021  
Page 4

The excavation work is anticipated to begin in late August 2021. Please do not hesitate to contact us if you should have any questions regarding the proposed excavation work or the ICM implementation activities at the former TTF area.

Sincerely,



Ali Ciblak, Ph.D., P.E. (GA)  
Project Engineer

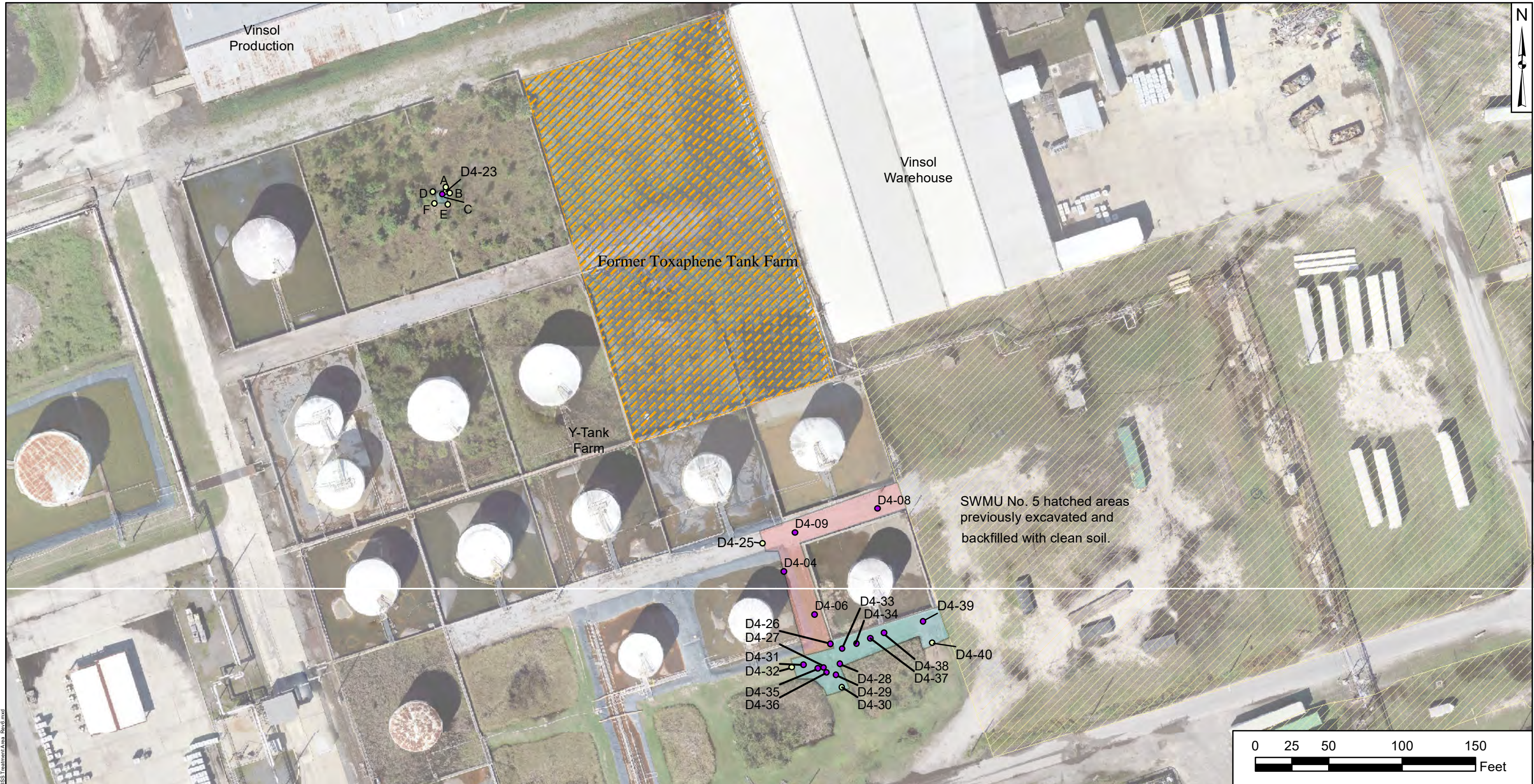


Gregory P. Roush, P.G. (GA)  
Senior Principal







Attachments: Figure 1 – Proposed Extent of Soil Excavations in SWMU No. 6  
Table 1 - Summary of Toxaphene Analytical Results South of the Former  
Toxaphene Tank Farm  
Table 2 – Summary of Toxaphene Analytical Results West of the Former  
Toxaphene Tank Farm  
Table 3 - Summary of Analytical Results For Other Analytes

Copies to: Tim Hassett (Hercules)  
Scott Elder (Geosyntec)  
Jim McNamara (EPD)  
Mike Crews (Pinova)

GR6881J



Path: N:\A\shahid\Brunswick Plant\GIS\MXD\Tanks\Proposed ISS Treatment Area\_Rev6.mxd

- |   |  |   |                       |
|---|--|---|-----------------------|
|  | Soil excavation (0-2ft) area in SWMU No. 6 |  | Soil Sample Locations |
|  | Soil excavation (0-4ft) area in SWMU No. 6 |  | Toxaphene > RML       |
|  | In Situ Solidification Treatment Area      |   | Toxaphene < RML       |
|  | SWMU No. 5 - Previously Excavated Areas    |   |                       |

**Notes:**  
 ICM - Interim corrective measure  
 SWMU - Solid waste management unit  
 RML - Removal management level (for toxaphene = 210 mg/kg)

**Extent of Soil Excavation in SWMU No. 6**

Hercules/Pinova Facility, Brunswick, Georgia



Figure  
**1**

Kennesaw July 2021

**Table 1**  
**Summary of Toxaphene Analytical Results South of the Former Toxaphene Tank Farm**  
**Hercules/Pinova Facility, Brunswick, Georgia**

Location ID	Soil Sample ID	Sampled Date	Sample Depth Range (ft bgs)	Toxaphene concentration (mg/Kg)
D4-04	SSD4-04 (0-2)-SO-04282020	4/28/2020	0-2	1200 J
D4-04	SSD4-04(2-4)-SO-12032020	12/3/2020	0-2	290
D4-06	SSD4-06 (0-2)-SO-04282020	4/28/2020	0-2	7800 J
D4-06	SSD4-06(2-4)-SO-12032020	12/3/2020	2-4	1700
D4-08	SSD4-08 (0-2)-SO-04282020	4/28/2020	0-2	1300 J
D4-08	SSD4-08(2-4)-SO-12032020	12/3/2020	2-4	2500
D4-09	SSD4-09 (0-2)-SO-04282020	4/28/2020	0-2	2400 J
D4-09	SSD4-09(2-4)-SO-12032020	12/3/2020	2-4	3300
<b>D4-23A</b>	SSD4-23A(0-2)-SO-12022020	12/2/2020	0-2	25
<b>D4-23B</b>	SSD4-23B(0-2)-SO-12022020	12/2/2020	0-2	3
D4-23C	SSD4-23C(0-2)-SO-12022020	12/2/2020	0-2	500
<b>D4-23D</b>	SSD4-23D(0-2)-SO-01272021	12/2/2020	0-2	100
<b>D4-23E</b>	SSD4-23E(0-2)-SO-01272021	12/2/2020	0-2	13
<b>D4-23F</b>	SSD4-23F(0-2)-SO-03162021	3/16/2021	0-2	64
<b>D4-25</b>	SSD4-25(0-2)-SO-09082020	9/8/2020	0-2	0.91
<b>D4-25</b>	SSD4-25(2-4)-SO-09082020	9/8/2020	2-4	31
D4-26	SSD4-26(0-2)-SO-09082020	9/8/2020	0-2	0.84
D4-26	SSD4-26(2-4)-SO-09082020	9/8/2020	2-4	900
D4-26	SSD4-26(0-2)-SO-09082020	9/8/2020	0-2	0.84
D4-26	SSD4-26(2-4)-SO-09082020	9/8/2020	2-4	1400
D4-27	SSD4-27(0-2)-SO-12042020	12/4/2020	0-2	260
D4-27	SSD4-27(2-4)-SO-12042020	12/4/2020	2-4	6
D4-28	SSD4-28(0-2)-SO-12042020	12/4/2020	0-2	150
D4-28	SSD4-28(2-4)-SO-12042020	12/4/2020	2-4	8.5
D4-29	SSD4-29(0-2)-SO-12042020	12/4/2020	0-2	17
D4-29	SSD4-29(2-4)-SO-12042020	12/4/2020	2-4	1.3
<b>D4-30</b>	SSD4-30(0-2)-SO-01272021	1/27/2021	0-2	17
D4-31	SSD4-31(0-2)-SO-01272021	1/27/2021	0-2	660
<b>D4-32</b>	SSD4-32(0-2)-SO-01272021	1/27/2021	0-2	45
D4-33	SSD4-33(0-2)-SO-03042021	3/4/2021	0-2	2,300
D4-34	SSD4-34(0-2)-SO-03042021	3/4/2021	0-2	2,000
D4-35	SSD4-35(0-2)-SO-03162021	3/16/2021	0-2	210
D4-36	SSD4-36(0-2)-SO-03162021	3/16/2021	0-2	69
D4-37	SSD4-37(0-2)-SO-03162021	3/16/2021	0-2	2000
D4-38	SSD4-38(0-2)-SO-03162021	3/16/2021	0-2	1700
D4-39	SSD4-39(0-2)-SO-05172021	5/17/2021	0-2	1,200
<b>D4-40</b>	SSD4-40(0-2)-SO-05172021	5/17/2021	0-2	98

**Notes:**

ft bgs = feet below ground surface.

mg/kg = milligram per kilogram.

Bold Location ID indicates samples adjacent to excavation below the removal management level of 210 mg/kg for toxaphene.

**Data qualifiers:**

"J" - estimated concentration.



**Table 2**  
**Summary of Toxaphene Analytical Results West of the Former Toxaphene Tank Farm**  
**Hercules/Pinova Facility, Brunswick, Georgia**

<b>Location ID</b>	<b>Soil Sample ID</b>	<b>Sampled Date</b>	<b>Sample Depth Range (ft bgs)</b>	<b>Toxaphene concentration (mg/Kg)</b>
<b>D4-23A</b>	SSD4-23A(0-2)-SO-12022020	12/2/2020	0-2	25
<b>D4-23B</b>	SSD4-23B(0-2)-SO-12022020	12/2/2020	0-2	3
D4-23C	SSD4-23C(0-2)-SO-12022020	12/2/2020	0-2	500
<b>D4-23D</b>	SSD4-23D(0-2)-SO-01272021	12/2/2020	0-2	100
<b>D4-23E</b>	SSD4-23E(0-2)-SO-01272021	12/2/2020	0-2	13
<b>D4-23F</b>	SSD4-23F(0-2)-SO-03162021	3/16/2021	0-2	64

**Notes:**

ft bgs = feet below ground surface.

mg/kg = milligram per kilogram.

Bold Location ID indicates samples adjacent to excavation below the removal management level of 210 mg/kg.

**Table 3**  
**Summary of Analytical Results For Other Analytes**  
**Hercules/Pinova Facility, Brunswick, Georgia**

Location ID	Soil Sample ID	Sampled Date	Sample Depth Range (ft bgs)	PCB-1016 (Aroclor 1016) (mg/kg)	PCB-1221 (Aroclor 1221) (mg/kg)	PCB-1232 (Aroclor 1232) (mg/kg)	PCB-1242 (Aroclor 1242) (mg/kg)	PCB-1248 (Aroclor 1248) (mg/kg)	PCB-1254 (Aroclor 1254) (mg/kg)	PCB-1260 (Aroclor 1260) (mg/kg)	alpha-BHC (mg/kg)	Arsenic (mg/kg)	Benzene (mg/kg)	Chlorobenzene (mg/kg)	Chlorobenzilate (mg/kg)	Chloroform (mg/kg)	Dieldrin (mg/kg)	Methylene Chloride (mg/kg)	Paracymene (mg/kg)
	<b>EPA Removal Management Level*</b>			150	83	72	95	94	44	99	36	300	510	4,000	2,100	140	14	9,500	30,000
D4-04	SSD4-04 (0-2)-SO-04282020	4/28/2020	0-2	--	--	--	--	--	170 U	170 U	8.5 U	1.8 U	0.01 U	0.01 U	500 UJ	0.01 U	8.5 U	0.01 U	0.065
D4-06	SSD4-06 (0-2)-SO-04282020	4/28/2020	0-2	--	--	--	--	--	170 U	170 U	9 U	1.9 U	0.007 U	0.007 U	530 UJ	0.007 U	9 U	0.007 U	0.0093 J+
D4-08	SSD4-08 (0-2)-SO-04282020	4/28/2020	0-2	--	--	--	--	--	95 U	95 U	4.9 U	2 U	0.0063 U	0.0063 U	290 UJ	0.0063 U	4.9 U	0.0063 U	0.037
D4-09	SSD4-09 (0-2)-SO-04282020	4/28/2020	0-2	--	--	--	--	--	190 U	190 U	9.6 U	1.9 U	0.0075 U	0.0075 UJ	560 UJ	0.011	9.6 U	0.0075 U	0.04 J+
D4-23	SSD4-23(0-2)-SO-06162020	6/16/2020	0-2	--	--	--	--	--	0.39	0.022 U	0.0011 U	2.5 U	0.0023 U	0.0023 U	0.066 UJ	0.0023 U	0.0011 U	0.0023 U	0.0023 U
D4-23	SSD4-23D(0-2)-SO-01272021	1/27/2021	0-2	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	--	--	--	--	--	--	--	--	--
D4-23	SSD4-23E(0-2)-SO-01272021	1/27/2021	0-2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--	--	--	--	--
D4-25	SSD4-25(0-2)-SO-09082020	9/8/2020	0-2	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	--	--	--	--	--	--	--	--	--
D4-25	SSD4-25(2-4)-SO-09082020	9/8/2020	2-4	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	0.93 U	--	--	--	--	--	--	--	--	--
D4-26	SSD4-26(0-2)-SO-09082020	9/8/2020	0-2	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	0.019 U	--	--	--	--	--	--	--	--	--
D4-26	SSD4-26(2-4)-SO-09082020	9/8/2020	2-4	17 U	17 U	17 U	17 U	17 U	17 U	17 U	--	--	--	--	--	--	--	--	--
D4-27	SSD4-27(0-2)-SO-12042020	12/4/2020	0-2	9.1 U	9.1 U	9.1 U	9.1 U	9.1 U	9.1 U	9.1 U	--	--	--	--	--	--	--	--	--
D4-27	SSD4-27(2-4)-SO-12042020	12/4/2020	2-4	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--	--	--	--	--
D4-28	SSD4-28(0-2)-SO-12042020	12/4/2020	0-2	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	--	--	--	--	--	--	--	--	--
D4-28	SSD4-28(2-4)-SO-12042020	12/4/2020	2-4	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--	--	--	--	--
D4-29	SSD4-29(0-2)-SO-12042020	12/4/2020	0-2	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	--	--	--	--	--	--	--	--	--
D4-29	SSD4-29(2-4)-SO-12042020	12/4/2020	2-4	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--	--	--	--	--
D4-30	SSD4-30(0-2)-SO-01272021	1/27/2021	0-2	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	--	--	--	--	--	--	--	--	--
D4-31	SSD4-31(0-2)-SO-01272021	1/27/2021	0-2	9.2 U	9.2 U	9.2 U	9.2 U	9.2 U	9.2 U	9.2 U	--	--	--	--	--	--	--	--	--
D4-32	SSD4-32(0-2)-SO-01272021	1/27/2021	0-2	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	--	--	--	--	--	--	--	--	--

**Notes:**

ft bgs = feet below ground surface.

mg/kg = milligram per kilogram.

-- not analyzed

**Data qualifiers:**

"U" - Not detected.

"J" - estimated concentration.

\* Cumene used as surrogate for paracymene for EPA Removal Management Level value.



# GEORGIA

DEPARTMENT OF NATURAL RESOURCES

ENVIRONMENTAL PROTECTION DIVISION

**Richard E. Dunn, Director**

---

**Land Protection Branch**  
2 Martin Luther King, Jr. Drive  
Suite 1054, East Tower  
Atlanta, Georgia 30334  
404-656-7802

October 22, 2020

**Sent via email and USPS**

Mr. Tim Hassett  
Project Manager  
Hercules, LLC  
500 Hercules Road  
Wilmington, DE 19808-1599

Ms. Molly Matthews  
Director of Operations  
DRT America, Inc.  
2801 Cook Street  
Brunswick, Georgia 31520

RE: Revised Interim Corrective Measure  
Work Plan SWMU 6 - Former Toxaphene  
Tank Farm  
Hercules/Pinova - Brunswick Facility  
Hazardous Waste Facility Permit  
No. HW-52(D&S)  
EPA ID# GAD004065520

Dear Mr. Hassett and Ms. Matthews:

The Georgia Environmental Protection Division (EPD) has reviewed the *Revised Interim Corrective Measure Work Plan SWMU 6 - Former Toxaphene Tank Farm* dated October 2020. The revised work plan addresses our questions and comments, therefore, the *Revised Interim Corrective Measure Work Plan SWMU 6 - Former Toxaphene Tank Farm* is approved. Please continue to keep us updated regarding implementation and field schedule.

Should you have any questions or concerns please contact Penny Gaynor or Steven Van Ginkel at 404-656-7802.

Sincerely,

James Sliwinski  
Unit Coordinator  
Remedial Sites Unit



Hercules, LLC  
Hercules Research Center  
500 Hercules Road  
Wilmington, DE 19808-1599  
Writer's Direct Dial: 302-995-3456

October 9, 2020

**VIA ELECTRONIC MAIL**

Jim Sliwinski  
Georgia Environmental Protection Division  
2 Martin Luther King, Jr. Dr. SE  
Suite 1054, East Tower  
Atlanta, GA 30334

**RE: SWMU 6 – Former Toxaphene Tank Farm  
Revised Interim Corrective Measures Plan  
Hercules/Pinova Facility, Brunswick, Georgia  
Hazardous Waste Permit 52 (D&S)  
EPA ID No. 004065552**

Dear Mr. Sliwinski:

Enclosed for your review and approval is a Revised Interim Corrective Measure (ICM) Plan for the former toxaphene tank farm (TTF) located within SWMU 6 at the Hercules/Pinova Facility, Brunswick, GA. The ICM Plan was prepared by Geosyntec Consultants, Inc. ("Geosyntec") on behalf of Hercules LLC for the industrial facility located at 2801 Cook Street in Brunswick, Georgia. The first phase of interim corrective measures was completed in 2019 and included the removal of P123 hazardous waste from the TTF. The enclosed ICM Plan addresses soils in the TTF and describes treatability studies, alternative evaluations, and implementation details for the selected remedy. The revised ICM Plan incorporates comments received from EPD on August 18, 2020.

Please call me if you have any questions at (302) 995-3456.

Sincerely,

Timothy D. Hassett  
Remediation Project Manager

cc: M. Crews – Pinova  
J. Brown – GA EPD  
P. Gaynor – GA EPD  
G. Roush – Geosyntec

*Prepared for*

**Hercules, LLC**  
500 Hercules Road  
Wilmington, DE 19808

**REVISED**

**INTERIM CORRECTIVE MEASURE  
WORK PLAN**

**SWMU NO. 6 –  
FORMER TOXAPHENE TANK FARM  
HERCULES/PINOVA BRUNSWICK FACILITY  
BRUNSWICK, GEORGIA**

*Prepared by*

**Geosyntec**   
consultants

engineers | scientists | innovators

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## LIST OF ACRONYMS

ALM	asphalt-like material
ASTM	ASTM International
BHHRA	baseline human health risk assessment
CACR	Corrective Action Completion Report
CAO	corrective action objectives
ED	Exposure Domain
EPA	United States Environmental Protection Agency
EPD	Environmental Protection Division
GBFS	granulated blast furnace slag
ICM	Interim Corrective Measures
ISS	in situ solidification
LEL	Lower Explosive Limit
PC	Portland cement
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SLERA	screening level ecological risk assessment
SMP	soil management plan
SVOC	Semi-volatile organic compounds
SWMU	Solid Waste Management Unit
TSP	total suspended particulates
TTF	toxaphene tank farm
UCS	Unconfined Compressive strength
VOC	volatile organic compounds
ZVI	zero valent iron



## 1.0 INTRODUCTION

Geosyntec Consultants, Inc. (“Geosyntec”) has prepared this work plan describing interim corrective measures (the “ICM Work Plan”) on behalf of Hercules LLC (“Hercules”) for submission to the Georgia Department of Natural Resources, Environmental Protection Division (“EPD”). The ICM Work Plan describes steps to address toxaphene impacted soils in an area where a toxaphene tank farm (“TTF”) was historically situated at an industrial facility located at 2801 Cook Street in Brunswick, Georgia (the “Site”). The former TTF area is located within the active operational portion of the Site that is owned by Pinova, Inc. (“Pinova”). The inactive portion of the Site is owned by Hercules. Environmental conditions at the Site are being addressed pursuant to the corrective action process under the Resource Conservation and Recovery Act (“RCRA”) as implemented through Hazardous Waste Permit No. HW-052 (D&S) issued by EPD to Hercules and Pinova. The former TTF occupies a portion of an area referred to as Solid Waste Management Unit No. 6 (“SWMU 6”) at the Site. The former TTF was part of what is known as the Y tank farm. The location of the former TTF area is shown on **Figure 1**.

This ICM Work Plan describes the second phase of interim corrective measures (“ICMs”) that Hercules is implementing in the former TTF area. The second phase of ICMs includes work that has already been completed (e.g., treatability studies) together with steps that are expected to be undertaken. Specifically, the ICM Work Plan describes (1) the results of treatability studies that have been performed to assess the viability of particular remedial technologies for use in the former TTF area, (2) the range of remedial alternatives that have been evaluated, (3) the basis for selecting *in situ* solidification (“ISS”) as the specific remedial technology that Hercules intends to use, and (4) the manner in which ISS will be implemented to address toxaphene impacts in shallow soils within the former TTF area. The ICMs are designed to mitigate remaining potential risks associated with toxaphene in shallow soils in the former TTF area. Given the permanent nature of the ICMs that are expected to be implemented, Hercules anticipates that those ICMs will also serve as the final corrective measures for soils in the former TTF area.

This ICM Work Plan is structured as follows:

- The remainder of Section 1.0 provides an overview of the general approach for interim corrective measures in the former TTF area and regulatory requirements under the hazardous waste regulations relating to management of wastes from the former TTF area, background information concerning the operational history of

the former TTF area, a description of the proposed treatment area, and a summary of the risk assessment that was performed evaluating potential risks from exposure to soils in the former TTF area.

- Section 2.0 provides a summary of the objectives for the corrective measures for the former TTF area, the methods used to assess potential remedial technologies, and the process for selecting particular corrective measures.
- Section 3.0 provides a discussion of how ISS will be implemented at the former TTF area.
- Section 4.0 describes health and safety considerations prior to, during, and after implementation of ISS at the former TTF area.
- Section 5.0 provides details regarding the quality assurance/quality control program for implementation of ISS.
- Section 6.0 provides a summary of the post implementation inspection and maintenance program for the former TTF area.
- Section 7.0 provides the implementation and reporting schedule for the work to be performed at the former TTF area.
- Section 8.0 provides references cited in this ICM Work Plan.

## **1.1 Overview**

SWMU 6 is located in the central portion of the main operational area of the Site. The former TTF area is located in the northeastern portion of SWMU 6 as shown in **Figure 1**. Based on the detected concentrations of toxaphene in soils within the former TTF area during previous investigation activities conducted at the Site, Hercules prepared and submitted documents to EPD describing the nature and scope of proposed ICMs for the former TTF area, including a document prepared by NewFields LLC titled *Former Hercules Brunswick Site, SWMU #6 Toxaphene Tank Area Interim Corrective Action Options Appraisal* (the “Interim Corrective Action Options Appraisal Report”) (Newfields, March 2017).

Following its review of the Interim Corrective Action Options Appraisal Report, EPD made a determination as set forth in a letter dated May 9, 2019, that “asphalt-like

material” (referred to as “ALM”) present in the former TTF area qualifies as listed hazardous waste with a waste designation code of P123 (toxaphene). While finding that ALM qualifies as a listed hazardous waste, EPD also concluded that all other wastes generated during the proposed ICMs at the former TTF area would not be classified as listed hazardous wastes but should be appropriately characterized and managed as characteristic hazardous wastes only if such wastes exhibit hazardous characteristics.

On September 24, 2019, Hercules submitted a letter to EPD acknowledging EPD’s determination and describing a phased approach for implementing ICMs in the former TTF area. The letter provided a detailed approach for implementing the first phase of the ICMs which included the removal of P123 listed hazardous wastes (ALM) from within the former TTF area. EPD approved the proposed plan for the ICMs in a letter dated October 1, 2019.

As part of the first phase of the ICMs in the former TTF area, ALM (i.e., P123 listed hazardous waste material) and related materials were removed from the former TTF area between October 24, 2019 and November 22, 2019. Geosyntec documented the activities completed during the first phase of the ICMs in the former TTF area in a document titled *Interim Corrective Measure SWMU No. 6 P123 Removal Completion Report for the Toxaphene Tank Farm Area* (Geosyntec, 2020) which Hercules submitted to EPD on February 14, 2020. Minor revisions to Appendix D and Appendix E of the report were submitted to EPD in April 2020. In a letter dated May 5, 2020, EPD acknowledged receipt and review of the report and provided notification to Hercules that no comments or deficiencies in the report were identified.

In accordance with Hercules’ letter of September 24, 2019, the second phase of the ICMs in the former TTF area focuses on addressing toxaphene present in shallow soils below the former TTF. Several alternatives for corrective measures technologies, including ISS, to address toxaphene in soils in the former TTF area were discussed with EPD during a meeting among representatives of EPD, Hercules, and Geosyntec on January 21, 2020. In addition, the results of treatability studies and evaluations of alternatives for corrective measures were presented to EPD during a virtual meeting on May 14, 2020. A copy of the PowerPoint presentation that was used during the virtual meeting was submitted to EPD on May 21, 2020, and is included in **Appendix A**.

## **1.2 Background Information Regarding Former Toxaphene Tank Farm**

The former TTF area is located within the portion of the Site that Hercules sold to Pinova in 2010. The former TTF is not readily accessible as it is bordered to the east by an active warehouse (the Vinsol Warehouse), to the south and west by the Y tank farm, and to the north by the Vinsol production plant as shown on **Figure 2**. Access to the former TTF area is restricted by the concrete secondary containment walls that remain in the area and posted signage.

The former TTF area was used in conjunction with the production at the Site of toxaphene, a pesticide that was widely used in the growing of cotton. Specifically, toxaphene was produced between 1948 and 1980 within the toxaphene production plant located near the center of the Site. Portions of the toxaphene that was produced was then dissolved in xylene to produce a toxaphene solution. The solution was stored in the former TTF area in eight aboveground storage tanks of various sizes that were situated on concrete tank pads within concrete berms serving as secondary containment.

The toxaphene production plant was demolished in 1984. The associated soils impacted by elevated concentrations of toxaphene were then excavated in conjunction with a plant expansion project and were subsequently removed from the Site and properly disposed. These corrective measures were completed in 1999. A further interim corrective measure for the remainder of the toxaphene production plant (also referred to as Solid Waste Management Unit No. 5) was performed from February 2008 to January 2010 and is documented in a report that Hercules submitted to EPD titled *Corrective Action Report Solid Waste Management Unit No. 5 Area* dated July 26, 2010 (CRA, 2010).

The aboveground storage tanks used to store toxaphene in the former TTF area were removed starting in the 1990s. All of the tanks were removed by December 2007. The tank pads and concrete debris associated with the tank pads were removed and disposed offsite as part of the first phase of the ICMs for the former TTF area (ALM removal) in 2019. Several concrete pads for pipe supports remain along the eastern edge of the former TTF area.

## **1.3 Target Treatment Area and Historical Concentrations of Toxaphene in Soils**

The former TTF area is approximately 140 feet wide and 260 feet long. The former TTF area is surrounded by a concrete containment wall with an access road bisecting the area as shown in **Figure 2**.

As discussed in the Interim Corrective Action Options Appraisal Report submitted to EPD in 2017, the target depth interval for impacted soils to be addressed within the former TTF area is from the ground surface to five feet below ground surface (“bgs”). Given the aerial extent of the former TTF area, approximately 6,750 cubic yards of impacted soils were identified to be addressed. While the Interim Corrective Action Options Appraisal Report refers to a target zone of “unsaturated” soils to be addressed in the former TTF area, the depth to groundwater is typically less than five feet bgs based on Geosyntec’s observations of field conditions at the Site. Nevertheless, as described in this ICM Work Plan, Hercules plans to address soils in the former TTF area to a depth of five feet bgs with the selected ISS remedy.

Hercules is also in the process of developing an approach to reduce potential risk from direct contact exposure to toxaphene in surface soils (0-2 feet bgs) at the Site outside of the footprint of the former TTF area. These efforts will be documented in a work plan focusing on interim corrective measures for sitewide soils. When the work plan is complete, it will identify surface soils from locations outside of the former TTF area to be targeted for remediation. Depending on the quantity of soils targeted for remediation, the location of those soils and the timing of the anticipated activities, such soils may be excavated and consolidated within the former TTF area for treatment using ISS. Accessible locations in SWMU 6, but outside the former TTF area, that will be targeted for excavation as part of the interim corrective measures for sitewide soils and that will be consolidated within the former TTF area for treatment using ISS are identified on **Figure 3**. The final decisions about other targeted locations outside of SWMU 6 to be excavated and consolidated in the former TTF area will be documented in an addendum to this ICM Work Plan. The addendum will describe areas, depths and volumes of soils to be excavated and consolidated in the former TTF area for treatment using ISS. The addendum will be submitted to EPD for review and approval.

As previously discussed with EPD, because the other areas within SWMU 6 where excavation of soils is expected to occur for consolidation and treatment using ISS within the former TTF area are all part of a single “area of contamination,” the excavation, movement and treatment of such soils using ISS (to the extent that they qualify as hazardous wastes) does not trigger permitting requirements, land disposal restrictions or minimum technology requirements under the Area of Contamination Policy developed by the United States Environmental Protection Agency (“EPA”). *See, e.g.,* Memorandum from Michael Shapiro, Director, Office of Solid Waste to RCRA Branch Chiefs and CERCLA Branch Chiefs titled *Use of the Area of Contamination (AOC) Concept During RCRA Cleanups* dated March 13, 1996. The Area of Contamination Policy is likewise

anticipated to be applicable to the excavation, movement and treatment of toxaphene impacted soils from other locations in proximity to SWMU 6 that may be targeted for treatment using ISS within the former TTF area.

**Table 1** summarizes historical sampling results for toxaphene in the former TTF area. Based on previous investigations, concentrations of toxaphene in the target treatment zone within the former TTF area range from 0.3 to 100,000 milligrams per kilogram (“mg/kg”). The average concentration of toxaphene in soils within the former TTF area is approximately 6,600 mg/kg. It should be noted that the highest concentrations of toxaphene are associated with P123 listed hazardous waste material that was recently removed from the former TTF area during the first phase of the ICMs for the former TTF area.

#### **1.4 Summary of Risk Assessment**

Potential risks posed by exposure to impacted soils at the Site are being mitigated and managed through operational controls. Specifically, a soil management plan has been and will continue to be utilized to minimize and mitigate potential exposures to on-site soils by potential receptors. In addition, access to and use of the former TTF area is restricted. Notwithstanding these measures, addressing soils in the former TTF area will significantly further reduce calculated, potential risks at the Site as discussed below.

On March 22, 2019, Hercules submitted a baseline human health risk assessment (“BHHRA”) and screening level ecological risk assessment (“SLERA”) report to EPD prepared by NewFields LLC. For risk assessment purposes, the Site was divided into four exposure domains. The exposure domains were developed in concert with EPD and are based on common types of activities and uses within the Site. While there have been a number of chemicals detected in soils at the Site that have been classified as chemicals of potential concern (“COPCs”), toxaphene is the primary contributor to potential risk in all four exposure domains at the Site based on direct contact exposure to soils. The former TTF area is located in Exposure Domain 4. Based on the BHHRA/SLERA report, toxaphene contributes between 95% and 99% of the potential risk in Exposure Domain 4 for the potential receptors that were evaluated (industrial workers, trespassers, and construction workers). Moreover, toxaphene present in soils within the former TTF area alone contributes approximately 50% of the overall potential risk calculated for direct contact exposure to soils in Exposure Domain 4. The actions that are expected to be undertaken as part of the second phase of the ICMs for the former TTF area will minimize potential risks posed by toxaphene present in soils in the former TTF area.

## **2.0 BASIS OF INTERIM CORRECTIVE MEASURES (ICM) PLAN**

This section of the ICM Work Plan presents corrective action objectives (“CAOs”) for the former TTF area, describes the basis for selection of interim corrective measures for the former TTF area, summarizes the results of treatability studies that have been performed, and evaluates the alternatives for interim corrective measures that were considered. We note that while the actions described herein are presented as ICMs, Hercules anticipates that they will be incorporated into the Corrective Action Plan (“CAP”) for the Site as the final corrective measures for soils within the former TTF area. As referenced previously, the results of treatability studies and interim corrective measures alternative evaluations were presented to EPD during a virtual meeting on May 14, 2020. A copy of the PowerPoint presentation that was used during the virtual meeting was submitted to EPD on May 21, 2020, and is included in **Appendix A**.

### **2.1 Corrective Action Objectives**

The following CAOs have been identified to mitigate present and/or future potential risks associated with exposure to toxaphene in soils within the former TTF area:

- Minimize current and future exposure (via ingestion, dermal contact and inhalation) to toxaphene in soils within the former TTF area as a means of reducing overall potential risk to soils in Exposure Domain 4; and
- Further minimize the mobility of toxaphene in soils within the former TTF area by reducing its potential for leaching from soils into the groundwater.

### **2.2 Basis of Corrective Action Selection**

Several technologies to address toxaphene impacted soils in the former TTF area were screened as described in the Interim Corrective Action Options Appraisal Report. The retained technologies in this ICM Work Plan were further evaluated in a focused feasibility study. The focused feasibility study included an evaluation of the following technologies: excavation/off-site disposal, chemical reduction with zero valent iron, chemical reduction/bioremediation with DARAMEND<sup>®</sup> II, *in situ* solidification (i.e., ISS), *ex situ* thermal treatment, and on-site thermal desorption. After screening the implementability and effectiveness of the various technologies/alternatives under consideration, four technologies/alternatives were retained for further evaluation. The retained technologies/alternatives included ISS, *ex situ* thermal treatment via StarX

Hottpad<sup>™</sup>, chemical reduction/bioremediation via DARAMEND<sup>®</sup> II, and excavation and offsite disposal. These four technologies/alternatives are described in more detail below.

**In Situ Solidification (ISS):** ISS is commonly used to encapsulate or bind contaminants within a physical structure or monolith to reduce the overall toxicity and mobility of the contaminants. Using this measure, toxaphene impacted soils would be solidified through *in situ* means using Portland cement and/or a mixture of Portland cement with other mixing reagents, such as granulated blast furnace slag (“GBFS”). The physical state of the resulting monolith is a non-friable, very low permeability solid mass that reduces the potential for leaching, ingestion, dermal exposure, and inhalation of contaminants.

**Ex Situ Thermal Treatment:** *Ex situ* thermal treatment relies on heat to treat contaminants that are present in soils that have been excavated from the targeted remedial area. In this case, StarX Hottpad<sup>™</sup> (“StarX”) by Savron Solutions was evaluated for potential use. StarX technology relies on the combustion of contaminants (i.e., toxaphene) at a high temperature. In the StarX process, the contaminant acts as the fuel source for a self-sustaining combustion (smoldering) reaction; thus, treatment is dominated by a destructive process (i.e., combustion). However, for compounds with higher vapor pressures such as toxaphene, a surrogate fuel (i.e., granular activated carbon) is used to facilitate the smoldering process such that the soil is remediated through a combination of destructive (i.e., combustion) and non-destructive (i.e., volatilization) processes. As an adjunct to the combustion process, the volatilized contaminants must be captured and treated via standard vapor treatment technologies such as thermal oxidation and/or vapor phase sorption to activated carbon.

**Chemical Reduction/Bioremediation:** Chemical reduction/bioremediation involves using chemical and biological mechanisms to destroy or transform contaminants present in soils. In this case, a soil amendment called DARAMEND<sup>®</sup> II was selected for evaluation. DARAMEND<sup>®</sup> II, manufactured by PeroxyChem, would be blended with toxaphene impacted soils and subjected to alternating periods of aerobic and anaerobic conditions to reduce the concentrations of toxaphene present in the soils. DARAMEND<sup>®</sup> II consists of approximately 45% zero valent iron (“ZVI”) and 55% propriety organic amendments. The ZVI content in DARAMEND<sup>®</sup> II reduces concentrations of toxaphene in soils via abiotic chemical reduction. The organic amendment in DARAMEND<sup>®</sup> II promotes anaerobic bioremediation of toxaphene and regulates the redox potential of the impacted soils to optimize chemical reduction with ZVI.



**Excavation and Off-Site Disposal:** Excavation and offsite disposal involves removing impacted soils from their current location and transporting such soils to an offsite location where they can be appropriately disposed. In this case, excavation and offsite disposal would involve excavating toxaphene impacted soils within the former TTF area and disposing of the excavated soils at a permitted offsite landfill. Based on the concentrations of toxaphene in the soils, it is likely that waste characterization results would show that the soils (in whole or in significant part) would qualify as characteristic hazardous waste and therefore require off-site treatment (i.e., incineration) prior to disposal.

### **2.3 Summary of Treatability Studies**

ISS, *ex situ* thermal treatment, and chemical reduction/bioremediation were evaluated with bench scale treatability studies that were initiated in October/November 2019 and completed in April 2020. The objective of these treatability studies was to provide a proof-of-concept evaluation of the tested technologies and to collect data for the full scale remedial design of the selected technology. The treatability studies included multiple replicates of test specimens, duplicate or triplicate analyses, and baseline analyses of materials used for the treatability studies to increase the reliability of the test results. While the elevated concentrations of toxaphene in the soils used in the treatability studies made the soils a difficult matrix for the laboratory to analyze and resulted in high dilution of analytical samples (causing elevated reporting limits), the treatability studies provided the necessary data to confirm the feasibility and effectiveness of the tested technologies. Treatability study reports are included in **Appendices B, C and D**.

The key conclusions from each treatability study are as follows:

- The ISS treatability study for toxaphene impacted soils from the former TTF area demonstrated that a selected mix containing 8% by weight of Portland cement and 8% by weight of GBFS (granulated blast furnace slag) achieved the target performance criteria approved by EPD of unconfined compressive strength (“UCS”) of 50 pounds per square inch (“psi”) or more, hydraulic conductivity of  $1 \times 10^{-6}$  centimeter per second (“cm/s”) or less, and wetting/drying cycle durability of 10% or less relative mass loss after completion of 12 cycles after 28 days of curing. The selected mix (8% Portland cement and 8% GBFS) achieved unconfined compressive strength of 214 psi and hydraulic conductivity of  $9.7 \times 10^{-7}$  cm/s after the 28-day curing period. Additionally, there was no significant mass loss (less than 0.5%) due to wetting/drying cycles.

- The *ex situ* thermal treatment treatability study achieved self-sustaining smoldering and significant reductions (99.9%) in concentrations of toxaphene in soils from the former TTF area. However, the concentrations of organic compounds observed in the exhaust from the thermal treatment process indicated that pilot scale testing would be required to further evaluate the feasibility of *ex situ* thermal treatment and options for vapor treatment that would be necessary at a larger scale.
- The chemical reduction/bioremediation treatability study did not show sufficient reductions in concentrations of toxaphene for this technology to be used on the soils in the former TTF area. During the treatability study, DARAMEND<sup>®</sup> II was applied at doses of up to 6% by weight, but significant reductions in concentrations of toxaphene were not observed in this study at the tested concentrations. While this technology may not be applicable to treating the concentrations of toxaphene present in soils in the former TTF area, additional future testing may be useful in evaluating the potential applicability of DARAMEND<sup>®</sup> II to address impacted soils in other areas of the Site.

Based on the treatability study results, chemical reduction/bioremediation was determined to be ineffective in treating toxaphene impacted soils in the former TTF area and was therefore eliminated from further consideration for use in addressing the soils in the former TTF area. The other two technologies (ISS and *ex situ* thermal treatment) along with excavation/offsite disposal were carried forward for a comparative analysis.

#### **2.4 Comparative Analysis of Retained Alternatives for Corrective Measures**

Based on the results of technology screening and treatability studies, three alternatives for corrective measures were retained for further evaluation based on their ability to achieve the CAOs. The retained alternatives consist of the following:

- Alternative 1: *In Situ* Solidification (ISS);
- Alternative 2: Excavation and Onsite *Ex Situ* Thermal Treatment; and
- Alternative 3: Excavation and Off-Site Treatment and Disposal.

The retained alternatives were compared against each other based on the following criteria:

- *Human Health and Environmental Protection:* This criterion assesses whether the corrective measure alternative can provide adequate protection of human health and the environment and whether the alternative meets the CAOs established for the Site. All three alternatives are protective to human health and environment. Alternative 1 protects human health and the environment by reducing toxaphene mobility and eliminates the potential risk of leaching of toxaphene into groundwater. Alternative 1 also reduces the potential risk of dermal contact to and ingestion or inhalation of toxaphene by creating a solidified monolith in which the toxaphene is bound. Alternatives 2 and 3 protect human health and the environment by reducing contaminant volume and toxicity at the Site (although the toxaphene would remain at the receiving facility for Alternative 3 unless the soil was thermally treated before placement).
- *Long Term Effectiveness and Permanence:* This criterion evaluates the effectiveness of the corrective measure alternative in protecting human health and the environment after the construction and implementation of the alternative. All three alternatives are effective in providing long term protection of human health and environment. As demonstrated by the wet/dry testing that was performed, Alternative 1 has favorable long-term effectiveness and permanence, particularly when coupled with institutional controls (to minimize disturbance of the treated soils) and periodic inspections. Alternative 2 has favorable long-term effectiveness and permanence because the toxaphene would be destroyed (via combustion and treatment of exhaust vapors). Alternative 3 has favorable long-term effectiveness and permanence because the toxaphene would be excavated and transported to an off-site facility and thereby no longer be present at the Site (although the toxaphene would remain at the receiving facility unless the soil was thermally treated before placement).
- *Reduction of Toxicity, Mobility or Volume:* This criterion evaluates the effectiveness of the corrective measure alternative in reducing the toxicity, mobility and volume of contaminants. All three alternatives reduce the toxicity, mobility or volume of toxaphene in soils within the former TTF area. Alternative 1 reduces toxaphene mobility and eliminates exposure pathways. Alternatives 2 and 3 reduce the toxicity, mobility and volume of toxaphene at the Site.
- *Short-Term Effectiveness:* This criterion assesses the protection of human health and environment during the construction and implementation of the corrective measure alternative. This criterion also evaluates the time required to implement

and achieve the CAOs. Alternative 1 has the shortest implementation period (three to five months). Alternative 2 has the longest implementation period (up to two years). The implementation period of Alternative 3 is approximately four to eight months. Compared to other alternatives, Alternative 1 is the fastest to implement and poses the fewest health and safety concerns during implementation due to the *in situ* treatment process. By contrast, Alternatives 2 and 3 pose greater potential risks to on-site workers and the community. Alternatives 2 and 3 have greater potential for generating fugitive dust and odors; they also both require dewatering for implementation. Dewatering creates additional waste streams requiring further treatment, which increases the potential for accidental exposure by on-site workers and the community. In addition, Alternative 2 generates exhaust and condensate containing elevated concentrations of toxaphene and other organic compounds that require additional treatment. Alternative 3 would also significantly increase truck traffic within the Site itself and on the road network for the surrounding community.

- *Implementability:* This criterion evaluates the technical and administrative feasibility of each corrective measures alternative by considering construction, reliability, operation and maintenance (“O&M”) and required permits and approvals. Alternative 1 is a widely implemented technology with a well-developed track record in Georgia and elsewhere. Moreover, all resources necessary to implement Alternative 1 are readily available. Alternative 2 requires a pilot scale test prior to field implementation to evaluate potential treatment options for the exhaust and condensate that will be produced. Alternative 2 also would require dewatering and associated treatment of a large volume of water. Treating these additional waste streams make this alternative more difficult to implement than the other alternatives. In addition, a pilot scale test would further add to the time before full-scale implementation of Alternative 2 could take place and extend the overall timeframe for completing the ICMs at the former TTF area. Alternative 3 is a widely implemented technology. Similar to Alternative 2, however, Alternative 3 would require dewatering and associated management/treatment of a large volume of water. Additionally, Alternative 3 would require significant additional sampling for landfill waste profiling purposes and associated management of stockpiles of excavated soils within a limited work space. These factors make Alternative 3 more difficult to implement than Alternative 1.

## 2.5 Selected Corrective Measure and Key Components

Based on the results of the focused feasibility study that was performed, the treatability studies that were completed, and the comparative analysis of the retained alternatives that was undertaken, ISS has been selected as the corrective measure alternative that Hercules intends to implement as part of the second phase of the ICMs to address toxaphene impacted soils in the former TTF area. Implementation of ISS has three key components:

- Solid monolith: ISS encapsulates contaminants (i.e., toxaphene) in the soil matrix by forming a solidified monolith. The generated monolith has high compressive strength, a decreased surface area, and low permeability that minimizes the potential for direct contact exposure to toxaphene as well as reduces the mobility and leaching potential of toxaphene in the treated soils.
- Vegetated soil layer: After implementation of ISS, a vegetated soil layer will be placed over the solidified material as a physical barrier to help protect the ISS monolith from potential disturbance.
- Institutional controls: Institutional controls are non-engineered mechanisms, such as administrative controls and/or legal instruments, that place activity and use limitations on land use. Institutional controls will be implemented to protect the ISS monolith from potential disturbance.

### **3.0 ICM IMPLEMENTATION**

This section of the ICM Work Plan describes in detail the steps that will be performed to implement ISS to address toxaphene impacted soils in the former TTF area as part of the second phase of the ICMs for the former TTF area.

#### **3.1 Preliminary Activities**

Preliminary activities include site surveying, pre-design investigations, permitting and planning, and bidding and contractor procurement, each of which is discussed below.

##### **3.1.1 Surveying**

A topographic and utility survey was conducted on July 21, 2020. The results from the topographic and utility survey are shown on **Figure 4**. The survey identified the following:

- Existing grading within the former TTF area, surface elevations inside the former TTF area, elevation contours, and surface elevations of the surrounding features at the Site;
- The location of existing utilities in the proposed ISS treatment area within the former TTF area; and
- The boundaries of existing structures (i.e., buildings, concrete berms, and tanks) adjacent to the proposed treatment area.

##### **3.1.2 Pre-Design Investigation**

Pre-design investigation activities have been completed. The pre-design investigation activities included installation of several temporary piezometers in the former TTF area to collect depth to water measurements. The locations of the piezometers are shown in **Figure 4**. Two 1-inch piezometers (TTF PZ-1 and TTF PZ-2) were installed using hand augurs in the former TTF area. The depth to water in the piezometers was measured and water levels were calculated to be at approximately 7.8 feet North American Vertical Datum of 1988 (“NAVD 88”). Based on these measurements, the depth to water generally varies between 0.2 feet bgs to 3 feet bgs within the former TTF area. One temporary 1-inch piezometer (TTF PZ-3) was installed just outside of the former TTF area. Based on the depth to water that was measured, the groundwater at piezometer TTF PZ-3 was

at an elevation of approximately 6.9 ft NAVD1988, which was slightly deeper than the groundwater elevation inside the former TTF area. This information will be provided to prospective contractors during the bidding process so that they can evaluate water addition requirements during implementation of ISS.

### **3.1.3 Permitting and Erosion/Sedimentation Control Plan**

Prior to commencing field work associated with implementing ISS, permits and approvals will be obtained from state and local authorities, as necessary. In addition, the work will be coordinated with Pinova. The permits and approvals for ISS may include, but not be limited to, a land disturbance permit and coordination with Pinova to discharge treated water through Outfall 003 under Pinova's existing discharge permit issued under the National Pollutant Discharge Elimination System ("NPDES") program (NPDES Permit GA0003735).

Regardless of permitting requirements, the contractor selected to perform the work will limit erosion and control stormwater runoff during implementation of ISS at the former TTF area. The proposed treatment area is surrounded by a concrete berm/wall, which will assist in controlling erosion and storm water runoff. In addition, temporary control measures, such as silt fence and/or hay bales, will be used to control storm water and mitigate the potential for soil to be transported out of the work area by stormwater runoff.

### **3.1.4 Bidding and Contractor Procurement**

Selection of the contractor to undertake ISS in the former TTF area will be based on a combination of qualitative and quantitative requirements designed to provide the best value. The contractor selection process will include identification of multiple contractors based on Geosyntec's and Hercules' past experiences. A performance-based bidding package will be prepared and submitted to ISS contractors. The bidding package will include: (i) a request for proposal letter; (ii) bidder instructions; (iii) a summary of work; (iv) performance-based design specifications, (v) design drawings, and (vi) health and safety requirements. Specific means and methods to meet the ISS performance criteria approved by EPD, as described below, will ultimately be the responsibility of the contractor that is selected to implement ISS:

- Unconfined compressive strength of 50 psi or more;
- Hydraulic conductivity of  $1 \times 10^{-6}$  cm/s or less; and

- Wetting/drying cycle durability of 10% or less relative mass loss after completion of 12 cycles after 28 days of curing.

Following the receipt of the bids from prospective contractors, the bids will be evaluated and compared with each other to select a contractor providing the best value. Considerations will include the contractor's ability to meet the performance criteria and project schedule, prior experience on similar projects, health and safety statistics, and overall approach to the project. During the bidding process, modifications to the implementation plan may be made based on the contractor's input while still meeting the ISS performance criteria described above. If the selected contractor wants to perform additional testing to verify and further optimize the concentration of stabilizing agent(s) to be used while still meeting the ISS performance criteria, the contractor will be allowed to collect samples of soils from the former TTF areas for the additional testing. The contractor will complete additional testing during the contractor submittal phase of the construction process in order not to delay the mobilization.

### **3.2 Mobilization and Site Preparation**

Following the retention of an ISS contractor, the ISS contractor will initiate mobilization of personnel and equipment to implement ISS at the former TTF area. The equipment will be staged in locations outside of the former TTF area as shown in **Figure 3**. The list of equipment required for the field implementation of ISS will be finalized during the bidding and procurement process, but the following equipment is expected to be mobilized to the Site and staged by the ISS contractor.

- Site trailers with a generator;
- Trash dumpsters for general trash collection;
- A pressure washer and associated containment for equipment decontamination;
- A forklift for general use;
- Mechanical blending equipment (such as a hydraulic excavator and/or blending auger) for *in situ* mechanical mixing for ISS;
- Construction vehicles (such as a skid steer and/or bulldozer) for constructing road improvements, grading spoils, and placing the working platform;



- A batch plant for batching, mixing and pumping of ISS reagents;
- Supplies and equipment to mitigate potential fugitive emissions (i.e., vapor, dust and odors); and
- Health and safety equipment including eye and hand washing stations and portable meters for dust and vapor monitoring.

The following site preparation activities will be performed:

- The overhead pipes along the eastern edge of treatment area will be relocated by Pinova prior to implementation of the ISS treatment process. If practical, the footers supporting the overhead pipes will be consolidated in the ISS treatment area. If the footers cannot be consolidated in the ISS treatment area, they will be removed, characterized and disposed of offsite at a permitted waste disposal facility;
- Erosion control measures around the ISS treatment area, soil stockpile areas, and the decontamination area will be installed;
- Work zones (consisting of the secure zone, support zone, exclusion zone, and decontamination zone) will be established, and temporary signage and barricades will be placed around the work zones; and
- Work permits will be obtained from Pinova, as required.

### **3.3 ISS Construction**

#### **3.3.1 ISS Treatment**

Details regarding specific operations to implement ISS at the former TTF area will be finalized following the selection of the ISS contractor. ISS operations typically include the following:

- The proposed treatment area will be divided into grid cells (or mixing cells). The size and layout of the grid cells will depend on the mixing equipment that is used. The mixing cells will be arranged in an overlapping sequence so that a solidified monolith is created within the horizontal and vertical limits of the treatment area.

- A mixing technique using the excavator bucket is typically utilized to implement ISS in shallow soils (i.e., soils at less than 20 feet bgs). Because the proposed treatment depth within the former TTF area is 5 feet bgs, it is anticipated that the excavator bucket mixing method would be used for ISS in this particular case. Given the fact that the overhead pipes near the eastern edge of the proposed treatment area will be relocated prior to initiation of the ISS treatment process as discussed in Section 3.2, above, the containment walls along the edge of the former TTF area are expected to be the only structural concern during the actual implementation of the ISS process. The bucket mixing method can be used immediately adjacent to the containment walls. Consideration will also be given for mixing the areas adjacent to the walls for the best risk mitigation approach. For example, the contractor may alternate mixing cells and allow them to set up (typically 24 to 72 hours) prior to advancing to the next mixing cell to minimize the length of containment wall exposed to treatment process. Although the bucket mixing process is the most applicable method for shallow soil mixing, alternate ISS mixing methods and techniques may be evaluated and proposed by selected contractor based on site-specific considerations. Alternative ISS mixing methods include techniques such as excavator-mounted rake (or hollow forks) injection, auger mixing, and jet grouting.
- A conceptual diagram of the excavator bucket mixing process for ISS in shallow soils is shown in **Figure 5**. If the excavator bucket mixing process is used, a working platform will be placed over the treatment area. The working platform can consist of timber mats, imported clean fill, or other materials depending on the contractor's approach. If imported clean fill is used to construct a working platform, the clean fill over a particular mixing cell will be excavated prior to mixing the underlying impacted soils with the selected ISS agent (grout) at that mixing cell as shown in **Figures 6**. ISS grout will be mixed with the impacted soils to generate a homogeneous mixture. The excavator will then move to the next mixing cell.
- ISS grout will be prepared using an on-site batch plant. As shown in the conceptual process flow diagram in **Figure 6**, the batch plant will consist of reagent silos, a grout mixing tank, and transfer pumps. A grout mix consisting of water, Portland cement and GBFS will be pumped from the batch plant to the mixing cell. The mechanical mixing equipment (i.e., the excavator bucket) will then be used to blend the impacted soil in the mixing cell with the grout to generate a homogenous mixture. For areas with standing water or in circumstances where

mixing is occurring following a storm event, the grout mix ratio may be adjusted by the contractor to minimize the potential effects of excess water on the mix performance.

### **3.3.2 ISS Swell Management**

Mixing of the grout with the soil may result in swelling of the treated soil. A swell management plan will be developed with the selected contractor prior to field implementation of ISS. The objective of swell management is to limit the swelling of treated soil and to manage ISS swell material on-site within the limits of the proposed treatment area. If required, ISS swell material will be graded in-place in accordance with proposed final grading plan for the former TTF area.

### **3.3.3 Waste Management**

The following waste streams may be generated during implementation of ISS at the former TTF area:

- Wastewater from ISS equipment decontamination;
- Wastewater from dewatering of the ISS treatment area to remove standing water or storm water, if the water is not used in the ISS admixture;
- Solid waste from excess ISS spoils or ISS swell material if grading of ISS swell material is needed; and
- Solid waste consisting of clean fill materials used to construct the working platform that become potentially impacted by contact with ISS spoils and swell material.

Wastewater generated during the ISS process will be treated in an on-site wastewater treatment system and discharged following treatment through Outfall 003 under Pinova's existing NPDES discharge permit (NPDES Permit GA0003735) or transported to an off-site wastewater treatment plant following waste characterization and profiling. The impacted solid waste materials will be characterized and pre-approved for disposal at a permitted landfill. Any materials that qualify as characteristic hazardous wastes will be properly managed and transported offsite to a permitted hazardous waste management facility for treatment or disposal. A bill of lading or hazardous waste manifest, as

appropriate, will be signed by a representative of the generator for each load of contaminated material removed from the former TTF area.

### **3.3.4 Stormwater Management**

Based on the survey data that have been obtained, the ISS monolith will be graded/sloped toward the south to drain into a catch basin at the southeast corner of the former TTF area. The proposed catch basin will be connected via piping to the existing stormwater conveyance system located south of the Vinsol warehouse. The existing stormwater conveyance system drains to the N Street Ditch. An underdrain piping system along the eastern edge and southern edge of the former TTF area will be installed above the monolith within the protective layer of clean soil (described below) to direct stormwater to the catch basin. The location of the catch basin and the stormwater pipe network is shown in **Figure 7**.

### **3.3.5 Protective Vegetative Soil Layer and Site Restoration**

During implementation of ISS at the former TTF area, the monolith will be graded to promote stormwater runoff to the existing stormwater drainage ditch system for the Site. Following grading activities, a 12-inch layer of protective clean soil will be imported and placed over the monolith. Vegetative seed will be planted to establish a vegetated cover for permanent erosion control. The erosion control measures used during implementation of ISS (e.g., perimeter silt fencing) will remain in place until sufficient vegetation is established for erosion control in the treatment area. The excavation area outside of the former TTF in SWMU 6 (as discussed in Section 1.3) will be backfilled with imported clean fill and gravel to match with pre-excavation grades.

#### 4.0 HEALTH AND SAFETY CONSIDERATIONS

Project specific health and safety plans (“HASPs”) will be prepared by Geosyntec and the contractor selected to implement ISS in the former TTF area. Health and safety requirements will be similar to those used during the interim corrective measure for the former toxaphene plant at the Site (SWMU No. 5) and the first phase of the ICMs in the former TTF area involving the removal of ALM and related materials. Pertinent elements of the HASPs will address hazard identification and mitigation, establishment of work zones, ingress/egress, decontamination procedures, worker breathing space monitoring, upwind and downwind air monitoring, and utilization of dust control measures as necessary (e.g., use of water or misting to suppress dust).

The potential for worker exposure to possible hazards (e.g., toxaphene, dust and other potential volatiles) will be monitored and documented frequently using a calibrated four-gas meter and a calibrated particulate meter in the working zone. The four-gas meter will be used regularly to measure volatile organic compounds (“VOCs”) and the lower explosive limit (“LEL”) for combustible gases as a matter of protecting worker health and safety related to chemicals other than toxaphene that were or are used at the Site. The particulate meter will be used to measure total suspended particulates (“TSP”) when activities are occurring that could generate fugitive emissions (such as activities involving the movement or mixing of soils or dry ISS admixtures). Monitoring of TSP levels will be performed to ensure that such levels do not exceed calculated action levels. If action level values for TSP are exceeded, further measures will be taken to protect worker health and safety such as upgrading personal protective equipment, implementing dust control measures, and/or temporarily discontinuing work until TSP readings fall below action level values.

The perimeter of the work area will be routinely monitored using a particulate meter to measure TSP in the upwind and downwind directions. If possible, the particulate meter will be set at a low sensitivity/detection limit to provide early warning of possible changes in ambient air quality to enable engineering controls to be deployed quickly and responsively to mitigate undesirable impacts to ambient air quality.

Fugitive dust is expected to be minimal during implementation of ISS because it is a “wet” process. However, a water mist will be used if needed to control fugitive dust in work areas.

## **5.0 CONSTRUCTION QUALITY CONTROL AND QUALITY ASSURANCE**

The contractor selected to implement ISS in the former TTF area will perform quality control (“QC”) and Geosyntec will provide quality assurance (“QA”) during implementation of ISS. The QA/QC activities will focus on confirming that the selected mix of water, Portland cement and GBFS (and any other additives identified by the contractor in accordance with the design for ISS) is achieved, and that the resulting ISS monolith meets the performance criteria approved by EPD. **Table 2** presents the QA/QC analytical testing plan.

### **5.1 Quality Control**

The QC program will, at a minimum, require the ISS contractor to take the following steps:

- Verify the amount of each additive that is added per mix batch;
- Collect depth-representative samples of treated soils in each mixing cell for evaluation of whether homogeneous mixing of soils and additives has occurred;
- Calibrate measuring equipment (e.g., flow meters) and scales;
- Verify that complete mixing within each mixing cell has occurred and that mixing cells overlap using survey control;
- Collect composite samples of the treated soils from different depths within each mixing cell; and
- Submit samples of the treated soils to a certified laboratory to perform quality control testing at a rate of one sample per 500 cubic yards or a minimum of one sample per day. Quality control testing will include analyzing samples of treated soils for unconfined compressive strength (“UCS”), hydraulic conductivity, and wetting/drying cycle durability.

The amounts of Portland cement and GBFS used for each batch of treated soil will be metered and documented to confirm that those amounts conform to the mix design. The selected contractor will also confirm and document the mixing duration, mixing type and mixing equipment for each mixing cell.

The contractor will collect depth-representative samples of treated soils from each treated mixing cell. An *in situ* sampling tool equipped with a hydraulically activated valve will be attached to an excavator to collect discrete depth samples from each freshly treated mixing cell. It is anticipated that two to three depth intervals will be sampled for each freshly treated cell. After the discrete samples of treated soils are collected, they will be spread over a light-colored piece of plastic and evaluated for homogeneous mixing by pH measurement and visual observations of color, consistency, soil clumps and reagents. Well-mixed materials will be coated with grout and the color of the grout will predominate. A color scale will be used to assign a qualitative value to the sample color for enhanced reproducibility. Visual inspection of the treated soils should show that the soils and additives are thoroughly mixed into a homogeneous mass, free of large lumps or pockets of fines, sand, or gravel. The pH of the treated soils will be measured using colorimetric paper.

Once the discrete samples described above have confirmed that the materials in a treated mixing cell have been uniformly mixed, selected samples will be composited to form composite samples representative of 500 cubic yard aliquots of treated soils. The composite samples will be containerized, labeled, and submitted for analysis of UCS, hydraulic conductivity, and wetting/drying cycle durability. If a composite sample meets the performance criteria for UCS and hydraulic conductivity, then wetting/drying cycle durability testing will be performed. If the wetting/drying cycle durability criterion is met, then all performance goals will be deemed to be satisfied and the 500 cubic yard aliquot of treated soils that the composite sample represents will be identified as meeting the ISS performance criteria.

The QC samples will be collected in duplicate. If a composite sample does not meet one of the performance criteria specified for the project the analysis will be confirmed on the duplicate sample and also compared to the QA sample results collected by the Site Manager. If it is confirmed the QC sample does not meet the performance criteria, then the 500 cubic yards of treated soils represented by that sample will be retreated and resampled.

In addition to the QC sampling described above; the contractor will sample imported clean fill in accordance with the requirements summarized in **Table 2**. Specifically, samples of imported clean fill will be analyzed for VOCs, semi-volatile organic compounds, metals, pesticides, and herbicides prior to use in the former TTF area. The soils used for the vegetated soil layer over the monolith will be analyzed for the same

suite of analytes and will also be analyzed for particle size, pH and organic content to confirm that the soil is appropriate to be used as topsoil.

## **5.2 Quality Assurance**

Geosyntec personnel will be present at the Site throughout the implementation of ISS within the former TTF area to observe the activities of the ISS contractor and perform QA activities. The QA activities will include work process observations, sample collection observations, review of contractor's logs, and analysis of split samples for performance criteria. Engineer's (Geosyntec) Site Manager will:

- Observe the methods used to measure and mix the Portland cement, GBFS, and soils;
- Review the contractor's batching logs daily to ensure that the mix design is being followed;
- Review the contractor's logs of worker breathing space air monitoring, logs of perimeter air monitoring, calibration logs of monitoring equipment, and daily reports;
- Perform routine inspections of treated soils and keep a daily photographic log;
- Keep real-time progress summary tables and charts;
- Serve as the liaison with Hercules and Pinova;
- Confirm that the contractor's QC laboratory data for UCS, hydraulic conductivity, and wetting/drying cycle durability meet the performance criteria;
- Submit quality assurance duplicate samples (one in every five QC samples that are collected) to an independent, certified laboratory for analysis of UCS, hydraulic conductivity, and wetting/drying cycle durability testing;
- Notify the contractor and Hercules if rework is needed because a QC sample or QA sample does not meet one or more of the performance criteria for UCS, hydraulic conductivity, or wetting/drying cycle durability; and



- Observe and document the contractor's retreatment and re-sampling of failed areas, if any.

### **5.3 QA/QC Reporting**

A daily quality control report will be provided by the ISS contractor. The daily quality control report shall include but will not be limited to safety statistics, daily person-hours performed along with cumulative person-hours for the project to date, equipment present at the Site, ISS production logs (daily and project to date), excavation production (daily and project to date if excavation is needed), samples collected and results received, deliveries made, daily transportation and disposal numbers, and key observations.

## **6.0 POST IMPLEMENTATION INSPECTIONS AND MAINTENANCE**

Post-implementation inspections, and maintenance will be performed to maintain the integrity of the ICMs completed at the former TTF area. Specifically, the focus of these activities will be to ensure that the ISS monolith is not damaged or disturbed in a manner that increases potential risk of exposure to toxaphene. At the same time, it should be noted that the structural characteristics of the ISS monolith are expected to be sufficient to accommodate the placement of buildings or structures over the monolith without negatively affecting the monolith. In other words, there are a broad array of activities and uses that can safely occur over the ISS monolith and that are compatible with the ISS monolith.

Following completion of the ICMs at the former TTF area, inspections of the former TTF area will be performed quarterly for the first year, semi-annual for the second year and on an annual basis thereafter unless EPD approves a different inspection schedule. Completed inspection forms will be compiled into a dedicated Inspection and Maintenance Field Book for the Site. Photographic logs will be provided with the completed inspection forms. The Inspection and Maintenance Field Book will be maintained at the Site and available for inspection upon request by EPD. The objective of the inspections is to identify any observable problems or conditions that would impair the integrity of the ISS monolith.

During the inspections of the former TTF area, the vegetated soil cover over the ISS monolith will be visually inspected for the items listed below.

- Evidence of subsidence or settling;
- Evidence of burrowing animals;
- The presence of erosion rills;
- The condition of vegetation;
- The presence of woody plants;
- The condition of surface water drainage systems, including any obstructions; and
- Other irregularities.

If structures or buildings are constructed over the ISS monolith, the condition of the structures or buildings will be observed along with any evidence of subsidence or settling.

Should inspections identify the need for maintenance activities or other measures, those activities or measures will be promptly undertaken.

Hercules anticipates that the foregoing inspection and maintenance requirements will be integrated into the soil management plan for the Site for near-term management purposes. In addition, such inspection and maintenance requirements are expected to be included in the environmental covenant that is being prepared for the portion of the Site owned by Pinova along with other activity and use limitations applicable to the Site as has been discussed with EPD.

## **7.0 SCHEDULE AND REPORTING**

### **7.1 Tentative Schedule for Second Phase of ICMs for the Former TTF Area**

Hercules is continuing to advance the project during EPD's review of the ICM Work Plan. Following review and approval of this ICM Work Plan by EPD, Hercules and Geosyntec will proceed with implementation of the second phase of the ICMs for the former TTF area. The tentative schedule for such activities is as follows assuming Hercules receives approval of the ICM Work Plan by September 30, 2020:

- Bid package preparation – September
- Contractor bidding – October to mid-November
- Contractor procurement – Late November
- Contractor submittals/permitting – December to early January
- Contractor mobilization – Mid to late-January, pending contractor availability and receipts of permits
- ISS field implementation – estimated duration of three to four months.

Hercules will update EPD of schedule modifications, if any, through TRIAD meetings or other communications.

### **7.2 Addendum to ICM Work Plan**

Prior to mobilization to implement the second phase of the ICMs for the former TTF area, an ICM Work Plan Addendum may be submitted to EPD to present plans for consolidation of toxaphene impacted soils (if any) outside of SWMU 6 within the former TTF area for treatment using ISS as discussed in Section 1.3 of this ICM Work Plan.

### **7.3 Completion Report**

Within 75 days after all work associated with the second phase of the ICMs for the former TTF area is completed, Hercules will submit a report to EPD describing the activities that were undertaken. The report is expected to include the following information:

- A narrative description of the work;

- QA/QC analytical testing results and field observations;
- Mixing reagent manufacturer specifications;
- Borrow source locations for clean fill;
- Perimeter air monitoring results;
- Documentation concerning the disposition of waste materials including profiles and manifests for waste materials shipped offsite;
- A boundary survey of the treated area; and
- Photographic logs of the work progress and final conditions.

## 8.0 REFERENCES

Conestoga Rovers, “*Corrective Action Report Solid Waste Management Unit No. 5 Area*” July 2010.

