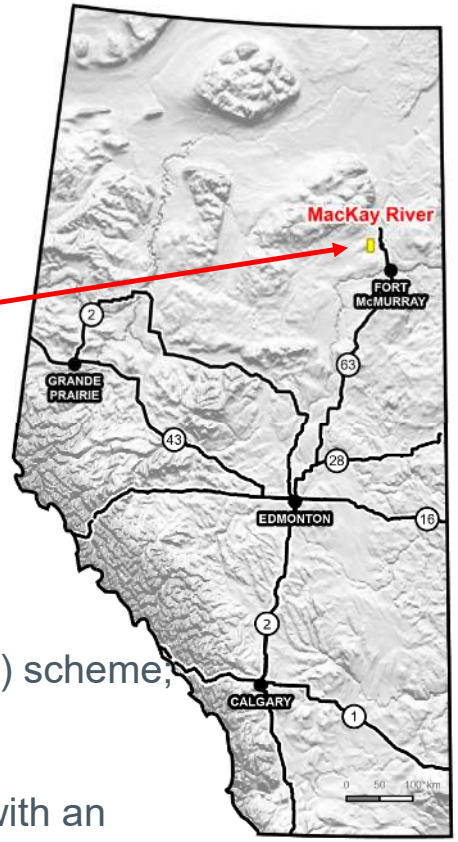
Suncor MacKay River In Situ Project
2021 AER Scheme Performance Report
Commercial Scheme Approval No. 8668

Reporting Period:
January 1, 2021 to December 31, 2021

Introduction

4.1

MacKay River Project Overview



- The MacKay River Project is a commercial Steam Assisted Gravity Drainage (SAGD) scheme;
- It is the shallowest SAGD project currently in operation within Alberta;
- Average bitumen production for the reporting period was 5,706 m^3/d (35,901 bbl/d) with an instantaneous steam-oil ratio (iSOR) of 2.77.
- Design rate for the MacKay River central processing facility is 6,041 m^3/d (38,000 bbl/d) @ 2.8 SOR.

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MacKay River Project Overview

- Suncor's first operated SAGD facility – located 60 km NW of Fort McMurray;
- Current approved bitumen production rate of 11,600 m^3/d (73,000 bbl/d);
- Adjacent to Suncor Dover (Underground Test Facility (UTF) / AOSTRA) Project;
- Horizontal production wells are placed in the McMurray Formation at a depth ranging from 98 to 145 m from surface;
- No extensive gas over bitumen or underlying water in current development area;
- Initial development had 25 well pairs with first steam in September 2002 and first production in November 2002 (Phase 1);
- 112 producers have been subsequently added.

Type of Well Pairs	Number of Well Pairs
Producing Well Pairs	130
Non-Producing Well Pairs	5
Abandoned or Planned for Abandonment – Well Pairs	2
Total Well Pairs	137

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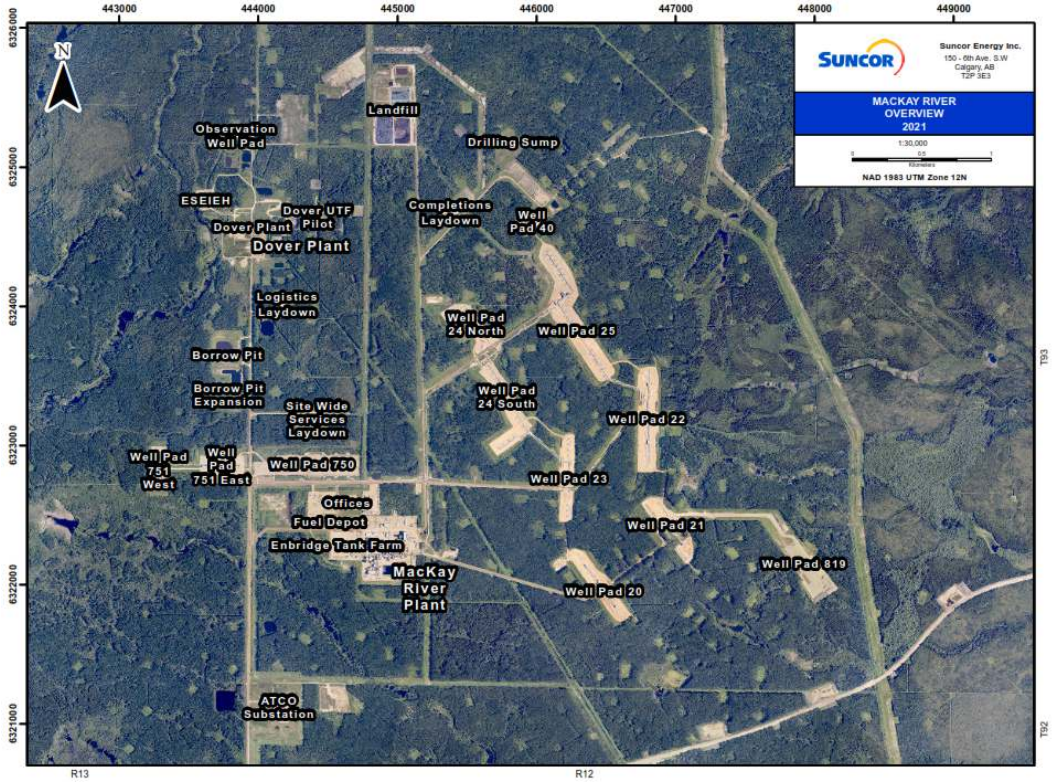
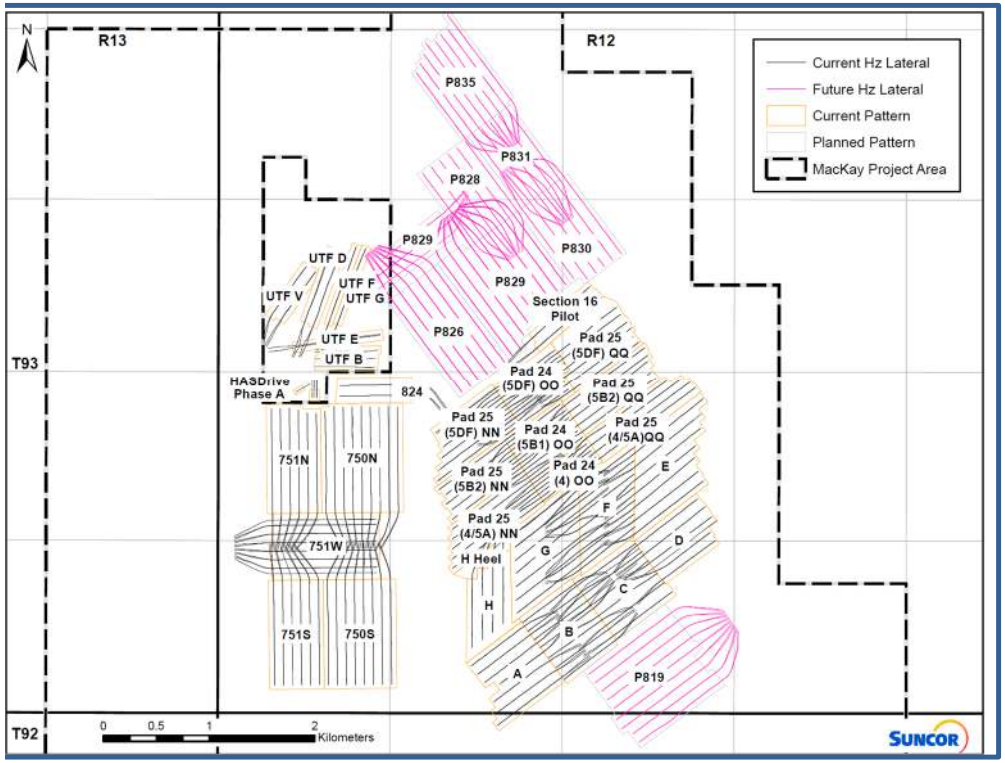
Project Area and Project Site

Current Project Area (PA) approximately 24 ½ sections.



Surface View



Subsurface View

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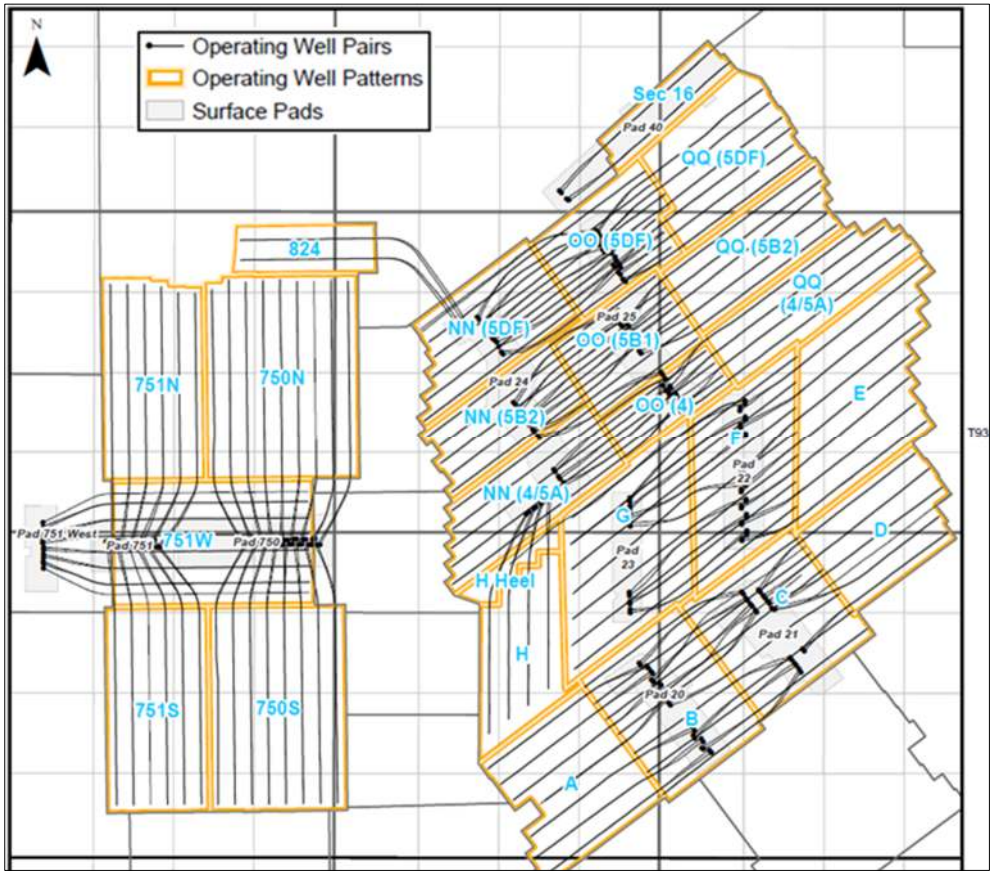
Subsurface

4.2

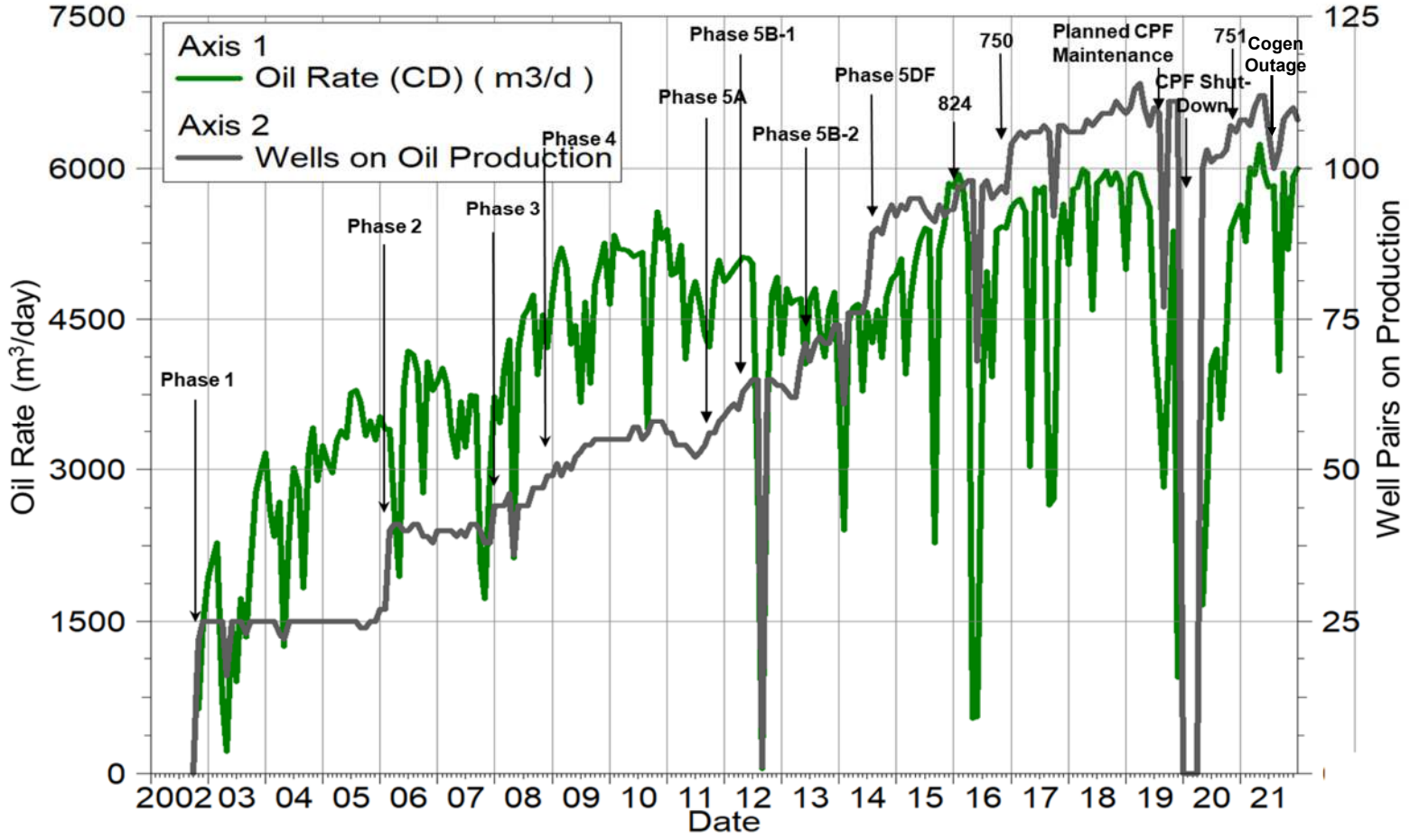
4.2.2
a) b)

