Canadian Natural

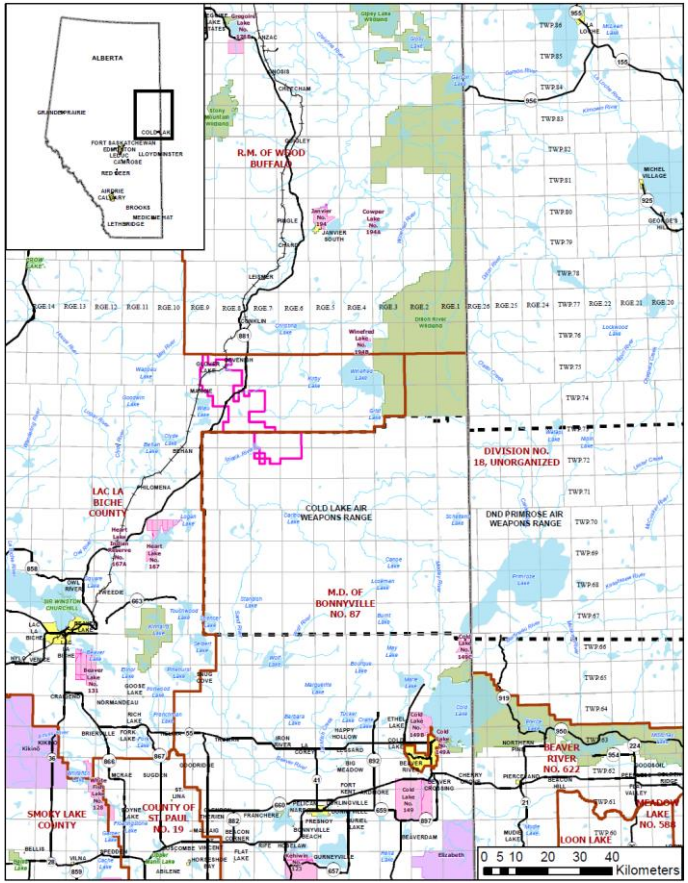
KIRBY IN SITU OIL SANDS PROJECT
DIRECTIVE 54 ANNUAL PERFORMANCE PRESENTATION

Commercial Scheme Approval 11475 (as amended)

June 30, 2022


4.1
Introduction

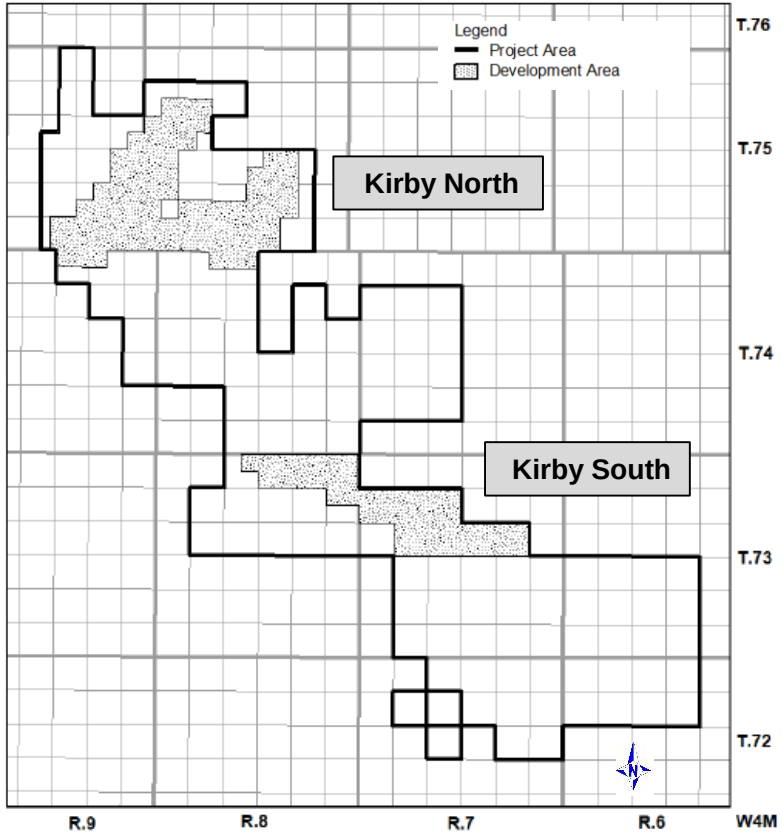
4.1, 1) Scheme Setting and Background



- Kirby South scheme approval granted September 2006
  - First steam October 2013
- Kirby Expansion (Kirby North) scheme approval granted May 2014
  - First steam May 2019

Approved Project Area

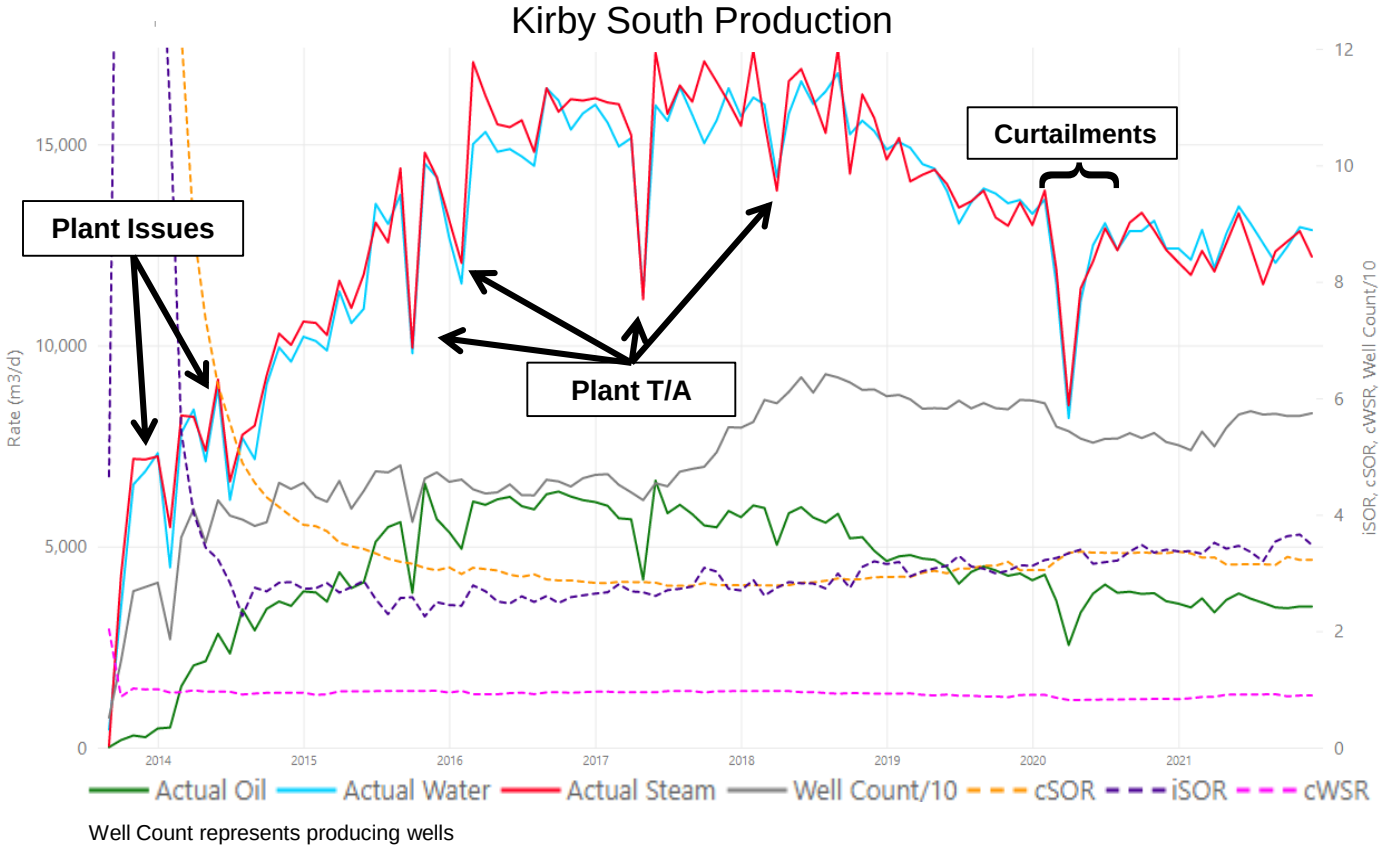
4.1, 1) Scheme Setting and Background (cont'd)



- The McMurray and Wabiskaw D formations are the bitumen-bearing sands and the target of steam injection in the Kirby Project operating areas.
- Recovery processes used is Steam Assisted Gravity Drainage (SAGD).
- The Kirby Project is split into the following two operating areas:
  - Kirby South
  - Kirby North