Geosyntec, “*Interim Corrective Measure SWMU No. 6 P123 Removal Completion Report for the Toxaphene Tank Farm Area*” February 2020.

NewFields, “*Former Hercules Brunswick Site, SWMU #6 Toxaphene Tank Area Interim Corrective Action Options Appraisal*” March 2017

NewFields, *Baseline Human Health Risk Assessment (BHHRA) and Screening Level Ecological Risk Assessment (SLERA) Report, Hercules/Pinova Brunswick Facility*” March 2019

# TABLES

**Table 1**  
**Summary of Historical Soil Toxaphene Analytical Results**  
**Hercules/Pinova Facility, Brunswick, Georgia**

Location ID	Soil Sample ID	Sampled Date	Sample Depth Range (ft bgs)	Toxaphene concentration (mg/Kg)
HI A1	HI A1_4/8/09_(0-1)GRAB_NM	4/8/2009	0-1	100,000
HI A1	HI A1_4/8/09_(1-2)GRAB_NM	4/8/2009	1-2	49,000
HI A2	HICS150_5/2/09_(0-1)GRAB_DUP	5/2/2009	0-1	300
HI A2	HI A2_5/2/09_(1-2)GRAB_NM	5/2/2009	1-2	200
HI A2	HI A2_5/2/09_(2-3)GRAB_NM	5/2/2009	2-3	9,200
HI A2	HI A2_5/2/09_(3-4)GRAB_NM	5/2/2009	3-4	20,000
HI A3	HICS130_4/8/09_(0-1)GRAB_DUP	4/8/2009	0-1	850
HI A3	HI A3_4/8/09_(1-2)GRAB_NM	4/8/2009	1-2	1,200
HI A3	HI A3_4/8/09_(2-3)GRAB_NM	4/8/2009	2-3	34,000
HI A3	HI A3_4/8/09_(3-4)GRAB_NM	4/8/2009	3-4	93,000
HI A3	HI A3_4/8/09_(4-5)GRAB_NM	4/8/2009	4-5	640
HI A3	HI A3_4/8/09_(5-6)GRAB_NM	4/8/2009	5-6	3,000
HI A4	HI A4_5/2/09_(0-1)GRAB_NM	5/2/2009	0-1	250
HI A4	HI A4_5/2/09_(1-2)GRAB_NM	5/2/2009	1-2	71,000
HI A4	HI A4_5/2/09_(2-3)GRAB_NM	5/2/2009	2-3	7,100
HI A4	HI A4_5/2/09_(3-4)GRAB_NM	5/2/2009	3-4	720
HI A4	HI A4_5/2/09_(4-5)GRAB_NM	5/2/2009	4-5	130
HI A5	HI A5_5/2/09_(0-1)GRAB_NM	5/2/2009	0-1	1,700
HI A5	HI A5_5/2/09_(1-2)GRAB_NM	5/2/2009	1-2	16,000
HI A5	HI A5_5/2/09_(2-3)GRAB_NM	5/2/2009	2-3	35,000
HI A5	HI A5_5/2/09_(3-4)GRAB_NM	5/2/2009	3-4	22,000
HI A5	HI A5_5/2/09_(4-5)GRAB_NM	5/2/2009	4-5	19,000
HI A6	HI A6_5/2/09_(0-1)GRAB_NM	5/2/2009	0-1	9.6
HI A6	HI A6_5/2/09_(1-2)GRAB_NM	5/2/2009	1-2	6.3
HI A6	HI A6_5/2/09_(2-3)GRAB_NM	5/2/2009	2-3	83.0
HI A6	HI A6_5/2/09_(3-4)GRAB_NM	5/2/2009	3-4	47.0
HI A6	HI A6_5/2/09_(4-5)GRAB_NM	5/2/2009	4-5	50.0
HI B1	HI B1_5/2/09_(4-5)GRAB_NM	5/2/2009	4-5	180
HI B1	HI B1_4/8/09_(0-1)GRAB_NM	4/8/2009	0-1	4,600
HI B1	HI B1_4/8/09_(1-2)GRAB_NM	4/8/2009	1-2	17,000
HI B1	HI B1_4/8/09_(2-3)GRAB_NM	4/8/2009	2-3	3,100
HI B1	HI B1_4/8/09_(3-4)GRAB_NM	4/8/2009	3-4	3,800
HI B2	HI B2_5/2/09_(4-5)GRAB_NM	5/2/2009	4-5	55
HI B2	HICS129_4/8/09_(0-1)GRAB_DUP	4/8/2009	0-1	2,100
HI B2	HI B2_4/8/09_(1-2)GRAB_NM	4/8/2009	1-2	48
HI B2	HI B2_4/8/09_(2-3)GRAB_NM	4/8/2009	2-3	86
HI B2	HI B2_4/8/09_(3-4)GRAB_NM	4/8/2009	3-4	16
HI B3	HI B3_4/8/09_(0-1)GRAB_NM	4/8/2009	0-1	26,000
HI B3	HI B3_4/8/09_(1-2)GRAB_NM	4/8/2009	1-2	11,000
HI B3	HI B3_4/8/09_(2-3)GRAB_NM	4/8/2009	2-3	19,000
HI B3	HI B3_4/8/09_(3-4)GRAB_NM	4/8/2009	3-4	200
HI B3	HI B3_4/8/09_(4-5)GRAB_NM	4/8/2009	4-5	280
HI B3	HI B3_4/8/09_(5-6)GRAB_NM	4/8/2009	5-6	520
HI B4	HI B4_4/9/09_(0-1)GRAB_NM	4/9/2009	0-1	2,600
HI B4	HICS133_4/9/09_(1-2)GRAB_DUP	4/9/2009	1-2	1,600
HI B4	HI B4_4/9/09_(2-3)GRAB_NM	4/9/2009	2-3	3,100
HI B4	HI B4_4/9/09_(3-4)GRAB_NM	4/9/2009	3-4	3,300
HI B4	HI B4_4/9/09_(4-5)GRAB_NM	4/9/2009	4-5	1,300
HI B5	HI B5_4/9/09_(0-1)GRAB_NM	4/9/2009	0-1	2,900
HI B5	HI B5_4/9/09_(1-2)GRAB_NM	4/9/2009	1-2	2,200
HI B5	HI B5_4/9/09_(2-3)GRAB_NM	4/9/2009	2-3	750
HI B5	HI B5_4/9/09_(3-4)GRAB_NM	4/9/2009	3-4	1,300
HI B5	HI B5_4/9/09_(4-5)GRAB_NM	4/9/2009	4-5	500



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Location ID	Soil Sample ID	Sampled Date	Sample Depth Range (ft bgs)	Toxaphene concentration (mg/Kg)
HI B6	HI B6_4/9/09_(0-1)GRAB_NM	4/9/2009	0-1	38,000
HI B6	HI B6_4/9/09_(1-2)GRAB_NM	4/9/2009	1-2	5,200
HI B6	HICS132_4/9/09_(2-3)GRAB_DUP	4/9/2009	2-3	710
HI B6	HI B6_4/9/09_(3-4)GRAB_NM	4/9/2009	3-4	2,200
HI B6	HI B6_4/9/09_(4-5)GRAB_NM	4/9/2009	4-5	1,100
HI C1	HI C1_5/2/09_(4-5)GRAB_NM	5/2/2009	4-5	180
HI C1	HI C1_4/8/09_(0-1)GRAB_NM	4/8/2009	0-1	4,700
HI C1	HI C1_4/8/09_(1-2)GRAB_NM	4/8/2009	1-2	3,000
HI C1	HI C1_4/8/09_(2-3)GRAB_NM	4/8/2009	2-3	1,500
HI C1	HI C1_4/8/09_(3-4)GRAB_NM	4/8/2009	3-4	320
HI C2	HI C2_5/2/09_(4-5)GRAB_NM	5/2/2009	4-5	1.7
HI C2	HI C2_4/8/09_(0-1)GRAB_NM	4/8/2009	0-1	130
HI C2	HI C2_4/8/09_(1-2)GRAB_NM	4/8/2009	1-2	6.3
HI C2	HI C2_4/8/09_(2-3)GRAB_NM	4/8/2009	2-3	5.9
HI C2	HI C2_4/8/09_(3-4)GRAB_NM	4/8/2009	3-4	0.3
HI C3	HI C3_4/8/09_(0-1)GRAB_NM	4/8/2009	0-1	360
HI C3	HI C3_4/8/09_(1-2)GRAB_NM	4/8/2009	1-2	3,700
HI C3	HI C3_4/8/09_(2-3)GRAB_NM	4/8/2009	2-3	590
HI C3	HI C3_4/8/09_(3-4)GRAB_NM	4/8/2009	3-4	47
HI C3	HI C3_4/8/09_(4-5)GRAB_NM	4/8/2009	4-5	90
HI C3	HI C3_4/8/09_(5-6)GRAB_NM	4/8/2009	5-6	260
HI C4	HI C4_4/9/09_(0-1)GRAB_NM	4/9/2009	0-1	3,000
HI C4	HI C4_4/9/09_(1-2)GRAB_NM	4/9/2009	1-2	1,300
HI C4	HI C4_4/9/09_(2-3)GRAB_NM	4/9/2009	2-3	2,600
HI C4	HICS135_4/9/09_(3-4)GRAB_DUP	4/9/2009	3-4	2,600
HI C4	HI C4_4/9/09_(4-5)GRAB_NM	4/9/2009	4-5	2,500
HI C5	HI C5_4/9/09_(0-1)GRAB_NM	4/9/2009	0-1	580
HI C5	HI C5_4/9/09_(1-2)GRAB_NM	4/9/2009	1-2	1,100
HI C5	HI C5_4/9/09_(2-3)GRAB_NM	4/9/2009	2-3	3,700
HI C5	HI C5_4/9/09_(3-4)GRAB_NM	4/9/2009	3-4	2,600
HI C5	HI C5_4/9/09_(4-5)GRAB_NM	4/9/2009	4-5	1,400
HI C6	HI C6_4/9/09_(0-1)GRAB_NM	4/9/2009	0-1	13,000
HI C6	HI C6_4/9/09_(1-2)GRAB_NM	4/9/2009	1-2	4,800
HI C6	HI C6_4/9/09_(2-3)GRAB_NM	4/9/2009	2-3	1,500
HI C6	HI C6_4/9/09_(3-4)GRAB_NM	4/9/2009	3-4	500
HI C6	HI C6_4/9/09_(4-5)GRAB_NM	4/9/2009	4-5	430
SS010A06	SS010A06_12/16/94_(0-0.5)GRAB_NM	12/16/1994	0	360
SS012A06	SS012A06_12/16/94_(0-0.5)GRAB_DUP	12/16/1994	0	92
SS-246	SS-246_6/26/00_(2-3)GRAB_NM	6/26/2000	2-3	1,400
SS-246	SS-246_6/26/00_(3-4)GRAB_NM	6/26/2000	3-4	110
SS-246	SS-246_5/8/00_(0-1)GRAB_NM	5/8/2000	0-1	6,300
SS-246	SS-246_5/8/00_(1-2)GRAB_NM	5/8/2000	1-2	55,000
TF-001-P	TF-001-P_1/19/10_(0-1)_NM	1/19/2010	0-1	22
TF-001-P	TF-001-P_1/19/10_(0-1)_NM	1/19/2010	0-1	29
TF-001-P	TF-001-P_1/19/10_(1-2)_NM	1/19/2010	1-2	154
TF-001-P	TF-001-P_1/19/10_(1-2)_NM	1/19/2010	1-2	172
TF-001-P	TF-001-P_1/19/10_(2-3)_NM	1/19/2010	2-3	34
TF-001-P	TF-001-P_1/19/10_(2-3)_NM	1/19/2010	2-3	46
TF-002-P	TF-002-P_1/19/10_(0-1)_NM	1/19/2010	0-1	13.2
TF-002-P	TF-002-P_1/19/10_(0-1)_NM	1/19/2010	0-1	16.8
TF-002-P	TF-002-P_1/19/10_(1-2)_NM	1/19/2010	1-2	33.3
TF-002-P	TF-002-P_1/19/10_(1-2)_NM	1/19/2010	1-2	40.8
TF-002-P	TF-002-P_1/19/10_(2-3)_NM	1/19/2010	2-3	1.4
TF-002-P	TF-002-P_1/19/10_(2-3)_NM	1/19/2010	2-3	1.3

**Table 1**  
**Summary of Historical Soil Toxaphene Analytical Results**  
**Hercules/Pinova Facility, Brunswick, Georgia**

Location ID	Soil Sample ID	Sampled Date	Sample Depth Range (ft bgs)	Toxaphene concentration (mg/Kg)
TF-003-P	TF-003-P_1/20/10_(0-1)_NM	1/20/2010	0-1	1,920
TF-003-P	TF-003-P_1/20/10_(0-1)_NM	1/20/2010	0-1	1,920
TF-003-P	TF-003-P_1/20/10_(1-2)_NM	1/20/2010	1-2	1,270
TF-003-P	TF-003-P_1/20/10_(1-2)_NM	1/20/2010	1-2	987
TF-005	TF-005_2/3/10_(0-1)_NM	2/3/2010	0-1	52
TF-005	TF-005_2/3/10_(0-1)_NM	2/3/2010	0-1	10
TF-005	TF-005_2/3/10_(1-2)_NM	2/3/2010	1-2	15
TF-005	TF-005_2/3/10_(1-2)_NM	2/3/2010	1-2	0.83J

**Notes:**

ft bgs = feet below ground surface.

mg/Kg = milligram per kilogram.

**Data qualifiers:**

"J" - estimated concentration.

**Table 2  
Preliminary ISS Quality Control and Quality Assurance Testing Plan  
Hercules/Pinova Facility, Brunswick, Georgia**

Quality Control/Assurance Testing	Test Method	Minimum Frequency	QA Acceptance Criteria
<b>ISS Implementation</b>			
Unconfined Compressive Strength	ASTM D1633	One sample in every 500 cubic yards. Minimum of one sample per day. Sample locations/depths to be selected by Engineer's Site Manager.	For a curing period of 28 days, an average UCS of 50 psi or more, no sample less than 40 psi
Hydraulic Conductivity	ASTM D5084	One sample in every 500 cubic yards. Minimum of one sample per day. Sample locations/depths to be selected by Engineer's Site Manager.	For a curing period of 28 days, an average hydraulic conductivity of $1 \times 10^{-6}$ cm/s or less, no sample more than $1 \times 10^{-5}$ cm/s
Wetting/Drying Cycle Durability	ASTM D4843	One sample in every 500 cubic yards. Sample locations/depths to be selected by Engineer's Site Manager	For a curing period of 28 days, 10% or less relative mass loss
Batch Proportions	Water, cement and slag amount	For each mixing cell	Approval by Engineer's Site Manager
Homogeneous Mixing	pH and visual observations of color, additives, consistency and soil clumps	Up to three samples from each treated cell, locations/depths to be selected by Engineer's Site Manager	Approval by Engineer's Site Manager
Calibrations of Measuring Equipment/Scales	Manufacturer's recommended method	One in every 3 days	Accuracy of $\pm 0.1\%$ with respect to calibration standard
Quality Assurance Duplicate Samples	UCS (ASTM D1653), hydraulic conductivity (ASTM D5084), wetting/drying cycle durability (ASTM D4843)	One in every five QC samples performed	Submitted to QA laboratory, meet performance criteria
<b>Imported Fill for Working Platform</b>			
Analytical Testing	VOCs, SVOCs, metals, pesticides and herbicides	One test per borrow source	Hazardous Site Response Act (HSRA) notification concentrations
<b>Topsoil for Vegetative Soil Layer</b>			
Particle Size	ASTM D422	One test per borrow source	Maximum particle size of 1 inch
pH	ASTM D4972	One test per borrow source	pH between 5 and 7
Organic Content	ASTM D2974	One test per borrow source	Organic content between 2% and 30%
Analytical Testing	VOCs, SVOCs, metals, pesticides and herbicides	One test per borrow source	Hazardous Site Response Act (HSRA) notification concentrations

**Notes:**

QA = Quality assurance  
 QC = Quality control  
 VOCs = Volatile organic compounds  
 UCS = Unconfined compressive strength

cm/s = centimeter per second  
 psi = pound per square inch  
 EPD = Georgia Environmental Protection Division  
 SVOCs = semi-volatile organic compounds

# FIGURES



- SWMU No. 6 Boundary
- Former Toxaphene Tank Farm Area
- Existing Structure
- Pinova Property Boundary
- Hercules Property Boundary

**Site Location**  
**SWMU No. 6 and Former Toxaphene Tank Farm**  
 Hercules/Pinova Facility, Brunswick, Georgia

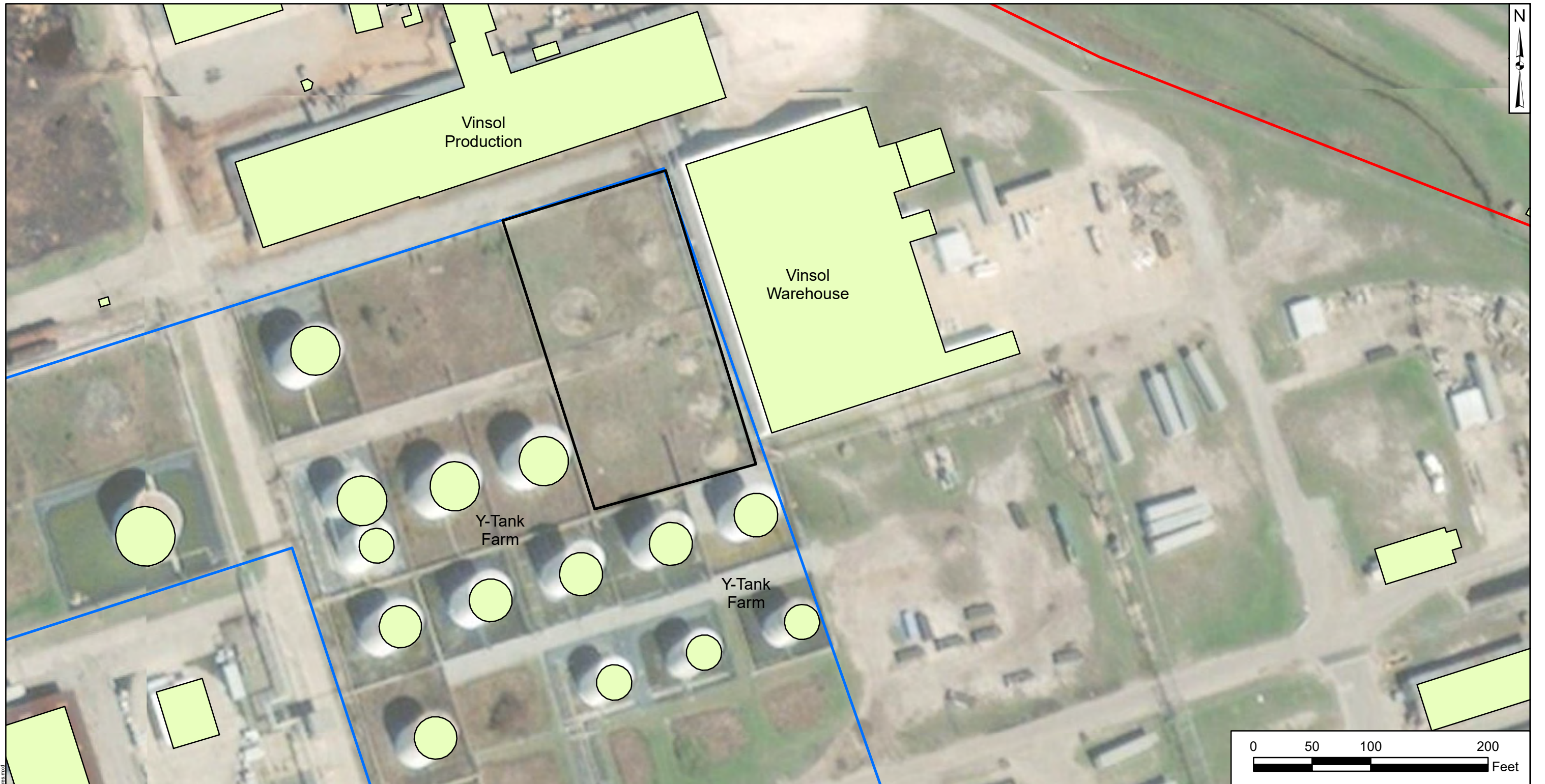


Figure  
**1**

Kennesaw

July 2020

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- SWMU No. 6 Boundary
- Former Toxaphene Tank Farm Area
- Existing Structure
- Pinova Property Boundary

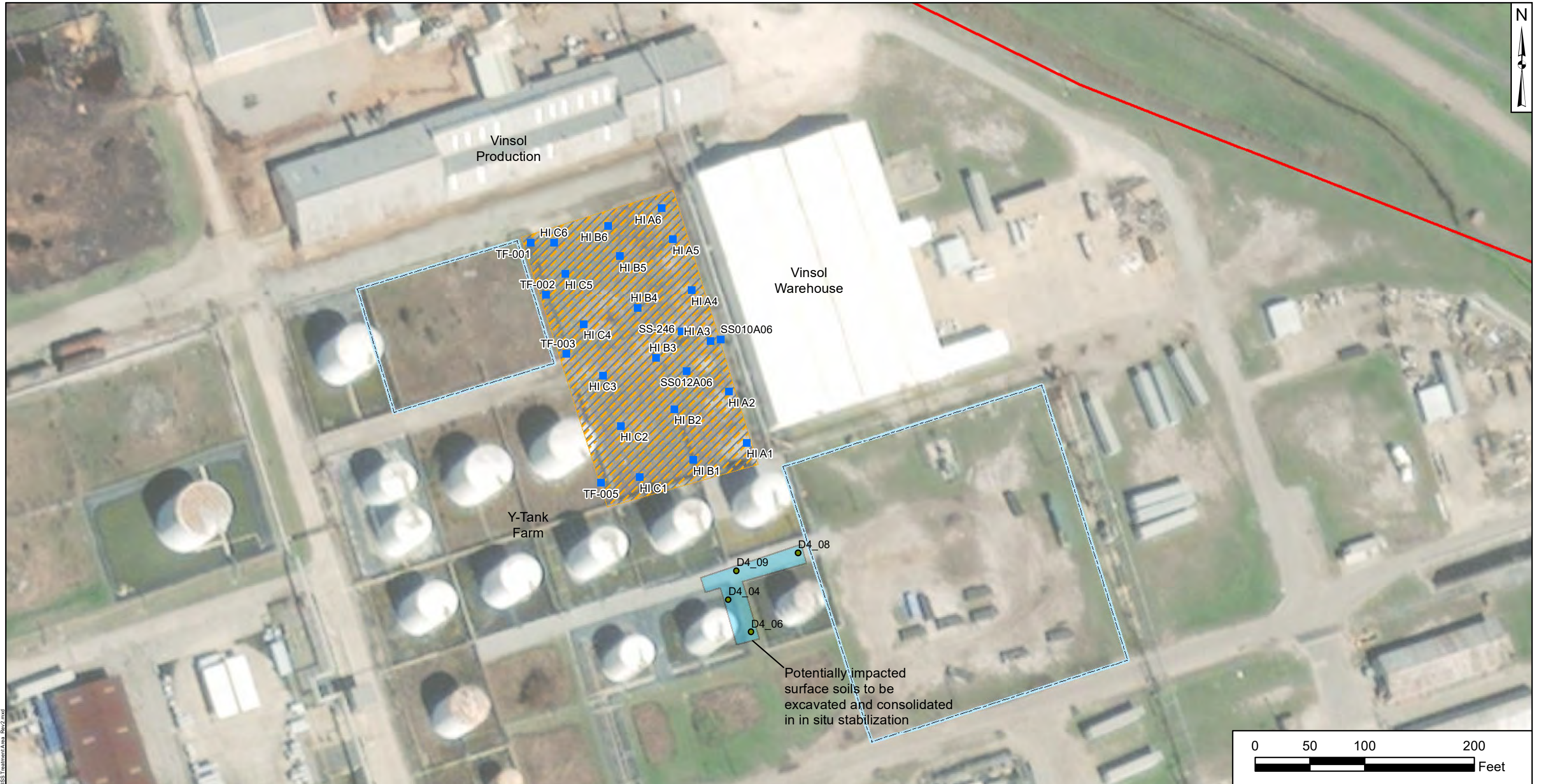
**Site Features**  
**SWMU No. 6 and Former Toxaphene Tank Farm**  
 Hercules/Pinova Facility, Brunswick, Georgia



Figure  
**2**

Kennesaw      July 2020

Path: N:\A\shand\Brunswick Plant\GIS\MXD\TankFarmSite Features.mxd



Path: \\A:\shland\Brunswick Plant\GIS\MXD\TankFarm\Proposed ISS Treatment Area\_Rev2.mxd

- Sitewide Soil ICM Sample Location
- Historical Soil Sample Locations
- ▭ Potential In Situ Solidification Staging
- ▭ Potential additional surface soil excavation area in SWMU No. 6
- ▨ In Situ Solidification Treatment
- ▭ Pinova Property Boundary

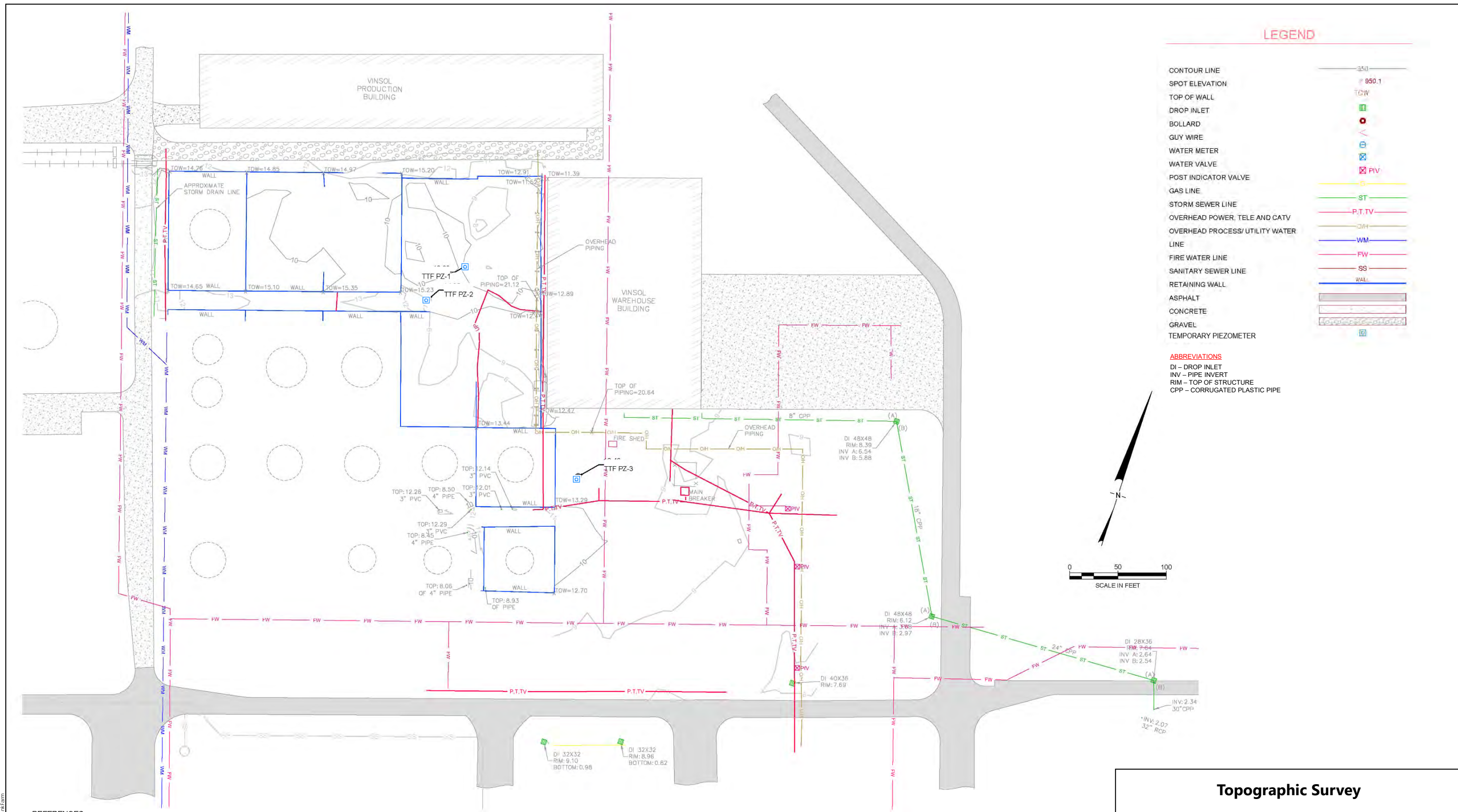
**In Situ Solidification Treatment Area**  
**SWMU No. 6 and Former Toxaphene Tank Farm**  
 Hercules/Pinova Facility, Brunswick, Georgia



Figure  
**3**

Kennesaw

September 2020



**LEGEND**

- CONTOUR LINE
- SPOT ELEVATION
- TOP OF WALL
- DROP INLET
- BOLLARD
- GUY WIRE
- WATER METER
- WATER VALVE
- POST INDICATOR VALVE
- GAS LINE
- STORM SEWER LINE
- OVERHEAD POWER, TELE AND CATV
- OVERHEAD PROCESS/ UTILITY WATER LINE
- FIRE WATER LINE
- SANITARY SEWER LINE
- RETAINING WALL
- ASPHALT
- CONCRETE
- GRAVEL
- TEMPORARY PIEZOMETER

- ABBREVIATIONS**
- DI - DROP INLET
  - INV - PIPE INVERT
  - RIM - TOP OF STRUCTURE
  - CPP - CORRUGATED PLASTIC PIPE



**REFERENCES**

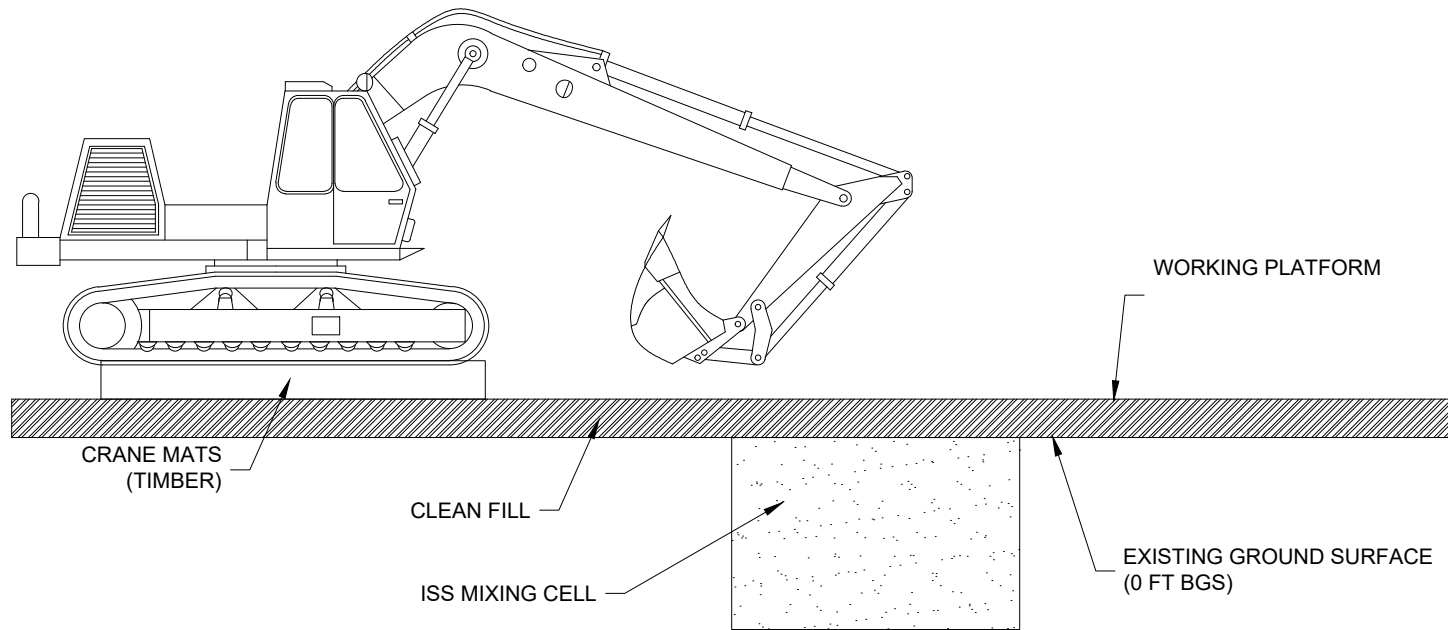
1. TOPOGRAPHIC SURVEY TITLED "PINOVA INC." PROVIDED BY WELLSTON ASSOCIATES LAND SURVEYORS, LLC. DRAWING NO. 036-TS DATE: JULY 31, 2020.
2. THE UNDERGROUND UTILITIES SHOWN ON THIS DRAWING WERE COMPILED FROM FIELD OBSERVATIONS AND UNDERGROUND UTILITIES MARKED BY OTHERS WITHOUT BENEFIT OF EXCAVATION.
3. ONE FOOT CONTOUR INTERVAL SHOWN. ELEVATIONS SHOWN ARE REFERENCED TO NAVD 88 VERTICAL DATUM.
4. HORIZONTAL COORDINATE SYSTEM IS NAD83 GEORGIA STATE PLANES, EAST ZONE, US FOOT.

<b>Topographic Survey</b>	
Hercules/Pinova Facility, Brunswick, Georgia	
Kennesaw, Georgia	September 2020
Figure <b>4</b>	

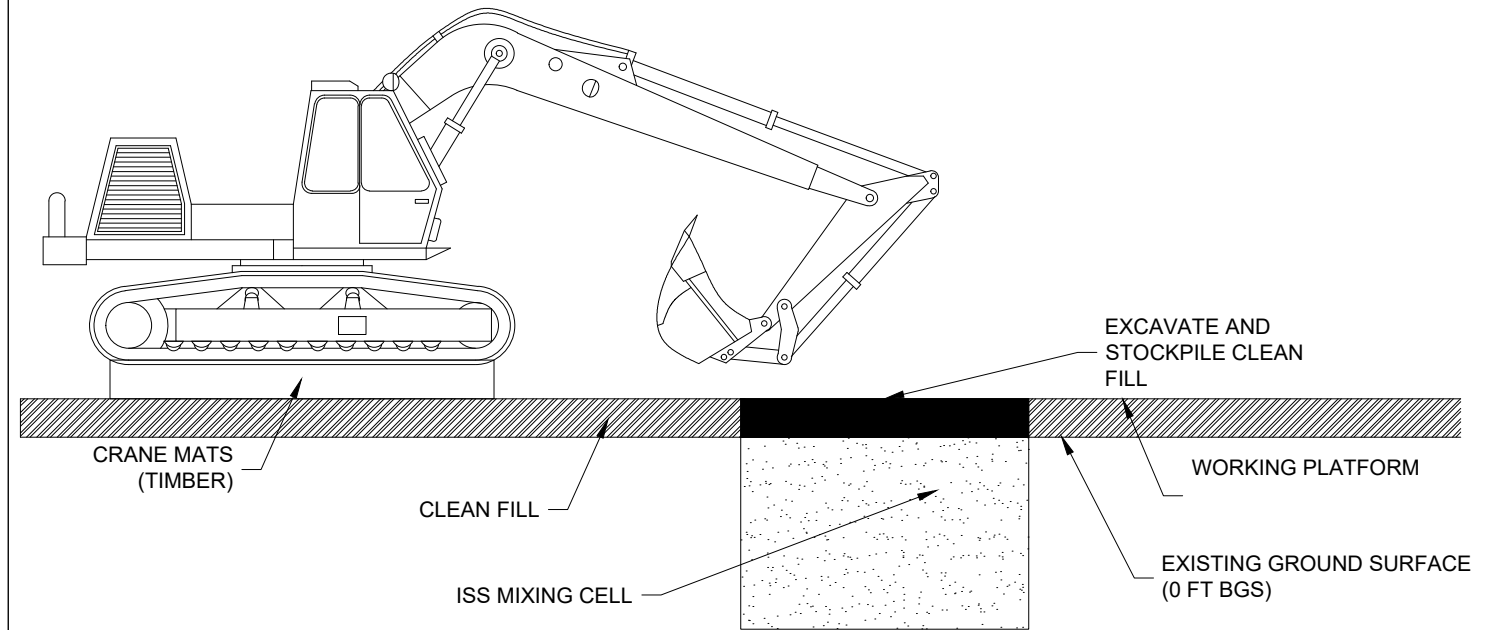
Path: N:\Mchland\Brunswick Plant\GIS\MXD\TaskFarm



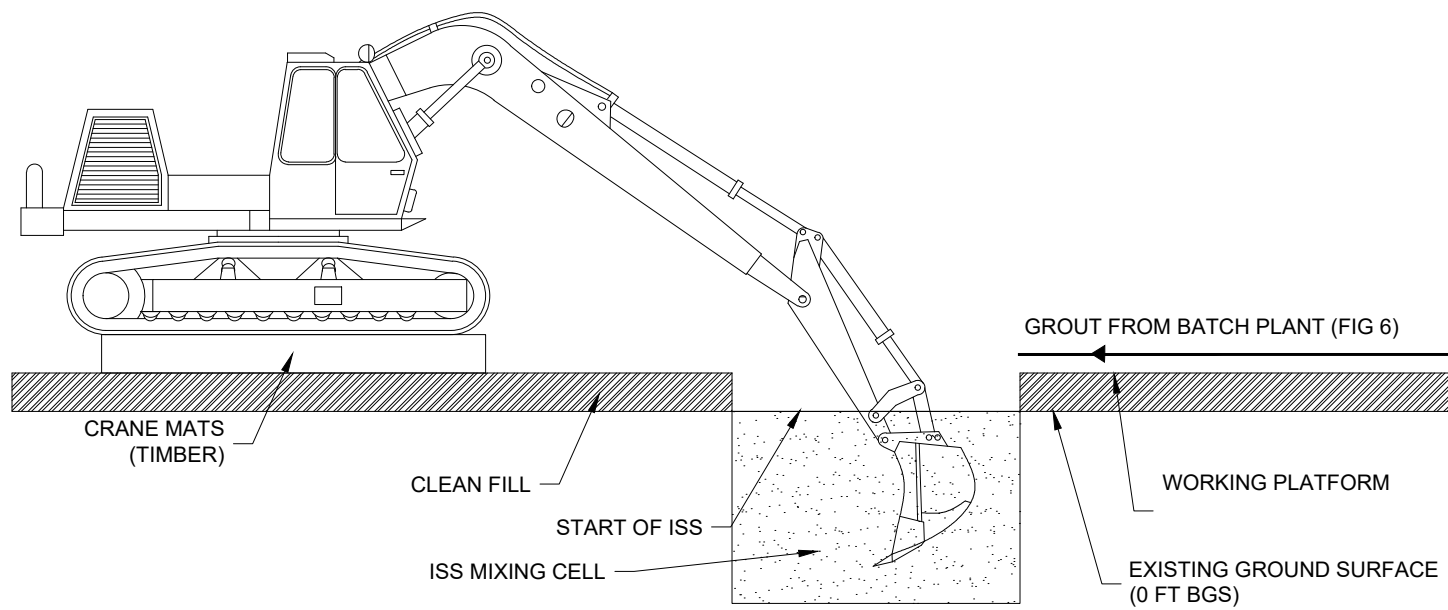
# 1. PREPARE WORKING PLAFORM



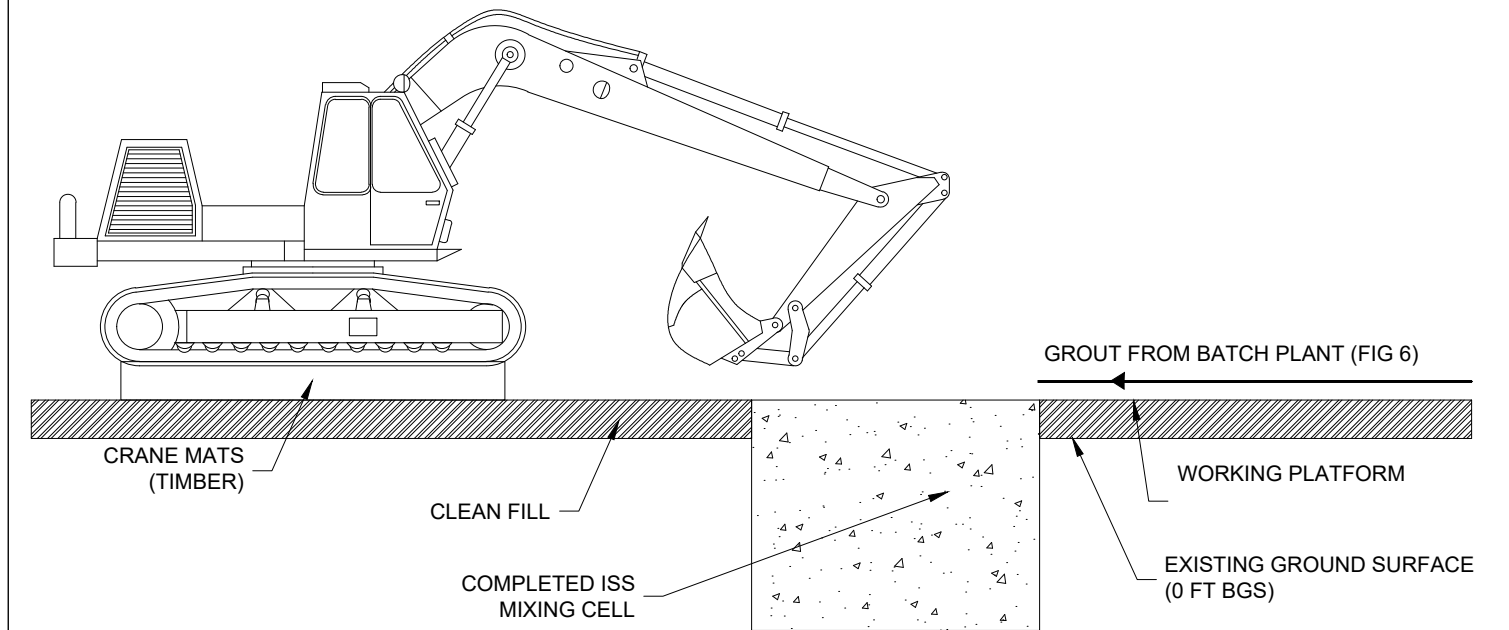
# 2. BENCH EXCAVATION



# 3. CONVEY GROUT TO MIXING CELL



# 4. MIX GROUT AND SOIL INTO HOMOGENOUS MIXTURE



**Notes:**  
 ISS: *in situ* solidification  
 bgs: below ground surface  
 ft: feet

CONCEPTUAL  
*IN SITU* SOLIDIFICATION  
 BUCKET MIXING PROCESS

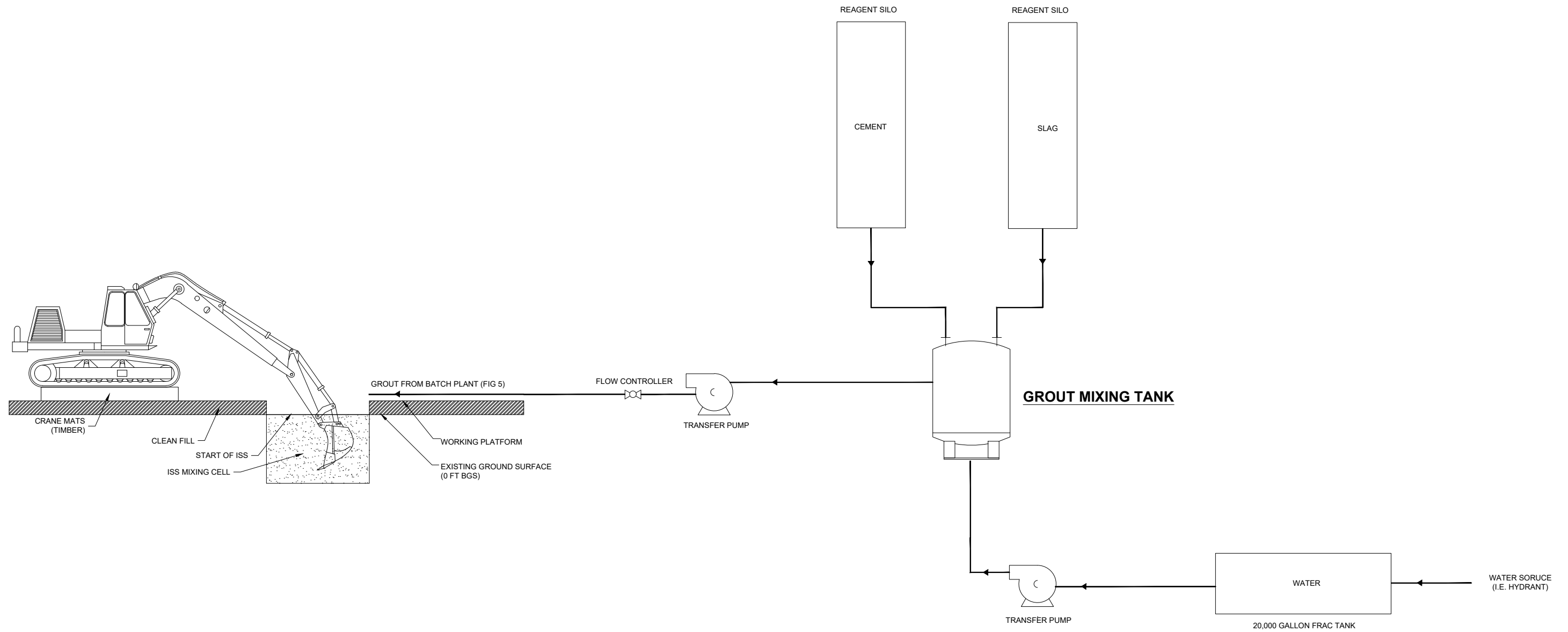


FIGURE

5

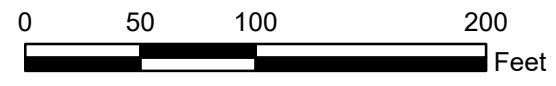
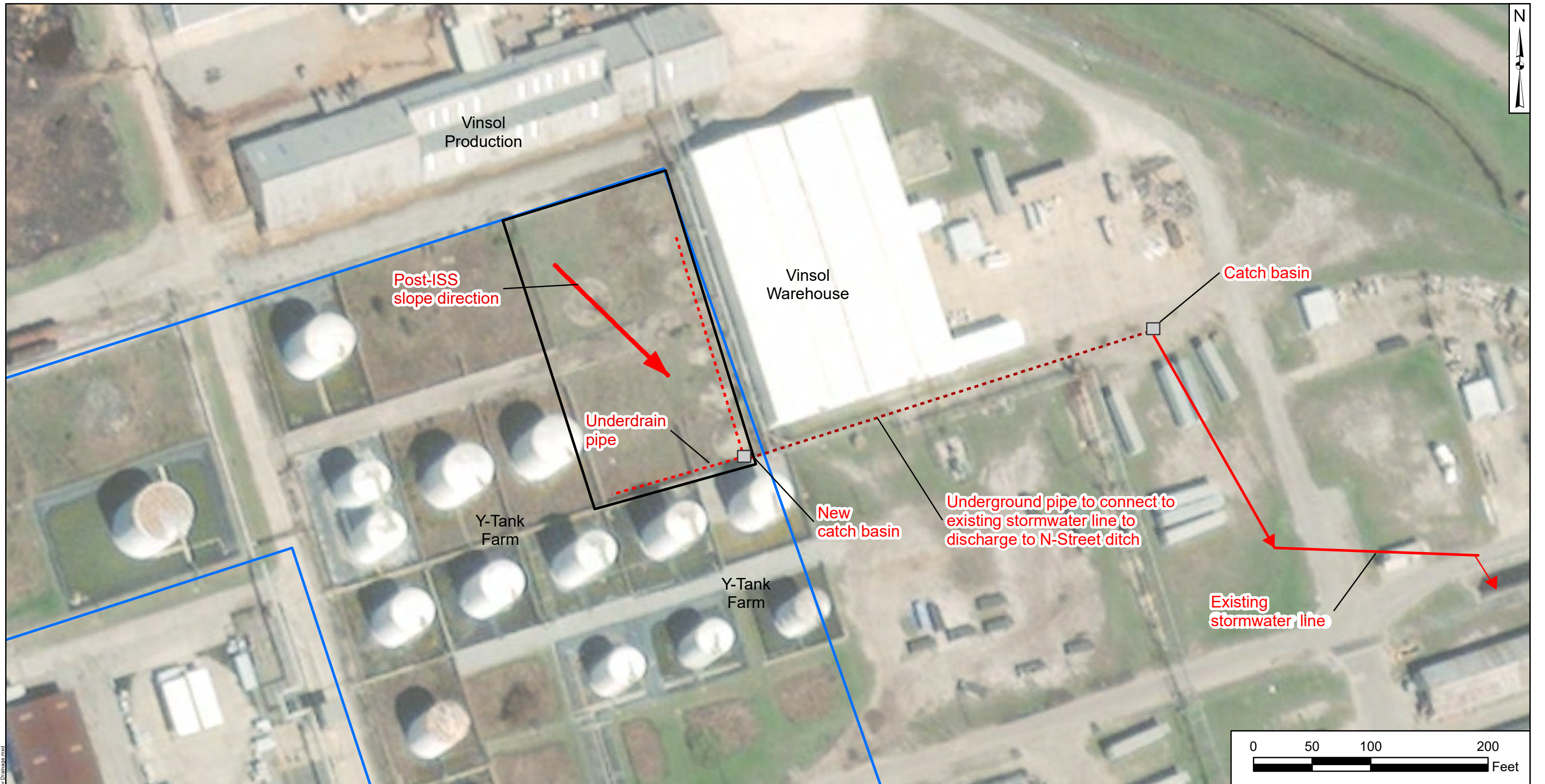
PROJECT NO: GR6881

JUNE 2020



**Notes:**  
 ISS: *in situ* solidification  
 bgs: below ground surface  
 ft: feet

CONCEPTUAL IN SITU SOLIDIFICATION BATCH PLANT PROCESS		FIGURE 6
PROJECT NO: GR6881	JUNE 2020	



**Note:**  
ISS - In Situ Solidification

- SWMU No. 6 Boundary
- Former Toxaphene Tank Farm

**Post-ISS Stormwater Drainage System Layout**  
**SWMU No. 6 and Former Toxaphene Tank Farm**  
 Hercules/Pinova Facility, Brunswick, Georgia



Kennesaw, Georgia      September 2020

Figure  
**7**

Path: N:\A\shand\Brunswick Plant\GIS\MXD\TankFarmStormwaterDrainage.mxd

## APPENDIX A

### SWMU No. 6 – Toxaphene Tank Farm Corrective Measure Alternatives Evaluation

# SWMU No. 6 – Former Toxaphene Tank Farm Remedial Alternatives Evaluation

May 14, 2020

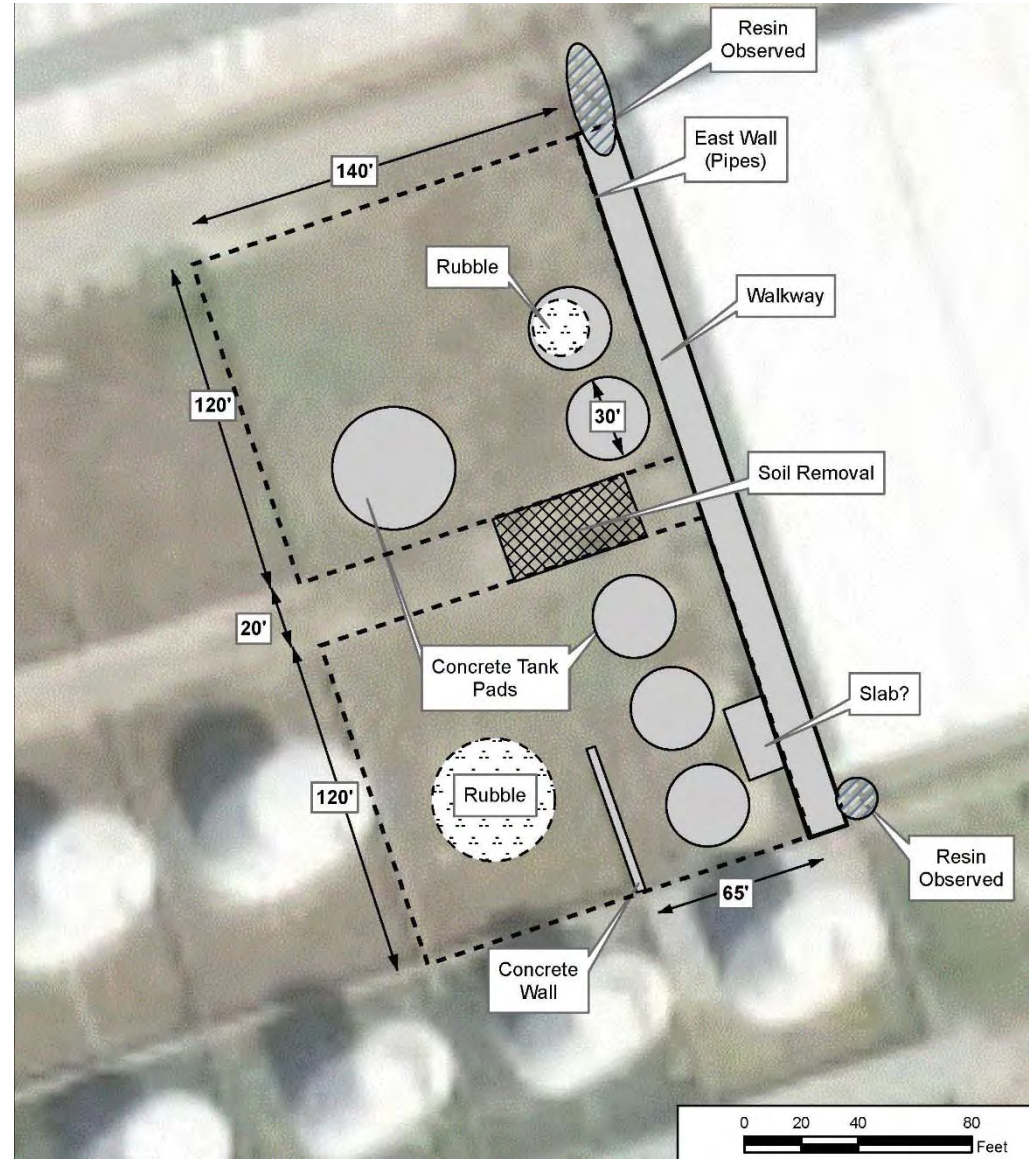
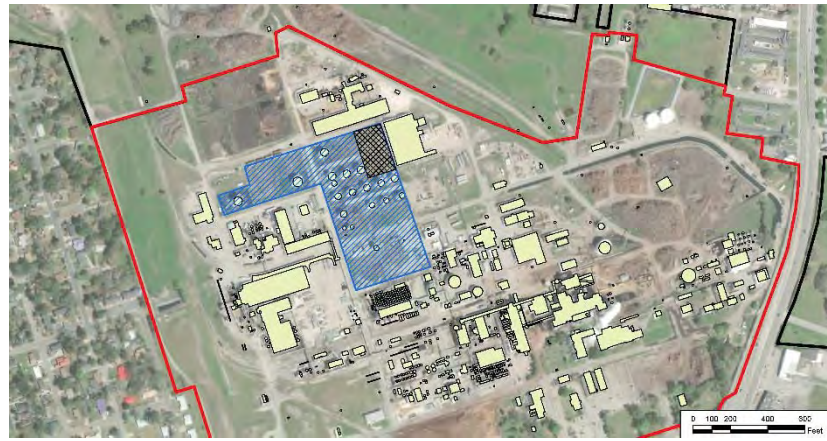
Geosyntec   
consultants



- March 2017 → Former Hercules Brunswick Site, SWMU #6 Toxaphene Tank Area Interim Corrective Action Options Appraisal
  - Treatment volume → 6,750 cubic yards of soil (area of 36,500 sq. ft, depth of 5 ft)
- March 2019 → Baseline Human Health Risk Assessment and Screening Level Ecological Risk Assessment Report
  - Former toxaphene tank farm (part of SWMU No. 6) is in Exposure Domain 4, where toxaphene contributes 99% of potential risk to human receptors
- September 2019 → Submission to EPD describing approach for an interim corrective measure (ICM) for former toxaphene tank farm
  - Phase 1 – Removal of asphalt-like material (classified as P123 listed hazardous waste)
  - Phase 2 – Remediation of soils impacted by toxaphene after completing treatability studies to evaluate alternative remedial technologies
- October/November 2019 → Completion of Phase 1 of ICM
  - All potentially listed hazardous waste removed from former toxaphene tank farm
  - EPD approval of the completion report for Phase 1 of the ICM → May 6, 2020
- October 2019 to April 2020 → Treatability studies
  - In-Situ Solidification (ISS)
  - Chemical reduction/bioremediation
  - Thermal treatment

# Overview – Treatment Area

Former toxaphene tank farm relative to SWMU No. 6



Significant quantities of waste removed from former toxaphene tank farm in October/November 2019:

Description	Classification	Quantity (approx.)	Units
Concrete (non-hazardous waste)	Non-hazardous	100	Tons
Resin	Non-hazardous	20	Tons
Drums containing asphalt-like material	Hazardous waste (P123)	6	Drums
Concrete (hazardous waste)	Hazardous waste (P123)	280	Yards
Roll-off containing asphalt-like material	Hazardous waste (P123)	72	Tons
Water	Hazardous waste (P123)	750	Gallons



# Former Toxaphene Tank Farm - Treatability Studies

May 14, 2020

Geosyntec   
consultants



- Prevent current and future exposure (via ingestion, direct contact and inhalation) to residual toxaphene in unsaturated soils beneath the former toxaphene tank farm and reduce overall potential risk in Exposure Domain 4; and
- Further reduce the mobility of residual toxaphene to reduce the potential for leaching of toxaphene into groundwater.

- Remedial Technologies Screening Process → September 2019
  - Excavation and Off-Site Disposal - **Retained**
  - In-Situ Solidification – **Evaluate further**
  - Chemical Reduction/Bioremediation with DARAMEND<sup>®</sup> II - **Evaluate further**
  - Chemical Reduction via ZVI Mixing - **Eliminated**
  - On-Site Thermal Direct Desorption - **Eliminated**
  - Thermal Treatment with StarX (Smoldering Technology) - **Evaluate further**
- Treatability studies initiated → October/November 2019
- Treatability studies and remedial alternatives reviewed with EPD during meeting on January 21, 2020

- In-Situ Solidification (ISS) Technology:
  - Entrap/solidify toxaphene within a monolith having low permeability and low hydraulic conductivity to minimize its mobility
- EPD-endorsed ISS performance criteria within 28 days of curing
  - Unconfined compressive strength (UCS) → 50 psi or higher
  - Hydraulic conductivity →  $1 \times 10^{-6}$  cm/s or less
  - Wetting/drying cycle durability → 10% or less mass loss (EPD request from January 2020 meeting)
- ISS treatability study objectives
  - Evaluate different mixing ratios of binding agents (i.e., Portland cement and ground blast furnace slag (GBFS)) to identify a design mix achieving the performance criteria
  - Collect data (i.e., volume change, water/cement ratio) to inform full-scale design

Study Stages	Specific Objectives
<b>Stage 1 – Baseline Analytical/Geotechnical Characterization</b>	<ol style="list-style-type: none"><li>1. Assess whether homogenized soil used in treatability study is representative of conditions at the former toxaphene tank farm</li><li>2. Refine mix ratios based on soil geotechnical characteristics</li></ol>
<b>Stage 2 – Solidification Test</b>	Identify a mix ratio to meet performance criteria for unconfined compressive strength and hydraulic conductivity
<b>Stage 3 – Verification of Design Mix Ratio</b>	Verify the design mix ratio selected in Stage 2 in triplicate geotechnical testing

- Stage 1 (baseline geotechnical/analytical characterization)
  - High organic content in soil ranging between 8.1% and 8.7%
  - About 80% sand, 8% gravel, 12% fines (silt/clay) – soil characterized as silty sand
  - Specific gravity is relatively low (between 2.5 and 2.6)

	CS-1	CS-2	CS-3
Technical Toxaphene, mg/kg	4,900	7,300	8,400
SPLP Technical Toxaphene, mg/L	0.51	0.53	0.65

# ISS Treatability Study – Results

- Stage 2 (Solidification Test) – 28 days of curing

Design Mix	Portland Cement Type I Ratio (%)	GBFS <sup>1</sup> Ratio, (%)	Unconfined Compressive Strength (psi)		Hydraulic Conductivity (cm/s)
Mix-1	3	6	12.9	--	4E-6
Mix-2	3	12	29.2	28.7	4E-6
Mix-3	5	10	158.8	189.9	7E-7
Mix-4	5	15	278.2	--	--
Mix-5	8	12	--	--	--

<sup>1</sup>GBFS - ground blast furnace slag

- Testing was truncated after Mix 3 because Mix 3 met the performance criteria
- Selected mix → 8% Portland Cement and 8% GBFS (Modified Mix 3)**

# ISS Treatability Study – Results

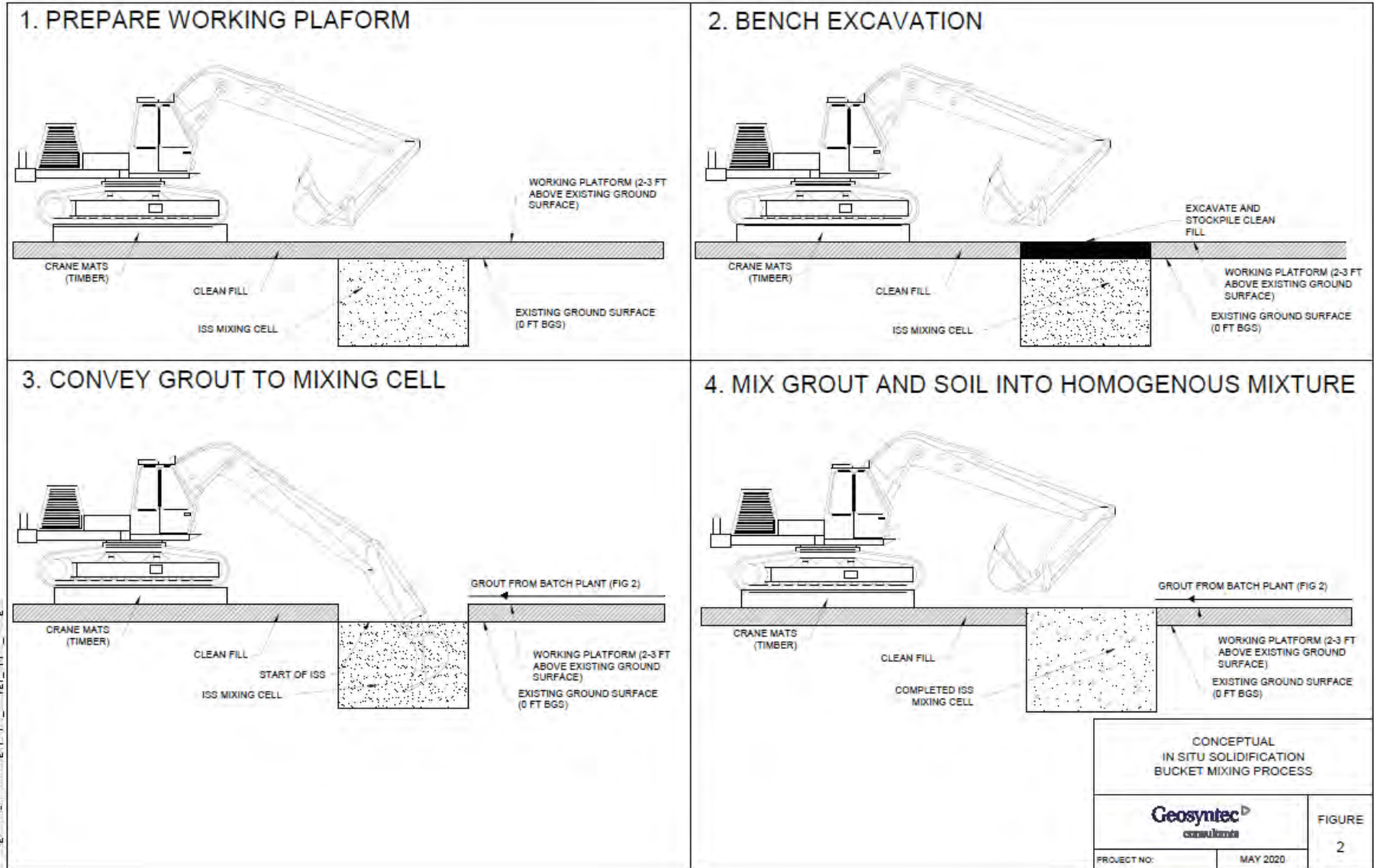
- Stage 3 (Verification Test) – 28 days of curing

Design Mix	Portland Cement Ratio (%)	GBFS <sup>1</sup> Ratio, (%)	Unconfined Compressive Strength (psi)	Hydraulic Conductivity (cm/s)	Wetting/ Drying Cycle Mass Loss (%)
Stage 2 Successful Mix (Mix 3)	5	10	158.8 and 189.9	4E-7	--
Stage 3 Selected Mix Triplicate No. 1	8	8	213	1E-6	0.33
Stage 3 Selected Mix Triplicate No. 2	8	8	218.8	9E-7	0.38
Stage 3 Selected Mix Triplicate No. 3	8	8	211.5	1E-6	0.48

<sup>1</sup>GBFS - ground blast furnace slag



# ISS - Typical Implementation Process



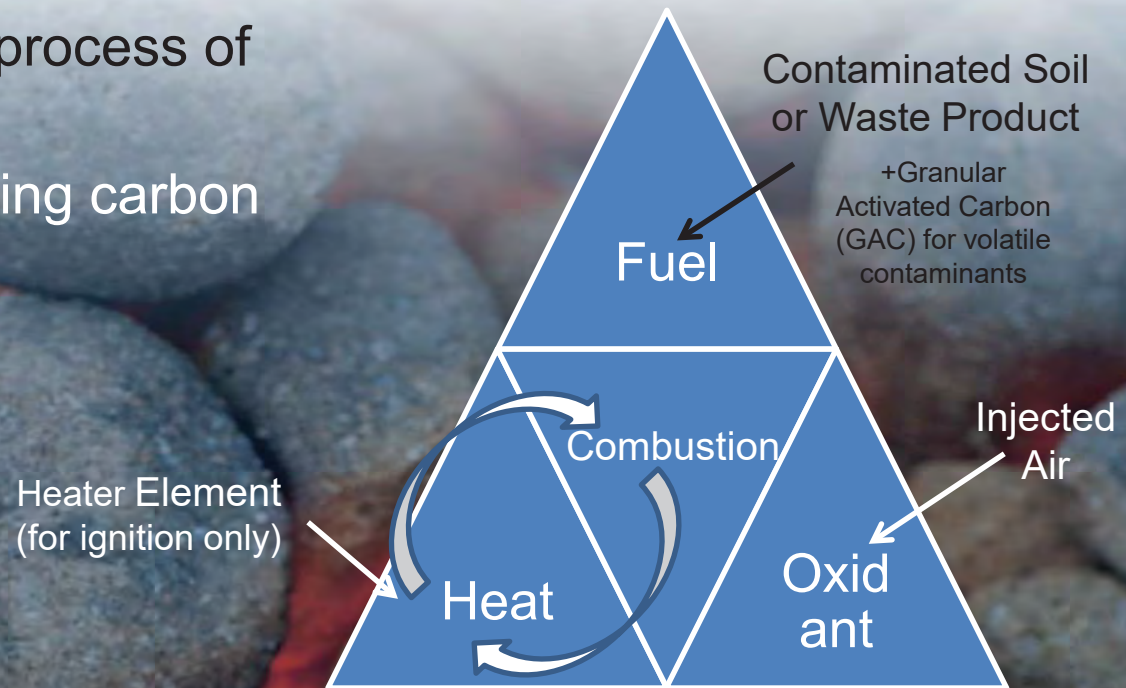
- Solidified/treated soil → Eliminates potential health risks
- Vegetative soil layer → Protective layer for the solidified soil monolith
- Institutional controls → Limit potential future land use and protect the solidified soil monolith from disturbance