Summary of Operating Wells



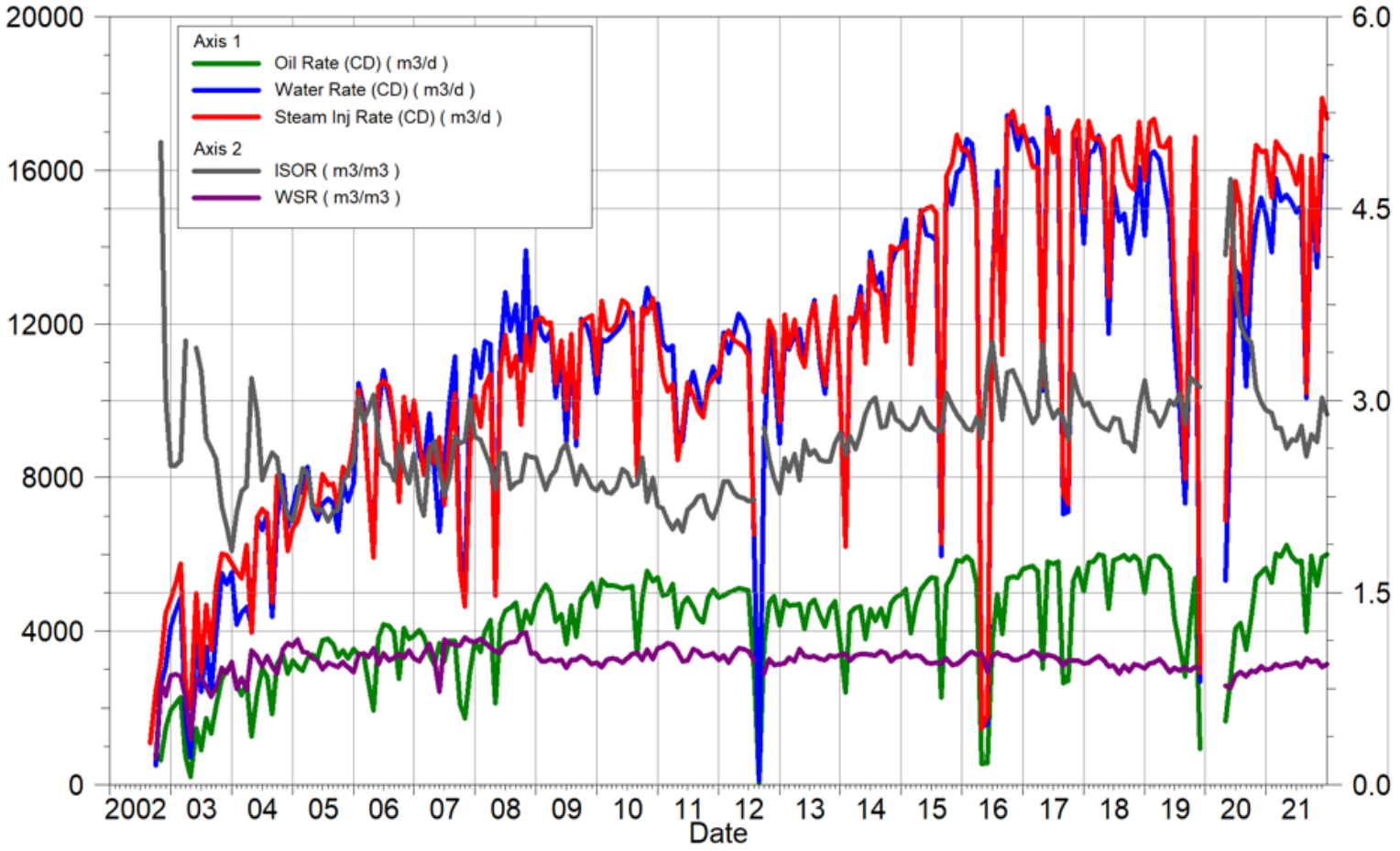
Pad	Pattern	Phase	# Well of Pairs	First Steam to Pad
20	A	1	7	2002
	C		6	
21	B		7	
	D		5	
22	E	2	7	2006
	G		7	
23	F	3	7	2007
24	OO	4	3	2008 - 2009
		5B-1	6	2012
		5DF	6	2014
	H	4	4	2009 - 2010
25	QQ	4	2	2008
		5A	2	2011
		5B-2	5	2013
		5DF	6	2014
	NN	4	1	2008
		5A	4	2011
		5B-2	5	2013
		5DF	6	2014
24	824	6	2	2015
750	750N	7A/D	8	2016
	750S	7A/B/C	8	2016 - 2019
751	751W	8A/B	6	2020
	751N	8C	1	2020
	751S	8B/C	5	2020
	751N	8D	4	2021
	751N/751S	8E	2	2021

Scheme Performance – Well Production History



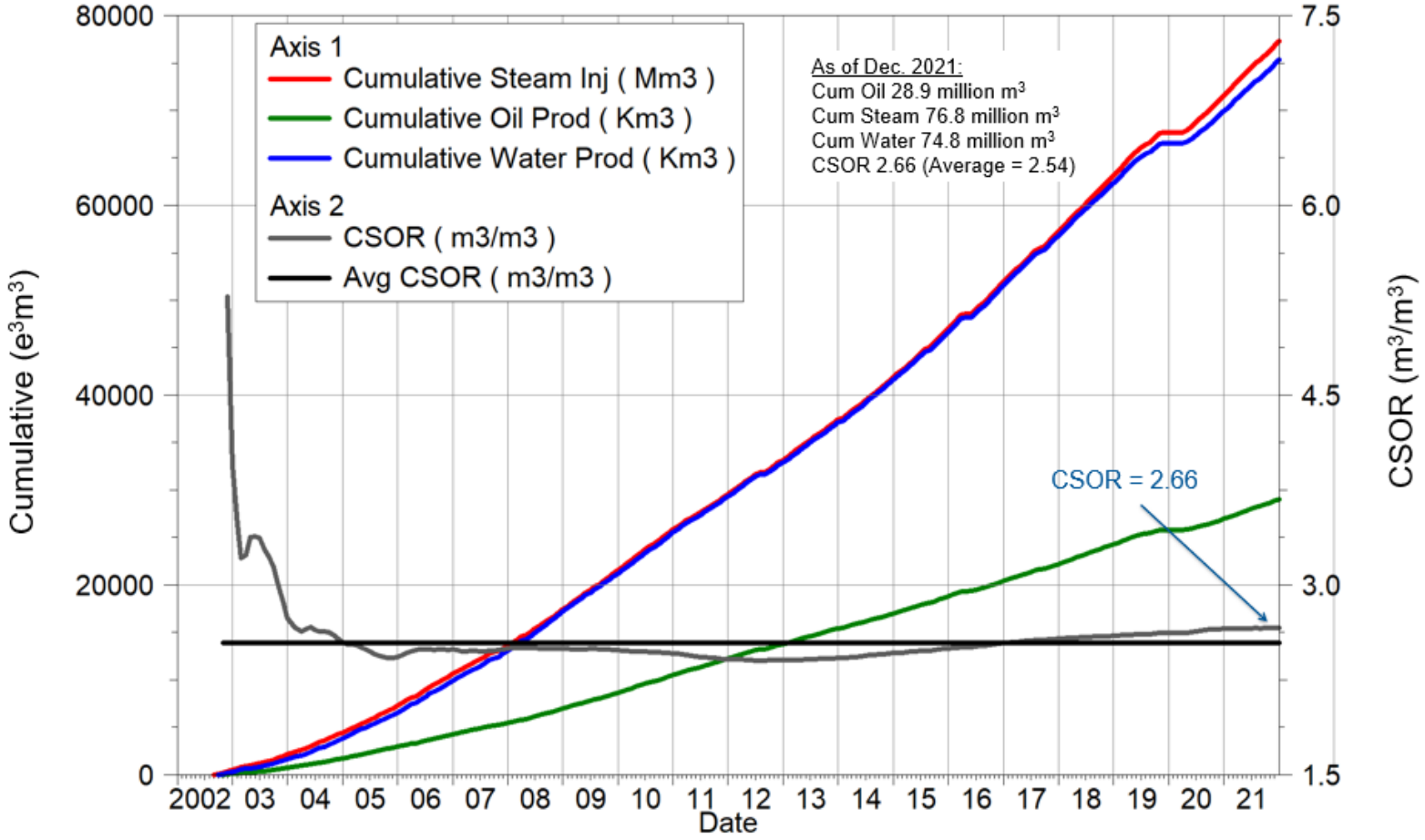
Scheme Performance – Well Production History

Historical Fluid Rates

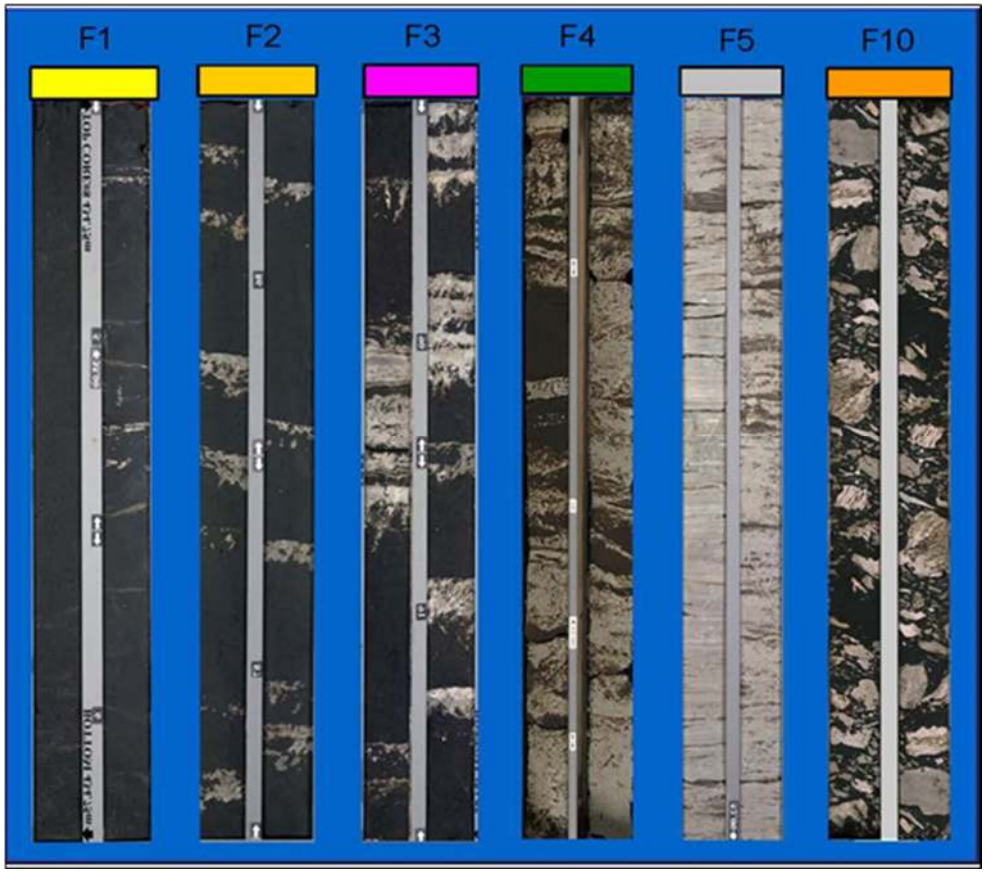


Scheme Performance – Well Production History

Historical Cumulative Fluid Volumes



Reservoir Facies



Facies:

- Defined by Visual Mud Index (VMI).

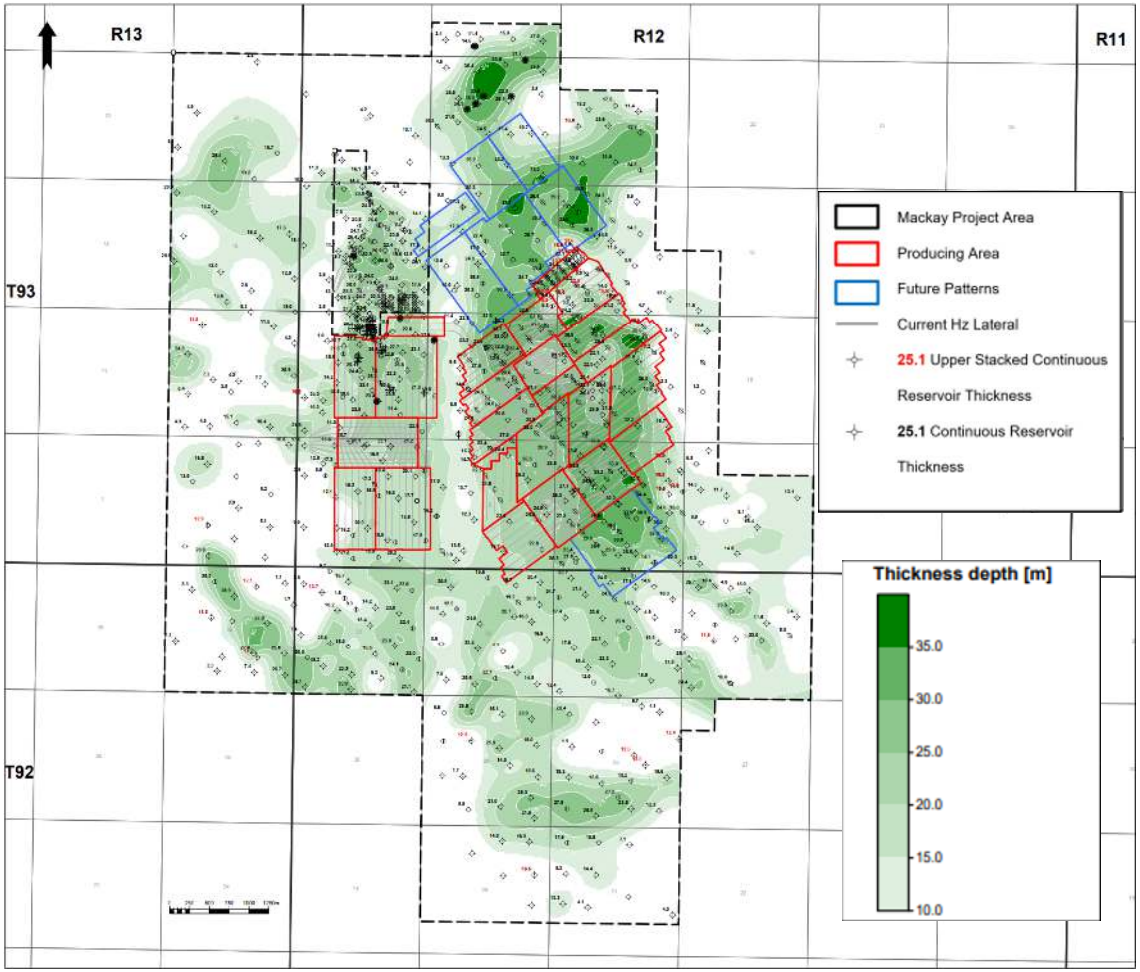
Cutoffs:

- F1 (Sandstone) <5% VMI;
- F2 (Sandy HIS*) 5-15% VMI;
- F3 (IHS*) 15-30% VMI;
- F4 (Muddy IHS) 30-70% VMI;
- F5 (Mudstone) 70-100% VMI;
- F10 (Breccia) Variable.

*IHS – Inclined Heterolithic Strata

- Reservoir includes Facies F1, F2, and F10, but can include F3-F5, if < 2m thick.
- Weight percent bitumen > 6%;
- Porosity (generally) > 30%;
- Continuous reservoir thickness >10m for OBIP volumetric calculation.

Continuous Reservoir Isopach

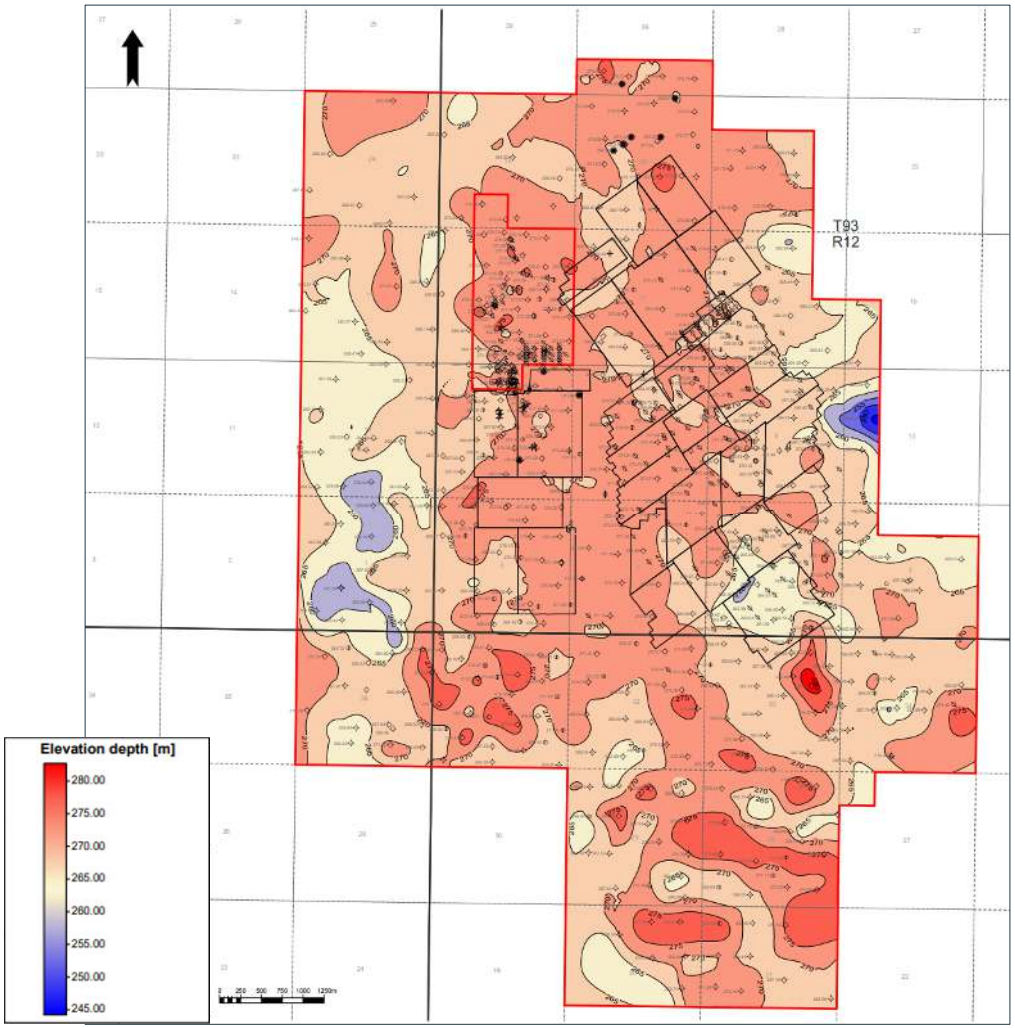


2021 MacKay Continuous Reservoir Isopach

- Contour Interval = 5m

4.2.3
b)

