PetroChina Canada

# 2022 Performance Presentation

## MacKay River Commercial Project

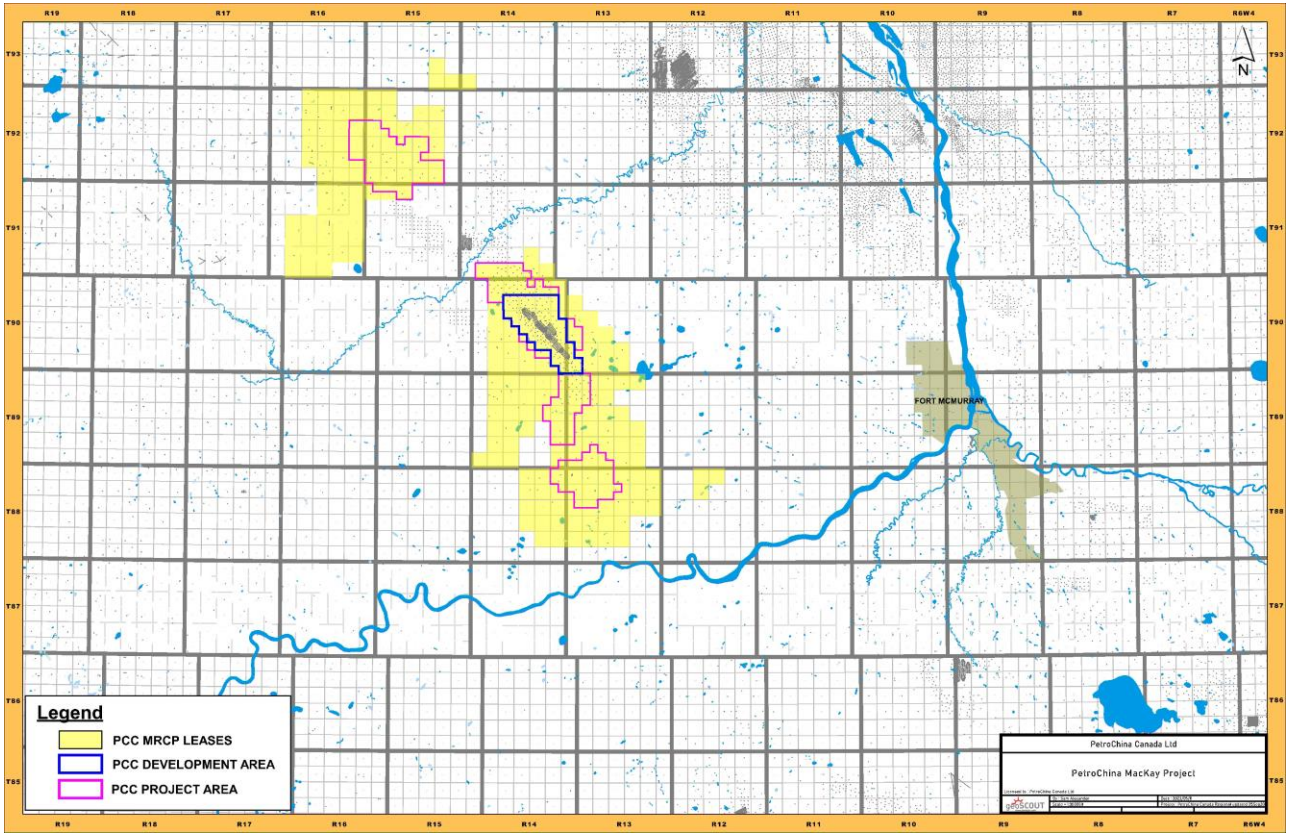
**AER Scheme Approval No. 11715**

**January to December 2022**

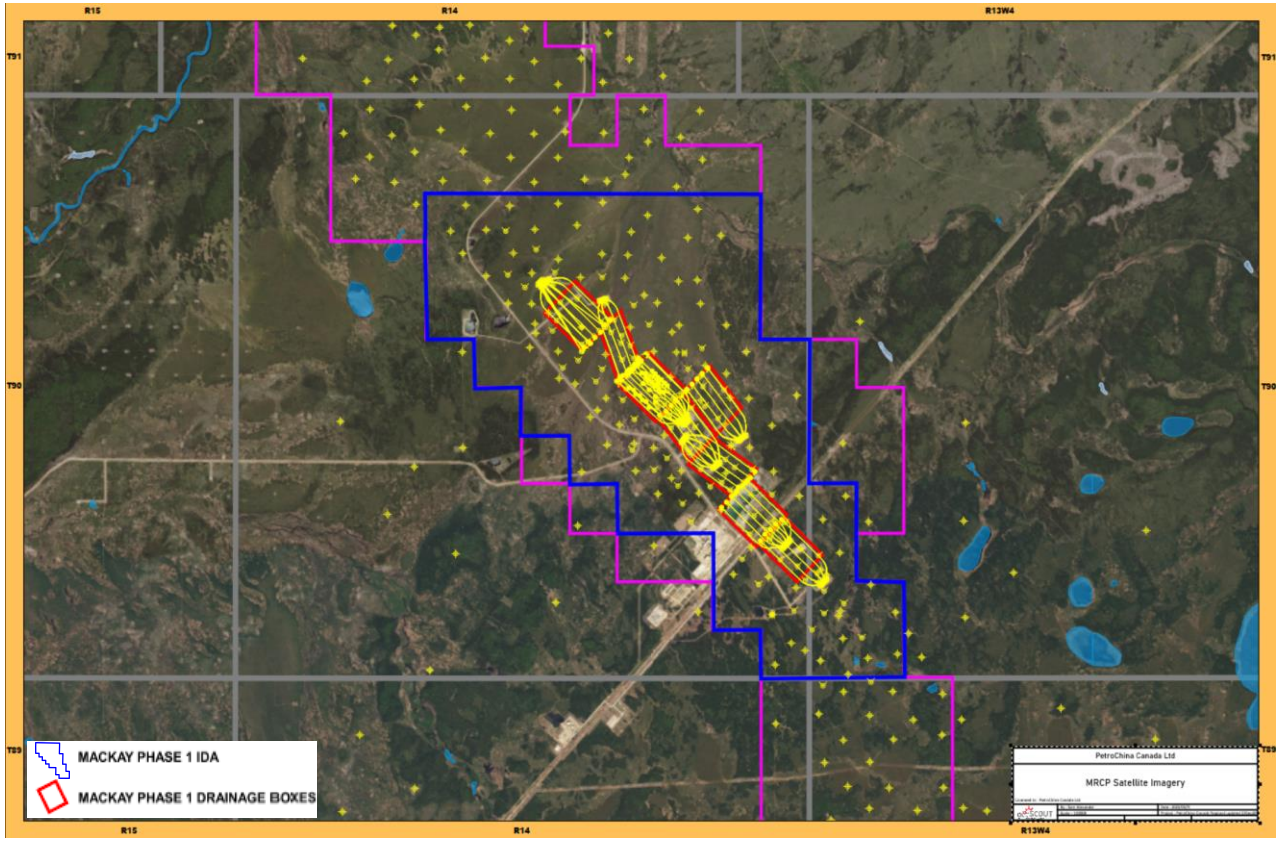
# 4.1 Introduction

# Project Background

- PetroChina Canada (“PCC”) owns and operates the MacKay River Commercial Project (“MRCP”).
- The MRCP is a bitumen recovery project located within the Regional Municipality of Wood Buffalo (“RMWB”) in northeast Alberta; approximately 30 km northwest of Fort McMurray.
- The MRCP utilizes steam-assisted gravity drainage (SAGD) technology.
- The MRCP is planned for phased development to maximum capacity of 150,000 barrels per day (bpd) of bitumen.



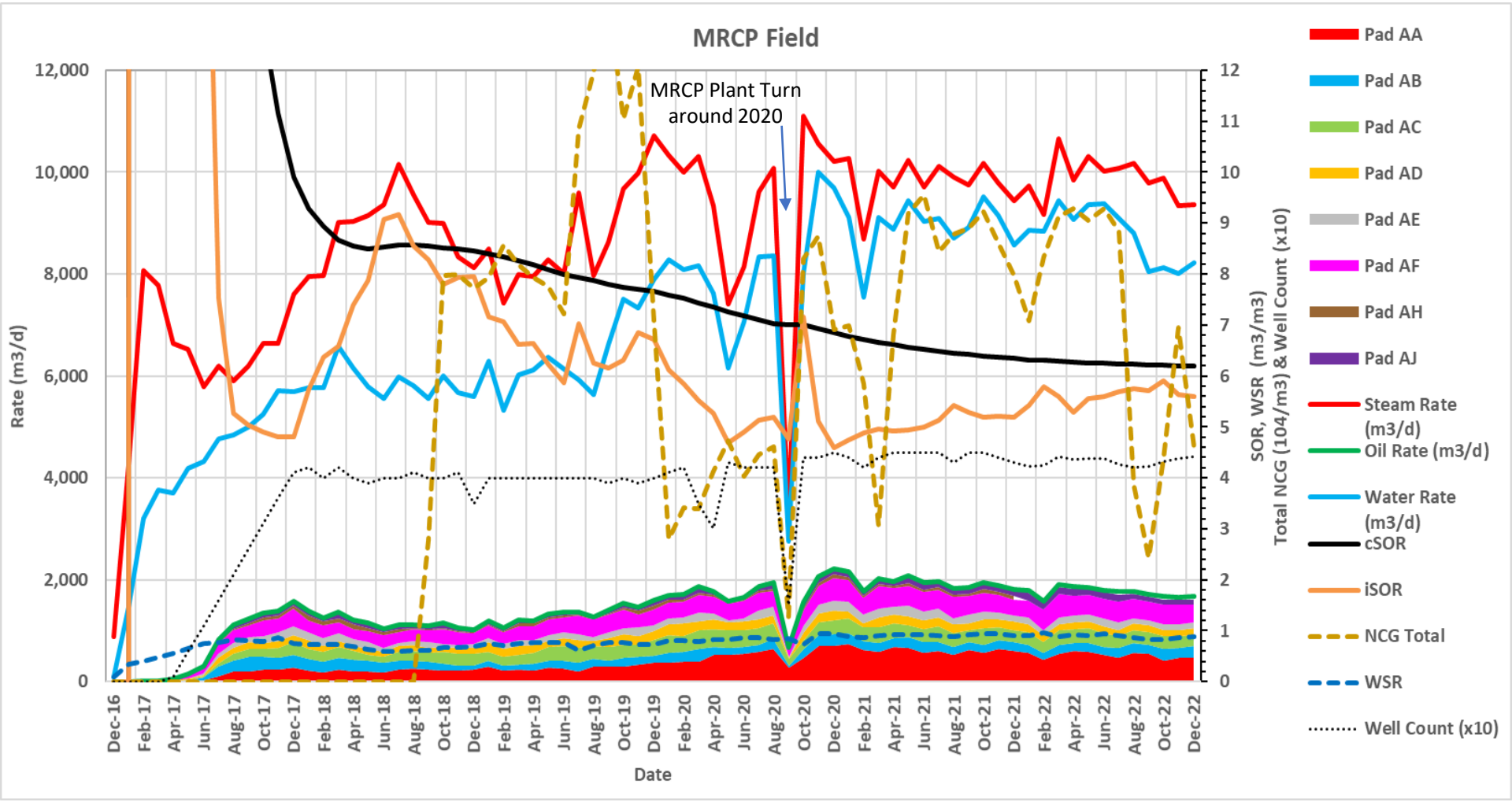
# MRCP Phase 1 Overview




- Phase 1 has a bitumen capacity of 35,000 bpd.
- The Phase 1 development area (DA) includes:
  - 8 SAGD surface well pads and associated subsurface drainage patterns.
  - 42 SAGD Horizontal well pairs
    - 850m long horizontals
    - 125m well spacing
  - 4 Horizontal infill well pairs (PAD AA)
    - 850m long horizontals
    - Producer and/or injector uptracks
    - 62.5m well spacing
  - The Central Processing Facility (“CPF”)
  - Water source wells and associated pipelines
  - Observation wells
  - Borrow areas
  - Access roads
  - Camps