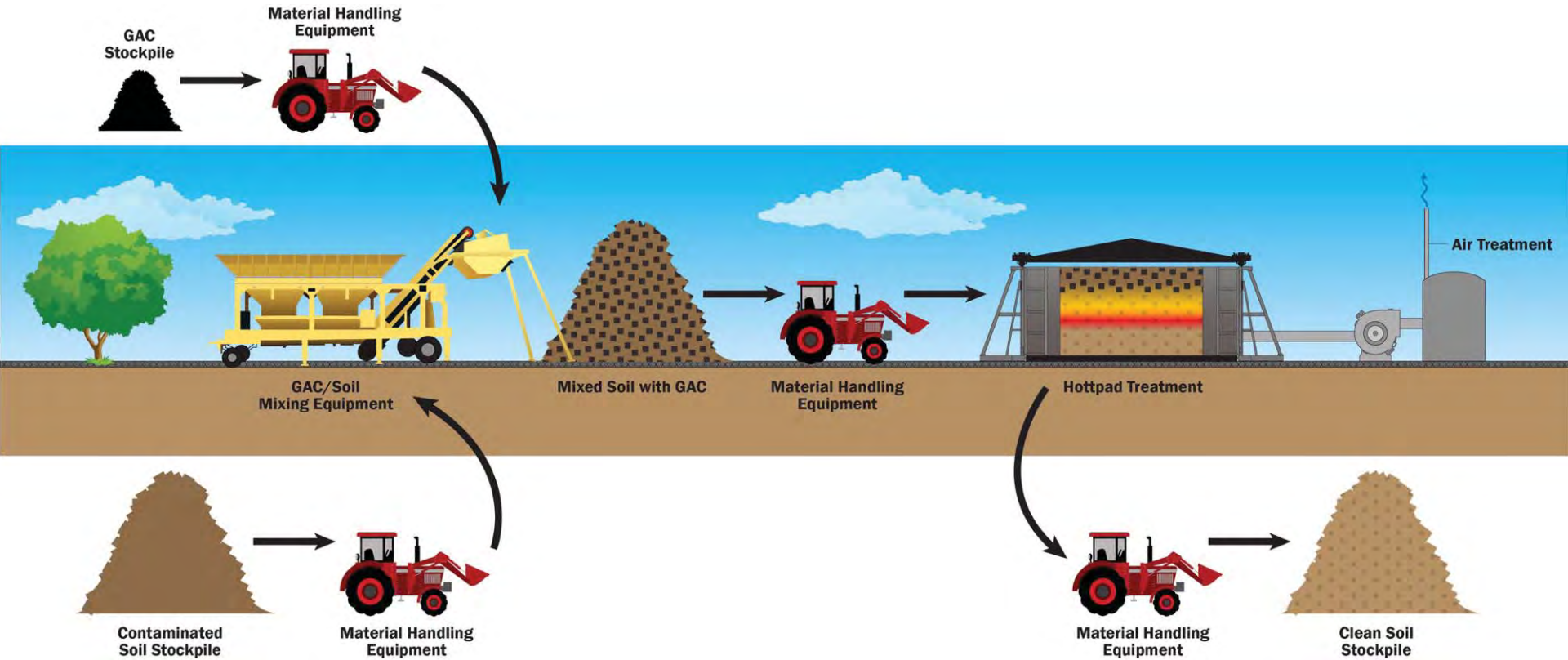
**Solidified Soil/Monolith**

- **STARx** is based on the process of smoldering combustion:

Exothermic reaction converting carbon compounds to  $\text{CO}_2 + \text{H}_2\text{O}$

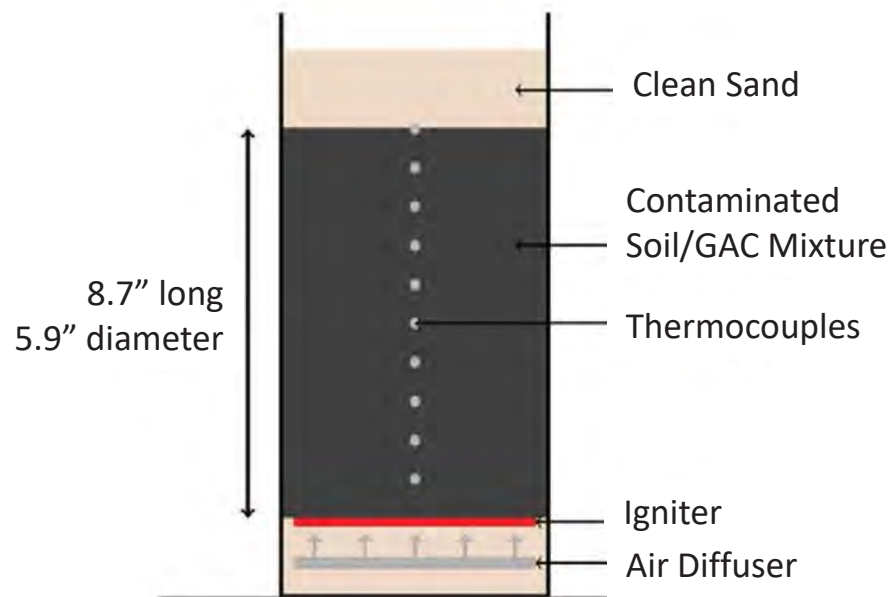


# STARx Treatment - Overview

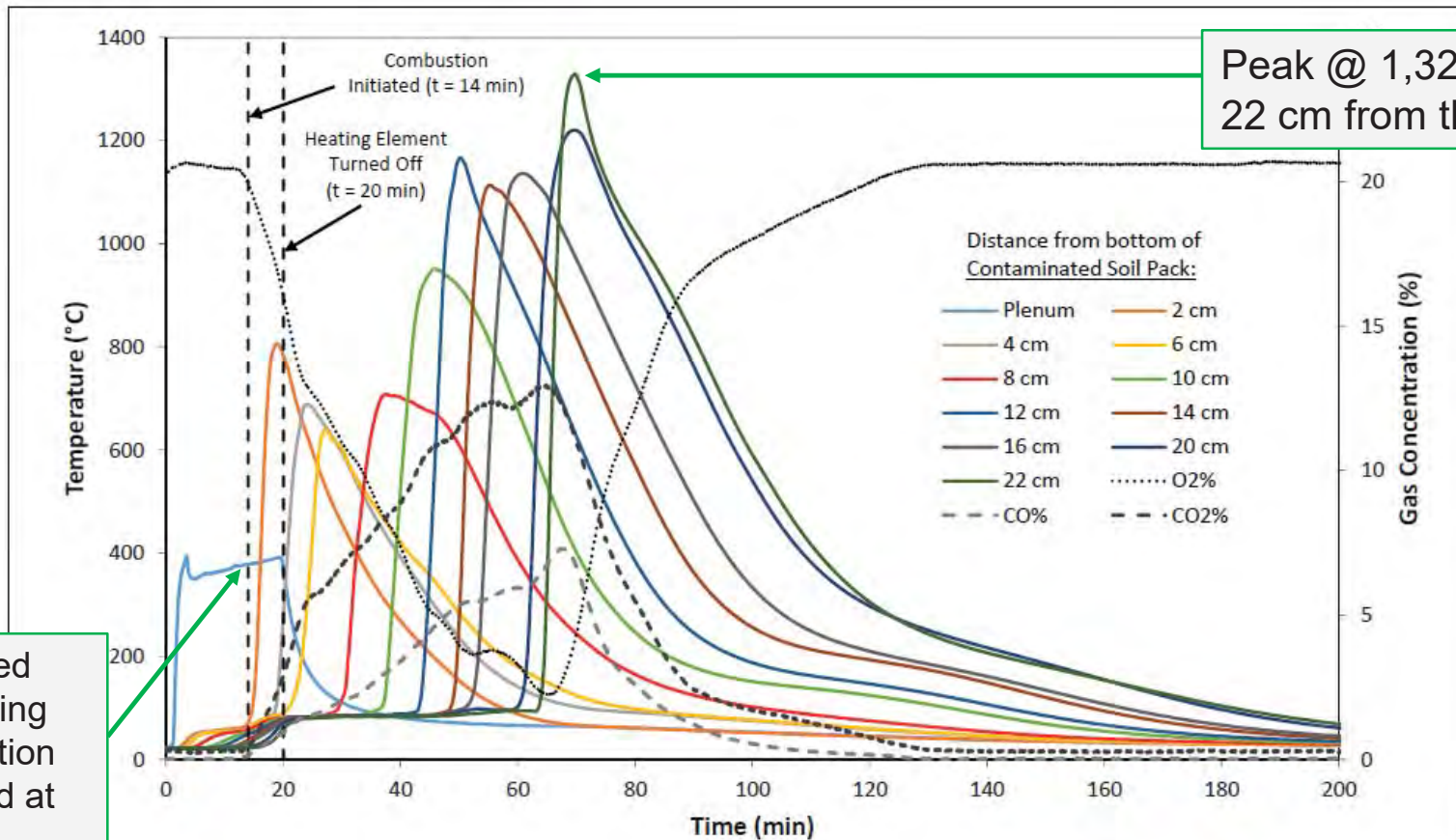


- Treatability Study Objectives:
  - Evaluate the effectiveness of thermal treatment to reduce concentrations of toxaphene in soils
  - Evaluate ignition temperature, airflow rate, and smoldering front propagation velocity to achieve self-sustaining smoldering combustion
  - Identify principal components of gaseous emissions and estimate average gas-phase emissions
  - Assess granular activated carbon (GAC) as surrogate fuel required to achieve self-sustaining smoldering combustion

- Test parameters:
  - 20 g/kg GAC dosage
  - Air flux of 5 cm/s (~2 inch/s)



# Thermal Treatment (StarX) Treatability Study – Results



**Notes:**

- 1) Colored lines represent temperatures at various heights within the contaminated soil pack
- 2) Dashed lines represent combustion gas concentrations in the emissions (O<sub>2</sub>, CO and CO<sub>2</sub>)

STARx Temperature Profiles Hercules/Pinova Facility Treatability Study	
	January 2020
	Figure 1

Compound	Units	Pre-Treatment Sample				Post-Treatment Sample			
		Duplicate 1		Duplicate 2		Duplicate 1		Duplicate 2	
		RDL	Results	RDL	Results	RDL	Results	RDL	Results
<b>Toxaphene</b>									
Toxaphene, Technical	mg/kg	1,100	<b>9,200</b>	1,100	<b>12,000</b>	0.08	<b>0.17</b>	0.08	<b>0.44</b>

- 99.99% reduction in concentrations of toxaphene in soil samples
- Toxaphene and other organics detected in the vapor phase
  - Toxaphene → 1,115 mg/m<sup>3</sup>
  - Other volatiles → Ranging between 0.210 and 2,080 mg/m<sup>3</sup>



- Results → 99.99% reduction in concentrations of toxaphene
- Exhaust/condensate treatment, permitting, and soil handling (i.e., excavation, dewatering) make this technology less feasible and more difficult to implement than other remediation approaches
- Pilot test is recommended prior to implementation for this technology  
→ ICM timeframe challenges



(a)

**Before Treatment**



(b)

**After Treatment**

- DARAMEND II
  - Product of PeroxyChem
  - ~40-50% zero valent iron and ~50-60% organic matter
  - Promotes chemical reduction and anaerobic bioremediation
- Treatability Study Objectives:
  - Evaluate effectiveness of DARAMEND II in reducing concentrations of toxaphene in soils
  - Assess the dosages of DARAMEND II and water amendment for full-scale implementation
  - Evaluate degradation kinetics and treatment duration

- Study involved a total of six treatment cycles
- Each cycle included 5 days anaerobic + 2 days aerobic
- Test Procedure:
  - DARAMEND II/Ferrous Sulfate added at the beginning of each anaerobic cycle (targeting 0.5% by weight each) – total 6% amendments
  - Water is added to the test reactors in order to achieve 90% of the water holding capacity of the soil

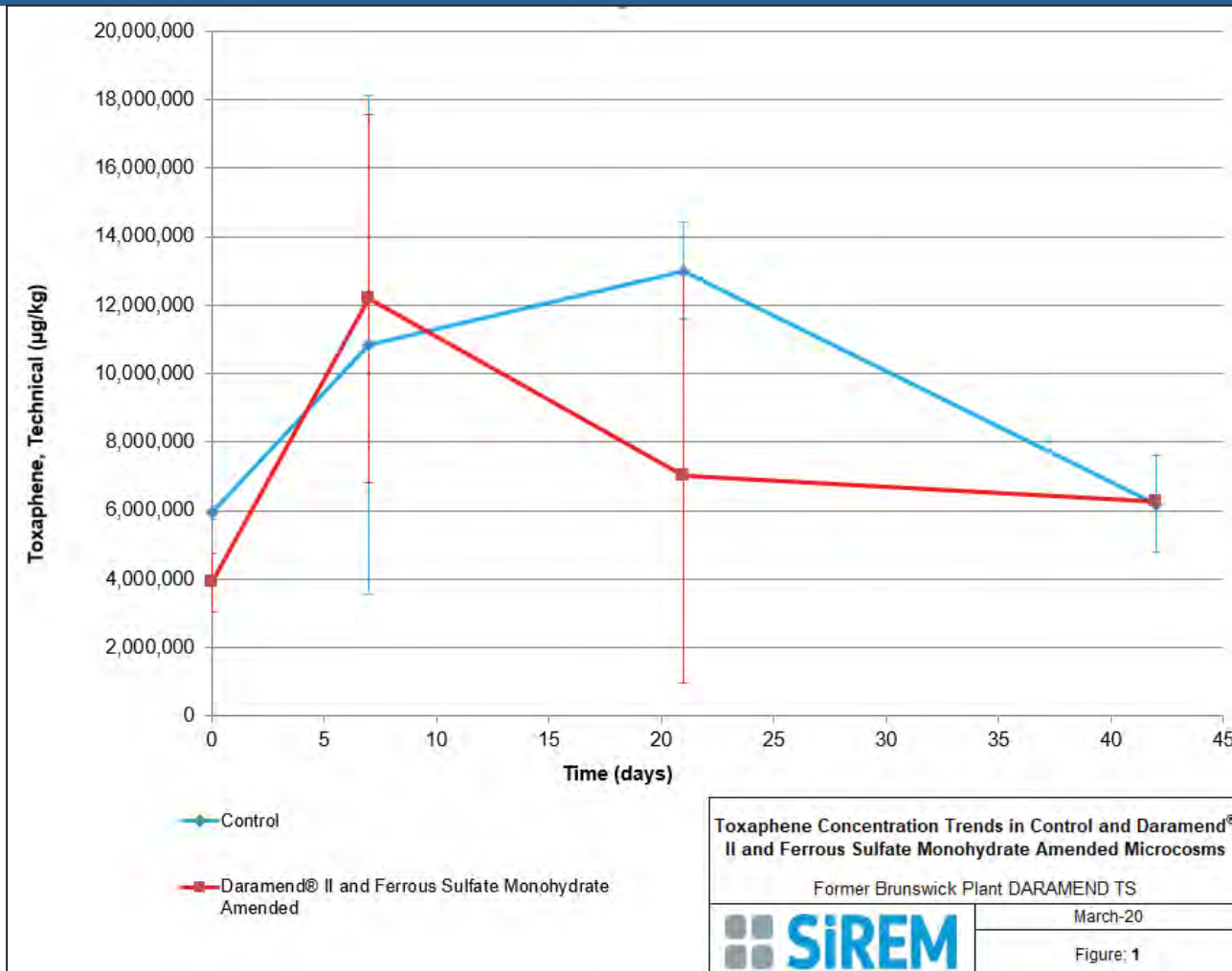




- Test Procedure:
  - Reactors are incubated at 28°C with sealed lids to stimulate anaerobic conditions followed by two days of aerobic incubation with open lids/daily mixing.
  - Soil samples are collected from the reactors at Baseline, Cycle 1, 3, and 6 for toxaphene analysis

Treatment/Control	Assigned Microcosm Number	Number of Microcosms	Geological Material	Deionized Water	Daramend® II	Ferrous Sulfate Monohydrate
Control	1 to 2	2	500 g dry weight	90% of water holding capacity at the beginning of each cycle	--	--
Daramend® II and Ferrous Sulfate Monohydrate Amended	3 to 4				0.5% of soil by wet weight	0.5% of soil by wet weight

# DARAMEND II Treatability Test - Results



Control and amended microcosms showed similar results, suggesting that DARAMEND II is not effective at the tested concentrations of toxaphene

- Remedial Alternatives:
  - Alternative 1 – In-Situ Solidification
  - Alternative 2 – Excavation and Onsite Ex-Situ Thermal Treatment
  - Alternative 3 – Excavation and Off-site Treatment/Disposal

# Former Toxaphene Tank Farm - Remedial Alternatives Evaluation

May 14, 2020

Geosyntec   
consultants



- Factors Considered
  - Human Health and Environmental Protection
  - Long Term Effectiveness and Permanence
  - Reduction of Toxicity, Mobility or Volume
  - Short Term Effectiveness
  - Implementability



<p>Alternative 1 – ISS</p>	<ul style="list-style-type: none"><li>• Protective of human health and environment<ul style="list-style-type: none"><li>• ISS → reduces the contaminant mobility/eliminates the potential risk of leaching of contaminants</li><li>• Reduces potential risk of direct contact and ingestion/inhalation by creating a solidified monolith</li></ul></li></ul>
<p>Alternative 2 – Excavation and Onsite Ex-Situ Thermal Treatment</p>	<ul style="list-style-type: none"><li>• Protective of human health and environment<ul style="list-style-type: none"><li>• Thermal Treatment → reduce contaminant volume and toxicity</li></ul></li></ul>
<p>Alternative 3 – Excavation and Off-Site Treatment/Disposal</p>	<ul style="list-style-type: none"><li>• Protective of human health and environment<ul style="list-style-type: none"><li>• Excavation → reduce contaminant volume (if treated offsite) and toxicity</li></ul></li></ul>

Alternative 1 - ISS	<ul style="list-style-type: none"><li>• Minimal residual potential risk with institutional controls and periodic inspection</li><li>• Wet/dry durability test to verify the long term effectiveness and permanence</li></ul>
Alternative 2 - Excavation and Onsite Ex-Situ Thermal Treatment	<ul style="list-style-type: none"><li>• Minimal residual potential risk</li><li>• Does not require long term inspection and maintenance</li></ul>
Alternative 3 – Excavation and Off-Site Treatment/Disposal	<ul style="list-style-type: none"><li>• Minimal residual potential risk</li><li>• Does not require long term inspection and maintenance</li></ul>

Alternative 1 – ISS	<ul style="list-style-type: none"><li>• Reduces contaminant mobility and eliminates exposure pathways (i.e. reduces potential health risks)</li></ul>
Alternative 2 - Excavation and Onsite Ex-Situ Thermal Treatment	<ul style="list-style-type: none"><li>• Reduces toxicity, mobility and volume</li></ul>
Alternative 3 – Excavation and Off-Site Treatment/Disposal	<ul style="list-style-type: none"><li>• Reduces toxicity, mobility and volume (if treated)</li></ul>

Alternative 1 – ISS	<ul style="list-style-type: none"><li>• Shortest implementation duration</li><li>• Minimal health and safety concerns during implementation</li></ul>
Alternative 2 – Excavation and Onsite Ex-Situ Thermal Treatment	<ul style="list-style-type: none"><li>• Longest implementation duration of the three alternatives</li><li>• Fugitive dust/exhaust generation during implementation</li><li>• Greater potential risks to on-site workers from waste handling and dewatering</li></ul>
Alternative 3 – Excavation and Off-Site Treatment/Disposal	<ul style="list-style-type: none"><li>• Longer implementation duration than Alternative 1 but shorter implementation duration than Alternative 2</li><li>• Fugitive dust generation during implementation</li><li>• Significant truck traffic</li><li>• Greater potential risks to on-site workers from waste handling and dewatering</li></ul>

<p>Alternative 1 – ISS</p>	<ul style="list-style-type: none"> <li>• Widely implemented technology</li> <li>• All resources are readily available</li> </ul>
<p>Alternative 2 – Excavation and Onsite Ex-Situ Thermal Treatment</p>	<ul style="list-style-type: none"> <li>• Difficult</li> <li>• Pilot scale would be required to evaluate treatment options for generated exhaust and condensate prior to field implementation</li> <li>• Requires dewatering and management/treatment of waste water during full scale implementation</li> <li>• Requires soil stockpile management</li> </ul>
<p>Alternative 3 – Excavation and Off-Site Treatment/Disposal</p>	<ul style="list-style-type: none"> <li>• Difficult</li> <li>• Requires dewatering and management/treatment of waste water during excavation</li> <li>• Requires additional sampling to determine whether soil qualifies as characteristic hazardous waste</li> <li>• Requires soil stockpile management</li> <li>• Widely implemented technology</li> <li>• All resources are readily available</li> </ul>

- Alternative 1 – In-Situ Solidification
  - Meets remedial action objectives
  - Readily available resources for full scale implementation
  - High chance of success → ISS is a well established and widely implemented technology
  - Shortest implementation duration
  - Minimizes generation of multiple waste streams compared to other alternatives



- Technical Report → End of May
  - Summary of results of treatability studies
  - Evaluation of remedial alternatives
- Phase 2 ICM Plan → End of June
  - Performance criteria
  - Quality assurance/quality control plan
  - Waste management procedures
  - Post-construction inspections
  - Land use controls
  - Schedule

## APPENDIX B

### *In Situ* Solidification Treatability Study Laboratory Reports



## ANALYTICAL REPORT

Eurofins TestAmerica, Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404  
Tel: (912)354-7858


Laboratory Job ID: 680-176840-1

Client Project/Site: Brunswick Plant - SWMU 6 ISS TS

**For:**

Geosyntec Consultants, Inc.  
1255 Roberts Blvd, NW  
Suite 200  
Kennesaw, Georgia 30144

Attn: Adria Reimer



Authorized for release by:  
11/30/2019 6:00:28 PM

Jerry Lanier, Project Manager I  
(912)250-0281  
[jerry.lanier@testamericainc.com](mailto:jerry.lanier@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

**Job ID: 680-176840-1**

**Laboratory: Eurofins TestAmerica, Savannah**

**Narrative**

## CASE NARRATIVE

**Client: Geosyntec Consultants, Inc.**

**Project: Brunswick Plant - SWMU 6 ISS TS**

**Report Number: 680-176840-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

### **RECEIPT**

The samples were received on 11/13/2019; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.5 C.

### **ORGANOCHLORINE PESTICIDES (GC)**

Samples CS\_1\_110519 (680-176840-1), CS\_2\_110519 (680-176840-2) and CS\_3\_110519 (680-176840-3) were analyzed for Organochlorine Pesticides (GC) in accordance with EPA SW-846 Method 8081B. The samples were prepared on 11/15/2019 and analyzed on 11/16/2019.

The following samples required a dilution due to the nature of the sample matrix: CS\_1\_110519 (680-176840-1), CS\_2\_110519 (680-176840-2) and CS\_3\_110519 (680-176840-3). Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

The method blank for preparation batch 680-596384 and analytical batch 680-596412 contained Toxaphene, Technical and Total Toxaphene above the reporting limit (RL). Associated sample(s) were not re-extracted and/or re-analyzed because results were greater than 10X the value found in the method blank.

The laboratory control sample (LCS) for preparation batch 680-596384 and analytical batch 680-596412 recovered outside control limits for the following analytes: Toxaphene, Technical and Total Toxaphene.

Samples CS\_1\_110519 (680-176840-1)[10000X], CS\_2\_110519 (680-176840-2)[10000X] and CS\_3\_110519 (680-176840-3)[10000X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **SPLP SEMIVOLATILE ORGANICS (GC)**

Samples CS\_1\_110519 (680-176840-1), CS\_2\_110519 (680-176840-2) and CS\_3\_110519 (680-176840-3) were analyzed for SPLP semivolatile organics (GC) in accordance with EPA SW-846 Methods 1312/8081\_8082. The samples were leached on 11/18/2019, prepared on 11/25/2019 and analyzed on 11/29/2019.

The following samples required a dilution due to the nature of the sample matrix: CS\_1\_110519 (680-176840-1), CS\_2\_110519 (680-176840-2) and CS\_3\_110519 (680-176840-3). Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

Samples CS\_1\_110519 (680-176840-1)[100X], CS\_2\_110519 (680-176840-2)[100X] and CS\_3\_110519 (680-176840-3)[100X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

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## Job ID: 680-176840-1 (Continued)

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### Laboratory: Eurofins TestAmerica, Savannah (Continued)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### PERCENT SOLIDS/MOISTURE

Samples CS\_1\_110519 (680-176840-1), CS\_2\_110519 (680-176840-2) and CS\_3\_110519 (680-176840-3) were analyzed for Percent Solids/Moisture in accordance with TestAmerica SOP. The samples were analyzed on 11/15/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# Sample Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-176840-1	CS_1_110519	Solid	11/11/19 00:00	11/13/19 09:20	
680-176840-2	CS_2_110519	Solid	11/11/19 00:00	11/13/19 09:20	
680-176840-3	CS_3_110519	Solid	11/11/19 00:00	11/13/19 09:20	

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# Method Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

Method	Method Description	Protocol	Laboratory
8081B	Organochlorine Pesticides (GC)	SW846	TAL SAV
8081B/8082A	Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography	SW846	TAL SAV
Moisture	Percent Moisture	EPA	TAL SAV
1312	SPLP Extraction	SW846	TAL SAV
3520C	Liquid-Liquid Extraction (Continuous)	SW846	TAL SAV
3546	Microwave Extraction	SW846	TAL SAV

**Protocol References:**

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858



# Definitions/Glossary

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

## Qualifiers

### GC Semi VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
B	Compound was found in the blank and sample.
D	Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples.
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Detection Summary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

## Client Sample ID: CS\_1\_110519

## Lab Sample ID: 680-176840-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	0.51		0.27		mg/L	100		8081B/8082A	SPLP East
Total Toxaphene	0.68		0.27		mg/L	100		8081B/8082A	SPLP East
Toxaphene, Technical	4900000	B	1000000		ug/Kg	10000	⊛	8081B	Total/NA
Total Toxaphene	4100000	B	1000000		ug/Kg	10000	⊛	8081B	Total/NA

## Client Sample ID: CS\_2\_110519

## Lab Sample ID: 680-176840-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	0.53		0.28		mg/L	100		8081B/8082A	SPLP East
Total Toxaphene	0.70		0.28		mg/L	100		8081B/8082A	SPLP East
Toxaphene, Technical	7300000	B	1000000		ug/Kg	10000	⊛	8081B	Total/NA
Total Toxaphene	6200000	B	1000000		ug/Kg	10000	⊛	8081B	Total/NA

## Client Sample ID: CS\_3\_110519

## Lab Sample ID: 680-176840-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	0.65		0.27		mg/L	100		8081B/8082A	SPLP East
Total Toxaphene	0.85		0.27		mg/L	100		8081B/8082A	SPLP East
Toxaphene, Technical	8400000	B	1000000		ug/Kg	10000	⊛	8081B	Total/NA
Total Toxaphene	7000000	B	1000000		ug/Kg	10000	⊛	8081B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah



# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

**Client Sample ID: CS\_1\_110519**

**Lab Sample ID: 680-176840-1**

Date Collected: 11/11/19 00:00

Matrix: Solid

Date Received: 11/13/19 09:20

Percent Solids: 77.3

**Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography - SPLP East**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	0.51		0.27		mg/L		11/25/19 13:03	11/29/19 16:11	100
Total Toxaphene	0.68		0.27		mg/L		11/25/19 13:03	11/29/19 16:11	100
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
DCB Decachlorobiphenyl	0	D	14 - 130				11/25/19 13:03	11/29/19 16:11	100
Tetrachloro-m-xylene	0	D	40 - 130				11/25/19 13:03	11/29/19 16:11	100

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	4900000	B	1000000		ug/Kg	☼	11/15/19 11:52	11/16/19 19:38	10000
Total Toxaphene	4100000	B	1000000		ug/Kg	☼	11/15/19 11:52	11/16/19 19:38	10000
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
DCB Decachlorobiphenyl	0	D	54 - 133				11/15/19 11:52	11/16/19 19:38	10000
Tetrachloro-m-xylene	0	D	46 - 130				11/15/19 11:52	11/16/19 19:38	10000

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

**Client Sample ID: CS\_2\_110519**

**Lab Sample ID: 680-176840-2**

Date Collected: 11/11/19 00:00

Matrix: Solid

Date Received: 11/13/19 09:20

Percent Solids: 80.5

**Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography - SPLP East**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	0.53		0.28		mg/L		11/25/19 13:03	11/29/19 16:26	100
Total Toxaphene	0.70		0.28		mg/L		11/25/19 13:03	11/29/19 16:26	100
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	D	14 - 130				11/25/19 13:03	11/29/19 16:26	100
Tetrachloro-m-xylene	0	D	40 - 130				11/25/19 13:03	11/29/19 16:26	100

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	7300000	B	1000000		ug/Kg	☼	11/15/19 11:52	11/16/19 19:53	10000
Total Toxaphene	6200000	B	1000000		ug/Kg	☼	11/15/19 11:52	11/16/19 19:53	10000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	D	54 - 133				11/15/19 11:52	11/16/19 19:53	10000
Tetrachloro-m-xylene	0	D	46 - 130				11/15/19 11:52	11/16/19 19:53	10000

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

**Client Sample ID: CS\_3\_110519**

**Lab Sample ID: 680-176840-3**

Date Collected: 11/11/19 00:00

Matrix: Solid

Date Received: 11/13/19 09:20

Percent Solids: 79.2

**Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography - SPLP East**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	0.65		0.27		mg/L		11/25/19 13:03	11/29/19 16:40	100
Total Toxaphene	0.85		0.27		mg/L		11/25/19 13:03	11/29/19 16:40	100
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
DCB Decachlorobiphenyl	0	D	14 - 130				11/25/19 13:03	11/29/19 16:40	100
Tetrachloro-m-xylene	0	D	40 - 130				11/25/19 13:03	11/29/19 16:40	100

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	8400000	B	1000000		ug/Kg	☼	11/15/19 11:52	11/16/19 20:08	10000
Total Toxaphene	7000000	B	1000000		ug/Kg	☼	11/15/19 11:52	11/16/19 20:08	10000
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
DCB Decachlorobiphenyl	0	D	54 - 133				11/15/19 11:52	11/16/19 20:08	10000
Tetrachloro-m-xylene	0	D	46 - 130				11/15/19 11:52	11/16/19 20:08	10000

# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

## Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP1 (54-133)	TCX1 (46-130)
680-176840-1	CS_1_110519	0 D	0 D
680-176840-2	CS_2_110519	0 D	0 D
680-176840-3	CS_3_110519	0 D	0 D

#### Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

## Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP2 (54-133)	TCX2 (46-130)
LCS 680-596384/14-A	Lab Control Sample	90	62
MB 680-596384/10-A	Method Blank	100	79

#### Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas

### Chromatography

Matrix: Solid

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP1 (14-130)	TCX1 (40-130)
LCS 680-597854/25-A	Lab Control Sample	70	77
MB 680-597854/18-A	Method Blank	67	81

#### Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas

### Chromatography

Matrix: Solid

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP2 (14-130)	TCX1 (40-130)
LCSD 680-597854/26-A	Lab Control Sample Dup	70	80

#### Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas

### Chromatography

Matrix: Solid

Prep Type: SPLP East

#### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP1 (14-130)	TCX1 (40-130)
680-176840-1	CS_1_110519	0 D	0 D
680-176840-2	CS_2_110519	0 D	0 D
680-176840-3	CS_3_110519	0 D	0 D
LB 680-596647/1-C	Method Blank	24	74

#### Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

## Method: 8081B - Organochlorine Pesticides (GC)

**Lab Sample ID: MB 680-596384/10-A**  
**Matrix: Solid**  
**Analysis Batch: 596412**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 596384**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Toxaphene, Technical	355		85		ug/Kg		11/15/19 11:52	11/15/19 20:56	1
Total Toxaphene	325		85		ug/Kg		11/15/19 11:52	11/15/19 20:56	1
Surrogate	MB	MB	Limits			Prepared	Analyzed	Dil Fac	
	%Recovery	Qualifier							
DCB Decachlorobiphenyl	100		54 - 133			11/15/19 11:52	11/15/19 20:56	1	
Tetrachloro-m-xylene	79		46 - 130			11/15/19 11:52	11/15/19 20:56	1	

**Lab Sample ID: LCS 680-596384/14-A**  
**Matrix: Solid**  
**Analysis Batch: 596412**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 596384**

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Toxaphene, Technical	255	345	*	ug/Kg		136	42 - 130
Total Toxaphene	255	347	*	ug/Kg		136	42 - 130
Surrogate	LCS	LCS			Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier	Limits				
DCB Decachlorobiphenyl	90		54 - 133		11/15/19 11:52	11/15/19 20:56	1
Tetrachloro-m-xylene	62		46 - 130		11/15/19 11:52	11/15/19 20:56	1

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography

**Lab Sample ID: MB 680-597854/18-A**  
**Matrix: Solid**  
**Analysis Batch: 598077**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 597854**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Toxaphene, Technical	0.0025	U	0.0025		mg/L		11/25/19 13:03	11/26/19 16:29	1
Total Toxaphene	0.0025	U	0.0025		mg/L		11/25/19 13:03	11/26/19 16:29	1
Surrogate	MB	MB	Limits			Prepared	Analyzed	Dil Fac	
	%Recovery	Qualifier							
DCB Decachlorobiphenyl	67		14 - 130			11/25/19 13:03	11/26/19 16:29	1	
Tetrachloro-m-xylene	81		40 - 130			11/25/19 13:03	11/26/19 16:29	1	

**Lab Sample ID: LCS 680-597854/25-A**  
**Matrix: Solid**  
**Analysis Batch: 598077**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 597854**

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Toxaphene, Technical	0.00400	0.00389		mg/L		97	56 - 130
Surrogate	LCS	LCS			Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier	Limits				
DCB Decachlorobiphenyl	70		14 - 130		11/25/19 13:03	11/26/19 16:29	1
Tetrachloro-m-xylene	77		40 - 130		11/25/19 13:03	11/26/19 16:29	1

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography (Continued)

Lab Sample ID: LCSD 680-597854/26-A

Matrix: Solid

Analysis Batch: 598077

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 597854

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Toxaphene, Technical	0.00400	0.00400		mg/L		100	56 - 130	3	30

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
DCB Decachlorobiphenyl	70		14 - 130
Tetrachloro-m-xylene	80		40 - 130

Lab Sample ID: LB 680-596647/1-C

Matrix: Solid

Analysis Batch: 598077

Client Sample ID: Method Blank

Prep Type: SPLP East

Prep Batch: 597854

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	0.0026	U	0.0026		mg/L		11/25/19 13:03	11/26/19 15:32	1
Total Toxaphene	0.0026	U	0.0026		mg/L		11/25/19 13:03	11/26/19 15:32	1

Surrogate	LB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
DCB Decachlorobiphenyl	24		14 - 130	11/25/19 13:03	11/26/19 15:32	1
Tetrachloro-m-xylene	74		40 - 130	11/25/19 13:03	11/26/19 15:32	1

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

## GC Semi VOA

### Prep Batch: 596384

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-176840-1	CS_1_110519	Total/NA	Solid	3546	
680-176840-2	CS_2_110519	Total/NA	Solid	3546	
680-176840-3	CS_3_110519	Total/NA	Solid	3546	
MB 680-596384/10-A	Method Blank	Total/NA	Solid	3546	
LCS 680-596384/14-A	Lab Control Sample	Total/NA	Solid	3546	

### Analysis Batch: 596412

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-596384/10-A	Method Blank	Total/NA	Solid	8081B	596384
LCS 680-596384/14-A	Lab Control Sample	Total/NA	Solid	8081B	596384

### Analysis Batch: 596528

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-176840-1	CS_1_110519	Total/NA	Solid	8081B	596384
680-176840-2	CS_2_110519	Total/NA	Solid	8081B	596384
680-176840-3	CS_3_110519	Total/NA	Solid	8081B	596384

### Leach Batch: 596647

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-176840-1	CS_1_110519	SPLP East	Solid	1312	
680-176840-2	CS_2_110519	SPLP East	Solid	1312	
680-176840-3	CS_3_110519	SPLP East	Solid	1312	
LB 680-596647/1-C	Method Blank	SPLP East	Solid	1312	

### Prep Batch: 597854

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-176840-1	CS_1_110519	SPLP East	Solid	3520C	596647
680-176840-2	CS_2_110519	SPLP East	Solid	3520C	596647
680-176840-3	CS_3_110519	SPLP East	Solid	3520C	596647
LB 680-596647/1-C	Method Blank	SPLP East	Solid	3520C	596647
MB 680-597854/18-A	Method Blank	Total/NA	Solid	3520C	
LCS 680-597854/25-A	Lab Control Sample	Total/NA	Solid	3520C	
LCSD 680-597854/26-A	Lab Control Sample Dup	Total/NA	Solid	3520C	

### Analysis Batch: 598077

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 680-596647/1-C	Method Blank	SPLP East	Solid	8081B/8082A	597854
MB 680-597854/18-A	Method Blank	Total/NA	Solid	8081B/8082A	597854
LCS 680-597854/25-A	Lab Control Sample	Total/NA	Solid	8081B/8082A	597854
LCSD 680-597854/26-A	Lab Control Sample Dup	Total/NA	Solid	8081B/8082A	597854

### Analysis Batch: 598484

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-176840-1	CS_1_110519	SPLP East	Solid	8081B/8082A	597854
680-176840-2	CS_2_110519	SPLP East	Solid	8081B/8082A	597854
680-176840-3	CS_3_110519	SPLP East	Solid	8081B/8082A	597854



# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

## General Chemistry

### Analysis Batch: 596346

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-176840-1	CS_1_110519	Total/NA	Solid	Moisture	
680-176840-2	CS_2_110519	Total/NA	Solid	Moisture	
680-176840-3	CS_3_110519	Total/NA	Solid	Moisture	

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# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

**Client Sample ID: CS\_1\_110519**

**Lab Sample ID: 680-176840-1**

Date Collected: 11/11/19 00:00

Matrix: Solid

Date Received: 11/13/19 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SPLP East	Leach	1312			100.09 g	2000 mL	596647	11/18/19 11:42	JEB	TAL SAV
SPLP East	Prep	3520C			929.4 mL	5 mL	597854	11/25/19 13:03	EHS	TAL SAV
SPLP East	Analysis	8081B/8082A		100			598484	11/29/19 16:11	JCK	TAL SAV
		Instrument ID: CSGJ								
Total/NA	Analysis	Moisture		1			596346	11/15/19 07:12	JEB	TAL SAV
		Instrument ID: NOEQUIP								

**Client Sample ID: CS\_1\_110519**

**Lab Sample ID: 680-176840-1**

Date Collected: 11/11/19 00:00

Matrix: Solid

Date Received: 11/13/19 09:20

Percent Solids: 77.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			15.97 g	5 mL	596384	11/15/19 11:52	DRT	TAL SAV
Total/NA	Analysis	8081B		10000			596528	11/16/19 19:38	JCK	TAL SAV
		Instrument ID: CSGZ								

**Client Sample ID: CS\_2\_110519**

**Lab Sample ID: 680-176840-2**

Date Collected: 11/11/19 00:00

Matrix: Solid

Date Received: 11/13/19 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SPLP East	Leach	1312			100.02 g	2000 mL	596647	11/18/19 11:42	JEB	TAL SAV
SPLP East	Prep	3520C			902.4 mL	5 mL	597854	11/25/19 13:03	EHS	TAL SAV
SPLP East	Analysis	8081B/8082A		100			598484	11/29/19 16:26	JCK	TAL SAV
		Instrument ID: CSGJ								
Total/NA	Analysis	Moisture		1			596346	11/15/19 07:12	JEB	TAL SAV
		Instrument ID: NOEQUIP								

**Client Sample ID: CS\_2\_110519**

**Lab Sample ID: 680-176840-2**

Date Collected: 11/11/19 00:00

Matrix: Solid

Date Received: 11/13/19 09:20

Percent Solids: 80.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			15.41 g	5 mL	596384	11/15/19 11:52	DRT	TAL SAV
Total/NA	Analysis	8081B		10000			596528	11/16/19 19:53	JCK	TAL SAV
		Instrument ID: CSGZ								

**Client Sample ID: CS\_3\_110519**

**Lab Sample ID: 680-176840-3**

Date Collected: 11/11/19 00:00

Matrix: Solid

Date Received: 11/13/19 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
SPLP East	Leach	1312			100.01 g	2000 mL	596647	11/18/19 11:42	JEB	TAL SAV
SPLP East	Prep	3520C			928 mL	5 mL	597854	11/25/19 13:03	EHS	TAL SAV
SPLP East	Analysis	8081B/8082A		100			598484	11/29/19 16:40	JCK	TAL SAV
		Instrument ID: CSGJ								

Eurofins TestAmerica, Savannah

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

**Client Sample ID: CS\_3\_110519**

**Lab Sample ID: 680-176840-3**

Date Collected: 11/11/19 00:00

Matrix: Solid

Date Received: 11/13/19 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			596346	11/15/19 07:12	JEB	TAL SAV

**Client Sample ID: CS\_3\_110519**

**Lab Sample ID: 680-176840-3**

Date Collected: 11/11/19 00:00

Matrix: Solid

Date Received: 11/13/19 09:20

Percent Solids: 79.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			15.37 g	5 mL	596384	11/15/19 11:52	DRT	TAL SAV
Total/NA	Analysis	8081B		10000			596528	11/16/19 20:08	JCK	TAL SAV
Instrument ID: CSGZ										

**Laboratory References:**

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858



# Chain of Custody Record

<b>Client Information</b>		<b>Sampler:</b> Nader Rad		<b>Lab PM:</b> Jerry Lanier	<b>Carrier Tracking No(s)</b>																																													
<b>Company:</b> Geosyntec Consultants Inc		<b>Phone:</b> 770-910-7537		<b>E-Mail:</b> jerry.lanier@testamericainc.com		<b>Page 1 of 1</b>																																												
<b>Address:</b> 1255 Roberts Blvd # 200		<b>Due Date Requested:</b>		<b>Analysis Requested</b>		<b>Job #:</b>																																												
<b>City:</b> Kennesaw		<b>TAT Requested (days):</b> Standard		<b>Field Filtered Sample (Yes or No)</b>		<b>Preservation Codes:</b> A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: M - Hexane N - None O - AshNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - ph 4-5 Z - other (specify)																																												
<b>State, Zip:</b> GA, 30144		<b>PO #:</b>		<b>GA modified Method 8081B (toxaphene)</b>			<b>Special Instructions/Note:</b>																																											
<b>Phone:</b> 678 202 9500		<b>WO #:</b>		<b>SPLP Toxaphene (EPA method 1312)</b>																																														
<b>Email:</b> aciblak@geosyntec.com		<b>Task 100</b>		<b>Patron MS/MSD (Yes or No)</b>																																														
<b>Project Name:</b> Brunswick Plant - SWMU 6 ISS TS		<b>Project #:</b> 68022348		<b>Matrix (W=Water, S=solid, O=soil, T=tissue, A=Air)</b>		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Sample Identification</th> <th>Sample Date</th> <th>Sample Time (C=comp, G=grab)</th> <th>Sample Type (C=comp, G=grab)</th> <th>Matrix (W=Water, S=solid, O=soil, T=tissue, A=Air)</th> <th>Preservation Code:</th> <th>Field Filtered Sample (Yes or No)</th> <th>Patron MS/MSD (Yes or No)</th> <th>GA modified Method 8081B (toxaphene)</th> <th>SPLP Toxaphene (EPA method 1312)</th> <th>Total Number of Containers</th> </tr> </thead> <tbody> <tr> <td>CS_1_110519</td> <td>11/11/19</td> <td></td> <td>G</td> <td>S</td> <td></td> <td>N</td> <td>N</td> <td>X</td> <td>X</td> <td>3</td> </tr> <tr> <td>CS_2_110519</td> <td>11/11/19</td> <td></td> <td>G</td> <td>S</td> <td></td> <td>N</td> <td>N</td> <td>X</td> <td>X</td> <td></td> </tr> <tr> <td>CS_3_110519</td> <td>11/11/19</td> <td></td> <td>G</td> <td>S</td> <td></td> <td>N</td> <td>N</td> <td>X</td> <td>X</td> <td></td> </tr> </tbody> </table>	Sample Identification	Sample Date	Sample Time (C=comp, G=grab)	Sample Type (C=comp, G=grab)	Matrix (W=Water, S=solid, O=soil, T=tissue, A=Air)	Preservation Code:	Field Filtered Sample (Yes or No)	Patron MS/MSD (Yes or No)	GA modified Method 8081B (toxaphene)	SPLP Toxaphene (EPA method 1312)	Total Number of Containers	CS_1_110519	11/11/19		G	S		N	N	X	X	3	CS_2_110519	11/11/19		G	S		N	N	X	X		CS_3_110519	11/11/19		G	S		N	N	X	X	
Sample Identification	Sample Date	Sample Time (C=comp, G=grab)	Sample Type (C=comp, G=grab)	Matrix (W=Water, S=solid, O=soil, T=tissue, A=Air)	Preservation Code:		Field Filtered Sample (Yes or No)	Patron MS/MSD (Yes or No)	GA modified Method 8081B (toxaphene)	SPLP Toxaphene (EPA method 1312)	Total Number of Containers																																							
CS_1_110519	11/11/19		G	S			N	N	X	X	3																																							
CS_2_110519	11/11/19		G	S			N	N	X	X																																								
CS_3_110519	11/11/19		G	S		N	N	X	X																																									
<b>Site:</b> Brunswick Plant, GA		<b>SSOW#:</b>		<b>Sample Date</b>		<b>Sample Time (C=comp, G=grab)</b>		<b>Sample Type (C=comp, G=grab)</b>		<b>Matrix (W=Water, S=solid, O=soil, T=tissue, A=Air)</b>		<b>Preservation Code:</b>																																						
<p><b>Possible Hazard Identification</b>  <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Toxic <input type="checkbox"/> Volatile <input type="checkbox"/> Explosive <input type="checkbox"/> Corrosive <input type="checkbox"/> Other (specify)</p> <p><b>Empty Kit Relinquished by:</b></p> <p>Relinquished by: <b>Artine Azimi</b> Date: 11/12/2019 17:00</p> <p>Relinquished by: _____ Date/Time: _____</p> <p>Relinquished by: _____ Date/Time: _____</p> <p>Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Custody Seal No: _____</p>																																																		
<p><b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b>  <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months</p> <p><b>Special Instructions/QC Requirements:</b></p>																																																		
<p><b>Received by:</b> _____ Date/Time: 11/13/19 9:20</p> <p><b>Received by:</b> _____ Date/Time: _____</p> <p><b>Received by:</b> _____ Date/Time: _____</p> <p>Company: <b>TestAmerica</b></p> <p>Company: _____</p> <p>Company: _____</p> <p>Cooler Temperature(s) °C and Other Remarks: _____</p>																																																		



## Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 680-176840-1

**Login Number: 176840**

**List Number: 1**

**Creator: Weston, Pamela**

**List Source: Eurofins TestAmerica, Savannah**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176840-1

## Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87052	06-30-20
Georgia	State Program	803	06-30-20

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**Excel Geotechnical Testing, Inc.**  
"Excellence in Testing"

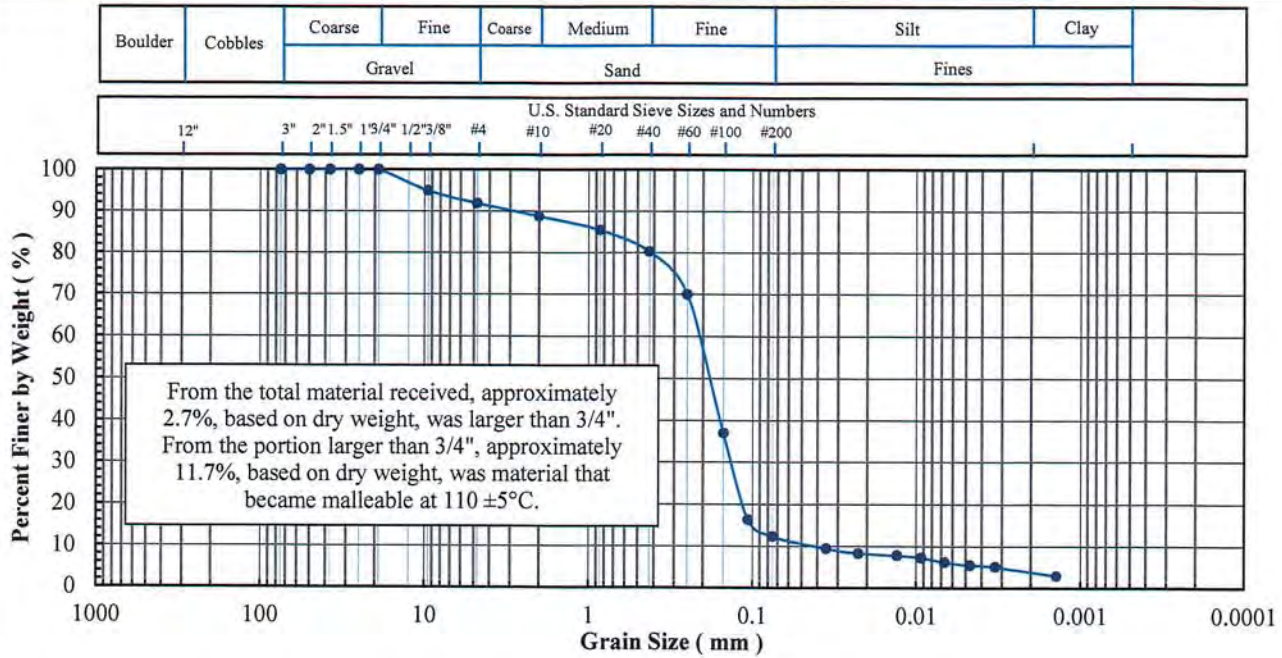
953 Forrest Street, Roswell, Georgia 30075  
Tel: (770) 910 7537 Fax: (770) 910 7538

**Project Name:** Brunswick Plant SWMU 6 Treatability Study  
**Project No:** 972  
**Client Sample ID:** CS-01  
**Lab Sample No:** 19J174E

ASTM C 136, D 422, D 854, D 1140, D 2216, D 2487, D2974, D 4318,  
D 4373, D 6913, D 7928

**SOIL INDEX PROPERTIES**

Grain Size, Spec. Gravity, Moist. Cont.,  
Eng. Classification, organic Content, Atterberg Limits, Carbonate Content

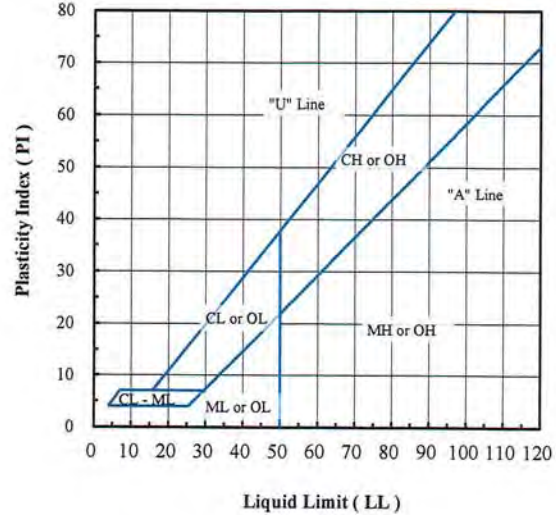


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	94.9
#4	4.75	91.9
#10	2.00	88.8
#20	0.850	85.5
#40	0.425	80.2
#60	0.250	69.9
#100	0.150	36.9
#140	0.106	16.3
#200	0.075	12.3

Hydrometer Particle Diameter (mm)	% Finer
0.0353	9.4
0.0131	7.8
0.0067	6.2
0.0033	5.1
0.0014	2.9

<b>Gravel (%):</b>	8.1
<b>Sand (%):</b>	79.6
<b>Fines (%):</b>	12.3
<b>Silt (%):</b>	8.7
<b>Clay (%):</b>	3.6

<b>Coeff. Unif. (Cu):</b>	
<b>Coeff. Curv. (Cc):</b>	



<b>Specific Gravity (-):</b>	2.570
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<b>Org. Content (%):</b>	8.2
--------------------------	-----

<b>Carbon. Content (%):</b>	
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Client Sample ID	Lab Sample No	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits			Engineering Classification
				LL (-)	PL (-)	PI (-)	
CS-01	19J174E	30.4	12.3	NP	NP	NP	SM - Silty sand

Note(s): pH of Soils (ASTM D 4972, Method A): In Distilled Water: 6.7 (-), in 0.01 M Calcium Chloride Solution: 6.6 (-)  
Engineering classification is based on the assumption that the fines are either ML or MH.

11-18-2019  
A.A. W.S.H.



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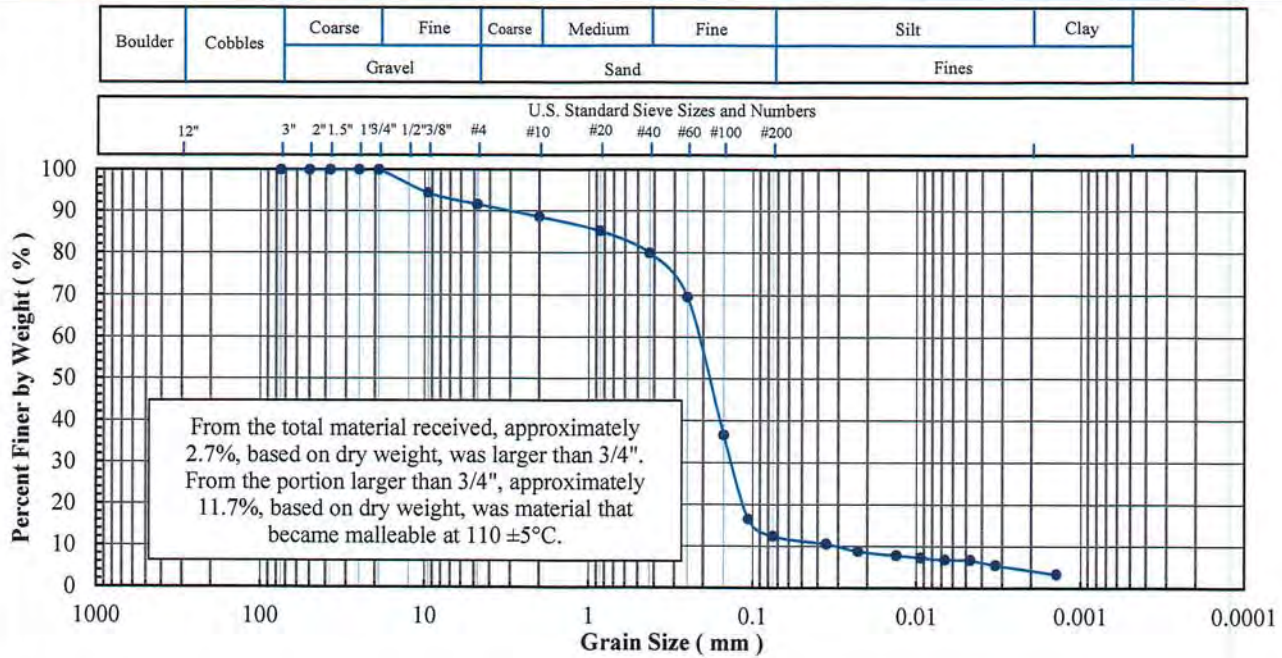
953 Forrest Street, Roswell, Georgia 30075  
Tel: (770) 910 7537 Fax: (770) 910 7538

**Project Name:** Brunswick Plant SWMU 6 Treatability Study  
**Project No:** 972  
**Client Sample ID:** CS-02  
**Lab Sample No:** 19J175E

ASTM C 136, D 422, D 854, D 1140, D 2216, D 2487, D2974, D 4318,  
D 4373, D 6913, D 7928

**SOIL INDEX PROPERTIES**

Grain Size, Spec. Gravity, Moist. Cont.,  
Eng. Classification, organic Content, Atterberg Limits, Carbonate Content

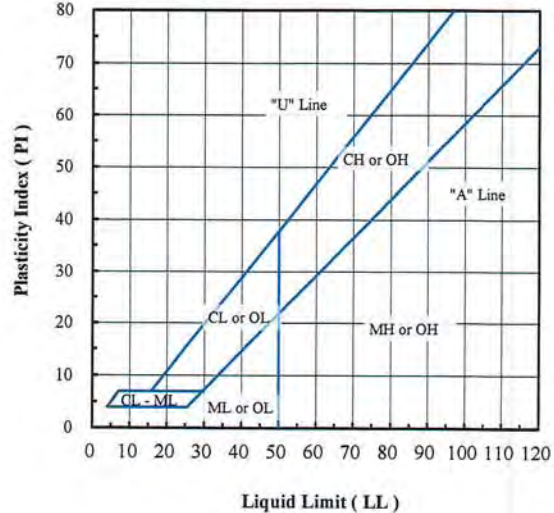


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	94.3
#4	4.75	91.6
#10	2.00	88.6
#20	0.850	85.2
#40	0.425	79.9
#60	0.250	69.5
#100	0.150	36.5
#140	0.106	16.5
#200	0.075	12.4

Hydrometer Particle Diameter (mm)	% Finer
0.0354	10.5
0.0133	7.8
0.0067	6.8
0.0033	5.5
0.0014	3.3

Gravel (%):	8.4
Sand (%):	79.2
Fines (%):	12.4
Silt (%):	8.4
Clay (%):	4.0

Coeff. Unif. (Cu):	
Coeff. Curv. (Cc):	



Specific Gravity (-):	2.540
-----------------------	-------

Org. Content (%):	8.1
-------------------	-----

Carbon. Content (%):	
----------------------	--

Client Sample ID.	Lab Sample No.	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits			Engineering Classification
				LL (-)	PL (-)	PI (-)	
CS-02	19J175E	30.2	12.4	NP	NP	NP	SM - Silty sand

Note(s): pH of Soils (ASTM D 4972, Method A): In Distilled Water: 6.8 (-), in 0.01 M Calcium Chloride Solution: 6.7 (-)  
Engineering classification is based on the assumption that the fines are either ML or MH.

11-18-2019  
AA, MSR





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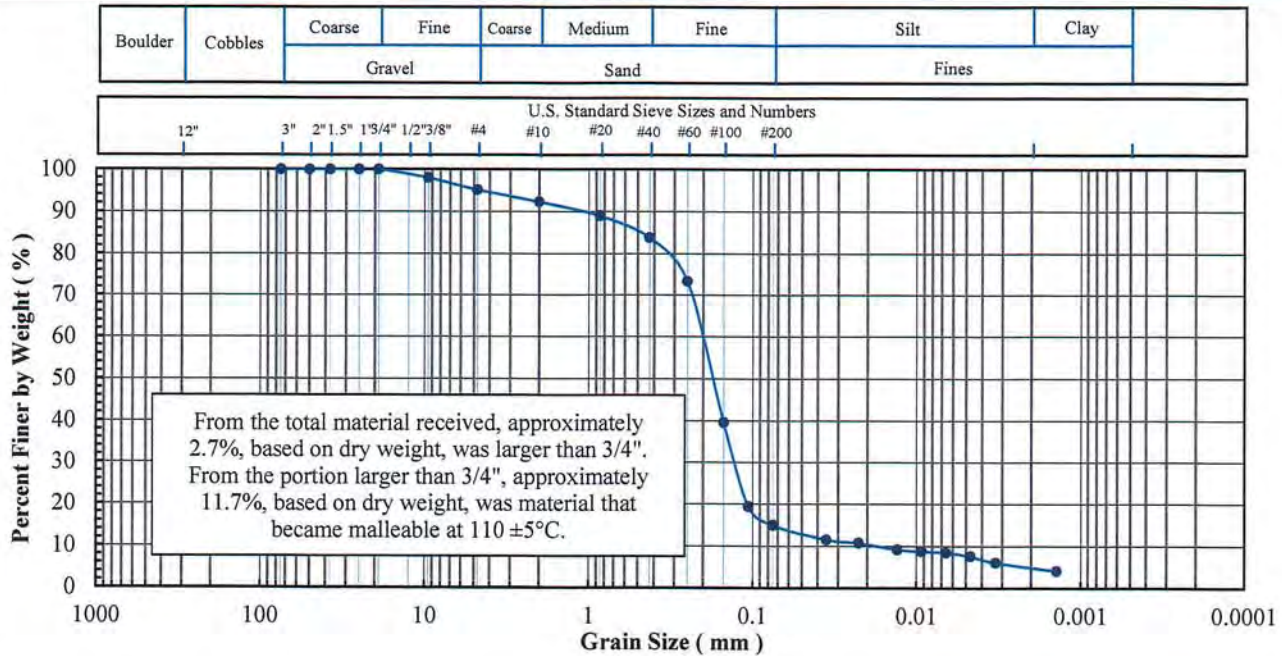
953 Forrest Street, Roswell, Georgia 30075  
Tel: (770) 910 7537 Fax: (770) 910 7538

**Project Name:** Brunswick Plant SWMU 6 Treatability Study  
**Project No:** 972  
**Client Sample ID:** CS-03  
**Lab Sample No:** 19J176E

ASTM C 136, D 422, D 854, D 1140, D 2216, D 2487, D2974, D 4318,  
D 4373, D 6913, D 7928

**SOIL INDEX PROPERTIES**

Grain Size, Spec. Gravity, Moist. Cont.,  
Eng. Classification, organic Content, Atterberg Limits, Carbonate Content

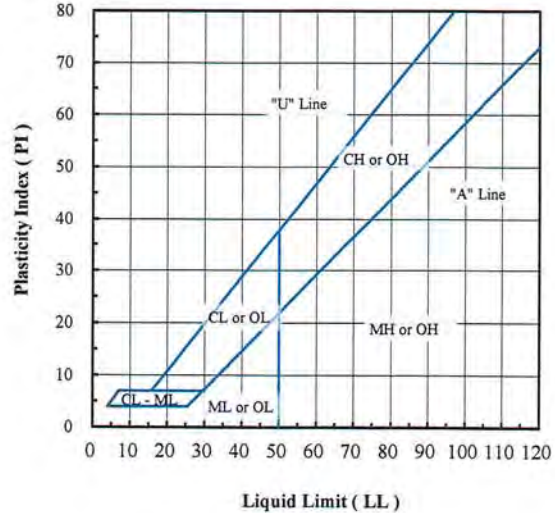


Sieve No.	Size (mm)	% Finer
3"	75	100.0
2"	50	100.0
1.5"	37.5	100.0
1"	25	100.0
3/4"	19	100.0
3/8"	9.5	98.0
#4	4.75	95.1
#10	2.00	92.3
#20	0.850	89.0
#40	0.425	83.8
#60	0.250	73.3
#100	0.150	39.5
#140	0.106	19.4
#200	0.075	15.0

Hydrometer Particle Diameter (mm)	% Finer
0.0354	11.5
0.0131	9.2
0.0066	8.5
0.0033	6.1
0.0014	4.1

<b>Gravel (%)</b> :	4.9
<b>Sand (%)</b> :	80.1
<b>Fines (%)</b> :	15.0
<b>Silt (%)</b> :	10.3
<b>Clay (%)</b> :	4.7

<b>Coeff. Unif. (Cu)</b> :	
<b>Coeff. Curv. (Cc)</b> :	



<b>Specific Gravity (-)</b> :	2.566
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<b>Org. Content (%)</b> :	8.7
---------------------------	-----

<b>Carbon. Content (%)</b> :	
------------------------------	--

Client Sample ID	Lab Sample No	Moisture Content (%)	Fines Content < No. 200 (%)	Atterberg Limits			Engineering Classification
				LL (-)	PL (-)	PI (-)	
CS-03	19J176E	29.2	15.0	NP	NP	NP	SM - Silty sand

Note(s): pH of Soils (ASTM D 4972, Method A): In Distilled Water: 6.8 (-), in 0.01 M Calcium Chloride Solution: 6.6 (-)  
Engineering classification is based on the assumption that the fines are either ML or MH.

11-18-2019  
A.A. WSA



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# LAST PAGE

**Test Applicability and Limitations:**

- The results are applicable only for the materials received at the laboratory and tested which may or may not be representative of the materials at the site.

**Storage Policy:**

- **Uncontaminated Material:** All samples (or what is left) will be archived for a period of 3 months from the date received. Thereafter the samples will be discarded unless a written request for extended storage is received. A rate of \$1.00 per sample per day will be applied after the initial 3 month storage period.

- **Contaminated Material:** All samples (or what is left) will be archived for a period of 3 months from the date received. Thereafter, the samples will be returned to the project manager or his/her designated receiver unless a written request for extended storage is received. A rate of \$1.30 per sample per day will be applied after the initial 3 months storage.



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## Test Results Summary

**Project Name:** Brunswick Plant SWMU 6 Treatability Study  
**Project No.:** 972

### Test Information

Site ID <sup>(1)</sup>	Lab No.	Days Cured	Pocket Penetrometer		Observations <sup>(2)</sup>
			Footring Diameter (in.)	Resistance (tsf)	
Mix-01	19L062E	0		0.00	Approximately 1.0 mm of free water separated from the top of the specimen shortly after placing in the mold. No strength or cementation. Decreased amount of free water on top of specimen. No visible volume change. Water released from soil pores upon pocket penetrometer penetration. Minor sheen of free water remaining on specimen top. No cracks. No visible volume change. Minor amount of water released upon pocket penetrometer penetration. Approximately 1/4" penetration.
		1		2.25	
		2		2.40	
		3		2.25	
		4		3.25	
		5		3.50	
		6		3.25	
		7		3.75	
		8	0.25	3.50	
		9		3.75	
		10		3.50	
		11		3.50	
		12		3.75	
		13		4.25	
		14		4.25	
		15		4.25	
16		4.25			

Notes: 1) Mix-01 was made using 100 parts soil at the as-received moisture content, 3 parts Portland type I/II cement by dry weight (provided by the client), 6 parts ground blasted furnace slag by dry weight (provided by the client), and a 0.75:1 tap water to total cement (i.e., Portland and slag cement) ratio on 12/11/2019.

2) Average change in height was approximately 0.3 mm. Reported value is the average change in height relative to the top of the mold after approximately 16 days of curing. A positive value denotes expansion, while a negative values denotes contraction. It must be noted that it was extremely difficult to obtain any accurate height changes and the value provided should be used with great caution.

6-03-2020  
 AA115R



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# Test Results Summary

**Project Name:** Brunswick Plant SWMU 6 Treatability Study  
**Project No.:** 972

**Test Information**

Site ID <sup>(1)</sup>	Lab No.	Days Cured	Pocket Penetrometer		Observations <sup>(2)</sup>
			Footing Diameter (in.)	Resistance (tsf)	
(-)	(-)	(-)			
		0		0.00	Approximately 1.0 mm of free water separated from the top of the specimen shortly after placing in the mold. No strength or cementation.
		1		2.25	Decreased amount of free water on top of specimen. No visible volume change. Water released from soil pores upon pocket penetrometer penetration.
		2		3.50	Minor sheen of free water remaining on specimen top. No cracks. No visible volume change. Minor amount of water released upon pocket penetrometer penetration. 1/4" penetration.
		3	0.25	4.50	Similar to day 2 observations
		4		4.50	Similar to day 2 observations
		5		4.50	Similar to day 2 observations
		6		>4.50	Similar to day 2 observations except sheen of free water was no longer present and approximately 1/8" penetration.
		7		>4.50	Similar to day 6 observations

Notes: 1) Mix-02 was made using 100 parts soil at the as-received moisture content, 3 parts Portland type I/II cement by dry weight (provided by the client), 12 parts ground blasted furnace slag by dry weight (provided by the client), and a 0.75:1 tap water to total cement (i.e., Portland and slag cement) ratio on 12/11/2019.

2) Average change in height was approximately 0.1 mm. Reported value is the average change in height relative to the top of the mold after approximately 7 days of curing. A positive value denotes expansion, while a negative value denotes contraction. It must be noted that it was extremely difficult to obtain any accurate height changes and the value provided should be used with great caution.

