

2024 *AER Directive 054* Performance Report

Hangingsstone Demonstration SAGD Project

Scheme Approval No. 8788, as amended
EPEA Approval No. 1604, as amended



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Disclaimer



Advisory

This presentation contains information in compliance with AER Directive 054 - Performance Presentations, Auditing, and Surveillance of In Situ Oil Sands Schemes. This document contains forward-looking information prepared and submitted pursuant to Alberta regulatory requirements and is not intended to be relied upon for any other purposes, including without limitation, to make investment decisions or to purchase, hold or sell any securities of Greenfire Resources Ltd. Additional information with respect to the risks and uncertainties associated with forward-looking information is contained in Greenfire's annual information form for the year ended on December 31, 2024, available on SEDAR+ at www.sedarplus.ca/, which is also included in Greenfire's Annual Report on Form 40-F filed on EDGAR at www.sec.gov and on the website (www.greenfireres.com).

Oil & Gas Financial Information

The estimates of reserves were prepared effective December 31, 2024. All estimates of reserves were prepared by independent qualified reserves evaluators based on definitions contained in the Canadian Oil and Gas Evaluation Handbook and in accordance with National Instrument 51-101 Standards of Disclosure for Oil and Gas Activities. Additional information with respect to pricing and additional reserves and other oil and gas information, including the risks and uncertainties associated with reserves estimates, is contained in Greenfire's annual information form for the year ended December 31, 2024 available on SEDAR+ at www.sedarplus.ca, which is also included in Greenfire's Annual Report on Form 40-F filed on EDGAR at www.sec.gov and on the website (www.greenfireres.com).

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Section 1.0 – Background



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1.1 Background

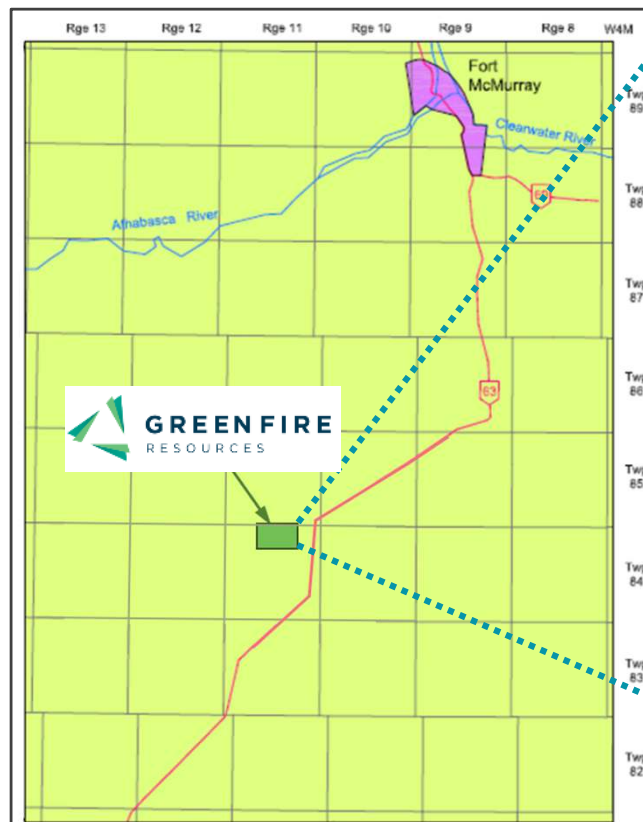


- Hangingstone Demonstration Project (the "**Project**") has been in operation since 1999, with an approved production capacity of 1,760 m³/day (~11,000 bbl/day)
- Alberta Energy Regulator (AER) Approvals:
 - EPEA Approval No. 1604, as amended
 - Scheme Approval No. 8788, as amended
- Project Operational History
 - Operated from 1999 to May 2016
 - Voluntary Suspension from May 2016 to September 2018
 - Operated from September 2018 to April 2020
 - Voluntary Suspension from May 2020 to December 2020
 - Re-start activities commenced in December 2020
 - Production recommenced March 2021

Note: The subject report includes information from January 1, 2024, to December 31, 2024, and is noted as the "*reporting period*" throughout.

