GHD Services Inc.

6400 Shafer Court, Suite 400
Rosemont, Illinois 60018

Vantage Specialty Chemicals

Gurnee, IL
Project #11197003

Analytical Report
(0619-214)

EPA Method TO-15 Analysis

Ethylene oxide

Enthalpy Analytical, LLC
Phone: (919) 850 - 4392 / Fax: (919) 850 - 9012 / www.enthalpy.com
800-1 Capitola Drive Durham, NC 27713-4385

Summary of Results

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Enthalpy Analytical

Job No.: 0619-214 EPA Mod. Method TO-15 - Ethylene Oxide

GHD Services, Inc. - Rosemont, IL 11197003 Vantage Specialty Chemicals - Gurnee, IL

Summary Table

Sample ID	ppbv	ug/m3
AIR-11197003-6/21/2019-029	0.077	0.14
AIR-11197003-6/21/2019-030	0.10	0.18
AIR-11197003-6/21/2019-031	0.096	0.17
AIR-11197003-6/21/2019-032	0.084	0.15
AIR-11197003-6/21/2019-033	< 0.040	< 0.072
AIR-11197003-6/21/2019-034	0.049	0.088

Narrative Summary

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Enthalpy Analytical Narrative Summary

Company	GHD Services, Inc.
SGS Login	L486700
Parameters	EPA TO-15 – Ethylene oxide

Client #	11197003
Enthalpy Job #	0619-180
# Samples	6

Custody	Matt St. Lawrence received the samples on 6/20/19 after being relinquished by Evan Meinzer of GHD Servicess, Inc. of Rosemont, IL. The samples were received at ambient temperature and in good condition. The samples were relinqushed for subcontract analysis to SGS Galson of East Syracuse, NY by Melanie Bethea on 7/3/19. Samples were received by Brett Grenert-Fischer of SGS on 7/8/19. Prior to being sent to SGS Galson, the samples were kept under lock with access only to authorized personnel by Enthalpy Analytical, LLC.
Analysis	The samples were analyzed for ethylene oxide using modified methods OSHA PV2120 and EPA TO-15. Samples were pressurized with nitrogen prior to shipment to SGS for analysis.
QC Notes	None.
Reporting Notes	The results presented in this report are representative of the sample results as provided by SGS Galson sample analysis for Login 485131.

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Sample Custody

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Chain of Custody Record

Page____of____

Special Handling:
☐ Standard Turn Around Time
☐ Rush Turn Around Time -- Date Needed_____
• All TATs Subject to Approval by Enthalpy Analytical
• All Bag/Can Samples Disposed of 1 Month from Receipt.
• All Other Samples Disposed of 4 Months from Receipt.

Sample(s) Collected by: Youa Yang
Client Name: GHD
Project Manager: Matt Lazaric

Project Number: 11197003
Site Name: Vantage
Location: Gurnee, IL

PO#:
Telephone#:
Email: matthew.lazaric@ghd.com

For spiked or duplicate samples: please provide sample volumes for recovery calculations. For Particulates: please provide tare weights and/or condensed water volumes.

Special Instructions:

A=Air 1=H2SO4 2=NaOH W=Water O=Other
X=XAD C=Charcoal SG=Silica Gel
G=Grab C=Composite Q=Quality Control O=Other

Sample ID	Date	Time	Sample Volume	Type	Matrix	# of VOA Vials	# of Glass	# of Plastic	# of Bags	# of Canisters	# of Tubes	# Other	Ethylene Oxide				Can ID#			Notes:
AIR-11197003-6/21/2019-029	6/21/2019	11:10	6 L	C	A					1							0013			10:42
AIR-11197003-6/21/2019-030	↓	11:12	6 L	C	A					1							1474			10:43
AIR-11197003-6/21/2019-031		11:34	6 L	C	A					1							0722			11:04
AIR-11197003-6/21/2019-032		11:53	6 L	C	A					1							1610			11:27
AIR-11197003-6/21/2019-033		12:08	6 L	C	A					1							0020			11:38
AIR-11197003-6/21/2019-034	↓	12:16	6 L	C	A					1							1609			11:46