Base of Reservoir Structure Map



Legend

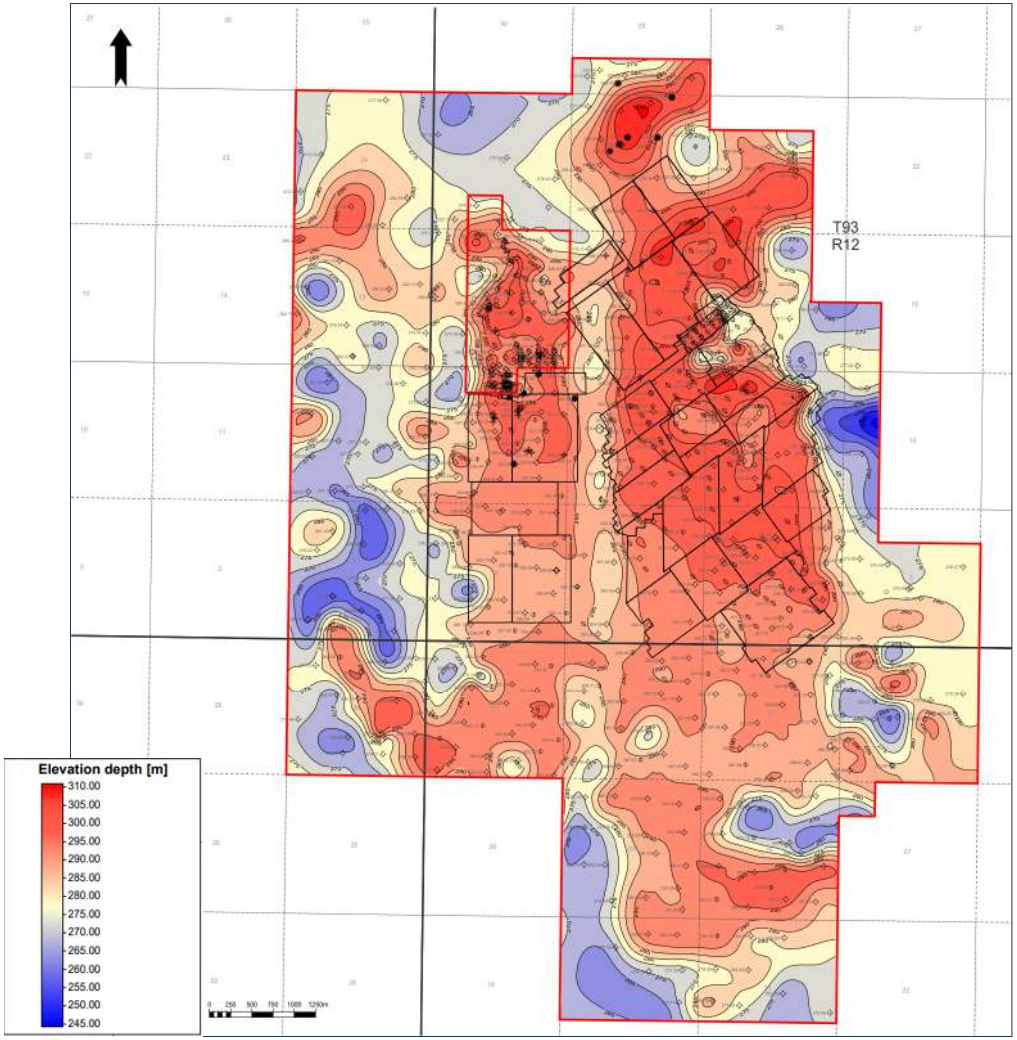
Approved PA Boundary

- Contour Interval = 5m

2021 MacKay Base of Reservoir

- Contour Interval = 5m

Top of Reservoir Structure Map



Legend

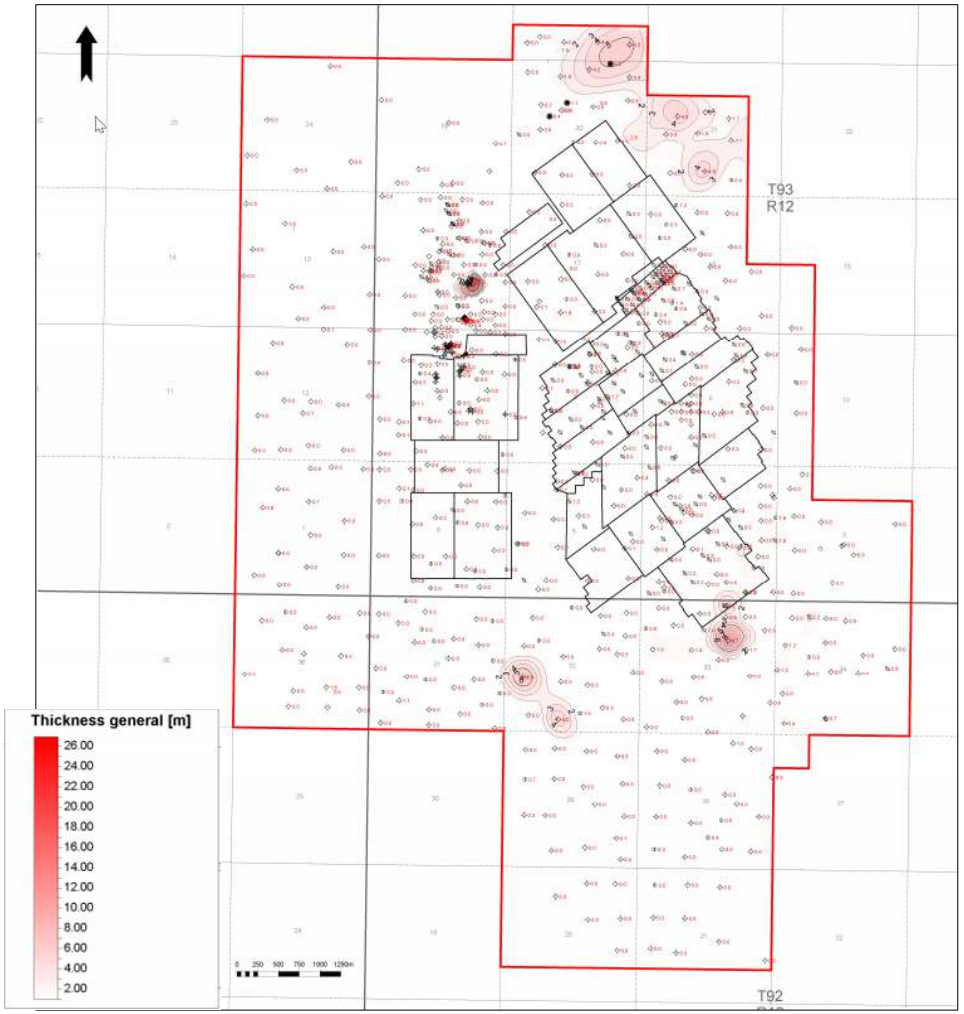
Approved PA Boundary

- Contour Interval = 5m

2021 MacKay Top of Reservoir

- Contour Interval = 5m

Reservoir Gas Isopach



Legend

Approved PA Boundary

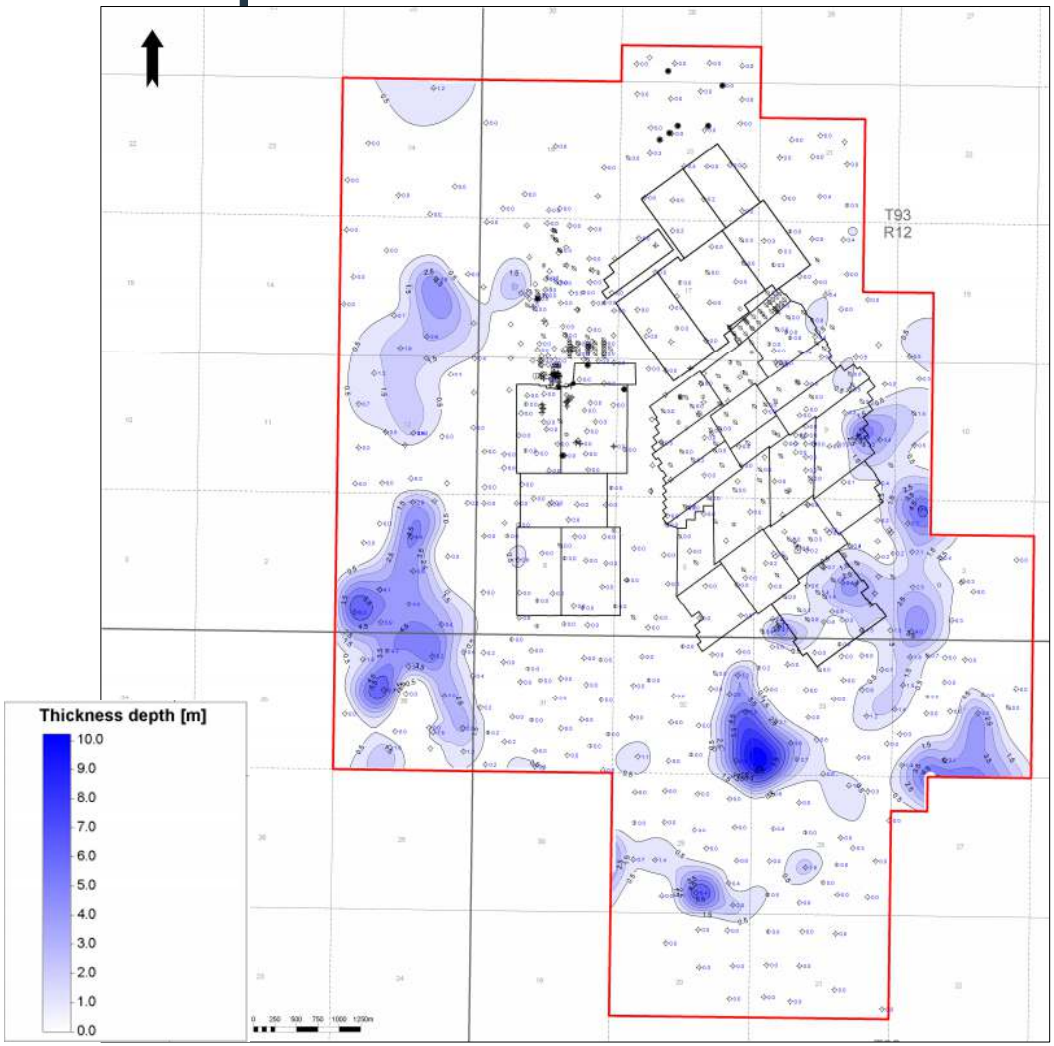
- Contour Interval = 1m

2021 Reservoir Cumulative Gas Isopach

- Cutoff = Sg > 0.03
- Contour Interval = 1m

Gas zones shown above are inconsequential to SAGD operations at Mackay River but are included for reference

Bottom Water Isopach



Legend

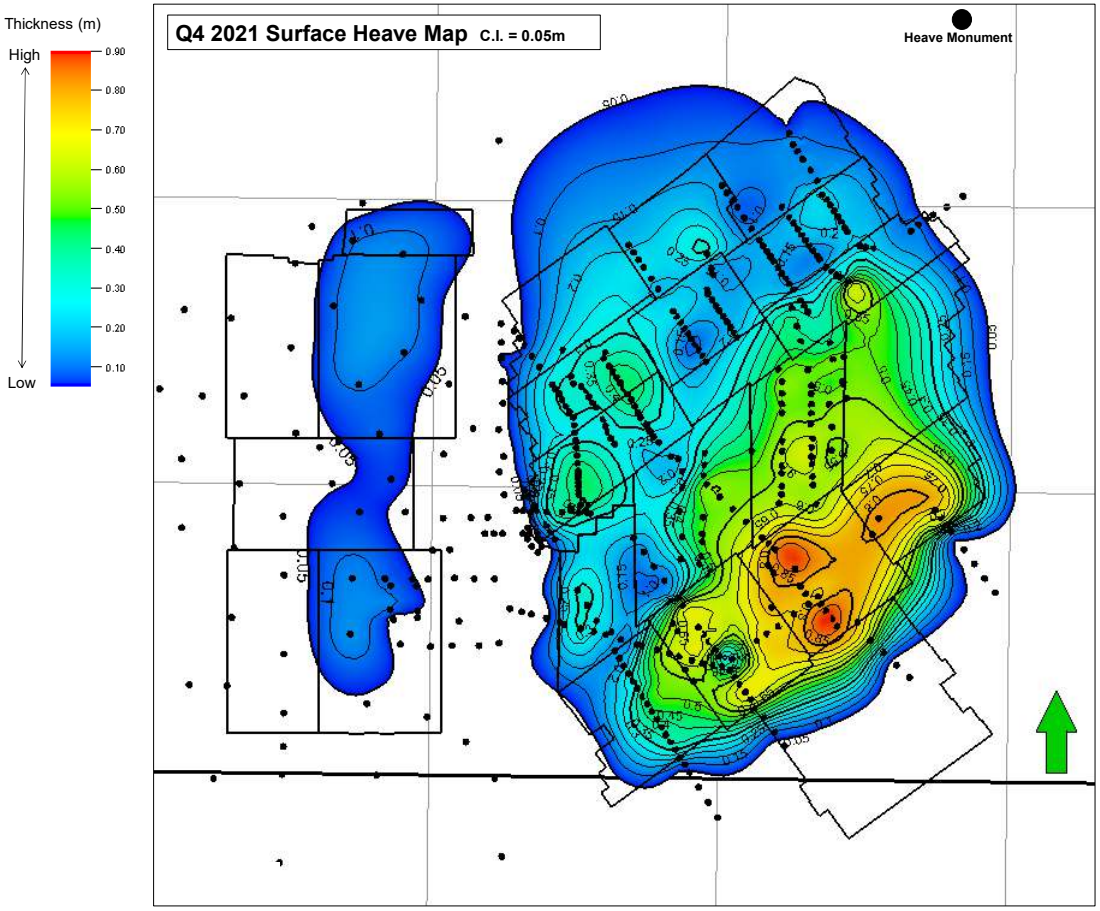
Approved PA Boundary

- Contour Interval = 1m

2021 Mackay Bottom Water Isopach

- Cutoff = BMFO < 0.02 & GR < 60 API
- Contour Interval = 1m

Cumulative Heave: From 2002 - 2021

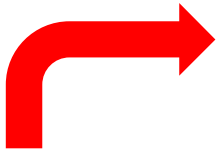


- Maximum heave of ~90 cm observed over C Pattern / Pad 21 (this relates to an increase of ~4 cm over 2 years):
  - Mature area of the field,
- Monitor subsurface safety and investigate areas which appear anomalous,
- There are no geomechanical anomalies in the development area,
- Heave data is used to calibrate geomechanical models,

Note: 2021 heave mapping covered all the producing area of MacKay River.

Uncertainty with manual heave monuments +/- 5mm

MacKay River Coupled Geomechanics / Reservoir Workflow



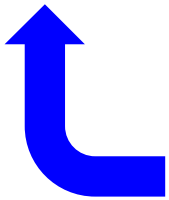
1 - Data Gathering
- SAGD well operations (Rate/Pressure)
- Ob well pressure (Piezometer)
- Ob well temperature (Thermocouple/Fiber)
- Surface heave (Monuments)
- Cores and borehole image log analysis
- Rock geo-mechanical properties (Lab tests)
- In situ stress (mini-frac tests)

2 – Data Interpretation

Reservoir Physics
- Well performance
- Pressure Leak-off
- Heat transfer

Geomechanics
- Stress state
- Rock behavior
  - Shear failure conditions
  - Tensile failure conditions
  - Permeability change
- Thermal expansion
- Reservoir level deformations

3 - Coupled Reservoir Geomechanics
- Update pressures and temperature
- Update stress state
- Recalibrate models using history match to field data
- Forecast/Design for safe development



4 - Learnings
- Sensitize key variables within uncertainty range
- Quantify geomechanical risks
- Verify and update MOP
- Recommend/Design further measurements / lab tests

Geomechanics analysis for safe optimal MacKay River operations

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Reservoir Fracture Closure Gradients

No Mini-Frac wells in 2021.

