

Agriculture and Resource Development Resource Development Division 360-1395 Ellice Avenue Winnipeg, MB

May 26th, 2025

Attn: Petroleum Inspectors

RE: (16-28-002-28) 100.05-03-003-28 W1M Pierson New Battery Application – Flare Stack at Single Well Battery

As per subsection 75(1) of the *Drilling and Production Regulation* Tundra Oil & Gas Limited is applying to construct a new battery to be located at 16-28-002-28 W1M surface location. A vapour collection system complete with separator and flare is to be installed at this single well battery to control H2S odors, ensure ambient air quality off lease, and ensure worker safety. This well is a few miles from the nearest tie-in point and is likely to remain producing to a tank for several years. Please review the following application.

- A) The application fee of \$1,000 has been requested from our accounting department and will be submitted via electronic transfer with the project name attached.
- B) The performance deposit for Tundra is currently topped up and up to-date.
- C) A survey plan of the well site has been included in the application package.
- C.1) The description of landowner consultation is attached in **Appendix A**. This appendix also includes the names and addresses for all the landowners and occupants within 1.5 km of the proposed battery. There were no objections received from the interested parties.
- D) (16-28-002-28) 100.05-03-003-28, well license #12345, will be the only well that will produce to this battery.
- E) This well expected to produce 10.0 m3/day oil, 15.0 m3/day water, and 0.10 e3m3/day gas. The well has a calculated GOR of 18. It is assumed that 100% of the gas will disperse in the separator and go to flare. A scrubber will be utilized to prevent odors when loading a truck to haul the fluid.
- E.1) A gas analysis for a similar well in the same targeted reservoir as this drill has been attached. This was used as an analog for gas dispersion modeling.
- F) Equipment specification.
 - There will be a separator, 2 400bbl test tanks, and a flare stack with an integral knockout drum on site. The well will be electrified from a new service provided by MB Hydro.
 - The CRN and Serial numbers of the separator and flare stack will be forwarded to the Branch when they are acquired.

- Separator Building Specs:
 - o 12' x 8.5' building on a skid
 - Vessel is 5' high x 28" OD. MAWP 500 PSI. 2 Phase separator
 - o 2" Taylor PSV "G" orifice set at 500 PSI
 - o MB CRN # TBD, SN# TBD
 - 3-way divert valve actuated for high level and high pressure
 - Scanner 2000 gas meter run with bypass
 - Nitrogen bottle
 - Building heater
 - Air compressor
- The flare stack is:
 - 3" dia. by 40' self-supported flare stack, Serial #TBD, mounted c/w the following:
 - Integral 24" diameter x 5' knockout drum
 - hand winch to raise/lower stack c/w cable
 - 3" 150# Flame Arrestor
 - Electronic Ignition System (120V) with stand
- G) This well will produce through the separator with a meter, and it is the only well producing to the tank, so it is tested daily.
- G.1) Flare and vapour system. All gas broken out in the separator will be directed to flare on site through piping off the gas leg.
- G.2) The results of the dispersion modelling for SO₂ included within **Appendix B.**

A comparable well in the same reservoir was used for modelling. All gas is being directed to the flare stack. As per the Dispersion Modeling Guidelines for Oil Batteries in the Province of Manitoba within Informational Notice 02-215 it is assumed that the combustion conversion of H₂S to SO₂ is 100% and the radiation heat loss is assumed to be 25%. Therefore, if 100% of the gas is collected and passes through the flare this location will be in compliance with ambient air quality for H₂S.

Air dispersion modeling for SO_2 was completed at expected production rates and show result of $42.52 \mu g/m^3$. These results are in compliance with regulations.

- H) Plot Plan: a proposed plot plan has been included in the application package. Tundra will complete an as-built survey of the site and forward it when construction is complete. For site planning, we will ensure the tanks are 25 meters away from the wellhead and the flare is 25 meters away from the tanks and the wellhead.
- I) A process flow diagram has been included in the application package.
- K) The oil & water from this location will be hauled to the 04-01-002-28W1M battery where it will be processed. The water will be disposed of between the 100.01-02-002-28W1M and 102.01-11-002-28 W1M disposal wells.

If you have any additional questions, comments, or concerns please contact me at (204) 851-6229 or by email.