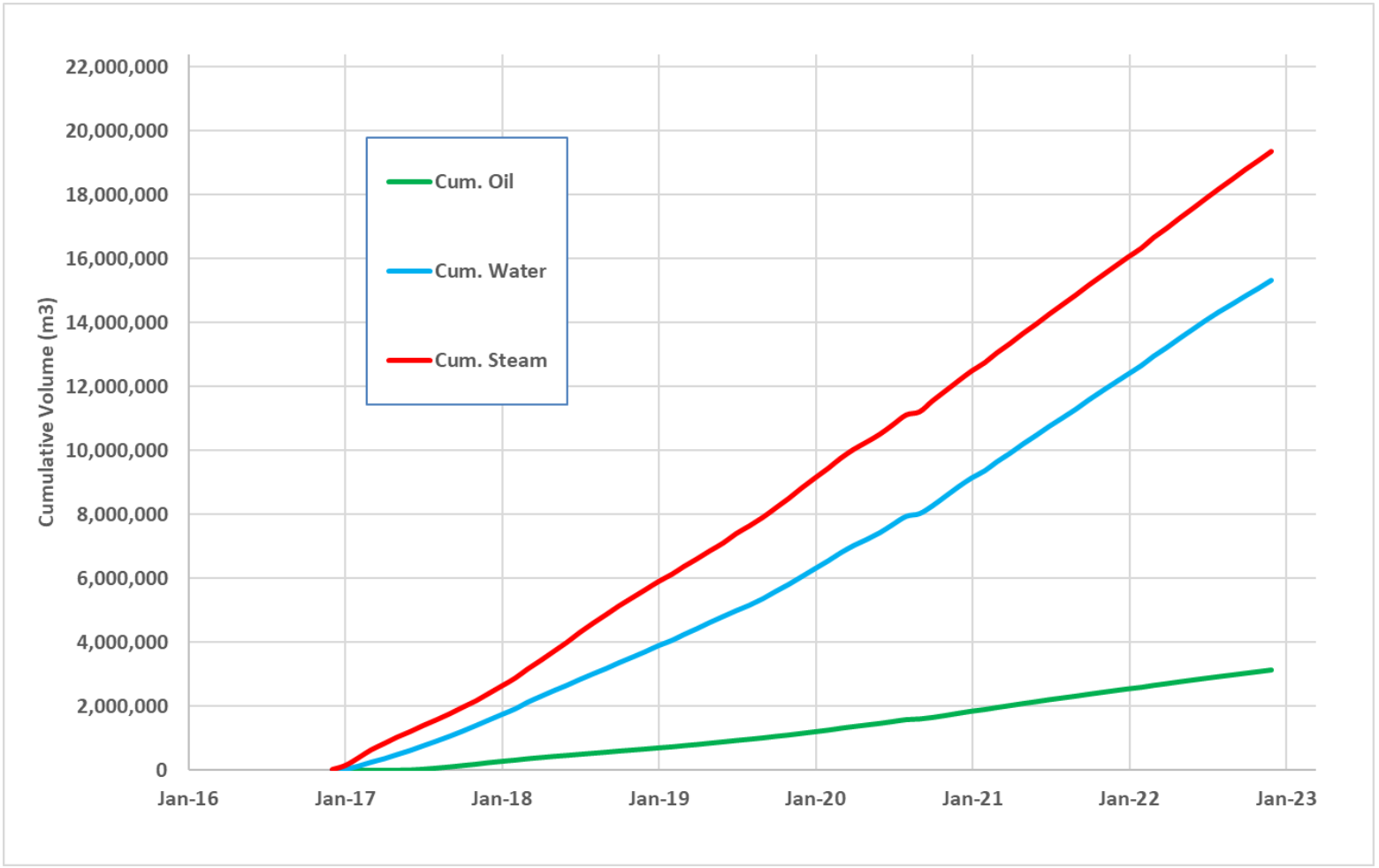
# 4.2 SUBSURFACE

# MRCP – Field Performance



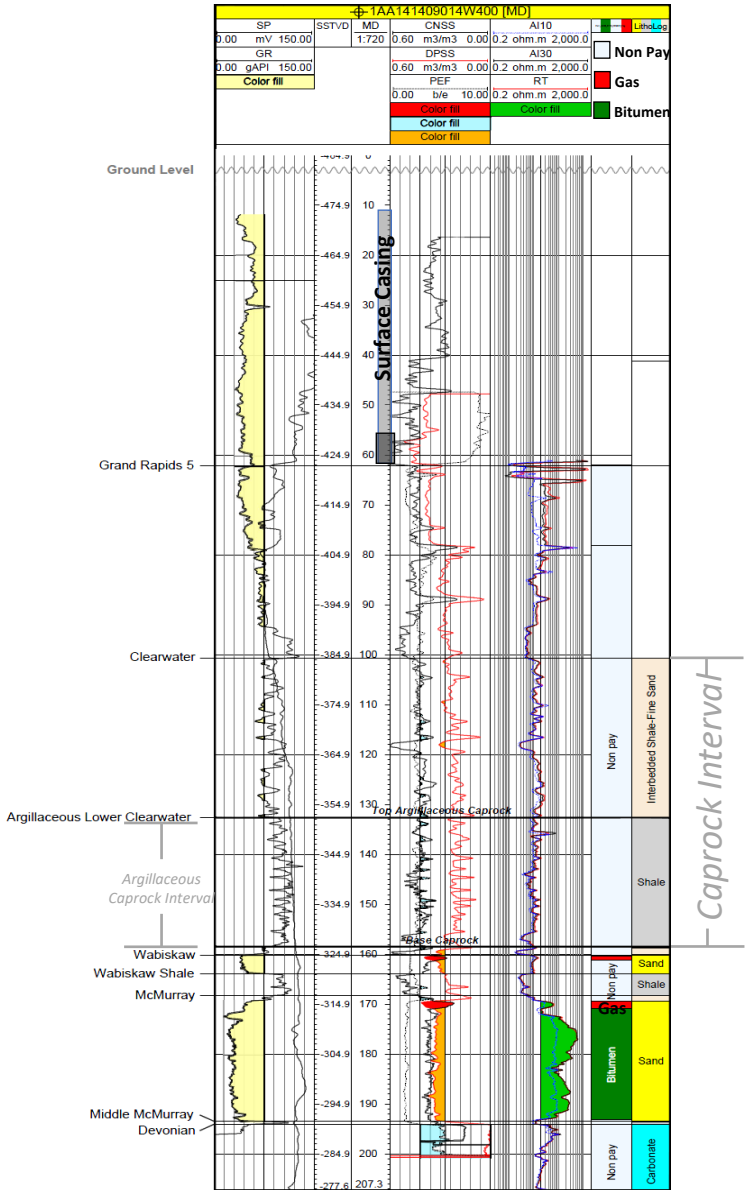

- MRCP maintained steady production throughout 2022 . The average bitumen production was approximately 1,754 m3/d (11,033 bpd). The Steam-to-Oil Ratio (SOR) was stable and averaged approximately 5.62 throughout the year.
- PCC is continuing with field operation optimizations: Producer sidetrack operations were completed on AC04 and AF05 in January 2022. PCC is continuing planning of future infill wells.
- Non-Condensable Gas (NCG) co-injection continued in selected well pairs in 2022. PCC also maintained NCG injection in one vertical injection well until September 2022.

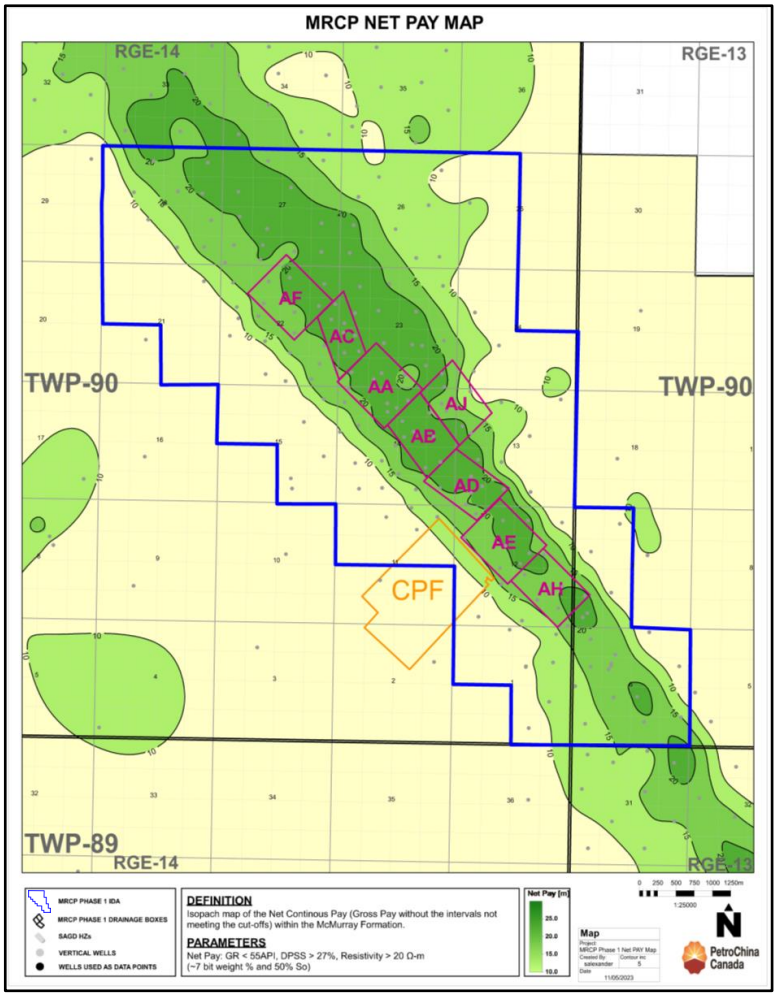
# MRCP – Cumulative Fluid Volumes




- Performance is impacted by the presence of top gas/top lean zones, areas of thicker lower transition zone, and the presence of geological baffles (zones of higher mud bed frequency) affecting chamber growth
  - In certain areas, steam chamber interactions with top gas and losses to the lower transition zone has resulted in higher water retention by the reservoir.
  - Mitigation strategies implemented includes, gas cap pressurization (NCG injection and co-injection), and balancing operating pressures with multiple thief zones. These strategies have significantly helped reduce water retention and steam losses.

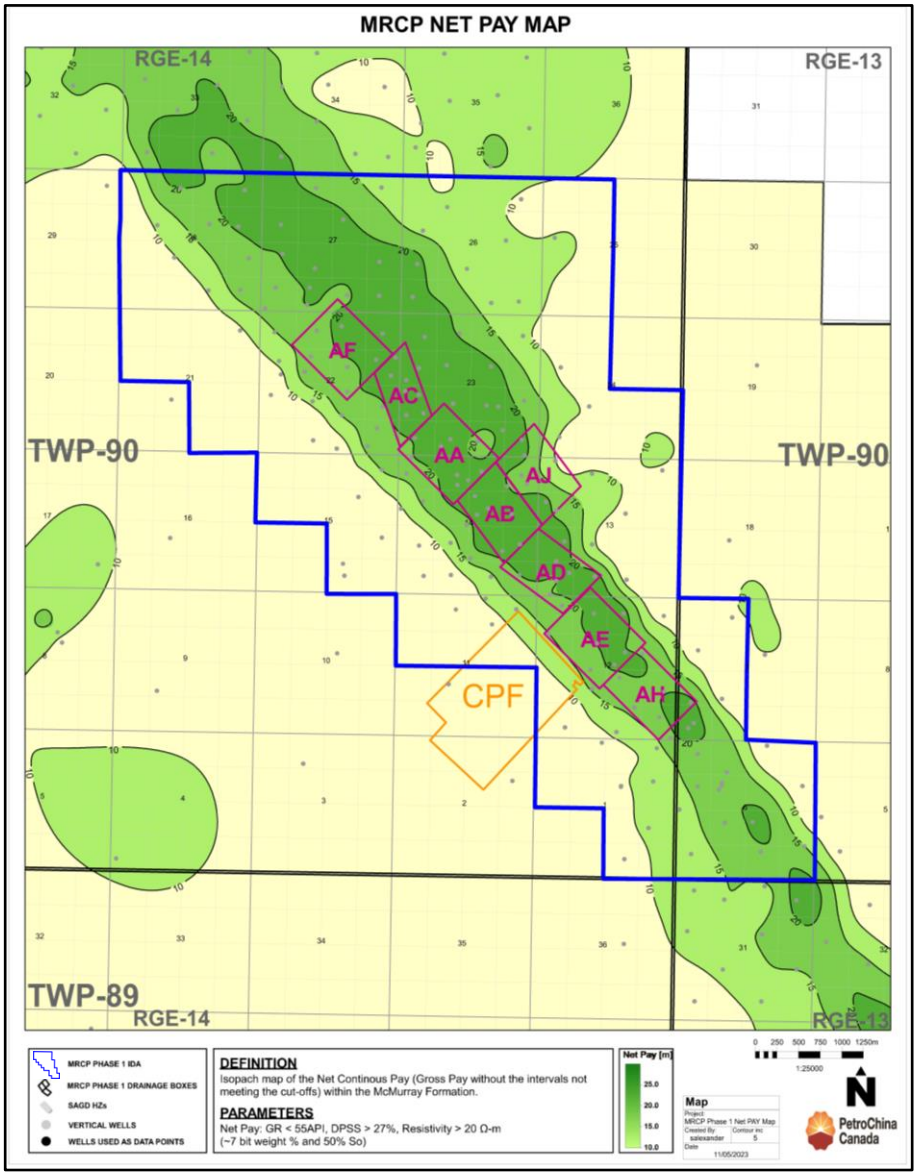
# MacKay River Stratigraphy



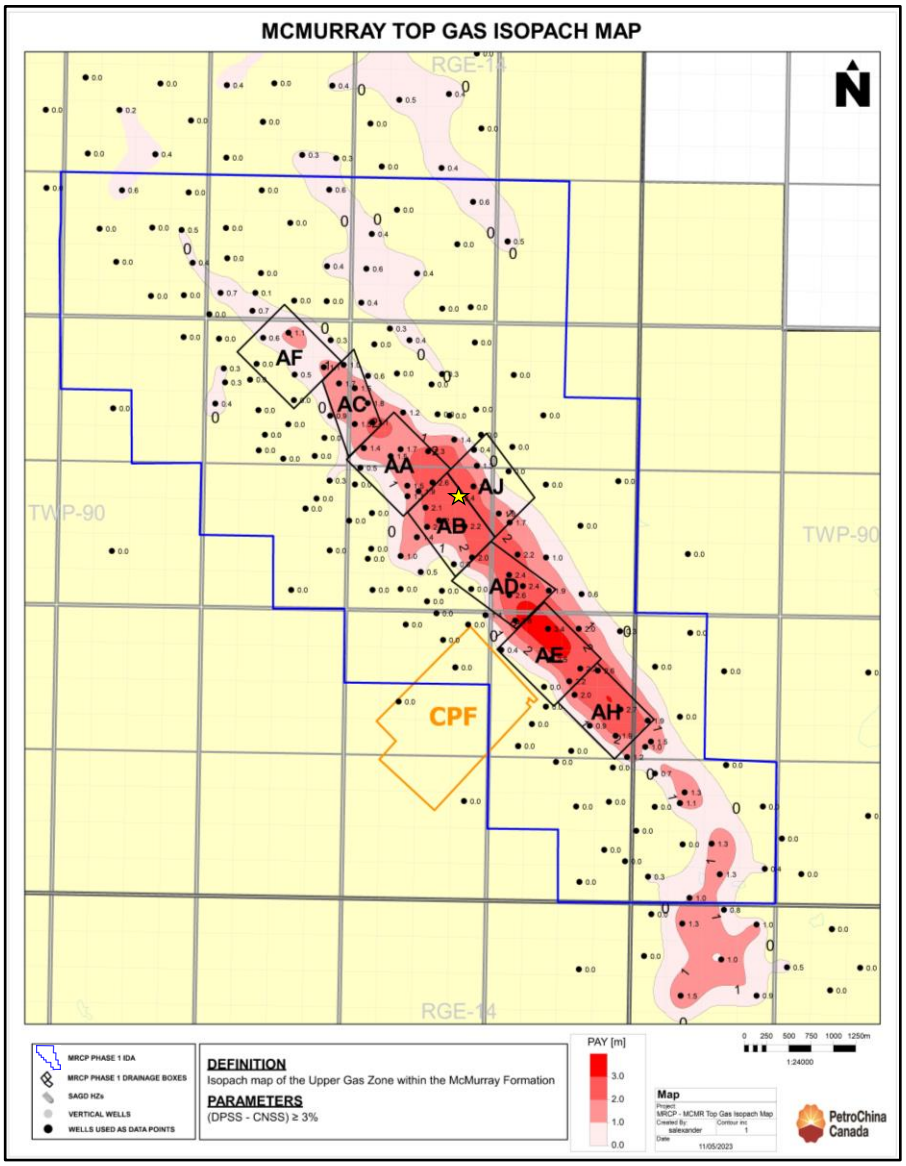

- Caprock is Argillaceous Lower Clearwater.
- Wabiskaw sand above McMurray across DA.
- Target reservoir is Upper McMurray.