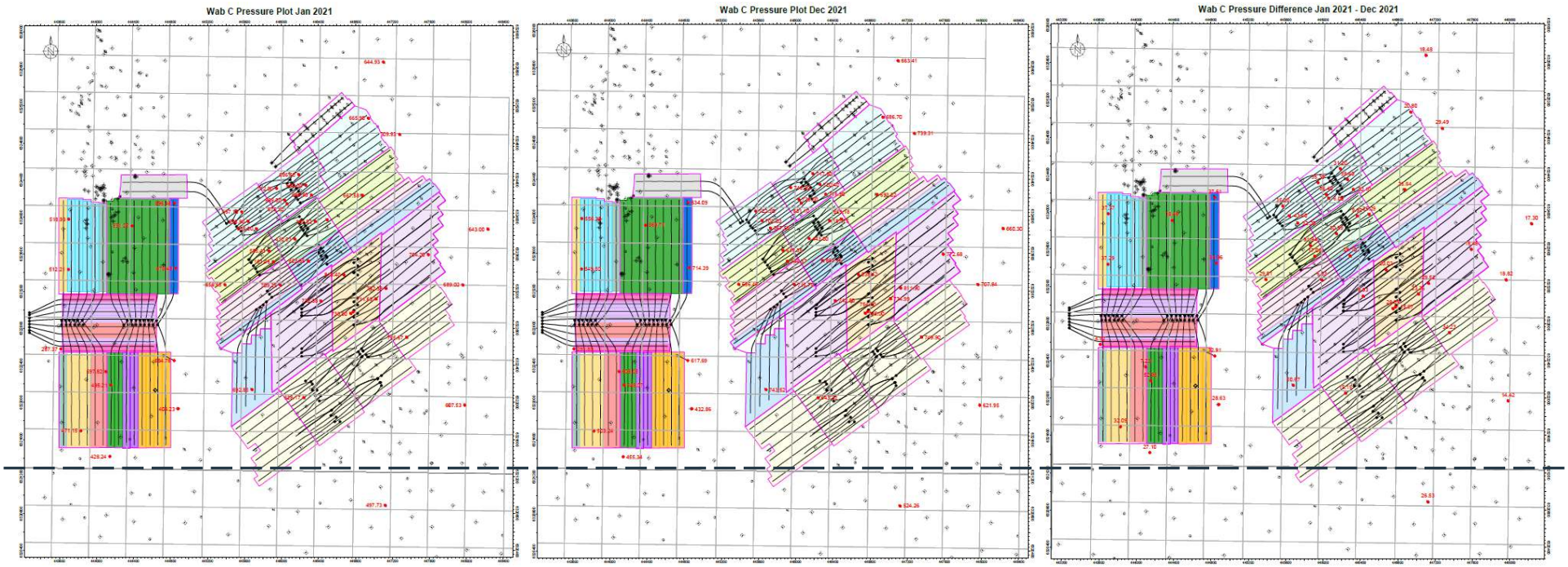
No changes recommended to the MacKay River bottomhole maximum operating pressures (MOPs) currently approved; using the following methodology:

- Fracture gradient of 21 kPa/m X based of the caprock (Wab D) in pattern X 80% (20% safety factor).

Well Date Collected	Formation			
	Clearwater	Wabiskaw D	Wabiskaw C	McMurray
Dover 7-36 AB/07-36-092-13W4 2020	22.8	23.1	23.7	19.8
Dover 6-17 AB/06-17-093-12W4 2020	22.2	22.8	24.2	21.5
OB23 100/11-20-093-12W4 2017	20.4	19.5	-	19.0
JK-9 1AA/16-04-093-12W4 2014	22.3	21.1	22.1	-
LQ2 100/05-34-092-12W4 2011	21.3	21.2	22.6	21.1
SST3 100/09-06-093-12W4 2008	24.1	-	24.3	19.9
kPa/m: unit of fracture gradient				

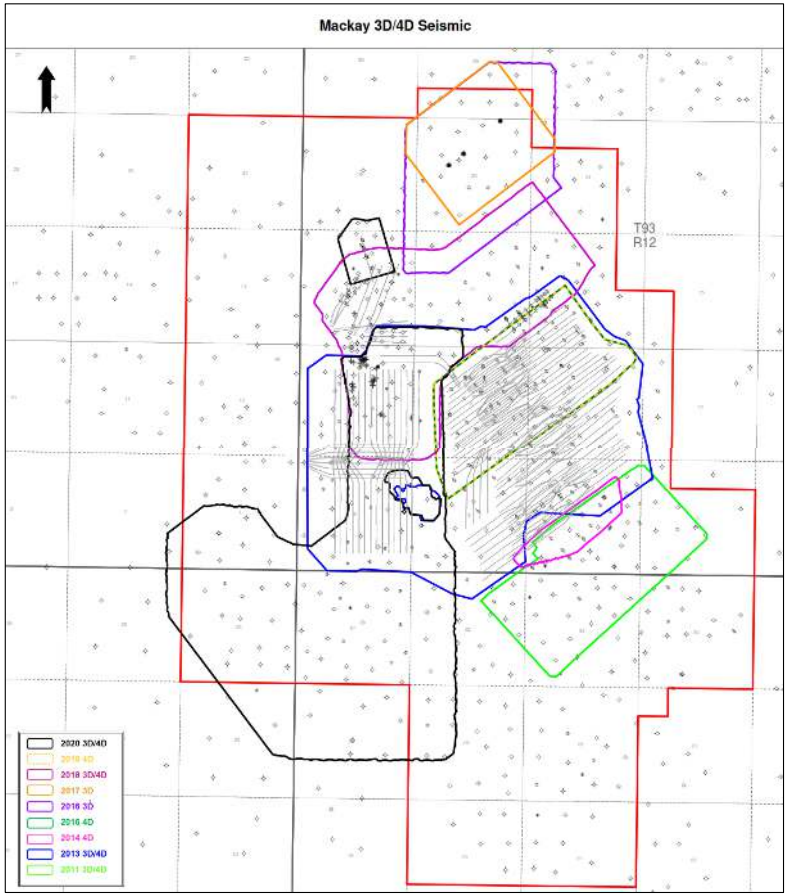
4.2.3
d)

Monitoring: Wabiskaw C Pressure



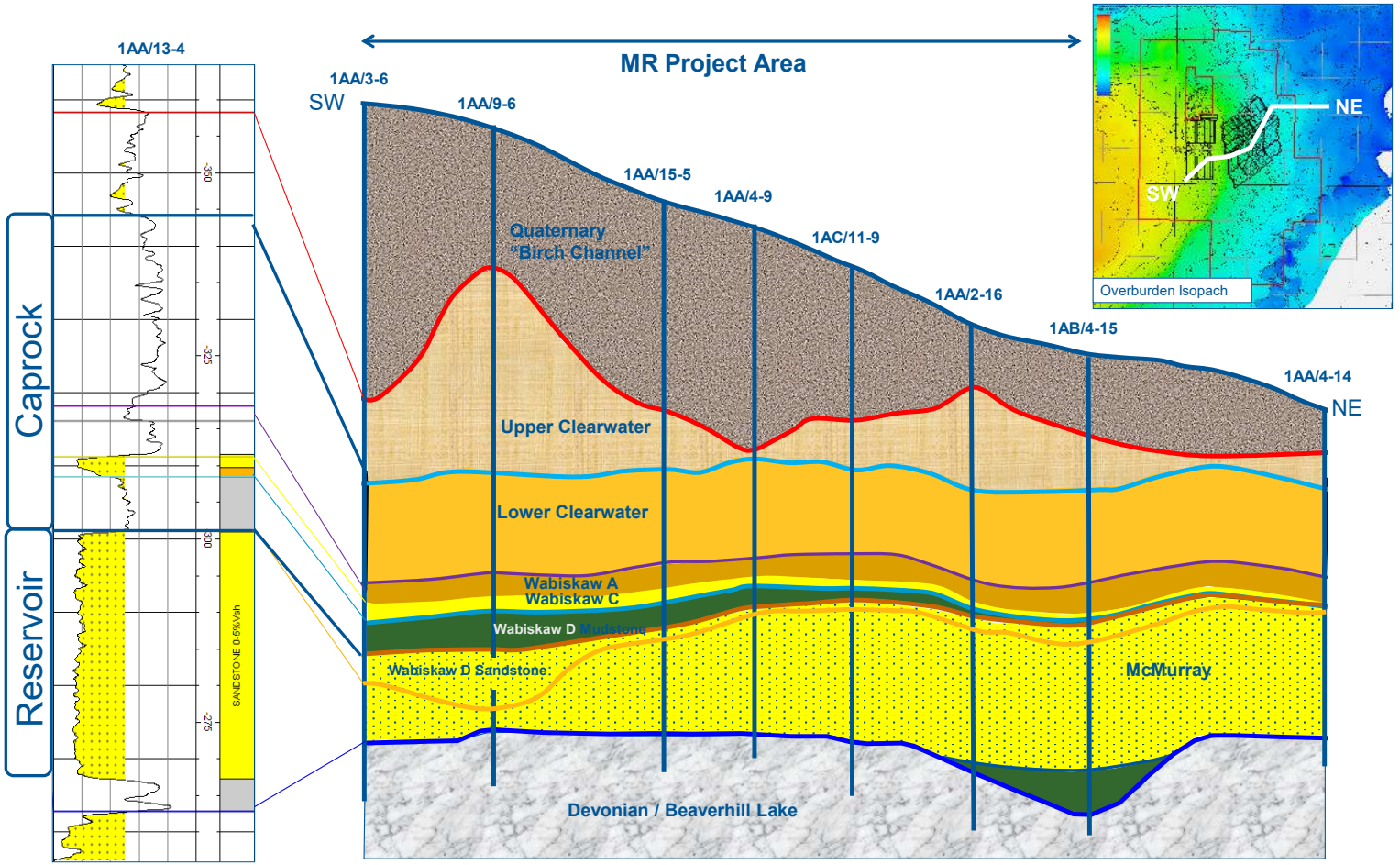
- Average pressure increase of ~25 kPa in the original producing area; pressure increase of ~36 kPa in Pad 750 area and ~24 kPa in Pad 751 area.
  - Pressures are below fracture pressures.

MacKay River – 3D / 4D Seismic Activity



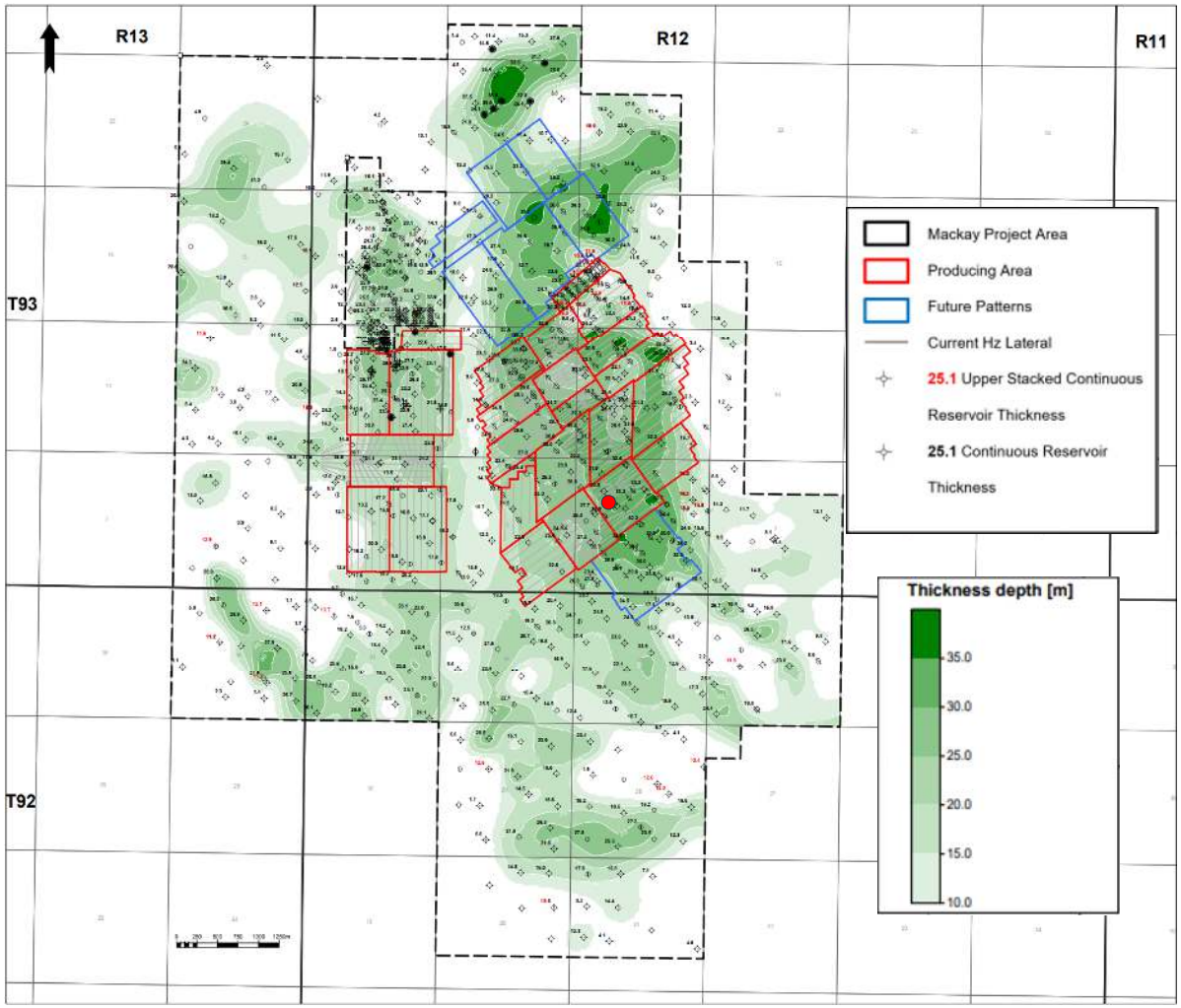
- No seismic activity in 2021.

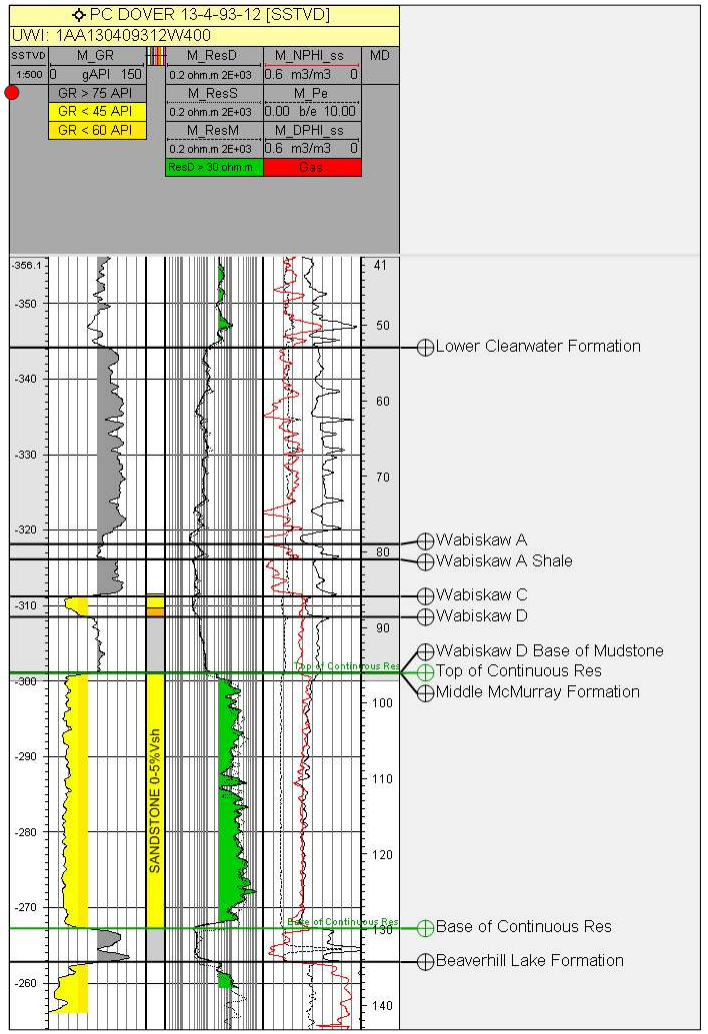
MacKay River Regional Structure



4.2.4
a) b)