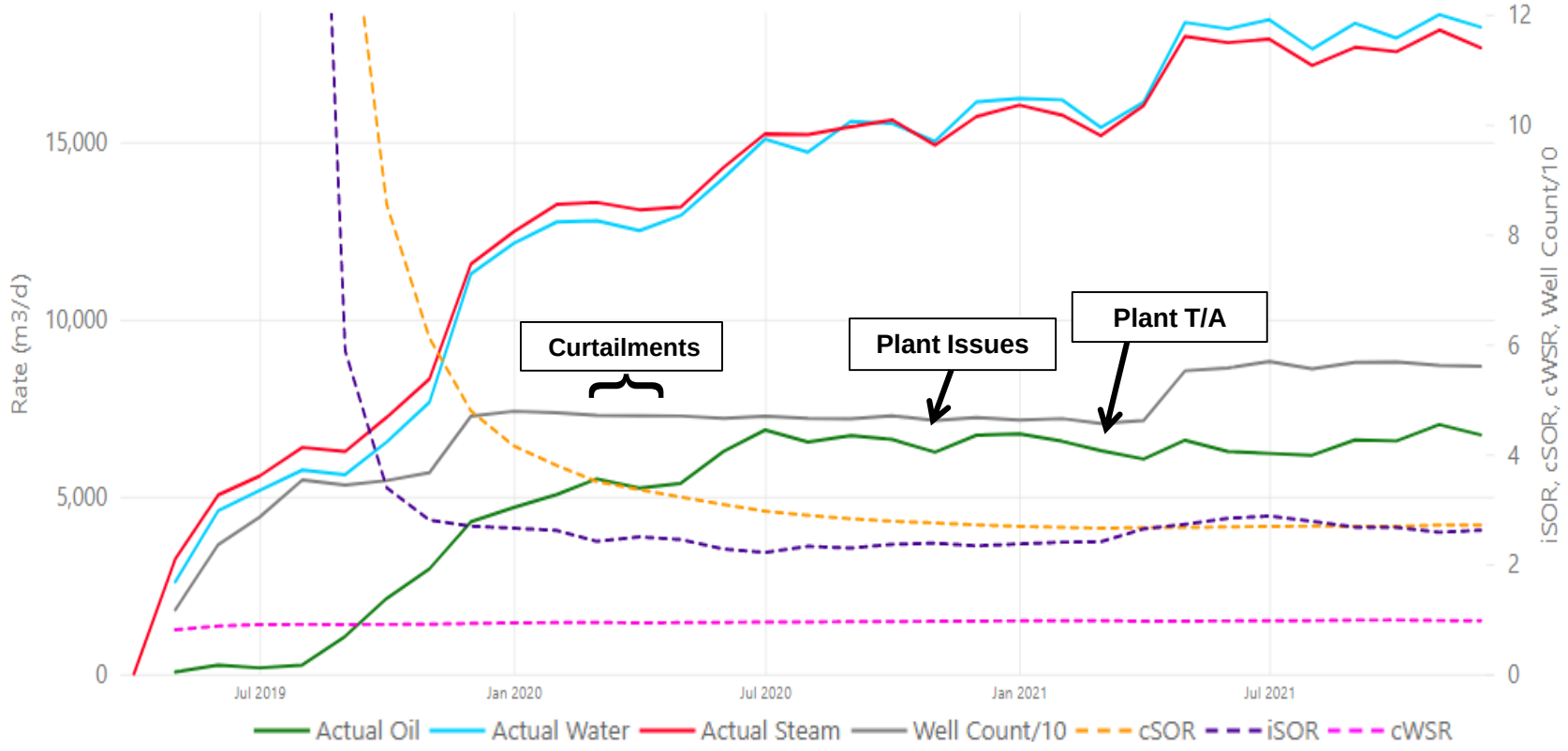
4.2 Subsurface

4.2, 2) Production Plot - Kirby South



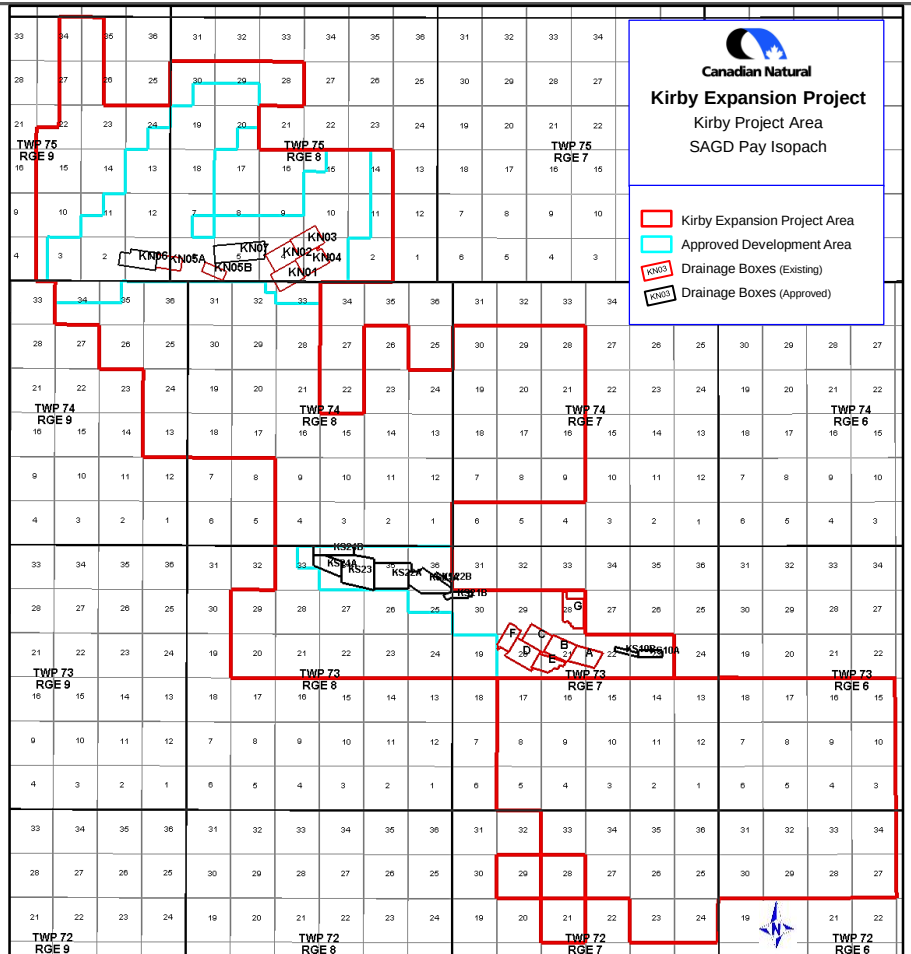
Well Count represents producing wells

4.2, 2) Production Plot - Kirby North



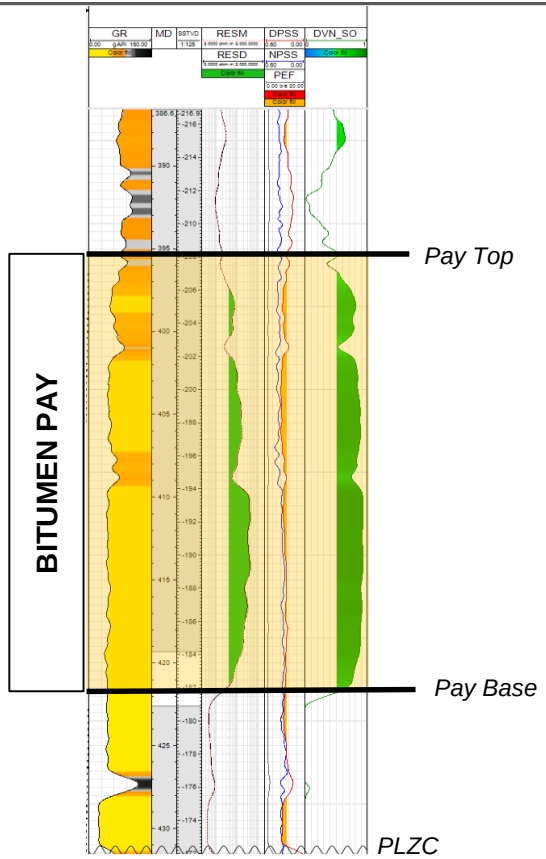
Well Count represents producing wells

4.2, 3 a) Drilled and Approved Drainage Areas



4.2, 3 b) Resource Cut-off

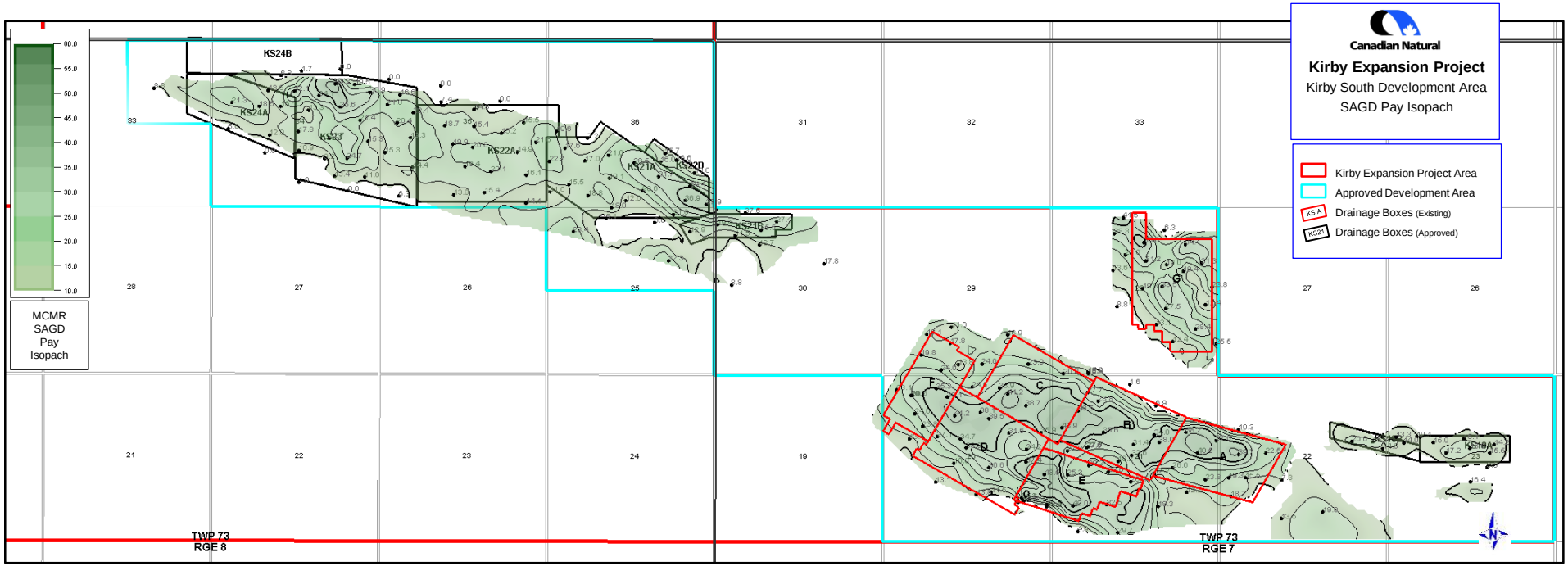
Jackfish Bitumen Pay Definition



Bitumen Pay

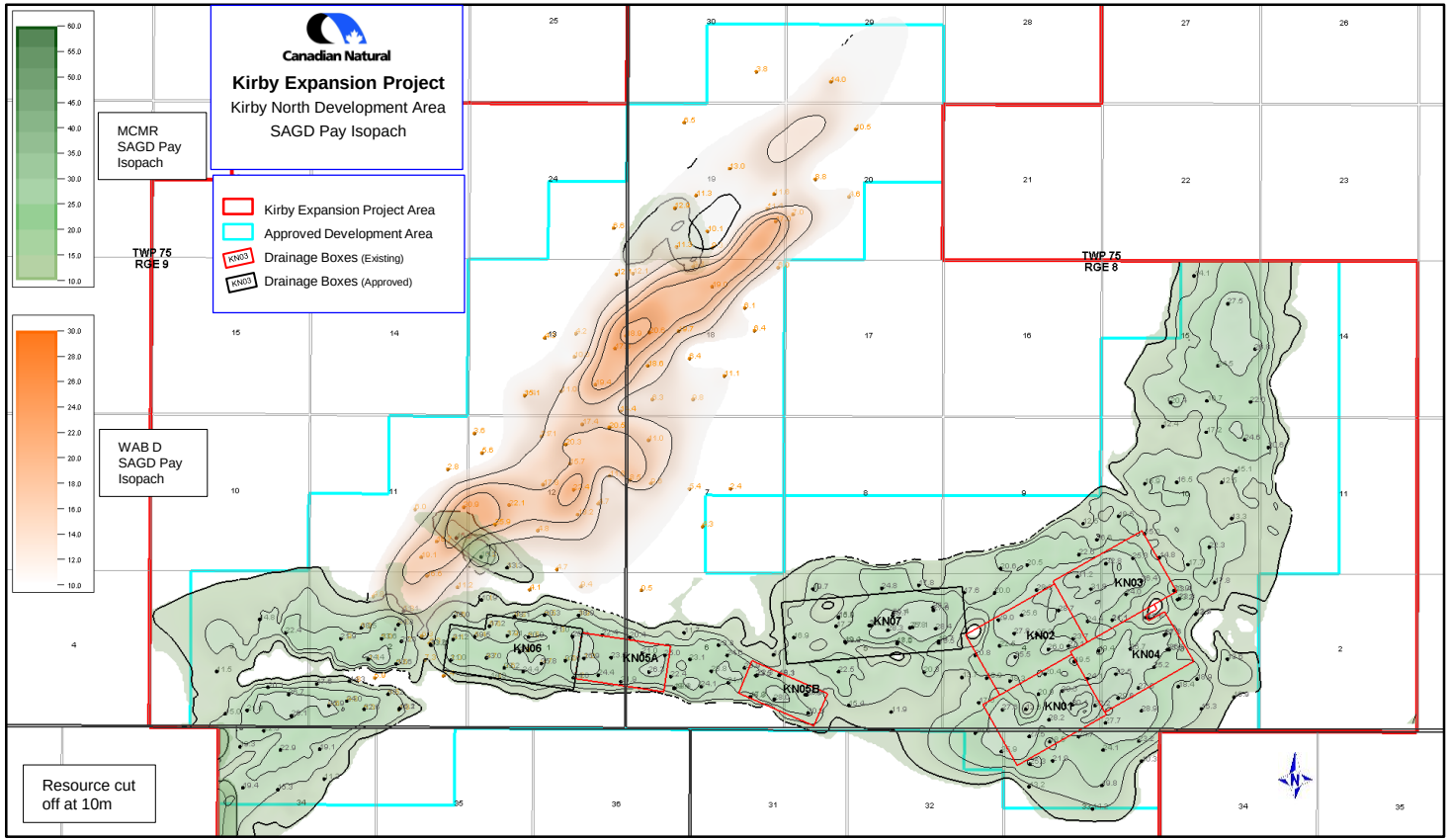
- Characterizes the complete package accessible through SAGD.
- Defined by:
  - S_o > 50%
  - Encompasses all brecciated intervals
  - May include minimal IHS
- S_o is a standard petrophysical curve calculated from resistivity and porosity logs, and correlated to core data