Sincerely,



Shelby Benko

Facilities E.I.T.
Tundra Oil & Gas
295 3rd Ave.
Virden, Manitoba R0M 2C0
shelby.benko@tundraoilandgas.com

PLAN SHOWING SURVEY OF WELL SITE

TUNDRA PIERSON HZNTL 5-3-3-28WPM

Surface Location In

LS 16C Sec 28 Twp 2 Rge 28WPM

Bottom Hole L1 In

LS 5D Sec 3 Twp 3 Rge 28WPM

Bottom Hole L2 In

LS 6C Sec 3 Twp 3 Rge 28WPM

Municipality Of Two Borders

COORDINATES						
Wellbore	Davidani.	Booton muleu	Geograph	ic (CSRS)	UTM (CSRS) Zone 14	
vveiibore	Boundary	Rectangular	NAD 83	NAD 27	NAD 83	NAD 27
Surface 16C-28	60.00 S Reference: North East Section 28-2-28WPM		49°09'41.37" Lat 101°09'55.85" Long	49°09'41.32" Lat 101°09'54.27" Long	5447665.87 N 342126.88 E	5447444.59 N 342153.84 E
Landing Point	94.91 N Reference: South East 501.91 W Section 33-2-28WPM	185.25 N	49°09'47.36" Lat	49°09'47.32" Lat	5447855.64 N	5447634.37 N
2A-33		161.81 W } of Surface	101°10'03.84" Long	101°10'02.26" Long	341970.47 E	341997.43 E
Inflection	250.93 N Reference: South East 747.16 W Section 33-2-28WPM	341.51 N	49°09'52.42" Lat	49°09'52.38" Lat	5448018.82 N	5447797.56 N
2C-33		406.97 W } of Surface	101°10'15.94" Long	101°10'14.36" Long	341729.92 E	341756.88 E
Bottom Hole L1	737.53 N Reference: South West 295.59 E Section 3-3-28WPM	2555.92 N	49°11'04.09" Lat	49°11'04.05" Lat	5450259.94 N	5450038.77 N
5D-3		1385.52 W } of Surface	101°11'04.27" Long	101°11'02.68" Long	340815.23 E	340842.27 E
Side Track	105.65 N Reference: South East 518.78 W Section 33-2-28WPM	196.00 N	49°09'47.71" Lat	49°09'47.67" Lat	5447866.87 N	5447645.60 N
2A-33		178.67 W } of Surface	101°10'04.67" Long	101°10'03.09" Long	341953.92 E	341980.88 E
Bottom Hole L2	737.64 N Reference: South West 459.53 E Section 3-3-28WPM	2556.02 N	49°11'04.10" Lat	49°11'04.05" Lat	5450255.36 N	5450034.19 N
6C-3		1221.58 W } of Surface	101°10'56.17" Long	101°10'54.58" Long	340979.09 E	341006.13 E

461.79 A61.57 **6**460.91 460.46 460.77 CE 461

GROUND ELEVATIONS

AREAS				
	Location	Hectares	Acres	
Well Site	NE28	1.265	3.13	
Work Space	NE28	0.175	0.43	

LANDOWNERS

00 401
LICENCING
The proposed surface:
Is at least 45m from any surveyed road
Is at least 75m from any surface improvement other than a well, flowline or road allowance ¹
Is at least 100m from any water covered area
Is at least 200m from any occupied dwelling, public facility or urban centre
Additional Information:
Is at least 6.0km from the centre of an aerodrome subject to an Airport Zoning Regulation

NE Sec 28 Twp 2 Rge 28WPM Title No: 2719528/2 Owner(s): Darren Wade Mayes

MANITOBA LAND SURVEYOR'S CERTIFICATION

Yes No

I Brendan L. Wood, Manitoba Land Surveyor certify that the survey represented by this plan is correct and true to the best of my knowledge and was completed on the 8th day of January, 2025.

This is a copy of an original plan, signed and sealed by Brendan L. Wood, Manitoba Land Surveyor, on January 21st, 2025.

+/-1370m from the nearest occupied dwelling (NW 33-2-28WPM)

+/-6.8km from the nearest urban centre (Pierson)

Proximities: ¹Buried Telecom

The original plan is held on file in the office of Caltech Manitoba Land Surveying Inc. This copy has been prepared for distribution via electronic and other means Should there be a discrepancy between this document and the original document, the signed, sealed original shall govern.

OPERATOR



ASSOCIATION OF MANITOBA LAND SURVEYORS PERMIT

CALTECH MANITOBA LAND SURVEYING INC.

