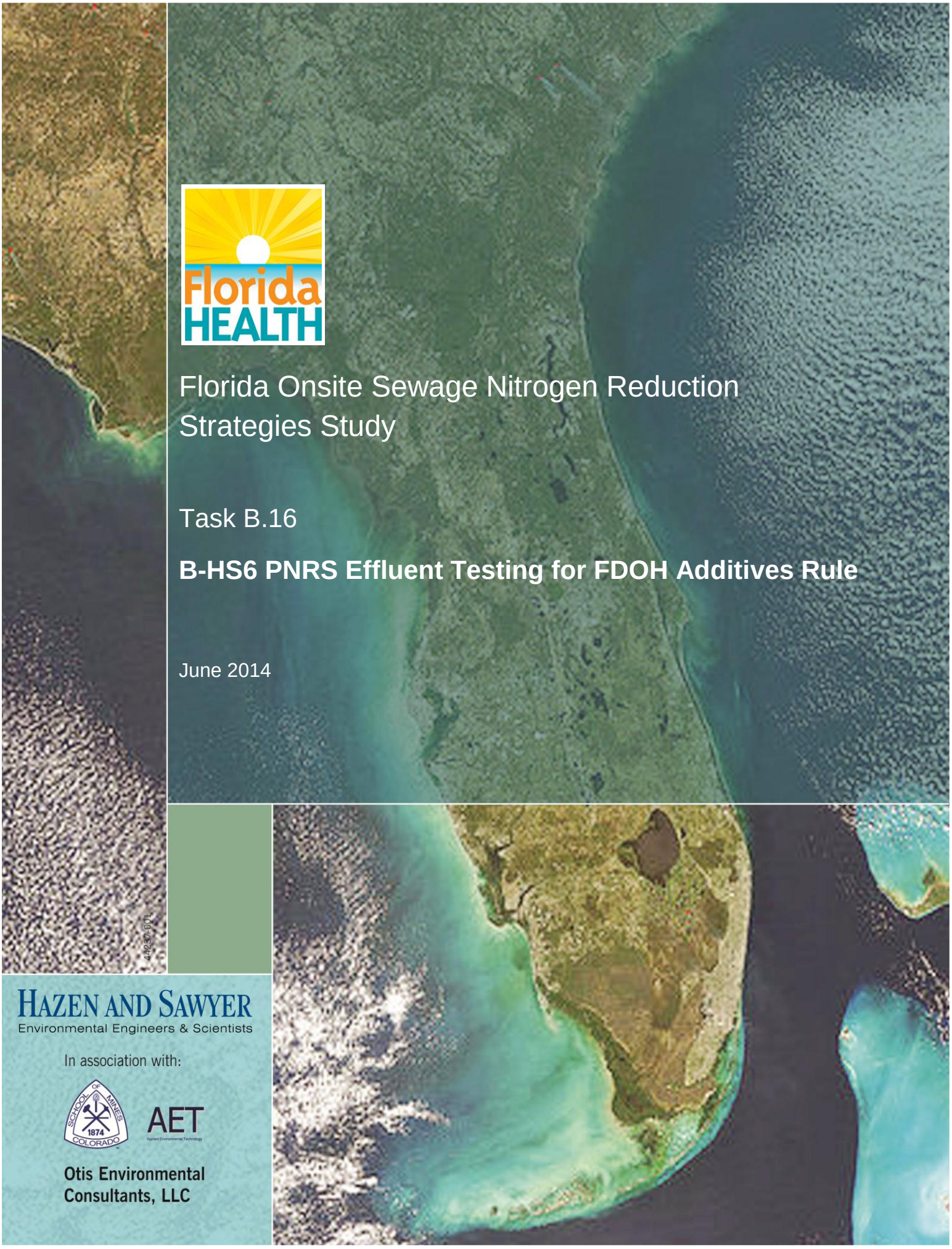

Florida Onsite Sewage Nitrogen Reduction Strategies Study

Task B.16

B-HS6 PNRS Effluent Testing for FDOH Additives Rule

June 2014

HAZEN AND SAWYER
Environmental Engineers & Scientists

In association with:

AET

Otis Environmental Consultants, LLC

Florida Onsite Sewage Nitrogen Reduction Strategies Study

TASK B.16

B-HS6 PNRS Effluent Testing for FDOH Additives Rule

Prepared for:

Florida Department of Health
Division of Disease Control and Health Protection
Bureau of Environmental Health
Onsite Sewage Programs
4042 Bald Cypress Way Bin #A-08
Tallahassee, FL 32399-1713

FDOH Contract CORCL

June 2014

Prepared by:

HAZEN AND SAWYER
Environmental Engineers & Scientists

In Association With:

AET
Applied Environmental Technology

B-HS6 PNRS Effluent Testing for FDOH Additives Rule

Executive Summary

Effluent sampling and analyses were performed on the B-HS6 full-scale PNRS to evaluate the impact of expanded clay, elemental sulfur and lignocellulosic (a blended waste wood from AAA Tree Experts, Tallahassee, FL) media used in the system on effluent quality. Testing was done according to Florida's Additive Rule for Septic System Products established by the Florida Department of Health (FDOH). Each of these media were used in biofilters that enhance nitrogen removal in onsite wastewater treatment systems. Expanded clay is a porous media for aerobic biofilters, while elemental sulfur and lignocellulosic materials are intended as reactive media in anoxic denitrifying biofilters.

Additives testing was conducted by performing chemical analyses and acute toxicity bioassays on effluent samples from the primary tank and Stage 2 biofilter that was actively operating at the passive nitrogen reduction system at home site B-HS6 in Wakulla County, Florida. Volatile organic compound (VOC) analyses were conducted using E.P.A. Methods 8260 and 504.1, and acute toxicity testing was performed by ninety-six hour bioassay with Cyprinella leedsi (Bannerfin Shiner) according to the E.P.A. Whole Effluent Toxicity (WET) protocol.

The concentrations of VOCs in both effluents were below Method Detection Limits for the majority of chemicals. None of the analytical results exceeded the Guidance Maximum Contaminant Level (GMCL) for VOCs established by the Florida Department of Health.

The primary tank (septic tank effluent) did exhibit toxicity by the WET protocol, with a Lethal Concentration 50 (LC50) of 13.2%. The Stage 2 biofilter effluent also exhibited toxicity by the WET protocol, as exhibited by LC50 of 56.1%. The Stage 2 effluent included contact with the following test media: expanded clay, lignocellulosic and elemental sulfur.

1.0 Background

1.1 Florida's Additive Rule for Septic System Products

Florida Department of Health has established specific testing and evaluation requirements for materials that are added to onsite wastewater systems in Florida (FDOH, 2013). Chapter 381.0065 (4) (m), Florida Statutes states: "No product sold in the state for use in onsite sewage treatment and disposal systems may contain any substance in concentrations or amounts that would interfere with or prevent the successful operation of such system, or that would cause discharges from such system to violate applicable water quality standards." The additives rule testing requirements generally include evaluation of volatile organic chemicals by U.S. E.P.A. Method 8260 and acute toxicity bioassay testing by the E.P.A. Whole Effluent Toxicity 96 hr. bioassay protocol (FDOH, 2013).

1.2 Media Evaluated

The B-HS6 system evaluated included three media: expanded clay, lignocellulosic material and elemental sulfur.

Expanded clay (Riverlite) is taken from a clay deposit, and calcining the clay at a temperature of approximately 2000°F in rotary kilns produces a structural grade lightweight aggregate used for concrete masonry (Big River, 2012). Riverlite has a unit weight of 48 lb/ft^3 (Big River, 2012). Expanded clay is an excellent candidate for onsite wastewater treatment biofilters; they provide an excellent attachment surface for nitrifying microorganisms, significant sorption potential for ammonium ions and a high water retention. A number of studies have addressed the use of expanded clay for water, wastewater and stormwater treatment in various process configurations (Anderson et. al., 1998; Kietlinska and Renman 2005; Hinkle, Böhlke et al. 2008, Smith, 2006; Smith, 2011). Recent FDOH studies have also shown expanded clay to be highly effective as an unsaturated biofilter media for onsite wastewater treatment (Smith, 2009).

Lignocellulosic material is a structural component of woody plants and one of the most abundant biopolymers on earth. It is primarily composed of cellulose, hemicellulose and lignin. Cellulose is an organic compound with molecular formula $(C_6H_{10}O_5)_n$, a polysaccharide consisting of a linear chain of several hundred to over ten thousand $\beta(1\rightarrow4)$ linked D-glucose units. Hemicellulose is a polysaccharide related to cellulose that comprises ca. 20% of the biomass of most plants. Hemicellulose, in contrast to cellulose, is derived from several sugars in addition to glucose, especially xylose. Lignin is a complex chemical and an integral part of the secondary cell walls of woody plants (Lebo et al.,2001). Lignin is

one of the most abundant organic polymers on Earth, exceeded only by cellulose, and constitutes from a quarter to a third of the dry mass of wood. As a biopolymer, lignin is unusual because of its heterogeneity and lack of a defined primary structure. Lignin is a cross-linked macromolecule composed of three types of substituted phenols (phenylpropanes) having guaiacyl, syringyl p-hydroxyphenyl and biphenyl nuclei, linked and polymerized through a variety of nonhydroxyl stable C-C and C-O-C bonds (Paul, and Clark, 1989). Its structure is based on the phenyl propanoid unit, which consists of an aromatic ring and 3-C side chain. Lignin fills the spaces in the cell wall between cellulose, hemicellulose, and pectin and is covalently linked to hemicellulose; it resembles a kind of phenol-formaldehyde resin that acts like glue to hold the lignocellulose matrix together. The most commonly noted lignin function is the support through strengthening of wood (xylem cells) in trees (Wardrop, 1969). Lignin is generally associated with reduced digestibility of the overall plant biomass, which helps defend against pathogens and pests. As part of natural cycling, lignin degradation is facilitated by microorganisms including fungi and bacteria although the details of biodegradation are not well understood. Organic products of lignin degradation can be further processed by bacteria.

Southern Yellow Pine (SYP) is a collective term that refers to a group of coniferous species which are classified as yellow pine (as opposed to white pine) and which are native to the Southern United States. Pines are a common feature of the Florida landscape. There are seven species of pines that are native to Florida and three other commonly planted non-native species (Amy and Flinchum, (2011). They grow very well in the acidic soil found in the region. The varieties principally include Longleaf (Pinus palustris), Loblolly (Pinus taeda), Shortleaf (Pinus echinata), and Slash (Pinus elliotti) pine (Forest Products Laboratory, 1936). There are generally no fundamental differences among southern pines for lumber production and Longleaf and Slash pines have historically been responsible for 60% of the world's turpentine supply.

The use of lignocellulosic material has been generally recognized as a viable approach to engineered denitrification (Schipper et al., 2010a; Collins et al., 2010). Successful application of lignocellulosic materials as electron donor in passive denitrification systems has been reported in many studies (Cameron and Schipper, 2010; Elgood et al., 2010; Moorman et al., 2010; Oakley et al. 2010; Schipper et al., 2010b; Woli et al., 2010). Several studies have successfully applied pine based lignocellulosics in denitrification biofilters (Cameron and Schipper, 2010; Elgood et al., 2010; Robertson, 2010; Schipper et al., 2010c).

Elemental sulfur is a non-metallic element on the periodic chart, with an atomic number of 16 and atomic weight of 32.065. It is known as Brimstone in its natural state. It is insoluble in water, tasteless and odorless, and often occurs as a light yellow solid. Sulfur is distributed widely over the earth's surface and occurs in both combined and free states. A significant amount of the world's supply of sulfur for human uses formerly came from sulfur-bearing limestone deposits found in the Gulf Coast region of North America.

Currently, elemental sulfur is produced primarily through its recovery from the hydrogen sulfide (H2S) in "sour" natural gas and by refining of petroleum (Claus process).
The rhombic structure is the most commonly found sulfur form and consists of eight sulfur atoms (S8) arranged in a puckered-ring structure. Rhombic elemental sulfur has a molecular weight of 256.50 Da, a specific gravity of 2.07 at 70^{o}F. The rhombic structure is the stable crystalline form at one atmosphere pressure and temperature less than 95.4°C, while the monoclinic crystalline structure is thermodynamically dominant from 95.4°C up to the melt temperature of 118.9°C. Elemental sulfur is not readily wetted or dissolved by water.

Numerous studies have addressed the use of elemental sulfur for denitrification in laboratory and field studies in a variety of biofilter configurations (Aoi et al., (2005); Batchelor et al., 1978; Bisogni et al., 1977; Darbi et al., 2003b; Darbi et al., 2002; Darbi et al., 2003a; Flere and Zhang, 1998; Furumai et al., 1996; Hasegawa and Hanaki, 2001; Hwang et al., 2005; Kanter et al., 1998; Kim et al., 2004; Kim and Bae, 2000; Kim et al., 2003; Koenig and Liu, 2002; Koenig and Liu, 2004; Koenig et al., 2005; Kuai and Verstraete, 1999; Lampe and Zhang, 1996; Li et al., 2009; Moon et al., 2004; Moon et al., 2006; Moon et al., 2008; Nugroho et al., 2002; Oh et al., 2002; Oh et al., 2001; Park et al., 2002; Shan and Zhang, 1998; Sierra-Alvarez et al., 2007; Soares, 2002; Tanaka et al., 2007; Wang et al., 2005; Yamamoto-Ikemoto and Komori, 2003; Zeng and Zhang, 2005; Zhang, 2002; Zhang, 2004; Zhang and Lampe, 1999; Zhang and Shan, 1999). Recently, elemental sulfur was shown to be highly effective in supporting onsite wastewater denitrification in saturated anoxic biofilters (Smith, 2009).

1.3 Known and Expected Reactions

Expanded clay serves as a support media for microorganisms that catalyze many types of biochemical reactions without necessarily participating directly in them. Lignocellulosic media is expected to degrade through hydrolytic reactions which may be enhanced by microbial processes, thereby releasing organic carbon which may undergo possible subsequent reactions to produce labile organic carbon compounds that can be used by heterotrophic denitrifying microorganisms. Elemental sulfur is expected to undergo oxidative

dissolution catalyzed by autotrophic microbial processes when external electron donors are present, including molecular oxygen, nitrate, and nitrite.

2.0 TestingMethods

2.1 Source of Media

Expanded clay media was purchased from Big River Industries, Inc., Irwinville, LA in Riverlite G 1/4 and 3/16 size gradations, which were used directly in the biofilters. The expanded clay has a bulk density of approximately 48 lbs/ft^3. A Material Safety Data Sheet (MSDS) for Riverlite is included in Appendix A. Lignocellulosic material was procured in November 2013 from a blended waste wood facility AAA Tree Experts, Tallahassee, FL. The material was a mulch material from the internal sections of wood waste and did not include bark, small limbs, and leaf components. A Material Safety Data Sheet (MSDS) for lignocellulosic material is included in Appendix B. Pastille elemental sulfur was supplied by CoreAgri, Arroya Grande, CA. The ES99 material has a bulk density of 76 lbs/ft^3 and a minimum elemental sulfur content of 99.5%. The MSDS for ES99 pastille sulfur is included in Appendix C.

2.2 Biofilter Configuration and Sample Collection

The nitrogen reducing onsite treatment system for the single family residence was installed in November 2013. Design and construction details were presented previously in the Task B.6 document. Figure 1 is a system schematic showing the system components and layout of the installation. The PNRS system consists of a 1,500 gallon dual chamber concrete primary tank; 275 gallon concrete pump tank; 1,650 gallon concrete tank Stage 1 unsaturated media filter; and 1,500 gallon concrete Stage 2 saturated media biofilter. The treated effluent is discharged into the soil via the existing drainfield (standard trenches).

The PNRS system had been operating for approximately thirty-one weeks when samples were collected for additives testing. A sample of septic tank effluent (STE) was collected for chemical analysis. Household wastewater enters the primary tank and exits as septic tank effluent through an effluent filter screen into the pump tank. The effluent was sampled from a sample port on the pump discharge line which is referred to as primary effluent or STE. Samples are representative of the whole household wastewater and represent the influent to the remainder of the onsite nitrogen reduction system. The Stage 2 biofilter effluent was collected from the second chamber of the Stage 2 biofilter sampled approximately 1 foot below the surface of the effluent baffle tee. This sample location is after

passage through the expanded clay media within the Stage 1 biofilter, lignocellulosic media underlying the expanded clay media, and the sulfur media in the Stage 2 biofilter. It is the final effluent from the treatment system prior to being discharged to the soil infiltration system, or drainfield.

Biofilter characteristics are listed in Table 1. Samples were collected into specific sample containers for chemical and bioassay analysis, immediately placed in coolers on ice, and transported to laboratories in Oldsmar and Sarasota, FL. As a part of the Passive Nitrogen Removal Study, a water quality monitoring event was conducted on June 23, 2014. The water quality data (Table 2) represent conditions when the bioassay samples were collected and can be used to provide insight into biofilter performance when the effluent samples were collected for the Additives Testing.

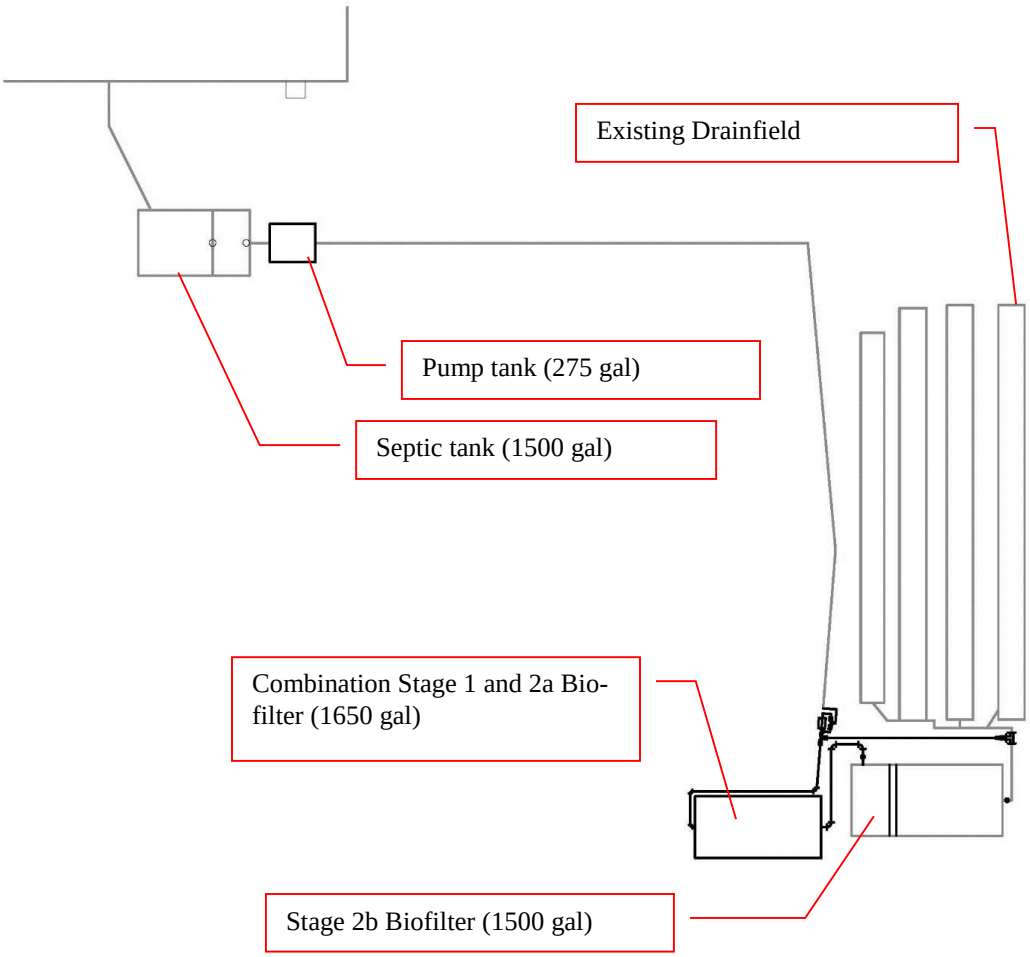

Figure 1
Plan view of B-HS6 System Layout

Table 1
Passive Nitrogen Reduction System Components

	Influent	Tank Volume (gal)	Surface Area (ft^2)	Media	Media Saturated or Unsaturated
Primary Tank	Wastewater from home	1,500	67	none	N/A
Pump tank	Primary tank effluent	275	13	none	N/A
Stage 1 Biofilter and Stage 2a Biofilter	Primary tank effluent	1,650	67	30” Riverlite 1/4 12” Lignocellulosic	-Riverlite Unsaturated -Lignocellu-losic bottom 4” saturated
Stage 2b Biofilter, upflow	Stage 2a effluent	~500 (1,500 total)	~20 (61 total)	12” Elemental sulfur (90%) & oyster shell mixture (10%)	Saturated

Table 2
Biofilter Effluent Water Quality June 23, 2014

Parameter	Primary tank (STE)	Stage 2 effluent
Temperature, °C	24.2	24.1
Dissolved oxygen, mg/L	0.23	0.34
Specific conductance, umhos/cm	1278	1085
pH	7.13	6.60
Total alkalinity, mg/L as $CaCO_3$	530	350
Total suspended solids, mg/L	16	2
Volatile suspended solids, mg/L	15	2
Carbonaceous five day biochemical oxygen demand, mg/L	61	5
Chemical oxygen demand, mg/L	200	58
Total kjeldahl nitrogen, mg/L	7.4[1]	5.9
Ammonia nitrogen, mg/L[1]	95[1]	4.9
Nitrate nitrogen, mg/L	0.01	0.01
Nitrite nitrogen, mg/L	0.01	0.01
Sulfate, mg/L	6.9	140
Sulfide, mg/L	4.9	2.2
Hydrogen sulfide, unionized, mg/L	2.2	1.6
Total phosphorus, mg/L	6.3	3.6
Orthophosphate phosphorus, mg/L	6.3	2.5
Fecal coliform, Ct/100 mL	600,000	1000
e-coli, Ct/100 mL	580,000	1000

[1]Ammonia N and TKN values are likely an analytical error and have been requested to be re-run by the laboratory.

2.3 Chemical Analyses

Chemical analyses were conducted by Southern Analytical Laboratories Inc., 110 Bayview Boulevard, Oldsmar, Florida. Southern Analytical Laboratory, Inc. is NELAP accredited through the Florida Department of Health. Florida's Additive Rule for Septic System Products specifies that E.P.A. Method 8260 be used to analyze for volatile organic chemicals.

The organic chemicals quantified by Method 8260 are listed in Table 3 along with Guidance Maximum Contaminant Levels (MCLs) established by FDOH and Method Detection Limits (MDLs). E.P.A. Method 504.1 was additionally employed to achieve lower MDLs for the two chemicals listed in Table 4. Analytical MDLs were less than the FDOH Guidance Maximum Contaminant Levels (MCLs) for all chemicals.