# Bitumen Net Pay Map – Development Area

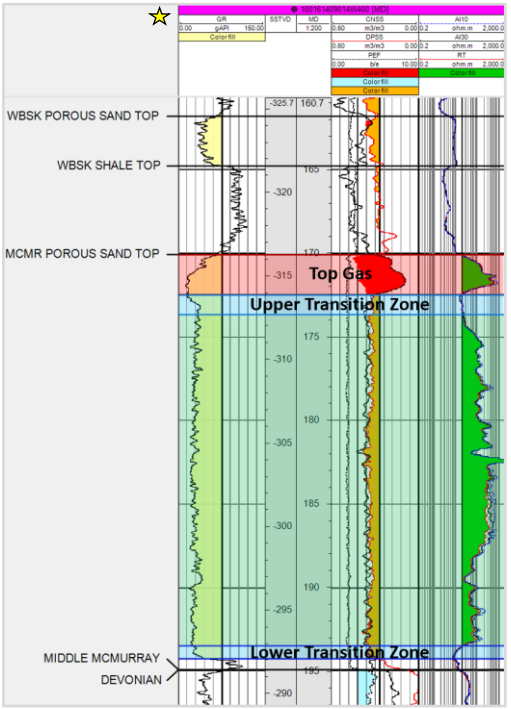



- Net pay cut-off at ≥10m.
- Thickness ranges from 10 to 25m in the DA.
- Upper McMurray reservoir shows strong NW to SE trend.
- Central processing facility located Southwest of development area.
- Majority of 8 drainage boxes are in >15m bitumen pay.

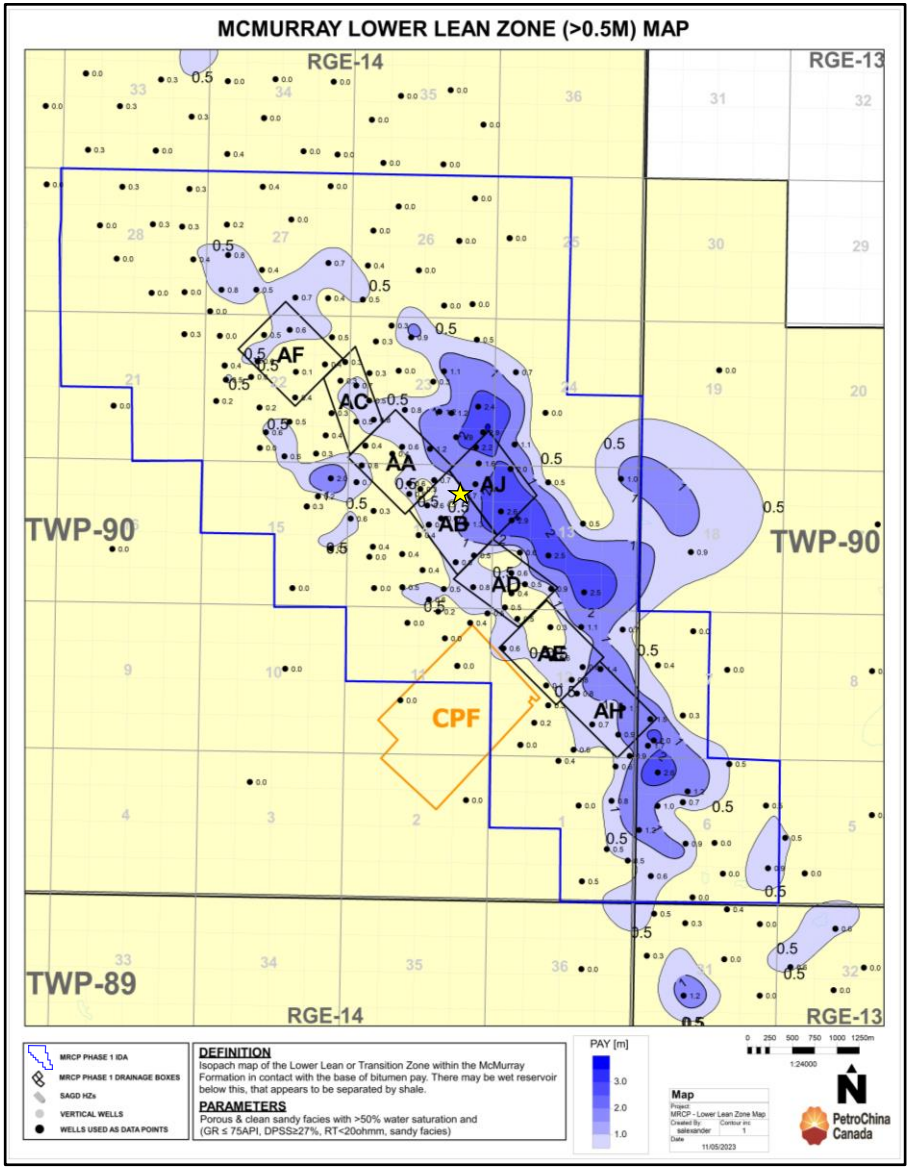
# MCMR Top Gas Isopach Map



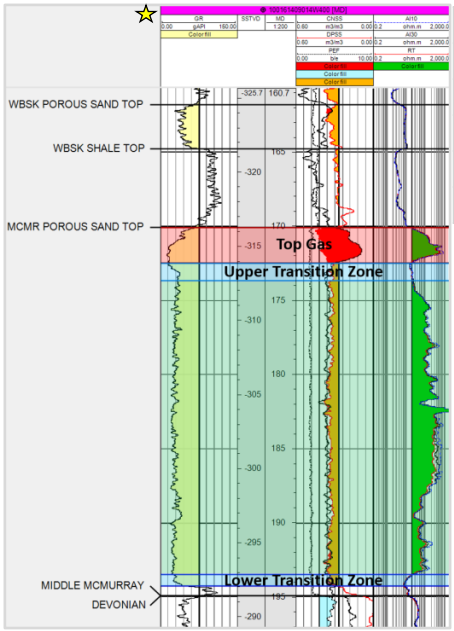

- Top gas zone present in the upper McMurray over the DA.
- Ranges in thickness from approximately 0 to 3 meters.



# Lower Transition Zone Map

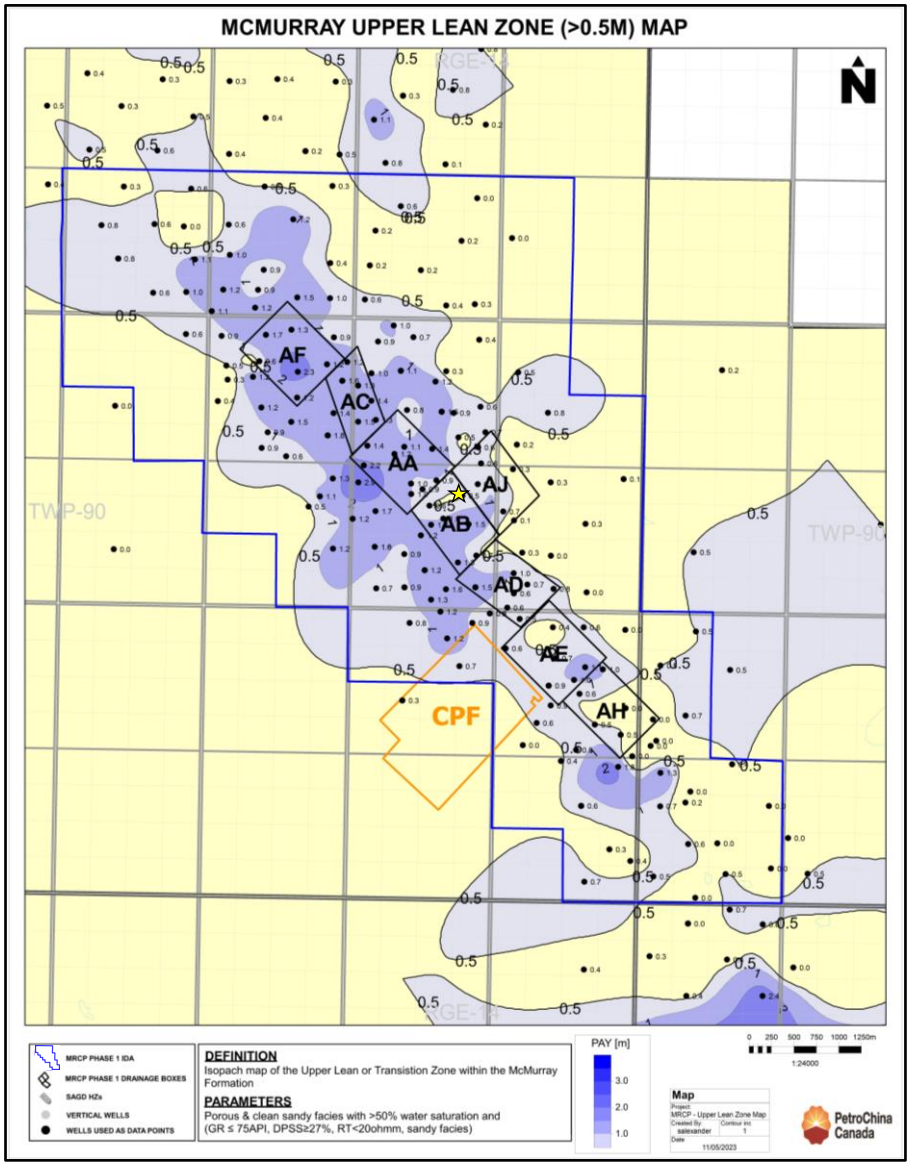



- Criteria:
  - Porous and clean sandy facies with >50% water saturation (GR ≤ 75API, DPSS≥27%, RT<20ohmm, sandy facies).
  - In communication with and below pay zone.
- Characteristics:
  - Thin: <1.0m over most of the Phase 1 drainage boxes.
  - Limited Lateral Extent.

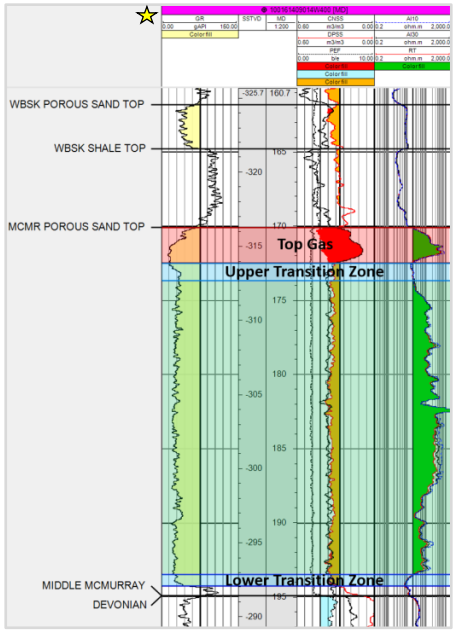



| Lower Transition Zone Properties | |
|---|---|
| **Parameter** | **Average** |
| Total Water Saturation | 70% |
| Total Porosity | 33% |
| Horizontal Permeability (Core) | 3300 mD |
| Vertical Permeability (Core) | 2400 mD |

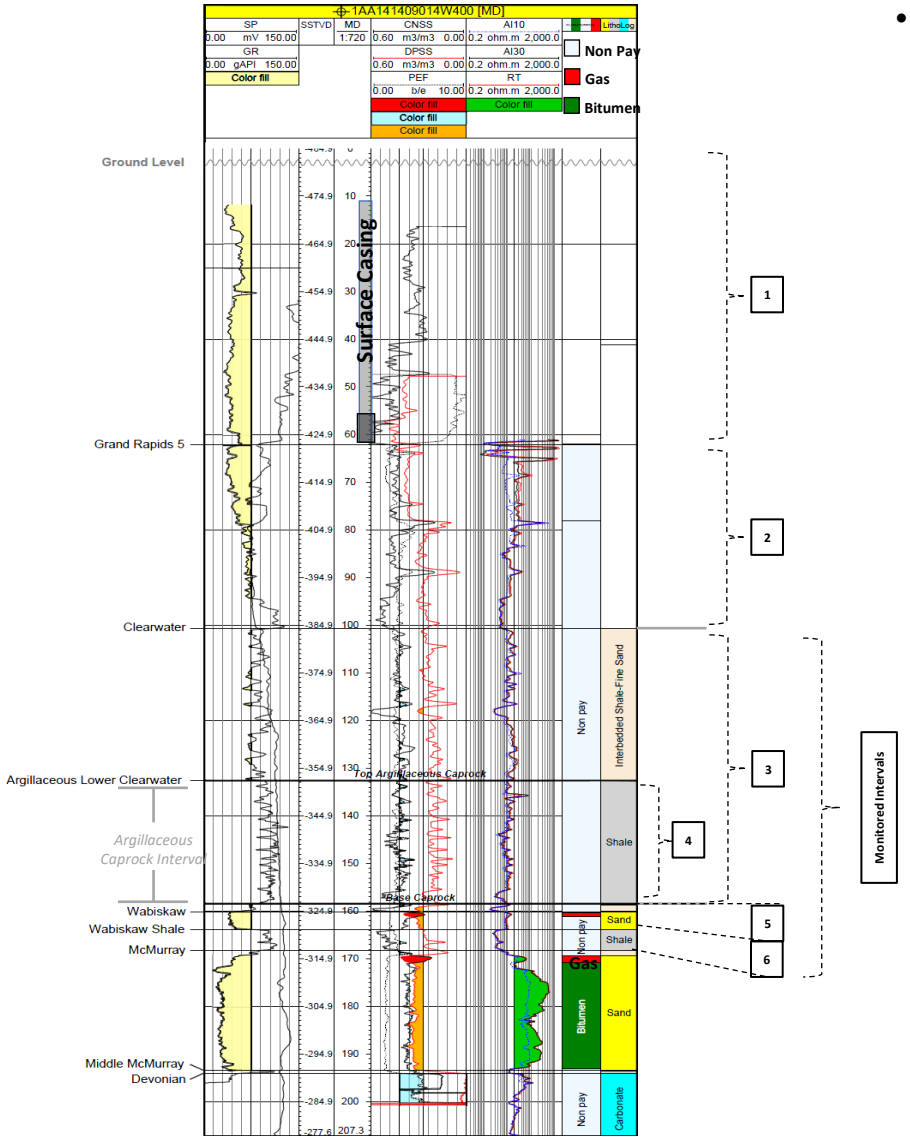
# Upper Transition Zone Map




- Criteria:
  - Porous & clean sandy facies with >50% water saturation (GR ≤ 75API, DPSS≥27%, RT<20ohmm, sandy facies).
  - In communication with and above pay zone.
- Characteristics:
  - Thin: <1.5m over most of the Phase 1 drainage boxes.
  - Limited Lateral Extent.



