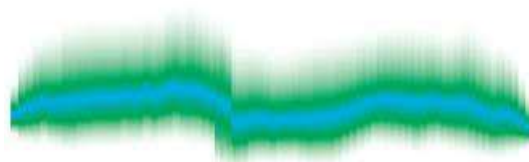


# APPENDIX W

## Methane Surveys

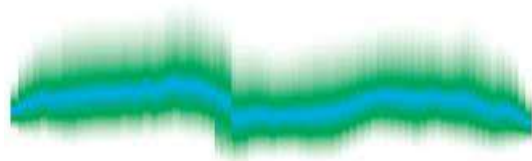


Bifrost

Environmental and Remediation Services Inc.


# APPENDIX W<sub>1</sub>

Methane Survey - LSD 7



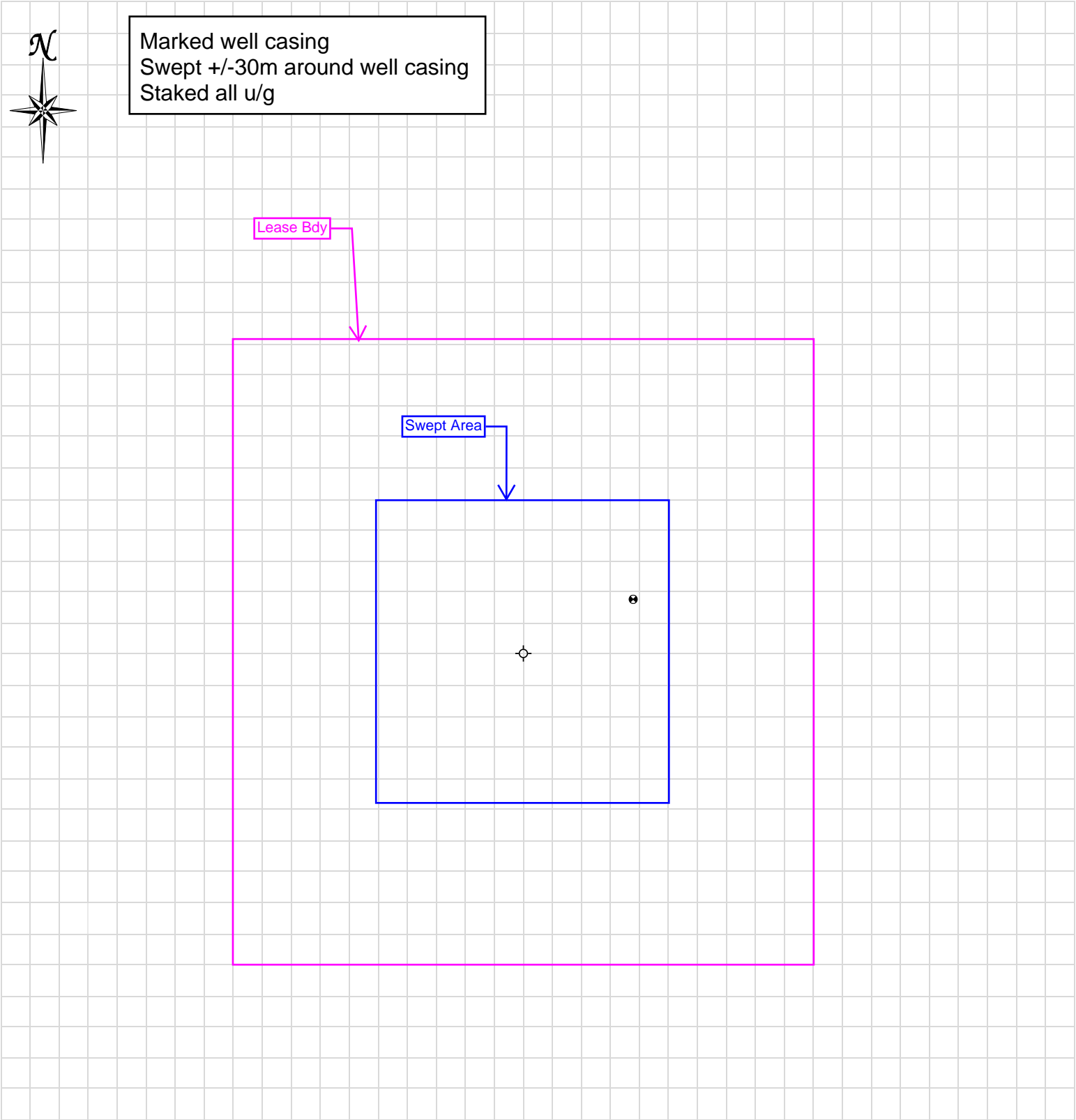
Bifrost

Environmental and Remediation Services Inc.

 <b>McElhanney</b> 4728 78A Street Close Red Deer, Alberta Phone: 403 346 7555 T4P 2J2 Email: reddeer@mcelhanney.com		<b>Client:</b> Peyto Exploration c/o ANTHONY TRAVERSE		
		<b>Location:</b> 7-3-33-1w5		
<b>Job#</b>	<b>AOC#</b>	<b>Date:</b>	<b>Crew:</b>	<b>Locating Equipment Make/Serial #</b>
254286		Mar 12, 2024	JR/BG	Fuji 960 000931

<b>Facility Location Checklist</b>	<b>Yes</b>	<b>No</b>
Daily Function Test	✓	
Grid Sweep(s)	✓	
Circle Sweep(s)	✓	
Parallel Line Check(s)	✓	
Swept Area(s) Shown	✓	
Discrepancies (Info/Locate)	✓	
Discrepancies Noted	✓	
<b>SKETCH NOT TO SCALE</b>		

This drawing references buried utilities and anomalies located to the best of the locator's abilities during the site visit and is valid for two (2) weeks after the date of the locate. Due to limitations of the electronic locating equipment, ground conditions and pipe material, McElhanney Ltd cannot guarantee the depth, size, material, or substance of buried utilities and anomalies. The location of all buried utilities and anomalies must be considered approximate, and some buried utilities and anomalies may not have been located. There may be buried utilities and anomalies within five (5) meters of above ground infrastructure that could not be located due to bleed off and/or interference within five (5) meters of other buried infrastructure that could not be located. Underground segments of pipe and cable may not be located. Markings delineating buried utilities and anomalies are not representative of the true size of the utility. Single cables and pipes shown on the sketch may include multiple buried utilities and anomalies in a common trench. All pipelines have been identified by AER licence and line number to the best of the locator's ability with the available information. Additional procedures and locating may be required if buried utilities and anomalies need to be identified with 100% certainty. Prior to any mechanical excavation within five (5) meters from markings, expose the locations of all existing buried utilities and anomalies by hand digging or hydro-vac. McElhanney Ltd is not liable for any untraceable, unlocatable, or unregistered buried utilities and anomalies that have not been marked in the field or shown on the locate sketch or for any ground disturbance conducted outside of the scanned boundary. If the work area described or outlined on this drawing is not correct or if there is any change to the work area or scope, additional locating is required prior to ground disturbance. If field markings are removed or are destroyed, a new locate is required. This drawing is the property of McElhanney Ltd and shall not be used, reused, or reproduced without the consent of McElhanney Ltd. This drawing has been prepared for the client identified, based on the client requirements and to meet the standards and requirements of the applicable agencies at the time of preparation. McElhanney Ltd will not be liable for any losses or other consequences resulting from the improper or unauthorized use of this drawing, or the use or reliance upon this drawing by any third party, including contractors, suppliers, consultants and stakeholders without McElhanney Ltd.'s prior written consent.





## D079 Project Report

Unique Well Identifier	Well Name	Surface Location	License #	Date
00/07-03-033-01W5/0	ALBERTA856 GARR 7-3-33-1	07-03-033-01W5	0072245	05/15/2024

Dir. 079 Gas Migration Test Prepared For: Peyto Exploration & Development Corp.

- The subject property inspection was conducted and completed by trained and competent personnel employed by Capstone Oilfield Services - Well Integrity Division.
- GM testing performed according to AER Directive 079 guidance, and Capstone Dir. 079 testing protocols.
- Gas Migration (GM) test results are displayed in "ppm" unless otherwise noted. - All methane testing conducted using I.R. LMD unit serial #3381122.
- Magnetic Locator - Make: Schonstedt-HeliFlux Model GA-72Cd / Serial #268308
- Detection threshold: 1 ppm sensitivity, sampling intervals - continuous.
- Measurement scales: 0-10,000 ppm or 0 ppm to 100 % gas volume.
- Response time: T90 standard: 4.5 seconds.
- Calibration Span: 01/01/2024 - 01/01/2026 (+/- 10%) CH4.
- GM testing commenced at 11:00 and concluded at 12:30.
- Atmosphere methane concentrations of 2 ppm were noted prior to commencement of Gas Migration testing.
- Control test points used as a background soil methane reference were selected and are noted as, #BG1, #BG2, #BG3.
- Background soil methane was established to be: 2 ppm. See attached test point map.
- Cut/capped well is located across Olds Golf Club.
- Well center determined by GPS coordinates from historical data in Abadata.





Unique Well Identifier	Well Name	Surface Location	License #	Date
00/07-03-033-01W5/0	ALBERTA856 GARR 7-3-33-1	07-03-033-01W5	0072245	05/15/2024
<ul style="list-style-type: none"><li>- Vegetation appears normal and healthy for seasonal growth.</li><li>- Nearest permanent structure is the golf cart garage located 306m away from the located well center. (see attached map)</li><li>- Gas migration testing was conducted in a 6m radius around the located well center. (See attached Capstone Well Integrity report, and gas migration test point grid)</li><li>- No elevated methane concentrations above background values were detected.</li><li>- Gas migration appears to be absent at the subject well.</li></ul>				

Tested By Lawrence Ridsdale

**00/07-03-033-01W5/0**



**Date: May 11, 2024**    Nearest permanent structure from well centre: 306m north

**Well Centre:** 51.800064, -114.055921

**Background 1 (BG1):** 30.0 meters West of Well Centre. (51.800063, -114.056361) 5ppm methane

**Background 2 (BG2):** 30.0 meters South of Well Centre. (51.799791, -114.055924) 3ppm methane

**Background 3 (BG3):** 30.0 meters East of Well Centre. (51.800043, -114.055475) 2ppm methane



**CAPSTONE**

**Toll Free:** 1-855-500-VENT  
**E-mail:** support@doullsite.com  
**Office:** 780-875-5522  
**Web:** www.doullsite.com  
**Fax:** 780-875-5533