4.2, 3 b) Pay Isopach - Kirby South



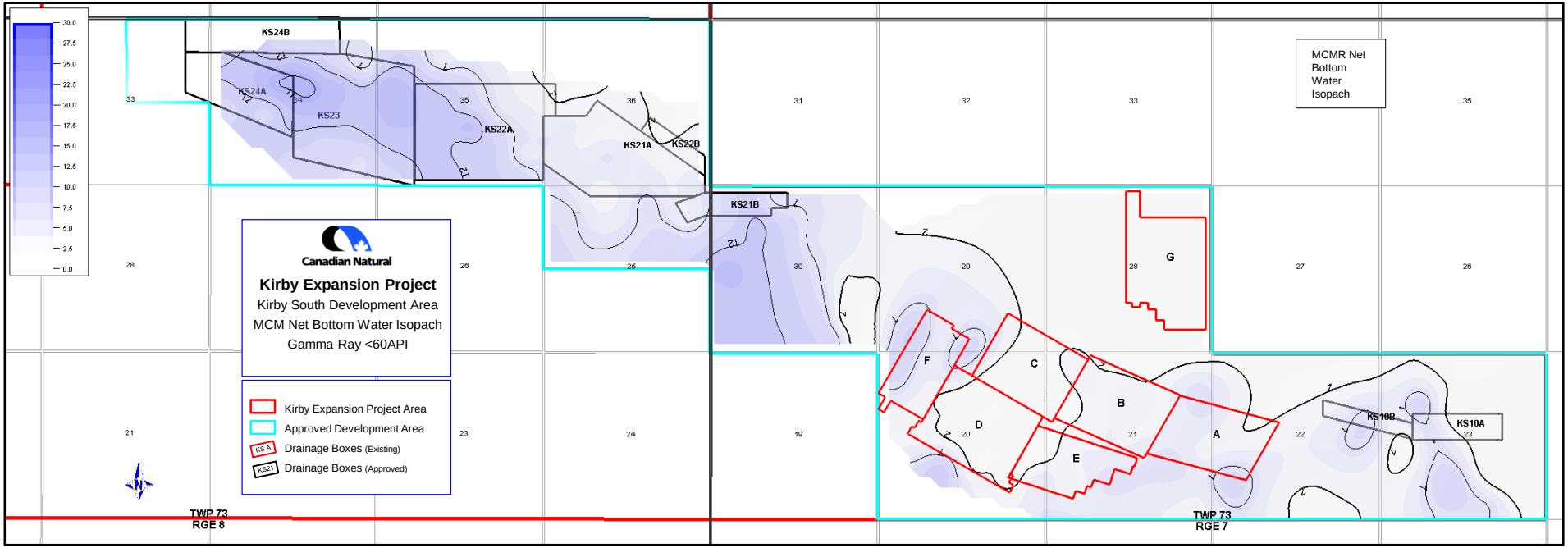
Resource cut off at 10m

4.2, 3 b) Pay Isopach - Kirby North



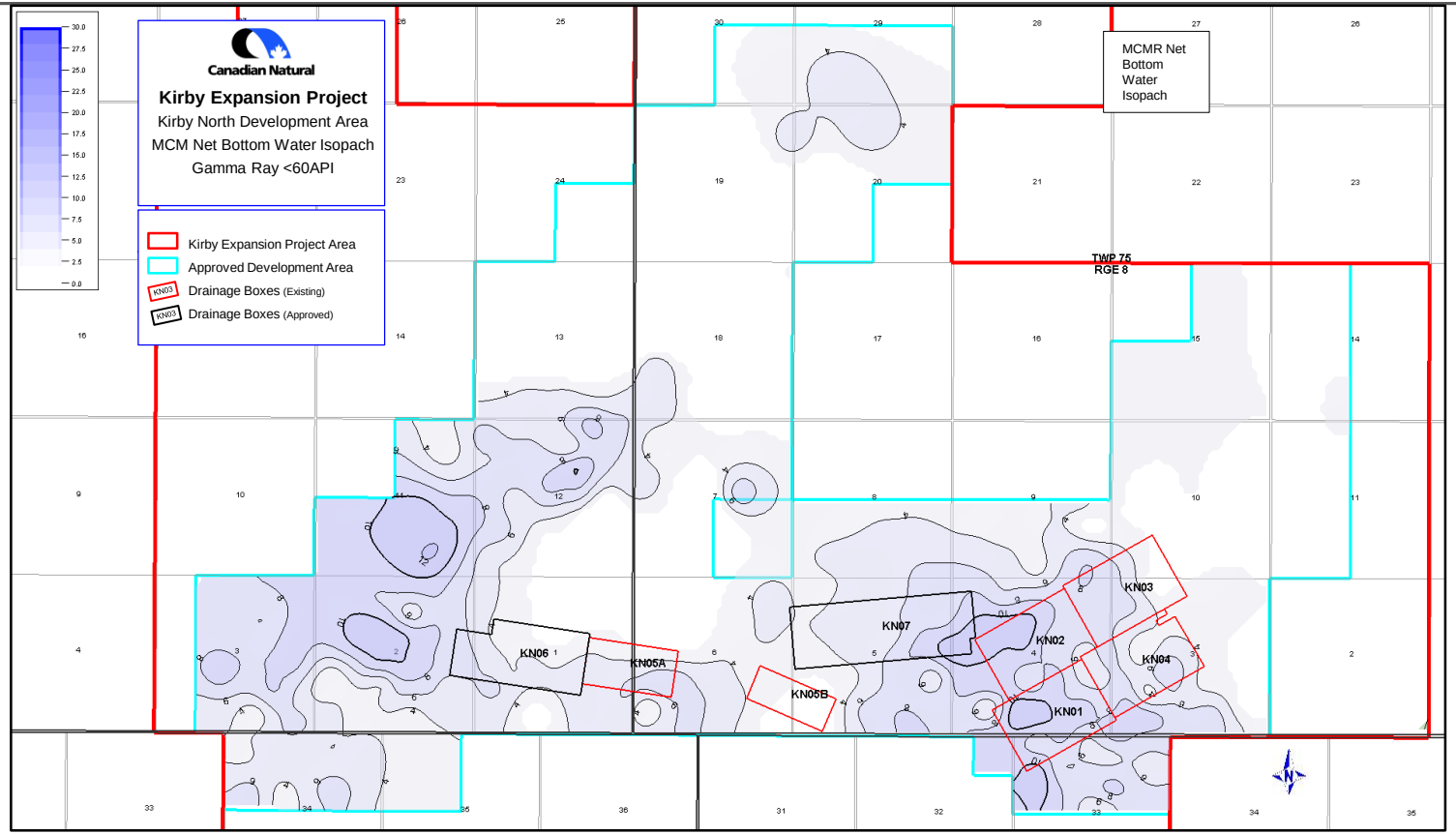
4.2, 3 c) Major Gas and Water Intervals

Kirby South McMurray Net Bottom Water Isopach



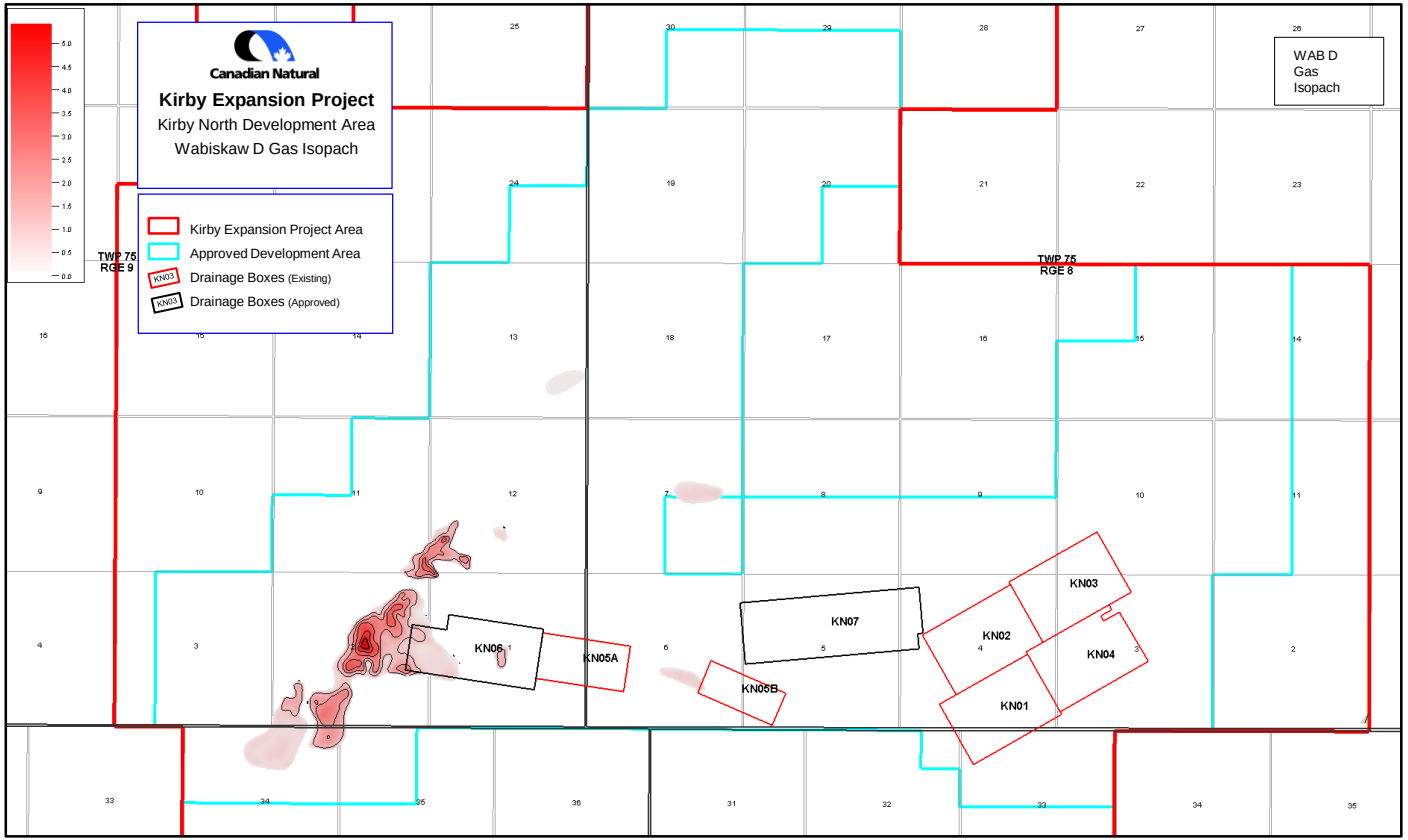
4.2, 3 c) Major Gas and Water Intervals

Kirby North McMurray Net Bottom Water Isopach



4.2, 3 c) Major Gas and Water Intervals

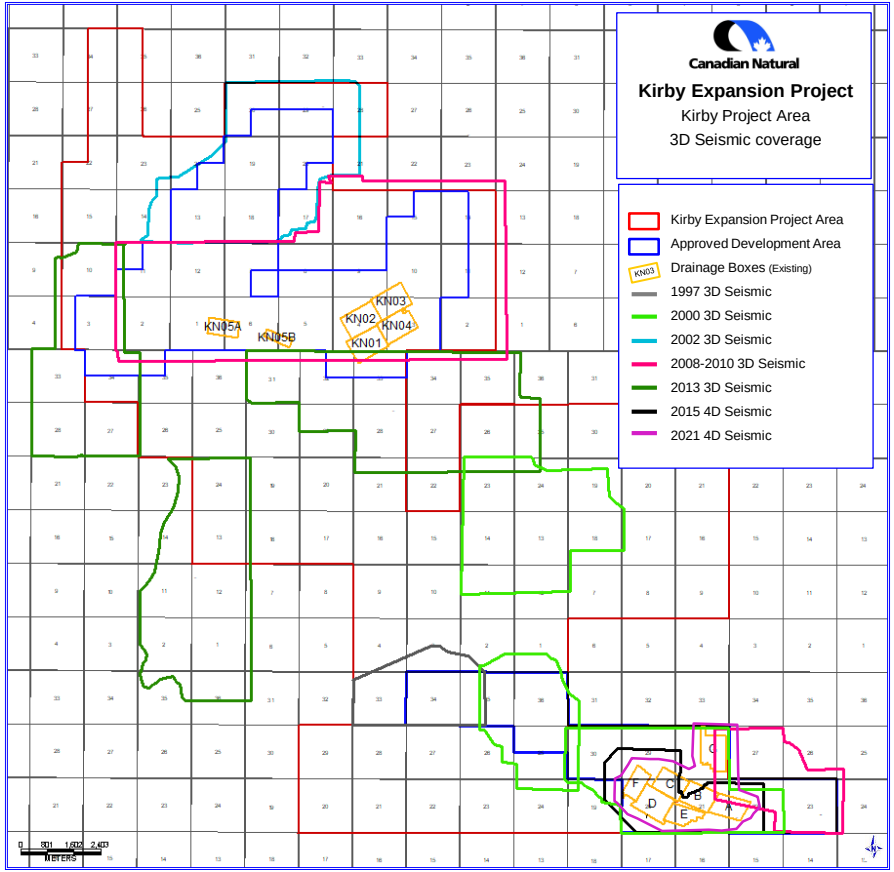
Kirby North Gas Isopach - Wabiskaw D



4.2, 3 d) Geomechanical Anomalies

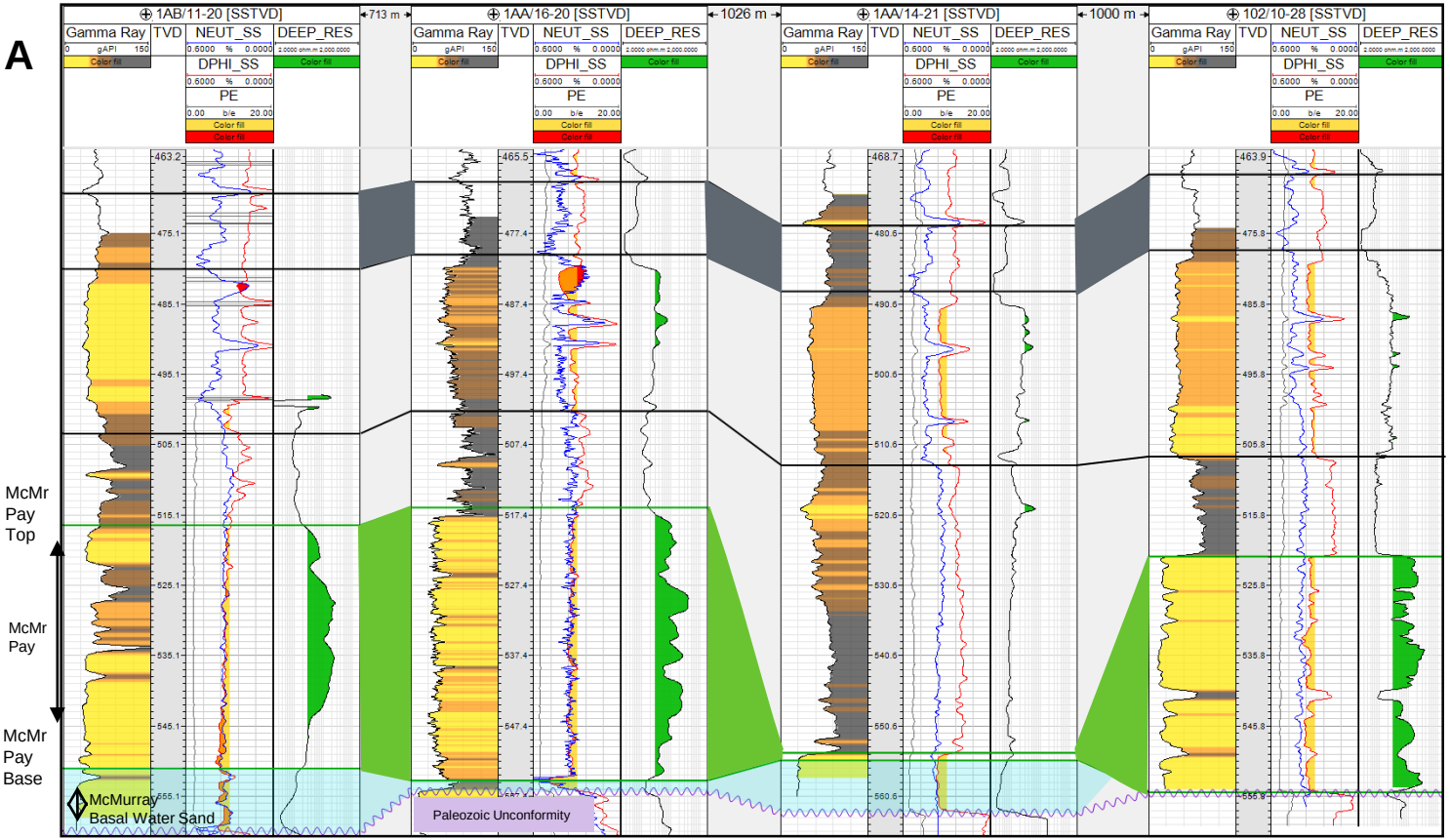
- No known geomechanical anomalies at Kirby

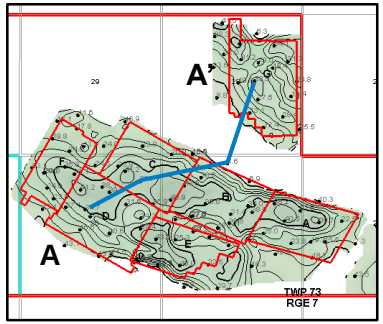
4.2, 3 e) Seismic



4.2, 4) Cross-Section

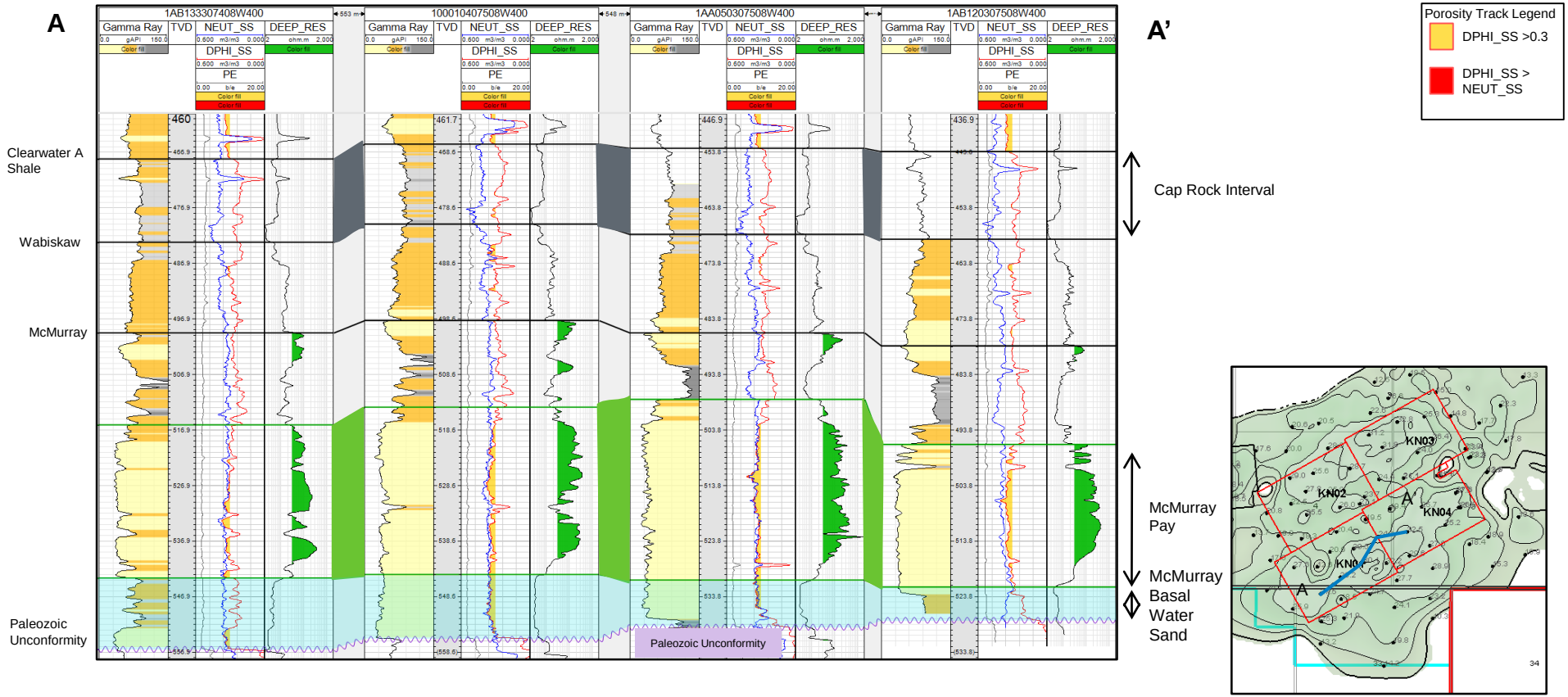
Kirby South Structural Cross-Section





4.2, 4) Cross-Section

Kirby North Structural Cross-Section



4.2, 5) Project, Development and Combined Active Well Pattern Volumetrics

	Average pay thickness (m)	Average oil saturation (%)	Average porosity (%)	Average Permeability (D)	Original bitumen in place (e^6m^3)	Cumulative % bitumen recovery
KS Combined Active Well Pattern	25.3	73	33	4.7	31	42.8%
