REPORT OF FINDINGS
FOR SEDIMENT CHARACTERIZATION IN
TWO MONROE COUNTY DEMONSTRATION CANALS

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
GRANT AGREEMENT NO. S0679

Prepared for:

MONROE COUNTY AND
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

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TABLE OF CONTENTS

1.0 INTRODUCTION 1-1

2.0 SCOPE OF WORK 2-1

3.0 METHODOLOGIES 3-1
3.1 Sampling Methodology 3-1
3.2 Laboratory Test Methods 3-3
3.2.1 Physical Test Methods 3-3
3.2.2 Chemical Test Methods 3-3
3.2.3 Polymer Testing 3-4

4.0 RESULTS 4-1
4.1 General Description of Sediment 4-1
4.2 Sediment Physical Characterization 4-1
4.3 Sediment Chemical Characterization 4-4
4.4 Disposal Options 4-8
4.5 Polymer Test Results 4-9

LIST OF FIGURES

1. Site Location Map Canal #266
2. Site Location Map Canal #290
3. Canal #266 Sediment Sample Location Map
4. Canal #290 Sediment Sample Location Map

LIST OF TABLES

Table 1 Organic Content of Sediment Samples
Table 2 Particle Size Distribution in Sediment Samples
Table 3 Chemical Analytical Results

APPENDICES

Appendix A	Photographs
Appendix B	Soil Boring Logs
Appendix C	Laboratory Physical Test Results
Appendix D	Laboratory Chemical Test Results
Appendix E	Historical Sediment Chemical Analytical Data
Appendix F	Dewatering Trial Performance Polymer Test Results

1.0 INTRODUCTION

Construction of residential canals in the Florida Keys was initiated in the mid-20th century, before resource managers fully understood their impacts on local water quality and broader coastal ecosystems. Many of the 502 canal systems currently present in the Keys were excavated to depths of three to six meters in order to maximize production of fill material. Most were designed as long, multi-segmented, dead-end canal networks which maximize waterfront property but provide little or no tidal flushing and accumulate oxygen-demanding and potentially toxic sediments as well as decomposing organic material.

Water quality issues involving manmade canals have been evaluated by the U.S. Environmental Protection Agency (Kruczynski 1999), the Florida Keys National Marine Sanctuary (FKNMS 2007), and the Florida Department of Environmental Protection (FDEP 2011). As summarized in the Monroe County Comprehensive Plan updated 2011, these issues include anthropogenic pollutant loadings from on-site sewage disposal and stormwater runoff, and accumulation of non-anthropogenic materials such as senescent seagrass leaves and other organic flotsam ("weed wrack"), leading to elevated levels of nutrients, biochemical oxygen demand, hydrogen sulfide, and bacteriological indicators.

Kruczynski (1999) provided the following summary of water quality issues related to existing Keys canals:

- the water column of many canals over six feet deep is stratified and bottom waters are oxygen deficient;
- because they usually violate Class III Surface Water Quality Standards, canals were excluded from the State's previous Outstanding Florida Waters (OFW) designations;
- artificial aeration of canals does not eliminate the sources of excessive nutrients in canal waters but may result in better mixing which may facilitate nitrogen cycling;

- canal systems and basins with poor water quality are a potential source of nutrients and other contaminants to other nearshore waters;
- improving flushing of degraded canal systems may improve the water quality within the canal, but may also result in adding additional nutrients to the adjacent waters; and
- Seagrass beds located near the mouths of some degraded canal systems exhibit signs of undesirable nutrient enrichment and eutrophication, such as increased epiphyte load and growth of benthic algae.

Improvements in wastewater treatment and stormwater management practices are currently being implemented in many areas of the Keys. These improvements are an essential first step, but will not solve all the water quality problems in existing canals. Although many of these problems are linked to wastewater and stormwater discharges, others are due to the physical structure, depth, and orientation of canals, which can contribute to low flushing and the build-up of organic flotsam.

In order to address canal impaired water quality, a Canal Management Master Plan (CMMP) was prepared to inventory all the canals in the Keys, rank them for need for water quality improvement, and identify appropriate restoration technologies (AMEC Environment & Infrastructure, 2013). As one of the first efforts to implement the CMMP, Monroe County approved $5 million to fund canal restorations and implement a demonstration project. The work conducted for the tasks described in this report is has been funded by a FDEP grant and is intended to support Monroe County's demonstration project implementation effort.

The work to be accomplished as part of this effort has been identified by the Canal Restoration Advisory Subcommittee of the Florida Keys National Marine Sanctuary (FKNMS) Water Quality Protection Program (WQPP) as a high priority to assist with Monroe County canal water quality restoration. The tourism economy of the Keys depends largely on clean water and a healthy environment and this project is fully supported by the WQPP Steering Committee and local governments in Monroe County. The successful implementation of this project is also consistent with the goals of the

Florida Keys Reasonable Assurance Document that was recently adopted by the Department in order to satisfy the requirements of the Impaired Waters Rule, Chapter 62-303 of the Florida Administrative Code.

The work described in this report which was completed under DEP grant S0679 contained specific tasks required before Monroe County can move forward with demonstration canal water quality improvement restorations. The scope included detailed sediment characterization testing in the two top ranked canals (Big Pine Key #266 and #290) for application of the organic removal technology in the unincorporated Monroe County demonstration project. These data will be used, in part, to establish the fundamental objectives for engineering design of sediment handling and sediment dewatering controls. It will also be used to screen the potential beneficial use and the ultimate disposition of the dewatered sediments. Physical and chemical data were collected from ten canals as a preliminary characterization under DEP Grant S0640 completed in June 2013. This current grant scope is an extension of that initial testing.

2.0 SCOPE OF WORK

Sediment samples were collected from the two (2) canals including Canal #266 located between Bailey and Witters Lanes and Canal #290 located between Avenues I and J, both in Big Pine Key. **Figures 1** and **2** provide site location maps. In order to prepare design packages and develop detailed costs, nine (9) sediment cores were collected in each canal. The samples were collected at three (3) locations (back, middle and front of each canal) to develop cross sections of the sediment. Three (3) core samples were collected at each cross section: two (2) sides and middle.

Cores were logged for evaluation of variations in organic content that will influence the need to remove the material. In order to confirm the organic content at various locations and depths nine (9) samples per canal (total 18 samples) were analyzed for total organic content by ASTM-D-2974 at AMEC's geotechnical laboratory.

Additionally, three (3) samples from each canal were submitted for grain size distribution analysis by ASTM D-422 to assist with the design for removal of the material from the canal bottoms. The physical testing was performed by AMEC's Geotechnical Lab located in Jacksonville, Florida.

Additionally, one composite sample from canal #290 was be submitted for chemical characterization to determine disposal options (data is already available for #266, obtained under Grant S0640). Test America Analytical Laboratories, a State National Environmental Laboratory Accreditation Conference (NELAC) certified laboratory performed the analyses. The test methods were based upon the previous list of disposal parameters completed during the DEP grant S0640 and include:

- Organochlorine Pesticides and PCBs by 8081/8082
- Chlorinated Herbicides by 8151
- 8 RCRA Metals by 6010/7471
- Copper by 6010
- Polynuclear Aromatic Hydrocarbons (PAHs) by 8270 low level

- Total Recoverable Petroleum Hydrocarbons (TRPH) by FL-PRO
- TCLP metals (if required based upon total metal's concentrations).

Additionally, one composite sample from each canal was collected and submitted for Synthetic Precipitation Leaching Procedure (SPLP) analysis for Copper, Arsenic and Lead to determine leachability.

Also a bench scale polymer dosing testing was performed by WaterSolve, LLC using one sample from each canal to assist with the dewatering design. This testing was conducted to evaluate the turbidity of the dewatering fluid prior to discharge.

The test results and summary of sediment disposal options that meet all applicable Department regulations, including the requirements of Chapter 62-160 of the Florida Administrative Code are presented in this report.

3.0 METHODOLOGIES

Sediment samples were collected on December 18 and 19, 2013 from canals #266 and #290 at nine locations in each canal. The samples were collected at three (3) transects located at the back, middle and front of each canal. The transects were labeled 1, 2 and 3. Three (3) core samples were collected at each transect: two (2) sides and middle and labeled A, B and C. **Figures 3** and **4** show the sample locations. Photographs of the sampling activities are included in **Appendix A**.

3.1 SAMPLING METHODOLOGY

A piston tube corer attached to a small barge was utilized to collect the sediment cores. Adventure Environmental, Inc. was subcontracted to supply the barge and operators. A picture of the barge within canal #266 is shown below.

Once the barge was positioned at each sample location, a GPS coordinate of the transect was obtained. Next the depth to bottom from the top of water was recorded and the time noted in the log book. The required length of three (3) inch diameter clear hard plastic core-tube liners, were then assembled to allow up to 8 feet of sediment core to be collected. Each core tube was eight (8) feet in length. The corer was then lowered into the water and direct pushed manually by two (2) topside personnel to penetrate into the sediments. The corer was pushed to refusal. The driller's log of the depths of the top of sediment and depths to refusal at each sample location are included in **Appendix B**.

Upon withdrawal from the water surface, the core liner was capped at both ends with water proof rubber stoppers. After taking and sealing the cores they were labeled and put into a rack for delivery to a land side location for subsequent handling.

AMEC setup a land side staging area at each canal to allow room for logging the cores. The general texture, color, odor, and gross composition were noted on soil boring logs which are included in **Appendix B**. A picture of the staging area and example of one transect of cores is shown in **Appendix A**.

After visually determining the depths of the different lithologic materials in each core tube, the sediment was extruded into stainless steel bowls. The different lithologic materials were placed in different bowls. Each material was evaluated for presence of seaweed, mineral content, odor and color. Sample intervals were selected for submittal for physical testing for organic content and grain size. These samples were placed in ziplock bags and sealed for shipment to AMEC's Geotechnical Laboratory located in Jacksonville, Florida.

At each canal, a composite sample for chemical testing was created by incorporation of material from each core. Pre-cleaned laboratory sample containers were labeled and filled with sediment and stored in coolers preserved to 4°C with wet ice. The samples were delivered to a TestAmerica courier under proper chain-of-custody who transported the samples to the TestAmerica Laboratory located in Tampa, Florida for chemical testing.

AMEC followed the procedures detailed in the project Sampling and Analysis Plan that was approved by DEP for completion of the sediment sampling and analysis performed under this grant.

3.2 LABORATORY TEST METHODS

3.2.1 Physical Test Methods

The physical tests performed at AMEC's Geotechnical Laboratory in Jacksonville, Florida included the following methods,

1) Grain size analysis will be determined using ASTM D422, *Standard Test Method for Particle-Size Analysis of Soils*, and D1140, *Standard Test Methods for Amount of Material in Soils Finer Than the No. 200 (75-um) Sieve, and.*

2) Total organic content by ASTM D2974, *Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.*

3.2.2 Chemical Test Methods

AMEC consulted with DEP concerning the chemical analytical test methods that would allow an evaluation of the disposal options for the canal sediments. The agreed upon list of the chemical test methods included the following:

- Organochlorine Pesticides and PCBs by 8081/8082
- Chlorinated Herbicides by 8151
- 8 RCRA Metals by 6010/7471
- Copper by 6010
- Polynuclear Aromatic Hydrocarbons (PAHs) by 8270 low level
- Total Recoverable Petroleum Hydrocarbons (TRPH) by FL-PRO
- TCLP metals (if required based upon total metal's concentrations).

Additionally, one composite sample from each canal was collected and submitted for Synthetic Precipitation Leaching Procedure (SPLP) analysis for Copper, Arsenic and Lead to determine leachability.

TestAmerica Laboratory in Tampa, Florida was selected as the chemical analytical laboratory for this project. TestAmerica Tampa is accredited through the National Environmental Laboratory Accreditation Program (NELAP) for all of the above test methods. The laboratory implemented all Quality Assurance and Quality Control procedures in accordance with their NELAP requirements.

3.2.3 Polymer Testing

AMEC researched polymers that had been previously used in the Keys on other dredging projects and had already been permitted by DEP. AMEC identified that at Florida Keys Community College in Key West, Solve 164 and Solve 426 had been permitted. AMEC contacted the manufacturer of these polymers, WaterSolve, LLC, and arranged to have them run a bench scale dosing test on samples from Canals #266 ad #290. AMEC shipped a composite of the 0-3 foot interval sediment plus canal water samples from each canal to WaterSolve, LLC for testing. The objective is to determine the range of polymer dosing rates that accelerates effective dewatering and substantial reduction of dewatering effluent turbidity.

4.0 RESULTS

4.1 GENERAL DESCRIPTION OF SEDIMENT

A general description of the sediment collected at each of the two (2) canals is shown below. The boring logs in **Appendix B** may be referred to for the variations in depth of each of these units.

Canal #266

0 to 4 feet	**Highly Organic Layer** with obvious seaweed pieces; increases to 6 foot thickness near back of canal
4 to 6 feet	**Mixed layer of organic material and marly fine sand**; transitions to weathered limestone, not present near back of canal where organics are thicker
6 feet	**Refusal**, assumed to be hard **Limestone** based upon observance of pieces in tip of core sampler; depth decreases to 5 feet near mouth

Canal #290

0 to 3 feet	**Highly Organic Layer,** decomposed; increases to 5 foot thickness near canal mouth
3 to 5 feet	**Mixed layer of organic material and marly fine sand**; transitions to weathered limestone
5 feet	**Refusal**, assumed to be hard **Limestone** based upon observance of pieces in tip of core sampler; depth increases to 6 feet near mouth, and decreases to 4 feet in middle section of canal.

4.2 SEDIMENT PHYSICAL CHARACTERIZATION

Total Organic Carbon analysis was completed on nine (9) sediment samples from Canal #266 and nine (9) sediment samples from Canal #290 to assist in determining which

sediments had the highest organic carbon loading in the canals. The sample locations and intervals were selected to provide results from various lithologic units and depths. **Table 1** presents the results. The complete laboratory report is included in **Appendix C**.

Table 1
Organic Content of Sediment

Canal ID	Sample No.	Depth (ft)	Lithologic Unit	Organic Content (%)
266	1C	6	Highly Organic Layer	86.6
266	1B	3	Highly Organic Layer	94.6
266	1A	5.5	Highly Organic Layer	89.9
266	2A	4	Organic and Marly Fine Sand	23.7
266	2B	4	Top of Organic and Marly Fine Sand Layer	52.2
266	3B	0-1.5	Highly Organic Layer	94.1
266	3A	4	Organic and Marly Fine Sand	2.8
266	3C	3.5	Organic and Marly Fine Sand	69.3
266	3B	4	Organic and Marly Fine Sand	12.8
290	3A	3	Organic Layer	31.1
290	2A	4	Organic and Marly Fine Sand	27.3
290	2B	3.5	Organic and Marly Fine Sand	4.5
290	2A	3	Organic and Marly Fine Sand	33.8
290	3A	6	Weathered Limestone	1.7
290	1C	4	Organics - decomposed	13.6
290	1B	4	Organics	25.7
290	3B	3	Organics	35.2
290	3A	5	Organic and Marly Fine Sand	15.4

The highest total organic content of the samples collected for this project were observed in Canal #266 at 94.6%. The highest value reported at Canal #290 was 35.2%. Canal #266 does not have an effective weed barrier and contains sediment with a higher

percentage of undecomposed seaweed. There is a transitional zone of layered organic and marly material below the upper highly organic layer in both canals that ranges in organic content from 2.8 to 69.3%. The large variation is likely due to the non homogeneous nature of this zone. The underlying limestone showed a low organic carbon content o f 1.7% and will likely be the base of the organic removal.

Three (3) samples from each canal were submitted for particle size analysis. Different lithologic units were selected to provide a variation with depth in each canal. **Table 2** summarizes the percent sand, silt and clay reported for each sample. The complete laboratory reports are included in **Appendix B**.

Table 2
Particle Size Distribution in Sediment Samples

Canal and Sample ID	Depth (ft)	Lithologic Unit	% Gravel	% Sand	% Silt	% Clay
266 1C	0-3	Highly Organic	0	16.6	52.1	31.3
266 3B	3.5	Transitional	0	8.9	54.7	36.4
266 3C	4	Transitional	29.5	34.1	26.9	9.5
290 3A	0-3	Organics	1.9	17.8	50.6	29.7
290 1A	4	Organics and Fine Sand	0	23.7	55.4	20.9
290 2B	5	Marly Very Fine Sand	0	1.2	53.7	45.1

The grain size results will assist in the dewatering design during organic removal in regards to geolube sizing and settling rates.

The boring data were utilized to revise the estimated volumes of sediment to be removed. Based upon removal of material to the depth of refusal, the revised volumes are 8,300 cubic yards for Canal #266 and 4,700 cubic yards for Canal #290. These values are significantly higher than the previous estimates of 1,530 cubic yards for Canal

#266 and 1,025 cubic yards for Canal #290 which were based upon indirect sediment thickness measuring devises (dual frequency transponder). It is inferred that the dual frequency results identified the thickness of the upper highly organic layer and reflected back at the transitional layer in these canals.

4.3 SEDIMENT CHEMICAL CHARACTERIZATION

The analytical laboratory results for the two (2) sediment samples are shown in **Table 3**. The reported sample concentrations are compared to the DEP 62-777 Table 2 Soil Cleanup Target Levels (SCTLs) as well as the DEP Sediment Quality Assessment Guidelines (SQAGs) for both Toxic Effect Level (TEL) and Probable Effect Level (PEL). Although RCRA regulations do not apply to in-situ canal sediments the concentrations of RCRA metals were evaluated for disposal options.

The complete laboratory reports are included in **Appendix D**. Please note that not all method detection limits are below all SCTLs or SQAGs. All reports were considered valid and all data useable.

A summary of the test results for the sediment sample collected form Canal #290 follows:

- **Organochlorine Pesticides** – not detected
- **PCBs** – not detected
- **Chlorinated Herbicides** – not detected
- **Polynuclear Aromatic Hydrocarbons** - not detected except for Pyrene which was reported as an estimated value of 0.096i milligrams per kilogram (mg/kg), well below all the SCTLs and SQAGs.
- **Total Recoverable Petroleum Hydrocarbons (TRPH)** - 440 mg/kg which exceeds the DEP Leachability SCTL but is below the Residential Direct Exposure SCTL. There were no SQAGs identified for TRPH.
- **Barium, Cadmium, Chromium, Lead, Selenium, Silver, and Mercury** – either not detected or at concentrations below SCTLs. The Cadmium concentration was above TEL.

- **Arsenic** was detected at a concentration of 8.2 mg/kg which exceeds the Residential Direct Exposure SCTL but is below the Industrial/Commercial Direct Exposure SCTL. The concentration is above the TEL.
- **Copper** was detected at a concentration of 540 mg/kg which exceeds the Residential Direct Exposure SCTL but is below the Industrial/Commercial SCTL. The concentration is above both the TEL and PEL.

DEP indicated that based upon the total metal concentrations, TCLP testing was not required. The Synthetic Precipitation Leaching Procedure (SPLP) results for the sediment sample collected from Canal #290 reported concentrations of all three metals (Arsenic, Copper and Lead) either non detectable or below Groundwater Cleanup Target Levels and Class III Marine Surface Water standards. The SPLP sample results from Canal #266 reported non-detectable concentrations of Arsenic, Lead and Copper.

Table 3
Chemical Analytical Results

Parameter	Reporting Units	SQAGs for FL Coastal Waters TEL	SQAGs for FL Coastal Waters PEL	62-777 Table2 Soil Residential	62-777 Table2 Soil Commercial Industrial	62-777 Table2 Soil Leach Base GW Criteria	62-777 Table1 Soil Leach Base GW Low Yield	Sample ID: Canal 2W
								Sampled By: W. Blondin
								Sample Collection Date: 12/19/2012 11:20
								Sample Matrix: Composite
								Comments
Semivolatiles by 8270C LL								
1-Methylnaphthalene	mg/kg	-	-	200	1800	3.1	31	0.053U
2-Methylnaphthalene	mg/kg	0.0201	0.201	210	2100	8.5	85	0.085U
Acenaphthene	mg/kg	0.00671	0.0889	2400	20000	2.1	21	0.24U
Acenaphthylene	mg/kg	0.00587	0.128	1800	20000	27	270	0.080U
Anthracene	mg/kg	0.0469	0.245	21000	300000	2500	25000	0.050U
Benzo(a)anthracene	mg/kg	0.0748	0.693	#	#	0.8	8	0.047U
Benzo(a)pyrene	mg/kg	0.0888	0.763	0.1	0.7	8	80	0.092U
Benzo(b)fluoranthene	mg/kg	-	-	#	#	2.4	24	0.073U
Benzo(g,h,i)perylene	mg/kg	-	-	2500	52000	32000	320000	0.053U
Benzo(k)fluoranthene	mg/kg	-	-	#	#	24	240	0.043U
Chrysene	mg/kg	0.108	0.846	#	#	77	770	0.054U
Dibenz(a,h)anthracene	mg/kg	0.00622	0.135	#	#	0.7	7	0.049U
Fluoranthene	mg/kg	0.113	1.494	3200	59000	1200	12000	0.048U
Fluorene	mg/kg	0.0212	0.144	2600	33000	160	1600	0.042U
Indeno(1,2,3-cd)pyrene	mg/kg	-	-	#	#	6.6	66	0.085U
Naphthalene	mg/kg	0.0346	0.391	55	300	1.2	12	0.053U
Phenanthrene	mg/kg	0.0867	0.544	2200	36000	250	2500	0.047U
Pyrene	mg/kg	0.153	1.398	2400	45000	890	8800	0.066
GC Semivolatiles by 8081A								
4,4'-DDD	mg/kg	0.00122	0.00781	4.2	22	5.8	58	0.0054U
4,4'-DDE	mg/kg	0.00207	0.374	2.9	15	18	180	0.0042U
4,4'-DDT	mg/kg	0.00119	0.00477	2.9	15	11	110	0.0054U
Aldrin	mg/kg	ID	ID	0.08	0.3	0.2	2	0.0054U
alpha-BHC	mg/kg	-	-	0.1	0.6	0.0003	0.003	0.0046U
beta-BHC	mg/kg	-	-	0.5	2.4	0.001	0.01	0.0072U
Chlordane (technical)	mg/kg	0.00226	0.00479	2.8	NA	9.6	96	0.069U
delta-BHC	mg/kg	-	-	24	490	0.2	2	0.0072U
Dieldrin	mg/kg	0.000715	0.0043	0.08	0.3	0.002	0.02	0.0054U
Endosulfan I	mg/kg	ID	ID	NA	NA	NA	NA	0.0054U
Endosulfan II	mg/kg	ID	ID	NA	NA	NA	NA	0.0078U
Endosulfan sulfate	mg/kg	-	-	NA	NA	NA	NA	0.0054U
Endrin	mg/kg	ID	ID	25	510	1	10	0.0084U
Endrin aldehyde	mg/kg	-	-	NA	NA	NA	NA	0.0060U
Endrin ketone	mg/kg	-	-	NA	NA	NA	NA	0.0060U
gamma-BHC (Lindane)	mg/kg	0.00032	0.00099	0.7	2.5	0.009	0.09	0.0060U
Heptachlor	mg/kg	ID	ID	0.2	1	23	230	0.0078U
Heptachlor epoxide	mg/kg	ID	ID	0.1	0.5	0.4	6	0.0054U
Methoxychlor	mg/kg	-	-	420	8800	160	1600	0.012U
Toxaphene	mg/kg	ID	ID	0.9	4.5	31	310	0.35U
GC Semivolatiles by 8082								
PCB-1016	mg/kg	****	****	NA	NA	NA	NA	0.14U
PCB-1221	mg/kg	****	****	NA	NA	NA	NA	0.067U
PCB-1232	mg/kg	****	****	NA	NA	NA	NA	0.12U
PCB-1242	mg/kg	****	****	NA	NA	NA	NA	0.16U
PCB-1248	mg/kg	****	****	NA	NA	NA	NA	0.12U
PCB-1254	mg/kg	****	****	NA	NA	NA	NA	0.12U
PCB-1260	mg/kg	****	****	NA	NA	NA	NA	0.067U
GC Semivolatiles by 8151A								
2,4,5-T	mg/kg	-	-	690	9600	0.4	4	0.12U
2,4-D	mg/kg	-	-	270	13000	0.7	7	0.059U
2,4-DB	mg/kg	-	-	NA	NA	NA	NA	0.078U
Dalapon	mg/kg	-	-	NA	NA	NA	NA	0.28U
Dicamba	mg/kg	-	-	2200	40000	2.6	26	0.15U
Dichlorprop	mg/kg	-	-	370	5800	0.3	3	0.30U
Dinoseb	mg/kg	-	-	65	840	0.03	0.3	0.10U
MCPA	mg/kg	-	-	35	500	0.02	0.2	9.0U
MCPP	mg/kg	-	-	64	800	0.03	0.3	4.9U
Pentachlorophenol	mg/kg	ID	ID	7.2	28	0.03	0.3	0.061U
Picloram	mg/kg	-	-	NA	NA	NA	NA	0.015U
Silvex (2,4,5-TP)	mg/kg	-	-	660	14000	5.4	54	0.12U
GC Semivolatiles by FL-PRO								
Total Petroleum Hydrocarbons (C8-C	mg/kg	-	-	460	2700	340	3400	440
Metals by 6010B								
Arsenic	mg/kg	7.24	41.6	2.1	12	***	***	8.2*
Barium	mg/kg	-	-	120	130000	1600	16000	8.1I
Cadmium	mg/kg	0.676	4.21	82	1700	7.5	75	2.4I*
Chromium	mg/kg	52.3	160	210	470	38	380	15

Table 3
Chemical Analtyical Results

							Sample ID	Canal 290
							Sampled By	W. Blondin
							Sample Collection Date	12/19/2013 13:20
							Sample Interval	Composite
							Comments	
Parameter	Reporting Units	SQAGs for FL Coastal Waters TEL	SQAGs for FL Coastal Waters PEL	62-777 Table2 Soil Residential	62-777 Table2 Soil Commercial Industrial	62-777 Table2 Soil Leach Base GW Criteria	62-777 Table1 Soil Leach Base GW Low Yield	
Copper	mg/kg	18.7	108	150	89000	***	***	540**
Lead	mg/kg	30.2	112	400	1400	***	***	9.5
Selenium	mg/kg	-	-	440	11000	5.2	52	4.6U
Silver	mg/kg	0.733	1.77	410	8200	17	170	2.3U
Metals by 7471A								
Mercury	mg/kg	0.13	0.696	3	17	2.1	21	0.14U

Notes:

Residential Direct Exposure SCTL exceedance

Bold indicates Leachability SCTL exceedance

SQAGs - Numerical Sediment Quality Assessment Guidelines TEL - Toxic Effect Concentration PEL - Probable effect level

* indicates TEL exceedance ** TEL and PEL exceedance

mg/Kg - milligrams per kilogram

I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

J3 - Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.

