LIONHEAD
ENGINEERING
A CCS Company

December 11, 2009

Culture and Community Spirit
Old St. Stephens College
8820 - 112 Street
Edmonton, Alberta, T6G 2P8

Attention: Mr. Ron Johnson, Restoration Officer

Gas Migration Test Report – Dingman # 1 Seep Area

Lionhead performed a gas migration test on the Dingman # 1 seep area on November 23, 2009. The objective was to delineate the seep area (see field diagram) and establish LEL percentages in the affected areas. Four sets of samples of the gas were also forwarded to Maxxam for carbon isotope analyses.

The findings are shown in the attached report. As small amounts of H2S in gas samples can frequently dissipate in sample bottles prior to being analyzed (as happened in this case), it was decided to take field H2S readings using a dragger tester. Three tube tests showed H2S readings of 90 PPM (parts per million) which can create off-site odors. The ERCB regulations (Directive 064) pertaining to off-site odor complaints are attached.

As a next step we would suggest locating the Dingman #1 wellbore to establish if any of the gas migration is emanating from the old wellbore or adjacent from the casing.

Please advise if further information is required.

Thank you.

Art Wichert

Art Wichert, P.Eng.
Engineering & Regulatory Compliance Manager
Lionhead Engineering: A CCS Company
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Ph - (403) 294 3027

LIONHEAD ENGINEERING
A CCS Company

ACCS

V016-09

Gas Migration Testing Report

Striving towards an accident free workplace!

Operation date:	23-Nov-09	Report No.	1

Well Name	Dingman #1		
UWI	00/14-06-020-02W5/0		
Project Type	Gas Migration Testing		
Today's Operation	Travel to location from base to conduct a gas migration test.		
Lionhead Project #	14581	AFE #	
Rig Information			
Rig			
Rig Mgr.		Ph	
Lionhead Engineering Personnel			
Field Supv.	Karl Hummel	Ph	780-779-1026
Hotel/Base		Fax	
Report to	William Hewitt	Weather	sunny
Project Mgr.		Ph	
Lease Cond.	good	Temp	-3

Well Pressures and SCVF test results

TP	N/A	kPa	CP	N/A	kPa	Int. CP	N/A	kPa

SCVF Test Result: N/A

Costs	Prev. Cost	Daily Cost	Cumm Cost
Engineering/Site Insp	$0	$0	$0
Lease & Road	$0	$0	$0
Fluids/Hauling	$0	$0	$0
Rentals/Tools	$0	$0	$0
Safety & Environment	$0	$2,519	$2,519
Waste Disposal	$0	$0	$0
SCVF Testing	$0	$1,150	$1,150
Hydrovac	$0	$0	$0
Packer Isolation Testing	$0	$550	$550
Surf Susp Compl Insp	$0	$0	$0
Surf Well Compl Work	$0	$0	$0
Downhole Susp Review	$0	$0	$0
Maintenance Crews	$0	$0	$0
Misc. Equipment/Supplies	$0	$0	$0
Other Services	$0	$720	$720
Supervision	$0	$2,450	$2,450
Eng. & Project Managemt	$0	$1,108	$1,108
Total	$0	$8,498	$8,498