1.2 Location

The Project is located approximately 60km south of Fort McMurray, Alberta

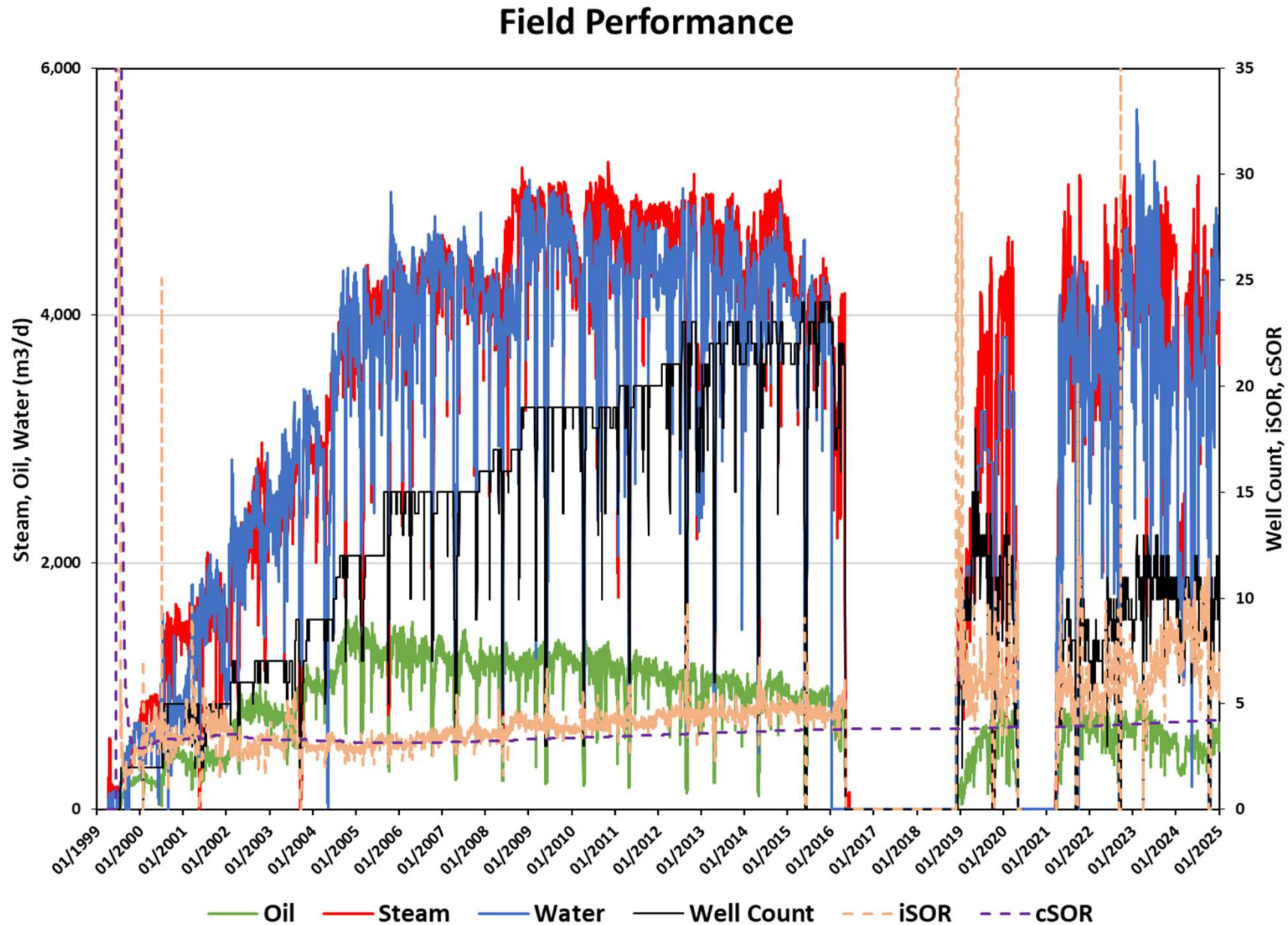


Section 2.0 – Subsurface

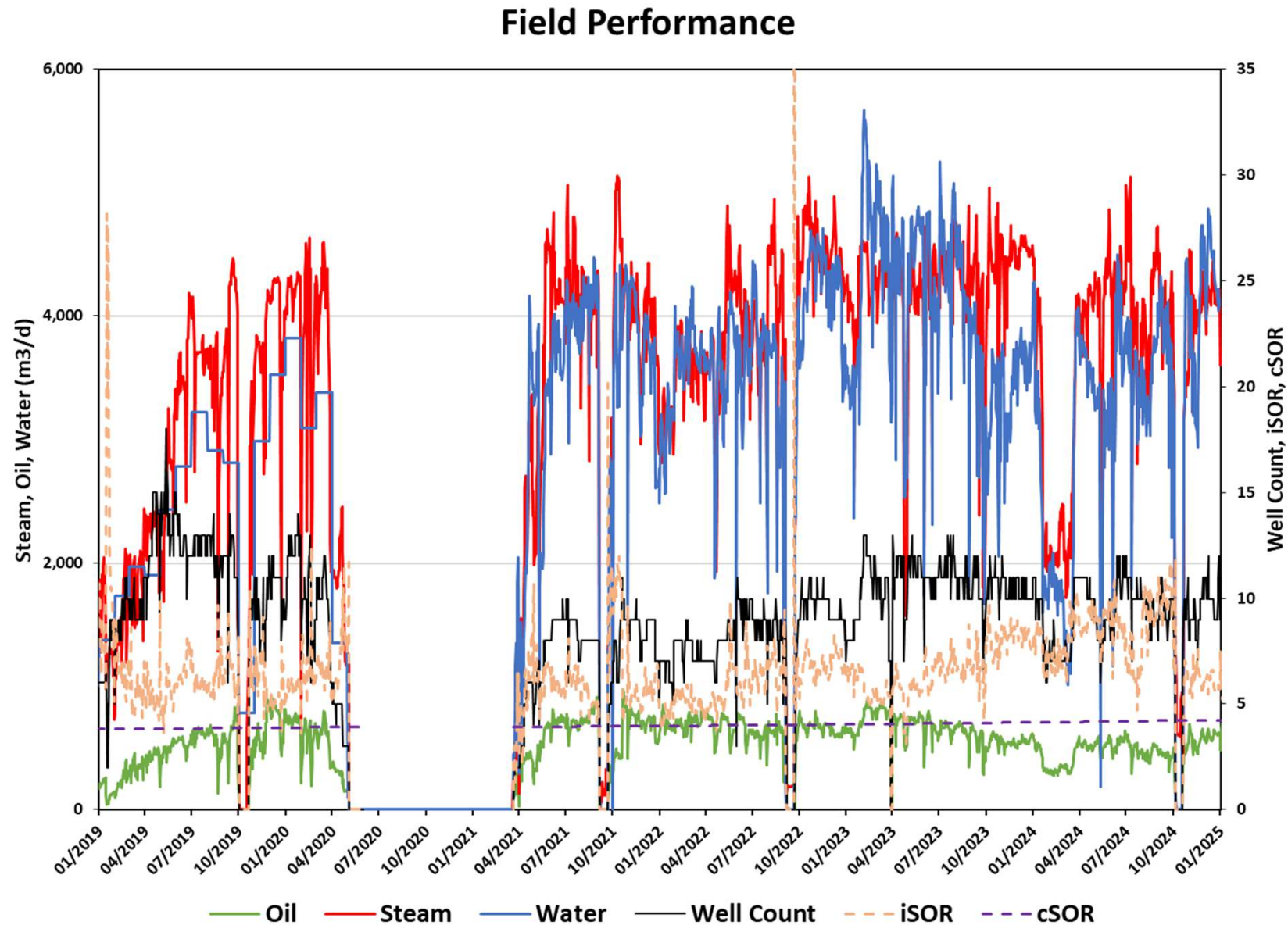