Table 3
Guidance MCLs and Method Detection Limits for E.P.A. 8260 Parameters

#	Chemical Parameter (EPA 8260)	CAS #	FDOH VOC Guidance MCL, ug/L[1]	MDL, ug/L
1	1,1,1,2-Tetrachloroethane	630-20-6	1	0.5
2	1,1,1-Trichloroethane	71-55-6	200	0.5
3	1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.18
4	1,1,2-Trichloroethane	79-00-5	5	0.5
5	1,1-Dichloroethane	75-34-3	700	0.5
6	1,1-Dichloroethene (Vinylidene Chloride)	75-35-4	7	0.5
7	1,1-Dichloropropene	563-58-6	1	0.5
8	1,2,3-Trichlorobenzene	87-61-6	70	0.5
9	1,2,3-Trichloropropane	96-18-4	42	0.36
10	1,2,4-Trichlorobenzene	120-82-1	70	0.5
11	1,2,4-Trimethylbenzene	95-63-6	10	0.5
12	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	0.2	0.3
13	1,2-Dibromoethane (EDB,Ethylene dibromide)	106-93-4	0.02	0.2
14	1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	600	0.5
15	1,2-Dichloroethane (Ethylene dichloride)	107-06-2	3	0.5
16	1,2-Dichloropropane	78-87-5	5	0.5
17	1,3,5-Trimethylbenzene	108-67-8	10	0.5
18	1,3-Dichlorobenzene (m-Dichlorobenzene)	541-73-1	10	0.5
19	1,4-Dichlorobenzene (p-Dichlorobenzene)	106-46-7	75	0.5
20	2,2-Dichloropropane	594-20-7	5	0.5
21	2-Butanone (Methyl ethyl ketone) (MEK)	78-93-3	4200	5
22	2-Chloroethyl Vinyl Ether	110-75-8	1	0.5
23	o-Chlorotoluene	95-49-8	140	0.5
24	Hexachlorobutadiene	87-68-3	0.5	0.5
25	p-Chlorotoluene	106-43-4	140	0.5
26	4-Isopropyltoluene (p-Cymene)	99-87-6	70	0.5
27	4-Methyl-2-pentanone (Methyl isobutyl ketone) [MIBK]	108-10-1	350	5
28	Acetone	67-64-1	700	5
29	Benzene	71-43-2	1	0.5
30	Bromobenzene	108-86-1		0.5
31	Bromochloromethane	74-97-5	91	0.5
32	Bromodichloromethane	75-27-4	0.6	0.27
33	Bromoform	75-25-2	4	0.5
34	Bromomethane (Methyl bromide)	74-83-9	9.8	0.5
35	Carbon disulfide	75-15-0	700	0.5
36	Carbon Tetrachloride (Tetrachloromethane)	56-23-5	3	0.5
37	Chlorobenzene	108-90-7	100	0.5
38	Chloroethane (Ethyl chloride)	75-00-3	12	0.5
39	Chloroform	67-66-3	70	0.5
40	Chloromethane (Methyl chloride)	74-87-3	2.7	0.62

Table 3 (con't)
Guidance MCLs and Method Detection Limits for E.P.A. 8260 Parameters

#	Chemical Parameter (EPA 8260)	CAS #	FDOH VOC Guidance MCL, ug/L[1]	MDL, ug/L
41	cis-1,2-Dichloroethene	156-59-2	70	0.5
42	cis-1,3-Dichloropropene (DCP, Telone)	10061-02-5	1	0.25
43	Dibromochloromethane	124-48-1	0.4	0.26
44	Dibromomethane	74-95-3		0.5
45	Dichlorodifluoromethane (CFC 12)	75-71-8	1400	0.5
46	Ethylbenzene	100-41-4	30	0.5
47	Isopropylbenzene (Cumene)	98-82-8	0.8	0.5
48	m,p-Xylenes	1330-20-7	20	0.5
49	Methylene Chloride (Dichloromethane)	75-09-2	5	2.5
50	Methyl-tert-Butyl-Ether (MTBE)	1634-04-4	20	0.5
51	Naphthalene	91-20-3	14	0.5
52	n-Butyl Benzene	104-51-8	280	0.5
53	n-Propyl Benzene	103-65-1	280	0.5
54	o-Xylene	95-47-6	20	0.5
55	sec-Butylbenzene	135-98-8	280	0.5
56	Styrene (Vinyl benzene)	100-42-5	100	0.5
57	tert-Butylbenzene	98-06-6	280	0.5
58	Tetrachloroethene	127-18-4	3	0.5
59	Toluene	108-88-3	40	0.5
60	trans-1,2-Dichloroethene	156-60-5	100	0.5
61	trans-1,3-Dichloropropene	10061-01-5	0.4	0.25
62	Trichloroethene (TCE)	79-01-6	3	0.5
63	Trichlorofluoromethane (CFC 11)	75-69-4	2100	0.5
64	Vinyl chloride	75-01-4	1	0.5
65	Xylenes (Total)	1330-20-07	20	0.5
66	2-Hexanone	591-78-6		2.1
67	Acrylonitrile	107-13-1		1.3
68	Iodomethane	74-88-4		0.2
69	trans-1,4-Dichloro-2-butene	110-57-6		0.3
70	Vinyl acetate	108-05-4		0.4

[1]Provided by Sonia Cruz, FDOH

Table 4
Guidance MCLs and Method Detection Limits for E.P.A. 504.1 Parameters

#	Chemical Parameter (EPA 504.1)	CAS #	FDOH VOC Guidance MCL, ug/L[1]	MDL, ug/L
71	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	0.2	0.0048 - 0.0050
72	1,2-Dibromoethane (EDB,Ethylene dibromide)	106-93-4	0.02	0.0061 - 0.0063

[1]Provided by Sonia Cruz, FDOH

2.4 Acute Toxicity Bioassays

Acute toxicity bioassays were conducted by Marinco Bioassay Laboratory, Inc., 4569 Samual Street, Sarasota, Florida. Marinco Bioassay Laboratory, Inc. is NELAP accredited through the Florida Department of Health. The bioassay tests followed standard protocols for whole effluent toxicity testing (U.S. Environmental Protection Agency, 2002). Ten day old *Cyprinella leedsi* (Bannerfin Shiner) were the sensitive test organisms used in the bioassays (Figure 2).

Figure 2
Cyprinella leedsi

3.0 Results and Discussion

3.1 Chemical Analyses

The concentrations of VOCs in both effluents are shown in Table 5. VOCs were below Method Detection Limits for the majority of chemicals. A full laboratory report of VOC analytical results is included in Appendix D. The reported VOC analytical results reported for both effluents show that none exceeded the Guidance Maximum Contaminant Level (GMCL) for VOCs established by the Florida Department of Health.

Table 5
Effluent Analyte Concentrations and FDOH Guidance Levels

#	Chemical Parameter	CAS #	FDOH Guid-ance MCL, ug/L	Effluent Concentration (ug/L) [1,2]	
				Pri-mary Tank (STE)	Stage 2 effluent
1	1,1,1,2-Tetrachloroethane	630-20-6	1	0.2	0.2
2	1,1,1-Trichloroethane	71-55-6	200	0.2	0.2
3	1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.2	0.2
4	1,1,2-Trichloroethane	79-00-5	5	0.2	0.2
5	1,1-Dichloroethane	75-34-3	700	0.2	0.2
6	1,1-Dichloroethene (Vinylidene Chloride)	75-35-4	7	0.2	0.2
7	1,1-Dichloropropene	563-58-6	1	0.2	0.2
8	1,2,3-Trichlorobenzene	87-61-6	70	0.2	0.2
9	1,2,3-Trichloropropane	96-18-4	42	0.4	0.4
10	1,2,4-Trichlorobenzene	120-82-1	70	0.3	0.3
11	1,2,4-Trimethylbenzene	95-63-6	10	0.1	0.1
12	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	0.2	0.3	0.3
13	1,2-Dibromoethane (EDB,Ethylene dibromide)	106-93-4	0.02	0.2	0.2
14	1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	600	0.1	0.1
15	1,2-Dichloroethane (Ethylene dichloride)	107-06-2	3	0.1	0.1
16	1,2-Dichloropropane	78-87-5	5	0.2	0.2
17	1,3,5-Trimethylbenzene	108-67-8	10	0.1	0.1
18	1,3-Dichlorobenzene (m-Dichlorobenzene)	541-73-1	10	0.07	0.07
19	1,4-Dichlorobenzene (p-Dichlorobenzene)	106-46-7	75	0.2	0.2
20	2,2-Dichloropropane	594-20-7	5	0.3	0.3
21	2-Butanone (Methyl ethyl ketone) (MEK)	78-93-3	4200	6.8	7.2
22	2-Chloroethyl Vinyl Ether	110-75-8	1	0.5	0.5
23	o-Chlorotoluene	95-49-8	140	0.1	0.1
24	Hexachlorobutadiene	87-68-3	0.5	0.4	0.4
25	p-Chlorotoluene	106-43-4	140	0.1	0.1
26	4-Isopropyltoluene (p-Cymene)	99-87-6	70	0.2	1.2
27	4-Methyl-2-pentanone (Methyl isobutyl ketone) [MIBK]	108-10-1	350	2.6	2.6
28	Acetone	67-64-1	700	41	6.7
29	Benzene	71-43-2	1	0.1	0.1
30	Bromobenzene	108-86-1		0.2	0.2
31	Bromochloromethane	74-97-5	91	0.1	0.1
32	Bromodichloromethane	75-27-4	0.6	0.2	0.2
33	Bromoform	75-25-2	4	0.2	0.2
34	Bromomethane (Methyl bromide)	74-83-9	9.8	0.4	0.4
35	Carbon disulfide	75-15-0	700	0.2	0.8
36	Carbon Tetrachloride (Tetrachloromethane)	56-23-5	3	0.2	0.2
37	Chlorobenzene	108-90-7	100	0.1	0.1
38	Chloroethane (Ethyl chloride)	75-00-3	12	0.4	0.4
39	Chloroform	67-66-3	70	0.2	0.2

#	Chemical Parameter	CAS #	FDOH Guid-ance MCL, ug/L	Effluent Concentration (ug/L) [1,2]	
				Pri-mary Tank (STE)	Stage 2 effluent
40	Chloromethane (Methyl chloride)	74-87-3	2.7	0.4	0.4
41	cis-1,2-Dichloroethene	156-59-2	70	0.09	0.09
42	cis-1,3-Dichloropropene (DCP, Telone)	10061-02-5	1	0.2	0.2
43	Dibromochloromethane	124-48-1	0.4	0.1	0.1
44	Dibromomethane	74-95-3		0.2	0.2
45	Dichlorodifluoromethane (CFC 12)	75-71-8	1400	0.5	0.5
46	Ethylbenzene	100-41-4	30	0.08	0.08
47	Isopropylbenzene (Cumene)	98-82-8	0.8	0.1	0.1
48	m,p-Xylenes	1330-20-7	20	0.2	0.2
49	Methylene Chloride (Dichloromethane)	75-09-2	5	0.2	0.2
50	Methyl-tert-Butyl-Ether (MTBE)	1634-04-4	20	0.2	0.2
51	Naphthalene	91-20-3	14	0.2	0.2
52	n-Butyl Benzene	104-51-8	280	0.2	0.2
53	n-Propyl Benzene	103-65-1	280	0.1	0.1
54	o-Xylene	95-47-6	20	0.2	0.2
55	sec-Butylbenzene	135-98-8	280	0.2	0.2
56	Styrene (Vinyl benzene)	100-42-5	100	0.05	0.05
57	tert-Butylbenzene	98-06-6	280	0.1	0.1
58	Tetrachloroethene	127-18-4	3	0.1	0.1
59	Toluene	108-88-3	40	5.7	3.5
60	trans-1,2-Dichloroethene	156-60-5	100	0.2	0.2
61	trans-1,3-Dichloropropene	10061-01-5	0.4	0.1	0.1
62	Trichloroethene (TCE)	79-01-6	3	0.2	0.2
63	Trichlorofluoromethane (CFC 11)	75-69-4	2100	0.2	0.2
64	Vinyl chloride	75-01-4	1	0.3	0.3
65	Xylenes (Total)	1330-20-07	20	0.1	0.1
66	2-Hexanone	591-78-6		2.1	2.1
67	Acrylonitrile	107-13-1		1.3	1.3
68	Iodomethane	74-88-4		0.2	0.2
69	trans-1,4-Dichloro-2-butene	110-57-6		0.3	0.3
70	Vinyl acetate	108-05-4			
E.P.A. 504.1 Parameters					
71	1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	0.2	0.0052	0.0052
72	1,2-Dibromoethane (EDB,Ethylene dibromide)	106-93-4	0.02	0.0052	0.0052

[1]Gray-shaded data points indicate values below method detection level (mdl), mdl value used for statistical analyses.
[2]Yellow-shaded data points indicate the reported value is between the laboratory method detection limit and the laboratory practical quantitation limit, value used for statistical analysis.

3.2 Acute Toxicity Bioassays

Results of acute bioassay testing with *Cyprinella leedsi* are summarized in Table 6. A full laboratory report of acute bioassay testing is included in Appendix E. The primary tank (septic tank effluent) did exhibit toxicity by the WET protocol, with a Lethal Concentration

50 (LC50) of 13.2%. The Stage 2 biofilter effluent also exhibited toxicity by the WET protocol, as exhibited by Lethal Concentration 50 (LC50) of 56.1%.

Table 6
Acute Bioassay Results with *Cyprinella leedsi*

Biofilter	Effluent LC 50
BHS6-STE	13.2%
BHS6-ST2	56.1%

Whole Effluent Toxicity Test Permit requirement of LC50 > 100%

4.0 Summary

Testing was conducted on the full-scale PNRS at site B-HS6 to evaluate expanded clay, elemental sulfur and lignocellulosic (a blended waste wood from AAA Tree Experts, Tallahassee, FL) media on effluent quality. Testing was done according to *Florida's Additive Rule For Septic System Products* established by the Florida Department of Health (FDOH). Each material is a media for biofilters that enhance nitrogen removal in onsite wastewater treatment systems. Expanded clay is a porous media for aerobic biofilters, while elemental sulfur and lignocellulosic materials are intended as reactive media in anoxic denitrifying biofilters. Additives testing was conducted by performing chemical analyses and acute toxicity bioassays on effluent samples from the primary tank and Stage 2 biofilter that was actively operating at the passive nitrogen reduction system at home site B-HS6 in Wakulla County, Florida.

Analysis of volatile organic compounds (VOCs) employed E.P.A. Methods 8260 and 504.1. The VOC concentrations were below Method Detection Limits for the majority of chemicals in both effluents. None of the analytical results exceeded the Guidance Maximum Contaminant Level (GMCL) for VOCs established by the Florida Department of Health.

Acute toxicity testing was performed by ninety-six hour bioassays using *Cyprinella leedsi* (Bannerfin Shiner) according to the E.P.A. Whole Effluent Toxicity (WET) protocol. The primary tank (septic tank effluent) did exhibit toxicity by the WET protocol, with a Lethal Concentration 50 (LC50) of 13.2%. The Stage 2 biofilter effluent also exhibited toxicity by the WET protocol, as exhibited by Lethal Concentration 50 (LC50) of 56.1%. However, effluent from the PNRS exhibited a reduction in toxicity compared to the primary effluent.

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Appendix A: Expanded Clay (Riverlite) Material Data Safety Sheet

Big River Industries, Inc.

Material Safety Data Sheet

This complies with OSHA'S Hazard Communication Standard 29 CFR 1910.1200

IDENTITY (As used on Label and List) Expanded Clay Lightweight Aggregate	Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name Big River Industries, Inc. Louisiana Division	**Emergency Telephone Number** (225) 627-4242
Address ***(Number, Street, City, State, and ZIP Code)*** U.S. Highway 190 W 12652 Airline Hwy	**Telephone Number for Information** (225) 627-4242
Erwinville, LA 70729	**Date Prepared** 01/15/12
	Signature of Preparer (*optional)*

Section II – Hazard Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
SiO_2 SILICON DIOXIDE		10*		64.60
Fe_2O_3 FERRIC OXIDE		10*		6.55
Al_2O_3 ALUMINUM OXIDE		10*		20.57
CaO CALCIUM OXIDE		3*		0.84
MgO MAGNESIUM OXIDE		10*		2.91
* Milligrams per cubic meter (Mg/M^3)				

Section III – Physical/Chemical Characteristics

Boiling Point	N/A	**Specific Gravity (H_2O = 1)**	1.32 (SSD)
Vapor Pressure (mm Hg.)	N/A	**Melting Point**	2100 F
Vapor Density (AIR = 1)	N/A	**Evaporation Rate (Butyl Acetate = 1)**	Not Available
Solubility in Water N/A			
Appearance and Odor Reddish, brown angular with no odor			

Section IV – Fire and Explosion Hazard Data

Flash Point (Method Used) N/A	**Flammable Limits** N/A	**LEL** N/A	**UEL** N/A
Extinguishing Media N/A			
Special Fire Fighting Procedures N/A			
Unusual Fire and Explosion Hazards None known			

Section V – Reactivity Data

Stability	Unstable		**Conditions to Avoid** None Known
	Stable	X	
Incompatibility (*Materials to Avoid*) None Known			
Hazardous Decomposition or Byproducts None Known			
Hazardous Polymerization	May Occur		**Conditions to Avoid** None Known
	Will Not Occur	X	

Section VI – Health Hazard Data

Route(s) of Entry:	**Inhalation?** X	**Skin?** X	**Ingestion?** X
Health Hazards (*Acute and Chronic*) Exposure to dust may irritate respiratory system, eyes and skin			
Carcinogenicity: No	**NTP?** No	**IARC Monographs?** No	**OSHA Regulated?** No
Signs and Symptoms of Exposure Irritated eyes from dust, difficulty in breathing, irritated skin.			
Medical Conditions Generally Aggravated by Exposure Respiratory system, irritated eyes or open wounds.			
Emergency and First Aid Procedures Eyes-Flush with running water. Dust Inhalation-Move to fresh air. Skin-Wash with soap and water. Contact physician if irritation persists.			

Section VII – Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled Spilled material may generate dust. Wetting will help reduce dust levels. Respiratory protective equipment may be necessary.
Waste Disposal Method Pickup and reuse clean material. Dispose of waste material in accordance with applicable federal, state and local regulations.
Precautions to be Taken in Handling and Storing Respirable dust may be generated during processing, handling or storage. Control measures as outlined in section VIII should be followed.

Other Precautions
None Known

Section VIII – Control Measures

Respiratory Protection (*Specify Type*) NIOSH – MSHA Approved Dust Respirators		
Ventilation	**Local Exhaust** X	**Special** N/A
	Mechanical (*General)* X	**Other** N/A

Protective Gloves Recommended but not required	**Eye Protection** Safety glasses with side shields
Other Protective Clothing or Equipment Long sleeves and trousers recommended, but not required.	
Work/Hygienic Practices Wash exposed skin with soap and water. Wash work cloths as necessary.	

Appendix B: Lignocellulosic Material Data Safety Sheet

MATERIAL SAFETY DATA SHEET

SECTION I: IDENTIFICATION OF PRODUCT

COMPANY:	**Diversity Technologies Corp.**	DATE:	Apr. 1, 2002
	8750 – 53rd Ave.	PHONE:	780-468-4064
	Edmonton, AB T6E 5G2	FAX:	780-469-1899
PRODUCT NAME:	**SAWDUST**		
PRODUCT USE:	Oil well drilling fluid additive		
CHEMICAL FAMILY:	Wood by-product	CAS #:	None

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)

WHMIS CLASSIFICATION:	Not a controlled product under WHMIS.
WORKPLACE HAZARD:	Not applicable.

TRANSPORTATION OF DANGEROUS GOODS (TDG)

PROPER SHIPPING NAME:	Not regulated under TDG
TDG CLASSIFICATION:	Not applicable
UN NUMBER (PIN):	Not applicable
PACKING GROUP:	Not applicable

SECTION II: HAZARDOUS INGREDIENTS

INGREDIENT	PERCENT	CAS NUMBER	LD_{50} Oral-Rat	LC_{50} Inhal-Rat	ACGIH-TLV

Contains no WHMIS controlled ingredients

SECTION III: HEALTH HAZARDS

ROUTE OF ENTRY:	[ ] EYE CONTACT [ ] SKIN [ ] INHALATION [ ] INGESTION
EYE CONTACT:	Mechanical irritant.
SKIN CONTACT:	No effects expected. Abrasion may occur with prolonged contact.
INGESTION:	No toxic effects expected.
INHALATION:	Possible irritation of nasal passages, throat and bronchial passages. People with existing respiratory problems should avoid wood dust.
CARCINOGENICTY:	Not applicable
TERATOGENICITY:	Not applicable
REPRODUCTIVE TOXICITY:	Not applicable
MUTAGENICTY:	Not applicable

SYNERGISTIC PRODUCTS:	Not applicable

SECTION IV: FIRST AID MEASURES

SKIN CONTACT:	Wash with soap and water. If irritation develops, obtain medical attention.
EYE CONTACT:	Flush eye to remove debris. If irritation persists, obtain medical attention.
INGESTION:	If a large amount is ingested, consult a physician.
INHALATION:	Move patient from dusty environment. Apply oxygen or artificial respiration if required. If breathing difficulties or distress continues obtain medical attention.

SECTION V: PHYSICAL DATA

APPEARANCE AND ODOUR:	Yellow granular flake; woody odour
SPECIFIC GRAVITY:	Variable
BOILING POINT (C):	Not applicable
MELTING POINT (C):	Not applicable
SOLUBILITY IN WATER:	Insoluble pH: No data
PERCENT VOLATILE BY VOLUME:	Not applicable
EVAPORATION RATE:	Not applicable
VAPOUR PRESSURE (mmHg):	Not applicable
VAPOUR DENSITY (air = 1)	Not applicable
BULK DENSITY:	Not applicable

SECTION VI: FIRE AND EXPLOSION HAZARD DATA

FLASH POINT:	Not applicable
FLAMMABLE LIMITS:	LEL: 40 gm/m^3 UEL: Variable
EXTINGUISHING MEDIA:	Dry chemical, carbon dioxide, water spray or foam. Suggest water spray for large fires.
SPECIAL FIRE FIGHTING PRODCEDURES:	Self-contained breathing apparatus required for fire fighting personnel. Move containers from fire area, or cool with water spray, if possible.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	Material will burn under fire conditions. Autoignition temperature = 400-500F.

SECTION VII: REACTIVITY DATA

STABILITY:	STABLE [XX]	UNSTABLE [ ]

INCOMPATIBILITY (CONDITIONS TO AVOID):	Incompatible with oxidizers. Avoid open flames and high temperatures.
CONDITIONS OF REACTIVITY:	Contact with strong oxidizers. May undergo autoignition at high temperatures.
HAZARDOUS DECOMPOSITION PRODUCTS:	Thermal decomposition will result in the following: Water, carbon dioxide, formaic acid, acetic acid, carbon monoxide, methane, wood coal and aldehydes.
HAZARDOUS POLYMERIZATION:	WILL NOT OCCUR [XX] MAY OCCUR [ ]

SECTION VIII: PREVENTATIVE MEASURES

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION:	Suggest NIOSH approved dust mask. OEL = 5 mg/m^3 for non-allergenic wood dust.
VENTILATION:	General mechanical sufficient for normal conditions of use.
PROTECTIVE GLOVES:	Suggest PVC or rubber.
EYE PROTECTION:	Suggest goggles.
OTHER PROTECTIVE EQUIPMENT (Specify):	Long-sleeve shirt and coveralls. Ensure eye wash station and emergency shower available.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Eye and respiratory protection suggested when handling this material. Store in a cool dry area away from incompatibles and open flames.

STEPS TO BE TAKEN IN CASE THE MATERIAL IS SPILLED OR RELEASED

Wear suitable protective equipment. Eliminate ignition sources. Sweep up and collect uncontaminated material for repackaging. Sweep up and collect contaminated material in approved containers for disposal.

WASTE DISPOSAL METHOD

Dispose/incinerate in accordance with all federal, provincial and local regulations. It is the responsibility of the user to determine if material meets the criteria of hazardous waste at the time of disposal.

SECTION IX: PREPARATION

THE INFORMATION CONTAINED HEREIN IS GIVEN IN GOOD FAITH, BUT NO WARRANTY EXPRESSED OR IMPLIED, IS MADE.