End time 6/22/201

Relinquished By:	Date:	Received By:	Date:	Time:	Sample Condition Upon Receipt:
[signature]	6/22/2019	[signature]	6-24-19	9:24AM	☐ Iced ☐ Ambient ☐ °C_____
					☐ Iced ☐ Ambient ☐ °C_____
					☐ Iced ☐ Ambient ☐ °C_____

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Good Condition Ambient Temp DSM 06-24-19

2485131 Rush Cart # 2

ENTHALPY analytical, inc.

Chain of Custody Record

Page 1 of 1

Special Handling:
- ☐ Standard Turn Around Time (10 business days)
- ☑ Rush Turn Around Time -- Date Needed _____
- All TATs Subject to Approval by Enthalpy Analytical, Inc.
- All Bag/Can Samples Disposed of 1 Month from Receipt.
- All Other Samples Disposed of 4 Months from Receipt.

Client Name: Enthalpy Analytical
Project Manager: David Berkowitz
Report To: David Berkowitz

Project Number: 0619-180/214
Site Name:
Location:

PO#:
Telephone#: 919-491-9841
Email: david.berkowitz@enthalpy.com

For spiked or duplicate samples: please provide sample volumes for recovery calculations. For Particulates: please provide tare weights and/or condensed water volumes.

Special Instructions:
Analyze for EtO - 0.04 ppb RL - already pressurized for analysis

A=Air 1=H2SO4 2=NaOH W=Water O=Other
X=XAD C=Charcoal SG=Silica Gel
G=Grab C=Composite Q=Quality Control O=Other

Sample ID	Date	Time	Sample Volume	Type	Matrix	# of VOA Vials	# of Glass	# of Plastic	# of Bags	# of Canisters	# of Tubes	# Other	TO-15 /EtO								Notes:
0619-180.023	06/18/19	11:05	6L	C	A					1			1								Can 000007
0619-180.024	06/18/19	11:33	6L	C	A					1			1								Can 000061
0619-180.025	06/18/19	11:37	6L	C	A					1			1								Can 000010
0619-180.026	06/18/19	11:59	6L	C	A					1			1								Can 0720
0619-180.027	06/18/19	12:56	6L	C	A					1			1								Can 000008
0619-180.028	06/18/19	13:26	6L	C	A					1			1								Can 1475
0619-214.029	6/21/19	11:10	6L	C	A					1			1								Can 0013
0619-214.030	6/21/19	11:12	6L	C	A					1			1								Can 1474
0619-214.031	6/21/19	11:34	6L	C	A					1			1								Can 0722
0619-214.032	6/21/19	11:53	6L	C	A					1			1								Can 1610
0619-214.033	6/21/19	12:08	6L	C	A					1			1								Can 0020
0619-214.034	6/21/19	12:16	6L	C	A					1			1								Can 1609

Relinquished By:	Date:	Received By:	Date:	Time:	Sample Condition Upon Receipt:
Mel Britt	07-03-19	Brett Grenert-Fischer Brett Grenert-Fischer			☐ Iced ☒ Ambient ☐ °C_____
			7/8/19	0954	☐ Iced ☐ Ambient ☐ °C_____
					☐ Iced ☐ Ambient ☐ °C_____

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Canister and Controller Data Sheet

Enthalpy Analytical, LLC

Client Name: Enthalpy Analytical
Client #:
Enthalpy Job #: 0619-214; 0619-243; 0619-180