No. 2017-9

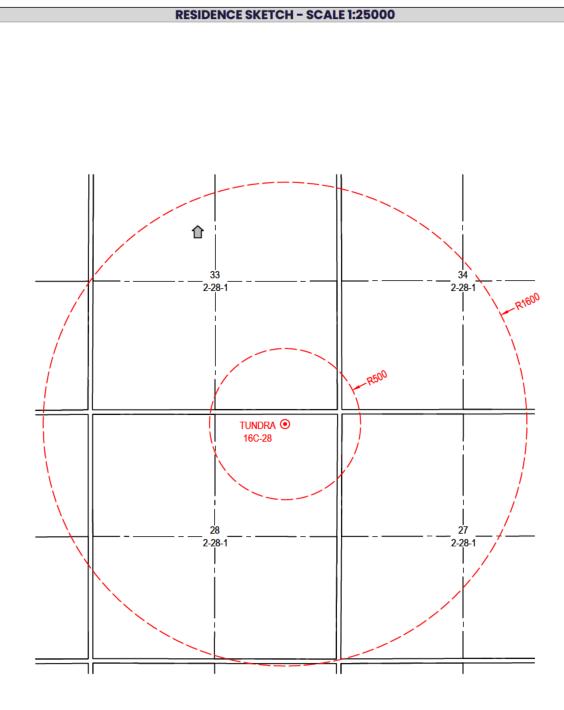
•
Tundra Oil & Gas

	REVISION TABLE				
Rev.	Date	Description	CA/DR/QA		
0	2025.01.21	Issued	/BM/SB		



Virden, MB Brandon, MB 1-888-263-8055 caltechgroup.com

		0 Revision
Caltech No: 25-0002-00-AWS01-R0	FS: CNM	Page 1 of 6





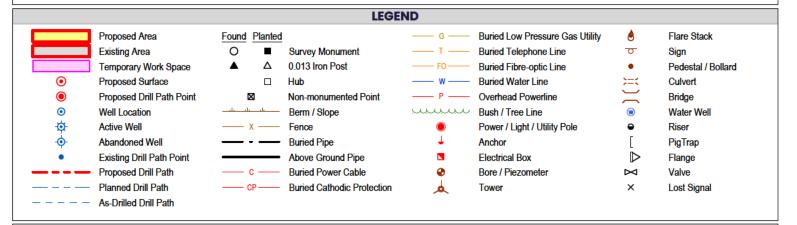
Proposed Surface

企 Occupied Residence

Unoccupied Residence

Public Facility

Information beyond outer radius circle not shown



Geodetic Datum: CGVD2013/NAD83(CSRS) Precise Point Positioning Scale: 1:5000 (unless otherwise stated).

Distances are ground and in metres and decimals thereof.

Bearings shown are UTM Grid, NAD83 (CSRS) Reference Meridian 99° (Zone 14) unless otherwise shown and are derived from GNSS observations.

Rectangular and Cartesian coordinates are True North.