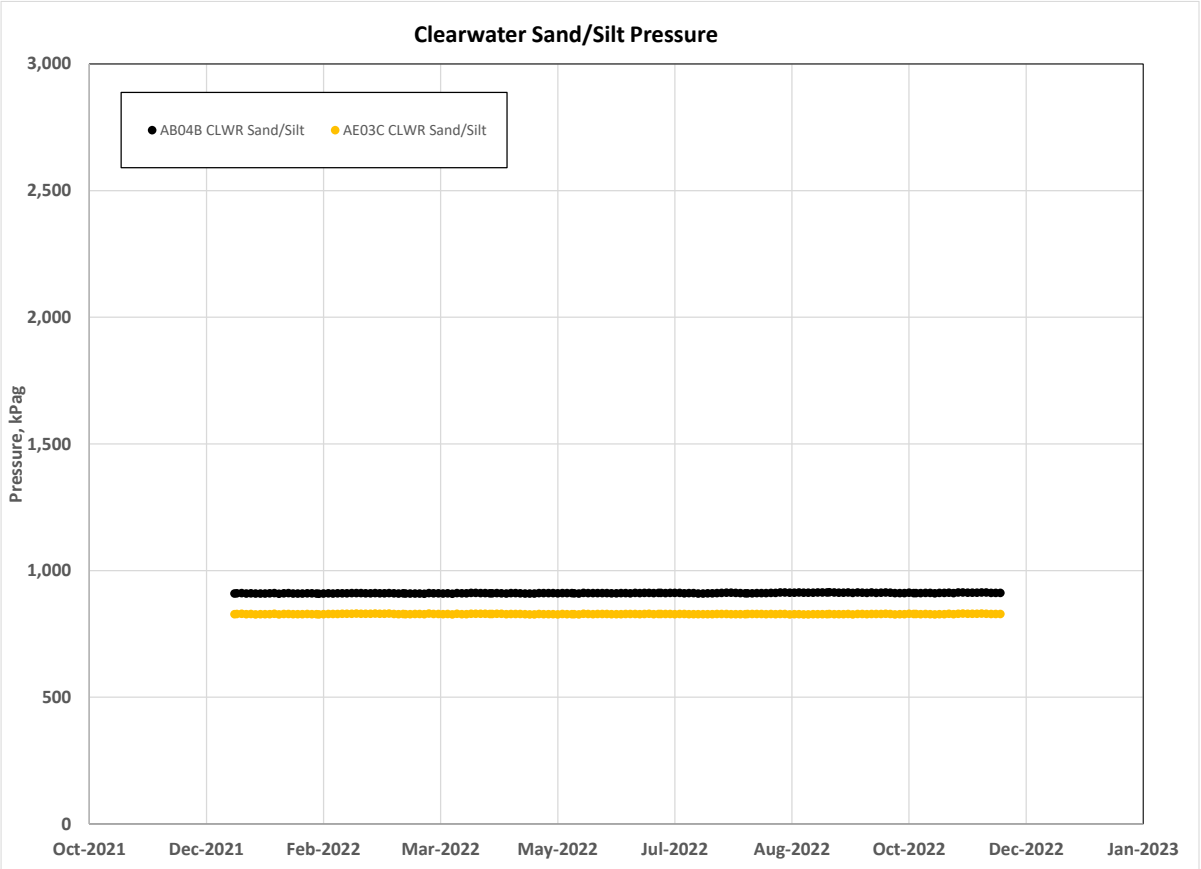
# Caprock Monitoring: Overburden & Cap Rock Intervals




- Overburden intervals:
  1. Quaternary Sediments: from surface to the Grand Rapids.
  2. Grand Rapids, overlies Clearwater.
  3. Clearwater Formation, which is the gross caprock.
  4. Argillaceous interval of Clearwater is the primary caprock for MRCP. It is present across the MRCP DA, it is a thick (>21 m), and laterally continuous, consistent, clay-rich caprock, free of influence of any vertical pore pressure transmission pathways.
     - Some instrumentation is set outside the casing of observation wells to monitor the sandier Clearwater intervals above the Argillageous caprock.
  5. Wabiskaw sand is the first known horizontal pathway on top of the reservoir. It is the main target for reservoir containment assurance and/or caprock integrity monitoring, early warning for pressure buildup.
  6. Wabiskaw shale lies above the McMurray reservoir and is the lower-most interval included within the overburden monitoring strategy.

# Overburden surveillance above MRCP caprock (Clearwater Argillageous )

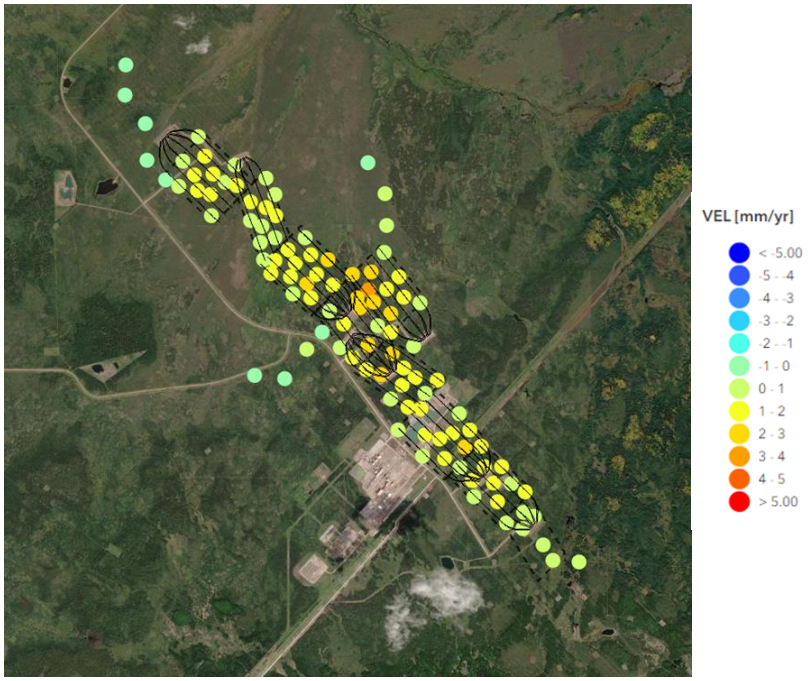
- Clearwater sand/silt is above the MRCP caprock.
- Pressure range in 2022: 829 to 907 kPag (initial range: 826 to 896 kPag), Remains at virgin conditions, as expected.
- Temperature: range 4 to 5 C (initial range: 4 to 5 C).
- Pressure and temperature are expected to remain steady as this interval is immediately above the caprock.



# Heave Monitoring

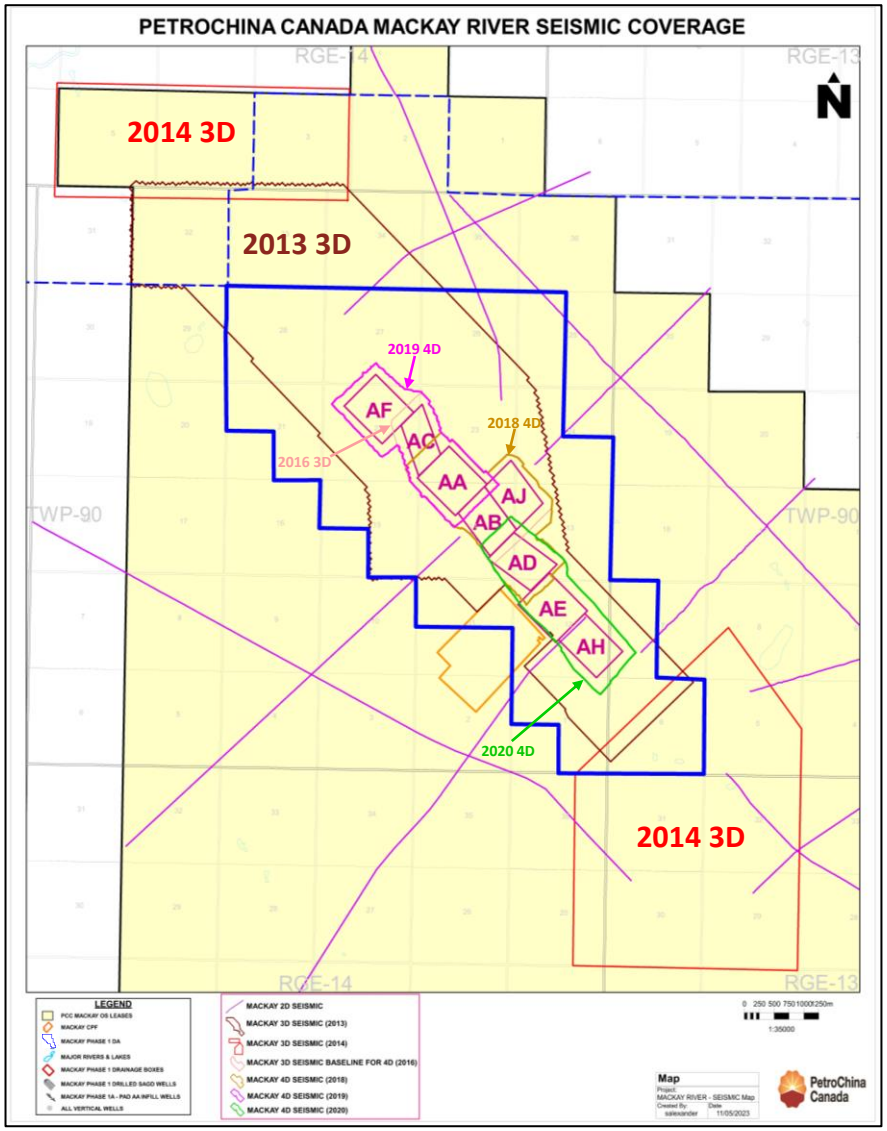
- PCC implemented ground displacement monitoring using 104 corner reflectors (CR) over MRCP using Synthetic-aperture Radar Interferometry (InSAR) technology.
- Cumulative heave up to 26.9 cm has been recorded at all MRCP pads (the most was recorded at Pad AJ).
- A Satellite outage began at the end of 2021 which has impacted data collection using CRs.
- Cumulative displacement per pad, September 2014 to December 2021 is shown in the adjacent table.
- The displacement measured at each CR for the period January 2021 to December 2021 is shown on the adjacent map.
- PCC also monitors natural reflectors (NR) displacement for snow-free periods of each year. Heave was the dominant ground displacement effect registered in 2022 using NR as shown in the table below. However, NR data can't be used to record trends.

| Pad | Cumulative Heave 2014-2021 | |
|---|---|---|
| | Ave Heave (cm) | Max Heave (cm) |
| AJ | 11.80 | 26.90 |
| AA | 11.90 | 22.60 |
| AB | 11.00 | 21.20 |
| AD | 10.30 | 17.30 |
| AE | 8.40 | 14.90 |
| AF | 6.90 | 12.80 |
| AC | 7.90 | 12.80 |
| AH | 6.70 | 10.40 |




| Apr 2022 – Nov 2022 Displacement | | | | | |
|---|---|---|---|---|---|
| PAD | MP Count | Cumulative Heave (MIN) cm | Cumulative Heave (AVG) cm | Cumulative Heave (MAX) cm | RATE (AVG) cm/yr |
| AA | 194 | 0.4 | 1.3 | 2.1 | 2 |
| AB | 888 | 0.3 | 2 | 4.1 | 3.3 |
| AC | 506 | -1 | 0.7 | 2.8 | 1 |
| AD | 638 | -0.7 | 1.2 | 2.4 | 1.8 |
| AE | 825 | -0.2 | 1 | 2.7 | 1.1 |
| AF | 1364 | -0.4 | 2.2 | 4.5 | 3.7 |
| AH | 368 | -0.8 | 0.9 | 2 | 1.2 |
| AJ | 20 | 0 | 0.8 | 1 | 0.8 |

# MRCP Seismic




Coverage Across MRCP includes:

- ~96 km of 2D.
- ~58.4 $km^2$ of 3D.
- ~3.9 $km^2$ of 3D baseline for 4D.
- ~3.5 $km^2$ of 4D in 2018 – Interpreted.
- ~3.0 $km^2$ of 4D in 2019 – Interpreted.
- ~2.9 $km^2$ of 4D in 2020 – Interpreted.

