

Edith Chin Senior Manager, Upstream Regulatory Strategy Regulatory Affairs Tel 416 495 5499 Edith.Chin@enbridge.com Enbridge Gas Distribution 500 Consumers Road North York, Ontario M2J 1P8 Canada

VIA RESS, EMAIL AND COURIER

December 20, 2015

Ms. Kirsten Walli Ontario Energy Board P.O. Box 2319 2300 Yonge Street, 27th Floor Toronto, ON M4P 1E4

Re: Enbridge Gas Distribution Inc. ("Enbridge") Ontario Energy Board ("Board") Amendment to EB-2015-0303 Application to Drill Well TC 9H (Horiz#2) Moore 4-20-X

On October 14, 2016, Enbridge Gas Distribution Inc. ("Enbridge") applied to the Ministry of Natural Resources and Forestry ("MNRF") for permission to drill a well within the Corunna Designated Storage Area. Pursuant to section 40 of the Ontario Energy Board Act, 1998, S.O. 1998 c.15, Schedule B, the Minister of Natural Resources is obligated to refer the application for the granting of a license related to a well in a designated storage area to the Ontario Energy Board for a report. Enbridge understands that the MNRF referred the application to the Board on November 28, 2016.

The proposed well is a second attempt to drill a well as described in Enbridge's EB-2015-0303 application. The first attempt (TC 9H1) was drilled in June 2016, but unfortunately did not provide the desired results. Other details can be found in Enbridge's October 14, 2016 letter to the MNRF. Although a separate well license is required for this second attempt for the TC 9H well, it is essentially an extension to the original TC 9H1 well application. There will not be any additional impact that was not examined in the EB-2015-0303 Report of the Ontario Energy Board to the Ministry of Natural Resources and Forestry Application dated March 10, 2016.

Enclosed please find the drilling applications filed by Enbridge with the MNRF. Enbridge requests that the Board recommends the granting of the license application.

Please contact the undersigned if you have any questions.

Sincerely,

(Original Signed)

Edith Chin Technical Advisor, Upstream Regulatory Strategy



Enbridge Gas Distribution Inc. Gas Storage Operations 3501 Tecumseh Road Mooretown, ON, NON 1M0

October 14, 2016

Ministry of Natural Resources and Forestry Petroleum Operations Section 659 Exeter Road London, Ontario N6E 1L3

Attention: Ms. Sherry Pineo, Manager Petroleum Operations Section

Subject:Submittal of Drilling Application for: TC 9H (Horiz#2) Moore 4-20-X An Amendment to EB-2015-0303

Enclosed, please find the drilling application for a proposed second horizontal leg to be added to TC 9H (Horiz#1), Moore 4-20-X (TC 9H1; WL# 12483) gas storage well located in the Corunna Designated Storage Area. The application includes two copies of the Form 1, two copies of the Wellsite Survey, two copies of the Drilling Program. The application fee will be sent by cheque from our Toronto office. It is our hope to start the drilling of the well by February 1st, 2017. We would be pleased to meet with you to review or clarify any portion of the applications. The following two sections outline the work that has been completed to date and our proposal for future work:

Drilling History and Results:

The TC 9H1 well was drilled in June 2016 to replace approximately 23% of the deliverability that was lost due to the abandonment of two wells and the conversion of one injection well to an observation well. Unfortunately, the TC 9H1 did not provide the volume needed to replace the lost deliverability. The well was targeting an excellent porosity zone, interpreted to be at a depth of 680 metres (-480m subsea), coincident with the porosity zone identified at the TC 3 well, located 200 metres to the west of the horizontal well. TC 9H1 followed the directional plan and reached -480mSS at 796 metres MD (measured depth). The well remained close to horizontal and at the -480mSS elevation until a total depth of 940 metres MD. The porosity predicted at the -480mSS elevation was not encountered and only limited porosity was seen during the drilling of TC 9H1. It is concluded that the TC 9H1 horizontal path was too far removed from the porosity seen at the TC 3 well. Figure 1, attached to this letter, illustrates the location of TC 9H1, the porosity zones associated with the vertical wells and the proposed path of second horizontal leg.

Second Horizontal Leg Proposal:

A second horizontal leg, named TC 9H (Horiz#2), Moore 4-20-X (TC 9H2) is proposed in the Corunna Gas Storage Pool. The well would utilize the existing vertical wellbore and

Page 1 of 2

kick-off below the 219mm casing which is set at 661.8m MD. The second leg would target a consistent porosity zone seen at existing vertical wells, TC 1, TC 4, and TC 5. It is projected that the horizontal portion of the TC 9H2 well would begin at an elevation of -487mSS and would extend down to an elevation of -490mSS at a total depth of 930m MD. The proposed second leg would be drilled east of the path of the first leg and closer to the vertical wells.

The drilling pad remains in place from the summer of 2016. There will be no additional lands required for the drilling of the second leg, as Enbridge is planning on utilizing the TC 9H1 wellbore. There will be no additional casing installed and the second horizontal leg will be drilled below the 219mm production casing. The procedures used to drill the second horizontal leg will be consistent with those used to drill TC 9H1. Therefore, there will be no change to the Risk Assessment or Environmental Assessment that were submitted for TC 9H1.

The landowner, Mr. Richard Wellington, was notified that the drilling pad would remain until 2017 and that there was a possibility of additional drilling at the site. Mr. Wellington will be compensated for the occupation of his property in both 2016 and 2017.

Although a separate well licence is required to drill this second horizontal leg in the TC 9H well, it is essentially an extension to the original TC 9H1 well and requires a technical review only. There will not be any additional impact that was not examined in the original EB-2015-0303 Report of the Ontario Energy Board to the Ministry of Natural Resources and Forestry Application¹. Enbridge will accept the same Conditions of Approval proposed by the OEB staff in EB-2015-0303 and will drill, operate and maintain the well in accordance with all applicable Acts, Regulations and Standards.

If any further information is required please contact the undersigned at 519-862-6032.

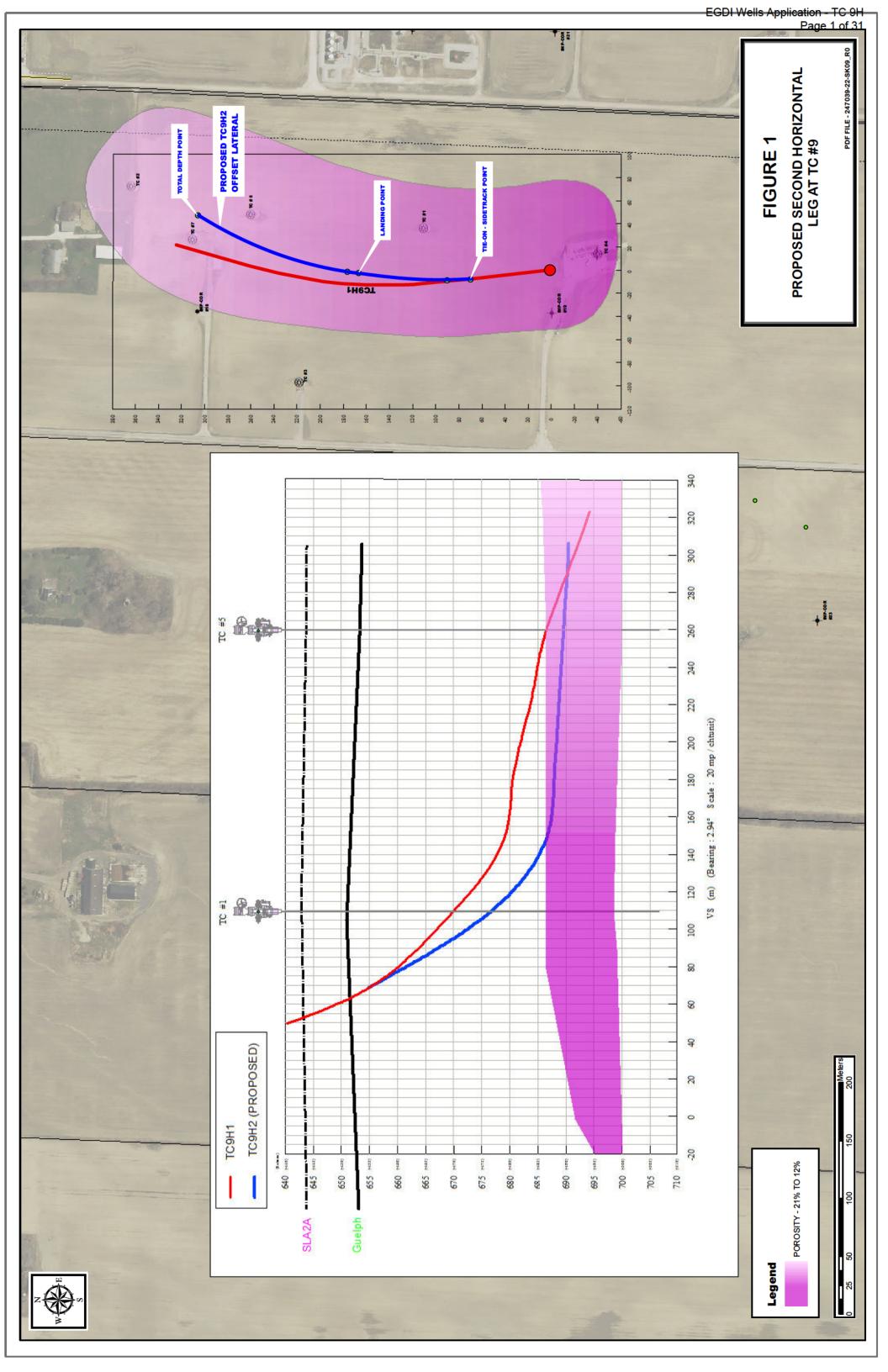
Yours truly,

Kathy McConnell, P.Geo. Manager Reservoir Development 3501 Tecumseh Road Mooretown, Ontario NON 1M0

Enclosures

Cc Mr. Jug Manocha, Operations Engineer, Ministry of Natural Resources & Forestry

¹ EB-2015-0303 Report of the Ontario Energy Board to the Ministry of Natural Resources and Forestry Application by Enbridge Gas Distribution Inc. to Drill Well in the Corunna Designated Storage Area dated March 10, 2016



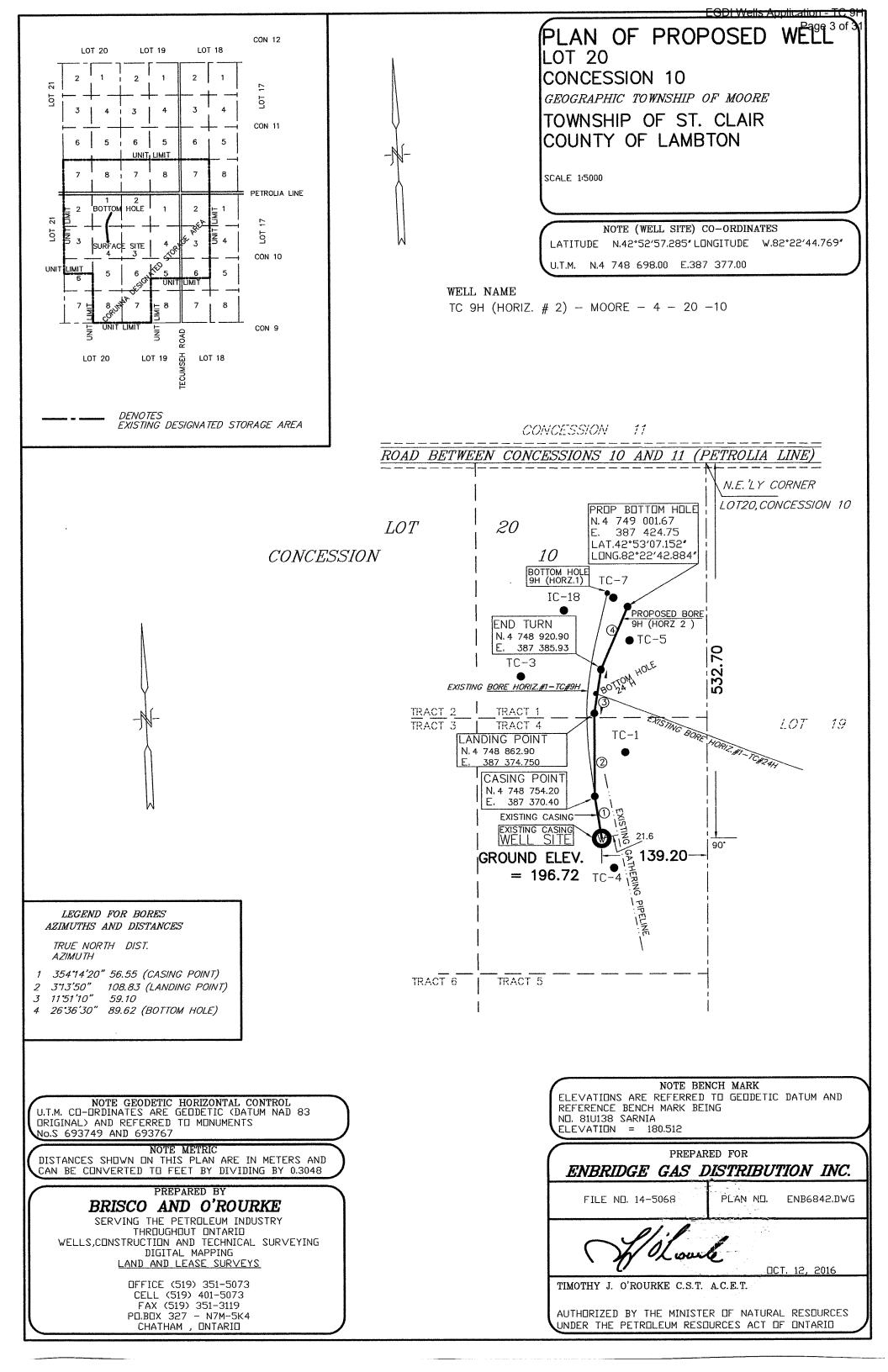
D>0	ntario	Applic	cation			d Salt Resources Ac Licence	t	EG	DI Wells A	pplication - T Page 2
Form 1				То	the Ministe	r of Natural Resourc	ces			v.2013-10-0
The undersign the following in	ed operator ap formation, tog	plies for a v ether with th	vell licence u ne applicatio	inder the C n fee of \$1	0il, Gas and 00 + 13% H	I Salt Resources Act IST. Make cheques	t and the Regu payable to "Mi	lations thereund inister of Financ	ler and submits e".	
1. WELL NAN	IE		TC 9H (I	-IORIZ#2)	Moore 4-20	-10	Targe	t Formation	Gu	elph
Purpose of Pro	posed Well (V	Vell Type)				G	as Storage			
2. OPERATO	3		Enbridge G	ias Distribu	ution Inc.		Tel #51	9-862-1473	Fax #	519-862-1178
Street Address			3501 Tecum	seh Road		City	Mooretown	Prov.	ON Postal Code	NON 1MO
Mailing Addres	s	3	3501 Tecum	seh Road		City	Mooretown	Prov.	ON Postal Code	NON 1M0
Contact Name			Ka	athy McCo	nnell	·	Conta	ct Tel #	519-862	-6032
Email			kathy.mcc	connell@e	nbridge.con	n				
3. LOCATION	Cour	ity	l	ambton		Township		м	oore	
Tract 4	Lot	20	Concession		10	Lake Er	ie: Block	Tract	Licence/Lease No.	
Surface location metres from	n, <u>532.7</u>	<u>m</u> mN	lorth	South	Latitud	e 42 ⁰ 52' 57	.285"	Bottom-hole Lat	42 ⁰ 5	3' 07.152"
Lot Boundaries	139.2	2m_m I	East	West X	Longitu	ide 82 ⁰ 22' 44.	.769"	Bottom-hole Lor	ig. 82 ⁰ 2	2' 42.884"
Within 1.6 km c	f Designated S	Storage Are	a? Y	′es X	No		Off-ta	rget? Yes	NoX	
4. WELL PART	TICULARS	Ver	tical	Horizo	ntal X	Directional	Deepenin	g Re-e	entry L	ateral
Rig Type: R	otaryX	Cable	Well	to be core	ed? Yes	NoX	Formation a	at TD	Guelph	1
Ground Elevation	on 196.72	Propo	sed Depth	930.0	Prop	osed Depth TVD	688.00	Proposed Sta	rt Date	1-Feb-17
5. LANDOWNE	R			Richa	rd J. Wellin	gton		Tel	#	
Street Address						City		Prov.		
he landowner l personal informa	ation, via the o	perator, as	per Section	12 of this f		Landowner Signa			NA	
as been compl	eted (see Ont.	Reg. 245/9	of the Unit A 7 definitions	rea shown for "poole	on the atta d spacing u	ched well location pl init" and "unitize")		X No		
. DRILLING C	ONTRACTOR				Unkno	own		Tel #		
ddress						City		Prov.	Postal Co	de
PROPOSED		CEMENTI				-				
Hole Cas Size O.	-	Grade	New Used or	Setting Depth	Setting Depth	Cottine F	motion		SETTING INF	
(mm) (mr	5		in-hole	TVD	Meas.	Setting Fo	mauon	How Set	Cement	Cement Top
508 40		LS	Existing	60	60	Kettle	Point	Cement	Type Class 'G'	KB / RF surface
375 29		J55	Existing	411.3	411.3	F Ur	nit	Cement	Class 'G'	surface
270 21	9 47.62	J55	Existing	645.8	661.8	A-2 Anh	lydrite	Cement	Class 'G'	surface
BLOW-OUT	PREVENTION	EQUIPMEN				entor and Double Ga				
				Rotating C	ontrol Devic	ce 9" x 2/3M will be	used for drilling	in the reef		
WELL SECU	RITY Name	of Trustee	F	larrison Pe	ensa LLP	Total # U	nplugged Well	s <u>147</u> C	Current Balance	\$70K
0. REMARKS							······································			
1. ENCLOSUR	ES F	ee X		Location	Plan X	(Land wells only)		Drilling Progr	am X	
2. NOTICE OF		•	ur pareonal in							

lesources is collecting your personal information under the authority of the Oil, Gas and Salt Resources Act. Any personal information provided on this application will be used for licensing and law enforcement purposes only and will be protected in accordance with the Freedom of Information and Protection of Privacy Act. If you have questions about use of your personal information, please contact the Policy and Program Officer, Petroleum Operations Section, Ministry of Natural Resources, 659 Exeter Road, London N6E11.3, 519-873-4638.

13. AUTHORITY

The undersigned certifies that the information provided herein is complete and accurate, the operator has the right to drill or operate a well in the above location, and he/she has authority to bind the operator. Л

Date (d/m/y)	14.Oct.16	Name	Kathy McConnell	Signature	allament.
		Company	Enbridge Gas Distribution Inc.	Title	Manager Reservoir Development



EGDI Wells Application - TC 9H Page 4 of 31

TC 9H (HORZ. #2) MOORE 4-20-X

DRILLING PROGRAM

TC 9H (HORIZ. #2) MOORE 4-20-X

Enbridge Gas Distribution Inc.

TABLE OF CONTENTS

SECTION 1.0 GENERAL DATA

Section 1.1	Well Summary
Section 1.2	Special Notes
Section 1.3	Contact Numbers

SECTION 2.0 GEOLOGICAL PROGNOSIS

SECTION 3.0 CASING AND CEMENTING SUMMARY

Section 3.1	Summary
Section 3.2	Wellbore Diagram
Section 3.3	Wellhead Information
Section 3.4	Directional Planning Report

SECTION 4.0 DRILLING PROCEDURES

Section 4.1	Pre-Spud
Section 4.2	Installation of Temporary Plugs
Section 4.3	Intermediate Hole and Intermediate Casing
Section 4.4	Production Hole and Production Casing
Section 4.5	Main Hole
Section 4.6	Loss Circulation Contingency Program

SECTION 5.0 REPORTING PROCEDURES

Section 5.1	Tower Sheets
Section 5.2	Worker Injury

SECTION 6.0 SAFETY AND PROCEDURES

Section 6.1	General Safety
Section 6.2	Well Control

Enbridge Gas Distribution Inc.

SECTION 1.0 - GENERAL DATA

Section 1.1 - Well Summary

Well Name:	TC 9H (Horiz. # 1) Moore 4-20-X
Operator:	Enbridge Gas Distribution Inc.
Surface Hole Location:	Tract 4, Lot 20, Con. 10, Moore Twp, Lambton County N 4 748 698.00; E 387 377. 00
Surface Hole Coordinates:	532.7m South; 139.2m West
Bottom Hole Location:	Tract 1, Lot 20, Con. 10, Moore Twp, Lambton County
Bottom Hole Coordinates:	N 4 749 001.67; E 387 424.75
Ground Elevation:	196.72m
KB Elevation:	200.72m
Total Depth:	691mTVD; 930mMD
Target Formation:	Guelph
Logging Program:	None
Spud Date:	February 1, 2017
Duration:	14 days

Section 1.2 – Special Notes

1. Safety of personnel and environment is our primary concern. Section 6.1 of this program, outlines Enbridge's general safety requirements which obliges all personnel on the wellsite to follow the Occupational Health and Safety Act and Regulations (Ministry of Labour (MOL)) and the Oil, Gas & Salt Resources Act and Regulations (Ministry of Natural Resources and Forestry (MNRF)). Safety and/or environmental ("tailgate") meetings shall be conducted as per Section 6. Wellsite Supervisor shall conduct daily 'walk around' inspections of the equipment on site and record the results on the daily reports. Please refer to Section 5.2 for the procedure to be followed if a worker injury occurs.

- 2. The Wellsite Supervisor has authority over all activities conducted on the drilling location. The Wellsite Supervisor shall ensure that all applicable regulations and policies (MNRF, MOL, Ministry of the Environment and Climate Change (MOECC), and Enbridge) are followed and that all permits are kept on site and/or signed off as required.
- 3. All operations are to be to MNRF standards.
- 4. BOPs are to be installed, maintained and used as per MNRF requirements. Testing of the BOPs must be in accordance with Section 6.2 of this program.
- 5. Tower sheets must be completed daily and will include the information listed in Section 5.1 of this program. The Wellsite Supervisor will complete daily reports and forward the reports to Enbridge's office by 10am the following day.
- 6. The well will be drilled with fresh water or formation brine, hauled to location by an approved contractor. The fresh water will be obtained from local municipal water systems, located at Brigden, Corruna and other available water systems. The brine used will be Guelph formation brine obtained from Enbridge's existing operations.
- 7. A minimum of four 500 bbl frac tanks will be spotted on location prior to the commencement of drilling operations. The tanks will be filled with fresh water / brine as reserve for the drilling of potential loss circulation zones. Potential loss circulation zones exist in the Guelph formation.

Enbridge Gas Distribution Inc.

Section 1.3 - Contact Numbers

Emergency Numbers:

- Police, Fire & Ambulance:* 911
- 911 Address: 1049 Petrolia Line, Corunna, Ontario

* For 911 Map and Map and Directions to Nearest Hospital see attached Map at end of Section 1.3

Rob Carlson	Reservoir Field Supervisor	Fax: Cell:	519-862-6036 519-862-1168 519-312-4863 arlson@enbridge.com
Kathy McConnell	Manager Reservoir Development	Fax: Cell:	519-862-6032 519-862-1168 519-312-2168 cconnell@enbridge.com
Terry Chupa	Land Administrator	Fax: Cell:	519-862-6008 519-862-1168 519-384-0215 apa@enbridge.com
Control Room		Office:	519-862-6012
Drilling Supervisor:			
Wayne Bolton			.9-312-8437 ulting@aim.com
Steve Thompson			19-383-5404 nsulting@rogers.com

Enbridge Gas Distribution Inc.

Geologist:

Neil Hoey

Office: 519-472-4776 Fax: 519-472-4776 Cell: 519-649-6918 neil_hoey@hotmail.com

Rotary Rig:

Unknown – this section will be completed upon reward of the drilling contract

Directional Drillers:

Danny Brown	Account Manager - Weatherford	Fax:	403-693-7831 403-510-1995 rown@ca.weatherford.com	
Craig Dalziel	Drilling Technologist - Weatherford	Office: 780-979-4539 Craig.dalziel@ca.weatherford.com		
Cementing:				
Ian Veen	Black Creek Well Service President	Office: Fax: Cell:	519-882-4732 519-834-2466 519-383-4645	
Casing, Wellheads & E	<u>SDs:</u>			
Brian DeJaegher	Wellmaster Pipe &Supply Sales Representative	Office: Fax: bdejaeg	519-688-0500 519-688-0563 her@wellmaster.ca	
Graham Shone	DNow Manager	Fax:	519-336-9797 519-336-9733 .shone@dnow.com	
Karen Derrick	Stream-Flo Ltd. Technical Sales Rep.	Fax:	832-647-0710 519-688-0563 ¢@streamflo.com	

TC 9H (HORIZ. #2) MOORE 4-20-X

Enbridge Gas Distribution Inc.

Drill Bits:

Brad Takenaka	Varel Rock Bits Canada Sales Manager	Office: 403-968-9369 Cell: 403-303-2533 btakenaka@varelintl.com
Mike Kellar	Trendon Bit Service Ltd. Director, Sales	Office: 403-990-1299 mkellar@trendoninc.com
Wireline Services:		
Gord Mackenzie	Baker Atlas Station Manager	Office: 519-332-8030 Fax: 519-332-4714 Cell: 519-339-6783 gord.mackenzie@bakerhughes.com
Dave Tipping	Weatherford Canada – Wireline & Logging Services Station Manager	Office: 519-683-2010 Fax: 519-683-2577 Cell: 519-436-3541 dave.tipping@canada.weatherford.com
Water Hauling:	Station Managor	
Keith McKeegan	President McKeegan Trucking Limited	Office:519-864-1037Fax:519-864-1036Cell:519-490-4042
Denis Marcus	President Harold Marcus Limited	Office: 519-695-3735 Fax: 519-695-2249 Cell: 519-380-5238 dmarcus@haroldmarcus.com
Rental Equipment:		
Dale Holland	Wheatley Wireline Services Ltd.	Office:519-825-3680Fax:519-825-9348Cell:519-322-8015
Keith Davis	Ecan Energy Services Inc.	Office: 519-627-3824 Fax: 519-627-5306 Cell: 519-437-7038 kmecanen@kent.net
Brian Lackie	Weatherford Fishing Supervisor & Shop Manager	Office: 780-955-7933 Cell: 780-490-8710 brian.lackie@ca.weatherford.com

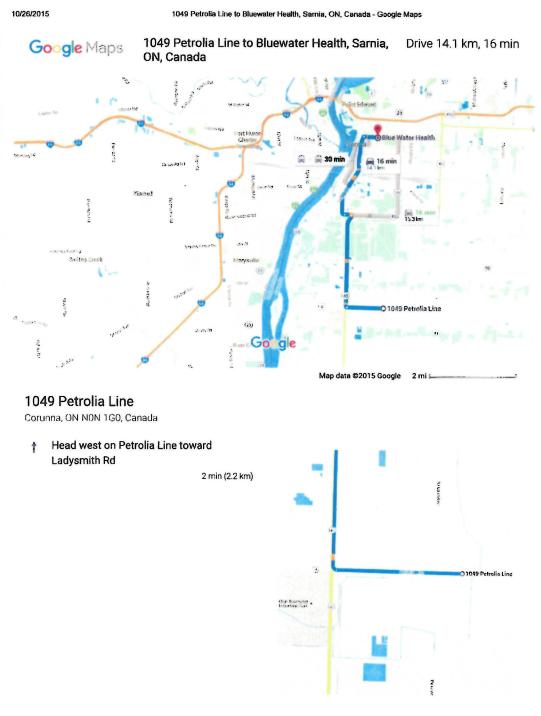
TC 9H (HORIZ. #2) MOORE 4-20-X

Vern Anger	Canfish Services Inc. Fishing Supervisor	Office: Cell:	780-955-2600 403-845-0012
Orval Beam	Orval L. Beam Limited Operations Manager Tank Rentals	Office: Fax: Cell:	519-436-0164 519-436-0164 519-436-4801
Welders:			
John Dawson	St. Clair Mechanical President	Office: Fax: Cell:	519-864-0927 519-864-0801 519-330-9672
Government & Other A	Agencies		
MNRF	Petroleum Resources Centre	Fax:	519-873-4634 519-873-4645 nrf.gov.on.ca
MOECC	Spill Reporting	1-800-2	268-6060
MOL	Health & Safety	1-800-2	265-1676
Oil, Gas & Salt Resour	rces Library	Office: Fax:	519-686-2772 519-686-7225

TC 9H (HORIZ. #2) MOORE 4-20-X

Enbridge Gas Distribution Inc.

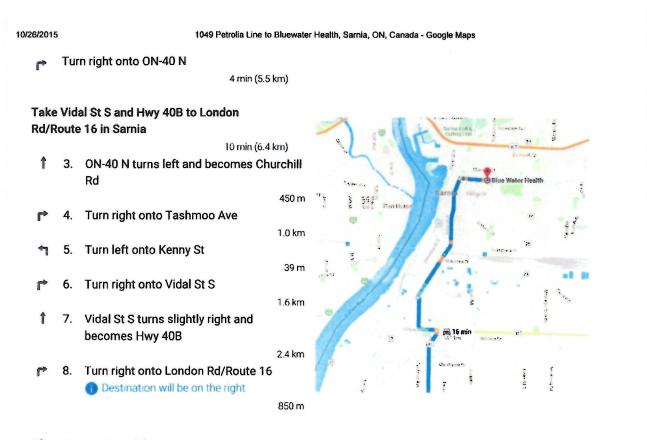
911 Map & Directions to Nearest Hospital:



https://www.google.com/maps/dir/1049+Petrolia+Line,+Corunna,+ON+N0N+1G0,+Canada/Bluewater+Health,+Samia,+ON,+Canada/@42.9330131,+8... 1/2

TC 9H (HORIZ. #2) MOORE 4-20-X

Enbridge Gas Distribution Inc.



Blue Water Health

Canada

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Live traffic

Fasi 🚃 📻 🗰 Slow

TC 9H (HORIZ. #2) MOORE 4-20-X

Enbridge Gas Distribution Inc.

Section 2.0 - Geological Prognosis

TC 9H Moore						
County: Lambton	Twp: Moore	Conc: X	Lot: 20	Tract: 4		
Elevation: 196.72m						
Formation	Тор	Elevation	Thickness	Gas Oil	Water	Pressure
К.В.	0.0	201.3	4.0			
Drift	4.0	197.3	38.0			
Kettle Point	42.0	158.7	31.0			
Hamilton	73.0	127.7	83.5			
Dundee	156.5	44.2	38.5			
Detroit River	195.0	5.7	116.0			
Bois Blanc	311.0	-110.3	38.0			
Bass Islands	349.0	-148.3	41.5			
G-Shale	390.5	-189.8	7.0			
F-Shale	397.5	-196.8	100.5			
E-Carbonate	498.0	-297.3	22.0			
D-Salt	520.0	-319.3	11.0			
C-Shale	531.0	-330.3	19.0			
B-Salt	550.0	-355.8	68.5			
A-2 Carbonate	618.5	-417.8	26.0			
A-2 Anhydrite	644.5	-443.8	10.0			
Guelph	654.5	-453.8	200±	ХХ		2800 kPa

Note: Prognosis with TVD tops. **Note:** TC 9H1 used to build prog

TC 9H (HORIZ. #2) MOORE 4-20-X

Enbridge Gas Distribution Inc.

Section 3.0 - Casing and Cementing Summary

Section 3.1 - Summary

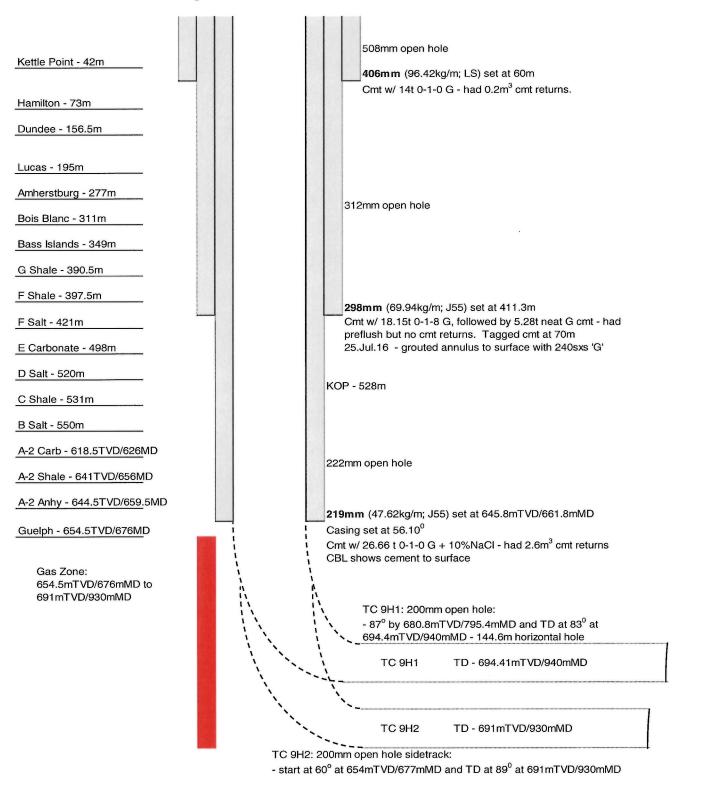
Hole Size (mm)	Casing Size (mm)	Casing Grade	Casing Weight (kg/m)	Setting Depth (mKB)	How Set
508	406	LS	96.42	60	Existing Casing
375	298	J-55	69.94	411.3	Existing Casing
270	219	J-55	47.62	645.8m TVD 661.8m MD	Existing Casing

Sidetrack: 200mm open hole will be drilled from 654.339m TVD / 676.88mMD at 59.98⁰ and will reach 88.5⁰ at 687.788mTVD (780mMD) and will be drilled for approximately 143m to a TD of 690.815mTVD (930mMD) at 88.94⁰.

TC 9H (HORIZ. #2) MOORE 4-20-X

Enbridge Gas Distribution Inc.

Section 3.2 - Wellbore Diagram



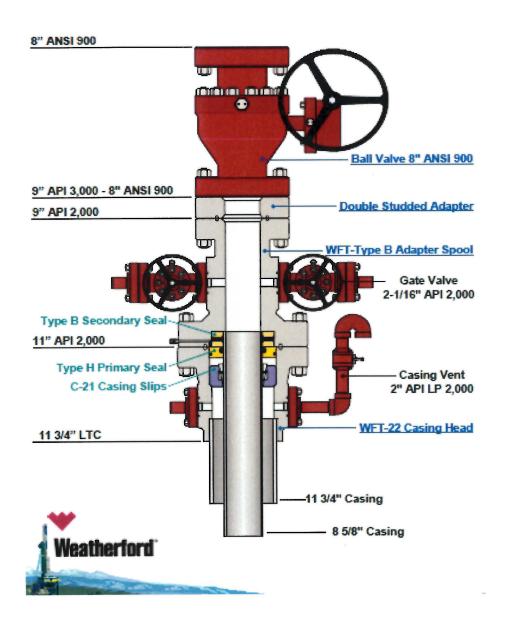
TC 9H (HORIZ. #2) MOORE 4-20-X

Enbridge Gas Distribution Inc.

Section 3.3 - Wellhead Summary

Existing Wellhead: Weatherford 13.8 MPa Wellhead:

298mm x 340mm slip on casing bowl340mm x 228.6mm spool c/w 2 gate valves on side outlets203.2mm ANSI 900 Cameron Grove full port ball valve

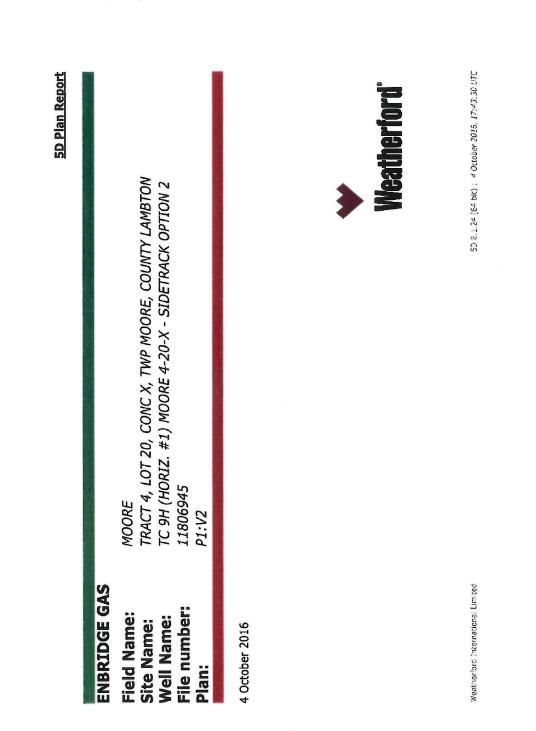


TC 9H (HORIZ. #2) MOORE 4-20-X

Enbridge Gas Distribution Inc.

Section 3.4 - Directional Planning Report

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2

	TC 9H (HORI7. #1) MOORE 4-20-X - SIDETRACK OPTION 2	0-X - SIDETRACK OPTI	2 N 2
Fjeld Name: MOORE	Map Units: m Vertical Reference Datum (VRD): Mean Sea Level Projected Coordinate System: NAD83 / UTM zone 17N Comment:	Company Name: ENBRIDGE GAS	E GAS
	Units: m North Reference: True	Convergence Angle: -0.94	e: -0.94
Site:	Northing: 4748698.30 m Position: Easting: 387377.00 m	Latitude: 42.88258 Longitude: -82.37910	8
TRACT 4, LOT 20, CONC X, TWP MODRE, COUNTY LAMBTON	TRACT 4, LOT 20, CONC Elevation above MSL:197.300 m X, TWP MOORE, COUNTY LAMBTON Comment:		
Slot:	Position +N/-S: 0.00 m Northing: 4748698.00 m +E/-W: 0.00 m Easting: 387377.00 m	Position (Relative to Site Centre) 0 m Latitude: 42.88258 n Longitude: -82.37910	8 910
TC 9H (HORIZ. #1) MOORE 4-20-X	Slot TVD Reference: Ground Elevation Elevation above MSL: 196.720 m Comment:		
urali.	Type:Sidetrack Parent: TC 9H (HORIZ. #1) MOORE 4-20-X File Number: 11806645 Comment:	UWI: Tie Point Method: MD	Plan:P1:V2 Tie Point: 676.880 m
TC 9H (HORIZ. #1) NOORE 4-20-X - SIDETRACK OPTION 2	Closure Distance:307.398m Vertical Section: Position of Origin (Relative to Slot centre) +N/-5: 0.00 m	Closure Azimuth: 8.00° +E/-W: 0.00 m	Az: 5.61°

Plan Folder Date Comment Plans Plan 03/0002016 Plan Date Plan 03/0002016 Plans Comment	Drill floor: Plan: P1:V2 Rig Height (Drill Floor): 4.070m	ic Param bggm2016	Field Strength: 53927.2nT Field Strength: 53927.2nT Elevation above MSL: 200.790m	12nT Declination: -8.27º Inclination: 0.000º		Azimuth: 0.000°	Date: 03/0ct/2016
Date Comment Plans 03/0cv2016 Plan Date 03/0cv2016 Plan Date							
03/0cd2016 Plan Date Date 12/1 Date 12/1	Plan Folder	Date	Comment		Plar	IS	
	£	03/Oct/2016		Plan PI:VI	Date 03/0ct/2016	Сотт	ent

Weatherford International Limited

5D 8.1.24 (64 bit) : 4 October 2016, 17:43:30 UTC

TC 9H (HORIZ. #2) MOORE 4-20-X

TC 9H (HORIZ. #2) MOORE 4-20-X

Enbridge Gas Distribution Inc.

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5D P an Report

			$\left \right $									Commed		
							Plan P1:V2		Date 04/0ct/2016		REVISED	COMMENT REVISED LATERAL - MOVED CLOSER TO TCS	nt D CLOSER TO TC	ş
Wellpath creat	Wellpath Greated using minimum curvature	m curvature.												
Tie Point: MD: 676.880m	80m	Inclination	Inclination: 59,98°		Azimuth: 353.77°	°17°	TVD:	TVD: 654.339m	North Off	North Offset: 68.16m	F	East Offs	East Offset: -8.86m	
Salient Points	: (Relative to Slo	Salient Points: (Relative to Slot centre)(TVD relative to Drill Floor)	tive to Drill FI	001)										TPate
TIE-ON - SIDETBACK	676.880	20-32 29-38	353.77 65	654.339	-453.549	68.16	-8.Bf	4748766.29	387369.26	65.964	000	0.0	0.00	0:00
POINT							1							
DNIDAL	750.840	0 F0 FC	0.98 68 68	687.808	-487.018	58.34 164.85	-4.95	4748862.91	38/308.00 387374.75	163.576	0.1.	0.01	10.86	1.83
	790.840	88 80 5.	5.89 68	688.017	-487 227	174.79	-3.93	4748872.84	387375.94	173.573	0.00	0.0	0.00	0.00
PROPOSED TD	930.000	88.94 33	33.73 69	690.815	-490.025	304.41	42.77	4749001.67	387424.75	307.131	6.00	30.0	0.03	6.00
Interpolated Po		ats: (Relative to Slot centre)(TVD relative to Drill Floor	D relative to L	Intil Flaor)	Section of			and the second se						
Comment	2 E	¥C.	25	28	55 Elevation (m)	N.Office	E.Offiset (m)	(m)	Easting (m)	y Ē	510 510	T Autor ("/ Jitan) -	(m0t/r)	1 Fact
	0:000			0000	200.790	0:00	0.00	4745698.00	387377.00	0.000	0.00	0.00	0:00	0.0
GROUND LEVEL	4.070	0.00	0.00	4.070	196.720	0.00	0.00	4748698.00	00.775785	0:000	0.00	0.00	0.00	0.0
	30 000			30.000	170.790	0.00	0.00	4748698.00	387377.00	0:00	0.03	0.00	0.00	0.0
KETTLE POINT	44,890	0.00	0.00	44.890	155.900	0.00	0.00	4748698.00	387377.00	0.000	0.00	0.00	0.00	0.0
	60.000	0.00	0.00 6	60.000	140.790	0.00	0.00	4748698.00	387377.00	0.000	0.03	0.00	0,00	0.0
HAMILTON :	75.290			75 290	125.500	0.00	0.00	4748698.00	387377.00	0.000	0.00	0.00	0.00	0.0
	000.06			000 05	110.790	0.00	000	4748698.00	387377.00	0.000	0.00	0.00	0.00	0.0
	120.000			120.000	80.790	0.00	0.00	4748698.00	387377.00	0.000	0.00	0.00	0.00	0.0
	150 000			150.000	50.790	0 00	0.00	4748558.00	387377.00	0.000	0,00	0.00	0.00	0.0
DUNDEE :	159.190			159.190	41.600	0.00	800	4748698.00	387377.00	0.000	0.00	00.0	0.00	0.0
	180 000			180.000	20.790	0.00	0.00	4748658.00	387377,00	0.000	0.00	0.00	0.00	0.0
DETROIT RIVER :	193.290	0.00	0.00	193.290	7,500	0.00	0.00	4748658.00	387377,00	0.000	0.00	0.00	0.00	0.0
	210.000			210.000	-9.210	00:00	0.00	4748698.00	387377.00	0:0:0	0.00	0.00	0.00	0.0
	240.000	0.00		240.000	-39.210	0.00	0.0	4748698.00	387377.00	0.00	0.03	0.00	0,00	0.0
	270.000			270.000	-69.210	0.00	00.0	4748698.00	387377.00	0.000	0.03	0.00	0.00	0.0
	300.000	0.00	0.00	300.000	-99.210	0.00	0.00	4748698.00	367377.00	0.000	0.00	0.00	0.00	0.0

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Weatherford International Limited

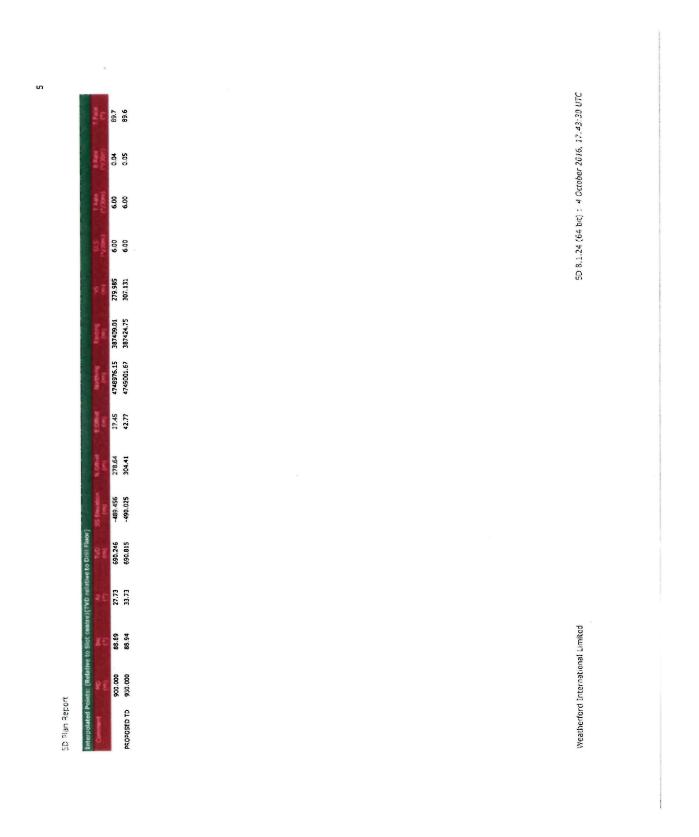
TC 9H (HORIZ. #2) MOORE 4-20-X

Enbridge Gas Distribution Inc.

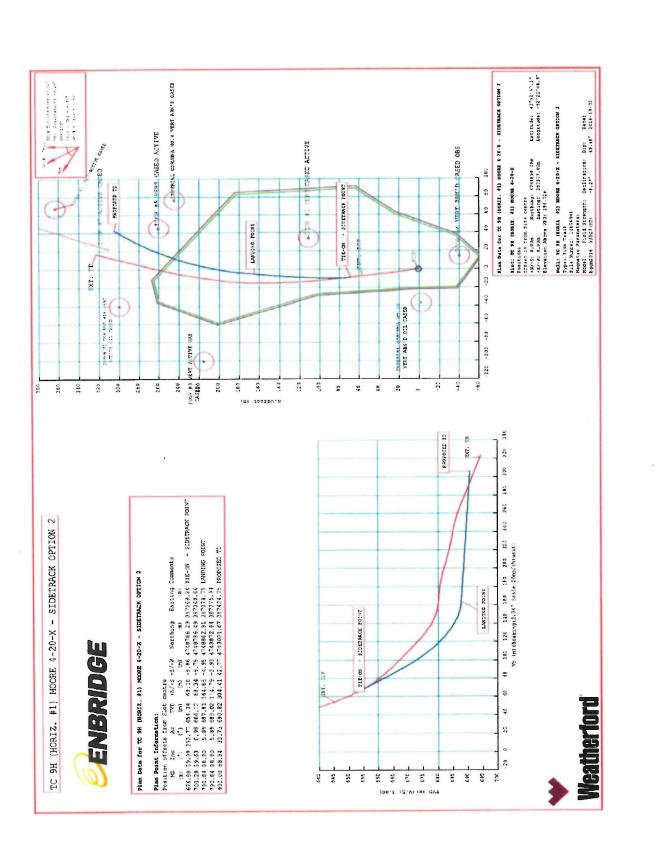
Interpolated Points: (Relative to Slot centre)(TVD relative to Drill Floor	ints: (Relative	to Slot centre)	(TVD relative	to Drill Floor)	San Charles	Party and	Marst He	and and and						
Comment	RE	HE.	25	20	SS Elevation (m)	ALCHINE (m)	E.Offinet	Northing (m)	Earting (m)	SE	015 (mBC/*)	T. Plate (*/30m)	8. Page (*/30m)	1 Pace
BOIS BLANC :	303.590	0.00	0.00	303.590	-102.800	0:00	0.00	4748698.00	387377.00	0:00	0.0	0.60	0:00	0,0
	330.000	0.00	0.00	330.000	-129.210	0.00	0.00	4748698.00	387377.00	0.000	0.00	0.00	0.00	0.0
BASS ISLANDS :	339.990	0.00	0.00	339,990	-139.200	0.00	0.00	4748698.00	387377.00	0.000	00.0	0.00	0.00	0.0
	360.000	0.00	0.00	360.000	-159.210	0.00	0.00	4748658.00	387377.00	0.000	0.0	0.00	0 00	0.0
	390.000	0.00	0.00	390.000	-189.210	00 0	0.00	4748558.00	387377.00	0.000	0.00	0.00	00.00	0.0
G-SHALE :	393.590	0.00	0.00	393.590	-192.800	0.00	0.00	4748698.00	387377.00	0.000	0.00	0.00	00.0	0.0
F-SHALE :	06E.69E	000	0.00	399.390	-198.600	0.00	0.00	4748698.00	387377.00	0:000	0.00	0.00	0.00	0.0
	420.000	0.48	9.79	420.000	-219.210	E0.03	10.0	4748598.03	387377.01	0.033	1.79	0.00	1.79	9.8
	450.000	0.78	354.65	449.997	-249.207	0.45	0.04	4748598.45	387377.04	0.453	0.34	-19.94	-0.17	232.5
	480.000	0.63	339,99	479.995	-279.205	0.81	-0.05	4748598.82	387376.95	0.805	0.22	-1.90	-0.22	185.4
E-CARBONATE	499.196	0.49	336.18	499.190	-298.400	66'0	-0.13	4748698.99	387376.89	0.973	0.22	-2.82	-0.22	186.3
	510.000	0.46	347.22	509.993	-309.203	1.07	-0.16	4748699.07	387376.86	1:051	0.64	38 36	0.16	60.2
D-SALT :	524.198	1.59	359.48	524.190	-323.400	1.24	-0.15	4748699.25	387376.86	E22-1	6.45	-44.85	6.41	348.9
KOP	528.000	2.41	358.16	527.990	-327.200	1.36	-0.16	4748599.38	387376.86	1.355	0.00	0.00	0.00	0.0
C-SHALE :	233.107	3.56	357.15	533.090	-332.300	1.64	71.0-	4748699.64	387376.85	1.616	90.6	-13.55	9.02	354.7
	540.000	5.63	355.29	539.960	-339.170	2.19	-0.21	4748700.19	387376.82	2.150	90.6	-8.14	9.04	354.9
B-SALT :	556.808	10.83	352.35	556.590	-355.800	4.58	-C.48	4748702.58	387376.60	4.507	9.44	-5.89	9.40	353.3
	570.000	15.61	350.54	569.431	-368.641	7.55	·0.93	4748705.56	387376.19	7.420	11.18	4.19	11.14	354.2
	600.000	27.12	351.23	597.331	-396.541	18.29	-2.73	4748716.33	367374.57	17.933	11.66	2.67	11.60	6.0
A-2 CARBONATE :	621 964	35.17	352.92	616.090	-415.300	29 57	-4.29	4748727.63	387373.20	29.007	10.42	2.36	10.34	2.5
	630.000	37.84	352.94	622.547	-421.757	34.31	-4.87	4748732.39	387372.69	33.675	9.80	0.94	9.78	356.6
	660.000	48.99	353.42	644.452	-443.662	54.59	×C.1-	4748752.71	387370.56	53.616	12.94	0.69	12.93	2.3
INT. ICP	662.000	49.85	353.46	645.753	-444.953	56.10	-7.51	4748754.22	387370.41	55.100	0.00	0.00	0.00	0.0
A-2 Anhydrite :	662.993	50.28	353.48	646.390	-445.600	56.86	-7.60	4748754.98	387370.33	55.844	12.85	0.71	12.68	2.4
	663.700	50.58	353.50	646.841	-446.051	57.40	-7,66	4748755.52	387370.28	56.378	12.89	0.70	12.88	2.4
CUEUPH :	673.505	57.57	353.71	652.590	-451.800	62.29	-8.55	4748763.42	387369.53	64.140	21.40	0.63	21.40	1.4
TIE-ON - SIDETRACK POINT	676.880	59.98	353.77	654.339	-453.549	68.16	-8.86	4748766.29	387369.26	66.964	21.40	0.56	21.40	3
	000.069	59.74	357.81	626 099	·460.139	79.47	69'6-	4748777.62	387365.61	78.140	8.00	9.23	-0.56	95.0
	700.280	59.63	0.98	666 119	-465.329	5 8.34	61.2	4748786.49	387365 66	096.98	8.00	9.26	-0.30	93 C
	720.000	66.75	2.34	675.006	-474.216	105.92	-9.27	4748804.05	387369 47	104.508	11.00	2.07	10.84	10 0
	750.000	77.62	4.17	684.168	-483.378	134.39	-7.64	4748832.50	387371.56	133.003	11.00	1.83	10.86	9.4
	780.000	88.50	5.8S	687.788	-486.998	164.01	-5.04	4748862.07	387374.65	162.736	11.00	1.68	10.87	8.8
POINT	780.840	88.80	5.89	687.808	-457.018	164.85	-4.95	4748662.91	387374 75	163.576	11.00	1.65	10.88	8.5
	790.840	88.80	5.89	688.017	-487.227	174.79	-3.93	4748872 84	387375.94	173.573	0.00	0.00	0.00	0.0
	810.000	08.88	5.72	688 417	-487.627	193.77	·1.32	4748891.75	387378.85	192.711	6.00	6.00	0.00	0.06
	840.000	88.82	15.73	689.040	-488.250	223.01	5.28	4748920.90	387385.93	222.460	6.00	6.00	0.01	5.68
	870.000	88.85	21.73	689.652	-488.862	251.41	14.91	4748949.13	387396.02	251.653	6.00	6.00	0.03	8 68
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SD Plan Report

4



TC 9H (HORIZ. #2) MOORE 4-20-X



Enbridge Gas Distribution Inc.

SECTION 4.0 - DRILLING PROCEDURES

Section 4.1 - Pre Spud

1. Government Notification of Spud

48 hours prior to spud, notify the Ministry of Natural Resources and Forestry – Petroleum Resources Section by fax @ (519) 873 – 4645 of the date of commencement of drilling operations

2. Signs

Install rig signs on access road to lease.

3. Safety Meeting

Conduct a pre-spud safety meeting for all crews. Rig Manager and all crewmembers must be present. A similar meeting shall be conducted with the remaining crew(s) as they come on duty. Additional safety meetings shall be conducted at the Wellsite Supervisor's discretion.

Section 4.2 – Installation of Temporary Plugs

- 1. Move in and rig up a pitman truck to hoist the logging tools and lubricator. Ensure that a pressure truck is on site with sufficient fresh water to fill the hole and pressure test the plug.
- 2. Move in and rig up Wireline Company complete with a lubricator, BOP and bleeder sub to set 2 retrievable WR-1 plugs. Fill lubricator with fresh water and pressure test lubricator and wireline BOPs to 7000kPa (1000psi). Bleed down the pressure until it is equal to or slightly less the reef pressure and open the master valve and allow the lubricator and the well to equalize. Run in the well with the junk basket and gauge ring to ensure that the hole is clear to the plug setting depth.
- 3. The lubricator will be purged with nitrogen prior to opening the master valve for each subsequent tool run and will be tested with well pressure prior to running in the well with the logging tools: purge the lubricator with nitrogen, slowly open the master valve and allow the lubricator to reach well pressure. Shut-in the master valve to pressure test the lubricator and to ensure that there are no leaks.
- 4. Wellsite supervisor to record the OD of all tools entering the wellbore. With the Tool Representative on site and using the September 2017 High Resolution Vertilog as a reference, run a wireline set WR-1 retrievable bridge plug in the casing. Set the bridge plug in the middle of the second last joint at the depth indicated in the following table do not to set over any casing collars:

TC 9H (HORIZ. #2) MOORE 4-20-X

Enbridge Gas Distribution Inc.

WR Plug Size	Joint	Setting Depth
219mm	43	525mMV±

- 5. Blow well down and monitor the blow down to ensure that bridge plug is secure. Fill hole with fresh water and pressure test the plug in stages to 5200kP (750psi) at surface for 10 minutes; 7000kPa (1000psi) for 10 minutes; and finally to 8300kPa (1200psi) for 30 minutes. Note results of pressure test and contact head office.
- 6. Run a second wireline set, retrievable bridge plug and set one joint up as per table below. **NOTE: If pressure test failed on first plug attempt to pressure test again on the second plug and record results**. Record the depth of the top of the bridge plugs. Contact head office with the results prior to proceeding to the next step.

WR Plug Size	Joint	Setting Depth
219mm	42	512mMV±

- 7. Upon successful completion of the pressure test release the Tool Representative.
- 8. Rig down Wireline Company and re-install blind flange.
- 9. Ensure that all extra equipment and garbage are cleaned up and removed from the wellsite and that the fencing is put back around the well.

Section 4.5 – Sidetrack Leg 2

- 1. Move in and rig up Drilling Rig.
- 2. Installation of the BOPs

Remove blind flange and perform a 30 minute flow check. If flow check is successful, remove the master valve and place in a protected location. If flow check is not successful, contact the Enbridge Office for further instructions. Install Class B (Rotary) BOPs as per MNRF requirements on 228.6mm flange. Pressure test each component of the BOPs as per Section 6.2.

3. Plug Recovery

Upon completion of successfully pressure testing all components of the BOP, move in and rig up the Wireline Company and Tool Representative. Install bleeder sub, lubricator and wireline BOP. Rig in pressure truck, fill lubricator with water and pressure test BOPs and lubricator to 7000kPa. Do

Enbridge Gas Distribution Inc.

not proceed until all components pass the pressure tests and record the results on the daily reports. Bleed down lubricator until the pressure is equal to the casing pressure and open the master valve. Run in hole with retrieving tool without grapple to open equalizing sleeve. Add 2100kPa at surface prior to opening by-pass tool. Tag first WR-1 plug and jar down and open sleeve to allow pressure (if any) to stabilize and pull out of hole with retrieving tool.

Install grapple in retrieving tool and add JDC tool. Run back in the well and latch onto the plug. Pull slick line into tension and fire hydraulic jars to release the plug, wait 5 to 10 minutes for the element to relax. Lower plug a few metres, past the original setting depth, to ensure that plug is moving freely and trip out of hole with the bridge plug.

Run in hole with retrieving tool without grapple to open equalizing sleeve. Tag second WR-1 plug and jar down and open sleeve to allow pressure to stabilize and pull out of hole with retrieving tool – this will allow ample time for the well pressure to stabilize.

Install grapple in retrieving tool and add JDC tool. Run back in the well and latch onto the plug. Pull slick line into tension and fire hydraulic jars to release the plug, wait 5 to 10 minutes for the element to relax. Lower plug a few metres, past the original setting depth, to ensure that plug is moving freely and trip out of hole with the bridge plug. Close master valve, install blind flange and record the pressure at surface.

Rig down and release Wireline Company and Tool Rep.

4. Drilling Method

Move in and rig up directional drilling equipment. Drill a 200mm hole with fresh water system – ensure that the frac tanks are full of fresh water and water trucks have been put on alert. In accordance with the instructions of the Directional Drilling Company begin to sidetrack the well. By plan, the sidetrack (Leg 2) will commence at 677mMD (654m TVD) at 59.98⁰. The hole will be drilled to 88.5⁰ at 780mMD (688mTVD) and will be drilled for approximately 143m to a TD of 930mMD (691mTVD) at 88.94⁰. After drilling a sufficient length, work the newly drilled hole to ensure that there will not be any issues running in and out of the open hole. A high vis sweep with floc will be added at each connection to assist with hole cleaning.

Ensure that Wellsite Geologist is on site to monitor cuttings and liaise with Directional Drillers concerning the path of the horizontal well. Drill to TD indicated by Wellsite Geologist. At TD pump a final sweep and if possible, circulate hole until clean returns are observed at surface.

The potential for loss circulation exists while drilling through the Guelph formation. If loss circulation is encountered, use the loss circulation contingency program located in Section 4.6. Note all lost circulation intervals and monitor and record fluid loss volumes.

TC 9H (HORIZ. #2) MOORE 4-20-X

Enbridge Gas Distribution Inc.

Pull out of hole with drilling assembly and laydown drill pipe, drill collars and bottom hole assembly. Move in and rig up Wireline Company complete with full lubricators. Run in hole with gauge ring to ensure clear hole to bridge plug setting depth. Run in hole with wireline set, retrievable 219mm bridge plug and place as deep as possible in the 219mm casing and pull out of hole with the setting tool. Fill hole with fresh water and pressure test plug to 7000 kPa for 10 minutes. If the plug does not hold pressure, be prepared to set another 219mm retrievable bridge plug. Release Wireline Company and release Directional Drilling Company.

Nipple down BOPs and install 315mm x 900 ANSI full port ball (master) valve. Close master valve and install 315mm blind flange. Install pressure recorder, ensure that the well is full of fresh water and pressure test casing, wellhead and master valve to a surface pressure of 12,000 kPa for a minimum of 4 hours. Call Enbridge Office with the results.

- 5. Rig down rotary rig and move off of location.
- 6. Restore wellsite to Enbridge's specifications.

TC 9H (HORIZ. #2) MOORE 4-20-X

Enbridge Gas Distribution Inc.

Section 4.6 - Loss Circulation Procedure

- 1. Before drilling out the casing shoe:
 - a. Identify sources and location of fresh water and/or brine, loss circulation materials and weight materials
 - b. Ensure BOPs and manifold are properly installed
 - c. Ensure auxiliary tanks are connected to the pumping system and a standby mud pump is hooked up for annular injection in case of severe loss circulation (so that fluid can be pumped down both the drill pipe and annulus simultaneously)
 - d. Pressure test BOPs prior to drill out
- 2. After drilling out shoe:
 - a. Alert water suppliers and haulers
 - b. Ensure adequate amounts of fresh water and/or brine are readily available prior to penetrating the Guelph formations
 - c. Mechanically test BOPs and perform BOP drill prior to penetrating the Guelph formations.
- 3. Drilling Blind Guelph
 - a. In an attempt to maintain or re-establish circulation, pump fluid down both the annulus and the drill pipe simultaneously
 - b. Make wiper trips or reciprocate the drill pipe to maintain a clean hole every joint or two as directed by the Wellsite Supervisor
 - c. Sweep the hole every 1 to 3 joints
 - d. Use a. and b. in combination
 - e. At TD conduct a final sweep and then trip out BHA

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SECTION 5.0 - REPORTING PROCEDURES

Section 5.1 - Tower Sheets

Shall be completed daily and shall include:

- 1. Bit size, fluid type and weight, weight on bit, deviation surveys, depth at the beginning of the shift and end of each shift.
- 2. Water, gas or oil type, depth encountered depth of sample collected and the static level and/or rate of flow.
- 3. Pressure tests individually, surface pressures, fluid density used in the tests, bleed-off rate and duration of test.
- 4. Logging Details type and interval.
- 5. Abandonment details intervals, amount and type of cement, top of plug and time felt.
- 6. Rig release date and time.

Section 5.2 – Worker Injury

Immediately provide first aid to the injured party and ensure that all personnel are removed from harm's way. Secure the area and ensure that the site is preserved in case an investigation is required.

Every work related accident or injury shall be reported immediately to the Wellsite Supervisor. The Supervisor shall immediately contact the Enbridge Gas Distribution Inc. Office, specifically the Manager, Reservoir Development followed by the Reservoir Field Supervisor. The verbal report shall be followed with a written report, including but not limited to, the Contractor's Accident/Incident Investigation form. The affected Contractor is responsible to contact the proper authorities concerning the accident.

Enbridge Gas Distribution Inc.

SECTION 6.0 - SAFETY AND PROCEDURES

Section 6.1 - General Safety

- 1. All works at the Wellsite shall be in compliance with the Occupational Health and Safety Act and the Oil, Gas & Salt Resources Act and all associated legislation. In addition, all work at the Wellsite shall be done in compliance with good oil field practices. All verbal notifications given to and approvals received from government agencies shall be recorded on the tower sheets.
- 2. Safety meetings are to be held with each crew, at the start of the well and periodically while drilling meetings shall also be held prior to cementing and upon arrival of the logging company, prior to commencement of directional drilling operations and prior to penetrating the Detroit River formations and the A-2 Carbonate formation.
- 3. The Wellsite Supervisor shall ensure that the operations are in compliance with all applicable government regulations and shall complete daily walk around rig inspections.

Section 6.2 – Well Control

All blowout prevention systems are to be in strict compliance with MNR regulations. The function and pressure testing guidelines required by the regulatory bodies (such as daily function testing of the pipe rams) will be strictly adhered to.

- 1. All pressure tests of blowout prevention equipment will be conducted with fresh water and will be conducted in 2 stages low and high pressure. It is essential that the low pressure test be done first, to prevent the high pressure test from healing leaks that would have been noted at low pressures.
- 2. The following pressure test will be conducted with fresh water prior to drilling out each casing string and the results recorded on the tower sheets and daily reports:
 - a. The blind rams, kill lines and choke manifold will be tested individually for 10 minutes each to:
 - i. Production casing 2000 kPa low and 10000 kPa high
 - b. Run in hole with BHA, drill pipe and drill collars and pressure test the casing string, pipe rams, kelly cock, stand pipe, swivel, safety valves, etc. will be tested individually for 10 minutes each to:
 - i. Production casing 2000 kPa low and 10000 kPa high
 - c. The annular preventer will be tested for 10 minutes to
 - i. Production casing 2000 kPa low and 10000 kPa high

- 3. After one day of drilling below the casing shoe, check the entire blowout prevention system and tighten all bolts.
- 4. Crews should be kept alert and familiar with the blowout prevention equipment. At least one member of the crew who has been trained in blowout prevention and well control procedures must be on the floor at all times.
- 5. Conduct blowout prevention drills prior to drilling out casing and once per week thereafter. Ensure that the drills are recorded in the tour book.
- 6. The blowout preventers are to be function tested once per shift. Ensure that the function test is recorded on the tower sheets.