DATE ISSUED:	April 1, 2002	BY:	Product safety committee
SUPERSEDES:	March 29, 1999		

Diversity Technologies Corp. is the parent company of Canamara-United Supply Ltd., Hollimex Products Ltd. and Canamara SDS

MATERIAL SAFETY DATA SHEET

WOOD DUST

Company Name, Address

TRADE NAME: Wood Dust
SYNONYMS: None
CAS. NO.: None
DESCRIPTION: Particles generated by any manual or mechanical cutting or abrasion process performed on wood.

PHYSICAL DATA

Boiling Point .....Not Applicable
Specific Gravity.....Variable
(Dependent on wood species and moisture content).
Vapor Density.....Not Applicable
% Volatiles by Volume.....Not Applicable
Melting Point.....Not Applicable
Vapor Pressure.....Not Applicable
Solubility in H_2O (% by wt.).....Insoluble
Evaporation Rate -
(Butyl Acetate=1).....Not Applicable
pH.....Not Applicable
Appearance & Odor.....Light to dark colored granular solid
Color and odor are dependent on the wood species and time since dust was generated.

FIRE & EXPLOSION DATA

Flash Point.....Not Applicable
Autoignition Temperature.....Variable
(typically 400-500°F)
Explosive Limits in Air.....40 grams/m^3 (LEL)
Extinguishing Media.....Water, CO_2, Sand
Special Fire Fighting Procedures.....Wet down with water
Wet down wood dust to reduce likelihood of ignition or dispersion of dust into the air. Remove burned or wet dust to open area after fire is extinguished.
Unusual Fire & Explosion Hazard.....Strong to severe explosion hazard
(if wood dust "cloud" contacts an ignition source)

HEALTH EFFECTS DATA

Exposure Limit.....ACGIH TLV(R):
TWA - 5.0 mg/m^3;
STEL$_{(15\ min.)}$ - 10 mg/m^3 (softwood)
TWA - 1.0 mg/m^3;
(certain hardwoods such as beech and oak)
OSHA PEL: TWA (see Footnote 1) -
(total dust) - 15.0 mg/m^3

(respirable factor) - 5.0 mg/m^3
Skin & Eye Contact.....Eye Irritation & Allergic Contact Dermatitis
(Wood dust can cause eye irritation. Various species of wood dust can elicit allergic contact dermatitis in sensitized individuals)
Ingestion.....Not Applicable
Skin Absorption.....Not known to occur
Inhalation.....May cause:
nasal dryness, irritation & obstruction. Coughing, wheezing, & sneezing: sinusitis & prolonged colds have also been reported.
Chronic Effects.....May cause:
Wood Dust, depending on species, may cause dermatitis on prolonged repetitive contact; may cause respiratory sensitization and/or irritation. IARC classifies wood dust as a carcinogen to humans (Group 1). This classification is based primarily on IARC's evaluation of increased risk in the occurrence of adenocarcinomas of the nasal cavities and paranasal sinuses associated with exposure to wood dust. IARC did not find sufficient evidence to associate cancers of the oropharynx, hypopharynx, lung, lymphatic and hematopoietic systems, stomach, colon, or rectum with exposure to wood dust.

REACTIVITY DATA

Conditions Contributing to Instability.....Stable
(under normal Conditions)
Incompatibility.....Avoid Contact with:

oxidizing agents, drying oils and flame. Product may ignite at temperatures in excess of 400° F.

Hazardous Decomposition Products.....Thermal-oxidative degradation of wood produces: irritating & toxic fumes and gases, including CO, aldehydes and organic acids.

Conditions Contributing to Polymerization.....Not Applicable

PRECAUTIONS AND SAFE HANDLING

Eye Contact.....Avoid

Skin Contact.....Avoid: Repeated or Prolonged Contact with Skin. Careful bathing and Clean clothes are indicated after exposure.

Inhalation.....Avoid: Prolonged or Repeated breathing of Wood Dust in Air.

Oxidizing agents and drying oils.....Avoid contact

Open flame.....Avoid

GENERALLY APPLICABLE CONTROL MEASURES

Ventilation.....Provide: adequate general and local exhaust ventilation to maintain healthful working conditions.

Safety Equipment.....Wear goggles or safety glasses. Other protective equipment such as gloves and approved dust respirators may be needed depending upon dust conditions.

EMERGENCY AND FIRST AID PROCEDURES

Eyes.....Flush with water to remove dust particles. If irritation persists, get medical attention.

Skin.....Get Medical advice If a rash or persistent irritation or dermatitis occur, get medical advice where applicable before returning to work where wood dust is present.

Inhalation.....Remove to fresh air. If persistent irritation, severe coughing, breathing difficulties occur, get medical advice before returning to work where wood dust is present.

Ingestion..... ..... Not Applicable

SPILL/LEAK CLEAN-UP PROCEDURES

Recovery or Disposal.....Clean-up: Sweep or vacuum spills for recovery or disposal; avoid creating dust conditions. Provide good ventilation where dust conditions may occur. Place recovered wood dust in a container for proper disposal.

FOOTNOTE

Footnote 1: In AFL-CIO v. OSHA 965 F. 2d 962 (11th Cir. 1992), the court overturned OSHA's 1989 Air Contaminants Rule, including the specific PELs for wood dust that OSHA had established at that time. The 1989 PELs were: TWA - 5.0 mg/m^3; STEL (15 MIN.) - 10.0 mg/m^3 (ALL SOFT AND HARD WOODS, EXCEPT WESTERN RED CEDAR); WESTERN RED CEDAR: TWA - 2.5 mg/m^3. Wood dust is now officially regulated as an organic dust under the Particulates Not Otherwise Regulated (PNOR) or Inert or Nuisance Dust categories at PELs noted under Health Effects Information section of this MSDS. However, a number of states have incorporated provisions of the 1989 standard in their state plans.

IMPORTANT

Sawdust & Shavings

Material Safety Data Sheet

Product Name: Screened Sawdust, Screened Shavings

SECTION I--DIVISION AND LOCATION
Pioneer Sawdust
621 Fulton Street
Salt Lake City, Utah 84104
Telephone: (801) 972-4432

SECTION II--HAZARDOUS INGREDIENTS/IDENTITY INFORMATION
Ingredients in Product: Kiln Dried White Pine Wood
Chemical Name and Synonyms: Cellulosic Wood Fibre
Chemical Family: Cellulose
Molecular Formula: Complex

SECTION III--PHYSICAL/CHEMICAL CHARACTERISTICS
Boiling Point: N/A
Vapor Pressure: N/A
Vapor Density: N/A
Solubility in Water: Insoluble
Specific Gravity: (WATER = 1): <1
Melting Point: N/A
Evaporation Rate: N/A
Appearance: Yellowish particles of wood/sawdust
Odor: None to typical wood smell

SECTION IV--FIRE AND EXPLOSION DATA
Flash Point: N/A
Flammable Limits: Slight when exposed to flames
Extinguishing Media: Drychemical, Waterspray, Foam
Special Fire Fighting Procedures: None
Unusual Fire and Explosion Hazards: Avoid CO2 blast. Spontaneous heating possible. Avoid hot, humid storage. Do not disperse in air, as this could lend to dust explosion.

SECTION V--REACTIVITY DATA
Stability: Stable
Incompatibility (Material to Avoid): Strong oxidizing agents
Hazardous Decomposition or By-products: Unknown
Hazardous Polymerization: Will not occur

SECTION VI--HEALTH HAZARD DATA
Permissible Concentrations (AIR): Unknown
Effects of Overexposure: Allergies, dermatitis (skin irritation)
Toxicological Properties: Unknown

EMERGENCY FIRST AID PROCEDURES
Eyes: Flush with large amounts of water, consult an eye physician
Skin Contact: Wipe off excess, wash with soap and water
Inhalation: Remove from area
If Swallowed: Call physician immediately

TEL
(801) 972-4432
Toll Free: (800) 962-7632

FAX
(801) 975-7076

EMAIL
info@pioneersawdust.com

Salt Lake City, UT
Headquarters/Distribution Center
621 Fulton Street
Salt Lake City, UT 84104-4327
PO Box 27861
Salt Lake City, UT 84127-0861

San Leandro, CA
DMS Warehouse
1956 Williams Street
San Leandro, CA 94577

www.pioneersawdust.com

PIONEER SAWDUST®

SECTION VII--PRECAUTIONS FOR SAFE HANDLING AND USE
Procedures for Clean-up: Handle as normal solid waste. Scoop up and place in waste container, vacuum, or wet clean.
Waste Disposal Method: Waste material can be buried in an approved landfill or handled as inert waste in accordance with Federal, State, and Local Environmental Regulations

SECTION VIII--SPECIAL PROTECTION INFORMATION
Ventilation Type Required (Local, Mechanical, Special): Use adequate ventilation in volume to keep dust concentration below TLV (5mg/m3).
Respiratory Protection: NIOSH approved Dust to Mist Respirator
Eye Protection: Safety glasses or goggles
Other Protective Equipment: N/A

SECTION IX--SPECIAL PRECAUTIONS
Precautions to be Taken in Handling and Storing: Store dry at ambient temperature. Avoid moisture.
Other Precautions: None

Preparer: Duncan H. Brockbank
Original Date: 12/04/85 (by Norman L. Brockbank)
Revision Date:
Supersedes:

Appendix C: Elemental Sulfur Material Data Safety Sheet

MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT AND COMPANY INFORMATION

Trade Name (as labeled): CoreSulphur ES99

Common Name: Elemental Sulfur 99.5%

Manufactured By: CoreSulphur, Inc.
PO Box 1027
Arroyo Grande, CA 93421

Business Phone: (805) 202-4371

Emergency Phone: INFOTRAC – (800) 535-5053

Date of Preparation: December, 2009
Updated September, 2011

SECTION 2. COMPOSITION AND INFORMATION ON INGREDIENTS

		Exposure Limits In Air	
Chemical Name	**CAS #**	**ACGIH TVL (ppm)**	**OSHA PEL (ppm)**
Sulfur	7704-34-9	NA	NA
NE = Not Established		NA = Not Available	

SECTION 3. EMERGENCY/HAZARDS OVERVIEW

Emergency Overview: Bright yellow colored, free flowing pastille with a possible slight sulfur odor. Dust may cause mild irritation. Sulfur trioxide fumes at temperatures above 1067 °F. Not D.O.T. regulated.

Symptoms Of Over Exposure:

Eyes: Sulfur dust may cause severe irritation with prolonged exposure.
Skin: Prolonged or repeated exposure to sulfur dust may cause skin irritation.
Inhalation: Sulfur dust may cause breathing difficulties and irritation of mucous membranes.
Ingestion: Solid sulfur can be digested in fairly large amounts without injury.
Injection: Not possible.

SECTION 4. FIRST-AID MEASURES

If Inhaled:	Remove to fresh air. If breathing becomes difficult, contact a medical physician. Give artificial respiration if victim is not breathing and obtain immediate medical attention.
If Ingested:	Seek Medical Attention. Do not induce vomiting unless directed to do so by a medical professional. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. If vomiting occurs, keep head lower than hips to prevent introduction of fluid into the lungs.

In Case Of Skin Contact:	Wash thoroughly with soap and water. Remove contaminated clothing and wash before reuse. Seek medical attention if skin becomes irritated.
In Case Of Eye Contact:	Flush immediately with water for at least 15 minutes, lifting the upper and lower eyelids occasionally. Call a physician if eye irritation persists.
Victims of chemical exposure and all rescuers must be taken for medical attention. Take a copy of label and MSDS to physician or health professional with victim.	

SECTION 5. FIRE-FIGHTING MEASURES

Flash Point: Pure liquid sulfur, 370 °F.
Impure liquid sulfur, 428 °F.

LEL Flammable Limits: 35 gm/m^3.

UEL Flammable Limits: 1400 gm/m^3.

Auto Ignition Temperature: Dust Clouds, 374 °F.

Extinguishing Media: Use any standard agent suitable for surrounding structural fire or for other chemicals that may be involved. Fine water sprays and/or dry chemical agent. CO_2, dry chemicals, or sand.

Fire Extinguishing Media to Avoid: Hoses and extinguishers with pressure streams should be avoided where solid sulfur is dusty or where it may create a further hazard by raising more dust clouds.

Unusual Fire And Explosion Hazards: Sulfur trioxide fumes at temperatures above 1067 °F. Dust suspended in air is readily ignited by flame, static electricity, or friction spark. Every reasonable step must be taken to minimize dust formation. Dust tight casings should be equipped with explosion relief vents. Sparkless electrical equipment is recommended. Handling equiqment must be grounded or bonded to avoid static electricity. Keep away from sources of flame or sparks. Detailed recommendations in Manufacturing Chemists Association SD-74 and National Safety Council 612 Bulletins covering “Sulfur” should be followed when handling GreenSun ES 99.5%.

Special Firefighting Procedures: Wear positive pressure, self-contained breathing apparatus (SCBA) and goggles. Avoid exposure to smoke or fumes.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Spill And Leak Response: Pick up dry spills by scooping, shoveling, or vacuuming and place into containers for reuse or disposal. The minimum personal protective equipment should include rubber gloves, rubber apron, and chemical goggles. Gas masks or SCBA gear may be required. Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Keep material out of sewers, storm drains, and surface waters. Comply with all applicable government regulations on spill reporting, handling, and waste disposal. For landfill disposal, mix with limestone 3 times the weight of sulfur.

SECTION 7. STORAGE AND HANDLING

Storage Practices: Store in a cool (above 40 °F), dry, well-ventilated area away from incompatible materials. Solid becomes corrosive to metals when stored wet. Product will physically break down when exposed to moisture.

Handling Practices: Wash thoroughly after handling. Avoid contact with eyes, skin, and clothing. Wash with soap and water after handling.

Work/Hygiene Practices: Avoid getting chemicals ON YOU or IN YOU. Wash hands with soap and water after handling chemicals. Do not eat or drink around or while handling chemicals. Keep out of reach of children.

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Ventilation/Engineering Controls: Use of local exhaust is recommended at product transfer points and where dusty conditions exist.

Respiratory Protection: For normal product handling, use any NIOSH approved air-purifying dust respirator. For extremely dusty conditions, a full facepiece purifying particulate respirator is recommended.

Eye Protection: Chemical dust/splash goggles or full-face shield to prevent eye contact. As a general rule, contact lenses should not be worn when working with chemicals because they contribute to the severity of an eye injury.

Hand Protection: Wear cotton or canvas protective glove to prevent contact. Rubber gloves may be used if product may become wet or moist.

Body Protection: Use body protection appropriate for task. Chemical-resistant coveralls and rubber aprons are generally acceptable.

Other Protective Measures: An eyewash and safety shower should be nearby and ready for use.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Bright yellow colored pastille.	**Boiling Point:**	832 °F.
Odor:	May have slight sulfur odor.	**Crystallization Point:**	NA.
pH:	Neutral when dry.	**Freezing Point:**	246 °F.
Water Solubility:	Insoluble	**Vapor Pressure:**	Solid, less than 0.0001 mm. hg at 68 °F
Density:	76 lbs/ft^3.	**Vapor Density (air = 1):**	>1.
Specific Gravity (H_2O = 1):	Solid, 2.07 gm/ml	NA = Not Available.	

SECTION 10. STABILITY AND REACTIVITY

Stability: Stable.

Conditions To Avoid: Fire and dust explosions.

Incompatibility: Alkaline materials, or mixtures with chlorates, nitrates, or other oxidizing agents.

Hazardous Polymerization: Will not occur.

SECTION 11. TOXICOLOGICAL INFORMATION

Toxicity Data: NA.

Acute Effects:

Eyes: Mild irritant. May cause redness, tearing and/or burning.
Skin: Mild irritant, especially with prolonged exposure or when in contact with moisture.
Ingestion: Nausea and upset stomach
Inhalation: Moderate irritation of nose and throat from dust. May cause dry coughing, wheezing, chest tightness, and burning of mucous membranes.

Chronic Effects: None known.

SECTION 12. ECOLOGICAL INFORMATION

Environmental Stability: Sulfur, is stable in the environment. Its transport in the environment depends upon the exact compound, the pH, the soil type, and the salinity. All work practices should be aimed at eliminating environmental contamination.

SECTION 13. DISPOSAL CONSIDERATIONS

Do not contaminate lakes, streams, ponds, estuaries, oceans, or other waters by discharge of waste effluents or equipment rinsate. Dispose of waste effluents according to federal, state, and local regulations. For landfill disposal, mix with limestone 3 times the weight of sulfur.

SECTION 14. TRANSPORTATION INFORMATION

This product is not regulated per CFR 49 (Special Provisions 172.102 pt 30

SECTION 15. REGULATORY INFORMATION

SARA Reporting Requirements: This material does not contain toxic chemicals subject to reporting requirements of Section 313, Title III of the Superfund Amendments and Reauthorization Act of 1986.

California Proposition 65: WARNING. This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

SECTION 16. OTHER INFORMATION

The information and recommendations herein are taken from data contained in independent, industry recognized references including NIOSH, OSHA, ANSI, and NFPA. This information is, as of date listed above, true and accurate to the best of CoreSulphur, Inc. knowledge. It is intended for use by persons possessing technical knowledge and at their own discretion and risk. Since actual use is beyond our control, no guarantee, express or implied, and no liability is assumed by CoreSulphur, Inc. in conjunction with the use of this information. Actual conditions of use and handling may require consideration of information other than, or in addition to, that which is provided herein.

Appendix D: EPA Methods 8260 and 504.1 Laboratory Report

SOUTHERN ANALYTICAL LABORATORIES, INC.
110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 FAX 813-855-2218

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Laboratory Report

Project Name **BHS6 SE#5**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		**BHS6-STE**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-01**						
Date/Time Collected		**06/23/14 10:48**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Volatile Organic Compounds								
Acetone	ug/L	41 J5	EPA 8260b	4.0	2.0		07/01/14 22:33	1
Acrylonitrile	ug/L	1.3 U	EPA 8260b	4.0	1.3		07/01/14 22:33	1
Benzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Bromobenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Bromochloromethane	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Bromodichloromethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Bromoform	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Bromomethane	ug/L	0.4 U,J5	EPA 8260b	0.8	0.4		07/01/14 22:33	1
2-Butanone	ug/L	6.8	EPA 8260b	4.0	2.0		07/01/14 22:33	1
n-Butylbenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
sec-Butylbenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
t-Butylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Carbon disulfide	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Carbon tetrachloride	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Chlorobenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Chloroethane	ug/L	0.4 U,J5	EPA 8260b	1.6	0.4		07/01/14 22:33	1
Chloroform	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Chloromethane	ug/L	0.4 U	EPA 8260b	1.6	0.4		07/01/14 22:33	1
1,2-Dibromoethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,2-Dibromo-3-chloropropane	ug/L	0.3 U	EPA 8260b	0.8	0.3		07/01/14 22:33	1
2-Chlorotoluene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
2-Chloroethylvinyl Ether	ug/L	0.5 U	EPA 8260b	1.6	0.5		07/01/14 22:33	1
4-Chlorotoluene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Dibromochloromethane	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Dibromomethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,2-Dichlorobenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
1,3-Dichlorobenzene	ug/L	0.07 U	EPA 8260b	0.8	0.07		07/01/14 22:33	1
1,4-Dichlorobenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
trans-1,4-Dichloro-2-butene	ug/L	0.3 U,J5	EPA 8260b	0.8	0.3		07/01/14 22:33	1
Dichlorodifluoromethane	ug/L	0.5 U	EPA 8260b	1.6	0.5		07/01/14 22:33	1
1,1-Dichloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,2-Dichloroethane	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
1,1-Dichloroethene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
cis-1,2-Dichloroethene	ug/L	0.09 U	EPA 8260b	0.8	0.09		07/01/14 22:33	1
trans-1,2-Dichloroethene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,2-Dichloropropane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
2,2-Dichloropropane	ug/L	0.3 U	EPA 8260b	0.8	0.3		07/01/14 22:33	1

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Laboratory Report

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Sample Description		**BHS6-STE**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-01**						
Date/Time Collected		**06/23/14 10:48**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
1,1-Dichloropropene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
cis-1,3-Dichloropropene	ug/L	0.2 U,J5	EPA 8260b	0.8	0.2		07/01/14 22:33	1
trans-1,3-Dichloropropene	ug/L	0.1 U,J5	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Ethylbenzene	ug/L	0.08 U	EPA 8260b	0.8	0.08		07/01/14 22:33	1
Hexachlorobutadiene	ug/L	0.4 U	EPA 8260b	0.8	0.4		07/01/14 22:33	1
2-Hexanone	ug/L	2.1 U	EPA 8260b	4.0	2.1		07/01/14 22:33	1
Iodomethane	ug/L	0.2 U,J5	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Isopropylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
4-Isopropyltoluene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Methyl-t-butyl ether	ug/L	0.2 U	EPA 8260b	1.6	0.2		07/01/14 22:33	1
Methylene Chloride	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
4-Methyl-2-pentanone	ug/L	2.6 U	EPA 8260b	4.0	2.6		07/01/14 22:33	1
Naphthalene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
n-Propylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Styrene	ug/L	0.05 U	EPA 8260b	0.8	0.05		07/01/14 22:33	1
1,1,1,2-Tetrachloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,1,2,2-Tetrachloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Tetrachloroethene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Toluene	ug/L	5.7	EPA 8260b	0.8	0.09		07/01/14 22:33	1
1,2,3-Trichlorobenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,2,4-Trichlorobenzene	ug/L	0.3 U	EPA 8260b	0.8	0.3		07/01/14 22:33	1
1,1,1-Trichloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,1,2-Trichloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Trichloroethene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ug/L	0.6 U	EPA 8260b**	1.6	0.6		07/01/14 22:33	1
Trichlorofluoromethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
1,2,3-Trichloropropane	ug/L	0.4 U	EPA 8260b	0.8	0.4		07/01/14 22:33	1
1,2,4-Trimethylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
1,3,5-Trimethylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Vinyl chloride	ug/L	0.3 U	EPA 8260b	1.6	0.3		07/01/14 22:33	1
Xylene-m,p	ug/L	0.2 U	EPA 8260b	1.6	0.2		07/01/14 22:33	1
Xylene-o	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 22:33	1
Xylenes- Total	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
Total Trihalomethanes	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 22:33	1
1,4-Dioxane	ug/L	0.0	EPA 8260b**				07/01/14 22:33	1
Surrogate for EPA 8260b	*Dibromofluoromethane*		*103 %*	*Limits*	*65-135*			

Pesticide Analyses

SOUTHERN ANALYTICAL LABORATORIES, INC.
110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 FAX 813-855-2218

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Laboratory Report

Project Name **BHS6 SE#5**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		**BHS6-STE**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-01**						
Date/Time Collected		**06/23/14 10:48**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
1,2-Dibromo-3-chloropropane	ug/L	0.0052 U	EPA 504.1	0.021	0.0052	06/30/14 09:53	06/30/14 20:07	1
1,2-Dibromoethane	ug/L	0.0052 U	EPA 504.1	0.021	0.0052	06/30/14 09:53	06/30/14 20:07	1
Surrogate for EPA 504.1	*2-Bromo-1-chloropropane*	*115 %*	*Limits*	*70-130*				
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	2.2	SM 4550SF	0.04	0.01		06/30/14 09:29	1
Carbonaceous BOD	mg/L	61	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Chemical Oxygen Demand	mg/L	200	EPA 410.4	25	10	06/30/14 13:20	07/01/14 14:58	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		06/25/14 09:56	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		06/25/14 09:56	1
Orthophosphate as P	mg/L	6.3	EPA 300.0	0.040	0.010		06/25/14 09:56	1
Sulfate	mg/L	6.9	EPA 300.0	0.60	0.20		06/25/14 09:56	1
Sulfide	mg/L	4.9	SM 4500SF	0.40	0.10		06/30/14 09:29	1
Total Alkalinity	mg/L	530	SM 2320B	8.0	2.0		06/27/14 12:52	1
Total Suspended Solids	mg/L	16	SM 2540D	1	1	06/27/14 12:35	06/30/14 15:58	1
Volatile Suspended Solids	mg/L	15	EPA 160.4	1	1	06/27/14 12:35	06/30/14 15:58	1
Nitrate+Nitrite (N)	mg/L	0.02 U	EPA 300.0	0.08	0.02		06/25/14 09:56	1
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	95	350.1	2.5	1.3		07/15/14 10:42	50
Nitrogen, Total Kjeldahl								
Nitrogen, Kjeldahl	mg/L	7.4	351.2	2.0	1.5	07/14/14 15:00	07/18/14 18:25	10
Phosphorus, Total								
Phosphorus	mg/L	6.3	365.4	1.0	0.41	07/14/14 15:00	07/18/14 09:44	10
Sample Description		**BHS6-DP01**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-02**						
Date/Time Collected		**06/23/14 11:56**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Inorganics								
Carbonaceous BOD	mg/L	5	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Nitrite (as N)	mg/L	0.11	EPA 300.0	0.04	0.01		06/25/14 10:07	1
Nitrate+Nitrite (N)	mg/L	0.11	EPA 300.0	0.04	0.01		06/25/14 10:07	1
		TestAmerica Savannah						