U - Indicates that the compound was analyzed for but not detected.

* Contaminant is not a health concern for this exposure scenario.

** Direct exposure based on acute toxicity considerations

*** Leachability values may be derived using the SPLP Test to calculate site-specific SCTLs or may be determined using TCLP in the event oily wastes are present.

= Site concentrations for carcinogenic polycyclic aromatic hydrocarbons must be converted to Benzo(a)pyrene equivalents before comparison with the appropriate direct exposure SCTL for Benzo(a)pyrene using the approach described in the February 2005 'Final Technical Report: Development of Cleanup Target Levels (CTLs) for Chapter 62-777, F.A.C.'

ID - insufficient data to derive sediment quality assessment guidelines

**** - Total PCB TEC = 0.0216 mg/kg and PEC = 0.189 mg/kg

- not listed in the SQAG guidelines or SCTL tables NR - not required

Synthetic Precipitation Leaching Procedure Results

				Sample ID	Canal 266	Canal 290
				Sampled By	W. Blondin	W. Blondin
				Sample Collection Date	12/18/2013 16:00	12/19/2013 13:20
				Laboratory Order Number	660-58314-1	660-58314-2
Parameter	Reporting Units	62-777 GW Criteria	62-777 Fresh	62-302 Class III Marine Water		
Metals by 6010B SPLP						
Arsenic	mg/l	0.01	**	0.05	0.0040U	0.0051I
Copper	mg/l	1	**	0.0037	0.0029U	0.010
Lead	mg/l	0.015	**	0.0085	0.0030U	0.0020U

Notes:

mg/l - milligrams per liter

I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

U - Indicates that the compound was analyzed for but not detected.

Summary of Chemical Analytical Results

The results form Canal #290 are very similar to the past data obtained from ten (10) other canals, where arsenic was detected above the Residential Direct Exposure SCTL in seven (7) of the ten (10) samples tested. Copper was also the only other metal detected historically above the Residential Direct Exposure SCTL. The prior test results for Canal #266 indicated all parameters including arsenic and copper were below the Residential Direct Exposure SCTLs. The canal historical analytical results are included in **Appendix E.**

4.4 DISPOSAL OPTIONS

The DEP SCTLs are the regulatory guidelines to be utilized for determining disposal options. Disposal options for these canals are presented based upon the detected concentration levels in comparison to the DEP SCTLs.

1. **Canal #266**

The chemical analytical results for the samples collected from Canal #266 were below all DEP SCTLs. The organic materials from this canal should be able to reused or disposed as non-impacted clean material.

2. **Canal #290**

The chemical analytical results from the composite sample collected from Canal #290 showed exceedances of the Residential Direct Exposure SCTLs for Arsenic and Copper but at concentrations below the Industrial/Commercial Direct Exposure SCTLs. The organic materials removed from this canal can be mixed with clean fill to reduce the concentrations of Arsenic and Copper to below Residential SCTLs so that the material can be disposed as clean fill.

An alternate choice is the collection of a confirmation sample, to be tested by FL-PRO for TRPH, and by EPA Method 6010B for Arsenic and Copper. In the event the confirmation results are at a lower concentration (at or within SCTLs) following testing the soils may be re-used. DEP has indicated that these options are acceptable if the soils are used as fill above the water table. An additional option is to perform a risk evaluation for use of the materials at a saltwater wetland restoration site.

4.5 POLYMER TEST RESULTS

The results of the polymer testing performed by WaterSolve, LLC are presented in **Appendix F**. The conclusion was that for both canals the dual polymer system of Solve 426 followed by Solve 164 was determined to flocculate and dewater the residual most effectively. Polymer dosing rates that substantially reduce dewatering effluent turbidity and accelerate dewatering were determined, using representative sediments that are planned to be dredged from Canals #266 and #290 and site water from these canals. Material Safety Data Sheets for these polymers are also included in **Appendix F**. These results will be utilized during the final design phase of the organic removal at these canals. Additional testing may be required to design and permit a cost-effective dewatering treatment system but the tests performed and presented in **Appendix F** demonstrate the feasibility of accelerated dewatering of the dredged material while producing a dewatering effluent that meets Class III water quality standards.

FIGURES

Source: Google Earth Pro
2013 (aerial), AMEC 2013

N

Monroe County Canal Demonstration Project				
266 BIG PINE KEY (MM-31)				
Drawn	Date	amec	Project# 6783-13-2507	Figure 1
JAM	01/28/2014			
Checked	Date			
WCB	01/28/2014			

Source: Google Earth Pro
2013 (aerial), AMEC 2013

N

Monroe County Canal Demonstration Project				
290 BIG PINE KEY (MM-31)				
Drawn	Date	amec	Project# 6783-13-2507	Figure 2
JAM	01/28/2014			
Checked	Date			
WCB	01/28/2014			

Source: Google Earth Pro
2013 (aerial), AMEC 2013

N

0 70' 140'
GRAPHIC SCALE

Monroe County Canal Demonstration Project				
266 BIG PINE KEY (MM-31)				
Drawn	Date	amec	Project# 6783-13-2507	Figure 3
JAM	01/28/2014			
Checked	Date			
WCB	01/28/2014			

Source: Google Earth Pro 2013 (aerial), AMEC 2013

N

0 30' 60'

GRAPHIC SCALE

Monroe County Canal Demonstration Project				
290 BIG PINE KEY (MM-31)				
Drawn	Date	amec	Project# 6783-13-2507	Figure 4
JAM	01/28/2014			
Checked	Date			
WCB	01/28/2014			

APPENDIX A

PHOTOGRAPHS

1. Sampling barge arriving at Canal #266 staging area to start canal sediment sample collection

2. Lowering core sediment sampler for first core at back end of Canal #266

3. Core sample 1A at Canal #266 staging area

4. Sediment cores collected at transect 3 of Canal #266 being brought to the staging area

5. Sampling barge entering Canal #290

6. Sediment sample of upper 4 feet from Canal #290

7. #290 core sample showing varying lithology from organics at surface (left) to limestone (right)

8. Collecting canal water samples at Canal #290 for polymer testing

APPENDIX B

SOIL BORING LOGS

SEDIMENT SAMPLING LOG

12/18/2013 Canal No. 266 Between Witters and Bailey:

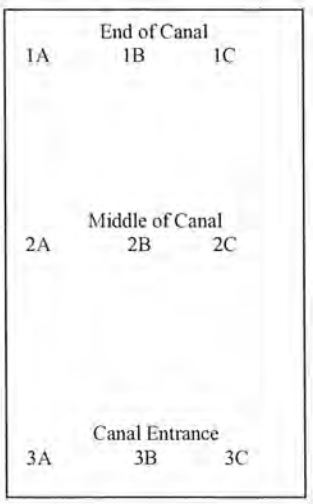
Sample No.	Time	TOW – TOS	TOS – HB	TOW - HB
1A	1130	30"	64"	94"
1B	1145	36"	70"	106"
1C	1200	34"	72"	106"
2A	1300	71.5"	48"	119.5"
2B	1315	83.5"	61"	144.5"
2C	1330	71.5"	52"	123.5"
3A	1400	35"	61"	96"
3B	1415	45"	58"	103"
3C	1430	35"	46"	81"

12/19/2013 Canal No. 290 Between Avenues I & J:

3A	0930	39"	79"	118"
3B	0945	42"	56"	98"
3C	1000	40.5"	72"	112.5"
2A	1100	74.5"	49"	123.5"
2B	1115	79"	50"	129"
2C	1130	69.5"	36"	105.5"
1A	1200	43"	54.5"	97.5"
1B	1215	53"	59"	112"
1C	1230	49"	61"	110"

Legend:

TOW: *top of water*
TOS: *top of sediment*
HB: *hard bottom- "refusal"*



BORING LOG

Boring/Well Number: 266 - 1A	Project Name: DEP Grant S0679	FDEP Facility Identification Number: NA
Site Name: Canal #266	Borehole Start Date: 12/18/13 End Date: 12/18/13	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: AMEC	Geologist's Name: Jeremy Paris/Wendy Blondin	Environmental Technician's Name: NA

Drilling Company: Adventure Environmental	Pavement Thickness (inches): NA	Borehole Diameter (inches): 3	Borehole Depth (feet): 5.3
Drilling Method(s): piston tube corer	Apparent Borehole DTW (in feet from soil moisture content): NA	Measured Well DTW (in feet after water recharges in well): NA	OVA (list model and check type): NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to 4.6 feet **HIGHLY ORGANIC** dark brown 5YR 3/2 soupy material. Leaves, mangrove roots and seaweed present. Hydrogen sulfide odor.			Polymer test sample
							2				
							3				
							4				
							5	4.6 to 5.5 feet Same as above **HIGHLY ORGANIC** except slightly more decomposed with small pockets of grey silt. Hydrogen sulfide odor.			1A 5.5 feet TOC sample
							6	5.5 feet Refusal			
							7				
							8				
							9				
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number:	Project Name:	FDEP Facility Identification Number:
266 - 1B	DEP Grant S0679	NA

Site Name:	Borehole Start Date: 12/18/13	Borehole Start Time: ☐ AM ☐ PM
Canal #266	End Date: 12/18/13	End Time: ☐ AM ☐ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
AMEC	Jeremy Paris/Wendy Blondin	NA

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
Adventure Environmental	NA	3	5.8

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
piston tube corer	NA	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to 5 feet **HIGHLY ORGANIC** dark brown 5YR 3/2 soupy material. Leaves, mangrove roots and seaweed present. Hydrogen sulfide odor.			
							2				
							3				266 1B 3 feet TOC sample
							4				
							5	5 to 6 feet Same as above **HIGHLY ORGANIC** except slightly more decomposed dark brown. Hydrogen sulfide odor.			
							6	6 feet refusal			
							7				
							8				
							9				
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: 266 - 1C	Project Name: DEP Grant S0679	FDEP Facility Identification Number: NA
Site Name: Canal #266	Borehole Start Date: 12/18/13 End Date: 12/18/13	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: AMEC	Geologist's Name: Jeremy Paris/Wendy Blondin	Environmental Technician's Name: NA

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
Adventure Environmental	NA	3	6

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
piston tube corer	NA	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to 1.7 feet **HIGHLY ORGANIC** dark brown 5YR 3/2 soupy material. Leaves, mangrove roots and seaweed present. Hydrogen sulfide odor.			
							2	1.7 to 3.5 feet same as above **HIGHLY ORGANIC** but slightly more decomposed			
							3				266 1C 3 feet grain size sample
							4	4 to 5.5 feet **HIGHLY ORGANIC** but slightly more decomposed seaweed with more mineral sediment			
							5				266 1C 6 feet TOC sample
							6	6 feet **HIGHLY ORGANIC** mixed with grey silt deposits 5YR 6/1. Hydrogen sulfide odor throughout entire core. 6 foot refusal			
							7				
							8				
							9				
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: 266 - 2A	Project Name: DEP Grant S0679	FDEP Facility Identification Number: NA
Site Name: Canal #266	Borehole Start Date: 12/18/13 End Date: 12/18/13	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: AMEC	Geologist's Name: Jeremy Paris/Wendy Blondin	Environmental Technician's Name: NA

Drilling Company: Adventure Environmental	Pavement Thickness (inches): NA	Borehole Diameter (inches): 3	Borehole Depth (feet): 4
Drilling Method(s): piston tube corer	Apparent Borehole DTW (in feet from soil moisture content): NA	Measured Well DTW (in feet after water recharges in well): NA	OVA (list model and check type): NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to 1.5 feet **HIGHLY ORGANIC** dark brown 5YR 3/2 soupy material. Leaves, mangrove roots and seaweed present. Hydrogen sulfide odor.			
							2	1.5 to 3 feet same as above **HIGHLY ORGANIC** but slightly more decomposed			
							3	3 to 4 feet **MIXED DECOMPOSED ORGANICS AND MARLY FINE SAND.**			266 2A 3-4 feet TOC sample
							4	Tip of core **at** 4 feet **WEATHERD LIMESTONE** with 2 inch pieces of rock 10YR 7/1. Refusal			
							5				
							6				
							7				
							8				
							9				
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: 266 - 2B	Project Name: DEP Grant S0679	FDEP Facility Identification Number: NA
Site Name: Canal #266	Borehole Start Date: 12/18/13 End Date: 12/18/13	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: AMEC	Geologist's Name: Jeremy Paris/Wendy Blondin	Environmental Technician's Name: NA

Drilling Company: Adventure Environmental	Pavement Thickness (inches): NA	Borehole Diameter (inches): 3	Borehole Depth (feet): 5
Drilling Method(s): piston tube corer	Apparent Borehole DTW (in feet from soil moisture content): NA	Measured Well DTW (in feet after water recharges in well): NA	OVA (list model and check type): NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to 1.5 feet **HIGHLY ORGANIC** dark brown 5YR 3/2 soupy material. Leaves, mangrove roots and seaweed present. Hydrogen sulfide odor.			
							2	1.5 to 4 feet same as above **HIGHLY ORGANIC** but slightly more decomposed.			
							3				
							4	4 to 5 feet **MIXED DECOMPOSED ORGANICS AND MARLY SILTY FINE SAND.** 2.5 YR 7/2.			266 2B 4 feet TOC sample
							5	5 feet **WEATHERED LIMESTONE** with 2 inch pieces of rock. Refusal			
							6				
							7				
							8				
							9				
							10				
							11	12 foot refusal			
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: 266 - 2C	Project Name: DEP Grant S0679	FDEP Facility Identification Number: NA
Site Name: Canal #266	Borehole Start Date: 12/18/13 End Date: 12/18/13	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: AMEC	Geologist's Name: Jeremy Paris/Wendy Blondin	Environmental Technician's Name: NA

Drilling Company: Adventure Environmental	Pavement Thickness (inches): NA	Borehole Diameter (inches): 3	Borehole Depth (feet): 4.3
Drilling Method(s): piston tube corer	Apparent Borehole DTW (in feet from soil moisture content): NA	Measured Well DTW (in feet after water recharges in well): NA	OVA (list model and check type): NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to 2 feet **HIGHLY ORGANIC** dark brown 5YR 3/2 soupy material. Leaves, mangrove roots and seaweed present. Hydrogen sulfide odor.			
							2	2 to 4 feet **MIXED HIGHLY ORGANIC AND WEATHERED LIMESTONE**			
							3				
							4	No limestone observed. 4.3 feet refusal			
							5				
							6				
							7				
							8				
							9				
							10				
							11	12 foot refusal			
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: 266 - 3A	Project Name: DEP Grant S0679	FDEP Facility Identification Number: NA
Site Name: Canal #266	Borehole Start Date: 12/18/13 End Date: 12/18/13	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: AMEC	Geologist's Name: Jeremy Paris/Wendy Blondin	Environmental Technician's Name: NA

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
Adventure Environmental	NA	3	5

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
piston tube corer	NA	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to 2.5 feet **HIGHLY ORGANIC** dark brown 5YR 3/2 soupy material. Leaves, mangrove roots and seaweed present. Hydrogen sulfide odor.			
							2				
							3	2.5 to 3 feet same as above **HIGHLY ORGANIC** but slightly more decomposed.			266 3A 3-4 feet TOC sample
							4	3 to 4 feet **MIXED DECOMPOSED ORGANICS AND MARLY SILTY FINE SAND.** 2.5 YR 7/2.			
							5	4 feet **WEATHERED LIMESTONE** with 2 inch pieces of rock, very little organics. 5 feet refusal			
							6				
							7				
							8				
							9				
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number:	Project Name:	FDEP Facility Identification Number:
266 - 3B	DEP Grant S0679	NA

Site Name:	Borehole Start Date: 12/18/13	Borehole Start Time: ☐ AM ☐ PM
Canal #266	End Date: 12/18/13	End Time: ☐ AM ☐ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
AMEC	Jeremy Paris/Wendy Blondin	NA

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
Adventure Environmental	NA	3	4.8

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
piston tube corer	NA	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to 1.5 feet **HIGHLY ORGANIC** dark brown 5YR 3/2 soupy material. Leaves, mangrove roots and seaweed present. Hydrogen sulfide odor.			266 3B 0-1.5 feet TOC sample
							2	1.5 to 4 feet **MIXED DECOMPOSED ORGANICS AND MARLY SILTY FINE SAND**			266 3B 3.5 feet Grains size
							3				266 3B 4 feet TOC sample
							4	No recovery below 4 feet. 4.8 feet refusal.			
							5				
							6				
							7				
							8				
							9				
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: 266 - 3C	Project Name: DEP Grant S0679	FDEP Facility Identification Number: NA
Site Name: Canal #266	Borehole Start Date: 12/18/13 End Date: 12/18/13	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: AMEC	Geologist's Name: Jeremy Paris/Wendy Blondin	Environmental Technician's Name: NA

Drilling Company: Adventure Environmental	Pavement Thickness (inches): NA	Borehole Diameter (inches): 3	Borehole Depth (feet): 3.8
Drilling Method(s): piston tube corer	Apparent Borehole DTW (in feet from soil moisture content): NA	Measured Well DTW (in feet after water recharges in well): NA	OVA (list model and check type): NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to 1.5 feet **HIGHLY ORGANIC** dark brown 5YR 3/2 soupy material. Leaves, mangrove roots and seaweed present. Hydrogen sulfide odor.			
							2	1.5 to 4 feet **MIXED DECOMPOSED ORGANICS AND MARLY SILTY FINE SAND**			
							3				
							4				266 3C 3.5 feet TOC sample
							5	~4 feet **WEATHERED LIMESTONE** with pieces of rock. Refusal.			266 3C 4 feet Grain size sample
							6				
							7				
							8				
							9				
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: 290 - 3A	Project Name: DEP Grant S0679	FDEP Facility Identification Number: NA
Site Name: Canal #290	Borehole Start Date: 12/19/13 End Date: 12/19/13	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: AMEC	Geologist's Name: Jeremy Paris/Wendy Blondin	Environmental Technician's Name: NA

Drilling Company: Adventure Environmental	Pavement Thickness (inches): NA	Borehole Diameter (inches): 3	Borehole Depth (feet): 6.5
Drilling Method(s): piston tube corer	Apparent Borehole DTW (in feet from soil moisture content): NA	Measured Well DTW (in feet after water recharges in well): NA	OVA (list model and check type): NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to 3.5 feet Fairly well decomposed **ORGANICS**, no obvious seaweed pieces, 5YR 2.5/2. Hydrogen sulfide odor.			
							2				290 3A 0-3 feet grain size
							3				290 3A 3 feet TOC sample
							4	3.5 to 5.5 feet Mix of **ORGANICS AND MARLY FINE SAND**, vey low % recovery			
							5				290 3A 5 feet TOC sample
							6	5.5 to 6.5 feet **WEATHERED LIMESTONE**, up to 2 inch pieces of limestone. 2.5 YR 7/2 6.5 feet refusal.			290 3A 6 feet TOC sample
							7				
							8				
							9				
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: 290 - 3B	Project Name: DEP Grant S0679		FDEP Facility Identification Number: NA
Site Name: Canal #290	Borehole Start Date: 12/19/13 End Date: 12/19/13	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM	
Environmental Contractor: AMEC	Geologist's Name: Jeremy Paris/Wendy Blondin		Environmental Technician's Name: NA
Drilling Company: Adventure Environmental	Pavement Thickness (inches): NA	Borehole Diameter (inches): 3	Borehole Depth (feet): 4.7
Drilling Method(s): piston tube corer	Apparent Borehole DTW (in feet from soil moisture content): NA	Measured Well DTW (in feet after water recharges in well): NA	OVA (list model and check type): NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to ~ 5 feet Fairly well decomposed **ORGANICS**, no obvious seaweed pieces, 5YR 2.5/2. Hydrogen sulfide odor.			
							2				
							3				290 3B 3 feet TOC sample
							4	4.7 feet refusal.			
							5				
							6				
							7				
							8				
							9				
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: 290 - 3C	Project Name: DEP Grant S0679	FDEP Facility Identification Number: NA
Site Name: Canal #290	Borehole Start Date: 12/19/13 End Date: 12/19/13	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: AMEC	Geologist's Name: Jeremy Paris/Wendy Blondin	Environmental Technician's Name: NA

Drilling Company: Adventure Environmental	Pavement Thickness (inches): NA	Borehole Diameter (inches): 3	Borehole Depth (feet): 6
Drilling Method(s): piston tube corer	Apparent Borehole DTW (in feet from soil moisture content): NA	Measured Well DTW (in feet after water recharges in well): NA	OVA (list model and check type): NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to 3 feet Fairly well decomposed **ORGANICS**, no obvious seaweed pieces, 5YR 2.5/2. Hydrogen sulfide odor.			
							2				
							3	3 to 5 feet **ORGANICS** smilar to above but with small pockets of weathered limestone			
							4				
							5	5 to 6 feet Small pieces of **LIMESTONE**. 6 feet refusal.			
							6				
							7				
							8				
							9				
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: 290 - 2A	Project Name: DEP Grant S0679	FDEP Facility Identification Number: NA
Site Name: Canal #290	Borehole Start Date: 12/19/13 End Date: 12/19/13	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: AMEC	Geologist's Name: Jeremy Paris/Wendy Blondin	Environmental Technician's Name: NA

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
Adventure Environmental	NA	3	4.1

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
piston tube corer	NA	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to 2 feet Fairly well decomposed **ORGANICS**, no obvious seaweed pieces, 5YR 2.5/2. Hydrogen sulfide odor.			
							2				
							3	2 to 3 feet **ORGANICS with areas of MARLY FINE SAND**			290 2A 3 feet TOC sample
							4	3.5 to 4 feet **ORGANICS AND MARLY FINE SAND MIX.** Obvious bands of weatherd limestone. 4 feet **VERY FINE SAND** layer 2.5 YR 7/2. 4.1 feet refusal.			
							5				
							6				
							7				
							8				
							9	10 feet refusal			
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: 290 - 2B	Project Name: DEP Grant S0679	FDEP Facility Identification Number: NA
Site Name: Canal #290	Borehole Start Date: 12/19/13 End Date: 12/19/13	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: AMEC	Geologist's Name: Jeremy Paris/Wendy Blondin	Environmental Technician's Name: NA

Drilling Company: Adventure Environmental	Pavement Thickness (inches): NA	Borehole Diameter (inches): 3	Borehole Depth (feet): 4.2
Drilling Method(s): piston tube corer	Apparent Borehole DTW (in feet from soil moisture content): NA	Measured Well DTW (in feet after water recharges in well): NA	OVA (list model and check type): NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to 3 feet Fairly well decomposed **ORGANICS**, no obvious seaweed pieces, 5YR 2.5/2. Hydrogen sulfide odor.			
							2				
							3				
							4	3 to 4 feet **ORGANICS AND MARLY FINE SAND MIX.**			290 2B 3.5 feet TOC sample
							5	4 to ~5 feet **MARLY FINE SAND.** 10YR 8/1.			290 2B 4- 5 feet grain size
							6				
							7				
							8				
							9				
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number:	Project Name:	FDEP Facility Identification Number:
290 - 2C	DEP Grant S0679	NA

Site Name:	Borehole Start Date: 12/19/13	Borehole Start Time: ☐ AM ☐ PM
Canal #290	End Date: 12/19/13	End Time: ☐ AM ☐ PM

Environmental Contractor:	Geologist's Name:	Environmental Technician's Name:
AMEC	Jeremy Paris/Wendy Blondin	NA