Canister Data

Canister ID	Sample ID	Canister Pressure Pre-Sample (mmHg)	Canister Pressure Post-Sample (mmHg)	Canister Pressure Final (mmHg)	Canister Pressurization Factor
1474	0619-214	-760	-14	561	1.773
1610	0619-214	-763	-12	526	1.721
000013	0619-214	-760	-14	524	1.723
1609	0619-214	-763	-15	526	1.728
000020	0619-214	-763	-14	526	1.726
0722	0619-214	-763	-9	517	1.702
000073	0619-243	-763	-21	623	1.874
0726	0619-243	-763	-25	551	1.786
0730	0619-243	-763	-31	536	1.780
000061	0619-243	-763	-30	561	1.812
000021	0619-243	-763	-34	528	1.776
000088	0619-243	-763	-32	573	1.833
0720	0619-180	-757	-8	520	1.704
000067	0619-180	-757	-8	544	1.736
1475	0619-180	-760	-8	630	1.850
000007	0619-180	-757	-4	605	1.807
000010	0619-180	-757	-6	599	1.804
000008	0619-180	-760	-16	518	1.719

Date Prepared: 6/3/19
Date Received: 7/3/19

Prepared By: WRC
Received By:

0619-180,214,24 packing List

SGS Galson Report

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ANALYTICAL

SGS GALSON

Mr. David Berkowitz
Enthalpy Analytical, Inc.
800 Capitola Drive
Suite 1
Durham, NC 27713

July 26, 2019

Account# 32042

Login# L486700

Dear David Berkowitz:

Enclosed are the analytical results for the samples received by our laboratory on June 08, 2019. All samples on the chain of custody were received in good condition unless otherwise noted. Any additional observations will be noted on the chain of custody.

Please contact client services at (888) 432-5227 if you would like any additional information regarding this report. Thank you for using SGS Galson.

Sincerely,

SGS Galson

Lisa Swab

Lisa Swab
Laboratory Director

Enclosure(s)

Terms and Conditions & General Disclaimers

- This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

- Any holder of this document is advised that information contained herein reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Analytical Disclaimers

- Unless otherwise noted within the report, all quality control results associated with the samples were within established control limits or did not impact reported results.

- Note: The findings recorded within this report were drawn from analysis of the sample(s) provided to the laboratory by the Client (or a third party acting at the Client's direction). The laboratory does not have control over the sampling process, including but not limited to the use of field equipment and collection media, as well as the sampling duration, collection volume or any other collection parameter used by the Client. The findings herein constitute no warranty of the sample's representativeness of any sampled environment, and strictly relate to the samples as they were presented to the laboratory. For recommended sampling collection parameters, please refer to the Sampling and Analysis Guide at www.sgsgalson.com.

- Unrounded results are carried through the calculations that yield the final result and the final result is rounded to the number of significant figures appropriate to the accuracy of the analytical method. Please note that results appearing in the columns preceding the final result column may have been rounded and therefore, if carried through the calculations, may not yield an identical final result to the one reported.

- The stated LOQs for each analyte represent the demonstrated LOQ concentrations prior to correction for desorption efficiency (if applicable).

- Unless otherwise noted within the report, results have not been blank corrected for any field blank or method blank data.

Accreditations SGS Galson holds a variety of accreditations and recognitions. Our quality management system conforms with the requirements of ISO/IEC 17025. Where applicable, samples may also be analyzed in accordance with the requirements of ELAP, NELAC, or LELAP under one of the state accrediting bodies listed below. Current Scopes of Accreditation can be viewed at http://www.sgsgalson.com in the accreditations section of the "About" page. To determine if the analyte tested falls under our scope of accreditation, please visit our website or call Client Services at (888) 432-5227.