KN Combined Active Well Pattern	23.9	81	33	5.3	24	20.3%
Kirby South Approved Development Area	22.9	74	33	4.5	54	-
Kirby North Approved Development Area (McMurray)	17.6	81	33	4.8	78	-
Kirby North Approved Development Area (Wabiskaw D)	15.6	78	33	3.5	44	-
Kirby Approved Project Area	14.7	79	33	4.6	273	-

Volumetric calculation = Area within 10m contour **x** SAGD thickness **x** avg. oil saturation **x** avg. porosity

4.2, 6) Well Patterns Volumetrics – Kirby South

Drainage Area	Area (m^2)	Average pay thickness (m)	Average porosity (%)	Average oil saturation (%)	Average permeability (D)	OBIP/PBIP (e^6m^3)	Total recovery % of original bitumen in place	Ultimate recovery % of original bitumen in place
A	650,936	27.0	33	76	4.6	4	33.0%	50-70%
B	669,008	29.9	32	70	4.1	4	45.4%	50-70%
C	631,017	32.2	33	75	4.8	5	52.3%	50-70%
D	808,782	28.6	32	70	4.4	5	43.0%	50-70%
E	487,683	27.6	33	70	4.5	4	42.4%	50-70%
F	596,898	19.8	32	70	4.6	3	31.3%	50-70%
G	905,529	20.5	34	90	5.7	5	46.9%	50-70%

Note: in Kirby, PBIP=OBIP

OBIP = Original Bitumen in Place

PBIP = Producible Bitumen In Place

Volumetric calculation = Area within drainage box boundary and 10m contour **x** SAGD thickness **x** avg. oil saturation **x** avg. porosity