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
Adventure Environmental	NA	3	3

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
piston tube corer	NA	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to 3 feet Fairly well decomposed **ORGANICS**, no obvious seaweed pieces, 5YR 2.5/2. Hydrogen sulfide odor.			
							2				
							3		3		
							4	3 to ~ 3.3 feet **ORGANICS AND MARLY FINE SAND MIX.** Tip of Core broken **LIMESTONE** pieces. Refusal			
							5				
							6				
							7				
							8				
							9				
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: 290 - 1A	Project Name: DEP Grant S0679	FDEP Facility Identification Number: NA
Site Name: Canal #290	Borehole Start Date: 12/19/13 End Date: 12/19/13	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: AMEC	Geologist's Name: Jeremy Paris/Wendy Blondin	Environmental Technician's Name: NA

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
Adventure Environmental	NA	3	4.5

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
piston tube corer	NA	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to 3 feet **ORGANICS**, obvious seaweed pieces. Hydrogen sulfide odor.			
							2				
							3				
							4	3 to 4.5 feet **ORGANICS** with some **MARLY FINE SAND** Refusal 4.5 feet			290 1A 4 feet grain size
							5				
							6				
							7				
							8				
							9				
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number: 290 - 1B	Project Name: DEP Grant S0679		FDEP Facility Identification Number: NA
Site Name: Canal #290	Borehole Start Date: 12/19/13 End Date: 12/19/13	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM	
Environmental Contractor: AMEC	Geologist's Name: Jeremy Paris/Wendy Blondin		Environmental Technician's Name: NA
Drilling Company: Adventure Environmental	Pavement Thickness (inches): NA	Borehole Diameter (inches): 3	Borehole Depth (feet): 4.9
Drilling Method(s): piston tube corer	Apparent Borehole DTW (in feet from soil moisture content): NA	Measured Well DTW (in feet after water recharges in well): NA	OVA (list model and check type): NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to 3 feet **ORGANICS**, obvious seaweed pieces. Hydrogen sulfide odor.			
							2				
							3	3 to 5 feet **ORGANICS** more decomposed than above. 5 feet **LIMESTONE** rock Refusal 5 feet			290 1B 4feet TOC sample
							4				
							5				
							6				
							7				
							8				
							9				
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

BORING LOG

Boring/Well Number:	Project Name:	FDEP Facility Identification Number:
290 - 1C	DEP Grant S0679	NA
Site Name: Canal #290	Borehole Start Date: 12/19/13 End Date: 12/19/13	Borehole Start Time: ☐ AM ☐ PM End Time: ☐ AM ☐ PM
Environmental Contractor: AMEC	Geologist's Name: Jeremy Paris/Wendy Blondin	Environmental Technician's Name: NA

Drilling Company:	Pavement Thickness (inches):	Borehole Diameter (inches):	Borehole Depth (feet):
Adventure Environmental	NA	3	5

Drilling Method(s):	Apparent Borehole DTW (in feet from soil moisture content):	Measured Well DTW (in feet after water recharges in well):	OVA (list model and check type):
piston tube corer	NA	NA	NA ☐ FID ☐ PID

Disposition of Drill Cuttings [check method(s)]: ☐ Drum ☐ Spread ☐ Backfill ☐ Stockpile ☐ Other

None generated

Borehole Completion (check one): ☐ Well ☐ Grout ☐ Bentonite ☐ Backfill ☐ Other (describe)

Natural collapse

Sample Type	Sample Depth Interval (feet)	Sample Recovery (inches)	SPT Blows (per six inches)	Unfiltered OVA	Filtered OVA	Net OVA	Depth (feet)	Sample Description (include grain size based on USCS, odors, staining, and other remarks)	USCS Symbol	Moisture Content	Lab Soil and Groundwater Samples (list sample number and depth or temporary screen interval)
							1	0 to 2 feet **ORGANICS**, obvious seaweed pieces. Hydrogen sulfide odor.			
							2				
							3	2 to 4 feet **ORGANICS** more decomposed than above			
							4				290 1C 4 feet TOC sample
							5	4 to 5 feet **ORGANICS AND SAND MIX.**			
							6	5 feet **LIMESTONE** piece Refusal			
							7				
							8				
							9				
							10				
							11				
							12				

Sample Type Codes: **PH** = Post Hole; **HA** = Hand Auger; **SS** = Split Spoon; **ST** = Shelby Tube; **DP** = Direct Push; **SC** = Sonic Core; **DC** = Drill Cuttings

Moisture Content Codes: **D** = Dry; **M** = Moist; **W** = Wet; **S** = Saturated

APPENDIX C

LABORATORY PHYSICAL TEST RESULTS

amec

Organic Loss Determination by Ignition of Soil

Project Name: DEP Grant Keys Canals **Project No.:** 6783-13-2563.07

Client:

Date Tested: January 13, 2014
Date Reported: January 14, 2014

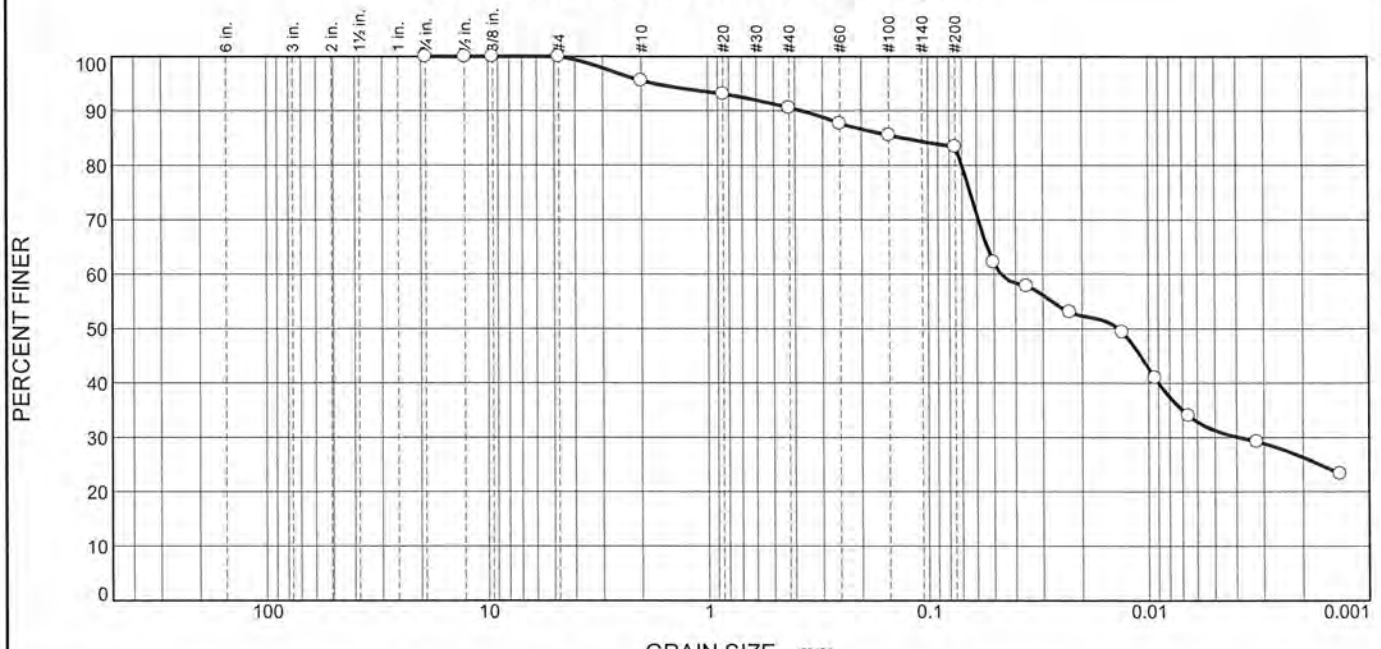
As requested, AMEC Environment & Infrastructure has tested soil samples delivered to our Jacksonville laboratory on December 30, 2013. The samples were tested for total organic content (ASTM D-2974). The results are outlined below.

Boring No.	Sample No.	Depth (ft)	Organic Content (percent)
266	1C	6	86.6%
266	1B	3	94.6%
266	1A	5.5	89.9%
266	2A	4	23.7%
266	2B	4	52.2%
266	3B	0-1.5	94.1%
266	3A	4	2.8%
266	3C	3.5	69.3%
266	3B	4	12.8%
290	3A	3	31.1%
290	2A	4	27.3%
290	2B	3.5	4.5%
290	2A	3	33.8%
290	3A	6	1.7%
290	1C	4	13.6%
290	1B	4	25.7%
290	3B	3	35.2%
290	3A	5	15.4%

Respectfully Submitted

Corey T. Thaskin, E.I. 1.15.14

Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	4.4	5.0	7.2	52.1	31.3

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	100.0		
#10	95.6		
#20	93.1		
#40	90.6		
#60	87.6		
#100	85.5		
#200	83.4		
0.0504 mm.	62.2		
0.0357 mm.	57.8		
0.0227 mm.	53.0		
0.0131 mm.	49.4		
0.0093 mm.	40.9		
0.0066 mm.	34.0		
0.0032 mm.	29.2		
0.0014 mm.	23.3		

* (no specification provided)

Material Description

Dark Gray Sandy SILT

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 0.3718 D_{85}= 0.1292 D_{60}= 0.0465
D_{50}= 0.0136 D_{30}= 0.0039 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 12/30/13 **Date Tested:** 1/14/14
Tested By: CM
Checked By: Corey T. Chascin, E.I.
Title: Staff Engineer

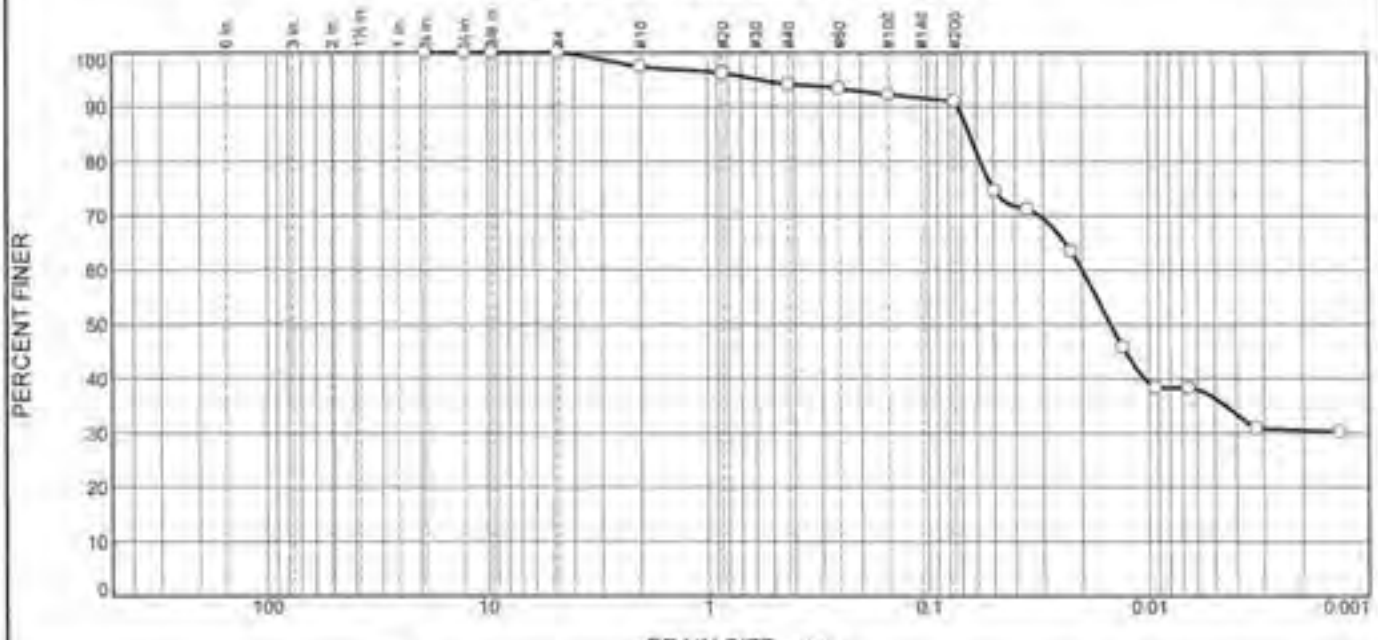
Source of Sample: 266 **Depth:** 0.0'- 3.0'
Sample Number: 1C
Date Sampled: 12/19/13

AMEC E&I

Jacksonville, Florida

Client:
Project: DEP Grant Keys Canals
Project No: 6783132563.07
Figure

Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	2.6	3.2	3.1	54.7	36.4

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	100.0		
#10	97.4		
#20	96.2		
#40	94.2		
#60	93.4		
#100	92.3		
#200	91.1		
0.0495 mm.	74.5		
0.0351 mm.	71.1		
0.0224 mm.	63.4		
0.0130 mm.	45.7		
0.0093 mm.	38.3		
0.0066 mm.	38.3		
0.0032 mm.	30.9		
0.0014 mm.	30.2		

* (no specification provided)

Material Description

Dark Gray Slightly Sandy SILT

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 0.0726 D_{85}= 0.0643 D_{60}= 0.0200
D_{50}= 0.0149 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 12/30/14 **Date Tested:** 1/14/14
Tested By: CM
Checked By: Corey T. Chascin, E.I.
Title: Staff Engineer

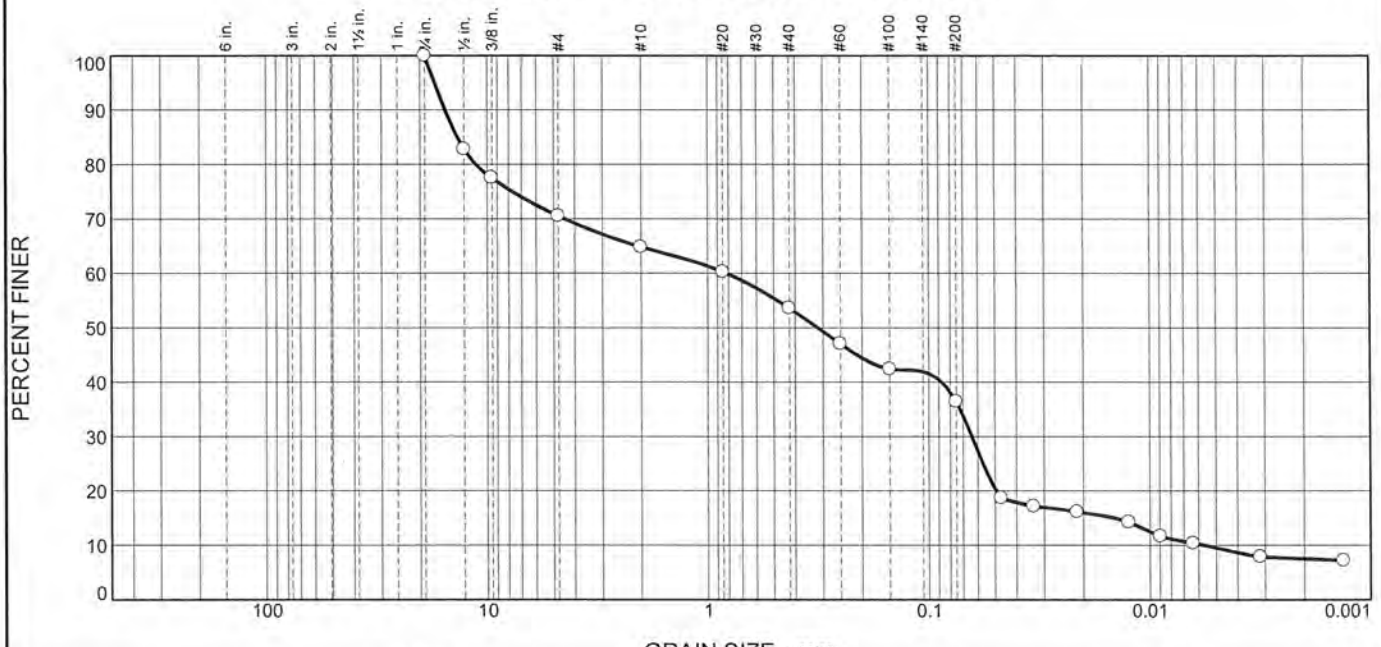
Source of Sample: 266 **Depth:** 3.5'
Sample Number: 3B
Date Sampled: 12/19/14

AMEC E&I

Jacksonville, Florida

Client:
Project: DEP Grant Keys Canals
Project No: 678313256307 **Figure**

Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	29.5	5.7	11.2	17.2	26.9	9.5

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4	100.0		
1/2	82.8		
3/8	77.5		
#4	70.5		
#10	64.8		
#20	60.3		
#40	53.6		
#60	47.0		
#100	42.4		
#200	36.4		
0.0468 mm.	18.7		
0.0335 mm.	17.2		
0.0213 mm.	16.1		
0.0124 mm.	14.2		
0.0089 mm.	11.7		
0.0063 mm.	10.4		
0.0032 mm.	7.9		
0.0013 mm.	7.2		

* (no specification provided)

Material Description

Gray Very Silty Medium to Fine SAND w/ little shell & rock fragments

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 15.4294 D_{85}= 13.6046 D_{60}= 0.8213
D_{50}= 0.3167 D_{30}= 0.0636 D_{15}= 0.0144
D_{10}= 0.0057 C_u= 144.42 C_c= 0.87

Remarks

Date Received: 12/30/13 **Date Tested:** 1/14/14
Tested By: CM
Checked By: Corey T. Chascin, E.I.
Title: Staff Engineer

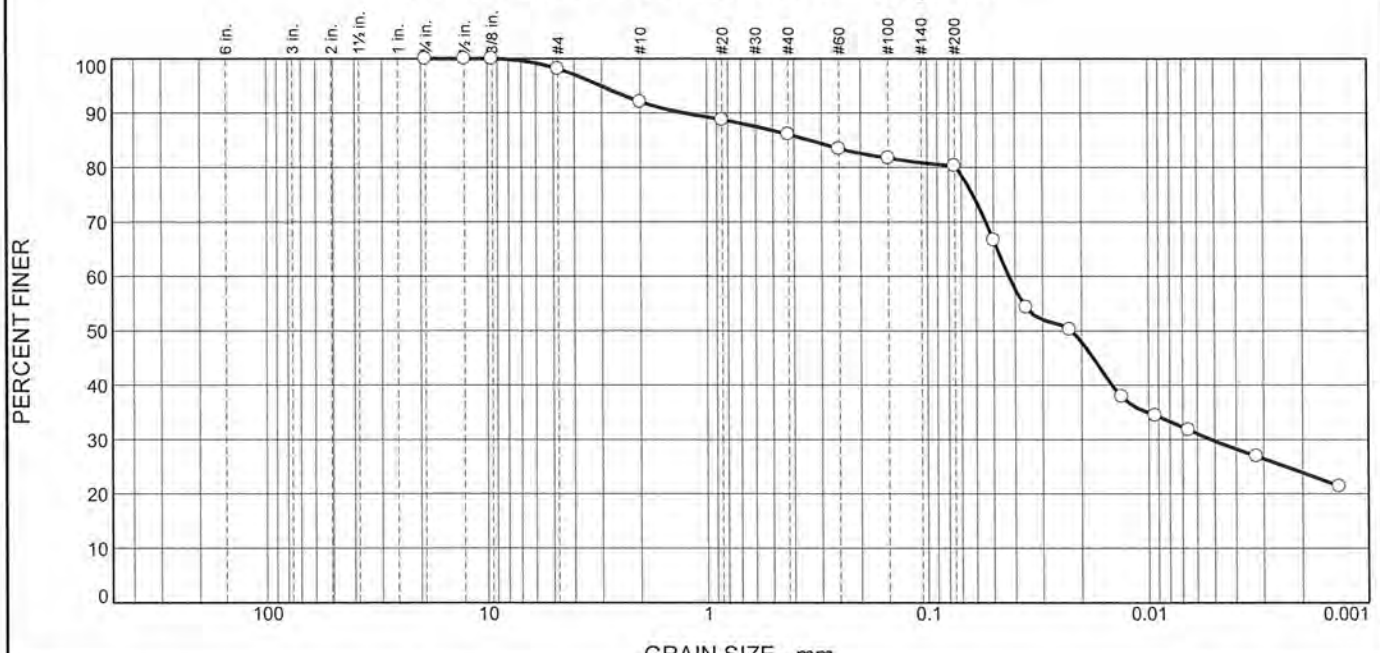
Source of Sample: 266 **Depth:** 4.0'
Sample Number: 3C
Date Sampled: 12/19/13

AMEC E&I

Jacksonville, Florida

Client:
Project: DEP Grant Keys Canals
Project No: 6783132563.07
Figure

Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.9	6.0	6.0	5.8	50.6	29.7

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	98.1		
#10	92.1		
#20	88.8		
#40	86.1		
#60	83.4		
#100	81.7		
#200	80.3		
0.0500 mm.	66.6		
0.0357 mm.	54.3		
0.0226 mm.	50.2		
0.0132 mm.	37.9		
0.0093 mm.	34.5		
0.0066 mm.	31.8		
0.0032 mm.	26.9		
0.0014 mm.	21.4		

* (no specification provided)

Material Description

Dark Gray Slightly Sandy SILT

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 1.2647 D_{85}= 0.3392 D_{60}= 0.0426
D_{50}= 0.0223 D_{30}= 0.0052 D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 12/30/13 **Date Tested:** 1/14/14

Tested By: CM

Checked By: Corey T. Chascin, E.I.

