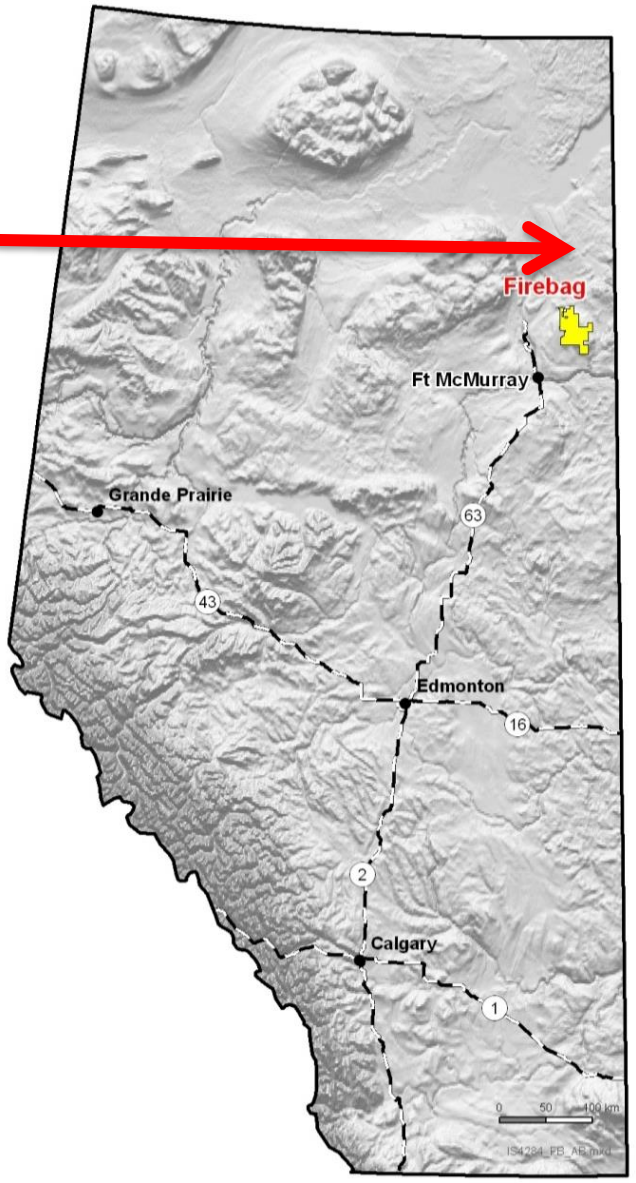
Suncor Firebag
2020 AER Scheme Performance Report
Commercial Scheme Approval No. 8870