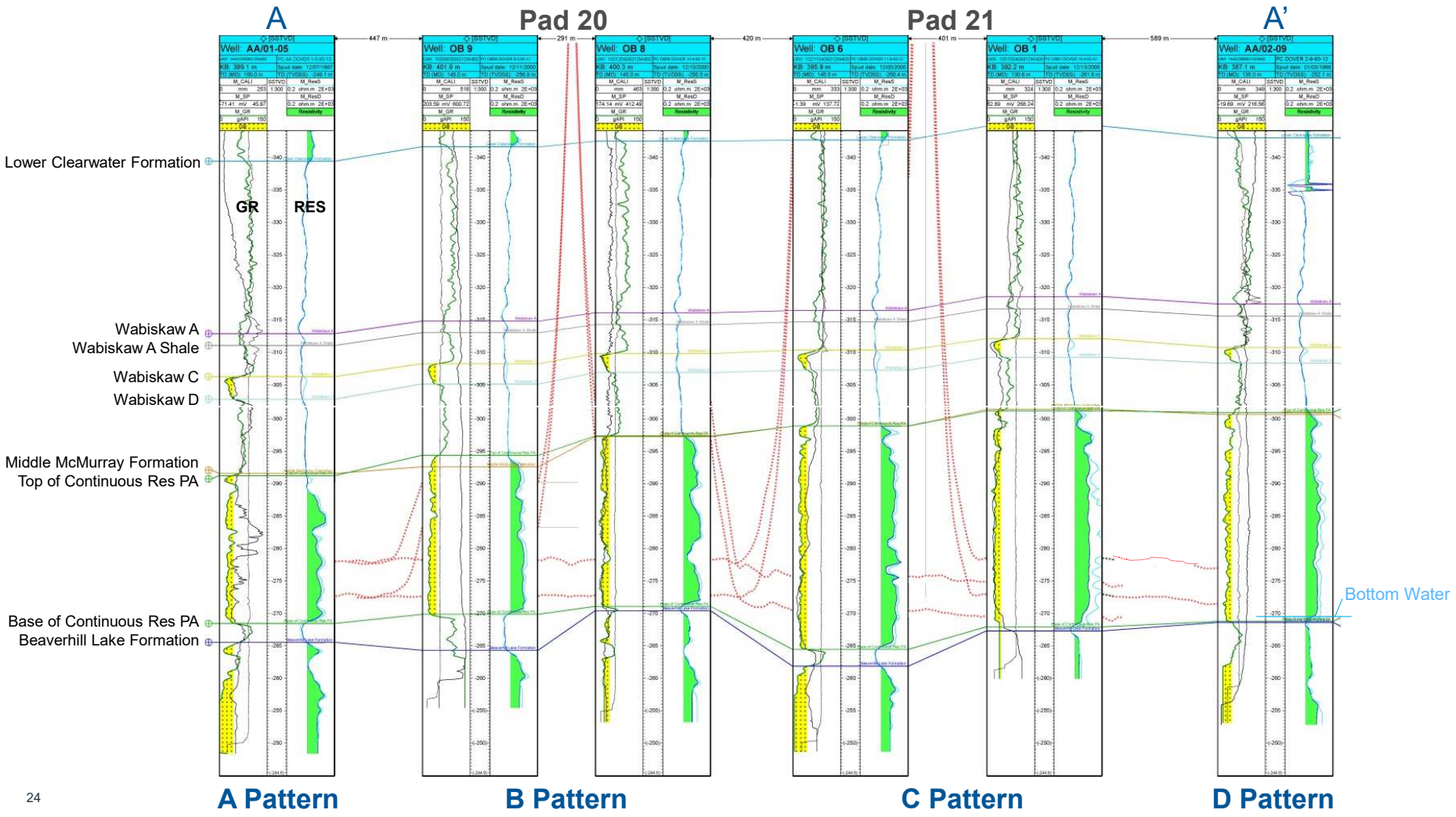
MacKay River Stratigraphy





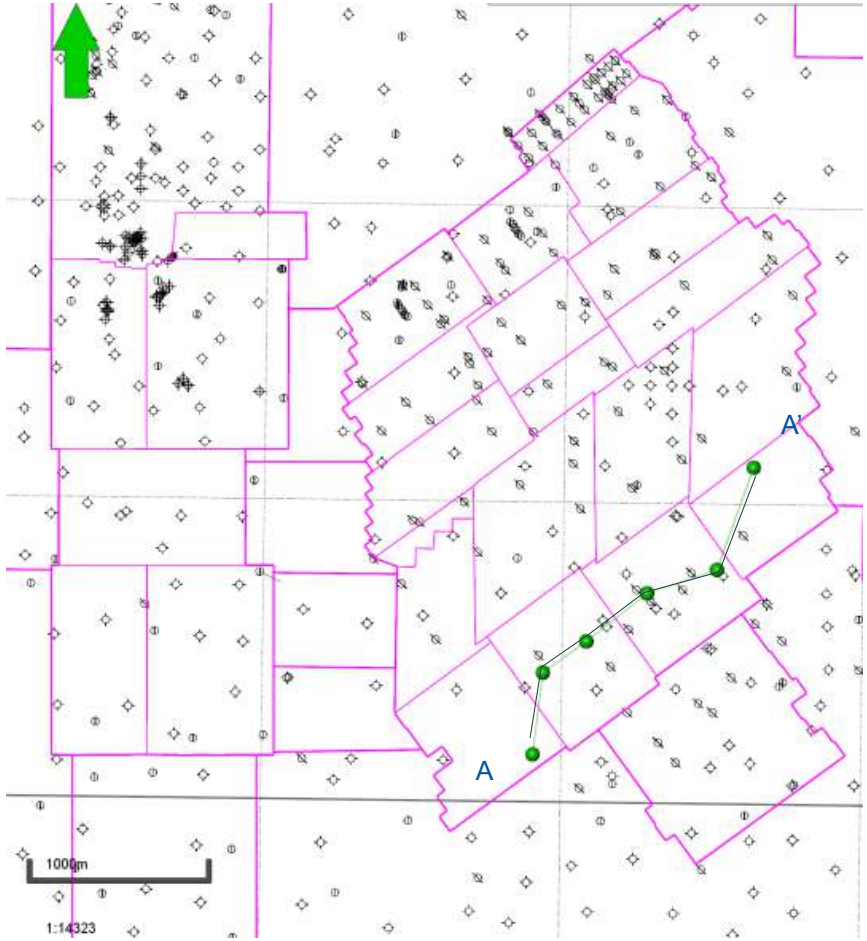
Representative well cross-section: Phase 1

4.2.4
a) b) c)



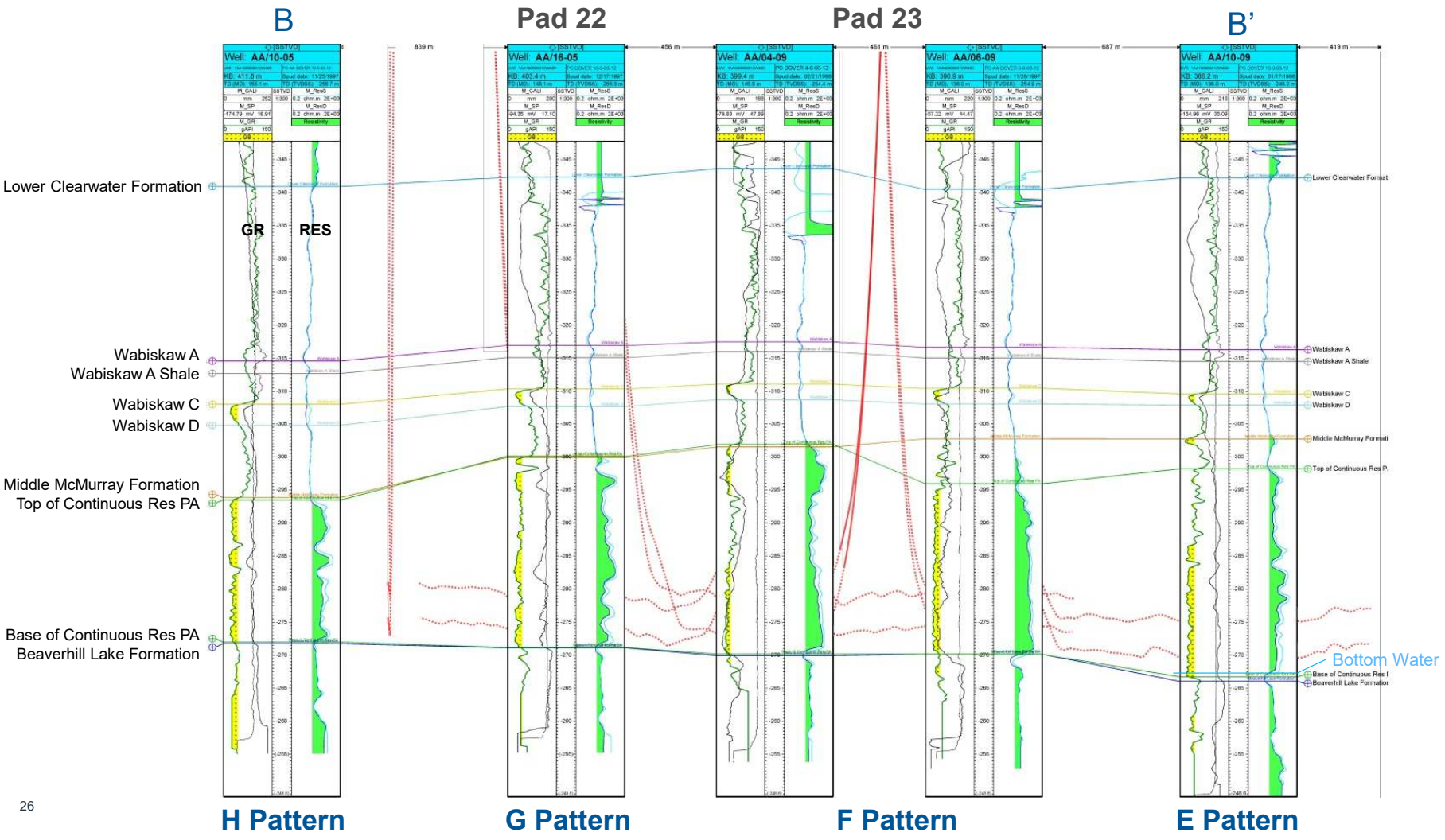
Representative well top-down view: Phase 1

Wells that defined the representative cross section (slide 24)



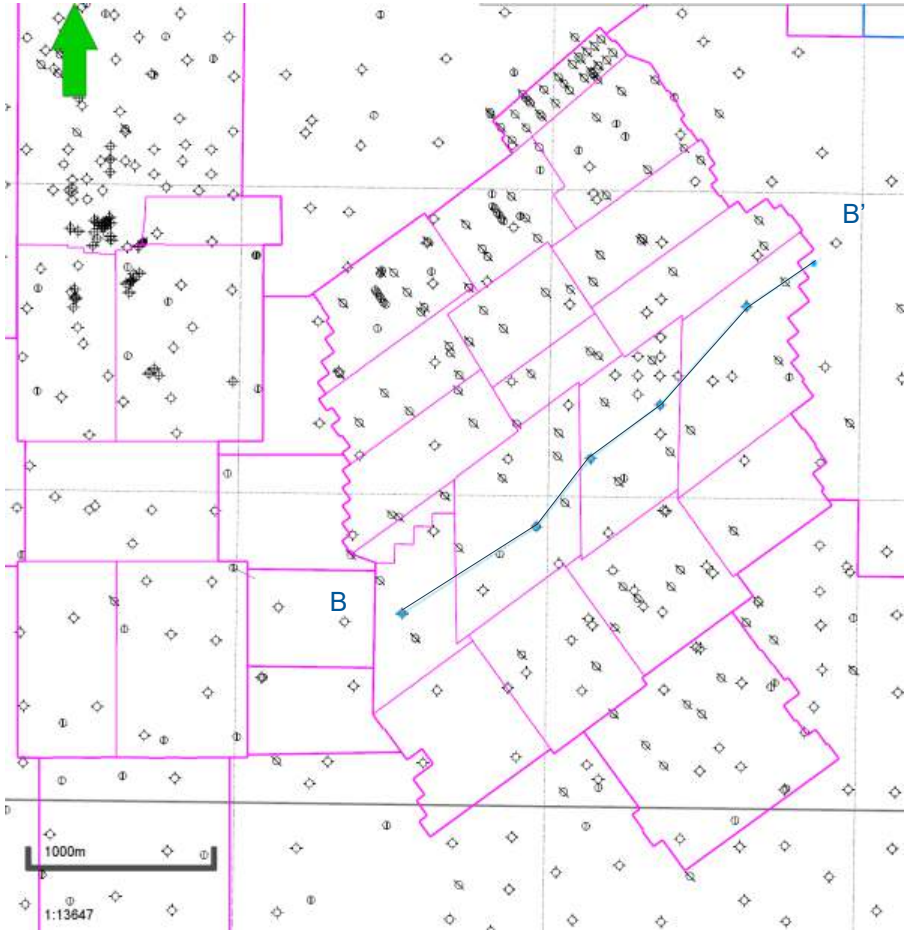
Representative well cross-section: Phases 2, 3 and 4

4.2.4
a) b) c)



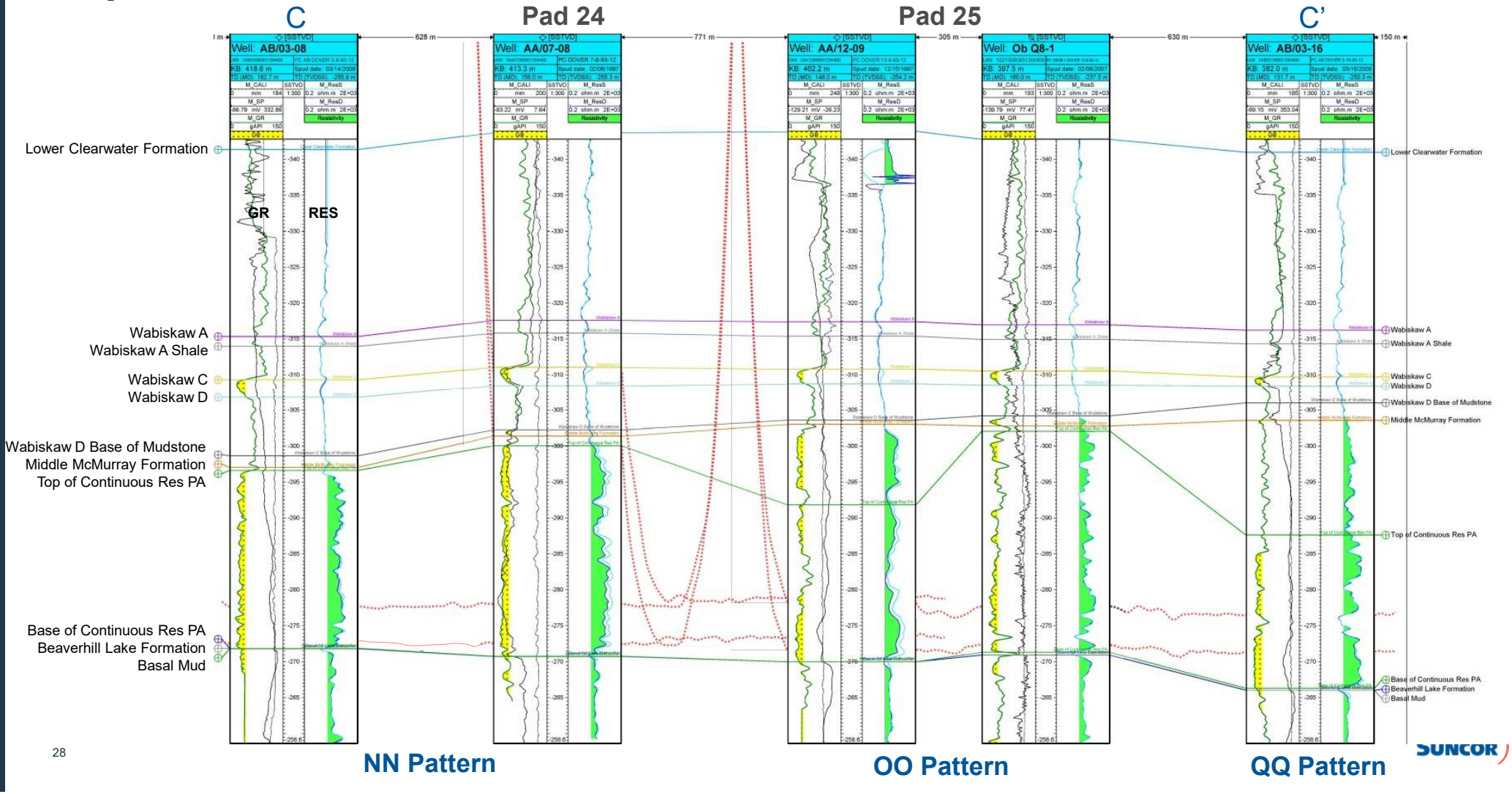
Representative well top-down view: Phases 2, 3 and 4