6-03-2020  
 GAI/MSR



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# Test Results Summary

**Project Name:** Brunswick Plant SWMU 6 Treatability Study  
**Project No.:** 972

**Test Information**

Site ID <sup>(1)</sup>	Lab No.	Days Cured	Pocket Penetrometer		Observations <sup>(2)</sup>
			Footing Diameter (in.)	Resistance (tsf)	
(-)	(-)	(-)	0.25	0.00	Approximately 1.0 mm of free water separated from the top of the specimen shortly after placing in the mold. No strength or cementation. Decreased amount of free water on top of specimen. No visible volume change. Water released from soil pores upon pocket penetrometer penetration. Minor sheen of free water remaining on specimen top. No cracks. No visible volume change. Minor amount of water released upon pocket penetrometer penetration. 1/4" penetration.
				1.50	
				3.75	
				4.00	
				4.50	
				4.50	
				>4.50	
Mix-03	19L064E	7		>4.50	Similar to day 2 observations except sheen of free water was no longer present and approximately 1/16" penetration.
				>4.50	
				>4.50	
				>4.50	
				>4.50	
				>4.50	
				>4.50	

Notes: 1) Mix-03 was made using 100 parts soil at the as-received moisture content, 5 parts Portland type I/II cement by dry weight (provided by the client), 10 parts ground blasted furnace slag by dry weight (provided by the client), and a 0.75:1 tap water to total cement (i.e., Portland and slag cement) ratio on 12/1/2019.

2) Average change in height was approximately -0.1 mm. Reported value is the average change in height relative to the top of the mold after approximately 7 days of curing. A positive value denotes expansion, while a negative value denotes contraction. It must be noted that it was extremely difficult to obtain any accurate height changes and the value provided should be used with great caution.

6-03-2020  
 AM



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**Test Results Summary**

**Project Name:** Brunswick Plant SWMU 6 Treatability Study  
**Project No.:** 972

**Test Information**

Site ID <sup>(1)</sup>	Lab No.	Days Cured	Pocket Penetrometer		Observations <sup>(2)</sup>
			Footing Diameter (in.)	Resistance (tsf)	
(-)	(-)	(-)	0.25	0.00	Approximately 1.0 mm of free water separated from the top of the specimen shortly after placing in the mold. No strength or cementation. Decreased amount of free water on top of specimen. No visible volume change. Water released from soil pores upon pocket penetrometer penetration. Minor sheen of free water remaining on specimen top. No cracks. No visible volume change. Minor amount of water released upon pocket penetrometer penetration. 1/4" penetration.
				1.00	
				3.60	
				4.25	
				4.50	
				4.50	
				>4.50	
Mix-04	19L065E	0	0.25	0.00	Similar to day 2 observations except sheen of free water was no longer present and approximately 1/16" penetration.
				1.00	
				3.60	
				4.25	
				4.50	
				4.50	
				>4.50	
		0	0.25	0.00	Similar to day 6 observations
				1.00	
				3.60	
				4.25	
				4.50	
				4.50	
				>4.50	

Notes: 1) Mix-04 was made using 100 parts soil at the as-received moisture content, 5 parts Portland type I/II cement by dry weight (provided by the client), 15 parts ground blasted furnace slag by dry weight (provided by the client), and a 0.75:1 tap water to total cement (i.e., Portland and slag cement) ratio on 12/11/2019.

2) Average change in height was approximately 0.5 mm. Reported value is the average change in height relative to the top of the mold after approximately 7 days of curing. A positive value denotes expansion, while a negative value denotes contraction. It must be noted that it was extremely difficult to obtain any accurate height changes and the value provided should be used with great caution.

6-03-2020  
 6-PA145H



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**Test Results Summary**

**Project Name:** Brunswick Plant SWMU 6 Treatability Study  
**Project No.:** 972

**Test Information**

Site ID <sup>(1)</sup>	Lab No.	Days Cured	Pocket Penetrometer		Observations <sup>(2)</sup>			
			Footing Diameter (in.)	Resistance (tsf)				
(-)	(-)	(-)	0.00	0.00	Approximately 1.0 mm of free water separated from the top of the specimen shortly after placing in the mold. No strength or cementation.			
						1	1.50	Decreased amount of free water on top of specimen. No volume change. Water released from soil pores upon pocket penetrometer penetration
						2	4.25	Minor sheen of free water remaining on specimen top. No cracks. No visible volume change. Minor amount of water released upon pocket penetrometer penetration. Approximately 1/4" penetration.
						3	>4.50	Similar to day 2 observations except penetrometer penetrated approximately 1/8".
						4	>4.50	Similar to day 3 observations
						5	>4.50	Similar to day 3 observations except less than 1 mm penetration of pocket penetrometer observed
						6	>4.50	No cracks. No visible volume change. Minor amount of water released upon pocket penetrometer penetration. Less than approximately 1 mm of penetration
		7	>4.50	Similar to day 6 observations				

Notes: 1) Mix-05 was made using 100 parts soil at the as-received moisture content, 8 parts Portland type I/II cement by dry weight (provided by the client), 12 parts ground blasted furnace slag by dry weight (provided by the client), and a 0.75:1 tap water to total cement (i.e., Portland and slag cement) ratio on 12/1/2019.

2) Average change in height was approximately 0.1 mm. Reported value is the average change in height relative to the top of the mold after approximately 7 days of curing. A positive value denotes expansion, while a negative value denotes contraction. It must be noted that it was extremely difficult to obtain any accurate height changes and the value provided should be used with great caution.

6-03-2020  
 G.A.N. JSK



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# LAST PAGE

**Test Applicability and Limitations:**

- The results are applicable only for the materials received at the laboratory and tested which may or may not be representative of the materials at the site.

**Storage Policy:**

- Uncontaminated Material: All samples (or what is left) will be archived for a period of 3 months from the date received. Thereafter the samples will be discarded unless a written request for extended storage is received. A rate of \$1.00 per sample per day will be applied after the initial 3 month storage period.

- Contaminated Material: All samples (or what is left) will be archived for a period of 3 months from the date received. Thereafter, the samples will be returned to the project manager or his/her designated receiver unless a written request for extended storage is received. A rate of \$1.30 per sample per day will be applied after the initial 3 months storage.





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**Project Name:** Brunswick Plant SWMU 6 Treatability Study

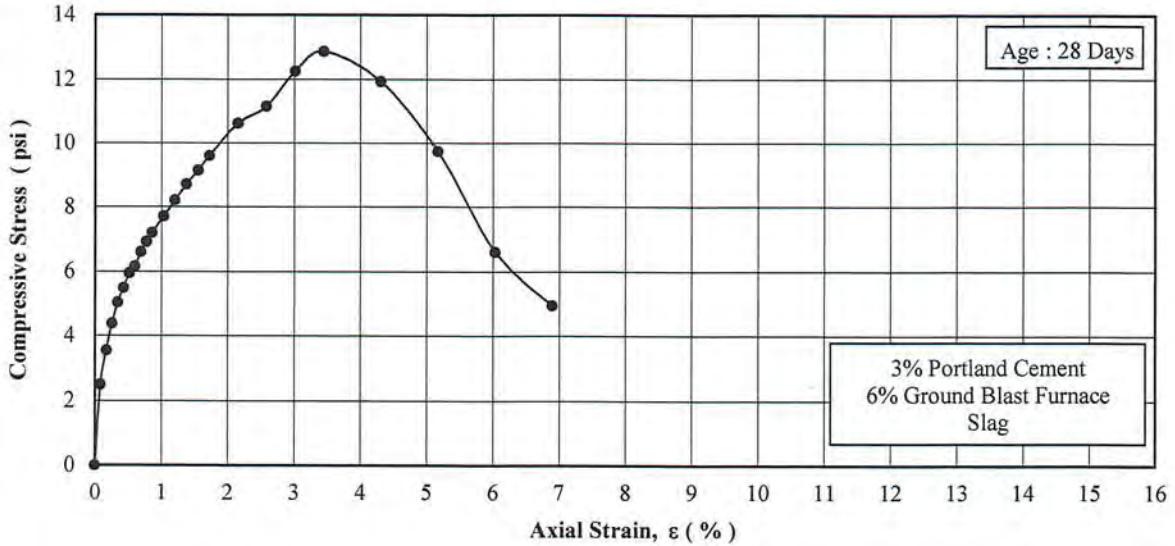
**Project No:** 972

**Sample ID:** Mix-01

**Lab Sample No:** 19L062E

ASTM D 1633

**COMPRESSIVE STRENGTH OF MOLDED SOIL-CEMENT  
 CYLINDERS**



Test Specimen		Initial Conditions				Strain Rate (% / min)	Unconfined Compressive Strength				Specimen Quality 1 to 10 <sup>(1)</sup>	Notes
No.	Type	Height (in)	Diameter (in)	Moisture Content (%)	Dry Unit Weight (pcf)		Peak		Residual			
							Strain (%)	Strength (psi)	Strain (%)	Strength (psi)		
1	CM	5.80	3.02	32.9	83.0	0.517	3.4	12.9	6.9	4.9	8	



Specimen No. 1



Specimen No. 2



Specimen No. 3

**Specimen Type**

- UD - Undisturbed Specimen
- ST - Shelby Tube Specimen
- RE - Remolded Specimen
- CM - Three-inch Concrete Mold Specimen

Dr. brown, dr. grey cemented gravelly silty sand

Notes:

1 - 1 to 10 indicates extremely poor to excellent specimen conditions.

5-20-2020  
 AA1NSR



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**Project Name:** Brunswick Plant SWMU 6 Treatability Study

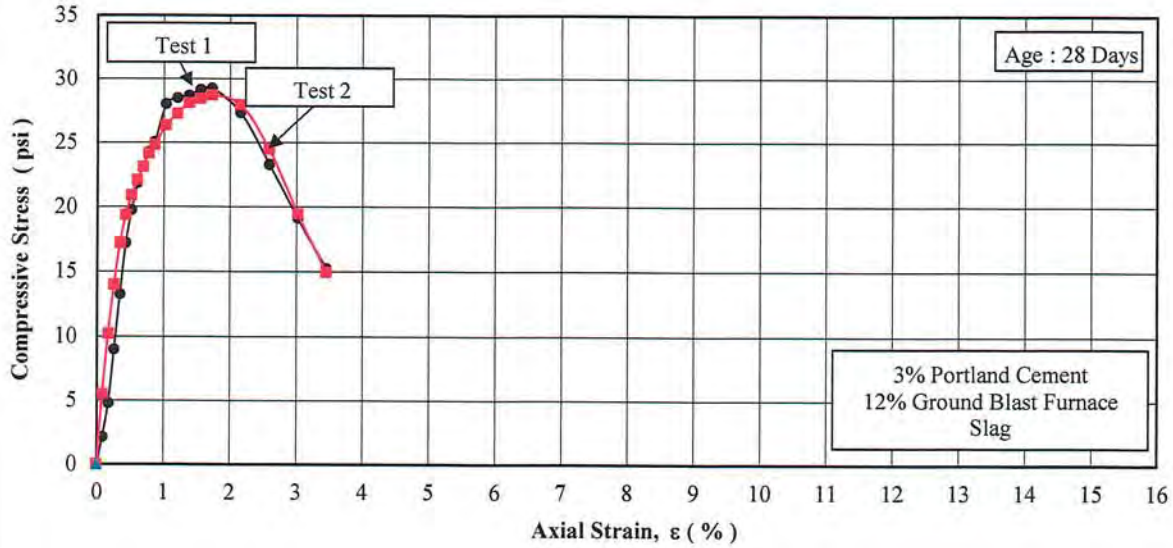
**Project No:** 972

**Sample ID:** Mix-02

**Lab Sample No:** 19L063E

ASTM D 1633

**COMPRESSIVE STRENGTH OF MOLDED SOIL-CEMENT  
 CYLINDERS**



Test Specimen		Initial Conditions				Strain Rate (%/min)	Unconfined Compressive Strength				Specimen Quality 1 to 10 <sup>(1)</sup>	Notes
No.	Type	Height (in)	Diameter (in)	Moisture Content (%)	Dry Unit Weight (pcf)		Peak		Residual			
							Strain (%)	Strength (psi)	Strain (%)	Strength (psi)		
1	CM	5.78	3.02	34.2	82.9	0.519	1.7	29.2	3.5	15.2	7	
2	CM	5.78	3.02	34.2	82.5	0.519	1.7	28.7	3.5	15.0	9	



Specimen No. 1

Dr. brown, dr. grey cemented  
 gravelly silty sand



Specimen No. 2

Dr. brown, dr. grey cemented  
 gravelly silty sand



Specimen No. 3

**Specimen Type**

- UD - Undisturbed Specimen
- ST - Shelby Tube Specimen
- RE - Remolded Specimen
- CM - Three-inch Concrete Mold Specimen

Notes:

1 - 1 to 10 indicates extremely poor to excellent specimen conditions.

*5-20-2020  
 AA, NSR*



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**Project Name:** Brunswick Plant SWMU 6 Treatability Study

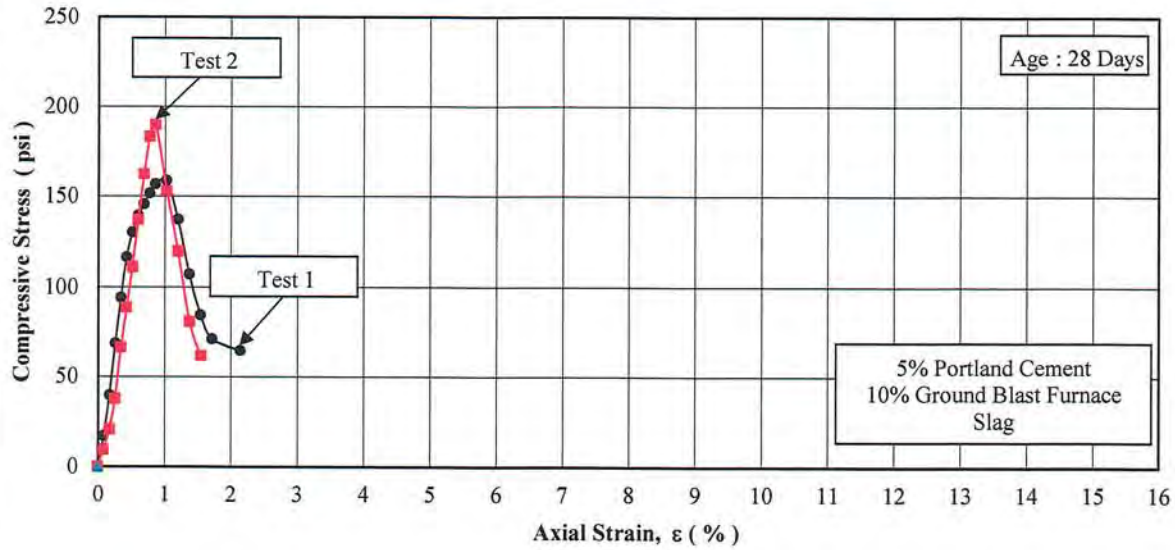
**Project No:** 972

**Sample ID:** Mix-03

**Lab Sample No:** 19L064E

ASTM D 1633

**COMPRESSIVE STRENGTH OF MOLDED SOIL-CEMENT CYLINDERS**



Test Specimen		Initial Conditions				Strain Rate (%/min)	Unconfined Compressive Strength				Specimen Quality 1 to 10 <sup>(1)</sup>	Notes
No.	Type	Height (in)	Diameter (in)	Moisture Content (%)	Dry Unit Weight (pcf)		Peak		Residual			
							Strain (%)	Strength (psi)	Strain (%)	Strength (psi)		
1	CM	5.83	3.02	32.1	84.4	0.514	1.0	158.8	2.1	64.8	8	
2	CM	5.81	3.02	32.4	84.2	0.516	0.9	189.9	1.5	61.9	9	



Specimen No. 1

Dr. brown, dr. grey cemented  
 gravelly silty sand



Specimen No. 2

Dr. brown, dr. grey cemented  
 gravelly silty sand



Specimen No. 3

**Specimen Type**

- UD - Undisturbed Specimen
- ST - Shelby Tube Specimen
- RE - Remolded Specimen
- CM - Three-inch Concrete Mold Specimen

Notes:

1 - 1 to 10 indicates extremely poor to excellent specimen conditions.

5-20-2020  
 AA1 NSR



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**Project Name:** Brunswick Plant SWMU 6 Treatability Study

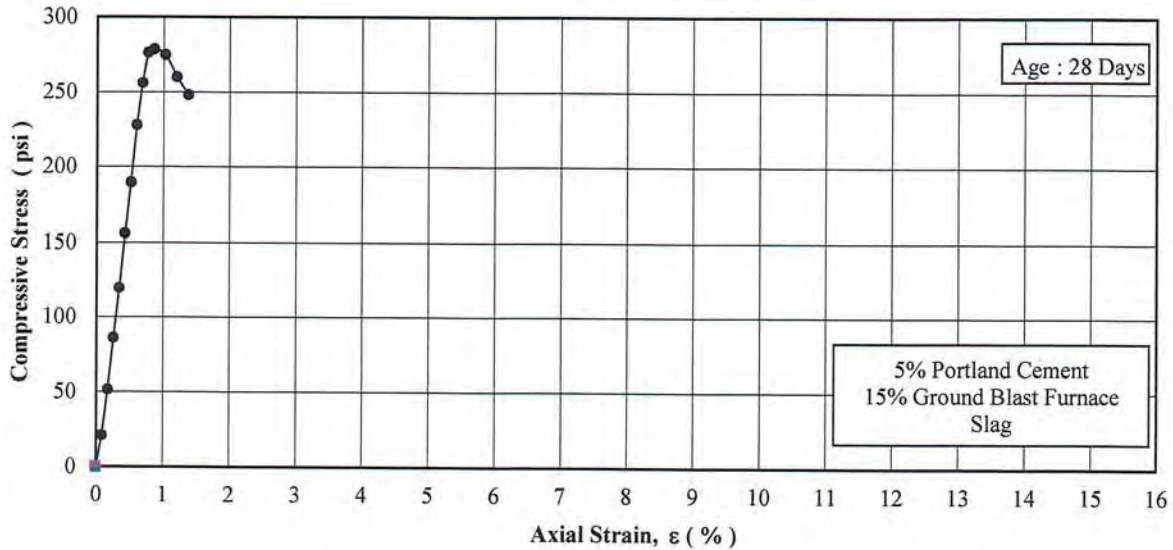
**Project No:** 972

**Sample ID:** Mix-04

**Lab Sample No:** 19L065E

ASTM D 1633

**COMPRESSIVE STRENGTH OF MOLDED SOIL-CEMENT  
 CYLINDERS**



Test Specimen		Initial Conditions				Strain Rate (% / min)	Unconfined Compressive Strength				Specimen Quality 1 to 10 <sup>(1)</sup>	Notes
No.	Type	Height (in)	Diameter (in)	Moisture Content (%)	Dry Unit Weight (pcf)		Peak		Residual			
							Strain (%)	Strength (psi)	Strain (%)	Strength (psi)		
1	CM	5.81	3.02	33.8	83.5	0.516	0.9	278.7	1.4	247.9	8	



Specimen No. 1



Specimen No. 2



Specimen No. 3

**Specimen Type**

- UD - Undisturbed Specimen
- ST - Shelby Tube Specimen
- RE - Remolded Specimen
- CM - Three-inch Concrete Mold Specimen

Dr. brown, dr. grey cemented  
 gravelly silty sand

Notes:

1 - 1 to 10 indicates extremely poor to excellent specimen conditions.

5-20-2020  
 AA1NSR



**Excel Geotechnical Testing, Inc.**  
 "Excellence in Testing"

953 Forrest Street, Roswell, Georgia 30075  
 Tel: (770) 910 7537 Fax: (770) 910 7538

**Project Name:** Brunswick Plant SWMU 6 Treatability Study

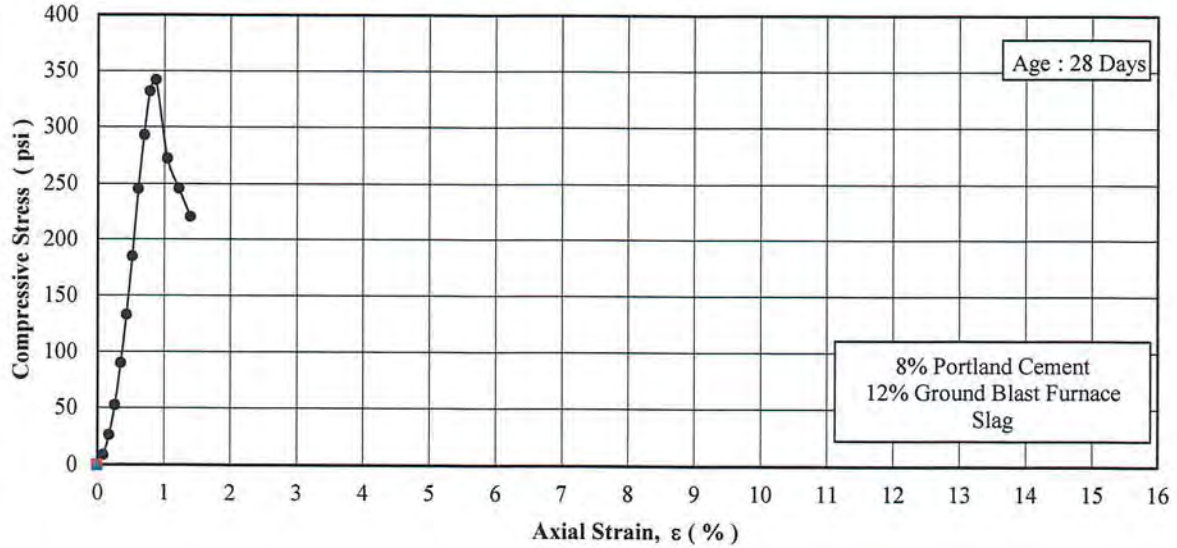
**Project No:** 972

**Sample ID:** Mix-05

**Lab Sample No:** 19L066E

ASTM D 1633

**COMPRESSIVE STRENGTH OF MOLDED SOIL-CEMENT  
 CYLINDERS**



Test Specimen		Initial Conditions				Strain Rate (% / min)	Unconfined Compressive Strength				Specimen Quality 1 to 10 <sup>(1)</sup>	Notes
No.	Type	Height (in)	Diameter (in)	Moisture Content (%)	Dry Unit Weight (pcf)		Peak		Residual			
							Strain (%)	Strength (psi)	Strain (%)	Strength (psi)		
1	CM	5.73	3.02	32.8	84.6	0.524	0.9	341.8	1.4	220.6	8	



Specimen No. 1



Specimen No. 2



Specimen No. 3

**Specimen Type**

- UD - Undisturbed Specimen
- ST - Shelby Tube Specimen
- RE - Remolded Specimen
- CM - Three-inch Concrete Mold Specimen

Dr. brown, dr. grey cemented  
 gravelly silty sand

Notes:

1 - 1 to 10 indicates extremely poor to excellent specimen conditions.

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- Contaminated Material: All samples (or what is left) will be archived for a period of 3 months from the date received. Thereafter, the samples will be returned to the project manager or his/her designated receiver unless a written request for extended storage is received. A rate of \$1.30 per sample per day will be applied after the initial 3 months storage.



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**FLEXIBLE WALL PERMEABILITY TEST** <sup>(1)</sup>  
**ASTM D 5084 \***

<b>Project Name:</b>	Brunswick Plant SWMU 6 Treatability Study
<b>Project Number:</b>	972
<b>Client Name:</b>	Geosyntec Consultants
<b>Site Sample ID:</b>	Mix-01
<b>Lab Sample Number:</b>	19L062E
<b>Material Type:</b>	3% Portland Cement, 6% Ground Blast Furnace Slag
<b>Specified Value (cm/sec):</b>	N/A
<b>Date Test Started:</b>	01/08/2020

Specimen Type ( See Note2 )  ( - )	Specimen Initial Conditions				Test Conditions					Hydraulic Conductivity  ( cm/s )
	Specimen Final Conditions				Cell Press. ( psi )	Back Press. ( psi )	Consolid. Press. ( psi )	Permeant Liquid <sup>(3)</sup> ( - )	Average Gradient ( - )	
	Spec. Length ( cm )	Spec. Diameter ( cm )	Dry Unit Weight ( pcf )	Moisture Content ( % )						
C	7.31	7.65	82.3	34.4	75.0	70.0	5.0	DTW	4	4.7E-6
	7.32	7.66	82.0	35.0						

**Notes:**

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
2. Specimen Type: ST = Shelby Tube, C = Three-inch by Three-inch Cylindrical Concrete Mold Specimen, Ot = Others
3. Type of permeant liquid: DTW = Deaired Tap Water, DDI = Deaired Deionized Water

\* Deviations:

Laboratory temperature at 22±3 °C.

5-20-2020  
 AA, NSR



**FLEXIBLE WALL PERMEABILITY TEST** <sup>(1)</sup>  
**ASTM D 5084 \***

<b>Project Name:</b>	Brunswick Plant SWMU 6 Treatability Study
<b>Project Number:</b>	972
<b>Client Name:</b>	Geosyntec Consultants
<b>Site Sample ID:</b>	Mix-02
<b>Lab Sample Number:</b>	19L063E
<b>Material Type:</b>	3% Portland Cement, 12% Ground Blast Furnace Slag
<b>Specified Value (cm/sec):</b>	N/A
<b>Date Test Started:</b>	01/08/2020

Specimen Type ( See Note2 )  ( - )	Specimen Initial Conditions				Test Conditions					Hydraulic Conductivity  ( cm/s )
	Specimen Final Conditions				Cell Press. ( psi )	Back Press. ( psi )	Consolid. Press. ( psi )	Permeant Liquid <sup>(3)</sup> ( - )	Average Gradient ( - )	
	Spec. Length ( cm )	Spec. Diameter ( cm )	Dry Unit Weight ( pcf )	Moisture Content ( % )						
C	7.38	7.66	83.3	34.3	75.0	70.0	5.0	DTW	4	4.8E-6
	7.37	7.66	83.3	34.8						

**Notes:**

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
2. Specimen Type: ST = Shelby Tube, C = Three-inch by Three-inch Cylindrical Concrete Mold Specimen, Ot = Others
3. Type of permeant liquid: DTW = Deaired Tap Water, DDI = Deaired Deionized Water

\* Deviations:  
 Laboratory temperature at 22±3 °C.

*5-20-2020  
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**FLEXIBLE WALL PERMEABILITY TEST** <sup>(1)</sup>  
**ASTM D 5084 \***

<b>Project Name:</b>	Brunswick Plant SWMU 6 Treatability Study
<b>Project Number:</b>	972
<b>Client Name:</b>	Geosyntec Consultants
<b>Site Sample ID:</b>	Mix-03
<b>Lab Sample Number:</b>	19L064E
<b>Material Type:</b>	5% Portland Cement, 10% Ground Blast Furnace Slag
<b>Specified Value (cm/sec):</b>	N/A
<b>Date Test Started:</b>	01/08/2020

Specimen Type ( See Note2 )  ( - )	Specimen Initial Conditions				Test Conditions					Hydraulic Conductivity  ( cm/s )
	Specimen Final Conditions				Cell Press. ( psi )	Back Press. ( psi )	Consolid. Press. ( psi )	Permeant Liquid <sup>(3)</sup> ( - )	Average Gradient ( - )	
	Spec. Length ( cm )	Spec. Diameter ( cm )	Dry Unit Weight ( pcf )	Moisture Content ( % )						
C	7.44	7.64	84.3	32.8	75.0	70.0	5.0	DTW	11	7.8E-7
	7.45	7.65	84.2	34.2						

**Notes:**

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
2. Specimen Type: ST = Shelby Tube, C = Three-inch by Three-inch Cylindrical Concrete Mold Specimen, Ot = Others
3. Type of permeant liquid: DTW = Deaired Tap Water, DDI = Deaired Deionized Water

\* Deviations:

Laboratory temperature at 22±3 °C.

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**Project Name:** Brunswick Plant SWMU 6 Treatability Study

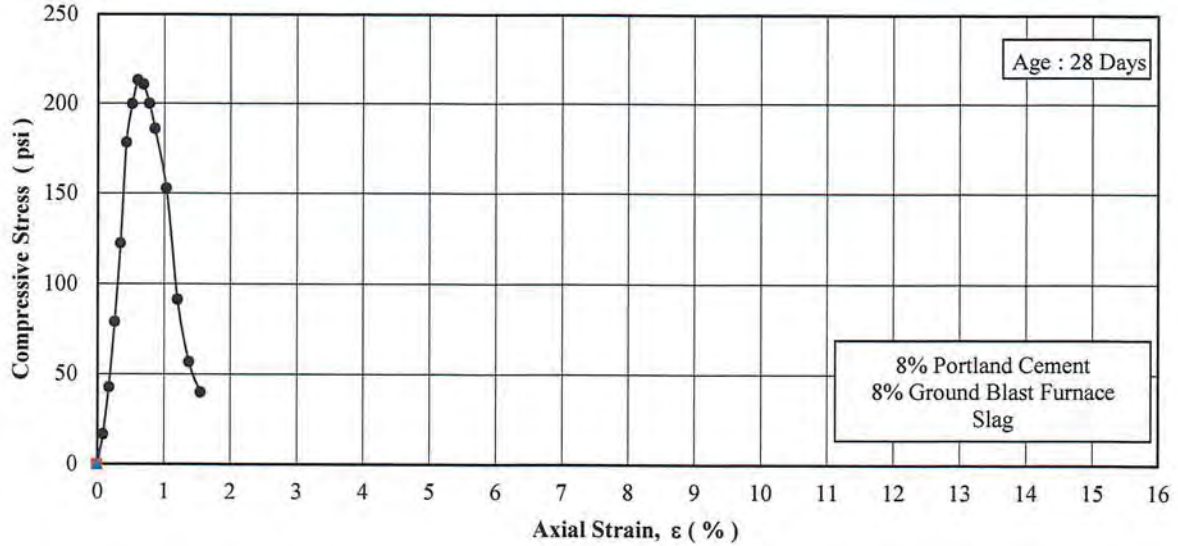
**Project No:** 972

**Sample ID:** Selected Mix - Sample 01

**Lab Sample No:** 20A009E

ASTM D 1633

**COMPRESSIVE STRENGTH OF MOLDED SOIL-CEMENT  
 CYLINDERS**



Test Specimen		Initial Conditions				Strain Rate (%/min)	Unconfined Compressive Strength				Specimen Quality 1 to 10 <sup>(1)</sup>	Notes
No.	Type	Height (in)	Diameter (in)	Moisture Content (%)	Dry Unit Weight (pcf)		Peak		Residual			
							Strain (%)	Strength (psi)	Strain (%)	Strength (psi)		
1	CM	5.80	3.02	33.0	83.3	0.517	0.6	213.0	1.6	39.9	7	



Specimen No. 1



Specimen No. 2



Specimen No. 3

**Specimen Type**

- UD - Undisturbed Specimen
- ST - Shelby Tube Specimen
- RE - Remolded Specimen
- CM - Three-inch Concrete Mold Specimen

Dr. brown, dr. grey cemented  
 gravelly silty sand

Notes:

1 - 1 to 10 indicates extremely poor to excellent specimen conditions.

*5-20-2020  
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**Project Name:** Brunswick Plant SWMU 6 Treatability Study

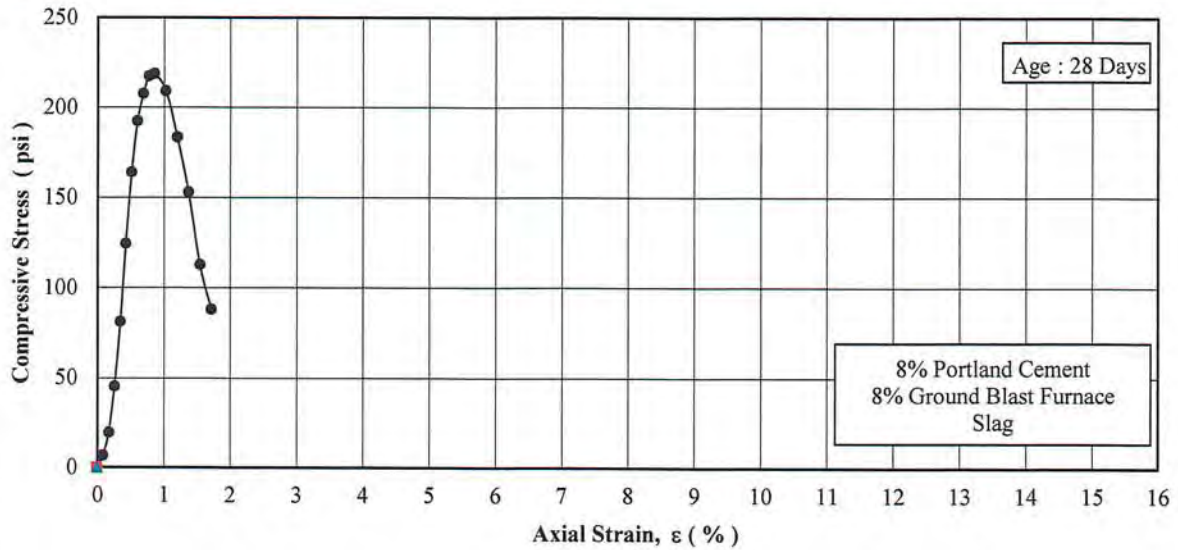
**Project No:** 972

**Sample ID:** Selected Mix - Sample 02

**Lab Sample No:** 20A010E

ASTM D 1633

**COMPRESSIVE STRENGTH OF MOLDED SOIL-CEMENT  
 CYLINDERS**



Test Specimen		Initial Conditions				Strain Rate (% / min)	Unconfined Compressive Strength				Specimen Quality 1 to 10 <sup>(1)</sup>	Notes
No.	Type	Height (in)	Diameter (in)	Moisture Content (%)	Dry Unit Weight (pcf)		Peak		Residual			
							Strain (%)	Strength (psi)	Strain (%)	Strength (psi)		
1	CM	5.83	3.02	31.8	85.2	0.515	0.9	218.8	1.7	88.0	8	



Specimen No. 1



Specimen No. 2



Specimen No. 3

**Specimen Type**

- UD - Undisturbed Specimen
- ST - Shelby Tube Specimen
- RE - Remolded Specimen
- CM - Three-inch Concrete Mold Specimen

Dr. brown, dr. grey cemented  
 gravelly silty sand

Notes:

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*5-20-2020  
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**Project Name:** Brunswick Plant SWMU 6 Treatability Study

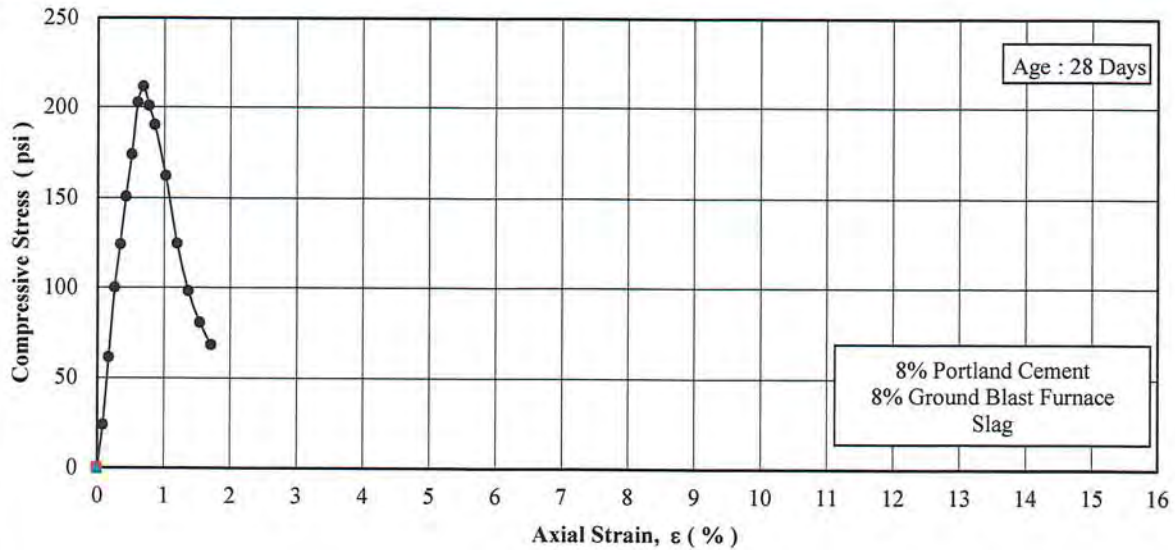
**Project No:** 972

**Sample ID:** Selected Mix - Sample 03

**Lab Sample No:** 20A011E

ASTM D 1633

**COMPRESSIVE STRENGTH OF MOLDED SOIL-CEMENT  
 CYLINDERS**



Test Specimen		Initial Conditions				Strain Rate (% / min)	Unconfined Compressive Strength				Specimen Quality 1 to 10 <sup>(1)</sup>	Notes
No.	Type	Height (in)	Diameter (in)	Moisture Content (%)	Dry Unit Weight (pcf)		Peak		Residual			
							Strain (%)	Strength (psi)	Strain (%)	Strength (psi)		
1	CM	5.85	3.02	32.4	84.1	0.513	0.7	211.5	1.7	68.3	7	



Specimen No. 1



Specimen No. 2



Specimen No. 3

**Specimen Type**

- UD - Undisturbed Specimen
- ST - Shelby Tube Specimen
- RE - Remolded Specimen
- CM - Three-inch Concrete Mold Specimen

Dr. brown, dr. grey cemented  
 gravelly silty sand

Notes:

1 - 1 to 10 indicates extremely poor to excellent specimen conditions.

*5-20-2020  
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**FLEXIBLE WALL PERMEABILITY TEST** <sup>(1)</sup>  
**ASTM D 5084 \***

<b>Project Name:</b>	Brunswick Plant SWMU 6 Treatability Study
<b>Project Number:</b>	972
<b>Client Name:</b>	Geosyntec Consultants
<b>Site Sample ID:</b>	Selected Mix - Sample 01
<b>Lab Sample Number:</b>	20A009E
<b>Material Type:</b>	8% Portland Cement, 8% Ground Blast Furnace Slag
<b>Specified Value (cm/sec):</b>	N/A
<b>Date Test Started:</b>	02/26/2020

Specimen Type ( See Note2 )  ( - )	Specimen Initial Conditions				Test Conditions					Hydraulic Conductivity  ( cm/s )
	Specimen Final Conditions				Cell Press. ( psi )	Back Press. ( psi )	Consolid. Press. ( psi )	Permeant Liquid <sup>(3)</sup> ( - )	Average Gradient ( - )	
	Spec. Length ( cm )	Spec. Diameter ( cm )	Dry Unit Weight ( pcf )	Moisture Content ( % )						
C	7.46	7.63	84.7	31.2	75.0	70.0	5.0	DTW	9	1.1E-6
	7.46	7.66	84.1	32.5						

**Notes:**

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
2. Specimen Type: ST = Shelby Tube, C = Three-inch by Three-inch Cylindrical Concrete Mold Specimen, Ot = Others
3. Type of permeant liquid: DTW = Deaired Tap Water, DDI = Deaired Deionized Water

\* Deviations:

Laboratory temperature at 22±3 °C.

*5-27-2020  
 A.A. NSR*



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**FLEXIBLE WALL PERMEABILITY TEST** <sup>(1)</sup>  
**ASTM D 5084 \***

<b>Project Name:</b>	Brunswick Plant SWMU 6 Treatability Study
<b>Project Number:</b>	972
<b>Client Name:</b>	Geosyntec Consultants
<b>Site Sample ID:</b>	Selected Mix - Sample 02
<b>Lab Sample Number:</b>	20A010E
<b>Material Type:</b>	8% Portland Cement, 8% Ground Blast Furnace Slag
<b>Specified Value (cm/sec):</b>	N/A
<b>Date Test Started:</b>	02/26/2020

Specimen Type ( See Note2 )  ( - )	Specimen Initial Conditions				Test Conditions					Hydraulic Conductivity  ( cm/s )
	Specimen Final Conditions				Cell Press. ( psi )	Back Press. ( psi )	Consolid. Press. ( psi )	Permeant Liquid <sup>(3)</sup> ( - )	Average Gradient ( - )	
	Spec. Length ( cm )	Spec. Diameter ( cm )	Dry Unit Weight ( pcf )	Moisture Content ( % )						
C	7.45	7.63	85.5	30.9	75.0	70.0	5.0	DTW	9	9.1E-7
	7.45	7.64	85.3	32.7						

**Notes:**

1. Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
2. Specimen Type: ST = Shelby Tube, C = Three-inch by Three-inch Cylindrical Concrete Mold Specimen, Ot = Others
3. Type of permeant liquid: DTW = Deaired Tap Water, DDI = Deaired Deionized Water

\* Deviations:  
 Laboratory temperature at 22±3 °C.

*S-27-2020  
 AA, NSR*





**FLEXIBLE WALL PERMEABILITY TEST** <sup>(1)</sup>  
**ASTM D 5084 \***

<b>Project Name:</b>	Brunswick Plant SWMU 6 Treatability Study
<b>Project Number:</b>	972
<b>Client Name:</b>	Geosyntec Consultants
<b>Site Sample ID:</b>	Selected Mix - Sample 03
<b>Lab Sample Number:</b>	20A011E
<b>Material Type:</b>	8% Portland Cement, 8% Ground Blast Furnace Slag
<b>Specified Value (cm/sec):</b>	N/A
<b>Date Test Started:</b>	02/26/2020

Specimen Type ( See Note2 )  ( - )	Specimen Initial Conditions				Test Conditions					Hydraulic Conductivity  ( cm/s )
	Specimen Final Conditions				Cell Press. ( psi )	Back Press. ( psi )	Consolid. Press. ( psi )	Permeant Liquid <sup>(3)</sup> ( - )	Average Gradient ( - )	
	Spec. Length ( cm )	Spec. Diameter ( cm )	Dry Unit Weight ( pcf )	Moisture Content ( % )						
C	7.44	7.67	83.6	32.0	75.0	70.0	5.0	DTW	9	9.9E-7
	7.42	7.66	83.9	33.2						

**Notes:**

- Method C, "Falling-Head, Increasing-Tailwater" test procedures were followed during the testing.
- Specimen Type: ST = Shelby Tube, C = Three-inch by Three-inch Cylindrical Concrete Mold Specimen, Ot = Others
- Type of permeant liquid: DTW = Deaired Tap Water, DDI = Deaired Deionized Water

\* Deviations:  
 Laboratory temperature at 22±3 °C.

*5-27-2020  
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**WETTING AND DRYING TEST OF SOLID WASTES**

ASTM D 4843 \*

**Table 1**

<b>Project Name:</b>	Brunswick Plant SWMU 6 Treatability Study
<b>Project Number:</b>	972
<b>Client Name:</b>	Geosyntec Consultants
<b>Site Sample ID:</b>	Selected Mix-01, -02, & -03
<b>Lab Sample Number:</b>	20A009E, 20A010E, & 20A011E
<b>Material Type:</b>	Solidified Soil Cement Mix
<b>Specified Value:</b>	N/A
<b>Date Test Started:</b>	3/02/2020

**Specimen Conditions**

Test Specimen							Control Specimen						
Specimen Type <sup>(1)</sup>	Specimen ID	Specimen Initial Conditions					Specimen Type <sup>(1)</sup>	Specimen ID	Specimen Final Conditions				
		Height	Diameter	Dry Unit Weight <sup>(2,3)</sup>	Specimen Quality	Moisture Content <sup>(4,5)</sup>			Height	Diameter	Dry Unit Weight <sup>(2,3)</sup>	Specimen Quality	Moisture Content <sup>(4,5)</sup>
(-)	(-)	(cm)	(cm)	(pcf)	(-)	(%)	(-)	(-)	(cm)	(cm)	(pcf)	(-)	(%)
C	Mix-01	7.54	7.64	86.2	8	29.1	C	Mix-01	7.65	7.64	86.9	8	29.1
		7.51	7.65	86.1	6	24.8			7.62	7.65	87.0	7	29.7
C	Mix-02	7.64	7.64	87.6	8	29.1	C	Mix-02	7.65	7.63	86.4	8	29.1
		7.66	7.63	88.2	7	23.7			7.63	7.65	86.0	6	30.6
C	Mix-03	7.46	7.65	86.0	7	29.1	C	Mix-03	7.62	7.65	86.4	8	29.1
		7.51	7.60	86.5	6	24.9			7.59	7.64	86.3	7	31.1

**Notes:**

1. Specimen Type: UD - Undisturbed Specimen, RE - Remolded Specimen, C - Three-inch by Three-inch Cylindrical Concrete Mold Specimen
2. Initial moisture content based on one specimen which was made in conjunction with test and control specimen.
3. Final moisture content taken on specimen after twelve cycles. Specimen was surface dried prior to measuring its moist weight.
4. Initial values of Dry Unit Weight calculated based on moisture content obtained from one specimen.
5. Final values of Dry Unit Weight measured from drying the specimen in a 60 ± 5°C oven.

4-02-2020  
AAI/NSR



**WETTING AND DRYING TEST OF SOLID WASTES**  
**ASTM D 4843 \***

**Table 2**

<b>Project Name:</b>	Brunswick Plant SWMU 6 Treatability Study
<b>Project Number:</b>	972
<b>Client Name:</b>	Geosyntec Consultants
<b>Site Sample ID:</b>	Selected Mix-01, -02, & -03
<b>Lab Sample Number:</b>	20A009E, 20A010E, & 20A011E
<b>Material Type:</b>	Solidified Soil Cement Mix
<b>Specified Value:</b>	N/A
<b>Date Test Started:</b>	3/02/2020

**Cumulative Percent Mass Loss After Each Cycle**

	Cycle Number											
	1	2	3	4	5	6	7	8	9	10	11	12
Test Mix-01	0.03	0.05	0.06	0.07	0.09	0.11	0.16	0.18	0.23	0.28	0.32	0.33
Test Mix-02	0.05	0.08	0.13	0.14	0.15	0.18	0.23	0.26	0.30	0.33	0.38	0.38
Test Mix-03	0.08	0.12	0.17	0.17	0.22	0.25	0.31	0.34	0.38	0.42	0.46	0.48
Control Mix-01	0.03	0.07	0.10	0.10	0.12	0.14	0.20	0.23	0.26	0.30	0.34	0.35
Control Mix-02	0.06	0.11	0.16	0.17	0.19	0.22	0.29	0.32	0.35	0.40	0.44	0.45
Control Mix-03	0.07	0.14	0.18	0.19	0.21	0.29	0.37	0.41	0.45	0.49	0.53	0.57

**Notes:**

*4-02-2020  
AAINSR*



**WETTING AND DRYING TEST OF SOLID WASTES**

ASTM D 4843 \*

**Table 3**

<b>Project Name:</b>	Brunswick Plant SWMU 6 Treatability Study
<b>Project Number:</b>	972
<b>Client Name:</b>	Geosyntec Consultants
<b>Site Sample ID:</b>	Selected Mix-01, -02, & -03
<b>Lab Sample Number:</b>	20A009E, 20A010E, & 20A011E
<b>Material Type:</b>	Solidified Soil Cement Mix
<b>Specified Value:</b>	N/A
<b>Date Test Started:</b>	3/02/2020

**Cumulative Percent Mass Loss After 12 Cycles**

	Specimen Number			Average
	1	2	3	
Test Specimen Mass Loss (%)	0.33	0.38	0.48	0.40
Control Specimen Mass Loss (%)	0.35	0.45	0.57	0.46
Difference in Mass Loss (%)	-0.02	-0.07	-0.08	-0.06

Average Cumulative Corrected Mass Loss After 12 Cycles (%)	-0.06
--	-------

Notes:

4-02-2020  
AA, NSB



**WETTING AND DRYING TEST OF SOLID WASTES**  
**ASTM D 4843 \***

**Table 4**

<b>Project Name:</b>	Brunswick Plant SWMU 6 Treatability Study
<b>Project Number:</b>	972
<b>Client Name:</b>	Geosyntec Consultants
<b>Site Sample ID:</b>	Selected Mix-01, -02, & -03
<b>Lab Sample Number:</b>	20A009E, 20A010E, & 20A011E
<b>Material Type:</b>	Solidified Soil Cement Mix
<b>Specified Value:</b>	N/A
<b>Date Test Started:</b>	3/02/2020

**Visual Observations <sup>(1)</sup>**

	Cycle Number											
	Date of Cycle											
	1	2	3	4	5	6	7	8	9	10	11	12
	3/4/2020	3/6/2020	3/8/2020	3/10/2020	3/12/2020	3/14/2020	3/16/2020	3/18/2020	3/20/2020	3/22/2020	3/24/2020	3/26/2020
Test Specimen 1	0, 0, 0, 0	0, 0, 0, 0	0, 1, 1, 1	0, 1, 1, 1	0, 1, 1, 1	0, 2, 2, 1	0, 2, 2, 1	0, 2, 2, 1	0, 2, 2, 1	0, 3, 2, 1	0, 3, 2, 1	0, 3, 2, 1
Test Specimen 2	0, 0, 0, 0	0, 0, 0, 0	0, 0, 0, 0	0, 0, 0, 0	0, 1, 1, 1	0, 1, 1, 1	0, 1, 1, 1	0, 1, 1, 1	0, 1, 1, 1	0, 2, 2, 1	0, 3, 2, 1	0, 3, 2, 1
Test Specimen 3	0, 0, 0, 0	0, 0, 0, 0	0, 0, 0, 0	0, 0, 0, 0	0, 1, 1, 1	0, 1, 1, 1	0, 1, 1, 1	0, 1, 1, 1	0, 1, 1, 1	0, 1, 1, 1	0, 1, 1, 1	0, 1, 1, 1
Control Specimen 1	0, 0, 0, 0	0, 0, 0, 0	0, 0, 0, 1	0, 0, 0, 1	0, 2, 2, 1	0, 2, 2, 1	0, 2, 2, 1	0, 2, 2, 1	0, 2, 2, 1	0, 2, 2, 1	0, 2, 2, 1	0, 2, 2, 1
Control Specimen 2	0, 0, 0, 0	0, 0, 0, 0	0, 0, 0, 0	0, 0, 0, 0	0, 0, 0, 1	0, 0, 0, 1	0, 0, 0, 1	0, 0, 0, 1	0, 1, 1, 1	0, 1, 1, 1	0, 1, 1, 1	0, 1, 1, 1
Control Specimen 3	0, 0, 0, 0	0, 0, 0, 0	0, 0, 0, 0	0, 0, 0, 0	0, 0, 0, 0	0, 0, 1, 1	0, 0, 1, 1	0, 0, 1, 1	0, 0, 1, 1	0, 0, 1, 1	0, 0, 1, 1	0, 0, 1, 1

**Notes:**

- Specimens ranked after each cycle as follows: First Digit - Visual cracking/ fracturing (0 to 10, None to Substantial). Second Digit - Degradation of Specimen Corners (0 to 10, None to Substantial). Third Digit - Overall Deterioration (0 to 10, None to Substantial). Fourth Digit - Change in Surface Roughness (0 to 10, None to Substantial).

*4-02-2020  
AA, NSM*



**Excel Geotechnical Testing, Inc.**  
"Excellence in Testing"

953 Forrest Street, Roswell, Georgia 30075  
Tel: (770) 910 7537 Fax: (770) 910 7538

**Project Name:** Brunswick Plant SWMU 6 Treatability Study

**Project No:** 972

**Sample ID:** Selected Mix-01, -02, & -03

**Lab Sample No:** 20A009E, 20A010E, & 20A011E

ASTM D 4843

**WETTING AND DRYING TEST OF SOLID WASTES**

(a)



Selected Mix-01

(b)



(a)



Selected Mix-02

(b)



(a)



Selected Mix-03

(b)



Notes: (a) Test Specimen  
(b) Control Specimen

4-02-2020  
AA1NSR



**Excel Geotechnical Testing, Inc.**

*"Excellence in Testing"*

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Tel: (770) 910 7537 Fax: (770) 910 7538

# LAST PAGE

## **Test Applicability and Limitations:**

- The results are applicable only for the materials received at the laboratory and tested which may or may not be representative of the materials at the site.

## **Storage Policy:**

- Uncontaminated Material: All samples (or what is left) will be archived for a period of 3 months from the date received. Thereafter the samples will be discarded unless a written request for extended storage is received. A rate of \$1.00 per sample per day will be applied after the initial 3 month storage period.

- Contaminated Material: All samples (or what is left) will be archived for a period of 3 months from the date received. Thereafter, the samples will be returned to the project manager or his/her designated receiver unless a written request for extended storage is received. A rate of \$1.30 per sample per day will be applied after the initial 3 months storage.



## APPENDIX C

### Thermal Treatment Treatability Study Report

February 12, 2020

Ali Ciblak, Ph.D., P.E.  
Remediation Engineer  
Geosyntec Consultants, Inc.  
1255 Roberts Boulevard, Suite 200  
Kennesaw, Georgia 30144

Via email: [ACiblak@Geosyntec.com](mailto:ACiblak@Geosyntec.com)

**Subject: Ex Situ Self-sustaining Treatment for Active Remediation (STARx) Treatability Study Report to Treat Toxaphene-Impacted Soils from a Site in Brunswick, Georgia**

Dear Ali:

A treatability study for the application of ex situ Self-sustaining Treatment for Active Remediation (STARx) to treat toxaphene-impacted soils from the site in Brunswick, Georgia (the "Site") was conducted. This report presents a brief description of the scope of work, the results of treatability testing, and recommendations of future phases of work.

## **SCOPE OF WORK**

The proposed scope of work was conducted as presented in our proposal dated 16 October 2019 with the following exceptions:

- An air flux of 5.0 centimeters per second [cm/s] was used for testing;
- A soil pack height of 22 cm was used in this study to provide additional information regarding the self-sustainability of the smoldering process; and,
- Analysis of toxaphene in condensate was added to the sampling plan. Due to the limited volume of condensate produced, sufficient sample volume for analysis of volatile organic compounds (VOCs) in condensate was not available.

As discussed in the proposal, granular activated carbon (GAC) was used as a surrogate fuel to facilitate smoldering due to the high vapor pressure of target compounds (i.e., toxaphene). Successful self-sustaining smoldering was achieved using a GAC concentration of 20 grams (g) GAC per kilogram (kg) soil (20 g/kg); therefore, no further experiments were conducted.

## **RESULTS**

### **Ignition Protocol and Smoldering Characteristics**

A convective ignition source with air injected at a fixed flux of 5.0 cm/s was used to initiate the smoldering combustion process. Smoldering combustion was initiated successfully once the

temperature of the injected air (as measured by the “plenum” thermocouple) reached approximately 375°C (Figure 1). Evidence of the initiation of combustion can be observed through the rapid rise in temperature of the first thermocouple in the contaminant pack, as well as the generation of combustion gases (i.e., increase of carbon monoxide [CO] and carbon dioxide [CO<sub>2</sub>] concentrations, and decrease of oxygen [O<sub>2</sub>] concentrations). The combustion test demonstrated strong self-sustaining smoldering behavior; that is, temperatures at each location within the experimental apparatus continued to increase and “cross-over” temperatures at the preceding monitoring interval following the termination of the heating element (Figure 1).

The peak temperature recorded for the sample was approximately 1329°C and the smoldering front propagation velocity was estimated to be 0.44 centimeters per minute (cm/min) (or 20.8 feet per day [ft/d]). Propagation velocities are correlated to soil properties and the mass of fuel (i.e., contaminants and GAC surrogate fuel) present in the pore space and will vary during field implementation as a function of fuel concentrations and heterogeneity.

### **Soil Analytical Results**

Analytical results both ‘Before’ (baseline) and ‘After’ (post) treatment for the soil / GAC mixture are presented in Table 1. Data presented in Table 1 includes: VOCs, petroleum hydrocarbons, and toxaphene. ‘Before’ concentrations of total and technical toxaphene ranged from 8,800 milligrams per kilogram (mg/kg) to 12,000 mg/kg. An average of 3,500 mg/kg of diesel range organics (DRO) was reported in baseline samples, with low levels of gasoline range organics (GRO) and VOCs also detected. ‘After’ STARx treatment concentrations were non detect for VOCs and GRO, with low levels of DRO detected. Low levels of toxaphene were also detected in post-treatment soils; however, the detected toxaphene concentrations represent a percent concentration decrease of greater than 99.99%.

Photographs of mixing of the as-received soil with GAC prior to STARx treatment are presented as Plate 1. Photographs, presented as Plates 2 and 3, showing the ‘Before’ and ‘After’ samples provide visual evidence of contaminant destruction.

### **Principle Components of Gaseous Emissions and Condensate**

Concentrations of CO and CO<sub>2</sub> (combustion gases) measured during the STARx combustion test ranged between background levels and 7.3% and 13.0%, respectively.

These combustion gas concentrations are within the range of typical values for the types of contaminants (i.e., high volatility contaminants requiring addition of a surrogate fuel) and soils examined at the laboratory bench scale. Combustion gas presence is primarily viewed as an indicator of the occurrence of combustion, and can be used to guide operations during a field trial or full-scale STARx application.

Fixed gases, volatile compounds, and toxaphene measured in the vapor phase during the combustion test are presented in Table 2. A total of 43 VOCs were detected in the vapor phase, with the highest concentrations measured for chloromethane (2,080 mg/m<sup>3</sup>). The concentration of toxaphene captured by the vapor collection system (1,115 mg/m<sup>3</sup>) is also reported in Table 2. Based on the measured toxaphene concentration and the extraction flow rate, the total mass of toxaphene released in the emissions represents approximately 5.3% of the total mass of toxaphene contained in pre-treatment soils.

The volatile compounds identified in the vapors are consistent with the types of compounds typically identified in STAR laboratory bench scale tests involving volatile contaminants. Vapor concentrations during a laboratory bench test are anticipated to over-estimate the fraction of volatile emissions (relative to mass destroyed via smoldering) due to the large air flow rates used and the scale of the apparatus. However, these vapor data provide important information about the constituents that can be anticipated to be generated during STARx operation in the field and will be used to design a suitable vapor capture and treatment system for any subsequent field pilot testing.

Condensate was captured by the vapor collection and treatment system and contained both aqueous and non-aqueous phases. Condensate analytical results are summarized in Table 3. Based on the measured toxaphene concentrations and estimated volumes produced for both phases, the total mass of toxaphene contained in condensate represents approximately 5.7% of the total mass of toxaphene contained in pre-treatment soils. An estimated 89% of total toxaphene in pre-treatment soils was therefore destroyed via smoldering (i.e., assuming 5.3% and 5.7% of toxaphene mass was contained in the emissions and condensate, respectively).

## RECOMMENDATIONS

Self-sustaining smoldering combustion was observed for Site soils with the addition of 20 g/kg GAC to support the combustion reaction. The remediation efficiency as observed in Plates 2 and 3 along with the concentration reductions observed through laboratory analysis (Table 1) and the calculated smoldering propagation velocity suggests that STARx could be successfully applied at the Site to treat toxaphene in soil.

It is recommended that a pilot test be conducted to collect additional data for full scale design, costing, and operation of a STARx system. This would include an assessment of processing/treatment rates and treatment of vapor emissions at a larger scale. A refined conceptual approach and cost estimate for full-scale STARx implementation could be completed following pilot testing.

If you have any questions or require additional information regarding this report, please contact me at 1-416-306-8314.

Sincerely,



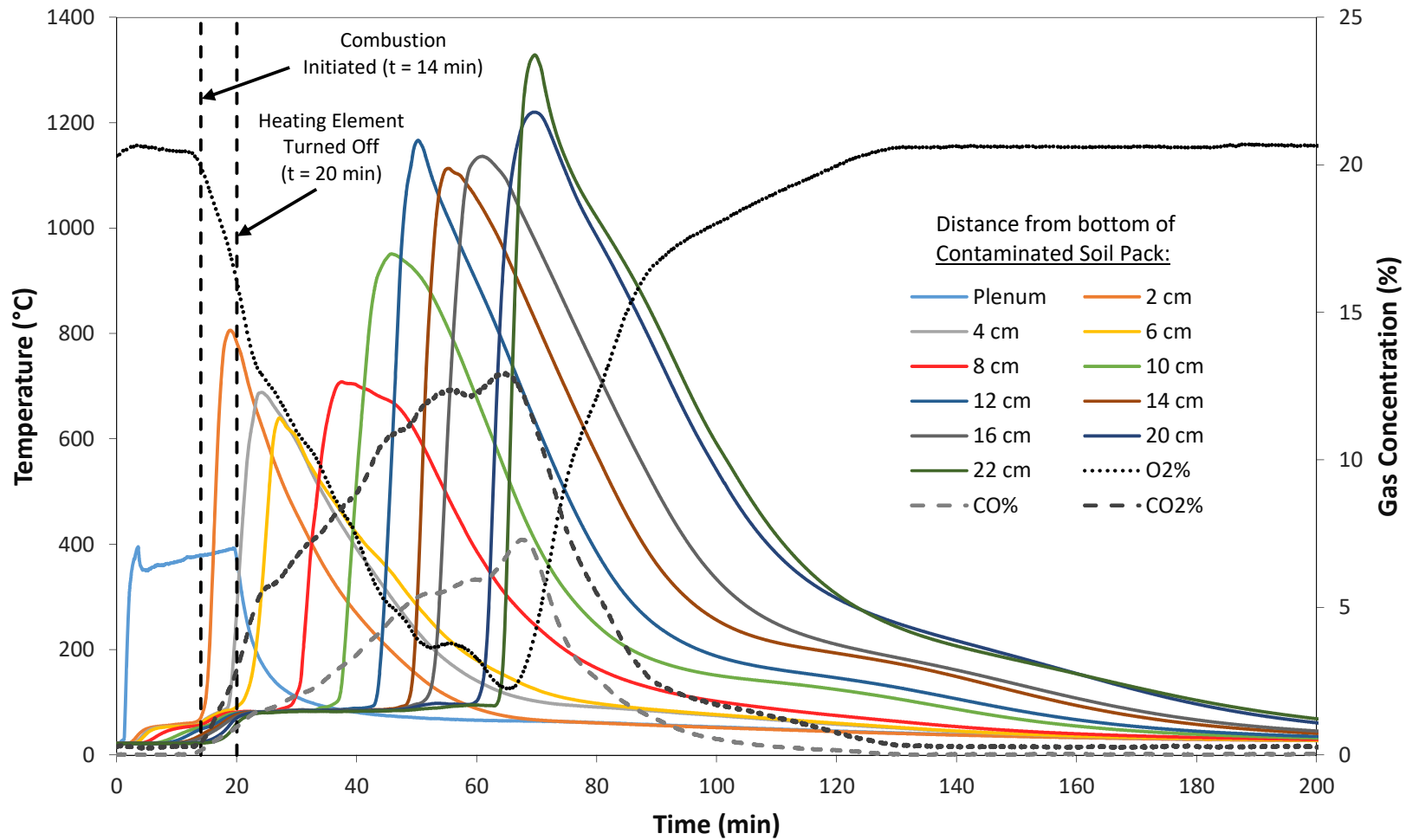
Laura Kinsman, M.E.Sc.  
Senior Staff Professional



Warren Ferguson, M.A.Sc., P.Eng.  
Senior Engineer



Gavin Grant, Ph.D., P.Eng.  
Operations Manager



**Notes:**

- 1) Colored lines represent temperatures at various heights within the contaminated soil pack
- 2) Dashed lines represent combustion gas concentrations in the emissions (O<sub>2</sub>, CO and CO<sub>2</sub>)

**STARx Temperature Profiles  
Brunswick Plant Treatability Study**

GR6881



February 2020

Figure 1

Table 1 Concentrations of Target Compounds in Soil Brunswick Plant Treatability Study GR6881									
Compound	Units	'Before' STARx Treatment <sup>1</sup>				'After' STARx Treatment			
		Sample 1		Sample 2		Sample 1		Sample 2	
		RDL	Concentration in Soil	RDL	Concentration in Soil	RDL	Concentration in Soil	RDL	Concentration in Soil
<b>Volatile Organic Compounds</b>									
Xylenes (Total)	ug/kg	12	<b>430</b>	11	<b>160</b>	12	ND	11	ND
p-Cymene	ug/kg	630	<b>3,000</b>	260	<b>2,200</b>	6.0	ND	5.7	ND
<b>Hydrocarbons</b>									
Gasoline Range Organics (GRO; C6-C10)	mg/kg	13	<b>22</b>	13	<b>23</b>	10	ND	10	ND
Diesel Range Organics (DRO; C10-C28)	mg/kg	390	<b>3,700</b>	420	<b>3,300</b>	3.2	<b>3.8*</b>	3.1	ND
<b>Toxaphene</b>									
Toxaphene, Technical	mg/kg	1,100	<b>9,200</b>	1,100	<b>12,000</b>	0.081	<b>0.17*</b>	0.082	<b>0.44</b>
Total Toxaphene	mg/kg	1,100	<b>8,800</b>	1,100	<b>12,000</b>	0.081	<b>0.21*</b>	0.082	<b>0.44</b>

Notes:

ND - non detect

ug/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

RDL - Reported Detection Limit

\* Results reported for re-extracted samples. Results are within +/-30% of the results reported for the initial extraction.