Title: Staff Engineer

Source of Sample: 290 **Depth:** 3.0' **Date Sampled:** 12/19/13

AMEC E&I

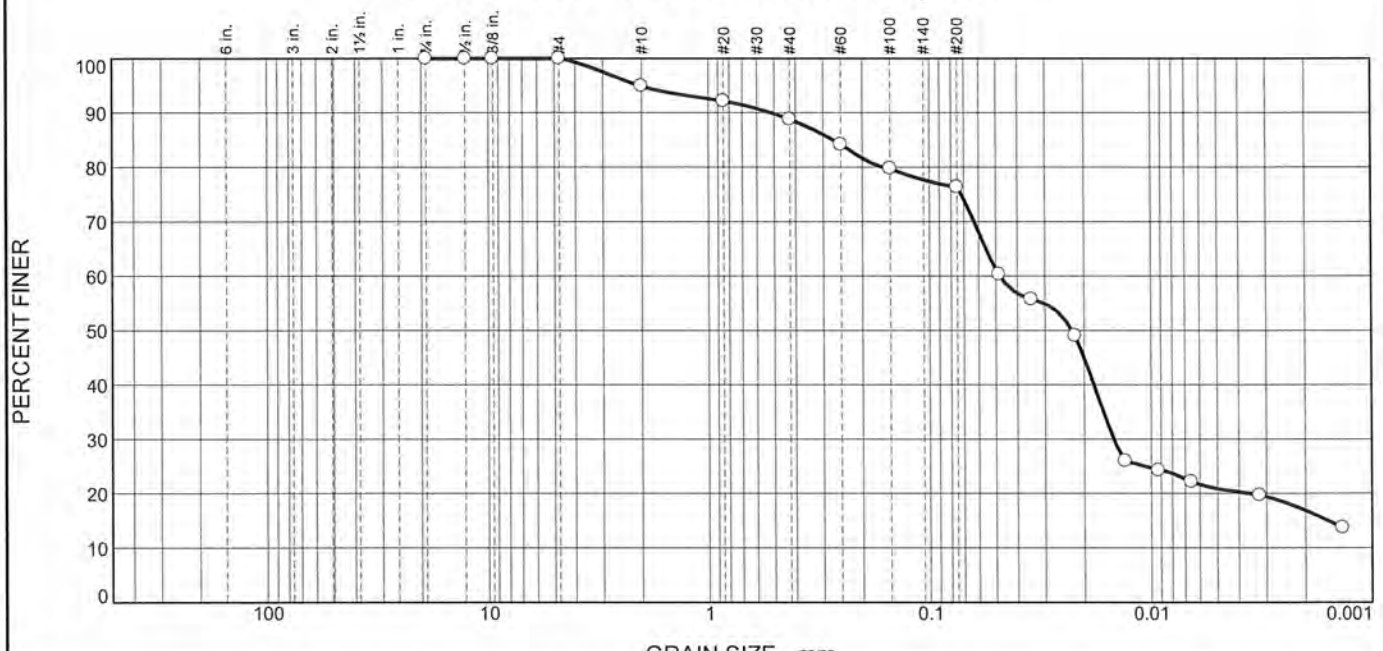
Jacksonville, Florida

Client:

Project: DEP Grant Keys Canals

Project No: 6783132563.07 **Figure**

Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	5.1	6.1	12.5	55.4	20.9

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	100.0		
#10	94.9		
#20	92.1		
#40	88.8		
#60	84.2		
#100	79.8		
#200	76.3		
0.0485 mm.	60.3		
0.0345 mm.	55.7		
0.0220 mm.	49.0		
0.0131 mm.	26.0		
0.0092 mm.	24.3		
0.0065 mm.	22.2		
0.0032 mm.	19.7		
0.0014 mm.	13.7		

* (no specification provided)

Material Description

Dark Grayish Brown sandy SILT

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 0.5175 D_{85}= 0.2703 D_{60}= 0.0479
D_{50}= 0.0227 D_{30}= 0.0147 D_{15}= 0.0016
D_{10}= C_u= C_c=

Remarks

Date Received: 12/30/14 **Date Tested:** 1/14/14
Tested By: CM
Checked By: Corey T. Chascin, E.I.
Title: Staff Engineer

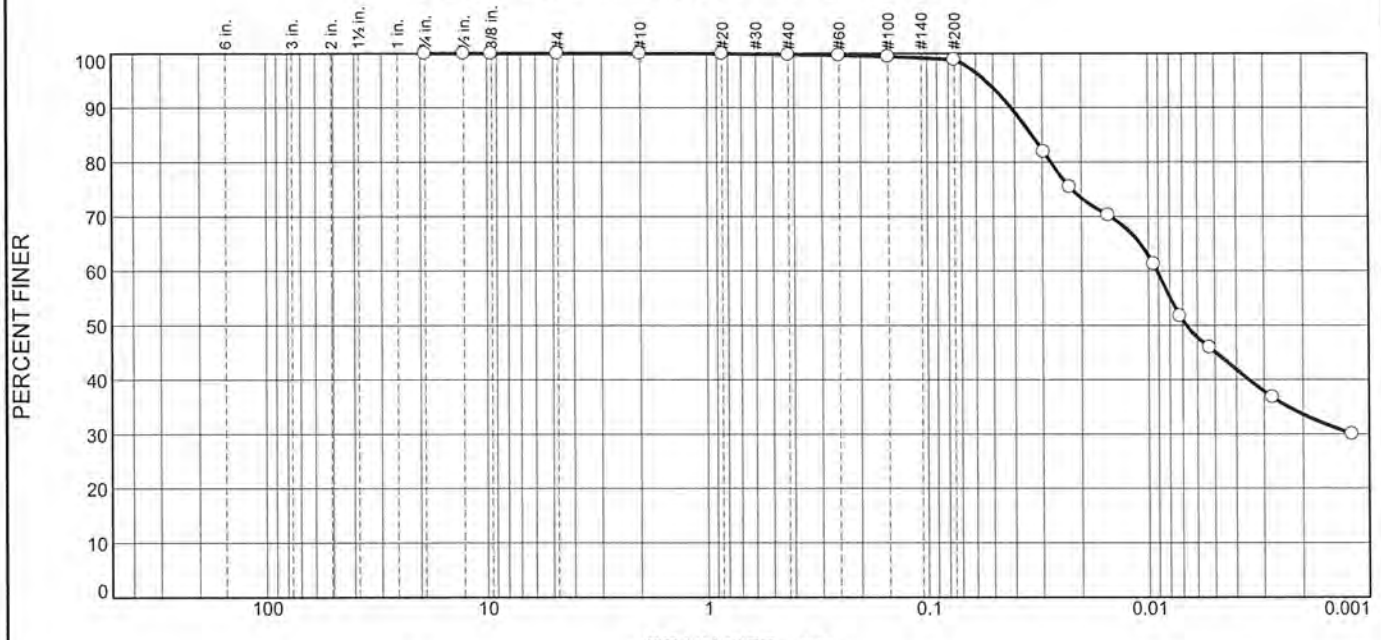
Source of Sample: 290 **Depth:** 4.0'
Sample Number: 1A
Date Sampled: 12/19/14

AMEC E&I

Jacksonville, Florida

Client:
Project: DEP Grant Keys Canals
Project No: 6783132563.07
Figure

Grain Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	1.0	53.7	45.1

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/4	100.0		
1/2	100.0		
3/8	100.0		
#4	100.0		
#10	100.0		
#20	99.9		
#40	99.8		
#60	99.6		
#100	99.4		
#200	98.8		
0.0295 mm.	81.9		
0.0226 mm.	75.4		
0.0151 mm.	70.2		
0.0095 mm.	61.2		
0.0072 mm.	51.7		
0.0053 mm.	45.9		
0.0027 mm.	36.8		
0.0012 mm.	30.0		

* (no specification provided)

Material Description

Light Gray SILT w/ trace sand

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 0.0414 D_{85}= 0.0334 D_{60}= 0.0091
D_{50}= 0.0067 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Date Received: 12/30/14 **Date Tested:** 1/14/14
Tested By: CM
Checked By: Corey T. Chascin, E.I.
Title: Staff Engineer

Source of Sample: 290 **Depth:** 5.0'
Sample Number: 2B
Date Sampled: 12/19/13

AMEC E&I

Jacksonville, Florida

Client:
Project: DEP Grant Keys Canals
Project No: 6783132563.07 **Figure**

APPENDIX D

LABORATORY CHEMICAL TEST RESULTS

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Tampa
6712 Benjamin Road
Suite 100
Tampa, FL 33634
Tel: (813)885-7427

TestAmerica Job ID: 660-58314-1
Client Project/Site: DEP Grant S0769

For:
AMEC Environment & Infrastructure, Inc.
5845 N.W. 158th Street
Miami Lakes, Florida 33014

Attn: Wendy C. Blondin

Authorized for release by:
1/7/2014 1:03:58 PM

Nancy Robertson, Project Manager II
(813)885-7427
nancy.robertson@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

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

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

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

Table of Contents

Cover Page 1
Table of Contents 2
Sample Summary 3
Case Narrative 4
Definitions/Glossary 5
Detection Summary 6
Client Sample Results 7
QC Sample Results 10
QC Association Summary 22
Lab Chronicle 26
Method Summary 27
Certification Summary 28
Chain of Custody 29
Receipt Checklists 30

Sample Summary

Client: AMEC Environment & Infrastructure, Inc.
Project/Site: DEP Grant S0769

TestAmerica Job ID: 660-58314-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-58314-1	Canal 266	Solid	12/18/13 16:00	12/20/13 09:50
660-58314-2	Canal 290	Solid	12/19/13 13:20	12/20/13 09:50

Job ID: 660-58314-1

Laboratory: TestAmerica Tampa

Narrative

Job Narrative
660-58314-1

Comments
No additional comments.

Receipt
The samples were received on 12/20/2013 9:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.7° C.

GC/MS Semi VOA
Method 8270C LL: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for batch 144780 were outside control limits. Sample matrix interference is suspected. The laboratory control sample (LCS) recoveries were within acceptance limits.

No other analytical or quality issues were noted.

GC Semi VOA
Method 8151A: The laboratory control sample (LCS) batch 144763 recovered outside control limits for the following analytes: dinoseb. This analyte was biased high in the LCS was not detected in the associated samples; therefore, the data have been reported and flagged with J3.

Method 8151A: The matrix spike / matrix spike duplicate(MS/MSD) recoveries and or precision for batch 144763 were outside control limits. The laboratory control sample (LCS) recoveries were within acceptance limits.

Method FL-PRO: Both surrogate recoveries for the following sample were outside control limits: Canal 290 (660-58314-2). Evidence of matrix interference is present; therefore, re-extraction and re-analysis was not performed. The sample is flagged with J1.

No other analytical or quality issues were noted.

Metals
No analytical or quality issues were noted.

Qualifiers

GC/MS Semi VOA

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
L	Off-scale high. Actual value is known to be greater than the value given.

GC Semi VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
J1	Estimated value; value may not be accurate. Surrogate recovery outside of criteria.
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Glossary

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

Detection Summary

Client: AMEC Environment & Infrastructure, Inc.
Project/Site: DEP Grant S0769

TestAmerica Job ID: 660-58314-1

Client Sample ID: Canal 266 — Lab Sample ID: 660-58314-1

No Detections.

Client Sample ID: Canal 290 — Lab Sample ID: 660-58314-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Pyrene	0.096	I	0.24	0.044	mg/Kg	1	☐	8270C LL	Total/NA
Total Petroleum Hydrocarbons (C8-C40)	440		120	60	mg/Kg	1	☐	FL-PRO	Total/NA
Arsenic	8.2		8.2	2.8	mg/Kg	1	☐	6010B	Total/NA
Barium	8.1	I	12	2.0	mg/Kg	1	☐	6010B	Total/NA
Cadmium	2.4	I	6.2	1.1	mg/Kg	1	☐	6010B	Total/NA
Chromium	15		12	2.1	mg/Kg	1	☐	6010B	Total/NA
Copper	540		25	6.2	mg/Kg	1	☐	6010B	Total/NA
Lead	9.5		6.2	1.9	mg/Kg	1	☐	6010B	Total/NA
Arsenic	0.0051	I	0.010	0.0040	mg/L	1		6010B	SPLP East
Copper	0.010		0.010	0.0029	mg/L	1		6010B	SPLP East

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: AMEC Environment & Infrastructure, Inc.
Project/Site: DEP Grant S0769

TestAmerica Job ID: 660-58314-1

Client Sample ID: Canal 266

Lab Sample ID: 660-58314-1
Matrix: Solid

Date Collected: 12/18/13 16:00
Date Received: 12/20/13 09:50

Method: 6010B - Metals (ICP) - SPLP East

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0040	U	0.010	0.0040	mg/L		12/26/13 10:30	12/31/13 12:31	1
Copper	0.0029	U	0.010	0.0029	mg/L		12/26/13 10:30	12/31/13 12:31	1
Lead	0.0020	U	0.010	0.0020	mg/L		12/26/13 10:30	12/31/13 12:31	1

Client Sample ID: Canal 290

Lab Sample ID: 660-58314-2
Matrix: Solid
Percent Solids: 8.3

Date Collected: 12/19/13 13:20
Date Received: 12/20/13 09:50

Method: 8270C LL - Semivolatile Organic Compounds by GCMS - Low Levels

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	0.24	U	1.2	0.24	mg/Kg		12/26/13 13:48	12/27/13 14:18	1
Acenaphthylene	0.060	U	0.48	0.060	mg/Kg		12/26/13 13:48	12/27/13 14:18	1
Anthracene	0.050	U	0.10	0.050	mg/Kg		12/26/13 13:48	12/27/13 14:18	1
Benzo[a]anthracene	0.047	U	0.095	0.047	mg/Kg		12/26/13 13:48	12/27/13 14:18	1
Benzo[a]pyrene	0.062	U	0.12	0.062	mg/Kg		12/26/13 13:48	12/27/13 14:18	1
Benzo[b]fluoranthene	0.073	U	0.15	0.073	mg/Kg		12/26/13 13:48	12/27/13 14:18	1
Benzo[g,h,i]perylene	0.053	U	0.24	0.053	mg/Kg		12/26/13 13:48	12/27/13 14:18	1
Benzo[k]fluoranthene	0.043	U	0.095	0.043	mg/Kg		12/26/13 13:48	12/27/13 14:18	1
Chrysene	0.054	U	0.11	0.054	mg/Kg		12/26/13 13:48	12/27/13 14:18	1
Dibenz(a,h)anthracene	0.049	U	0.24	0.049	mg/Kg		12/26/13 13:48	12/27/13 14:18	1
Fluoranthene	0.048	U	0.24	0.048	mg/Kg		12/26/13 13:48	12/27/13 14:18	1
Fluorene	0.049	U	0.24	0.049	mg/Kg		12/26/13 13:48	12/27/13 14:18	1
Indeno[1,2,3-cd]pyrene	0.085	U	0.24	0.085	mg/Kg		12/26/13 13:48	12/27/13 14:18	1
1-Methylnaphthalene	0.053	U	0.48	0.053	mg/Kg		12/26/13 13:48	12/27/13 14:18	1
2-Methylnaphthalene	0.085	U	0.48	0.085	mg/Kg		12/26/13 13:48	12/27/13 14:18	1
Naphthalene	0.053	U	0.48	0.053	mg/Kg		12/26/13 13:48	12/27/13 14:18	1
Phenanthrene	0.047	U	0.095	0.047	mg/Kg		12/26/13 13:48	12/27/13 14:18	1
Pyrene	**0.096**	I	0.24	0.044	mg/Kg		12/26/13 13:48	12/27/13 14:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	84		30 - 130	12/26/13 13:48	12/27/13 14:18	1

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.0054	U	0.020	0.0054	mg/Kg		12/23/13 08:46	01/03/14 12:44	1
4,4'-DDE	0.0042	U	0.020	0.0042	mg/Kg		12/23/13 08:46	01/03/14 12:44	1
4,4'-DDT	0.0054	U	0.020	0.0054	mg/Kg		12/23/13 08:46	01/03/14 12:44	1
Aldrin	0.0054	U	0.020	0.0054	mg/Kg		12/23/13 08:46	01/03/14 12:44	1
alpha-BHC	0.0046	U	0.020	0.0046	mg/Kg		12/23/13 08:46	01/03/14 12:44	1
beta-BHC	0.0072	U	0.020	0.0072	mg/Kg		12/23/13 08:46	01/03/14 12:44	1
Chlordane (technical)	0.036	U	0.20	0.036	mg/Kg		12/23/13 08:46	01/03/14 12:44	1
delta-BHC	0.0072	U	0.020	0.0072	mg/Kg		12/23/13 08:46	01/03/14 12:44	1
Dieldrin	0.0054	U	0.020	0.0054	mg/Kg		12/23/13 08:46	01/03/14 12:44	1
Endosulfan I	0.0054	U	0.020	0.0054	mg/Kg		12/23/13 08:46	01/03/14 12:44	1
Endosulfan II	0.0078	U	0.020	0.0078	mg/Kg		12/23/13 08:46	01/03/14 12:44	1
Endosulfan sulfate	0.0084	U	0.020	0.0084	mg/Kg		12/23/13 08:46	01/03/14 12:44	1
Endrin	0.0084	U	0.020	0.0084	mg/Kg		12/23/13 08:46	01/03/14 12:44	1
Endrin aldehyde	0.0060	U	0.020	0.0060	mg/Kg		12/23/13 08:46	12/27/13 17:30	1
Endrin ketone	0.0060	U	0.020	0.0060	mg/Kg		12/23/13 08:46	01/03/14 12:44	1
gamma-BHC (Lindane)	0.0060	U	0.020	0.0060	mg/Kg		12/23/13 08:46	01/03/14 12:44	1

Client Sample Results

Client: AMEC Environment & Infrastructure, Inc.
Project/Site: DEP Grant S0769

TestAmerica Job ID: 660-58314-1

Client Sample ID: Canal 290
Date Collected: 12/19/13 13:20
Date Received: 12/20/13 09:50

Lab Sample ID: 660-58314-2
Matrix: Solid
Percent Solids: 8.3

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Heptachlor	0.0076	U	0.020	0.0076	mg/Kg	☼	12/23/13 08:46	01/03/14 12:44	1
Heptachlor epoxide	0.0054	U	0.020	0.0054	mg/Kg	☼	12/23/13 08:46	01/03/14 12:44	1
Methoxychlor	0.012	U	0.20	0.012	mg/Kg	☼	12/23/13 08:46	01/03/14 12:44	1
Toxaphene	0.35	U	2.0	0.35	mg/Kg	☼	12/23/13 08:46	01/03/14 12:44	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	114		30 - 150	12/23/13 08:46	12/27/13 17:30	1
Tetrachloro-m-xylene	120		30 - 150	12/23/13 08:46	12/27/13 17:30	1

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	0.14	U	0.79	0.14	mg/Kg	☼	12/23/13 08:47	01/02/14 15:26	1
PCB-1221	0.087	U	1.6	0.087	mg/Kg	☼	12/23/13 08:47	01/02/14 15:26	1
PCB-1232	0.12	U	0.79	0.12	mg/Kg	☼	12/23/13 08:47	01/02/14 15:26	1
PCB-1242	0.16	U	0.79	0.16	mg/Kg	☼	12/23/13 08:47	01/02/14 15:26	1
PCB-1248	0.12	U	0.79	0.12	mg/Kg	☼	12/23/13 08:47	01/02/14 15:26	1
PCB-1254	0.12	U	0.79	0.12	mg/Kg	☼	12/23/13 08:47	01/02/14 15:26	1
PCB-1260	0.067	U	0.79	0.067	mg/Kg	☼	12/23/13 08:47	01/02/14 15:26	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	69		30 - 150	12/23/13 08:47	01/02/14 15:26	1
DCB Decachlorobiphenyl	75		30 - 150	12/23/13 08:47	01/02/14 15:26	1

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-T	0.12	U	0.61	0.12	mg/Kg	☼	12/27/13 11:23	12/31/13 10:06	1
2,4-D	0.019	U	0.10	0.019	mg/Kg	☼	12/27/13 11:23	12/31/13 10:06	1
2,4-DB	0.078	U	0.10	0.078	mg/Kg	☼	12/27/13 11:23	12/31/13 10:06	1
Dalapon	0.28	U	24	0.28	mg/Kg	☼	12/27/13 11:23	12/31/13 10:06	1
Dicamba	0.15	U	0.61	0.15	mg/Kg	☼	12/27/13 11:23	12/31/13 10:06	1
Dichlorprop	0.30	U	1.2	0.30	mg/Kg	☼	12/27/13 11:23	12/31/13 10:06	1
Dinoseb	0.10	J3 U	0.36	0.10	mg/Kg	☼	12/27/13 11:23	12/31/13 10:06	1
MCPA	9.0	U	24	9.0	mg/Kg	☼	12/27/13 11:23	12/31/13 10:06	1
MCPP	4.9	U	24	4.9	mg/Kg	☼	12/27/13 11:23	12/31/13 10:06	1
Pentachlorophenol	0.061	U	0.21	0.061	mg/Kg	☼	12/27/13 11:23	12/31/13 10:06	1
Picloram	0.015	U	0.040	0.015	mg/Kg	☼	12/27/13 11:23	12/31/13 10:06	1
Silvex (2,4,5-TP)	0.12	U	0.61	0.12	mg/Kg	☼	12/27/13 11:23	12/31/13 10:06	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4-Dichlorophenylacetic acid	58		10 - 135	12/27/13 11:23	12/31/13 10:06	1

Method: FL-PRO - Florida - Petroleum Range Organics (GC)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Petroleum Hydrocarbons (C8-C40)	440		120	60	mg/Kg	☼	12/23/13 08:42	12/23/13 17:32	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	122	J1	57 - 115	12/23/13 08:42	12/23/13 17:32	1
n-C39	158	J1	61 - 153	12/23/13 08:42	12/23/13 17:32	1

Client Sample Results

Client: AMEC Environment & Infrastructure, Inc.
Project/Site: DEP Grant S0769

TestAmerica Job ID: 660-58314-1

Client Sample ID: Canal 290
Date Collected: 12/19/13 13:20
Date Received: 12/20/13 09:50

Lab Sample ID: 660-58314-2
Matrix: Solid
Percent Solids: 8.3

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	8.2		6.2	2.8	mg/Kg	☐	12/26/13 09:26	12/26/13 13:20	1
Barium	8.1	I	12	2.0	mg/Kg	☐	12/26/13 09:26	12/26/13 13:20	1
Cadmium	2.4	I	6.2	1.1	mg/Kg	☐	12/26/13 09:26	12/26/13 13:20	1
Chromium	16		12	2.1	mg/Kg	☐	12/26/13 09:26	12/26/13 13:20	1
Copper	540		25	6.2	mg/Kg	☐	12/26/13 09:26	12/26/13 13:20	1
Lead	9.5		6.2	1.9	mg/Kg	☐	12/26/13 09:26	12/26/13 13:20	1
Selenium	4.6	U	12	4.6	mg/Kg	☐	12/26/13 09:26	12/26/13 13:20	1
Silver	2.3	U	12	2.3	mg/Kg	☐	12/26/13 09:26	12/26/13 13:20	1

Method: 6010B - Metals (ICP) - SPLP East

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0051	I	0.010	0.0040	mg/L		12/26/13 10:30	12/31/13 12:34	1
Copper	0.010		0.010	0.0029	mg/L		12/26/13 10:30	12/31/13 12:34	1
Lead	0.0020	U	0.010	0.0020	mg/L		12/26/13 10:30	12/31/13 12:34	1

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.14	U	0.34	0.14	mg/Kg	☐	12/26/13 10:16	12/26/13 14:39	1

Method: 8270C LL - Semivolatile Organic Compounds by GCMS - Low Levels

Lab Sample ID: MB 660-144732/1-A
Matrix: Solid
Analysis Batch: 144780

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 144732

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	0.020	U	0.10	0.020	mg/Kg		12/26/13 13:17	12/27/13 11:33	1
Acenaphthylene	0.0050	U	0.040	0.0050	mg/Kg		12/26/13 13:17	12/27/13 11:33	1
Anthracene	0.0042	U	0.0084	0.0042	mg/Kg		12/26/13 13:17	12/27/13 11:33	1
Benzo[a]anthracene	0.0039	U	0.0080	0.0039	mg/Kg		12/26/13 13:17	12/27/13 11:33	1
Benzo[a]pyrene	0.0052	U	0.010	0.0052	mg/Kg		12/26/13 13:17	12/27/13 11:33	1
Benzo[b]fluoranthene	0.0061	U	0.012	0.0061	mg/Kg		12/26/13 13:17	12/27/13 11:33	1
Benzo[g,h,i]perylene	0.0044	U	0.020	0.0044	mg/Kg		12/26/13 13:17	12/27/13 11:33	1
Benzo[k]fluoranthene	0.0036	U	0.0080	0.0036	mg/Kg		12/26/13 13:17	12/27/13 11:33	1
Chrysene	0.0045	U	0.0090	0.0045	mg/Kg		12/26/13 13:17	12/27/13 11:33	1
Dibenz(a,h)anthracene	0.0041	U	0.020	0.0041	mg/Kg		12/26/13 13:17	12/27/13 11:33	1
Fluoranthene	0.0040	U	0.020	0.0040	mg/Kg		12/26/13 13:17	12/27/13 11:33	1
Fluorene	0.0041	U	0.020	0.0041	mg/Kg		12/26/13 13:17	12/27/13 11:33	1
Indeno[1,2,3-cd]pyrene	0.0071	U	0.020	0.0071	mg/Kg		12/26/13 13:17	12/27/13 11:33	1
1-Methylnaphthalene	0.0044	U	0.040	0.0044	mg/Kg		12/26/13 13:17	12/27/13 11:33	1
2-Methylnaphthalene	0.0071	U	0.040	0.0071	mg/Kg		12/26/13 13:17	12/27/13 11:33	1
Naphthalene	0.0044	U	0.040	0.0044	mg/Kg		12/26/13 13:17	12/27/13 11:33	1
Phenanthrene	0.0039	U	0.0080	0.0039	mg/Kg		12/26/13 13:17	12/27/13 11:33	1
Pyrene	0.0037	U	0.020	0.0037	mg/Kg		12/26/13 13:17	12/27/13 11:33	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	69		30 - 130	12/26/13 13:17	12/27/13 11:33	1

Lab Sample ID: LCS 660-144732/2-A
Matrix: Solid
Analysis Batch: 144780

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 144732

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene	0.657	0.417		mg/Kg		64	39 - 130
Acenaphthylene	0.657	0.433		mg/Kg		66	38 - 130
Anthracene	0.657	0.436		mg/Kg		66	37 - 130
Benzo[a]anthracene	0.657	0.525		mg/Kg		80	40 - 130
Benzo[a]pyrene	0.657	0.460		mg/Kg		70	49 - 130
Benzo[b]fluoranthene	0.657	0.507		mg/Kg		77	37 - 130
Benzo[g,h,i]perylene	0.657	0.480		mg/Kg		73	32 - 130
Benzo[k]fluoranthene	0.657	0.390		mg/Kg		59	32 - 130
Chrysene	0.657	0.508		mg/Kg		77	41 - 130
Dibenz(a,h)anthracene	0.657	0.491		mg/Kg		75	27 - 130
Fluoranthene	0.657	0.467		mg/Kg		71	40 - 130
Fluorene	0.657	0.438		mg/Kg		67	40 - 130
Indeno[1,2,3-cd]pyrene	0.657	0.475		mg/Kg		72	30 - 130
1-Methylnaphthalene	0.657	0.422		mg/Kg		64	31 - 130
2-Methylnaphthalene	0.657	0.417		mg/Kg		64	33 - 130
Naphthalene	0.657	0.413		mg/Kg		63	36 - 130
Phenanthrene	0.657	0.450		mg/Kg		69	42 - 130
Pyrene	0.657	0.522		mg/Kg		79	44 - 130

Method: 8270C LL - Semivolatile Organic Compounds by GCMS - Low Levels (Continued)