Wells that defined the representative cross section (slide 26)



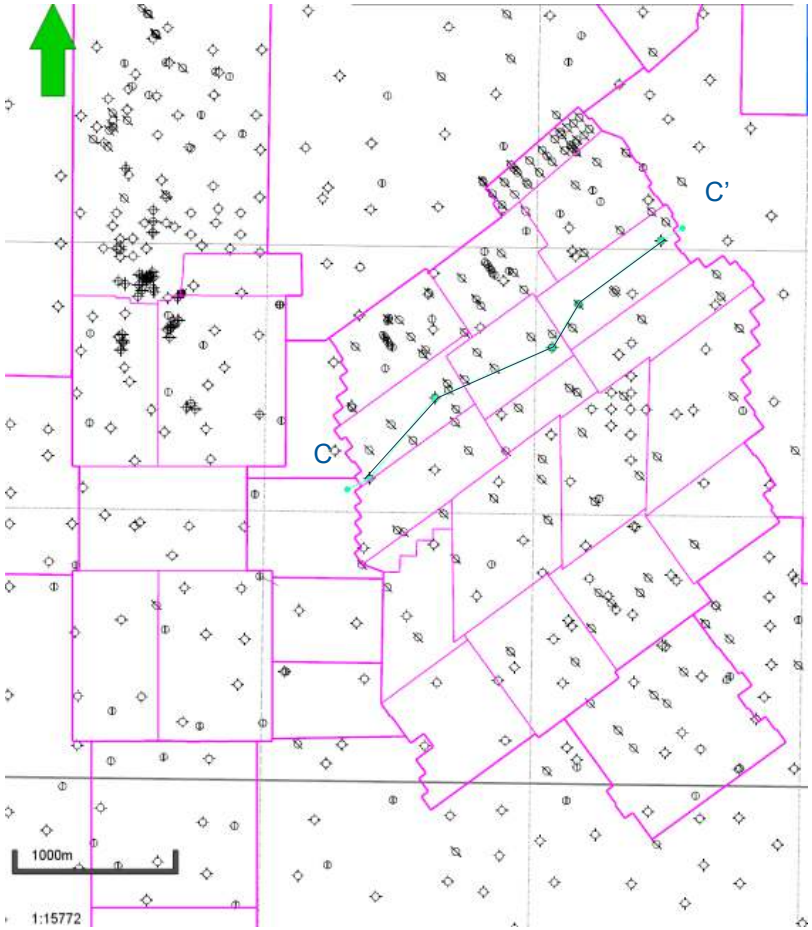
Representative well cross-section: Phase 5

4.2.4
a) b) c)



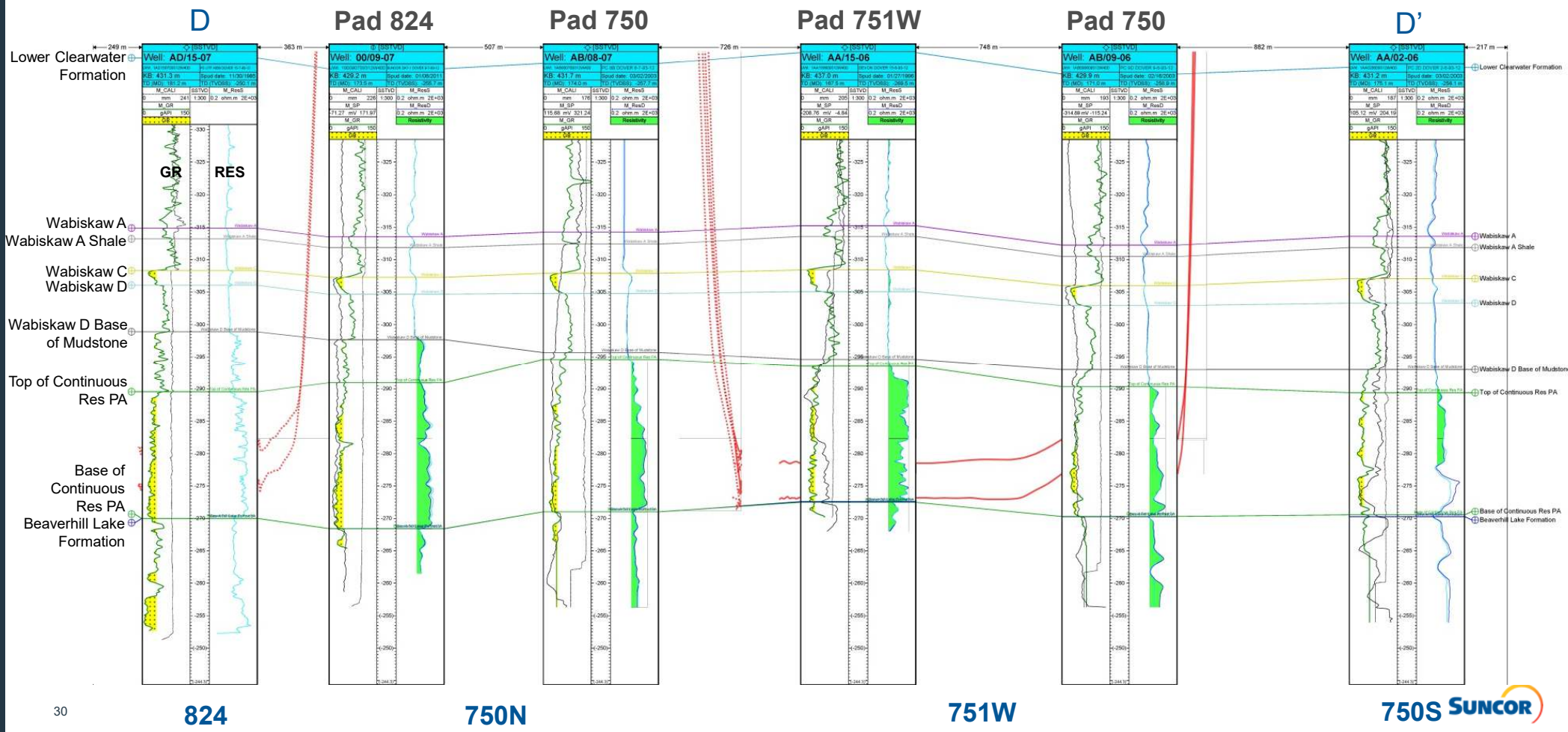
Representative well top-down view: Phase 5

Wells that defined the representative cross section (slide 28)



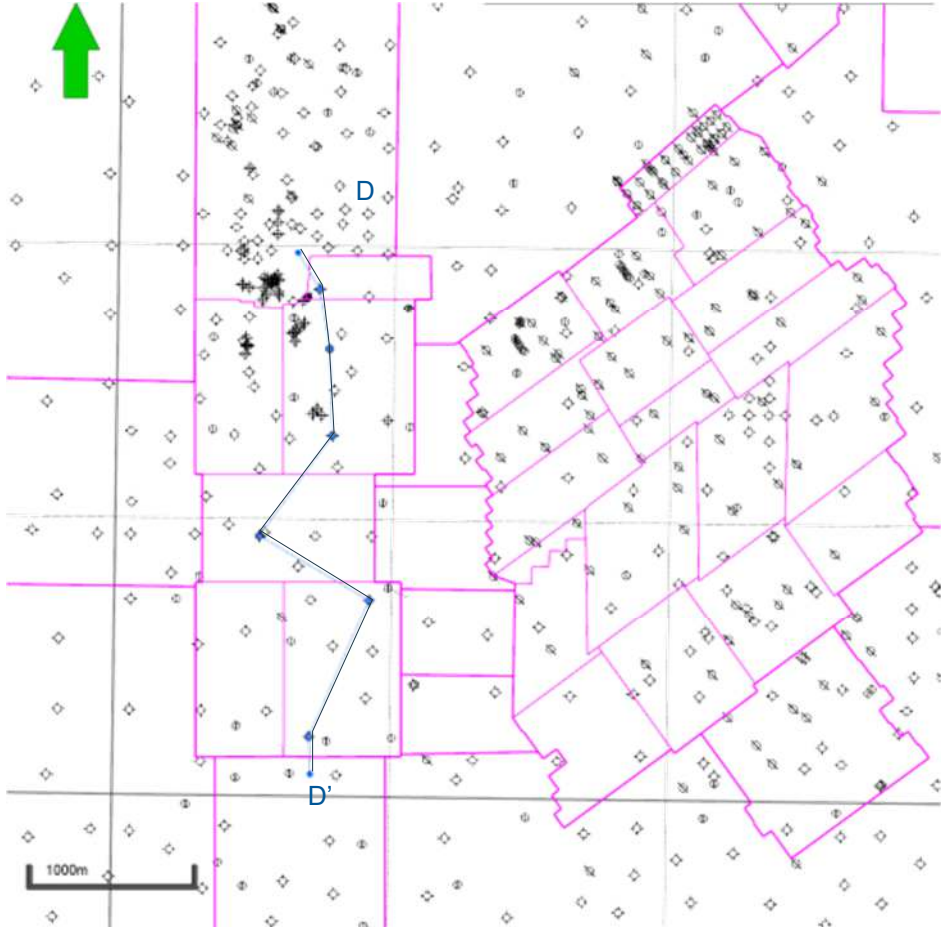
Representative well cross-section: Pads 824 / 750 / 751

4.2.4
a) b) c)

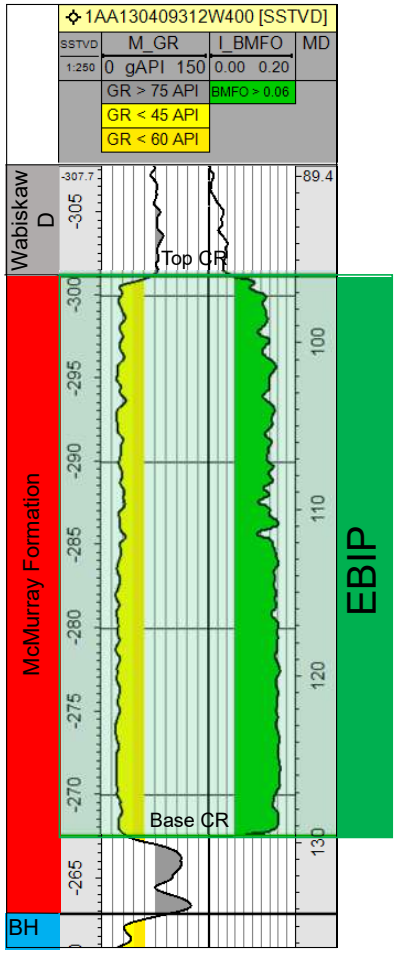


Representative well top-down view: Pads 824 / 750 / 751

Wells that defined the representative cross section (slide 30)



Exploitable Bitumen in Place (EBIP)



BH: Beaverhill Lake Group

Exploitable Bitumen in Place (EBIP) is defined in each well by the top and base of Continuous Reservoir; It is selected at the base of a continuous sand unit either developed or most likely to be developed.

- Continuous Reservoir base: lowest portion of the continuous reservoir sandstone with Bulk Mass Fraction of Oil (BMFO) cut-off of 6%, <3m of >50% mud/breccia in the lower portion.
- Continuous Reservoir top: 2m of mudstone, no BMFO or porosity cut offs.

Upper Lean, Middle Lean, and Gas Zones that are in pressure communication with the continuous reservoir are included with no thickness cutoffs.

Observation wells and 4D seismic will take precedence over pre-operations core and log-based picks.

Note: EBIP at Mackay River is the same as Original Bitumen in Place (OBIP). EBIP is the preferred term used on site.

4.2.5
4.2.6

Exploitable Bitumen in Place & Average Reservoir Properties

Pattern	HC area (m^2)	Continuous Reservoir Thickness (m)	Porosity	Horizontal Permeability (mD)	Vertical Permeability (mD)	Oil Saturation	EBIP (e^3m^3)	EBIP (MMbbls)
A	466,561	21.7	0.34	6000	1000	0.72	2,449	15.40
B	476,917	26.8	0.34	7000	1000	0.82	3,596	22.62
C	475,673	33.1	0.34	7000	1000	0.82	4,399	27.67
D	362,305	28.1	0.34	6000	1000	0.82	2,806	17.65
E	523,590	28.7	0.34	6000	1000	0.82	4,180	26.29
F	475,138	29.4	0.34	7000	1000	0.83	3,913	24.61
G	584,365	28.3	0.34	6000	1000	0.78	4,341	27.30
H	405,338	21.9	0.34	6000	1000	0.79	2,367	14.89
NN	1,059,073	26.2	0.34	6000	1000	0.78	7,351	46.24
OO	769,362	27.7	0.34	6000	1000	0.76	5,482	34.48
QQ	1,014,944	26.3	0.34	6000	1000	0.76	6,833	42.98
824	181,530	19.6	0.33	6000	1000	0.81	946	5.95
750N	795,880	22.9	0.33	6000	1000	0.79	4,446	27.96
750S	711,080	18.1	0.34	6000	1000	0.74	3,197	20.11
751W	639,111	20.2	0.34	6000	1000	0.78	3,359	21.13
751N	522,977	22.0	0.33	5000	1000	0.77	2,930	18.43
751S	410,219	17.3	0.34	6000	1000	0.76	1,846	11.61
Combined Active Well Pattern Area	9,874,062	24.6	0.34	N/A	N/A	0.78	64,441	405
*** Project Development Area**	41,230,470	20.8	0.33	N/A	N/A	0.73	208,798	1313

EBIP: Exploitable Bitumen In Place. Without modification this generally stands for SAGD EBIP or producible bitumen in place.
EBIP = OBIP
HC: Hydrocarbon
- **Project area and Development area are the same.**
- Interpreted 3D seismic acquired in 2020 was used to update constraining surfaces for EBIP estimation after 2020 D54 submission

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4.2.5
4.2.6

Performance Summary by Pattern

Pattern	EBIP (e^3m^3)	Cum. Oil (e^3m^3)	Recovery (%)	CSOR (m^3/m^3)	iSOR (m^3/m^3)	Ultimate Recovery (%)
A	2,449	1200	49%	4.3	3.6	56%
B	3,596	2927	81%	2.7	2.4	90%
C	4,399	3905	89%	2.3	1.5	75%
D	2,806	2147	77%	2.6	2.1	84%
E	4,180	2778	66%	2.3	2.4	76%
F	3,913	2850	73%	2.7	3.3	87%
G	4,341	2291	53%	2.5	2.6	59%
H	2,367	805	34%	3.2	2.8	64%
NN	7,351	3545	48%	2.8	2.9	73%
OO	5,482	1621	30%	2.8	2.9	50%
QQ	6,833	2211	32%	2.5	2.8	51%
824	946	225	24%	3.0	2.4	30%
750	7,643	1866	24%	2.9	2.5	64%
751	8,135	403	5%	3.6	3.1	71%
Combined Active Well Pattern Area	64,441	28,774	45%	2.7	2.7	68%

EBIP = OBIP

4.2.5
4.2.6

Average Reservoir Properties

Average reservoir properties for the operating portion of the scheme:

- Initial reservoir pressure: 400kPa
- Initial reservoir temperature: 6°C
- Average reservoir thickness: 21.0 m
- Average porosity: 0.337
- Average oil saturation: 0.78
- Horizontal permeability: 2 to 8 D
- Vertical permeability: 1 to 4 D
- Viscosity: ~ 1,000,000 cp @ 15°C

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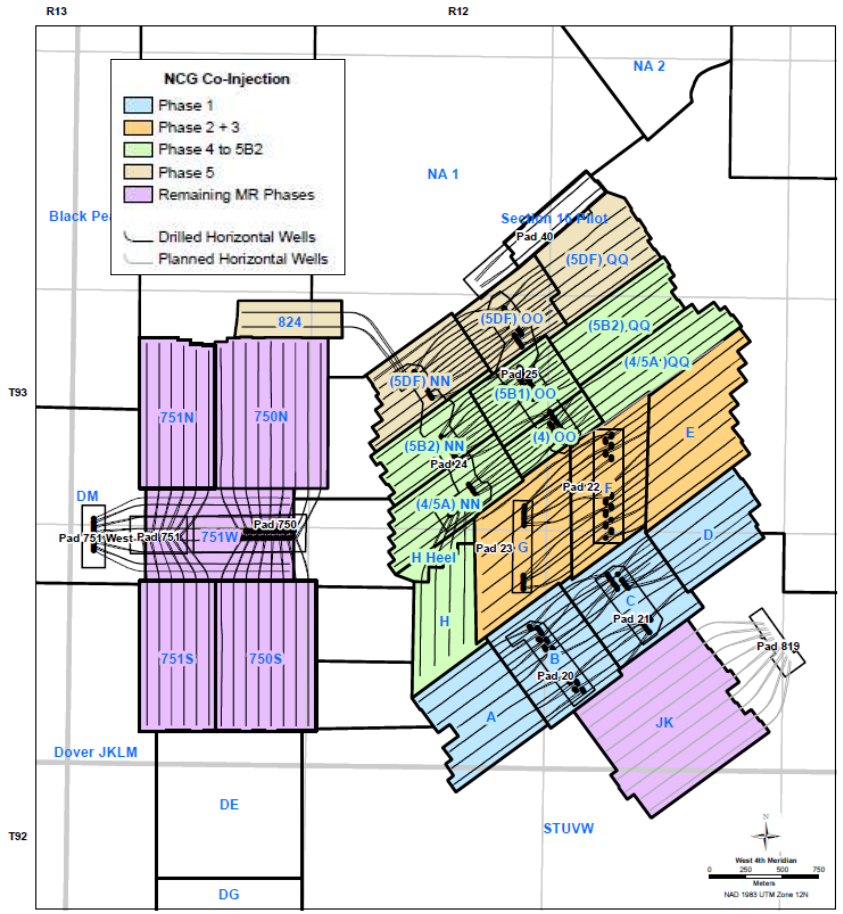
SAGD NCG Co-Injection Strategy



Pilot

- NCG (non-condensable gas) co-injection into B pattern – 2011
- Injection was based on steam availability

Phase 1

- NCG co-injection to A, B, C and D patterns – 2016

Phase 2 + 3

- NCG co-injection to E, F and G patterns – 2018

Phase 4

- NCG co-injection to H Pattern, NN1 to NN10, OO1 to OO9 and QQ2 to QQ10 – Mar 2021

Phase 5

- NCG co-injection to Pad 824, NN11 to NN16, OO10 to OO15 and QQ11 to QQ16 – 2023

Received Regulatory Approval:

4.2.7
b)

NCG Co-Injection Strategy

At MacKay, NCG (i.e. methane fuel gas) is co-injected with steam:

- The primary purpose is to maintain production and chamber pressures while reducing steam usage.