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Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Laboratory Report

Project Name **BHS6 SE#5**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		**BHS6-DP01**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-02**						
Date/Time Collected		**06/23/14 11:56**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	3.1	350.1	0.10	0.052		07/15/14 09:45	2
Nitrogen, Total Kjeldahl								
Nitrogen, Kjeldahl	mg/L	3.2	351.2	0.20	0.15	07/14/14 15:00	07/17/14 19:33	1
Sample Description		**BHS6-DP02**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-03**						
Date/Time Collected		**06/23/14 12:12**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Inorganics								
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Nitrite (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		06/25/14 10:18	1
Nitrate+Nitrite (N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		06/25/14 10:18	1
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	5.6	350.1	0.25	0.13		07/15/14 09:56	5
Nitrogen, Total Kjeldahl								
Nitrogen, Kjeldahl	mg/L	7.4	351.2	2.0	1.5	07/14/14 15:00	07/18/14 09:46	10
Sample Description		**BHS6-DP03**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-04**						
Date/Time Collected		**06/23/14 11:26**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Inorganics								
Carbonaceous BOD	mg/L	33	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Nitrate (as N)	mg/L	1.8	EPA 300.0	0.04	0.01		06/25/14 10:29	1
Total Alkalinity	mg/L	360	SM 2320B	8.0	2.0		06/27/14 13:05	1
Total Suspended Solids	mg/L	4	SM 2540D	1	1	06/27/14 12:35	06/30/14 15:58	1
Volatile Suspended Solids	mg/L	3	EPA 160.4	1	1	06/27/14 12:35	06/30/14 15:58	1
Nitrate+Nitrite (N)	mg/L	1.8	EPA 300.0	0.04	0.01		06/25/14 10:29	1

Florida Certification Number: E84129
NELAP Accredited

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Laboratory Report

Project Name **BHS6 SE#5**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		**BHS6-DP03**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-04**						
Date/Time Collected		**06/23/14 11:26**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	2.0	350.1	0.050	0.026		07/15/14 09:01	1
Nitrogen, Total Kjeldahl								
Nitrogen, Kjeldahl	mg/L	3.8	351.2	0.20	0.15	07/14/14 15:00	07/17/14 19:35	1
Sample Description		**BHS6-DP04**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-05**						
Date/Time Collected		**06/23/14 11:36**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Inorganics								
Carbonaceous BOD	mg/L	26	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Chemical Oxygen Demand	mg/L	110	EPA 410.4	25	10	06/30/14 13:20	07/01/14 14:58	1
Nitrate (as N)	mg/L	0.56	EPA 300.0	0.04	0.01		06/25/14 11:03	1
Nitrite (as N)	mg/L	0.27	EPA 300.0	0.04	0.01		06/25/14 11:03	1
Sulfate	mg/L	3.5	EPA 300.0	0.60	0.20		06/25/14 11:03	1
Total Alkalinity	mg/L	400	SM 2320B	8.0	2.0		07/05/14 15:47	1
Total Suspended Solids	mg/L	9	SM 2540D	1	1	06/27/14 12:35	06/30/14 15:58	1
Volatile Suspended Solids	mg/L	9	EPA 160.4	1	1	06/27/14 12:35	06/30/14 15:58	1
Nitrate+Nitrite (N)	mg/L	0.83	EPA 300.0	0.08	0.02		06/25/14 11:03	1
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	0.38	350.1	0.050	0.026		07/15/14 09:01	1
Nitrogen, Total Kjeldahl								
Nitrogen, Kjeldahl	mg/L	3.0	351.2	0.20	0.15	07/14/14 15:00	07/17/14 19:38	1
Sample Description		**BHS6-ST1&2a**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-06**						
Date/Time Collected		**06/23/14 11:06**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Inorganics								

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

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Laboratory Report

Project Name **BHS6 SE#5**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		**BHS6-ST1&2a**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-06**						
Date/Time Collected		**06/23/14 11:06**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Hydrogen Sulfide (Unionized)	mg/L	0.01 U	SM 4550SF	0.04	0.01		06/30/14 09:29	1
Carbonaceous BOD	mg/L	16	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Chemical Oxygen Demand	mg/L	60	EPA 410.4	25	10	06/30/14 13:20	07/01/14 14:58	1
Nitrite (as N)	mg/L	0.94 Q	EPA 300.0	0.04	0.01		06/25/14 11:14	1
Orthophosphate as P	mg/L	2.7 Q	EPA 300.0	0.040	0.010		06/25/14 11:14	1
Sulfate	mg/L	15	EPA 300.0	0.60	0.20		06/25/14 11:14	1
Sulfide	mg/L	0.10 U	SM 4500SF	0.40	0.10		06/30/14 09:29	1
Total Alkalinity	mg/L	240	SM 2320B	8.0	2.0		07/05/14 15:58	1
Total Suspended Solids	mg/L	5	SM 2540D	1	1	06/27/14 12:35	06/30/14 15:58	1
Volatile Suspended Solids	mg/L	4	EPA 160.4	1	1	06/27/14 12:35	06/30/14 15:58	1
Nitrate+Nitrite (N)	mg/L	0.94	EPA 300.0	0.04	0.01		06/25/14 11:14	1
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	8.7	350.1	0.25	0.13		07/15/14 09:56	5
Nitrogen, Total Kjeldahl								
Nitrogen, Kjeldahl	mg/L	9.9	351.2	2.0	1.5	07/14/14 15:00	07/18/14 09:47	10
Phosphorus, Total								
Phosphorus	mg/L	4.5	365.4	0.10	0.041	07/14/14 15:00	07/17/14 19:39	1
Sample Description		**BHS6-ST1&2a-DUP**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-07**						
Date/Time Collected		**06/23/14 11:08**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	0.01 U	SM 4550SF	0.04	0.01		06/30/14 09:29	1
Carbonaceous BOD	mg/L	18	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Chemical Oxygen Demand	mg/L	54	EPA 410.4	25	10	06/30/14 13:20	07/01/14 14:58	1
Nitrite (as N)	mg/L	1.1 Q	EPA 300.0	0.04	0.01		06/25/14 11:25	1
Orthophosphate as P	mg/L	2.5 Q	EPA 300.0	0.040	0.010		06/25/14 11:25	1
Sulfate	mg/L	16	EPA 300.0	0.60	0.20		06/25/14 11:25	1
Sulfide	mg/L	0.10 U	SM 4500SF	0.40	0.10		06/30/14 09:29	1
Total Alkalinity	mg/L	250	SM 2320B	8.0	2.0		07/05/14 16:09	1
Total Suspended Solids	mg/L	2	SM 2540D	1	1	06/27/14 12:35	06/30/14 15:58	1
Volatile Suspended Solids	mg/L	2	EPA 160.4	1	1	06/27/14 12:35	06/30/14 15:58	1

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
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Laboratory Report

Project Name		**BHS6 SE#5**						
Parameters	**Units**	**Results ***	**Method**	**PQL**	**MDL**	**Prepared**	**Analyzed**	**Dilution**
Sample Description		**BHS6-ST1&2a-DUP**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-07**						
Date/Time Collected		**06/23/14 11:08**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Nitrate+Nitrite (N)	mg/L	1.1	EPA 300.0	0.04	0.01		06/25/14 11:25	1
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	7.8	350.1	0.25	0.13		07/15/14 09:56	5
Nitrogen, Total Kjeldahl								
Nitrogen, Kjeldahl	mg/L	10	351.2	2.0	1.5	07/14/14 15:00	07/18/14 09:48	10
Phosphorus, Total								
Phosphorus	mg/L	4.5	365.4	0.10	0.041	07/14/14 15:00	07/17/14 19:40	1
Sample Description		**BHS6-ST2b-T**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-08**						
Date/Time Collected		**06/23/14 10:30**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Volatile Organic Compounds								
Acetone	ug/L	6.7	EPA 8260b	4.0	2.0		07/01/14 23:05	1
Acrylonitrile	ug/L	1.3 U	EPA 8260b	4.0	1.3		07/01/14 23:05	1
Benzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Bromobenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Bromochloromethane	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Bromodichloromethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Bromoform	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Bromomethane	ug/L	0.4 U	EPA 8260b	0.8	0.4		07/01/14 23:05	1
2-Butanone	ug/L	7.2	EPA 8260b	4.0	2.0		07/01/14 23:05	1
n-Butylbenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
sec-Butylbenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
t-Butylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Carbon disulfide	ug/L	0.8	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Carbon tetrachloride	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Chlorobenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Chloroethane	ug/L	0.4 U	EPA 8260b	1.6	0.4		07/01/14 23:05	1
Chloroform	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Chloromethane	ug/L	0.4 U	EPA 8260b	1.6	0.4		07/01/14 23:05	1
1,2-Dibromoethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,2-Dibromo-3-chloropropane	ug/L	0.3 U	EPA 8260b	0.8	0.3		07/01/14 23:05	1

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Project Name		**BHS6 SE#5**						
Parameters	**Units**	**Results ***	**Method**	**PQL**	**MDL**	**Prepared**	**Analyzed**	**Dilution**
Sample Description		**BHS6-ST2b-T**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-08**						
Date/Time Collected		**06/23/14 10:30**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
2-Chlorotoluene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
2-Chloroethylvinyl Ether	ug/L	0.5 U	EPA 8260b	1.6	0.5		07/01/14 23:05	1
4-Chlorotoluene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Dibromochloromethane	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Dibromomethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,2-Dichlorobenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
1,3-Dichlorobenzene	ug/L	0.07 U	EPA 8260b	0.8	0.07		07/01/14 23:05	1
1,4-Dichlorobenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
trans-1,4-Dichloro-2-butene	ug/L	0.3 U	EPA 8260b	0.8	0.3		07/01/14 23:05	1
Dichlorodifluoromethane	ug/L	0.5 U	EPA 8260b	1.6	0.5		07/01/14 23:05	1
1,1-Dichloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,2-Dichloroethane	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
1,1-Dichloroethene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
cis-1,2-Dichloroethene	ug/L	0.09 U	EPA 8260b	0.8	0.09		07/01/14 23:05	1
trans-1,2-Dichloroethene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,2-Dichloropropane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
2,2-Dichloropropane	ug/L	0.3 U	EPA 8260b	0.8	0.3		07/01/14 23:05	1
1,1-Dichloropropene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
cis-1,3-Dichloropropene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
trans-1,3-Dichloropropene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Ethylbenzene	ug/L	0.08 U	EPA 8260b	0.8	0.08		07/01/14 23:05	1
Hexachlorobutadiene	ug/L	0.4 U	EPA 8260b	0.8	0.4		07/01/14 23:05	1
2-Hexanone	ug/L	2.1 U	EPA 8260b	4.0	2.1		07/01/14 23:05	1
Iodomethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Isopropylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
4-Isopropyltoluene	ug/L	1.2	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Methyl-t-butyl ether	ug/L	0.2 U	EPA 8260b	1.6	0.2		07/01/14 23:05	1
Methylene Chloride	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
4-Methyl-2-pentanone	ug/L	2.6 U	EPA 8260b	4.0	2.6		07/01/14 23:05	1
Naphthalene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
n-Propylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Styrene	ug/L	0.05 U	EPA 8260b	0.8	0.05		07/01/14 23:05	1
1,1,1,2-Tetrachloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,1,2,2-Tetrachloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Tetrachloroethene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Toluene	ug/L	3.5	EPA 8260b	0.8	0.09		07/01/14 23:05	1
1,2,3-Trichlorobenzene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,2,4-Trichlorobenzene	ug/L	0.3 U	EPA 8260b	0.8	0.3		07/01/14 23:05	1

Hazen and Sawyer
10002 Princess Palm Ave, Suite 200
Tampa, FL 33619

July 22, 2014
Work Order: 1406489

Laboratory Report

Project Name **BHS6 SE#5**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		**BHS6-ST2b-T**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-08**						
Date/Time Collected		**06/23/14 10:30**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
1,1,1-Trichloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,1,2-Trichloroethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Trichloroethene	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,1,2-Trichloro-1,2,2-trifluoroethane	ug/L	0.6 U	EPA 8260b**	1.6	0.6		07/01/14 23:05	1
Trichlorofluoromethane	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
1,2,3-Trichloropropane	ug/L	0.4 U	EPA 8260b	0.8	0.4		07/01/14 23:05	1
1,2,4-Trimethylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
1,3,5-Trimethylbenzene	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Vinyl chloride	ug/L	0.3 U	EPA 8260b	1.6	0.3		07/01/14 23:05	1
Xylene-m,p	ug/L	0.2 U	EPA 8260b	1.6	0.2		07/01/14 23:05	1
Xylene-o	ug/L	0.2 U	EPA 8260b	0.8	0.2		07/01/14 23:05	1
Xylenes- Total	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
Total Trihalomethanes	ug/L	0.1 U	EPA 8260b	0.8	0.1		07/01/14 23:05	1
1,4-Dioxane	ug/L	0.0	EPA 8260b**				07/01/14 23:05	1
Surrogate for EPA 8260b	*Dibromofluoromethane*		*107 %*	*Limits*	*65-135*			
Pesticide Analyses								
1,2-Dibromo-3-chloropropane	ug/L	0.0052 U	EPA 504.1	0.021	0.0052	06/30/14 09:53	06/30/14 20:30	1
1,2-Dibromoethane	ug/L	0.0052 U	EPA 504.1	0.021	0.0052	06/30/14 09:53	06/30/14 20:30	1
Surrogate for EPA 504.1	*2-Bromo-1-chloropropane*		*114 %*	*Limits*	*70-130*			
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	1.6	SM 4550SF	0.04	0.01		06/30/14 09:29	1
Carbonaceous BOD	mg/L	5	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Chemical Oxygen Demand	mg/L	58	EPA 410.4	25	10	06/30/14 13:20	07/01/14 14:58	1
Nitrate (as N)	mg/L	0.01 U,Q	EPA 300.0	0.04	0.01		06/25/14 11:36	1
Nitrite (as N)	mg/L	0.01 U,Q	EPA 300.0	0.04	0.01		06/25/14 11:36	1
Orthophosphate as P	mg/L	2.5 Q	EPA 300.0	0.040	0.010		06/25/14 11:36	1
Sulfate	mg/L	140	EPA 300.0	6.0	2.0		07/10/14 13:47	10
Sulfide	mg/L	2.2	SM 4500SF	0.40	0.10		06/30/14 09:29	1
Total Alkalinity	mg/L	350	SM 2320B	8.0	2.0		07/05/14 16:21	1
Total Suspended Solids	mg/L	2	SM 2540D	1	1	06/27/14 12:35	06/30/14 15:58	1
Volatile Suspended Solids	mg/L	2	EPA 160.4	1	1	06/27/14 12:35	06/30/14 15:58	1
Nitrate+Nitrite (N)	mg/L	0.02 U	EPA 300.0	0.08	0.02		06/25/14 11:36	1
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	4.9	350.1	0.25	0.13		07/15/14 09:56	5
Nitrogen, Total Kjeldahl								

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July 22, 2014
Work Order: 1406489

Laboratory Report

Project Name **BHS6 SE#5**

Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		**BHS6-ST2b-T**						
Matrix		**Wastewater**						
SAL Sample Number		**1406489-08**						
Date/Time Collected		**06/23/14 10:30**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
		TestAmerica Savannah						
Nitrogen, Kjeldahl	mg/L	5.9	351.2	2.0	1.5	07/14/14 15:00	07/18/14 09:49	10
Phosphorus, Total								
Phosphorus	mg/L	3.6	365.4	0.10	0.041	07/14/14 15:00	07/17/14 19:44	1
Sample Description		**BHS6-EB**						
Matrix		**Reagent Water**						
SAL Sample Number		**1406489-09**						
Date/Time Collected		**06/23/14 11:48**						
Collected by		**Harmon Harden**						
Date/Time Received		**06/24/14 09:25**						
Inorganics								
Hydrogen Sulfide (Unionized)	mg/L	0.01 U	SM 4550SF	0.04	0.01		06/30/14 09:29	1
Carbonaceous BOD	mg/L	2 U	SM 5210B	2	2	06/25/14 09:07	06/30/14 15:55	1
Chemical Oxygen Demand	mg/L	10 U	EPA 410.4	25	10	06/30/14 13:20	07/01/14 14:58	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		06/25/14 11:48	1
Nitrite (as N)	mg/L	0.04	EPA 300.0	0.04	0.01		06/25/14 11:48	1
Orthophosphate as P	mg/L	0.010 U	EPA 300.0	0.040	0.010		06/25/14 11:48	1
Sulfate	mg/L	0.31 I	EPA 300.0	0.60	0.20		06/25/14 11:48	1
Sulfide	mg/L	0.10 U	SM 4500SF	0.40	0.10		06/30/14 09:29	1
Total Alkalinity	mg/L	2.2 I	SM 2320B	8.0	2.0		07/05/14 16:24	1
Total Suspended Solids	mg/L	1 U	SM 2540D	1	1	06/27/14 12:35	06/30/14 15:58	1
Volatile Suspended Solids	mg/L	1 U	EPA 160.4	1	1	06/27/14 12:35	06/30/14 15:58	1
Nitrate+Nitrite (N)	mg/L	0.04 I	EPA 300.0	0.08	0.02		06/25/14 11:48	1
		TestAmerica Savannah						
Nitrogen, Ammonia								
Ammonia (as N)	mg/L	0.17	350.1	0.050	0.026		07/15/14 09:01	1
Nitrogen, Total Kjeldahl								
Nitrogen, Kjeldahl	mg/L	0.15 U,U	351.2	0.20	0.15	07/14/14 15:00	07/17/14 19:45	1
Phosphorus, Total								
Phosphorus	mg/L	0.053 I,I	365.4	0.10	0.041	07/14/14 15:00	07/17/14 19:45	1

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Volatile Organic Compounds - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
Blank (BG40123-BLK1)					Prepared & Analyzed: 07/01/14 18:41					
Acetone	2.0 U	4.0	2.0	ug/L						
Acrylonitrile	1.3 U	4.0	1.3	ug/L						
Benzene	0.1 U	0.8	0.1	ug/L						
Bromobenzene	0.2 U	0.8	0.2	ug/L						
Bromochloromethane	0.1 U	0.8	0.1	ug/L						
Bromodichloromethane	0.2 U	0.8	0.2	ug/L						
Bromoform	0.2 U	0.8	0.2	ug/L						
Bromomethane	0.4 U	0.8	0.4	ug/L						
2-Butanone	2.0 U	4.0	2.0	ug/L						
n-Butylbenzene	0.2 U	0.8	0.2	ug/L						
sec-Butylbenzene	0.2 U	0.8	0.2	ug/L						
t-Butylbenzene	0.1 U	0.8	0.1	ug/L						
Carbon disulfide	0.2 U	0.8	0.2	ug/L						
Carbon tetrachloride	0.2 U	0.8	0.2	ug/L						
Chlorobenzene	0.1 U	0.8	0.1	ug/L						
Chloroethane	0.4 U	1.6	0.4	ug/L						
Chloroform	0.2 U	0.8	0.2	ug/L						
Chloromethane	0.4 U	1.6	0.4	ug/L						
1,2-Dibromoethane	0.2 U	0.8	0.2	ug/L						
1,2-Dibromo-3-chloropropane	0.3 U	0.8	0.3	ug/L						
2-Chlorotoluene	0.1 U	0.8	0.1	ug/L						
2-Chloroethylvinyl Ether	0.5 U	1.6	0.5	ug/L						
4-Chlorotoluene	0.1 U	0.8	0.1	ug/L						
Dibromochloromethane	0.1 U	0.8	0.1	ug/L						
Dibromomethane	0.2 U	0.8	0.2	ug/L						
1,2-Dichlorobenzene	0.1 U	0.8	0.1	ug/L						
1,3-Dichlorobenzene	0.07 U	0.8	0.07	ug/L						
1,4-Dichlorobenzene	0.2 U	0.8	0.2	ug/L						
trans-1,4-Dichloro-2-butene	0.3 U	0.8	0.3	ug/L						
Dichlorodifluoromethane	0.5 U	1.6	0.5	ug/L						
1,1-Dichloroethane	0.2 U	0.8	0.2	ug/L						
1,2-Dichloroethane	0.1 U	0.8	0.1	ug/L						
1,1-Dichloroethene	0.2 U	0.8	0.2	ug/L						
cis-1,2-Dichloroethene	0.09 U	0.8	0.09	ug/L						
trans-1,2-Dichloroethene	0.2 U	0.8	0.2	ug/L						
1,2-Dichloropropane	0.2 U	0.8	0.2	ug/L						
2,2-Dichloropropane	0.3 U	0.8	0.3	ug/L						
1,1-Dichloropropene	0.2 U	0.8	0.2	ug/L						
cis-1,3-Dichloropropene	0.2 U	0.8	0.2	ug/L						
trans-1,3-Dichloropropene	0.1 U	0.8	0.1	ug/L						
Ethylbenzene	0.08 U	0.8	0.08	ug/L						
Hexachlorobutadiene	0.4 U	0.8	0.4	ug/L						
2-Hexanone	2.1 U	4.0	2.1	ug/L						
Iodomethane	0.2 U	0.8	0.2	ug/L						
Isopropylbenzene	0.1 U	0.8	0.1	ug/L						

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Volatile Organic Compounds - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
Blank (BG40123-BLK1)					Prepared & Analyzed: 07/01/14 18:41					
4-Isopropyltoluene	0.2 U	0.8	0.2	ug/L						
Methyl-t-butyl ether	0.2 U	1.6	0.2	ug/L						
Methylene Chloride	0.2 U	0.8	0.2	ug/L						
4-Methyl-2-pentanone	2.6 U	4.0	2.6	ug/L						
Naphthalene	0.2 U	0.8	0.2	ug/L						
n-Propylbenzene	0.1 U	0.8	0.1	ug/L						
Styrene	0.05 U	0.8	0.05	ug/L						
1,1,1,2-Tetrachloroethane	0.2 U	0.8	0.2	ug/L						
1,1,2,2-Tetrachloroethane	0.2 U	0.8	0.2	ug/L						
Tetrachloroethene	0.1 U	0.8	0.1	ug/L						
Toluene	0.09 U	0.8	0.09	ug/L						
1,2,3-Trichlorobenzene	0.2 U	0.8	0.2	ug/L						
1,2,4-Trichlorobenzene	0.3 U	0.8	0.3	ug/L						
1,1,1-Trichloroethane	0.2 U	0.8	0.2	ug/L						
1,1,2-Trichloroethane	0.2 U	0.8	0.2	ug/L						
Trichloroethene	0.2 U	0.8	0.2	ug/L						
1,1,2-Trichloro-1,2,2-trifluoroethane	0.6 U	1.6	0.6	ug/L						
Trichlorofluoromethane	0.2 U	0.8	0.2	ug/L						
1,2,3-Trichloropropane	0.4 U	0.8	0.4	ug/L						
1,2,4-Trimethylbenzene	0.1 U	0.8	0.1	ug/L						
1,3,5-Trimethylbenzene	0.1 U	0.8	0.1	ug/L						
Vinyl chloride	0.3 U	1.6	0.3	ug/L						
Xylene-m,p	0.2 U	1.6	0.2	ug/L						
Xylene-o	0.2 U	0.8	0.2	ug/L						
Xylenes- Total	0.1 U	0.8	0.1	ug/L						
Total Trihalomethanes	0.1 U	0.8	0.1	ug/L						
1,4-Dioxane	0.00			ug/L						
Surrogate: 4-Bromofluorobenzene	*20.3*			*ug/L*	*20*		*102*	*65-135*		
Surrogate: 1,2-Dichloroethane-d4	*20.5*			*ug/L*	*20*		*102*	*65-135*		
Surrogate: Toluene-d8	*19.5*			*ug/L*	*20*		*98*	*65-135*		
Surrogate: Dibromofluoromethane	*21.3*			*ug/L*	*20*		*106*	*65-135*		