Lab Sample ID: LCS 660-144732/2-A
Matrix: Solid
Analysis Batch: 144780

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 144732

Surrogate	LCS %Recovery	LCS Qualifier	Limits
o-Terphenyl	72		30 - 130

Lab Sample ID: 660-58346-A-1-B MS
Matrix: Solid
Analysis Batch: 144780

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 144732

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Acenaphthene	0.21		0.693	0.758		mg/Kg	☼	79	39 - 130
Acenaphthylene	0.0059	I	0.693	0.432		mg/Kg	☼	61	38 - 130
Anthracene	0.50	J3	0.693	1.34		mg/Kg	☼	121	37 - 130
Benzo[a]anthracene	0.86	J3	0.693	2.21	J3	mg/Kg	☼	195	40 - 130
Benzo[a]pyrene	0.53	J3	0.693	1.59	J3	mg/Kg	☼	152	49 - 130
Benzo[b]fluoranthene	0.78	J3	0.693	2.13	J3	mg/Kg	☼	194	37 - 130
Benzo[g,h,i]perylene	0.31		0.693	1.07		mg/Kg	☼	110	32 - 130
Benzo[k]fluoranthene	0.25		0.693	0.969		mg/Kg	☼	103	32 - 130
Chrysene	0.83	J3	0.693	2.11	J3	mg/Kg	☼	185	41 - 130
Dibenz(a,h)anthracene	0.093		0.693	0.642		mg/Kg	☼	79	27 - 130
Fluoranthene	2.2	J3	0.693	3.47	J3 L	mg/Kg	☼	182	40 - 130
Fluorene	0.28		0.693	0.869		mg/Kg	☼	85	40 - 130
Indeno[1,2,3-cd]pyrene	0.30		0.693	1.09		mg/Kg	☼	113	30 - 130
1-Methylnaphthalene	0.023	I	0.693	0.414		mg/Kg	☼	56	31 - 130
2-Methylnaphthalene	0.032	I	0.693	0.437		mg/Kg	☼	58	33 - 130
Naphthalene	0.019	I	0.693	0.395		mg/Kg	☼	54	36 - 130
Phenanthrene	2.2	J3	0.693	3.10	J3	mg/Kg	☼	137	42 - 130
Pyrene	1.9	J3	0.693	3.48	J3 L	mg/Kg	☼	221	44 - 130

Surrogate	MS %Recovery	MS Qualifier	Limits
o-Terphenyl	65		30 - 130

Lab Sample ID: 660-58346-A-1-C MSD
Matrix: Solid
Analysis Batch: 144780

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 144732

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Acenaphthene	0.21		0.693	0.808		mg/Kg	☼	86	39 - 130	6	40
Acenaphthylene	0.0059	I	0.693	0.454		mg/Kg	☼	65	38 - 130	5	40
Anthracene	0.50	J3	0.693	1.53	J3	mg/Kg	☼	149	37 - 130	13	40
Benzo[a]anthracene	0.86	J3	0.693	2.18	J3	mg/Kg	☼	191	40 - 130	1	40
Benzo[a]pyrene	0.53	J3	0.693	1.49	J3	mg/Kg	☼	138	49 - 130	7	40
Benzo[b]fluoranthene	0.78	J3	0.693	1.85	J3	mg/Kg	☼	154	37 - 130	14	40
Benzo[g,h,i]perylene	0.31		0.693	0.979		mg/Kg	☼	97	32 - 130	9	40
Benzo[k]fluoranthene	0.25		0.693	0.983		mg/Kg	☼	105	32 - 130	1	40
Chrysene	0.83	J3	0.693	2.16	J3	mg/Kg	☼	191	41 - 130	2	40
Dibenz(a,h)anthracene	0.093		0.693	0.613		mg/Kg	☼	75	27 - 130	5	40
Fluoranthene	2.2	J3	0.693	3.19	J3	mg/Kg	☼	141	40 - 130	8	40
Fluorene	0.28		0.693	0.925		mg/Kg	☼	93	40 - 130	6	40
Indeno[1,2,3-cd]pyrene	0.30		0.693	1.01		mg/Kg	☼	102	30 - 130	7	40
1-Methylnaphthalene	0.023	I	0.693	0.456		mg/Kg	☼	62	31 - 130	10	40

Method: 8270C LL - Semivolatile Organic Compounds by GCMS - Low Levels (Continued)

Lab Sample ID: 660-58346-A-1-C MSD
Matrix: Solid
Analysis Batch: 144780

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 144732

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Methylnaphthalene	0.032	I	0.693	0.475		mg/Kg	☼	64	33 - 130	8	40
Naphthalene	0.019	I	0.693	0.421		mg/Kg	☼	58	36 - 130	7	40
Phenanthrene	2.2	J3	0.693	3.13	J3	mg/Kg	☼	140	42 - 130	1	40
Pyrene	1.9	J3	0.693	3.20	J3	mg/Kg	☼	181	44 - 130	8	40

Surrogate	MSD %Recovery	MSD Qualifier	Limits
o-Terphenyl	71		30 - 130

Method: 8081A - Organochlorine Pesticides (GC)

Lab Sample ID: MB 660-144597/1-A
Matrix: Solid
Analysis Batch: 144818

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 144597

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
4,4'-DDD	0.00044	U	0.0017	0.00044	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
4,4'-DDE	0.00034	U	0.0017	0.00034	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
4,4'-DDT	0.00044	U	0.0017	0.00044	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
Aldrin	0.00044	U	0.0017	0.00044	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
alpha-BHC	0.00037	U	0.0017	0.00037	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
beta-BHC	0.00059	U	0.0017	0.00059	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
Chlordane (technical)	0.0030	U	0.017	0.0030	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
delta-BHC	0.00059	U	0.0017	0.00059	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
Dieldrin	0.00044	U	0.0017	0.00044	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
Endosulfan I	0.00044	U	0.0017	0.00044	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
Endosulfan II	0.00064	U	0.0017	0.00064	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
Endosulfan sulfate	0.00069	U	0.0017	0.00069	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
Endrin	0.00069	U	0.0017	0.00069	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
Endrin aldehyde	0.00049	U	0.0017	0.00049	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
Endrin ketone	0.00049	U	0.0017	0.00049	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
gamma-BHC (Lindane)	0.00049	U	0.0017	0.00049	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
Heptachlor	0.00062	U	0.0017	0.00062	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
Heptachlor epoxide	0.00044	U	0.0017	0.00044	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
Methoxychlor	0.00098	U	0.017	0.00098	mg/Kg		12/23/13 08:46	12/27/13 16:10	1
Toxaphene	0.029	U	0.17	0.029	mg/Kg		12/23/13 08:46	12/27/13 16:10	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	105		30 - 150	12/23/13 08:46	12/27/13 16:10	1
Tetrachloro-m-xylene	86		30 - 150	12/23/13 08:46	12/27/13 16:10	1

Lab Sample ID: LCS 660-144597/2-A
Matrix: Solid
Analysis Batch: 144818

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 144597

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.0329	0.0349		mg/Kg		106	52 - 137
4,4'-DDE	0.0329	0.0352		mg/Kg		107	54 - 132

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS 660-144597/2-A
Matrix: Solid
Analysis Batch: 144818

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 144597

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDT	0.0329	0.0356		mg/Kg		108	54 - 137
Aldrin	0.0329	0.0345		mg/Kg		105	54 - 130
alpha-BHC	0.0329	0.0385		mg/Kg		117	50 - 130
beta-BHC	0.0329	0.0296		mg/Kg		90	48 - 130
delta-BHC	0.0329	0.0330		mg/Kg		100	33 - 130
Dieldrin	0.0329	0.0358		mg/Kg		109	50 - 130
Endosulfan I	0.0329	0.0326		mg/Kg		99	47 - 130
Endosulfan II	0.0329	0.0347		mg/Kg		105	46 - 130
Endosulfan sulfate	0.0329	0.0343		mg/Kg		104	30 - 130
Endrin	0.0329	0.0357		mg/Kg		109	52 - 131
Endrin aldehyde	0.0329	0.0340		mg/Kg		103	40 - 130
Endrin ketone	0.0329	0.0346		mg/Kg		105	50 - 144
gamma-BHC (Lindane)	0.0329	0.0336		mg/Kg		102	47 - 130
Heptachlor	0.0329	0.0349		mg/Kg		106	56 - 130
Heptachlor epoxide	0.0329	0.0345		mg/Kg		105	60 - 130
Methoxychlor	0.0329	0.0358		mg/Kg		109	50 - 146

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl	107		30 - 150
Tetrachloro-m-xylene	93		30 - 150

Lab Sample ID: 660-58314-2 MS
Matrix: Solid
Analysis Batch: 144818

Client Sample ID: Canal 290
Prep Type: Total/NA
Prep Batch: 144597

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Endrin aldehyde	0.0060	U	0.398	0.368		mg/Kg	☼	92	40 - 130

Surrogate	MS %Recovery	MS Qualifier	Limits
DCB Decachlorobiphenyl	112		30 - 150
Tetrachloro-m-xylene	124		30 - 150

Lab Sample ID: 660-58314-2 MS
Matrix: Solid
Analysis Batch: 144929

Client Sample ID: Canal 290
Prep Type: Total/NA
Prep Batch: 144597

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
4,4'-DDD	0.0054	U	0.398	0.408		mg/Kg	☼	102	52 - 137
4,4'-DDE	0.0042	U	0.398	0.408		mg/Kg	☼	102	54 - 132
4,4'-DDT	0.0054	U	0.398	0.391		mg/Kg	☼	98	54 - 137
Aldrin	0.0054	U	0.398	0.383		mg/Kg	☼	96	54 - 130
alpha-BHC	0.0046	U	0.398	0.342		mg/Kg	☼	86	50 - 130
beta-BHC	0.0072	U	0.398	0.295		mg/Kg	☼	74	48 - 130
delta-BHC	0.0072	U	0.398	0.258		mg/Kg	☼	65	33 - 130
Dieldrin	0.0054	U	0.398	0.393		mg/Kg	☼	99	50 - 130
Endosulfan I	0.0054	U	0.398	0.345		mg/Kg	☼	87	47 - 130
Endosulfan II	0.0078	U	0.398	0.359		mg/Kg	☼	90	46 - 130
Endosulfan sulfate	0.0084	U	0.398	0.286		mg/Kg	☼	72	30 - 130

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 660-58314-2 MS
Matrix: Solid
Analysis Batch: 144929

Client Sample ID: Canal 290
Prep Type: Total/NA
Prep Batch: 144597

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Endrin	0.0084	U	0.398	0.393		mg/Kg	☼	99	52 - 131
Endrin ketone	0.0060	U	0.398	0.380		mg/Kg	☼	95	50 - 144
gamma-BHC (Lindane)	0.0060	U	0.398	0.321		mg/Kg	☼	81	47 - 130
Heptachlor	0.0076	U	0.398	0.357		mg/Kg	☼	90	56 - 130
Heptachlor epoxide	0.0054	U	0.398	0.360		mg/Kg	☼	90	60 - 130
Methoxychlor	0.012	U	0.398	0.427		mg/Kg	☼	107	50 - 146

Surrogate	MS %Recovery	MS Qualifier	Limits
Tetrachloro-m-xylene	*81*		*30 - 150*

Lab Sample ID: 660-58314-2 MSD
Matrix: Solid
Analysis Batch: 144818

Client Sample ID: Canal 290
Prep Type: Total/NA
Prep Batch: 144597

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Endrin aldehyde	0.0060	U	0.398	0.298		mg/Kg	☼	75	40 - 130	21	40

Surrogate	MSD %Recovery	MSD Qualifier	Limits
DCB Decachlorobiphenyl	*115*		*30 - 150*
Tetrachloro-m-xylene	*125*		*30 - 150*

Lab Sample ID: 660-58314-2 MSD
Matrix: Solid
Analysis Batch: 144929

Client Sample ID: Canal 290
Prep Type: Total/NA
Prep Batch: 144597

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
4,4'-DDD	0.0054	U	0.398	0.371		mg/Kg	☼	93	52 - 137	9	40
4,4'-DDE	0.0042	U	0.398	0.397		mg/Kg	☼	100	54 - 132	3	40
4,4'-DDT	0.0054	U	0.398	0.350		mg/Kg	☼	88	54 - 137	11	40
Aldrin	0.0054	U	0.398	0.369		mg/Kg	☼	93	54 - 130	4	40
alpha-BHC	0.0046	U	0.398	0.316		mg/Kg	☼	80	50 - 130	7	40
beta-BHC	0.0072	U	0.398	0.259		mg/Kg	☼	65	48 - 130	13	40
delta-BHC	0.0072	U	0.398	0.234		mg/Kg	☼	59	33 - 130	10	40
Dieldrin	0.0054	U	0.398	0.369		mg/Kg	☼	93	50 - 130	6	40
Endosulfan I	0.0054	U	0.398	0.334		mg/Kg	☼	84	47 - 130	3	40
Endosulfan II	0.0078	U	0.398	0.313		mg/Kg	☼	79	46 - 130	14	40
Endosulfan sulfate	0.0084	U	0.398	0.256		mg/Kg	☼	64	30 - 130	11	40
Endrin	0.0084	U	0.398	0.376		mg/Kg	☼	94	52 - 131	4	40
Endrin ketone	0.0060	U	0.398	0.331		mg/Kg	☼	83	50 - 144	14	40
gamma-BHC (Lindane)	0.0060	U	0.398	0.292		mg/Kg	☼	73	47 - 130	9	40
Heptachlor	0.0076	U	0.398	0.350		mg/Kg	☼	88	56 - 130	2	40
Heptachlor epoxide	0.0054	U	0.398	0.333		mg/Kg	☼	84	60 - 130	8	40
Methoxychlor	0.012	U	0.398	0.374		mg/Kg	☼	94	50 - 146	13	40

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 660-144597/1-A
Matrix: Solid
Analysis Batch: 144816

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 144597

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
PCB-1016	0.012	U	0.065	0.012	mg/Kg		12/23/13 08:46	12/27/13 18:06	1
PCB-1221	0.0071	U	0.13	0.0071	mg/Kg		12/23/13 08:46	12/27/13 18:06	1
PCB-1232	0.010	U	0.065	0.010	mg/Kg		12/23/13 08:46	12/27/13 18:06	1
PCB-1242	0.013	U	0.065	0.013	mg/Kg		12/23/13 08:46	12/27/13 18:06	1
PCB-1248	0.0095	U	0.065	0.0095	mg/Kg		12/23/13 08:46	12/27/13 18:06	1
PCB-1254	0.010	U	0.065	0.010	mg/Kg		12/23/13 08:46	12/27/13 18:06	1
PCB-1260	0.0055	U	0.065	0.0055	mg/Kg		12/23/13 08:46	12/27/13 18:06	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	70		30 - 150	12/23/13 08:46	12/27/13 18:06	1
DCB Decachlorobiphenyl	65		30 - 150	12/23/13 08:46	12/27/13 18:06	1

Lab Sample ID: LCS 660-144597/3-A
Matrix: Solid
Analysis Batch: 144816

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 144597

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
PCB-1016	0.331	0.238		mg/Kg		72	43 - 130
PCB-1260	0.331	0.246		mg/Kg		74	35 - 155

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Tetrachloro-m-xylene	71		30 - 150
DCB Decachlorobiphenyl	69		30 - 150

Lab Sample ID: 660-58314-2 MS
Matrix: Solid
Analysis Batch: 144905

Client Sample ID: Canal 290
Prep Type: Total/NA
Prep Batch: 144597

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
PCB-1016	0.14	U	3.94	3.14		mg/Kg	☼	80	43 - 130
PCB-1260	0.067	U	3.94	3.84		mg/Kg	☼	98	35 - 155

Surrogate	MS %Recovery	MS Qualifier	Limits
Tetrachloro-m-xylene	68		30 - 150
DCB Decachlorobiphenyl	81		30 - 150

Lab Sample ID: 660-58314-2 MSD
Matrix: Solid
Analysis Batch: 144905

Client Sample ID: Canal 290
Prep Type: Total/NA
Prep Batch: 144597

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
PCB-1016	0.14	U	4.01	2.91		mg/Kg	☼	73	43 - 130	8	50
PCB-1260	0.067	U	4.01	3.30		mg/Kg	☼	82	35 - 155	15	50

Surrogate	MSD %Recovery	MSD Qualifier	Limits
Tetrachloro-m-xylene	68		30 - 150
DCB Decachlorobiphenyl	77		30 - 150

QC Sample Results

Client: AMEC Environment & Infrastructure, Inc.
Project/Site: DEP Grant S0769

TestAmerica Job ID: 660-58314-1

Method: 8151A - Herbicides (GC)

Lab Sample ID: MB 660-144763/1-A
Matrix: Solid
Analysis Batch: 144832

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 144763

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4,5-T	0.010	U	0.051	0.010	mg/Kg		12/27/13 11:23	12/30/13 09:43	1
2,4-D	0.0016	U	0.0084	0.0016	mg/Kg		12/27/13 11:23	12/30/13 09:43	1
2,4-DB	0.0065	U	0.0084	0.0065	mg/Kg		12/27/13 11:23	12/30/13 09:43	1
Dalapon	0.023	U	2.0	0.023	mg/Kg		12/27/13 11:23	12/30/13 09:43	1
Dicamba	0.012	U	0.051	0.012	mg/Kg		12/27/13 11:23	12/30/13 09:43	1
Dichlorprop	0.025	U	0.10	0.025	mg/Kg		12/27/13 11:23	12/30/13 09:43	1
Dinoseb	0.0084	U	0.030	0.0084	mg/Kg		12/27/13 11:23	12/30/13 09:43	1
MCPA	0.75	U	2.0	0.75	mg/Kg		12/27/13 11:23	12/30/13 09:43	1
MCPP	0.40	U	2.0	0.40	mg/Kg		12/27/13 11:23	12/30/13 09:43	1
Pentachlorophenol	0.0051	U	0.017	0.0051	mg/Kg		12/27/13 11:23	12/30/13 09:43	1
Picloram	0.0012	U	0.0033	0.0012	mg/Kg		12/27/13 11:23	12/30/13 09:43	1
Silvex (2,4,5-TP)	0.010	U	0.051	0.010	mg/Kg		12/27/13 11:23	12/30/13 09:43	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4-Dichlorophenylacetic acid	82		10 - 135	12/27/13 11:23	12/30/13 09:43	1

Lab Sample ID: LCS 660-144763/2-A
Matrix: Solid
Analysis Batch: 144832

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 144763

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4,5-T	0.0837	0.0632		mg/Kg		76	44 - 130
2,4-D	0.0837	0.0595		mg/Kg		71	29 - 130
2,4-DB	0.0837	0.0664		mg/Kg		79	39 - 150
Dalapon	0.0837	0.0621	I	mg/Kg		74	10 - 134
Dicamba	0.0837	0.0679		mg/Kg		81	29 - 130
Dichlorprop	0.0837	0.0513	I	mg/Kg		61	39 - 130
Dinoseb	0.0837	0.262	J3	mg/Kg		313	10 - 130
MCPA	8.37	6.07		mg/Kg		72	29 - 134
MCPP	8.37	7.14		mg/Kg		85	26 - 133
Pentachlorophenol	0.0837	0.0871		mg/Kg		104	16 - 130
Picloram	0.0837	0.0340		mg/Kg		41	10 - 150
Silvex (2,4,5-TP)	0.0837	0.0697		mg/Kg		83	50 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
2,4-Dichlorophenylacetic acid	90		10 - 135

Lab Sample ID: 640-46240-G-2-D MS
Matrix: Solid
Analysis Batch: 144832

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 144763

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
2,4,5-T	0.013	U	0.109	0.0812		mg/Kg	☼	74	44 - 130
2,4-D	0.0021	U	0.109	0.0763		mg/Kg	☼	70	29 - 130
2,4-DB	0.0084	J3 U	0.109	0.135		mg/Kg	☼	124	39 - 150
Dalapon	0.030	U	0.109	0.0779	I	mg/Kg	☼	71	10 - 134
Dicamba	0.016	U	0.109	0.0895		mg/Kg	☼	82	29 - 130

Method: 8151A - Herbicides (GC) (Continued)

Lab Sample ID: 640-46240-G-2-D MS
Matrix: Solid
Analysis Batch: 144832

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 144763

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Dichlorprop	0.033	U	0.109	0.0728	I	mg/Kg	☼	67	39 - 130
Dinoseb	0.011	J3 U	0.109	0.125		mg/Kg	☼	114	10 - 130
MCPA	0.97	U	10.9	8.27		mg/Kg	☼	76	29 - 134
MCPP	0.52	U	10.9	11.1		mg/Kg	☼	102	28 - 133
Pentachlorophenol	0.0065	U	0.109	0.0872		mg/Kg	☼	80	16 - 130
Picloram	0.0016	U	0.109	0.0297		mg/Kg	☼	27	10 - 150
Silvex (2,4,5-TP)	0.013	U	0.109	0.0912		mg/Kg	☼	84	50 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*86*		*10 - 135*

Lab Sample ID: 640-46240-G-2-E MSD
Matrix: Solid
Analysis Batch: 144832

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 144763

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2,4,5-T	0.013	U	0.109	0.0787		mg/Kg	☼	72	44 - 130	3	59
2,4-D	0.0021	U	0.109	0.0800		mg/Kg	☼	73	29 - 130	5	47
2,4-DB	0.0084	J3 U	0.109	0.0881	J3	mg/Kg	☼	81	39 - 150	42	40
Dalapon	0.030	U	0.109	0.0735	I	mg/Kg	☼	67	10 - 134	6	40
Dicamba	0.016	U	0.109	0.0918		mg/Kg	☼	84	29 - 130	2	40
Dichlorprop	0.033	U	0.109	0.0726	I	mg/Kg	☼	67	39 - 130	0	40
Dinoseb	0.011	J3 U	0.109	0.342	J3	mg/Kg	☼	314	10 - 130	93	50
MCPA	0.97	U	10.9	8.30		mg/Kg	☼	76	29 - 134	0	50
MCPP	0.52	U	10.9	12.0		mg/Kg	☼	110	28 - 133	8	50
Pentachlorophenol	0.0065	U	0.109	0.138	J3	mg/Kg	☼	126	16 - 130	45	40
Picloram	0.0016	U	0.109	0.0351		mg/Kg	☼	32	10 - 150	17	40
Silvex (2,4,5-TP)	0.013	U	0.109	0.0974		mg/Kg	☼	89	50 - 130	7	51

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*103*		*10 - 135*

Method: FL-PRO - Florida - Petroleum Range Organics (GC)

Lab Sample ID: MB 660-144595/1-A
Matrix: Solid
Analysis Batch: 144648

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 144595

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Petroleum Hydrocarbons (C8-C40)	5.0	U	9.9	5.0	mg/Kg		12/23/13 08:42	12/23/13 15:29	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*105*		*57 - 115*	*12/23/13 08:42*	*12/23/13 15:29*	*1*
n-C39	*104*		*61 - 153*	*12/23/13 08:42*	*12/23/13 15:29*	*1*

Method: FL-PRO - Florida - Petroleum Range Organics (GC) (Continued)

Lab Sample ID: LCS 660-144595/2-A
Matrix: Solid
Analysis Batch: 144648

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 144595

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Petroleum Hydrocarbons (C8-C40)	90.5	73.5		mg/Kg		81	63 - 135

Surrogate	LCS %Recovery	LCS Qualifier	Limits
o-Terphenyl	97		57 - 115
n-C39	109		61 - 153

Lab Sample ID: 640-46165-F-7-B MS
Matrix: Solid
Analysis Batch: 144648

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 144595

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Petroleum Hydrocarbons (C8-C40)	5.3	U	96.7	79.3		mg/Kg	☼	82	41 - 224

Surrogate	MS %Recovery	MS Qualifier	Limits
o-Terphenyl	89		57 - 115
n-C39	135		61 - 153

Lab Sample ID: 640-46165-F-7-C MSD
Matrix: Solid
Analysis Batch: 144648

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 144595

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Petroleum Hydrocarbons (C8-C40)	5.3	U	96.7	76.8		mg/Kg	☼	79	41 - 224	3	25

Surrogate	MSD %Recovery	MSD Qualifier	Limits
o-Terphenyl	95		57 - 115
n-C39	130		61 - 153

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 660-144708/1-A
Matrix: Solid
Analysis Batch: 144705

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 144708

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.23	U	0.50	0.23	mg/Kg		12/26/13 09:26	12/26/13 12:22	1
Barium	0.16	U	1.0	0.16	mg/Kg		12/26/13 09:26	12/26/13 12:22	1
Cadmium	0.067	U	0.50	0.067	mg/Kg		12/26/13 09:26	12/26/13 12:22	1
Chromium	0.17	U	1.0	0.17	mg/Kg		12/26/13 09:26	12/26/13 12:22	1
Copper	0.50	U	2.0	0.50	mg/Kg		12/26/13 09:26	12/26/13 12:22	1
Lead	0.15	U	0.50	0.15	mg/Kg		12/26/13 09:26	12/26/13 12:22	1
Selenium	0.37	U	1.0	0.37	mg/Kg		12/26/13 09:26	12/26/13 12:22	1
Silver	0.19	U	1.0	0.19	mg/Kg		12/26/13 09:26	12/26/13 12:22	1

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: LCS 660-144708/2-A
Matrix: Solid
Analysis Batch: 144705

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 144708

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	50.0	49.1		mg/Kg		98	75 - 125
Barium	50.0	51.7		mg/Kg		103	75 - 125
Cadmium	50.0	48.4		mg/Kg		97	75 - 125
Chromium	50.0	51.4		mg/Kg		103	75 - 125
Copper	50.0	50.6		mg/Kg		101	75 - 125
Lead	50.0	50.4		mg/Kg		101	75 - 125
Selenium	50.0	47.5		mg/Kg		95	75 - 125
Silver	50.0	48.8		mg/Kg		98	75 - 125

