GROUNDWATER ANALYTICAL

Massachusetts DEP EPH Method
Extractable Petroleum Hydrocarbons by GC/FID

Field ID:	**BJ-DS-S04**	Matrix:	**Soil**
Project:	**Buzzards Bay/3871-000**	Container:	**120 mL Amber Glass**
Client:	**GeoInsight, Inc.**	Preservation:	**Cool**
Laboratory ID:	**76312-10**	QC Batch ID:	**EP-1945-M**
Sampled:	**09-02-04 15:20**	Instrument ID:	**GC-9 Agilent 6890**
Received:	**09-03-04 18:40**	Sample Weight:	**15 g**
Extracted:	**09-08-04 16:00**	Final Volume:	**1 mL**
Analyzed (AL):	**09-11-04 07:30**	% Solids:	**69**
Analyzed (AR):	**09-11-04 08:15**	Aliphatic Dilution Factor:	**1**
Analyst:	**MM**	Aromatic Dilution Factor:	**1**

EPH Ranges	Concentration	Notes	Units	Reporting Limit
n-C9 to n-C18 Aliphatic Hydrocarbons †	BRL		mg/Kg	42
n-C19 to n-C36 Aliphatic Hydrocarbons †	BRL		mg/Kg	42
n-C11 to n-C22 Aromatic Hydrocarbons †◊	BRL		mg/Kg	42
Unadjusted n-C11 to n-C22 Aromatic Hydrocarbons †	BRL		mg/Kg	42

QC Surrogate Compound		Spiked	Measured	Recovery	QC Limits
Fractionation:	2-Fluorobiphenyl	3.7	2.5	**68 %**	40 - 140 %
	2-Bromonaphthalene	3.7	2.2	**59 %**	40 - 140 %
Extraction:	Chloro-octadecane	3.7	2.2	**59 %**	40 - 140 %
	ortho-Terphenyl	3.7	2.7	**72 %**	40 - 140 %

QA/QC Certification

1. Were all QA/QC procedures required by the method followed?	Yes
2. Were all performance/acceptance standards for the required QA/QC procedures achieved?	Yes
3. Were any significant modifications made to the method, as specified in Section 11.3.1.1?	No

Method non-conformances indicated above are detailed below on this data report, or in the accompanying project narrative and project quality control report. Release of this data is authorized by the accompanying signed project cover letter. The accompanying cover letter, project narrative and quality control report are considered part of this data report.

Method Reference: Method for the Determination of Extractable Petroleum Hydrocarbons, MA DEP (Revision 1.1, 2004).
Sample extraction performed by microwave accelerated solvent extraction technique. Results are reported on a dry weight basis.

Report Notations:
BRL Indicates concentration, if any, is below reporting limit for analyte. Reporting limit is the lowest concentration that can be reliably quantified under routine laboratory operating conditions. Reporting limits are adjusted for sample size and dilution.
† Hydrocarbon range data excludes concentrations of any surrogate(s) and/or internal standards eluting in that range.
◊ n-C11 to n-C22 Aromatic Hydrocarbons range data excludes the method target analyte concentrations.

GROUNDWATER ANALYTICAL

EPA Method 8270C
Polynuclear Aromatic Hydrocarbons by GC/MS-SIM

Field ID:	**BJ-DS-S04**	Matrix:	**Soil**
Project:	**Buzzards Bay/3871-000**	Container:	**120 mL Amber Glass**
Client:	**GeoInsight, Inc.**	Preservation:	**Cool**
Laboratory ID:	**76312-10**	QC Batch ID:	**SV-1491-P**
Sampled:	**09-02-04 15:20**	Instrument ID:	**MS-6 HP 6890**
Received:	**09-03-04 18:40**	Sample Weight:	**15 g**
Extracted:	**09-08-04 19:00**	Final Volume:	**1 mL**
Cleaned Up:	**09-13-04 20:00**	Percent Solids:	**69**
Analyzed:	**09-14-04 20:06**	Dilution Factor:	**1**
Analyst:	**JJT**		