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Volatile Organic Compounds - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
LCS (BG40123-BS1)					Prepared & Analyzed: 07/01/14 19:15					
Acetone	128	4.0	2.0	ug/L	100		128	70-130		
Acrylonitrile	127	4.0	1.3	ug/L	100		127	70-130		
Benzene	21.6	0.8	0.1	ug/L	20		108	70-130		
Bromobenzene	19.7	0.8	0.2	ug/L	20		98	70-130		
Bromochloromethane	23.7	0.8	0.1	ug/L	20		119	70-130		
Bromodichloromethane	23.0	0.8	0.2	ug/L	20		115	70-130		
Bromoform	21.0	0.8	0.2	ug/L	20		105	70-130		
Bromomethane	41.7	0.8	0.4	ug/L	40		104	70-130		
2-Butanone	129	4.0	2.0	ug/L	100		129	70-130		
n-Butylbenzene	19.0	0.8	0.2	ug/L	20		95	70-130		
sec-Butylbenzene	18.7	0.8	0.2	ug/L	20		94	70-130		
t-Butylbenzene	18.6	0.8	0.1	ug/L	20		93	70-130		
Carbon disulfide	22.6	0.8	0.2	ug/L	20		113	70-130		
Carbon tetrachloride	23.0	0.8	0.2	ug/L	20		115	70-130		
Chlorobenzene	20.7	0.8	0.1	ug/L	20		103	70-130		
Chloroethane	41.1	1.6	0.4	ug/L	40		103	70-130		
Chloroform	22.1	0.8	0.2	ug/L	20		111	70-130		
Chloromethane	42.0	1.6	0.4	ug/L	40		105	70-130		
2-Chlorotoluene	20.1	0.8	0.1	ug/L	20		100	70-130		
4-Chlorotoluene	20.1	0.8	0.1	ug/L	20		100	70-130		
Dibromochloromethane	21.9	0.8	0.1	ug/L	20		109	70-130		
Dibromomethane	23.2	0.8	0.2	ug/L	20		116	70-130		
1,2-Dichlorobenzene	19.4	0.8	0.1	ug/L	20		97	70-130		
1,3-Dichlorobenzene	19.6	0.8	0.07	ug/L	20		98	70-130		
1,4-Dichlorobenzene	19.6	0.8	0.2	ug/L	20		98	70-130		
trans-1,4-Dichloro-2-butene	23.2	0.8	0.3	ug/L	20		116	70-130		
Dichlorodifluoromethane	51.3	1.6	0.5	ug/L	40		128	70-130		
1,1-Dichloroethane	22.8	0.8	0.2	ug/L	20		114	70-130		
1,2-Dichloroethane	24.1	0.8	0.1	ug/L	20		121	70-130		
1,1-Dichloroethene	22.7	0.8	0.2	ug/L	20		114	70-130		
cis-1,2-Dichloroethene	22.7	0.8	0.09	ug/L	20		113	70-130		
trans-1,2-Dichloroethene	22.7	0.8	0.2	ug/L	20		113	70-130		
1,2-Dichloropropane	22.6	0.8	0.2	ug/L	20		113	70-130		
2,2-Dichloropropane	23.9	0.8	0.3	ug/L	20		120	70-130		
1,1-Dichloropropene	23.6	0.8	0.2	ug/L	20		118	70-130		
cis-1,3-Dichloropropene	23.7	0.8	0.2	ug/L	20		119	70-130		
trans-1,3-Dichloropropene	22.7	0.8	0.1	ug/L	20		113	70-130		
Ethylbenzene	20.1	0.8	0.08	ug/L	20		101	70-130		
Hexachlorobutadiene	17.6	0.8	0.4	ug/L	20		88	70-130		
2-Hexanone	128	4.0	2.1	ug/L	100		128	70-130		
Iodomethane	25.2	0.8	0.2	ug/L	20		126	70-130		
Isopropylbenzene	20.4	0.8	0.1	ug/L	20		102	70-130		
4-Isopropyltoluene	18.7	0.8	0.2	ug/L	20		93	70-130		
Methyl-t-butyl ether	23.6	1.6	0.2	ug/L	20		118	70-130		
Methylene Chloride	22.9	0.8	0.2	ug/L	20		115	70-130		

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Volatile Organic Compounds - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
LCS (BG40123-BS1)					Prepared & Analyzed: 07/01/14 19:15					
4-Methyl-2-pentanone	117	4.0	2.6	ug/L	100		117	70-130		
Naphthalene	20.2	0.8	0.2	ug/L	20		101	70-130		
n-Propylbenzene	19.3	0.8	0.1	ug/L	20		96	70-130		
Styrene	20.8	0.8	0.05	ug/L	20		104	70-130		
1,1,1,2-Tetrachloroethane	20.2	0.8	0.2	ug/L	20		101	70-130		
1,1,2,2-Tetrachloroethane	20.6	0.8	0.2	ug/L	20		103	70-130		
Tetrachloroethene	20.0	0.8	0.1	ug/L	20		100	70-130		
Toluene	20.2	0.8	0.09	ug/L	20		101	70-130		
1,2,3-Trichlorobenzene	18.5	0.8	0.2	ug/L	20		93	70-130		
1,2,4-Trichlorobenzene	18.5	0.8	0.3	ug/L	20		93	70-130		
1,1,1-Trichloroethane	23.1	0.8	0.2	ug/L	20		115	70-130		
1,1,2-Trichloroethane	21.2	0.8	0.2	ug/L	20		106	70-130		
Trichloroethene	22.0	0.8	0.2	ug/L	20		110	70-130		
Trichlorofluoromethane	21.0	0.8	0.2	ug/L	20		105	70-130		
1,1,2-Trichloro-1,2,2-trifluoroethane	23.0	1.6	0.6	ug/L	20		115	70-130		
1,2,3-Trichloropropane	21.2	0.8	0.4	ug/L	20		106	70-130		
1,2,4-Trimethylbenzene	19.4	0.8	0.1	ug/L	20		97	70-130		
1,3,5-Trimethylbenzene	19.5	0.8	0.1	ug/L	20		98	70-130		
Vinyl chloride	37.6	1.6	0.3	ug/L	40		94	70-130		
Xylene-m,p	41.1	1.6	0.2	ug/L	40		103	70-130		
Xylene-o	20.4	0.8	0.2	ug/L	20		102	70-130		
Surrogate: 4-Bromofluorobenzene	*19.7*			*ug/L*	*20*		*99*	*65-135*		
Surrogate: 1,2-Dichloroethane-d4	*20.3*			*ug/L*	*20*		*102*	*65-135*		
Surrogate: Toluene-d8	*19.1*			*ug/L*	*20*		*95*	*65-135*		
Surrogate: Dibromofluoromethane	*21.1*			*ug/L*	*20*		*105*	*65-135*		
Duplicate (BG40123-DUP1)		**Source: 1406489-08**			Prepared & Analyzed: 07/01/14 23:37					
Acetone	6.90	4.0	2.0	ug/L		6.72			3	20
Acrylonitrile	1.3 U	4.0	1.3	ug/L		ND				20
Benzene	0.1 U	0.8	0.1	ug/L		ND				20
Bromobenzene	0.2 U	0.8	0.2	ug/L		ND				20
Bromochloromethane	0.1 U	0.8	0.1	ug/L		ND				20
Bromodichloromethane	0.2 U	0.8	0.2	ug/L		ND				20
Bromoform	0.2 U	0.8	0.2	ug/L		ND				20
Bromomethane	0.4 U	0.8	0.4	ug/L		ND				20
2-Butanone	6.70	4.0	2.0	ug/L		7.19			7	20
n-Butylbenzene	0.2 U	0.8	0.2	ug/L		ND				20
sec-Butylbenzene	0.2 U	0.8	0.2	ug/L		ND				20
t-Butylbenzene	0.1 U	0.8	0.1	ug/L		ND				20
Carbon disulfide	0.710 I	0.8	0.2	ug/L		0.838			17	20
Carbon tetrachloride	0.2 U	0.8	0.2	ug/L		ND				20
Chlorobenzene	0.1 U	0.8	0.1	ug/L		ND				20
Chloroethane	0.4 U	1.6	0.4	ug/L		ND				20
Chloroform	0.2 U	0.8	0.2	ug/L		ND				20
Chloromethane	0.4 U	1.6	0.4	ug/L		ND				20

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
Duplicate (BG40123-DUP1)		**Source: 1406489-08**			Prepared & Analyzed: 07/01/14 23:37					
1,2-Dibromoethane	0.2 U	0.8	0.2	ug/L		ND				200
2-Chlorotoluene	0.1 U	0.8	0.1	ug/L		ND				20
1,2-Dibromo-3-chloropropane	0.3 U	0.8	0.3	ug/L		ND				200
2-Chloroethylvinyl Ether	0.5 U	1.6	0.5	ug/L		ND				200
4-Chlorotoluene	0.1 U	0.8	0.1	ug/L		ND				20
Dibromochloromethane	0.1 U	0.8	0.1	ug/L		ND				20
Dibromomethane	0.2 U	0.8	0.2	ug/L		ND				20
1,2-Dichlorobenzene	0.1 U	0.8	0.1	ug/L		ND				20
1,3-Dichlorobenzene	0.07 U	0.8	0.07	ug/L		ND				20
1,4-Dichlorobenzene	0.2 U	0.8	0.2	ug/L		ND				20
trans-1,4-Dichloro-2-butene	0.3 U	0.8	0.3	ug/L		ND				20
Dichlorodifluoromethane	0.5 U	1.6	0.5	ug/L		ND				20
1,1-Dichloroethane	0.2 U	0.8	0.2	ug/L		ND				20
1,2-Dichloroethane	0.1 U	0.8	0.1	ug/L		ND				20
1,1-Dichloroethene	0.2 U	0.8	0.2	ug/L		ND				20
cis-1,2-Dichloroethene	0.09 U	0.8	0.09	ug/L		ND				20
trans-1,2-Dichloroethene	0.2 U	0.8	0.2	ug/L		ND				20
1,2-Dichloropropane	0.2 U	0.8	0.2	ug/L		ND				20
2,2-Dichloropropane	0.3 U	0.8	0.3	ug/L		ND				20
1,1-Dichloropropene	0.2 U	0.8	0.2	ug/L		ND				20
cis-1,3-Dichloropropene	0.2 U	0.8	0.2	ug/L		ND				20
trans-1,3-Dichloropropene	0.1 U	0.8	0.1	ug/L		ND				20
Ethylbenzene	0.08 U	0.8	0.08	ug/L		ND				20
Hexachlorobutadiene	0.4 U	0.8	0.4	ug/L		ND				20
2-Hexanone	2.1 U	4.0	2.1	ug/L		ND				20
Iodomethane	0.2 U	0.8	0.2	ug/L		ND				20
Isopropylbenzene	0.1 U	0.8	0.1	ug/L		ND				20
4-Isopropyltoluene	1.25	0.8	0.2	ug/L		1.25			0.3	20
Methyl-t-butyl ether	0.2 U	1.6	0.2	ug/L		ND				20
Methylene Chloride	0.2 U	0.8	0.2	ug/L		ND				20
4-Methyl-2-pentanone	2.6 U	4.0	2.6	ug/L		ND				20
Naphthalene	0.2 U	0.8	0.2	ug/L		ND				20
n-Propylbenzene	0.1 U	0.8	0.1	ug/L		ND				20
Styrene	0.05 U	0.8	0.05	ug/L		ND				20
1,1,1,2-Tetrachloroethane	0.2 U	0.8	0.2	ug/L		ND				20
1,1,2,2-Tetrachloroethane	0.2 U	0.8	0.2	ug/L		ND				20
Tetrachloroethene	0.1 U	0.8	0.1	ug/L		ND				20
Toluene	3.48	0.8	0.09	ug/L		3.51			0.7	20
1,2,3-Trichlorobenzene	0.2 U	0.8	0.2	ug/L		ND				20
1,2,4-Trichlorobenzene	0.3 U	0.8	0.3	ug/L		ND				20
1,1,1-Trichloroethane	0.2 U	0.8	0.2	ug/L		ND				20
1,1,2-Trichloroethane	0.2 U	0.8	0.2	ug/L		ND				20
Trichloroethene	0.2 U	0.8	0.2	ug/L		ND				20
Trichlorofluoromethane	0.2 U	0.8	0.2	ug/L		ND				20

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Volatile Organic Compounds - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
Duplicate (BG40123-DUP1)		**Source: 1406489-08**			Prepared & Analyzed: 07/01/14 23:37					
1,1,2-Trichloro-1,2,2-trifluoroethane	0.6 U	1.6	0.6	ug/L		ND				20
1,2,3-Trichloropropane	0.4 U	0.8	0.4	ug/L		ND				20
1,2,4-Trimethylbenzene	0.1 U	0.8	0.1	ug/L		ND				20
1,3,5-Trimethylbenzene	0.1 U	0.8	0.1	ug/L		ND				20
Vinyl chloride	0.3 U	1.6	0.3	ug/L		ND				20
Xylene-m,p	0.2 U	1.6	0.2	ug/L		ND				20
Xylene-o	0.2 U	0.8	0.2	ug/L		ND				20
Xylenes- Total	0.1 U	0.8	0.1	ug/L		ND				20
Total Trihalomethanes	0.1 U	0.8	0.1	ug/L		ND				200
1,4-Dioxane	0.00			ug/L		0.00				200
Surrogate: 4-Bromofluorobenzene	*20.6*			*ug/L*	*20*		*103*	*65-135*		
Surrogate: 1,2-Dichloroethane-d4	*20.9*			*ug/L*	*20*		*104*	*65-135*		
Surrogate: Toluene-d8	*19.2*			*ug/L*	*20*		*96*	*65-135*		
Surrogate: Dibromofluoromethane	*20.8*			*ug/L*	*20*		*104*	*65-135*		
Matrix Spike (BG40123-MS1)		**Source: 1406708-02**			Prepared & Analyzed: 07/01/14 20:23					
Acetone	137	4.0	2.0	ug/L	100	ND	137	65-135		
Acrylonitrile	124	4.0	1.3	ug/L	100	ND	124	65-135		
Benzene	21.1	0.8	0.1	ug/L	20	ND	105	65-135		
Bromobenzene	20.4	0.8	0.2	ug/L	20	ND	102	65-135		
Bromochloromethane	23.4	0.8	0.1	ug/L	20	ND	117	65-135		
Bromodichloromethane	36.2	0.8	0.2	ug/L	20	13.2	115	65-135		
Bromoform	31.0	0.8	0.2	ug/L	20	7.47	118	65-135		
Bromomethane	7.96	0.8	0.4	ug/L	40	ND	20	65-135		
2-Butanone	136	4.0	2.0	ug/L	100	ND	136	65-135		
n-Butylbenzene	19.6	0.8	0.2	ug/L	20	ND	98	65-135		
sec-Butylbenzene	19.4	0.8	0.2	ug/L	20	ND	97	65-135		
t-Butylbenzene	19.1	0.8	0.1	ug/L	20	ND	95	65-135		
Carbon disulfide	22.2	0.8	0.2	ug/L	20	ND	111	65-135		
Carbon tetrachloride	23.2	0.8	0.2	ug/L	20	ND	116	65-135		
Chlorobenzene	21.1	0.8	0.1	ug/L	20	ND	105	65-135		
Chloroethane	42.8	1.6	0.4	ug/L	40	ND	107	65-135		
Chloroform	28.2	0.8	0.2	ug/L	20	6.48	109	65-135		
Chloromethane	37.4	1.6	0.4	ug/L	40	ND	94	65-135		
2-Chlorotoluene	20.5	0.8	0.1	ug/L	20	ND	103	65-135		
4-Chlorotoluene	20.8	0.8	0.1	ug/L	20	ND	104	65-135		
Dibromochloromethane	44.5	0.8	0.1	ug/L	20	21.2	117	65-135		
Dibromomethane	23.7	0.8	0.2	ug/L	20	ND	118	65-135		
1,2-Dichlorobenzene	20.3	0.8	0.1	ug/L	20	ND	102	65-135		
1,3-Dichlorobenzene	20.0	0.8	0.07	ug/L	20	ND	100	65-135		
1,4-Dichlorobenzene	20.0	0.8	0.2	ug/L	20	ND	100	65-135		
trans-1,4-Dichloro-2-butene	10.9	0.8	0.3	ug/L	20	ND	54	65-135		
Dichlorodifluoromethane	42.2	1.6	0.5	ug/L	40	ND	105	65-135		
1,1-Dichloroethane	22.6	0.8	0.2	ug/L	20	ND	113	65-135		
1,2-Dichloroethane	23.8	0.8	0.1	ug/L	20	ND	119	65-135		

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
Matrix Spike (BG40123-MS1)		**Source: 1406708-02**			Prepared & Analyzed: 07/01/14 20:23					
1,1-Dichloroethene	22.8	0.8	0.2	ug/L	20	ND	114	65-135		
cis-1,2-Dichloroethene	22.7	0.8	0.09	ug/L	20	ND	113	65-135		
trans-1,2-Dichloroethene	22.4	0.8	0.2	ug/L	20	ND	112	65-135		
1,2-Dichloropropane	22.2	0.8	0.2	ug/L	20	ND	111	65-135		
2,2-Dichloropropane	23.0	0.8	0.3	ug/L	20	ND	115	65-135		
1,1-Dichloropropene	23.2	0.8	0.2	ug/L	20	ND	116	65-135		
cis-1,3-Dichloropropene	7.66	0.8	0.2	ug/L	20	ND	38	65-135		
trans-1,3-Dichloropropene	15.8	0.8	0.1	ug/L	20	ND	79	65-135		
Ethylbenzene	20.8	0.8	0.08	ug/L	20	ND	104	65-135		
Hexachlorobutadiene	18.4	0.8	0.4	ug/L	20	ND	92	65-135		
2-Hexanone	128	4.0	2.1	ug/L	100	ND	128	65-135		
Iodomethane	5.70	0.8	0.2	ug/L	20	ND	28	65-135		
Isopropylbenzene	20.8	0.8	0.1	ug/L	20	ND	104	65-135		
4-Isopropyltoluene	19.4	0.8	0.2	ug/L	20	ND	97	65-135		
Methyl-t-butyl ether	23.6	1.6	0.2	ug/L	20	ND	118	65-135		
Methylene Chloride	22.4	0.8	0.2	ug/L	20	ND	112	65-135		
4-Methyl-2-pentanone	119	4.0	2.6	ug/L	100	ND	119	65-135		
Naphthalene	20.3	0.8	0.2	ug/L	20	ND	101	65-135		
n-Propylbenzene	19.6	0.8	0.1	ug/L	20	ND	98	65-135		
Styrene	21.4	0.8	0.05	ug/L	20	ND	107	65-135		
1,1,1,2-Tetrachloroethane	21.0	0.8	0.2	ug/L	20	ND	105	65-135		
1,1,2,2-Tetrachloroethane	20.3	0.8	0.2	ug/L	20	ND	102	65-135		
Tetrachloroethene	20.4	0.8	0.1	ug/L	20	ND	102	65-135		
Toluene	20.5	0.8	0.09	ug/L	20	ND	102	65-135		
1,2,3-Trichlorobenzene	19.0	0.8	0.2	ug/L	20	ND	95	65-135		
1,2,4-Trichlorobenzene	18.9	0.8	0.3	ug/L	20	ND	95	65-135		
1,1,1-Trichloroethane	23.0	0.8	0.2	ug/L	20	ND	115	65-135		
1,1,2-Trichloroethane	21.6	0.8	0.2	ug/L	20	ND	108	65-135		
Trichloroethene	22.3	0.8	0.2	ug/L	20	ND	111	65-135		
Trichlorofluoromethane	21.5	0.8	0.2	ug/L	20	ND	107	65-135		
1,1,2-Trichloro-1,2,2-trifluoroethane	23.0	1.6	0.6	ug/L	20	ND	115	65-135		
1,2,3-Trichloropropane	21.6	0.8	0.4	ug/L	20	ND	108	65-135		
1,2,4-Trimethylbenzene	20.1	0.8	0.1	ug/L	20	ND	101	65-135		
1,3,5-Trimethylbenzene	20.0	0.8	0.1	ug/L	20	ND	100	65-135		
Vinyl chloride	42.0	1.6	0.3	ug/L	40	ND	105	65-135		
Xylene-m,p	42.9	1.6	0.2	ug/L	40	ND	107	65-135		
Xylene-o	20.5	0.8	0.2	ug/L	20	ND	103	65-135		
Surrogate: 4-Bromofluorobenzene	*20.1*			*ug/L*	*20*		*100*	*65-135*		
Surrogate: 1,2-Dichloroethane-d4	*20.5*			*ug/L*	*20*		*102*	*65-135*		
Surrogate: Toluene-d8	*19.1*			*ug/L*	*20*		*96*	*65-135*		
Surrogate: Dibromofluoromethane	*20.7*			*ug/L*	*20*		*104*	*65-135*		