4.2, 6) Well Patterns Volumetrics – Kirby North

Drainage Area	Area (m^2)	Average pay thickness (m)	Average porosity (%)	Average oil saturation (%)	Average permeability (D)	OBIP/PBIP (e^6m^3)	Total recovery % of original bitumen in place	Ultimate recovery % of original bitumen in place
KN01	763,253	25.0	32%	80	4.7	5	3.5%	50-70%
KN02	754,806	24.3	32%	82	5.0	5	29.3%	50-70%
KN03	763,821	25.0	33%	84	5.6	5	28.4%	50-70%
KN04	763,330	24.9	33%	85	5.4	5	20.1%	50-70%
KN05a	443,979	23.5	33%	81	5.3	3	22.8%	50-70%
KN05b	205,465	20.6	33%	75	5.6	2	15.2%	50-70%

Note: in Kirby, PBIP=OBIP

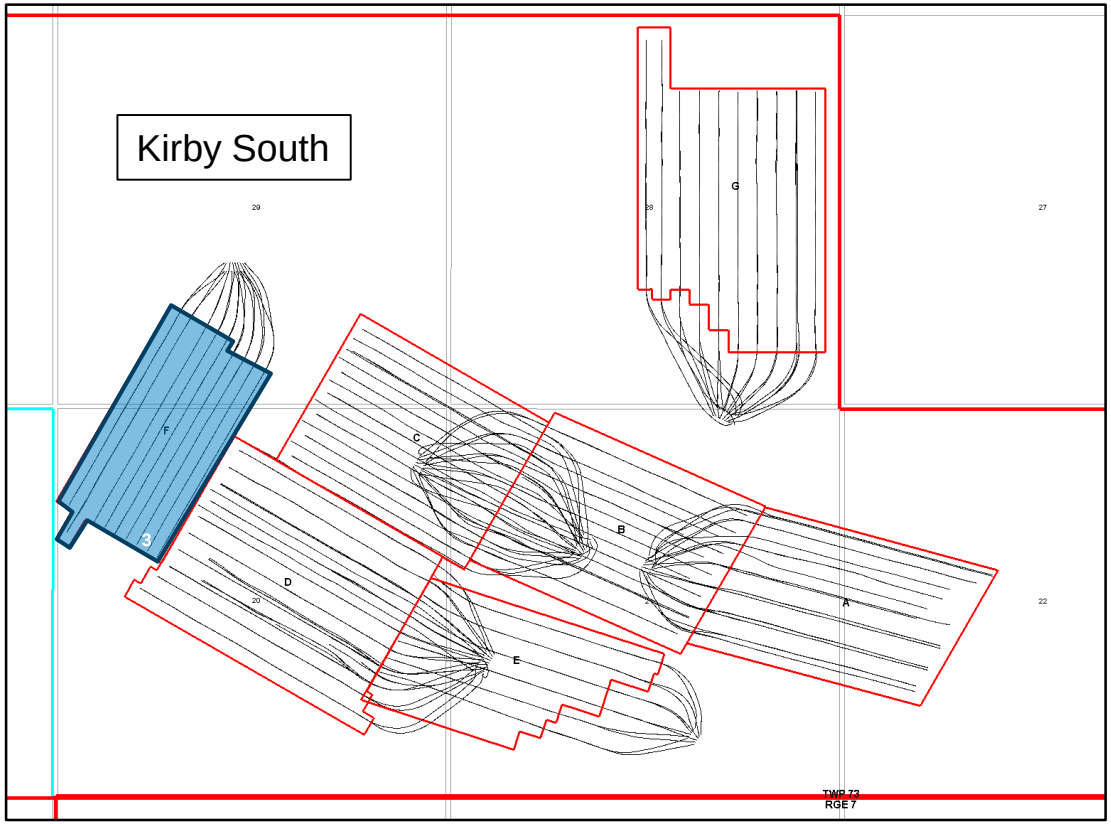
OBIP = Original Bitumen in Place

PBIP = Producible Bitumen In Place

Volumetric calculation = Area within drainage box boundary and 10m contour **x** SAGD thickness **x** avg. oil saturation **x** avg. porosity

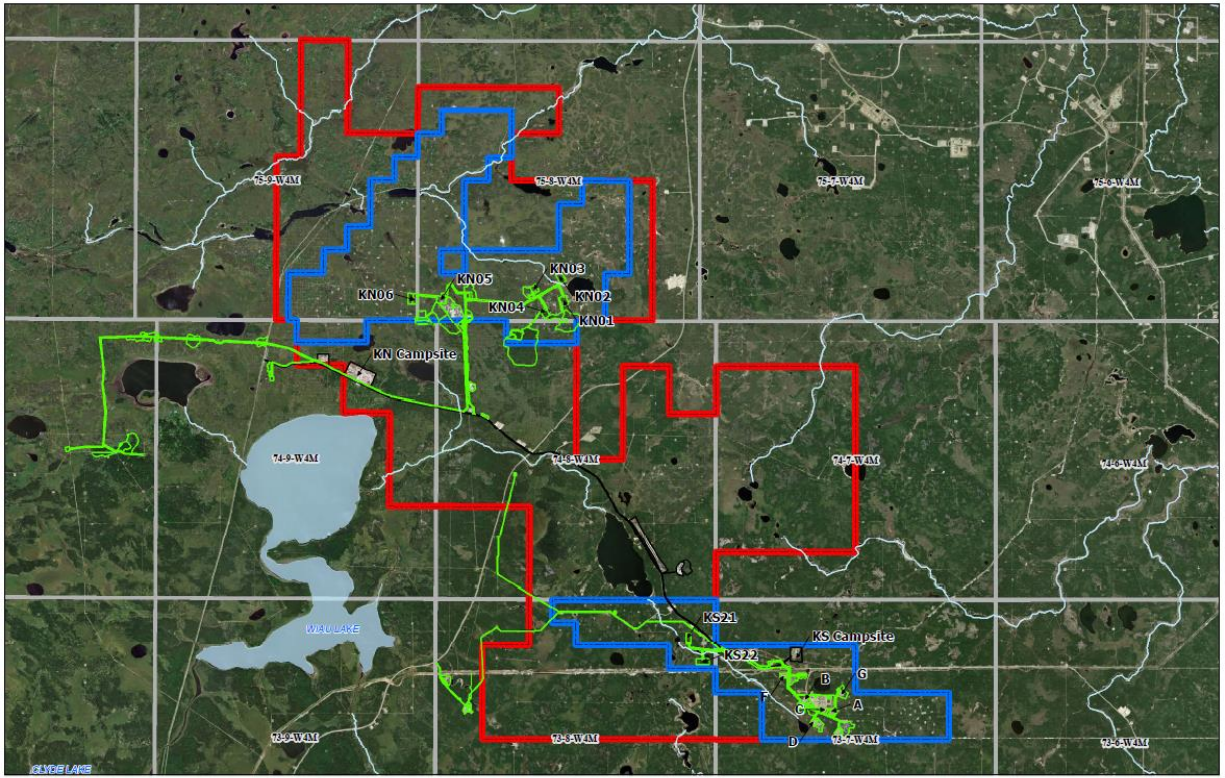
4.2, 7) Co-Injection

- Co-Injection: NCG (fuel gas, predominantly methane)
- Target Concentration: 0.5-2.75 mol%
- Co-Injection started on F Pad in 2021.
- Learnings to date:
  - Evidence shows a decrease in SOR while maintaining reservoir pressures and oil production.
  - No negative impact to resource recovery observed in late life NCG co-injection.
  - No McMurray aquifer or well integrity impacts evident to date.



4.3
Surface

4.3, 8 a) Built and Planned Surface Infrastructure Map



PROJECT AREA

MAP INFORMATION

Legend

Creeks / Rivers
Lakes and Large Rivers
Kirby CnR Footprint 2020
Exisiting Disturbance
Kirby Project Area
Kirby Development Area

MAP SCALE

1:160,000

0 2.25 4.5 9
Kilometres

Projection: UTM Zone 12N
Satellite Imagery Acquired: DATE

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Kirby Built & Planned Surface Infrastructure

Author: Megan Loring	Date: 5/30/2022
Requested By: Marc Scrimshaw	Map Name: K00020.mxd

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4.3, 8 b) Modifications to the Central Processing Facility

- There were no facility modifications at the Kirby North CPF and Kirby South CPF in 2021 that required AER approval.

4.3, 8 c) Annual Operational Bitumen and Steam Rates

Kirby South	Actual Operational	Facility Design
Bitumen	3,574 m^3/cd	7,532 m^3/sd*
Steam (Sm^3/d)	12,313	18,720

Kirby North	Actual Operational	Facility Design
Bitumen	6,495 m^3/cd	8,368 m^3/sd*
Steam (Sm^3/d)	17,084	18,720

* Note: Directive 056 Licence Limit

4.4
Historical & Upcoming Activity

4.4, 9) Suspension and Abandonment Activity

- No thermal in situ wells were suspended or abandoned during the reporting period
- No well patterns were suspended or abandoned during the reporting period
- No well patterns are on active blow-down or ramp down during the reporting period

4.4, 10 a) Regulatory Approvals

Application Description	Application Number	Submission Date	Approval Date
Removal of monitoring requirements for observation well 00/12-34	1932077	01/28/2021	03/19/2021
Kirby South Sulphur Management Compliance Assurance Plan	1932192	02/09/2021	03/31/2021
Pad F Natural Gas Co-injection	1932303	02/19/2021	03/19/2021
Well Pair List Amendment for Hydrocarbon Assisted Start-up	1932424	03/02/2021	04/21/2021
KN06 Drainage Box Amendment Application	1932521	03/12/2021	09/27/2021
Kirby North NCG Co-injection Application	1932699	03/31/2021	04/28/2021
Pad F NCG Co-Injection Measurement Waiver	1933039	05/17/2021	05/17/2021
KS21B Drainage Box Amendment Application	1933401	06/18/2021	09/27/2021
KS23 and KS24 Development Application	1934262	09/13/2021	12/20/2021
KN07 Drainage Box Amendment Application	1934447	10/01/2021	11/17/2021
Kirby South Sulphur Management Strategy	1934607	10/18/2021	12/15/2021

4.4, 10 a) Regulatory Approvals (cont'd)

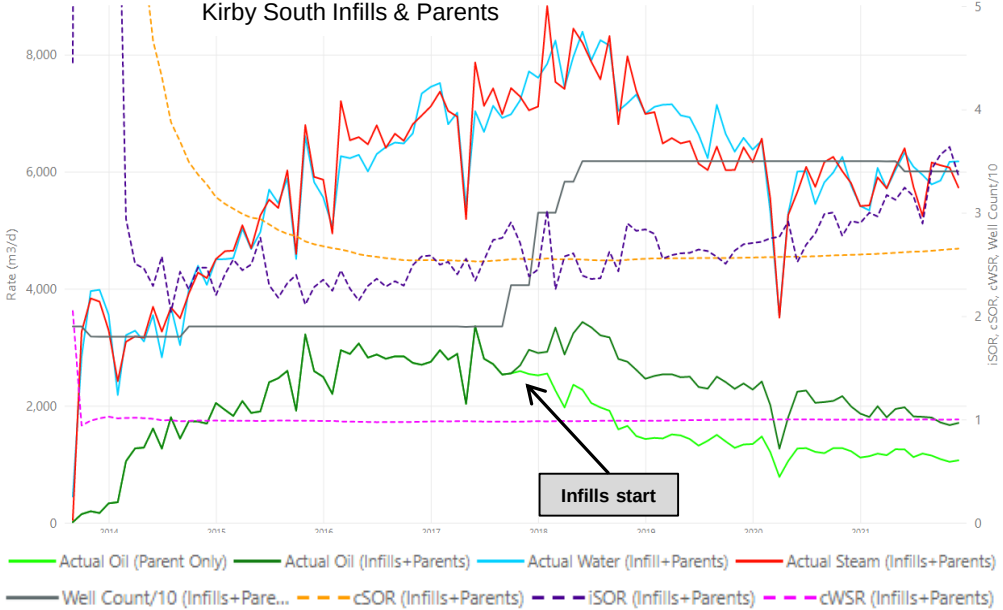
Application Description	Application Number	Submission Date	Approval Date
KN01 to KN05 Light Hydrocarbon Enhanced SAGD	1934894	11/16/2021	01/11/2022
KN06 Light Hydrocarbon Enhanced SAGD	1935021	11/30/2021	01/11/2022
Kirby North Sulphur Management Strategy	1935312	12/21/2021	02/28/2022
KN04 Drainage Box Expansion	1935313	12/21/2021	04/25/2022