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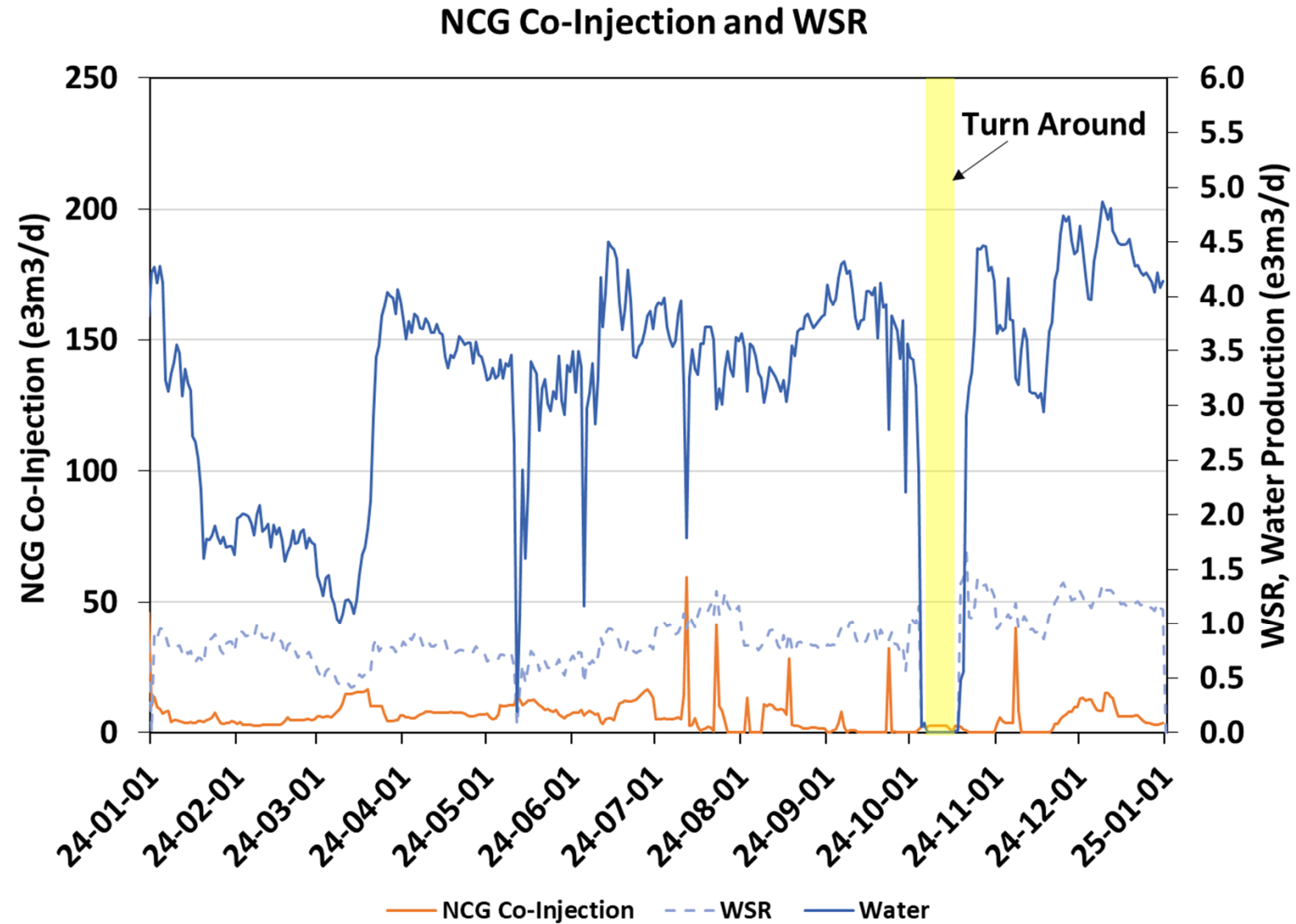
2.1 Field Performance: Lifespan Production



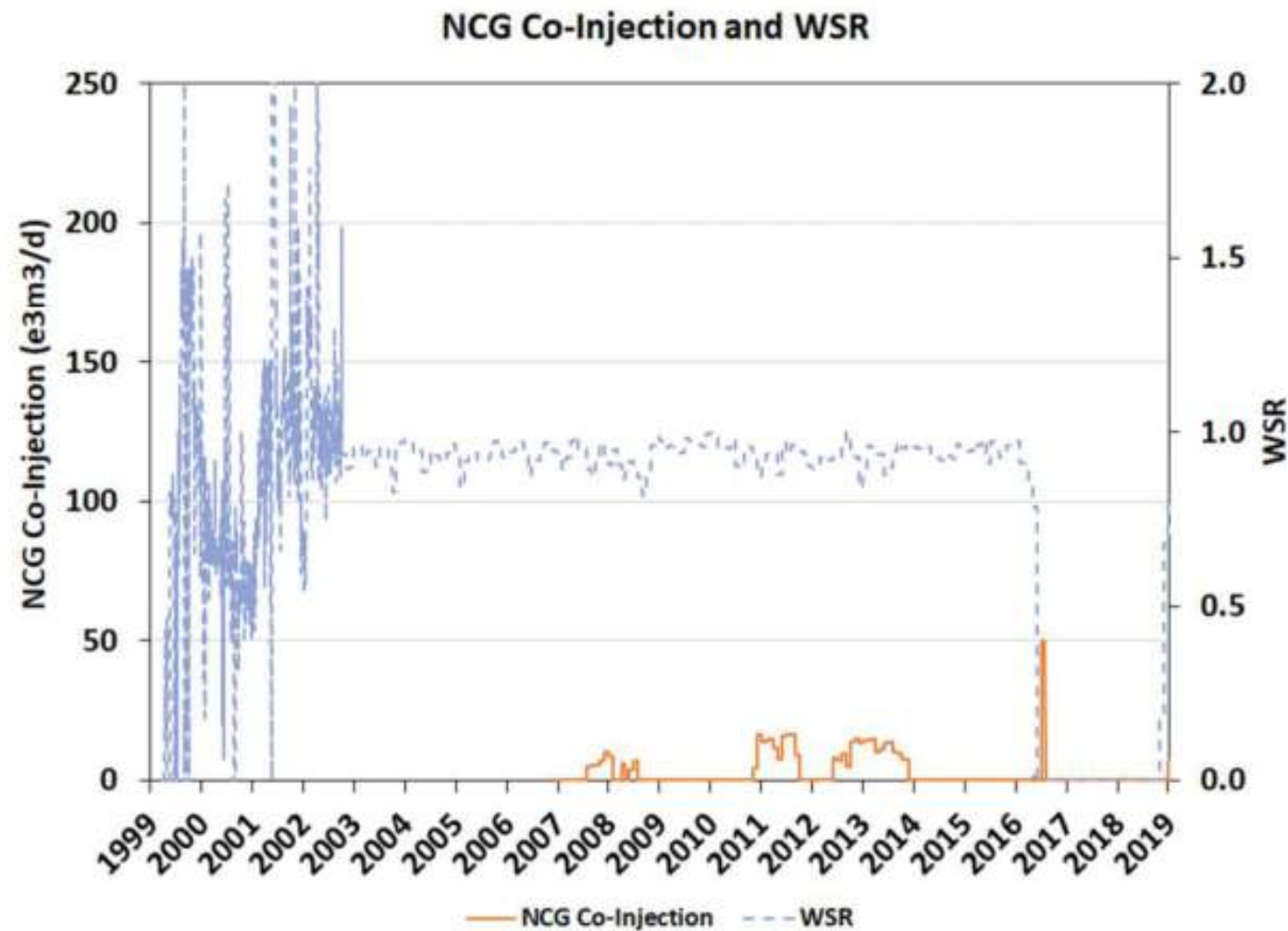
2.2 Field Performance: 2019-2024 Production