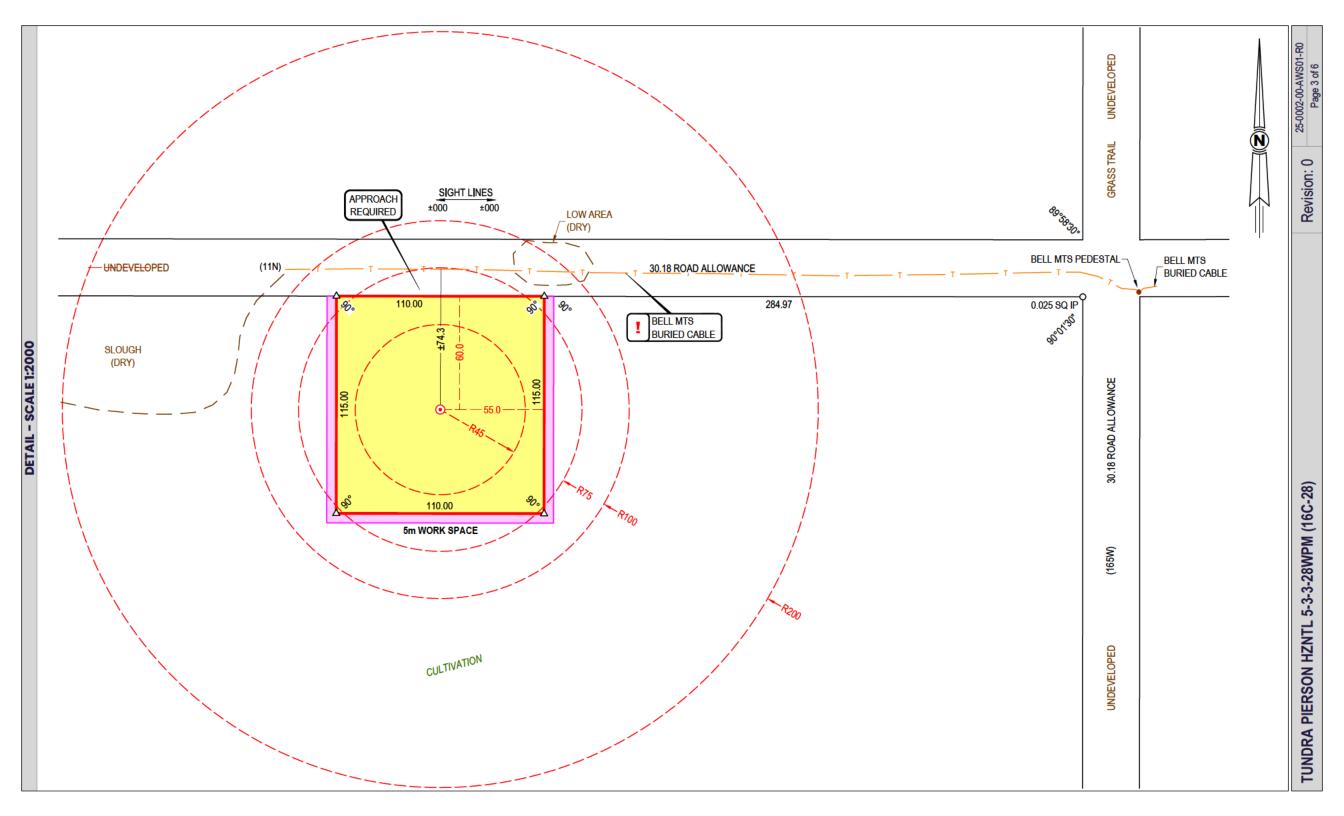
To obtain True North bearings apply Convergence at Surface: -1°38'20"

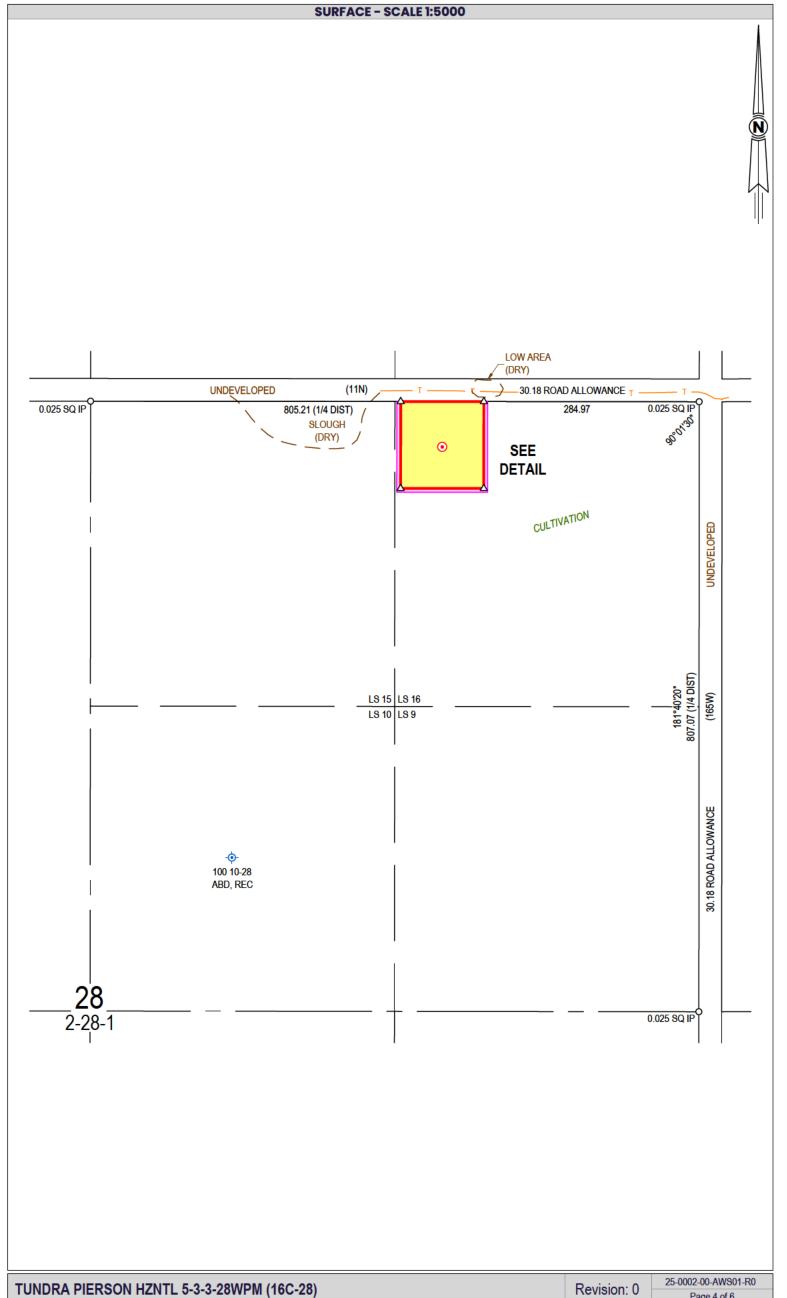
Surrounding information provided by NRND/IHS, Caltech assumes no responsibility for the accuracy of the data provided.