CAS Number	Analyte	Concentration	Notes	Units	Reporting Limit
91-20-3	Naphthalene	BRL		ug/Kg	14
91-57-6	2-Methylnaphthalene	BRL		ug/Kg	14
208-96-8	Acenaphthylene	BRL		ug/Kg	14
83-32-9	Acenaphthene	BRL		ug/Kg	14
86-73-7	Fluorene	BRL		ug/Kg	14
85-01-8	Phenanthrene	BRL		ug/Kg	14
120-12-7	Anthracene	BRL		ug/Kg	14
206-44-0	Fluoranthene	BRL		ug/Kg	14
129-00-0	Pyrene	BRL		ug/Kg	14
56-55-3	Benzo[a]anthracene	BRL		ug/Kg	14
218-01-9	Chrysene	BRL		ug/Kg	14
205-99-2	Benzo[b]fluoranthene	BRL		ug/Kg	14
207-08-9	Benzo[k]fluoranthene	BRL		ug/Kg	14
50-32-8	Benzo[a]pyrene	BRL		ug/Kg	14
193-39-5	Indeno[1,2,3-c,d]pyrene	BRL		ug/Kg	14
53-70-3	Dibenzo[a,h]anthracene	BRL		ug/Kg	14
191-24-2	Benzo[g,h,i]perylene	BRL		ug/Kg	14

QC Surrogate Compound	Spiked	Measured	Recovery		QC Limits
Nitrobenzene-d5	950	380	40 %		30 - 130 %
2-Fluorobiphenyl	950	240	25 %	m	30 - 130 %
Terphenyl-d14	950	560	59 %		30 - 130 %

Method Reference: Test Methods for Evaluating Solid Waste, US EPA, SW-846, Third Edition, Update III (1996). Method modified by use of selected ion monitoring (SIM) in accordance with Section 7.5.5 of the method. Sample extraction performed by EPA Method 3545. Cleanup performed by EPA Method 3630C. Results are reported on a dry weight basis.

Report Notations: BRL Indicates concentration, if any, is below reporting limit for analyte. Reporting limit is the lowest concentration that can be reliably quantified under routine laboratory operating conditions. Reporting limits are adjusted for sample size and dilution.

m Surrogate recovery outside recommended limits due to sample matrix interference.

GROUNDWATER ANALYTICAL

Project Narrative

Project:	**Buzzards Bay/3871-000**	Lab ID:	**76312**
Client:	**GeoInsight, Inc.**	Received:	**09-03-04 18:40**

A. Documentation and Client Communication

The following documentation discrepancies, and client changes or amendments were noted for this project:

1. No documentation discrepancies, changes, or amendments were noted.

B. Method Modifications, Non-Conformances and Observations

The sample(s) in this project were analyzed by the references analytical method(s), and no method modifications, non-conformances or analytical issues were noted, except as indicated below:

1. EPA 8270C Modification: Samples 76312-01,-02,-03,-04,-05,-06,-07,-08,-09,-10. Method modified by use of selected ion monitoring (SIM) in accordance with Section 7.5.5 of the method. GC/MS-SIM was used to achieve low quantification limits necessary for regulatory compliance.
2. EPA 8270C Note: Samples 76312-01,-02,-03,-04,-05,-06,-07,-08,-09,-10. Samples were analyzed for only selected polynuclear aromatic hydrocarbons (PAH) target analytes, as requested by client.
3. MA DEP EPH Note: Samples 76312-01,-02,-03,-04,-05,-06,-07,-08,-09,-10. Samples were analyzed for only carbon range analytes, as requested by client.
4. EPA 8270C Non-conformance: Samples 76312-02,-08,-10. Surrogate recovery for 2-Fluorobiphenyl was below recommended limit due to matrix interference as a result of low percent solids.