Lab Sample ID: 660-58346-F-3-C MS
Matrix: Solid
Analysis Batch: 144705

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 144708

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.25	U	55.3	50.5		mg/Kg	☼	91	75 - 125
Barium	7.1		55.3	61.6		mg/Kg	☼	99	75 - 125
Cadmium	0.096	U	55.3	49.7		mg/Kg	☼	90	75 - 125
Chromium	2.7		55.3	55.9		mg/Kg	☼	96	75 - 125
Copper	0.55	U	55.3	51.7		mg/Kg	☼	94	75 - 125
Lead	2.9		55.3	54.1		mg/Kg	☼	93	75 - 125
Selenium	0.41	U	55.3	50.0		mg/Kg	☼	90	75 - 125
Silver	0.21	U	55.3	49.3		mg/Kg	☼	89	75 - 125

Lab Sample ID: 660-58346-F-3-D MSD
Matrix: Solid
Analysis Batch: 144705

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 144708

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.25	U	54.1	50.6		mg/Kg	☼	93	75 - 125	0	20
Barium	7.1		54.1	59.2		mg/Kg	☼	96	75 - 125	4	20
Cadmium	0.096	U	54.1	49.8		mg/Kg	☼	92	75 - 125	0	20
Chromium	2.7		54.1	56.0		mg/Kg	☼	96	75 - 125	0	20
Copper	0.55	U	54.1	52.1		mg/Kg	☼	96	75 - 125	1	20
Lead	2.9		54.1	54.0		mg/Kg	☼	94	75 - 125	0	20
Selenium	0.41	U	54.1	49.8		mg/Kg	☼	92	75 - 125	0	20
Silver	0.21	U	54.1	49.1		mg/Kg	☼	91	75 - 125	1	20

Lab Sample ID: LCS 660-144715/2-A
Matrix: Solid
Analysis Batch: 144855

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 144715

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1.00	0.976		mg/L		98	80 - 120
Copper	1.00	0.995		mg/L		99	80 - 120
Lead	1.00	1.01		mg/L		101	80 - 120

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: LB 660-144667/1-B
Matrix: Solid
Analysis Batch: 144855

Client Sample ID: Method Blank
Prep Type: SPLP East
Prep Batch: 144715

Analyte	LB Result	LB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0040	U	0.010	0.0040	mg/L		12/26/13 10:30	12/31/13 11:38	1
Copper	0.0029	U	0.010	0.0029	mg/L		12/26/13 10:30	12/31/13 11:38	1
Lead	0.0020	U	0.010	0.0020	mg/L		12/26/13 10:30	12/31/13 11:38	1

Lab Sample ID: 660-57741-A-59-E MS
Matrix: Solid
Analysis Batch: 144855

Client Sample ID: Matrix Spike
Prep Type: SPLP East
Prep Batch: 144715

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.054		1.00	0.942		mg/L		89	80 - 120
Copper	0.0029	U	1.00	0.900		mg/L		90	80 - 120
Lead	0.018		1.00	0.922		mg/L		90	80 - 120

Lab Sample ID: 660-57741-A-59-F MSD
Matrix: Solid
Analysis Batch: 144855

Client Sample ID: Matrix Spike Duplicate
Prep Type: SPLP East
Prep Batch: 144715

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.054		1.00	0.945		mg/L		89	80 - 120	0	20
Copper	0.0029	U	1.00	0.918		mg/L		92	80 - 120	2	20
Lead	0.018		1.00	0.921		mg/L		90	80 - 120	0	20

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 660-144720/1-A
Matrix: Solid
Analysis Batch: 144740

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 144720

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.012	U	0.030	0.012	mg/Kg		12/26/13 10:16	12/26/13 14:03	1

Lab Sample ID: LCS 660-144720/2-A
Matrix: Solid
Analysis Batch: 144740

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 144720

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.167	0.173		mg/Kg		104	80 - 120

Lab Sample ID: 660-58331-A-8-E MS
Matrix: Solid
Analysis Batch: 144740

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 144720

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.012	U	0.172	0.177		mg/Kg		103	80 - 120

Method: 7471A - Mercury (CVAA) (Continued)

Lab Sample ID: 660-58331-A-8-F MSD
Matrix: Solid
Analysis Batch: 144740

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 144720

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.012	U	0.172	0.168		mg/Kg	☼	97	80 - 120	6	20

QC Association Summary

Client: AMEC Environment & Infrastructure, Inc.
Project/Site: DEP Grant S0769

TestAmerica Job ID: 660-58314-1

GC/MS Semi VOA

Prep Batch: 144732

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-58314-2	Canal 290	Total/NA	Solid	3546	
660-58346-A-1-B MS	Matrix Spike	Total/NA	Solid	3546	
660-58346-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Solid	3546	
LCS 660-144732/2-A	Lab Control Sample	Total/NA	Solid	3546	
MB 660-144732/1-A	Method Blank	Total/NA	Solid	3546	

Analysis Batch: 144780

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-58314-2	Canal 290	Total/NA	Solid	8270C LL	144732
660-58346-A-1-B MS	Matrix Spike	Total/NA	Solid	8270C LL	144732
660-58346-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Solid	8270C LL	144732
LCS 660-144732/2-A	Lab Control Sample	Total/NA	Solid	8270C LL	144732
MB 660-144732/1-A	Method Blank	Total/NA	Solid	8270C LL	144732

GC Semi VOA

Prep Batch: 144595

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-46165-F-7-B MS	Matrix Spike	Total/NA	Solid	3541	
640-46165-F-7-C MSD	Matrix Spike Duplicate	Total/NA	Solid	3541	
660-58314-2	Canal 290	Total/NA	Solid	3541	
LCS 660-144595/2-A	Lab Control Sample	Total/NA	Solid	3541	
MB 660-144595/1-A	Method Blank	Total/NA	Solid	3541	

Prep Batch: 144597

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-58314-2	Canal 290	Total/NA	Solid	3546	
660-58314-2	Canal 290	Total/NA	Solid	3546	
660-58314-2 MS	Canal 290	Total/NA	Solid	3546	
660-58314-2 MS	Canal 290	Total/NA	Solid	3546	
660-58314-2 MSD	Canal 290	Total/NA	Solid	3546	
660-58314-2 MSD	Canal 290	Total/NA	Solid	3546	
LCS 660-144597/2-A	Lab Control Sample	Total/NA	Solid	3546	
LCS 660-144597/3-A	Lab Control Sample	Total/NA	Solid	3546	
MB 660-144597/1-A	Method Blank	Total/NA	Solid	3546	

Analysis Batch: 144648

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-46165-F-7-B MS	Matrix Spike	Total/NA	Solid	FL-PRO	144595
640-46165-F-7-C MSD	Matrix Spike Duplicate	Total/NA	Solid	FL-PRO	144595
660-58314-2	Canal 290	Total/NA	Solid	FL-PRO	144595
LCS 660-144595/2-A	Lab Control Sample	Total/NA	Solid	FL-PRO	144595
MB 660-144595/1-A	Method Blank	Total/NA	Solid	FL-PRO	144595

Prep Batch: 144763

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-46240-G-2-D MS	Matrix Spike	Total/NA	Solid	8151A	
640-46240-G-2-E MSD	Matrix Spike Duplicate	Total/NA	Solid	8151A	
660-58314-2	Canal 290	Total/NA	Solid	8151A	
LCS 660-144763/2-A	Lab Control Sample	Total/NA	Solid	8151A	

GC Semi VOA (Continued)

Prep Batch: 144763 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 660-144763/1-A	Method Blank	Total/NA	Solid	8151A	

Analysis Batch: 144816

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 660-144597/3-A	Lab Control Sample	Total/NA	Solid	8082	144597
MB 660-144597/1-A	Method Blank	Total/NA	Solid	8082	144597

Analysis Batch: 144818

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-58314-2	Canal 290	Total/NA	Solid	8081A	144597
660-58314-2 MS	Canal 290	Total/NA	Solid	8081A	144597
660-58314-2 MSD	Canal 290	Total/NA	Solid	8081A	144597
LCS 660-144597/2-A	Lab Control Sample	Total/NA	Solid	8081A	144597
MB 660-144597/1-A	Method Blank	Total/NA	Solid	8081A	144597

Analysis Batch: 144832

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-46240-G-2-D MS	Matrix Spike	Total/NA	Solid	8151A	144763
640-46240-G-2-E MSD	Matrix Spike Duplicate	Total/NA	Solid	8151A	144763
LCS 660-144763/2-A	Lab Control Sample	Total/NA	Solid	8151A	144763
MB 660-144763/1-A	Method Blank	Total/NA	Solid	8151A	144763

Analysis Batch: 144862

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-58314-2	Canal 290	Total/NA	Solid	8151A	144763

Analysis Batch: 144905

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-58314-2	Canal 290	Total/NA	Solid	8082	144597
660-58314-2 MS	Canal 290	Total/NA	Solid	8082	144597
660-58314-2 MSD	Canal 290	Total/NA	Solid	8082	144597

Analysis Batch: 144929

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-58314-2	Canal 290	Total/NA	Solid	8081A	144597
660-58314-2 MS	Canal 290	Total/NA	Solid	8081A	144597
660-58314-2 MSD	Canal 290	Total/NA	Solid	8081A	144597

Metals

Leach Batch: 144667

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-57741-A-59-E MS	Matrix Spike	SPLP East	Solid	1312	
660-57741-A-59-F MSD	Matrix Spike Duplicate	SPLP East	Solid	1312	
660-58314-1	Canal 266	SPLP East	Solid	1312	
660-58314-2	Canal 290	SPLP East	Solid	1312	
LB 660-144667/1-B	Method Blank	SPLP East	Solid	1312	

QC Association Summary

Client: AMEC Environment & Infrastructure, Inc.
Project/Site: DEP Grant S0769

TestAmerica Job ID: 660-58314-1

Metals (Continued)

Analysis Batch: 144705

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-58314-2	Canal 290	Total/NA	Solid	6010B	144708
660-58346-F-3-C MS	Matrix Spike	Total/NA	Solid	6010B	144708
660-58346-F-3-D MSD	Matrix Spike Duplicate	Total/NA	Solid	6010B	144708
LCS 660-144708/2-A	Lab Control Sample	Total/NA	Solid	6010B	144708
MB 660-144708/1-A	Method Blank	Total/NA	Solid	6010B	144708

Prep Batch: 144708

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-58314-2	Canal 290	Total/NA	Solid	3050B	
660-58346-F-3-C MS	Matrix Spike	Total/NA	Solid	3050B	
660-58346-F-3-D MSD	Matrix Spike Duplicate	Total/NA	Solid	3050B	
LCS 660-144708/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 660-144708/1-A	Method Blank	Total/NA	Solid	3050B	

Prep Batch: 144715

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-57741-A-59-E MS	Matrix Spike	SPLP East	Solid	3010A	144667
660-57741-A-59-F MSD	Matrix Spike Duplicate	SPLP East	Solid	3010A	144667
660-58314-1	Canal 266	SPLP East	Solid	3010A	144667
660-58314-2	Canal 290	SPLP East	Solid	3010A	144667
LB 660-144667/1-B	Method Blank	SPLP East	Solid	3010A	144667
LCS 660-144715/2-A	Lab Control Sample	Total/NA	Solid	3010A	

Prep Batch: 144720

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-58314-2	Canal 290	Total/NA	Solid	7471A	
660-58331-A-8-E MS	Matrix Spike	Total/NA	Solid	7471A	
660-58331-A-8-F MSD	Matrix Spike Duplicate	Total/NA	Solid	7471A	
LCS 660-144720/2-A	Lab Control Sample	Total/NA	Solid	7471A	
MB 660-144720/1-A	Method Blank	Total/NA	Solid	7471A	

Analysis Batch: 144740

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-58314-2	Canal 290	Total/NA	Solid	7471A	144720
660-58331-A-8-E MS	Matrix Spike	Total/NA	Solid	7471A	144720
660-58331-A-8-F MSD	Matrix Spike Duplicate	Total/NA	Solid	7471A	144720
LCS 660-144720/2-A	Lab Control Sample	Total/NA	Solid	7471A	144720
MB 660-144720/1-A	Method Blank	Total/NA	Solid	7471A	144720

Analysis Batch: 144855

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-57741-A-59-E MS	Matrix Spike	SPLP East	Solid	6010B	144715
660-57741-A-59-F MSD	Matrix Spike Duplicate	SPLP East	Solid	6010B	144715
660-58314-1	Canal 266	SPLP East	Solid	6010B	144715
660-58314-2	Canal 290	SPLP East	Solid	6010B	144715
LB 660-144667/1-B	Method Blank	SPLP East	Solid	6010B	144715
LCS 660-144715/2-A	Lab Control Sample	Total/NA	Solid	6010B	144715

QC Association Summary

Client: AMEC Environment & Infrastructure, Inc.
Project/Site: DEP Grant S0769

TestAmerica Job ID: 660-58314-1

General Chemistry

Analysis Batch: 144690

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-58314-2	Canal 290	Total/NA	Solid	Moisture	
660-58314-2 DU	Canal 290	Total/NA	Solid	Moisture	

Lab Chronicle

Client: AMEC Environment & Infrastructure, Inc.
Project/Site: DEP Grant S0769

TestAmerica Job ID: 660-58314-1

Client Sample ID: Canal 266

Lab Sample ID: 660-58314-1
Matrix: Solid

Date Collected: 12/18/13 16:00
Date Received: 12/20/13 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
SPLP East	Leach	1312			144667	12/23/13 16:10	SR1	TAL TAM
SPLP East	Prep	3010A			144715	12/26/13 10:30	RAG	TAL TAM
SPLP East	Analysis	6010B		1	144855	12/31/13 12:31	SR1	TAL TAM

Client Sample ID: Canal 290

Lab Sample ID: 660-58314-2
Matrix: Solid
Percent Solids: 8.3

Date Collected: 12/19/13 13:20
Date Received: 12/20/13 09:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			144732	12/26/13 13:48	SC1	TAL TAM
Total/NA	Analysis	8270C LL		1	144780	12/27/13 14:18	SCC	TAL TAM
Total/NA	Prep	3541			144595	12/23/13 08:42	AG1	TAL TAM
Total/NA	Analysis	FL-PRO		1	144648	12/23/13 17:32	TGP	TAL TAM
Total/NA	Prep	3546			144597	12/23/13 08:46	MAH	TAL TAM
Total/NA	Analysis	8081A		1	144818	12/27/13 17:30	JB1	TAL TAM
Total/NA	Prep	8151A			144763	12/27/13 11:23	SC1	TAL TAM
Total/NA	Analysis	8151A		1	144862	12/31/13 10:06	TGP	TAL TAM
Total/NA	Prep	3546			144597	12/23/13 08:47	MAH	TAL TAM
Total/NA	Analysis	8082		1	144905	01/02/14 15:26	JB1	TAL TAM
Total/NA	Analysis	8081A		1	144929	01/03/14 12:44	JB1	TAL TAM
Total/NA	Prep	3050B			144708	12/26/13 09:26	GAF	TAL TAM
Total/NA	Analysis	6010B		1	144705	12/26/13 13:20	GAF	TAL TAM
Total/NA	Prep	7471A			144720	12/26/13 10:16	RAG	TAL TAM
Total/NA	Analysis	7471A		1	144740	12/26/13 14:39	RAG	TAL TAM
SPLP East	Leach	1312			144667	12/23/13 16:10	SR1	TAL TAM
SPLP East	Prep	3010A			144715	12/26/13 10:30	RAG	TAL TAM
SPLP East	Analysis	6010B		1	144855	12/31/13 12:34	SR1	TAL TAM
Total/NA	Analysis	Moisture		1	144690	12/24/13 06:51	AJG	TAL TAM

Laboratory References:

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Method Summary

Client: AMEC Environment & Infrastructure, Inc.
Project/Site: DEP Grant S0769

TestAmerica Job ID: 660-58314-1

Method	Method Description	Protocol	Laboratory
8270C LL	Semivolatile Organic Compounds by GCMS - Low Levels	SW846	TAL TAM
8081A	Organochlorine Pesticides (GC)	SW846	TAL TAM
8082	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	SW846	TAL TAM
8151A	Herbicides (GC)	SW846	TAL TAM
FL-PRO	Florida - Petroleum Range Organics (GC)	FL-DEP	TAL TAM
6010B	Metals (ICP)	SW846	TAL TAM
7471A	Mercury (CVAA)	SW846	TAL TAM
Moisture	Percent Moisture	EPA	TAL TAM

Protocol References:

EPA = US Environmental Protection Agency

FL-DEP = State Of Florida Department Of Environmental Protection, Florida Administrative Code

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

Laboratory References:

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Certification Summary

Client: AMEC Environment & Infrastructure, Inc.
Project/Site: DEP Grant S0769

TestAmerica Job ID: 660-58314-1

Laboratory: TestAmerica Tampa

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alabama	State Program	4	40610	06-30-14
Florida	NELAP	4	E84282	06-30-14
Georgia	State Program	4	905	06-30-14
USDA	Federal		P330-11-00177	04-20-14

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

TestAmerica Tampa
5712 Benjamin Road Suite 100
Tampa, FL 33634
Phone (813) 885-7427 Fax (813) 885-7049

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler:	Lab PM: Robertson, Nancy	Carrier Tracking Hdqrs:	COC No: 660-62871-17183.1
Client Contact: Wendy Blondin	Phone:	E-Mail: nancy.robertson@testamericainc.com		Page: Page 1 of 1
Company: AMEC Environment & Infrastructure, Inc.				Job #:
Address: 5845 N.W. 158th Street	Due Date Requested:			
City: Miami Lakes	TAT Requested (days):			
State, Zip: FL, 33014				
Phone: 305-826-5588(Tel) 305-826-1799(Fax)	PO #: Purchase Order Requested			
Email: wendy.blondin@amec.com	WO #:			
Project Name: DEP Grant S0769	Project #: 66007246			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (Wastewater, Soil, Sediment, Oil, Tissue, Air)	8081A, 8082, 8151A, 8270C_LL, FL_PRO	8010B, 7471A	8010B, 7471A	8010B - SPLP Arsenic, Copper, Lead	TCLP	Special Instructions/Note:
Canal 266	12/18/13	1600		Solid				✓		
Canal 290	12/19/13	1320		Solid	✓	✓	✓	✓	✓	Hold for TCLP
new 1-7-14				Solid						
				Solid						

660-58314 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by: [signature]	Date: 12-11-2013	Time: 1040	Method of Shipment:		
Relinquished by: [signature]	Date/Time: 12/19/13 8:26PM	Company: [signature]	Received by: [signature]	Date/Time: 12/19/13 2026	Company: TA
Relinquished by:	Date/Time:	Company:	Received by: Carol McNulty	Date/Time: 12/20/13 0950	Company: TA Tampa
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: 0.7° C 4407

1/7/2014

Login Sample Receipt Checklist

Client: AMEC Environment & Infrastructure, Inc.

Job Number: 660-58314-1

Login Number: 58314
List Number: 1
Creator: McNulty, Carol

List Source: TestAmerica Tampa

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

APPENDIX E

HISTORICAL SEDIMENT CHEMICAL ANALYTICAL DATA

Historical Sediment
Chemical Analytical Results

						Sample ID	Canal #11	Canal #82	Canal #145	Canal #152	Canal #163	Canal #159	Canal #52	Canal #182	Canal # 206	Canal # 172
						Sampled By	M. Folks	M. Folks	M. Folks	M. Folks	M. Folks	M. Folks	M. Folks	M. Folks	M. Folks	M. Folks
						Sample Collection Date	3/19/2013	3/20/2013	4/13/2013	4/14/2013	4/24/2013	5/1/2013	5/10/2013	5/14/2013	5/16/2013	5/30/2013
						Sample Interval	1.5'	1.5'	1.5'	1.5'	1.5'	1.5'	1.5'	1.5'	1.5	1.5'
Parameter	Reporting Units	SQAGs for FL Coastal Waters TEL	SQAGs for FL Coastal Waters PEL	62-777 Table2 Soil Commercial Industrial Direct	62-777 Table2 Soil Leach Base GW Criteria	62-777 Table2 Soil Residential										
SVOMS SEMI VOA BY 8270C EL																
1-Methylnaphthalene	mg/Kg	-	-	1800	3.1	200	0.048 I	0.038U	0.0080U	0.0075U	0.019U	0.012U	0.022U	0.010U	0.0094U	0.0095U
2-Methylnaphthalene	mg/Kg	0.0201	0.201	2100	8.5	210	**0.062 I**	0.061U	0.013U	0.012U	0.030U	0.020U	0.036U	0.017U	0.015U	0.015U
Acenaphthene	mg/Kg	0.00671	0.0889	20000	2.1	2400	0.081U	0.17U	0.038U	0.034U	0.085U	0.056U	0.10U	0.047U	0.043U	0.043U
Acenaphthylene	mg/Kg	0.00587	0.128	20000	27	1800	0.020U	0.043U	0.0091U	0.0085U	0.021U	**0.016 I**	0.025U	0.012U	0.011U	0.011U
Anthracene	mg/Kg	0.0469	0.245	300000	2500	21000	0.017U	0.036U	0.0076U	0.0071U	0.018U	0.025	0.021U	0.0098U	0.0090U	0.0091U
Benzo(a)anthracene	mg/Kg	0.0748	0.693	#	0.8	#	0.016U	0.034U	0.0071U	0.0066U	0.017U	0.011U	0.020U	0.0091U	0.0083U	0.0085U
Benzo(a)pyrene	mg/Kg	0.0888	0.763	0.7	8	0.1	0.021U	0.045U	0.0094U	0.0088U	0.022U	0.023 I	0.026U	0.012U	0.011U	0.011U
Benzo(b)fluoranthene	mg/Kg	-	-	#	2.4	#	0.025U	0.052U	0.011U	0.010U	0.026U	0.041	0.031U	0.014U	0.013U	0.013U
Benzo(g,h,i)perylene	mg/Kg	-	-	52000	32000	2500	0.018U	0.038U	0.0080U	0.0075U	0.019U	0.012U	0.022U	0.010U	0.0094U	0.0095U
Benzo(k)fluoranthene	mg/Kg	-	-	#	24	#	0.015U	0.031U	0.0065U	0.0061U	0.015U	0.012 I	0.018U	0.0084U	0.0077U	0.0078U
Chrysene	mg/Kg	0.108	0.846	#	77	#	0.018U	0.039U	0.0082U	0.016	0.019U	0.013U	0.023U	0.011U	0.0096U	0.0098U
Dibenz(a,h)anthracene	mg/Kg	0.00622	0.135	#	0.7	#	0.017U	0.035U	0.0074U	0.0069U	0.017U	0.012U	0.021U	0.0096U	0.0087U	0.0089U
Fluoranthene	mg/Kg	0.113	1.494	59000	1200	3200	0.016U	0.034U	0.0073U	0.011 I	0.021 I	0.013 I	0.020U	0.0094U	0.0085U	0.0087U
Fluorene	mg/Kg	0.0212	0.144	33000	160	2800	0.017U	0.035U	0.0074U	0.0069U	0.017U	0.012U	0.021U	0.0096U	0.0087U	0.0089U
Indeno(1,2,3-cd)pyrene	mg/Kg	-	-	#	6.6	#	0.029U	0.061U	0.013U	0.012U	0.030U	0.020U	0.036U	0.017U	0.015U	0.015U
Naphthalene	mg/Kg	0.0346	0.391	300	1.2	55	0.016U	0.038U	0.0080U	0.0075U	**0.079 I**	0.023 I	**0.058 I**	0.010U	0.0094U	0.0095U
Phenanthrene	mg/Kg	0.0867	0.544	36000	250	2200	0.016U	0.034U	0.0071U	0.0066U	0.017U	0.027	0.04	0.0091U	0.0083U	0.0085U
Pyrene	mg/Kg	0.153	1.398	45000	880	2400	0.015U	0.032U	0.0067U	0.013 I	0.016U	0.022 I	0.028 I	0.0087U	0.0079U	0.0080U
BaP Equivalent	mg/Kg	-	-	0.7	-	0.1	NR	NR	NR	0.6	NR	0.0	NR	NR	NR	NR
GC SEMI VOA BY 8081A																
4,4'-DDD	mg/Kg	0.00122	0.00781	22	5.8	4.2	0.0018U	0.0039U	0.00081U	0.00078U	0.0019U	0.0013U	0.0023U	0.0011U J3	**0.0019 I**	0.0010U
4,4'-DDE	mg/Kg	0.00207	0.374	15	18	2.9	0.0014U	0.0030U	0.00063U	0.00061U	0.0015U	0.00096U	**0.0056 I**	0.00084U J3	**0.0096**	0.00078U
4,4'-DDT	mg/Kg	0.00119	0.00477	15	11	2.9	0.0018U	0.0039U J3	0.00081U	0.00078U	0.0019U	0.0013U	0.0023U	0.0011U J3	0.00096U	0.0010U
Aldrin	mg/Kg	ID	ID	0.3	0.2	0.06	0.0018U	0.0039U	0.00081U	0.00078U	0.0019U	0.0013U	0.0023U	0.0011U J3	0.00096U	0.0010U
alpha-BHC	mg/Kg	-	-	0.6	0.0003	0.1	0.0016U	0.0033U	0.00069U	0.00066U	0.0016U	0.0011U	0.0019U	0.00091U J3	0.00081U	0.00085U
beta-BHC	mg/Kg	-	-	2.4	0.001	0.5	0.0024U	0.0052U	0.0011U	0.0010U	0.0025U	0.0017U	0.0031U	0.0014U J3	0.0013U	0.0013U
Chlordane (technical)	mg/Kg	0.00226	0.00479	-	9.6	2.8	0.012U	0.026U	0.0054U	0.0052U	0.013U	0.0084U	0.015U	0.0072U	0.0064U	0.0067U
delta-BHC	mg/Kg	-	-	480	0.2	24	0.0024U	0.0052U	0.0011U	0.0010U	0.0025U	0.0017U	0.0031U	0.0014U J3	0.0013U	0.0013U
Dieldrin	mg/Kg	0.00072	0.0043	0.3	0.002	0.06	0.0018U	0.0039U	0.00081U	0.00078U	0.0019U	0.0013U	0.0023U	0.0011U J3	0.00096U	0.0010U
Endosulfan I	mg/Kg	ID	ID	-	-	-	0.0018U	0.0039U	0.00081U	0.00078U	0.0019U	0.0013U	0.0023U	0.0011U J3	0.00096U	0.0010U
Endosulfan II	mg/Kg	ID	ID	-	-	-	0.0027U	0.0056U	0.0012U	0.0011U	0.0028U	0.0018U	0.0033U	0.0016U J3	0.0014U	0.0014U
Endosulfan sulfate	mg/Kg	-	-	-	-	-	0.0029U	0.0061U	0.0013U	0.0012U	0.0030U	0.0020U	0.0036U	0.0017U J3	0.0015U	0.0016U
Endrin	mg/Kg	ID	ID	510	1	25	0.0029U	0.0061U	0.0013U	0.0012U	0.0030U	0.0020U	0.0036U	0.0017U J3	0.0015U	0.0016U
Endrin aldehyde	mg/Kg	-	-	-	-	-	0.0020U	0.0043U	0.00090U	0.00087U	0.0021U	0.0014U	0.0026U	0.0012U	0.0011U	0.0011U
Endrin ketone	mg/Kg	-	-	-	-	-	0.0020U	0.0043U	0.00090U	0.00087U	0.0021U	0.0014U	0.0026U	0.0012U J3	0.0011U	0.0011U
gamma-BHC (Lindane)	mg/Kg	0.00032	0.00099	2.6	0.009	0.7	0.0020U	0.0043U	0.00090U	0.00087U	0.0021U	0.0014U	0.0026U	0.0012U J3	0.0011U	0.0011U
Heptachlor	mg/Kg	ID	ID	1	23	0.2	0.0026U	0.0054U	0.0011U	0.0011U	0.0027U	0.0018U	0.0032U	0.0015U J3	0.0013U	0.0014U
Heptachlor epoxide	mg/Kg	ID	ID	0.5	0.6	0.1	0.0018U	0.0039U	0.00081U	0.00078U	0.0019U	0.0013U	0.0023U	0.0011U J3	0.00096U	0.0010U
Methoxychlor	mg/Kg	-	-	8900	160	420	0.0041U	0.0086U	0.0018U	0.0017U	0.0042U	0.0028U	0.0051U	0.0024U J3	0.0021U	0.0022U
Toxaphene	mg/Kg	ID	ID	4.5	31	0.9	0.12U	0.25U	0.052U	0.050U	0.12U	0.081U	0.15U	0.070U	0.062U	0.065U
GC SEMI VOA BY 8082																
PCB-1016	mg/Kg	****	****	-	-	-	0.049U	0.10U	0.022U	0.021U	0.051U	0.034U	0.031U	0.014U	0.013U	0.013U
PCB-1221	mg/Kg	****	****	-	-	-	0.029U	0.062U	0.013U	0.013U	0.031U	0.020U	0.019U	0.0087U	0.0077U	0.0080U
PCB-1232	mg/Kg	****	****	-	-	-	0.042U	0.088U	0.018U	0.018U	0.043U	0.029U	0.026U	0.012U	0.011U	0.011U
PCB-1242	mg/Kg	****	****	-	-	-	0.054U	0.11U	0.024U	0.023U	0.056U	0.037U	0.034U	0.016U	0.014U	0.015U
PCB-1248	mg/Kg	****	****	-	-	-	0.039U	0.083U	0.017U	0.017U	0.041U	0.027U	0.025U	0.012U	0.010U	0.011U
PCB-1254	mg/Kg	****	****	-	-	-	0.042U	0.088U	0.018U	0.018U	0.043U	0.029U	0.026U	0.012U	0.011U	0.011U
PCB-1260	mg/Kg	****	****	-	-	-	0.023U	0.048U	0.010U	0.0097U	0.024U	0.016U	0.027U	0.013U	0.011U	0.012U