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Volatile Organic Compounds - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
Matrix Spike (BG40123-MS2)		**Source: 1406489-01**			Prepared & Analyzed: 07/01/14 20:56					
Acetone	184 J2	4.0	2.0	ug/L	100	40.5	143	65-135		
Acrylonitrile	119	4.0	1.3	ug/L	100	ND	119	65-135		
Benzene	22.3	0.8	0.1	ug/L	20	ND	111	65-135		
Bromobenzene	20.4	0.8	0.2	ug/L	20	ND	102	65-135		
Bromochloromethane	25.4	0.8	0.1	ug/L	20	ND	127	65-135		
Bromodichloromethane	22.0	0.8	0.2	ug/L	20	ND	110	65-135		
Bromoform	17.5	0.8	0.2	ug/L	20	ND	87	65-135		
Bromomethane	2.09 J2	0.8	0.4	ug/L	40	ND	5	65-135		
2-Butanone	139	4.0	2.0	ug/L	100	6.76	132	65-135		
n-Butylbenzene	20.2	0.8	0.2	ug/L	20	ND	101	65-135		
sec-Butylbenzene	19.5	0.8	0.2	ug/L	20	ND	97	65-135		
t-Butylbenzene	19.4	0.8	0.1	ug/L	20	ND	97	65-135		
Carbon disulfide	22.5	0.8	0.2	ug/L	20	ND	112	65-135		
Carbon tetrachloride	21.5	0.8	0.2	ug/L	20	ND	107	65-135		
Chlorobenzene	21.3	0.8	0.1	ug/L	20	ND	107	65-135		
Chloroethane	56.3 J2	1.6	0.4	ug/L	40	ND	141	65-135		
Chloroform	23.6	0.8	0.2	ug/L	20	ND	118	65-135		
Chloromethane	39.3	1.6	0.4	ug/L	40	ND	98	65-135		
2-Chlorotoluene	20.4	0.8	0.1	ug/L	20	ND	102	65-135		
4-Chlorotoluene	20.8	0.8	0.1	ug/L	20	ND	104	65-135		
Dibromochloromethane	19.4	0.8	0.1	ug/L	20	ND	97	65-135		
Dibromomethane	25.6	0.8	0.2	ug/L	20	ND	128	65-135		
1,2-Dichlorobenzene	20.5	0.8	0.1	ug/L	20	ND	102	65-135		
1,3-Dichlorobenzene	20.1	0.8	0.07	ug/L	20	ND	101	65-135		
1,4-Dichlorobenzene	20.5	0.8	0.2	ug/L	20	ND	102	65-135		
trans-1,4-Dichloro-2-butene	4.72 J2	0.8	0.3	ug/L	20	ND	24	65-135		
Dichlorodifluoromethane	47.9	1.6	0.5	ug/L	40	ND	120	65-135		
1,1-Dichloroethane	23.0	0.8	0.2	ug/L	20	ND	115	65-135		
1,2-Dichloroethane	23.8	0.8	0.1	ug/L	20	ND	119	65-135		
1,1-Dichloroethene	22.1	0.8	0.2	ug/L	20	ND	111	65-135		
cis-1,2-Dichloroethene	23.4	0.8	0.09	ug/L	20	ND	117	65-135		
trans-1,2-Dichloroethene	23.0	0.8	0.2	ug/L	20	ND	115	65-135		
1,2-Dichloropropane	23.1	0.8	0.2	ug/L	20	ND	115	65-135		
2,2-Dichloropropane	22.1	0.8	0.3	ug/L	20	ND	111	65-135		
1,1-Dichloropropene	23.8	0.8	0.2	ug/L	20	ND	119	65-135		
cis-1,3-Dichloropropene	2.15 J2	0.8	0.2	ug/L	20	ND	11	65-135		
trans-1,3-Dichloropropene	10.2 J2	0.8	0.1	ug/L	20	ND	51	65-135		
Ethylbenzene	20.9	0.8	0.08	ug/L	20	ND	105	65-135		
Hexachlorobutadiene	20.6	0.8	0.4	ug/L	20	ND	103	65-135		
2-Hexanone	122	4.0	2.1	ug/L	100	ND	122	65-135		
Iodomethane	3.17 J2	0.8	0.2	ug/L	20	ND	16	65-135		
Isopropylbenzene	21.0	0.8	0.1	ug/L	20	ND	105	65-135		
4-Isopropyltoluene	19.4	0.8	0.2	ug/L	20	ND	97	65-135		
Methyl-t-butyl ether	23.6	1.6	0.2	ug/L	20	ND	118	65-135		
Methylene Chloride	23.7	0.8	0.2	ug/L	20	ND	119	65-135		

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40123 - VOC - Prep										
Matrix Spike (BG40123-MS2)		**Source: 1406489-01**			Prepared & Analyzed: 07/01/14 20:56					
4-Methyl-2-pentanone	119	4.0	2.6	ug/L	100	ND	119	65-135		
Naphthalene	20.9	0.8	0.2	ug/L	20	ND	105	65-135		
n-Propylbenzene	20.0	0.8	0.1	ug/L	20	ND	100	65-135		
Styrene	22.0	0.8	0.05	ug/L	20	ND	110	65-135		
1,1,1,2-Tetrachloroethane	21.2	0.8	0.2	ug/L	20	ND	106	65-135		
1,1,2,2-Tetrachloroethane	20.5	0.8	0.2	ug/L	20	ND	102	65-135		
Tetrachloroethene	20.5	0.8	0.1	ug/L	20	ND	102	65-135		
Toluene	26.3	0.8	0.09	ug/L	20	5.71	103	65-135		
1,2,3-Trichlorobenzene	18.7	0.8	0.2	ug/L	20	ND	94	65-135		
1,2,4-Trichlorobenzene	18.9	0.8	0.3	ug/L	20	ND	95	65-135		
1,1,1-Trichloroethane	23.4	0.8	0.2	ug/L	20	ND	117	65-135		
1,1,2-Trichloroethane	21.4	0.8	0.2	ug/L	20	ND	107	65-135		
Trichloroethene	22.8	0.8	0.2	ug/L	20	ND	114	65-135		
1,1,2-Trichloro-1,2,2-trifluoroethane	23.1	1.6	0.6	ug/L	20	ND	116	65-135		
Trichlorofluoromethane	21.4	0.8	0.2	ug/L	20	ND	107	65-135		
1,2,3-Trichloropropane	20.9	0.8	0.4	ug/L	20	ND	104	65-135		
1,2,4-Trimethylbenzene	20.4	0.8	0.1	ug/L	20	ND	102	65-135		
1,3,5-Trimethylbenzene	20.0	0.8	0.1	ug/L	20	ND	100	65-135		
Vinyl chloride	46.6	1.6	0.3	ug/L	40	ND	116	65-135		
Xylene-m,p	42.4	1.6	0.2	ug/L	40	ND	106	65-135		
Xylene-o	21.0	0.8	0.2	ug/L	20	ND	105	65-135		
Surrogate: 4-Bromofluorobenzene	*20.1*			*ug/L*	*20*		*101*	*65-135*		
Surrogate: 1,2-Dichloroethane-d4	*20.1*			*ug/L*	*20*		*100*	*65-135*		
Surrogate: Toluene-d8	*19.4*			*ug/L*	*20*		*97*	*65-135*		
Surrogate: Dibromofluoromethane	*20.5*			*ug/L*	*20*		*103*	*65-135*		

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Pesticide Analyses - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BF43006 - 8011 microextraction for EDB/DBCP										
Blank (BF43006-BLK1)					Prepared & Analyzed: 06/30/14 18:12					
1,2-Dibromo-3-chloropropane	0.0050 U	0.020	0.0050	ug/L						
1,2-Dibromoethane	0.0050 U	0.020	0.0050	ug/L						
Surrogate: 2-Bromo-1-chloropropane	*0.111*			*ug/L*	*0.10*		*111*	*70-130*		
LCS (BF43006-BS1)					Prepared & Analyzed: 06/30/14 18:35					
1,2-Dibromoethane	0.0869	0.020	0.0050	ug/L	0.10		87	70-130		
1,2-Dibromo-3-chloropropane	0.102	0.020	0.0050	ug/L	0.10		102	70-130		
Surrogate: 2-Bromo-1-chloropropane	*0.100*			*ug/L*	*0.10*		*100*	*70-130*		
LCS Dup (BF43006-BSD1)					Prepared & Analyzed: 06/30/14 18:58					
1,2-Dibromoethane	0.0877	0.020	0.0050	ug/L	0.10		88	70-130	0.9	20
1,2-Dibromo-3-chloropropane	0.105	0.020	0.0050	ug/L	0.10		105	70-130	3	20
Surrogate: 2-Bromo-1-chloropropane	*0.101*			*ug/L*	*0.10*		*101*	*70-130*		
Matrix Spike (BF43006-MS1)		**Source: 1406553-03**			Prepared & Analyzed: 06/30/14 19:21					
1,2-Dibromoethane	0.0977	0.022	0.0054	ug/L	0.11	ND	91	65-135		
1,2-Dibromo-3-chloropropane	0.101	0.022	0.0054	ug/L	0.11	ND	94	65-135		
Surrogate: 2-Bromo-1-chloropropane	*0.0926*			*ug/L*	*0.11*		*86*	*70-130*		
Matrix Spike Dup (BF43006-MSD1)		**Source: 1406553-03**			Prepared & Analyzed: 06/30/14 19:44					
1,2-Dibromo-3-chloropropane	0.119	0.021	0.0052	ug/L	0.10	ND	114	65-135	16	20
1,2-Dibromoethane	0.106	0.021	0.0052	ug/L	0.10	ND	102	65-135	8	20
Surrogate: 2-Bromo-1-chloropropane	*0.112*			*ug/L*	*0.10*		*108*	*70-130*		

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BF42425 - Ion Chromatography 300.0 Prep										
Blank (BF42425-BLK1)					Prepared & Analyzed: 06/24/14 18:42					
Nitrite (as N)	0.01 U	0.04	0.01	mg/L						
Nitrate (as N)	0.01 U	0.04	0.01	mg/L						
Sulfate	0.20 U	0.60	0.20	mg/L						
Orthophosphate as P	0.010 U	0.040	0.010	mg/L						
Surrogate: Dichloroacetate	*0.826*			*mg/L*	*1.0*		*83*	*78-120*		
Surrogate: Dichloroacetate	*0.826*			*mg/L*	*1.0*		*83*	*78-120*		
Surrogate: Dichloroacetate	*0.826*			*mg/L*	*1.0*		*83*	*78-120*		
Surrogate: Dichloroacetate	*0.826*			*mg/L*	*1.0*		*83*	*78-120*		
LCS (BF42425-BS1)					Prepared & Analyzed: 06/24/14 18:54					
Sulfate	8.44	0.60	0.20	mg/L	9.0		94	85-115		
Nitrite (as N)	1.31	0.04	0.01	mg/L	1.4		94	85-115		
Orthophosphate as P	0.896	0.040	0.010	mg/L	0.90		100	85-115		
Nitrate (as N)	1.50	0.04	0.01	mg/L	1.7		88	85-115		
Surrogate: Dichloroacetate	*0.917*			*mg/L*	*1.0*		*92*	*78-120*		
Surrogate: Dichloroacetate	*0.917*			*mg/L*	*1.0*		*92*	*78-120*		
Surrogate: Dichloroacetate	*0.917*			*mg/L*	*1.0*		*92*	*78-120*		
Surrogate: Dichloroacetate	*0.917*			*mg/L*	*1.0*		*92*	*78-120*		
LCS Dup (BF42425-BSD1)					Prepared & Analyzed: 06/24/14 19:05					
Nitrite (as N)	1.28	0.04	0.01	mg/L	1.4		92	85-115	2	200
Sulfate	8.36	0.60	0.20	mg/L	9.0		93	85-115	1	200
Orthophosphate as P	0.810	0.040	0.010	mg/L	0.90		90	85-115	10	200
Nitrate (as N)	1.52	0.04	0.01	mg/L	1.7		89	85-115	0.9	200
Surrogate: Dichloroacetate	*0.961*			*mg/L*	*1.0*		*96*	*78-120*		
Surrogate: Dichloroacetate	*0.961*			*mg/L*	*1.0*		*96*	*78-120*		
Surrogate: Dichloroacetate	*0.961*			*mg/L*	*1.0*		*96*	*78-120*		
Surrogate: Dichloroacetate	*0.961*			*mg/L*	*1.0*		*96*	*78-120*		

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BF42425 - Ion Chromatography 300.0 Prep										
Matrix Spike (BF42425-MS1)		**Source: 1406502-01**			Prepared & Analyzed: 06/25/14 09:44					
Orthophosphate as P	0.801	0.040	0.010	mg/L	0.90	ND	89	85-115		
Sulfate	8.29 J2,J6	0.60	0.20	mg/L	9.0	1.31	78	85-115		
Nitrite (as N)	0.666 J2,J6	0.04	0.01	mg/L	1.4	ND	48	85-115		
Nitrate (as N)	1.38 J2	0.04	0.01	mg/L	1.7	ND	81	85-115		
Surrogate: Dichloroacetate	*0.809*			*mg/L*	*1.0*		*81*	*78-120*		
Surrogate: Dichloroacetate	*0.809*			*mg/L*	*1.0*		*81*	*78-120*		
Surrogate: Dichloroacetate	*0.809*			*mg/L*	*1.0*		*81*	*78-120*		
Surrogate: Dichloroacetate	*0.809*			*mg/L*	*1.0*		*81*	*78-120*		
Matrix Spike (BF42425-MS2)		**Source: 1405693-03**			Prepared & Analyzed: 06/25/14 12:55					
Nitrate (as N)	1.34 J2	0.04	0.01	mg/L	1.7	ND	79	85-115		
Nitrite (as N)	1.52	0.04	0.01	mg/L	1.4	ND	108	85-115		
Orthophosphate as P	0.834	0.040	0.010	mg/L	0.90	ND	93	85-115		
Sulfate	9.09	0.60	0.20	mg/L	9.0	1.16	88	85-115		
Surrogate: Dichloroacetate	*0.834*			*mg/L*	*1.0*		*83*	*78-120*		
Surrogate: Dichloroacetate	*0.834*			*mg/L*	*1.0*		*83*	*78-120*		
Surrogate: Dichloroacetate	*0.834*			*mg/L*	*1.0*		*83*	*78-120*		
Surrogate: Dichloroacetate	*0.834*			*mg/L*	*1.0*		*83*	*78-120*		
Batch BF42532 - BOD										
Blank (BF42532-BLK1)					Prepared: 06/25/14 Analyzed: 06/30/14 15:55					
Carbonaceous BOD	2 U	2	2	mg/L						
LCS (BF42532-BS1)					Prepared: 06/25/14 Analyzed: 06/30/14 15:55					
Carbonaceous BOD	182	2	2	mg/L	200		91	85-115		

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BF42532 - BOD										
LCS Dup (BF42532-BSD1)					Prepared: 06/25/14 Analyzed: 06/30/14 15:55					
Carbonaceous BOD	182	2	2	mg/L	200		91	85-115	0	200
Duplicate (BF42532-DUP1)		**Source: 1406489-01**			Prepared: 06/25/14 Analyzed: 06/30/14 15:55					
Carbonaceous BOD	55	2	2	mg/L		61			9	25
Batch BF42629 - alkalinity										
Blank (BF42629-BLK1)					Prepared & Analyzed: 06/27/14 09:37					
Total Alkalinity	2.0 U	8.0	2.0	mg/L						
LCS (BF42629-BS1)					Prepared & Analyzed: 06/27/14 09:44					
Total Alkalinity	120	8.0	2.0	mg/L	120		95	90-110		
Matrix Spike (BF42629-MS1)		**Source: 1406210-05**			Prepared & Analyzed: 06/27/14 10:19					
Total Alkalinity	130	8.0	2.0	mg/L	120	9.8	92	80-120		
Matrix Spike Dup (BF42629-MSD1)		**Source: 1406210-05**			Prepared & Analyzed: 06/27/14 10:25					
Total Alkalinity	130	8.0	2.0	mg/L	120	9.8	92	80-120	0	26
Batch BF42707 - TSS prep										
Blank (BF42707-BLK1)					Prepared: 06/27/14 Analyzed: 06/30/14 15:58					
Total Suspended Solids	1 U	1	1	mg/L						
Volatile Suspended Solids	1 U	1		mg/L						
Blank (BF42707-BLK2)					Prepared: 06/27/14 Analyzed: 06/30/14 15:58					
Total Suspended Solids	1 U	1	1	mg/L						
Volatile Suspended Solids	1 U	1		mg/L						

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BF42707 - TSS prep										
LCS (BF42707-BS1)					Prepared: 06/27/14 Analyzed: 06/30/14 15:58					
Total Suspended Solids	45.5	1	1	mg/L	50		91	85-115		
LCS (BF42707-BS2)					Prepared: 06/27/14 Analyzed: 06/30/14 15:58					
Total Suspended Solids	50.0	1	1	mg/L	50		100	85-115		
Duplicate (BF42707-DUP1)		**Source: 1406550-07**			Prepared: 06/27/14 Analyzed: 06/30/14 15:58					
Total Suspended Solids	8.00	1	1	mg/L		18.2			78	30
Volatile Suspended Solids	8.00	1		mg/L		4.00			67	20
Batch BF43015 - COD prep										
Blank (BF43015-BLK1)					Prepared: 06/30/14 Analyzed: 07/01/14 14:58					
Chemical Oxygen Demand	10 U	25	10	mg/L						
LCS (BF43015-BS1)					Prepared: 06/30/14 Analyzed: 07/01/14 14:58					
Chemical Oxygen Demand	45	25	10	mg/L	50		90	90-110		
Matrix Spike (BF43015-MS1)		**Source: 1406427-01**			Prepared: 06/30/14 Analyzed: 07/01/14 14:58					
Chemical Oxygen Demand	530	25	10	mg/L	250	310	88	85-115		
Matrix Spike Dup (BF43015-MSD1)		**Source: 1406427-01**			Prepared: 06/30/14 Analyzed: 07/01/14 14:58					
Chemical Oxygen Demand	530	25	10	mg/L	250	310	88	85-115	0	32
Batch BF43037 - Sulfide prep										
Blank (BF43037-BLK1)					Prepared & Analyzed: 06/30/14 09:29					
Sulfide	0.10 U	0.40	0.10	mg/L						

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Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BF43037 - Sulfide prep										
LCS (BF43037-BS1)					Prepared & Analyzed: 06/30/14 09:29					
Sulfide	9.33	0.40	0.10	mg/L	10		93	85-115		
Matrix Spike (BF43037-MS1)		**Source: 1406553-01**			Prepared & Analyzed: 06/30/14 09:29					
Sulfide	15.6	0.40	0.10	mg/L	10	ND	156	85-115		
Matrix Spike Dup (BF43037-MSD1)		**Source: 1406553-01**			Prepared & Analyzed: 06/30/14 09:29					
Sulfide	15.6	0.40	0.10	mg/L	10	ND	156	85-115	0	14
Batch BG40502 - alkalinity										
Blank (BG40502-BLK1)					Prepared & Analyzed: 07/05/14 15:24					
Total Alkalinity	2.0 U	8.0	2.0	mg/L						
LCS (BG40502-BS1)					Prepared & Analyzed: 07/05/14 15:30					
Total Alkalinity	120	8.0	2.0	mg/L	120		95	90-110		
Matrix Spike (BG40502-MS1)		**Source: 1406654-06**			Prepared & Analyzed: 07/05/14 17:48					
Total Alkalinity	220	8.0	2.0	mg/L	120	110	93	80-120		
Matrix Spike Dup (BG40502-MSD1)		**Source: 1406654-06**			Prepared & Analyzed: 07/05/14 17:56					
Total Alkalinity	220	8.0	2.0	mg/L	120	110	92	80-120	0.4	26
Batch BG40907 - Ion Chromatography 300.0 Prep										
Blank (BG40907-BLK1)					Prepared & Analyzed: 07/09/14 17:23					
Sulfate	0.20 U	0.60	0.20	mg/L						
Surrogate: Dichloroacetate	*0.892*			*mg/L*	*1.0*		*89*	*78-120*		

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Inorganics - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch BG40907 - Ion Chromatography 300.0 Prep										
LCS (BG40907-BS1)					Prepared & Analyzed: 07/09/14 17:34					
Sulfate	9.33	0.60	0.20	mg/L	9.0		104	85-115		
Surrogate: Dichloroacetate	*0.998*			*mg/L*	*1.0*		*100*	*78-120*		
LCS Dup (BG40907-BSD1)					Prepared & Analyzed: 07/09/14 17:45					
Sulfate	9.15	0.60	0.20	mg/L	9.0		102	85-115	2	200
Surrogate: Dichloroacetate	*1.02*			*mg/L*	*1.0*		*102*	*78-120*		
Matrix Spike (BG40907-MS1)		**Source: 1407014-06**			Prepared & Analyzed: 07/09/14 18:30					
Sulfate	113 L	0.60	0.20	mg/L	9.0	104	95	85-115		
Surrogate: Dichloroacetate	*0.877*			*mg/L*	*1.0*		*88*	*78-120*		
Matrix Spike (BG40907-MS2)		**Source: 1406866-02**			Prepared & Analyzed: 07/09/14 19:48					
Sulfate	18.0	0.60	0.20	mg/L	9.0	8.44	107	85-115		
Surrogate: Dichloroacetate	*1.00*			*mg/L*	*1.0*		*100*	*78-120*		

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Nitrogen, Ammonia - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Matrix Spike Dup (339110-10)		**Source: 680-339110-8**			Prepared & Analyzed: 07/15/14 08:50					
Ammonia (as N)	1.63 J3	0.050	0.026	mg/L	1.00		129	90-110	6	30
Duplicate (339110-25)		**Source: 680-339110-24**			Prepared & Analyzed: 07/15/14 09:22					
Ammonia (as N)	30.8	1.0	0.52	mg/L				-	7	30
LCS (339110-35)					Prepared & Analyzed: 07/15/14 09:45					
Ammonia (as N)	1.00	0.050	0.026	mg/L	1.00		100	90-110		
Blank (339110-46)					Prepared & Analyzed: 07/15/14 10:43					
Ammonia (as N)	0.026 U,U	0.050	0.026	mg/L				-		
Matrix Spike (339110-9)		**Source: 680-339110-8**			Prepared & Analyzed: 07/15/14 08:50					
Ammonia (as N)	1.53 J3	0.050	0.026	mg/L	1.00		119	90-110		
Matrix Spike (339111-23)		**Source: 680-339111-22**			Prepared & Analyzed: 07/15/14 09:45					
Ammonia (as N)	3.18 J3	0.10	0.052	mg/L	1.00		123	90-110		
LCS (339111-24)					Prepared & Analyzed: 07/15/14 09:45					
Ammonia (as N)	1.00	0.050	0.026	mg/L	1.00		100	90-110		
Matrix Spike Dup (339111-26)		**Source: 680-339111-22**			Prepared & Analyzed: 07/15/14 09:45					
Ammonia (as N)	3.15 J3	0.10	0.052	mg/L	1.00		121	90-110	1	30
Blank (339111-44)					Prepared & Analyzed: 07/15/14 10:43					
Ammonia (as N)	0.026 U,U	0.050	0.026	mg/L				-		

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Nitrogen, Ammonia - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Duplicate (616182X)		**Source: 1406489-02**			Prepared & Analyzed: 07/15/14 09:56					
Ammonia (as N)	3.22	0.10	0.052	mg/L		3.1		-	3	30

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Nitrogen, Total Kjeldahl - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
LCS (339754-28)					Prepared: 07/14/14 Analyzed: 07/17/14 19:19					
Nitrogen, Kjeldahl	2.29	0.20	0.15	mg/L	2.00		114	75-125		
Blank (339754-29)					Prepared: 07/14/14 Analyzed: 07/17/14 19:20					
Nitrogen, Kjeldahl	0.15 U,U	0.20	0.15	mg/L				-		
Matrix Spike (339754-31)		**Source: 680-339754-30**			Prepared: 07/14/14 Analyzed: 07/17/14 19:22					
Nitrogen, Kjeldahl	3.40	0.20	0.15	mg/L	2.00		88	75-125		
Matrix Spike Dup (339754-32)		**Source: 680-339754-30**			Prepared: 07/14/14 Analyzed: 07/17/14 19:23					
Nitrogen, Kjeldahl	3.71	0.20	0.15	mg/L	2.00		104	75-125	9	40
Duplicate (339754-34)		**Source: 680-339754-33**			Prepared: 07/14/14 Analyzed: 07/17/14 19:27					
Nitrogen, Kjeldahl	1.13	0.20	0.15	mg/L				-	3	40

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Phosphorus, Total - Quality Control

Analyte	Result	PQL	MDL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Matrix Spike (339753-107)		**Source: 680-339753-106**			Prepared: 07/14/14 Analyzed: 07/18/14 09:42					
Phosphorus	6.73	1.0	0.41	mg/L	2.00		69	60-140		
Matrix Spike Dup (339753-108)		**Source: 680-339753-106**			Prepared: 07/14/14 Analyzed: 07/18/14 09:43					
Phosphorus	6.87	1.0	0.41	mg/L	2.00		76	60-140	2	40
LCS (339753-28)					Prepared: 07/14/14 Analyzed: 07/17/14 19:19					
Phosphorus	2.21	0.10	0.041	mg/L	2.00		110	60-140		
Duplicate (339753-34)		**Source: 680-339753-33**			Prepared: 07/14/14 Analyzed: 07/17/14 19:27					
Phosphorus	0.237	0.10	0.041	mg/L				-	18	40
Blank (339930-95)					Prepared: 07/14/14 Analyzed: 07/19/14 17:03					
Phosphorus	0.041 U,U	0.10	0.041	mg/L				-		

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* Qualifiers, Notes and Definitions

Results followed by a "U" indicate that the sample was analyzed but the compound was not detected. Results followed by "I" indicate that the reported value is between the laboratory method detection limts and the laboratory practical quantitation limit.