National/International	Accreditation/Recognition	Lab ID#	Program/Sector
AIHA-LAP, LLC - IHLAP, ELLAP, EMLAP	ISO/IEC 17025 and USEPA NLLAP	Lab ID 100324	Industrial Hygiene, Environmental Lead, Environmental Microbiology

State	Accreditation/Recognition	Lab ID#	Program/Sector
New York (NYSDOH)	ELAP and NELAC (TNI)	Lab ID: 11626	Air Analysis, Solid and Hazardous Waste
New Jersey (NJDEP)	NELAC (TNI)	Lab ID: NY024	Air Analysis
Louisiana (LDEQ)	LELAP	Lab ID: 04083	Air Analysis, Solid Chemical Materials
Texas	Texas Dept. of Licensing and Regulation	Lab ID: 1042	Mold Analysis Laboratory license

Legend

< - Less than	mg - Milligrams	MDL - Method Detection Limit	ppb - Parts per Billion
> - Greater than	ug - Micrograms	NA - Not Applicable	ppm - Parts per Million
l - Liters	m3 - Cubic Meters	NS - Not Specified	ppbv - ppb Volume
LOQ - Limit of Quantitation	kg - Kilograms	ND - Not Detected	ppmv - ppm Volume
ft2 - Square Feet	cm2 - Square Centimeters	in2 - Square Inches	ng - Nanograms

LELAP Lab ID #04083

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Enthalpy Analytical, Inc.
Site : NS
Project No. : 0619-214
Date Sampled : 21-JUN-19
Date Received : 08-JUN-19

Account No.: 32042
Login No. : L486700

Date Analyzed : 11-JUL-19
Report ID : 1149311

Ethylene Oxide

Galson ID:			L486700-1		L486700-2		L486700-3	
Client ID:			619-214.029		619-214.030		619-214.031	
	LOQ ppbv	LOQ ug/m3	ppbv	ug/m3	ppbv	ug/m3	ppbv	ug/m3
Ethylene oxide	0.040	0.072	0.077	0.14	0.10	0.18	0.096	0.17

Analytical Method: mod. OSHA PV2120/mod. EPA TO15; GC/MS
Collection Media : 6L Canister
Submitted by : BLD

Approved by : SAP
Date : 26-JUL-19

Supervisor: SAP

LELAP Lab ID #04083

LABORATORY ANALYSIS REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client : Enthalpy Analytical, Inc.
Site : NS
Project No. : 0619-214
Date Sampled : 21-JUN-19
Date Received : 08-JUN-19

Account No.: 32042
Login No. : L486700

Date Analyzed : 11-JUL-19
Report ID : 1149311

Ethylene Oxide

Galson ID:			L486700-4		L486700-5		L486700-6	
Client ID:			619-214.032		619-214.033		619-214.034	
	LOQ ppbv	LOQ ug/m3	ppbv	ug/m3	ppbv	ug/m3	ppbv	ug/m3
Ethylene oxide	0.040	0.072	0.084	0.15	<0.040	<0.072	0.049	0.088

Analytical Method: mod. OSHA PV2120/mod. EPA TO15; GC/MS
Collection Media : 6L Canister
Submitted by : BLD

Approved by : SAP
Date : 26-JUL-19

Supervisor: SAP

LABORATORY FOOTNOTE REPORT

6601 Kirkville Road
East Syracuse, NY 13057
(315) 432-5227
FAX: (315) 437-0571
www.sgsgalson.com

Client Name : Enthalpy Analytical, Inc.
Site :
Project No. : 0619-214

Date Sampled : 21-JUN-19
Date Received: 08-JUN-19
Date Analyzed: 11-JUL-19

Account No.: 32042
Login No. : L486700

L486700 (Report ID: 1149311):
SOPs: in-vocs(36)

L486700-1-6 (Report ID: 1149311):
Samples were pressurized by client before reciept by lab. Injection volumes were increased to compensate for dilution factor provided by client.

L486700 (Report ID: 1149311):
Accuracy and mean recovery data presented below is based on a 95% confidence interval (k=2). The estimated accuracy applies to the media, technology, and SOP referenced in this report and does not account for the uncertainty associated with the sampling process. The accuracy is based solely on spike recovery data from internal quality control samples. Where N/A appears below, insufficient data is available to provide statistical accuracy and mean recovery values for the associated analyte.