3D acquired in MRCP to help:

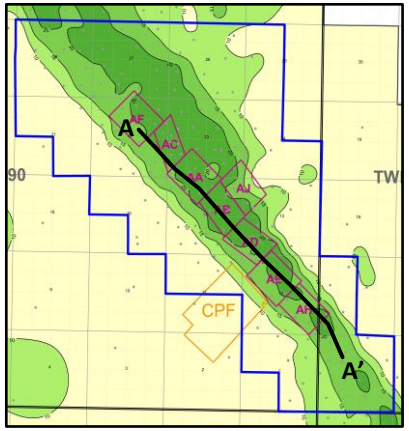
- Assess Caprock.
- Plan/drill horizontal well trajectories.
- Assess McMurray reservoir.

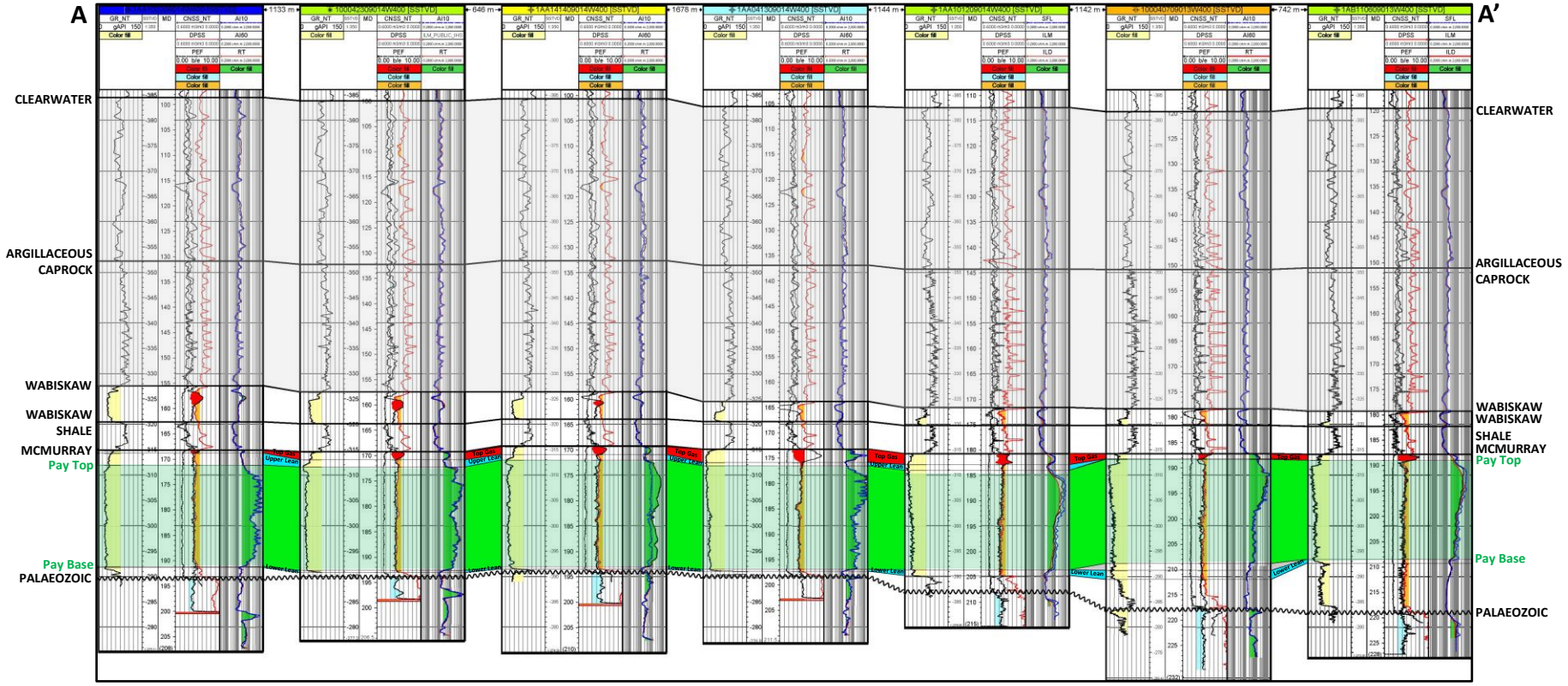
4D seismic surveys acquired at MRCP in 2018, 2019, and 2020

- Used to monitor steam chamber growth.
- 2018: Pads AA, AB, AJ, AD.
- 2019: Pads AF, AC, AA.
- 2020: Pads AD, AE, AH.

# Structural Cross-Section across MRCP

- Good reservoir quality with continuity along Development Area.
- Minor structural variation at base of pay.
- Thick and laterally continuous caprock with consistent lithology.



# Geologic and Reservoir Properties – OBIP FOR OPERATING AREA

| Drainage Box | # Well Pairs | Drainage Box Area ($m^2$) | Average $S_o$ (frac) | Average $\Phi$ (frac) | Average $K_h$ (D) | Average $K_v$ (D) | Average Bitumen Pay Thickness (m) | Drainage Box OBIP (m3) | Estimated RF (%) | Estimated Drainage Box RBIP (m3) |
|---|---|---|---|---|---|---|---|---|---|---|
| AA | 10 | 698,200 | 0.83 | 0.34 | 2.7 | 1.1 | 21.3 | 4,197,138 | 54 | 2,273,450 |
| AB | 5 | 562,600 | 0.8 | 0.34 | 2.7 | 1.1 | 22.6 | 3,465,819 | 57 | 1,971,383 |
| AC | 4 | 418,700 | 0.85 | 0.34 | 2.6 | 1 | 21.9 | 2,655,008 | 63 | 1,669,316 |
| AD | 5 | 560,100 | 0.77 | 0.33 | 2.6 | 1 | 20.8 | 2,957,075 | 54 | 1,605,723 |
| AE | 6 | 674,700 | 0.76 | 0.33 | 2.2 | 0.9 | 20.8 | 3,513,514 | 53 | 1,860,095 |
| AF | 6 | 675,400 | 0.82 | 0.34 | 2.6 | 1 | 22 | 4,149,444 | 62 | 2,575,517 |
| AH | 5 | 594,300 | 0.77 | 0.34 | 2.6 | 1 | 20.4 | 3,179,650 | 48 | 1,526,232 |
| AJ | 5 | 562,300 | 0.75 | 0.34 | 2.5 | 0.9 | 20.5 | 2,941,176 | 57 | 1,669,316 |
| *Total* | *46* | *4,746,300* | *0.79* | *0.34* | *2.6* | *1* | *21.3* | *27,058,824* | *56* | *15,151,033* |

**OBIP** = Original Bitumen In-Place and measured in $10^6 m^3$ units and converted to $10^6$ barrels using conversion factor of 6.2898.

**NRV** = Net Rock Volume in $10^6 m^3$ derived from deterministic mapping of SAGDable net pay, or from geomodel calculations.

**SO** = Average bitumen saturation from the SAGD exploitable reservoir interval generated from 1-SWT (in fractions).

**PORT** = Average porosity from the SAGD exploitable reservoir interval generated from PORT (in fractions).

RBIP = Recoverable Bitumen in Place

$$OBIP = (NRV \times PORT \times SO)$$

# Geologic and Reservoir Properties – OBIP

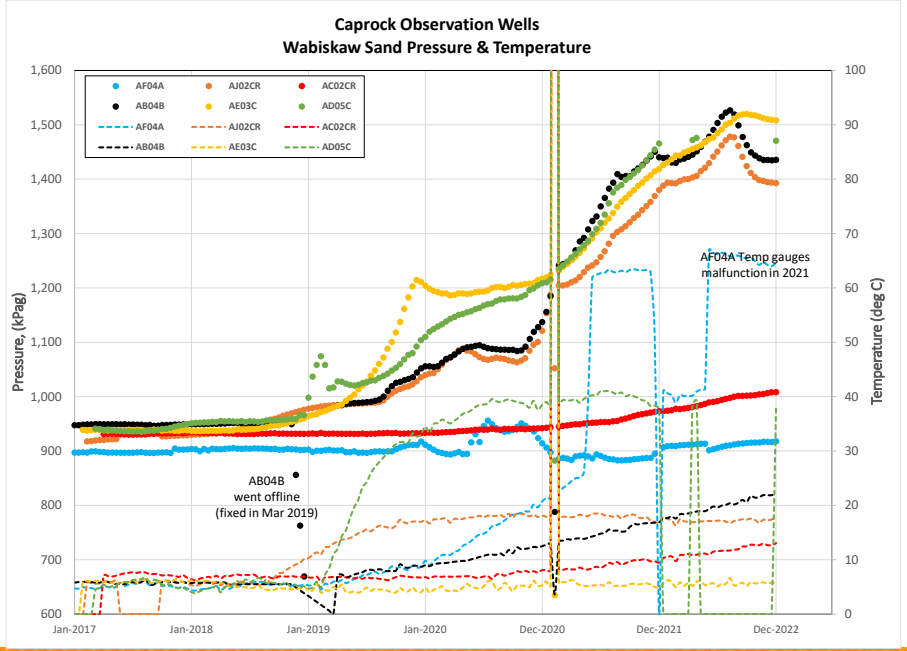
| Parameters | Development Area | Project Area |
|---|---|---|
| Top of Reservoir Depth (mTVD) | 176 | 175 |
| Top of Reservoir Depth (TVD masl) | 315 | 311 |
| Base of Reservoir Depth (mTVD) | 197 | 193 |
| Base of Reservoir Depth (TVD masl) | 294 | 293 |
| Net Pay Thickness (m) | 21.3 | 12.8 |
| Porosity (frac) | 0.34 | 0.33 |
| Bitumen Saturation (frac) | 0.79 | 0.75 |
| OBIP ($10^6$ bbl) | 170.2 | 2890.8 |
| OBIP ($10^6$ $m^3$) | 27.1 | 459.6 |
| Initial Pressure (kPaa) | 220 (top) to 400 (bottom) | 220 (top) to 400 (bottom)* |
| Original Reservoir Temperature (°C) | 6 | 6* |

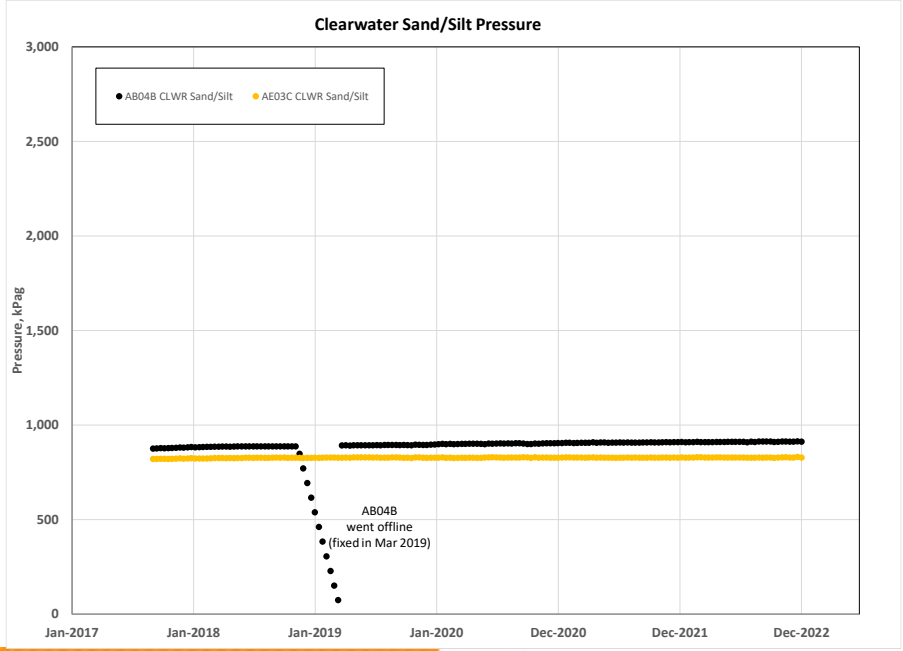
* *Extrapolated from operating area*

# Caprock Monitoring: P & T Wabiskaw and Clearwater Sands

## Overburden surveillance below and above MRCP caprock (Clearwater Argillageous )

- Wabiskaw Sand First line of defense (above reservoir, below caprock):
  - Pressure: Average 1,320 kPag, range 918 to 1,508 kPag (initial range: 900 to 950 kPag).
  - Temperature: Average 23C , range 6 to 43C (initial range: 5 to 7C).
  - All pressure and temperature trends were considered normal in 2022 and attributed to thermal operations in the MCMR reservoir.
- Clearwater sand/silt is above of MRCP caprock
  - Pressure: range 828 to 911 kPag (initial range: 826 to 896 kPag) – <u>this Remains at virgin conditions as expected.</u>
  - Temperature: range 4 to 5C , (initial range: 4 to 5C ).
  - Pressure and temperature expected to remain steady as this interval is immediately above the caprock.