## CAPSTONE JOB REPORT

**Peyto Exploration & Development Corp.**

**271765**

*Prepared For*

*Job Number*

**Anthony Traverse**

*Contact*

*Phone number*

**ATraverse@peyto.com**

*Email*

**00/07-03-033-01W5/0**

*Unique Well Identifier*

**PEYTO OIL & GAS CORP.**

*Well Licensee*

**0072245**

*License #*

**2024-05-15**

*Date*



## JOB AND SITE INFORMATION

### Job Information

<b>Peyto Exploration &amp; Development Corp.</b>	<b>00/07-03-033-01W5/0</b>	<b>0072245</b>	<b>2024-05-15</b>
<i>Prepared For</i>	<i>Unique Well Identifier</i>	<i>License #</i>	<i>Date</i>
<b>ALBERTA856 GARR 7-3-33-1</b>			
<i>Well Name</i>			
<b>Anthony Traverse</b>		<b>2024.05.15.LR</b>	
<i>On Site Contact</i>	<i>Phone</i>	<i>SWP</i>	
<i>A/E</i>	<i>P/O</i>		
<b>Lawrence Ridsdale</b>			
<i>DSA On Site Personnel</i>	<i>Email Address</i>	<i>Phone</i>	
<b>Work Performed:</b>			
<ul style="list-style-type: none"><li>■ Gas Migration</li><li>■ Directive 079 Inspection</li></ul>			
<i>Job Details</i>			

### Site Information

<b>2.0 ppm 20 m South of Well Head.</b>		
<i>Peak Background Atmospheric Methane Measured</i>		
<b>In agricultural (cultivated/seeded land) area</b>	<b>Single well site</b>	<b>Vertical</b>
<i>Well Resides In</i>	<i>Single/Multi-well Site</i>	<i>Drill Type</i>
<b>Foot</b>	<b>Clear/Dry and Firm</b>	
<i>Accessed By</i>	<i>Access Is</i>	
<b>Site is accessible by foot on seeded land.</b>		
<i>Comments/Recommendations</i>		



# CAPSTONE

E-mail: [support@doullsite.com](mailto:support@doullsite.com)

Web: [www.doullsite.com](http://www.doullsite.com)

Toll Free: 1-855-500-VENT

Office: 780-875-5522

Fax: 780-875-5533

## GAS MIGRATION INSPECTION

**Peyto Exploration & Development Corp.**

*Company*

**00/07-03-033-01W5/0**

*Unique Well Identifier*

**0072245**

*License #*

**2024-05-15**

*Date*

**Background soil gas methane was 2.0 ppm measured 20 m South-East of well centre.**

*Background Soil Gas Methane*

**Absent**

*Gas Migration Status*

**No significant elevated methane levels were detected in the soils surrounding the wellbore. Gas migration is not suspected.**

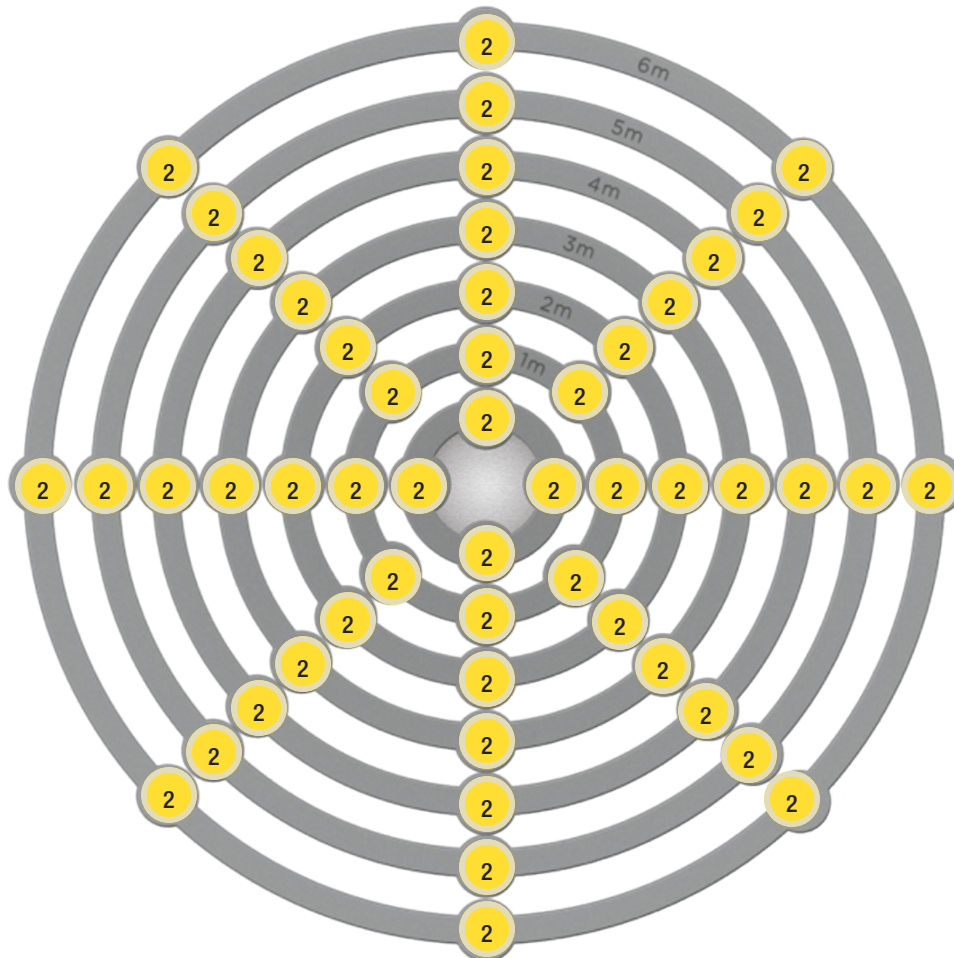
*Gas Migration Comments*

**Vegetation appears healthy across site, exhibiting normal seasonal colour and growth.**








*Vegetation Comments*




## GAS MIGRATION INSPECTION

### Surface Soil Gas Data



PEAK READING	
2	ppm
< 0.05	% V
< 1	% LEL

Legend			
	Water		Rigmat
	Concrete		Ice
	Pump Jack		Building
	Sample		

PPM Color Key	
	10 or less
	11 to 99
	100 and up

Surface soil gas data is collected using DSA's patent pending surface contact GM test method. The method is recognized and accepted by regulatory bodies where DSA operates. For more information about our procedures and/or intellectual property, contact [legal@doullsite.com](mailto:legal@doullsite.com).



## GAS MIGRATION INSPECTION

SURFACE SOIL GAS DATA									
#	Soil Methane			Position	Direction	Obstruction			Sample
1	2 ppm	< 0.05 % V	< 1 % LEL	0 m	North				NO
2	2 ppm	< 0.05 % V	< 1 % LEL	1 m	North				NO
3	2 ppm	< 0.05 % V	< 1 % LEL	2 m	North				NO
4	2 ppm	< 0.05 % V	< 1 % LEL	3 m	North				NO
5	2 ppm	< 0.05 % V	< 1 % LEL	4 m	North				NO
6	2 ppm	< 0.05 % V	< 1 % LEL	5 m	North				NO
7	2 ppm	< 0.05 % V	< 1 % LEL	6 m	North				NO
8	2 ppm	< 0.05 % V	< 1 % LEL	1 m	North-East				NO
9	2 ppm	< 0.05 % V	< 1 % LEL	2 m	North-East				NO
10	2 ppm	< 0.05 % V	< 1 % LEL	3 m	North-East				NO
11	2 ppm	< 0.05 % V	< 1 % LEL	4 m	North-East				NO
12	2 ppm	< 0.05 % V	< 1 % LEL	5 m	North-East				NO
13	2 ppm	< 0.05 % V	< 1 % LEL	6 m	North-East				NO
14	2 ppm	< 0.05 % V	< 1 % LEL	0 m	East				NO
15	2 ppm	< 0.05 % V	< 1 % LEL	1 m	East				NO
16	2 ppm	< 0.05 % V	< 1 % LEL	2 m	East				NO
17	2 ppm	< 0.05 % V	< 1 % LEL	3 m	East				NO
18	2 ppm	< 0.05 % V	< 1 % LEL	4 m	East				NO
19	2 ppm	< 0.05 % V	< 1 % LEL	5 m	East				NO
20	2 ppm	< 0.05 % V	< 1 % LEL	6 m	East				NO
21	2 ppm	< 0.05 % V	< 1 % LEL	1 m	South-East				NO
22	2 ppm	< 0.05 % V	< 1 % LEL	2 m	South-East				NO
23	2 ppm	< 0.05 % V	< 1 % LEL	3 m	South-East				NO
24	2 ppm	< 0.05 % V	< 1 % LEL	4 m	South-East				NO
25	2 ppm	< 0.05 % V	< 1 % LEL	5 m	South-East				NO
26	2 ppm	< 0.05 % V	< 1 % LEL	6 m	South-East				NO
27	2 ppm	< 0.05 % V	< 1 % LEL	0 m	South				NO
28	2 ppm	< 0.05 % V	< 1 % LEL	1 m	South				NO

