

Trace Analytical Laboratories, Inc.  
2241 Black Creek Road  
Muskegon, MI 49444-2673



231-773-5998 Phone  
888-979-4469 Fax  
www.trace-labs.com

September 14, 2017

Mr. Brian Majka  
GEI Consultants of Michigan, P.C.  
5225 Edgewater Drive  
Allendale, MI 49401

Phone: (616) 384-2710

RE: Trace Project T171163  
Client Project GEI - 1

Dear Mr. Majka:

Enclosed are your analytical results. The results of this report relate only to the samples listed in the body of this report.

All reports were examined through Trace's validation process to ensure that requirements for quality and completeness were satisfied. All reported analytical results were obtained in accordance with the methods referenced on the reports. Every practical effort was made to meet the reporting limit specifications for this work, however, some results may have raised reporting limits to correct for percent solids.

For clients that require NELAC Accreditation, Trace certifies that these test results meet all requirements of the NELAC Standard, except for those analytes with a "N" notation. These analytes have not been evaluated by NELAC at Trace's discretion and will not be reported unless requested by client.

If you have questions concerning this report, please contact me at 231.773.5998 or by email at [jmink@trace-labs.com](mailto:jmink@trace-labs.com).

Sincerely,

A handwritten signature in black ink, appearing to read "Jon Mink".

Jon Mink  
Senior Project Manager  
Enclosures



NJDEP Accreditation No. MI008

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### SAMPLE SUMMARY

Trace Project ID: T171163  
Client Project ID: GEI - 1

Trace ID	Sample ID	Matrix	Collected By	Date Collected	Date Received
T171163-01	GEI - 1	Soil	Client	09/11/17 15:30	09/11/17 15:46

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## AN EXPLANATION OF TERMS AND SYMBOLS WHICH MAY OCCUR IN THIS REPORT

### DEFINITIONS

LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MS	Matrix Spike
MSD	Matrix Spike Duplicate
RPD	Relative Percent Difference
DUP	Matrix Duplicate
RDL	Reporting Detection Limit
MCL	Maximum Contamination Limit
TIC	Tentatively Identified Compound
<, ND or U	Indicates the compound was analyzed for but not detected
*	Indicates a result that exceeds its associated MCL or Surrogate control limits
N	Indicates that the compound has not been evaluated by NELAC
NA	Indicates that the compound is not available.

NOTE: Samples for volatiles that have been extracted with a water miscible solvent were corrected for the total volume of the solvent/water mixture.  
Solid matrices Method Blanks are at 100% solids as such results are the same wet or dry.

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**ANALYTICAL RESULTS**

Trace Project ID: T171163  
 Client Project ID: GEI - 1

Trace ID: T171163-01 Date Collected: 09/11/17 15:30 Matrix: Soil  
 Sample ID: GEI - 1 Date Received: 09/11/17 15:46

PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
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**VOLATILE ORGANIC COMPOUNDS BY GC-MS**

Analysis Method: EPA 8260B  
 Batch: T071922

Methyl-tert-butyl ether	<320 ug/kg dry	320	50	09/13/17	was	09/14/17	was		
Benzene	<65 ug/kg dry	65	50	09/13/17	was	09/14/17	was		
1,2-Dichloroethane	<65 ug/kg dry	65	50	09/13/17	was	09/14/17	was		
Toluene	<100 ug/kg dry	100	50	09/13/17	was	09/14/17	was		
1,2-Dibromoethane (EDB)	<65 ug/kg dry	65	50	09/13/17	was	09/14/17	was		
Ethylbenzene	<65 ug/kg dry	65	50	09/13/17	was	09/14/17	was		
m,p-Xylene	<130 ug/kg dry	130	50	09/13/17	was	09/14/17	was	N	
o-Xylene	<65 ug/kg dry	65	50	09/13/17	was	09/14/17	was	N	
Xylenes, total	<190 ug/kg dry	190	50	09/13/17	was	09/14/17	was		
1,3,5-Trimethylbenzene	<100 ug/kg dry	100	50	09/13/17	was	09/14/17	was		
1,2,4-Trimethylbenzene	<100 ug/kg dry	100	50	09/13/17	was	09/14/17	was		
Naphthalene	<330 ug/kg dry	330	50	09/13/17	was	09/14/17	was	N	
2-Methylnaphthalene	<330 ug/kg dry	330	50	09/13/17	was	09/14/17	was	N	
<b>Surrogates:</b>									
1,2-Dichloroethane-d4	100 %	68-133	50	09/13/17	was	09/14/17	was		
Toluene-d8	100 %	75-120	50	09/13/17	was	09/14/17	was		
4-Bromofluorobenzene	98 %	69-119	50	09/13/17	was	09/14/17	was		
1,2-Dichlorobenzene-d4	98 %	72-127	50	09/13/17	was	09/14/17	was		

**VOLATILE ORGANIC COMPOUNDS BY GC**

Analysis Method: EPA 8015B  
 Batch: T071934

Gasoline Range Organics (TPH)	11 mg/kg dry	4.0	50	09/14/17	was	09/14/17	was		
<b>Surrogates:</b>									
Fluorobenzene	103 %	82-137	50	09/14/17	was	09/14/17	was	N	

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### ANALYTICAL RESULTS

Trace Project ID: T171163  
Client Project ID: GEI - 1

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Trace ID: T171163-01	Date Collected: 09/11/17 15:30	Matrix: Soil
Sample ID: GEI - 1	Date Received: 09/11/17 15:46	

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PARAMETERS	RESULTS UNITS	RDL	DILUTION	PREPARED BY	ANALYZED BY	NOTES	MCL
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#### WET CHEMISTRY