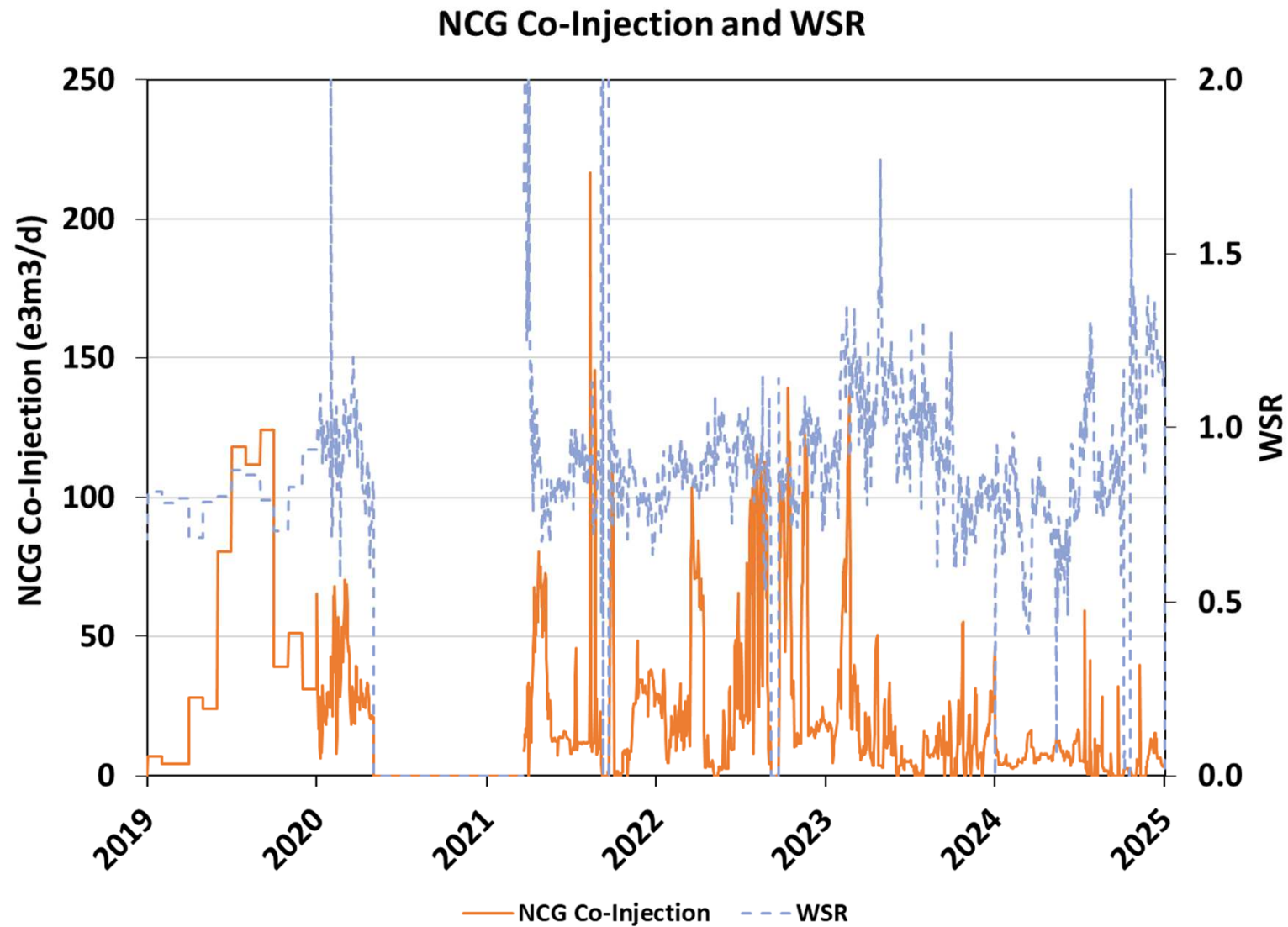
2.3 2024 Field NCG Co-Injection & WSR



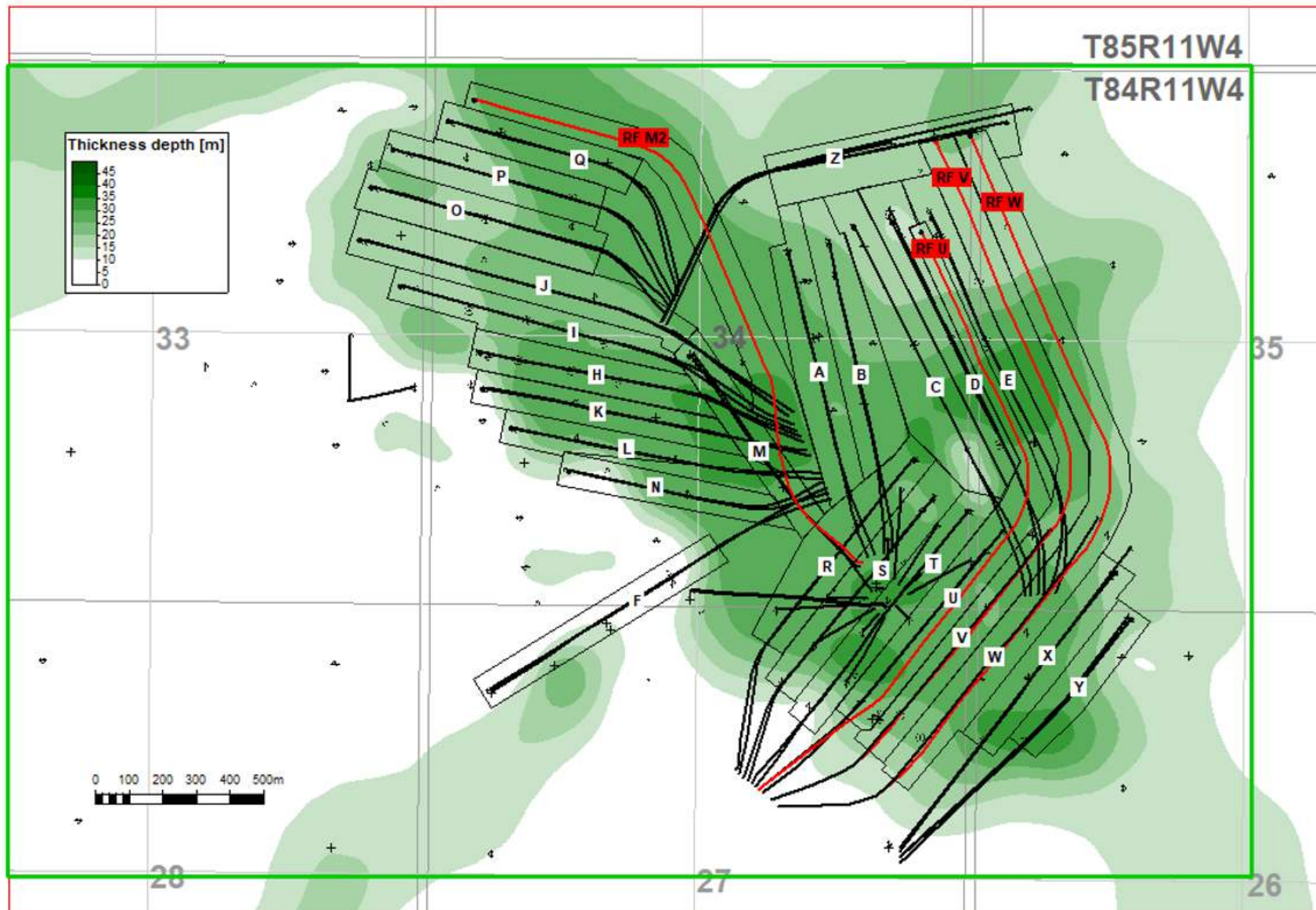
2.4 1999-2018 Field NCG Co-Injection & WSR