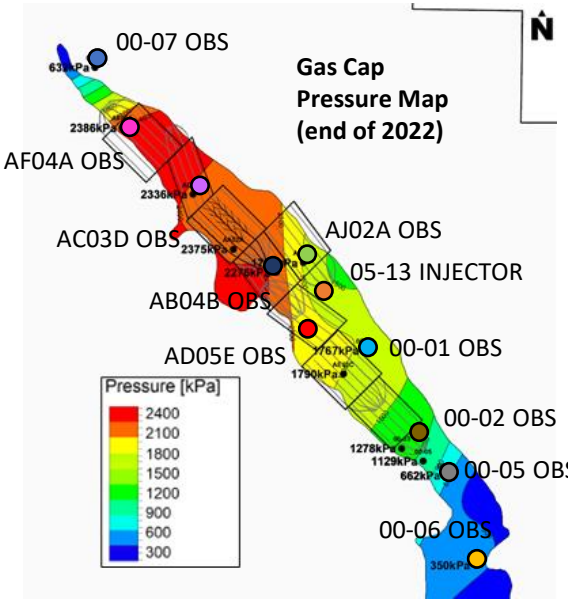
# MRCP – Performance Indicators by Pad

| Pad | OBIP ($m^3$) | Cum. Oil to December 2021 ($m^3$) | Recovery to December 2021 (%) | CSOR by Dec 2022 | ISOR by Dec 2022 | Ultimate Recovery (%) |
|---|---|---|---|---|---|---|
| AA | 4,197,138 | 816,960 | 19.46% | 4.8 | 4.9 | 54% |
| AB | 3,465,819 | 355,035 | 10.24% | 6.7 | 5.0 | 57% |
| AC | 2,655,008 | 483,197 | 18.20% | 4.1 | 4.8 | 63% |
| AD | 2,957,075 | 292,281 | 9.88% | 7.6 | 7.3 | 54% |
| AE | 3,513,514 | 252,750 | 7.19% | 9.3 | 7.9 | 53% |
| AF | 4,149,444 | 644,224 | 15.53% | 4.5 | 5.1 | 62% |
| AH | 3,179,650 | 94,960 | 2.99% | 16.2 | 9.2 | 48% |
| AJ | 2,941,176 | 187,020 | 6.36% | 10.9 | 6.9 | 57% |
| Total | 27,058,824 | 3,126,428 | 11.55% | 6.2 | 5.6 | 56% |

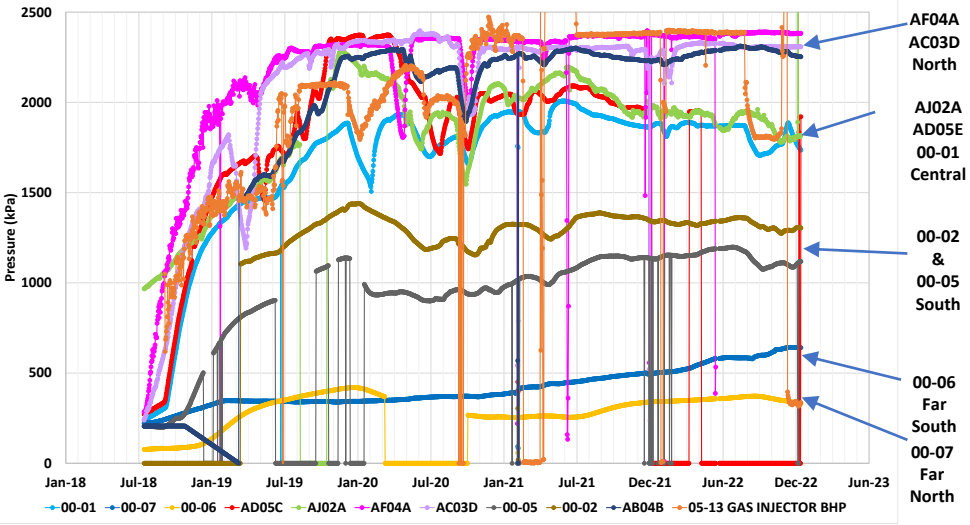
- Higher SORs experienced on AD, AE, AH, and AJ pads are primarily due to gas cap contact and/or slightly larger lower transition zone leak off.
- Mitigations:
  - Operating pressure is balanced with the thief zones pressure, accordingly.
  - Gas cap pressurization with natural gas started in September 2018 in vertical well 05-13 (central DA). The injector was maintained active until August to September 2022, mechanical issues were identified and the well remained shut in, except for a 2-week test period in November, for the rest of 2022. The well was deemed irreparable, and abandonment was conducted in 2023.
  - Gas co-injection started in well pairs of pads AH, AE, AD in January 2019, then expanded to some well pairs in pads AA and AB. Gas co-injection continued to support gas cap pressurization in the Central and Southern DA during 2022.

# Gas Cap Pressurization: NCG Injection

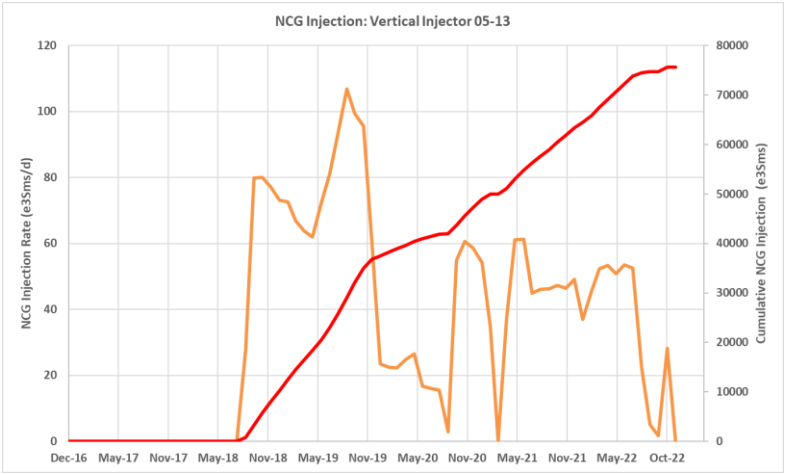
- The purpose of gas cap pressurization at MRCP is to increase the pressure in the gas cap to operate at a more favorable pressure balance between steam chambers and top thief zones to minimize steam losses.
  - Initial gas cap pressure of 200 kPag, presented a challenge to SAGD operation pressure balance.
  - These has been evidence of steam chamber communication to the gas cap since early 2018.
  - The pressurization process started in September 2018. Natural gas is injected in the vertical well 103/05-13-090-14W4-00. By Q3, 2019 injection reached a maximum of 106,000 $Sm^3/d$ (max approved by AER is 120,000 $Sm^3/d$ per injector).
  - Injection suspended from December 2019 to October 2020. PCC reactivated NCG injection to continue support field pressure ramp-up. Intermittent injection from 2021 to mid-2022.
  - Injection was suspended in August 2022, mechanical issues were identified and the well remained shut in for the rest of 2022, except for a 2-week test period in November 2022. The well was deemed irreparable, and abandonment was conducted in 2023.
  - By December 2022, cumulative NCG injection was ~75,600 $e^3Sm^3$, the average injection rate in 2022 was 33,500 Sm3/d (as per chart below, right).
  - The gas cap pressurization process has helped reduced SOR and maintain stable operation and production of wells affected by gas cap contact.




## Observation Wells Pressure Responses in Gas Cap

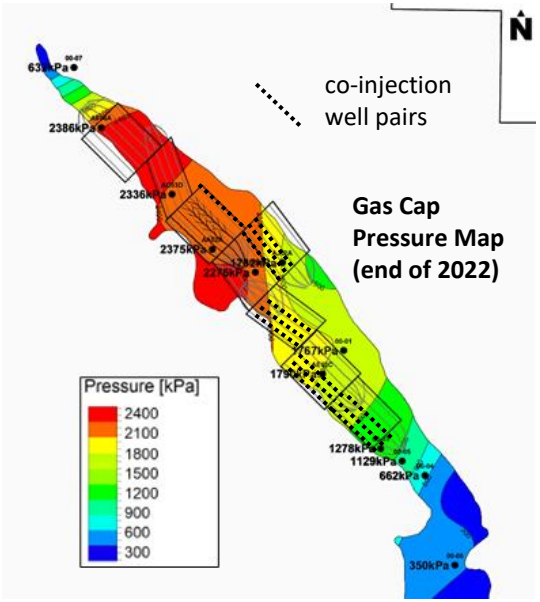



## NCG Injection: Vertical Injector Well

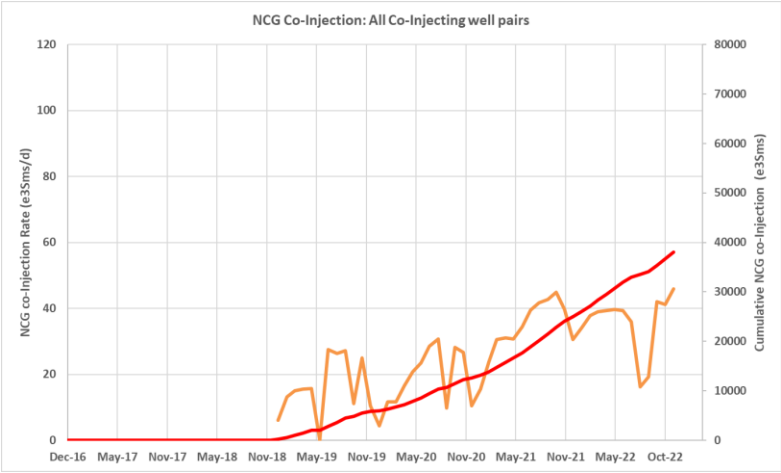


# Gas Cap Pressurization: NCG Co-Injection

- NCG co-injection supports the gas cap pressurization at MRCP
  - Gas co-injection was implemented in January 2019 to additionally support gas cap pressurization in areas distanced from vertical injector 05-13.
  - Typical co-injection rates range from 2,400 to 4,200 $Sm^3/d$ per well (Max approved by AER is 5,000 $Sm^3/d$ per well). Cumulative NCG co-injection was ~38,000 $e^3Sm^3$ (as per chart below, right), by December 2022.
  - Typical mole fractions (concentration) range between 0.5 and 2.0%.
  - NCG co-injection parameters are evaluated weekly: Co-Injection rates (within the permitted range) are adjusted as per each well pair response. Wells could be on and off co-injection depending on SOR and TFSR evaluation.
  - PCC has identified and used up to 13 well pairs (shown in map) for NCG co-injection up to December 2022.
    - AA06
    - AB05
    - AJ01, AJ02
    - AD03, AD04, AD05
    - AE01, AE02, AE03
    - AH01, AH02, AH03
  - Additional wells could be added to the co-injection group if the need is identified.
  - NCG co-injection helps provide extra buoyancy to the steam chambers and support growth through tortuous and heterogeneous reservoir paths.
  - Pressure monitoring of the gas cap indicates that co-injected NCG reaches the top of the reservoir, effectively providing pressure support, preventing excessive steam losses and supporting effective SAGD operation.
  - No wellbore integrity issues identified.
  - Gas Production remains negligible, PCC estimates that most of the co-injected gas remains in the gas cap
  - After the suspension of gas injection in the vertical well 05-13, it is expected that gas co-injection will be the main mechanism utilized by PCC to continue to support the pressurization of the gas cap.