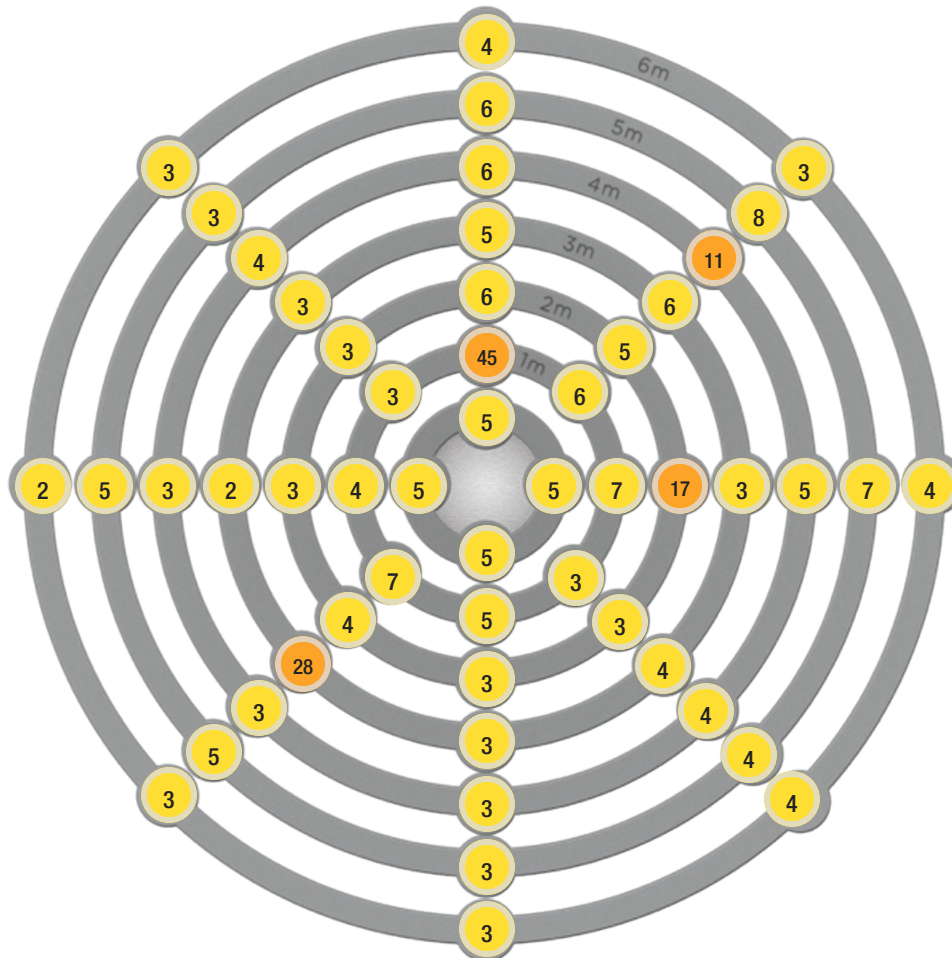
## GAS MIGRATION INSPECTION

SURFACE SOIL GAS DATA									
#	Soil Methane			Position	Direction	Obstruction			Sample
29	2 ppm	< 0.05 % V	< 1 % LEL	2 m	South				NO
30	2 ppm	< 0.05 % V	< 1 % LEL	3 m	South				NO
31	2 ppm	< 0.05 % V	< 1 % LEL	4 m	South				NO
32	2 ppm	< 0.05 % V	< 1 % LEL	5 m	South				NO
33	2 ppm	< 0.05 % V	< 1 % LEL	6 m	South				NO
34	2 ppm	< 0.05 % V	< 1 % LEL	1 m	South-West				NO
35	2 ppm	< 0.05 % V	< 1 % LEL	2 m	South-West				NO
36	2 ppm	< 0.05 % V	< 1 % LEL	3 m	South-West				NO
37	2 ppm	< 0.05 % V	< 1 % LEL	4 m	South-West				NO
38	2 ppm	< 0.05 % V	< 1 % LEL	5 m	South-West				NO
39	2 ppm	< 0.05 % V	< 1 % LEL	6 m	South-West				NO
40	2 ppm	< 0.05 % V	< 1 % LEL	0 m	West				NO
41	2 ppm	< 0.05 % V	< 1 % LEL	1 m	West				NO
42	2 ppm	< 0.05 % V	< 1 % LEL	2 m	West				NO
43	2 ppm	< 0.05 % V	< 1 % LEL	3 m	West				NO
44	2 ppm	< 0.05 % V	< 1 % LEL	4 m	West				NO
45	2 ppm	< 0.05 % V	< 1 % LEL	5 m	West				NO
46	2 ppm	< 0.05 % V	< 1 % LEL	6 m	West				NO
47	2 ppm	< 0.05 % V	< 1 % LEL	1 m	North-West				NO
48	2 ppm	< 0.05 % V	< 1 % LEL	2 m	North-West				NO
49	2 ppm	< 0.05 % V	< 1 % LEL	3 m	North-West				NO
50	2 ppm	< 0.05 % V	< 1 % LEL	4 m	North-West				NO
51	2 ppm	< 0.05 % V	< 1 % LEL	5 m	North-West				NO
52	2 ppm	< 0.05 % V	< 1 % LEL	6 m	North-West				NO











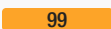

## GAS MIGRATION INSPECTION

### Subsurface Soil Gas Data



PEAK READING	
45	ppm
< 0.05	% V
< 1	% LEL

Legend			
	Water		Rigmat
	Concrete		Ice
	Pump Jack		Building
	Sample		

PPM Color Key	
	10 or less
	11 to 99
	100 and up

Subsurface soil gas data is collected by DSA's subsurface GM test method. The method is recognized and accepted by regulatory bodies where DSA operates. For more information about our procedures and/or intellectual property, contact [legal@doullsite.com](mailto:legal@doullsite.com).

## GAS MIGRATION INSPECTION

SUBSURFACE SOIL GAS DATA									
#	Soil Methane			Position	Direction	Obstruction			Sample
1	5 ppm	< 0.05 % V	< 1 % LEL	0 m	North				NO
2	45 ppm	< 0.05 % V	< 1 % LEL	1 m	North				NO
3	6 ppm	< 0.05 % V	< 1 % LEL	2 m	North				NO
4	5 ppm	< 0.05 % V	< 1 % LEL	3 m	North				NO
5	6 ppm	< 0.05 % V	< 1 % LEL	4 m	North				NO
6	6 ppm	< 0.05 % V	< 1 % LEL	5 m	North				NO
7	4 ppm	< 0.05 % V	< 1 % LEL	6 m	North				NO
8	6 ppm	< 0.05 % V	< 1 % LEL	1 m	North-East				NO
9	5 ppm	< 0.05 % V	< 1 % LEL	2 m	North-East				NO
10	6 ppm	< 0.05 % V	< 1 % LEL	3 m	North-East				NO
11	11 ppm	< 0.05 % V	< 1 % LEL	4 m	North-East				NO
12	8 ppm	< 0.05 % V	< 1 % LEL	5 m	North-East				NO
13	3 ppm	< 0.05 % V	< 1 % LEL	6 m	North-East				NO
14	5 ppm	< 0.05 % V	< 1 % LEL	0 m	East				NO
15	7 ppm	< 0.05 % V	< 1 % LEL	1 m	East				NO
16	17 ppm	< 0.05 % V	< 1 % LEL	2 m	East				NO
17	3 ppm	< 0.05 % V	< 1 % LEL	3 m	East				NO
18	5 ppm	< 0.05 % V	< 1 % LEL	4 m	East				NO
19	7 ppm	< 0.05 % V	< 1 % LEL	5 m	East				NO
20	4 ppm	< 0.05 % V	< 1 % LEL	6 m	East				NO
21	3 ppm	< 0.05 % V	< 1 % LEL	1 m	South-East				NO
22	3 ppm	< 0.05 % V	< 1 % LEL	2 m	South-East				NO
23	4 ppm	< 0.05 % V	< 1 % LEL	3 m	South-East				NO
24	4 ppm	< 0.05 % V	< 1 % LEL	4 m	South-East				NO
25	4 ppm	< 0.05 % V	< 1 % LEL	5 m	South-East				NO
26	4 ppm	< 0.05 % V	< 1 % LEL	6 m	South-East				NO
27	5 ppm	< 0.05 % V	< 1 % LEL	0 m	South				NO
28	5 ppm	< 0.05 % V	< 1 % LEL	1 m	South				NO

## GAS MIGRATION INSPECTION

SUBSURFACE SOIL GAS DATA									
#	Soil Methane			Position	Direction	Obstruction			Sample
29	3 ppm	< 0.05 % V	< 1 % LEL	2 m	South				NO
30	3 ppm	< 0.05 % V	< 1 % LEL	3 m	South				NO
31	3 ppm	< 0.05 % V	< 1 % LEL	4 m	South				NO
32	3 ppm	< 0.05 % V	< 1 % LEL	5 m	South				NO
33	3 ppm	< 0.05 % V	< 1 % LEL	6 m	South				NO
34	7 ppm	< 0.05 % V	< 1 % LEL	1 m	South-West				NO
35	4 ppm	< 0.05 % V	< 1 % LEL	2 m	South-West				NO
36	28 ppm	< 0.05 % V	< 1 % LEL	3 m	South-West				NO
37	3 ppm	< 0.05 % V	< 1 % LEL	4 m	South-West				NO
38	5 ppm	< 0.05 % V	< 1 % LEL	5 m	South-West				NO
39	3 ppm	< 0.05 % V	< 1 % LEL	6 m	South-West				NO
40	5 ppm	< 0.05 % V	< 1 % LEL	0 m	West				NO
41	4 ppm	< 0.05 % V	< 1 % LEL	1 m	West				NO
42	3 ppm	< 0.05 % V	< 1 % LEL	2 m	West				NO
43	2 ppm	< 0.05 % V	< 1 % LEL	3 m	West				NO
44	3 ppm	< 0.05 % V	< 1 % LEL	4 m	West				NO
45	5 ppm	< 0.05 % V	< 1 % LEL	5 m	West				NO
46	2 ppm	< 0.05 % V	< 1 % LEL	6 m	West				NO
47	3 ppm	< 0.05 % V	< 1 % LEL	1 m	North-West				NO
48	3 ppm	< 0.05 % V	< 1 % LEL	2 m	North-West				NO
49	3 ppm	< 0.05 % V	< 1 % LEL	3 m	North-West				NO
50	4 ppm	< 0.05 % V	< 1 % LEL	4 m	North-West				NO
51	3 ppm	< 0.05 % V	< 1 % LEL	5 m	North-West				NO
52	3 ppm	< 0.05 % V	< 1 % LEL	6 m	North-West				NO



**Toll Free:** 1-855-500-VENT  
**E-mail:** support@doullsite.com  
**Office:** 780-875-5522  
**Web:** www.doullsite.com  
**Fax:** 780-875-5533

## INSPECTION PHOTOS AND WELL INFO

Peyto Exploration & Development Corp.	00/07-03-033-01W5/0	0072245	2024-05-15
<i>Prepared For</i>	<i>Unique Well Identifier</i>	<i>License #</i>	<i>Date</i>

### Well Information

1978-12-29	1979-01-05	ABD	07-03-033-01W5	N 51.799975, W 114.055749
<i>Final drill date</i>	<i>Abandoned date</i>	<i>Status</i>	<i>Surface Location</i>	<i>Surface coordinates - WGS 84 Decimal Degrees</i>

□

*Comments/Recommendations*



**CAPSTONE**

E-mail: [support@doullsite.com](mailto:support@doullsite.com)

Web: [www.doullsite.com](http://www.doullsite.com)

Toll Free: 1-855-500-VENT

Office: 780-875-5522

Fax: 780-875-5533

## INSPECTION PHOTOS AND WELL INFO



*Comment*

*Comment*



Background sample 2 (30m, 3ppm, south)

Background reading 3 (30m, east, 2 ppm)

*Comment*

*Comment*



## INSPECTION PHOTOS AND WELL INFO



Background sample 1 (30m ,5ppm, west)