NCG injection targets are determined by:

- Desired operating pressures;
- Field wide strategies for steam reallocation;
- Steam chamber maturity and current oil recovery;
- NCG retention within the reservoir.

Typical NCG to gas replacement ratios range between 15 – 40 Sm^3/m^3 CWE;

Injected NCG does not exceed a maximum of 18 e^3m^3/d per well on a quarter year average basis;

NCG returns have been challenging to measure precisely due to produced gas from gas lift usage.

NCG returns have been challenging to measure precisely due to produced gas from the fas lift usage. The percentage of NCG recovered is estimated to be in the range of 6 – 10%.

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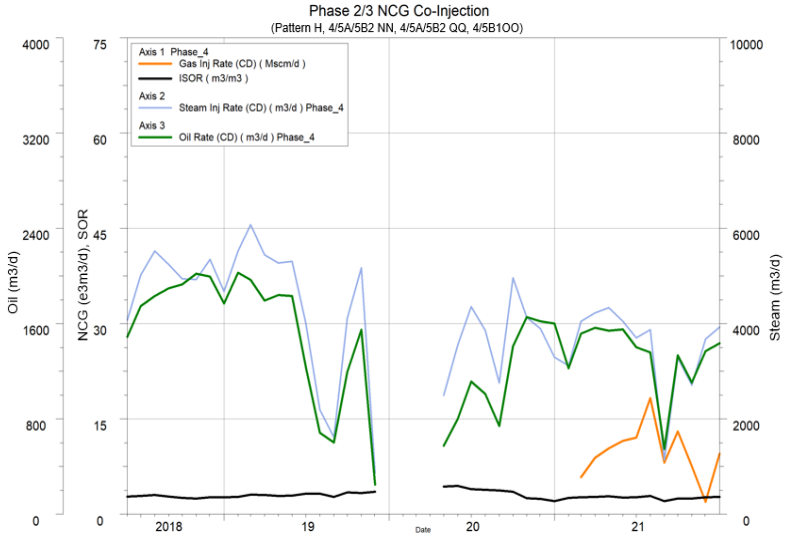
Key Learnings



- NCG was used successfully after the outages to help rebuild pressures and optimize steam allocation to younger, more impacted patterns,
- Phase 4 NCG co-injection was started March 2021,
- Steam cuts were made while co-injecting less NCG than anticipated to sustain target chamber pressures,
- Overall, NCG has helped reduce SOR where it has been applied,
- No negative impacts to oil rates, wellbore integrity, or ultimate recovery have been observed,
- Future NCG phases have been considered for acceleration to further optimize steam allocation.


Surface
4.3
SUNCOR

4.3.8
a)

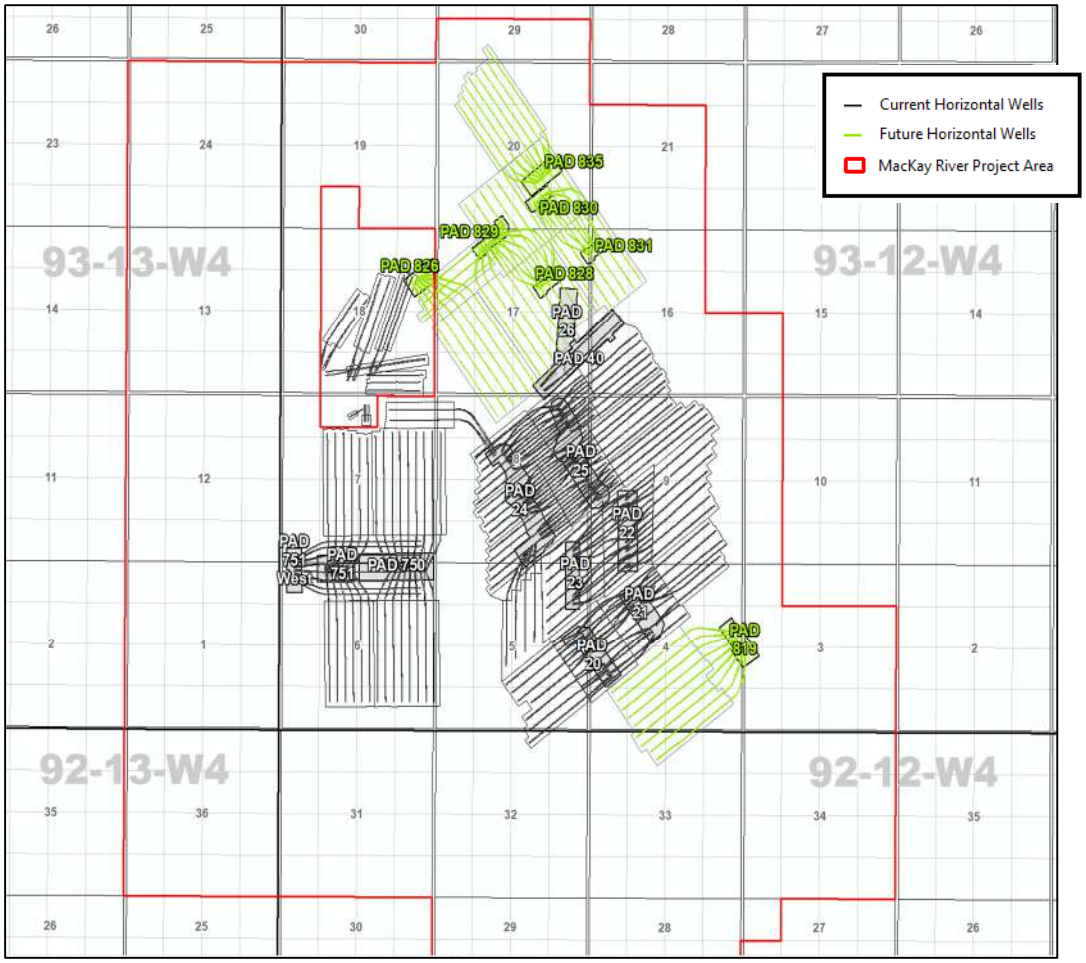
Overview of Surface Infrastructure

4.3.8
a)

Aerial Photo of MacKay River

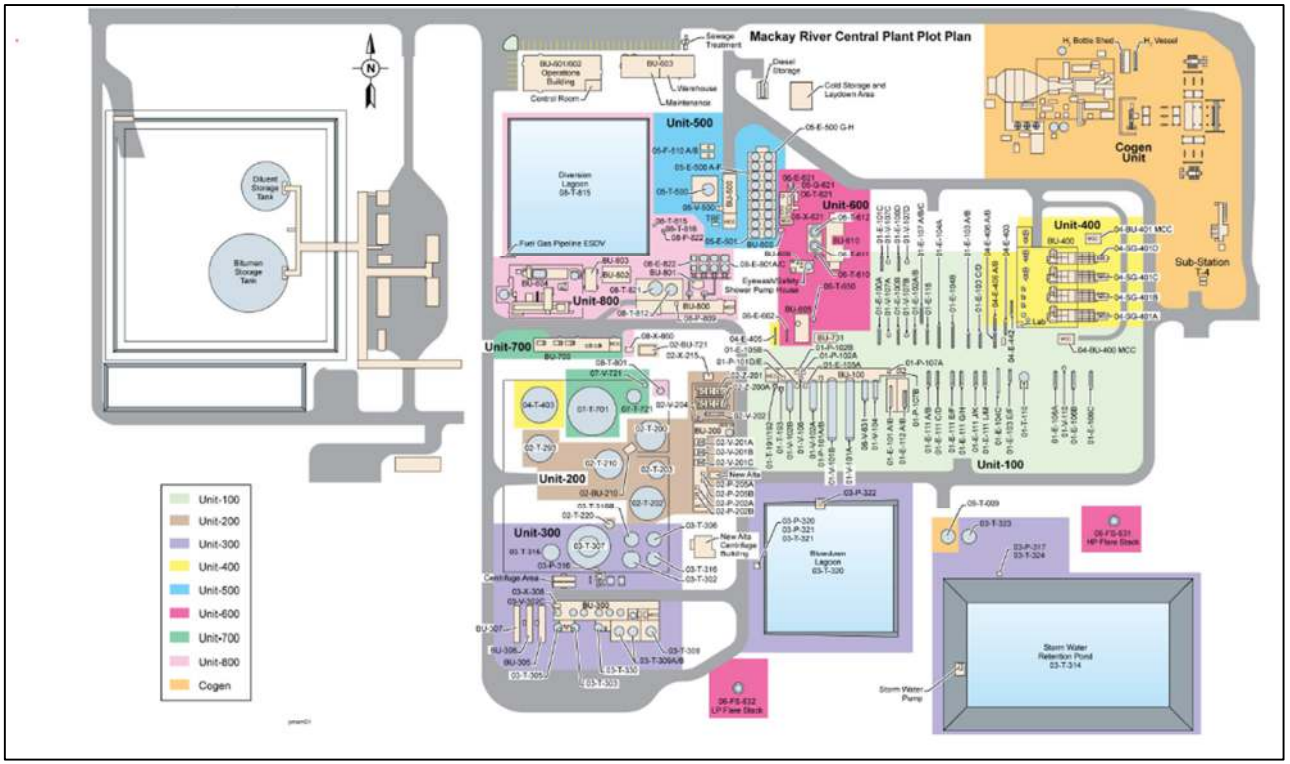
4.2.3
a)

AER Project & Approved Development Areas



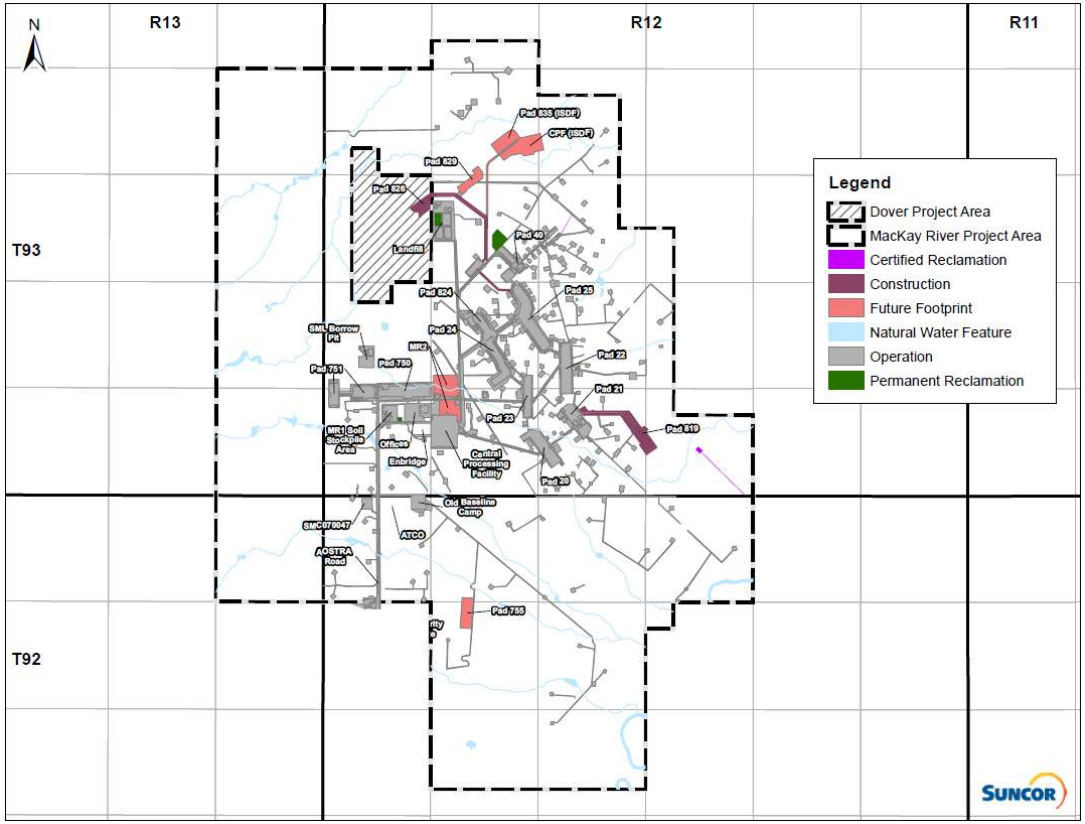
MacKay River Central Processing Plant Modifications

There were no modifications to the Central Processing Facility (CPF) over the last reporting period that required Alberta Energy Regulator (AER) approval



4.3.8
a)

MacKay River; Built and Planned Surface Infrastructure



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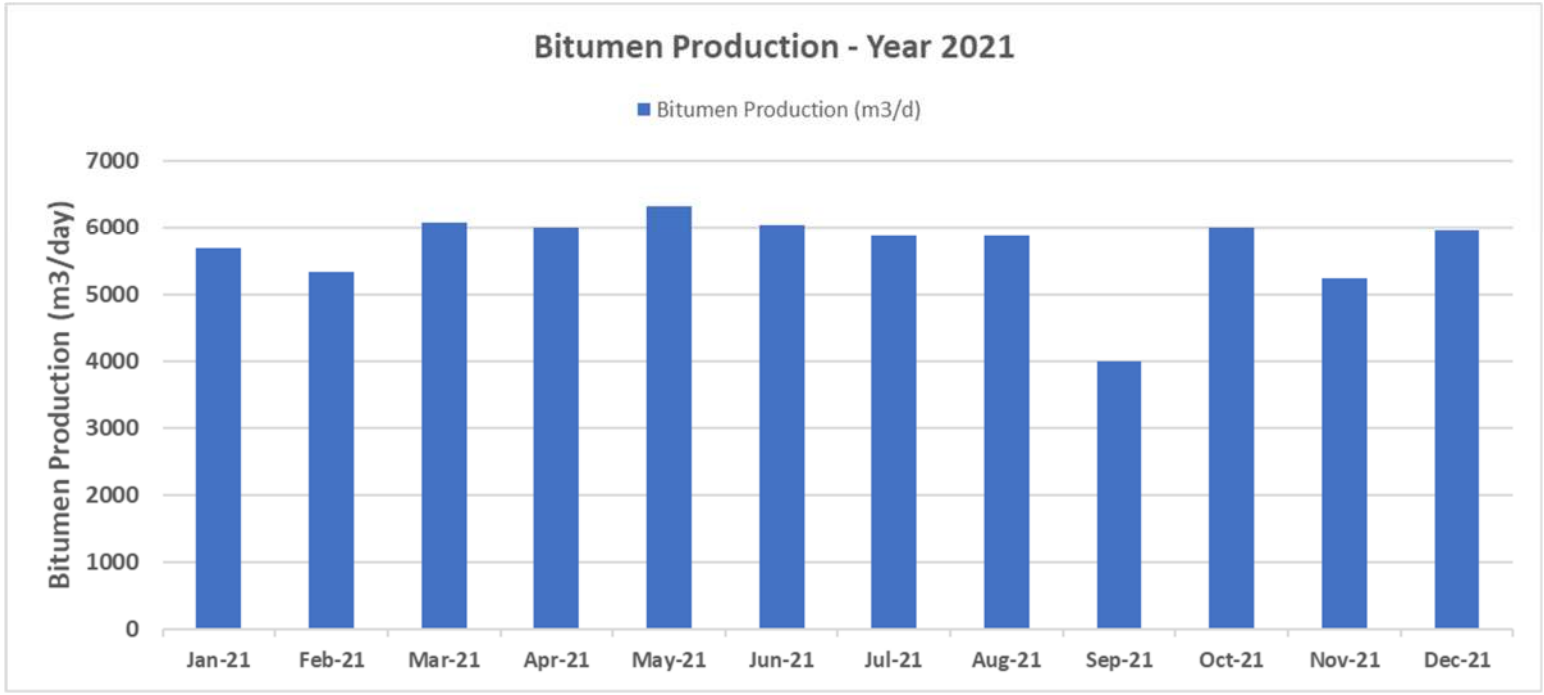
Annual Rates – Bitumen; January 1, 2021 to December 31, 2021

From January 2021 to December 2021 MacKay River averaged 5,706 m^3/day (35,901 bbl/d) of bitumen production.