Analysis Method: ASTM D2974-87  
Batch: T071874

% Solids	84 % by Wt.	0.10	1	09/13/17	nm	09/14/17	nm	N
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**QUALITY CONTROL RESULTS**

Trace Project ID: T171163  
 Client Project ID: GEI - 1

QC Batch: T071934	Analysis Description: Gasoline Range Organics
QC Batch Method: EPA 8015B	Analysis Method: EPA 8015B

**METHOD BLANK: T071934-BLK1**

Parameter	Units	Blank Result	Reporting Limit	Notes
Gasoline Range Organics (TPH)	mg/kg wet	<4.0	4.0	
Fluorobenzene (S)	%	107	82-137	

**LABORATORY CONTROL SAMPLE: T071934-BS1**

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Gasoline Range Organics (TPH)	mg/kg wet	20.0	19.9	100	80-120	
Fluorobenzene (S)	%	40.0	42.7	107	82-137	

Trace Project ID: T171163  
 Client Project ID: GEI - 1

QC Batch: T071922	Analysis Description: Volatiles, OpMemo14 full list
QC Batch Method: EPA 5035 Purge-and-Trap for Solids and Wastes	Analysis Method: EPA 8260B

**METHOD BLANK: T071922-BLK1**

Parameter	Units	Blank Result	Reporting Limit	Notes
Methyl-tert-butyl ether	ug/kg wet	<250	250	
Benzene	ug/kg wet	<50	50	
1,2-Dichloroethane	ug/kg wet	<50	50	
Toluene	ug/kg wet	<100	100	
1,2-Dibromoethane (EDB)	ug/kg wet	<50	50	
Ethylbenzene	ug/kg wet	<50	50	
m,p-Xylene	ug/kg wet	<100	100	
o-Xylene	ug/kg wet	<50	50	
Xylenes, total	ug/kg wet	<150	150	
1,3,5-Trimethylbenzene	ug/kg wet	<100	100	
1,2,4-Trimethylbenzene	ug/kg wet	<100	100	
Naphthalene	ug/kg wet	<330	330	
2-Methylnaphthalene	ug/kg wet	<330	330	
1,2-Dichloroethane-d4 (S)	%	103	68-133	
Toluene-d8 (S)	%	103	75-120	
4-Bromofluorobenzene (S)	%	101	69-119	
1,2-Dichlorobenzene-d4 (S)	%	101	72-127	

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**LABORATORY CONTROL SAMPLE: T071922-BS1**

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
Benzene	ug/kg wet	1000	992	99	80-120	
Toluene	ug/kg wet	1000	966	97	80-120	
1,2-Dichloroethane-d4 (S)	%	50.0	50.9	102	68-133	
Toluene-d8 (S)	%	50.0	47.8	96	75-120	
4-Bromofluorobenzene (S)	%	50.0	51.8	104	69-119	
1,2-Dichlorobenzene-d4 (S)	%	50.0	51.1	102	72-127	

Trace Project ID: T171163  
 Client Project ID: GEI - 1

QC Batch: T071874

Analysis Description: Solids, Dry Weight

QC Batch Method: % Solids

Analysis Method: ASTM D2974-87

**SAMPLE DUPLICATE: T071874-DUP1**

Original: T171163-01

Parameter	Units	Original Result	DUP Result	RPD	Max RPD	Notes
% Solids	% by Wt.	83.7	83.6	0.04	20	

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**SAMPLE LOG IN CHECKLIST**

Trace ID #: T171163 Date: 9/1/17 Package Description: Bag Temperature: 20.6  
 Client Name: GFI Time: 15:46 Logged in by: LFH

**Cooler Receipt**

Cooler/samples delivered by: Trace courier   
 Hand delivered  Name of delivery person: \_\_\_\_\_  
 Commercial courier  UPS  FED EX  US Mail   
 Tracking Number:  Not Applicable  
 Tracking #: \_\_\_\_\_  
 COC Seals present and intact on cooler?  Not Applicable  No  Yes  
 Custody seals signed by Client?  No  Yes Client custody seal # (if applicable): \_\_\_\_\_

**Coolant and Temperature**

**Type of Coolant Used**  
 Slurry w/ crushed, cubed, or chip ice?   
 Multiple bags of ice around samples?   
 Ice Packs/ Blue Ice :   
 No Coolant Present:   
 Ice still present upon receipt (circle one):  
 Yes No N/A

**Cooler Temperature**  
 Correction Factors: •Digital Stick Thermometer CF = -0.6°C  
 •IR Thermometer CF = -0.4°C  
 Representative Sample Temperature: 20.6 °C (check one below)  
 Temp Blank (Stick Thermometer)  
 Client Sample (IR Thermometer)  
 Melt Water: None °C (Use Digital Stick Thermometer)

**General**

	Yes	No	NA	Comments
All bottles arrived unbroken with labels in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Each sample point is in a sealed plastic bag?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Labels filled out completely?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
All bottle labels agree with Chain of Custody (COC)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sufficient sample to run tests requested?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
pH checked and samples at correct pH?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	See Below*
Correct preservative added to samples?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Air bubbles absent from VOAs?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
COC filled out properly and signed by client?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
COC signed in by TRACE sample custodian?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was project manager called and samples discussed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

**Notes:**

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**\*EMD pH Test Strips Used:**

pH 0-2.5 Lot: HC563733  pH 11.0-13.0 Lot: HC547328

Other: \_\_\_\_\_

Lot: HC563733 verified 6/21/16 AY  
 Lot: HC574761 verified 04/03/17 JS

Form 70-A.21  
 Effective 7/5/17

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