<sup>1</sup> 'Before' STARx treatment sample collected from homogenized soil / granular activated carbon (GAC) mixture

<b>Table 2</b> <b>Concentrations of Target Compounds in Vapor Emissions</b> <b>Brunswick Plant Treatability Study</b> <b>GR6881</b>			
Compound	Units	During STARx Treatment	
		RDL	Summa Canister
<b>Permanent Gases</b>			
Carbon Monoxide	%	0.050	<b>4.04</b>
Carbon Dioxide	%	0.050	<b>10.0</b>
<b>Volatile Organic Compounds</b>			
Acetone	ug/m <sup>3</sup>	45,000	<b>81,000</b>
Allyl chloride	ug/m <sup>3</sup>	190	<b>2,280</b>
Benzene	ug/m <sup>3</sup>	24,000	<b>127,000</b>
Benzyl chloride	ug/m <sup>3</sup>	310	<b>4,340</b>
Bromodichloromethane	ug/m <sup>3</sup>	410	ND
Bromoform	ug/m <sup>3</sup>	630	ND
Bromomethane	ug/m <sup>3</sup>	240	<b>4,480</b>
1,3-Butadiene	ug/m <sup>3</sup>	670	<b>7,650</b>
Carbon Disulfide	ug/m <sup>3</sup>	940	<b>7,500</b>
Carbon Tetrachloride	ug/m <sup>3</sup>	380	<b>950</b>
Chlorobenzene	ug/m <sup>3</sup>	1,400	<b>17,600</b>
Dibromochloromethane	ug/m <sup>3</sup>	520	ND
Chloroethane	ug/m <sup>3</sup>	800	<b>5,710</b>
Chloroform	ug/m <sup>3</sup>	1,500	<b>8,100</b>
Chloromethane	ug/m <sup>3</sup>	170,000	<b>2,080,000</b>
Cyclohexane	ug/m <sup>3</sup>	210	<b>210</b>
1,2-Dibromoethane	ug/m <sup>3</sup>	470	ND
1,2-Dichlorobenzene	ug/m <sup>3</sup>	360	<b>4,020</b>
1,3-Dichlorobenzene	ug/m <sup>3</sup>	360	<b>2,980</b>
1,4-Dichlorobenzene	ug/m <sup>3</sup>	360	<b>3,870</b>
Dichlorodifluoromethane	ug/m <sup>3</sup>	300	ND
1,1-Dichloroethane	ug/m <sup>3</sup>	250	ND
1,2-Dichloroethane	ug/m <sup>3</sup>	250	<b>410</b>
1,1-Dichloroethene	ug/m <sup>3</sup>	1,200	<b>15,000</b>
cis-1,2-Dichloroethene	ug/m <sup>3</sup>	240	<b>3,710</b>
trans-1,2-Dichloroethene	ug/m <sup>3</sup>	240	<b>3,210</b>
Methylene chloride	ug/m <sup>3</sup>	1,100	<b>8,500</b>
1,2-Dichloropropane	ug/m <sup>3</sup>	280	<b>330</b>
cis-1,3-Dichloropropene	ug/m <sup>3</sup>	280	<b>450</b>
trans-1,3-Dichloropropene	ug/m <sup>3</sup>	280	ND
1,4-Dioxane	ug/m <sup>3</sup>	220	ND
Ethyl acetate	ug/m <sup>3</sup>	220	ND
Ethylbenzene	ug/m <sup>3</sup>	1,300	<b>37,300</b>
4-Ethyltoluene	ug/m <sup>3</sup>	1,500	<b>14,000</b>
n-Heptane	ug/m <sup>3</sup>	250	<b>4,250</b>
Hexachlorobutadiene	ug/m <sup>3</sup>	650	ND
n-Hexane	ug/m <sup>3</sup>	1,100	<b>4,800</b>
2-Hexanone	ug/m <sup>3</sup>	1,200	ND
Isooctane	ug/m <sup>3</sup>	280	ND
Isopropyl alcohol	ug/m <sup>3</sup>	740	<b>930</b>
Isopropylbenzene	ug/m <sup>3</sup>	300	<b>4,150</b>
Methyl ethyl ketone	ug/m <sup>3</sup>	890	<b>17,900</b>
Methyl isobutyl ketone	ug/m <sup>3</sup>	250	<b>1,370</b>
MTBE	ug/m <sup>3</sup>	220	ND
Propylene	ug/m <sup>3</sup>	13,000	<b>121,000</b>



<b>Table 2</b> <b>Concentrations of Target Compounds in Vapor Emissions</b> <b>Brunswick Plant Treatability Study</b> <b>GR6881</b>			
Compound	Units	During STARx Treatment	
		RDL	Summa Canister
Styrene	ug/m <sup>3</sup>	1,300	<b>36,100</b>
1,1,2,2-Tetrachloroethane	ug/m <sup>3</sup>	420	ND
Tetrachloroethylene	ug/m <sup>3</sup>	410	<b>860</b>
Tetrahydrofuran	ug/m <sup>3</sup>	180	ND
Toluene	ug/m <sup>3</sup>	29,000	<b>319,000</b>
Freon 113	ug/m <sup>3</sup>	460	ND
1,2,4-Trichlorobenzene	ug/m <sup>3</sup>	450	<b>2,380</b>
1,1,1-Trichloroethane	ug/m <sup>3</sup>	330	ND
1,1,2-Trichloroethane	ug/m <sup>3</sup>	330	<b>880</b>
Trichloroethylene	ug/m <sup>3</sup>	330	<b>3,220</b>
Trichlorofluoromethane	ug/m <sup>3</sup>	340	ND
Freon 114	ug/m <sup>3</sup>	420	ND
1,2,4-Trimethylbenzene	ug/m <sup>3</sup>	1,500	<b>14,900</b>
1,3,5-Trimethylbenzene	ug/m <sup>3</sup>	300	<b>4,250</b>
Vinyl acetate	ug/m <sup>3</sup>	3,500	ND
Vinyl bromide	ug/m <sup>3</sup>	270	ND
Vinyl chloride	ug/m <sup>3</sup>	770	<b>16,400</b>
o-Xylene	ug/m <sup>3</sup>	1,300	<b>23,200</b>
m&p-Xylene	ug/m <sup>3</sup>	2,600	<b>60,600</b>
<b>Toxaphene</b>			
Toxaphene	mg/m <sup>3</sup>	--	<b>1,115</b>

Notes:

ND - non detect

ug/m<sup>3</sup> - micrograms per cubic meter

mg/m<sup>3</sup> - milligrams per cubic meter

% - percent

RDL - Reported Detection Limit

-- Not applicable/not reported

<b>Table 3</b> <b>Concentrations of Target Compounds in Emitted Condensate</b> <b>Brunswick Plant Treatability Study</b> <b>GR6881</b>						
Compound	Condensate					
	Units	RDL	Aqueous Phase	Units	RDL	Non-Aqueous Phase
<b>Toxaphene</b>						
Toxaphene, Technical	mg/L	0.990	<b>6.6</b>	mg/kg	6100	<b>70,000</b>
Total Toxaphene	mg/L	0.990	<b>8.5</b>	mg/kg	6100	<b>99,000</b>
<b>Physical Properties</b>						
pH	--	--	<b>0.3</b>	--	--	--

Notes:

ND - non detect

ug/L - micrograms per litre

RDL - Reported Detection Limit

-- Not applicable or not analyzed



**CALCULATION**

Calculation No.:	1
Client:	Geosyntec Consultants Inc.
Project:	Brunswick, Georgia
Project/Proposal No.:	GR6881
Task No.:	104AA

Title:  
**Toxaphene Mass Balance**

**OBJECTIVE**

Determine the estimated mass of toxaphene destroyed via smoldering

**METHOD**

1. Determine the total initial mass of toxaphene contained in pre-treatment soils in the column.
2. Determine the total mass of toxaphene in post-treatment soils, emissions, and condensate.
3. Determine the fraction of mass contained in post-treatment soils, emissions, and condensate relative to the initial mass.
4. Subtract the fraction of mass contained in post-treatment soils, emissions, and condensate from the initial mass (100%) to estimate percent destroyed via smoldering.

**INPUTS**

Total Initial Toxaphene Mass

Average total toxaphene concentration in pre-treatment soil	10,400	mg/kg
Total mass of soil in test column	6.004	kg
Total initial toxaphene mass	62,442	mg

Total Toxaphene Mass in Post-Treatment Soil

Average total toxaphene concentration in post-treatment soil	0.33	mg/kg
Total mass of soil in test column	5.743	kg
Total toxaphene mass in post-treatment soil	1.87	mg
Fraction of initial toxaphene mass in post-treatment soil	0.003	%

Total Toxaphene Mass in Emissions

Toxaphene concentration in emissions	1,115	mg/m <sup>3</sup>
Total volume of emissions over duration of combustion	2.97	m <sup>3</sup>
Total toxaphene mass in emissions	3,308	mg
Fraction of initial toxaphene mass in emissions	5.3	%

Total Toxaphene Mass in Condensate

Total toxaphene concentration in aqueous phase	8.5	mg/L
Total volume of aqueous phase condensate	0.9	L
Total toxaphene concentration in non-aqueous phase	99,000	mg/kg
Total volume of non-aqueous phase condensate	0.03	L
Estimated density of non-aqueous phase condensate	1.2	kg/L
Total toxaphene mass in condensate	3,564	mg
Fraction of initial toxaphene mass in condensate	5.7	%

Estimated Toxaphene Mass Destroyed

Estimated mass destroyed via smoldering	89.0	%
---	------	---

**ASSUMPTIONS**

1. Initial mass of toxaphene that is not contained in post-treatment soils, condensate, or emissions is assumed to be destroyed via smoldering.

**CONCLUSIONS**

1. The total mass of toxaphene contained in post-treatment soil represents approximately 0.003% of the total mass of toxaphene contained in pre-treatment soils.
2. The total mass of toxaphene contained in emissions represents approximately 5.3% of the total mass of toxaphene contained in pre-treatment soils.
3. The total mass of toxaphene contained in condensate represents approximately 5.7% of the total mass of toxaphene contained in pre-treatment soils.
4. An estimated 89% of total toxaphene in pre-treatment soils was therefore destroyed via smoldering.



(a)



(b)



(c)




(d)



(e)

**Notes:**

- a) As-received soil on mass balance;
- b) Granular activated carbon (GAC) added to soil on mass balance;
- c) GAC and soil added to mixer;
- d) GAC and soil mixing; and,
- e) Homogenized GAC and soil.

<b>Impacted Soil and GAC Mixing Brunswick Plant Treatability Study</b>	
GR6881	
	February 2020
	Plate 1



(a)



(b)

**Notes:**

- a) Soil / GAC mixture before STARx treatment; and,
- b) Soil after STARx treatment

<b>Untreated and Post-STARx Treated Soils</b> <b>Brunswick Plant Treatability Study</b> GR6881	
	February 2020
	Plate 2




(a)



(b)

**Notes:**

- a) Loading of soil / GAC mixture into column before STARx treatment; and,
- b) Unloading of soil from column after STARx treatment

<b>Loading and Unloading of STARx Laboratory Column Brunswick Plant Treatability Study</b>	
GR6881	
	February 2020
	Plate 3

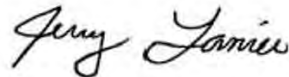
## ANALYTICAL REPORT

Eurofins TestAmerica, Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404  
Tel: (912)354-7858

Laboratory Job ID: 680-178247-1  
Client Project/Site: Ashland - Brunswick Plant Soil

For:  
Geosyntec Consultants, Inc.  
1255 Roberts Blvd, NW  
Suite 200  
Kennesaw, Georgia 30144

Attn: Adria Reimer



Authorized for release by:  
1/31/2020 3:40:18 PM

Jerry Lanier, Project Manager I  
(912)250-0281  
[jerry.lanier@testamericainc.com](mailto:jerry.lanier@testamericainc.com)

### LINKS

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*The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

**Job ID: 680-178247-1**

**Laboratory: Eurofins TestAmerica, Savannah**

**Narrative**

## CASE NARRATIVE

**Client: Geosyntec Consultants, Inc.**

**Project: Ashland - Brunswick Plant Soil**

**Report Number: 680-178247-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

### **RECEIPT**

The samples were received on 12/13/2019 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 11.7° C.

### **Receipt Exceptions**

The following samples were received at the laboratory outside the required temperature criteria: Pre-Treatment 1 (680-178247-1), Pre-Treatment 2 (680-178247-2), Post-Treatment 1 (680-178247-3), Post-Treatment 2 (680-178247-4), Aqueous Condensate (680-178247-5), Organic Condensate (680-178247-6), Trip Blank (680-178247-7) and Organic Condensate (680-178247-8). There was no cooling media present in the cooler. The client was contacted regarding this issue, and the laboratory was instructed to proceed with analysis.

### **VOLATILE ORGANIC COMPOUNDS (GC-MS)**

Samples Pre-Treatment 1 (680-178247-1), Pre-Treatment 2 (680-178247-2), Post-Treatment 1 (680-178247-3) and Post-Treatment 2 (680-178247-4) were analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were prepared on 12/16/2019 and analyzed on 12/17/2019, 12/19/2019 and 12/20/2019.

The following samples were received outside of holding time: Pre-Treatment 1 (680-178247-1) and Pre-Treatment 2 (680-178247-2).

The following samples were received in pre-weighed containers with a label that was added in the field, which would cause a slight low bias in the final results: All 4 samples have extra labels. Pre-Treatment 1 (680-178247-1), Pre-Treatment 2 (680-178247-2), Post-Treatment 1 (680-178247-3) and Post-Treatment 2 (680-178247-4).

Surrogate recovery for the following samples were outside control limits: Pre-Treatment 1 (680-178247-1) and Pre-Treatment 2 (680-178247-2). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Surrogate recovery for the following samples were outside the upper control limit: Post-Treatment 1 (680-178247-3) and Post-Treatment 2 (680-178247-4). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

The following samples were diluted to bring the concentration of target analytes within the calibration range: Pre-Treatment 1 (680-178247-1) and Pre-Treatment 2 (680-178247-2). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **VOLATILE ORGANIC COMPOUNDS (GC-MS)**

Sample Trip Blank (680-178247-7) was analyzed for Volatile Organic Compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 12/20/2019.

# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Job ID: 680-178247-1 (Continued)

### Laboratory: Eurofins TestAmerica, Savannah (Continued)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### GASOLINE RANGE ORGANICS (GRO)

Samples Pre-Treatment 1 (680-178247-1), Pre-Treatment 2 (680-178247-2), Post-Treatment 1 (680-178247-3) and Post-Treatment 2 (680-178247-4) were analyzed for gasoline range organics (GRO) in accordance with SW 846 8015C GRO. The samples were analyzed on 12/18/2019.

The following samples were received outside of holding time: Pre-Treatment 1 (680-178247-1) and Pre-Treatment 2 (680-178247-2).

Surrogate recovery for the following samples were outside control limits: Pre-Treatment 1 (680-178247-1) and Pre-Treatment 2 (680-178247-2). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Internal standard responses were outside of acceptance limits for the following samples: Pre-Treatment 1 (680-178247-1) and Pre-Treatment 2 (680-178247-2). The sample(s) shows evidence of matrix interference.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### DIESEL RANGE ORGANICS (DRO)

Samples Pre-Treatment 1 (680-178247-1), Pre-Treatment 2 (680-178247-2), Post-Treatment 1 (680-178247-3) and Post-Treatment 2 (680-178247-4) were analyzed for Diesel Range Organics (DRO) in accordance with EPA SW-846 Method 8015C. The samples were prepared on 01/07/2020 and 12/20/2019 and analyzed on 01/08/2020, 12/20/2019 and 12/23/2019.

Due to the nature of this analysis which involves a total area sum over the entire retention time range, manual integrations are routinely performed for target analytes and surrogates to ensure consistent integration.

Diesel Range Organics [C10-C28] was detected above the reporting limit (RL) in the method blank associated with preparation batch 680-601451 and analytical batch 680-601572 as well as in the following sample: Post-Treatment 1 (680-178247-3). All affected samples were re-extracted and re-analyzed outside of holding time. Both sets of data have been reported.

The following samples required a dilution due to the nature of the sample matrix: Pre-Treatment 1 (680-178247-1) and Pre-Treatment 2 (680-178247-2). Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

Samples Pre-Treatment 1 (680-178247-1)[100X] and Pre-Treatment 2 (680-178247-2)[100X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### ORGANOCHLORINE PESTICIDES (GC)

Samples Pre-Treatment 1 (680-178247-1), Pre-Treatment 2 (680-178247-2), Post-Treatment 1 (680-178247-3), Post-Treatment 2 (680-178247-4) and Organic Condensate (680-178247-8) were analyzed for Organochlorine Pesticides (GC) in accordance with EPA SW-846 Method 8081B. The samples were prepared on 01/08/2020, 01/15/2020 and 12/20/2019 and analyzed on 01/15/2020, 01/20/2020, 12/21/2019 and 12/27/2019.

The following samples required a dilution to bring the concentration of target analytes within the calibration range: Pre-Treatment 1 (680-178247-1), Pre-Treatment 2 (680-178247-2), Organic Condensate (680-178247-8), CondensateMS (680-178247-8MS), DCB Decachlorobiphenyl and Tetrachloro-m-xylene failed the surrogate recovery criteria low for Organic CondensateMSD (680-178247-8MSD).. Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

Total Toxaphene and Toxaphene, Technical failed the recovery criteria high for LCS 680-601450/6-A. Total Toxaphene failed the recovery criteria high for LCS 680-603146/10-A. Total Toxaphene failed the recovery criteria high for LCSD 680-603825/5-A. Refer to the QC report for details.

Due to the high concentration of Toxaphene, Technical and Total Toxaphene, the matrix spike / matrix spike duplicate (MS/MSD) for

# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Job ID: 680-178247-1 (Continued)

### Laboratory: Eurofins TestAmerica, Savannah (Continued)

preparation batch 680-603146 and analytical batch 680-604326 could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria.

Total Toxaphene and Toxaphene, Technical failed the recovery criteria high for the MS/MSD of sample Organic Condensate (680-178247-8) in batch 680-604326.

Refer to the QC report for details.

Samples Pre-Treatment 1 (680-178247-1)[10000X], Pre-Treatment 2 (680-178247-2)[10000X] and Organic Condensate (680-178247-8) [10000X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### PESTICIDES AND PCBS

Sample Aqueous Condensate (680-178247-5) was analyzed for Pesticides and PCBs in accordance with EPA SW-846 Method 8081B\_8082A. The samples were prepared on 12/26/2019 and analyzed on 01/10/2020.

This method incorporates 2nd column confirmation. Corrective action is not taken for surrogate/spike compounds unless results from both columns are unacceptable. Results outside criteria are qualified.

The following sample required a dilution due to the nature of the sample matrix: Aqueous Condensate (680-178247-5). Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

Sample Aqueous Condensate (680-178247-5)[200X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### PH

Sample Aqueous Condensate (680-178247-5) was analyzed for pH in accordance with EPA SW-846 Method 9040C. The samples were analyzed on 01/28/2020.

This analysis is considered a field test and is to be performed within 15 minutes of collection. This sample(s) was performed in the laboratory outside the 15 minute timeframe.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### PERCENT SOLIDS/MOISTURE

Samples Pre-Treatment 1 (680-178247-1), Pre-Treatment 2 (680-178247-2), Post-Treatment 1 (680-178247-3), Post-Treatment 2 (680-178247-4) and Organic Condensate (680-178247-8) were analyzed for Percent Solids/Moisture in accordance with TestAmerica SOP. The samples were analyzed on 01/09/2020 and 12/24/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Sample Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-178247-1	Pre-Treatment 1	Solid	11/27/19 10:00	12/13/19 09:30	
680-178247-2	Pre-Treatment 2	Solid	11/27/19 10:00	12/13/19 09:30	
680-178247-3	Post-Treatment 1	Solid	12/06/19 12:00	12/13/19 09:30	
680-178247-4	Post-Treatment 2	Solid	12/06/19 12:00	12/13/19 09:30	
680-178247-5	Aqueous Condensate	Water	12/06/19 14:00	12/13/19 09:30	
680-178247-7	Trip Blank	Water	12/06/19 00:00	12/13/19 09:30	
680-178247-8	Organic Condensate	Solid	12/06/19 14:00	12/13/19 09:30	

# Method Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL SAV
8015C	Nonhalogenated Organics using GC/FID -Modified (Gasoline Range Organics)	SW846	TAL SAV
8015C	Nonhalogenated Organics using GC/FID -Modified (Diesel Range Organics)	SW846	TAL SAV
8081B	Organochlorine Pesticides (GC)	SW846	TAL SAV
8081B/8082A	Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography	SW846	TAL SAV
9040C	pH	SW846	TAL SAV
Moisture	Percent Moisture	EPA	TAL SAV
3520C	Liquid-Liquid Extraction (Continuous)	SW846	TAL SAV
3546	Microwave Extraction	SW846	TAL SAV
5030B	Purge and Trap	SW846	TAL SAV
5035	Closed System Purge and Trap	SW846	TAL SAV

#### Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

# Definitions/Glossary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
*	ISTD response or retention time outside acceptable limits
H	Sample was prepped or analyzed beyond the specified holding time
H3	Sample was received and analyzed past holding time.
U	Indicates the analyte was analyzed for but not detected.
X	Surrogate is outside control limits

### GC VOA

Qualifier	Qualifier Description
*	ISTD response or retention time outside acceptable limits
H	Sample was prepped or analyzed beyond the specified holding time
H3	Sample was received and analyzed past holding time.
U	Indicates the analyte was analyzed for but not detected.
X	Surrogate is outside control limits

### GC Semi VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
B	Compound was found in the blank and sample.
D	Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples.
E	Result exceeded calibration range.
H	Sample was prepped or analyzed beyond the specified holding time
H3	Sample was received and analyzed past holding time.
U	Indicates the analyte was analyzed for but not detected.

### General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)

# Definitions/Glossary

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Glossary (Continued)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

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# Detection Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Client Sample ID: Pre-Treatment 1

Lab Sample ID: 680-178247-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Xylenes, Total	430	H H3	12		ug/Kg	1	☼	8260B	Total/NA
p-Cymene - DL	3000	H H3	630		ug/Kg	100	☼	8260B	Total/NA
Gasoline Range Organics (GRO) -C6-C10	22	H H3 *	13		mg/Kg	100	☼	8015C	Total/NA
Diesel Range Organics [C10-C28]	3700	H H3 B	390		mg/Kg	100	☼	8015C	Total/NA
Toxaphene, Technical	9200000	H H3 *	1100000		ug/Kg	10000	☼	8081B	Total/NA
Total Toxaphene	8800000	H H3 *	1100000		ug/Kg	10000	☼	8081B	Total/NA

## Client Sample ID: Pre-Treatment 2

Lab Sample ID: 680-178247-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Xylenes, Total	160	H H3	11		ug/Kg	1	☼	8260B	Total/NA
p-Cymene - DL	2200	H H3	260		ug/Kg	40	☼	8260B	Total/NA
Gasoline Range Organics (GRO) -C6-C10	23	H H3 *	13		mg/Kg	100	☼	8015C	Total/NA
Diesel Range Organics [C10-C28]	3300	H H3 B	420		mg/Kg	100	☼	8015C	Total/NA
Toxaphene, Technical	12000000	H H3 *	1100000		ug/Kg	10000	☼	8081B	Total/NA
Total Toxaphene	12000000	H H3 *	1100000		ug/Kg	10000	☼	8081B	Total/NA

## Client Sample ID: Post-Treatment 1

Lab Sample ID: 680-178247-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Diesel Range Organics [C10-C28]	4.0	B	3.2		mg/Kg	1	☼	8015C	Total/NA
Diesel Range Organics [C10-C28] - RE	3.8	H	3.3		mg/Kg	1	☼	8015C	Total/NA
Toxaphene, Technical	240	*	81		ug/Kg	1	☼	8081B	Total/NA
Total Toxaphene	240	*	81		ug/Kg	1	☼	8081B	Total/NA
Toxaphene, Technical - RE	170	H	85		ug/Kg	1	☼	8081B	Total/NA
Total Toxaphene - RE	210	H *	85		ug/Kg	1	☼	8081B	Total/NA

## Client Sample ID: Post-Treatment 2

Lab Sample ID: 680-178247-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	440	*	82		ug/Kg	1	☼	8081B	Total/NA
Total Toxaphene	440	*	82		ug/Kg	1	☼	8081B	Total/NA

## Client Sample ID: Aqueous Condensate

Lab Sample ID: 680-178247-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	6600	H	990		ug/L	200		8081B/8082A	Total/NA
Total Toxaphene	8500	H	990		ug/L	200		8081B/8082A	Total/NA
pH	0.3	HF			SU	1		9040C	Total/NA
Temperature	21.4	HF			Degrees C	1		9040C	Total/NA

## Client Sample ID: Trip Blank

Lab Sample ID: 680-178247-7

No Detections.

## Client Sample ID: Organic Condensate

Lab Sample ID: 680-178247-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	70000000	H	6100000		ug/Kg	10000	☼	8081B	Total/NA
Total Toxaphene	99000000	H *	6100000		ug/Kg	10000	☼	8081B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah



# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Client Sample ID: Pre-Treatment 1

Date Collected: 11/27/19 10:00

Date Received: 12/13/19 09:30

## Lab Sample ID: 680-178247-1

Matrix: Solid

Percent Solids: 79.1

### Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Xylenes, Total</b>	<b>430</b>	<b>H H3</b>	12		ug/Kg	☼	12/16/19 10:10	12/17/19 15:32	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Toluene-d8 (Surr)	118	*	70 - 130				12/16/19 10:10	12/17/19 15:32	1
1,2-Dichloroethane-d4 (Surr)	133	X	70 - 130				12/16/19 10:10	12/17/19 15:32	1
Dibromofluoromethane (Surr)	121		70 - 130				12/16/19 10:10	12/17/19 15:32	1
4-Bromofluorobenzene (Surr)	2298	*X	70 - 130				12/16/19 10:10	12/17/19 15:32	1

### Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>p-Cymene</b>	<b>3000</b>	<b>H H3</b>	630		ug/Kg	☼	12/16/19 10:10	12/19/19 03:40	100
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Toluene-d8 (Surr)	99		70 - 130				12/16/19 10:10	12/19/19 03:40	100
1,2-Dichloroethane-d4 (Surr)	109		70 - 130				12/16/19 10:10	12/19/19 03:40	100
Dibromofluoromethane (Surr)	109		70 - 130				12/16/19 10:10	12/19/19 03:40	100
4-Bromofluorobenzene (Surr)	155	X	70 - 130				12/16/19 10:10	12/19/19 03:40	100

### Method: 8015C - Nonhalogenated Organics using GC/FID -Modified (Gasoline Range Organics)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Gasoline Range Organics (GRO) -C6-C10</b>	<b>22</b>	<b>H H3 *</b>	13		mg/Kg	☼	12/18/19 15:04	12/18/19 21:13	100
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
a,a,a-Trifluorotoluene	25	X*	70 - 131				12/18/19 15:04	12/18/19 21:13	100

### Method: 8015C - Nonhalogenated Organics using GC/FID -Modified (Diesel Range Organics)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Diesel Range Organics [C10-C28]</b>	<b>3700</b>	<b>H H3 B</b>	390		mg/Kg	☼	12/20/19 09:10	12/23/19 16:16	100
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
o-Terphenyl (Surr)	0	D	45 - 130				12/20/19 09:10	12/23/19 16:16	100

### Method: 8081B - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Toxaphene, Technical</b>	<b>9200000</b>	<b>H H3 *</b>	1100000		ug/Kg	☼	12/20/19 09:10	12/27/19 17:31	10000
<b>Total Toxaphene</b>	<b>8800000</b>	<b>H H3 *</b>	1100000		ug/Kg	☼	12/20/19 09:10	12/27/19 17:31	10000
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
DCB Decachlorobiphenyl	0	D	54 - 133				12/20/19 09:10	12/27/19 17:31	10000
Tetrachloro-m-xylene	0	D	46 - 130				12/20/19 09:10	12/27/19 17:31	10000

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Client Sample ID: Pre-Treatment 2

## Lab Sample ID: 680-178247-2

Date Collected: 11/27/19 10:00

Matrix: Solid

Date Received: 12/13/19 09:30

Percent Solids: 78.0

### Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Xylenes, Total</b>	<b>160</b>	<b>H H3</b>	11		ug/Kg	☼	12/16/19 10:10	12/17/19 15:54	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Toluene-d8 (Surr)	104		70 - 130				12/16/19 10:10	12/17/19 15:54	1
1,2-Dichloroethane-d4 (Surr)	123		70 - 130				12/16/19 10:10	12/17/19 15:54	1
Dibromofluoromethane (Surr)	117		70 - 130				12/16/19 10:10	12/17/19 15:54	1
4-Bromofluorobenzene (Surr)	930	X	70 - 130				12/16/19 10:10	12/17/19 15:54	1

### Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>p-Cymene</b>	<b>2200</b>	<b>H H3</b>	260		ug/Kg	☼	12/16/19 10:10	12/19/19 04:01	40
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
Toluene-d8 (Surr)	101		70 - 130				12/16/19 10:10	12/19/19 04:01	40
1,2-Dichloroethane-d4 (Surr)	106		70 - 130				12/16/19 10:10	12/19/19 04:01	40
Dibromofluoromethane (Surr)	112		70 - 130				12/16/19 10:10	12/19/19 04:01	40
4-Bromofluorobenzene (Surr)	178	X	70 - 130				12/16/19 10:10	12/19/19 04:01	40

### Method: 8015C - Nonhalogenated Organics using GC/FID -Modified (Gasoline Range Organics)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Gasoline Range Organics (GRO) -C6-C10</b>	<b>23</b>	<b>H H3 *</b>	13		mg/Kg	☼	12/18/19 15:04	12/18/19 21:36	100
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
a,a,a-Trifluorotoluene	30	X *	70 - 131				12/18/19 15:04	12/18/19 21:36	100

### Method: 8015C - Nonhalogenated Organics using GC/FID -Modified (Diesel Range Organics)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Diesel Range Organics [C10-C28]</b>	<b>3300</b>	<b>H H3 B</b>	420		mg/Kg	☼	12/20/19 09:10	12/23/19 16:50	100
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
o-Terphenyl (Surr)	0	D	45 - 130				12/20/19 09:10	12/23/19 16:50	100

### Method: 8081B - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Toxaphene, Technical</b>	<b>12000000</b>	<b>H H3 *</b>	1100000		ug/Kg	☼	12/20/19 09:10	12/27/19 17:47	10000
<b>Total Toxaphene</b>	<b>12000000</b>	<b>H H3 *</b>	1100000		ug/Kg	☼	12/20/19 09:10	12/27/19 17:47	10000
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
DCB Decachlorobiphenyl	0	D	54 - 133				12/20/19 09:10	12/27/19 17:47	10000
Tetrachloro-m-xylene	0	D	46 - 130				12/20/19 09:10	12/27/19 17:47	10000

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

**Client Sample ID: Post-Treatment 1**

**Lab Sample ID: 680-178247-3**

Date Collected: 12/06/19 12:00

Matrix: Solid

Date Received: 12/13/19 09:30

Percent Solids: 99.9

### Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	12	U	12		ug/Kg	☼	12/16/19 10:10	12/20/19 19:42	1
p-Cymene	6.0	U	6.0		ug/Kg	☼	12/16/19 10:10	12/20/19 19:42	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	94		70 - 130				12/16/19 10:10	12/20/19 19:42	1
1,2-Dichloroethane-d4 (Surr)	133	X	70 - 130				12/16/19 10:10	12/20/19 19:42	1
Dibromofluoromethane (Surr)	121		70 - 130				12/16/19 10:10	12/20/19 19:42	1
4-Bromofluorobenzene (Surr)	98		70 - 130				12/16/19 10:10	12/20/19 19:42	1

### Method: 8015C - Nonhalogenated Organics using GC/FID -Modified (Gasoline Range Organics)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	10	U	10		mg/Kg	☼	12/18/19 15:04	12/18/19 21:58	100
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene	93		70 - 131				12/18/19 15:04	12/18/19 21:58	100

### Method: 8015C - Nonhalogenated Organics using GC/FID -Modified (Diesel Range Organics)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Diesel Range Organics [C10-C28]</b>	<b>4.0</b>	<b>B</b>	3.2		mg/Kg	☼	12/20/19 09:10	12/20/19 21:58	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl (Surr)	87		45 - 130				12/20/19 09:10	12/20/19 21:58	1

### Method: 8015C - Nonhalogenated Organics using GC/FID -Modified (Diesel Range Organics) - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Diesel Range Organics [C10-C28]</b>	<b>3.8</b>	<b>H</b>	3.3		mg/Kg	☼	01/07/20 09:33	01/08/20 15:43	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl (Surr)	64		45 - 130				01/07/20 09:33	01/08/20 15:43	1

### Method: 8081B - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	240	*	81		ug/Kg	☼	12/20/19 09:10	12/21/19 01:26	1
Total Toxaphene	240	*	81		ug/Kg	☼	12/20/19 09:10	12/21/19 01:26	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	82		54 - 133				12/20/19 09:10	12/21/19 01:26	1
Tetrachloro-m-xylene	81		46 - 130				12/20/19 09:10	12/21/19 01:26	1

### Method: 8081B - Organochlorine Pesticides (GC) - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	170	H	85		ug/Kg	☼	01/15/20 10:10	01/15/20 21:45	1
Total Toxaphene	210	H *	85		ug/Kg	☼	01/15/20 10:10	01/15/20 21:45	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	112		54 - 133				01/15/20 10:10	01/15/20 21:45	1
Tetrachloro-m-xylene	91		46 - 130				01/15/20 10:10	01/15/20 21:45	1

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# Client Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Client Sample ID: Post-Treatment 2

## Lab Sample ID: 680-178247-4

Date Collected: 12/06/19 12:00

Matrix: Solid

Date Received: 12/13/19 09:30

Percent Solids: 100.0

### Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	11	U	11		ug/Kg	☼	12/16/19 10:10	12/20/19 20:03	1
p-Cymene	5.7	U	5.7		ug/Kg	☼	12/16/19 10:10	12/20/19 20:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	93		70 - 130				12/16/19 10:10	12/20/19 20:03	1
1,2-Dichloroethane-d4 (Surr)	134	X	70 - 130				12/16/19 10:10	12/20/19 20:03	1
Dibromofluoromethane (Surr)	122		70 - 130				12/16/19 10:10	12/20/19 20:03	1
4-Bromofluorobenzene (Surr)	97		70 - 130				12/16/19 10:10	12/20/19 20:03	1

### Method: 8015C - Nonhalogenated Organics using GC/FID -Modified (Gasoline Range Organics)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	10	U	10		mg/Kg	☼	12/18/19 15:04	12/18/19 22:21	100
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene	90		70 - 131				12/18/19 15:04	12/18/19 22:21	100

### Method: 8015C - Nonhalogenated Organics using GC/FID -Modified (Diesel Range Organics)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	3.1	U	3.1		mg/Kg	☼	12/20/19 09:10	12/20/19 22:15	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl (Surr)	73		45 - 130				12/20/19 09:10	12/20/19 22:15	1

### Method: 8081B - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	440	*	82		ug/Kg	☼	12/20/19 09:10	12/21/19 01:42	1
Total Toxaphene	440	*	82		ug/Kg	☼	12/20/19 09:10	12/21/19 01:42	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	100		54 - 133				12/20/19 09:10	12/21/19 01:42	1
Tetrachloro-m-xylene	108		46 - 130				12/20/19 09:10	12/21/19 01:42	1

### Method: 8081B - Organochlorine Pesticides (GC) - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	84	U H	84		ug/Kg	☼	01/15/20 10:10	01/15/20 21:59	1
Total Toxaphene	84	U H *	84		ug/Kg	☼	01/15/20 10:10	01/15/20 21:59	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	119		54 - 133				01/15/20 10:10	01/15/20 21:59	1
Tetrachloro-m-xylene	88		46 - 130				01/15/20 10:10	01/15/20 21:59	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

**Client Sample ID: Aqueous Condensate**

**Lab Sample ID: 680-178247-5**

Date Collected: 12/06/19 14:00

Matrix: Water

Date Received: 12/13/19 09:30

**Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	6600	H	990		ug/L		12/26/19 18:27	01/10/20 03:38	200
Total Toxaphene	8500	H	990		ug/L		12/26/19 18:27	01/10/20 03:38	200
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	D	10 - 130				12/26/19 18:27	01/10/20 03:38	200
Tetrachloro-m-xylene	0	D	39 - 130				12/26/19 18:27	01/10/20 03:38	200

**General Chemistry**

Analyte	Result	Qualifier	NONE	NONE	Unit	D	Prepared	Analyzed	Dil Fac
pH	0.3	HF			SU			01/28/20 16:13	1
Temperature	21.4	HF			Degrees C			01/28/20 16:13	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

**Client Sample ID: Trip Blank**

**Lab Sample ID: 680-178247-7**

**Date Collected: 12/06/19 00:00**

**Matrix: Water**

**Date Received: 12/13/19 09:30**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	1.0	U	1.0		ug/L			12/20/19 06:11	1
p-Cymene	1.0	U	1.0		ug/L			12/20/19 06:11	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	86		73 - 131					12/20/19 06:11	1
4-Bromofluorobenzene (Surr)	105		80 - 120					12/20/19 06:11	1
Dibromofluoromethane (Surr)	100		80 - 122					12/20/19 06:11	1
Toluene-d8 (Surr)	111		80 - 120					12/20/19 06:11	1

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

**Client Sample ID: Organic Condensate**

**Lab Sample ID: 680-178247-8**

Date Collected: 12/06/19 14:00

Matrix: Solid

Date Received: 12/13/19 09:30

Percent Solids: 41.8

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	70000000	H	6100000		ug/Kg	☼	01/08/20 11:42	01/20/20 17:13	10000
Total Toxaphene	99000000	H *	6100000		ug/Kg	☼	01/08/20 11:42	01/20/20 17:13	10000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	D	54 - 133				01/08/20 11:42	01/20/20 17:13	10000
Tetrachloro-m-xylene	0	D	46 - 130				01/08/20 11:42	01/20/20 17:13	10000

# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		TOL (70-130)	DCA (70-130)	DBFM (70-130)	BFB (70-130)
680-178247-1	Pre-Treatment 1	118 *	133 X	121	2298 * X
680-178247-1 - DL	Pre-Treatment 1	99	109	109	155 X
680-178247-2	Pre-Treatment 2	104	123	117	930 X
680-178247-2 - DL	Pre-Treatment 2	101	106	112	178 X
680-178247-3	Post-Treatment 1	94	133 X	121	98
680-178247-4	Post-Treatment 2	93	134 X	122	97
LCS 680-600893/4	Lab Control Sample	95	93	94	95
LCS 680-601214/4	Lab Control Sample	100	90	98	99
LCS 680-601481/5	Lab Control Sample	109	103	111	101
LCSD 680-600893/5	Lab Control Sample Dup	101	100	103	101
LCSD 680-601214/5	Lab Control Sample Dup	97	92	98	95
LCSD 680-601481/1004	Lab Control Sample Dup	95	91	96	92
MB 680-600893/9	Method Blank	101	100	104	102
MB 680-601214/8	Method Blank	100	100	107	103
MB 680-601481/8	Method Blank	98	99	109	96

### Surrogate Legend

TOL = Toluene-d8 (Surr)

DCA = 1,2-Dichloroethane-d4 (Surr)

DBFM = Dibromofluoromethane (Surr)

BFB = 4-Bromofluorobenzene (Surr)

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		DCA (73-131)	BFB (80-120)	DBFM (80-122)	TOL (80-120)
680-178247-7	Trip Blank	86	105	100	111
LCS 680-601394/5	Lab Control Sample	99	99	106	105
LCSD 680-601394/6	Lab Control Sample Dup	99	95	105	115
MB 680-601394/11	Method Blank	84	98	98	106

### Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)

TOL = Toluene-d8 (Surr)

## Method: 8015C - Nonhalogenated Organics using GC/FID -Modified (Gasoline Range Organics)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)
		TFT1 (70-131)
680-178247-1	Pre-Treatment 1	25 X *
680-178247-2	Pre-Treatment 2	30 X *
680-178247-3	Post-Treatment 1	93
680-178247-4	Post-Treatment 2	90
LCS 680-601041/5	Lab Control Sample	96
LCSD 680-601041/6	Lab Control Sample Dup	102

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# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Method: 8015C - Nonhalogenated Organics using GC/FID -Modified (Gasoline Range Organics)

(Continued)

Matrix: Solid

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TFT1 (70-131)
MB 680-601041/7	Method Blank	103

**Surrogate Legend**

TFT = a,a,a-Trifluorotoluene

## Method: 8015C - Nonhalogenated Organics using GC/FID -Modified (Diesel Range Organics)

Matrix: Solid

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	OTPH1 (45-130)
680-178247-1	Pre-Treatment 1	0 D
680-178247-2	Pre-Treatment 2	0 D
680-178247-3	Post-Treatment 1	87
680-178247-3 - RE	Post-Treatment 1	64
680-178247-3 MS	Post-Treatment 1	72
680-178247-3 MSD	Post-Treatment 1	72
680-178247-4	Post-Treatment 2	73
LCS 680-601451/6-A	Lab Control Sample	93
LCS 680-602999/3-A	Lab Control Sample	65
MB 680-601451/5-A	Method Blank	89
MB 680-602999/2-A	Method Blank	78

**Surrogate Legend**

OTPH = o-Terphenyl (Surr)

## Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP1 (54-133)	TCX1 (46-130)
680-178247-1	Pre-Treatment 1	0 D	0 D
680-178247-2	Pre-Treatment 2	0 D	0 D
680-178247-8	Organic Condensate	0 D	0 D
680-178247-8 MS	Organic Condensate	0 D	0 D
680-178247-8 MSD	Organic Condensate	0 D	0 D
LCS 680-603146/10-A	Lab Control Sample	117	109
MB 680-603146/6-A	Method Blank	99	93

**Surrogate Legend**

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

## Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP2 (54-133)	TCX2 (46-130)
680-178247-3	Post-Treatment 1	82	81
680-178247-3 - RE	Post-Treatment 1	112	91

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# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Matrix: Solid

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP2 (54-133)	TCX2 (46-130)
680-178247-4	Post-Treatment 2	100	108
680-178247-4 - RE	Post-Treatment 2	119	88
LCS 680-601450/6-A	Lab Control Sample	93	91

#### Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

## Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP2 (54-133)	TCX1 (46-130)
LCS 680-603825/4-A	Lab Control Sample	126	96
LCS 680-603825/5-A	Lab Control Sample Dup	121	100
MB 680-603825/3-A	Method Blank	123	90

#### Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

## Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP1 (54-133)	TCX2 (46-130)
MB 680-601450/5-A	Method Blank	108	89

#### Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography

Matrix: Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP1 (10-130)	TCX1 (39-130)
680-178247-5	Aqueous Condensate	0 D	0 D
LCS 680-602119/8-A	Lab Control Sample	100	81
MB 680-602119/3-A	Method Blank	81	72

#### Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

**Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas**

**Chromatography**

**Matrix: Water**

**Prep Type: Total/NA**

## Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP2 (10-130)	TCX1 (39-130)
LCSD 680-602119/9-A	Lab Control Sample Dup	62	57

### Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 680-600893/9**  
**Matrix: Solid**  
**Analysis Batch: 600893**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Xylenes, Total	10	U	10		ug/Kg			12/17/19 14:07	1
p-Cymene	5.0	U	5.0		ug/Kg			12/17/19 14:07	1
Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac			
	%Recovery	Qualifier							
1,2-Dichloroethane-d4 (Surr)	100		70 - 130		12/17/19 14:07	1			
Dibromofluoromethane (Surr)	104		70 - 130		12/17/19 14:07	1			
Toluene-d8 (Surr)	101		70 - 130		12/17/19 14:07	1			
4-Bromofluorobenzene (Surr)	102		70 - 130		12/17/19 14:07	1			

**Lab Sample ID: LCS 680-600893/4**  
**Matrix: Solid**  
**Analysis Batch: 600893**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Xylenes, Total	100	98.2		ug/Kg		98	70 - 130
p-Cymene	50.0	48.8		ug/Kg		98	70 - 130
Surrogate	LCS	LCS	Limits				
	%Recovery	Qualifier					
1,2-Dichloroethane-d4 (Surr)	93		70 - 130				
Dibromofluoromethane (Surr)	94		70 - 130				
Toluene-d8 (Surr)	95		70 - 130				
4-Bromofluorobenzene (Surr)	95		70 - 130				

**Lab Sample ID: LCSD 680-600893/5**  
**Matrix: Solid**  
**Analysis Batch: 600893**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
		Result	Qualifier						
Xylenes, Total	100	104		ug/Kg		104	70 - 130	5	20
p-Cymene	50.0	51.2		ug/Kg		102	70 - 130	5	20
Surrogate	LCSD	LCSD	Limits						
	%Recovery	Qualifier							
1,2-Dichloroethane-d4 (Surr)	100		70 - 130						
Dibromofluoromethane (Surr)	103		70 - 130						
Toluene-d8 (Surr)	101		70 - 130						
4-Bromofluorobenzene (Surr)	101		70 - 130						

**Lab Sample ID: MB 680-601214/8**  
**Matrix: Solid**  
**Analysis Batch: 601214**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Xylenes, Total	10	U	10		ug/Kg			12/18/19 20:57	1
p-Cymene	5.0	U	5.0		ug/Kg			12/18/19 20:57	1
Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac			
	%Recovery	Qualifier							
1,2-Dichloroethane-d4 (Surr)	100		70 - 130		12/18/19 20:57	1			

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: MB 680-601214/8**  
**Matrix: Solid**  
**Analysis Batch: 601214**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Surrogate	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Dibromofluoromethane (Surr)	107		70 - 130		12/18/19 20:57	1
Toluene-d8 (Surr)	100		70 - 130		12/18/19 20:57	1
4-Bromofluorobenzene (Surr)	103		70 - 130		12/18/19 20:57	1

**Lab Sample ID: LCS 680-601214/4**  
**Matrix: Solid**  
**Analysis Batch: 601214**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
p-Cymene	50.0	53.5		ug/Kg		107	70 - 130

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	90		70 - 130
Dibromofluoromethane (Surr)	98		70 - 130
Toluene-d8 (Surr)	100		70 - 130
4-Bromofluorobenzene (Surr)	99		70 - 130

**Lab Sample ID: LCSD 680-601214/5**  
**Matrix: Solid**  
**Analysis Batch: 601214**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
p-Cymene	50.0	51.1		ug/Kg		102	70 - 130	5	20

Surrogate	LCSD LCSD		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	92		70 - 130
Dibromofluoromethane (Surr)	98		70 - 130
Toluene-d8 (Surr)	97		70 - 130
4-Bromofluorobenzene (Surr)	95		70 - 130

**Lab Sample ID: MB 680-601394/11**  
**Matrix: Water**  
**Analysis Batch: 601394**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Xylenes, Total	1.0	U	1.0		ug/L			12/20/19 03:27	1
p-Cymene	1.0	U	1.0		ug/L			12/20/19 03:27	1

Surrogate	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
1,2-Dichloroethane-d4 (Surr)	84		73 - 131		12/20/19 03:27	1
Dibromofluoromethane (Surr)	98		80 - 122		12/20/19 03:27	1
Toluene-d8 (Surr)	106		80 - 120		12/20/19 03:27	1
4-Bromofluorobenzene (Surr)	98		80 - 120		12/20/19 03:27	1

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 680-601394/5**  
**Matrix: Water**  
**Analysis Batch: 601394**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Xylenes, Total	100	102		ug/L		102	80 - 120
p-Cymene	50.0	51.9		ug/L		104	80 - 120

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	99		73 - 131
Dibromofluoromethane (Surr)	106		80 - 122
Toluene-d8 (Surr)	105		80 - 120
4-Bromofluorobenzene (Surr)	99		80 - 120

**Lab Sample ID: LCSD 680-601394/6**  
**Matrix: Water**  
**Analysis Batch: 601394**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Xylenes, Total	100	107		ug/L		107	80 - 120	4	20
p-Cymene	50.0	52.1		ug/L		104	80 - 120	0	20

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	99		73 - 131
Dibromofluoromethane (Surr)	105		80 - 122
Toluene-d8 (Surr)	115		80 - 120
4-Bromofluorobenzene (Surr)	95		80 - 120

**Lab Sample ID: MB 680-601481/8**  
**Matrix: Solid**  
**Analysis Batch: 601481**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	10	U	10		ug/Kg			12/20/19 12:57	1
p-Cymene	5.0	U	5.0		ug/Kg			12/20/19 12:57	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		70 - 130		12/20/19 12:57	1
Dibromofluoromethane (Surr)	109		70 - 130		12/20/19 12:57	1
Toluene-d8 (Surr)	98		70 - 130		12/20/19 12:57	1
4-Bromofluorobenzene (Surr)	96		70 - 130		12/20/19 12:57	1

**Lab Sample ID: LCS 680-601481/5**  
**Matrix: Solid**  
**Analysis Batch: 601481**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Xylenes, Total	100	116		ug/Kg		116	70 - 130
p-Cymene	50.0	58.3		ug/Kg		117	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	103		70 - 130

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 680-601481/5**  
**Matrix: Solid**  
**Analysis Batch: 601481**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
Dibromofluoromethane (Surr)	111		70 - 130
Toluene-d8 (Surr)	109		70 - 130
4-Bromofluorobenzene (Surr)	101		70 - 130

**Lab Sample ID: LCSD 680-601481/1004**  
**Matrix: Solid**  
**Analysis Batch: 601481**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD
									Limit
Xylenes, Total	100	101		ug/Kg		101	70 - 130	14	20
p-Cymene	50.0	50.3		ug/Kg		101	70 - 130	15	20

Surrogate	LCSD LCSD		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	91		70 - 130
Dibromofluoromethane (Surr)	96		70 - 130
Toluene-d8 (Surr)	95		70 - 130
4-Bromofluorobenzene (Surr)	92		70 - 130

## Method: 8015C - Nonhalogenated Organics using GC/FID -Modified (Gasoline Range Organics)

**Lab Sample ID: MB 680-601041/7**  
**Matrix: Solid**  
**Analysis Batch: 601041**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	10	U	10		mg/Kg			12/18/19 13:10	100

Surrogate	%Recovery	MB MB Qualifier	Limits	Prepared	Analyzed	Dil Fac

**Lab Sample ID: LCS 680-601041/5**  
**Matrix: Solid**  
**Analysis Batch: 601041**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
a,a,a-Trifluorotoluene	96		70 - 131

**Lab Sample ID: LCSD 680-601041/6**  
**Matrix: Solid**  
**Analysis Batch: 601041**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD
									Limit
Gasoline Range Organics (GRO) -C6-C10	50.0	55.9		mg/Kg		112	64 - 133	6	50

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Method: 8015C - Nonhalogenated Organics using GC/FID -Modified (Gasoline Range Organics) (Continued)

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
a,a,a-Trifluorotoluene	102		70 - 131

## Method: 8015C - Nonhalogenated Organics using GC/FID -Modified (Diesel Range Organics)

Lab Sample ID: MB 680-601451/5-A  
 Matrix: Solid  
 Analysis Batch: 601572

Client Sample ID: Method Blank  
 Prep Type: Total/NA  
 Prep Batch: 601451

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Diesel Range Organics [C10-C28]	3.35		3.3		mg/Kg		12/20/19 09:10	12/20/19 20:01	1
Surrogate	MB MB		Limits			Prepared	Analyzed	Dil Fac	
%Recovery	Qualifier								
o-Terphenyl (Surr)	89		45 - 130			12/20/19 09:10	12/20/19 20:01	1	

Lab Sample ID: LCS 680-601451/6-A  
 Matrix: Solid  
 Analysis Batch: 601572

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 601451

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	
								Diesel Range Organics [C10-C28]
Surrogate	LCS LCS		Limits			Prepared	Analyzed	Dil Fac
%Recovery	Qualifier							
o-Terphenyl (Surr)	93		45 - 130					

Lab Sample ID: MB 680-602999/2-A  
 Matrix: Solid  
 Analysis Batch: 603149

Client Sample ID: Method Blank  
 Prep Type: Total/NA  
 Prep Batch: 602999

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Diesel Range Organics [C10-C28]	3.2	U	3.2		mg/Kg		01/07/20 09:33	01/08/20 15:10	1
Surrogate	MB MB		Limits			Prepared	Analyzed	Dil Fac	
%Recovery	Qualifier								
o-Terphenyl (Surr)	78		45 - 130			01/07/20 09:33	01/08/20 15:10	1	

Lab Sample ID: LCS 680-602999/3-A  
 Matrix: Solid  
 Analysis Batch: 603149

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 602999

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	
								Diesel Range Organics [C10-C28]
Surrogate	LCS LCS		Limits			Prepared	Analyzed	Dil Fac
%Recovery	Qualifier							
o-Terphenyl (Surr)	65		45 - 130					



# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Method: 8015C - Nonhalogenated Organics using GC/FID -Modified (Diesel Range Organics) (Continued)

**Lab Sample ID: 680-178247-3 MS**  
**Matrix: Solid**  
**Analysis Batch: 603149**

**Client Sample ID: Post-Treatment 1**  
**Prep Type: Total/NA**  
**Prep Batch: 602999**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics [C10-C28]	3.8	H	63.6	42.6		mg/Kg	☼	61	35 - 130
<b>Surrogate</b>	<b>%Recovery</b>	<b>MS Qualifier</b>	<b>MS Limits</b>						
<i>o</i> -Terphenyl (Surr)	72		45 - 130						

**Lab Sample ID: 680-178247-3 MSD**  
**Matrix: Solid**  
**Analysis Batch: 603149**

**Client Sample ID: Post-Treatment 1**  
**Prep Type: Total/NA**  
**Prep Batch: 602999**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diesel Range Organics [C10-C28]	3.8	H	65.6	44.1		mg/Kg	☼	61	35 - 130	3	50
<b>Surrogate</b>	<b>%Recovery</b>	<b>MSD Qualifier</b>	<b>MSD Limits</b>								
<i>o</i> -Terphenyl (Surr)	72		45 - 130								

## Method: 8081B - Organochlorine Pesticides (GC)

**Lab Sample ID: MB 680-601450/5-A**  
**Matrix: Solid**  
**Analysis Batch: 601632**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 601450**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	83	U	83		ug/Kg		12/20/19 09:10	12/20/19 22:30	1
Total Toxaphene	83	U	83		ug/Kg		12/20/19 09:10	12/20/19 22:30	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>MB Qualifier</b>	<b>MB Limits</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>			
<i>DCB</i> Decachlorobiphenyl	108		54 - 133	12/20/19 09:10	12/20/19 22:30	1			
Tetrachloro- <i>m</i> -xylene	89		46 - 130	12/20/19 09:10	12/20/19 22:30	1			

**Lab Sample ID: LCS 680-601450/6-A**  
**Matrix: Solid**  
**Analysis Batch: 601632**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 601450**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Toxaphene, Technical	257	450	*	ug/Kg		175	42 - 130
Total Toxaphene	257	459	*	ug/Kg		178	42 - 130
<b>Surrogate</b>	<b>%Recovery</b>	<b>LCS Qualifier</b>	<b>LCS Limits</b>				
<i>DCB</i> Decachlorobiphenyl	93		54 - 133				
Tetrachloro- <i>m</i> -xylene	91		46 - 130				

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Method: 8081B - Organochlorine Pesticides (GC) (Continued)

**Lab Sample ID: MB 680-603146/6-A**  
**Matrix: Solid**  
**Analysis Batch: 603722**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 603146**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	81	U	81		ug/Kg		01/08/20 11:42	01/14/20 18:33	1
Total Toxaphene	81	U	81		ug/Kg		01/08/20 11:42	01/14/20 18:33	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	99		54 - 133	01/08/20 11:42	01/14/20 18:33	1
Tetrachloro-m-xylene	93		46 - 130	01/08/20 11:42	01/14/20 18:33	1

**Lab Sample ID: LCS 680-603146/10-A**  
**Matrix: Solid**  
**Analysis Batch: 603722**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 603146**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Toxaphene, Technical	254	315		ug/Kg		124	42 - 130
Total Toxaphene	254	378	*	ug/Kg		149	42 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl	117		54 - 133
Tetrachloro-m-xylene	109		46 - 130

**Lab Sample ID: 680-178247-8 MS**  
**Matrix: Solid**  
**Analysis Batch: 604326**

**Client Sample ID: Organic Condensate**  
**Prep Type: Total/NA**  
**Prep Batch: 603146**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Toxaphene, Technical	70000000	H	1890	228000000	E 4	ug/Kg	☼	83844	42 - 130
Total Toxaphene	99000000	H *	1890	326000000	E 4	ug/Kg	☼	11989 860	42 - 130

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl	0	D	54 - 133
Tetrachloro-m-xylene	0	D	46 - 130

**Lab Sample ID: 680-178247-8 MSD**  
**Matrix: Solid**  
**Analysis Batch: 604326**

**Client Sample ID: Organic Condensate**  
**Prep Type: Total/NA**  
**Prep Batch: 603146**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Toxaphene, Technical	70000000	H	1890	154000000	E 4	ug/Kg	☼	44218	42 - 130	39	50
Total Toxaphene	99000000	H *	1890	225000000	E 4	ug/Kg	☼	66200 38	42 - 130	37	50

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl	0	D	54 - 133
Tetrachloro-m-xylene	0	D	46 - 130

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# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Method: 8081B - Organochlorine Pesticides (GC) (Continued)

**Lab Sample ID: MB 680-603825/3-A**  
**Matrix: Solid**  
**Analysis Batch: 603959**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 603825**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	82	U	82		ug/Kg		01/15/20 10:10	01/15/20 21:02	1
Total Toxaphene	82	U	82		ug/Kg		01/15/20 10:10	01/15/20 21:02	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	123		54 - 133	01/15/20 10:10	01/15/20 21:02	1
Tetrachloro-m-xylene	90		46 - 130	01/15/20 10:10	01/15/20 21:02	1

**Lab Sample ID: LCS 680-603825/4-A**  
**Matrix: Solid**  
**Analysis Batch: 603959**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 603825**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Toxaphene, Technical	262	309		ug/Kg		118	42 - 130
Total Toxaphene	262	326		ug/Kg		124	42 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl	126		54 - 133
Tetrachloro-m-xylene	96		46 - 130

**Lab Sample ID: LCSD 680-603825/5-A**  
**Matrix: Solid**  
**Analysis Batch: 603959**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 603825**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Toxaphene, Technical	262	307		ug/Kg		117	42 - 130	1	50
Total Toxaphene	262	366	*	ug/Kg		140	42 - 130	12	50

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
DCB Decachlorobiphenyl	121		54 - 133
Tetrachloro-m-xylene	100		46 - 130

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography

**Lab Sample ID: MB 680-602119/3-A**  
**Matrix: Water**  
**Analysis Batch: 603057**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 602119**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	1.3	U	1.3		ug/L		12/26/19 18:27	01/07/20 15:58	1
Total Toxaphene	1.3	U	1.3		ug/L		12/26/19 18:27	01/07/20 15:58	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	81		10 - 130	12/26/19 18:27	01/07/20 15:58	1
Tetrachloro-m-xylene	72		39 - 130	12/26/19 18:27	01/07/20 15:58	1

Eurofins TestAmerica, Savannah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Method: 8081B/8082A - Organochlorine Pesticides and Polychlorinated Biphenyls by Gas Chromatography (Continued)

Lab Sample ID: LCS 680-602119/8-A  
Matrix: Water  
Analysis Batch: 603057

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 602119

Surrogate	LCS		Limits
	%Recovery	Qualifier	
DCB Decachlorobiphenyl	100		10 - 130
Tetrachloro-m-xylene	81		39 - 130

Lab Sample ID: LCSD 680-602119/9-A  
Matrix: Water  
Analysis Batch: 603057

Client Sample ID: Lab Control Sample Dup  
Prep Type: Total/NA  
Prep Batch: 602119

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
DCB Decachlorobiphenyl	62		10 - 130
Tetrachloro-m-xylene	57		39 - 130

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## GC/MS VOA

### Prep Batch: 600676

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-1 - DL	Pre-Treatment 1	Total/NA	Solid	5035	
680-178247-1	Pre-Treatment 1	Total/NA	Solid	5035	
680-178247-2 - DL	Pre-Treatment 2	Total/NA	Solid	5035	
680-178247-2	Pre-Treatment 2	Total/NA	Solid	5035	
680-178247-3	Post-Treatment 1	Total/NA	Solid	5035	
680-178247-4	Post-Treatment 2	Total/NA	Solid	5035	

### Analysis Batch: 600893

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-1	Pre-Treatment 1	Total/NA	Solid	8260B	600676
680-178247-2	Pre-Treatment 2	Total/NA	Solid	8260B	600676
MB 680-600893/9	Method Blank	Total/NA	Solid	8260B	
LCS 680-600893/4	Lab Control Sample	Total/NA	Solid	8260B	
LCSD 680-600893/5	Lab Control Sample Dup	Total/NA	Solid	8260B	

### Analysis Batch: 601214

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-1 - DL	Pre-Treatment 1	Total/NA	Solid	8260B	600676
680-178247-2 - DL	Pre-Treatment 2	Total/NA	Solid	8260B	600676
MB 680-601214/8	Method Blank	Total/NA	Solid	8260B	
LCS 680-601214/4	Lab Control Sample	Total/NA	Solid	8260B	
LCSD 680-601214/5	Lab Control Sample Dup	Total/NA	Solid	8260B	

### Analysis Batch: 601394

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-7	Trip Blank	Total/NA	Water	8260B	
MB 680-601394/11	Method Blank	Total/NA	Water	8260B	
LCS 680-601394/5	Lab Control Sample	Total/NA	Water	8260B	
LCSD 680-601394/6	Lab Control Sample Dup	Total/NA	Water	8260B	

### Analysis Batch: 601481

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-3	Post-Treatment 1	Total/NA	Solid	8260B	600676
680-178247-4	Post-Treatment 2	Total/NA	Solid	8260B	600676
MB 680-601481/8	Method Blank	Total/NA	Solid	8260B	
LCS 680-601481/5	Lab Control Sample	Total/NA	Solid	8260B	
LCSD 680-601481/1004	Lab Control Sample Dup	Total/NA	Solid	8260B	

## GC VOA

### Analysis Batch: 601041

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-1	Pre-Treatment 1	Total/NA	Solid	8015C	601566
680-178247-2	Pre-Treatment 2	Total/NA	Solid	8015C	601566
680-178247-3	Post-Treatment 1	Total/NA	Solid	8015C	601566
680-178247-4	Post-Treatment 2	Total/NA	Solid	8015C	601566
MB 680-601041/7	Method Blank	Total/NA	Solid	8015C	
LCS 680-601041/5	Lab Control Sample	Total/NA	Solid	8015C	
LCSD 680-601041/6	Lab Control Sample Dup	Total/NA	Solid	8015C	

Eurofins TestAmerica, Savannah

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## GC VOA

### Prep Batch: 601566

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-1	Pre-Treatment 1	Total/NA	Solid	5030B	
680-178247-2	Pre-Treatment 2	Total/NA	Solid	5030B	
680-178247-3	Post-Treatment 1	Total/NA	Solid	5030B	
680-178247-4	Post-Treatment 2	Total/NA	Solid	5030B	

## GC Semi VOA

### Prep Batch: 601450

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-1	Pre-Treatment 1	Total/NA	Solid	3546	
680-178247-2	Pre-Treatment 2	Total/NA	Solid	3546	
680-178247-3	Post-Treatment 1	Total/NA	Solid	3546	
680-178247-4	Post-Treatment 2	Total/NA	Solid	3546	
MB 680-601450/5-A	Method Blank	Total/NA	Solid	3546	
LCS 680-601450/6-A	Lab Control Sample	Total/NA	Solid	3546	

### Prep Batch: 601451

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-1	Pre-Treatment 1	Total/NA	Solid	3546	
680-178247-2	Pre-Treatment 2	Total/NA	Solid	3546	
680-178247-3	Post-Treatment 1	Total/NA	Solid	3546	
680-178247-4	Post-Treatment 2	Total/NA	Solid	3546	
MB 680-601451/5-A	Method Blank	Total/NA	Solid	3546	
LCS 680-601451/6-A	Lab Control Sample	Total/NA	Solid	3546	

### Analysis Batch: 601572

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-3	Post-Treatment 1	Total/NA	Solid	8015C	601451
680-178247-4	Post-Treatment 2	Total/NA	Solid	8015C	601451
MB 680-601451/5-A	Method Blank	Total/NA	Solid	8015C	601451
LCS 680-601451/6-A	Lab Control Sample	Total/NA	Solid	8015C	601451

### Analysis Batch: 601632

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-3	Post-Treatment 1	Total/NA	Solid	8081B	601450
680-178247-4	Post-Treatment 2	Total/NA	Solid	8081B	601450
MB 680-601450/5-A	Method Blank	Total/NA	Solid	8081B	601450
LCS 680-601450/6-A	Lab Control Sample	Total/NA	Solid	8081B	601450

### Analysis Batch: 601838

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-1	Pre-Treatment 1	Total/NA	Solid	8015C	601451
680-178247-2	Pre-Treatment 2	Total/NA	Solid	8015C	601451

### Prep Batch: 602119

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-5	Aqueous Condensate	Total/NA	Water	3520C	
MB 680-602119/3-A	Method Blank	Total/NA	Water	3520C	
LCS 680-602119/8-A	Lab Control Sample	Total/NA	Water	3520C	
LCSD 680-602119/9-A	Lab Control Sample Dup	Total/NA	Water	3520C	

Eurofins TestAmerica, Savannah

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## GC Semi VOA

### Analysis Batch: 602249

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-1	Pre-Treatment 1	Total/NA	Solid	8081B	601450
680-178247-2	Pre-Treatment 2	Total/NA	Solid	8081B	601450

### Prep Batch: 602999

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-3 - RE	Post-Treatment 1	Total/NA	Solid	3546	
MB 680-602999/2-A	Method Blank	Total/NA	Solid	3546	
LCS 680-602999/3-A	Lab Control Sample	Total/NA	Solid	3546	
680-178247-3 MS	Post-Treatment 1	Total/NA	Solid	3546	
680-178247-3 MSD	Post-Treatment 1	Total/NA	Solid	3546	

### Analysis Batch: 603057

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-602119/3-A	Method Blank	Total/NA	Water	8081B/8082A	602119
LCS 680-602119/8-A	Lab Control Sample	Total/NA	Water	8081B/8082A	602119
LCSD 680-602119/9-A	Lab Control Sample Dup	Total/NA	Water	8081B/8082A	602119

### Prep Batch: 603146

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-8	Organic Condensate	Total/NA	Solid	3546	
MB 680-603146/6-A	Method Blank	Total/NA	Solid	3546	
LCS 680-603146/10-A	Lab Control Sample	Total/NA	Solid	3546	
680-178247-8 MS	Organic Condensate	Total/NA	Solid	3546	
680-178247-8 MSD	Organic Condensate	Total/NA	Solid	3546	

### Analysis Batch: 603149

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-3 - RE	Post-Treatment 1	Total/NA	Solid	8015C	602999
MB 680-602999/2-A	Method Blank	Total/NA	Solid	8015C	602999
LCS 680-602999/3-A	Lab Control Sample	Total/NA	Solid	8015C	602999
680-178247-3 MS	Post-Treatment 1	Total/NA	Solid	8015C	602999
680-178247-3 MSD	Post-Treatment 1	Total/NA	Solid	8015C	602999

### Analysis Batch: 603368

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-5	Aqueous Condensate	Total/NA	Water	8081B/8082A	602119

### Analysis Batch: 603722

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-603146/6-A	Method Blank	Total/NA	Solid	8081B	603146
LCS 680-603146/10-A	Lab Control Sample	Total/NA	Solid	8081B	603146

### Prep Batch: 603825

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-3 - RE	Post-Treatment 1	Total/NA	Solid	3546	
680-178247-4 - RE	Post-Treatment 2	Total/NA	Solid	3546	
MB 680-603825/3-A	Method Blank	Total/NA	Solid	3546	
LCS 680-603825/4-A	Lab Control Sample	Total/NA	Solid	3546	
LCSD 680-603825/5-A	Lab Control Sample Dup	Total/NA	Solid	3546	

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## GC Semi VOA

### Analysis Batch: 603959

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-3 - RE	Post-Treatment 1	Total/NA	Solid	8081B	603825
680-178247-4 - RE	Post-Treatment 2	Total/NA	Solid	8081B	603825
MB 680-603825/3-A	Method Blank	Total/NA	Solid	8081B	603825
LCS 680-603825/4-A	Lab Control Sample	Total/NA	Solid	8081B	603825
LCSD 680-603825/5-A	Lab Control Sample Dup	Total/NA	Solid	8081B	603825

### Analysis Batch: 604326

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-8	Organic Condensate	Total/NA	Solid	8081B	603146
680-178247-8 MS	Organic Condensate	Total/NA	Solid	8081B	603146
680-178247-8 MSD	Organic Condensate	Total/NA	Solid	8081B	603146

## General Chemistry

### Analysis Batch: 601936

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-1	Pre-Treatment 1	Total/NA	Solid	Moisture	
680-178247-2	Pre-Treatment 2	Total/NA	Solid	Moisture	
680-178247-3	Post-Treatment 1	Total/NA	Solid	Moisture	
680-178247-4	Post-Treatment 2	Total/NA	Solid	Moisture	

### Analysis Batch: 603249

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-8	Organic Condensate	Total/NA	Solid	Moisture	

### Analysis Batch: 605405

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178247-5	Aqueous Condensate	Total/NA	Water	9040C	



# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Client Sample ID: Pre-Treatment 1

Date Collected: 11/27/19 10:00

Date Received: 12/13/19 09:30

## Lab Sample ID: 680-178247-1

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			601936	12/24/19 10:00	WRB	TAL SAV
Instrument ID: NOEQUIP										

## Client Sample ID: Pre-Treatment 1

Date Collected: 11/27/19 10:00

Date Received: 12/13/19 09:30

## Lab Sample ID: 680-178247-1

Matrix: Solid

Percent Solids: 79.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			5.158 g	5 mL	600676	12/16/19 10:10	FES	TAL SAV
Total/NA	Analysis	8260B		1	5 g	5 g	600893	12/17/19 15:32	UI	TAL SAV
Instrument ID: CMSS										
Total/NA	Prep	5035	DL		4.998 g	5 mL	600676	12/16/19 10:10	FES	TAL SAV
Total/NA	Analysis	8260B	DL	100	5 g	5 g	601214	12/19/19 03:40	SMP	TAL SAV
Instrument ID: CMSS										
Total/NA	Prep	5030B			5.0 g	5 mL	601566	12/18/19 15:04	SMP	TAL SAV
Total/NA	Analysis	8015C		100	5 mL	5 mL	601041	12/18/19 21:13	SMP	TAL SAV
Instrument ID: CVGWFD1										
Total/NA	Prep	3546			15.89 g	1 mL	601451	12/20/19 09:10	DRT	TAL SAV
Total/NA	Analysis	8015C		100			601838	12/23/19 16:16	JCK	TAL SAV
Instrument ID: CSGQ										
Total/NA	Prep	3546			15.25 g	5 mL	601450	12/20/19 09:10	DRT	TAL SAV
Total/NA	Analysis	8081B		10000			602249	12/27/19 17:31	GEM	TAL SAV
Instrument ID: CSGK										

## Client Sample ID: Pre-Treatment 2

Date Collected: 11/27/19 10:00

Date Received: 12/13/19 09:30

## Lab Sample ID: 680-178247-2

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			601936	12/24/19 10:00	WRB	TAL SAV
Instrument ID: NOEQUIP										

## Client Sample ID: Pre-Treatment 2

Date Collected: 11/27/19 10:00

Date Received: 12/13/19 09:30

## Lab Sample ID: 680-178247-2

Matrix: Solid

Percent Solids: 78.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			6.049 g	5 mL	600676	12/16/19 10:10	FES	TAL SAV
Total/NA	Analysis	8260B		1	5 g	5 g	600893	12/17/19 15:54	UI	TAL SAV
Instrument ID: CMSS										
Total/NA	Prep	5035	DL		5.009 g	5 mL	600676	12/16/19 10:10	FES	TAL SAV
Total/NA	Analysis	8260B	DL	40	5 g	5 g	601214	12/19/19 04:01	SMP	TAL SAV
Instrument ID: CMSS										
Total/NA	Prep	5030B			5.0 g	5 mL	601566	12/18/19 15:04	SMP	TAL SAV
Total/NA	Analysis	8015C		100	5 mL	5 mL	601041	12/18/19 21:36	SMP	TAL SAV
Instrument ID: CVGWFD1										