*Comment*



Facing east

*Comment*



Facing north

*Comment*



Facing west

*Comment*

## INSPECTION PHOTOS AND WELL INFO



Facing south

*Comment*



*Comment*

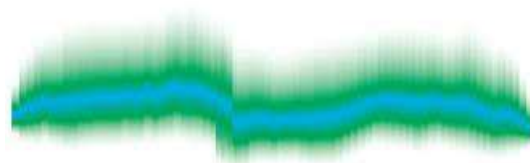


Pipe to east

*Comment*

# APPENDIX W<sub>2</sub>

Methane Survey - LSD 8

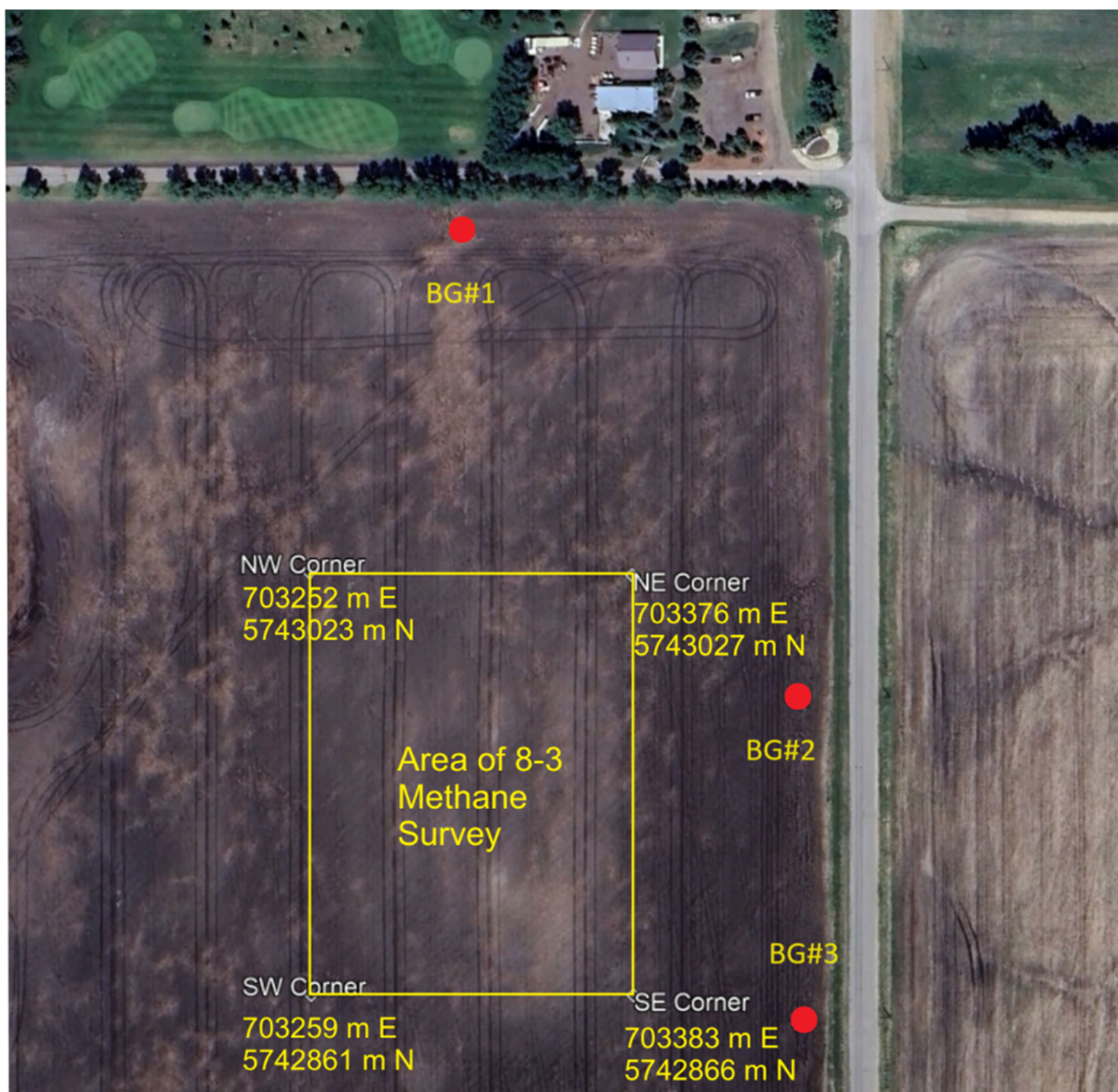


Bifrost

Environmental and Remediation Services Inc.



00/08-03-033-01W5/0



**Date: May 11, 2024** Nearest permanent structure from center point: ~310m north

**Centre:** 51.800064, -114.055921

**Background 1 (BG1):** (51.802283, -114.051224) 2ppm methane

**Background 2 (BG2):** (51.800653, -114.049236) 2ppm methane

**Background 3 (BG3):** (51.799539, -114.049225) 2ppm methane



## D079 Project Report

Unique Well Identifier	Well Name	Surface Location	License #	Date
		08-03-033-01W5		05/14/2024

Dir. 079 Gas Migration Test Prepared For: BiFrost inc.

- The subject property inspection was conducted and completed by trained and competent personnel employed by Capstone Oilfield Services - Well Integrity Division.
- GM testing performed according to AER Directive 079 guidance, and Capstone Dir. 079 testing protocols.
- Gas Migration (GM) test results are displayed in "ppm" unless otherwise noted. - All methane testing conducted using I.R. LMD unit serial #3381122.
- Magnetic Locator - Make: Schonstedt-HeliFlux Model GA-72Cd / Serial #268308
- Detection threshold: 1 ppm sensitivity, sampling intervals - continuous.
- Measurement scales: 0-10,000 ppm or 0 ppm to 100 % gas volume.
- Response time: T90 standard: 4.5 seconds.
- Calibration Span: 01/01/2024 - 01/01/2026 (+/- 10%) CH<sub>4</sub>.
- GM testing commenced at 8:00 and concluded at 17:30.
- Atmosphere methane concentrations of 2 ppm were noted prior to commencement of Gas Migration testing.
- Control test points used as a background soil methane reference were selected and are noted as, #BG1, #BG2, #BG3.
- Background soil methane was established to be: 2 ppm. See attached test point map.
- Designated test area is located on cultivated agricultural field near the Olds Golf Club.
- Test area was chosen by starting at center point of test area in picture provided.
- As per client request site was accessed by foot.

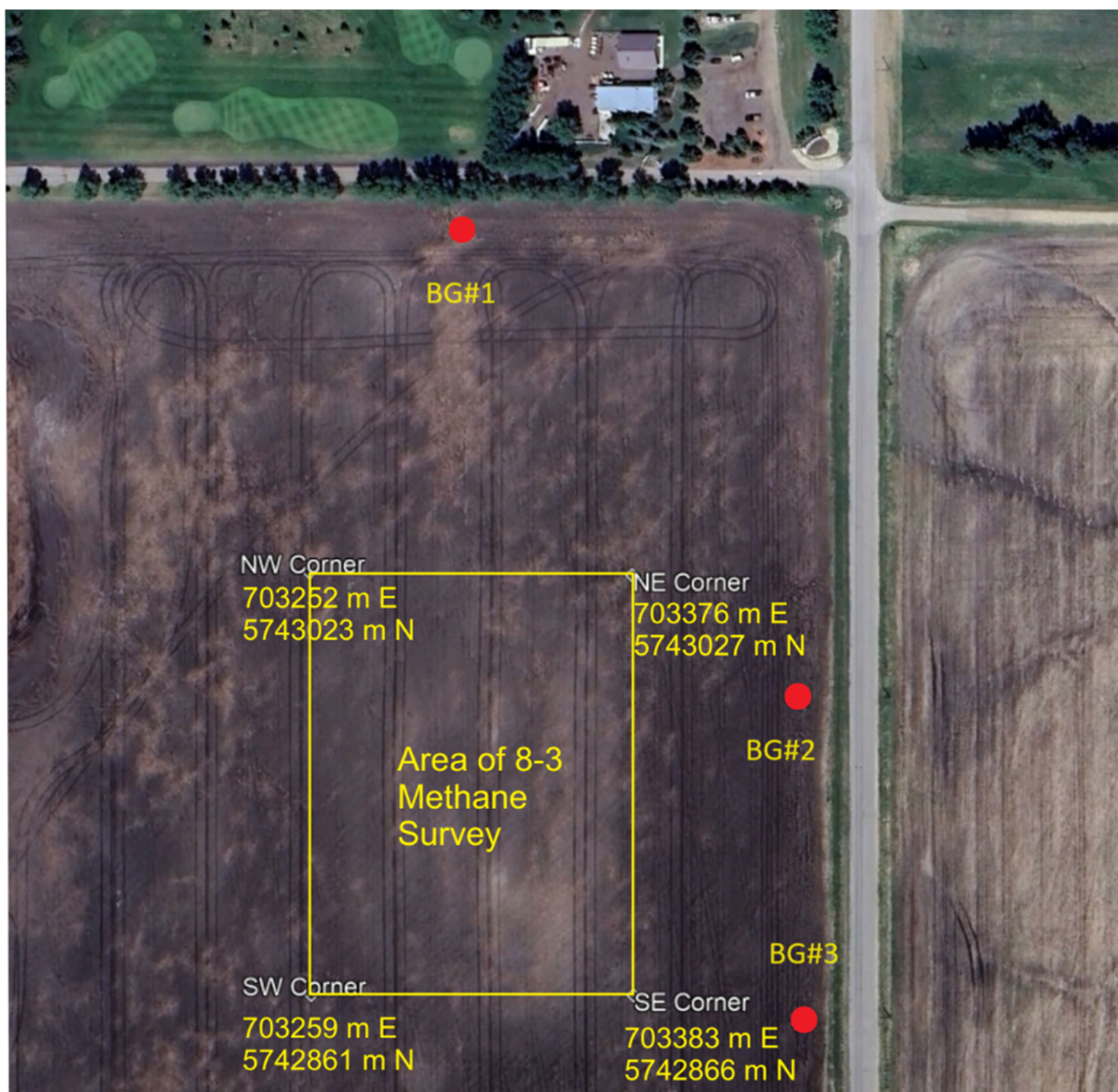


Unique Well Identifier	Well Name	Surface Location	License #	Date
		08-03-033-01W5		
<p>- Field was recently tilled and seeded so there is a lack of vegetation to be assessed.</p> <p>- Nearest permanent structure is the golf shed located 310m away from the located test areas center point. (see attached map)</p> <p>- Gas migration testing was conducted in a 60mx60m grid around the determined center point. (See attached)</p> <p>- Very slightly elevated methane levels ranging from 2ppm (Atmospheric Levels) to 120 ppm were measured throughout the 60mx60m test grid. There is no historical information of any oil or gas wells actually being drilled on this lot of land, but these levels could be due to a very slight gas migration issue occurring if said wells were in fact drilled. These levels could also be due to the decomposing organic material that was left on the soil from the previous years harvest has now been mixed into the soil then combined with the high amount of moisture and rain has created the necessary conditions to continue decomposition of the organic materials causing trace methane readings in the soil.</p>				