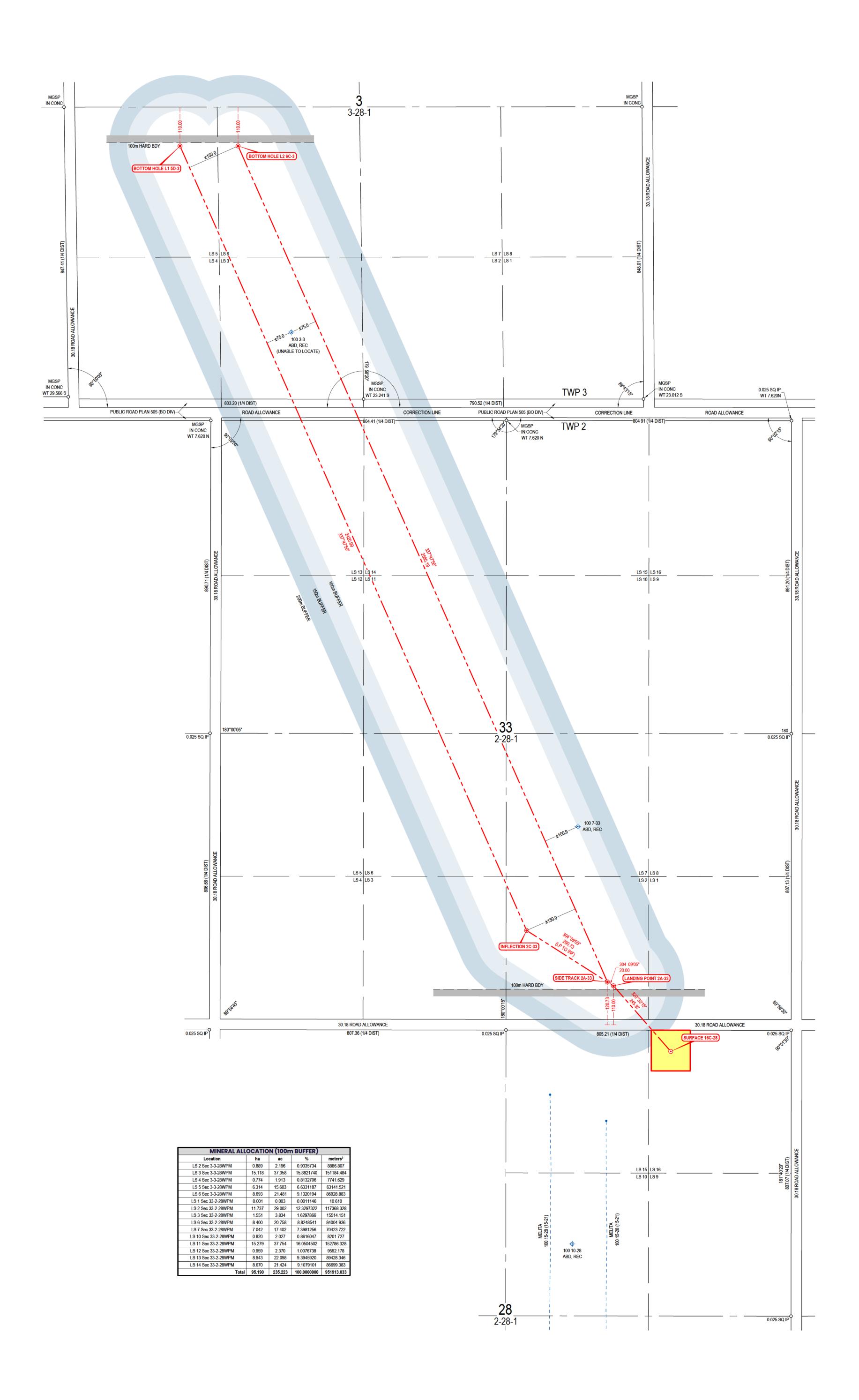
All plans referred to are on record in the Brandon Land Titles Office.

Due to the limitations of the electronic devices used to locate underground facilities, it should not be assumed that the locations and/or depths shown on this plan of survey are exact or that all underground facilities are shown. Caltech and any of its employees take no responsibility for the accuracy of the underground facilities shown and all underground facilities should be located by the respective authorities prior to construction.

Contact Click Before You Dig MB before digging 1-800-940-3447.



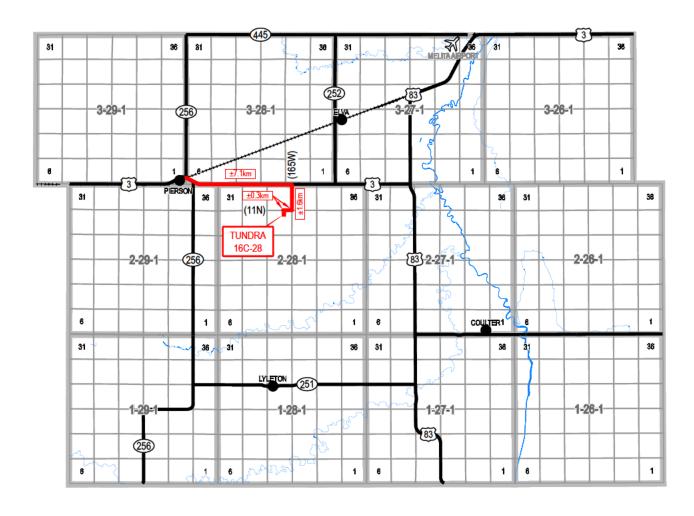




TUNDRA PIERSON HZNTL 5-3-3-28WPM (16C-28)

ACCESS ROUTE SKETCH - SCALE 1:250000







GAS ANALYSIS

07000779A 25GS259248A Container Identification Sample Point Code Meter Code AGAT WDMS Number Previous Number Laboratory Number TUNDRA OIL & GAS LIMITED WELLHEAD CASING 100/07-10-003-28W1/02 Operator Name Sampling Point Unique Well Identifier TUNDRA PIERSON HzNTL 7-10-3-28 10819 08-09-003-28W1 Well Name Well License Well Status Well Fluid Status LSD KJ **PIERSON** MISSION CANYON 3A AGAT/ESTEVAN Field or Area Pool or Zone Sampler's Company Name of Sampler Test Interval (mKB) Elevation (m) Pressure (kPa) Temperature (°C) 90 467.80 463.70 60 6 23 KΒ GRD Received From: To: Test Type Test No. Source Source Received Mar 18, 2025 Mar 19, 2025 Mar 25, 2025 Mar 25, 2025 Calgary - Mukhinderjeet Kaur - Reporter Date Analyzed Location - Approved By - Title Date/Time Sampled Date Received Date Reported

COMPOSITION

Other Information :

FIELD H2S BY TUT= 2.7010%; LAB H2S BY GC= 0.5366 %

	Mole F	raction		
Component	Air Free As Received	Air & Acid Gas Free As Received	Liquid Volume mL / m³	Mole Fraction of Previous Analysis
H₂	0.0001	0.0001		
He	0.0005	0.0005		
N ₂	0.1494	0.1564		
CO ₂	0.0178	0.0000		
H₂S	0.0270	0.0000		
C ₁	0.3327	0.3482		
C2	0.1291	0.1352	458.8	
С₃	0.1675	0.1754	615.5	
<i>i</i> C₄	0.0291	0.0305	127.1	
nC₄	0.0843	0.0883	354.7	
<i>i</i> C₅	0.0242	0.0253	118.1	
nC₅	0.0271	0.0284	131.1	
C ₆	0.0086	0.0090	47.2	
C ₇ +	0.0026	0.0027	16.1	
TOTAL	1.0000	1.0000	1868.6	

WDMS Data Verification Check

Exceeds normal limits: IC5, NC5, N2

PROPERTIES

Calculated Heating Value @15 °C & 101.325 kPa (MJ/m³) Gross 0.54 61.44 63.64 55.90 57.91 Air Free as Moisture & C₇+ Moisture Air Free as Moisture & Received Acid Gas Free Free Received Acid Gas Free

Calculated Density				
Relative			Absolute	
1.167	1.160	3.478	688.8	1.429
Moisture Free	Moisture & Acid	C ₇ + Moisture	C ₇ + Density	Total Sample
As Received	Gas Free	Free	(kg/m³)	Density (kg/m³)

Calculated Pseudo Critical Properties					
	As Sampled	Acid	Acid Gas Free		
4384.8 pPc (kPa)	276.5 _{ρTc (K)}	4198.6 pPc (kPa)	273.2 pTc (K)		

Hydrogen Sulfide (H₂S) (ppm)					
Fiel	d Value	Lab	oratory Value	g/m³	
	27010			38.84	
Stain Tube	Tutweiler	Other	GC-SCD		

Calculated Molecular Weight (Moisture Free as Received) (g/mol)		
33.8	100.7	
33.0		

Calculated Vapour Pressure	Gas Compressibility
106.30	0.9864
C_s + (kPa)	@15 °C & 101.325 kPa

Battery Application (16-28-002-28) 100.05-03-002-28W1

Appendix B- Gas Dispersion Modelling

Screen3 Calcula	tor Assum	otions					
Company	Tundra Oi	l &Gas		Date Reviewed	20-May-25		
Facility	(16-28-2-2	28) 100.5-3-3-28		Name	S. Benko		
RED are inputs							
Oil (m3)	10			Treater	Flare	Tank Vent	
H20 (m3)	15		% volume of total	0	100	0	100
GOR (m3/m3)	18		m3	0	180	0	180
Total Gas=	180	m3					
Mole Fraction	0.027		Date of test	18-Mar-25			
	Treater		Flare		Tank Vent		
Vent Height (m Stack ID (m)		Vent Height (m) Stack ID (m)		Vent Height (m Stack ID (m)	0.0762		
	point	551 194	point	2	point	Source	
RESULTS							
Flare Vent stack Exit	Flow Rate	0.000056250	m3/s				
Emission Rate	H2S SO2	0.081079313 0.152407688					
Vent stack area Vent stack exit		0.004560233 0.45684802	10 10 T				



Sour Gas Flare Properties

Company Facility Case Tundra Oil & Gas (16-28-2-28) 100.5-3-3-28 Wellhead

Solution Gas

			_	
ы	0	w	Ra	te

Gas Stream	flare	scrubber	total gas	
Flow Rate	0.180	0.000	0.180	103 m3/d at 15°C and 101.3 kPa
Percentage	100.0	0.0	100.0	%
Reference Temp	15	15	15	°C

Composition (drv)

composition (ary)					
H ₂	0.0001		0.0001	Mole Fraction	
He	0.0005		0.0005		
N ₂	0.1494		0.1494		
CO2	0.0178		0.0178		
H ₂ S	0.0270		0.0270		
C ₁	0.3327		0.3327		
C ₂	0.1291		0.1291		
C ₃	0.1675		0.1675		
IC4	0.0291		0.0291		
n C ₄	0.0843		0.0843		
iC ₅	0.0242		0.0242		
n C ₅	0.0271		0.0271		
C ₆	0.0086		0.0086		
C7+	0.0026		0.0026		
otal	1.0000	0.0000	1.0000	1	

Gas Stream Properties

Molecular Mass	33.79	0.00	33.79	kg/kmole
Net Heating Value	55.90	0.00	55.90	103 m3/d at 15°C and 101.3 kPa
Net Heat Release Rate	27,815	0	27,815	cal/s
Equivalent SO ₂ Inlet	0.013	0.000	0.013	t/d
Equivalent SO ₂ Inlet	0.15	0.00	0.15	g/s

Stack Parameters

otdok i didilicters			
Flare Stack Height	12.2	m	
Flare Stack Diameter	76.20	mm	
Actual Exit Velocity	0.48	m/s	
Length of Flame:	0.77	m	
Heat Intensity at Base	1.05	kW/m ²	Background = 1.04 kW/m ²
Conversion Efficiency	100.00	96	
Radiation Loss	25	96	(Brode => 55%, AENV => 25%)
Sensible Heat Release	20,861	cal/s	Based on conversion efficiency & radiation loss

Model Input Parameters

Effective Stack Height	12.81	m	(per EPA and Beychok, M.; 1979)
Pseudo-diameter	0.944	m	based on actual exit velocity
Actual Exit Velocity	0.48	m/s	
Exit Temperature	1273	K	1000 °C
Ambient temperature	288	K	Pseudo temperature for modelling

Emissions

SO ₂ Emission	0.152	g/s	Based on user-specified conversion efficiency
H₂S Emission	0.000	g/s	Based on user-specified conversion efficiency
NO _x Emission	0.003	g/s	Based on US EPA AP-42

RWDI West Inc.

Consulting Engineers 1800, 840-7th Avenue S.W. Calgary, Alberta, T2P 3G2

Tel: (403) 232-6771 Fax: (403) 232-6762 Email: info@rwdiwest.com Website: www.rwdiwest.com

Model Results:

05/21/25

*** SCREEN3 MODEL RUN ***

*** VERSION DATED 13043 ***

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = FLARE

EMISSION RATE (G/S) = 0.152408

FLARE STACK HEIGHT (M) = 12.2000

TOT HEAT RLS (CAL/S) = 20861.0

RECEPTOR HEIGHT (M) = 0.0000

URBAN/RURAL OPTION = RURAL

EFF RELEASE HEIGHT (M) = 12.7292

BUILDING HEIGHT (M) = 0.0000

MIN HORIZ BLDG DIM (M) = 0.0000

MAX HORIZ BLDG DIM (M) = 0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.

THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = $0.346 \text{ M}^{**}4/\text{S}^{**}3$; MOM. FLUX = $0.211 \text{ M}^{**}4/\text{S}^{**}2$.

*** FULL METEOROLOGY ***

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST CONC U10M USTK MIX HT PLUME SIGMA SIGMA

(M) (UG/M**3) STAB (M/S) (M/S) (M) HT (M) Y (M) Z (M) DWASH

1. 0.000 1 1.0 1.0 320.0 22.23 0.62 0.49 NO 100. 36.58 1 1.0 1.0 320.0 22.23 26.99 14.21 NO 200. 41.86 3 1.0 1.0 320.0 22.16 23.77 14.29 NO 300. 37.44 3 1.0 1.0 320.0 22.16 34.40 20.51 NO 4 1.0 1.0 320.0 22.05 29.57 15.50 NO 400. 37.11 500. 34.29 4 1.0 1.0 320.0 22.05 36.24 18.49 NO 600. 30.04 4 1.0 1.0 320.0 22.05 42.80 21.38 NO 700. 25.92 4 1.0 1.0 320.0 22.05 49.26 24.18 NO 800. 22.34 4 1.0 1.0 320.0 22.05 55.64 26.91 NO 900. 19.34 4 1.0 1.0 320.0 22.05 61.94 29.59 NO 4 1.0 1.0 320.0 22.05 68.18 32.20 NO 1000. 16.86 1100. 14.94 4 1.0 1.0 320.0 22.05 74.36 34.23 NO 1200. 13.34 4 1.0 1.0 320.0 22.05 80.48 36.19 NO 6 1.0 1.1 10000.0 29.29 43.30 17.14 NO 1300. 13.28 6 1.0 1.1 10000.0 29.29 46.29 17.90 NO 1400. 13.44 1500. 13.46 6 1.0 1.1 10000.0 29.29 49.26 18.64 NO 1600. 13.39 6 1.0 1.1 10000.0 29.29 52.21 19.37 NO MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M: 220. 42.52 3 1.0 1.0 320.0 22.16 26.03 15.60 NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)

DWASH=NO MEANS NO BUILDING DOWNWASH USED

DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED

DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED

DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