Eurofins TestAmerica, Savannah

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Client Sample ID: Pre-Treatment 2

Lab Sample ID: 680-178247-2

Date Collected: 11/27/19 10:00

Matrix: Solid

Date Received: 12/13/19 09:30

Percent Solids: 78.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			15.28 g	1 mL	601451	12/20/19 09:10	DRT	TAL SAV
Total/NA	Analysis	8015C		100			601838	12/23/19 16:50	JCK	TAL SAV
Instrument ID: CSGQ										
Total/NA	Prep	3546			15.51 g	5 mL	601450	12/20/19 09:10	DRT	TAL SAV
Total/NA	Analysis	8081B		10000			602249	12/27/19 17:47	GEM	TAL SAV
Instrument ID: CSGK										

## Client Sample ID: Post-Treatment 1

Lab Sample ID: 680-178247-3

Date Collected: 12/06/19 12:00

Matrix: Solid

Date Received: 12/13/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			601936	12/24/19 10:00	WRB	TAL SAV
Instrument ID: NOEQUIP										

## Client Sample ID: Post-Treatment 1

Lab Sample ID: 680-178247-3

Date Collected: 12/06/19 12:00

Matrix: Solid

Date Received: 12/13/19 09:30

Percent Solids: 99.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.176 g	5 mL	600676	12/16/19 10:10	FES	TAL SAV
Total/NA	Analysis	8260B		1	5 g	5 g	601481	12/20/19 19:42	UI	TAL SAV
Instrument ID: CMSS										
Total/NA	Prep	5030B			5.0 g	5 mL	601566	12/18/19 15:04	SMP	TAL SAV
Total/NA	Analysis	8015C		100	5 mL	5 mL	601041	12/18/19 21:58	SMP	TAL SAV
Instrument ID: CVGWFID1										
Total/NA	Prep	3546			15.26 g	1 mL	601451	12/20/19 09:10	DRT	TAL SAV
Total/NA	Analysis	8015C		1			601572	12/20/19 21:58	JCK	TAL SAV
Instrument ID: CSGQ										
Total/NA	Prep	3546	RE		15.08 g	1 mL	602999	01/07/20 09:33	DRT	TAL SAV
Total/NA	Analysis	8015C	RE	1			603149	01/08/20 15:43	JCK	TAL SAV
Instrument ID: CSGQ										
Total/NA	Prep	3546	RE		15.06 g	5 mL	603825	01/15/20 10:10	DRT	TAL SAV
Total/NA	Analysis	8081B	RE	1			603959	01/15/20 21:45	JCK	TAL SAV
Instrument ID: CSGJ										
Total/NA	Prep	3546			15.72 g	5 mL	601450	12/20/19 09:10	DRT	TAL SAV
Total/NA	Analysis	8081B		1			601632	12/21/19 01:26	DBM	TAL SAV
Instrument ID: CSGK										

## Client Sample ID: Post-Treatment 2

Lab Sample ID: 680-178247-4

Date Collected: 12/06/19 12:00

Matrix: Solid

Date Received: 12/13/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			601936	12/24/19 10:00	WRB	TAL SAV
Instrument ID: NOEQUIP										

Eurofins TestAmerica, Savannah

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Client Sample ID: Post-Treatment 2

Lab Sample ID: 680-178247-4

Date Collected: 12/06/19 12:00

Matrix: Solid

Date Received: 12/13/19 09:30

Percent Solids: 100.0

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5035			4.381 g	5 mL	600676	12/16/19 10:10	FES	TAL SAV
Total/NA	Analysis	8260B		1	5 g	5 g	601481	12/20/19 20:03	UI	TAL SAV
Instrument ID: CMSS										
Total/NA	Prep	5030B			5.0 g	5 mL	601566	12/18/19 15:04	SMP	TAL SAV
Total/NA	Analysis	8015C		100	5 mL	5 mL	601041	12/18/19 22:21	SMP	TAL SAV
Instrument ID: CVGWFID1										
Total/NA	Prep	3546			15.88 g	1 mL	601451	12/20/19 09:10	DRT	TAL SAV
Total/NA	Analysis	8015C		1			601572	12/20/19 22:15	JCK	TAL SAV
Instrument ID: CSGQ										
Total/NA	Prep	3546	RE		15.18 g	5 mL	603825	01/15/20 10:10	DRT	TAL SAV
Total/NA	Analysis	8081B	RE	1			603959	01/15/20 21:59	JCK	TAL SAV
Instrument ID: CSGJ										
Total/NA	Prep	3546			15.64 g	5 mL	601450	12/20/19 09:10	DRT	TAL SAV
Total/NA	Analysis	8081B		1			601632	12/21/19 01:42	DBM	TAL SAV
Instrument ID: CSGK										

## Client Sample ID: Aqueous Condensate

Lab Sample ID: 680-178247-5

Date Collected: 12/06/19 14:00

Matrix: Water

Date Received: 12/13/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3520C			251.7 mL	2.5 mL	602119	12/26/19 18:27	EHS	TAL SAV
Total/NA	Analysis	8081B/8082A		200			603368	01/10/20 03:38	GEM	TAL SAV
Instrument ID: CSGJ										
Total/NA	Analysis	9040C		1			605405	01/28/20 16:13	JER	TAL SAV
Instrument ID: MANTECH										

## Client Sample ID: Trip Blank

Lab Sample ID: 680-178247-7

Date Collected: 12/06/19 00:00

Matrix: Water

Date Received: 12/13/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	5 mL	5 mL	601394	12/20/19 06:11	SMP	TAL SAV
Instrument ID: CMSP2										

## Client Sample ID: Organic Condensate

Lab Sample ID: 680-178247-8

Date Collected: 12/06/19 14:00

Matrix: Solid

Date Received: 12/13/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			603249	01/09/20 06:25	JEB	TAL SAV
Instrument ID: NOEQUIP										

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

**Client Sample ID: Organic Condensate**

**Lab Sample ID: 680-178247-8**

**Date Collected: 12/06/19 14:00**

**Matrix: Solid**

**Date Received: 12/13/19 09:30**

**Percent Solids: 41.8**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			5.02 g	5 mL	603146	01/08/20 11:42	DRT	TAL SAV
Total/NA	Analysis	8081B		10000			604326	01/20/20 17:13	JCK	TAL SAV


Instrument ID: CSGK

## Laboratory References:

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

5102 La Roche Ave  
Savannah, GA, 31404  
Phone (912) 354 7858

# Chain of Custody Record

<b>Client Information</b>		Sampler: <u>Joshua Brown</u>		Lab PM: <u>Jerry Lanier</u>		Carrier Tracking No(s):		COC No:	
Client Contact: <u>Ali Ciblak</u>		Phone: <u>519-615-0589</u>		E-Mail: <u>jerry.lanier@testamericainc.com</u>		Page 1 of 1		Job #:	
Company: <u>Geosyntec Consultants Inc</u>		Address: <u>1255 Roberts Blvd # 200</u>		City: <u>Kennesaw</u>		State, Zip: <u>GA, 30144</u>		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Phone: <u>678 202 9500</u>		Email: <u>aciblak@geosyntec.com</u>		Project Name: <u>Brunswick Plant - SWMU 6 StarX TS</u>		Site: <u>Brunswick Plant, GA</u>		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2SO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - ph 4-5 Z - other (specify)	
Task 100		Project # <u>68022348</u>		SSOW#:		Due Date Requested:		Analysis Requested	
TAT Requested (days):		Standard		Field Filtered Sample (Yes or No)		Perform MSMSD (Yes or No)		Method 8081B (TOXOPHENE)	
FO #:		Sample Date		Sample Time		Sample Type (C=Comp, G=grab)		Matrix (W=water, S=solid, O=organic, oil, B=biomass, A=air)	
Sample Identification		Sample Date		Sample Time		Sample Type (C=Comp, G=grab)		Matrix (W=water, S=solid, O=organic, oil, B=biomass, A=air)	
Pre-Treatment 1		Nov 27		10:00		S		S	
Pre-Treatment 2		Nov 27		10:00		S		S	
Post-Treatment 1		Dec 6		12:00		S		S	
Post-Treatment 2		Dec 6		12:00		S		S	
Aqueous Condensate		Dec 6		14:00		W		W	
Organic Condensate		Dec 6		14:00		O		O	
Special Instructions/Note:		Total Number of Containers		EPA Method 8015 (DRO and GRO)		EPA Method 8260 (VOCs)		Special Instructions/Note: Condensate sample may contain oil	
Barcode: 		680-178247 Chain of Custody		Method of Shipment:		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)		Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Possible Hazard Identification		Date: <u>Dec 9 2019</u>		Time: <u>11:00</u>		Special Instructions/QC Requirements:		Received by: <u>[Signature]</u>	
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable		Date/Time:		Company:		Deliverable Requested: I, II, III, IV, Other (specify)		Date/Time: <u>12/13/19</u>	
Relinquished by: <u>Joshua Brown</u>		Date/Time:		Company:		Relinquished by:		Date/Time:	
Relinquished by:		Date/Time:		Company:		Relinquished by:		Date/Time:	
Relinquished by:		Date/Time:		Company:		Relinquished by:		Date/Time:	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temperature(s) °C: <u>11°C</u>		Other Remarks:		Company: <u>IBSA</u>	



## Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 680-178247-1

**Login Number: 178247**

**List Source: Eurofins TestAmerica, Savannah**

**List Number: 1**

**Creator: Weston, Pamela**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Ashland - Brunswick Plant Soil

Job ID: 680-178247-1

## Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87052	06-30-20
Georgia	State Program	803	06-30-20

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UNIVERSITY- WESTERN ONTARIO  
ATTN: Joshua Keegan Brown  
Dept. of Civil and Environmental Eng.  
Spencer Engineering Building, RM 3029  
London ON N6A 5B9

Date Received: 11-DEC-19  
Report Date: 27-DEC-19 14:04 (MT)  
Version: FINAL

Client Phone: 519-661-2111

## Certificate of Analysis

Lab Work Order #: L2394865  
Project P.O. #: NOT SUBMITTED  
Job Reference: BRUNSWICK  
C of C Numbers:  
Legal Site Desc:



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ADDRESS: 309 Exeter Road Unit #29, London, ON N6L 1C1 Canada | Phone: +1 519 652 6044 | Fax: +1 519 652 0671  
ALS CANADA LTD Part of the ALS Group An ALS Limited Company



## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2394865-1 BRUNSWICK GAS							
Sampled By: J. BROWN on 05-DEC-19 @ 11:00							
Matrix: IH							
<b>Permanent Gases</b>							
Carbon Monoxide	4.04		0.050	%		13-DEC-19	R4944389
Carbon Dioxide	10.0		0.050	%		13-DEC-19	R4944389
<b>Volatile Organic Compounds</b>							
Acetone	81000	DLA	45000	ug/m3		27-DEC-19	R4955009
Acetone	34000	DLA	19000	ppb(V)		27-DEC-19	R4955009
Allyl chloride	2280	DLHC	190	ug/m3		27-DEC-19	R4955009
Allyl chloride	728	DLHC	61	ppb(V)		27-DEC-19	R4955009
Benzene	127000	DLA	24000	ug/m3		27-DEC-19	R4955009
Benzene	39600	DLA	7600	ppb(V)		27-DEC-19	R4955009
Benzyl chloride	4340	DLHC	310	ug/m3		27-DEC-19	R4955009
Benzyl chloride	839	DLHC	61	ppb(V)		27-DEC-19	R4955009
Bromodichloromethane	<410	DLHC	410	ug/m3		27-DEC-19	R4955009
Bromodichloromethane	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
Bromoform	<630	DLHC	630	ug/m3		27-DEC-19	R4955009
Bromoform	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
Bromomethane	4480	DLHC	240	ug/m3		27-DEC-19	R4955009
Bromomethane	1150	DLHC	61	ppb(V)		27-DEC-19	R4955009
1,3-Butadiene	7650	AI	670	ug/m3		27-DEC-19	R4955009
1,3-Butadiene	3460	AI	300	ppb(V)		27-DEC-19	R4955009
Carbon Disulfide	7500	DLA	940	ug/m3		27-DEC-19	R4955009
Carbon Disulfide	2410	DLA	300	ppb(V)		27-DEC-19	R4955009
Carbon Tetrachloride	950	DLHC	380	ug/m3		27-DEC-19	R4955009
Carbon Tetrachloride	151	DLHC	61	ppb(V)		27-DEC-19	R4955009
Chlorobenzene	17600	DLA	1400	ug/m3		27-DEC-19	R4955009
Chlorobenzene	3820	DLA	300	ppb(V)		27-DEC-19	R4955009
Dibromochloromethane	<520	DLHC	520	ug/m3		27-DEC-19	R4955009
Dibromochloromethane	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
Chloroethane	5710	DLA	800	ug/m3		27-DEC-19	R4955009
Chloroethane	2160	DLA	300	ppb(V)		27-DEC-19	R4955009
Chloroform	8100	DLA	1500	ug/m3		27-DEC-19	R4955009
Chloroform	1650	DLA	300	ppb(V)		27-DEC-19	R4955009
Chloromethane	2080000	DLA	170000	ug/m3		27-DEC-19	R4955009
Chloromethane	1010000	DLA	82000	ppb(V)		27-DEC-19	R4955009
Cyclohexane	210	AI	210	ug/m3		27-DEC-19	R4955009
Cyclohexane	62	AI	61	ppb(V)		27-DEC-19	R4955009
1,2-Dibromoethane	<470	DLHC	470	ug/m3		27-DEC-19	R4955009
1,2-Dibromoethane	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
1,2-Dichlorobenzene	4020	DLHC	360	ug/m3		27-DEC-19	R4955009
1,2-Dichlorobenzene	668	DLHC	61	ppb(V)		27-DEC-19	R4955009
1,3-Dichlorobenzene	2980	DLHC	360	ug/m3		27-DEC-19	R4955009
1,3-Dichlorobenzene	496	DLHC	61	ppb(V)		27-DEC-19	R4955009
1,4-Dichlorobenzene	3870	DLHC	360	ug/m3		27-DEC-19	R4955009
1,4-Dichlorobenzene	644	DLHC	61	ppb(V)		27-DEC-19	R4955009
Dichlorodifluoromethane	<300	DLHC	300	ug/m3		27-DEC-19	R4955009
Dichlorodifluoromethane	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2394865-1 BRUNSWICK GAS							
Sampled By: J. BROWN on 05-DEC-19 @ 11:00							
Matrix: IH							
<b>Volatile Organic Compounds</b>							
1,1-Dichloroethane	<250	DLHC	250	ug/m3		27-DEC-19	R4955009
1,1-Dichloroethane	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
1,2-Dichloroethane	410	DLHC	250	ug/m3		27-DEC-19	R4955009
1,2-Dichloroethane	101	DLHC	61	ppb(V)		27-DEC-19	R4955009
1,1-Dichloroethene	15000	DLA	1200	ug/m3		27-DEC-19	R4955009
1,1-Dichloroethene	3790	DLA	300	ppb(V)		27-DEC-19	R4955009
cis-1,2-Dichloroethene	3710	DLHC	240	ug/m3		27-DEC-19	R4955009
cis-1,2-Dichloroethene	936	DLHC	61	ppb(V)		27-DEC-19	R4955009
trans-1,2-Dichloroethene	3210	DLHC	240	ug/m3		27-DEC-19	R4955009
trans-1,2-Dichloroethene	808	DLHC	61	ppb(V)		27-DEC-19	R4955009
Methylene chloride	8500	DLA	1100	ug/m3		27-DEC-19	R4955009
Methylene chloride	2460	DLA	300	ppb(V)		27-DEC-19	R4955009
1,2-Dichloropropane	330	DLHC	280	ug/m3		27-DEC-19	R4955009
1,2-Dichloropropane	71	DLHC	61	ppb(V)		27-DEC-19	R4955009
cis-1,3-Dichloropropene	450	DLHC	280	ug/m3		27-DEC-19	R4955009
cis-1,3-Dichloropropene	100	DLHC	61	ppb(V)		27-DEC-19	R4955009
trans-1,3-Dichloropropene	<280	DLHC	280	ug/m3		27-DEC-19	R4955009
trans-1,3-Dichloropropene	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
1,4-Dioxane	<220	DLHC	220	ug/m3		27-DEC-19	R4955009
1,4-Dioxane	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
Ethyl acetate	<220	DLHC	220	ug/m3		27-DEC-19	R4955009
Ethyl acetate	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
Ethylbenzene	37300	DLA	1300	ug/m3		27-DEC-19	R4955009
Ethylbenzene	8600	DLA	300	ppb(V)		27-DEC-19	R4955009
4-Ethyltoluene	14000	DLA	1500	ug/m3		27-DEC-19	R4955009
4-Ethyltoluene	2860	DLA	300	ppb(V)		27-DEC-19	R4955009
n-Heptane	4250	DLHC	250	ug/m3		27-DEC-19	R4955009
n-Heptane	1040	DLHC	61	ppb(V)		27-DEC-19	R4955009
Hexachlorobutadiene	<650	DLHC	650	ug/m3		27-DEC-19	R4955009
Hexachlorobutadiene	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
n-Hexane	4800	DLA	1100	ug/m3		27-DEC-19	R4955009
n-Hexane	1370	DLA	300	ppb(V)		27-DEC-19	R4955009
2-Hexanone	<1200	DLHC	1200	ug/m3		27-DEC-19	R4955009
2-Hexanone	<300	DLHC	300	ppb(V)		27-DEC-19	R4955009
Isooctane	<280	DLHC	280	ug/m3		27-DEC-19	R4955009
Isooctane	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
Isopropyl alcohol	930	DLHC	740	ug/m3		27-DEC-19	R4955009
Isopropyl alcohol	380	DLHC	300	ppb(V)		27-DEC-19	R4955009
Isopropylbenzene	4150	DLHC	300	ug/m3		27-DEC-19	R4955009
Isopropylbenzene	844	DLHC	61	ppb(V)		27-DEC-19	R4955009
Methyl ethyl ketone	17900	DLA	890	ug/m3		27-DEC-19	R4955009
Methyl ethyl ketone	6060	DLA	300	ppb(V)		27-DEC-19	R4955009
Methyl isobutyl ketone	1370	DLHC	250	ug/m3		27-DEC-19	R4955009
Methyl isobutyl ketone	335	DLHC	61	ppb(V)		27-DEC-19	R4955009

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.

## ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2394865-1 BRUNSWICK GAS Sampled By: J. BROWN on 05-DEC-19 @ 11:00 Matrix: IH							
<b>Volatile Organic Compounds</b>							
MTBE	<220	DLHC	220	ug/m3		27-DEC-19	R4955009
MTBE	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
Propylene	121000	DLA	13000	ug/m3		27-DEC-19	R4955009
Propylene	70200	DLA	7600	ppb(V)		27-DEC-19	R4955009
Styrene	36100	DLA	1300	ug/m3		27-DEC-19	R4955009
Styrene	8480	DLA	300	ppb(V)		27-DEC-19	R4955009
1,1,2,2-Tetrachloroethane	<420	DLHC	420	ug/m3		27-DEC-19	R4955009
1,1,2,2-Tetrachloroethane	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
Tetrachloroethylene	860	DLHC	410	ug/m3		27-DEC-19	R4955009
Tetrachloroethylene	126	DLHC	61	ppb(V)		27-DEC-19	R4955009
Tetrahydrofuran	<180	DLHC	180	ug/m3		27-DEC-19	R4955009
Tetrahydrofuran	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
Toluene	319000	DLA	29000	ug/m3		27-DEC-19	R4955009
Toluene	84600	DLA	7600	ppb(V)		27-DEC-19	R4955009
Freon 113	<460	DLHC	460	ug/m3		27-DEC-19	R4955009
Freon 113	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
1,2,4-Trichlorobenzene	2380	DLHC	450	ug/m3		27-DEC-19	R4955009
1,2,4-Trichlorobenzene	321	DLHC	61	ppb(V)		27-DEC-19	R4955009
1,1,1-Trichloroethane	<330	DLHC	330	ug/m3		27-DEC-19	R4955009
1,1,1-Trichloroethane	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
1,1,2-Trichloroethane	880	DLHC	330	ug/m3		27-DEC-19	R4955009
1,1,2-Trichloroethane	162	DLHC	61	ppb(V)		27-DEC-19	R4955009
Trichloroethylene	3220	DLHC	330	ug/m3		27-DEC-19	R4955009
Trichloroethylene	599	DLHC	61	ppb(V)		27-DEC-19	R4955009
Trichlorofluoromethane	<340	DLHC	340	ug/m3		27-DEC-19	R4955009
Trichlorofluoromethane	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
Freon 114	<420	DLHC	420	ug/m3		27-DEC-19	R4955009
Freon 114	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
1,2,4-Trimethylbenzene	14900	DLA	1500	ug/m3		27-DEC-19	R4955009
1,2,4-Trimethylbenzene	3020	DLA	300	ppb(V)		27-DEC-19	R4955009
1,3,5-Trimethylbenzene	4250	DLHC	300	ug/m3		27-DEC-19	R4955009
1,3,5-Trimethylbenzene	864	DLHC	61	ppb(V)		27-DEC-19	R4955009
Vinyl acetate	<3500	DLQ	3500	ug/m3		27-DEC-19	R4955009
Vinyl acetate	<990	DLQ	990	ppb(V)		27-DEC-19	R4955009
Vinyl bromide	<270	DLHC	270	ug/m3		27-DEC-19	R4955009
Vinyl bromide	<61	DLHC	61	ppb(V)		27-DEC-19	R4955009
Vinyl chloride	16400	DLA	770	ug/m3		27-DEC-19	R4955009
Vinyl chloride	6420	DLA	300	ppb(V)		27-DEC-19	R4955009
o-Xylene	23200	DLA	1300	ug/m3		27-DEC-19	R4955009
o-Xylene	5350	DLA	300	ppb(V)		27-DEC-19	R4955009
m&p-Xylene	60600	DLA	2600	ug/m3		27-DEC-19	R4955009
m&p-Xylene	14000	DLA	610	ppb(V)		27-DEC-19	R4955009
Surrogate: 4-Bromofluorobenzene	102.6		50-150	%		27-DEC-19	R4955009
<b>Miscellaneous</b>							
Batch Proof ID	191114.117				17-DEC-19	17-DEC-19	R4944737

\* Refer to Referenced Information for Qualifiers (if any) and Methodology.



## Reference Information

**Sample Parameter Qualifier key listed:**

Qualifier	Description
AI	Analytical interferences may be present. Result may be biased high.
DLA	Detection Limit adjusted for required dilution
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.

**Test Method References:**

ALS Test Code	Matrix	Test Description	Method Reference**
CAN-DATA-WT	Canister	Canister Information Batch Proof ID, Canister ID, Pressure on Receipt, Regulator ID.	EPA TO-15
FIXED GASES-TCD-WT	Canister	High Level Fixed Gases by TCD This analysis is performed using procedures adapted from EPA Method 3C & ASTM D1946. Air samples are collected into cleaned evacuated canisters. A volume of air is removed from the canister and injected by means of a gas-sampling/backflush valve onto a series of packed GC columns and measured using a thermal conductivity detector (TCD). Oxygen is not separated from Argon.	EPA Method 3C & ASTM D1946
TO15-GCMS-WT	Canister	Canister EPA TO-15 This analysis is performed using procedures adapted from EPA Method TO-15. Air samples are collected into cleaned evacuated canisters. A volume of air sample is transferred from the canister to a preconcentrator system where the analytes are trapped & focused. The analytes are then thermally desorbed into a GC-MSD for analysis. Test results are not blank corrected unless indicated by a qualifier. Canister samples will be retained for 7 calendar days after final report. If you require a longer canister storage time, please contact your account manager.	EPA TO-15

\*\* ALS test methods may incorporate modifications from specified reference methods to improve performance.

*The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:*

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

**Chain of Custody Numbers:**
**GLOSSARY OF REPORT TERMS**

*Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.*

*mg/kg - milligrams per kilogram based on dry weight of sample*

*mg/kg wwt - milligrams per kilogram based on wet weight of sample*

*mg/kg lwt - milligrams per kilogram based on lipid weight of sample*

*mg/L - unit of concentration based on volume, parts per million.*

*< - Less than.*

*D.L. - The reporting limit.*

*N/A - Result not available. Refer to qualifier code and definition for explanation.*

*Test results reported relate only to the samples as received by the laboratory.*

*UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.*

*Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.*



# Quality Control Report

Workorder: L2394865

Report Date: 27-DEC-19

Page 1 of 8

Client: UNIVERSITY- WESTERN ONTARIO  
 Dept. of Civil and Environmental Eng. Spencer Engineering Building, RM  
 3029  
 London ON N6A 5B9  
 Contact: Joshua Keegan Brown

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>CAN-DATA-WT</b>		<b>Canister</b>						
Batch	R4944737							
<b>WG3244055-1 MB</b>								
Pressure on Receipt			-29.8		in Hg			17-DEC-19
<b>FIXED GASES-TCD-WT</b>		<b>Canister</b>						
Batch	R4944389							
<b>WG3236065-5 LCS</b>								
Carbon Dioxide			95.4		%		70-130	13-DEC-19
Carbon Monoxide			95.7		%		70-130	13-DEC-19
<b>WG3236065-6 LCSD</b>		<b>WG3236065-5</b>						
Carbon Dioxide		95.4	96		%	0.8	25	13-DEC-19
Carbon Monoxide		95.7	96		%	0.2	25	13-DEC-19
<b>WG3236065-7 MB</b>								
Carbon Dioxide			<0.050		%		0.05	13-DEC-19
Carbon Monoxide			<0.050		%		0.05	13-DEC-19
<b>TO15-GCMS-WT</b>		<b>Canister</b>						
Batch	R4955009							
<b>WG3249254-2 LCS</b>								
1,1,1-Trichloroethane			94.5		%		70-130	27-DEC-19
1,1,2,2-Tetrachloroethane			101.2		%		70-130	27-DEC-19
1,1,2-Trichloroethane			101.0		%		70-130	27-DEC-19
1,1-Dichloroethane			93.0		%		70-130	27-DEC-19
1,1-Dichloroethene			92.6		%		70-130	27-DEC-19
1,2,4-Trichlorobenzene			116.0		%		70-130	27-DEC-19
1,2,4-Trimethylbenzene			108.7		%		70-130	27-DEC-19
1,2-Dibromoethane			96.7		%		70-130	27-DEC-19
1,2-Dichlorobenzene			101.7		%		70-130	27-DEC-19
1,2-Dichloroethane			103.6		%		70-130	27-DEC-19
1,2-Dichloropropane			90.5		%		70-130	27-DEC-19
1,3,5-Trimethylbenzene			102.6		%		70-130	27-DEC-19
1,3-Butadiene			90.7		%		70-130	27-DEC-19
1,3-Dichlorobenzene			104.6		%		70-130	27-DEC-19
1,4-Dichlorobenzene			104.4		%		70-130	27-DEC-19
1,4-Dioxane			98.5		%		70-130	27-DEC-19
2-Hexanone			99.3		%		70-130	27-DEC-19
4-Ethyltoluene			100.1		%		70-130	27-DEC-19
Acetone			122.1		%		70-130	27-DEC-19



## Quality Control Report

Workorder: L2394865

Report Date: 27-DEC-19

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>TO15-GCMS-WT</b>		<b>Canister</b>						
<b>Batch</b>	<b>R4955009</b>							
<b>WG3249254-2</b>	<b>LCS</b>							
Allyl chloride			86.7		%		70-130	27-DEC-19
Benzene			101.0		%		70-130	27-DEC-19
Benzyl chloride			93.1		%		70-130	27-DEC-19
Bromodichloromethane			95.2		%		70-130	27-DEC-19
Bromoform			100.7		%		70-130	27-DEC-19
Bromomethane			104.8		%		70-130	27-DEC-19
Carbon Disulfide			80.9		%		70-130	27-DEC-19
Carbon Tetrachloride			98.3		%		70-130	27-DEC-19
Chlorobenzene			98.0		%		70-130	27-DEC-19
Chloroethane			115.2		%		70-130	27-DEC-19
Chloroform			98.9		%		70-130	27-DEC-19
Chloromethane			91.3		%		70-130	27-DEC-19
cis-1,2-Dichloroethene			91.1		%		70-130	27-DEC-19
cis-1,3-Dichloropropene			101.3		%		70-130	27-DEC-19
Cyclohexane			99.9		%		70-130	27-DEC-19
Dibromochloromethane			96.8		%		70-130	27-DEC-19
Dichlorodifluoromethane			95.0		%		70-130	27-DEC-19
Ethyl acetate			72.8		%		70-130	27-DEC-19
Ethylbenzene			99.8		%		70-130	27-DEC-19
Freon 113			96.9		%		70-130	27-DEC-19
Freon 114			100.3		%		70-130	27-DEC-19
Hexachlorobutadiene			114.8		%		70-130	27-DEC-19
Isooctane			96.7		%		70-130	27-DEC-19
Isopropyl alcohol			123.2		%		70-130	27-DEC-19
Isopropylbenzene			101.9		%		50-150	27-DEC-19
m&p-Xylene			104.8		%		70-130	27-DEC-19
Methyl ethyl ketone			100.6		%		70-130	27-DEC-19
Methyl isobutyl ketone			100.1		%		70-130	27-DEC-19
Methylene chloride			90.9		%		70-130	27-DEC-19
MTBE			98.0		%		70-130	27-DEC-19
n-Heptane			94.7		%		70-130	27-DEC-19
n-Hexane			90.1		%		70-130	27-DEC-19
o-Xylene			99.5		%		70-130	27-DEC-19
Propylene			100.7		%		70-130	27-DEC-19



## Quality Control Report

Workorder: L2394865

Report Date: 27-DEC-19

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>TO15-GCMS-WT</b>		<b>Canister</b>						
<b>Batch</b>	<b>R4955009</b>							
<b>WG3249254-2</b>	<b>LCS</b>							
Styrene			91.7		%		70-130	27-DEC-19
Tetrachloroethylene			102.1		%		70-130	27-DEC-19
Tetrahydrofuran			96.3		%		70-130	27-DEC-19
Toluene			100.7		%		70-130	27-DEC-19
trans-1,2-Dichloroethene			102.2		%		70-130	27-DEC-19
trans-1,3-Dichloropropene			99.3		%		70-130	27-DEC-19
Trichloroethylene			96.7		%		70-130	27-DEC-19
Trichlorofluoromethane			106.1		%		70-130	27-DEC-19
Vinyl acetate			94.4		%		70-130	27-DEC-19
Vinyl bromide			111.6		%		70-130	27-DEC-19
Vinyl chloride			94.2		%		70-130	27-DEC-19
<b>WG3249254-3</b>	<b>LCS</b>		<b>WG3249254-2</b>					
1,1,1-Trichloroethane		94.5	95		%	0.9	25	27-DEC-19
1,1,2,2-Tetrachloroethane		101.2	106		%	4.8	25	27-DEC-19
1,1,2-Trichloroethane		101.0	98		%	2.9	25	27-DEC-19
1,1-Dichloroethane		93.0	102		%	9.1	25	27-DEC-19
1,1-Dichloroethene		92.6	96		%	3.7	25	27-DEC-19
1,2,4-Trichlorobenzene		116.0	118		%	2.1	25	27-DEC-19
1,2,4-Trimethylbenzene		108.7	105		%	3.7	25	27-DEC-19
1,2-Dibromoethane		96.7	100		%	2.9	25	27-DEC-19
1,2-Dichlorobenzene		101.7	106		%	4.3	25	27-DEC-19
1,2-Dichloroethane		103.6	100		%	3.5	25	27-DEC-19
1,2-Dichloropropane		90.5	91		%	0.3	25	27-DEC-19
1,3,5-Trimethylbenzene		102.6	107		%	4.7	25	27-DEC-19
1,3-Butadiene		90.7	115		%	24	25	27-DEC-19
1,3-Dichlorobenzene		104.6	94		%	11	25	27-DEC-19
1,4-Dichlorobenzene		104.4	108		%	3.1	25	27-DEC-19
1,4-Dioxane		98.5	101		%	3.0	25	27-DEC-19
2-Hexanone		99.3	99		%	0.1	25	27-DEC-19
4-Ethyltoluene		100.1	102		%	1.5	25	27-DEC-19
Acetone		122.1	112		%	8.7	25	27-DEC-19
Allyl chloride		86.7	86		%	0.2	25	27-DEC-19
Benzene		101.0	95		%	5.7	25	27-DEC-19
Benzyl chloride		93.1	102		%	9.4	25	27-DEC-19





## Quality Control Report

Workorder: L2394865

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>TO15-GCMS-WT</b>		<b>Canister</b>						
<b>Batch</b>	<b>R4955009</b>							
<b>WG3249254-3</b>	<b>LCSD</b>	<b>WG3249254-2</b>						
Bromodichloromethane		95.2	97		%	1.5	25	27-DEC-19
Bromoform		100.7	103		%	2.0	25	27-DEC-19
Bromomethane		104.8	108		%	3.4	25	27-DEC-19
Carbon Disulfide		80.9	85		%	5.0	25	27-DEC-19
Carbon Tetrachloride		98.3	95		%	3.3	25	27-DEC-19
Chlorobenzene		98.0	100		%	2.0	25	27-DEC-19
Chloroethane		115.2	121		%	5.1	25	27-DEC-19
Chloroform		98.9	101		%	1.6	25	27-DEC-19
Chloromethane		91.3	106		%	15	25	27-DEC-19
cis-1,2-Dichloroethene		91.1	103		%	12	25	27-DEC-19
cis-1,3-Dichloropropene		101.3	96		%	5.5	25	27-DEC-19
Cyclohexane		99.9	98		%	1.9	25	27-DEC-19
Dibromochloromethane		96.8	97		%	0.7	25	27-DEC-19
Dichlorodifluoromethane		95.0	106		%	11	25	27-DEC-19
Ethyl acetate		72.8	89		%	20	25	27-DEC-19
Ethylbenzene		99.8	99		%	1.1	25	27-DEC-19
Freon 113		96.9	92		%	5.4	25	27-DEC-19
Freon 114		100.3	117		%	15	25	27-DEC-19
Hexachlorobutadiene		114.8	117		%	2.2	25	27-DEC-19
Isooctane		96.7	94		%	3.4	25	27-DEC-19
Isopropyl alcohol		123.2	117		%	5.0	25	27-DEC-19
Isopropylbenzene		101.9	105		%	2.8	50	27-DEC-19
m&p-Xylene		104.8	104		%	0.9	25	27-DEC-19
Methyl ethyl ketone		100.6	96		%	4.7	25	27-DEC-19
Methyl isobutyl ketone		100.1	97		%	2.6	25	27-DEC-19
Methylene chloride		90.9	96		%	5.0	25	27-DEC-19
MTBE		98.0	90		%	8.6	25	27-DEC-19
n-Heptane		94.7	90		%	5.0	25	27-DEC-19
n-Hexane		90.1	90		%	0.2	25	27-DEC-19
o-Xylene		99.5	104		%	4.6	25	27-DEC-19
Propylene		100.7	123		%	20	25	27-DEC-19
Styrene		91.7	98		%	6.4	25	27-DEC-19
Tetrachloroethylene		102.1	105		%	3.1	25	27-DEC-19
Tetrahydrofuran		96.3	104		%	7.6	25	27-DEC-19



## Quality Control Report

Workorder: L2394865

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>TO15-GCMS-WT</b>		<b>Canister</b>						
<b>Batch</b>	<b>R4955009</b>							
<b>WG3249254-3</b>	<b>LCSD</b>	<b>WG3249254-2</b>						
Toluene		100.7	97		%	4.2	25	27-DEC-19
trans-1,2-Dichloroethene		102.2	99		%	2.9	25	27-DEC-19
trans-1,3-Dichloropropene		99.3	95		%	4.5	25	27-DEC-19
Trichloroethylene		96.7	96		%	1.2	25	27-DEC-19
Trichlorofluoromethane		106.1	107		%	0.7	25	27-DEC-19
Vinyl acetate		94.4	79		%	18	25	27-DEC-19
Vinyl bromide		111.6	113		%	1.2	25	27-DEC-19
Vinyl chloride		94.2	118		%	23	25	27-DEC-19
<b>WG3249254-1</b>	<b>MB</b>							
1,1,1-Trichloroethane			<0.20		ppb(V)		0.2	27-DEC-19
1,1,2,2-Tetrachloroethane			<0.20		ppb(V)		0.2	27-DEC-19
1,1,2-Trichloroethane			<0.20		ppb(V)		0.2	27-DEC-19
1,1-Dichloroethane			<0.20		ppb(V)		0.2	27-DEC-19
1,1-Dichloroethene			<0.20		ppb(V)		0.2	27-DEC-19
1,2,4-Trichlorobenzene			<0.20		ppb(V)		0.2	27-DEC-19
1,2,4-Trimethylbenzene			<0.20		ppb(V)		0.2	27-DEC-19
1,2-Dibromoethane			<0.20		ppb(V)		0.2	27-DEC-19
1,2-Dichlorobenzene			<0.20		ppb(V)		0.2	27-DEC-19
1,2-Dichloroethane			<0.20		ppb(V)		0.2	27-DEC-19
1,2-Dichloropropane			<0.20		ppb(V)		0.2	27-DEC-19
1,3,5-Trimethylbenzene			<0.20		ppb(V)		0.2	27-DEC-19
1,3-Butadiene			<0.20		ppb(V)		0.2	27-DEC-19
1,3-Dichlorobenzene			<0.20		ppb(V)		0.2	27-DEC-19
1,4-Dichlorobenzene			<0.20		ppb(V)		0.2	27-DEC-19
1,4-Dioxane			<0.20		ppb(V)		0.2	27-DEC-19
2-Hexanone			<1.0		ppb(V)		1	27-DEC-19
4-Ethyltoluene			<0.20		ppb(V)		0.2	27-DEC-19
Acetone			<0.50		ppb(V)		0.5	27-DEC-19
Allyl chloride			<0.20		ppb(V)		0.2	27-DEC-19
Benzene			<0.20		ppb(V)		0.2	27-DEC-19
Benzyl chloride			<0.20		ppb(V)		0.2	27-DEC-19
Bromodichloromethane			<0.20		ppb(V)		0.2	27-DEC-19
Bromoform			<0.20		ppb(V)		0.2	27-DEC-19
Bromomethane			<0.20		ppb(V)		0.2	27-DEC-19



## Quality Control Report

Workorder: L2394865

Report Date: 27-DEC-19

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>TO15-GCMS-WT</b>		<b>Canister</b>						
<b>Batch</b>	<b>R4955009</b>							
<b>WG3249254-1</b>	<b>MB</b>							
Carbon Disulfide			<0.20		ppb(V)		0.2	27-DEC-19
Carbon Tetrachloride			<0.20		ppb(V)		0.2	27-DEC-19
Chlorobenzene			<0.20		ppb(V)		0.2	27-DEC-19
Chloroethane			<0.20		ppb(V)		0.2	27-DEC-19
Chloroform			<0.20		ppb(V)		0.2	27-DEC-19
Chloromethane			<0.20		ppb(V)		0.2	27-DEC-19
cis-1,2-Dichloroethene			<0.20		ppb(V)		0.2	27-DEC-19
cis-1,3-Dichloropropene			<0.20		ppb(V)		0.2	27-DEC-19
Cyclohexane			<0.20		ppb(V)		0.2	27-DEC-19
Dibromochloromethane			<0.20		ppb(V)		0.2	27-DEC-19
Dichlorodifluoromethane			<0.20		ppb(V)		0.2	27-DEC-19
Ethyl acetate			<0.20		ppb(V)		0.2	27-DEC-19
Ethylbenzene			<0.20		ppb(V)		0.2	27-DEC-19
Freon 113			<0.20		ppb(V)		0.2	27-DEC-19
Freon 114			<0.20		ppb(V)		0.2	27-DEC-19
Hexachlorobutadiene			<0.20		ppb(V)		0.2	27-DEC-19
Isooctane			<0.20		ppb(V)		0.2	27-DEC-19
Isopropyl alcohol			<1.0		ppb(V)		1	27-DEC-19
Isopropylbenzene			<0.20		ppb(V)		0.2	27-DEC-19
m&p-Xylene			<0.40		ppb(V)		0.4	27-DEC-19
Methyl ethyl ketone			<0.20		ppb(V)		0.2	27-DEC-19
Methyl isobutyl ketone			<0.20		ppb(V)		0.2	27-DEC-19
Methylene chloride			<0.20		ppb(V)		0.2	27-DEC-19
MTBE			<0.20		ppb(V)		0.2	27-DEC-19
n-Heptane			<0.20		ppb(V)		0.2	27-DEC-19
n-Hexane			<0.20		ppb(V)		0.2	27-DEC-19
o-Xylene			<0.20		ppb(V)		0.2	27-DEC-19
Propylene			<0.20		ppb(V)		0.2	27-DEC-19
Styrene			<0.20		ppb(V)		0.2	27-DEC-19
Tetrachloroethylene			<0.20		ppb(V)		0.2	27-DEC-19
Tetrahydrofuran			<0.20		ppb(V)		0.2	27-DEC-19
Toluene			<0.20		ppb(V)		0.2	27-DEC-19
trans-1,2-Dichloroethene			<0.20		ppb(V)		0.2	27-DEC-19
trans-1,3-Dichloropropene			<0.20		ppb(V)		0.2	27-DEC-19



# Quality Control Report

Workorder: L2394865

Report Date: 27-DEC-19

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
<b>TO15-GCMS-WT</b>	<b>Canister</b>							
<b>Batch</b>	<b>R4955009</b>							
<b>WG3249254-1</b>	<b>MB</b>							
Trichloroethylene			<0.20		ppb(V)		0.2	27-DEC-19
Trichlorofluoromethane			<0.20		ppb(V)		0.2	27-DEC-19
Vinyl acetate			<0.50		ppb(V)		0.5	27-DEC-19
Vinyl bromide			<0.20		ppb(V)		0.2	27-DEC-19
Vinyl chloride			<0.20		ppb(V)		0.2	27-DEC-19
Surrogate: 4-Bromofluorobenzene			96.1		%		50-150	27-DEC-19

# Quality Control Report

Workorder: L2394865

Report Date: 27-DEC-19

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## Legend:

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Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

## Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

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The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



# ANALYTICAL REPORT

Report Date: December 18, 2019

Peter Stastny  
ALS Laboratory Group  
Unit 29 , 309 Exeter Rd.  
London, ON N6L 1C1  
CANADA

Phone: (519) 652-6044 x 224

E-mail: Peter.Stastny@alsglobal.com

Workorder: **34-1934753**

Client Project ID: Brunswick 120519

Purchase Order: NA

Project Manager: Jessica Helland

## Analytical Results

Sample ID: <b>8404900202</b>	Sampling Location: Brunswick			Collected: 12/05/2019
Lab ID: 1934753001				Received: 12/12/2019
Method: NIOSH 5605 by GC-ECD	Media: SKC 226-58, Sorbent Tube, XAD-2 OVS, Quartz Filter	Instrument: GCE18		
	Sampling Info: Air Volume Not Provided	Analyzed: 12/16/2019 (253605)		
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Toxaphene	<b>29000</b>	NA	NA	2000

## Comments

**Quality Control: NIOSH 5605 by GC-ECD - (HBN: 253605)**

Sample 1934753001 required 10000 dilution for sections A and B.

## Report Authorization ( /S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
NIOSH 5605 by GC-ECD	/S/ Mila V. Potekhin 12/17/2019 14:18	/S/ Matthew Roberts 12/18/2019 15:09

## Laboratory Contact Information

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# ANALYTICAL REPORT

Workorder: **34-1934753**

Client Project ID: Brunswick 120519

Purchase Order: NA

Project Manager: Jessica Helland

## General Lab Comments

The results provided in this report relate only to the items tested.  
Samples were received in acceptable condition unless otherwise noted.  
Samples have not been blank corrected unless otherwise noted.  
This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

Testing Sector	Accreditation Body (Standard)	Certificate Number	Website
Environmental	PJLA (DoD ELAP)	L17-506	<a href="http://www.pjlabs.com">http://www.pjlabs.com</a>
	PJLA (ISO 17025)	L17-507-R1	<a href="http://www.pjlabs.com">http://www.pjlabs.com</a>
	Utah (TNI)	UT00953	<a href="http://lams.nelac-institute.org/search">http://lams.nelac-institute.org/search</a>
	Iowa (TNI)	IA# 376	<a href="http://www.shl.uiowa.edu/labcert/idnr/">http://www.shl.uiowa.edu/labcert/idnr/</a>
	Kansas	E-10416	<a href="http://www.kdheks.gov/envlab/disclaimer.html">http://www.kdheks.gov/envlab/disclaimer.html</a>
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
	DOECAP-AP	L18-606	<a href="http://www.pjlabs.com">http://www.pjlabs.com</a>
	Washington	C596	<a href="https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation">https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation</a>
Dietary Supplements	PJLA (ISO 17025)	L17-507-R1	<a href="http://www.pjlabs.com">http://www.pjlabs.com</a>

## Definitions

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.

LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.

ND = Not Detected, Testing result not detected above the LOD or LOQ.

NA = Not Applicable.

\*\* No result could be reported, see sample comments for details.

< Means this testing result is less than the numerical value.

( ) This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.



L2394865-COFC

# ANALYTICAL REQUEST FORM



1.  REGULAR Status

RUSH Status Requested - ADDITIONAL CHARGE  
 RESULTS REQUIRED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 CONTACT ALS SALT LAKE PRIOR TO SENDING SAMPLES

2. Date 11/20/11 Purchase Order No. \_\_\_\_\_ 4. Quote No. \_\_\_\_\_  
 3. Company Name ALS Company Ltd ALS Project Manager \_\_\_\_\_  
 Address 309 LeVoy Rd Unit 100 5. Sample Collection  
 Sampling Site Brimbank  
 Person to Contact Peter Skilling Industrial Process \_\_\_\_\_  
 Telephone ( ) 579 652 6044 Date of Collection 5-11-11  
 Fax Telephone ( ) \_\_\_\_\_ Time Collected 1:00 PM  
 E-mail Address peter.skilling@als.com.au Date of Shipment 11-18-11  
 Billing Address (if different from above) \_\_\_\_\_ Chain of Custody No. \_\_\_\_\_  
 6. How did you first learn about ALS? \_\_\_\_\_

## 7. REQUEST FOR ANALYSES

Laboratory Use Only	Client Sample Number	Matrix*	Sample Volume	ANALYSES REQUESTED - Use method number if known	Units**
	<u>Brimbank 1</u>	<u>Water</u>		<u>70ml/gpm</u>	
	<u>(8701900212)</u>				
	<u>Brimbank 2</u>	<u>Water</u>		<u>(70ml/gpm)</u>	

\* Specify: Solid sorbent tube, e.g. Charcoal; Filter type; Impinger solution; Bulk sample; Blood; Urine; Tissue; Soil; Water; Other  
 \*\* 1. µg/sample 2. mg/m<sup>3</sup> 3. ppm 4. % 5. µg/m<sup>3</sup> 6. \_\_\_\_\_ (other) Please indicate one or more units in the column entitled Units\*\*  
 Comments \_\_\_\_\_

Possible Contamination and/or Chemical Hazards \_\_\_\_\_

### 7. Chain of Custody (Optional)

Relinquished by P Skilling Date/Time 11/20/11 1:45  
 Received by \_\_\_\_\_ Date/Time \_\_\_\_\_  
 Relinquished by \_\_\_\_\_ Date/Time \_\_\_\_\_  
 Received by \_\_\_\_\_ Date/Time \_\_\_\_\_





L2394865-COFC

60 NORTHLAND ROAD, UNIT 1  
WATERLOO, ON N2V 2B8

Phone: (519) 886-6910

Fax: (519) 886-9047

Toll Free: 1-800-668-9878



### AIR QUALITY CHAIN OF CUSTODY FORM - Canister/Tube/Gas Bag

<b>Note:</b> All TAT Quoted is in business days which exclude statutory holidays and weekends. TAT of samples received past 3:00 pm or Saturday / Sunday begin the next day.	DATE REQUIRED	SERVICE REQUESTED	Rush 3 day (100%)	<input type="checkbox"/>	
		10 day (regular)	<input checked="" type="checkbox"/>	Rush 2 day (200%)	<input type="checkbox"/>
		Rush 5 day (50%)	<input type="checkbox"/>	Rush 1 day (300%) - Enquire	<input type="checkbox"/>

COMPANY NAME <b>UWO</b>		REGULATION		ANALYSIS REQUEST										All rush work requires lab approval before sample submission									
OFFICE		CRITERIA		TUBE AIR VOLUME: L <input type="checkbox"/> or m <sup>3</sup> <input type="checkbox"/> Vec. (Tols) W.C. (W) (S) (S) Toxaphene (W) (S) (S) Canister Prep STARTING PRESSURE - Pre-Sampling ("Hg) ENDING PRESSURE - Post Sampling ("Hg) COLLECTION TIME (HRS)										SUBMISSION #: <b>L2394865</b>									
PROJECT MANAGER <b>Joshua Brown</b>		OTHER INFORMATION												ENTERED BY: <b>PS Stastny</b>									
PROJECT # <b>Brunswick</b>		REPORT FORMAT/DISTRIBUTION												DATE/TIME ENTERED: <b>11 Dec -19</b>									
PHONE <b>514-615-0889</b>		EMAIL FAX BOTH												BIN #:									
ACCOUNT #		SELECT: PDF DIGITAL BOTH		SAMPLE DESCRIPTION TO APPEAR ON REPORT Date (dd-mmm-yy)   Time (24hr) (hh:mm)   Canister or Tube ID# (e.g. 060000-XXXX or G0XXXXXXSVI)   Regulator Serial # CS1200-XXXX or GXX   Matrix Type										Field Conditions (Rain/Wind/Dust/Odour) Field PID Reading		LAB ID							
QUOTATION #		EMAIL 1 <b>jbrown227@uwo.ca</b>												SAMPLE DATE/TIME		Date		Time		Canister or Tube ID#		Regulator Serial #	
SAMPLING INFORMATION		EMAIL 2		Date		Time		Canister or Tube ID#		Regulator Serial #		Matrix Type		Date		Time		Canister or Tube ID#		Regulator Serial #		Matrix Type	
				05-12-2014		11:00		00946-0229		6323				05-12-2014		11:00		Lot 12478 Cat No 220-55		220-55			

SPECIAL INSTRUCTIONS/COMMENTS		This Chain of Custody Form is only to be used for Air Quality Samples										SAMPLE CONDITION AS RECEIVED					
		Matrix Type		Soil Gas Vapour = SG					Indoor Air = IA					FROZEN <input type="checkbox"/>		MEAN TEMP	
				Ambient Air = AA					Industrial Hygiene = IH					COLD <input type="checkbox"/>			
SAMPLED BY: <b>Joshua Brown</b>		DATE & TIME: <b>05-12-2014/11:00</b>		RECEIVED BY: <b>PS Stastny</b>					DATE & TIME: <b>11-Dec-19</b>					OBSERVATIONS: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If yes add SIF		INIT: <b>PS</b>	
RELINQUISHED BY: <b>Joshua Brown</b>		DATE & TIME: <b>10-12-2014/11:00</b>															

Notes

1. Quote number must be provided to ensure proper pricing

2. TAT may vary dependent on complexity of analysis and lab workload at time of submission. Please contact the lab to confirm TATs.

3. Any known or suspected hazards relating to a sample must be noted on the chain of custody in comments section.

13.10

REV6-2015

## APPENDIX D

# Chemical Reduction/Bioremediation Treatability Study Report

**Prepared for:**

Geosyntec Consultants Inc.  
1255 Roberts Boulevard, Suite 200  
Kennesaw, Georgia, 30144

# **Laboratory Treatability Study to Evaluate Remediation of Toxaphene in Soil**

Former Hercules Brunswick Plant, Brunswick, Georgia

Prepared by:



130 Stone Road West  
Guelph, Ontario N1G 3Z2

SiREM Ref: GR6881

17 March 2020

[siremlab.com](http://siremlab.com)

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## LIST OF ABBREVIATIONS

°C	degrees Celsius
DI	de-ionized
Geosyntec	Geosyntec Consultants
g	grams
g/m <sup>2</sup>	grams per meter squared
h	hour
L	liter
ORP	oxidation reduction potential
%	percent
SiREM	SiREM Laboratory
WHC	water holding capacity

## 1 INTRODUCTION

Geosyntec Consultants (Geosyntec) retained SiREM Laboratory (SiREM) to perform a laboratory biotreatability study to assess the potential for in situ bioremediation of toxaphene in soil at the Former Hercules Brunswick Plant site in Brunswick, Georgia (the Site). The purpose of the study was to assess biodegradation of toxaphene in materials collected from two locations at the Site.

The geologic materials labelled Bucket 1 and Bucket 3 were collected by Geosyntec personnel on 22 October 2019 and received by SiREM on 24 October 2019. The materials were received in good condition at a temperature of 13 degrees Celsius (°C) or less. Refer to Appendix A for the chain of custody documentation received with the materials.

The remainder of this report contains a summary of the experimental materials and methods (Section 2), and the results of the microcosm study (Section 3).

## 2 MATERIALS AND METHODS

The following sections describe the materials and methods used for microcosm construction and incubation (Section 2.1), and microcosm sampling and analysis (Section 2.2).

### 2.1 Microcosm Construction and Incubation

#### 2.1.1 Microcosm Construction

Prior to microcosm construction, the geologic materials (Bucket 1 and 3) were passed through a ¾" sieve to remove coarse debris, combined and homogenized.

Microcosms were constructed on 29 November 2019 (Day -34) by filling 1 liter (L) (nominal volume) clear glass bottles (Systems Plus, New Hamburg, ON) with 500 grams (g) dry weight of homogenized soil. The bottles were capped with Teflon-lined lids and sealed with parafilm. Control and treatment microcosms were constructed in duplicate. Table 1 summarizes the details of microcosm construction and the amendments used for the treatment microcosms.

#### 2.1.2 Microcosm Amendments and Incubation

Microcosms were incubated in an incubator (Fisher Scientific, Waltham, MA) at approximately 27 °C. The incubation period followed a 7-day cycle that consisted of 5 days of anaerobic conditions followed by 2 days of aerobic conditions. During the anaerobic portion of each cycle, the microcosms were capped and sealed. During the aerobic portion of each cycle, the microcosms were left uncapped and stirred once per day using a clean spatula. The incubation period was 6 cycles (42 days) long.

Due to technician error, the third cycle had 6 days of anaerobic conditions rather than 5 days. Geosyntec was notified of this and instructed SiREM to maintain the same calendar schedule and shorten the fourth cycle to 1 day of aerobic conditions instead of 2 days.

On Day 0 and at the end of each 7-day cycle, the treatment microcosms were amended with Daramend® II (PeroxyChem LLC, Philadelphia, PA) and ferrous sulfate monohydrate (PeroxyChem LLC, Philadelphia, PA), each to a target of 0.5 percent (%) wet weight of the geologic material. The mass of geologic material at the time of amendment was used as the wet weight. The microcosms were then stirred thoroughly with a clean spatula to ensure an even distribution. Afterwards, all microcosms were amended with deionized (DI) water to a target of 90% of the geologic material's water holding capacity (WHC). At the recommendation of PeroxyChem LLC and with the agreement of Geosyntec, during the incubation period the WHC was assessed qualitatively by appearance and consistency relative to a reference material as opposed to quantitatively as described in section 2.2.2.

## 2.2 Microcosm Sampling and Analysis

### 2.2.1 Microcosm Sampling Schedules

The bulk homogenized geologic material was sampled in duplicate for moisture content, WHC, toxaphene, and total metals prior to microcosm construction. During the incubation period, the microcosms were sampled for pH and ORP at the end of each 7-day cycle. The pH was also sampled on Day 0. Toxaphene sampling occurred on Day 0 and at the end of cycles 1, 3, and 6.

### 2.2.2 Analysis of Moisture Content & WHC

The moisture content was determined by calculating the difference in mass of a soil sample before and after it was dried in an oven at 105 °C for 24 hours (h).

For the WHC, a Büchner funnel was lined with 100 grams per meter squared ( $\text{g/m}^2$ ) filter paper. The funnel was then filled with soil and thoroughly saturated with DI water. Once the water stopped dripping from the funnel, the material was left for an additional 4 h to ensure proper saturation. The moisture content of the saturated soil is the WHC and was measured using the method outlined above.

### 2.2.3 Analysis of pH & ORP

The pH measurements were performed using an Oakton pH spear with a combination pH electrode (Oakton, Vernon Hills, IL). The pH spear was calibrated at each sampling event according to the manufacturer's instructions using pH 4.0, 7.0 and 10 standards.

Oxidation reduction potential (ORP) measurements were performed at SiREM using an Omega PHH-127 Multi-Parameter Water Quality Monitor with ORP probe (Omega, Laval, QC). A single point calibration of the meter was performed at each sampling event with Zobell ORP calibration solution.

The pH and ORP were measured by inserting the probe directly into the microcosm geologic material. The measurements were taken after the microcosms were amended with Daramend® II, ferrous sulfate monohydrate, and DI water.

#### 2.2.4 External Analysis

The following methods were used by TestAmerica in Savannah, GA for this study:

- EPA 8081B for total and technical toxaphene
- EPA 6020A and 7471B for metals

The baseline samples for external analysis were collected from the bulk soil after homogenization. During the incubation period, the toxaphene samples were collected prior to the addition of any amendments.

### 3 RESULTS

The toxaphene results are presented in Table 2 and Figure 1. The pH and ORP results are presented in Table 3. The soil moisture results are presented in Table 4. The metals results can be found in Appendix B along with all the laboratory reports issued by TestAmerica.



## TABLES

**TABLE 1: SUMMARY OF MICROCOSM CONTROLS, TREATMENTS AND AMENDMENTS**  
Former Hercules Brunswick Plant, Brunswick, Georgia

Treatment/Control	Assigned Microcosm Number	Number of Microcosms	Geological Material	DI Water	Daramend® II	Ferrous Sulfate Monohydrate
Control	1 to 2	2	500 g dry weight	Amended with DI water to 90% of the WHC at the beginning of each cycle	--	--
Daramend® II and Ferrous Sulfate Monohydrate Amended	3 to 4				Amended with Daramend® II to target 0.5% of soil as wet weight	Amended with ferrous sulfate monohydrate to target 0.5% of soil as wet weight

**Notes:**

- - not applicable
- % - percent
- g - grams
- DI - deionized
- WHC - water holding capacity

**TABLE 2: SUMMARY OF MICROCOSM TOXAPHENE RESULTS**  
Former Hercules Brunswick Plant, Brunswick, Georgia

Treatment	Cycle	Date	Day	Replicate	Toxaphene, Technical
					µg/kg
Baseline	--	6-Nov-19	-34	B3-1	2,700,000
				B3-2	3,800,000
				<b>Average</b>	<b>3,250,000</b>
				<b>Standard Deviation</b>	<b>777,817</b>
Control	0	10-Dec-19	0	1	6,100,000
				2	5,800,000
				<b>Average</b>	<b>5,950,000</b>
				<b>Standard Deviation</b>	<b>212,132</b>
	1	17-Dec-19	7	1	5,700,000
				2	16,000,000
				<b>Average</b>	<b>10,850,000</b>
				<b>Standard Deviation</b>	<b>7,283,200</b>
	3	31-Dec-19	21	1	12,000,000
				2	14,000,000
				<b>Average</b>	<b>13,000,000</b>
				<b>Standard Deviation</b>	<b>1,414,214</b>
	6	21-Jan-20	42	1	7,200,000
				2	5,200,000
				<b>Average</b>	<b>6,200,000</b>
				<b>Standard Deviation</b>	<b>1,414,214</b>
Daramend® II and Ferrous Sulfate Monohydrate Amended	0	10-Dec-19	0	3	3,300,000
				4	4,500,000
				<b>Average</b>	<b>3,900,000</b>
				<b>Standard Deviation</b>	<b>848,528</b>
	1	17-Dec-19	7	3	16,000,000
				4	8,400,000
				<b>Average</b>	<b>12,200,000</b>
				<b>Standard Deviation</b>	<b>5,374,012</b>
	3	31-Dec-19	21	3	10,000,000
				4	4,000,000
				<b>Average</b>	<b>7,000,000</b>
				<b>Standard Deviation</b>	<b>6,045,763</b>
	6	21-Jan-20	42	3	6,300,000
				4	6,200,000
				<b>Average</b>	<b>6,250,000</b>
				<b>Standard Deviation</b>	<b>70,711</b>

**Notes:**

-- not applicable  
µg/kg - microgram per kilogram

**TABLE 3: SUMMARY OF MICROCOSM pH and ORP RESULTS**  
Former Hercules Brunswick Plant, Brunswick, Georgia

SIREM

Treatment	Cycle	Date	Day	Replicate	pH	ORP (mV)
Control	0	10-Dec-19	0	1	6.52	--
				2	6.53	--
				<b>Average</b>	<b>6.53</b>	<b>--</b>
	1	17-Dec-19	7	1	6.32	59
				2	6.36	74
				<b>Average</b>	<b>6.32</b>	<b>67</b>
	2	24-Dec-19	14	1	6.32	81
				2	6.42	21
				<b>Average</b>	<b>6.32</b>	<b>51</b>
	3	31-Dec-19	21	1	6.72	-26
				2	6.75	72
				<b>Average</b>	<b>6.74</b>	<b>23</b>
	4	7-Jan-20	28	1	6.63	8
				2	6.74	86
<b>Average</b>				<b>6.69</b>	<b>47</b>	
5	14-Jan-20	35	1	6.85	124	
			2	6.84	141	
			<b>Average</b>	<b>6.85</b>	<b>133</b>	
6	21-Jan-20	42	1	6.77	128	
			2	6.79	138	
			<b>Average</b>	<b>6.78</b>	<b>133</b>	
Daramend® II and Ferrous Sulfate Monohydrate Amended	0	10-Dec-19	0	3	5.26	--
				4	5.36	--
				<b>Average</b>	<b>5.31</b>	<b>--</b>
	1	17-Dec-19	7	3	5.79	-66
				4	5.78	-98
				<b>Average</b>	<b>5.79</b>	<b>-82</b>
	2	24-Dec-19	14	3	5.15	-48
				4	5.01	-51
				<b>Average</b>	<b>5.15</b>	<b>-50</b>
	3	31-Dec-19	21	3	5.21	6
				4	5.10	65
				<b>Average</b>	<b>5.16</b>	<b>36</b>
	4	7-Jan-20	28	3	5.00	-18
				4	4.64	48
				<b>Average</b>	<b>4.82</b>	<b>15</b>
	5	14-Jan-20	35	3	4.28	80
				4	4.24	142
				<b>Average</b>	<b>4.28</b>	<b>111</b>
	6	21-Jan-20	42	3	3.91	114
				4	4.30	-34
				<b>Average</b>	<b>3.91</b>	<b>40</b>

**Notes:**

-- not analyzed  
mV - millivolts  
ORP - oxidation reduction potential

**TABLE 4: SUMMARY OF SOIL MOISTURE RESULTS**  
 Former Hercules Brunswick Plant, Brunswick, Georgia

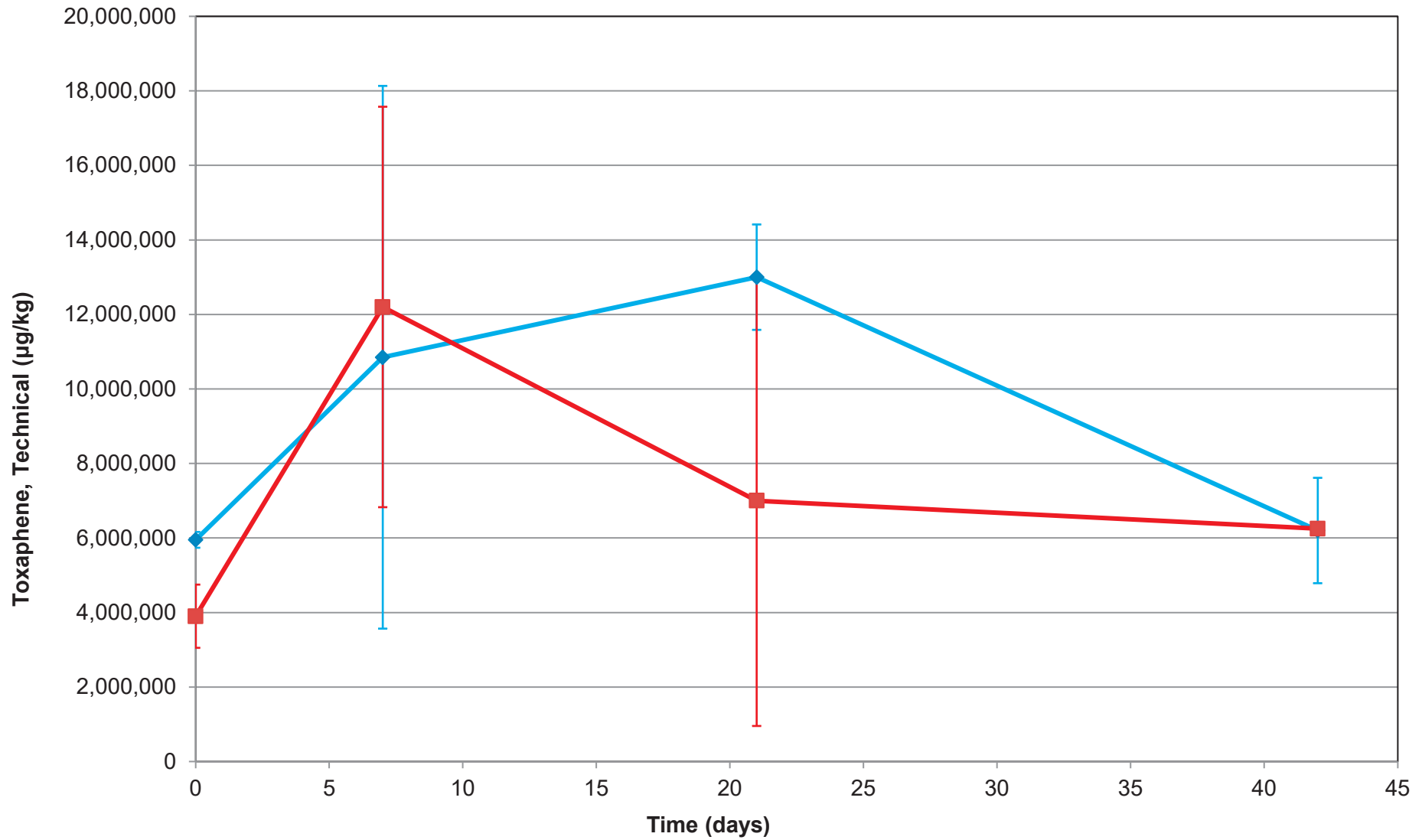
Material	Replicate	Moisture Content	WHC
		%	%
Bucket 3	B3-1	18%	24%
	B3-2	18%	25%
	<b>Average</b>	<b>18%</b>	<b>25%</b>

**Notes:**

% - percent

WHC - water holding capacity

## FIGURES



◆ Control  
■ Daramend® II and Ferrous Sulfate Monohydrate Amended

**Toxaphene Concentration Trends in Control and Daramend® II and Ferrous Sulfate Monohydrate Amended Microcosms**  
 Former Hercules Brunswick Plant, Brunswick, Georgia



March-20

Figure: 1

## APPENDIX A: Chain of Custody Documentation





## APPENDIX B: TestAmerica Laboratory Reports

## ANALYTICAL REPORT

Eurofins TestAmerica, Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404  
Tel: (912)354-7858

Laboratory Job ID: 680-176586-1

Client Project/Site: Brunswick Plant - SWMU 6 ISS TS

**For:**

Geosyntec Consultants, Inc.  
1255 Roberts Blvd, NW  
Suite 200  
Kennesaw, Georgia 30144

Attn: Adria Reimer



Authorized for release by:  
11/20/2019 12:10:02 PM

Sheila Hoffman, Project Manager II  
(912)250-0279

[sheila.hoffman@testamericainc.com](mailto:sheila.hoffman@testamericainc.com)

Designee for

Jerry Lanier, Project Manager I  
(912)250-0281

[jerry.lanier@testamericainc.com](mailto:jerry.lanier@testamericainc.com)

### LINKS

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results through  
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[www.testamericainc.com](http://www.testamericainc.com)

*The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

**Job ID: 680-176586-1**

**Laboratory: Eurofins TestAmerica, Savannah**

**Narrative**

## CASE NARRATIVE

**Client: Geosyntec Consultants, Inc.**

**Project: Brunswick Plant - SWMU 6 ISS TS**

**Report Number: 680-176586-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

### **RECEIPT**

The samples were received on 11/07/2019; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.7 C.