AFE	$0	**AFE Remaining**	-$8,498

GAS MIGRATION TESTING DETAILS

Start time	
05:00	Contact Ron Johnson; 780-717-1133; travel to location to do walk around with LEL forehead monitor to check for any toxic explosives on site; conduct pre-job safety meeting; review and discuss all hazards that would be involved in operations today, and what we could do to mitigate these hazards; have lease line located to check for any buried pipe or wires; review line locators field diagram when completed; start at center of the fenced off part of the lease; using a gas powered auger to drill holes to 0.3m deep; plugging the holes to trap the gases; center hole was 100% LEL (right center of fenced area); drill more holes going North, South, East, West; every two, four and six meters and more until zero percent LEL was found as follows: **North-** 2 m was 2% LEL; 4 m was 2%LEL; and **6 m was 0% LEL** (still inside the fence) **East- 2** m was 100% LEL; 4 m as 18% LEL; 6 m was 15% LEL; **8 m was 0% LEL** (out side the fence) **South- 2** m was 10% LEL; 4 m was 14% LEL; 6 m was 5% LEL; 8 m was 27% LEL; 10 m was 28% LEL; **13 m was 0%** LEL (out side the fence) **West- 2** m was 12% LEL; 4 m was 35% LEL; **6 m was 0% LEL** (out side the fence) Drill holes going North, South, East, West out ~1 meter (could not auger close to well due to plate around the well below ground), no gas migration in that area. Drilling was very difficult do to alot of rocks in the ground so a gas powered heavy duty auger equipment was required and saved one full day of augering with hand powered auger; conducted testing from center hole with a dragger tester to test for H2S; three tubes came out the same showing 90 ppm; take and fill four sample bags with the leaking gas from the ground to be tested at Maxxam; take photograph of work site; pull all line locating stakes; load all equipment into truck; locked gate when left work site; travel back to base.
20:00	**SDFN**

Safety Topic Bump test monitors daily before using.

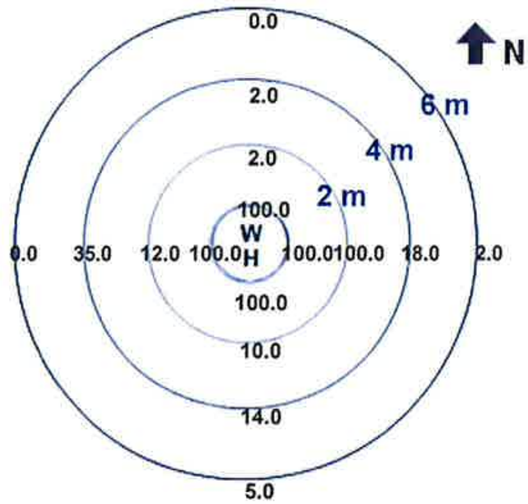
Job Obs	0	Journey Haz	0	LH Man Hrs	30	3rd P Hrs	14	LH kms	1018	3rd P kms	125
No. of people on site	4										
Hazard IDs	0					Near Misses	0				
Slips/Trips	0	Pinch Points	0	Driving	0	Miscellaneous	0				
Slips/Trips	0	Pinch Points	0	Driving	0	Miscellaneous	0				

GAS MIGRATION TEST REPORT

WELL NAME:	ROYALITE NO. 1	UNIQUE WELL IDENTIFIER :	00/14-06-020-02W5/0

GAS MIGRATION TEST % LEL MEASUREMENTS

DISTANCE	NORTH	EAST	SOUTH	WEST
At Fence Center	100.0 %	100.0 %	100.0 %	100.0 %
At 2m from Fence Center	2.0 %	100.0 %	10.0 %	12.0 %
At 4m from Fence Center	2.0 %	18.0 %	14.0 %	35.0 %
At 6m from Fence Center	0.0 %	2.0 %	5.0 %	0.0 %



Is Gas Migration a fire, public safety, or off lease environmental hazard? **NO**