A statement of estimated uncertainty of test results is available upon request.

For methods marked with **, all QC criteria have been met for this method which is equivalent to a SAL certified method.

Test results in this report meet all the requirements of the NELAC standards. Any applicable qualifiers are shown below.

U	Indicates that the compound was analyzed for but not detected.
Q	Sample held beyond the accepted holding time.
L	Off-scale high. Result exceeded highest calibration standard.
J6	The sample matrix interfered with the ability to make any accurate determination.
J5	Matrix spike of this sample was outside typical range. All other QC criteria were acceptable.
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
J2	Quality control value for accuracy was outside control limits.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Questions regarding this report should be directed to :

Kathryn Nordmark
Telephone (813) 855-1844 FAX (813) 855-2218
Kathryn@southernanalyticallabs.com

SOUTHERN ANALYTICAL LABORATORIES, INC.
110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

SAL Project No. 146489

Client Name	Contact / Phone:
Hazen and Sawyer	
Project Name / Location: BHS6 SE#5	
Samplers: (Signature)	

Matrix Codes: DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water

PARAMETER / CONTAINER DESCRIPTION

SAL Use Only Sample No.	Sample Description	Date	Time	Matrix	Composite	Grab	40mLV, $Na_2S_2O_3$ 504.1, 8260	500mLP, Cool Total Alkalinity, TSS, VSS, CBOD, NOx, OP, SO_4	125mLP, H_2SO_4 COD, TKN, NH_3, TP	500mLP, NaOH, Zn Acetate H_2S	125mLP, Cool Total Alkalinity, TSS, VSS, CBOD, NOx	125mLP, H_2SO_4 TKN, NH_3	500mLP, Cool Total Alkalinity, TSS, VSS, CBOD, NOx	500mLP, Cool Total Alkalinity, TSS, VSS, CBOD, NOx, SO_4	125mLP, H_2SO_4 COD, TKN, NH_3	Field pH	Field Temperature	Field Conductivity	Field DO			No. of Containers (Total per each location)
01	BHS6-STE	6/23/14	10:48	WW		X	5	2	1	1						7.13	24.2	1278	.23			
02	BHS6-DP01		11:56	WW		X					1	1										
03	BHS6-DP02		12:12	WW		X					1	1				↙	↘					
04	BHS6-DP03		11:26	WW		X						1	2			25.3	6.36	898	30	.30		
05	BHS6-DP04		11:36	WW		X								2	1	6.39	25.4	930	.16			
06	BHS6-ST1&2a		11:06	WW		X		2	1	1						6.28	25.9	946	.29			
07	BHS6-ST1&2a-DUP		11:08	WW		X		2	1	1						6.28	25.9	945	.30			
08	BHS6-ST2b-T		10:30	WW		X	5	2	1	1						6.60	24.1	108	.34			
09	BHS6-EB	↓	11:48	R		X		2	1	1						5.26	25.9	2.1	.61			
10	Trip Blank	6/23/14		R		X	1															

Containers Prepared/ Relinquished:	Date/Time: 6/23/14	Received: 6/24/14 15:00	Date/Time:
Relinquished:	Date/Time: 6/23/14 1430	Received:	Date/Time: 6-23-14 6-24-14 925
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:
Relinquished:	Date/Time:	Received:	Date/Time:

Seal intact?	Ø N N/A
Samples intact upon arrival?	Ø N N/A
Received on ice? Temp. 1.9	Ø N N/A
Proper preservatives indicated?	Ø N N/A
Rec'd within holding time?	Ø N N/A
Volatiles rec'd w/out headspace?	Ø N N/A
Proper containers used?	Ø N N/A

Instructions / Remarks:
Ship to:
Harmon Harden
1825 Cottage Grove Rd.
Talahassee, FL 32303 850-212-4378

Chain of Custody xls
Rev.Date 11/19/01

Chain of Custody

Appendix E: Acute Toxicity Bioassay Report

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

Whole Effluent Toxicity Testing Summary Page

Client name: Hazen & Sawyer BHS6-STE

MBL Project/Report # 140676

MBL Sample #	Species	Product Name	Test Results	Passing or Failure
140676-1	*Cyprinella leedsi*	LC50 > / = 100%	LC50 = 13.2%	Failure
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Additional Testing Required: N/A

Comments:

QA/QC Officer/Reviewer: Signature

Date: 7/9/2014

Effluent Toxicity Testing Report Form

All blanks on this form are to be filled in. Blanks that are not should be filled in with "N/A" or a line drawn through the blank. Please print.

ATTACHMENTS: Please attach the following items to this report form and indicate with an "X" in box.

1. All Chain-of-Custody Forms	X
2. Standard Reference Toxicant (SRT) Reports attached. 1 SRT Reports attached.	X
3. All Raw Data (Bench Sheets) Pertaining to the Tests (i.e., all physical, chemical and biological measurements)	X
4. All Result Calculations	X

Facility/ Industry/ Client Name and address: **Hazen & Sawyer, 10002 Princess Palm Ave., Registry One Bldg. Suite 200, Tampa, FL 33619**

NPDES Number: N/A

County: Hillsborough

Non-NPDES (1) N/A Yes

Project: N/A

Dates Test(s) Conducted:

Name, Address, & Phone Number of Consultant Company: **Marinco Bioassay Laboratory, Inc. (MBL), 4569 Samuel Street Sarasota, Florida 34233, (941) 925-3594, Certification #E84191, Contact: Jason Weeks Laboratory Director**

Start Date: 06/24/2014

End Date: 06/28/2014

Start Time: 1545 hrs.

Name(s) of Person(s) Conducting Test(s):(Printed): **Dubravka Mihajlovic, Smiljana Kerkez, Marlena Beck, Sutanya Singivipulya, Predrag Mihajlovic, and Noel Young**

QA/QC Officer/Reviewer: Signature

Date: 7/9/2014

Laboratory Report #/ Project #: 140676

Sampler's Name: (Print) Harmon Harden

Routine Test: X

Additional: N/A

For failed routine test dated: N/A

Samples

#	Product Name	Lab Sample #	Sample Type: Grab or Composite	Arrival Temp oC	Initial Residual Chlorine (mg/L)	Lab Dechlorination	Chemical Used
1	06/23/2014 1050 hrs.	140676-1	Grab	1	-------	------	-------
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Type of Refrigerant Used for Sample Transportation: X Wet Ice; N/A Blue Ice; N/A Other

Sample Delivered By: N/A Bus; N/A Hand; X Common Carrier

Samples Aerated: Yes, to increase D.O. levels. Yes (Describe) N/A No

Samples Filtered: N/A Yes (Describe) X No

Provide Description:

(1) If toxicity testing data are reported for any project other than permit compliance testing, mark "yes" and identify the reason that toxicity data are being submitted, e.g., Consent Order, ambient monitoring, mixing zone evaluation.

This Page Last Edited By: Marlena Beck on: 07/02/2014

Summary of Test Conditions

Type of Test (1)	Test Conc (cm sq)	Age of Test Organism	Test Species Used (3)	Amount & Type Food	How Often Fed	Test Chamber Volume	Volume of Effluent Used	Type of Chamber	# of Organism/ Chamber	# of Replicates	Temp Range (Degrees Celsius)
D	0, 6.25, 12.5, 25, 50, 100	11 days	CL	0.04 mL1200 Artemia nauplii/0.1 mL per replicate	Once at renewal	1000 mL	250 mL	Beaker	10	2	25
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-	----------	------	--	----------	----------	------	------	----------	------	--	-----

G. Other: N/A

Temperature Readings Were: N/A Single | N/A Multiple | X Continuous

Description of Control Water: Synthetic Moderately Hard (Reconstituted)

Photoperiod During Test: 16 Hrs. Light : 8 Hrs. Dark

Reference Toxicant Data (4)

Name of Toxicant	Dates of Test Begin and End	Species (3)	In-House or Commercially Obtained	LC50/IC25
NaCl	06/20/2014-06/24/2014	CL	In-House	3.11 g/L NaCl
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(1) Please fill the "Type of Test" Box with the Appropriate Letter:
- A. 48-Hr/Non-Renewal/Single Concentration (Screen)
- B. 48-Hr/Non-Renewal/Multi-Concentration (Definitive)
- C. 96-Hr/Renewed Every 48-Hrs/Single Concentration (Screen)
- D. 96-Hr/Renewed Every 48-Hrs/Multi-Concentration (Definitive)
- E. 7-Day Chronic/Single Concentration (Screen)/Renewed Daily
- F. 7-Day Chronic/Multi-Concentration (Definitive)/Renewed Daily
- G. Other - Describe in the "G" Box

(2) List all concentrations of effluent used (i.e., 0%, 6.25%, 12.5%, 25%, 50%, 100%)

(3) Write Appropriate Letters for the following species in this column:
- CD Ceriodaphnia dubia
- FM Pimephales promelas (fathead minnow)
- SS Menidia beryllina (inland silverside)
- MS Mysidopsis bahia (mysid shrimp)
- DP Daphnia pulex
- DM Daphnia magna
- CL Cyprinella leedsi (bannerfin shiner)
- Other - Please Describe _____

(4) Attach all reference toxicant raw data and control charts for each organism/reference toxicant used for the test.

QA/QC Officer/Reviewer: Signature

Date: 7/9/2014

ACUTE Test Results.
Test conducted in accordance with EPA-821-R-02-012.

Test Species	Test Concentration (cm sq)	Sample # (3) & Sample I.D.	% Mortality 24 Hrs (4)	% Mortality 48 Hrs (4)	% Mortality 96 Hrs (4)	LC50 (5)
CL-Control	0	--------------	-----	-----	10	------
CL	6.25, 12.5, 25, 50, 100	140676-1	-----	-----	-------	13.2%
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(1) List % control mortality in appropriate column (48 or 96 hr.) for organisms (use abbreviations shown on footnote 3, Page 2) that you list under the word "Control."
(2) List all concentrations of effluent used (i.e., 0%, 6.25%, 12.5%, 25%, 50%, 100%).
(3) Record number that corresponds with the number of the sample in the "Date and Time Collected" column in sample section on Page 1.
(4) List % Mortality for each organism and control if you are conducting a single concentration (Screen) test.

Species	LC50 (6)
--	----
--	----
--	----
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(5) If multi-concentration (Definitive) tests are conducted on grab or composite samples, record the calculated LC50 in this column for each sample. Enter "N/A" in all % Mortality columns and LC50 box at bottom of this table.
(6) If a single concentration (Screen) test is conducted and >50% mortality occurs in any one of the four grab or composites, record <100% in this box. If <=50% mortality occurs in all four grabs or composites, record >100% in this box. Draw a line through the LC50 column in above table.
F = Flagged data, see page 5.
* No statistical test was used in endpoint determination as the data either did not appropriately fit the requirements of any point estimate techniques presented in EPA/600/4-90/027F or these methods provided an unrealistic or unrealiable result as demonstrated herein.

QA/QC Officer/Reviewer: Signature [signature]

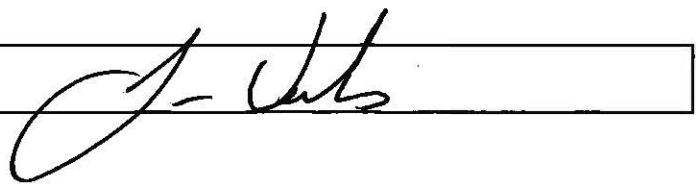
Date: 7/9/2014

Specify if samples DO NOT meet NELAC standards:	
Standard violation	**Yes/No**
Improper container	No
36-hour holding time exceeded	No
Temperature above 6 degrees Celsius	No

Specify any deviations from, additions to, or exclusions from the test method or any non-standard conditions that may have affected the quality of the results, and include any data qualifiers.

All calculated statistical endpoints were calculated using ToxCalc version 5.0.21 - Tidepool Scientific Software.
The results contained in this report relate only to the items tested or to the samples as received by the laboratory. MBL certifies the results contained in this report meet NELAC standards.
This report shall not be reproduced except in full, without the written approval of MBL.

QA/QC Officer/Reviewer: Signature



Date: 7/9/2014

Acute Fish Test-96 Hr Survival

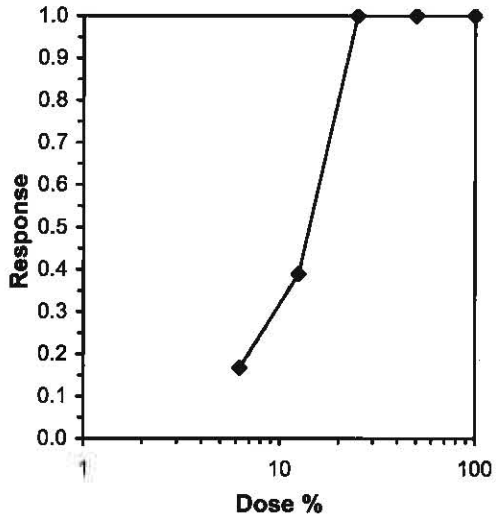
Start Date:	6/24/2014	Test ID:	140676CL	Sample ID:	140676-1
End Date:	6/28/2014	Lab ID:	MBL-Marinco Bioassay Lab.	Sample Type:	
Sample Date:		Protocol:	EPA Method #2000.0	Test Species:	CL-*Cyprinella leedsi*
Comments:	This analysis was performed by Marlena Beck at MBL.				

Conc-%	1	2
Control	0.9000	0.9000
6.25	0.6000	0.9000
12.5	0.5000	0.6000
25	0.0000	0.0000
50	0.0000	0.0000
100	0.0000	0.0000

			Transform: Untransformed					Number	Total
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
Control	**0.9000**	1.0000	0.9000	0.9000	0.9000	0.000	2	2	20
6.25	**0.7500**	0.8333	0.7500	0.6000	0.9000	28.284	2	5	20
12.5	**0.5500**	0.6111	0.5500	0.5000	0.6000	12.856	2	9	20
25	**0.0000**	0.0000	0.0000	0.0000	0.0000	0.000	2	20	20
50	**0.0000**	0.0000	0.0000	0.0000	0.0000	0.000	2	20	20
100	**0.0000**	0.0000	0.0000	0.0000	0.0000	0.000	2	20	20

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%			
5.0%			
10.0%			
20.0%	13.366	10.399	17.180
Auto-16.7%	**13.174**	**10.417**	**16.661**



SURVIVAL BENCH SHEET

Project #: 140676 **Test Start:** 6/24/14 1545

Test Organism: Cyprinella leedsi **Test End:** 6/28/14 1538

Organism Age: 11 days **Brood #:** CL140613

Concentration %	Sample Number	Survival: Replicate A					Survival: Replicate B					A & B %
		0 Hours	24 Hours	48 Hours	72 Hours	96 Hours	0 Hours	24 Hours	48 Hours	72 Hours	96 Hours	
100	140676-1	10	0	—	—	—	10	0	—	—	—	0
50		10	0	—	—	—	10	0	—	—	—	0
25		10	0	—	—		10	0	—	—	—	0
12.5		10	10	7	6	5	10	9	9	8	6	55
6.25		10	10	8	8	6	10	10	10	10	9	75
Control		10	10	10	10	9	10	10	10	9	9	90
Organisms Fed By: (Initials & Time)		—	—	PM 0810	—	—	—	—	PM 0810	—	—	—
0 Hours started/checked by: 24, 72, 96 Hours counted by: 48 Hours renewed/cleaned by:		MM/SS	IM	PM	SK	SS	MM/SS	IM	PM	SK	SS	SS

Comments or Corrections: _____

Reviewed by: MB

Date: 7/2/14

ACUTE TOXICITY TEST PHYSICAL AND CHEMICAL MEASUREMENTS

EPA Method # 2000.0

Project #: 140676 **Test Start:** 6/24/14 1545

Test Organism: Cyprinella leedsi **Test End:** 6/28/14 1538

Effluent Concentration %	Sample Number	Dissolved Oxygen (mg/L) 0 Hours	24 Hours	48 Hours	72 Hours	96 Hours	pH 0 Hours	24 Hours	48 Hours	72 Hours	96 Hours
100	140676-1	8.0	4.4	—	—	—	8.0	8.3	—	—	—
50.0		8.2	5.0	—	—	—	8.0	8.2	—	—	—
25.0		8.2	6.5	—	—	—	8.0	8.1	—	—	—
12.5		8.2	7.2	5.0 / 8.2	5.3	5.5	7.9	8.0	7.8 / 7.8	7.7	7.8
6.25		8.1	7.7	5.3 / 8.1	6.0	6.0	7.9	8.0	7.7 / 7.8	7.6	7.7
Control		8.1	7.8	7.0 / 8.1	7.0	6.2	7.7	7.8	7.7 / 7.8	7.7	7.6
Measured by:		SK	SK	SK / PM	SK	MM	SK	SK	SK / PM	SK	MM

Effluent Concentration %	Sample Number	Temperature (Degrees Celsius) 0 Hours	24 Hours	48 Hours	72 Hours	96 Hours	Conductivity (mS/cm) 0 Hours	24 Hours	48 Hours	72 Hours	96 Hours
100	140676-1	25	25	—	—	—	1.239	1.153	—	—	—
50.0		25	25	—	—	—	0.781	0.760	—	—	—
25.0		25	25	—	—	—	0.535	0.532	—	—	—
12.5		25	25	25 / 25	25	25	0.427	—	0.428	—	0.451
6.25		25	25	25 / 25	25	25	0.366	—	0.366	—	0.395
Control		25	25	25 / 25	25	25	0.305	—	0.305	—	0.340
Measured by:		SK	SK	SK / PM	SK	MM	SK	SK	— / PM	—	MM

Comments or corrections: _____

Reviewed by: MB

Date: 7/1/14

SAMPLE/CONTROL WATER INFORMATION

Project #: 140676

Control Water and Sample Analysis

		Laboratory Number	Alkalinity (mg/L)	Date	Measured by	Hardness (mg/L)	Date	Measured by	Chlorine (mg/L)	Date	Measured by	Cond. (mS/cm)*	Date	Measured by
Initial Sample Analysis		140676-1	494	6/25/14	NM	318	6/25/14	NM	—			1.239	6/24/14	NC
Control Water	Initial	SWA140622	55	6/25/14	NM	84	6/25/14	NM	—			0.305	6/26/14	SW
	Renewal	SWA140622	55	6/25/14	NM	84	6/25/14	NM	—			0.305	6/26/14	PM

*Conductivity values indicated at a reference temperature of 25 degrees celsius. Values in this column for salt-control-water, SWyymmdd, are for salinity determined at the time of initial use in the test.

Sample Aeration

Sample #	Initial D.O (mg/L)	Aeration Duration (min.)	Aeration Rate (ml/min.)	Final D.O (mg/L)	Aerated by: Initials/Date/Time/Volume	Initial Sample pH	Measured by
140676-1	0.5	10	~500	7.0	NM 6/24/14 1508	7.1	NM
140676-1	7.9	N/A	N/A	N/A	NM 6/26/14 1035	7.5	NM

Comments or corrections: _____

Reviewed by: MB

Date: 7/2/14

ACUTE TEST CONDITIONS

Project #: 140676 **Client:** Hazen & Sawyer

Test type: CL 96 hr @ def **Test run in Environmental Chamber #:** 2

Species Code (1)	Receipt Date and Supplier of Organism (if commercially obtained)	Init.	Amount & Type of Food (2)	Init.	How Often Fed (3)	Init.	Test Chamber Vol. (mL)	Init.	Vol. of Effluent Used (mL)	Init.	Type of Chamber (4)	Init.
CL	NA	SS	E	PM	R	PM	1000	SS	250	SS	B	SS

(1) CD *Ceriodaphnia dubia*
FM *Pimephales promelas* (fathead minnow)
SS *Menidia beryllina* (inland silverside)
MS *Americamysis bahia* (mysid shrimp)
DP *Daphnia pulex*
DM *Daphnia magna*
CL *Cyprinella leedsi* (bannerfin shiner)
Other - Please Describe _____

(2) Please fill the "Amount & Type of Food" Box with the appropriate letter:
'AA' 0.1 mL Selenastrum per replicate, 0.1 mL YCT per replicate
'A' 0.2 mL Selenastrum per replicate, 0.2 mL YCTper replicate
'B' 1.4 mL Selenastrum/200 mL of sample, 1.4 mL YCT/200 mL of sample
'C' 0.1 mL of 1200 Artemia nauplii/0.1 mL per replicate
'D' 0.085 mL of 1200 Artemia nauplii/0.1 mL per replicate
'E' 0.04 mL of 1200 Artemia nauplii/0.1 mL per replicate
'O' Other_____

(3) Please fill the "How Often Fed" box with the appropriate letter:
'R' Once, at least two hours before renewal
'F' Once, at least four hours before renewal
'D' Once daily
'T' Twice daily
'O' Other _____

(4) Please fill the "Type of Chamber" box with the appropriate letter:
'B' Plastic Beaker
'M' Plastic Medicine Cup
'P' Plastic Cup
'G' Glass Beaker
'C' Plastic Container

Photoperiod: [SS] 16 hours Light/8 hours dark
[—] Other —

Test(s) conducted in accordance with EPA-821-R-02-012 **Randomization version:** 18

Method number 2000.0

Physical and Chemical Measurement Equipment

Equipment type	Test start	24 hours	48 hours	72 hours	96 hours
Thermometer (A)	E	E	E/E	E	E
DO Meter (B)	4	4	4/4	4	4
pH Meter (C)	7	7	7/7	7	7
Conductivity meter (D)	10	10	—/10	—	10
Freshwater cond. checked by	—	—	—/—	—	—
Used by (Initials)	SLC	SLC	SLC/PM	SLC	PM

(A)Thermometer number is the serial number or designated number on thermometer.
(B)DO Meters: "3" Orion 830
"4" Hach Sension 6
"5" Orion 830A
"6" Orion 820
(C)pH Meters "7" Hach Sension 2
"8" Orion 290A
"9" Orion 720
(D)Conductivity "10" Orion 160
"11" Orion 126
"O" Other _____

Comments or Corrections: _____

Reviewed by: MB

Date: 7/2/14

Marinco Bioassay Laboratory
4569 Samuel Street · Sarasota, FL 34233 · Phone: (941) 925-3594 · Fax: (941) 922-3874

Chain of Custody Record

Please use black ink only

Client: Hazen & Sawyer Permit #: _____

Samplers (Print Names): Harmon Harden _____

_____ _____

Sample Containers

1 qt.	2 qt.	1 Gal.
	2	

Sample Cooler #: _____

Tests Required

Acute: SOW CL 96HR DEF

Chronic:

Client Provided Information | **Lab Use Only**

TRC	Location	Sample ID#	Date of Sampling	Time of Sampling	Grab or Composite	Number of Bottles	Sample on Ice?	MBL Number (lab use only)	Arrival Temp.
Pump tank	B-HS6	STE	6/23/14	10:50	Grab	1	✓	1406164	1°C
ST2 port	B-HS6	ST2	6/23/14	10:32	Grab	1	✓		

Sampling Kit Transfers

Relinquished By:	Received By:	Date	Time	Count
MBL:	Carrier: FedEx	6/18/14	1530	2
Carrier: FedEx	Client: Harmon Harden	6/19/14	1630	2

Please refer to the back of this page for instructions and examples.