The Design rate for the MacKay River CPF is 6,041 m^3/day (38,000 bbl/d) @ 2.8 SOR.



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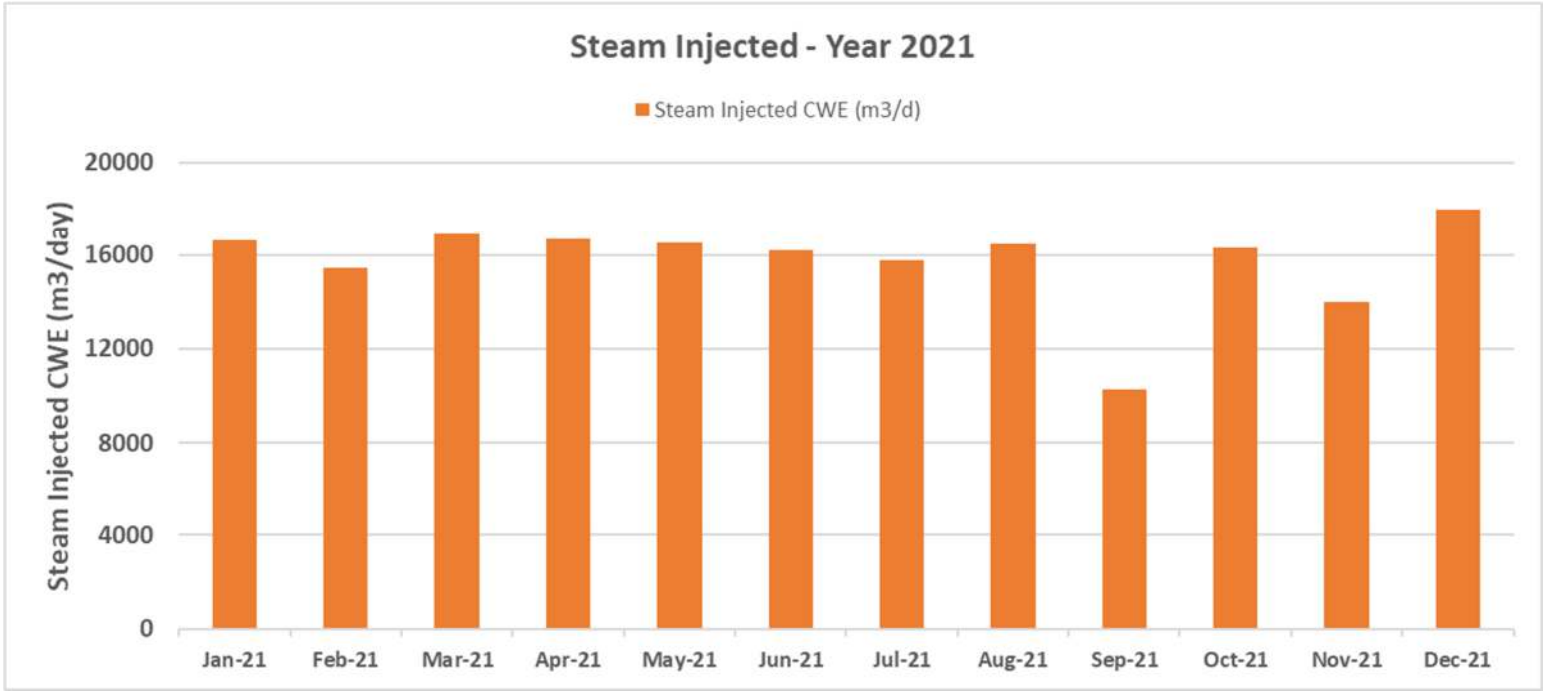
Annual Rates – Steam; January 1, 2021 to December 31, 2021

From January 2021 to December 2021 MacKay River injected on average 15,784 m^3/day (99,281 bbl/d) of steam into the wells.

The steam injection design rate for the MacKay River CPF is 18,432 standard m^3/d (115,937 bbl/d).



Historical and Upcoming Activity

4.4

4.4.9
a) b)

Suspension and Abandonment Activity

Well Abandonment:

- For the reporting period from January 1, 2021 to December 31, 2021, no producing wells were abandoned in the MacKay River project.
- Four observation wells were abandoned.

Pad Abandonment:

- For the reporting period from January 1, 2021 to December 31, 2021, no pads were abandoned in the MacKay River project.

4.4.10 a)
4.4.12 c)

Regulatory Applications; January 1, 2021, to December 31, 2021

Approved Applications:

Application Number	Application Files	Approval Date
1935951	Submission of Mini-Frac data to allow for operations at Pads 826 and 829	2021/03/10
1934709	Request to cease SAGD operations at Pad 40	2021/11/20

Future Applications:

- For the reporting period of January 1, 2022, to December 31, 2023:
  - Suncor to submit Water Act Licence application for use of surface water for industrial uses including dust suppression;
  - Suncor to renew and amend Water Act Licence 188229 to delete WSW3 and add WSW3B;
  - Suncor to submit HOLLER application to pilot HOLLER technology.

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Summary of Events

Pad 751 Start-Up Continued into 2021

- There are 18 well pairs and 2 single well producers on Pad 751:
  - Pad 751 start up had a staggered of well pairs, to support CPF capacity demand;
    - Circulation commenced in 2020 and continued through 2021, with the remaining wells started up in 2022

Summary of Key Learnings

CPF Emulsion line erosion:

- Scheduled piping wall thickness measurements on high exposure areas indicated accelerated wall loss away from baseline;
- Capital project kicked-off and is in implementation phase to provide an engineered solution against accelerated erosion.

Lower pH operation in water treatment circuit:

- Reviewed/evaluated of impact of lower pH boiler feed water against High Pressure Steam piping integrity from learnings from industry and Suncor Firebag;
- Trial planning underway to assess CPF stability in operating with new key performance indicator range.

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Pilots / Technical Innovations – New Technology Update

Heavy Oil Late Life Energy Recovery:

- Application to be submitted in Q1 or Q2 2022;
- Applying to use well on MacKay River's Pad 20 to pilot the HOLLER technology.

In Situ Demonstration Facility (ISDF):

- Project is temporarily on hold;
- No updates for this reporting period.

Compliance History

	Date	Edge# OneStop #	Description	Title & Description	Remediation or compliance efforts
January to December - 2021	Jan 05-2021	374941	Contravention	Contravention report for 2020 water withdrawal daily exceedances.	Daily exceedances occurred during plant start up.
	Jan-23-2021	375421	Reportable	Drain Valve leak at Pad 21 Pipeline.	Leak was halted by re-injecting the bonnet with sealant with replacement scheduled for next outage.
	Jan-31-2021	375651	Reportable	Flange leak at well head on Pad.	Failed valve replaced.
	Jan-22-2021	31091483	Flaring > 4hrs	Installation of stopper on Pad 20-21.	Once the stopper installation work was completed, flaring stopped.
	Jan-26-2021	31091488	Flaring > 4hrs	High Pressure (HP) flaring due duct burner maintenance.	Flaring ceased after completion of the planned work
	Feb 19-21	376190	Release	Faulty valve at stem header pipeline.	Maintenance team reworked more heat trace on the valve.
	Feb 13-21	31146778 31150343	Flaring > 4hrs	Inlet piping caused plant ramp-down/low rates.	Corrective actions was prioritized to replace the inlet pipping.
	Feb 16-21	31150613	Flaring > 4hrs	Boiler Feed Water (BFW) was off-spec due to a hardness excursion causing shutdown of Cogen duct burners.	BFW was brought to the specs and duct burners were put back in operation.
	Feb 20-21	31150621	Flaring > 4hrs	Low Pressure (LP) flare due to steam generator trip.	Work was conducted to identify and repair the cause of the trip which brought the steam generator back on line.
	April 22-2021	31220154	Flaring > 4hrs	Vapour Recovery Unit (VRU) planned maintenance.	Flaring stopped after completion of the planned work.
	May 07-2021	378675	Release	Steam leak at the 751S14 long tubing valve connection on Pad 751.	Steam injection was reduced to keep the well under control. Suncor completed a investigation and has reviewed its procedures to include routine torque inspections.
	May 30-2021	31242722	Flaring > 4hrs	VRU Planning maintenance	Flaring stopped after completion of the planned work.
	July 15-2021	31327243	Flaring > 4hrs	Emergency HP flaring due to excess of produced gas due to Steam Gen-D being off line.	Flaring stopped after pressure stabilized.
	July 21-2021	31327274	Flaring > 4hrs	Emergency HP flaring due to high produced gas pressure.	Flaring stopped once the pressure went back to normal.
	Aug 14-2021	382469	Contravention	Daily volume of water use from production well WSW2 at Suncor MacKay River was exceeded.	Lower ambient temperatures would reduce the need for raw water for cooling purposes.
	Sep 1- 2021	31375487	Flaring > 4hrs	Planned turnaround from Sept 1 until Sept 16	Flaring during the shut down for turnaround.
	Sep 25- 2021	31375520	Flaring > 4hrs	VRU Planning maintenance.	Flaring stopped after completion of the planned work.
	Sep 29 - 2021	31375536	Flaring > 4hrs	VRU Planning maintenance.	Flaring stopped after completion of the planned work.
	Oct 05-2021	384245	Release	Intermittent produced water carry over from the top of the tank 02-T-220 due to issues with the agitator.	Clean up completed. Tank will operated with lower levels until repairs are completed.
	Oct 05-2021	384290	Contravention	MR-NW -Site 4 air monitoring station and samples were found on the ground.	After further investigation there was no clear evidence of what happened with the air monitoring station. It is located in a remote area without vehicle traffic or other activities. Most likely, this incident was caused by wildlife.
	Nov-06-2022	31458371	Flaring > 4hrs	VRU lost compression.	VRU was examined and repaired.
	Nov-08-2022	31458391	Flaring > 4hrs	VRU planned maintenance.	Flaring ceased after completion of planned work
	Dec-24-2021	386633	Release	Warn lime softener water release in the tank farm.	Upon discovery of the release, operations decreased the flow int the tank to stop the overflow. Hydro-vac trucks were dispatched to clean up fluids on the ground. The fault level transmitter was replaced.

Surface Casing Vent Flow; Reporting and Deferral

ID Submission 2073143

PC NN(I) - 07 DOVER 03-08-93-12W4M; UWI 102/03-08-093-12W4/0;

Reported VIA DDS on November 27, 2020;

Deferral request approved to January 26, 2023.

ID Submission 2073151

PC NN(I) - 09 DOVER 06-08-93-12W4M; UWI: (107/06-08-093-12W4/0);

Reported via DDS on November 27, 2020;

Deferral request approved to January 26, 2023.

ID Submission 2125382

PC NN(I) - 08 DOVER 03-08-93-12W4M; UWI: (111/03-08-093-12W4/0);

Reported via DDS on October 12, 2021;

Deferral request approved to December 31, 2022.

ID Submission 2125384

PC NN(I) - 10 DOVER 06-08-93-12W4M; UWI: (108/06-08-093-12W4/0);

Reported via DDS on October 12, 2021;

Deferral request approved to December 31, 2022.

ID Submission 2125385

PC QQ(I) - 09 DOVER 03-16-93-12W4M; UWI: (109/03-16-093-12W4/0);

Reported via DDS on October 12, 2021;

Deferral request approved to December 31, 2022.

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Future Plans

The following horizontal drilling activities are expected to commence within the next five years:

- Brownfield Program – 4 sidetracks in 2022, 4 sidetracks in 2023
- Pad 819 – 9 well pairs – 2022 – 2023;
- Pad 826 – 6 well pairs – 2023;
- Pad 829 – 9 well pairs – 2023 – 2024.

The following first steam dates are planned to occur within the next five years:

- Pad 819 – Q2 2024;
- Pad 826 – Q4 2024;
- Pad 829 – Q2 2025.

Corehores and observation wells will be drilled as necessary to:

- Adequately delineate the resource;
- Monitor SAGD operations;
- Further caprock integrity analysis
- Allow land retention.

Development plans are evaluated annually and are subject to change.

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Future Plans

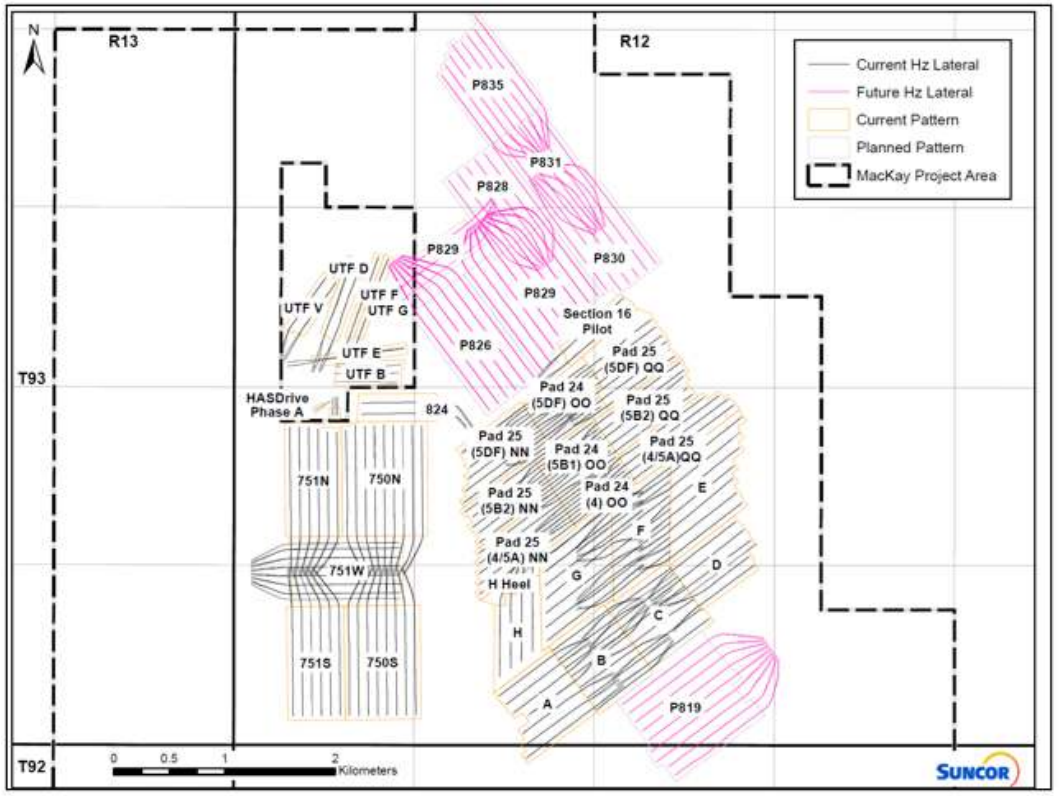
First steam dates planned to occur within the next five years:

- Pad 819 – Q2 2024;
- Pad 826 – Q4 2024;
- Pad 829 – Q2 2025.

(Regulatory approval in place for these pads)

Brownfield sidetracks are evaluated as needed to capture additional cellar resource (if present) and/or restore production to existing areas;

Development plans evaluated annually and are subject to change.

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