Maximum LEL Reading: 100.0 %

EUB Classification: ______

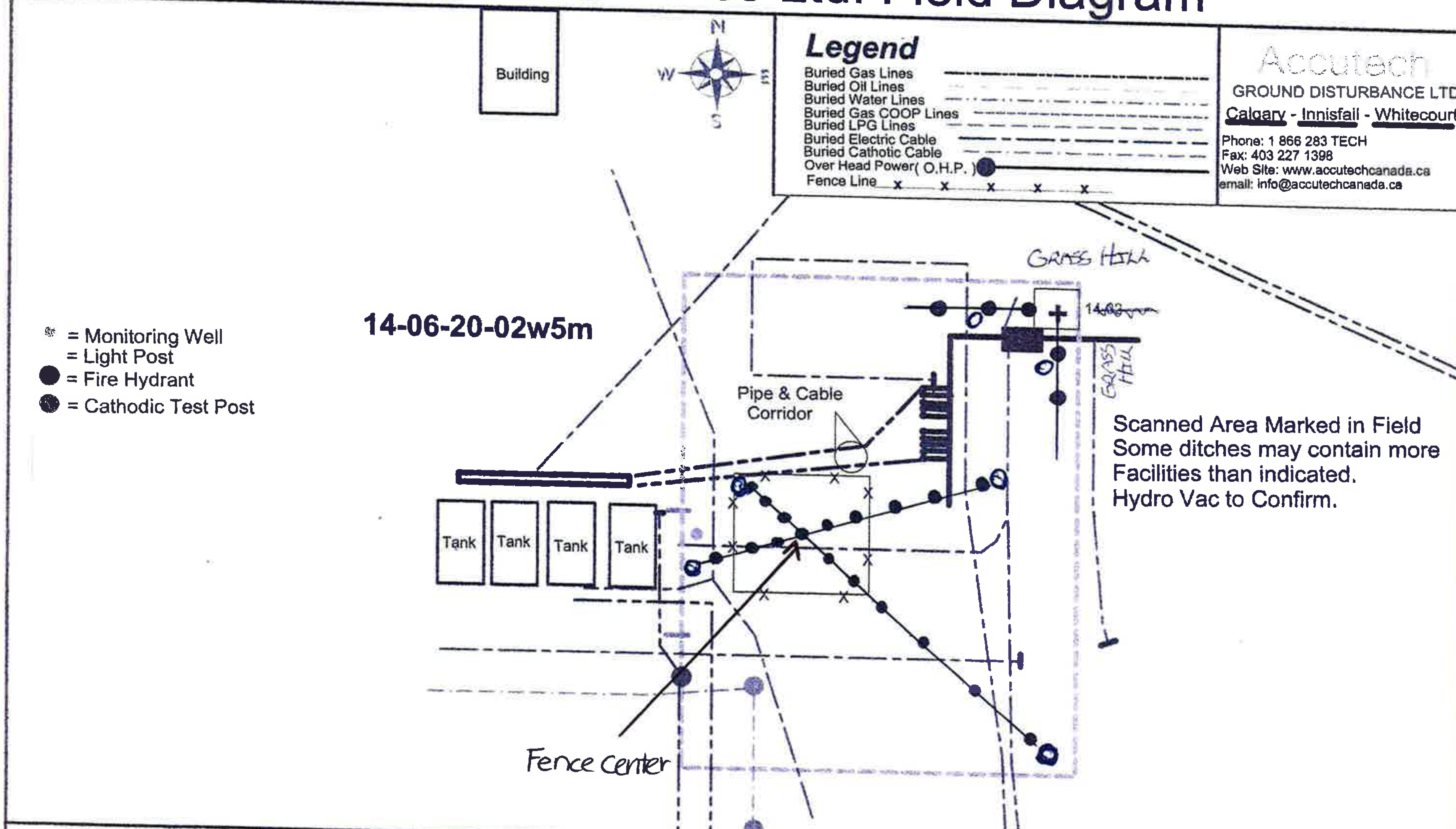
COMMENTS:

Please see DOR.

PICTURE(S):

TESTED BY:	Karl Hummel	TEST DATE:	23-Nov-09

Accutech Ground Disturbance Ltd. Field Diagram



Company: Lionhead Eng
Operator: David McDonald
Date: Nov 23 // 2009

Caution:
Every effort has been made to ensure this drawing accurately reflects the location of ALL lines at time of locating.

* A best effort has been made to accuratly locate any facilities shown, or not shown on this diagram. Accutech Ground Disturbance Ltd. cannot be held responsible for any damage or loss due to an inacurate locate.