Sample Transfers

Relinquished By:	Received By:	Date	Time	Count
Person's Name: [signature] Facility Name: Harmon Harden	Person's Name: Fed Ex Facility Name:	6/23/14	14:30	2
Person's Name: [signature] Facility Name:	Person's Name: [signature] Facility Name:	6/24/14	1048	2
Person's Name: Facility Name:	Person's Name: Facility Name:			
Person's Name: Facility Name:	Person's Name: Facility Name:			
Person's Name: Facility Name:	Person's Name: Facility Name:			

Shipped via : FedEx Busbill/Airbill #: 8047 9332 8016

INTERNAL CHAIN OF CUSTODY
MARINCO BIOASSAY LABORATORY, INC.

Acute Toxicity Test

Project # 140676

Sample expiration date/time 6/24/14 2055

Sample #(s)	140676-1	140676-1
Procedure	**Test Start**	**Test Renewal**
Sample(s) checked in by Initials/Date/Time	MB 6/24/14 1028	N/A
Sample(s) warmed by Initials/Date/Time	M 6/24/14 1440	M 6/26/14 1030
Total Residual Chlorine measured by Initials/Date/Time	N/A	N/A
Sample(s) salted to test salinity using HW Marinemix by: Initials/Date/Time	N/A	N/A
Dilutions prepared by: Initials/Date/Time	SK 6/24/14 1515	M 6/26/14 1044
Test Start-test started by: Test renewal-test renewed by: Initials/Date/Time	M 6/24/14 1545	PM 6/20/14 1100
Remaining sample(s) returned to refrigerator by: Initials/Date/Time	SK 6/24/14 1515	N/A
Samples disposed of by & disposal method Initials/Date/Time	N/A	sample consumed in test M 6/26/14 1044

All samples are stored in the laboratory refrigerator from just above freezing to 6 degrees Celsius unless noted on this Internal chain of custody.

Comments: _____

Reviewed by: MB Date: 7/1/14

MARINCO BIOASSAY LABORATORY
The Aquatic Toxicology Specialists

Whole Effluent Toxicity Testing Summary Page

Client name: Hazen & Sawyer BHS6-ST2

MBL Project/Report # 140677

MBL Sample #	Species	Product Name	Test Results	Passing or Failure
140677-1	*Cyprinella leedsi*	LC50 > / = 100%	LC50 = 56.1%	Failure
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Additional Testing Required: N/A

Comments:

QA/QC Officer/Reviewer: Signature 

Date: 7/9/2014

Effluent Toxicity Testing Report Form

All blanks on this form are to be filled in. Blanks that are not should be filled in with "N/A" or a line drawn through the blank. Please print.

ATTACHMENTS: Please attach the following items to this report form and indicate with an "X" in box.

1. All Chain-of-Custody Forms	X
2. Standard Reference Toxicant (SRT) Reports attached. 1 SRT Reports attached.	X
3. All Raw Data (Bench Sheets) Pertaining to the Tests (i.e., all physical, chemical and biological measurements)	X
4. All Result Calculations	X

Facility/ Industry/ Client Name and address: **Hazen & Sawyer, 10002 Princess Palm Ave., Registry One Bldg. Suite 200, Tampa, FL 33619**

NPDES Number: N/A

County: Hillsborough

Non-NPDES (1) N/A Yes

Project: N/A

Name, Address, & Phone Number of Consultant Company: **Marinco Bioassay Laboratory, Inc. (MBL), 4569 Samuel Street Sarasota, Florida 34233, (941) 925-3594, Certification #E84191, Contact: Jason Weeks Laboratory Director**

Dates Test(s) Conducted:

Start Date: 06/24/2014

End Date: 06/28/2014

Start Time: 1555 hrs.

Name(s) of Person(s) Conducting Test(s):(Printed): **Dubravka Mihajlovic, Smiljana Kerkez, Marlena Beck, Sutanya Singivipulya, Predrag Mihajlovic, and Noel Young**

QA/QC Officer/Reviewer: Signature

Date: 7/9/2014

Laboratory Report #/ Project #: 140677

Sampler's Name: (Print) Harmon Harden

Routine Test: X

Additional: N/A

For failed routine test dated: N/A

Samples

#	Product Name	Lab Sample #	Sample Type: Grab or Composite	Arrival Temp oC	Initial Residual Chlorine (mg/L)	Lab Dechlorination	Chemical Used
1	06/23/2014 1032 hrs.	140677-1	Grab	1	-------	------	-------
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Type of Refrigerant Used for Sample Transportation: X Wet Ice; N/A Blue Ice; N/A Other

Sample Delivered By: N/A Bus; N/A Hand; X Common Carrier

Samples Aerated: Yes, to increase D.O. levels. Yes (Describe) N/A No

Samples Filtered: N/A Yes (Describe) X No

Provide Description:

(1) If toxicity testing data are reported for any project other than permit compliance testing, mark "yes" and identify the reason that toxicity data are being submitted, e.g., Consent Order, ambient monitoring, mixing zone evaluation.

This Page Last Edited By: Marlena Beck on: 07/02/2014

Summary of Test Conditions

Type of Test (1)	Test Conc (cm sq)	Age of Test Organism	Test Species Used (3)	Amount & Type Food	How Often Fed	Test Chamber Volume	Volume of Effluent Used	Type of Chamber	# of Organism/ Chamber	# of Replicates	Temp Range (Degrees Celsius)
D	0, 6.25, 12.5, 25, 50, 100	11 days	CL	0.04 mL1200 Artemia nauplii/0.1 mL per replicate	Once at renewal	1000 mL	250 mL	Beaker	10	2	25
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G. Other: N/A

Temperature Readings Were: N/A Single | N/A Multiple | X Continuous

Description of Control Water: Synthetic Moderately Hard (Reconstituted)

Photoperiod During Test: 16 Hrs. Light : 8 Hrs. Dark

Reference Toxicant Data (4)

Name of Toxicant	Dates of Test Begin and End	Species (3)	In-House or Commercially Obtained	LC50/IC25
NaCl	06/20/2014-06/24/2014	CL	In-House	3.11 g/L NaCl
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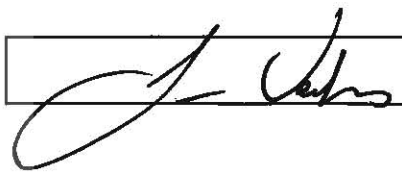
(1) Please fill the "Type of Test" Box with the Appropriate Letter:
- A. 48-Hr/Non-Renewal/Single Concentration (Screen)
- B. 48-Hr/Non-Renewal/Multi-Concentration (Definitive)
- C. 96-Hr/Renewed Every 48-Hrs/Single Concentration (Screen)
- D. 96-Hr/Renewed Every 48-Hrs/Multi-Concentration (Definitive)
- E. 7-Day Chronic/Single Concentration (Screen)/Renewed Daily
- F. 7-Day Chronic/Multi-Concentration (Definitive)/Renewed Daily
- G. Other - Describe in the "G" Box

(2) List all concentrations of effluent used (i.e., 0%, 6.25%, 12.5%, 25%, 50%, 100%)

(3) Write Appropriate Letters for the following species in this column:
- CD Ceriodaphnia dubia
- FM Pimephales promelas (fathead minnow)
- SS Menidia beryllina (inland silverside)
- MS Mysidopsis bahia (mysid shrimp)
- DP Daphnia pulex
- DM Daphnia magna
- CL Cyprinella leedsi (bannerfin shiner)
- Other - Please Describe _____

(4) Attach all reference toxicant raw data and control charts for each organism/reference toxicant used for the test.

QA/QC Officer/Reviewer: Signature



Date: 7/9/2014

ACUTE Test Results.
Test conducted in accordance with EPA-821-R-02-012.

Test Species	Test Concentration (cm sq)	Sample # (3) & Sample I.D.	% Mortality 24 Hrs (4)	% Mortality 48 Hrs (4)	% Mortality 96 Hrs (4)	LC50 (5)
CL-Control	0	--------------	-----	-----	10	------
CL	6.25, 12.5, 25, 50, 100	140677-1	-----	-----	-------	56.1%
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(1) List % control mortality in appropriate column (48 or 96 hr.) for organisms (use abbreviations shown on footnote 3, Page 2) that you list under the word "Control."
(2) List all concentrations of effluent used (i.e., 0%, 6.25%, 12.5%, 25%, 50%, 100%).
(3) Record number that corresponds with the number of the sample in the "Date and Time Collected" column in sample section on Page 1.
(4) List % Mortality for each organism and control if you are conducting a single concentration (Screen) test.

Species	LC50 (6)
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(5) If multi-concentration (Definitive) tests are conducted on grab or composite samples, record the calculated LC50 in this column for each sample. Enter "N/A" in all % Mortality columns and LC50 box at bottom of this table.
(6) If a single concentration (Screen) test is conducted and >50% mortality occurs in any one of the four grab or composites, record <100% in this box. If <=50% mortality occurs in all four grabs or composites, record >100% in this box. Draw a line through the LC50 column in above table.
F = Flagged data, see page 5.
* No statistical test was used in endpoint determination as the data either did not appropriately fit the requirements of any point estimate techniques presented in EPA/600/4-90/027F or these methods provided an unrealistic or unrealiable result as demonstrated herein.

QA/QC Officer/Reviewer: Signature

Date: 7/9/2014

Specify if samples DO NOT meet NELAC standards:	
Standard violation	**Yes/No**
Improper container	No
36-hour holding time exceeded	No
Temperature above 6 degrees Celsius	No

Specify any deviations from, additions to, or exclusions from the test method or any non-standard conditions that may have affected the quality of the results, and include any data qualifiers.

All calculated statistical endpoints were calculated using ToxCalc version 5.0.21 - Tidepool Scientific Software.
The results contained in this report relate only to the items tested or to the samples as received by the laboratory. MBL certifies the results contained in this report meet NELAC standards.
This report shall not be reproduced except in full, without the written approval of MBL.

QA/QC Officer/Reviewer: Signature

Date: 7/9/2014

Acute Fish Test-96 Hr Survival

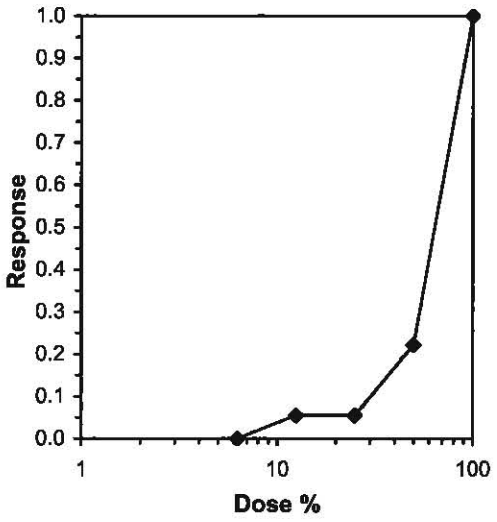
Start Date:	6/24/2014	Test ID:	140677CL	Sample ID:	140677-1
End Date:	6/28/2014	Lab ID:	MBL-Marinco Bioassay Lab.	Sample Type:	
Sample Date:		Protocol:	EPA Method #2000.0	Test Species:	CL-*Cyprinella leedsi*
Comments:	This analysis was performed by Marlena Beck at MBL.				

Conc-%	1	2
Control	0.9000	0.9000
6.25	0.9000	0.9000
12.5	0.8000	0.9000
25	0.7000	1.0000
50	0.7000	0.7000
100	0.0000	0.0000

			Transform: Untransformed					Number	Total
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
Control	**0.9000**	1.0000	0.9000	0.9000	0.9000	0.000	2	2	20
6.25	**0.9000**	1.0000	0.9000	0.9000	0.9000	0.000	2	2	20
12.5	**0.8500**	0.9444	0.8500	0.8000	0.9000	8.319	2	3	20
25	**0.8500**	0.9444	0.8500	0.7000	1.0000	24.957	2	3	20
50	**0.7000**	0.7778	0.7000	0.7000	0.7000	0.000	2	6	20
100	**0.0000**	0.0000	0.0000	0.0000	0.0000	0.000	2	20	20

Trimmed Spearman-Karber

Trim Level	EC50	95% CL	
0.0%	56.123	47.664	66.084
5.0%	60.419	50.982	71.604
10.0%	62.120	52.555	73.425
20.0%	63.958	47.936	85.335
Auto-0.0%	**56.123**	**47.664**	**66.084**



SURVIVAL BENCH SHEET

Project #: 140677 **Test Start:** 6/24/14 1535

Test Organism: Cyprinella leedsi **Test End:** 6/28/14 1540 (SS 6/30)

Organism Age: 11 days **Brood #:** CL140613

Concentration %	Sample Number	Survival: Replicate A					Survival: Replicate B					A & B %
		0 Hours	24 Hours	48 Hours	72 Hours	96 Hours	0 Hours	24 Hours	48 Hours	72 Hours	96 Hours	
100	140677-1	10	10	1	0	–	10	8	2	2	0	0
50		10	10	10	10	7	10	10	9	8	7	70
25		10	10	10	8	7	10	10	10	10	10	85
12.5		10	10	10	10	8	10	10	10	10	9	85
6.25		10	10	10	10	9	10	10	10	10	9	90
Control		10	10	10	10	9	10	10	10	9	9	90
Organisms Fed By: (Initials & Time)		–	–	PM @10	–	–	–	–	PM @10	–	–	–
0 Hours started/checked by: 24, 72, 96 Hours counted by: 48 Hours renewed/cleaned by:		MY / SS	AM	PM	SLC	SS	MY / SS	AM	PM	SLC	SS	SS

Comments or Corrections:

Reviewed by: MB

Date: 7/2/14

ACUTE TOXICITY TEST PHYSICAL AND CHEMICAL MEASUREMENTS

EPA Method # 2000.0

Project #: 140677 **Test Start:** 6/24/14 1555

Test Organism: Cyprinella leedsi **Test End:** 6/28/14 1540

Effluent Concentration %	Sample Number	Dissolved Oxygen (mg/L) 0 Hours	24 Hours	48 Hours (1)	72 Hours	96 Hours	pH 0 Hours	24 Hours	48 Hours	72 Hours	96 Hours
100	140677-1	7.9	7.7	3.8 / 8.1	7.7	7.3	7.7	8.4	8.0 / 7.2	8.6	8.5
50.0		8.1	7.8	4.5 / 8.3	7.5	7.3	7.8	8.2	8.3 / 7.5	8.2	8.3
25.0		8.2	7.8	4.8 / 8.2	7.8	7.4	7.8	8.1	7.7 / 7.6	8.0	8.0
12.5		8.2	7.7	5.6 / 8.1	7.8	7.6	7.8	8.0	7.7 / 7.7	8.0	8.1
6.25		8.1	7.7	6.2 / 8.1	7.8	7.4	7.7	7.9	7.7 / 7.7	8.0	7.9
Control		8.1	7.7	7.5 / 8.1	7.7	7.5	7.7	7.9	7.7 / 7.7	7.8	7.9
Measured by:		MM	SLC	SLC / MM	SLC	MM	MM	SLC	SLC / MM	SLC	MM

Effluent Concentration %	Sample Number	Temperature (Degrees Celsius) 0 Hours	24 Hours	48 Hours	72 Hours	96 Hours	Conductivity (uS/cm) 0 Hours	24 Hours	48 Hours	72 Hours	96 Hours
100	140677-1	25	25	25 / 25	25	25	1.080	—	— / 1.087	—	1.105
50.0		25	25	25 / 25	25	25	0.691	—	— / 0.697	—	0.745
25.0		25	25	25 / 25	25	25	0.496	—	— / 0.498	—	0.542
12.5		25	25	25 / 25	25	25	0.410	—	— / 0.407	—	0.450
6.25		25	25	25 / 25	25	25	0.358	—	— / 0.356	—	0.405
Control		25	25	25 / 25	25	25	0.304	—	— / 0.304	—	0.359
Measured by:		MM	SLC	SLC / MM	SLC	MM	MM	—	— / MM	—	MM

Comments or corrections: (1) Aeration started on all concentrations and replicates ~100 bubbles/min SLC 6/26/14 0930

Reviewed by: MB

Date: 7/2/14

SAMPLE/CONTROL WATER INFORMATION

Project #: 140677

Control Water and Sample Analysis

		Laboratory Number	Alkalinity (mg/L)	Date	Measured by:	Hardness (mg/L)	Date	Measured by:	Chlorine (mg/L)	Date	Measured by:	Cond. (mS/cm)*	Date	Measured by:
Initial Sample Analysis		140677-1	346	6/25/14	AM	478	6/25/14	AM				1.080	6/24/14	AM
Control Water	Initial	SWH140622	55	6/25/14	AM	84	6/25/14	AM				0.304	6/24/14	AM
	Renewal	SWH140622	55	6/25/14	AM	84	6/25/14	AM				0.304	6/26/14	AM

*Conductivity values indicated at a reference temperature of 25 degrees celsius. Values in this column for salt-control-water, SWyymmdd, are for salinity determined at the time of initial use in the test.

Sample Aeration

Sample #	Initial D.O (mg/L)	Aeration Duration (min.)	Aeration Rate (ml/min.)	Final D.O (mg/L)	Aerated by: Initials/Date/Time/Volume	Initial Sample pH	Measured by:
140677-1	0.5	6	~500	7.9	AM 6/24/14 1500	6.6	AM
140677-1	8.1	N/A	N/A	N/A	AM 6/26/14 1035	7.1	AM

Comments or corrections: _____

Reviewed by: MB

Date: 7/1/14

ACUTE TEST CONDITIONS

Project #: 140677 **Client:** Hazen & Sawyer

Test type: CL 96 hr @ def **Test run in Environmental Chamber #:** 2

Species Code (1)	Receipt Date and Supplier of Organism (if commercially obtained)	Init.	Amount & Type of Food (2)	Init.	How Often Fed (3)	Init.	Test Chamber Vol. (mL)	Init.	Vol of Effluent Used (mL)	Init.	Type of Chamber (4)	Init.
CL	NA	SS	E	SM	R	SM	1000	SS	250	SS	B	SS

(1) CD *Ceriodaphnia dubia*
FM *Pimephales promelas* (fathead minnow)
SS *Menidia beryllina* (inland silverside)
MS *Americamysis bahia* (mysid shrimp)
DP *Daphnia pulex*
DM *Daphnia magna*
CL *Cyprinella leedsi* (bannerfin shiner)
Other - Please Describe _____

(2) Please fill the "Amount & Type of Food" Box with the appropriate letter:
'AA' 0.1 mL Selenastrum per replicate, 0.1 mL YCT per replicate
'A' 0.2 mL Selenastrum per replicate, 0.2 mL YCTper replicate
'B' 1.4 mL Selenastrum/200 mL of sample, 1.4 mL YCT/200 mL of sample
'C' 0.1 mL of 1200 Artemia nauplii/0.1 mL per replicate
'D' 0.085 mL of 1200 Artemia nauplii/0.1 mL per replicate
'E' 0.04 mL of 1200 Artemia nauplii/0.1 mL per replicate
'O' Other _____

(3) Please fill the "How Often Fed" box with the appropriate letter:
'R' Once, at least two hours before renewal
'F' Once, at least four hours before renewal
'D' Once daily
'T' Twice daily
'O' Other _____

(4) Please fill the "Type of Chamber" box with the appropriate letter:
'B' Plastic Beaker
'M' Plastic Medicine Cup
'P' Plastic Cup
'G' Glass Beaker
'C' Plastic Container

Photoperiod: [SS] 16 hours Light/8 hours dark

[—] Other _____

Test(s) conducted in accordance with EPA-821-R-02-012 **Randomization version:** 18

Method number 2000.0

Physical and Chemical Measurement Equipment

Equipment type	Test start	24 hours	48 hours	72 hours	96 hours
Thermometer (A)	E	E	E/E	E	E
DO Meter (B)	4	4	4/4	4	4
pH Meter (C)	7	7	7/7	7	7
Conductivity meter (D)	10	NA	-/10	—	10
Freshwater cond. checked by	—	—	—/—	—	—
Used by (Initials)	MY	SIC	SIC/MY	SIC	MY

(A)Thermometer number is the serial number or designated number on thermometer.
(B)DO Meters: "3" Orion 830
"4" Hach Sension 6
"5" Orion 830A
"6" Orion 820
(C)pH Meters "7" Hach Sension 2
"8" Orion 290A
"9" Orion 720
(D)Conductivity "10" Orion 160
"11" Orion 126
"O" Other _____

Comments or Corrections: _____

Reviewed by: MB

Date: 7/2/14

Marinco Bioassay Laboratory
4569 Samuel Street · Sarasota, FL 34233 · Phone: (941) 925-3594 · Fax: (941) 922-3874

Chain of Custody Record

Please use black ink only

Client: Hazen & Sawyer Permit #: _____

Samplers (Print Names): Harmon Harden _____

_____ _____

Sample Containers

1 qt.	2 qt.	1 Gal.
	2	

Sample Cooler #: _____

Tests Required

Acute: SOW CL 96HR DEF

Chronic:

Client Provided Information | **Lab Use Only**

TRC	Location	Sample ID#	Date of Sampling	Time of Sampling	Grab or Composite	Number of Bottles	Sample on Ice?	MBL Number (Lab use only)	Arrival Temp.
pump tank	B-HS6	STE	6/23/14	10:50	Grab	1	✓		
ST2 port	B-HS6	ST2	6/23/14	10:32	Grab	1	✓	140677H	1°C

Sampling Kit Transfers

Relinquished By:	Received By:	Date	Time	Count
MBL: [signature]	Carrier: FedEx	6/18/14	1530	2
Carrier: FedEx	Client: Harmon Harden	6/19/14	1630	2

Please refer to the back of this page for instructions and examples.

Sample Transfers

Relinquished By:	Received By:	Date	Time	Count
Person's Name: [signature] Facility Name: Harmon Harden	Person's Name: Fed Ex Facility Name:	6/23/14	14:30	2
Person's Name: FedEx Facility Name:	Person's Name: [signature] Facility Name:	6/24/14	1048	2
Person's Name: Facility Name:	Person's Name: Facility Name:			
Person's Name: Facility Name:	Person's Name: Facility Name:			
Person's Name: Facility Name:	Person's Name: Facility Name:			

Shipped via : FedEx Busbill/Airbill #: 8047 9232 8016

INTERNAL CHAIN OF CUSTODY
MARINCO BIOASSAY LABORATORY, INC.

Acute Toxicity Test

Project # 140677

Sample expiration date/time 6/24/14 0232

Sample #(s)	140677-1	140677-1
Procedure	**Test Start**	**Test Renewal**
Sample(s) checked in by Initials/Date/Time	MB 6/24/14 1048	N/A
Sample(s) warmed by Initials/Date/Time	DM 6/24/14 1440	DM 6/26/14 1030
Total Residual Chlorine measured by Initials/Date/Time	N/A	N/A
Sample(s) salted to test salinity using HW Marinemix by: Initials/Date/Time	N/A	N/A
Dilutions prepared by: Initials/Date/Time	DM 6/24/14 1505	DM 6/26/14 1050
Test Start-test started by: Test renewal-test renewed by: Initials/Date/Time	DM 6/24/14 1535	DM 6/26/14 1115
Remaining sample(s) returned to refrigerator by: Initials/Date/Time	DM 6/24/14 1507	N/A
Samples disposed of by & disposal method Initials/Date/Time	N/A	Sample consumed in test DM 6/26/14 1050

All samples are stored in the laboratory refrigerator from just above freezing to 6 degrees Celsius unless noted on this Internal chain of custody.

Comments: _____

Reviewed by: MB Date: 7/2/14