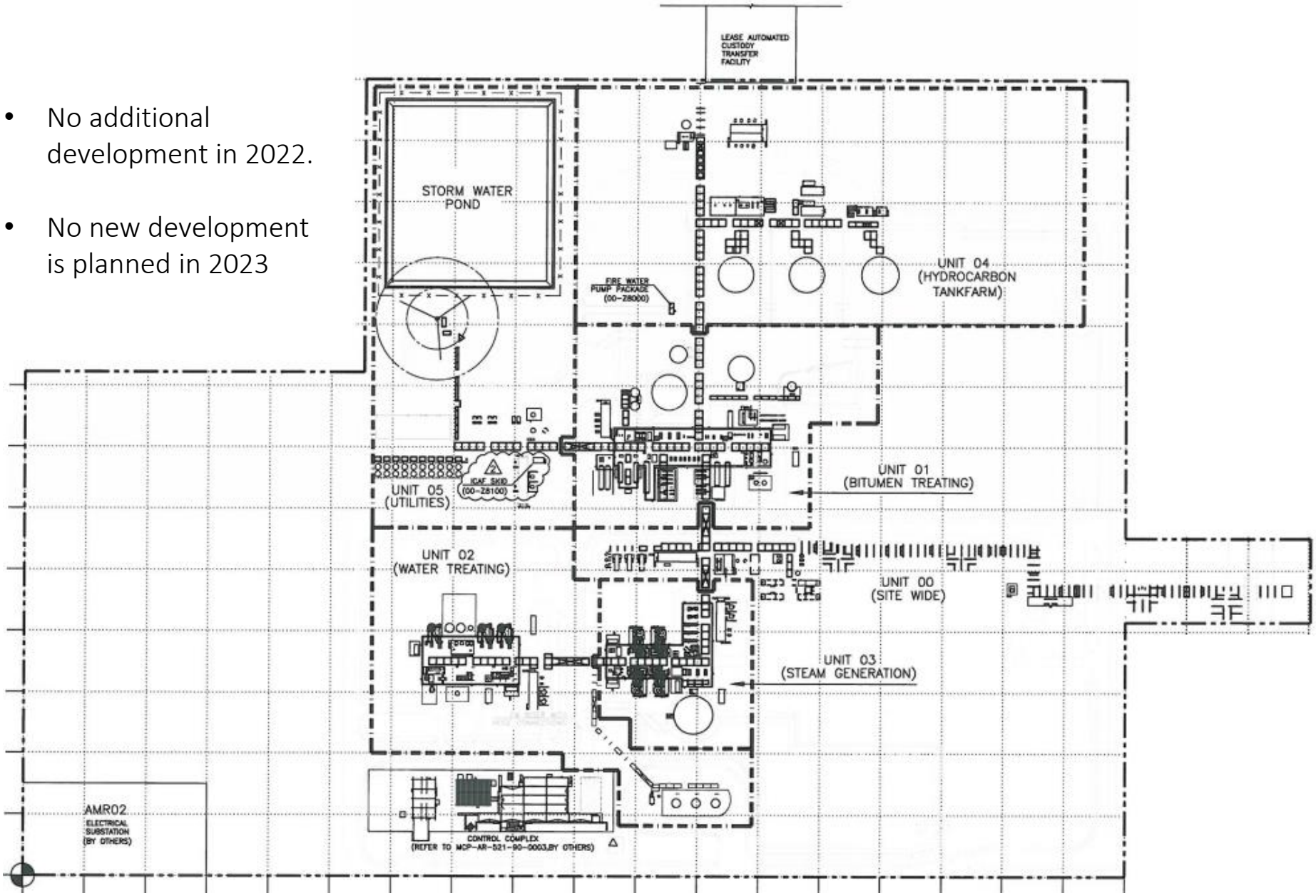

NCG co-Injection: Several Well Pairs



# 4.3 SURFACE

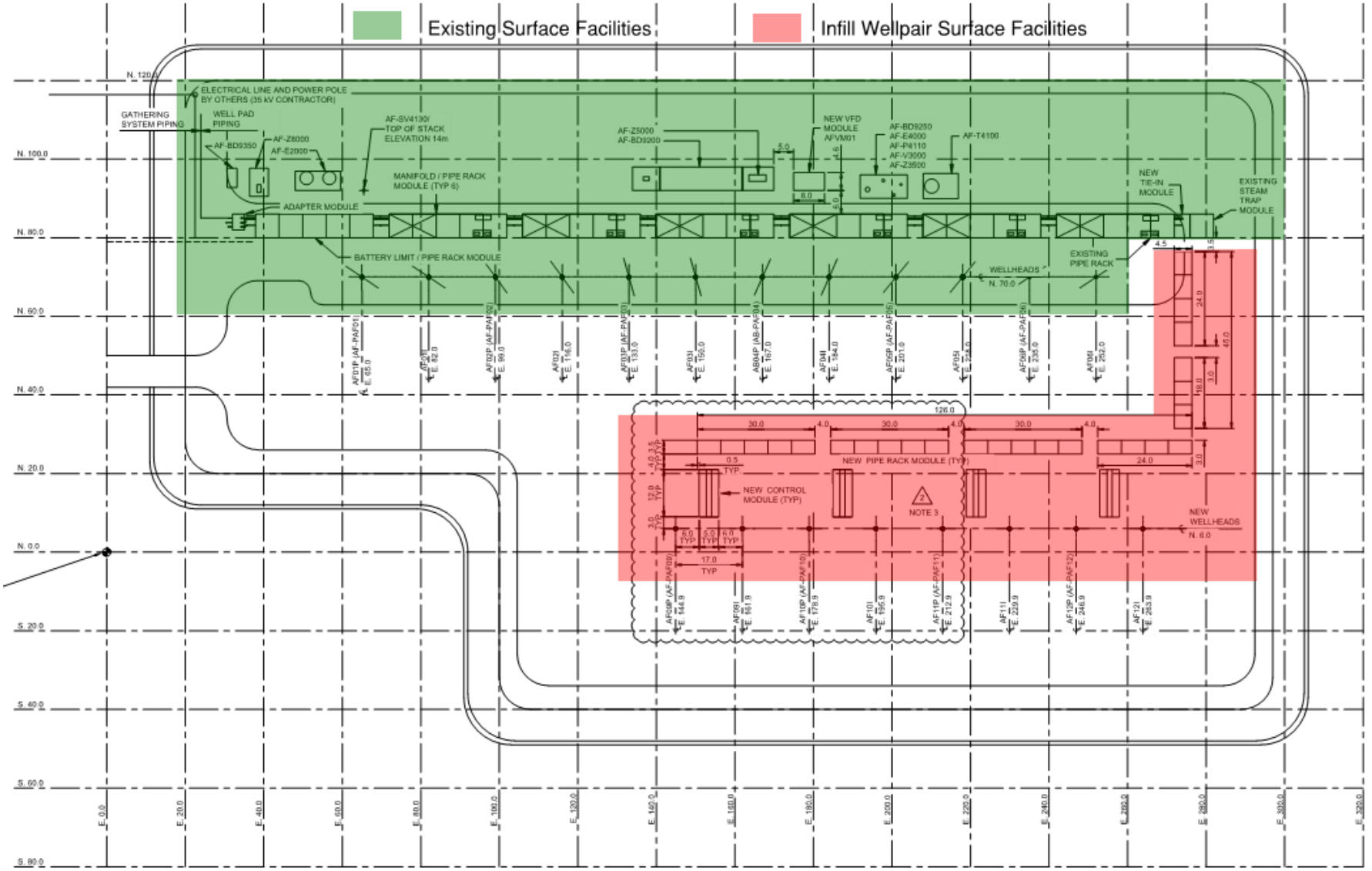
# Central Plant Facility Development Plot Plan

- No additional development in 2022.
- No new development is planned in 2023



# Pad AF Surface Facility Development

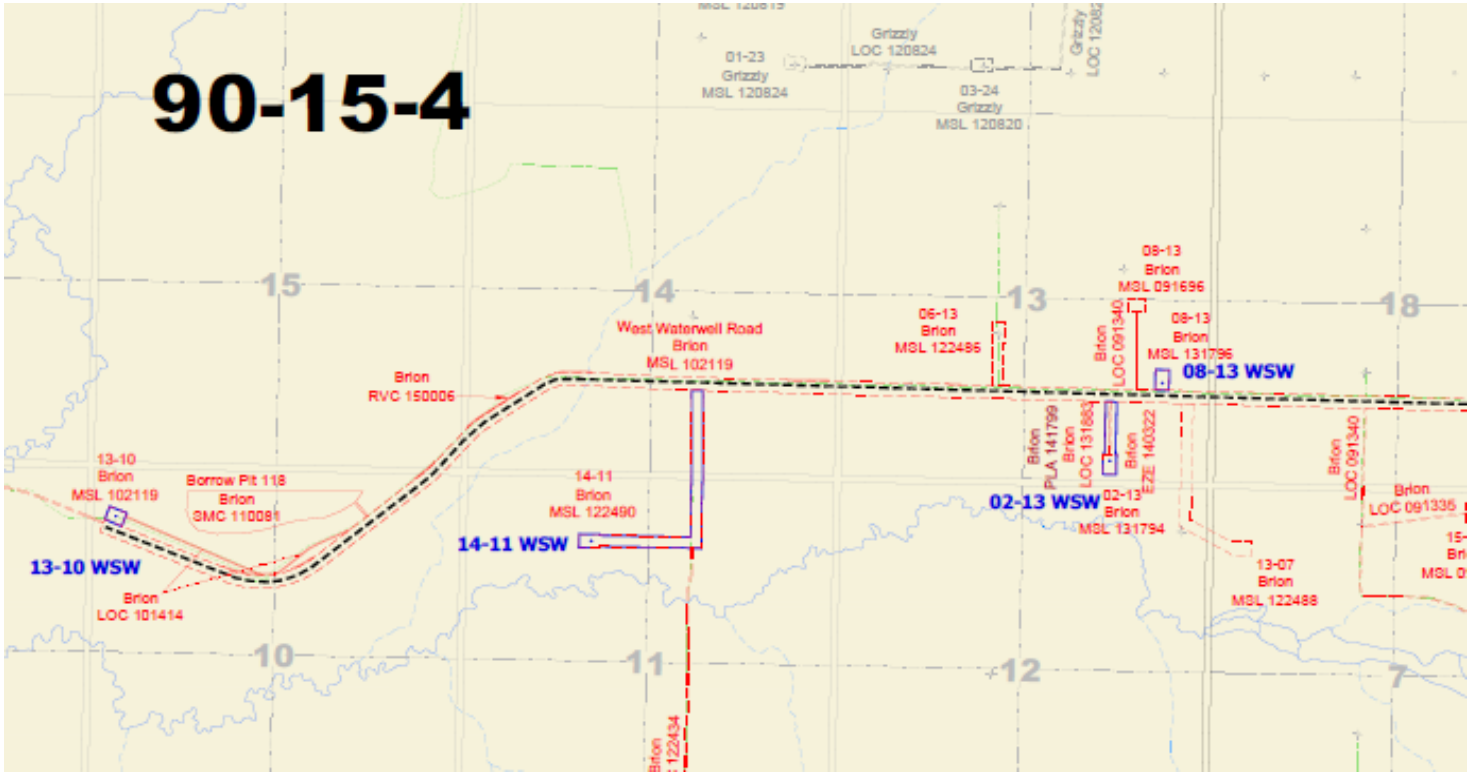
- Well Pad AF was expanded in 2022 to support the drilling of additional well pairs.



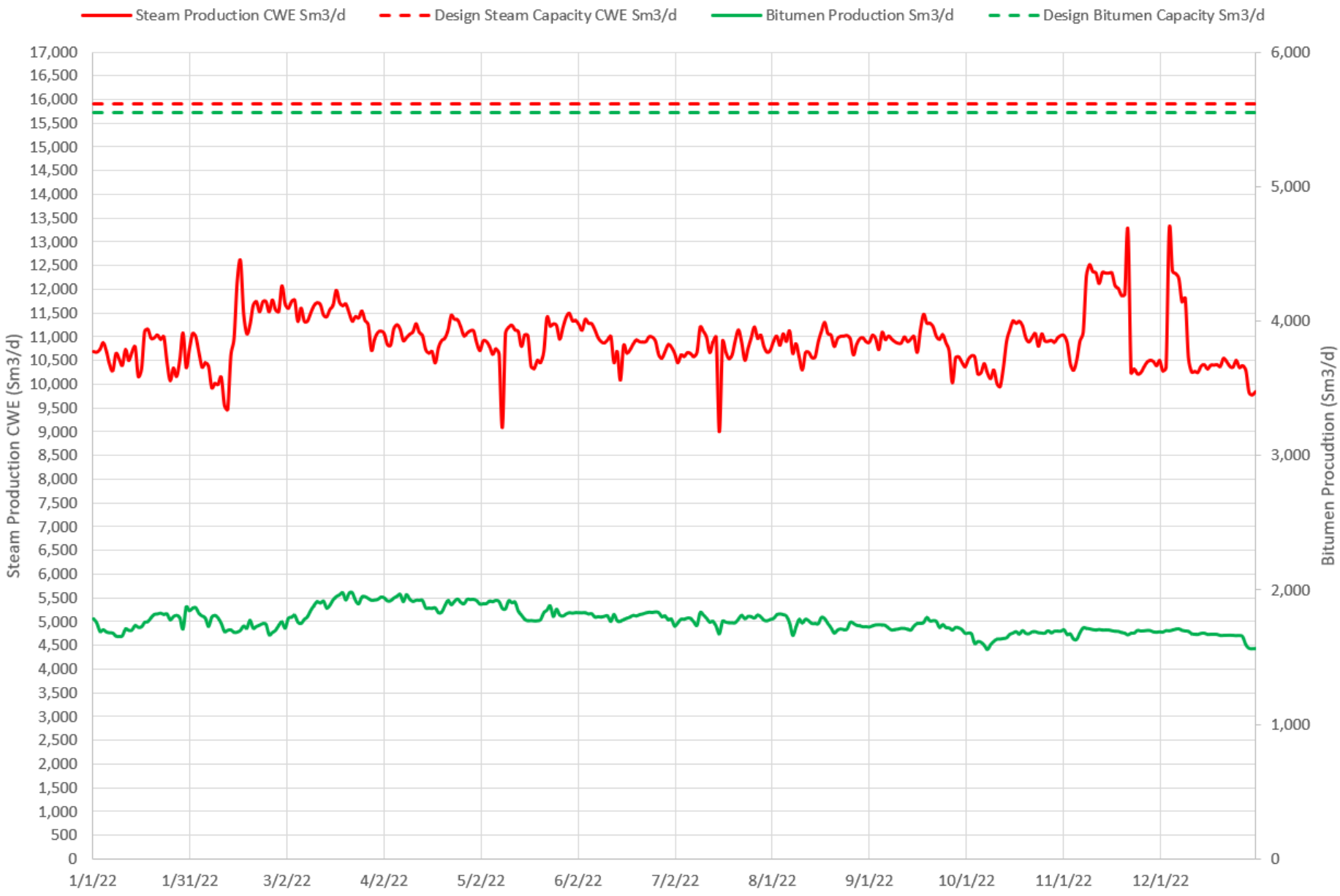
# Built and Planned Water Infrastructure

## Water Act Licence No. 00266369-01-03:

- Approved Annual Withdrawal Volume = 2,116,964 $m^3$/year from the Empress Channel Aquifer:
  - 13-10-90-15W4, max rate 2,930 $m^3$/d.
  - 14-11-90-15W4M, max rate 3,000 $m^3$/d.
  - 02-13-90-15W4M, max rate 2,900 $m^3$/d.
  - 08-13-90-15W4M, max rate 3,100 $m^3$/d.



# Operational Comparison to Design Throughputs



# 4.4 Historical and Upcoming Activity

# Historical and Upcoming Activity

Summary of suspension and abandonment activity within 2022:

There were no suspension or abandonment activities in 2022

# 2022 Regulatory and Operational Changes

| Amendments to Scheme Approval No. 11715 | | | |
|---|---|---|---|
| **Amendment No.** | **Application No.** | **Description** | **Approval Date** |
| 11715T | 1935550 | Expanded Development Area | 28-Mar-2022 |
| 11715T(2) | 1939397 | Well pad AF Edge Well pairs | 27-Sep-2022 |

There were no phase expansions, change in injection strategy, or infrastructure changes throughout 2022 that materially affected scheme performance or energy material balances

PCC received EPEA Approval No. 254465-01-00, as amended, in November 2022.