Tested By Lawrence Ridsdale



00/08-03-033-01W5/0



**Date: May 11, 2024** Nearest permanent structure from center point: ~310m north

**Centre:** 51.800064, -114.055921

**Background 1 (BG1):** (51.802283, -114.051224) 2ppm methane

**Background 2 (BG2):** (51.800653, -114.049236) 2ppm methane

**Background 3 (BG3):** (51.799539, -114.049225) 2ppm methane





Facing west

*Comment*



Facing east

*Comment*



Facing south

*Comment*



Gps centre

*Comment*



*Comment*



*Comment*



*Comment*



*Comment*



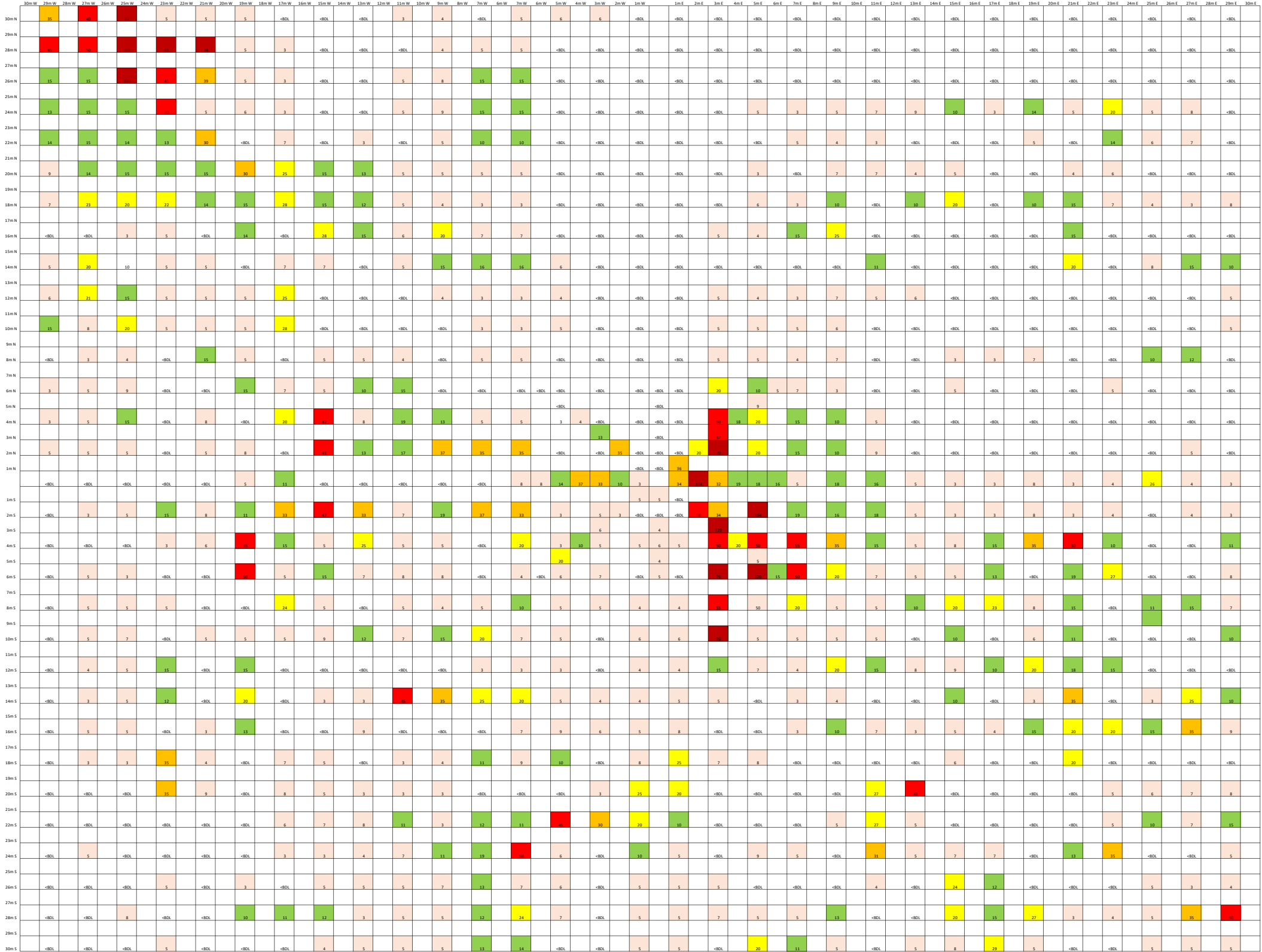
*Comment*



Facing north

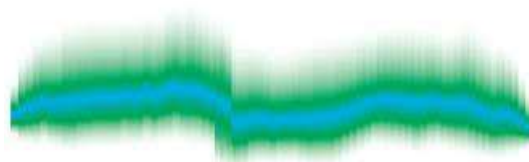
*Comment*

60m Subsurface Gas Migration Test



# APPENDIX X

## Concept Plan



Bifrost

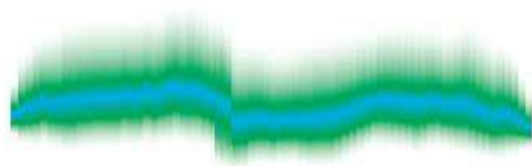
Environmental and Remediation Services Inc.



August 2024

# APPENDIX Y

## Assessor Qualifications



Bifrost

Environmental and Remediation Services Inc.

## Employment

Bifröst Environmental and Remediation Services, Inc. (Bifröst), Calgary, Alberta 2016 – Present

***General Manager***

Clifton Associates Ltd, Calgary, Alberta, Canada April 2012 – March 2016

***Manager, Environmental Services/Regional Technical Lead***

Clifton Associates Ltd, Calgary, Alberta, Canada 2011 – April 2012

***Senior Project Manager***

O'Connor Associates Environmental, Inc., Calgary, Alberta, Canada 2009 – 2011

***Senior Project Manager/Geologist***

Professional Service Industries, Inc (PSI), Columbus, Ohio, 2005 - 2009

***Manager, Environmental Services***

Millennium Environmental and Remediation Services, Inc (Millennium E/RS), Galloway, Ohio 1995 - 2004

***Owner and President***

R&R International, Inc. (R&R), Columbus, Ohio, 1993 - 1995

***Manager, Environmental Services***

ERM Midwest, Inc., Worthington, Ohio, 1992 - 1993

***Project Geologist***

Ohio Environmental Protection Agency (Ohio EPA), Dayton, Ohio, 1990 - 1992

***Project Manager***

Ohio Air National Guard (OhioANG), Springfield, Ohio, 1982 – 1987

Ready Reserve, 1987 – 1996

***Enlisted (1982 – 1986); Final Rank: Staff Sergeant***

***Officer (1986 – 1996); Final Rank: 1<sup>st</sup> Lieutenant***

## Education

Graduate work in Geophysics, Wright State University, Dayton, Ohio, 1988 - 1989

Bachelor of the Arts (BA), Honors in Geology, Wright State University, Dayton, Ohio, 1988

Associate's, Applied Science (AAS), Community College of the Air Force, 1986

## Certifications/Registrations

EGBC Professional Geoscientist #57618, Engineers and Geoscientists of British Columbia, February 2023\*

APEGS Professional Geoscientist #34549, Saskatchewan, July 2015\*

APEGA Professional Geoscientist #146001, Calgary, Alberta, August 2012\*

IOL Level I Supervisor, Calgary, Alberta, August 2010

Ohio Radon Tester - License #RT651, December 2008

National Environmental Health Association Radon Measurement Specialist, NRSB 8SS0071 June 2008

Ohio EPA Voluntary Action Program (VAP) Certified Professional – Number CP305, November 2006

Principal Consultant Certification, Phase II & III ESA Service Line, August 2006

Principal Consultant Appointment, Phase I ESA Service Line, January 2006

Project Management Certification, June 2005

Professional Geologist #1924, Indiana, 1998\*

\* Current

## **Professional Managerial Experience**

Mr. Lehar has over 40 years of professional managerial and supervisory experience, including over 30 years of managerial experience in the environmental and remediation field, 6 years in the military, and at least 4 years with other various organizations. Throughout his career, he has demonstrated proficiency in providing environmental assessment and remediation solutions to Clients, the Public, the Regulatory community, and other Stakeholders through his understanding of technical guidance and regulations, the ability to interpret and communicate those requirements to interested parties, and through the use of multi-disciplinary teams to take effective actions on complex contaminated sites. Mr. Lehar has an innate ability to listen to Client's and other Stakeholder's needs, interpret them, and the ability to facilitate the needs of the Stakeholder with the legal requirements of the Regulator. He has shown that he has the ability to quickly grasp significant site details and then coordinate project team members, to direct the appropriate resources towards environmental and remediation program solutions using the correct operational guidelines and procedures required.

## **Professional Technical Experience**

Mr. Lehar has over 35 years of professional environmental experience and has demonstrated technical proficiency in all manner of soil and groundwater site investigations, project management, proposals, and budgets. He has held positions where he has either directly selected appropriate remediation and risk management plans, or reviewed and approved them for use by others to ensure that all remedial objectives and regulatory requirements are met. His work has included projects working with: Alberta Environment and Parks (AEP), The City of Calgary, the City of Edmonton, Alberta Transportation (AT), Alberta Infrastructure (AI), and the Town of High River, within Canada and has included projects in the United States (US) working with the US Environmental Protection Agency (USEPA), the US Army Corps of Engineers (USACE), the US Air Force (USAF), the US Department of Energy (DOE), the Ohio EPA, the Kentucky Department of Environmental Protection (KDEP), the City of Columbus, the Ohio State University, and various banks, developers, and commercial and industrial Clients in both countries, including Imperial Oil, Pepsi, Nationwide Insurance, PNC Bank, and General Electric.

His experience with various types of projects have consisted of: Brownfields; military bases and facilities; former missile bases; DOE nuclear facilities; USEPA Superfund Sites; Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) facilities; other government facilities; downstream petroleum retail facilities; bulk petroleum plants; petroleum distribution facilities; chemical plants; various industrial manufacturing facilities; automotive and truck manufacturing plants; automotive and truck repair facilities; metal plating operations; dry cleaners; power plants; lead smelters; radioactive tailings dumps; cement manufacturing plants; quarries; abandoned landfills; abandoned chemical release dump sites; schools; airports; cell tower sites; large undeveloped tracks of land; commercial real estate; warehousing facilities; and, greenfield sites.

He has completed or provided technical expertise on hundreds of projects, including: various Phase I, II, and III environmental site assessments; remedial investigation/ feasibility studies (RI/FS); remedial design / remedial actions (RD/RA); RCRA facility investigation/ corrective measures studies (RFI/CMS); Record of Decision (ROD) actions; risk assessments; remedial action plans; risk management plans; remedial management plans; UST closures; remediation using various technologies; regulatory review and interpretation; confirmation documentation; SOP development and implementation; annual monitoring reports; environmental training; aquatic pathway assessments; environmental construction plans; asbestos surveys and abatement oversight; QA/QC implementation and review; bioremediation facility installation; air, solid waste, and storm water permitting; explosive gas planning, permitting and monitoring; field verification; litigation support; delineation and permitting of wetlands and other jurisdictional waters; database research; radon measurement; lead-based paint surveys, mold surveys and mitigation; storm water pollution prevention plans; hazardous materials surveys; and, other environmental and remediation activities.