2.5 2019-2024 Field NCG Co-Injection & WSR

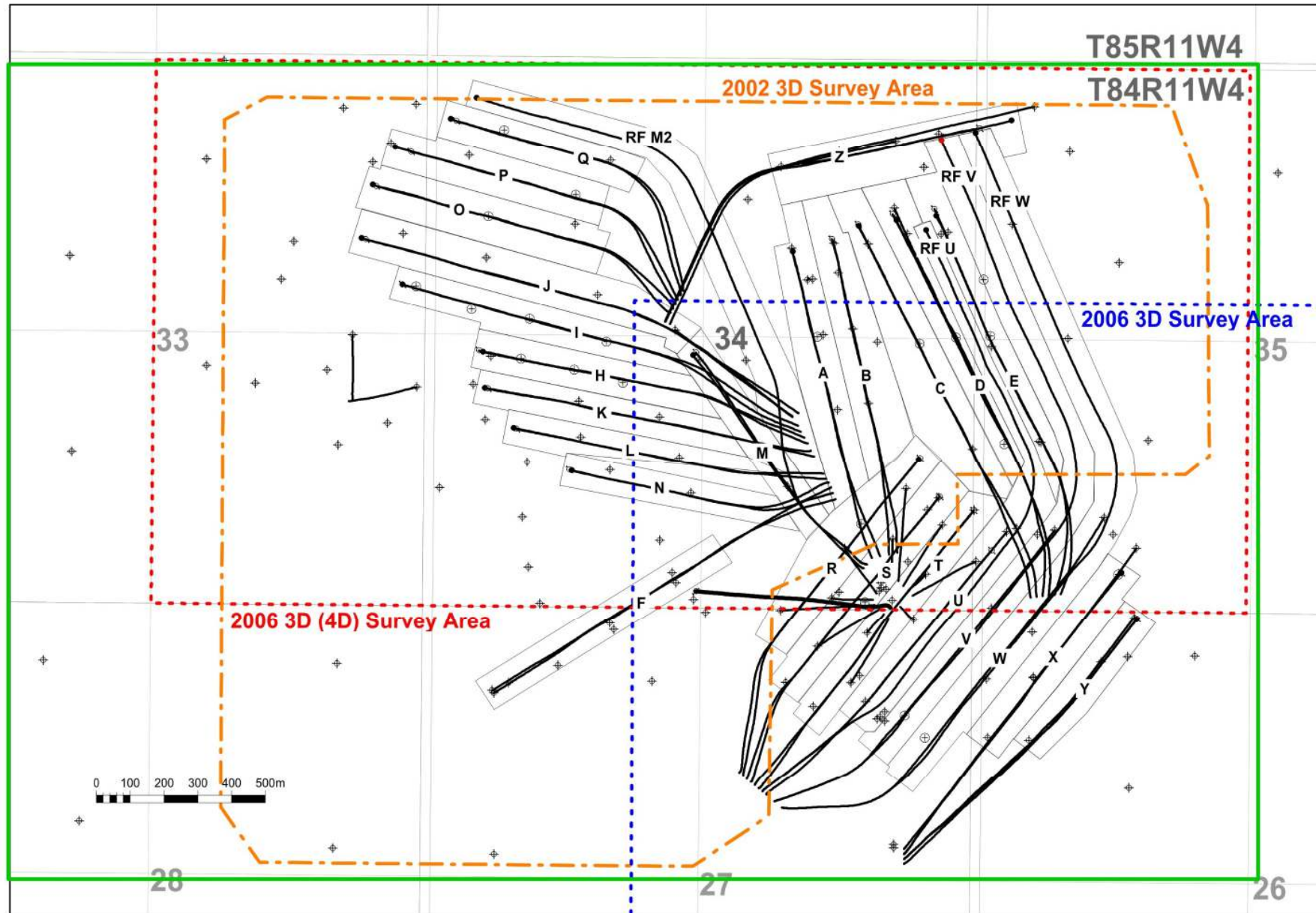


2.6 Net Pay Isopach and Drainage Areas



McMurray Net Pay Criteria:

2.7 Seismic Summary

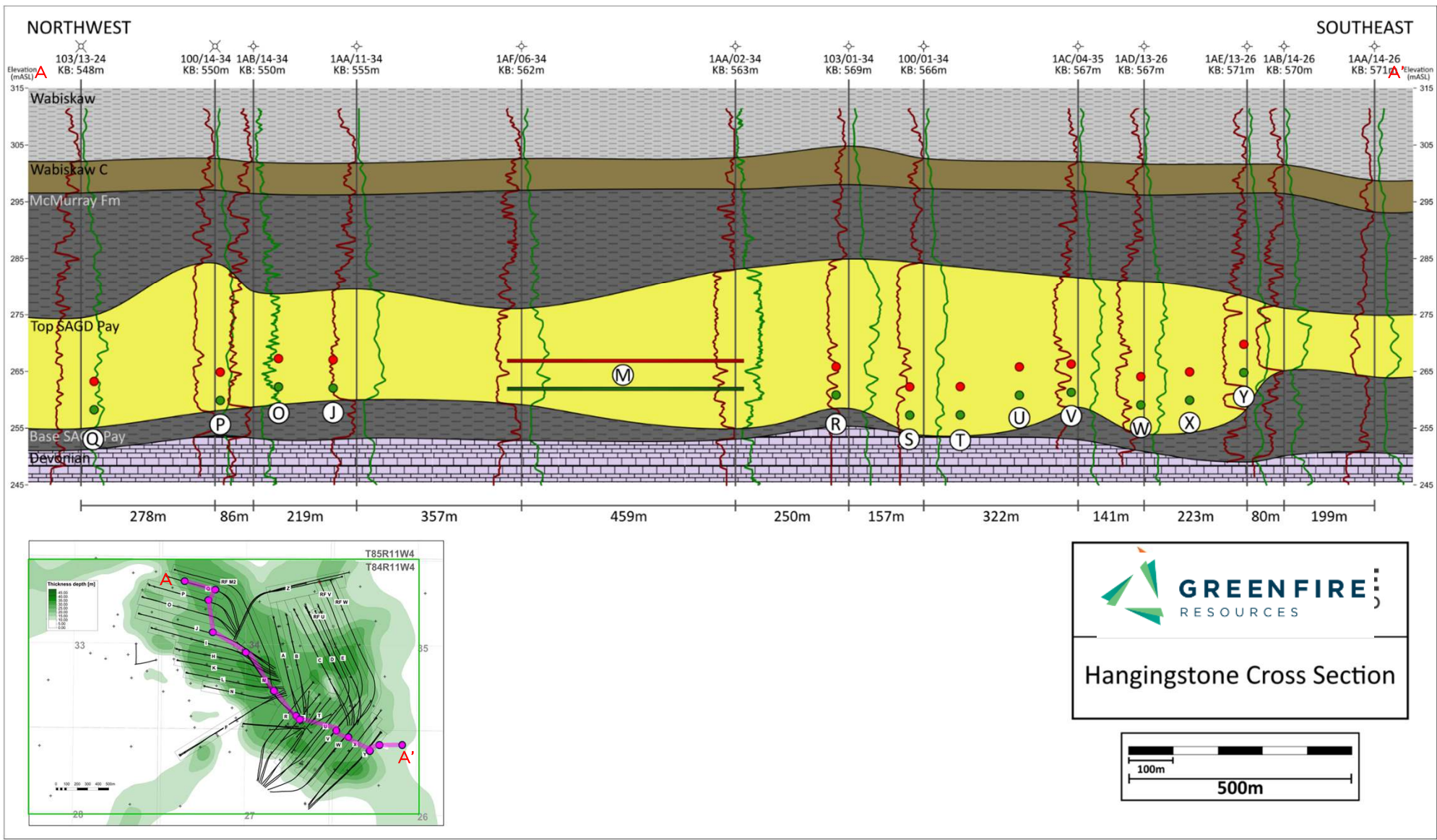


2.8 Geomechanical Summary

- No change in caprock integrity analysis since August 2018
- Original injection pressures determined by mini-frac tests in the 1980's
- Greenfire's Hangingstone Expansion (~3km from the Project) conducted mini-frac testing in 2010 and exhibited consistent results to original data
- Reservoir pressure is monitored through blanket gas pressure readings in the casing annulus

Formation/Lithology	Depth TVD (m)	Min. Stress		Vertical Stress		Stress Regime
		Mpa	kPa/m	Mpa	kPa/m	
Clearwater Shale	272.0	5.39	19.82	5.73	21.07	Horizontal Fracture
Wabiskaw Shale	297.0	6.17	20.77	6.26	21.08	Horizontal Fracture
McMurray Shale	314.5	5.55	17.65	6.64	21.11	Vertical Fracture
McMurray Sand	327.0	5.59	17.09	6.91	21.13	Vertical Fracture

2.9 Well Cross Section



2.10 Original Bitumen in Place (OBIP)

Reservoir Parameter	Value
Initial Oil Saturation (%)	85
Porosity (%)	30
Average SAGD pay Thickness (m)	24
Average Vertical Permeability (mD)	5,132
Average Horizontal Permeability (mD)	5,774

OBIP Calculation Method

$$\text{OBIP} = R_v \times \phi \times (1 - S_w) \times FVF$$

Where

OBIP =	Original bitumen in place
R_v =	Rock Volume
ϕ =	Porosity
S_w =	Initial water saturation
FVF =	Formation volume factor (1.001)

Area	OBIP (e ⁶ m ³)	Cumulative Production (e ⁶ m ³)	Recovery Factor (Based on OBIP) (%)
Operating Area	14.9	6.7	44.9%
Development Area	27.0		24.8%
Project Area	27.0		24.8%

Note: Project Area and Development Area are defined to be the same in the Scheme Approval