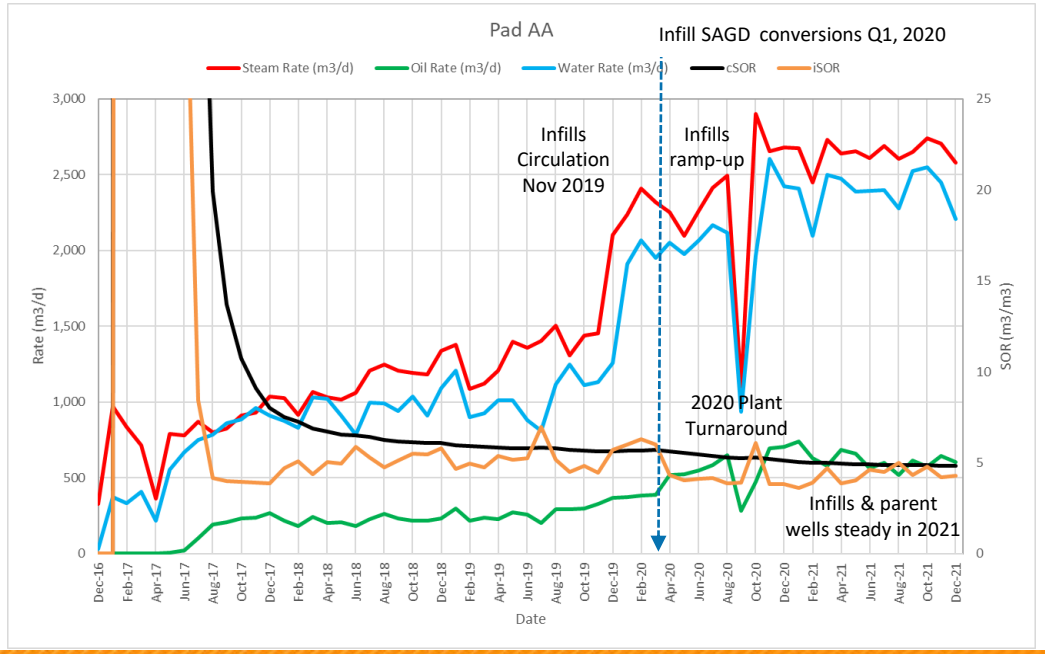
# Key Learnings To-Date

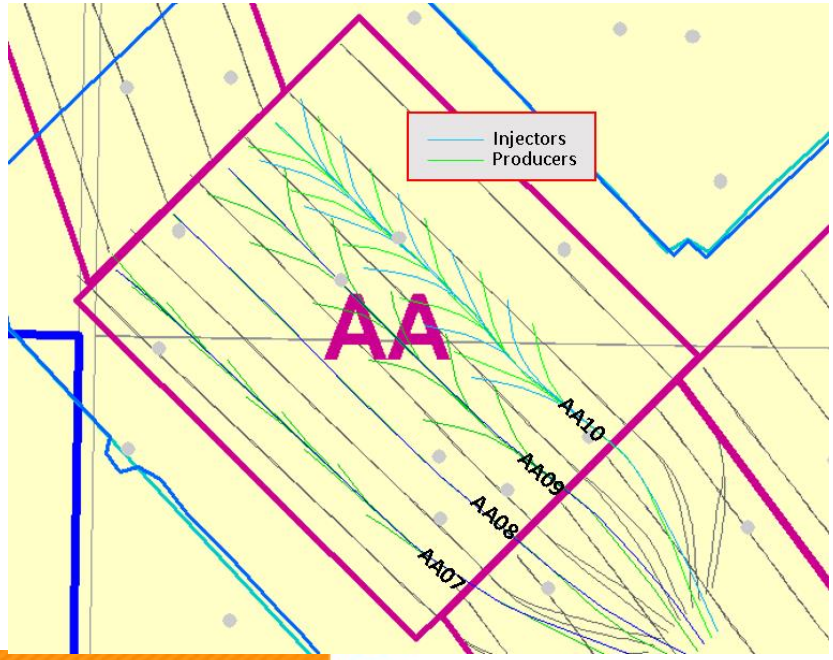
- Continuing to ramp-up production through optimization efforts and mitigating the effects of:
  - Top gas and thicker lower transition zones
  - Operational pressure strategies tied to “thief” zones
  - Effects of baffles and barriers
  - Fines migration
- The implementation of infill wells in pad AA has resulted in a positive experience. Key learnings in well/facilities planning, drilling, completion and operation are considered for future developments at MRCP
- Electrical Submersible Pump (ESP) conversions continue to meet run-life expectations and are in-line with industry averages.
- The use of fiber optic temperature coils has proven to be a valuable tool to diagnose downhole issues and survey the conformance along the horizontal section.
- For wells that have been worked over with Tubing Deployed Inflow Control Devices (TDICD), continuous fiber optic temperature coils have been left out of the completion to minimize pressure drop inside the liner. However, some surveys or installation of coils may be required to further assess TDICD performance.

# Well Pad AA Infill Wells

- Steam circulation began late November 2019
- SAGD conversion between March and April 2020
- Infill wells performance to-date represents a clear improvement over their parent (original) wells
- Multilaterals showing communication with adjacent steam chambers. PCC continues to develop strategies to promote steam chamber development in heterogeneous reservoir
- Reservoir Conditions (heterogeneities, quality) variable along the pad. Generally improving in the NE-SW direction. No direct comparison of infills performance is possible as each infill (as well as original wells) deals with different reservoir qualities.
- Main learnings:
  - Conventional infill well pair (no multilateral) with completion enhancements in cleaner reservoir outperforms parent wells
  - Multilateral wells are more adequate to lower quality reservoir to help promote steam chamber growth and reach out to interbedded sands. They also outperform parent wells
  - Technology adaptation to reservoir quality
- **Infill Wells proposed for Pad AF in 2023 capturing learnings from AA Pad infills**

- AA07:
  - Casing Inflow Control Device in producer, PPS liner
  - Uptrack laterals
  - Vacuum Insulated Tubing
- AA08:
  - Casing Inflow Control Device in producer
  - Base Pair (conventional well pair, enhanced design with learning from first 42 well pairs), PPS liner.
- AA09:
  - Casing Inflow Control Device in producer,
  - Producer multilaterals to adjacent steam chamber
- AA10:
  - Casing Inflow Control Device in producer,
  - Producer and injector multilaterals to adjacent steam chamber



# 2022 Compliance Summary

| Event Description and AER Reference Number (if applicable) | Event Details | Event Reason (if applicable) | Plan to Resolution |
|---|---|---|---|
| *Waste Control Regulation* (518671) | AER requested PCC provide waste manifests required under the *Waste Control Regulation* during an inspection. PCC was not able to provide these at the time of the request. | PCC did not have a process in place to readily access signed waste control manifests once the fully executed copies are sent back to PCC | PCC has instituted a new process to electronically store waste manifests for ready access. |
| *Air Monitoring Directive* Late Reporting (402220) | April, May, and June monthly AMD reporting was reported after the timelines established in the Air Monitoring Directive. RATA testing was completed on HZ2100 on May 31, 2022. The RATA report was due by end of June 2022, but it was not submitted until August 2, 2022. | The contravention is primarily due to organizational changes within PCC. Certain reporting has been delayed while workloads were shifted and new responsibilities are understood fully. | New system access and consultant support have been arranged to support these submissions going forward. |
| Directive 017 MARP Tags Faded (523304) | Following up on the inspection conducted on September 1, 2022 AER identified that several non compliances in relation to MARP tags. | The tags were not sufficiently shielded from the elements that led to the tags fading or being lost. | Tags were replaced and covers were added to protect them from the elements. |
| *Public Lands Act* (31765049) | AER conducted an audit of a previous Public Lands Act Application and noted that there were several issues:<br>- the incorrect purpose was used for the lease.<br>- the sketch plan was inadequate<br>- no wildlife sweep was completed prior to the activity. | These were one-time issues or the result of contractor error. | PCC is in the process of amending the lease to address the non-compliances. |

# 2022 Compliance Summary

| Event Description and AER Reference Number (if applicable) | Event Details | Event Reason (if applicable) | Plan to Resolution |
|---|---|---|---|
| EPEA Approval No. 254465-00-00 (404616) | It was identified that incorrect or insufficient data was collected during the July and August discharge of industrial wastewater from the MRCP. | The issues were the result of errors on the part of the contractor conducting the sampling. | PCC has changed the contractor completing this work and has provided them with additional training and guidance. |
| Scheme approval No. 11715T (11470) | During a steam push treatment at producer well AF01 on September 2, 2022, the producer bottomhole pressure exceeded the limit for two intervals: a seven-minute interval and a six-minute interval. The pressure reached a maximum of 3599 kPa. | The root cause of this exceedance was determined to be a valve malfunction, and steam did not get shut in immediately when the trip set-point was reached. The valve was manually closed by an operator. Alarms are in place to alert operators when pressure exceeds the set-point. | PCC submitted a VSD to AER with additional data on the event and commitment to update procedures to prevent a similar occurrence. |
| Directive 055 (523304) | There were two non-compliances identified in relation to Directive 055:<br>- The LOW-RISK NC is in relation to record keeping in relation D055 inspections going back to 2021. The Directive requires operators keep records for a period of five years, but several inspection reports were missing.<br>- The HIGH-RISK NC is in relation to the Requirement in Directive 055 that any deficiencies are immediately corrected. AER identified that there were several deficiencies that were identified month-over-month, including one cracked gauge that was identified in both the April and October inspection records. | A number of issues were identified with the systems and forms that PCC had used to track and address maintenance issues.<br><br>The cracked gauges were in fact not part of the operation of the tanks as they are a part of PCC's larger asset management systems. | PCC issued a remedial action Plan in January 2023 that included a revised process and form for tracking and addressing tank maintenance issues. The remedial action plan was accepted by AER in January 2023. |

# Future Initiatives - 2023

- Winter Appraisal Program:
  - No new delineation wells.
  - No seismic survey planned.

- Potential Commercial Amendment Applications:
  - Use of combustion gases as potential replacement of natural gas injection to be assessed.
  - Pressure maintenance in bottom transition zone continue to be assessed.

- New Developments:
  - Infill wells approved by AER in 2022.
  - Two new infill well pairs in will be drilled at Well Pad AF in 2023.

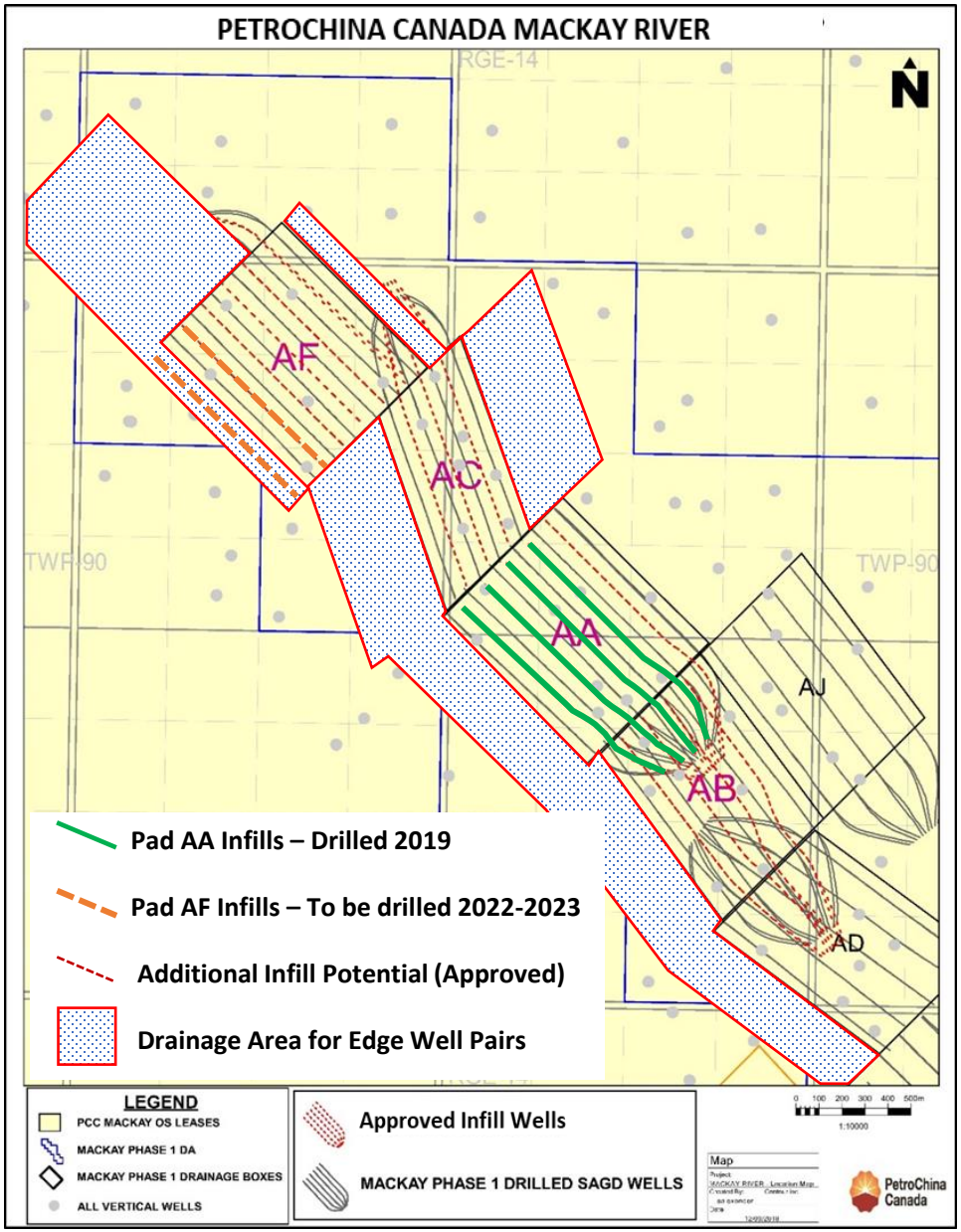
- Other initiatives:
  - Producer sidetrack in selected wells pairs.
  - Continue improving technology implementations (acid and solvent wellbore stimulations to treat liner plugging and high-pressure differential).

# Future Initiatives

- PCC long-range planning is ongoing and subject to change
  - No new delineation wells are planned.
    - Sufficient delineation exist in near term (~5 years).
  - 4D seismic will be acquired throughout MRCP.
    - As a needed basis to monitor and manage reservoir.
    - Opportunistically cycle through the drainage areas.
    - ~2 to 3 drainage boxes annually.

- Potential Amendment Applications:
  - Application for additional future sustaining well pairs.

- Future Sustaining Development Potential.
  - two new Pad AF well pairs will be drilled in 2023 (1 infill + 1 outboard).
  - Development, internal discussions and refinement on the remaining 11 infills well pairs approved in 2017.
  - Development extends from current drainage boxes
    - Use existing footprint and pad facilities wherever possible.
    - Incorporate learning from Pad AA and AF Infill well pairs.



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