Parameter	Accuracy	Mean Recovery
Ethylene oxide	+/-34.6%	103%

L485131 0619-180.02X samples reported on L485131
0619-214.0XX samples reported on L486700
per client. ZRK 7/23/19

Rush Cart # 2

ENTHALPY analytical, inc.

Chain of Custody Record

Page 1 of 1

Special Handling:
- ☐ Standard Turn Around Time (10 business days)
- ☑ Rush Turn Around Time -- Date Needed_____
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- All Other Samples Disposed of 4 Months from Receipt.

Client Name: Enthalpy Analytical
Project Manager: David Berkowitz
Report To: David Berkowitz

Project Number: 0619-180/214
Site Name:
Location:

PO#:
Telephone#: 919-491-9841
Email: david.berkowitz@enthalpy.com

For spiked or duplicate samples: please provide sample volumes for recovery calculations. For Particulates: please provide tare weights and/or condensed water volumes.

Special Instructions:
Analyze for EtO - 0.04 ppb RL - already pressurized for analysis

A=Air 1=H2SO4 2=NaOH W=Water O=Other
X=XAD C=Charcoal SG=Silica Gel
G=Grab C=Composite Q=Quality Control O=Other

Sample ID	Date	Time	Sample Volume	Type	Matrix	# of VOA Vials	# of Glass	# of Plastic	# of Bags	# of Canisters	# of Tubes	# Other	TO-15 /EtO								Notes:
0619-180.023	06/18/19	11:05	6L	C	A					1			1								Can 000007
0619-180.024	06/18/19	11:33	6L	C	A					1			1								Can 000061
0619-180.025	06/18/19	11:37	6L	C	A					1			1								Can 000010
0619-180.026	06/18/19	11:59	6L	C	A					1			1								Can 0720
0619-180.027	06/18/19	12:56	6L	C	A					1			1								Can 000008
0619-180.028	06/18/19	13:26	6L	C	A					1			1								Can 1475
0619-214.029	6/21/19	11:10	6L	C	A					1			1								Can 0013
0619-214.030	6/21/19	11:12	6L	C	A					1			1								Can 1474
0619-214.031	6/21/19	11:34	6L	C	A					1			1								Can 0722
0619-214.032	6/21/19	11:53	6L	C	A					1			1								Can 1610
0619-214.033	6/21/19	12:08	6L	C	A					1			1								Can 0020
0619-214.034	6/21/19	12:16	6L	C	A					1			1								Can 1609

Relinquished By:	Date:	Received By:	Date:	Time:	Sample Condition Upon Receipt:
Mel Bates	07-03-19	Brett Grenert-Fischer Brett Grenert-Fischer			☐ Iced ☑ Ambient ☐ °C_____
			7/8/19	0954	☐ Iced ☐ Ambient ☐ °C_____
					☐ Iced ☐ Ambient ☐ °C_____

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Canister and Controller Data Sheet

Enthalpy Analytical, LLC

Client Name: Enthalpy Analytical
Client #:
Enthalpy Job #: 0619-214; 0619-243; 0619-180

Canister Data

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000020	0619-214	-763	-14	526	1.726
0722	0619-214	-763	-9	517	1.702
000073	0619-243	-763	-21	623	1.874
0726	0619-243	-763	-25	551	1.786
0730	0619-243	-763	-31	536	1.780
000061	0619-243	-763	-30	561	1.812
000021	0619-243	-763	-34	528	1.776
000088	0619-243	-763	-32	573	1.833
0720	0619-180	-757	-8	520	1.704
000067	0619-180	-757	-8	544	1.736
1475	0619-180	-760	-8	630	1.850
000007	0619-180	-757	-4	605	1.807
000010	0619-180	-757	-6	599	1.804
000008	0619-180	-760	-16	518	1.719

Date Prepared: 6/3/19
Date Received: 7/3/19

Prepared By: WRC
Received By:

0619-180,214,24 packing List