2.11 Well Patterns



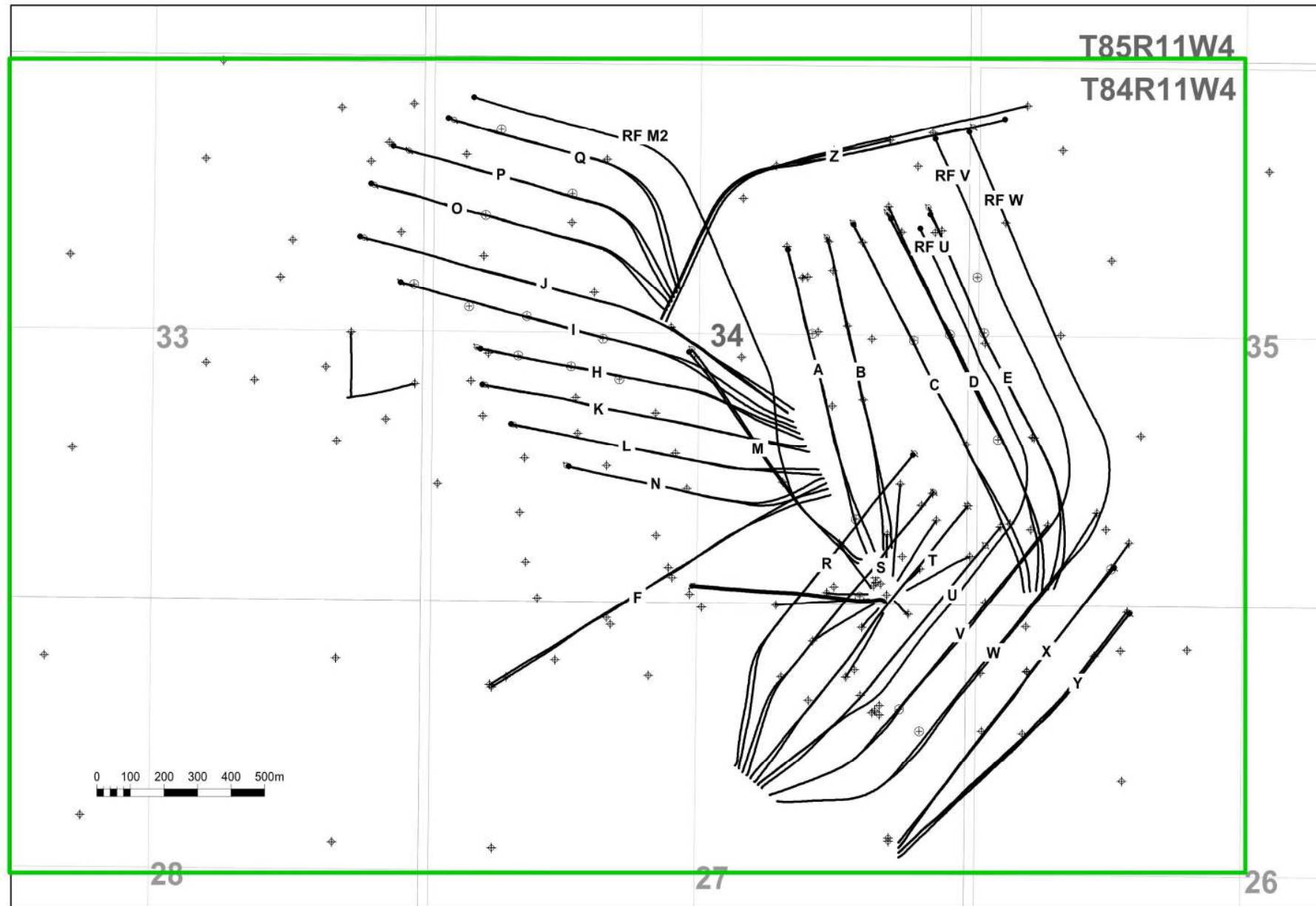
Pad	Well Pairs	Area (m ²)	Average Net Pay (m)	Porosity (%)	Oil Saturation (%)	Vertical Perm. (mD)	Horizontal Perm. (mD)	OBIP (e ³ m ³)	PBIP (e ³ m ³)	Cumulative Prod. (e ³ m ³)	Current OBIP RF (%)	Current PBIP RF (%)	Est. OBIP Ultimate RF (%)
1	ABM	338,560	27	30	85	5,132	5,774	2,342	2,032	1,420	60.6%	69.9%	75-85
2	CDE	395,550	23.4	30	85	5,132	5,774	2,368	2,053	1,089	46.0%	53.0%	70-80
3	HIJKLN	525,613	23.8	30	85	5,132	5,774	3,133	2,766	2,085	66.5%	75.4%	75-85
4	OPQZ	364,067	21.6	30	85	5,132	5,774	1,983	1,807	840	42.4%	46.5%	65-75
5	RSTUVW	627,926	25.9	30	85	5,132	5,774	4,123	3,795	1,115	27.0%	29.4%	65-75
6	XY	148,378	24.7	30	85	5,132	5,774	934	774	125	13.4%	16.1%	60-70
Operating Area		2,400,094	24.4	30	85	5,132	5,774	14,883	13,227	6,673	44.8%	50.5%	70-80

2.12 Co-Injection Summary

- The Project is approved for full field NCG co-injection (pipeline fuel gas) and to increase injection up to 50-mole percent with steam monthly
- The table provides NCG co-injection carried rates for January to December 2024 by pad:
 - Average project injection for 2024 was 6,010 m³/d
 - Cumulative co-injection for 2024 was 2,193,800 m³
- Greenfire intends to continue with NCG co-injection to assist with reservoir pressure maintenance, pending market conditions, as it helps to keep pressure in the reservoir while allocating steam around the field

Pad	Well	Average Injection by Well (m ³ /d)	Cumulative Injection (m ³)
1	B	1	326
	M	713	260,082
2	C	3	960
	D	56	20,571
	E	83	30,322
3	H	15	5,564
	I	26	9,654
	J	647	236,001
	K	136	49,819
	L	19	7,034
	N	0	0
4	O	71	26,046
	P	32	11,646
	Q	3	1,037
5	R	1168	426,473
	S	695	253,717
	T	248	90,363
	U	1048	382,389
	V	830	302,834
	W	216	78,935
6	X	0	0
	Y	0	0

2.13 Co-Injection Well Locations



Section 3.0 – Surface



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3.1 Infrastructure



There are no immediate infrastructure projects planned.