Reporting Period:
June 1, 2020 to December 31, 2020

Introduction

4.1

Firebag Project Overview

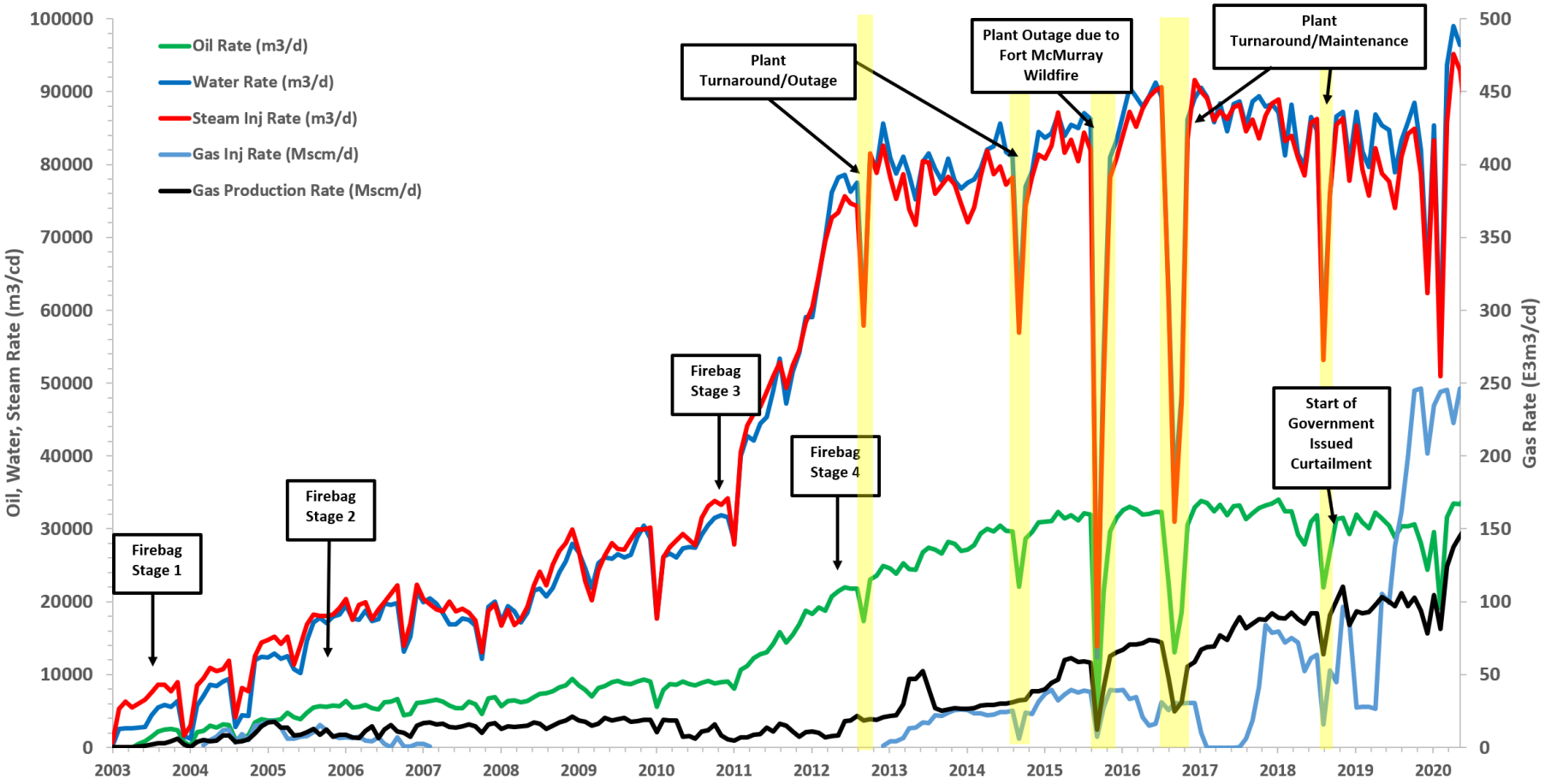


- The Firebag Project is a commercial Steam Assisted Gravity Drainage (SAGD) scheme.
- Supplies bitumen to the Oil Sands Upgrader and sales to market.
- Average bitumen production for the reporting period has been 28,986 m3/d (182,319 bbl/d) with a steam to oil ratio (iSOR) of 2.7

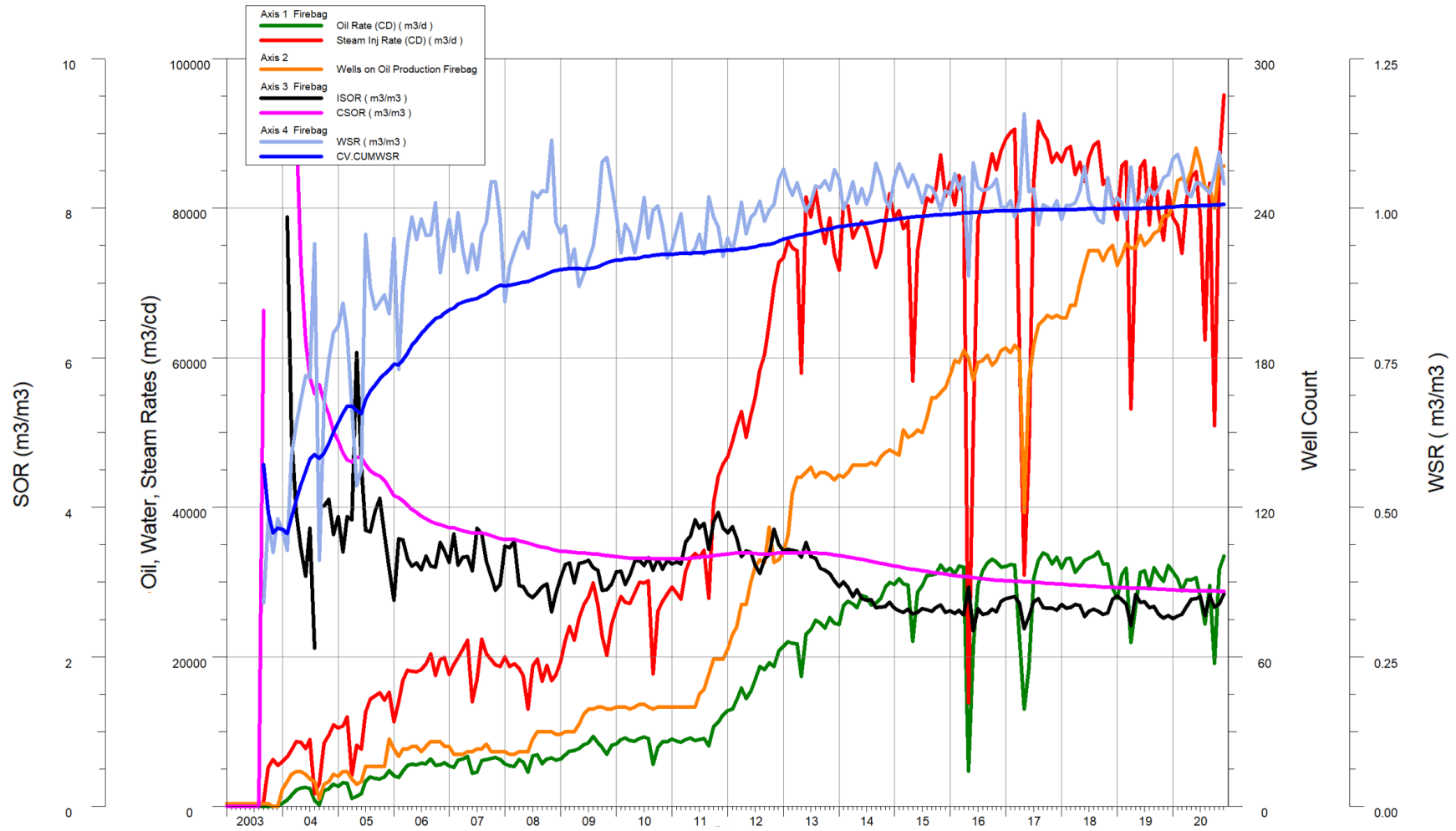
Subsurface

4.2

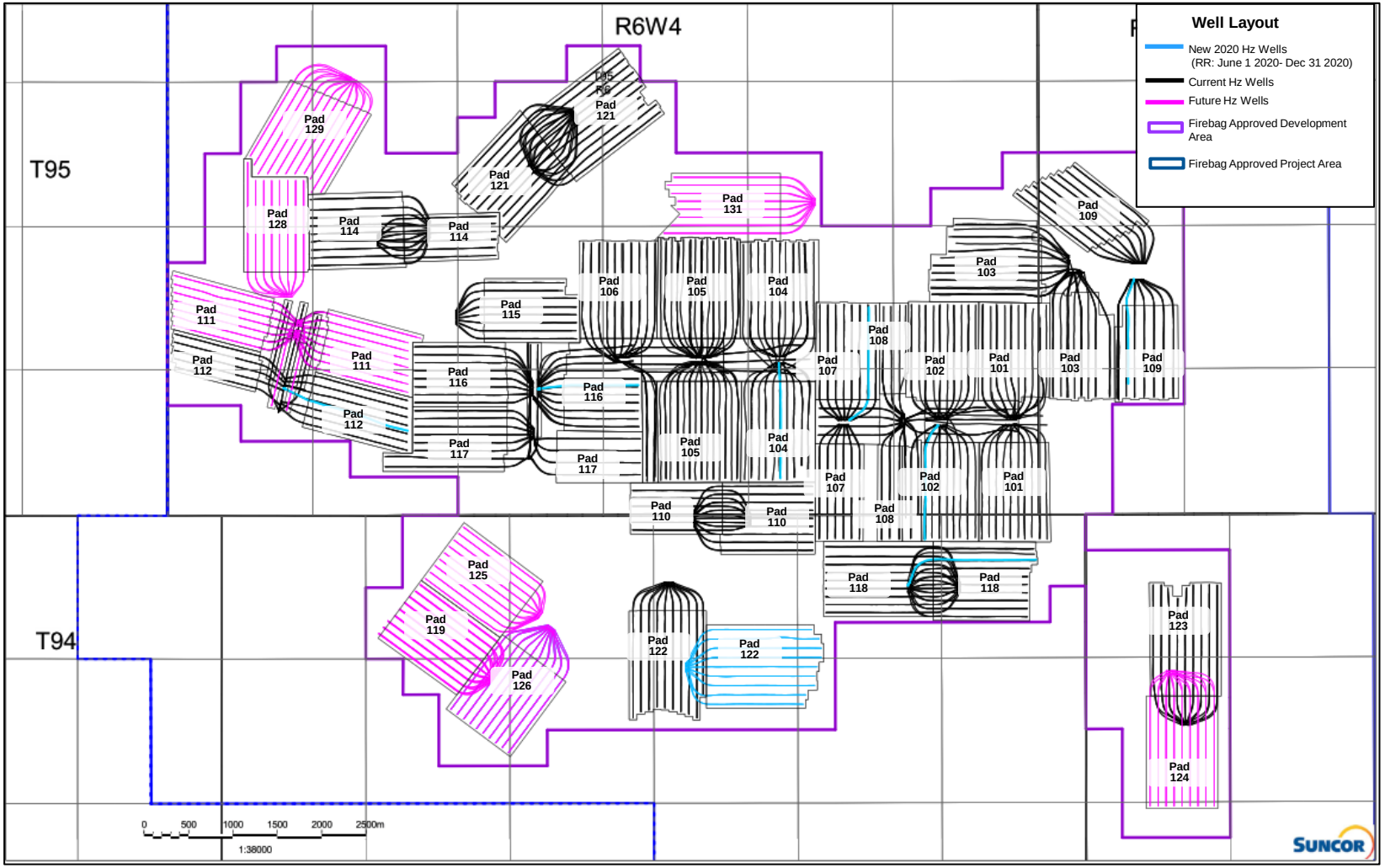
Scheme Performance – Well Production History



Scheme Performance – Well Production History

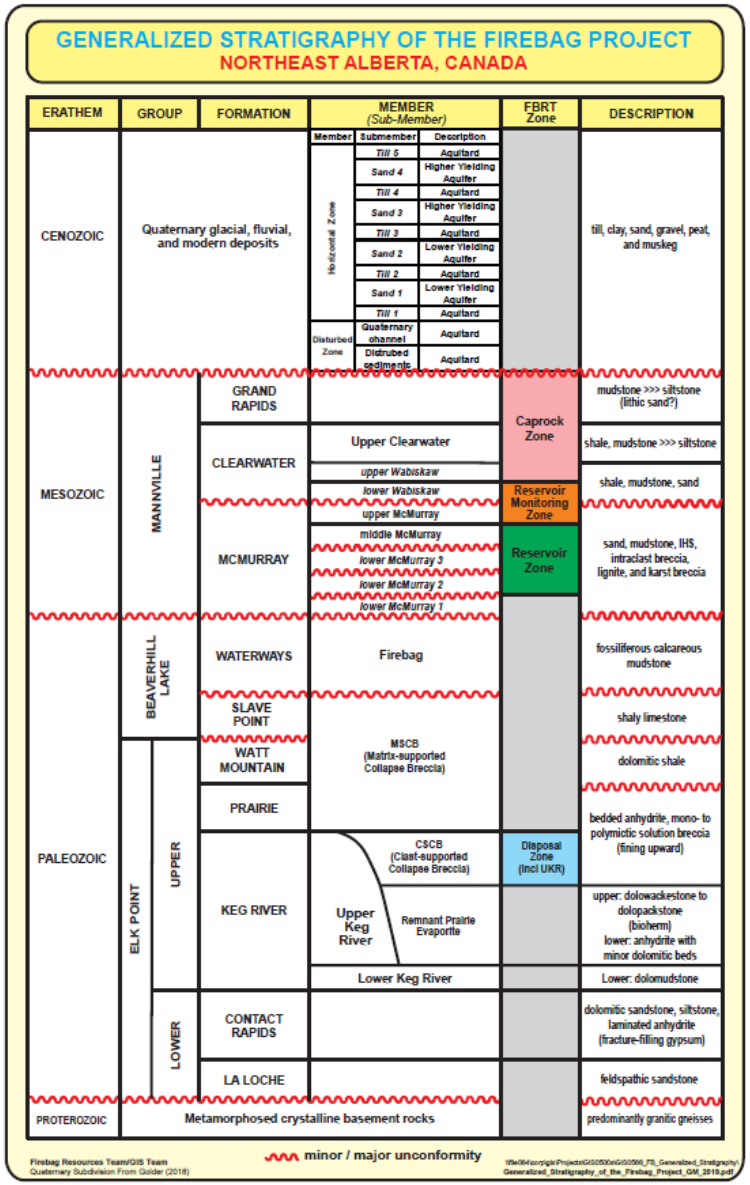


AER Project & Approved Development Areas

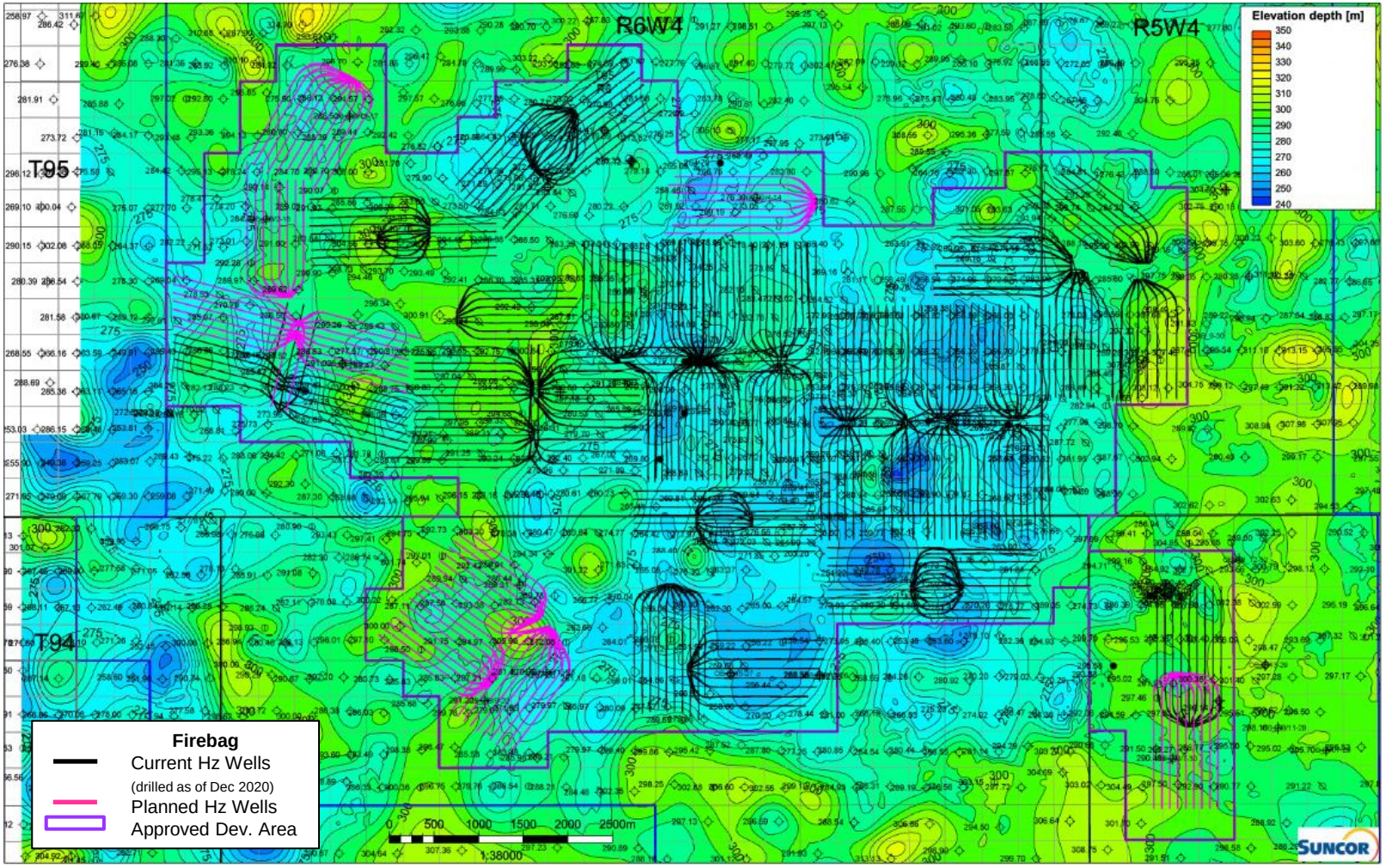


Firebag Approval 8870 as of December 2020

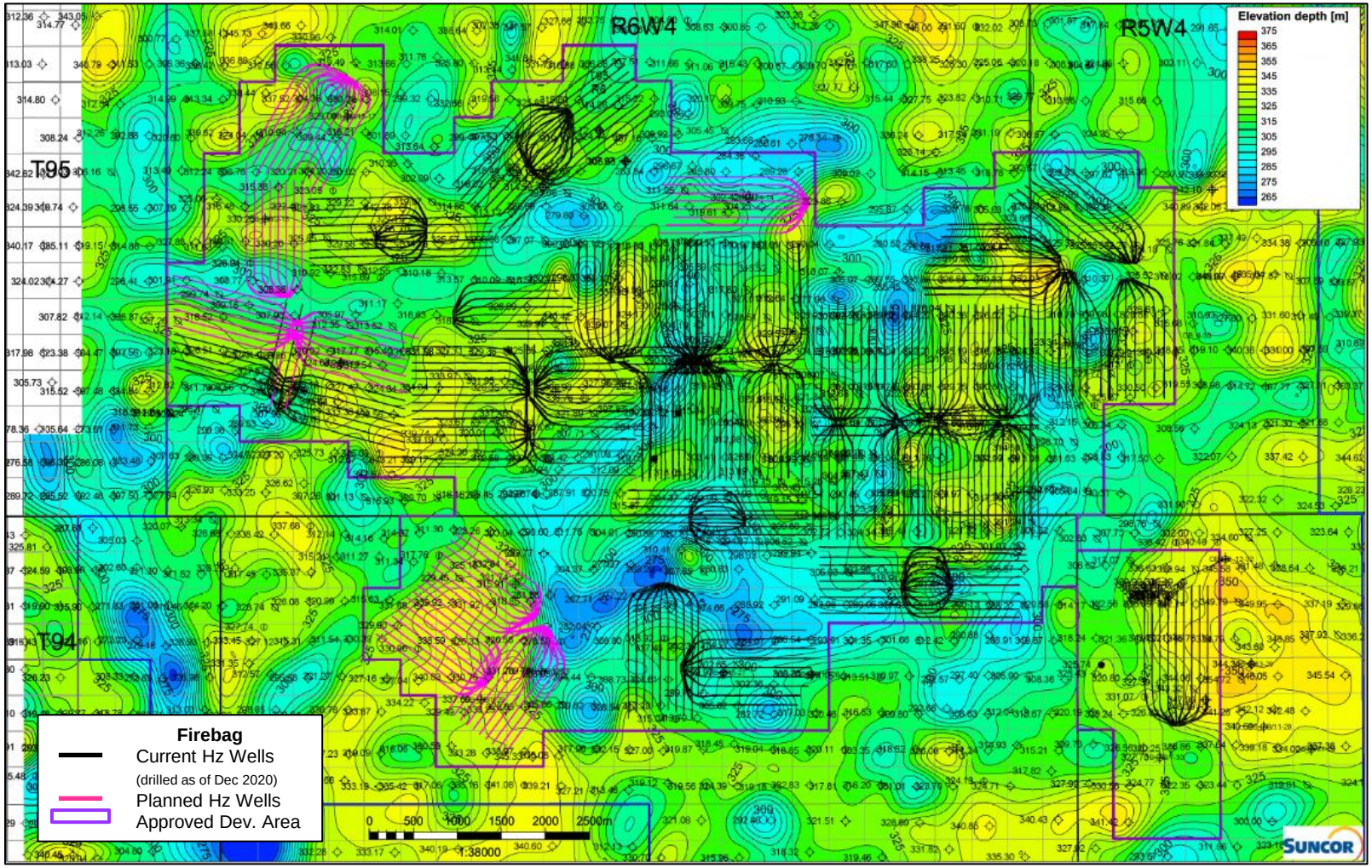