## Public and Stakeholder Outreach Experience

Mr. Lehar has held positions during his career as both a regulator and as a consultant, which required either public investigation or interviews with stakeholders, public town hall meetings, regulatory site meetings, or stakeholder education and project acceptance during his professional career. Major projects that have required some of the above coordination, included:

**As the Project Manager for the Ohio EPA on the USEPA Skinner Superfund Site:** The site was an unregulated landfill containing various solvents, semi-volatile compounds, metals, polycyclic aromatic hydrocarbons, and other contaminants that were in direct hydrologic connection with an adjacent waterway (Mill Creek). The site owners were also operating a daycare facility on the site. Investigations were conducted on the site including interviews with former employees and operators at the site to determine the universe of potential contaminants in the landfill. Numerous town halls were conducted to update the public on the investigation and the remedy selection process. Coordination was maintained with the Project Managers from USEPA Region 5, the local government, and the local air pollution control agency. Coordination was also maintained with the Agency for Toxic Substances and Disease Registry (ATSDR), due to suspected potential cancer clusters in the area. Numerous public meetings were held with a local citizens group and other interested parties, who were concerned about the potential health effects on the surrounding and downstream population. News coverage was extensive.

**As the Project Manager for the Ohio EPA on the Southwestern Portland Cement Kiln Dust Landfill Site:** This site was an unregulated cement kiln dust landfill containing arsenic and highly basic leachate that was flowing into a protected wetlands. The uncapped landfill was allowing rainwater to infiltrate completely through the kiln dust and solubilize the arsenic in the dust, allowing it to exit the landfill at the base as a leachate that flowed into the wetland. The leachate near the base of the landfill held a pH of 13. Numerous public meetings were held with a local citizens group and other interested parties, who had brought the landfill to the attention of the Ohio EPA. News coverage was extensive.

**As the Consultant and owner of Millennium Environmental and Remediation Services, Inc. working for a local citizens group opposed to a proposed quarry operation:** A company was planning on using ammonium nitrate explosives to break up the rock in an area of highly fractured bedrock and known sinkholes. Additionally, some of the sinkholes were known to contain Pleistocene mammal mega fauna remains, as well as potential artifacts from historical indigenous populations. Groundwater contamination from local animal herds (horses and cattle) was identified as an issue in the shallow bedrock, as was the use of septic systems in the area near local residential wells. Public meetings were held and discussions had with the Ohio EPA regarding the ease with which the local groundwater under the site may be contaminated by the nitrates, affecting local wells. An air permit that the company was attempting to secure for the site was also called into question.

**As the Manager of the Environmental group at PSI, where the National City Bank was a Client:** A Phase I ESA completed by our group identified potential industrial fill in the area of new construction for an NCB regional data hub. During this process it was found that the NCB Project Manager working on the construction site had planned on taking any excavated fill to be dumped at an unlicensed site. After consultation with bank officials, a contract was negotiated where PSI would handle the Phase II ESA work ahead of the construction to identify potential problem soils, and handled the tracking and disposal of the excavated soils. What had been a couple of thousand dollar Phase I ESA, turned into a multi-million dollar job, when extensive contamination was found under the proposed location for two massive emergency generator tanks and other areas of the site. Coordination was maintained with the local regulatory agency regarding the historical release and confirmation samples collected to prove that the site was clean after remediation.

**As the Manager of the Environmental group at Clifton Associates, where the Sears was a Client:** Sears asked Clifton to handle the investigation and remediation of a petroleum release at the North Hill Mall, which had flowed through a permeable zone under a neighborhood in the Hounsfield Heights/ Briar Hill area. He corrected previous geological interpretations for the site, which had limited the understanding and identified potential concerns the plumes might pose to the local residents. Additionally, he broadened the scope of the potential contaminants of concern with his assessment knowledge, realizing that previous consultants had failed to account for certain volatile compounds that have since been discovered at the Site. Meetings were held frequently with a local citizens group to explain the site conditions, as well as the progress regarding the investigation. Meetings were held individually with local residents to gain their acceptance and permissions for the installation of monitoring wells on their property, and subsurface vapour wells to monitor the potential vapours that might intersect their structures. Concerns were discussed and alleviated. A large public meeting was held for the community to explain the location, size, and health issues related to both the local groundwater and vapour plumes.

**As the owner of Bifröst Environmental and Remediation Services, Inc. while working for an industrial Client attempting to sell a real estate location:** A Phase I ESA was completed on the site, which had been expected by the real estate agent to be an easy site to clear. During the Phase I ESA investigation, historical documentation, which had been missed during previous Phase I ESA investigations, was identified by Mr. Lehar during discussions with the provincial regulatory agency. The data identified the site as the location of a former hazardous waste operation that had buried wastes on the site and went bankrupt, while being investigated by the provincial regulatory agency. Documentation was located in older files from the 1990s that indicated the site had been partially cleaned up. The location of the previously buried drums was investigated by Bifröst during a Phase II ESA and thorough documentation accumulated to show that the area in question was free of contamination. The real estate transaction was completed without incident. Contact was maintained with the local City of High River during the transaction, as the current government administration had been unaware of this previous incident.

## Representative Technical Project Experience

- ❖ **Confidential Client, Calgary, Alberta** – Professional consulting services for a former propane distribution facility that has been sold, and the property converted into a retail strip center in the 1970s. After review of another consultant's prior reports, it was shown that they had failed to both determine the location of a suspected Site underground storage tank (UST), as well as that a gasoline service station had been present on the adjacent property. After the recommendation that the Client complete a geophysical survey on the property using ground penetrating radar as well as electromagnetics, the former location of the UST was found. It was also shown that the UST had been removed and allowed further investigation of the now determined potential source area. This saved the Client tens of thousands of dollars in unnecessary drilling, well installation, and sampling costs chasing the source area of a release. Additional work has been completed on the Site since, including air sampling, a risk management plan (RMP), monitoring, and well network repairs to comply with the RMP.
- ❖ **Confidential Client, Waiparous, Alberta** - Professional consulting services over the last four years for a wastewater spray field associated with a wastewater treatment plant, located at a Federal facility. Permits for the facility require sampling once every two years of the upper meter of soil at multiple locations, for indications of the accumulation of hazardous constituents associated with a spray irrigation process. Resulting laboratory analytical data were compared against the Alberta *Tier 1 Soil and Groundwater Remediation Guidelines* (current version in force at the time), as well as other standards and guidelines.
- ❖ **Confidential Client, Calgary, Alberta** - Professional consulting services for a commercial structure that a Client was interested in purchasing; however, the Client had their suspicions regarding the existing environmental reports. After review of the assessment and remediation reports, it was determined that the solvent remediation was not fully remediated, nor was the source conclusively identified. Further, a petroleum release identified on another portion of the property had yet to be delineated. Further investigation and remediation costs would exceed several tens of thousands of dollars at a minimum and could run into the millions. Additionally, the property would clearly fall into the jurisdiction of AEP, requiring full delineation and a RMP, at a minimum. The Client choose to pass on the deal after reviewing the analysis of information.
- ❖ **Various Confidential Clients, Alberta/British Columbia/Northwest Territories/Yukon** - Professional consulting services for a number of other environmental and remediation companies, organizing their field-collected and laboratory-analyzed soil and groundwater data and comparing it against the regulations, guidelines, and standards of the respective province where the sites are physically located. Several projects have required the review and revision of older data to accurately compare it against the current standards and to correct other consultant's mistakes.
- ❖ **Confidential Client, Calgary, Alberta** – Professional assessment services associated with the completion of drinking water sampling within a residential condominium complex in downtown Calgary. A previous testing event by another consultant identified the potential for lead to be present in the water supply. Testing was completed on numerous resident's water supply sources, including both hot and cold taps within bathrooms and kitchen. Common areas and restrooms were tested, as was water associated with the air conditioning system. High levels of lead and antimony were identified in portions of the system prior to interior filtration. After filtration by the building water supply system, the water was safe to drink for all units on all floors of the building.
- ❖ **Confidential Client, Airdrie, Alberta** – Professional assessment services associated with the completion of a Phase 2 Environmental Site Assessment (ESA) for a proposed housing subdivision. The results of the soil and groundwater sampling associated with one active and one abandoned petroleum well, indicated that contamination existed at both locations that may require remediation. The contamination associated with the abandoned well location appears to have been metals residuals associated with a sump or holding pond when the site was active. The source of the metals contamination of the groundwater associated with the active production well has not yet been determined.

- ❖ **Warwick Structures Group, Rocky View, Alberta** - Professional consulting services on an emergency basis to determine the extent of an arsenic release associated with blasting sands. The Client had been using a product for several years with the unintended consequences of residual metals associated with the product leaching into the subsurface. While collecting shallow soil samples, the suggestion was made to the Client to collect samples to a greater depth than originally contracted, so that if samples came back above *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (current version in force at the time), then the Client could submit additional samples from the subsequent intervals without completing additional drilling and still achieve vertical delineation, saving time and money.
- ❖ **Alberta Transportation, Alberta** – Contract acquisition and professional consulting services for former highway maintenance yards and satellite facilities, including review of previous consultant's work in both the Southern and North Central Regions. Much of this work included identifying and delineating petroleum and salinity releases from petroleum or salt distribution facilities, or retail petroleum service station sites acquired through right-of-way acquisitions.
- ❖ **Sears Canada, Calgary, Alberta** - Professional consulting services for a former service station site with a release that extends over 500 m through a residential neighborhood. Interfacing with various stakeholders including: residents, AEP, Alberta Health Services, a citizen's group, and off-site property owners. Completion of a site management plan that included: Site-specific risk assessment and Tier 2 revision; well abandonments; the installation of over 100 monitoring wells in five, unconsolidated lithologic units to complete the delineation; soil vapour network installation and monitoring; groundwater monitoring using HydraSleeves; and remediation using Plume Stop™.
- ❖ **Confidential Client, Edmonton, Alberta** - Professional consulting services for a former service station site including the review of historical records and previous consultant's reports. It was determined that the previous consultant failed to achieve the desired Tier 2 AESRD 2010 action levels, forcing additional review and remediation options. Options were generated for the limited disposal of soil that met the action levels, and allowed the Client to avoid costly additional remediation, saving \$0.5 million.
- ❖ **Xcellent One, Calgary, Alberta** – Work has consisted of a review of previous documents, sampling of soil and groundwater, acquisition of a sewer discharge permit for contaminated groundwater, the installation of a sub-slab devapourization system and groundwater interception trench. Additional work to be completed includes delineation of the plumes, a risk management plan, and submittals to the City of Calgary and Alberta Health Services.
- ❖ **Imperial Oil, Calgary, Alberta** – Professional consulting services for a downstream former service station site including the review of historical records and previous consultant's reports. During the review, it was determined that the costs associated with the planned remediation of the site could be significantly reduced if site-specific action levels were generated. Initial calculations associated with the revised action levels indicated that a savings in remediation cost of over 75% were obtainable.
- ❖ **Imperial Oil, High River, Alberta** – Professional consulting services for a downstream former bulk plant and service station site including the review of historical records and previous consultant's reports, completion of an aquatic pathway assessment (AQP), Phase II services and the excavation of an oil/water separator and associated sumps and piping.
- ❖ **Imperial Oil, Calgary, Alberta** – Professional consulting services for a former laboratory site including the review of historical records and previous consultant's reports that determined that residual radioisotopes might yet be present on the site, as their contribution was overlooked during previous assessments. Additionally, the likely origins of a volatile organic compound (VOC) plume were found and plans put in place to complete additional Phase II services to verify the generated conclusions.
- ❖ **National City Bank, Cincinnati, Ohio** - Professional consulting services for a property transaction on a commercial structure including the completion of a Phase I ESA. The Client's comfort level with Mr. Lehar during the Phase I ESA led to additional assessment, which identified the area of a proposed building addition to have been the location of a former industrial landfill. Soil was to be sent to a construction and demolition debris landfill. Mr. Lehar's regulatory knowledge prevented the soil from being improperly disposed of by the Client's contractor, and diverted it to a licensed sanitary facility after the soils were determined to be non-hazardous. The project also led to the discovery of an orphan UST and extensive groundwater recovery. The identification and proper disposal of the impacted soils



saved the Client millions of dollars in fines and secondary handling of the soils, while bringing in fees for the Company in excess of over \$1.2 million.