3.2 CPF Modifications

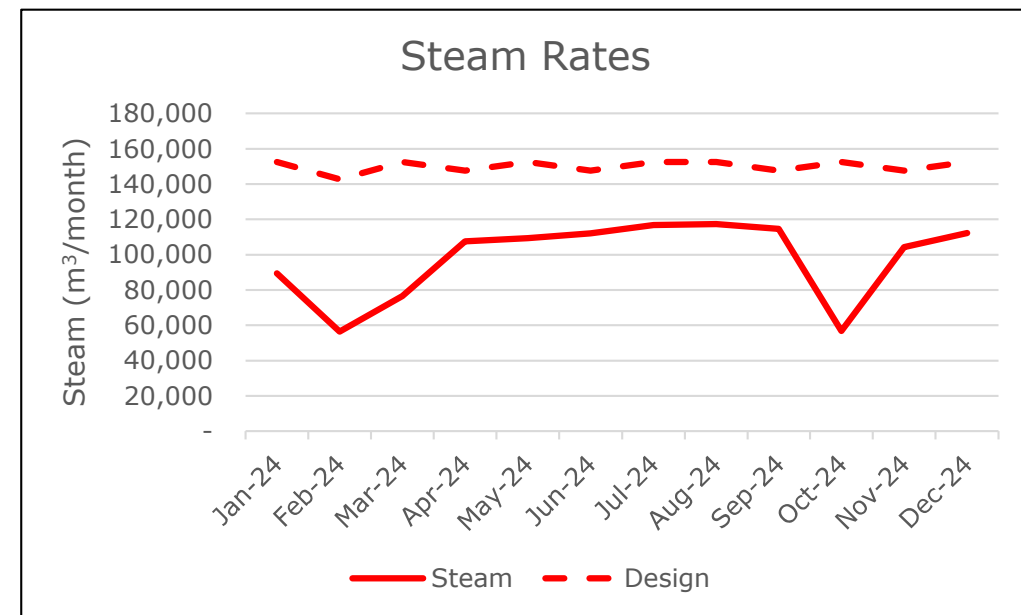
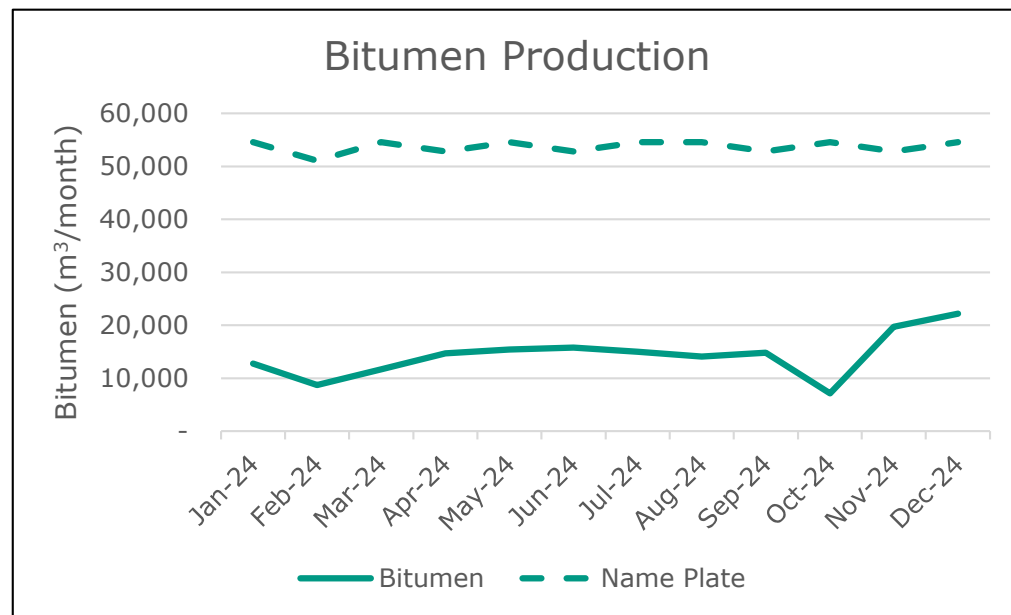


The modifications completed during the reporting period include:

- Tie-in and operation of a second on-site disposal well

3.3 Bitumen & Steam Rates

The following are the steam and bitumen rates for the Project for the Reporting Period. The rates matched the forecasted profiles.



**Plant Partial Outage in October 2024*

Licensed Nameplate = 1,760 m³/day

Steam Rate Design = 4,919 tonnes/day (80% quality)

Section 4.0 – Historical & Upcoming Activity



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4.1 Suspension & Abandonments



- There were no suspensions or abandonments of production wells or patterns for the reporting period.
- There are no well patterns with active blow-down or ramp-down.

4.2 Operational & Regulatory Changes

- Regulatory Approvals for the Reporting Period:
 - Directive 065 Disposal Scheme 13122 amendment:
 - Application No. 1950248 - Add a Class Ib disposal well at the Project
 - Application No. 1953890 - Grand Rapids Monitoring Plan update
 - Continued refill/redrill program at Pad 5 for producers U, V, and W (email approval)

Note:

- *There were no events for the reporting period that could materially affect scheme performance or energy or material balances (e.g., no phase expansions, no material changes in injection strategy, and no major infrastructure changes)*
- *The open-loop system was not operational during the reporting period*

4.3 Project Successes & Challenges



- Successes
 - Consistent oil treatment with high processing uptime
 - Maintained partial operations during a plant turnaround
- Challenges
 - Evaporator blower mechanical issues associated with maintaining unit un operation – working on resolution
 - Disposal well performance issues associated with plugging – working on resolution

4.4 Compliance History



- AER Reportable Incidents and Contraventions
 - Edge Reference No. 0436154 (FIS # 20242934) – On lease reportable spill. Fully cleaned up and resolved.

4.5 Future Plans



- 2025 Plans
 - There are no major development programs planned in 2025.
 - Ongoing evaluation of various central processing facility and well pad debottlenecking opportunities that could improve the overall performance of the scheme.
- 5-Year Development Plan
 - Greenfire is evaluating various development strategies over the next five years aimed at optimizing resource production while minimizing environmental impacts and ensuring full compliance with regulatory obligations.