Firebag Stratigraphic Chart



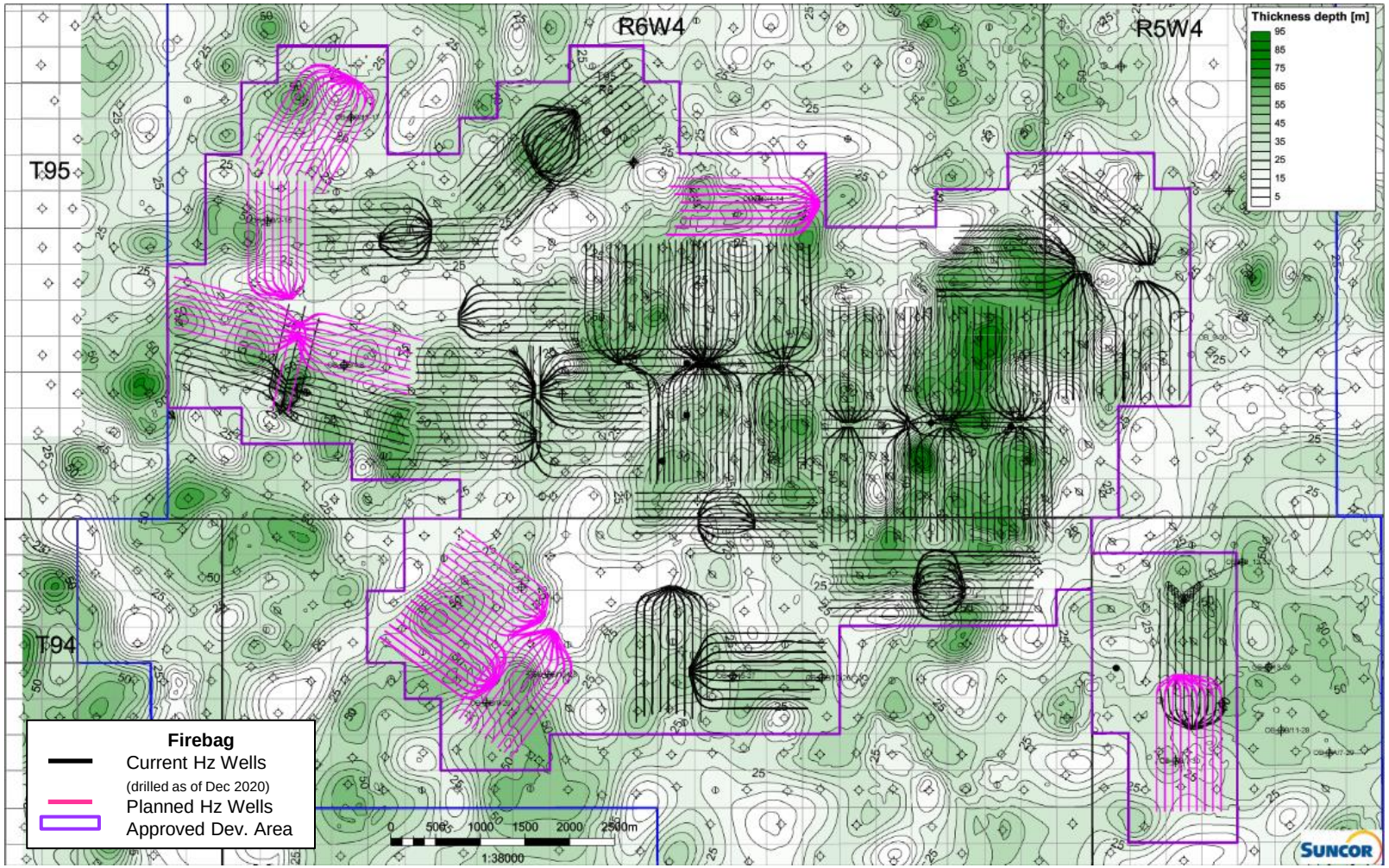
Structure Map of Base Continuous Reservoir



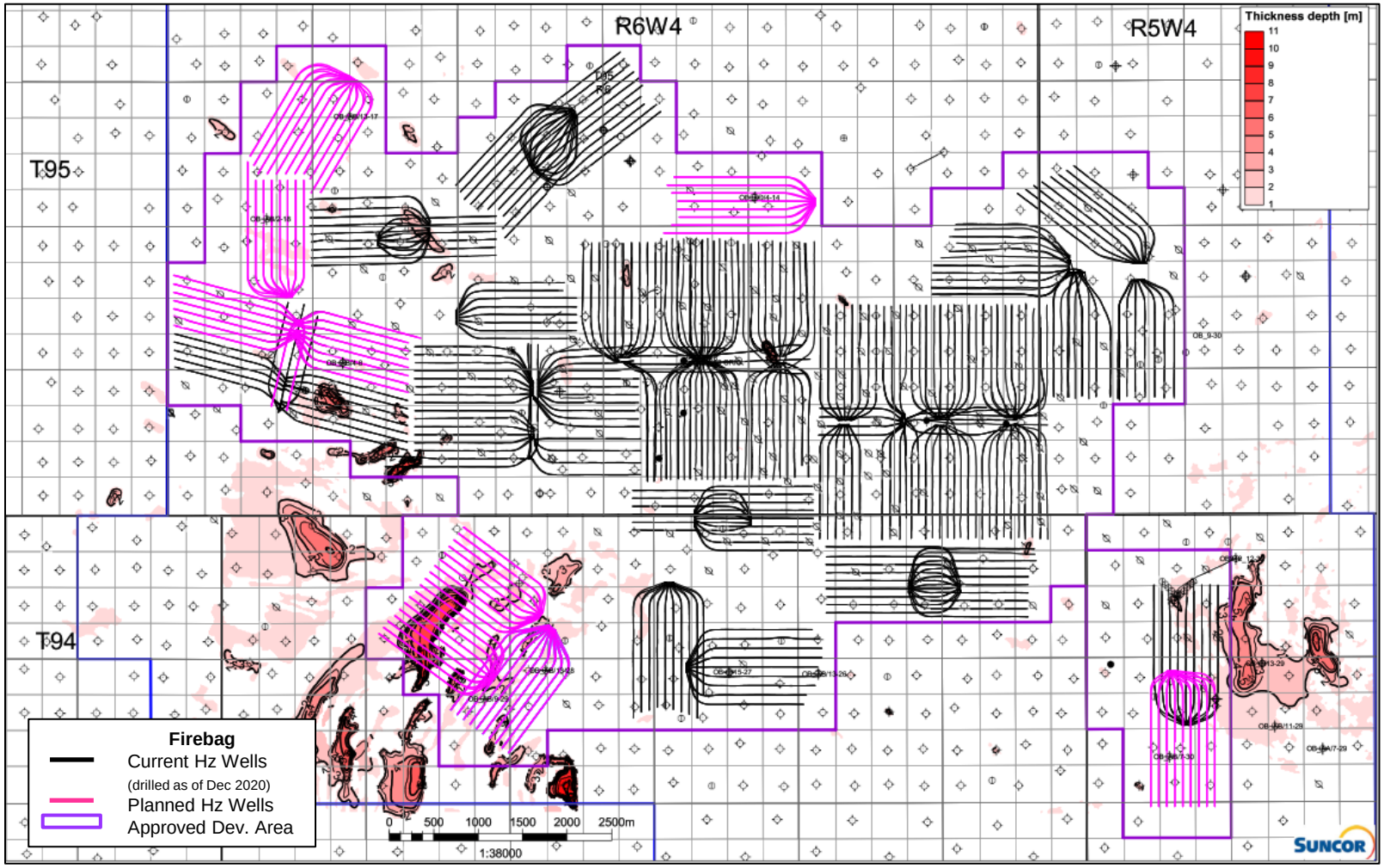
Structure Map of Top Continuous Reservoir



Isopach Map of Continuous Reservoir



Reservoir Zone Gas Isopach



Gas zones shown above are inconsequential to SAGD operations at Firebag but are included for reference.