GROUNDWATER ANALYTICAL

228 Main Street, P.O. Box 1200
Buzzards Bay, MA 02532
Telephone (508) 759-4441 • FAX (508) 759-4475
www.groundwateranalytical.com

CHAIN-OF-CUSTODY RECORD AND WORK ORDER

№ 099664

Project Name: Buzzards Bay	Firm: GeoInsight, Inc
Project Number: 3871-000	Address: 319 Littleton Rd
Sampler Name: LC	City / State / Zip: Westford, MA 01886
Project Manager: Kevin Trainer	Telephone: 978-692-1114

INSTRUCTIONS: Use separate line for each container (except replicates).

TURNAROUND

- [x] STANDARD (10 Business Days)
- [ ] PRIORITY (5 Business Days)
- [ ] RUSH (RAN- ______) (Rush requires Rush Authorization Number)
- [x] Please Email to: kdtrainer@geoinc.com, lochiumiento@geoinc.com
- [x] Please FAX to: 978-692-1115

BILLING

- [ ] Purchase Order No.:
- [ ] Third Party Billing:
- [ ] GWA Quote:

ANALYSIS REQUEST

Time	Sample Identification	Matrix	Type	Number	Container(s)	Preservation	Filtered	Laboratory Number (Lab Use Only)	8270C	MA DEP EPH w/ all targets	Other
1215	BT-SS-S01	Sediment X	Composite X	3	120mL/4 oz Amber Glass X	Ice X	No X	123	X	X	MS (4 JAR) X, MSD (2 JAR) X
1230	BT-SS-S02	X	X	1	X	X	X	4	X	X	
1245	BT-DS-S01	X	X	1	X	X	X	5	X	X	
1300	BT-DS-S02	X	X	1	X	X	X	6	X	X	
1330	BT-SS-S03	X	X	1	X	X	X	7	X	X	
1400	BT-SS-S04	X	X	1	X	X	X	8	X	X	
1430	BT-DS-S03	X	X	1	X	X	X	9	X	X	
1500	BT-DS-S04	X	X	1	X	X	X	10	X	X	

REMARKS / SPECIAL INSTRUCTIONS

MA DEP MCP Data Enhancement Affirmation

Signature: ______

DATA QUALITY OBJECTIVES

Regulatory Program

State: ☐ CT ☐ ME ☒ MA ☐ NH ☐ NY ☐ RI ☐ VT ☐

Standard: ☒ MCP GW-1/S-1 ☐ MCP GW-2/S-2 ☐ NY STARS ☐ Drinking Water ☐ Wastewater ☐ Waste Disposal ☐ Dredge Material ☐

Deliverables: ☐ PWS Form ☐ MWRA ☐

Project Specific QC

Many regulatory programs and EPA methods require project specific QC. Project specific QC includes Sample Duplicates, Matrix Spikes, and/or Matrix Spike Duplicates. Laboratory QC is not project specific unless prearranged. Project specific QC samples are charged on a per sample basis. **Each MS, MSD and Sample Duplicate requires an additional sample aliquot.**

Project Specific QC Required: ☐ Sample Duplicate ☒ Matrix Spike ☒ Matrix Spike Duplicate

Selection of QC Sample: ☒ Please use sample: BT-SS-S01

CHAIN-OF-CUSTODY RECORD

NOTE: All samples submitted subject to Standard Terms and Conditions on reverse hereof.

Relinquished by	Date	Time	Received by	
Relinquished by Sampler: [signature]	9/3/04	1500	Received by: [signature] 9/3/04 220	Receipt Temperature: ☒ Refrigerated 2-6°C Recommended 2.1
Relinquished by: [signature]	9/3/04	16:41	Received by:	Container Count: 10
Relinquished by:			Received by Laboratory: [signature]	Shipping/Airbill Number:

Method of Shipment: ☐ GWA Courier ☐ Express Mail ☐ Federal Express ☐ UPS ☐ Hand ☐ ______

Custody Seal Number: