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July 5th, 2024

Office of the Regulator of Oil and Gas Operations (OROGO)
4th Floor Northwest Tower
5201 – 50th Avenue
Yellowknife NT
X1A 3S9
Email: OROGO@gov.nt.ca

Dear Mrs. de Jong, Executive Director, OROGO

Suncor Energy Inc. is seeking an operational determination on placing a second permanent bridge plug into the wells in Colville Lake; Tweed Lake M-47 (WID1476), Tweed Lake A-67 (WID1555) and Bele O-35 (WID1600). The basis for this request is discussed in detail within the attached Basis of Design document.

In summary, Suncor Energy Inc. feel the proposed abandonment concept satisfies the OROGO requirements outlined in the Wells Suspension and Abandonment Guidelines, whilst minimising risk to people and the environment.

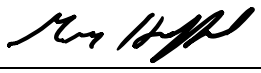
If there are any questions regarding this request, please contact me at 403-816-2422 or via email at gheffel@suncor.com.

Sincerely
SUNCOR ENERGY INC.

Greg Heffel
Specialist Engineering - Completions

Suncor Energy

Basis of Design Document
NWT (Northwest Territories) Abandonments

AUTHORISATION			
	Name / Position	**Signature**	**Date**
Compiled by:	Greg Heffel Specialist Engineer - Completions		July 5/24
Review by:	Don Fisher Director Completions Operations		
Independent Review by:	Shan Guna Senior Drilling Engineer		
Approved by:	Stephen Weatherhead Director Completions Engineering		July 5/24

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1.1 Introduction

This document outlines the Basis of Design for the abandonment of the three Colville Lake wells (A-67, M-47, O-35) which were drilled and completed in 1985 & 1986 respectively. This proposed abandonment strategy is in alignment with the OROGO Well Suspension and Abandonment Guidelines and considers the geological rational to leave the uncemented intervals of the surface casing in place, which was reviewed and accepted by OROGO (Office of the Regulator of Oil and Gas Operations) in February 2024.

The leases are located 20 and 60 km south of Colville lake and approximately 200 km north west of Norman Wells. The main access to Colville lake is via the Mackenzie River, by barge in the summer months and ice roads on the river during the winter. From Fort Good Hope, the wellsites can be accessed either by air or by ice road in the winter. Outside of the limited barging and ice road windows, access is by aircraft only.

The three wellbores that require abandonment are 100% owned Suncor. Two out of the three wellbores have been completed and suspended downhole. Well O-35, was never completed and is cased and cemented.

OROGO issued Suncor Energy an extension until March 31, 2025, to bring the wellbores into abandonment compliance. Suncor Energy have been working to evaluate the technical, logistical, and commercial options, whilst considering all stakeholders. The cancellation of the Mackenzie River barging for the summer of 2024 will impact the execution window, therefore this document assumes a Spring/Summer 2025 operation. A formal application for extension of the existing deadline will be submitted to the regulator in due course.

1.2 Completion Well Objectives

The objectives of the A-67, M-47, O-35 abandonments are:

- Manage operations effectively with a focus on safety above all else and protection of the environment .
- To comply with OROGO Well Suspension and Abandonment Guidelines and Interpretations Notes, sections 6 Well Abandonment Requirements, including Cement Evaluation, Wellbore Fluid, Pressure Testing, and Surface Abandonment Requirements.
- Complete the operation within the agreed AFE (Authorization for Expenditure) and OROGO approved time line.
- Communicate to stakeholders during well operations to ensure effective decision making, consistent with the objectives of the wells.
- Record and archive in appropriate data base quality data and operational reports. Distribute relevant data sets to Stakeholders.

1.3 Wells Overview

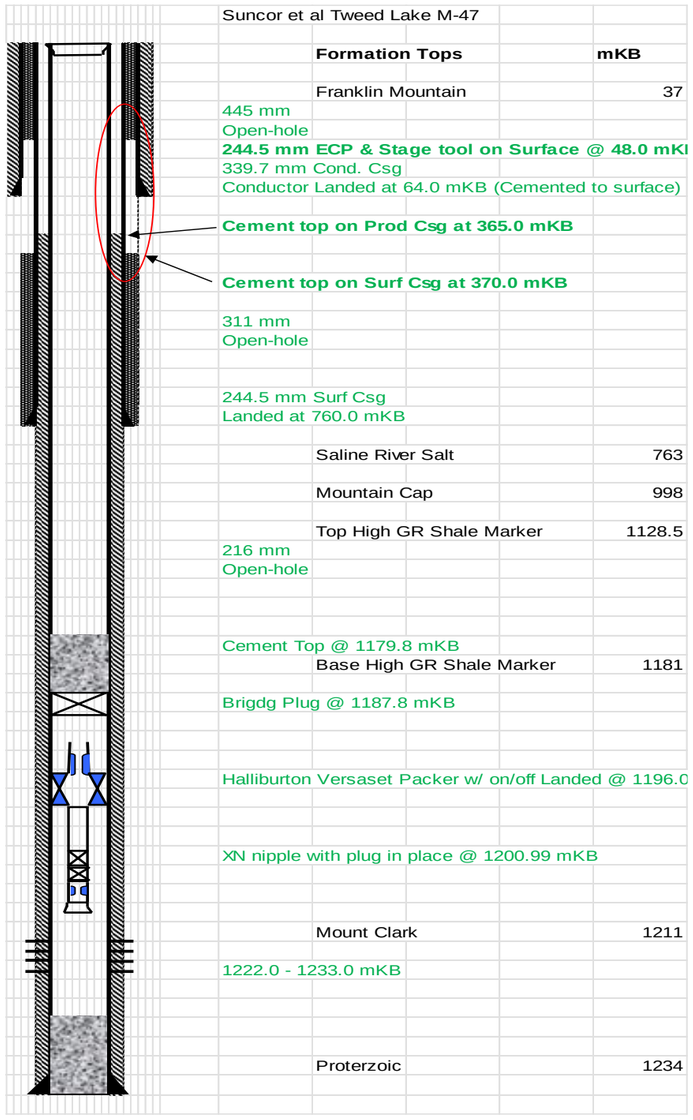
All three wells were drilled into the Proterozoic and the zone of interest was the Mount Clark Formation. In wells A-67 and M-47, the Mount Clark Formation was perforated and fractured. Both were flow tested and were subsequently down hole abandoned based on the regulation requirements at the time. The wellbore fluids currently consist of water with corrosion inhibitor. All three wells have some methanol in the fluid with each well having varying percentages (M-47 21% methanol, A-67 5.5% methanol, O-35 trace amount). O-35 has a thick brownish fluid (assumed to be drilling mud) down to 4 m with a diesel cap below that. A-67 has diesel down to 69 m and M-47 had diesel down to 7.2 m.

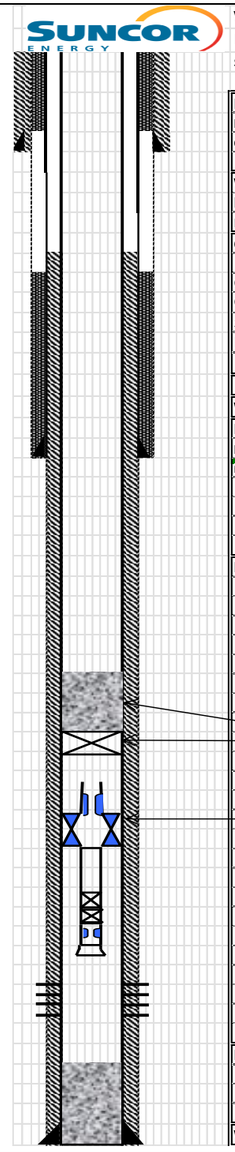
All the wellheads were serviced in June 2024 with no concerns noted. The wells were proactively pressure tested, (M-47 4.1 MPa for 15 minutes, A-67 4.2 MPa for 15 minutes, O-35 5.5 MPa for 15 minutes) and vent blow testing conducted, which was negative. The pressure testing was undertaken to confirm well integrity ahead of determining the most suitable abandonment option. Gas migration testing will be completed prior to the abandonment operations.

Current downhole configuration**s** for the three wells are shown in the following schematics.

2 Wells Technical Summary

2.1 Well Schematics





Well Name: Suncor et al Tweed Lake M-47 **Date:** Feb 15/15

UWI: 300M476700125450 **WA / Licence #** 1476

Surface Location: M-47 **Latitude:** 66°56' 47.11" N **Longitude:** 125°54' 09.42" W

Elevations

KB Elevation:	435.22	m	**KB-THF**	5.52	m	**TD**	1418.0	mKB
GL Elevation:	429.10	m	**KB-CF:**	6.12	m	**PBTD**	1179.8	mKB
			KB-GL:	6.12	m			

Wellhead: Size and Rating

Manufacturer	mm	x	mm	MPa	x	mm	MPa	x	mm	MPa
McEvoy / Crown	245	x	279	21	x	179	21	x	65	35

Casing	Hole	Joints	OD	Wt.	Grade	Thread	Top	Bottom	
	mm	#	mm	kg/m					
Conductor:	610	2	508	140	K-55	BT&C	surface	23.0	mKB
Conductor:	445	5	340	101	K-55	BT&C	surface	64.0	mKB
Surface:	311	61	245	60/65	L-80 / SOO95	LT&C	surface	760.0	mKB
Production:	216	109	178	43	N-80 / SOO95	LT&C	surface	1418.0	mKB

Wellbore Fluid: 25/75 methanol water w/ 0.8% Halliburton MX794 inhibitor

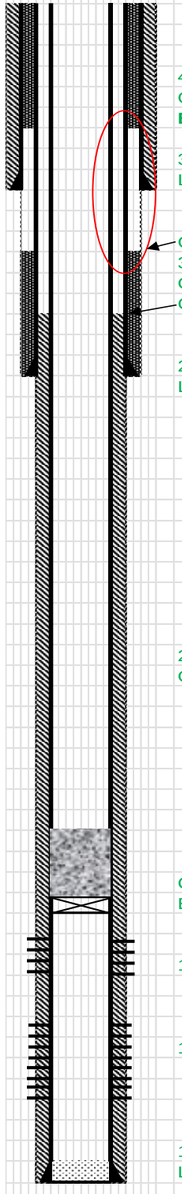
Perforations / Open Hole		**Top**	**Bottom**	**BHP**	**BHT**	**H_2S**	**CO_2**
Date	**Formation**	(mKB)	(mKB)	(kPa)	(°C)	(%)	(%)
Mar 3/04	Mount Clark (suspended w/ BP & cement)	1222.5	1233.5	12,500	11.5	0.00	0.00
	Perforated with 114 mm ERHSC guns loaded with 38.6 gm Powerjet charges @ 17 spm & 60° phasing						

Bottomhole Equipment Description (from top down) depth in mKB

Item	**Jts**	**Description**	**Length**	**Top**
1		179 mm x 73 mm EUE Crown 'CTC-1A-EN' tubing hanger with		
		9.53 mm control line (plugged) and 63.5 mm BPV prep		
2		8 lineal meter cement cap	8.0	**1179.8**
3		178 mm 69 MPa permanent bridge plug		**1187.8**
4		Halliburton 'HD' on/off connector mandrel w/ 58.75 mm 'X' profile		
5		178 mm x 73 mm EUE Halliburton 'Versaset' retrievable packer	1.90	**1196.00**
		with 'HNBR' elements		
6		3.0 m x 73 mm 9.7 kg/m L-80 EUE pup joint c/w two Owen 69 MPa	3.09	
		premium permanent bridge plugs		
7		73 mm EUE x 58.75 mm Halliburton 'XN' nipple w/ 56.01 mm no-go	0.39	**1200.99**
		with 58 mm no-go dart for setting bridge plug		
8		98.55 mm OD x 73 mm EUE wireline re-entry guide	0.15	
		Bottom of re-entry guide landed at		**1201.53**

Remarks Wellbore topped with 120 litres diesel for freeze protection.

Well Status Suspended gas well. **Prepared by** Bob Barvir



PCI Canterra Tweed A-67

Formation Tops	mKB
Mount Kindel	9

445 mm
Open-hole
ECP and Stage tool @ 49.5 mKB

339.7 mm Cond. Csg
Landed at 61.5 mKB

Franklin Mountain	76

Cement top on Surf Csg at ~ 420 mkB
311 mm
Open-hole
Cement top on Prod Csg at 683.0 mKB

Saline River Salt	727

244.5 mm Surf Csg
Landed at 754.0 mKB

Saline River Salt Member	796
Shale Marker	875

216 mm
Open-hole

High GR Shale Marker Base	1217

Cement top at 1250.7 mKB
BP @ 1260.0 mKB

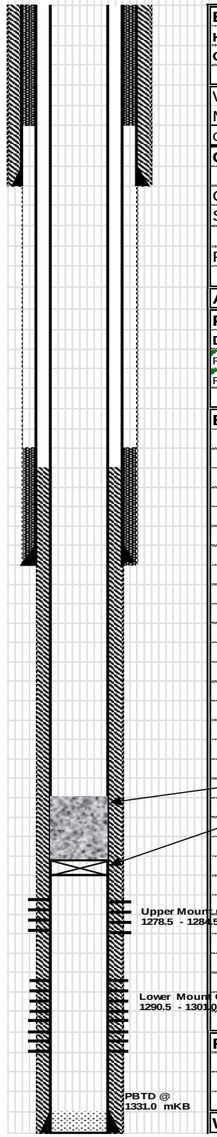
Mount Clark	1278

1278.5 - 1284.5 mKB

1290.5 - 1301.0 mKB

Proterozoic	1299

177.8 mm Prod Csg
Landed at 1347.0 mKB



SUNCOR ENERGY

Well Name	PCI Canterra Tweed A-67	**Date**	May 7/09
UWI		**WA / Licence #**	
Surface Location	**Latitude** 66° 56' 11.60"N	**Longitude**	125° 56' 18.88"W

Elevations								
KB Elevation	397.10 m	**KB-THF**	5.80 m			**TD**	1347.0	mKB
GL Elevation	390.90 m	**KB-CF**	6.35 m			**PBTD**	1250.7	mKB
		KB-GL	6.20 m					

Wellhead:	Size and Rating									
Manufacturer	mm	x	mm	MPa	x	mm	MPa	x	mm	MPa
Cameron	245	x	279	21	x	179	21	x	65	21

Casing	Hole	Jts	OD	Wt.	Grade	Thread	Top	Bottom	
	mm	#	mm	kg/m					
Conductor	444	5	340	101.2	K-55	ST&C	surface	61.5	mKB
Surface	311	62	245	59.5	MN-80	LT&C	surface	754.0	mKB
Production	216	132	178	43.2	L-80	LT&C	surface	1347.0	mKB

Annular Fluid	10% NaCl water w / 0.9 % inhibitor & topped w / 1.6 m^3 diesel	m^3

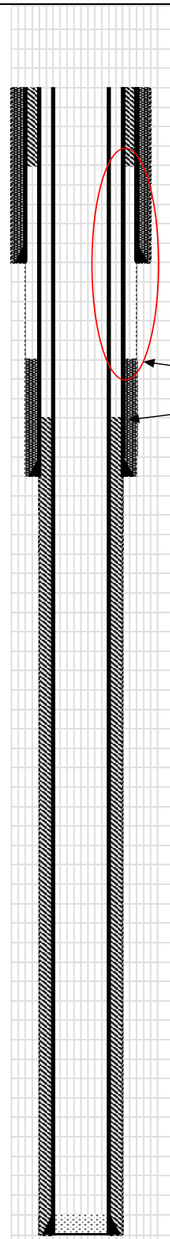
Perforations / Open Hole		**Top**	**Bottom**	**BHP**	**BHT**	**H_2S**	**CO_2**
Date	**Formation**	(mKB)	(mKB)	(kPa)	(°C)	(%)	(%)
Feb 7/86	Lower Mount Clark (abandoned	1290.5	1301.0	13,000	12.0		
Feb 19/86	Upper Mount Clark (abandoned	1278.5	1284.5	13,000	12.0		

Bottomhole Equipment Description (from top down) depth in mKB

Item	Jts	Description	Length	Top
1		Class 'G' cement above bridge plug	9.3	1250.7
2		178 mm Halliburton EZ-drill permanent bridge plug		1260.0

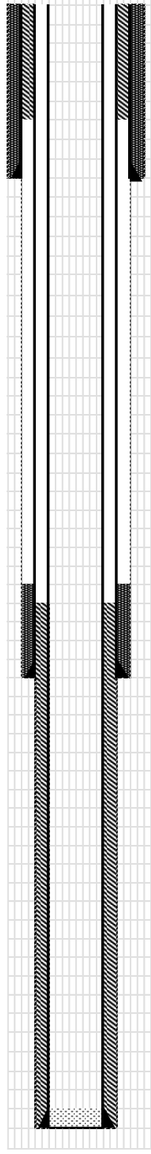
Remarks

Well Status	Suspended Mt. Clark gasw ell.	**Prepared by**	Bob Barvir



SUNCOR et al BELE 0-35

Formation Tops	DO you mKB
Bear Rock	0
445 mm Open-hole	
ECP and Stage tool @ 37.97 mKB	
339.7 mm Cond. Csg Landed at 63.0 mKB	
Franklin Mountain	120
311 mm Open-hole	
Cement top on Surf Csg @ ~ 625.0 mKB	
Cement top on Prod Csg at 676.0 mKB	
Saline River Salt	762.5
244.5 mm Surf Csg Landed at 777.0 mKB	
Saline River Salt Member	800.75
Shale Marker	812
Lower Salt	817
216 mm Open-hole	
Mount Cap	1120.25
Mount Clark	1343.7
Proterozoic	1362.5
177.8 mm Prod Csg Landed at 1384.33 mKB	



Well Name SUNCOR et al BELE O-35 **Date** Apr 10/20
UWI 300O356640126150 **WA / Licence #** N85A469
Surface Location **Latitude** 6º 34' 58.1357"\ **Longitude** 26º 21' 32.1083"\

Elevations

KB Elevation	397.76	m		**KB-THF**		m		**TD**	1384.0	mKB
GL Elevation	393.26	m		**KB-CF**		m		**PBTD**		mKB
				KB-GL	4.50	m				

Wellhead:	Size and Rating									
Manufacturer	mm	x	mm	MPa	x	mm	MPa	x	mm	MPa
Cameron	245	x	279	21	x	179	21	x	65	21

Casing	Hole	Jts	OD	Wt.	Grade	Thread	Top	Bottom	
	mm	#	mm	kg/m					
Conductor	444	5	339.7	101.2	K-55	BT&C	surface	63.0	mKB
Surface	311	42	244.5	59.5	K-55	LT&C	surface	515.7	mKB
	311	19	244.5	59.5	T-95	LT&C	515.66	739.0	mKB
	311	62	244.5	59.5	K-55	LT&C	739.03	777.0	mKB
Production	216	117	177.8	43.2	MN-80	LT&C	surface	1384.3	mKB

Stage Collar On the surface casing string 37.97 mKB
Heat / Siphon String mKB
Annular Fluid 10% NaCl water w / 0.9 % inhibitor & topped w / 1.6 m³ diesel m^3

Perforations / Open Hole		**Top**	**Bottom**	**BHP**	**BHT**	**H_2S**	**CO_2**
Date	**Formation**	(mKB)	(mKB)	(kPa)	(°C)	(%)	(%)

Bottomhole Equipment Description (from top down) depth in mKB

Item	Jts	Description	Length	Top

Remarks

Well Status Suspended **Prepared by** Greg Heffel

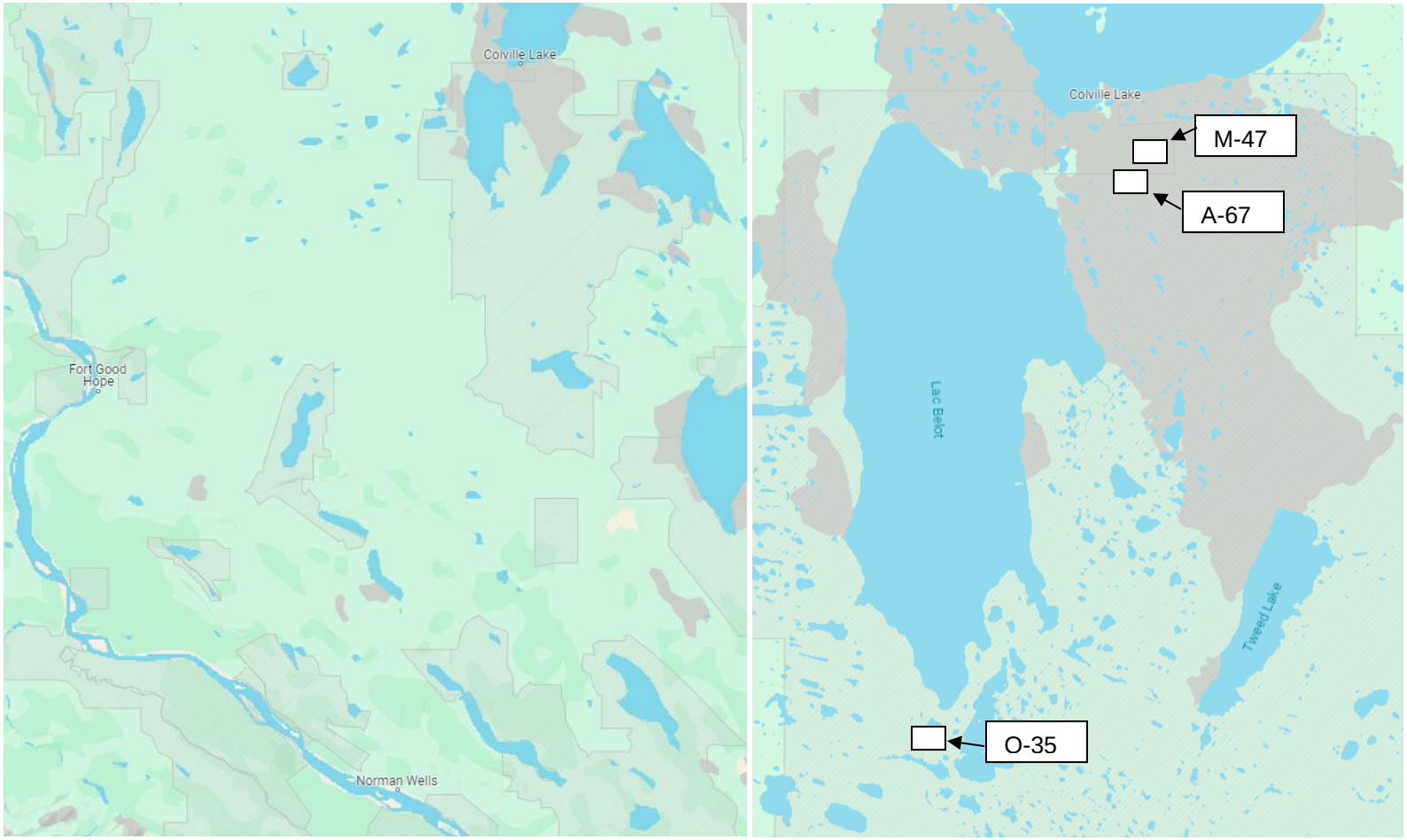
2.2 Location, Well and Rig Data

WELL DATA	**SUNCOR et al TWEED LAKE M-47**
Area:	Colville Lake
Spud date	Jan 11/85
U.W.I.	300M4767000125450
Surface Location:	Latitude: **66° 56' 47.11" N** Longitude : **125° 54' 9.42" W**
WID Number:	1476
Well Identification:	**M-47**
Kelly Bushing:	435.22 mMSL
Ground Level:	429.1 mMSL
TD:	1418.00 mKB
PBTD:	1179.8 mKB
Well Design Basis	Permanent Abandonment
H_2S Level of Preparedness	The abandoned producing interval was sweet.

WELL DATA	**SUNCOR et al TWEED LAKE A-67**
Area:	Colville Lake
Spud date	Nov 13/85
U.W.I.	300A6767000125450
Surface Location:	Latitude: **66° 56'11.60" N** Longitude: **125° 56' 18.88" W**
WID Number:	1555
Well Identification:	**A-67**
Kelly Bushing:	397.1 mMSL
Ground Level:	390.9 mMSL
TD:	1347.00 mKB
PBTD:	1250.7 mKB
Well Design Basis	Permanent Abandonment
H_2S Level of Preparedness	The abandoned producing interval was sweet.

WELL DATA	**SUNCOR et al BELE O-35**
Area:	Colville Lake
Spud date	Feb 14/86
U.W.I.	300O356640126150
Surface Location:	Latitude: **66° 34'58.1357" N** Longitude: **126° 21' 32.1083" W**
WID Number:	1600
Well Identification:	**O-35**
Kelly Bushing:	397.76 mMSL
Ground Level:	393.26 mMSL
TD:	1384.00 mKB
PBTD:	1380.00 mKB
Well Design Basis	Permanent Abandonment
H_2S Level of Preparedness	

2.3 Location Map



2.4 Abandonment of the Colville Lake wells.

The following three abandonment concepts have been evaluated:

1. Cut and pull of the existing production casing and perforation of surface casing to allow remedial cementing. Swab out of all existing wellbore fluids and replace with fresh water.

2. Swab out of all existing wellbore fluids and replace with fresh water.

3. Placement of permanent bridge plug above the surface casing shoe, replacing the fluid above the permanent bridge plug with fresh water.

Option three is proposed by Suncor as the optimal concept and is being presented to OROGO for concurrence. The rational for this recommendation is discussed below.

Option 1 – Remedial cementing

This approach is the most operationally and logistically complex with the lowest likelihood of success. Following the attempted cutting and pulling of the production casing, the surface casing would be perforated across the zones, considered to have insufficient annular cement. Remedial cementing would be attempted into those zones, all of which experienced significant losses during the original cementing operations. Assuming successful, the wells would be logged, displaced to fresh water, and cut and capped.

Significant challenges are anticipated with this approach, including:

- Uncertainty around cutting and pulling production casing.
- Uncertainty around ability to successfully place/squeeze remedial cement across the uncemented loss zones.
- Limited equipment and services within the region to support scope (drilling rig required)
- Complex logistical requirements to provide multi season winter road access to move equipment in and out.

In January 2024, Suncor Energy presented an independent geological assessment which demonstrated that the suspended Colville Lake wells do not create new pathways between the non-saline and saline water units. The study outlined that the existing casing cement has effectively isolated the known freshwater units from the known brine bearing units and that the attempted addition of remedial cement does not add value to the wellbore abandonments.

This proposal was reviewed by OROGO in February 2024 and the regulator concurred with the assessment. As a result, the remedial cementing **option was not considered any further.**

Option 2 – Swabbing entire wellbore fluid column.

This option builds on the determination that remedial cementing is not required and assumes the total wellbore contents are swabbed out and replaced with freshwater. This is a similar approach to that Suncor employed at the Tathlina N-18 well in 2022, where the swabbed fluids were flown out via helicopter and disposed of. On that occasion the well volume was significantly less than that of the 3 x Colville Lake wellbores (75m3 vs 9.2 m3) resulting in a higher logistical complexity and risk associated with increase helicopter flights.

The Tathlina well was swabbed using a wireline unit, however initial modelling suggests that swabbing the deeper, larger OD wellbores will exceed the capacity of the unit previously used. Other units are under consideration, including a Heli portable service rig. The condition and timeline for operational readiness is a concern for this option, as the only available Heli portable service rig has been cold stacked for a number of years. As a result, swabbing the entire wellbore contents is **not a recommended concept.**

Option 3 – Installation of permanent bridge plug and swabbing wellbore fluid above plug.

Suncor is proposing to place permanent bridge plugs in all the wells and replace the fluid above the plug with fresh water. This is based on the following rational:

- Reduction of the swabbed volume by up to 35m3. This in turn will significantly reduce the number of helicopter flights required to transport fluid to and from the wellsite. Reducing the number of flights mitigating the risk associated with helicopter operations as well as reducing GHG emissions (potential reduction of 60m3 of jet fuel).
- In wells M-47 and A-67, a additional bridge plug would allow a second barrier from the surface casing shoe to surface as both wells were abandoned under previous regulations, and do not meet the current requirements of 15 meters of cement on top of the lower bridge plug (8m and 9.3m respectively).
- Equipment limitations on swab depth. Reducing the total swabbed value allows a similar approach to the Tathlina operation to be utilized. By following a proven strategy and operational plan, chance of success is increased.
- Retaining inhibited fluid below the uppermost bridge plug helps ensure integrity of the casing below the surface casing shoe.

The placement of the additional bridge plug is supported by the determination that ground water protection has already been achieved above the surface casing shoe. For M-47 the proposed setting depth of 615m is based on existing bond log data and is well below the annular cement top.

For A-67 a bond log was run for the production casing and the top of annular cement is at 683 m. The cement top on the surface casing was calculated, with the expected cement top at 420 m. The proposed bridge plug placement in the production casing at 705m will ensure there is adequate amount of annular cement above the bridge plug.

Well O-35 currently does not have a bond log and the plug setting depth will be confirmed following the running of the log. For planning purposes, it is assumed the plug will be set at +/- 700m.

Based on the ability to reduce operational risk and complexity whilst satisfying OROGO requirements, **option three, installation of permanent bridge plug and swabbing wellbore fluid above plug, is the recommended option.**

To meet the abandonment requirements set out in OROGO's Well Suspension and Abandonment Guidelines and Interpretations Notes, Suncor will perform a bond log on well O-35. There are bond logs on M-47 and A-67 which will be sent into OROGO for their records. All wells will require pressure testing to 7 MPa for 10 minutes prior to cutting and capping.

Proposed final wellbore configurations are as follows:

Well Name:	Suncor et al Tweed Lake M-47							**Date:**	Feb 15/15	
UWI:	300M476700125450							**WA / Licence #**	1476	
Surface Location:	M-47		**Latitude:**	66°56' 47.11" N		**Longitude:**	125°54' 09.42" W			

Elevations									
KB Elevation:	435.22	m	**KB-THF**	5.52	m		**TD**	1418.0	mKB
GL Elevation:	429.10	m	**KB-CF:**	6.12	m		**PBTD**	1179.8	mKB
			KB-GL:	6.12	m				

Wellhead:	**Size and Rating**									
Manufacturer	mm	x	mm	MPa	x	mm	MPa	x	mm	MPa
McEvoy / Crown	245	x	279	21	x	179	21	x	65	35

Casing	Hole	Joints	OD	Wt.	Grade	Thread	Top	Bottom	
	mm	#	mm	kg/m					
Conductor:	610	2	508	140	K-55	BT&C	surface	23.0	mKB
Conductor:	445	5	340	101	K-55	BT&C	surface	64.0	mKB
Surface:	311	61	245	60/65	L-80 / SOO95	LT&C	surface	760.0	mKB
Production:	216	109	178	43	N-80 / SOO95	LT&C	surface	1418.0	mKB

Wellbore Fluid: 25/75 methanol water w / 0.8% Halliburton MX794 inhibitor

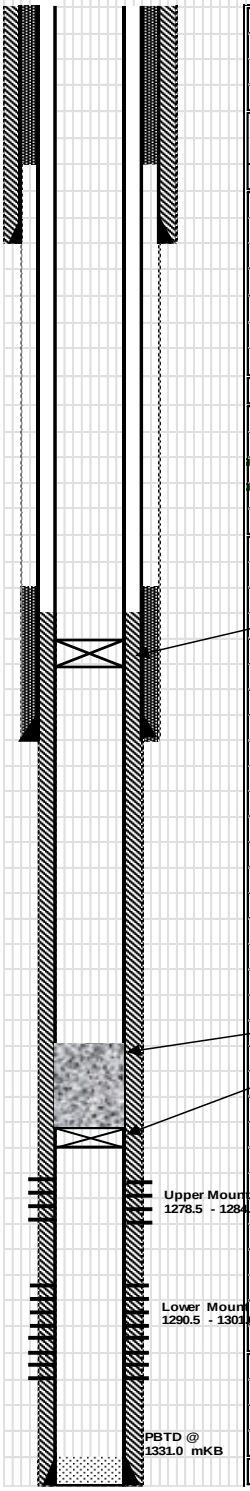
Perforations / Open Hole		**Top**	**Bottom**	**BHP**	**BHT**	**H_2S**	**CO_2**
Date	**Formation**	(mKB)	(mKB)	(kPa)	(°C)	(%)	(%)
Mar 3/04	Mount Clark (suspended w / BP & cement)	1222.5	1233.5	12,500	11.5	0.00	0.00
	Perforated with 114 mm ERHSC guns loaded with 38.6 gm Powerjet charges @ 17 spm & 60° phasing						

Bottomhole Equipment Description (from top down) depth in mKB

Item	**Jts**	**Description**	**Length**	**Top**
8		Bridge plug		615 mKB
1		179 mm x 73 mm EUE Crown 'CTC-1A-EN' tubing hanger with		
		9.53 mm control line (plugged) and 63.5 mm BPV prep		
2		8 lineal meter cement cap	8.0	**1179.8**
3		178 mm 69 MPa permanent bridge plug		**1187.8**
4		Halliburton 'HD' on/off connector mandrel w / 58.75 mm 'X' profile		
5		178 mm x 73 mm EUE Halliburton 'Versaset' retrievable packer	1.90	**1196.00**
		with 'HNBR' elements		
6		3.0 m x 73 mm 9.7 kg/m L-80 EUE pup joint c/w two Owen 69 MPa	3.09	
		premium permanent bridge plugs		
7		73 mm EUE x 58.75 mm Halliburton 'XN' nipple w / 56.01 mm no-go	0.39	**1200.99**
		with 58 mm no-go dart for setting bridge plug		
8		98.55 mm OD x 73 mm EUE wireline re-entry guide	0.15	
		Bottom of re-entry guide landed at		**1201.53**

Remarks Wellbore topped with 120 litres diesel for freeze protection.

Well Status	Suspended gas well.	**Prepared by**	Bob Barvir



Well Name	PCI Canterra Tweed A-67							**Date**	May 7/09		
UWI								**WA / Licence #**			
Surface Location				**Latitude**	66° 56' 11.60"N			**Longitude**	125° 56' 18.88"W		

Elevations									
KB Elevation	397.10	m	**KB-THF**	5.80	m		**TD**	1347.0	mKB
GL Elevation	390.90	m	**KB-CF**	6.35	m		**PBTD**	1250.7	mKB
			KB-GL	6.20	m				

Wellhead:	Size and Rating									
Manufacturer	mm	x	mm	MPa	x	mm	MPa	x	mm	MPa
Cameron	245	x	279	21	x	179	21	x	65	21

Casing	Hole	Jts	OD	Wt.	Grade	Thread	Top	Bottom	
	mm	#	mm	kg/m					
Conductor	444	5	340	101.2	K-55	ST&C	surface	61.5	mKB
Surface	311	62	245	59.5	MN-80	LT&C	surface	754.0	mKB
Production	216	132	178	43.2	L-80	LT&C	surface	1347.0	mKB

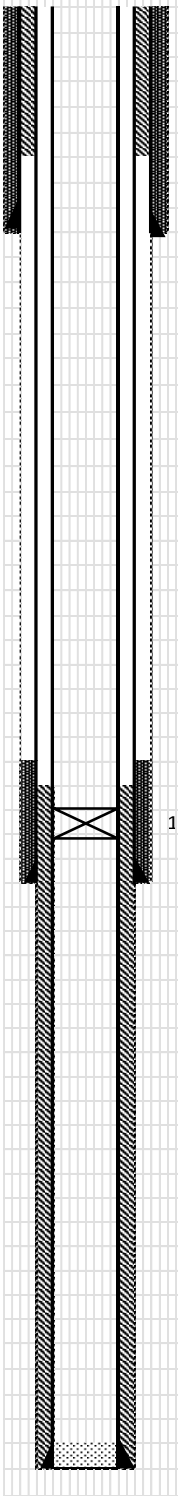
Annular Fluid	10% NaCl water w / 0.9 % inhibitor & topped w / 1.6 m^3 diesel	m^3

Perforations / Open Hole		**Top**	**Bottom**	**BHP**	**BHT**	**H_2S**	**CO_2**
Date	**Formation**	(mKB)	(mKB)	(kPa)	(°C)	(%)	(%)
Feb 7/86	Lower Mount Clark (abandoned	1290.5	1301.0	13,000	12.0		
Feb 19/86	Upper Mount Clark (abandoned	1278.5	1284.5	13,000	12.0		

Bottomhole Equipment Description (from top down) depth in mKB				
Item	**Jts**	**Description**	**Length**	**Top**
3		Bridge plug		705 mK
1		Class 'G' cement above bridge plug	9.3	1250.7
2		178 mm Halliburton EZ-drill permanent bridge plug		1260.0

Remarks

Well Status	Suspended Mt. Clark gas well.	**Prepared by**	Bob Barvir



Well Name	SUNCOR et al BELE O-35							**Date**	Apr 10/20			
UWI	300O356640126150							**WA / Licence #**	N85A469			
Surface Location				**Latitude**	6° 34' 58.1357"		**Longitude**	26° 21' 32.1083"\				
Elevations												
KB Elevation	397.76	m		**KB-THF**		m		**TD**	1384.0	mKB		
GL Elevation	393.26	m		**KB-CF**		m		**PBTD**		mKB		
				KB-GL	4.50	m						
Wellhead:	Size and Rating											
Manufacturer	mm	x	mm	MPa	x	mm	MPa	x	mm	MPa		
Cameron	245	x	279	21	x	179	21	x	65	21		
Casing	Hole	Jts	OD	Wt.	Grade	Thread		Top	Bottom			
	mm	#	mm	kg/m								
Conductor	444	5	339.7	101.2	K-55	BT&C		surface	63.0	mKB		
Surface	311	42	244.5	59.5	K-55	LT&C		surface	515.7	mKB		
	311	19	244.5	59.5	T-95	LT&C		515.66	739.0	mKB		
	311	62	244.5	59.5	K-55	LT&C		739.03	777.0	mKB		
Production	216	117	177.8	43.2	MN-80	LT&C		surface	1384.3	mKB		
Stage Collar	On the surface casing string								37.97	mKB		
Heat / Siphon String										mKB		
Annular Fluid	10% NaCl water / 0.9 % inhibitor & topped w / 1.6 m^3 diesel									m^3		
Perforations / Open Hole							**Top**	**Bottom**	**BHP**	**BHT**	**H_2S**	**CO_2**
Date	**Formation**						(mKB)	(mKB)	(kPa)	(°C)	(%)	(%)

Bottomhole Equipment Description (from top down) depth in mKB

Item	Jts	Description	Length	Top
1		Bridge plug		700 mK

Remarks

Well Status	Suspended	**Prepared by**	Greg Heffel

2.5 BOP Configuration

All three wells have been downhole suspended and previously pressure tested. The wells will be pressure tested to 7 MPa for 10 minutes before the wellheads are removed. With the knowledge that we have casing integrity and no pressure in the wellbore, it is proposed that no BOPs are installed. There will be a diverter and pack off for swabbing, therefore all fluids will be captured in holding tanks.

2.6 Wireline Logging requirements

GR / Bond Log

At this time there are bond logs over the production casing on M-47 and A-67. These will be submitted to OROGO for their records. O-35 will require a bond log run to confirm meeting 6A requirements in OROGO's Well Suspsension and Abandonment Guidelines and Interpretation Notes.

3 Operational Outline

The following is a high-level operational outline.

- The current expectation is to have a laydown yard in Colville Lake Area. Fluid storage and equipment will be moved up on the Q1 025 winter roads and placed in the laydown yard.
- Wireline unit will be flown to site from laydown yard and all associated equipment for the operation Q2 2025.
- Wellbores will be pressure tested to 7 MPa for 15 minutes. Pressure bled off after testing.
- Perform bond log on well O-35
- Install and pressure test bridge plug to 7MPa for 15 minutes
- Swabbing to the bridge plug to recover fluids.
- Bring in fresh water and pump back into the wellbore.
- Cut and cap wellbore for surface abandonment. The cut casing will be removed and a vented cap will be installed.

4 Appendices

The volumes to swabbed detailed in the table below:

Well Name	Depth to Swab	Volume to Depth
M-47	1179.8	23.1
M-47	615	12.0
A-67	1250.7	24.5
A-67	705	13.8
O-35	1380	27.0
O-35	700	13.7

Total volume in current configurations	74.6	m3
Total volume with bridge plugs in place	39.5	m3

Heli Fuel Assumptions

Helicopter burn rate	400	l/hr
Cruse Speed	220	Km/hr
Sling Cruse Speed	120	Km/hr
Range	650	Km/hr
Operational Hrs / da	10	Hr

	Distance To			Flight Time to			Ground Time			Total Time			Trips per day	
	Colville	Norman Wells		Colvile	Norman Wells		Colvile	Norman Wells		Colvile	Norman Wells		Colvile	Norman Wells
M-47	15	190	Km	0.25	2.45	hr	0.5	1.25	hr	0.75	3.70	hrs	13.33	2.70
A-67	15	190	Km	0.25	2.45	hr	0.5	1.25	hr	0.75	3.70	hrs	13.33	2.70
O-35	45	160	Km	0.75	2.06	hr	0.5	1.25	hr	1.25	3.31	hrs	8.00	3.02

	Total number of flying days to remove wellbore fluid.			Total Days to fly and Set up Equipment		Fly Out equipment to Norman Wells	Total Fuel Burn for the Helicopter	
		Colville	Norman Wells	Colville	Norman Wells	Norman Wells	Colvile	Norman Wells
M-47	23.1	1.73	8.54	2	1.5	4	3.73	10.04
M-47	12.0	0.90	4.45	2	1.5	4	2.90	5.95
A-67	24.5	1.84	9.05	1.5	1.5	4	3.34	10.55
A-67	13.8	1.03	5.10	1.5	1.5	4	2.53	6.60
O-35	27.0	3.38	8.94	1.5	4	4	4.88	12.94
O-35	13.7	1.71	4.53	1.5	4	4	3.21	8.53

Assume 10 hr flying days at 400 l/hr

		Total Flying Days		Total Jet Fuel Require		
		Colville	Norman Wells	Colville	Norman Wells	
For the Entire Wellbo		22.89	43.03	91.54	172.12	m3
For 1/2 Wellbore		16.30	27.15	65.20	108.62	m3