### **ORGANOCHLORINE PESTICIDES (GC)**

Samples Si-4181-B1-1 (680-176586-1), Si-4181-B1-2 (680-176586-2), Si-4181-B3-1 (680-176586-3) and Si-4181-B3-2 (680-176586-4) were analyzed for Organochlorine Pesticides (GC) in accordance with EPA SW-846 Method 8081B. The samples were prepared on 11/13/2019 and analyzed on 11/15/2019.

The following samples required a dilution due to the nature of the sample matrix: Si-4181-B1-1 (680-176586-1), Si-4181-B1-2 (680-176586-2), Si-4181-B3-1 (680-176586-3), Si-4181-B3-2 (680-176586-4), Si-4181-B1-1MS (680-176586-1MS) and Si-4181-B1-1MSD (680-176586-1MSD).

Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

Total Toxaphene and Toxaphene, Technical failed the recovery criteria high for the MS of sample Si-4181-B1-1MS (680-176586-1) in batch 680-596402.

Total Toxaphene and Toxaphene, Technical failed the recovery criteria high for the MSD of sample Si-4181-B1-1MSD (680-176586-1) in batch 680-596402. Total Toxaphene and Toxaphene, Technical exceeded the RPD limit.

Refer to the QC report for details.

Samples Si-4181-B1-1 (680-176586-1)[10000X], Si-4181-B1-2 (680-176586-2)[10000X], Si-4181-B3-1 (680-176586-3)[10000X] and Si-4181-B3-2 (680-176586-4)[10000X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **METALS (ICPMS)**

Samples Si-4181-B1-1 (680-176586-1), Si-4181-B1-2 (680-176586-2), Si-4181-B3-1 (680-176586-3) and Si-4181-B3-2 (680-176586-4) were analyzed for metals (ICPMS) in accordance with EPA SW-846 Methods 6020A. The samples were prepared on 11/11/2019 and analyzed on 11/11/2019 and 11/12/2019.

Several analytes failed the recovery criteria high for the MS of sample 680-176691-1 in batch 680-595685.

Zinc failed the recovery criteria low for the MSD of sample 680-176691-1 in batch 680-595685. Barium, Chromium and Vanadium failed the recovery criteria high.

# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

## Job ID: 680-176586-1 (Continued)

### Laboratory: Eurofins TestAmerica, Savannah (Continued)

The interference check standard solution (ICSA) associated with batch 680-595685 had results for one or more elements at a level greater than 2 times the limit of detection (LOD). The vendor acknowledges that these elements are trace impurities in the ICSA standard. These results are not indicative of a matrix interference.

Refer to the QC report for details.

Samples Si-4181-B1-1 (680-176586-1)[2X], Si-4181-B1-2 (680-176586-2)[2X], Si-4181-B3-1 (680-176586-3)[2X] and Si-4181-B3-2 (680-176586-4)[2X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **TOTAL MERCURY**

Samples Si-4181-B1-1 (680-176586-1), Si-4181-B1-2 (680-176586-2), Si-4181-B3-1 (680-176586-3) and Si-4181-B3-2 (680-176586-4) were analyzed for total mercury in accordance with EPA SW-846 Method 7471B. The samples were prepared on 11/11/2019 and analyzed on 11/12/2019.

Mercury failed the recovery criteria high for the MS of sample Si-4181-B1-1MS (680-176586-1) in batch 680-595796.

Mercury failed the recovery criteria high for the MSD of sample Si-4181-B1-1MSD (680-176586-1) in batch 680-595796.

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples Si-4181-B1-1 (680-176586-1)[10X], Si-4181-B1-2 (680-176586-2)[10X], Si-4181-B3-1 (680-176586-3)[10X] and Si-4181-B3-2 (680-176586-4)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **PERCENT SOLIDS/MOISTURE**

Samples Si-4181-B1-1 (680-176586-1), Si-4181-B1-2 (680-176586-2), Si-4181-B3-1 (680-176586-3) and Si-4181-B3-2 (680-176586-4) were analyzed for Percent Solids/Moisture in accordance with TestAmerica SOP. The samples were analyzed on 11/13/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Sample Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-176586-1	Si-4181-B1-1	Solid	11/06/19 00:00	11/07/19 09:15	
680-176586-2	Si-4181-B1-2	Solid	11/06/19 00:00	11/07/19 09:15	
680-176586-3	Si-4181-B3-1	Solid	11/06/19 00:00	11/07/19 09:15	
680-176586-4	Si-4181-B3-2	Solid	11/06/19 00:00	11/07/19 09:15	

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# Method Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

Method	Method Description	Protocol	Laboratory
8081B	Organochlorine Pesticides (GC)	SW846	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
7471B	Mercury (CVAA)	SW846	TAL SAV
Moisture	Percent Moisture	EPA	TAL SAV
3050B	Preparation, Metals	SW846	TAL SAV
3546	Microwave Extraction	SW846	TAL SAV
7471B	Preparation, Mercury	SW846	TAL SAV

**Protocol References:**

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858





# Definitions/Glossary

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

## Qualifiers

### GC Semi VOA

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
D	Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples.
E	Result exceeded calibration range.
F2	MS/MSD RPD exceeds control limits
U	Indicates the analyte was analyzed for but not detected.

### Metals

Qualifier	Qualifier Description
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Detection Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

## Client Sample ID: Si-4181-B1-1

## Lab Sample ID: 680-176586-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	7300000	F2	1100000		ug/Kg	10000	*	8081B	Total/NA
Total Toxaphene	8000000	F2	1100000		ug/Kg	10000	*	8081B	Total/NA
Arsenic	2.5		0.35		mg/Kg	1	*	6020A	Total/NA
Barium	26		0.58		mg/Kg	1	*	6020A	Total/NA
Beryllium	0.059		0.058		mg/Kg	1	*	6020A	Total/NA
Cadmium	0.21		0.058		mg/Kg	1	*	6020A	Total/NA
Chromium	7.3		1.2		mg/Kg	1	*	6020A	Total/NA
Cobalt	0.77	^	0.058		mg/Kg	1	*	6020A	Total/NA
Copper	42		0.58		mg/Kg	1	*	6020A	Total/NA
Lead	46		0.23		mg/Kg	1	*	6020A	Total/NA
Nickel	4.7		1.2		mg/Kg	1	*	6020A	Total/NA
Vanadium	5.9		0.58		mg/Kg	1	*	6020A	Total/NA
Zinc	84		2.3		mg/Kg	1	*	6020A	Total/NA
Mercury	2.8		0.23		mg/Kg	2	*	6020A	Total/NA
Mercury	2.5		0.24		mg/Kg	10	*	7471B	Total/NA

## Client Sample ID: Si-4181-B1-2

## Lab Sample ID: 680-176586-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	2200000		1100000		ug/Kg	10000	*	8081B	Total/NA
Total Toxaphene	2200000		1100000		ug/Kg	10000	*	8081B	Total/NA
Arsenic	1.2		0.35		mg/Kg	1	*	6020A	Total/NA
Barium	28		0.58		mg/Kg	1	*	6020A	Total/NA
Beryllium	0.064		0.058		mg/Kg	1	*	6020A	Total/NA
Cadmium	0.20		0.058		mg/Kg	1	*	6020A	Total/NA
Chromium	8.0		1.2		mg/Kg	1	*	6020A	Total/NA
Cobalt	0.79	^	0.058		mg/Kg	1	*	6020A	Total/NA
Copper	52		0.58		mg/Kg	1	*	6020A	Total/NA
Lead	45		0.23		mg/Kg	1	*	6020A	Total/NA
Nickel	4.5		1.2		mg/Kg	1	*	6020A	Total/NA
Vanadium	6.1		0.58		mg/Kg	1	*	6020A	Total/NA
Zinc	80		2.3		mg/Kg	1	*	6020A	Total/NA
Mercury	2.9		0.23		mg/Kg	2	*	6020A	Total/NA
Mercury	3.4		0.23		mg/Kg	10	*	7471B	Total/NA

## Client Sample ID: Si-4181-B3-1

## Lab Sample ID: 680-176586-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	2700000		1100000		ug/Kg	10000	*	8081B	Total/NA
Total Toxaphene	2700000		1100000		ug/Kg	10000	*	8081B	Total/NA
Arsenic	1.1		0.35		mg/Kg	1	*	6020A	Total/NA
Barium	27		0.58		mg/Kg	1	*	6020A	Total/NA
Beryllium	0.058		0.058		mg/Kg	1	*	6020A	Total/NA
Cadmium	0.15		0.058		mg/Kg	1	*	6020A	Total/NA
Chromium	6.8		1.2		mg/Kg	1	*	6020A	Total/NA
Cobalt	0.84	^	0.058		mg/Kg	1	*	6020A	Total/NA
Copper	42		0.58		mg/Kg	1	*	6020A	Total/NA
Silver	0.12		0.12		mg/Kg	1	*	6020A	Total/NA
Lead	45		0.23		mg/Kg	1	*	6020A	Total/NA
Nickel	4.8		1.2		mg/Kg	1	*	6020A	Total/NA
Vanadium	5.6		0.58		mg/Kg	1	*	6020A	Total/NA
Zinc	79		2.3		mg/Kg	1	*	6020A	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah

# Detection Summary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

## Client Sample ID: Si-4181-B3-1 (Continued)

## Lab Sample ID: 680-176586-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Mercury	3.1		0.23		mg/Kg	2	☼	6020A	Total/NA
Mercury	4.3		0.23		mg/Kg	10	☼	7471B	Total/NA

## Client Sample ID: Si-4181-B3-2

## Lab Sample ID: 680-176586-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	3800000		1000000		ug/Kg	10000	☼	8081B	Total/NA
Total Toxaphene	4000000		1000000		ug/Kg	10000	☼	8081B	Total/NA
Arsenic	1.0		0.33		mg/Kg	1	☼	6020A	Total/NA
Barium	28		0.55		mg/Kg	1	☼	6020A	Total/NA
Beryllium	0.067		0.055		mg/Kg	1	☼	6020A	Total/NA
Cadmium	0.20		0.055		mg/Kg	1	☼	6020A	Total/NA
Chromium	6.8		1.1		mg/Kg	1	☼	6020A	Total/NA
Cobalt	0.82	^	0.055		mg/Kg	1	☼	6020A	Total/NA
Copper	56		0.55		mg/Kg	1	☼	6020A	Total/NA
Silver	0.13		0.11		mg/Kg	1	☼	6020A	Total/NA
Lead	45		0.22		mg/Kg	1	☼	6020A	Total/NA
Nickel	5.2		1.1		mg/Kg	1	☼	6020A	Total/NA
Vanadium	5.4		0.55		mg/Kg	1	☼	6020A	Total/NA
Zinc	81		2.2		mg/Kg	1	☼	6020A	Total/NA
Mercury	3.3		0.22		mg/Kg	2	☼	6020A	Total/NA
Mercury	3.0		0.23		mg/Kg	10	☼	7471B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

**Client Sample ID: Si-4181-B1-1**

**Lab Sample ID: 680-176586-1**

Date Collected: 11/06/19 00:00

Matrix: Solid

Date Received: 11/07/19 09:15

Percent Solids: 74.8

### Method: 8081B - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	7300000	F2	1100000		ug/Kg	☼	11/13/19 11:22	11/15/19 20:38	10000
Total Toxaphene	8000000	F2	1100000		ug/Kg	☼	11/13/19 11:22	11/15/19 20:38	10000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	D	54 - 133				11/13/19 11:22	11/15/19 20:38	10000
Tetrachloro-m-xylene	0	D	46 - 130				11/13/19 11:22	11/15/19 20:38	10000

### Method: 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	2.5		0.35		mg/Kg	☼	11/11/19 06:56	11/11/19 21:22	1
Barium	26		0.58		mg/Kg	☼	11/11/19 06:56	11/11/19 21:22	1
Antimony	1.2	U	1.2		mg/Kg	☼	11/11/19 06:56	11/11/19 21:22	1
Beryllium	0.059		0.058		mg/Kg	☼	11/11/19 06:56	11/11/19 21:22	1
Cadmium	0.21		0.058		mg/Kg	☼	11/11/19 06:56	11/11/19 21:22	1
Chromium	7.3		1.2		mg/Kg	☼	11/11/19 06:56	11/11/19 21:22	1
Cobalt	0.77	^	0.058		mg/Kg	☼	11/11/19 06:56	11/11/19 21:22	1
Copper	42		0.58		mg/Kg	☼	11/11/19 06:56	11/11/19 21:22	1
Silver	0.12	U	0.12		mg/Kg	☼	11/11/19 06:56	11/11/19 21:22	1
Lead	46		0.23		mg/Kg	☼	11/11/19 06:56	11/11/19 21:22	1
Nickel	4.7		1.2		mg/Kg	☼	11/11/19 06:56	11/11/19 21:22	1
Selenium	0.58	U	0.58		mg/Kg	☼	11/11/19 06:56	11/11/19 21:22	1
Tin	12	U	12		mg/Kg	☼	11/11/19 06:56	11/11/19 21:22	1
Thallium	0.12	U	0.12		mg/Kg	☼	11/11/19 06:56	11/11/19 21:22	1
Vanadium	5.9		0.58		mg/Kg	☼	11/11/19 06:56	11/11/19 21:22	1
Zinc	84		2.3		mg/Kg	☼	11/11/19 06:56	11/11/19 21:22	1
Mercury	2.8		0.23		mg/Kg	☼	11/11/19 06:56	11/12/19 19:23	2

### Method: 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	2.5		0.24		mg/Kg	☼	11/11/19 15:56	11/12/19 12:33	10

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

**Client Sample ID: Si-4181-B1-2**

**Lab Sample ID: 680-176586-2**

Date Collected: 11/06/19 00:00

Matrix: Solid

Date Received: 11/07/19 09:15

Percent Solids: 72.8

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	2200000		1100000		ug/Kg	☼	11/13/19 11:22	11/15/19 20:52	10000
<b>Total Toxaphene</b>	<b>2200000</b>		1100000		ug/Kg	☼	11/13/19 11:22	11/15/19 20:52	10000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	D	54 - 133				11/13/19 11:22	11/15/19 20:52	10000
Tetrachloro-m-xylene	0	D	46 - 130				11/13/19 11:22	11/15/19 20:52	10000

**Method: 6020A - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.2		0.35		mg/Kg	☼	11/11/19 06:56	11/11/19 21:25	1
Barium	28		0.58		mg/Kg	☼	11/11/19 06:56	11/11/19 21:25	1
Antimony	1.2	U	1.2		mg/Kg	☼	11/11/19 06:56	11/11/19 21:25	1
Beryllium	0.064		0.058		mg/Kg	☼	11/11/19 06:56	11/11/19 21:25	1
Cadmium	0.20		0.058		mg/Kg	☼	11/11/19 06:56	11/11/19 21:25	1
Chromium	8.0		1.2		mg/Kg	☼	11/11/19 06:56	11/11/19 21:25	1
Cobalt	0.79	^	0.058		mg/Kg	☼	11/11/19 06:56	11/11/19 21:25	1
Copper	52		0.58		mg/Kg	☼	11/11/19 06:56	11/11/19 21:25	1
Silver	0.12	U	0.12		mg/Kg	☼	11/11/19 06:56	11/11/19 21:25	1
Lead	45		0.23		mg/Kg	☼	11/11/19 06:56	11/11/19 21:25	1
Nickel	4.5		1.2		mg/Kg	☼	11/11/19 06:56	11/11/19 21:25	1
Selenium	0.58	U	0.58		mg/Kg	☼	11/11/19 06:56	11/11/19 21:25	1
Tin	12	U	12		mg/Kg	☼	11/11/19 06:56	11/11/19 21:25	1
Thallium	0.12	U	0.12		mg/Kg	☼	11/11/19 06:56	11/11/19 21:25	1
Vanadium	6.1		0.58		mg/Kg	☼	11/11/19 06:56	11/11/19 21:25	1
Zinc	80		2.3		mg/Kg	☼	11/11/19 06:56	11/11/19 21:25	1
Mercury	2.9		0.23		mg/Kg	☼	11/11/19 06:56	11/12/19 19:26	2

**Method: 7471B - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	3.4		0.23		mg/Kg	☼	11/11/19 15:56	11/12/19 12:43	10

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

**Client Sample ID: Si-4181-B3-1**

**Lab Sample ID: 680-176586-3**

Date Collected: 11/06/19 00:00

Matrix: Solid

Date Received: 11/07/19 09:15

Percent Solids: 75.4

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	2700000		1100000		ug/Kg	☼	11/13/19 11:22	11/15/19 21:07	10000
<b>Total Toxaphene</b>	<b>2700000</b>		1100000		ug/Kg	☼	11/13/19 11:22	11/15/19 21:07	10000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	D	54 - 133				11/13/19 11:22	11/15/19 21:07	10000
Tetrachloro-m-xylene	0	D	46 - 130				11/13/19 11:22	11/15/19 21:07	10000

**Method: 6020A - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.1		0.35		mg/Kg	☼	11/11/19 06:56	11/11/19 21:28	1
Barium	27		0.58		mg/Kg	☼	11/11/19 06:56	11/11/19 21:28	1
Antimony	1.2	U	1.2		mg/Kg	☼	11/11/19 06:56	11/11/19 21:28	1
Beryllium	0.058		0.058		mg/Kg	☼	11/11/19 06:56	11/11/19 21:28	1
Cadmium	0.15		0.058		mg/Kg	☼	11/11/19 06:56	11/11/19 21:28	1
Chromium	6.8		1.2		mg/Kg	☼	11/11/19 06:56	11/11/19 21:28	1
Cobalt	0.84	^	0.058		mg/Kg	☼	11/11/19 06:56	11/11/19 21:28	1
Copper	42		0.58		mg/Kg	☼	11/11/19 06:56	11/11/19 21:28	1
Silver	0.12		0.12		mg/Kg	☼	11/11/19 06:56	11/11/19 21:28	1
Lead	45		0.23		mg/Kg	☼	11/11/19 06:56	11/11/19 21:28	1
Nickel	4.8		1.2		mg/Kg	☼	11/11/19 06:56	11/11/19 21:28	1
Selenium	0.58	U	0.58		mg/Kg	☼	11/11/19 06:56	11/11/19 21:28	1
Tin	12	U	12		mg/Kg	☼	11/11/19 06:56	11/11/19 21:28	1
Thallium	0.12	U	0.12		mg/Kg	☼	11/11/19 06:56	11/11/19 21:28	1
Vanadium	5.6		0.58		mg/Kg	☼	11/11/19 06:56	11/11/19 21:28	1
Zinc	79		2.3		mg/Kg	☼	11/11/19 06:56	11/11/19 21:28	1
Mercury	3.1		0.23		mg/Kg	☼	11/11/19 06:56	11/12/19 19:29	2

**Method: 7471B - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	4.3		0.23		mg/Kg	☼	11/11/19 15:56	11/12/19 12:53	10

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

**Client Sample ID: Si-4181-B3-2**

**Lab Sample ID: 680-176586-4**

Date Collected: 11/06/19 00:00

Matrix: Solid

Date Received: 11/07/19 09:15

Percent Solids: 77.4

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	3800000		1000000		ug/Kg	☼	11/13/19 11:22	11/15/19 21:21	10000
Total Toxaphene	4000000		1000000		ug/Kg	☼	11/13/19 11:22	11/15/19 21:21	10000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	D	54 - 133				11/13/19 11:22	11/15/19 21:21	10000
Tetrachloro-m-xylene	0	D	46 - 130				11/13/19 11:22	11/15/19 21:21	10000

**Method: 6020A - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.0		0.33		mg/Kg	☼	11/11/19 06:56	11/11/19 21:31	1
Barium	28		0.55		mg/Kg	☼	11/11/19 06:56	11/11/19 21:31	1
Antimony	1.1	U	1.1		mg/Kg	☼	11/11/19 06:56	11/11/19 21:31	1
Beryllium	0.067		0.055		mg/Kg	☼	11/11/19 06:56	11/11/19 21:31	1
Cadmium	0.20		0.055		mg/Kg	☼	11/11/19 06:56	11/11/19 21:31	1
Chromium	6.8		1.1		mg/Kg	☼	11/11/19 06:56	11/11/19 21:31	1
Cobalt	0.82	^	0.055		mg/Kg	☼	11/11/19 06:56	11/11/19 21:31	1
Copper	56		0.55		mg/Kg	☼	11/11/19 06:56	11/11/19 21:31	1
Silver	0.13		0.11		mg/Kg	☼	11/11/19 06:56	11/11/19 21:31	1
Lead	45		0.22		mg/Kg	☼	11/11/19 06:56	11/11/19 21:31	1
Nickel	5.2		1.1		mg/Kg	☼	11/11/19 06:56	11/11/19 21:31	1
Selenium	0.55	U	0.55		mg/Kg	☼	11/11/19 06:56	11/11/19 21:31	1
Tin	11	U	11		mg/Kg	☼	11/11/19 06:56	11/11/19 21:31	1
Thallium	0.11	U	0.11		mg/Kg	☼	11/11/19 06:56	11/11/19 21:31	1
Vanadium	5.4		0.55		mg/Kg	☼	11/11/19 06:56	11/11/19 21:31	1
Zinc	81		2.2		mg/Kg	☼	11/11/19 06:56	11/11/19 21:31	1
Mercury	3.3		0.22		mg/Kg	☼	11/11/19 06:56	11/12/19 19:32	2

**Method: 7471B - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	3.0		0.23		mg/Kg	☼	11/11/19 15:56	11/12/19 12:57	10

# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

## Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCBP1 (54-133)	TCX1 (46-130)
680-176586-1	Si-4181-B1-1	0 D	0 D
680-176586-1 MS	Si-4181-B1-1	0 D	0 D
680-176586-1 MSD	Si-4181-B1-1	0 D	0 D
680-176586-2	Si-4181-B1-2	0 D	0 D
680-176586-3	Si-4181-B3-1	0 D	0 D
680-176586-4	Si-4181-B3-2	0 D	0 D

**Surrogate Legend**  
DCBP = DCB Decachlorobiphenyl  
TCX = Tetrachloro-m-xylene

## Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	DCBP1 (54-133)	TCX2 (46-130)
LCS 680-595791/6-A	Lab Control Sample	95	64
MB 680-595791/5-A	Method Blank	97	94

**Surrogate Legend**  
DCBP = DCB Decachlorobiphenyl  
TCX = Tetrachloro-m-xylene



# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

## Method: 8081B - Organochlorine Pesticides (GC)

**Lab Sample ID: MB 680-595791/5-A**  
**Matrix: Solid**  
**Analysis Batch: 596014**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 595791**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Toxaphene, Technical	8g	U	8g		uK/NK		11/1A/1F 11:22	11/1A/1F 18:26	1
Total Toxaphene	8g	U	8g		uK/NK		11/1A/1F 11:22	11/1A/1F 18:26	1
Surrogate	MB	MB	Limits			Prepared	Analyzed	Dil Fac	
	%Recovery	Qualifier							
DCB Decachlorobiphenyl	97		54 - 133			11/13/19 11:22	11/13/19 18:26	1	
Tetrachloro-m-xylene	94		46 - 130			11/13/19 11:22	11/13/19 18:26	1	

**Lab Sample ID: LCS 680-595791/6-A**  
**Matrix: Solid**  
**Analysis Batch: 596014**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 595791**

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Toxaphene, Technical	251	212		uK/NK		8g	g2 - 1A0
Total Toxaphene	251	2AF		uK/NK		F5	g2 - 1A0
Surrogate	LCS	LCS	Limits			%Recovery	
	%Recovery	Qualifier					
DCB Decachlorobiphenyl	95		54 - 133				
Tetrachloro-m-xylene	64		46 - 130				

**Lab Sample ID: 680-176586-1 MS**  
**Matrix: Solid**  
**Analysis Batch: 596402**

**Client Sample ID: Si-4181-B1-1**  
**Prep Type: Total/NA**  
**Prep Batch: 595791**

Analyte	Sample	Sample	Spike Added	MS	MS	Unit	D	%Rec	%Rec. Limits
	Result	Qualifier		Result	Qualifier				
Toxaphene, Technical	7A00000	32	Ag2	6AA00000	mg	uK/NK	☼	16AF2	g2 - 1A0
Total Toxaphene	8000000	32	Ag2	70g00000	mg	uK/NK	☼	712 18275 558	g2 - 1A0
Surrogate	MS	MS	Limits			%Recovery			
	%Recovery	Qualifier							
DCB Decachlorobiphenyl	0	D	54 - 133						
Tetrachloro-m-xylene	0	D	46 - 130						

**Lab Sample ID: 680-176586-1 MSD**  
**Matrix: Solid**  
**Analysis Batch: 596402**

**Client Sample ID: Si-4181-B1-1**  
**Prep Type: Total/NA**  
**Prep Batch: 595791**

Analyte	Sample	Sample	Spike Added	MSD	MSD	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
	Result	Qualifier		Result	Qualifier						
Toxaphene, Technical	7A00000	32	Ag0	12600000	g 32	uK/NK	☼	1572g	g2 - 1A0	1AA	50
Total Toxaphene	8000000	32	Ag0	1Ag00000	g 32	uK/NK	☼	26 161A2 g8	g2 - 1A0	1A6	50
Surrogate	MSD	MSD	Limits			%Recovery					
	%Recovery	Qualifier									
DCB Decachlorobiphenyl	0	D	54 - 133								
Tetrachloro-m-xylene	0	D	46 - 130								

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

## Method: 6020A - Metals (ICP/MS)

**Lab Sample ID: MB 680-595471/1-A**  
**Matrix: Solid**  
**Analysis Batch: 595685**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 595471**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
drsenic	0.A0	U	0.A0		^ K/NK		11/11/1F 06:56	11/11/1F 20:A7	1
Bariu^	0.50	U	0.50		^ K/NK		11/11/1F 06:56	11/11/1F 20:A7	1
dnti^ ony	0.FF	U	0.FF		^ K/NK		11/11/1F 06:56	11/11/1F 20:A7	1
Berylliu^	0.050	U	0.050		^ K/NK		11/11/1F 06:56	11/11/1F 20:A7	1
CaL^ iu^	0.050	U	0.050		^ K/NK		11/11/1F 06:56	11/11/1F 20:A7	1
Chro^ iu^	0.FF	U	0.FF		^ K/NK		11/11/1F 06:56	11/11/1F 20:A7	1
Cobalt	0.050	U V	0.050		^ K/NK		11/11/1F 06:56	11/11/1F 20:A7	1
Copper	0.50	U	0.50		^ K/NK		11/11/1F 06:56	11/11/1F 20:A7	1
Sil4er	0.0FF	U	0.0FF		^ K/NK		11/11/1F 06:56	11/11/1F 20:A7	1
ZeaL	0.20	U	0.20		^ K/NK		11/11/1F 06:56	11/11/1F 20:A7	1
v ickel	0.FF	U	0.FF		^ K/NK		11/11/1F 06:56	11/11/1F 20:A7	1
Seleniu^	0.50	U	0.50		^ K/NK		11/11/1F 06:56	11/11/1F 20:A7	1
Tin	F.F	U	F.F		^ K/NK		11/11/1F 06:56	11/11/1F 20:A7	1
Thalliu^	0.0FF	U	0.0FF		^ K/NK		11/11/1F 06:56	11/11/1F 20:A7	1
EanaLiu^	0.50	U	0.50		^ K/NK		11/11/1F 06:56	11/11/1F 20:A7	1
f inc	2.0	U	2.0		^ K/NK		11/11/1F 06:56	11/11/1F 20:A7	1
Mercury	0.0FF	U	0.0FF		^ K/NK		11/11/1F 06:56	11/11/1F 20:A7	1

**Lab Sample ID: LCS 680-595471/2-A**  
**Matrix: Solid**  
**Analysis Batch: 595685**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 595471**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
drsenic	F.62	8.F1		^ K/NK		FA	80 - 120
Bariu^	F.62	F.g0		^ K/NK		F8	80 - 120
dnti^ ony	g.80	g.51		^ K/NK		Fg	80 - 120
Berylliu^	g.81	g.5F		^ K/NK		F5	80 - 120
CaL^ iu^	g.81	g.0g		^ K/NK		8g	80 - 120
Chro^ iu^	F.62	F.02		^ K/NK		Fg	80 - 120
Cobalt	g.81	g.58	V	^ K/NK		F5	80 - 120
Copper	F.62	8.A7		^ K/NK		87	80 - 120
Sil4er	g.81	g.0A		^ K/NK		8g	80 - 120
ZeaL	g8.5	gA.8		^ K/NK		F0	80 - 120
v ickel	F.57	F.12		^ K/NK		F5	80 - 120
Seleniu^	F.65	8.20		^ K/NK		85	80 - 120
Tin	F.62	8.FF	J	^ K/NK		FA	80 - 120
Thalliu^	A.85	A.55		^ K/NK		F2	80 - 120
EanaLiu^	F.60	8.F7		^ K/NK		FA	80 - 120
f inc	F.66	8.Fg		^ K/NK		F2	80 - 120
Mercury	0.g81	0.gA1		^ K/NK		F0	80 - 120

## Method: 7471B - Mercury (CVAA)

**Lab Sample ID: MB 680-595567/1-A**  
**Matrix: Solid**  
**Analysis Batch: 595796**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 595567**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.020	U	0.020		^ K/NK		11/11/1F 15:56	11/12/1F 12:26	1

muro9ns Testd^ erica, Sa4annah

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

## Method: 7471B - Mercury (CVAA) (Continued)

**Lab Sample ID: LCS 680-595567/2-A**  
**Matrix: Solid**  
**Analysis Batch: 595796**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 595567**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.2g5	0.2A5		^ K/NK		F6	80 - 120

**Lab Sample ID: 680-176586-1 MS**  
**Matrix: Solid**  
**Analysis Batch: 595796**

**Client Sample ID: Si-4181-B1-1**  
**Prep Type: Total/NA**  
**Prep Batch: 595567**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	2.5		0.11F	A.2F	g	^ K/NK	✱	627	80 - 120

**Lab Sample ID: 680-176586-1 MSD**  
**Matrix: Solid**  
**Analysis Batch: 595796**

**Client Sample ID: Si-4181-B1-1**  
**Prep Type: Total/NA**  
**Prep Batch: 595567**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	2.5		0.12F	2.8F	g	^ K/NK	✱	27g	80 - 120	1A	20

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

## GC Semi VOA

### Prep Batch: 595791

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-176586-1	Si-4181-B1-1	Total/NA	Solid	3546	
680-176586-2	Si-4181-B1-2	Total/NA	Solid	3546	
680-176586-3	Si-4181-B3-1	Total/NA	Solid	3546	
680-176586-4	Si-4181-B3-2	Total/NA	Solid	3546	
MB 680-595791/5-A	Method Blank	Total/NA	Solid	3546	
LCS 680-595791/6-A	Lab Control Sample	Total/NA	Solid	3546	
680-176586-1 MS	Si-4181-B1-1	Total/NA	Solid	3546	
680-176586-1 MSD	Si-4181-B1-1	Total/NA	Solid	3546	

### Analysis Batch: 596014

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-595791/5-A	Method Blank	Total/NA	Solid	8081B	595791
LCS 680-595791/6-A	Lab Control Sample	Total/NA	Solid	8081B	595791

### Analysis Batch: 596402

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-176586-1	Si-4181-B1-1	Total/NA	Solid	8081B	595791
680-176586-2	Si-4181-B1-2	Total/NA	Solid	8081B	595791
680-176586-3	Si-4181-B3-1	Total/NA	Solid	8081B	595791
680-176586-4	Si-4181-B3-2	Total/NA	Solid	8081B	595791
680-176586-1 MS	Si-4181-B1-1	Total/NA	Solid	8081B	595791
680-176586-1 MSD	Si-4181-B1-1	Total/NA	Solid	8081B	595791

## Metals

### Prep Batch: 595471

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-176586-1	Si-4181-B1-1	Total/NA	Solid	3050B	
680-176586-2	Si-4181-B1-2	Total/NA	Solid	3050B	
680-176586-3	Si-4181-B3-1	Total/NA	Solid	3050B	
680-176586-4	Si-4181-B3-2	Total/NA	Solid	3050B	
MB 680-595471/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 680-595471/2-A	Lab Control Sample	Total/NA	Solid	3050B	

### Prep Batch: 595567

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-176586-1	Si-4181-B1-1	Total/NA	Solid	7471B	
680-176586-2	Si-4181-B1-2	Total/NA	Solid	7471B	
680-176586-3	Si-4181-B3-1	Total/NA	Solid	7471B	
680-176586-4	Si-4181-B3-2	Total/NA	Solid	7471B	
MB 680-595567/1-A	Method Blank	Total/NA	Solid	7471B	
LCS 680-595567/2-A	Lab Control Sample	Total/NA	Solid	7471B	
680-176586-1 MS	Si-4181-B1-1	Total/NA	Solid	7471B	
680-176586-1 MSD	Si-4181-B1-1	Total/NA	Solid	7471B	

### Analysis Batch: 595685

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-176586-1	Si-4181-B1-1	Total/NA	Solid	6020A	595471
680-176586-2	Si-4181-B1-2	Total/NA	Solid	6020A	595471
680-176586-3	Si-4181-B3-1	Total/NA	Solid	6020A	595471
680-176586-4	Si-4181-B3-2	Total/NA	Solid	6020A	595471

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# QC Association Summary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

## Metals (Continued)

### Analysis Batch: 595685 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-595471/1-A	Method Blank	Total/NA	Solid	6020A	595471
LCS 680-595471/2-A	Lab Control Sample	Total/NA	Solid	6020A	595471

### Analysis Batch: 595796

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-176586-1	Si-4181-B1-1	Total/NA	Solid	7471B	595567
680-176586-2	Si-4181-B1-2	Total/NA	Solid	7471B	595567
680-176586-3	Si-4181-B3-1	Total/NA	Solid	7471B	595567
680-176586-4	Si-4181-B3-2	Total/NA	Solid	7471B	595567
MB 680-595567/1-A	Method Blank	Total/NA	Solid	7471B	595567
LCS 680-595567/2-A	Lab Control Sample	Total/NA	Solid	7471B	595567
680-176586-1 MS	Si-4181-B1-1	Total/NA	Solid	7471B	595567
680-176586-1 MSD	Si-4181-B1-1	Total/NA	Solid	7471B	595567

### Analysis Batch: 595869

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-176586-1	Si-4181-B1-1	Total/NA	Solid	6020A	595471
680-176586-2	Si-4181-B1-2	Total/NA	Solid	6020A	595471
680-176586-3	Si-4181-B3-1	Total/NA	Solid	6020A	595471
680-176586-4	Si-4181-B3-2	Total/NA	Solid	6020A	595471

## General Chemistry

### Analysis Batch: 595867

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-176586-1	Si-4181-B1-1	Total/NA	Solid	Moisture	
680-176586-2	Si-4181-B1-2	Total/NA	Solid	Moisture	
680-176586-3	Si-4181-B3-1	Total/NA	Solid	Moisture	
680-176586-4	Si-4181-B3-2	Total/NA	Solid	Moisture	

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

**Client Sample ID: Si-4181-B1-1**

**Lab Sample ID: 680-176586-1**

Date Collected: 11/06/19 00:00

Matrix: Solid

Date Received: 11/07/19 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			595867	11/13/19 06:13	JEB	TAL SAV
Instrument ID: NOEQUIP										

**Client Sample ID: Si-4181-B1-1**

**Lab Sample ID: 680-176586-1**

Date Collected: 11/06/19 00:00

Matrix: Solid

Date Received: 11/07/19 09:15

Percent Solids: 74.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			15.46 g	5 mL	595791	11/13/19 11:22	DRT	TAL SAV
Total/NA	Analysis	8081B		10000			596402	11/15/19 20:38	JCK	TAL SAV
Instrument ID: CSGAA										
Total/NA	Prep	3050B			1.16 g	500 mL	595471	11/11/19 06:56	CDD	TAL SAV
Total/NA	Analysis	6020A		1			595685	11/11/19 21:22	BJB	TAL SAV
Instrument ID: ICPMSD										
Total/NA	Prep	3050B			1.16 g	500 mL	595471	11/11/19 06:56	CDD	TAL SAV
Total/NA	Analysis	6020A		2			595869	11/12/19 19:23	BJB	TAL SAV
Instrument ID: ICPMSD										
Total/NA	Prep	7471B			0.55 g	50 mL	595567	11/11/19 15:56	DB	TAL SAV
Total/NA	Analysis	7471B		10			595796	11/12/19 12:33	BCB	TAL SAV
Instrument ID: LEEMAN2										

**Client Sample ID: Si-4181-B1-2**

**Lab Sample ID: 680-176586-2**

Date Collected: 11/06/19 00:00

Matrix: Solid

Date Received: 11/07/19 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			595867	11/13/19 06:13	JEB	TAL SAV
Instrument ID: NOEQUIP										

**Client Sample ID: Si-4181-B1-2**

**Lab Sample ID: 680-176586-2**

Date Collected: 11/06/19 00:00

Matrix: Solid

Date Received: 11/07/19 09:15

Percent Solids: 72.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			15.59 g	5 mL	595791	11/13/19 11:22	DRT	TAL SAV
Total/NA	Analysis	8081B		10000			596402	11/15/19 20:52	JCK	TAL SAV
Instrument ID: CSGAA										
Total/NA	Prep	3050B			1.19 g	500 mL	595471	11/11/19 06:56	CDD	TAL SAV
Total/NA	Analysis	6020A		1			595685	11/11/19 21:25	BJB	TAL SAV
Instrument ID: ICPMSD										
Total/NA	Prep	3050B			1.19 g	500 mL	595471	11/11/19 06:56	CDD	TAL SAV
Total/NA	Analysis	6020A		2			595869	11/12/19 19:26	BJB	TAL SAV
Instrument ID: ICPMSD										
Total/NA	Prep	7471B			0.60 g	50 mL	595567	11/11/19 15:56	DB	TAL SAV
Total/NA	Analysis	7471B		10			595796	11/12/19 12:43	BCB	TAL SAV
Instrument ID: LEEMAN2										

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# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

**Client Sample ID: Si-4181-B3-1**

**Lab Sample ID: 680-176586-3**

Date Collected: 11/06/19 00:00

Matrix: Solid

Date Received: 11/07/19 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			595867	11/13/19 06:13	JEB	TAL SAV
Instrument ID: NOEQUIP										

**Client Sample ID: Si-4181-B3-1**

**Lab Sample ID: 680-176586-3**

Date Collected: 11/06/19 00:00

Matrix: Solid

Date Received: 11/07/19 09:15

Percent Solids: 75.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			15.33 g	5 mL	595791	11/13/19 11:22	DRT	TAL SAV
Total/NA	Analysis	8081B		10000			596402	11/15/19 21:07	JCK	TAL SAV
Instrument ID: CSGAA										
Total/NA	Prep	3050B			1.15 g	500 mL	595471	11/11/19 06:56	CDD	TAL SAV
Total/NA	Analysis	6020A		1			595685	11/11/19 21:28	BJB	TAL SAV
Instrument ID: ICPMSD										
Total/NA	Prep	3050B			1.15 g	500 mL	595471	11/11/19 06:56	CDD	TAL SAV
Total/NA	Analysis	6020A		2			595869	11/12/19 19:29	BJB	TAL SAV
Instrument ID: ICPMSD										
Total/NA	Prep	7471B			0.57 g	50 mL	595567	11/11/19 15:56	DB	TAL SAV
Total/NA	Analysis	7471B		10			595796	11/12/19 12:53	BCB	TAL SAV
Instrument ID: LEEMAN2										

**Client Sample ID: Si-4181-B3-2**

**Lab Sample ID: 680-176586-4**

Date Collected: 11/06/19 00:00

Matrix: Solid

Date Received: 11/07/19 09:15

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			595867	11/13/19 06:13	JEB	TAL SAV
Instrument ID: NOEQUIP										

**Client Sample ID: Si-4181-B3-2**

**Lab Sample ID: 680-176586-4**

Date Collected: 11/06/19 00:00

Matrix: Solid

Date Received: 11/07/19 09:15

Percent Solids: 77.4

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			15.82 g	5 mL	595791	11/13/19 11:22	DRT	TAL SAV
Total/NA	Analysis	8081B		10000			596402	11/15/19 21:21	JCK	TAL SAV
Instrument ID: CSGAA										
Total/NA	Prep	3050B			1.18 g	500 mL	595471	11/11/19 06:56	CDD	TAL SAV
Total/NA	Analysis	6020A		1			595685	11/11/19 21:31	BJB	TAL SAV
Instrument ID: ICPMSD										
Total/NA	Prep	3050B			1.18 g	500 mL	595471	11/11/19 06:56	CDD	TAL SAV
Total/NA	Analysis	6020A		2			595869	11/12/19 19:32	BJB	TAL SAV
Instrument ID: ICPMSD										
Total/NA	Prep	7471B			0.56 g	50 mL	595567	11/11/19 15:56	DB	TAL SAV
Total/NA	Analysis	7471B		10			595796	11/12/19 12:57	BCB	TAL SAV
Instrument ID: LEEMAN2										

Eurofins TestAmerica, Savannah

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

**Laboratory References:**

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

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**Chain of Custody Record**

<b>Client Information</b>		Sampler: Steve Sande		Lab PM: Jerry Lanier		Carrier Tracking No(s):	
Client Contact: Ali Ciblak		Phone: 770-910-7537		E-Mail: jerry.lanier@testamerica.com		COC No:	
Company: Geosyntec Consultants Inc		Due Date Requested:		Analysis Requested		Page: Page 1 of 1	
Address: 1255 Roberts Blvd # 200		TAT Requested (days):		Standard		Job #:	
City: Kennesaw		PO #:		Appendix IX Metals (6020/470)		Preservation Codes:	
State, Zip: GA, 30144		WO #:		GA modified Method 8081B (toxaphene)		A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - Di Water K - EDTA L - EDTA Z - other (specify)	
Phone: 678 202 9500		Task 100		Perform MS/MSD (Yes or No)		Other:	
Email: aciblak@geosyntec.com		Project #:		Field Filtered Sample (Yes or No)		Special Instructions/Note:	
Project Name: Brunswick Plant - SWMU 6 ISS TS		SSOW#:		Matrix		Total Number of Containers	
Site: Brunswick Plant, GA		Sample Date		Sample Type (C=Comp, G=grab)		1	
Sample Identification		Sample Time		Preservation Code		1	
SI-4181-B1-1		11/6/19		G S		1	
SI-4181-B1-2		11/6/19		G S		1	
SI-4181-B3-1		11/6/19		G S		1	
SI-4181-B3-2		11/6/19		G S		1	
Possible Hazard Identification		Urf		Poisgn B		680-176586 Chain of Custody	
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> ammable <input type="checkbox"/> ant <input type="checkbox"/> Biological		Deliverable Requested: I, II, III, IV, Other (specify)		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)		Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For <input type="checkbox"/> Months	
Empty Kit Relinquished by:		Date:		Received by: <i>PP Banda</i>		Date/Time: 11-07-19	
Relinquished by: Steve Sande		Date/Time: 6Nov19		Received by:		Date/Time:	
Relinquished by:		Date/Time:		Received by:		Date/Time:	
Relinquished by:		Date/Time:		Received by:		Date/Time:	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 3.6 (C) 3.7 (C)		Company: SALS	



## Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 680-176586-1

**Login Number: 176586**

**List Source: Eurofins TestAmerica, Savannah**

**List Number: 1**

**Creator: Banda, Christy S**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Brunswick Plant - SWMU 6 ISS TS

Job ID: 680-176586-1

## Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87052	06-30-20
Georgia	State Program	803	06-30-20

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## ANALYTICAL REPORT

Eurofins TestAmerica, Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404  
Tel: (912)354-7858

Laboratory Job ID: 680-178049-1

Client Project/Site: Si-418/Frmr Brunswick Plant/Darament Is

**For:**

Geosyntec Consultants, Inc.  
1255 Roberts Blvd, NW  
Suite 200  
Kennesaw, Georgia 30144

Attn: Adria Reimer



Authorized for release by:  
12/18/2019 9:17:52 AM

Jerry Lanier, Project Manager I  
(912)250-0281  
[jerry.lanier@testamericainc.com](mailto:jerry.lanier@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Si-418/Frmr Brunswick Plant/Darament Is

Job ID: 680-178049-1

**Job ID: 680-178049-1**

**Laboratory: Eurofins TestAmerica, Savannah**

**Narrative**

## CASE NARRATIVE

**Client: Geosyntec Consultants, Inc.**

**Project: Si-418/Frmr Brunswick Plant/Darament Is**

**Report Number: 680-178049-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

### **RECEIPT**

The samples were received on 12/11/2019 9:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 11.5° C.

The following samples were received at the laboratory outside the required temperature criteria: Si-4181-1 (680-178049-1), Si-4181-2 (680-178049-2), Si-4181-3 (680-178049-3) and Si-4181-4 (680-178049-4). There was no cooling media present in the cooler. The client was contacted regarding this issue, and the laboratory was instructed to proceed with analysis

### **ORGANOCHLORINE PESTICIDES (GC)**

Samples Si-4181-1 (680-178049-1), Si-4181-2 (680-178049-2), Si-4181-3 (680-178049-3) and Si-4181-4 (680-178049-4) were analyzed for Organochlorine Pesticides (GC) in accordance with EPA SW-846 Method 8081B. The samples were prepared on 12/12/2019 and analyzed on 12/13/2019.

The following samples required a dilution due to the nature of the sample matrix: Si-4181-1 (680-178049-1), Si-4181-2 (680-178049-2), Si-4181-3 (680-178049-3) and Si-4181-4 (680-178049-4). Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

The following samples required a sulfuric acid clean-up, via EPA Method 3665A, to reduce matrix interferences: Si-4181-1 (680-178049-1), Si-4181-2 (680-178049-2), Si-4181-3 (680-178049-3), Si-4181-4 (680-178049-4), (680-178049-A-4 MS) and (680-178049-A-4 MSD).

Due to the high concentration of Toxaphene, Technical and Total Toxaphene, the matrix spike / matrix spike duplicate (MS/MSD) for preparation batch 680-600174 and analytical batch 680-600419 could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria.

Refer to the QC report for details.

Samples Si-4181-1 (680-178049-1)[25000X], Si-4181-2 (680-178049-2)[50000X], Si-4181-3 (680-178049-3)[5000X] and Si-4181-4 (680-178049-4)[10000X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **PERCENT SOLIDS/MOISTURE**

Samples Si-4181-1 (680-178049-1), Si-4181-2 (680-178049-2), Si-4181-3 (680-178049-3) and Si-4181-4 (680-178049-4) were analyzed for Percent Solids/Moisture in accordance with TestAmerica SOP. The samples were analyzed on 12/12/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Si-418/Frmr Brunswick Plant/Darament Is

Job ID: 680-178049-1

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**Job ID: 680-178049-1 (Continued)**

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**Laboratory: Eurofins TestAmerica, Savannah (Continued)**

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# Sample Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Si-418/Fmr Brunswick Plant/Darament Is

Job ID: 680-178049-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-178049-1	Si-4181-1	Solid	12/10/19 00:00	12/11/19 09:25	
680-178049-2	Si-4181-2	Solid	12/10/19 00:00	12/11/19 09:25	
680-178049-3	Si-4181-3	Solid	12/10/19 00:00	12/11/19 09:25	
680-178049-4	Si-4181-4	Solid	12/10/19 00:00	12/11/19 09:25	

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# Method Summary

Job ID: 680-17805C-1

Method Summary  
Method ID: Be518Sjk j Wjat yMeUr i, t S, j, k nt Gy

Method	Method Description	Protocol	Laboratory
8081W	4 j Q t ougioj n r ny dny ds l (	BT 856	) AL BAV
E oejn	r njunt E oejn	2r A	) AL BAV
3p56	E ejoM, vn 2xG, uot	BT 856	) AL BAV

### Protocol References:

2r A = mB 2t vtot k nt Gi r joGut ACnt uc

BT 856 = ") nyGE nGohy woj 2v, ia, G OBoid T, yG. r gcyu, iS gnk u, i E nGohy". ) gph 2 h eot . Fovnk bnj 1C86 At h lG mNn, GYP

### Laboratory References:

) AL BAV = 2ajoG y ) nyGk njei. . B, v, t t, g. p10f L, Rougn Avnt an. B, v, t t, g. s A 31505. ) 2L dC1f (3p5-78p8

2ajoG y ) nyGk njei. . B, v, t t, g



# Definitions/Glossary

Client: Geosyntec Consultants, Inc.  
Project/Site: Si-418/Frmr Brunswick Plant/Darament Is

Job ID: 680-178049-1

## Qualifiers

### GC Semi VOA

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
D	Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples.
F2	MS/MSD RPD exceeds control limits
F4	MS/MSD RPD exceeds control limits due to sample size difference.
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Detection Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Si-418/Frmr Brunswick Plant/Darament Is

Job ID: 680-178049-1

## Client Sample ID: Si-4181-1

Lab Sample ID: 680-178049-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	6100000		2800000		ug/Kg	25000	☼	8081B	Total/NA
Total Toxaphene	6600000		2800000		ug/Kg	25000	☼	8081B	Total/NA

## Client Sample ID: Si-4181-2

Lab Sample ID: 680-178049-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	5800000		5500000		ug/Kg	50000	☼	8081B	Total/NA
Total Toxaphene	6200000		5500000		ug/Kg	50000	☼	8081B	Total/NA

## Client Sample ID: Si-4181-3

Lab Sample ID: 680-178049-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	3300000		550000		ug/Kg	5000	☼	8081B	Total/NA
Total Toxaphene	3700000		550000		ug/Kg	5000	☼	8081B	Total/NA

## Client Sample ID: Si-4181-4

Lab Sample ID: 680-178049-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	4500000	F2	1100000		ug/Kg	10000	☼	8081B	Total/NA
Total Toxaphene	5000000	F2	1100000		ug/Kg	10000	☼	8081B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Si-418/Frmr Brunswick Plant/Darament Is

Job ID: 680-178049-1

**Client Sample ID: Si-4181-1**

**Lab Sample ID: 680-178049-1**

Date Collected: 12/10/19 00:00

Matrix: Solid

Date Received: 12/11/19 09:25

Percent Solids: 70.9

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	6100000		2800000		ug/Kg	☼	12/12/19 10:50	12/13/19 16:44	25000
Total Toxaphene	6600000		2800000		ug/Kg	☼	12/12/19 10:50	12/13/19 16:44	25000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	D	54 - 133				1/9/91: 10250	1/9/39: 18244	/ 5000
Tetrachloro-m-xylene	0	D	48 - 130				1/9/91: 10250	1/9/39: 18244	/ 5000



# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Si-418/Frmr Brunswick Plant/Darament Is

Job ID: 680-178049-1

**Client Sample ID: Si-4181-2**

**Lab Sample ID: 680-178049-2**

Date Collected: 12/10/19 00:00

Matrix: Solid

Date Received: 12/11/19 09:25

Percent Solids: 77.4

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	5800000		5500000		ug/Kg	☼	12/12/19 10:50	12/13/19 16:58	50000
Total Toxaphene	6200000		5500000		ug/Kg	☼	12/12/19 10:50	12/13/19 16:58	50000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	D	54 - 133				1/9/91: 10250	1/9/39: 18256	50000
Tetrachloro-m-xylene	0	D	48 - 130				1/9/91: 10250	1/9/39: 18256	50000

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# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Si-418/Frmr Brunswick Plant/Darament Is

Job ID: 680-178049-1

**Client Sample ID: Si-4181-3**

**Lab Sample ID: 680-178049-3**

Date Collected: 12/10/19 00:00

Matrix: Solid

Date Received: 12/11/19 09:25

Percent Solids: 77.5

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	3300000		550000		ug/Kg	☼	12/12/19 10:50	12/13/19 17:13	5000
Total Toxaphene	3700000		550000		ug/Kg	☼	12/12/19 10:50	12/13/19 17:13	5000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	D	54 - 133				1/9/91: 10250	1/9/39: 17213	5000
Tetrachloro-m-xylene	0	D	48 - 130				1/9/91: 10250	1/9/39: 17213	5000



# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Si-418/Frmr Brunswick Plant/Darament Is

Job ID: 680-178049-1

**Client Sample ID: Si-4181-4**

**Lab Sample ID: 680-178049-4**

Date Collected: 12/10/19 00:00

Matrix: Solid

Date Received: 12/11/19 09:25

Percent Solids: 75.0

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	4500000	F2	1100000		ug/Kg	☼	12/12/19 10:50	12/13/19 17:27	10000
Total Toxaphene	5000000	F2	1100000		ug/Kg	☼	12/12/19 10:50	12/13/19 17:27	10000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	D	54 - 133				1/9/91: 10250	1/9/39: 1727	10000
Tetrachloro-m-xylene	0	D	48 - 130				1/9/91: 10250	1/9/39: 1727	10000



# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Si-418/Frmr Brunswick Plant/Darament Is

Job ID: 680-178049-1

## Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP1 (54-133)	TCX1 (46-130)
680-178049-1	Si-4181-1	0 D	0 D
680-178049-2	Si-4181-2	0 D	0 D
680-178049-3	Si-4181-3	0 D	0 D
680-178049-4	Si-4181-4	0 D	0 D
680-178049-4 MS	Si-4181-4	0 D	0 D
680-178049-4 MSD	Si-4181-4	0 D	0 D
MB 680-600174/7-A	Method Blank	118	104

#### Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

## Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP1 (54-133)	TCX2 (46-130)
LCS 680-600174/11-A	Lab Control Sample	109	84

#### Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene



# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Si-418/Fmr Brunswick Plant/Darament Is

Job ID: 680-178049-1

## Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 680-600174/7-A

Matrix: Solid

Analysis Batch: 600222

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 600174

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Toxaphene, Technical	83	U	83		ug/Kg		12/12/19 10:50	12/12/19 20:39	1
Total Toxaphene	83	U	83		ug/Kg		12/12/19 10:50	12/12/19 20:39	1
Surrogate	MB	MB	Limits				Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier							
DCB Decachlorobiphenyl	118		54 - 133				12/12/19 10:50	12/12/19 20:39	1
Tetrachloro-m-xylene	104		46 - 130				12/12/19 10:50	12/12/19 20:39	1

Lab Sample ID: LCS 680-600174/11-A

Matrix: Solid

Analysis Batch: 600222

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 600174

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Toxaphene	260	284		ug/Kg		109	42 - 130
Surrogate	LCS	LCS	Limits				%Rec. Limits
	%Recovery	Qualifier					
DCB Decachlorobiphenyl	109		54 - 133				
Tetrachloro-m-xylene	84		46 - 130				

Lab Sample ID: 680-178049-4 MS

Matrix: Solid

Analysis Batch: 600419

Client Sample ID: Si-4181-4

Prep Type: Total/NA

Prep Batch: 600174

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
	Toxaphene, Technical	4500000		F2	355				
Total Toxaphene	5000000	F2	355	1760000	4	ug/Kg	☼	-9201	42 - 130
								57	
								51	
Surrogate	MS	MS	Limits					%Rec. Limits	
	%Recovery	Qualifier							
DCB Decachlorobiphenyl	0	D	54 - 133						
Tetrachloro-m-xylene	0	D	46 - 130						

Lab Sample ID: 680-178049-4 MSD

Matrix: Solid

Analysis Batch: 600419

Client Sample ID: Si-4181-4

Prep Type: Total/NA

Prep Batch: 600174

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
	Toxaphene, Technical	4500000		F2	726						
Total Toxaphene	5000000	F2	726	7670000	4 F4	ug/Kg	☼	36432	42 - 130	125	50
								9			
								4			
Surrogate	MSD	MSD	Limits					%Rec. Limits			
	%Recovery	Qualifier									
DCB Decachlorobiphenyl	0	D	54 - 133								
Tetrachloro-m-xylene	0	D	46 - 130								

Eurofins TestAmerica, Savannah

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Si-418/Frmr Brunswick Plant/Darament Is

Job ID: 680-178049-1

## GC Semi VOA

### Prep Batch: 600174

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178049-1	Si-4181-1	Total/NA	Solid	3546	
680-178049-2	Si-4181-2	Total/NA	Solid	3546	
680-178049-3	Si-4181-3	Total/NA	Solid	3546	
680-178049-4	Si-4181-4	Total/NA	Solid	3546	
MB 680-600174/7-A	Method Blank	Total/NA	Solid	3546	
LCS 680-600174/11-A	Lab Control Sample	Total/NA	Solid	3546	
680-178049-4 MS	Si-4181-4	Total/NA	Solid	3546	
680-178049-4 MSD	Si-4181-4	Total/NA	Solid	3546	

### Analysis Batch: 600222

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-600174/7-A	Method Blank	Total/NA	Solid	8081B	600174
LCS 680-600174/11-A	Lab Control Sample	Total/NA	Solid	8081B	600174

### Analysis Batch: 600419

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178049-1	Si-4181-1	Total/NA	Solid	8081B	600174
680-178049-2	Si-4181-2	Total/NA	Solid	8081B	600174
680-178049-3	Si-4181-3	Total/NA	Solid	8081B	600174
680-178049-4	Si-4181-4	Total/NA	Solid	8081B	600174
680-178049-4 MS	Si-4181-4	Total/NA	Solid	8081B	600174
680-178049-4 MSD	Si-4181-4	Total/NA	Solid	8081B	600174

## General Chemistry

### Analysis Batch: 600136

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178049-1	Si-4181-1	Total/NA	Solid	Moisture	
680-178049-2	Si-4181-2	Total/NA	Solid	Moisture	
680-178049-3	Si-4181-3	Total/NA	Solid	Moisture	
680-178049-4	Si-4181-4	Total/NA	Solid	Moisture	

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 Project/Site: Si-418/Frmr Brunswick Plant/Darament Is

Job ID: 680-178049-1

**Client Sample ID: Si-4181-1**

**Lab Sample ID: B86-108647-1**

Date Collectex: 1d/16/17 66:66

5 atriM Solix

Date 9 eceiRex: 1d/11/17 67:dv

Arep Type	Patch Type	Patch 5 ethox	9 zn	Dil Nactor	Initial s moznt	Ninal s moznt	Patch . z mber	Areparex or s nalyFex	s nalyut	Lab
Total/NA	Analysis	Moisture		1			600136	12/12/19 06:31	JEB	TAL SAV
Instrument ID: NOEQUIP										

**Client Sample ID: Si-4181-1**

**Lab Sample ID: B86-108647-1**

Date Collectex: 1d/16/17 66:66

5 atriM Solix

Date 9 eceiRex: 1d/11/17 67:dv

Aercent Solixu: 06Z

Arep Type	Patch Type	Patch 5 ethox	9 zn	Dil Nactor	Initial s moznt	Ninal s moznt	Patch . z mber	Areparex or s nalyFex	s nalyut	Lab
Total/NA	Prep	3546			15.97 g	5 mL	600174	12/12/19 10:50	DRT	TAL SAV
Total/NA	Analysis	8081B		25000			600419	12/13/19 16:44	GEM	TAL SAV
Instrument ID: CSGAA										

**Client Sample ID: Si-4181-d**

**Lab Sample ID: B86-108647-d**

Date Collectex: 1d/16/17 66:66

5 atriM Solix

Date 9 eceiRex: 1d/11/17 67:dv

Arep Type	Patch Type	Patch 5 ethox	9 zn	Dil Nactor	Initial s moznt	Ninal s moznt	Patch . z mber	Areparex or s nalyFex	s nalyut	Lab
Total/NA	Analysis	Moisture		1			600136	12/12/19 06:31	JEB	TAL SAV
Instrument ID: NOEQUIP										

**Client Sample ID: Si-4181-d**

**Lab Sample ID: B86-108647-d**

Date Collectex: 1d/16/17 66:66

5 atriM Solix

Date 9 eceiRex: 1d/11/17 67:dv

Aercent Solixu: 00Z

Arep Type	Patch Type	Patch 5 ethox	9 zn	Dil Nactor	Initial s moznt	Ninal s moznt	Patch . z mber	Areparex or s nalyFex	s nalyut	Lab
Total/NA	Prep	3546			15.01 g	5 mL	600174	12/12/19 10:50	DRT	TAL SAV
Total/NA	Analysis	8081B		50000			600419	12/13/19 16:58	GEM	TAL SAV
Instrument ID: CSGAA										

**Client Sample ID: Si-4181-3**

**Lab Sample ID: B86-108647-3**

Date Collectex: 1d/16/17 66:66

5 atriM Solix

Date 9 eceiRex: 1d/11/17 67:dv

Arep Type	Patch Type	Patch 5 ethox	9 zn	Dil Nactor	Initial s moznt	Ninal s moznt	Patch . z mber	Areparex or s nalyFex	s nalyut	Lab
Total/NA	Analysis	Moisture		1			600136	12/12/19 06:31	JEB	TAL SAV
Instrument ID: NOEQUIP										

**Client Sample ID: Si-4181-3**

**Lab Sample ID: B86-108647-3**

Date Collectex: 1d/16/17 66:66

5 atriM Solix

Date 9 eceiRex: 1d/11/17 67:dv

Aercent Solixu: 00Z

Arep Type	Patch Type	Patch 5 ethox	9 zn	Dil Nactor	Initial s moznt	Ninal s moznt	Patch . z mber	Areparex or s nalyFex	s nalyut	Lab
Total/NA	Prep	3546			15.03 g	5 mL	600174	12/12/19 10:50	DRT	TAL SAV
Total/NA	Analysis	8081B		5000			600419	12/13/19 17:13	GEM	TAL SAV
Instrument ID: CSGAA										

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 Project/Site: Si-418/Frmr Brunswick Plant/Darament Is

Job ID: 680-178049-1

**Client Sample ID: Si-4181-4**

**Lab Sample ID: B86-108647-4**

Date Collectex: 1d/16/17 66:66

5 atriM Solix

Date 9 eceiRex: 1d/11/17 67:dv

Arep Type	Patch Type	Patch 5 ethox	9 zn	Dil Nactor	Initial s moznt	Ninal s moznt	Patch . z mber	Areparex or s nalyFex	s nalyut	Lab
Total/NA	Analysis	Moisture		1			600136	12/12/19 06:31	JEB	TAL SAV
Instrument ID: NOEQUIP										

**Client Sample ID: Si-4181-4**

**Lab Sample ID: B86-108647-4**

Date Collectex: 1d/16/17 66:66

5 atriM Solix

Date 9 eceiRex: 1d/11/17 67:dv

Aercent Solixu: 0v2

Arep Type	Patch Type	Patch 5 ethox	9 zn	Dil Nactor	Initial s moznt	Ninal s moznt	Patch . z mber	Areparex or s nalyFex	s nalyut	Lab
Total/NA	Prep	3546			15.03 g	5 mL	600174	12/12/19 10:50	DRT	TAL SAV
Total/NA	Analysis	8081B		10000			600419	12/13/19 17:27	GEM	TAL SAV
Instrument ID: CSGAA										


**Laboratory 9 eferenceur:**

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858



# Chain of Custody Record

<b>Client Information</b>		Sampler: Steve Sande		Lab PM: Jerry Lanier		Carrier Tracking No(s):	
Client Contact: Ali Ciblak		Phone: 770-910-7537		E-Mail: jerry.lanier@testamericainc.com		COC No:	
Company: Geosyntec Consultants Inc		Due Date Requested:		Analysis Requested		Page: Page 1 of 1	
Address: 1255 Roberts Blvd # 200		TAT Requested (days):		Standard		Job #	
City: Kennesaw		FO #:		EPA Method 8081B		Preservation Codes:	
State/Zip: GA, 30144		WO #:		Field Filtered Sample (Yes or No)		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - ph 4-5 Z - other (specify)	
Phone: 678 202 9500		Project #:		Perform MSM/SD (Yes or No)		Other:	
Email: aciblak@geosyntec.com, ssande@siremlab.com, mhaleley@siremlab.com		SSOW#:		Appendix IX Metals (6020/7470)		Special Instructions/Note:	
Project Name: <i>Former Brunswick Plant</i>		Sample Date		EPA Method 8081B		Total Number of Containers	
Site: Brunswick Plant, GA		Sample Time		Field Filtered Sample (Yes or No)		1	
Sample Identification		Sample Type (C=Comp, G=grab)		Matrix (W=water, S=solid, O=water/soil, BT=TESTER ADD)		1	
SI-4181-1		G		S		1	
SI-4181-2		G		S		1	
SI-4181-3		G		S		1	
SI-4181-4		G		S		1	



680-178049 Chain of Custody

**Possible Hazard Identification**  
 Non-Hazard  Ammable  Skirt  Tank  Poison B  Ur  Pwn  R  ological  
 Deliverable Requested: I, II, III, IV, Other (specify)

**Empty Kit Relinquished by:** \_\_\_\_\_ Date: \_\_\_\_\_  
 Relinquished by: Steve Sande Date/Time: 6Nov19  
 Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_

**Custody Seals Intact:**  Yes  No **Custody Seal No.:** \_\_\_\_\_  
 Relinquished by: Steve Sande Date/Time: 6Nov19 Company: SIREM  
 Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_  
 Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_

**Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)**  
 Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months  
 Special Instructions/QC Requirements:

**Method of Shipment:** \_\_\_\_\_  
 Received by: \_\_\_\_\_ Date/Time: 12/11/19 925 Company: TABA  
 Received by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_  
 Received by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_

Cooler Temperature(s) °C and Other Remarks: *11.5 11.5*



## Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 680-17805/ -1

**Login Number: 178049**

**List Source: Eurofins TestAmerica, Savannah**

**List Number: 1**

**Creator: Weston, Pamela**

Question	Answer	Comment
d avioactivity ' asnl ckec<ev or is =A bac<Trounv as measurev by a survey meter.	NAR	
f ke cooler's custovy seal, ipSresent, is intact.	f rue	
OamSle custovy seals, ipSresent, are intact.	f rue	
f ke cooler or samSles vo not aSSear to kave been comSromisev or tamSerev ' itk.	f rue	
OamSles ' ere receivev on ice.	f rue	
Cooler f emSerature is acceStable.	f rue	
Cooler f emSerature is recorvev.	f rue	
CF C is Sresent.	f rue	
CF C is pillev out in in< anv leTible.	f rue	
CF C is pillev out ' itk all Sertinent inPormation.	f rue	
Is tke ?ielv OamSler's name Sresent on CF CH	f rue	
f kere are no viscreSancies bet' een tke containers receivev anv tke CF C.	f rue	
OamSles are receivev ' itkin ( olvinT f ime x)cluvinT tests ' itk immeviate ( f sP	f rue	
OamSle containers kave leTible labels.	f rue	
Containers are not bro<en or lea<inT.	f rue	
OamSle collection vateAimes are Srowivev.	f rue	
RSSroSriate samSle containers are usev.	f rue	
OamSle bottles are comSletely pillev.	f rue	
OamSle Vreservation qeripev.	f rue	
f kere is suppicient vol. ppr all reMuestev analyses, incl. any reMuestev D OAD Oz s	f rue	
Containers reMuirinT 4ero keavsSace kave no keavsSace or bubble is =6mm x1.5" P.	NAR	
DultiSkasic samSles are not Sresent.	f rue	
OamSles vo not reMuire sSlittinT or comSositinT.	f rue	
desivual Cklorine Ckec<ev.	NAR	

# Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Si-418/Frmr Brunswick Plant/Darament Is

Job ID: 680-178049-1

## Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87052	06-30-20

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## ANALYTICAL REPORT

Eurofins TestAmerica, Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404  
Tel: (912)354-7858

Laboratory Job ID: 680-178408-1

Client Project/Site: Frm Brunswick Plant - DARAMEND TS

**For:**

Geosyntec Consultants, Inc.  
1255 Roberts Blvd, NW  
Suite 200  
Kennesaw, Georgia 30144

Attn: Adria Reimer



Authorized for release by:  
1/15/2020 2:23:06 PM

Jerry Lanier, Project Manager I  
(912)250-0281  
[jerry.lanier@testamericainc.com](mailto:jerry.lanier@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*





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# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Frm Brunswick Plant - DARAMEND TS

Job ID: 680-178408-1

**Job ID: 680-178408-1**

**Laboratory: Eurofins TestAmerica, Savannah**

**Narrative**

## CASE NARRATIVE

**Client: Geosyntec Consultants, Inc.**

**Project: Frm Brunswick Plant - DARAMEND TS**

**Report Number: 680-178408-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

### RECEIPT

The samples were received on 12/18/2019; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.7 C.