- ❖ **Joy and Associates, Lexington, Kentucky** - Professional consulting services for a property transaction on a commercial structure including the completion of a geophysical survey. Work by a previous consultant had determined that the property was clean. A Phase I ESA identified multiple recognized environmental conditions (RECs) including former drycleaners, filling stations, and a chemical manufacturing operation on the property. The geophysical survey identified a previously unknown UST that was associated with former dry cleaning operations.
- ❖ **The Ohio State University, Columbus, Ohio** - Professional consulting services for the completion of the Phase II ESA associated with the expansion of Ohio Stadium, "The Horseshoe." Prior geotechnical investigations revealed potential fuels and solvent contamination of the soils near the stadium. Mr. Lehar completed extensive soil, groundwater, surface sediment, and surface water investigations under the State of Ohio Voluntary Action Program (VAP) program protocols to place the Site in a position to complete a VAP risk assessment.
- ❖ **The Ohio State University, Columbus, Ohio** - Professional-consulting services for the construction of the Woody Hayes Athletic Center included the identification and assessment of microbial issues associated with a former roof leak and a porous exterior wall. Appropriate sampling and quantification of the mold, recommendations with respect to the remediation as well as oversight of the remediation allowed the project to stay on schedule.
- ❖ **Confidential Clients, Various Locations** - Professional consulting services for multiple property portfolio transactions on both undeveloped and commercial parcels. Phase I ESAs were completed on both urban and remote locations. Generally, transaction times required the completion of the portfolio within a three-week period. Identification of RECs led to additional Phase II ESAs, wetlands, asbestos, lead paint, mold, well abandonment, remediation, and other environmental issues.
- ❖ **Confidential Client, Springfield, Ohio** - Professional consulting services for a property transaction on a commercial structure during the Phase I ESA. The report included all required components according to American Society for Testing and Materials (ASTM) E1527 standards. Property structures were identified as having been built upon a former undocumented landfill. Identification of the landfill allowed the medical Client to end the transaction prior to the purchase of any historical liabilities related to the property.
- ❖ **Columbus Metropolitan Housing Authority, Columbus, Ohio** - Professional asbestos consulting services for a multi-story residential property led to the identification of asbestos within the drywall of the structure. Identification of alternative methods of laboratory analysis lead to the determination that the asbestos in the drywall was less than 1% and therefore not considered to be asbestos containing material by regulation; therefore, saving the Client over \$1.1 million dollars in abatement costs.
- ❖ **Columbus Airport Authority, Columbus, Ohio** - Professional consulting services for various Hazardous Materials Surveys completed on acquisition properties. These surveys included environmental consulting services related to the discovery of asbestos, lead paint, polychlorinated biphenyls (PCBs), solvents, petroleum products, pesticides, and mercury identified during the property inspections. Identification led to proper disposal of the materials prior to demolition of the property structures.
- ❖ **JD Contracting, Columbus, Ohio** - Professional consulting services for a property transaction including National Environmental Policy Act (NEPA) Federal Communication Commission (FCC) checklists on an existing commercial structure for the installation of a new radio transmission tower that was critical to the new Homeland Security Act regulations. Site responsibilities included the completion of all required NEPA documents and review by the Ohio (State) Historical Preservation Officer (SHPO). Approvals given by the SHPO office in minimal time with no further additional documentation required.
- ❖ **Licking Valley Local Schools, Newark, Ohio** - Jurisdiction Determination achieved for a wetland and stream on the site of a proposed school. Site work included Cultural Resource Assessment (CRM) of three locations, which identified former cabins and a former tavern, suspected to have been the first structures in Licking County. In-ground radon samples were collected from the proposed school location in an effort to help design sub-slab mitigation measures, if required.

- ❖ **Watkins Trucking, Columbus, Ohio** - Professional consulting services for a property transaction on a commercial structure including the review of past UST removal services provided by another firm. The report included all required components according to ASTM E1527 standards. Although facility had a No Further Action (NFA) letter from the State of Ohio, inaccurate and incomplete information in the Closure Report led Mr. Lehar to suspect that residual petroleum hydrocarbons might still be present at the facility in excess of State of Ohio standards. Completed Phase II ESA indicated that residual petroleum hydrocarbon contamination was present in excess of State of Ohio standards, allowing Client to recover costs against the current owner prior to completion of the property transaction.
- ❖ **Citizens Group, Vanlue, Ohio** - Provided professional consulting and litigation research services for a local citizens group attempting to block the installation of a dolomite/limestone quarry. Geologic review indicated a shallow, highly fractured, and karsted bedrock aquifer extremely susceptible to shallow contamination influence, as demonstrated through local residential well sampling. Researched cutting-edge environmental issues related to the use of ammonium nitrate fuel oil (ANFO) explosives in quarrying operations, and their associated residuals left to contaminate the groundwater. Applied the lesser-known Surface Mining Law (SML) as related to groundwater projects, versus the Surface Mining Rules (SMR). Reviewed the surface mining permits for technical adequacy and completeness. Reviewed the Ohio EPA Division of Air Pollution Control (DAPC) Permits to Install (PTI) and Permits to Operate (PTO) for technical adequacy and completeness.
- ❖ **Various Residents, Vanlue, Carey, and Alvada, Ohio** – Managed a low-cost residential ground water sampling and analysis program to homes in the area surrounding a local geologic feature known as “The Ridge.” Sampling for 13 parameters revealed that 17 of 23 (74%) wells exceeded Federal standards. This allowed residents to realize that their groundwater supplies were actually a potential danger to their health and to initiate action to install groundwater treatment systems to correct the problems.
- ❖ **Earth Tec Environmental of Ohio Bioremediation Facility, Columbus, Ohio** – Managed the site selection, design, and installation of a soil bioremediation facility within the Columbus, Ohio city limits. Mr. Lehar identified site selection requirements and necessary permitting requirements for installation and operation of the facility. Services provided included Ohio EPA air permit to install (PTI), air modeling, storm water permitting, and completion of the Ohio EPA Division of Solid and Infectious Waste (DSIW) Title 13 Director’s letter (OAC 3745-27-13) requesting authorization to begin construction on a former solid waste facility. Original data on petroleum-contaminated soils was collected to satisfy PTI requirements. All permitting requirements were fulfilled and the bioremediation facility is the only site of its kind in the Columbus City limits.
- ❖ **Confidential Client, Cleveland, Ohio** – Developed and managed a Phase II ESA based upon another firm’s incomplete Phase I ESA at a former pesticide application facility. Recommended to the Client extensive testing regimen based upon previous site historical usage. Analyses confirmed extensive contamination of site and Client refrained from purchase of the property, saving himself and his business several hundreds of thousands of dollars in cleanup and remediation costs.
- ❖ **Former Anchor Solid Waste Landfill, Columbus, Ohio** - Managed the conception, design, and development, of an explosive gas-monitoring plan under OAC 3745-27-12 for a Client-owned, former solid waste landfill who wished to lease the land to another interested party. Included interactive planning with regulatory personnel from the Ohio EPA. The initial monitoring yielded data that indicated that methane from an adjacent landfill was migrating to the Client’s property.
- ❖ **Confidential Client, Columbus, Ohio** – Managed Phase II and III ESAs, Risk Assessment, Remedial Action Plan design and implementation for an automobile sales and service facility where three leaking used oil USTs were formerly located. Previous investigations indicated that an extensive amount of soil and groundwater had been impacted and required remediation. Remediation was made difficult by the presence of an actively utilized service structure overtop the majority of contamination. A Remedial Action Plan (RAP) was designed to remediate both the soil and groundwater, while recovering free product. The RAP was designed in phases to minimize disruption of site commercial operations, while maximizing remedial efforts. Remediation was completed to all State of Ohio requirements.
- ❖ **Army Corps of Engineers, Crab Orchard, Illinois** - Served as the project manager for all sampling and analytical functions associated with this NPL (Superfund) Project, including submittal of the Quality

Assurance Project Plan (QAPP), Field Sampling Plan, and Air Monitoring Plan and their subsequent approval. Mr. Lehar was also responsible for the validation of all data packages to Level IV.

- ❖ **Air Force Center for Environmental Excellence, Eaker AFB, Arkansas** – Served as the Plan Development Support Manager of a team, which developed and submitted an Environmental Cleanup Plan (ECP) for Delivery Order #2 remediation activities. The ECP received minimal comment.
- ❖ **DOE, Portsmouth, Ohio** - Project manager and key data validation for several data validation projects involving Ohio EPA RCRA Closure rules at the Portsmouth Gaseous Diffusion Plant, near Piketon, Ohio. Data validation consisted of level III USEPA protocols per standard guidance and procedures. Full data validation has included all TAL/TCL parameters and several radiological compounds.
- ❖ **DOE, Paducah, Kentucky** - Lead hydrogeologist for the installation of twelve soil borings, nineteen monitoring wells, and four extraction wells at the Paducah Gaseous Diffusion Plant, near Paducah, Kentucky tracking a Technetium groundwater plume. This six-month project included the installation of pumps, transducers and data loggers, as well as unexpected changes in project scope due to the identification of a gas pocket at depth.
- ❖ **NCR Corporation, Cambridge, Ohio** - Project manager of a team, which gathered data on 34 groundwater-monitoring wells at this facility. All sampling was completed per USEPA and Ohio EPA guidance for landfill closures. All wells were properly purged, with pH, temperature, and specific conductivity data gathered prior to actual sampling, on a semi-annual basis. Associated groundwater potentiometric data was also gathered. Groundwater data characterized utilizing USEPA GRITS database statistical system.
- ❖ **Ohio Army National Guard, Columbus, Ohio** - Project manager for the RCRA closure of a UST at The Ohio Army National Guard's Willoughby, Ohio Armory. The closure consisted of the preparation of a sampling and analysis plan, quality assurance project plan, health and safety plan, and associated field sampling, data validation, and preparation of the closure report. This was the first RCRA closure done by The Ohio Army National Guard.
- ❖ **Ohio Department of Transportation, Southern Ohio** - Program Manager for a task order contract under (Ohio Department of Transportation) ODOT District 8. Task Order projects included Phase I and II ESAs, asbestos abatement oversight, TPH remediation oversight, and professional services consulting.
- ❖ **Chase Brass and Copper, Montpelier, Ohio** – This facility is a brass recycler that used vapour degreasers to clean brass scrap prior to smelting. Several releases occurred at the facility, including leaking degreasers, damaged USTs, and releases to a septic field that eventually found its way to a storm drain and creek. Field manager in charge of the installation of dozens of groundwater monitoring wells, which varied in depth from less than 50 feet to total depths of over 200 feet to sample for trichloroethylene (TCE).
- ❖ **ESC, Cambridge, Ohio** - Project manager for this radiological investigation of an old quarry fill suspected to contain radioactive slag from a local Nuclear Regulatory Commission (NRC) site. The Client was interested in putting a new multi-million dollar facility in place, and required a very thorough investigation to minimize potential liabilities.