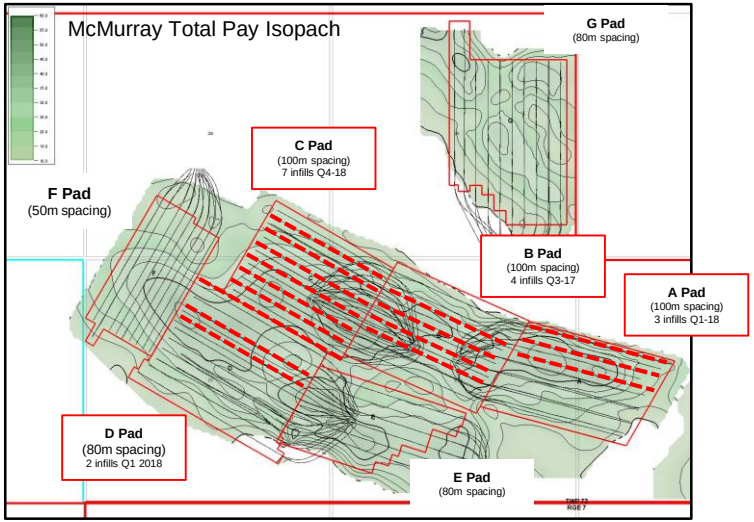
4.4, 10 b) Events with Potential to Impact to Scheme Performance

- Scheme Performance:
  - Kirby North
    - Ramp up of KN01 pad
  - Kirby South
    - No potential events to impact scheme performance

4.4, 10 c) Kirby Learnings

- Lessons Learned in Kirby South in 2021:
  - 16 producer only infills were drilled in Kirby South in Q3 2017- Q1 2018
  - Infills are forecasted to achieve 15-20% recovery
  - Infills benefit from improved liner design and operating strategies from historical KS learnings





Well Count represents all drilled infill and parent wells

4.4, 10 c) Kirby Learnings (cont'd)

- Lessons Learned in Kirby North in 2021:
  - ICD Design Learnings at Kirby North:
    - Total of 19 wells completed with ICD's at KN
    - Three different ICD designs trialed: Helical Channel, Cross Flow Nozzle and Single Nozzle
    - Learnings:
      - 6/7 wells completed with the Cross Flow Nozzle design have or are expected to have experienced ICD failures
      - Currently no plans to install Cross Flow Nozzle designs in the future

4.4, 10 d) Regulatory and Operational Changes

- There have been no pilots or major technical innovations conducted at the Kirby Project associated with Scheme Approval No. 11475 during 2021.

4.4, 11) Compliance History

- Reportable Incidents
  - Facility Releases:
    - None
  - Pipeline Releases:
    - 2 total release events with a total volume of 4 m^3
- All releases were recovered and associated remediation actions were taken as necessary.
  - March 27, 2021 – Ref. # 20210717
  - June 3, 2021 – Ref. # 20211240

4.4, 11) Compliance History

- Voluntary Self-Disclosures:
  - None
- Contraventions – Air and Water
  - January 11, 2021: Exceedance of NOx approved limit. Boilers ramped down to maintain NOx limits below thresholds. (ref. # 20210101)
  - June 2, 2021: Failed to report monthly air monitoring report. (ref. # 20211233)
  - April 6, 2021: Fresh snow melt breached berm resulting in fluid off lease. Berm repaired. (ref. # 20210804)
  - January 29, 2021: Brackish water entered an Industrial Water Source Well as a result of a failed check valve. Valve was repaired. (ref. # 20210261)

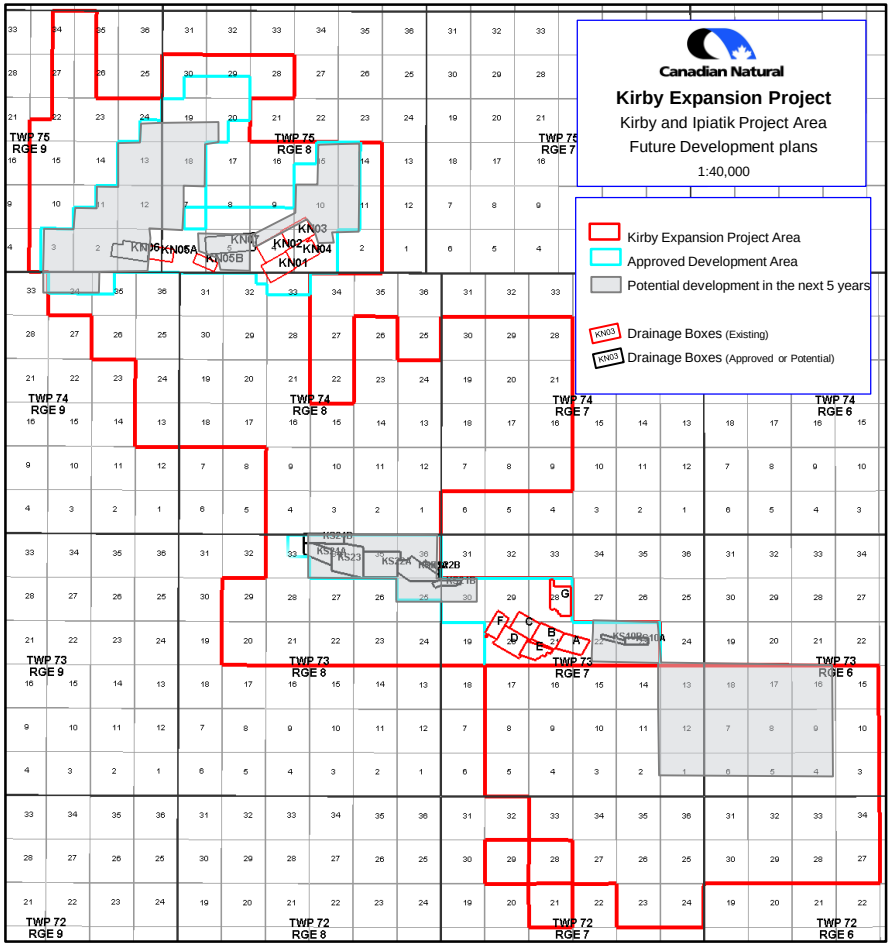
4.4 12 a) Future Plans: Upcoming 12 Month Activity- Kirby South

- Pending favorable economic conditions, the following potential future plans are under evaluation for 2022:
  - New Drills:
    - Kirby South West
      - Phase 1: Drilling 24 well pairs on KS22 and KS21 (8 producers drilled as of Q1 2022)
    - Continuing to evaluate re-drill opportunities
  - NCG Co-Injection:
    - Kirby South D Pad planned for Q4 2022
    - Kirby South E Pad started Q1 2022

4.4 12 a) Future Plans: Upcoming 12 Month Activity- Kirby North

- Pending favorable economic conditions, the following potential future plans are under evaluation for 2022:
  - KN06 New Pad Development
  - Continuing to evaluate re-drill opportunities
  - NCG Co-Injection:
    - KN02, KN03 and KN04 Pads planned for Q2 2022
  - New disposal well

4.4, 12) 5-Year Potential Development Plan



4.4, 12 c) Future Plans: Upcoming 12 Month Applications

Application Description	Application Number	Submission Date	Approval Date
KN24 and KN25 Surface Pad Location Change	1935524/1935866	1/18/2022	02/14/2022
KN02/3/4 NCG Co-injection Measurement	1936050	3/10/2022	03/10/2022
KN08 and KN09 Development Application	1936092	3/11/2022	03/30/2022
Kirby South Ipiatik Area Brownfield Lifecycle Application	1936272	3/29/2022	Under Review
Kirby South Pad G Drainage Box Expansion	1936552	4/27/2022	Under Review
Kirby South Pad B Drainage Box Expansion	1937710	05/13/2022	Under Review
Kirby North NCG Temporary Measurement Variance	1937713	05/13/2022	Under Review
Kirby South Sulphur Removal Unit Application	1937922	05/18/2022	05/30/2022
Kirby South Pad D NCG Co-injection Application		Q3 2022	

Continuing to evaluate future development applications

Scheme Approval No. 11475ZZ Directive 054 Requirements

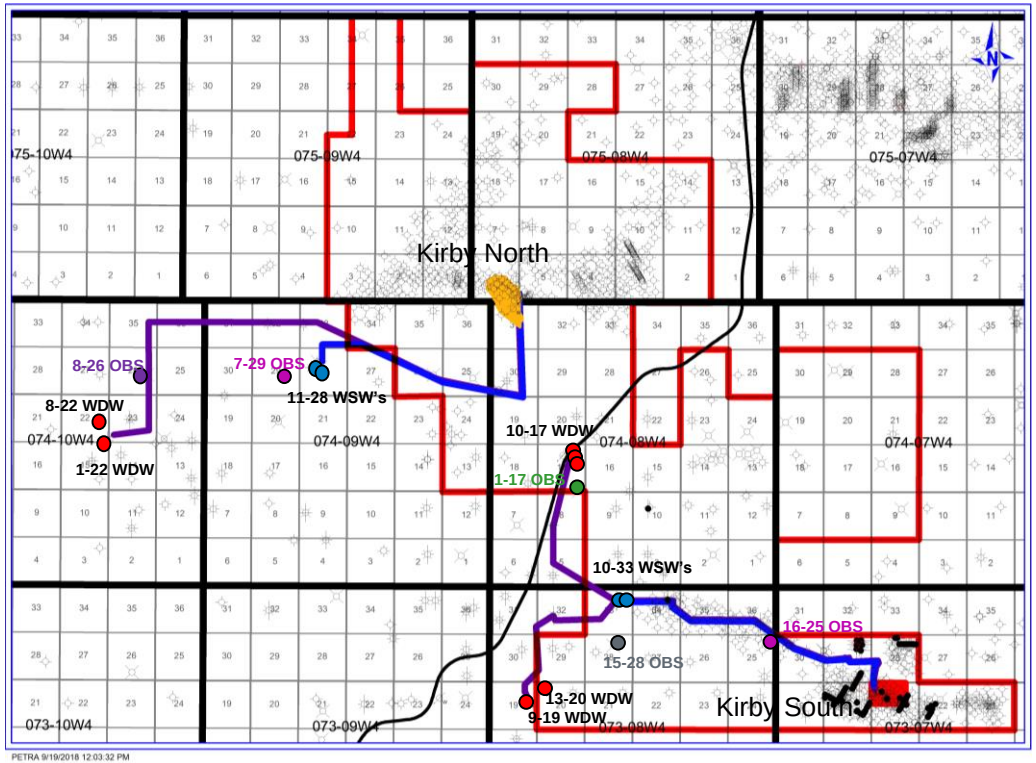
Clause 10, 11(2) b/c and 12

- The required information associated with the identified clauses of the scheme approval will be provided following the start of steam injection on the KN06 well pad.