Scale: NOT TO SCALE

0 12.5 25 50 metres

* Subject To Limitations *

ACCS

Gas Migration Test – November 23, 2009

100/14-06-020-02W5M/0

Gas migration test at center

Gas auguring holes

***Prepared by:* Lionhead Engineering**

ACCS

Gas Migration Test – November 23, 2009

100/14-06-020-02W5M/0

Picture of site with drilled holes

Picture of South and East side of lease

***Prepared by:* Lionhead Engineering**

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Gas Migration Test – November 23, 2009

100/14-06-020-02W5M/0

Picture of West side of lease

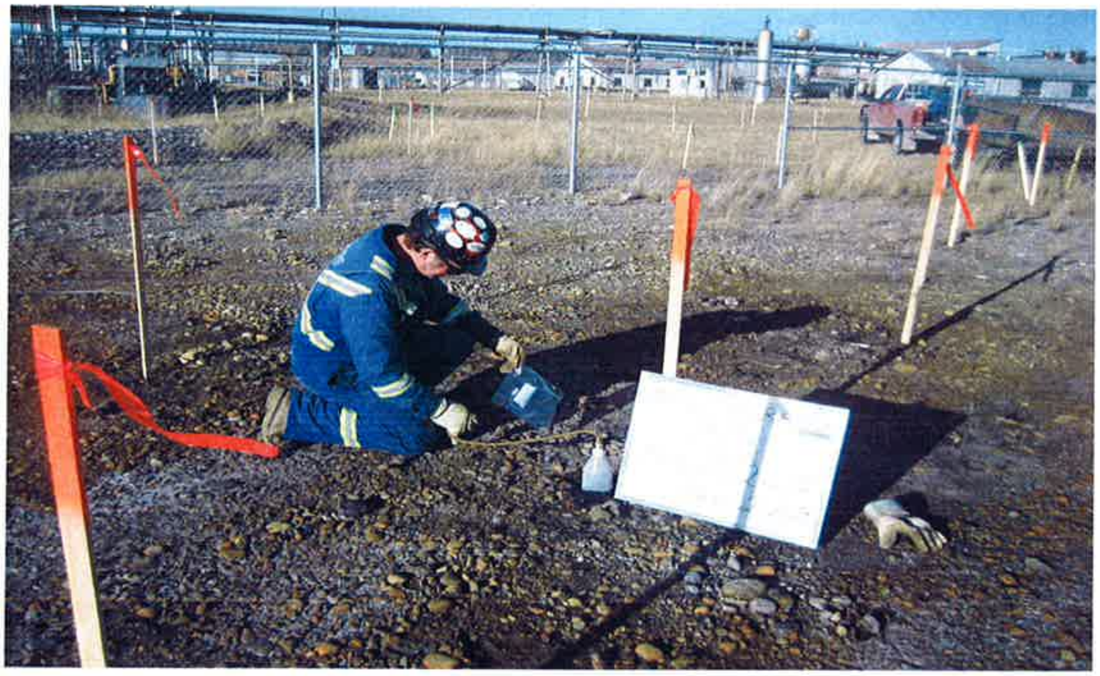
H2S testing with Dragger

***Prepared by:* Lionhead Engineering**

ACCS

Gas Migration Testing – November 23, 2009

100/14-06-020-02W5M/0



Picture of collecting gas samples

Picture of dragger test tubes

<u>Prepared by</u>: Lionhead Engineering

Maxxam Analytics
Driven by Service and Science

Dingman #1 Ground Gas Summary

Maxxam File #: A967654 – R91480
Date Sampled: n/g

Well Name: ROYALITE NO. 1
LSD: 100/14-06-020-02-W5M

Interpretations:

	Maxxam	Dr. Muehlenbachs
Ground Gas Possible Depth:	**1200 – 1500 m**	**N/A**
Ground Gas Possible Geologic Formation:	**Rundle**	**Rundle or Brown Sandstone**

Maxxam's Remarks:

- This gas is very similar to that of the gas sample taken from this location in August 2007 (A740949-G77168). It is also very similar to gases seen from 100/11-06-020-02-W5M.
- Based on the gas and carbon isotopic data, a possible source for this soil gas is the Rundle formation, at a depth of 1200 to 1500 m.