References available upon request

## Contact Information

Mark A. Lehar, P.Geo.  
340 Midpark Way SE, Suite 300  
Calgary, Alberta, Canada  
T2X 1P1

mark.lehar@bifrostinc.ca  
Mobile - 587.777.5026

**Dual Citizen USA/Canada**



## Employment

Bifröst Environmental and Remediation Services, Inc. (Bifröst), Calgary, Alberta. January 2023 – Present  
*Contractor – Senior Environmental Engineer*

Athena Environmental Consultants Ltd., Calgary, Alberta. December 2014 – December 2022  
*Principal*

Williams Engineering Canada Inc., Calgary, Alberta. March 2013 – November 2014  
*Senior Environmental Engineer*

Biophilia Inc., Calgary, Alberta, March 1994 – March 2013  
*Principal*

University of Calgary, Faculty of Environmental Design, Calgary, Alberta. September 1999 – Present  
*Adjunct Assistant Professor*

Quality Certification Bureau, Edmonton, Alberta. October 1999 – December 2000  
*ISO 14001 Auditor*

Southern Alberta Institute of Technology, Calgary, Alberta. September 1996 – June 1999  
*Contract Instructor*

Golder Associates, Calgary, Alberta. March 1993 – April 1994  
*Senior Environmental Engineer*

H.F. Thimm & Associates, Calgary, Alberta. September 1990 – March 1993  
*Professional Associate*

University of Calgary, Calgary, Alberta. September 1988 – May 1989  
*Adjunct Assistant Professor*

Energy Resources Conservation Board, Calgary, Alberta. November 1986 – August 1987  
*Drilling Engineer/ Reservoir Engineer*

Energy Resources Conservation Board, Calgary, Alberta. July 1981 – November 1986  
*Environmental Engineer*

## Education

Master of Environmental Design (M.E.Des.), University of Calgary, 1990  
Bachelor of Applied Science (B.A.Sc.), Bio-Resource Engineering, University of British Columbia, 1981

## Certifications/Registrations

APEGA Professional Engineer #34444, Calgary, Alberta, January 1984\*  
\* Current

## Publications

W. Thorne, 2009. “Guidance Manual: Potential Impacts of Petroleum Hydrocarbon Contamination on Fish and Fish Habitat.” Fisheries and Oceans Canada.

W. Thorne, 1998. "Working and Negotiating with the Regulatory Authorities, Environmental Management of Processes and Projects, Integrating Health and Safety with Environmental Management, The Defence of Environmental Charges", Understanding Environmental Regulations – Due Diligence, Educational Program Innovations Centre, Faculty of Continuing Education, University of Toronto; Continuing Education Courses offered through the Calgary Environmental Trade Show.

W. Thorne, A. Basso, F. Bres, L. Ostrinsky, and S. Friesen, 1997. "Introduction to Environmental Engineering", Bangladesh Gas Engineers Training Program, Southern Alberta Institute of Technology.

W. Thorne, 1996. "The Field Collection of Environmental Data for Human and Environmental Risk Assessment", AIHA Alberta, Fall Technical Symposium, Risk Assessment, Communication and Management, Calgary.

W. Thorne, 1996. "Management of Contaminated Sites". Continuing Education Course, Environmental Services Association of Alberta and Canadian Prairie and Northern Section, Air & Waste Management Association; Environment Business South.

W. Thorne, A. Basso and S. Dhol, 1996. "Identification and Assessment of Trace Contaminants Associated with Oil and Gas Pipelines Abandoned in Place", ASME International Pipeline Conference, Calgary, Alberta.

H.F. Thimm and W. Thorne, 1995. "Cost Control in Environmental Assessments and Damage Evaluations", presented at the Society of Petroleum Engineers, Canadian Section, 3rd Annual Operating Cost Symposium, "The Challenge of Optimizing Operating Costs", Calgary, Alberta.

W. Thorne, 1993. "Management of Contaminated Sites". Continuing Education Course, Air and Waste Management Association Training Institute, Northwest Regional Centre, Calgary.

W. Thorne and R. Revel, 1991. "The Influence of Seeding Pattern and Physical Amendments on Crust Strength of Phosphogypsum Tailings and Biomass Production", Restoration Management Notes, Nov., University of Wisconsin Press.

H.F. Thimm, D. Poon and W. Thorne, 1991. "Water Management in the Oil and Gas Industry". Continuing Education Course, CIM (Petroleum Section), Society of Petroleum Engineers, Asia Pacific Oil and Gas Conference and Exhibition, Perth, Australia.

W. Thorne and R. Revel, 1989. "The Application of Germination Tests to Revegetation of Phospho-gypsum Tailings: Preliminary Findings", presented at the conference Reclamation, a Global Perspective, Calgary, Alberta.

W. Thorne, H. Lillo, and D. Beamer, 1985. "Ensuring Public Safety in the Event of an Uncontrolled Release of Sour Gas", presented at the Annual Meeting of the Air Pollution Control Association, Canadian Prairie and Northern Section, Calgary, Alberta.



## Representative Technical Project Experience

- ❖ **Phase I Environmental Site Assessments (ESA), Various Clients, Multiple Locations** – Phase I ESA projects have included greenfield agricultural sites, recreational facilities, multi-family residential sites, care homes, a funeral home, roads, shopping centres, auto dealerships, restaurants, former gasoline service stations, oil and gas well sites and other production facilities, multi-tenant commercial and industrial sites, heavy industrial sites such as a metals foundry and sandblasting facilities, tank farms, fertilizer plants, and a decommissioned oil refinery. Clients have included developers, private and public companies, and municipalities. The majority of the assessments were conducted for the purpose of establishing environmental due diligence in the refinancing of the property. The potential for contamination and other environmental liability was identified through a historical records search, site inspection, and follow up research where necessary. Assessments were performed to meet the applicable regulatory guidelines and professional practice standards such as CSA. Recommendations were made to proceed to Phase II ESA where there was evidence of a significant potential for the presence of site contamination. Cost saving measures for Phase II investigations were recommended where appropriate.
- ❖ **Confidential Client, Confidential Location, Alberta** - Co-ordinated and managed a team, and designed the assessment work, for a Phase I and Phase II Environmental Site Assessment of a refinery site that had undergone decommissioning and remediation. The work was conducted for a potential purchaser and our work was monitored by the site owner's environmental consultant. The Phase II ESA included excavation and sampling of test pits; drilling, installation, and sampling of groundwater monitoring wells; and installation and testing of wells for a potential domestic use aquifer (DUA) exclusion. Areas of residual contamination were identified and mapped.
- ❖ **Town of Okotoks, Alberta** - Conducted a Phase I and II ESA of a former landfill, now located in a residential area. Phase II ESA investigations included installation and sampling of both groundwater and methane monitoring wells. Designed and supervised the installation of a self-venting methane barrier to protect an adjacent public recreational facility. A Risk Management Plan for ongoing management of methane was developed. Monitoring of the methane wells is being conducted on an ongoing basis.
- ❖ **Confidential Client, Calgary, Alberta** - Conducted a Phase II ESA of a historical landfill with both permitted and non-permitted waste disposal areas. Prepared a landfill closure plan. Negotiated extensively with both the City of Calgary and Alberta Environment for acceptance of the closure plan. Implemented the closure plan and ultimately received regulatory closure. The area surrounding this former landfill has now been developed for residential and commercial use.
- ❖ **Confidential Client, Calgary, Alberta** – An application for an Approval under the Alberta Environmental Protection and Enhancement Act (EPEA) was prepared for the construction and operation of a new industrial facility. This process included division of responsibilities with the client for preparation of various sections of the application, and extensive communication to ensure the application process met corporate deadlines. Work is currently ongoing to assist the client in meeting the Approval conditions, including annual groundwater monitoring and reporting.
- ❖ **Confidential Client, Hussar, Alberta** – An application for an Approval under the Alberta Environmental Protection and Enhancement Act (EPEA) was prepared for an agricultural client for an existing recycling facility. Soil and groundwater monitoring is being conducted on an ongoing basis to ensure that EPEA Approval conditions are being met. Liaison and negotiation with Alberta Environment is also being conducted regarding the Approval conditions and interpretation of regulatory requirements.
- ❖ **Confidential Client, Calgary, Alberta** - Developed an E2 Plan for a large logistics warehouse with an ammonia refrigeration system, to meet the requirements of the federal Environmental Emergency Regulations. Services included but were not limited to documentation of plan administration and continual improvement procedures; ammonia system description, facility configuration, and measures for release prevention; determination of potential release scenarios through various methods; modeling of ammonia dispersion, flammability, and explosion hazard zones; and response procedures in the event of a release. Currently provide ongoing advice and support.



- ❖ **Confidential Client, Edmonton, Alberta** – Prepared a Management Plan for Hazardous Products to assist in the establishment of environmental due diligence in the management of multi-tenant industrial/commercial buildings. The Plan addressed the diverse range in the quantities and types of products and chemicals used and stored by the tenants, and that there is also a wide range in the familiarity of different tenants with the regulatory requirements and industry practices relating to hazardous products. The Plan was prepared to assist the building operators and tenants in meeting the requirements of the BOMA Best Practices framework. A checklist was prepared and implemented through annual inspections of the tenant operations to determine compliance with the Plan.
- ❖ **Confidential Client, Cochrane, Alberta** - A Phase I ESA was conducted which identified the potential for a drilling waste disposal area from a historical wellsite (dry hole). Drilling records were obtained and reviewed, and the presence of invert (diesel-based) drilling mud was identified. An area of buried invert drilling mud was identified, assessed, and then remediated through excavation. Groundwater monitoring wells were installed and sampled and the potential for groundwater contamination was ruled out.