Scheme Approval No. 11475ZZ Directive 054 Requirements

Clause 13(f)

McMurray Source, Disposal and Observation Well Map



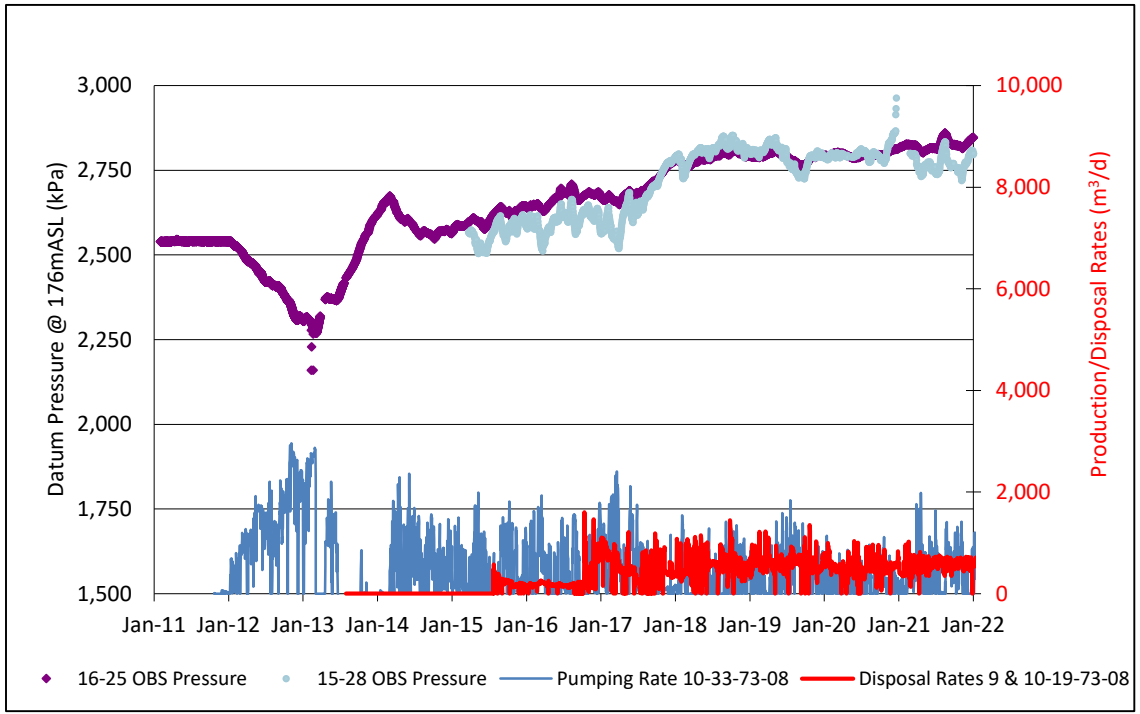
Legend

- McMurray Disposal well (WDW)
- McMurray Source well (WSW)
- McMurray Observation well (OBS; various colours)

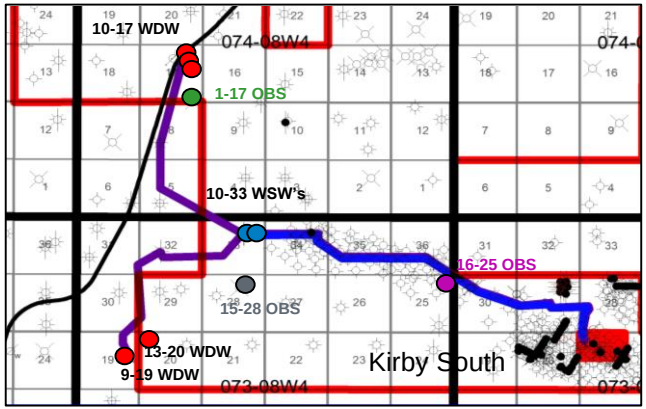
Scheme Approval No. 11475ZZ Directive 054 Requirements

Clause 13(f)

- McMurray Fm Basal Aquifer pressures Kirby South 10-33 well area



Notification of 15-28 data issues was submitted to the AER as per Scheme Approval requirements

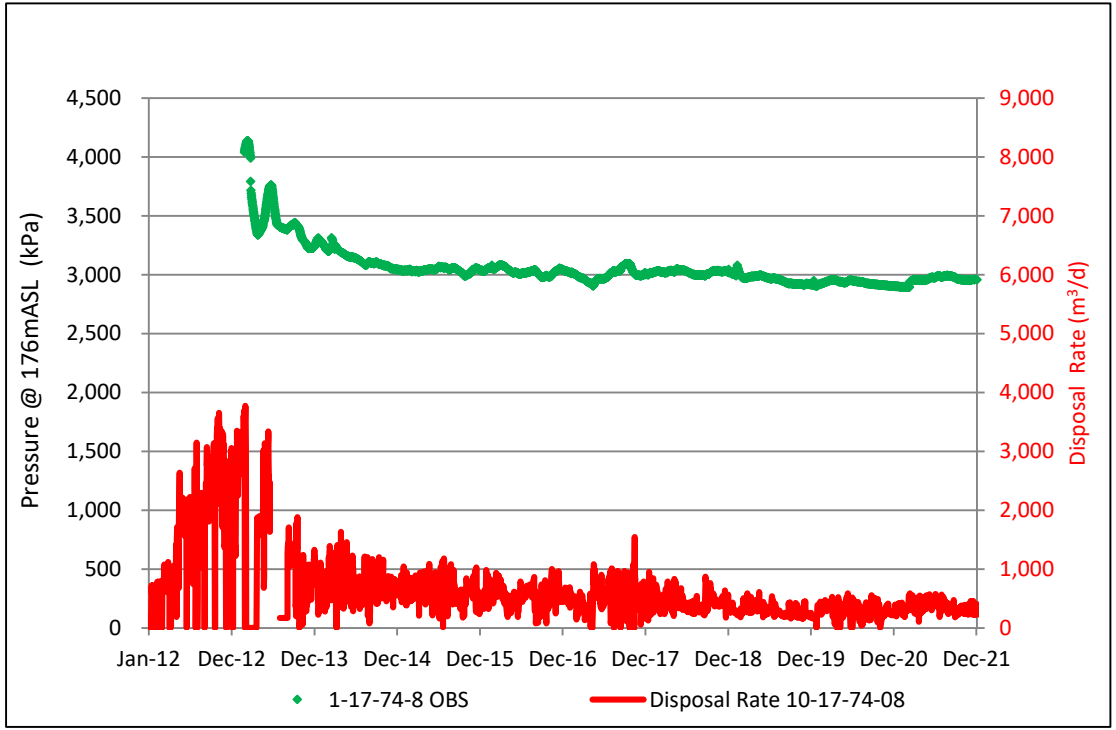


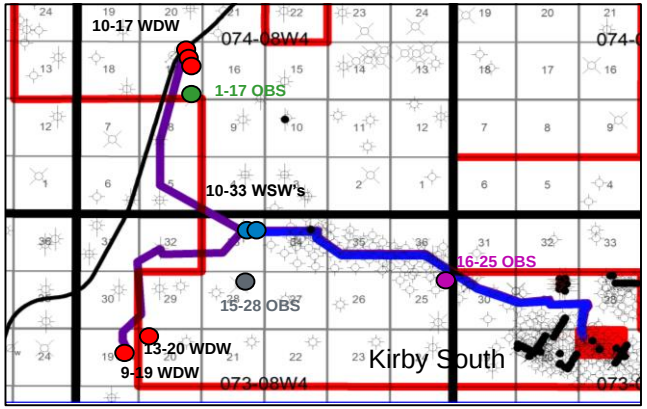
- Pressures in all observation wells above the initial pressures by ~ 250kPa.
- Over the last three years, increased sourcing from McMurray aquifer has stabilized regional pressures around 2,800 kPa.
- Successful McMurray pressure balance system in Kirby South area.

Scheme Approval No. 11475ZZ Directive 054 Requirements

Clause 13(f)

- McMurray Fm Basal Aquifer pressure near 10-17-74-8 disposal area





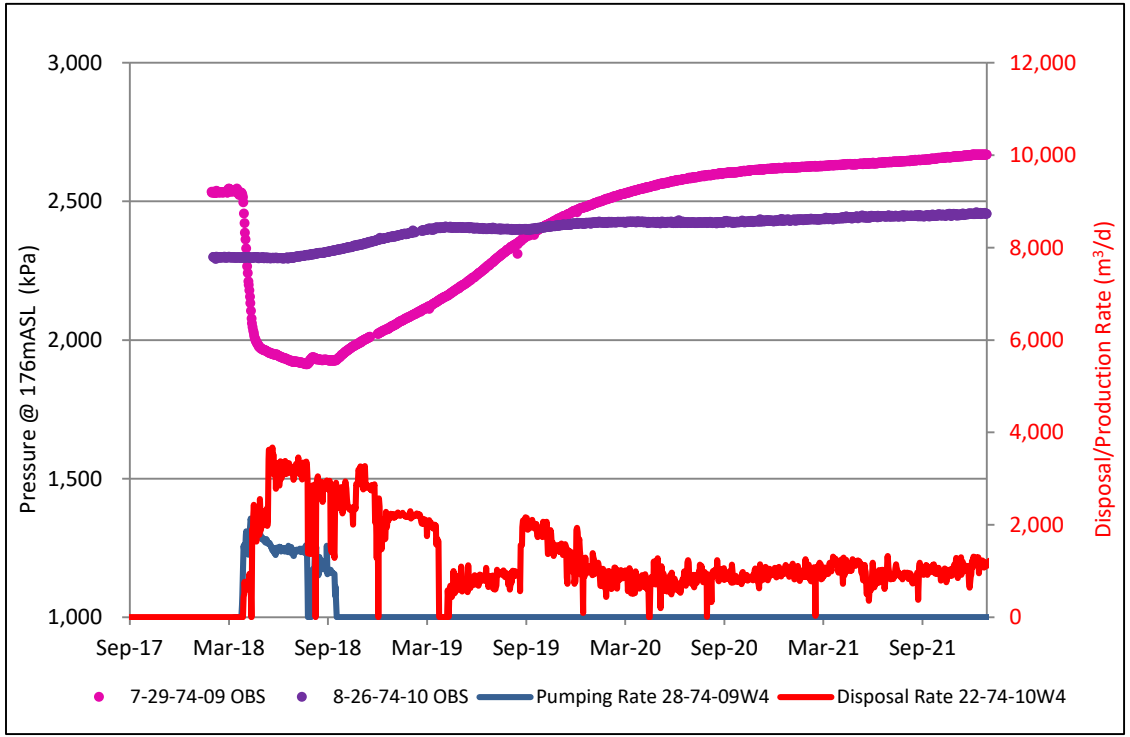
- Regional pressures at 01-17 OBS stabilized around ~3,000 kPa after cavern washing period (2012-2013).
- Approximately 300 kPa above original static pressure.

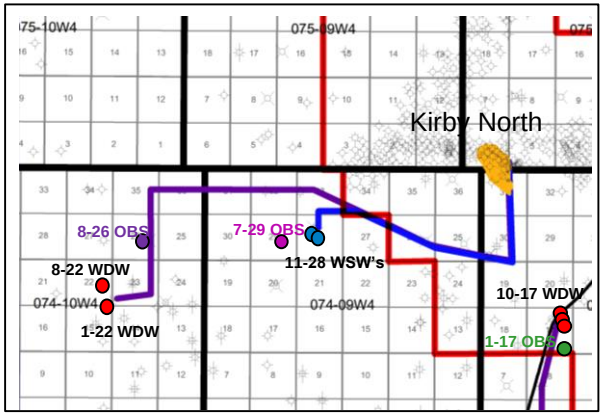
Notification of 01-17 data issues was submitted to the AER as per Scheme Approval requirements

Scheme Approval No. 11475ZZ Directive 054 Requirements

Clause 13(f)

- McMurray Fm Basal Aquifer pressures Kirby North





- Regional pressures recovered in 2019 after McMurray sourcing water at 11-28 source wells was stopped.
- Fluid disposal into 08-22 and 01-22 disposal wells is on-going.
- Minimal hydraulic connection between disposal and reservoir areas - pressure balance system in Kirby North area not required.