Dr. Karlis Muehlenbachs' Remarks (University of Alberta):

- Ground gas 14-6 has the isotopic fingerprint often seen in Turner Valley.
- Do not have enough production gas data to nail down source, but the source of these gases may be the Rundle or the Brown Sandstone.
- Gas has not changed much over the last few years.

- Maxxam's interpretation and remarks were done by Darlyce Simpson
- Email: darlyce.simpson@maxxamanalytics.com
- The University of Alberta interpretation and remarks were done by Dr. Karlis Muehlenbachs
- Email: karlis.muehlenbachs@ualberta.ca

Maxxam Analytics

GAS MIGRATION ANALYSIS

MaxxID	
Client ID	
Meter Number	
Laboratory Number	A967654:R91480
Operator Name	LIONHEAD ENGINEERING AND CONSULTING LTD.
LSD	14-06-020-02-W5M
Well ID	100/14-06-020-02W5/00**
Well Name	ROYALITE NO. 1
Initials of Sampler	N/A
Sampling Company	LIONHEAD
Field or Area	TURNER VALLEY
Pool or Zone	
Sample Point	DIGMAN #1 (GROUND)
Container Identity	TEDLAR BAG
Percent Full	
Test Recovery	
Test Type	
No.	
Multiple Recovery	
Interval From:	
Interval To:	
Elevations (m) KB	1198.5
Elevations (m) GRD	1198.5
Sample Gathering Point	
Solution Gas	
GPS	N 0.000000
GPS	W 0.000000
Production Rates: Water m3/d	
Production Rates: Oil m3/d	
Production Rates: Gas 1000m3/d	
Gauge Pressures kPa: Source	
Gauge Pressures kPa: As Received	21
Temperature °C: Source	
Temperature °C: As Received	
Well Fluid Type	
Licence No.	12009
Date Sampled Start	
Date Sampled End	
Date Received	2009/11/26
Date Reported	2009/12/09
Date Reissued	2009/12/09
Analyst	MW ,DT1

COMPOSITION

Component	Mole Fraction As Rec'd	ppm (v/v)	$\delta^{13}C$ ‰
H2	0.0004		
He	0.0001		
O2	0.0038		
N2	0.0177		
CO2	0.0169		
H2S	0.0000		
C1	0.7589		-42.41
C2	0.1098		-29.79
C3	0.0531		-27.43
IC4	0.0096		-27.96
NC4	0.0161		-27.74
IC5	0.0045		
NC5	0.0041		
C6	0.0029		
C7+	0.0021		
TOTAL	1.0000		

PROPERTIES

Calculated Molar Mass (Moisture Free as Sampled)	Calculated Gross Heating Value (MJ/m3) @ 101.325 kPa & 15°C	Calculated Relative Densities (Relative to Air @15°C)
21.6 (Total)	47.23 (GPA 2172)	0.747 (Moisture Free as Sampled)

Hydrogen Sulphide

On Site: Gastec (ppm v/v)	On Site: Tutweiler (mole%)	In Lab: Gastec (ppm v/v)	In Lab: Tutweiler (mole%)	In Lab: H2S from GC (mole%)
		<1		

Onsite analysis is required for accurate source H2S content.

H2S degrades variably in all sample containers and is also matrix dependant.

$$\delta^{13}C\ ‰ = [(^{13}C / ^{12}C_{sample} - ^{13}C / ^{12}C_{standard}) / (^{13}C / ^{12}C_{standard})] * 1000$$

INTERPRETATION

QC Check Std # 7540/5878 Date 2009/11/27 QC Passed Yes

** Information not supplied by client -- data derived from LSD information

Results relate only to items tested

Remarks:

CALGARY 2021-41 Avenue N.E., Calgary, Canada T2E 6P2 Tel: (403) 291-3077 Fax (403) 291-9468 GRANDE PRAIRIE #101, 7002 - 98 Street, Clairmont, Canada T0H 0W0 Tel: (780) 532-0227 Fax (780) 532-0288
EDMONTON 6744-50 Street, Edmonton, Canada T6B 3M9 Tel: (780) 378-8500 Fax (780) 378-8699 RED DEER Bay #3, 4845 79 Street, Red Deer, Canada T4P 2T4 Tel: (403) 341-8811 Fax (403) 341-8815

2009/12/09 15:23

Maxxam Analytics

Site: 14-06-20-02-W5M
Your C.O.C. #: 37440

Attention: WILL HEWITT
LIONHEAD ENGINEERING AND CONSULTING LTD.
1430, 717 - 7 AVENUE S.W.
CALGARY, AB
CANADA T2P 0Z3

Report Date: 2009/12/09

Job/Sample	Analysis Type	Well Name/Sample ID	Sample Point
A967654/ R91480	Carbon Isotope Gas	ROYALITE NO. 1	DIGMAN #1 (GROUND)

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

DARLYCE SIMPSON,
Email: dsimpson@maxxamanalytics.com
Phone# (780) 378-8500

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. SCC and CALA have approved this reporting process and electronic report format.

Report Distribution

2	Reports(A967654)WILL HEWITT	LIONHEAD ENGINEERING AND CONSULTING LTD.	1430, 717 - 7 AVENUE S.W.	CALGARY, CANADA
0	Reports(A967654)SARAH BARKS	LIONHEAD ENGINEERING AND CONSULTING LTD.	1430, 717 - 7 AVENUE S.W.	CALGARY, CANADA

Date of Issue 2009/12/09

All analyses are performed according to internal procedures that are based on current published reference methods.

Dr. Karlis Muehlenbachs' Carbon Isotope Abundance

07-Dec-09	LSD	SEC	T	R	M	Company	Sample ID	13C1	13C2	13C3	13iC4	13nC4	CO2
Dingman #1 Ground	14	6	20	2	5	Lionhead	A967654-R91480	-42.41	-29.79	-27.43	-27.96	-27.74	

Ground gas 14-6 has the isotopic fingerprint often seen in Turner Valley. Do not have enough production gas data in Turner Valley to nail down source, but the source of these gases may be the Rundle or the Brown Sandstone. Gas has not changed much over the last few years.

Carbon Isotope Abundance and Interpretations were done by Dr. Karlis Muehlenbachs at the University of Alberta
Email: karlis.muehlenbachs@ualberta.ca

Appendix 11 H_2S Odour Management Process

Purpose: To clarify off-site regulatory requirements for H_2S odour management.

For facilities ≥ 10 mol/kmol (1% H_2S), if an inspector or an air-monitoring unit detects H_2S odours off lease:

Off-site inspection/monitor results	Odour complaint/facility history	Action
Inspector/air monitor validates odours off lease.		• Licensee must control emissions immediately or suspend facility/operation until repairs can be made. • Licensee will be placed on EUB's Enforcement Ladder as a major noncompliance.

For facilities < 10 mol/kmol (1% H_2S), if an inspector or an air-monitoring unit detects H_2S odours off lease:

Off-site inspection/monitor results	Odour complaint/facility history	Action
Inspector/air monitor validates odours off lease.	• No complaint. • No complaint history (no odour complaints within last 12 months).	• Licensee must equip facility to control emissions within 30 days. • Failure to comply will result in suspension and major noncompliance.
	• Complaint received within 30 days of first inspection date.	• Licensee must control emissions immediately or suspend facility/operation until repairs can be made. • Failure to comply will result in suspension and major noncompliance.
Inspector/air monitor validates odours off lease.	• Initial (first) complaint.	• Licensee must control emissions immediately or suspend facility/operation until repairs can be made. • Failure to comply will result in suspension and major noncompliance.
	• Complaint received (documented complaint history on facility/ operation). • Previous odour mitigation requested by EUB.	• Licensee must suspend facility. • Licensee will be placed on EUB's Enforcement Ladder as a major noncompliance.

(continued)