### ORGANOCHLORINE PESTICIDES (GC)

Samples Si-4181-1 (680-178408-1), Si-4181-2 (680-178408-2), Si-4181-3 (680-178408-3) and Si-4181-4 (680-178408-4) were analyzed for Organochlorine Pesticides (GC) in accordance with EPA SW-846 Method 8081B. The samples were prepared on 12/31/2019 and analyzed on 01/10/2020.

Samples Si-4181-1 (680-178408-1)[10000X], Si-4181-2 (680-178408-2)[10000X], Si-4181-3 (680-178408-3)[10000X] and Si-4181-4 (680-178408-4)[10000X] required dilution prior to analysis due to the nature of the sample matrix and the abundance of target analytes. Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information. The reporting limits have been adjusted accordingly.

Total Toxaphene and Toxaphene, Technical failed the recovery criteria low for the MS/MSD of sample Si-4181-4 (680-178408-4) in batch 680-603368. Total Toxaphene and Toxaphene, Technical exceeded the RPD limit.

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### PERCENT SOLIDS/MOISTURE

Samples Si-4181-1 (680-178408-1), Si-4181-2 (680-178408-2), Si-4181-3 (680-178408-3) and Si-4181-4 (680-178408-4) were analyzed for Percent Solids/Moisture in accordance with TestAmerica SOP. The samples were analyzed on 12/19/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Sample Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Frm Brunswick Plant - DARAMEND TS

Job ID: 680-178408-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-178408-1	Si-4181-1	Solid	12/17/19 00:00	12/18/19 10:20	
680-178408-2	Si-4181-2	Solid	12/17/19 00:00	12/18/19 10:20	
680-178408-3	Si-4181-3	Solid	12/17/19 00:00	12/18/19 10:20	
680-178408-4	Si-4181-4	Solid	12/17/19 00:00	12/18/19 10:20	

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# Method Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Brw k runsWcMPlant - DUT U4 Og D hS

Job ID: 680-178508-1

Method	Method Description	Protocol	Laboratory
8081k	( r) anocAlorine Pesticiles VGC2	Sd 856	hUE SU3
4 oisture	Percent 4 oisture	OPU	hUE SU3
pv56	4 icroWaxe O=traction	Sd 856	hUE SU3

**Protocol References:**

OPU m" S Onxironwental Protection U) ency  
Sd 856 mFhest 4 etAoLs Bor Oxalutatin) SoliL d aste, PAysical/CAewical 4 etAoLsF, hAirL OLition, goxewber 1N86 UnL Its " 9Lates.

**Laboratory References:**

hUE SU3 mOurofins hestUwerica, SaxannaA, v10R.EaTocAe Uxenuue, SaxannaA, GU p1505, hOE W1RQpv5-78v8



## Definitions/Glossary

Client: Geosyntec Consultants, Inc.  
Project/Site: Frm Brunswick Plant - DARAMEND TS

Job ID: 680-178408-1

### Qualifiers

#### GC Semi VOA

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
D	Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples.
F2	MS/MSD RPD exceeds control limits
U	Indicates the analyte was analyzed for but not detected.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Detection Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Frm Brunswick Plant - DARAMEND TS

Job ID: 680-178408-1

## Client Sample ID: Si-4181-1

## Lab Sample ID: 680-178408-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	5700000		1100000		ug/Kg	10000	☼	8081B	Total/NA
Total Toxaphene	5700000		1100000		ug/Kg	10000	☼	8081B	Total/NA

## Client Sample ID: Si-4181-2

## Lab Sample ID: 680-178408-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	16000000		1100000		ug/Kg	10000	☼	8081B	Total/NA
Total Toxaphene	16000000		1100000		ug/Kg	10000	☼	8081B	Total/NA

## Client Sample ID: Si-4181-3

## Lab Sample ID: 680-178408-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	16000000		1100000		ug/Kg	10000	☼	8081B	Total/NA
Total Toxaphene	15000000		1100000		ug/Kg	10000	☼	8081B	Total/NA

## Client Sample ID: Si-4181-4

## Lab Sample ID: 680-178408-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	8400000	F2	1100000		ug/Kg	10000	☼	8081B	Total/NA
Total Toxaphene	8000000	F2	1100000		ug/Kg	10000	☼	8081B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Frm Brunswick Plant - DARAMEND TS

Job ID: 680-178408-1

**Client Sample ID: Si-4181-1**

**Lab Sample ID: 680-178408-1**

Date Collected: 1c21721/ 00:00

9 at Mr: Sxlio

Date Received: 1c21821/ 10:c0

PeMent Sxlios: 78.0

**9 et5xo: 8081h - BMAnxd5lxMne Pestidioes g CG**

Analyte	Result	Qualifier	RL	9 DL	Unit	D	Prepared	Analyzed	Dil Fac
) xrap5eneT) ed5nidal	, 700000		1100000		ug/Kg	*	12/31/19 10:38	01/10/20 03:52	10000
) xtal ) xrap5ene	, 700000		1100000		ug/Kg	*	12/31/19 10:38	01/10/20 03:52	10000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	1	D	85 4- 33				- 2/3- /- 9 - 10:	1- /- 1/21 1302	- 1111
Tetrachloro4m4ylene	1	D	56 4- 31				- 2/3- /- 9 - 10:	1- /- 1/21 1302	- 1111

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Frm Brunswick Plant - DARAMEND TS

Job ID: 680-178408-1

**Client Sample ID: Si-4181-c**

**Lab Sample ID: 680-178408-c**

Date Collected: 1c21721/ 00:00

9 at Mr: Sxlio

Date Received: 1c21821/ 10:c0

PeMent Sxlios: 7, ./

**9 et5xo: 8081h - BMAnxd5lxMne Pestidioes g CG**

Analyte	Result	Qualifier	RL	9 DL	Unit	D	Prepared	Analyzed	Dil Fac
) xrap5eneT) ed5nidal	16000000		1100000		ug/Kg	*	12/31/19 10:38	01/10/20 04:06	10000
) xtal ) xrap5ene	16000000		1100000		ug/Kg	*	12/31/19 10:38	01/10/20 04:06	10000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	1	D	85 4- 33				- 2/3- /- 9 - 10:	1- /- 1/21 15016	- 1111
Tetrachloro4m4ylene	1	D	56 4- 31				- 2/3- /- 9 - 10:	1- /- 1/21 15016	- 1111



# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Frm Brunswick Plant - DARAMEND TS

Job ID: 680-178408-1

**Client Sample ID: Si-4181-3**

**Lab Sample ID: 680-178408-3**

Date Collected: 1c21721/ 00:00

9 at Mr: Sxlio

Date Received: 1c21821/ 10:c0

PeMent Sxlios: 76.3

**9 et5xo: 8081h - BMAnxd5lxMne Pestidioes g CG**

Analyte	Result	Qualifier	RL	9 DL	Unit	D	Prepared	Analyzed	Dil Fac
) xrap5eneT) ed5nidal	16000000		1100000		ug/Kg	*	12/31/19 10:38	01/10/20 04:21	10000
) xtal ) xrap5ene	1, 000000		1100000		ug/Kg	*	12/31/19 10:38	01/10/20 04:21	10000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	1	D	85 4- 33				- 2/3- /- 9 - 10:	1- /- 1/21 150-	- 1111
Tetrachloro4m4ylene	1	D	56 4- 31				- 2/3- /- 9 - 10:	1- /- 1/21 150-	- 1111

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Frm Brunswick Plant - DARAMEND TS

Job ID: 680-178408-1

**Client Sample ID: Si-4181-4**

**Lab Sample ID: 680-178408-4**

Date Collected: 1c21721/ 00:00

9 at Mr: Sxlio

Date Received: 1c21821/ 10:c0

PeMent Sxlios: 7/ .c

**9 et5xo: 8081h - BMAnxd5lxMne Pestidioes g CG**

Analyte	Result	Qualifier	RL	9 DL	Unit	D	Prepared	Analyzed	Dil Fac
) xrap5eneT) ed5nidal	8400000	Fc	1100000		ug/Kg	*	12/31/19 10:38	01/10/20 04:35	10000
) xtal ) xrap5ene	8000000	Fc	1100000		ug/Kg	*	12/31/19 10:38	01/10/20 04:35	10000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	1	D	85 4- 33				- 2/3- /- 9 - 10:	1- /- 1/21 15088	- 1111
Tetrachloro4m4ylene	1	D	56 4- 31				- 2/3- /- 9 - 10:	1- /- 1/21 15088	- 1111

# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Frm Brunswick Plant - DARAMEND TS

Job ID: 680-178408-1

## Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP1 (54-133)	TCX1 (46-130)
680-178408-1	Si-4181-1	0 D	0 D
680-178408-2	Si-4181-2	0 D	0 D
680-178408-3	Si-4181-3	0 D	0 D
680-178408-4	Si-4181-4	0 D	0 D
680-178408-4 MS	Si-4181-4	0 D	0 D
680-178408-4 MSD	Si-4181-4	0 D	0 D
LCS 680-602716/6-A	Lab Control Sample	96	85
MB 680-602716/5-A	Method Blank	99	92

#### Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
Project/Site: Frm Brunswick Plant - DARAMEND TS

Job ID: 680-178408-1

## Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 680-602716/5-A

Matrix: Solid

Analysis Batch: 603057

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 602716

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Toxaphene, Technical	81	U	81		ug/Kg		12/31/19 10:38	01/07/20 16:46	1
Total Toxaphene	81	U	81		ug/Kg		12/31/19 10:38	01/07/20 16:46	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac	
DCB Decachlorobiphenyl	99		75 4- 11			- : /1- /- 9 - 38 T	3- /38/: 3 - 262	-	
t errachloro 4 Dylene	9:		52 4- 13			- : /1- /- 9 - 38 T	3- /38/: 3 - 262	-	

Lab Sample ID: LCS 680-602716/6-A

Matrix: Solid

Analysis Batch: 603057

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 602716

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Toxaphene, Technical	264	262		ug/Kg		99	42 - 130
Total Toxaphene	264	256		ug/Kg		97	42 - 130
Surrogate	%Recovery	Qualifier	Limits				
DCB Decachlorobiphenyl	92		75 4- 11				
t errachloro 4 Dylene	T7		52 4- 13				

Lab Sample ID: 680-178408-4 MS

Matrix: Solid

Analysis Batch: 603368

Client Sample ID: Si-4181-4

Prep Type: Total/NA

Prep Batch: 602716

Analyte	Sample	Sample	Spike Added	MS	MS	Unit	D	%Rec	%Rec. Limits
	Result	Qualifier		Result	Qualifier				
Toxaphene, Technical	8400000	F2	919	10100000	4	ug/Kg	☼	18479	42 - 130
Total Toxaphene	8000000	F2	919	9700000	4	ug/Kg	☼	18176	42 - 130
Surrogate	%Recovery	Qualifier	Limits						
DCB Decachlorobiphenyl	3	D	75 4- 11						
t errachloro 4 Dylene	3	D	52 4- 13						

Lab Sample ID: 680-178408-4 MSD

Matrix: Solid

Analysis Batch: 603368

Client Sample ID: Si-4181-4

Prep Type: Total/NA

Prep Batch: 602716

Analyte	Sample	Sample	Spike Added	MSD	MSD	Unit	D	%Rec	%Rec. Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Toxaphene, Technical	8400000	F2	987	3990000	4 F2	ug/Kg	☼	-4436	42 - 130	86	50
Total Toxaphene	8000000	F2	987	3470000	4 F2	ug/Kg	☼	-4620	42 - 130	95	50
Surrogate	%Recovery	Qualifier	Limits								
DCB Decachlorobiphenyl	3	D	75 4- 11								
t errachloro 4 Dylene	3	D	52 4- 13								

Eurofins TestAmerica, Savannah

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Frm Brunswick Plant - DARAMEND TS

Job ID: 680-178408-1

## GC Semi VOA

### Prep Batch: 602716

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178408-1	Si-4181-1	Total/NA	Solid	3546	
680-178408-2	Si-4181-2	Total/NA	Solid	3546	
680-178408-3	Si-4181-3	Total/NA	Solid	3546	
680-178408-4	Si-4181-4	Total/NA	Solid	3546	
MB 680-602716/5-A	Method Blank	Total/NA	Solid	3546	
LCS 680-602716/6-A	Lab Control Sample	Total/NA	Solid	3546	
680-178408-4 MS	Si-4181-4	Total/NA	Solid	3546	
680-178408-4 MSD	Si-4181-4	Total/NA	Solid	3546	

### Analysis Batch: 603057

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-602716/5-A	Method Blank	Total/NA	Solid	8081B	602716
LCS 680-602716/6-A	Lab Control Sample	Total/NA	Solid	8081B	602716

### Analysis Batch: 603368

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178408-1	Si-4181-1	Total/NA	Solid	8081B	602716
680-178408-2	Si-4181-2	Total/NA	Solid	8081B	602716
680-178408-3	Si-4181-3	Total/NA	Solid	8081B	602716
680-178408-4	Si-4181-4	Total/NA	Solid	8081B	602716
680-178408-4 MS	Si-4181-4	Total/NA	Solid	8081B	602716
680-178408-4 MSD	Si-4181-4	Total/NA	Solid	8081B	602716

## General Chemistry

### Analysis Batch: 601247

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178408-1	Si-4181-1	Total/NA	Solid	Moisture	
680-178408-2	Si-4181-2	Total/NA	Solid	Moisture	
680-178408-3	Si-4181-3	Total/NA	Solid	Moisture	
680-178408-4	Si-4181-4	Total/NA	Solid	Moisture	

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 9Prectj/ ite: SFF mRnsBicw9lant - DkAk ME2 D 3/

Job ID: 680-178408-1

**Client Sample ID: Si-4181-1**

**Lab Sample ID: B86-108468-1**

Date CollecteM 1xd0d/ 66:66

7 atri5: SoliM

Date 9 eceiReM 1xd8d/ 16:x6

Prep vTpe	y atch vTpe	y atch 7 ethoM	9 un	Dil Factor	Initial Amount	Final Amount	y atch Number	PrepareM or AnalTzeM	AnalTst	Lab
3otalj2k	k nalysis	MoistuRe		1			601T47	1Tj1Lj1L 07:VN	JEm	3kO/ kQ
InstRrF ent ID: 2 UEp 5 I9										

**Client Sample ID: Si-4181-1**

**Lab Sample ID: B86-108468-1**

Date CollecteM 1xd0d/ 66:66

7 atri5: SoliM

Date 9 eceiReM 1xd8d/ 16:x6

Percent SoliMs: 08.6

Prep vTpe	y atch vTpe	y atch 7 ethoM	9 un	Dil Factor	Initial Amount	Final Amount	y atch Number	PrepareM or AnalTzeM	AnalTst	Lab
3otalj2k	9ReR	VN#6			1N01 g	NFO	60T716	1TjV1j1L 10:V8	DA3	3kO/ kQ
3otalj2k	k nalysis	8081m		10000			60W68	01j10jT0 0V:NT	GEM	3kO/ kQ
InstRrF ent ID: C/ GJ										

**Client Sample ID: Si-4181-x**

**Lab Sample ID: B86-108468-x**

Date CollecteM 1xd0d/ 66:66

7 atri5: SoliM

Date 9 eceiReM 1xd8d/ 16:x6

Prep vTpe	y atch vTpe	y atch 7 ethoM	9 un	Dil Factor	Initial Amount	Final Amount	y atch Number	PrepareM or AnalTzeM	AnalTst	Lab
3otalj2k	k nalysis	MoistuRe		1			601T47	1Tj1Lj1L 07:VN	JEm	3kO/ kQ
InstRrF ent ID: 2 UEp 5 I9										

**Client Sample ID: Si-4181-x**

**Lab Sample ID: B86-108468-x**

Date CollecteM 1xd0d/ 66:66

7 atri5: SoliM

Date 9 eceiReM 1xd8d/ 16:x6

Percent SoliMs: 02./

Prep vTpe	y atch vTpe	y atch 7 ethoM	9 un	Dil Factor	Initial Amount	Final Amount	y atch Number	PrepareM or AnalTzeM	AnalTst	Lab
3otalj2k	9ReR	VN#6			1NN# g	NFO	60T716	1TjV1j1L 10:V8	DA3	3kO/ kQ
3otalj2k	k nalysis	8081m		10000			60W68	01j10jT0 04:06	GEM	3kO/ kQ
InstRrF ent ID: C/ GJ										

**Client Sample ID: Si-4181-3**

**Lab Sample ID: B86-108468-3**

Date CollecteM 1xd0d/ 66:66

7 atri5: SoliM

Date 9 eceiReM 1xd8d/ 16:x6

Prep vTpe	y atch vTpe	y atch 7 ethoM	9 un	Dil Factor	Initial Amount	Final Amount	y atch Number	PrepareM or AnalTzeM	AnalTst	Lab
3otalj2k	k nalysis	MoistuRe		1			601T47	1Tj1Lj1L 07:VN	JEm	3kO/ kQ
InstRrF ent ID: 2 UEp 5 I9										

**Client Sample ID: Si-4181-3**

**Lab Sample ID: B86-108468-3**

Date CollecteM 1xd0d/ 66:66

7 atri5: SoliM

Date 9 eceiReM 1xd8d/ 16:x6

Percent SoliMs: 0B.3

Prep vTpe	y atch vTpe	y atch 7 ethoM	9 un	Dil Factor	Initial Amount	Final Amount	y atch Number	PrepareM or AnalTzeM	AnalTst	Lab
3otalj2k	9ReR	VN#6			1N1Ng	NFO	60T716	1TjV1j1L 10:V8	DA3	3kO/ kQ
3otalj2k	k nalysis	8081m		10000			60W68	01j10jT0 04:T1	GEM	3kO/ kQ
InstRrF ent ID: C/ GJ										

EuRfins 3estk F eRca, / avannah

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 9Rrectj/ ite: SFF mRnsBicw9Iant - DkAkME2D 3/

Job ID: 680-178408-1

**Client Sample ID: Si-4181-4**

**Lab Sample ID: B86-108468-4**

**Date CollecteM 1xd0d/ 66:66**

**7 atri5: SoliM**

**Date 9 eceiReM 1xd8d/ 16:x6**

Prep vTpe	y atch vTpe	y atch 7 ethoM	9 un	Dil Factor	Initial Amount	Final Amount	y atch Number	PrepareM or AnaITzeM	AnalTst	Lab
3otalj2k	knalysis	MoistuRe		1			601T47	1Tj1Lj1L 07:VN	JEm	3kO/ kQ
InstRiF ent ID: 2UEp519										

**Client Sample ID: Si-4181-4**

**Lab Sample ID: B86-108468-4**

**Date CollecteM 1xd0d/ 66:66**

**7 atri5: SoliM**

**Date 9 eceiReM 1xd8d/ 16:x6**

**Percent SoliMs: 0/ .x**

Prep vTpe	y atch vTpe	y atch 7 ethoM	9 un	Dil Factor	Initial Amount	Final Amount	y atch Number	PrepareM or AnaITzeM	AnalTst	Lab
3otalj2k	9RER	VN#6			1NTVg	NF O	60T716	1TjV1j1L 10:V8	DA3	3kO/ kQ
3otalj2k	knalysis	8081m		10000			60W68	01j10jT0 04:VN	GEM	3kO/ kQ
InstRiF ent ID: C/ GJ										


**LaboratorT 9 eferences:**

3kO/ kQ = EuRfins 3estk F eRca, / avannah, N10T QaAoche k venue, / avannah, Gk V1404, 3EO(L1T)VN4-78N8

**Chain of Custody Record**

**TestAmerica Laboratory of Microcosm pH, ORP and Ferrous Iron Results**  
5102 La Roche Av Brunswick Plant,  
Savannah, GA, 31404  
Phone (912) 354 7858

Client Information		Sampler:		Lab PM:		Carrier Tracking No(s)		COC No	
Client Contact Ali Ciblak		Steve Sande		Jerry Lanier				Page 1 of 1	
Company Geosyntec Consultants Inc		Phone 770-910-7537		E-Mail jerry.lanier@testamericainc.com				Job #	
Address 1255 Roberts Blvd # 200		Due Date Requested:		Analysis Requested				Preservation Codes:	
City Kennesaw		TAT Requested (days):		Standard				A - HCL M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate	
State, Zip GA, 30144		PO #:		Field Filtered Sample (Yes or No)				U - Acetone V - MCAA W - ph 4.5 X - EDTA Y - EDTA Z - other (specify)	
Phone 678 202 9500		WO #:		Perform MS/MSD (Yes or No)				Other:	
Email aciblak@geosyntec.com, ssande@sremilab.com, mhoealy@sremilab.com		Project #: SI-4181		EPA Method 8081B				Total Number of Containers	
Project Name Former Brunswick Plant DARAMEND TS		SSOW#:		Appendix IX Metals (6020/7470)				Special Instructions/Note:	
Site Brunswick Plant, GA									
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, D=dredge, G=grab, etc-tissue, AA=)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	EPA Method 8081B	Appendix IX Metals (6020/7470)	Total Number of Containers
SI-4181-1	12/17/19		G	S	N	N	X		1
SI-4181-2	12/17/19		G	S	N	N	X		1
SI-4181-3	12/17/19		G	S	N	N	X		1
SI-4181-4	12/17/19		G	S	N	N	X		1



680-178408 Chain of Custody

<b>Possible Hazard Identification</b>		Sample Dis.		Return To Client		Archive For	
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> ammable <input type="checkbox"/> Corrosive <input type="checkbox"/> Toxic <input type="checkbox"/> Volatile <input type="checkbox"/> Biological Deliverable Requested: I, II, III, IV, Other (specify)		Months Months		Months Months		Months Months	
<b>Empty Kit Relinquished by:</b>		Date/Time		Date/Time		Date/Time	
Relinquished by: Steve Sande		12/18/19		10:20		Company: HSBM	
Relinquished by:						Company:	
Relinquished by:						Company:	
Custody Seals Intact Δ Yes Δ No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 2. Getz.			





## Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 680-178408-1

**Login Number: 178408**

**List Source: Eurofins TestAmerica, Savannah**

**List Number: 1**

**Creator: Weston, Pamela**

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Frm Brunswick Plant - DARAMEND TS

Job ID: 680-178408-1

## Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87052	06-30-20
Georgia	State Program	803	06-30-20

1

2

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14

15

## ANALYTICAL REPORT

Eurofins TestAmerica, Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404  
Tel: (912)354-7858

Laboratory Job ID: 680-179523-1

Client Project/Site: Fmr Brunswick Plant DARAMEND TS

**For:**

Geosyntec Consultants, Inc.  
1255 Roberts Blvd, NW  
Suite 200  
Kennesaw, Georgia 30144

Attn: Adria Reimer



Authorized for release by:  
2/6/2020 1:58:31 PM

Jerry Lanier, Project Manager I  
(912)250-0281  
[jerry.lanier@testamericainc.com](mailto:jerry.lanier@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Fmr Brunswick Plant DARAMEND TS

Job ID: 680-179523-1

**Job ID: 680-179523-1**

**Laboratory: Eurofins TestAmerica, Savannah**

**Narrative**

## CASE NARRATIVE

**Client: Geosyntec Consultants, Inc.**

**Project: Fmr Brunswick Plant DARAMEND TS**

**Report Number: 680-179523-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

### RECEIPT

The samples were received on 01/22/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.5 C.

### ORGANOCHLORINE PESTICIDES (GC)

Samples Si-4181-1 (680-179523-1), Si-4181-2 (680-179523-2), Si-4181-3 (680-179523-3) and Si-4181-4 (680-179523-4) were analyzed for Organochlorine Pesticides (GC) in accordance with EPA SW-846 Method 8081B. The samples were prepared on 02/03/2020 and analyzed on 02/05/2020.

The following samples were diluted due to the abundance of target analytes: Si-4181-1 (680-179523-1)[10000X], Si-4181-2 (680-179523-2)[10000X], Si-4181-3 (680-179523-3)[10000X] and Si-4181-4 (680-179523-4)[10000X]. As such, surrogate recoveries are below the calibration range or are not reported, and elevated reporting limits (RLs) are provided.

The method blank for preparation batch 680-605969 and analytical batch 680-606144 contained Toxaphene, Technical and Total Toxaphene above the reporting limit (RL). Associated sampleS were not re-extracted and re-analyzed because results were greater than 10X the value found in the method blank.

The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for preparation batch 680-605969 and analytical batch 680-606144 recovered outside control limits for the following analytes: Toxaphene, Technical and Total Toxaphene. These analytes were biased high in the LCS but detected at such a high level in the samples that the high bias of the LCS/LCSD are insignificant. The site samples have also had detections at this level historically.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 680-605969.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### PERCENT SOLIDS/MOISTURE

Samples Si-4181-1 (680-179523-1), Si-4181-2 (680-179523-2), Si-4181-3 (680-179523-3) and Si-4181-4 (680-179523-4) were analyzed for Percent Solids/Moisture in accordance with TestAmerica SOP. The samples were analyzed on 01/28/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Sample Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Frmr Brunswick Plant DARAMEND TS

Job ID: 680-179523-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-179523-1	Si-4181-1	Solid	01/21/20 00:00	01/22/20 09:00	
680-179523-2	Si-4181-2	Solid	01/21/20 00:00	01/22/20 09:00	
680-179523-3	Si-4181-3	Solid	01/21/20 00:00	01/22/20 09:00	
680-179523-4	Si-4181-4	Solid	01/21/20 00:00	01/22/20 09:00	

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# Method Summary

entGsy c GouasyG e osu. nPsyur ls, j  
/ SdS yk tyG WMSUS suTt, 4 / rPsyDOg Oh d ( D ) k

Job ID: 680-175Q i -1

Method	Method Description	Protocol	Laboratory
8081U	VSPso, Ero3sG/ Gyt, t3Gu p e v	kA 8L6	) Ox k O=
h otuy. SG	/ GS Gsyh otuy. SG	d/ O	) Ox k O=
i CL6	h t, SdTPnGd" ySP, ytos	kA 8L6	) Ox k O=

**Protocol References:**

d/ OF Nk dsnt3sMGyPh/ SdG ytos O2Gs, a  
kA 8L6 F 9) Guyh GEo3u WbSd nPh Pys2 k oit3 A PuyG / Eaut, Pnc EGMt, Pnh GEo3u9) EtS d3tytosr ( onbMbGS1586 Os3 lya Nf 3PyGj

**Laboratory References:**

) Ox k O= F d. SdRsu ) GuyOMG3, Pr k PnPssPEr C10l xPg o, EGOnGs. Gr k PnPssPEr c Oi 1L0Lr) dx p51l vi CL-78C8



# Definitions/Glossary

Client: Geosyntec Consultants, Inc.  
Project/Site: Frmr Brunswick Plant DARAMEND TS

Job ID: 680-179523-1

## Qualifiers

### GC Semi VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
B	Compound was found in the blank and sample.
D	Sample results are obtained from a dilution; the surrogate or matrix spike recoveries reported are calculated from diluted samples.
U	Indicates the analyte was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)



# Detection Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Frmr Brunswick Plant DARAMEND TS

Job ID: 680-179523-1

## Client Sample ID: Si-4181-1

## Lab Sample ID: 680-179523-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	7200000	B *	1000000		ug/Kg	10000	☼	8081B	Total/NA
Total Toxaphene	6900000	B *	1000000		ug/Kg	10000	☼	8081B	Total/NA

## Client Sample ID: Si-4181-2

## Lab Sample ID: 680-179523-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	5200000	B *	1100000		ug/Kg	10000	☼	8081B	Total/NA
Total Toxaphene	5100000	B *	1100000		ug/Kg	10000	☼	8081B	Total/NA

## Client Sample ID: Si-4181-3

## Lab Sample ID: 680-179523-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	6300000	B *	1100000		ug/Kg	10000	☼	8081B	Total/NA
Total Toxaphene	6200000	B *	1100000		ug/Kg	10000	☼	8081B	Total/NA

## Client Sample ID: Si-4181-4

## Lab Sample ID: 680-179523-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	6200000	B *	1100000		ug/Kg	10000	☼	8081B	Total/NA
Total Toxaphene	6000000	B *	1100000		ug/Kg	10000	☼	8081B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah

# Client Sample Results

entGy: c GouasyG e osu. nPsur ls, j  
 / SFG yBtyG wS SAS suRt, M/ rPsyDENET gKD 2B

Job ID: 680-174Q i -1

**Client Sample ID: Si-4181-1**

**Lab Sample ID: 680-179523-1**

Date Collected: 01/21/20 00:00

Matrix: Solid

Date Received: 01/22/20 09:00

Percent Solids: 78.5

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	7200000	B *	1000000		.3r03	☼	01 r0i r0 15:CC	01 r0Ch0 16:l 7	10000
Total Toxaphene	6900000	B *	1000000		.3r03	☼	01 r0i r0 15:CC	01 r0Ch0 16:l 7	10000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	D	54 - 133				02/03/20 14:55	02/05/20 16:27	10000
Tetrachloro-m-xylene	0	D	46 - 130				02/03/20 14:55	02/05/20 16:27	10000

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# Client Sample Results

entGy: c GouasyG e osu. nPsur Is, j  
 / SFG yBtyG wS SAS suRt, M/ rPsyDENET gKD 2B

Job ID: 680-174Q i -1

**Client Sample ID: Si-4181-2**

**Lab Sample ID: 680-179523-2**

Date Collected: 01/21/20 00:00

Matrix: Solid

Date Received: 01/22/20 09:00

Percent Solids: 79.0

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	5200000	B *	1100000		.3r03	✱	01 r0i r0 15:CC	01 r0Ch0 16:5i	10000
Total Toxaphene	5100000	B *	1100000		.3r03	✱	01 r0i r0 15:CC	01 r0Ch0 16:5i	10000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	D	54 - 133				02/03/20 14:55	02/05/20 16:43	10000
Tetrachloro-m-xylene	0	D	46 - 130				02/03/20 14:55	02/05/20 16:43	10000

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# Client Sample Results

entGy c GouasyG e osu. nPsur Is, j  
 / SFG yBtyG wS SAS suRt, M/ rPsyDENET gKD 2B

Job ID: 680-174Q i -1

**Client Sample ID: Si-4181-3**

**Lab Sample ID: 680-179523-3**

Date Collected: 01/21/20 00:00

Matrix: Solid

Date Received: 01/22/20 09:00

Percent Solids: 79.6

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	6300000	B *	1100000		.3r03	✱	01 r0i r0 15:CC	01 r0Ch0 16:C4	10000
Total Toxaphene	6200000	B *	1100000		.3r03	✱	01 r0i r0 15:CC	01 r0Ch0 16:C4	10000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	D	54 - 133				02/03/20 14:55	02/05/20 16:59	10000
Tetrachloro-m-xylene	0	D	46 - 130				02/03/20 14:55	02/05/20 16:59	10000

# Client Sample Results

entGy c GouasyG e osu. nPsur Is, j  
 / SFG yBtyG wS SAS suRt, M/ rPsyDENET gKD 2B

Job ID: 680-174Q i -1

**Client Sample ID: Si-4181-4**

**Lab Sample ID: 680-179523-4**

Date Collected: 01/21/20 00:00

Matrix: Solid

Date Received: 01/22/20 09:00

Percent Solids: 76.4

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toxaphene, Technical	6200000	B *	1100000		.3r03	*	01 r0i r0 15:CC	01 r0Ch0 17:1C	10000
Total Toxaphene	6000000	B *	1100000		.3r03	*	01 r0i r0 15:CC	01 r0Ch0 17:1C	10000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	D	54 - 133				02/03/20 14:55	02/05/20 17:15	10000
Tetrachloro-m-xylene	0	D	46 - 130				02/03/20 14:55	02/05/20 17:15	10000

# Surrogate Summary

entGy: c GouasyG e osu. nPsur ls, j  
 / SFG yBtyG wS SAS suRt, M/ rPsyDENET 23 D 9B

Job ID: 680-174Q i -1

## Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP1	TCX1
		(54-133)	(46-130)
680-174Q i -1	Bt-5181-1	0 D	0 D
680-174Q i -1	Bt-5181-1	0 D	0 D
680-174Q i -i	Bt-5181-i	0 D	0 D
680-174Q i -5	Bt-5181-5	0 D	0 D
Le B 680-60C464m-E	LPb e osySnBPk prG	11 7	81
Le BD 680-60C464m-E	LPb e osySnBPk prGD. p	11 l	8i
T A 680-60C464m-E	T Ghod AirPsM	1i i	86

### Surrogate Legend

De A/ = De A DG P, hroSbtphGs an  
 9e X = 9GSP, hroS-k -xarGs G

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Frmr Brunswick Plant DARAMEND TS

Job ID: 680-179523-1

## Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 680-605969/1-A

Matrix: Solid

Analysis Batch: 606144

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 605969

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Toxaphene, Technical	95.8		85		ug/Kg		02/03/20 14:55	02/04/20 16:25	1
Total Toxaphene	85	U	85		ug/Kg		02/03/20 14:55	02/04/20 16:25	1
Surrogate	MB	MB	Limits			Prepared	Analyzed	Dil Fac	
%Recovery	Qualifier								
DCB Decachlorobiphenyl	133		54 - 133			02/03/20 14:55	02/04/20 16:25	1	
Tetrachloro-m-xylene	86		46 - 130			02/03/20 14:55	02/04/20 16:25	1	

Lab Sample ID: LCS 680-605969/2-A

Matrix: Solid

Analysis Batch: 606144

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 605969

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Toxaphene, Technical	267	378	*	ug/Kg		142	42 - 130
Total Toxaphene	267	402	*	ug/Kg		151	42 - 130
Surrogate	LCS	LCS			Prepared	Analyzed	Dil Fac
%Recovery	Qualifier	Limits					
DCB Decachlorobiphenyl	127		54 - 133				
Tetrachloro-m-xylene	81		46 - 130				

Lab Sample ID: LCSD 680-605969/3-A

Matrix: Solid

Analysis Batch: 606144

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 605969

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	%Rec. Limits	RPD	
		Result	Qualifier					RPD	Limit
Toxaphene, Technical	267	499	*	ug/Kg		187	42 - 130	28	50
Total Toxaphene	267	551	*	ug/Kg		207	42 - 130	31	50
Surrogate	LCSD	LCSD			Prepared	Analyzed	Dil Fac		
%Recovery	Qualifier	Limits							
DCB Decachlorobiphenyl	132		54 - 133						
Tetrachloro-m-xylene	83		46 - 130						

# QC Association Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Frmr Brunswick Plant DARAMEND TS

Job ID: 680-179523-1

## GC Semi VOA

### Prep Batch: 605969

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-179523-1	Si-4181-1	Total/NA	Solid	3546	
680-179523-2	Si-4181-2	Total/NA	Solid	3546	
680-179523-3	Si-4181-3	Total/NA	Solid	3546	
680-179523-4	Si-4181-4	Total/NA	Solid	3546	
MB 680-605969/1-A	Method Blank	Total/NA	Solid	3546	
LCS 680-605969/2-A	Lab Control Sample	Total/NA	Solid	3546	
LCS D 680-605969/3-A	Lab Control Sample Dup	Total/NA	Solid	3546	

### Analysis Batch: 606144

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-605969/1-A	Method Blank	Total/NA	Solid	8081B	605969
LCS 680-605969/2-A	Lab Control Sample	Total/NA	Solid	8081B	605969
LCS D 680-605969/3-A	Lab Control Sample Dup	Total/NA	Solid	8081B	605969

### Analysis Batch: 606290

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-179523-1	Si-4181-1	Total/NA	Solid	8081B	605969
680-179523-2	Si-4181-2	Total/NA	Solid	8081B	605969
680-179523-3	Si-4181-3	Total/NA	Solid	8081B	605969
680-179523-4	Si-4181-4	Total/NA	Solid	8081B	605969

## General Chemistry

### Analysis Batch: 605257

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-179523-1	Si-4181-1	Total/NA	Solid	Moisture	
680-179523-2	Si-4181-2	Total/NA	Solid	Moisture	
680-179523-3	Si-4181-3	Total/NA	Solid	Moisture	
680-179523-4	Si-4181-4	Total/NA	Solid	Moisture	



# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 Project/Site: Frmr Brunswick Plant DARAMEND TS

Job ID: 680-179523-1

**Client Sample ID: Si-4181-1**

**Lab Sample ID: B86-1075Mk-1**

Date Collecte9: 61RM/RM6 66:66

d atri/ : Soli9

Date v eceiTe9: 61RM/RM6 67:66

s rep yPpe	Aatch yPpe	Aatch d etho9	v Fn	Dil . actor	Initial umoFnt	. inal umoFnt	Aatch 2 Fmber	s reprepare9 or unalPNe9	unalPzt	Lab
Total/NA	Analysis	Moisture		1			605257	01/28/20 06:33	JEB	TAL SAV
Instrument ID: NOEQUIP										

**Client Sample ID: Si-4181-1**

**Lab Sample ID: B86-1075Mk-1**

Date Collecte9: 61RM/RM6 66:66

d atri/ : Soli9

Date v eceiTe9: 61RM/RM6 67:66

sercent Soli9z: 083

s rep yPpe	Aatch yPpe	Aatch d etho9	v Fn	Dil . actor	Initial umoFnt	. inal umoFnt	Aatch 2 Fmber	s reprepare9 or unalPNe9	unalPzt	Lab
Total/NA	Prep	3546			15.74 g	5 mL	605969	02/03/20 14:55		TAL SAV
Total/NA	Analysis	8081B		10000			606290	02/05/20 16:27	JCK	TAL SAV
Instrument ID: CSGK										

**Client Sample ID: Si-4181-M**

**Lab Sample ID: B86-1075Mk-M**

Date Collecte9: 61RM/RM6 66:66

d atri/ : Soli9

Date v eceiTe9: 61RM/RM6 67:66

s rep yPpe	Aatch yPpe	Aatch d etho9	v Fn	Dil . actor	Initial umoFnt	. inal umoFnt	Aatch 2 Fmber	s reprepare9 or unalPNe9	unalPzt	Lab
Total/NA	Analysis	Moisture		1			605257	01/28/20 06:33	JEB	TAL SAV
Instrument ID: NOEQUIP										

**Client Sample ID: Si-4181-M**

**Lab Sample ID: B86-1075Mk-M**

Date Collecte9: 61RM/RM6 66:66

d atri/ : Soli9

Date v eceiTe9: 61RM/RM6 67:66

sercent Soli9z: 073

s rep yPpe	Aatch yPpe	Aatch d etho9	v Fn	Dil . actor	Initial umoFnt	. inal umoFnt	Aatch 2 Fmber	s reprepare9 or unalPNe9	unalPzt	Lab
Total/NA	Prep	3546			15.36 g	5 mL	605969	02/03/20 14:55		TAL SAV
Total/NA	Analysis	8081B		10000			606290	02/05/20 16:43	JCK	TAL SAV
Instrument ID: CSGK										

**Client Sample ID: Si-4181-x**

**Lab Sample ID: B86-1075Mk-x**

Date Collecte9: 61RM/RM6 66:66

d atri/ : Soli9

Date v eceiTe9: 61RM/RM6 67:66

s rep yPpe	Aatch yPpe	Aatch d etho9	v Fn	Dil . actor	Initial umoFnt	. inal umoFnt	Aatch 2 Fmber	s reprepare9 or unalPNe9	unalPzt	Lab
Total/NA	Analysis	Moisture		1			605257	01/28/20 06:33	JEB	TAL SAV
Instrument ID: NOEQUIP										

**Client Sample ID: Si-4181-x**

**Lab Sample ID: B86-1075Mk-x**

Date Collecte9: 61RM/RM6 66:66

d atri/ : Soli9

Date v eceiTe9: 61RM/RM6 67:66

sercent Soli9z: 073

s rep yPpe	Aatch yPpe	Aatch d etho9	v Fn	Dil . actor	Initial umoFnt	. inal umoFnt	Aatch 2 Fmber	s reprepare9 or unalPNe9	unalPzt	Lab
Total/NA	Prep	3546			15.20 g	5 mL	605969	02/03/20 14:55		TAL SAV
Total/NA	Analysis	8081B		10000			606290	02/05/20 16:59	JCK	TAL SAV
Instrument ID: CSGK										

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 Project/Site: Frmr Brunswick Plant DARAMEND TS

Job ID: 680-179523-1

**Client Sample ID: Si-4181-4**

**Lab Sample ID: B86-1075Mk-4**

Date Collected: 6/16/2016 66:66

Material: Soli9

Date received: 6/16/2016 67:66

Sample Type	Analysis	Parameter	Value	Dilution	Initial	Final	Batch	Prepared	Analyst	Lab
Total/NA	Analysis	Moisture		1			605257	01/28/20 06:33	JEB	TAL SAV

Instrument ID: NOEQUIP

**Client Sample ID: Si-4181-4**

**Lab Sample ID: B86-1075Mk-4**

Date Collected: 6/16/2016 66:66

Material: Soli9

Date received: 6/16/2016 67:66

Percent Solids: 0.33

Sample Type	Analysis	Parameter	Value	Dilution	Initial	Final	Batch	Prepared	Analyst	Lab
Total/NA	Prep	3546			15.13 g	5 mL	605969	02/03/20 14:55		TAL SAV
Total/NA	Analysis	8081B		10000			606290	02/05/20 17:15	JCK	TAL SAV

Instrument ID: CSGK

**Laboratory Reference:**

TAL SAV = Eurofins TestAmerica, Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

**Chain of Custody Record**

<b>Client Information</b> Client Contact: Steve Sande Phone: 770-910-7537 E-Mail: jerry.lanier@testamericainc.com Lab PM: Jerry Lanier Camer Tracking No(s):		C- Coc No: Page: Page 1 of 1 Job #:	
Company: Geosyntec Consultants Inc Address: 1255 Roberts Blvd # 200 City: Kennesaw State, Zip: GA, 30144 Phone: 678 202 9500 Email: aciblak@geosyntec.com, ssande@siremlab.com, mhealey@siremlab.com Project Name: Former Brunswick Plant DARAMEND TS Site: Brunswick Plant, GA		<b>Analysis Requested</b> Due Date Requested: TAT Requested (days): Standard PO #: WO #: Project #: SSOW#:	
<b>Sample Identification</b> Sample ID: Si-4181-1 Si-4181-2 Si-4181-3 Si-4181-4		Sample Date: 1/21/20 1/21/20 1/21/20 1/21/20	
Sample Type (C=Comp, G=grab): G G G G		Matrix (W=water, S=solid, O=soil, T=tissue, A=air): S S S S	
Field Filtered Sample (Yes or No): Perform MS/MSD (Yes or No): EPA Method 8081B: Appendix IX Metals (6020/470)		Total Number of Containers: Special Instructions/Note: HOLD for further instruction from Ali Cibiak or SIREM	
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) Return To Client: <input type="checkbox"/> Disposal By Lab: <input type="checkbox"/> Archive For: <input type="checkbox"/> Months		Special Instructions/OC Requirements: Method of Shipment: Received by: <i>[Signature]</i> Date/Time: 1-22-20 9:00 Received by: Date/Time: Received by: Date/Time: Cooler Temperature(s) °C and Other Remarks: 2.1 / 2.5	



## Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 680-179523-1

**Login Number: 179523**

**List Source: Eurofins TestAmerica, Savannah**

**List Number: 1**

**Creator: Sims, Robert D**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Frmr Brunswick Plant DARAMEND TS

Job ID: 680-179523-1

## Laboratory: Eurofins TestAmerica, Savannah

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87052	06-30-20
Georgia	State	E87052	06-30-20

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## ANALYTICAL REPORT

Eurofins TestAmerica, Savannah  
5102 LaRoche Avenue  
Savannah, GA 31404  
Tel: (912)354-7858

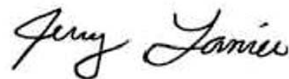
Laboratory Job ID: 680-178939-1

Client Project/Site: Former Brunswick Plant DARAMEND TS  
Revision: 1

**For:**

Geosyntec Consultants, Inc.  
1255 Roberts Blvd, NW  
Suite 200  
Kennesaw, Georgia 30144

Attn: Adria Reimer



---

Authorized for release by:  
2/28/2020 1:34:58 PM

Jerry Lanier, Project Manager I  
(912)250-0281  
[jerry.lanier@testamericainc.com](mailto:jerry.lanier@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Case Narrative

Client: Geosyntec Consultants, Inc.  
Project/Site: Former Brunswick Plant DARAMEND TS

Job ID: 680-178939-1

**Job ID: 680-178939-1**

**Laboratory: Eurofins TestAmerica, Savannah**

**Narrative**

## CASE NARRATIVE

**Client: Geosyntec Consultants, Inc.**

**Project: Former Brunswick Plant DARAMEND TS**

**Report Number: 680-178939-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

### **RECEIPT**

The samples were received on 01/03/2020; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.8 C.

The final report was revised to report total and technical toxaphene per client request.

### **ORGANOCHLORINE PESTICIDES (GC)**

Samples Si-4181-1 (680-178939-1), Si-4181-2 (680-178939-2), Si-4181-3 (680-178939-3) and Si-4181-4 (680-178939-4) were analyzed for Organochlorine Pesticides (GC) in accordance with EPA SW-846 Method 8081B. The samples were prepared on 01/08/2020 and analyzed on 01/20/2020.

The following samples required a dilution due to the nature of the sample matrix: Si-4181-1 (680-178939-1), Si-4181-2 (680-178939-2), Si-4181-3 (680-178939-3), Si-4181-4 (680-178939-4), (680-178939-A-1-B MS) and (680-178939-A-1-C MSD). Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

The laboratory control sample (LCS) for preparation batch 680-603146 and analytical batch 680-603722 recovered outside control limits for the following analytes: Endrin, gamma-BHC (Lindane), Heptachlor, Heptachlor epoxide and Methoxychlor. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

Reanalysis of the following sample was performed outside of the analytical holding time due to client request for less dilute analytical run: Si-4181-4 (680-178939-4).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **PERCENT SOLIDS/MOISTURE**

Samples Si-4181-1 (680-178939-1), Si-4181-2 (680-178939-2), Si-4181-3 (680-178939-3) and Si-4181-4 (680-178939-4) were analyzed for Percent Solids/Moisture in accordance with TestAmerica SOP. The samples were analyzed on 01/09/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



# Sample Summary

Job ID: 680-1784C4-1

Int Gs noyct Au l ot yaiGt Q. It uP  
r jo/nuG a: mojB nj wjat yk eAr i, t GDRMRE NT D dF

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
680-1784C4-1	Fe2181-1	Foie	13CS14 00:00	01CS0 04:00	
680-1784C4-3	Fe2181-3	Foie	13CS14 00:00	01CS0 04:00	
680-1784C4-C	Fe2181-C	Foie	13CS14 00:00	01CS0 04:00	
680-1784C4-2	Fe2181-2	Foie	13CS14 00:00	01CS0 04:00	

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# Method Summary

Job ID: 680-1785C5-1

Method Summary Table

Method	Method Description	Protocol	Laboratory
8081W	AjL, t ouVojd n r ny	B( 8)6	dTp BTv
Ooey@jn	r njunt Ooey@jn	gr T	dTp BTv
Ox)6	Oejom, =n gmf, uat	B( 8)6	dTp BTv

**Protocol References:**

gr T " FB gt =ot k nt Gi r joGut TLnt uc  
 B( 8)6 " NinyGOnGo2y woj g=, ia, G L Boie ( , yG. r Vcyu, i\$ Vnk u, i OnGo2yNdVg2 g2eot . ho=nk bnj 1586 Tt 2 IG F92, Gyp

**Laboratory References:**

dTp BTv " gajofd y dnyGk nje, . B, =, tt, V. x10Rp, 4 ouVn T=nt an. B, =, tt, V. s T C1)0) . dgp B1R3Cx) -78x8



# Definitions/Glossary

Client: Geosyntec Consultants, Inc.  
Project/Site: Former Brunswick Plant DARAMEND TS

Job ID: 680-178939-1

## Qualifiers

### GC Semi VOA

Qualifier	Qualifier Description
D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may be flagged with a D.
H	Sample was prepped or analyzed beyond the specified holding time
U	Indicates the analyte was analyzed for but not detected.
X	Surrogate is outside control limits

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Detection Summary

Client: Geosyntec Consultants, Inc.  
 Project/Site: Former Brunswick Plant DARAMEND TS

Job ID: 680-178939-1

## Client Sample ID: Si-4181-1

## Lab Sample ID: 680-178939-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	12000000		2800000		ug/Kg	10000	☼	8081B	Total/NA
Total Toxaphene	11000000		2800000		ug/Kg	10000	☼	8081B	Total/NA

## Client Sample ID: Si-4181-2

## Lab Sample ID: 680-178939-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	14000000		3100000		ug/Kg	10000	☼	8081B	Total/NA
Total Toxaphene	13000000		3100000		ug/Kg	10000	☼	8081B	Total/NA

## Client Sample ID: Si-4181-3

## Lab Sample ID: 680-178939-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toxaphene, Technical	10000000		2700000		ug/Kg	10000	☼	8081B	Total/NA
Total Toxaphene	9400000		2700000		ug/Kg	10000	☼	8081B	Total/NA

## Client Sample ID: Si-4181-4

## Lab Sample ID: 680-178939-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Toxaphene	3000000		2900000		ug/Kg	10000	☼	8081B	Total/NA
Toxaphene, Technical - DL	4000000	H	1500000		ug/Kg	5000	☼	8081B	Total/NA
Total Toxaphene - DL	3800000	H	1500000		ug/Kg	5000	☼	8081B	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Savannah

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Former Brunswick Plant DARAMEND TS

Job ID: 680-178939-1

**Client Sample ID: Si-4181-1**

**Lab Sample ID: 680-178939-1**

Date Collected: 12/31/19 00:00

Matrix: Solid

Date Received: 01/03/20 09:00

Percent Solids: 85.0

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlordane (technical)	280000	U	280000		ug/Kg	☼	01/08/20 11:42	01/20/20 17:29	10000
<b>Toxaphene, Technical</b>	<b>12000000</b>		2800000		ug/Kg	☼	01/08/20 11:42	01/20/20 17:29	10000
<b>Total Toxaphene</b>	<b>11000000</b>		2800000		ug/Kg	☼	01/08/20 11:42	01/20/20 17:29	10000
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	X	54 - 133				01/08/20 11:42	01/20/20 17:29	10000
Tetrachloro-m-xylene	0	X	46 - 130				01/08/20 11:42	01/20/20 17:29	10000



# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Former Brunswick Plant DARAMEND TS

Job ID: 680-178939-1

**Client Sample ID: Si-4181-2**

**Lab Sample ID: 680-178939-2**

**Date Collected: 12/31/19 00:00**

**Matrix: Solid**

**Date Received: 01/03/20 09:00**

**Percent Solids: 78.4**

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlordane (technical)	310000	U	310000		ug/Kg	☼	01/08/20 11:42	01/20/20 17:45	10000
<b>Toxaphene, Technical</b>	<b>14000000</b>		3100000		ug/Kg	☼	01/08/20 11:42	01/20/20 17:45	10000
<b>Total Toxaphene</b>	<b>13000000</b>		3100000		ug/Kg	☼	01/08/20 11:42	01/20/20 17:45	10000

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	X	54 - 133	01/08/20 11:42	01/20/20 17:45	10000
Tetrachloro-m-xylene	0	X	46 - 130	01/08/20 11:42	01/20/20 17:45	10000



# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Former Brunswick Plant DARAMEND TS

Job ID: 680-178939-1

**Client Sample ID: Si-4181-3**

**Lab Sample ID: 680-178939-3**

Date Collected: 12/31/19 00:00

Matrix: Solid

Date Received: 01/03/20 09:00

Percent Solids: 78.3

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlordane (technical)	270000	U	270000		ug/Kg	☼	01/08/20 11:42	01/20/20 18:01	10000
<b>Toxaphene, Technical</b>	<b>10000000</b>		2700000		ug/Kg	☼	01/08/20 11:42	01/20/20 18:01	10000
<b>Total Toxaphene</b>	<b>9400000</b>		2700000		ug/Kg	☼	01/08/20 11:42	01/20/20 18:01	10000

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	X	54 - 133	01/08/20 11:42	01/20/20 18:01	10000
Tetrachloro-m-xylene	0	X	46 - 130	01/08/20 11:42	01/20/20 18:01	10000

# Client Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Former Brunswick Plant DARAMEND TS

Job ID: 680-178939-1

**Client Sample ID: Si-4181-4**

**Lab Sample ID: 680-178939-4**

**Date Collected: 12/31/19 00:00**

**Matrix: Solid**

**Date Received: 01/03/20 09:00**

**Percent Solids: 77.1**

**Method: 8081B - Organochlorine Pesticides (GC)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlordane (technical)	290000	U	290000		ug/Kg	☼	01/08/20 11:42	01/20/20 18:17	10000
Toxaphene, Technical	2900000	U	2900000		ug/Kg	☼	01/08/20 11:42	01/20/20 18:17	10000
<b>Total Toxaphene</b>	<b>3000000</b>		2900000		ug/Kg	☼	01/08/20 11:42	01/20/20 18:17	10000

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	X	54 - 133	01/08/20 11:42	01/20/20 18:17	10000
Tetrachloro-m-xylene	0	X	46 - 130	01/08/20 11:42	01/20/20 18:17	10000

**Method: 8081B - Organochlorine Pesticides (GC) - DL**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlordane (technical)	150000	U H	150000		ug/Kg	☼	01/08/20 11:42	02/18/20 23:36	5000
<b>Toxaphene, Technical</b>	<b>4000000</b>	<b>H</b>	1500000		ug/Kg	☼	01/08/20 11:42	02/18/20 23:36	5000
<b>Total Toxaphene</b>	<b>3800000</b>	<b>H</b>	1500000		ug/Kg	☼	01/08/20 11:42	02/18/20 23:36	5000

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	0	D	54 - 133	01/08/20 11:42	02/18/20 23:36	5000
Tetrachloro-m-xylene	0	D	46 - 130	01/08/20 11:42	02/18/20 23:36	5000



# Surrogate Summary

Client: Geosyntec Consultants, Inc.  
Project/Site: Former Brunswick Plant DARAMEND TS

Job ID: 680-178939-1

## Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Solid

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCBP1 (54-133)	TCX1 (46-130)
680-178939-1	Si-4181-1	0 X	0 X
680-178939-1 MS	Si-4181-1	0 X	0 X
680-178939-1 MSD	Si-4181-1	0 X	0 X
680-178939-2	Si-4181-2	0 X	0 X
680-178939-3	Si-4181-3	0 X	0 X
680-178939-4	Si-4181-4	0 X	0 X
680-178939-4 - DL	Si-4181-4	0 D	0 D
LCS 680-603146/7-A	Lab Control Sample	109	107
MB 680-603146/6-A	Method Blank	99	93

#### Surrogate Legend

DCBP = DCB Decachlorobiphenyl

TCX = Tetrachloro-m-xylene

# QC Sample Results

Client: Geosyntec Consultants, Inc.  
 Project/Site: Former Brunswick Plant DARAMEND TS

Job ID: 680-178939-1

## Method: 8081B - Organochlorine Pesticides (GC)

**Lab Sample ID: MB 680-603146/6-A**

**Matrix: Solid**

**Analysis Batch: 603722**

**Client Sample ID: Method Blank**

**Prep Type: Total/NA**

**Prep Batch: 603146**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Chlordane (technical)	8.1	U	8.1		ug/Kg		01/08/20 11:42	01/14/20 18:33	1
Toxaphene, Technical	81	U	81		ug/Kg		01/08/20 11:42	01/14/20 18:33	1
Surrogate	MB	MB	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	99		54 - 133				01/08/20 11:42	01/14/20 18:33	1
Tetrachloro-m-xylene	93		46 - 130				01/08/20 11:42	01/14/20 18:33	1

**Lab Sample ID: LCS 680-603146/7-A**

**Matrix: Solid**

**Analysis Batch: 603722**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

**Prep Batch: 603146**

Surrogate	LCS	LCS	Limits
	%Recovery	Qualifier	
DCB Decachlorobiphenyl	109		54 - 133
Tetrachloro-m-xylene	107		46 - 130

**Lab Sample ID: 680-178939-1 MS**

**Matrix: Solid**

**Analysis Batch: 604326**

**Client Sample ID: Si-4181-1**

**Prep Type: Total/NA**

**Prep Batch: 603146**

Surrogate	MS	MS	Limits
	%Recovery	Qualifier	
DCB Decachlorobiphenyl	0	X	54 - 133
Tetrachloro-m-xylene	0	X	46 - 130

**Lab Sample ID: 680-178939-1 MSD**

**Matrix: Solid**

**Analysis Batch: 604326**

**Client Sample ID: Si-4181-1**

**Prep Type: Total/NA**

**Prep Batch: 603146**

Surrogate	MSD	MSD	Limits
	%Recovery	Qualifier	
DCB Decachlorobiphenyl	0	X	54 - 133
Tetrachloro-m-xylene	0	X	46 - 130

# QC Association Summary

2019  
 , oPsej @ : / o.SI . F.yi t mGB, i eDwk wA RMD Ej

Job ID: 680-178959-1

## GC Semi VOA

### Prep Batch: 603146

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178959-1	j Qd181-1	Eoe3Mw	j o3N	5Td6	
680-178959-4	j Qd181-4	Eoe3Mw	j o3N	5Td6	
680-178959-5	j Qd181-5	Eoe3Mw	j o3N	5Td6	
680-178959-d	j Qd181-d	Eoe3Mw	j o3N	5Td6	
680-178959-d - Dh	j Qd181-d	Eoe3Mw	j o3N	5Td6	
A F 680-6051d6r6-w	AI dLoNF3i B	Eoe3Mw	j o3N	5Td6	
h2j 680-6051d6r7-w	hcb 2oi eo3j cSp3	Eoe3Mw	j o3N	5Td6	
680-178959-1 Aj	j Qd181-1	Eoe3Mw	j o3N	5Td6	
680-178959-1 Aj D	j Qd181-1	Eoe3Mw	j o3N	5Td6	

### Analysis Batch: 603722

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
A F 680-6051d6r6-w	AI dLoNF3i B	Eoe3Mw	j o3N	8081F	6051d6
h2j 680-6051d6r7-w	hcb 2oi eo3j cSp3	Eoe3Mw	j o3N	8081F	6051d6

### Analysis Batch: 604326

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178959-1	j Qd181-1	Eoe3Mw	j o3N	8081F	6051d6
680-178959-4	j Qd181-4	Eoe3Mw	j o3N	8081F	6051d6
680-178959-5	j Qd181-5	Eoe3Mw	j o3N	8081F	6051d6
680-178959-d	j Qd181-d	Eoe3Mw	j o3N	8081F	6051d6
680-178959-1 Aj	j Qd181-1	Eoe3Mw	j o3N	8081F	6051d6
680-178959-1 Aj D	j Qd181-1	Eoe3Mw	j o3N	8081F	6051d6

### Analysis Batch: 607875

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178959-d - Dh	j Qd181-d	Eoe3Mw	j o3N	8081F	6051d6

## General Chemistry

### Analysis Batch: 603249

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-178959-1	j Qd181-1	Eoe3Mw	j o3N	AoCey.l	
680-178959-4	j Qd181-4	Eoe3Mw	j o3N	AoCey.l	
680-178959-5	j Qd181-5	Eoe3Mw	j o3N	AoCey.l	
680-178959-d	j Qd181-d	Eoe3Mw	j o3N	AoCey.l	

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 230 Rectrj ite: / o3S e3F3unsmicB2lant Dwk wA RMD Ej

Job ID: 680-178959-1

**Client Sample ID: Si-4181-1**

**Lab Sample ID: B86-108757-1**

Date Collected: 1/ 51917 66:66

Matrix: Solid

Date Received: 61959 6 67:66

Arep Type	Patch Type	Patch Method	Rzn	Dil Nactor	Initial s moznt	Ninal s moznt	Patch . z mber	Aprepared or s nalyFed	s nalyut	Lab
EotalrMw	wanalysis	A oistu3e		1			605N09	01r09rN0 06:NT	JRF	EwL j wV
Inst3uSent ID: MQRUpI2										

**Client Sample ID: Si-4181-1**

**Lab Sample ID: B86-108757-1**

Date Collected: 1/ 51917 66:66

Matrix: Solid

Date Received: 61959 6 67:66

Aercent Solidu: 823

Arep Type	Patch Type	Patch Method	Rzn	Dil Nactor	Initial s moznt	Ninal s moznt	Patch . z mber	Aprepared or s nalyFed	s nalyut	Lab
EotalrMw	23e4	5T06			T.50g	T SL	605106	01r08rN0 11:CN	Dk E	EwL j wV
EotalrMw	wanalysis	8081F		10000	1 SL	1.0 SL	60C6N6	01rN0rN0 17:N9	JCK	EwL j wV
Inst3uSent ID: Cj GK										

**Client Sample ID: Si-4181-1**

**Lab Sample ID: B86-108757-1**

Date Collected: 1/ 51917 66:66

Matrix: Solid

Date Received: 61959 6 67:66

Arep Type	Patch Type	Patch Method	Rzn	Dil Nactor	Initial s moznt	Ninal s moznt	Patch . z mber	Aprepared or s nalyFed	s nalyut	Lab
EotalrMw	wanalysis	A oistu3e		1			605N09	01r09rN0 06:NT	JRF	EwL j wV
Inst3uSent ID: MQRUpI2										

**Client Sample ID: Si-4181-1**

**Lab Sample ID: B86-108757-1**

Date Collected: 1/ 51917 66:66

Matrix: Solid

Date Received: 61959 6 67:66

Aercent Solidu: 083

Arep Type	Patch Type	Patch Method	Rzn	Dil Nactor	Initial s moznt	Ninal s moznt	Patch . z mber	Aprepared or s nalyFed	s nalyut	Lab
EotalrMw	23e4	5T06			T.N5 g	T SL	605106	01r08rN0 11:CN	Dk E	EwL j wV
EotalrMw	wanalysis	8081F		10000	1 SL	1.0 SL	60C6N6	01rN0rN0 17:OT	JCK	EwL j wV
Inst3uSent ID: Cj GK										

**Client Sample ID: Si-4181-5**

**Lab Sample ID: B86-108757-5**

Date Collected: 1/ 51917 66:66

Matrix: Solid

Date Received: 61959 6 67:66

Arep Type	Patch Type	Patch Method	Rzn	Dil Nactor	Initial s moznt	Ninal s moznt	Patch . z mber	Aprepared or s nalyFed	s nalyut	Lab
EotalrMw	wanalysis	A oistu3e		1			605N09	01r09rN0 06:NT	JRF	EwL j wV
Inst3uSent ID: MQRUpI2										

**Client Sample ID: Si-4181-5**

**Lab Sample ID: B86-108757-5**

Date Collected: 1/ 51917 66:66

Matrix: Solid

Date Received: 61959 6 67:66

Aercent Solidu: 083

Arep Type	Patch Type	Patch Method	Rzn	Dil Nactor	Initial s moznt	Ninal s moznt	Patch . z mber	Aprepared or s nalyFed	s nalyut	Lab
EotalrMw	23e4	5T06			T.98 g	T SL	605106	01r08rN0 11:CN	Dk E	EwL j wV
EotalrMw	wanalysis	8081F		10000	1 SL	1.0 SL	60C6N6	01rN0rN0 18:01	JCK	EwL j wV
Inst3uSent ID: Cj GK										

Ru3fins EestwS e3ca, j avannah

# Lab Chronicle

Client: Geosyntec Consultants, Inc.  
 230 Rectrj ite: / o3S e3F3unsmicB2lant Dwk wA RMD Ej

Job ID: 680-178959-1

**Client Sample ID: Si-4181-4**

**Lab Sample ID: B86-108757-4**

**Date Collected: 1/ 5 1917 66:66**

**Matrix: Solid**

**Date Received: 61 659 6 67:66**

Arep Type	Patch Type	Patch Method	Rzn	Dil Nactor	Initial s moznt	Ninal s moznt	Patch . z mber	Arepared or s nalyFed	s nalyut	Lab
EotalrMw	wanalysis	A oistu3e		1			605N09	01r09rN0 06:NT	JRF	EwL j wV
Inst3uSent ID: MQRUpI2										

**Client Sample ID: Si-4181-4**

**Lab Sample ID: B86-108757-4**

**Date Collected: 1/ 5 1917 66:66**

**Matrix: Solid**

**Date Received: 61 659 6 67:66**

**Aercent Solidu: 003**

Arep Type	Patch Type	Patch Method	Rzn	Dil Nactor	Initial s moznt	Ninal s moznt	Patch . z mber	Arepared or s nalyFed	s nalyut	Lab
EotalrMw	23e4	5T06			T.65 g	T SL	605106	01r08rN0 11:CN	Dk E	EwL j wV
EotalrMw	wanalysis	8081F		10000	1 SL	1.0 SL	60C5N6	01rN0rN0 18:17	JCK	EwL j wV
Inst3uSent ID: Cj GK										
EotalrMw	23e4	5T06	DL		T.65 g	T SL	605106	01r08rN0 11:CN	Dk E	EwL j wV
EotalrMw	wanalysis	8081F	DL	T000			60787T	0N18rN0 N5:56	GRA	EwL j wV
Inst3uSent ID: Cj GK										

**Laboratory Referenceu:**

EwL j wV = Ru3fins EestwS e3ca, j avannah, T10N Lak oche wvenue, j avannah, Gw 5100Q, ERL (91N)5TO-78T8

**Chain of Custody Record**

<b>Client Information</b>		Sampler: Steve Sande		Lab PM: Jerry Lanier	
Client Contact: Ali Ciblak		Phone: 770-910-7537		E-Mail: jerry.lanier@testamericainc.com	
Company: Geosyntec Consultants Inc		Due Date Requested:		Carrier Tracking No(s):	
Address: 1255 Roberts Blvd # 200		TAT Requested (days):		COC No:	
City: Kennesaw		Standard		Page: Page 1 of 1	
State/Zip: GA, 30144		PO #:		Job #:	
Phone: 678 202 9500		WO #:		Preservation Codes:	
Email: aciblak@geosyntec.com, ssande@siremlab.com, mhealey@siremlab.com		Project #:		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
Project Name: Former Brunswick Plant DARAMEND TS		SI-4181		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - ph 4-5 Z - other (specify)	
Site: Brunswick Plant, GA		SSOW#:		Special Instructions/Note:	
<b>Sample Identification</b>		Sample Date		Sample Type	
SI-4181-1		12/31/19		G	
SI-4181-2		12/31/19		G	
SI-4181-3		12/31/19		G	
SI-4181-4		12/31/19		G	
Matrix (W=water, S=solid, O=waste/sl, BI=TISSUE, A=AM)		Sample Time		Sample Type	
S		X		G	
S		X		G	
S		X		G	
S		X		G	
Preservation Code:		Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)	
S		X		X	
S		X		X	
S		X		X	
S		X		X	
EPA Method 8081B		Appendix IX Metals (6020/7470)		Total Number of Containers	
X		X		1	
X		X		1	
X		X		1	
X		X		1	
Barcode: 680-178939 Chain of Custody		Special Instructions/OC Requirements:		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	
Possible Hazard Identification		Toxic <input type="checkbox"/> Flammable <input type="checkbox"/> Corrosive <input type="checkbox"/> Irritant <input type="checkbox"/> Skin <input type="checkbox"/> Hazardous <input type="checkbox"/> Other (specify)		Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Deliverable Requested: I, II, III, IV, Other (specify)		Poison B <input type="checkbox"/> U <input type="checkbox"/> Down <input type="checkbox"/> Biological <input type="checkbox"/>		Special Instructions/OC Requirements:	
Empty Kit Relinquished by:		Date:		Method of Shipment	
Relinquished by: Steve Sande		Date/Time: 2/Jan/19		Date/Time: 01-03-20	
Relinquished by:		Date/Time:		Date/Time:	
Relinquished by:		Date/Time:		Date/Time:	
Custody Seals Intact <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/>		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: 3.7 (CF) 3.8°C	

## Login Sample Receipt Checklist

Client: Geosyntec Consultants, Inc.

Job Number: 680-178939-1

**Login Number: 178939**

**List Source: Eurofins TestAmerica, Savannah**

**List Number: 1**

**Creator: Laughlin, Paul D**

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Accreditation/Certification Summary

Client: Geosyntec Consultants, Inc.  
2300 E. ...

Job ID: 680-178959-1

## Laboratory: Eurofins TestAmerica, Savannah

EN 15189:2013 accreditation list below is applicable to this scope.

Authority	Program	Identification Number	Expiration Date
Georgia	MRLw2	R870fp	06-50-p0
Georgia	jurisdiction	805	06-50-p0

- 1
- 2
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