The 12-34 OBS monitoring requirements were removed from the Scheme Approval (11475KK) in March 2021

Scheme Approval No. 11475ZZ Directive 054 Requirements

Clause 13(f)

- Chemistry analysis
  - All saline water source wells (annually)

	1F1/10-33-073-08W4 (McMurray) Kirby South	1F3/13-21-73-07W4 (Grand Rapids) Kirby South	1F1/13-05-075-08W4 (Clearwater) Kirby North	1F1/04-05-075-08W4 (Clearwater) Kirby North
Date	September 8, 2021	September 8, 2021	Not used	August 13, 2021
Total Dissolved Solids	15,000 mg/L	4,500 mg/L	Not used	6,050 mg/L

McMurray source wells in Kirby North were shut-in September 2018.

  - McMurray Observation wells (every five years)

	100/15-28-073-08W4 Kirby South	100/01-17-074-08W4 Kirby South	100/08-26-074-10W4 Kirby North	100/07-29-074-09W4 Kirby North
Date	January 27, 2020	January 26, 2020	January 1, 2018	January 18, 2018
Total Dissolved Solids	16,900 mg/L	13,100 mg/L	10,900 mg/L	13,000 mg/L

McMurray observation wells were not sampled in 2021.

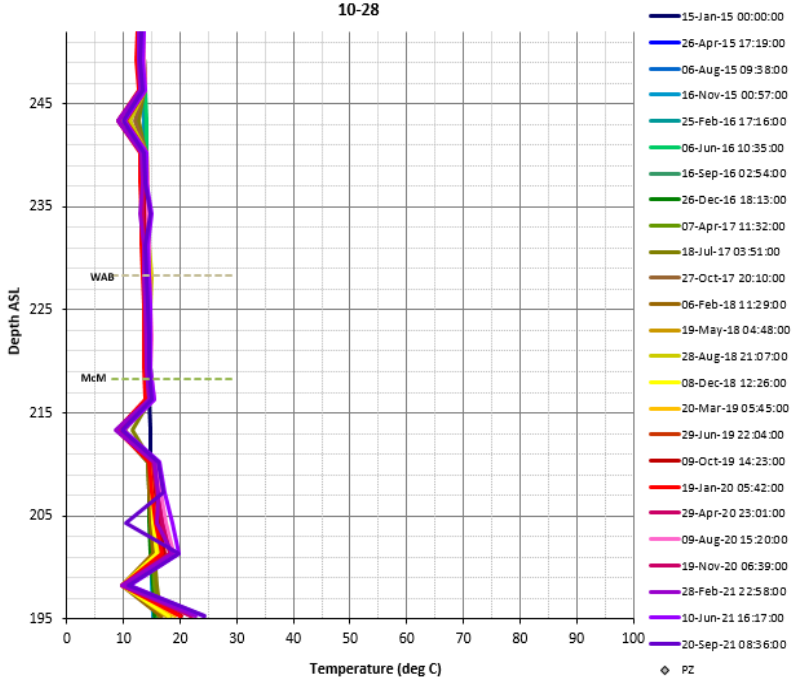
Scheme Approval No. 11475ZZ Directive 054 Requirements

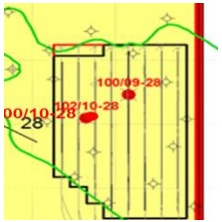
Clause 13(f)

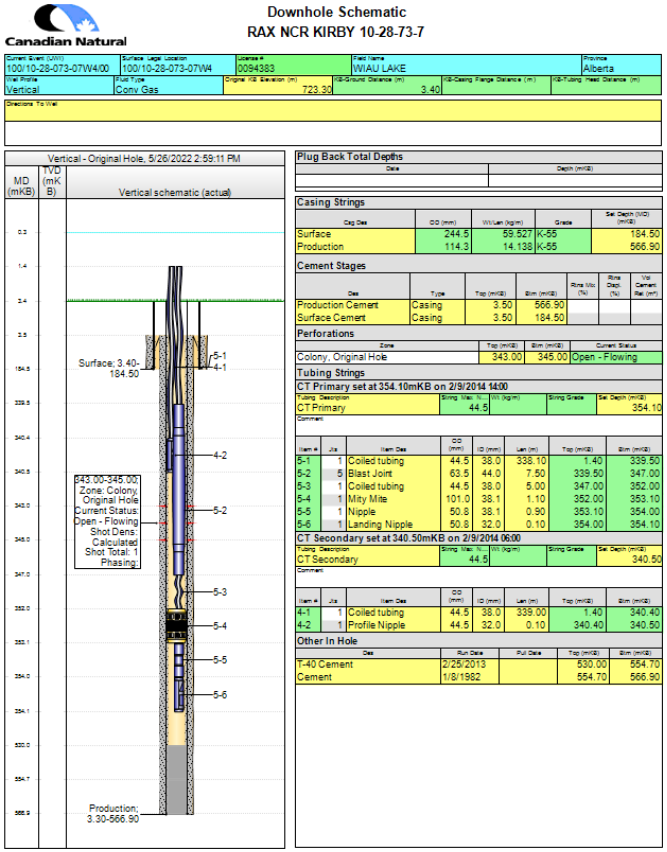
- Kirby South
  - Based on a review of the regional pressure and chemistry data, the Kirby South McMurray pressure balancing system remained unchanged over the last three years.
  - Model predictions would have remained constant from previous years results.
  - As such, Kirby South McMurray pressure balance groundwater numerical model was not updated.
- Kirby North
  - Pressure data indicates that there is no hydraulic connection between Kirby North McMurray disposal area and the rest of the Kirby project.
  - Due to lack of hydraulic communication with the disposal area, Canadian Natural is not operating a pressure balance system at Kirby North.
  - Therefore, the Kirby North groundwater numerical model was not updated.

Scheme Approval No. 11475ZZ
Kirby South Area 100/10-28-073-07W4 – Monitoring Results

- Colony gas well to evaluate the ability of non-thermal cement to maintain hydraulic isolation in a thermal environment
- Distinct jumps to cooler temperatures at 243, 213, 204 and 198 ASL are believed to be error in Thermocouple data







No thermal impacts seen to date. Hydraulic isolation maintained.

Advisory

Special Note Regarding Forward-Looking Statements

Certain statements relating to Canadian Natural Resources Limited (the "Company") in this document or documents incorporated herein by reference constitute forward-looking statements or information (collectively referred to herein as "forward-looking statements") within the meaning of applicable securities legislation. Forward-looking statements can be identified by the words "believe", "anticipate", "expect", "plan", "estimate", "target", "continue", "could", "intend", "may", "potential", "predict", "should", "will", "objective", "project", "forecast", "goal", "guidance", "outlook", "effort", "seeks", "schedule", "proposed", "aspiration" or expressions of a similar nature suggesting future outcome or statements regarding an outlook. Disclosure related to expected future commodity pricing, forecast or anticipated production volumes, royalties, production expenses, capital expenditures, income tax expenses and other targets provided throughout this presentation and the Company's Management's Discussion and Analysis ("MD&A") of the financial condition and results of operations of the Company, constitute forward-looking statements. Disclosure of plans relating to and expected results of existing and future developments, including, without limitation, those in relation to the Company's assets at Horizon Oil Sands ("Horizon"), the Athabasca Oil Sands Project ("AOSP"), Primrose thermal oil projects, the Pelican Lake water and polymer flood projects, the Kirby Thermal Oil Sands Project, the Jackfish Thermal Oil Sands Project, the North West Redwater bitumen upgrader and refinery, construction by third parties of new, or expansion of existing, pipeline capacity or other means of transportation of bitumen, crude oil, natural gas, natural gas liquids ("NGLs") or synthetic crude oil ("SCO") that the Company may be reliant upon to transport its products to market, the development and deployment of technology and technological innovations, and the financial capacity of the Company to complete its growth projects and responsibly and sustainably grow in the long term also constitute forward-looking statements. These forward-looking statements are based on annual budgets and multi-year forecasts, and are reviewed and revised throughout the year as necessary in the context of targeted financial ratios, project returns, product pricing expectations and balance in project risk and time horizons. These statements are not guarantees of future performance and are subject to certain risks. The reader should not place undue reliance on these forward-looking statements as there can be no assurances that the plans, initiatives or expectations upon which they are based will occur.

In addition, statements relating to "reserves" are deemed to be forward-looking statements as they involve the implied assessment based on certain estimates and assumptions that the reserves described can be profitably produced in the future. There are numerous uncertainties inherent in estimating quantities of proved and proved plus probable crude oil, natural gas and NGLs reserves and in projecting future rates of production and the timing of development expenditures. The total amount or timing of actual future production may vary significantly from reserves and production estimates.

The forward-looking statements are based on current expectations, estimates and projections about the Company and the industry in which the Company operates, which speak only as of the earlier of the date such statements were made or as of the date of the report or document in which they are contained, and are subject to known and unknown risks and uncertainties that could cause the actual results, performance or achievements of the Company to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements. Such risks and uncertainties include, among others: general economic and business conditions (including as a result of effects of the novel coronavirus ("COVID-19") pandemic and the actions of the Organization of the Petroleum Exporting Countries Plus ("OPEC+") which may impact, among other things, demand and supply for and market prices of the Company's products, and the availability and cost of resources required by the Company's operations; volatility of and assumptions regarding crude oil and natural gas and NGLs prices including due to actions of OPEC+ taken in response to COVID-19 or otherwise; fluctuations in currency and interest rates; assumptions on which the Company's current targets are based; economic conditions in the countries and regions in which the Company conducts business; political uncertainty, including actions of or against terrorists, insurgent groups or other conflict including conflict between states; industry capacity; ability of the Company to implement its business strategy, including exploration and development activities; impact of competition; the Company's defense of lawsuits; availability and cost of seismic, drilling and other equipment; ability of the Company and its subsidiaries to complete capital programs; the Company's and its subsidiaries' ability to secure adequate transportation for its products; unexpected disruptions or delays in the mining, extracting or upgrading of the Company's bitumen products; potential delays or changes in plans with respect to exploration or development projects or capital expenditures; ability of the Company to attract the necessary labour required to build, maintain, and operate its thermal and oil sands mining projects; operating hazards and other difficulties inherent in the exploration for and production and sale of crude oil and natural gas and in mining, extracting or upgrading the Company's bitumen products; availability and cost of financing; the Company's and its subsidiaries' success of exploration and development activities and its ability to replace and expand crude oil and natural gas reserves; the Company's ability to meet its targeted production levels; timing and success of integrating the business and operations of acquired companies and assets; production levels; imprecision of reserves estimates and estimates of recoverable quantities of crude oil, natural gas and NGLs not currently classified as proved; actions by governmental authorities (including production curtailments mandated by the Government of Alberta); government regulations and the expenditures required to comply with them (especially safety and environmental laws and regulations and the impact of climate change initiatives on capital expenditures and production expenses); asset retirement obligations; the sufficiency of the Company's liquidity to support its growth strategy and to sustain its operations in the short, medium, and long term; the strength of the Company's balance sheet; the flexibility of the Company's capital structure; the adequacy of the Company's provision for taxes; the continued availability of the Canada Emergency Wage Subsidy ("CEWS") or other subsidies; and other circumstances affecting revenues and expenses.

The Company's operations have been, and in the future may be, affected by political developments and by national, federal, provincial, state and local laws and regulations such as restrictions on production, changes in taxes, royalties and other amounts payable to governments or governmental agencies, price or gathering rate controls and environmental protection regulations. Should one or more of these risks or uncertainties materialize, or should any of the Company's assumptions prove incorrect, actual results may vary in material respects from those projected in the forward-looking statements. The impact of any one factor on a particular forward-looking statement is not determinable with certainty as such factors are dependent upon other factors, and the Company's course of action would depend upon its assessment of the future considering all information then available.

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