Historical Sediment
Chemical Analytical Results

						Sample ID	Canal #33	Canal #82	Canal #145	Canal #152	Canal #157	Canal #198	Canal #260	Canal #262	Canal # 300	Canal # 372
						Sampled By	M. Folks	M. Folks	M. Folks	M. Folks	M. Folks	M. Folks	M. Folks	M. Folks	M. Folks	M. Folks
						Sample Collection Date	3/19/2013	3/22/2013	4/23/2013	4/24/2013	4/25/2013	5/3/2013	5/10/2013	5/10/2013	5/10/2013	5/15/2013
						Sample Interval	1.5'	1.5'	1.5'	1.5'	1.5'	1.5'	1.5'	1.5'	1.5'	1.5'
Parameter	Reporting Units	SQAGs for FL Coastal Waters TEL	SQAGs for FL Coastal Waters PEL	62-777 Table2 Soil Commercial Industrial Direct	62-777 Table2 Soil Leach Direct GW Criteria	62-777 Table2 Soil Residential										
GC SEMI VOA BY 8151A																
2,4,5-T	mg/Kg	-	-	9500	0.4	690	0.041U	0.085U	0.019U	0.017U	0.043U	0.028U	0.052U	0.024U	0.021U	0.022U
2,4-D	mg/Kg	-	-	13000	0.7	770	0.0065U	0.014U	0.0030U	0.0028U	0.0068U	0.0045U	0.0083U	0.0039U	0.0034U	0.0036U
2,4-DB	mg/Kg	-	-	-	-	-	0.026U J3	0.055U	0.31	0.13	0.027U	0.018U	0.033U	0.016U	0.014U	0.014U
Dalapon	mg/Kg	-	-	-	-	-	0.094U	0.20U	0.043U	0.040U	0.096U	0.065U	0.12U	0.056U	0.049U	0.051U
Dicamba	mg/Kg	-	-	40000	2.6	2300	0.049U	0.10U	0.022U	0.021U	0.051U	0.034U	0.062U	0.029U	0.025U	0.027U
Dichlorprop	mg/Kg	-	-	5600	0.3	370	0.10U	0.21U	0.046U	0.043U	0.11U	0.070U	0.13U	0.061U	0.053U	0.056U
Dinoseb	mg/Kg	-	-	840	0.03	65	0.034U	0.071U	0.015U	0.014U	0.035U	0.023U J3	0.043U	0.020U	0.018U	0.019U
MCPA	mg/Kg	-	-	500	0.02	35	3.0U	6.3U	1.4U	1.3U	3.1U	2.1U	3.8U	1.8U	1.6U	1.7U
MCPP	mg/Kg	-	-	800	0.03	64	1.6U	3.4U	0.74U	0.69U	1.7U	1.1U	2.1U	0.97U	0.85U	0.89U
Pentachlorophenol	mg/Kg	ID	ID	28	0.03	7.2	0.020U	0.043U	0.0093U	0.0086U	0.021U	0.014U	0.026U	0.012U	0.011U	0.011U
Picloram	mg/Kg	-	-	-	-	-	0.0049U	0.010U	0.0022U	0.0021U	0.0051U	0.0034U J3	0.0062U	0.0029U	0.0025U	0.0027U
Silvex (2,4,5-TP)	mg/Kg	-	-	14000	5.4	680	0.041U	0.085U	0.019U	0.017U	0.043U	0.028U	0.052U	0.024U	0.021U	0.022U
GC SEMI VOA BY FL-PRO																
Total Petroleum Hydrocarbons (C8-C40)	mg/Kg	-	-	2700	340	460	39 I	120	9.2U	43	28 I	61	130	12U	11U	18 I
METALS BY 6010B																
Arsenic	mg/Kg	7.24	41.6	12	***	2.1	4.7	**11** [illegible]	2.2	5.7	3.5	5.7	2.0 I	2.7	1.0 I	1.4
Barium	mg/Kg	-	-	130000	1600	120	20	18	8.3	9.2	14	9.2	8.7	7.8	5.8	10
Cadmium	mg/Kg	0.676	4.21	1700	7.5	82	0.39 I	**0.86 I**	0.19 I	0.21 I	**0.75 I**	0.43 I	**1.3 I**	0.34 I	0.35 I	0.19U
Chromium	mg/Kg	52.3	160	470	38	210	16	22	8.4	20	14	11	7.8	4.5	2.6	4.7
Copper	mg/Kg	18.7	108	89000	***	150	**54**	**170** [illegible]	7.6	**25**	**59**	**56**	**40**	**35**	8.9	4.9
Lead	mg/Kg	30.2	112	1400	***	400	14	16	1.6	17	12	9.1	16	3.1	4.5	1.2
Selenium	mg/Kg	-	-	11000	5.2	440	1.6 I	3.3U	0.68U	0.64U	1.6U	1.0U	2.0U	0.91U	0.78U	0.80U
Silver	mg/Kg	0.733	1.77	8200	17	410	0.78U	1.7U	0.35U	0.33U	0.84U	0.52U	1.0U	0.47U	0.40U	0.41U
METALS BY 7471A																
Mercury	mg/Kg	0.13	0.696	17	2.1	3	0.047U	0.10U	0.041 I	0.051	0.068 I	0.051 I	0.056U	0.029U	0.024U	0.024U
GENERAL CHEMISTRY BY MOISTURE																
Percent Moisture	%	-	-	-	-	-	75	88	46	42	76	64	81	59	53	55

Notes:

Residential Direct Exposure SCTL exceedance

TEL - Toxic Effect Concentration

PEL - Probable effect level

SQAGs - Numerical Sediment Quality Assessment Guidelines

Bold indicates TEL exceedance

Bold with PEL Exc label = PEL exceedance

mg/Kg - milligrams per kilogram

I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

J3 - Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.

U - Indicates that the compound was analyzed for but not detected.

* Contaminant is not a health concern for this exposure scenario.

** Direct exposure based on acute toxicity considerations

*** Leachability values may be derived using the SPLP Test to calculate site-specific SCTLs or may be determined using TCLP in the event oily wastes are present.

= Site concentrations for carcinogenic polycyclic aromatic hydrocarbons must be converted to Benzo(a)pyrene equivalents before comparison with the appropriate direct exposure SCTL for Benzo(a)pyrene using the approach described in the February 2005 'Final Technical Report: Development of Cleanup Target Levels (CTLs) for Chapter 62-777, F.A.C.'

ID - insufficient data to derive sediment quality assessment guidelines

**** - Total PCB TEC = 0.0216 mg/kg and PEC = 0.189 mg/kg

- not listed in the SQAG guidelines or SCTL tables

NR - not required

APPENDIX F

DEWATERING TRIAL PERFORMANCE POLYMER TEST RESULTS

DEWATERING TRIAL PERFORMANCE
AMEC ENVIRONMENT & INFRASTRUCTURE
CORAL # 266 AND #290 BOTTOM SEDIMENT SAMPLES
BIG PINE KEY, FL

Samples provided by:
AMEC Environment & Infrastructure

For:
AMEC Environment & Infrastructure

By:
WaterSolve, LLC
5031 68th St. SE
Caledonia, MI 49316
www.gowatersolve.com
616-575-8693

WaterSolve LLC

January 15, 2014

1. Scope of Work

WaterSolve, LLC was tasked to perform a Geotube® dewatering performance trial and Rapid Dewatering Test (RDT) on residual and water samples from two coral bottoms in Big Pine Key, FL. The objectives of these dewatering trials were to identify chemical conditioning program(s), identify polymer flocculent(s), and dosing rate(s) for a potential Geotube® dewatering application. The objectives of subsequent RDTs were to measure total solids (TS) of the flocculated, contained, and dewatered residual after passage through a GT500D Geotube® filter.

2. Materials & Methods

Several sludge and water samples from the Coral bottom 266 & 290 samples were received at WaterSolve's Laboratory (Caledonia, MI) on January 3rd and 10th 2014. Samples of residual were diluted with water from the coral bottom, homogenized, and 150-mL samples were placed in graduated, glass jars.

Several coagulants and polymers (emulsions) were "made-down" (200-mL) at a 0.5% concentration for this dewatering trial. Coagulant (0.5 to 1.5-mL - 16 to 50-ppm) and polymer (0.5 to 1.5-mL; 17 to 50-ppm) were added to a sample with a 1-mL plastic syringe and moderately tumbled five to seven times. Observations of water release rate, water clarity, and flocculent appearance were recorded on appropriate data sheets (Appendix A). Polymer(s) that flocculated and dewatered these residuals most effectively were re-evaluated with lower doses in order to isolate the most efficient dewatering and flocculating polymer(s).

Percent total solids (dry weight) of the initial residual samples and dewatered cake samples (captured on GT500D Geotube® filters) were measured according to U.S. EPA Method 160.3 (ASTM D2216).

3.1 Results – Big Pine Key Coral 266

Chemical conditioning with a dual polymer system of Solve 426 followed by Solve 164 was determined to flocculate and dewater the residual most effectively compared to the other products (Appendix A). Water release volume and flocculent appearance were good to excellent at a 1.5-mL (50-ppm/ 0.83-lbs per dry ton) dose of Solve 426 followed by a 0.5–ml (17-ppm/.28-lbs per dry ton) dose of Solve 164 per 150-ml diluted sample.

The provided sample was 6.8-percent dry weight solids. After passing a 900-mL diluted and conditioned sample through a GT500D Geotube® filter, percent solids increased to 9.5-percent after sixty minutes of drying time. From this 900-mL diluted and conditioned sample,150 -mL and 700-mL of water was released in one minute and sixty minutes, respectively, after passage through the filter. Turbidity on the filtrate was 12.0–NTU's. See Appendix A-1

3.2 Results – Big Pine Key Coral 290

Chemical conditioning with a dual polymer system of Solve 426 followed by Solve 164 was determined to flocculate and dewater the residual most effectively compared to the other products (Appendix A). Water release volume and flocculent appearance were good to excellent

at a 1.5-mL (50-ppm/1.6-lbs per dry ton) dose of Solve 426 followed by a 0.5–ml (17-ppm/0.6-lbs per dry ton) dose of Solve 164 per 150-ml diluted sample.

The provided sample was 8.1-percent dry weight solids. After passing a 900-mL diluted and conditioned sample through a GT500D Geotube® filter, percent solids increased to 12-percent after sixty minutes of drying time. From this 900-mL diluted and conditioned sample, -mL and -mL of water was released in one minute and sixty minutes, respectively, after passage through the filter. Turbidity on the filtrate was 7.0–NTU's. See Appendix A-1

4. Recommendations for Big Pine Key Coral 266 and 290

We recommend a dual product application Solve 426 coagulant followed by Solve 164 flocculent for dewatering the residuals in a Geotube® application in order to pass a paint filter test for subsequent disposal. Additional evaluation is recommended for determining optimal inline percent solids thresholds for Geotube® performance including filtrate release and solids consolidation over time. Moderate mixing energy is required between the polymer introduction points and the Geotube® containers (e.g., one to two bends in the discharge line and/or inline static mixers).

Expected time to being able pass a Paint Filter Test is unpredictable in a Geotube® container from these bench-scale experiments. An onsite or laboratory hanging bag or Geotube® dewatering trial (GDT) may be used and is recommended if the timeline for achieving project goals of dry weight solids and if Geotube® filtrate characteristics are in question for this application. Additional dewatering evaluations over time are recommended if project objectives for consolidation are greater than passing a Paint Filter Test.

Please note, while a composite sample may give us an indication of an average treatment scenario, it does not indicate pockets of concern for treatment effectiveness or areas that may require a higher or lower dose of chemistry, or contain higher insitu solids, since the areas of concern may be masked by factors of dilution from other areas.

Due to potential variability of the material, daily on-site testing and chemical conditioning verifications are recommended during pumping operations.

Photographs:

One hundred fifty milliliters of the test dilution from canal 290 treated with Solve 426 (1.5-mL) followed by Solve 164 (0.5-mL) shown on the left. Cake and filtrate after filtering through GT500 fabric shown on the right.

Appendix A-1 Dewatering Trial

Page 1 of 1

WaterSolve, LLC

Clearly thinking about your water treatment

DEWATERING TRIAL PERFORMANCE

Date: 1/7/18
Analyst: PCW

Customer: AMEC
Location: BIG PINES KEY, FL CANAL 780
Equipment in Service: GESTURE

1=Best 6=Worst

Jar Number	Polymer Name	Polymer Dosage Pump Setting	Sludge Feed Rate	Water Ret. Rate (1-6)	Water Clarity (1-6)	Floc Appearance (1-6)	Cake Appearance (1-6)	Comments

Polymer make-down concentration = 0.5 %
Dilution of test sample = 1:1 SAMPLE: PROVIDED WATER

1	164	0.5mL	150mL	5	5	5		
2	164	1.0mL	150mL	5	5	5		
3	164	1.5mL	150mL	5	5	5		
4	164	2.0mL	150mL	5	5	5		
5	426/164	1.0mL/0.5mL	150mL	2-3	2	2		
6	426/164	0.5mL/0.5mL	150mL	4	4	4		
7	426/164	1.5mL/0.5mL	150mL	2	1-2	1-2		
8	426/164	1.5mL/1.0mL	150mL	2	1-2	2-3		
9								
10	426/164	1.5mL/1.0mL	150mL	2	1-2	1-2		[illegible]
11								[illegible]
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								

CONE TEST 900 mL TEST DILUTION TREATED WITH 9.0mL 426 FOLLOWED BY 3mL 164
FILTRATE @ 1min 125 mL @ 60min 460 mL

Additional testing was performed on the 13th and the 14th of January

Page 1c of 3

WaterSolve, LLC

Clearly thinking about your water treatment

DEWATERING TRIAL PERFORMANCE

Date: 1/13/19
Analyst: DWL

Customer: AMEL
Location: BG FUE KEY WEST, FL
Equipment in Service:

1=Best 6=Worst

Jar Number	Polymer Name	Polymer Dosage Pump Setting	Sludge Feed Rate	Water Rel. Rate (1-6)	Water Clarity (1-6)	Floc Appearance (1-6)	Cake Appearance (1-6)	Comments
	Polymer make-down concentration = 0.5 %							
	Dilution of test sample = 1:2 (Sample/make down)					2b 2b (0-2)		
1								
2	4126/164	1.5mL/0.9mL	150mL	2-3	1-2	2-3		
3	4126/164	2mL/1mL	150mL	2-3	1-2	2-3		
4	4126/164	1mL/1mL	150mL	2	1-2	2		
5	4126/164	2mL/2mL	150mL	1-2	1-2	2-3		
6	137	2mL	150mL	1-2	1-2	1-2		
7	CLEAR	2mL OLD	FED 1:1					
8								
9	4126/164	1.5mL/0.5mL	150mL	2	2	2		
10								
11	CLEAR	2mL OLD	FED 1:2					
12	4126/164	1.5mL/0.5mL	150mL	3	2	2		
13								
14	4126/180	1.5mL/0.5mL	150mL					
15	4126/180	1.5mL/0.5mL	150mL					
16	4126/163	1.5mL/0.5mL	150mL					
17	4126/180	1.5mL/0.5mL	150mL					
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								

WaterSolve, LLC

Clearly thinking about your water treatment!

DEWATERING TRIAL PERFORMANCE

Date: 8/14/14
Analyst: MF/DW

Customer: AMBC
Location:
Equipment in Service: CENTRIFE

1=Best 6=Worst

Jar Number	Polymer Name	Polymer Dosage Pump Setting	Sludge Feed Rate	Water Rel. Rate (1-6)	Water Clarity (1-6)	Floc Appearance (1-6)	Cake Appearance (1-6)	Comments
	Polymer make-down concentration = _____%							
	Dilution of test sample =		2/1	BRACKIN 4 / RAM				
1	426/154	7mL/1mL	15 mL	4	4	4		
2	426/23WA	5mL/1mL	11	4	4	4		
3	426/183	7mL/1mL	11	4	4	4		
4								
5								
6	137	1.5mL	11	1-2	2	1-2		
7	9342	1.5mL	11	2	2	2		
8	2168	1.5mL	11	1-2	2	1-2		
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								

Total Solids Determination
Percent Dry Weight

Customer Name/Application AMEC / BIG PINE KEY, FL

Date 1/7/14 Technician DCW Oven Temperature 105°C

Sample ID RAW Dish Number 1 Dilution Ø

Dish (dry) = 50.313 g Dish, Sample (wet) = 128.370 g Dish, Sample (dry) = 56.629 g

Dish, sample (wet) – Dish (dry) = 78.057 (A) Dish, sample (dry) – Dish (dry) = 6.316 (B)

Total Solids B ÷ A x 100 = 8.1 % Dry Weight Solids

Sample ID TEST DILUTION Dish Number 2 Dilution 1:1

Dish (dry) = 49.706 g Dish, Sample (wet) = 129.884 g Dish, Sample (dry) = 54.509 g

Dish, sample (wet) – Dish (dry) = 80.178 (A) Dish, sample (dry) – Dish (dry) = 4.803 (B)

Total Solids B ÷ A x 100 = 6.0 % Dry Weight Solids

Sample ID RDT MAKE Dish Number 3 Dilution Ø

Dish (dry) = 50.729 g Dish, Sample (wet) = 139.901 g Dish, Sample (dry) = 61.465 g

Dish, sample (wet) – Dish (dry) = 89.172 (A) Dish, sample (dry) – Dish (dry) = 10.736 (B)

Total Solids B ÷ A x 100 = 12.0 % Dry Weight Solids

DISSOLVED SOLIDS

Sample ID RDT FILTRATE Dish Number 4 Dilution Ø

Dish (dry) = 48.591 g Dish, Sample (wet) = 123.174 g Dish, Sample (dry) = 51.542 g

Dish, sample (wet) – Dish (dry) = 74.583 (A) Dish, sample (dry) – Dish (dry) = 2.951 (B)

Total Solids B ÷ A x 100 = 4.0 % Dry Weight Solids

Total Solids Determination - Percent Dry Weight

Customer Name/Application AMEC / BIG PINE KEY / 266

Date 1/14/14 Technician MB/CW Oven Temperature 105 °C

Sample ID 266 RAW Dish Number 1 Dilution Ø

Dish (dry) = 49.899 g Dish, Sample (wet) = 125.368 g Dish, Sample (dry) = 55.02 g

Dish, sample (wet) – Dish (dry) = 75.469 (A) Dish, sample (dry) – Dish (dry) = 5.121 (B)

Total Solids B ÷ A x 100 = 6.8 % Dry Weight Solids

Sample ID 266 DILUTION Dish Number 2 Dilution 1:2 SEDIMATE

Dish (dry) = 51.596 g Dish, Sample (wet) = 114.515 g Dish, Sample (dry) = 54.66 g

Dish, sample (wet) – Dish (dry) = 62.919 (A) Dish, sample (dry) – Dish (dry) = 3.064 (B)

Total Solids B ÷ A x 100 = 4.9 % Dry Weight Solids

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290 Sample ID 290 DILUTION Dish Number 3 Dilution 1:4

Dish (dry) = 51.421 g Dish, Sample (wet) = 129.720 g Dish, Sample (dry) = 55.41 g

Dish, sample (wet) – Dish (dry) = 78.299 (A) Dish, sample (dry) – Dish (dry) = 3.989 (B)

Total Solids B ÷ A x 100 = 5.1 % Dry Weight Solids

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290 Sample ID 290 DILUTION CAKE 266 Dish Number 4 Dilution Ø

Dish (dry) = 46.701 g Dish, Sample (wet) = 125.536 g Dish, Sample (dry) = 54.20 g

Dish, sample (wet) – Dish (dry) = 78.835 (A) Dish, sample (dry) – Dish (dry) = 7.499 (B)

Total Solids B ÷ A x 100 = 9.5 % Dry Weight Solids

Sample ID _____ Dish Number _____ Dilution _____

Dish (dry) = _____ g Dish, Sample (wet) = _____ g Dish, Sample (dry) = _____ g

Dish, sample (wet) – Dish (dry) = _____ (A) Dish, sample (dry) – Dish (dry) = _____ (B)

Total Solids B ÷ A x 100 = _____ % Dry Weight Solids

Organic Cationic Coagulant
Solve 426

Material Safety Data Sheet

Date Issued: 12/14/2012
Date Revised: 12/14/2012

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **SOLVE 426**
CHEMICAL TYPE: Cationic polyamine
Molecular Formula: Mixture
COMPANY: WaterSolve, LLC, 5031 68th Street, Caledonia, Michigan 49316, USA
For Product information call 616-575-8693.

For Chemical Emergency Spill, Leak, Fire, Exposure, or Accident
Call CHEMTREC Day or Night
Within USA and Canada: 1-800-424-9300
Outside USA and Canada: +1 703-527-3887 (collect calls accepted)

2. COMPOSITION/INFORMATION ON INGREDIENTS

OSHA Regulated Components
No Permissible Exposure Limits (PEL/TLV) have been established by OSHA or ACGIH.

3. HAZARDS IDENTIFICATION

Emergency Overview
Appearance and odor: **Colorless to amber liquid, slight amine type odor.**
Statement of Hazard: **Caution! May cause skin and eye irritation**
Important! Spills of this product are very slippery when wet.

Potential Health effects
Effects of exposure:
The 4-hour inhalation (rat) LC50 value is estimated to be >2,500 ppm. The acute oral (rat) LD50 and dermal (rabbit) LD50 values are 6,160 mg/kg and >10,000 mg/kg, respectively. Direct contact with this material may cause mild eye and skin irritation.

4. FIRST AID MEASURES

Ingestion:
If swallowed, call a physician immediately. Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person.

Skin Contact:
Wash immediately with plenty of water and soap.

Eye Contact:
Rinse immediately with plenty of water for at least 15 minutes.

Inhalation:
Material is not expected to be harmful if inhaled. Remove to fresh air.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media:
Use water spray, carbon dioxide or dry chemical.

Protective Equipment:
Firefighters, and others exposed, wear self-contained breathing apparatus.

Special Hazards:
Keep containers cool by spraying with water if exposed to fire.

Mechanical/Static Sensitivity Statements:
None

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:
Where exposure level is not known, wear approved, positive pressure, self-contained respirator. Where exposure level is known, wear approved respirator suitable for level of exposure. In addition to the protective clothing/equipment in Section 8 (Exposure Controls/Personal Protection), wear impermeable boots.

Methods For Cleaning Up:
Products may cause a slip hazard. Spilled material should be absorbed onto an inert material and scooped up. Flush spill area thoroughly with water and scrub to remove residue. If slipperiness remains apply more dry-sweeping compound.

7. HANDLING AND STORAGE

HANDLING
Precautionary Measures: Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Spills should be scooped up or wiped up immediately, and the spill area flushed with water.
Special Handling Statements: None

STORAGE
To avoid product degradation and equipment corrosion, do not use iron, copper or aluminum containers or equipment.
Store temperature: Room temperature
Reason: Integrity

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures:
Engineering controls are not usually necessary if good hygiene practices are followed.

Respiratory Protection:
For operations where inhalation exposure can occur, use an approved respirator recommended by an industrial hygienist after an evaluation of the operation. Where inhalation exposure cannot occur, no respiratory protection is required.

Eye Protection:
Wear eye/face protection such as chemical splash proof goggles or face shield.

Skin Protection:
Avoid skin contact. Wear impermeable gloves.

Additional Advice:
Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor:	Colorless to amber liquid, amine type odor
Boiling Point:	220°F; 104°C
Melting Point:	-18°C, 0°F
Vapor Pressure:	Not applicable
Specific Gravity/Density:	1.1- 1.2
Vapor Density:	Not applicable
% Volatile (By Wt):	50 (water)
pH:	4-7
Saturation in Air (% by Vol):	Not applicable
Evaporation Rate:	Not applicable
Solubility in Water:	Complete
Volatile Organic Content:	Not available
Flammable Properties	
Flash point:	Not detectable FP exceeds boiling point >220° F
(Flammable Limits (% by vol):	Not applicable
Autoignition temp:	Not available
Decomposition temp:	Not available
Partition Coefficient:	Not applicable
Odor threshold:	Not available

10. STABILITY AND REACTIVITY

Stability:	Stable
Conditions to avoid:	None known
Polymerization:	Will not occur
Conditions to Avoid:	None known
Incompatible Materials:	Avoid aluminum, iron and copper. Strong oxidizers, acids.
Hazardous Decomposition Products:	Carbon monoxide Carbon dioxide Ammonia Oxides of nitrogen Hydrogen chloride Dimethylamine

11. TOXICOLOGICAL INFORMATION

Toxicological information for the product is found under Section 3.
Toxicological information on the OSHA regulated components of this product is as follows:

This product contains no OSHA regulated (hazardous) components.
This product contains no WHMIS regulated (hazardous) components.

California Proposition 65 Warning (applicable in California only)-This product contains (a) chemical(s) known to the State of California to cause cancer and birth defects or other reproductive harm.

12. ECOLOGICAL INFORMATION

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Data for Green Algae, Zebra Fish, and Water Flea were the result of tests conducted on a structurally similar product. Data for Fathead Minnow and Water Flea, LC 50 were run using the actual product in laboratory water.

Algae Test Results
Test: Growth Inhibition (OECD 201)
Duration: 72 h
Species: Green Algae (*Selenastrum capricornutum*)
IC50: >10-100 mg/L

Information based on a structurally and compositionally similar material. Environmentally representative water.

Fish Test Results
Test: Acute toxicity, freshwater (OECD 203)
Duration: 96 h
Species: Zebra fish (*Brachydanio rerio*)
LC50: >10-100 mg/L

Information based on a structurally and compositionally similar material. Environmentally representative water.

Duration: 96 hr
Species: Fathead Minnow (Pimephales promelas)
0.393 mg/l LC50

Actual product tested. Laboratory water.

Invertebrate Test Results
Test: Acute Immobilization (OECD 202)
Duration: 48 h
Species: Water flea (*Daphnia magna*)
EC50: >10-100 mg/L

Information based on a structurally and compositionally similar material. Environmentally representative water.

Duration: 48 hr
Species: Water flea (*Daphnia magna*)
0.949 mg/l LC50

Actual product tested. Laboratory water.

Degradation:
Test: CO2 Evolution: Modified Sturm (OECD 301B)
Duration: 28 day
<70%
Procedure: Ready biodegradability
The large polymer size is incompatible with transport across biological membranes and diffusion; the bioconcentration factor is therefore considered to be zero. This material is not readily biodegradable (OECD 301B). Information based on a structurally and compositionally similar material.

13. DISPOSAL CONSIDERATIONS

The information on RCRA waste classification and disposal methodology provided below applies only to the product, as supplied. If the material has been altered or contaminated, or it has exceeded its recommended shelf life, the guidance may be inapplicable. Hazardous waste classification under federal regulations (40 CFR Part 261 et seq) is dependent upon whether a material is a RCRA "listed hazardous waste" or has any of the four RCRA "hazardous waste characteristics." Refer to 40 CFR Part 261.33 to determine if a given material to be disposed of is a RCRA "listed hazardous waste"; information contained in Section 15 of this MSDS is not intended to indicated if the product is a "listed hazardous waste." RCRA Hazardous Waste Characteristic. There are four characteristics defined in 40 CFR Section 261.21-61.24: Ignitability, Corrosivity, Reactivity, and Toxicity. To determine Ignitability, See Section 9 of this MSDS (flash point). For Corrosivity, see sections 9 and 14 (pH and DOT corrosivity). For Reactivity, see Section 10 (incompatible materials). For Toxicity, see Section 2 (composition). Federal regulations are subjected to change. State and local requirements, which may differ from or be more stringent than the federal regulations, may also apply to the classification of this material if it is to be disposed. The company encourages the recycle, recovery and reuse of materials, where permitted, as an alternate to disposal as a waste. The company recommends that organic materials classified as RCRA hazardous wastes to be disposed of by thermal treatment or incineration at EPA approved facilities. The company has provided the foregoing for information only; the person generating the waste is responsible for determining the waste classification and disposal method.

14. TRANSPORT INFORMATION

This section provides basic shipping classification information. Refer to appropriate transportation regulations for specific requirements.

USDOT

Proper Shipping Name: Not applicable/Not regulated
Hazardous Substances: Not applicable

TRANSPORT CANADA

Proper Shipping Name: Not applicable/Not regulated

ICAO/IATA

Proper Shipping name: Not applicable/Not regulated
Packing instructions/maximum net quantity per package:
Passenger Aircraft:
Cargo Aircraft:

IMO

Proper shipping name: Not applicable/Not regulated

15. REGULATORY INFORMATION

INVENTORY INFORMATION

USA : All components of this product are included on the TSCA Chemical Inventory in compliance with the Toxic Substances Control Act, 15 U.S.C. 2601 et. seq.

Canada: Components of this product have been reported to Environment Canada in accordance with Sections 66 and/or 81 of the Canadian Environmental Protection Act (1999), and are included on the Domestic Substances List.

European Union (EU): All components of this product are included on the European Inventory of Existing Chemical Substances (EINECS) in compliance with Council Directive 67/548/EEC and its amendments. or are not required to be listed on EINECS.

Australia: All components of this product are included in the Australian Inventory of Chemical Substances(AICA).

China: All components of this product are included on the Chinese inventory or are not required to be listed on the Chinese Inventory.

Japan: All components of this product are included on the Japanese (ENCS) inventory or are not required to be listed on the Japanese Inventory.

Korea: All components of this product are included on the Korean (ECL) inventory or are not required to be listed on the Korean inventory

Philippines: All components of this product are included on the Philippine (PICCS) inventory or are not required to be listed on the Philippine inventory.

OTHER ENVIRONMENTAL INFORMATION

The following components of this product may be subject to reporting requirements pursuant to Section 313 of CERCLA (40 CFR 372), Section 12(b) of TSCA, or may be subject to release reporting requirements (40 CFR 307, 40 CFR 311, etc.) See Section 13 for information on waste classification and waste disposal of this product. This product does not contain any components regulated under sections of the EPA.

Product Classification under section 311 of SARA
Not applicable

16. OTHER INFORMATION

NFPA HAZARD RATING (National Fire Protection Association)

Health 1- Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

Fire 1 – Materials that must be preheated before ignition can occur.

Reactivity 0 –Materials that in themselves are normally stable, even under fire exposure conditions.

REASON FOR ISSUE: New Format

Reasonable care has been taken in the preparation of this information, but the manufacturer makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The manufacturer makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. This information is for the specific material described only and may not be valid if the material is used in combination with any other materials or in any process. The user is responsible to determine the completeness of the information and suitability for the user's own particular use. The knowledge and belief of the company, the information is accurate and reliable as of the date indicated but the company makes no express or implied warranty of merchantability for the material or the information. The company makes no express or implied warranty of fitness for a purpose for the material or for the information. Users of any chemical should educate themselves on all aspects of its use by independent investigation of current scientific and medical knowledge that the material can be used safely.

Organic Anionic Emulsion
Solve 164

Material Safety Data Sheet

Date Issued: 08/12/2013
Date Revised: 08/12/2013

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **SOLVE 164**
CHEMICAL FAMILY: Anionic polyacrylamide
Molecular Formula: Mixture
COMPANY: WaterSolve, LLC, 5031 68th Street, Caledonia, Michigan 49316, USA
For Product information call 616-575-8693.

For Chemical Emergency Spill, Leak, Fire, Exposure, or Accident
Call CHEMTREC Day or Night
Within USA and Canada: 1-800-424-9300
Outside USA and Canada: +1 703-527-3887 (collect calls accepted)

2. COMPOSITION/INFORMATION ON INGREDIENTS

OSHA Regulated Components

Component	CAS NO. %	OSHA (pel)	AGGIH (TLV)	Carcinogen
Petroleum distillate Hydrotreated light	064742-47-8 22-25			-
Product contains one or more of the following residual acrylates at a maximum total concentration of :	<0.05			-
Alcohols (C12-16), ethoxylated	68551-12-2 0-3.6	Not established	Not established	-
Alcohols (C10-16), ethoxylated	68002-97-1 0-3.6	Not established	Not established	-
Alcohols (C12-14), ethoxylated	68439-50-90-3.6	Not established	Not established	-

3. HAZARDS IDENTIFICATION

Emergency Overview

Appearance and odor: colorless to light straw, clear to slightly hazy liquid, petroleum distillate
Statement of Hazard: WARNING! **Causes Skin Irritation; May cause Eye Irritation**

Potential Health effects

Effects of overexposure:
Direct contact with this material may cause moderate skin and mild eye irritation . Refer to Section 11 for toxicology information on the regulated components of this product. Over exposure to vapor may cause respiratory tract irritation and central nervous system depression. The estimated acute oral (rat) LD50, acute dermal (rabbit) LD50 and 4-hour inhalation (rat) LC50 values for this material are >5000mg/kg , >2000 mg/kg and >20 mg/L respectively.

4. FIRST AID MEASURES

Ingestion:
If swallowed, call a physician immediately. Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person.
Skin Contact:
Remove contaminated clothing and shoes without delay. Wash immediately with plenty of water. Do not reuse contaminated clothing without laundering. Get medical attention if pain of irritation persists after washing or if signs and symptoms of overexposure appear.

Eye Contact:
Eyewash equipment and safety shower should be provided in areas of potential exposure. Rinse immediately with plenty of water for at least 15 minutes. Wear eye/face protection such as chemical splash proof goggles or face shield.

Inhalation:
Remove to fresh air. If breathing is difficult, give oxygen. Obtain medical advice if there are persistent symptoms

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media:
Use water spray, fog, carbon dioxide or dry chemical.

Protective Equipment:
Firefighters, and others exposed, wear self-contained breathing apparatus. Wear full firefighting protective clothing. See MSDS Section 8 (exposure Controls/Personal Protection)

Special Hazards:
Keep containers cool by spraying with water if exposed to fire.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:
Where exposure level is not known, wear NIOSH approved, positive pressure, self-contained respirator. Where exposure level is known, wear NIOSH approved respirator suitable for level of exposure. In addition to the protective clothing/equipment in Section 8, wear impermeable boots.

Methods For Cleaning Up:
Products may cause a slip hazard. Spilled material should be absorbed onto an inert material and scooped up. Flush spill area with water. If slipperiness remains apply more dry-sweeping compound.

7. HANDLING AND STORAGE

Handling
Precautionary Measures: Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.
Special Handling Statements: None

STORAGE
To avoid product degradation and equipment corrosion, do not use iron, copper or aluminum containers or equipment. Flashpoint determinations on materials of this type are required by certain regulations and scientific standards to be performed using a Pensky-Martens type closed cup test method. This method indicates a flash point greater than 93.3C (200F). Although there was no flashpoint detected below 93.3C (200F) by the Pensky-Martens Closed Tester method, some flammable vapors were evolved during the test as evidenced by the enlargement for the test flame; therefore, caution should be excised during storage and handling.
Storage Temperature: Store at < 32° C 90° F Reason: Integrity

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures: Where this material is not used in a closed system, good enclosure and local exhaust ventilation should be provided to control exposure.

Respiratory Protection: Where exposures are below the established exposure limit, no respiratory protection is required. Where exposures exceed the established exposure limit, use respiratory protection recommended for the material and level of exposure.

Eye Protection: Wear eye/face protection such as chemical splash proof goggles or face shield. Eyewash equipment and safety shower should be provided in areas of potential exposure.

Skin Protection: Avoid skin contact. Wear impermeable gloves and suitable protective clothing.

Additional Advice: Food, beverages and tobacco products should not be carried, stored or consumed where this material is in use. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	colorless to light straw, clear to slightly hazy liquid
Odor:	petroleum distillate odor
Boiling Point:	Similar to water
Melting Point:	Not available
Vapor Pressure:	Not available
Specific Gravity:	1.03 – 1.06
Vapor Density:	Similar to water
% Volatile (By Wt):	56 - 62
pH:	6 – 8
Saturation in Air (% by Vol):	Not applicable
Evaporation Rate:	Not available
Solubility in Water:	Limited by viscosity
Volatile Organic Content:	~23-27 % (g/g)
Flash point:	>102°C 215°F closed cup
Flammable Limits (% by vol):	Not available
Autoignition temp:	Not available
Decomposition temp:	Not available
Odor Threshold	Not available
Partition coefficient (n-octanol/water)	Not available

10. STABILITY AND REACTIVITY

Stability:	Stable
Conditions to avoid:	None known
Polymerization:	Will not occur
Conditions to Avoid:	None known
Incompatible Materials:	No specific incompatibility
Hazardous Decomposition Products:	Oxides of nitrogen oxides of sulfur (includes sulfur di and tri oxides) Carbon dioxide Carbon monoxide Ammonia

11. TOXICOLOGICAL INFORMATION

Toxicological information for the product is found under Section 3.
Toxicological information on the OSHA regulated components of this product is as follows:

Ethoxylated Oley amine toxicological properties have not been fully investigated. It is reported to have an oral (rat) LD50 value of 1500 mg/kg. It is also reported to be severely irritating to eyes and moderately irritating to the skin.

Petroleum distillates, hydrotreated light(CAS#64742-47-8) has acute oral (rat) and dermal (rabbit) LD50 values of >5 g/kg and >3.16 g/kg, respectively. Prolonged or repeated skin contact tends to remove skin oils, possibly leading to irritation and dermatitis. Direct contact may cause eye irritation. Overexposure to high vapor concentrations, >~700 ppm, are irritating to the eyes and respiratory tract and may cause headaches, dizziness, drowsiness, and other central nervous system effects, including death. Aspiration of minute amounts during ingestion or vomiting may cause mild to severe pulmonary injury and possible death. In a 90-day oral gavage (rats) study at 100, 500 and 1000 mg/kg, no treatment related mortalities were observed. There were no significant changes in body weights or food consumption in any dose groups. Increased liver weights were observed in male and female rats a 500 and 1000 mg/kg. Increased kidney weights were observed only in male rats at 500 and 1000mg/kg. Testes weights were significantly elevated in male rats at 1000 mg/kg. Kidney effects indicative of light hydrocarbon nephropathy, occurred in male rat kidneys at all dose levels. Histological findings of hepatocellular hypertrophy were seen in the livers of male rats at 1000mg/kg and in female rats at 500 and 1000 mg/kg. All treatment-related effects were reversible within the 4- week recovery period. Observed kidney effects (including light hydrocarbon nephropathy and increased kidney weight) are a unique response by male rats to chronic hydrocarbon exposure, which the U.S. EPA has declared no relevant to humans. High-dose liver effects (including hepatocellular, or enlarged liver cells) are a direct consequence of the sustained high-fat hydrocarbon diet. The No observed Adverse Effect Level (NOAEL) for this study was 1000mg/kg.

Alcohols (C12-16), ethoxylated toxicological properties have not been fully investigated. Based on similar materials, the acute oral (rat) LD50 is estimated to range from 1600-2500 mg/kg and the acute dermal (rabbit) LD50 value is estimated to be >2000 mg/kg. Similar materials produced severe eye irritation and moderate skin irritation in studies with rabbits.

Alcohols (C10-16), ethoxylated toxicological properties have not been fully investigated. Based on similar materials, the acute oral (rat) LD50 is estimated to range from 1600-2500 mg/kg and the acute dermal (rabbit) LD50 value is estimated to be >2000mg/kg. Similar materials produced severe eye irritation and moderate skin irritation in studies with rabbits.

Alcohols C12-14 alcohol ethoxylated toxicological properties have not been fully investigated. The oral LD50 (rat) of this mixture is excepted to be consistent with the chemical family of ethoxylated alcohol surfactants and range from 1.6 to 2.5 g/kg. The acute dermal (rabbit) LD50 value is estimated to be >2.0 g/kg. One excepted component of this mixture was severely irritating to rabbits eyes (undiluted, Draize score=60). This mixture is expected to be moderately irritating to skin, based on data reported for C9-C11 6EO: (primary irritation index) PII=5.3/8.

California Proposition 65 Warning (applicable in California only)- This product contains (a) chemical(s) known to the State of California to cause cancer and birth defects or other reproductive harm.

12. ECOLOGICAL INFORMATION

ALGAE TEST RESULTS
Test: Growth Inhibition (OECD 201) Due to the cationicity of the polymer, an algae growth inhibition test is not appropriate.

FISH TEST RESULTS
Test: EPA 821-R-02-012Method 2021.0
Duration: 48 hr
Species: Fathead Minnow *Pimephales promelas* LC50 = 21.3 mg/L

INVERTEBRATE TEST RESULTS
Test: EPA 821-R-02-012Method 2021.0
Duration: 48hr
Species: Water Flea *Daphnia magna* LC50 = 4.8 mg/L

DEGRADATION: Test: CO2 Evolution: Modified Sturm (OECD 301B) The polymeric ingredient is not readily biodegradable. The large polymer size is incompatible with transport across biological membranes and diffusion; the bioconcentration factor is therefore considered to be zero.

13. DISPOSAL CONSIDERATIONS

The information on RCRA waste classification and disposal methodology provided below applies only to the product, as applied. If the material has been altered or contaminated, or it has exceeded its recommended shelf life, the guidance may be inapplicable. Hazardous waste classification under federal regulations (40 CFR Part 261 et seq) is dependent upon whether a material is a RCRA "listed hazardous waste" or has any of the four RCRA "hazardous waste characteristics." Refer to 40 CFR Part 261.33 to determine if a given material to be disposed of is a RCRA "listed hazardous waste"; information contained in Section 15 of this MSDS is not intended to indicated if the product is a "listed hazardous waste." RCRA Hazardous Waste Characteristic. There are four characteristics defined in 40 CFR Section 261.21-61.24: Ignitability, Corrosivity, Reactivity, and Toxicity. To determine Ignitability, See Section 9 of this MSDS (flash point). For Corrosivity, see sections 9 and 14 (pH and DOT corrosivity). For Reactivity, see Section 10 (incompatible materials). For Toxicity, see Section 2 (composition). Federal regulations are subject to change. State and local requirements, which may differ from or be more stringent than the federal regulations, may also apply to the classification of the material to be disposed. The company encourages the recycle, recovery and reuse of materials classified as RCRA hazardous wastes to be disposed of by thermal treatment or incineration at EPA approved facilities. The company has provided the foregoing for information only; the person generating the waste is responsible for determining the waste classification and disposal method.

14. TRANSPORT INFORMATION

This section provides basic shipping classification information. Refer to appropriate transportation regulations for specific requirements.

US DOT

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE,LIQUID, N.O.S.
Hazard Class: 9
Packing Group: 111
UN/ID Number: UN3082

Transport Label Required: Miscellaneous
Technical Name: (N.O.S.): Contains ammonium acetate
Hazardous Substances:

Component/Cas No.	Reportable Quantity of Product (lbs)
Ammonium acetate	5000

Comments: Hazardous Substances/Reportable Quantities- DOT requirements specific to Hazardous Substances only apply if the quantity in one package equals or exceeds the product reportable quantity.

TRANSPORT CANADA

Proper Shipping Name: Not applicable/Not regulated

ICAO/IATA

Proper Shipping name: Not applicable/Not regulated
Packing instructions/maximum net quantity per package:
Passenger Aircraft:
Cargo Aircraft:

IMO

Proper shipping name: Not applicable/Not regulated

15. REGULATORY INFORMATION

INVENTORY INFORMATION

USA : All components of this product are included on the TSCA Chemical Inventory or are not required to be listed on the TSCA Chemical I inventory.

Canada: All components of this product are included on the Domestic Substances List (DSL) or are not required to be listed on the DSL

.

European Union (EU): All components of this product are included on the European Inventory of Existing Chemical Substances (EINECS) or are not required to be listed on EINECS.

Australia: All components of this product are included in the Australian Inventory of Chemical Substances(AICA) or have been assessed by Worksafe Australia.

China: All components of this product are NOT included on the Chinese inventory. The Chinese State Environmental Protection Administration (SEPA) has granted a Polymer Exemption for the non-listed substance to WaterSolve, LLC and the product can be imported into China ONLY under specific conditions.

Japan: All components of this product are NOT included on the Japanese (ENCS) inventory.

Korea: All components of this product are NOT included on the Korean (ECL) inventory.

Philippines: All components of this product are NOT included on the Philippine (PICCS) inventory.

OTHER ENVIRONMENTAL INFORMATION

The following components of this product may be subject to reporting requirements pursuant to Section 313 of CERCLA (40 CFR 372), Section 12(b) of TSCA, or may be subject to release reporting requirements (40 CFR 307, 40 CFR 311, etc.) See Section 13 for information on waste classification and waste disposal of this product.

Component	CAS No	%	TPQ (lbs)	RQ (lbs)	S313	TSCA 12B
Ammonium acetate	631-61-8	2.0-10.0	None	5000	No	No

While this product does not contain any component CA numbers directly listed under SARA 313 of the Emergency Planning and Community Right-to –Know Act of 1986 (EPCRA), it does contain ammonia chemical (s) that may be sources per EPA of aqueous ammonia, a reportable chemical. For our customer's use evaluation for reporting purposes we have listed these above with their quantities when present at >1%. Please refer to EPA Guidance for Reporting Aqueous Ammonia, EPA 745-R-00-005.

Product Classification under section 311 of SARA
Acute (Y)

16. OTHER INFORMATION

NFPA HAZARD RATING (National Fire Protection Association)

Health 2- Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

Fire 1 – Materials that must be preheated before ignition can occur.

Reactivity 0 –Materials that in themselves are normally stable, even under fire exposure conditions.

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