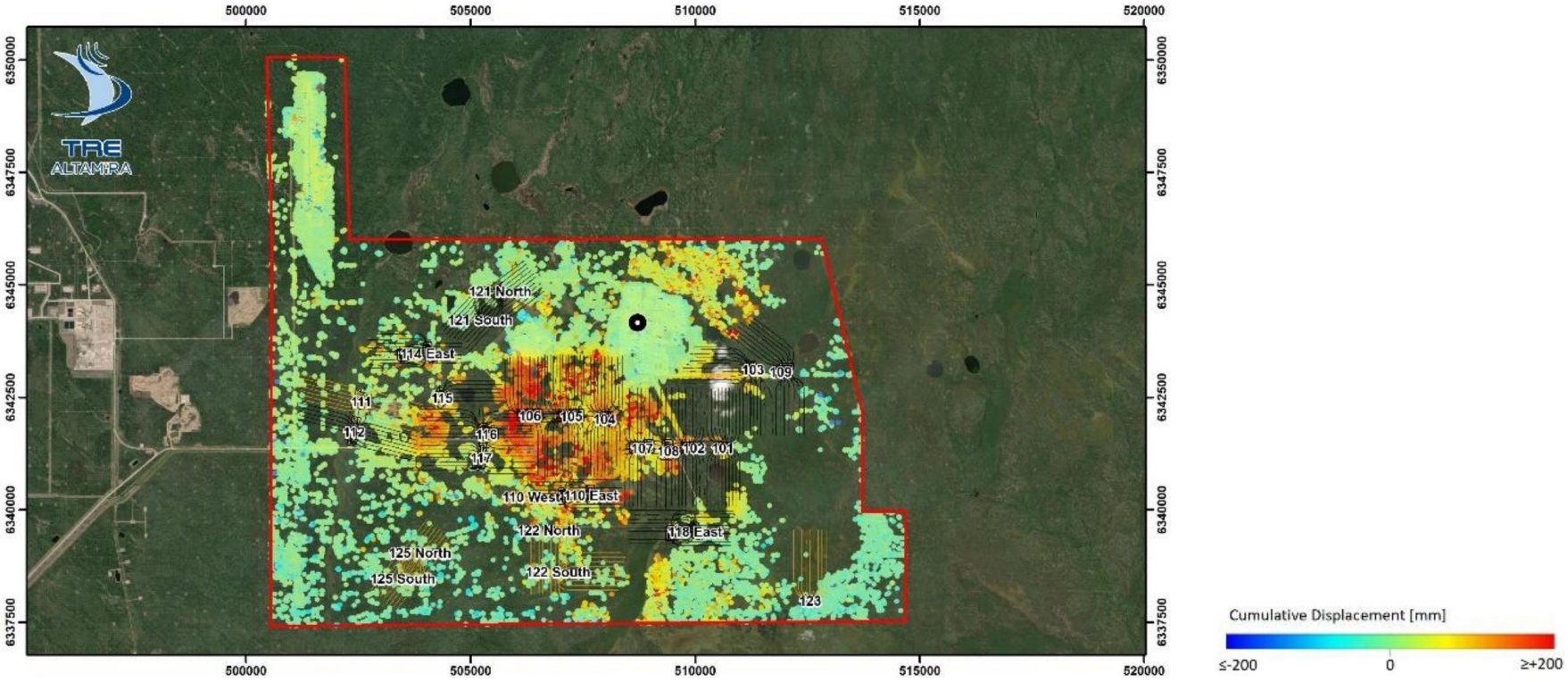
Water and Lean Zones

- No top or bottom water zones have been identified within the Firebag development area.

- Upper lean and middle lean are present in some parts of the Firebag development area. Thief zone potential is unknown at this time but is actively being investigated.

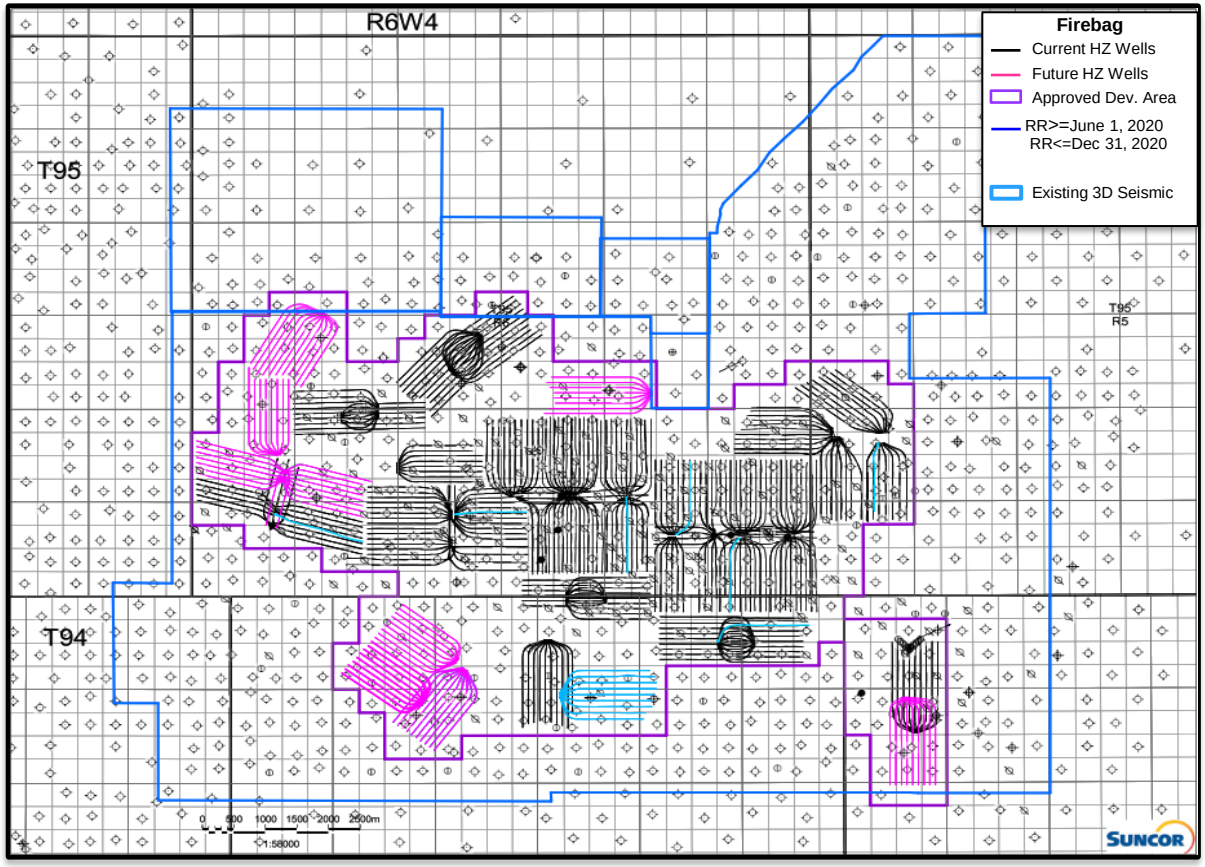
- For more information on lean zones, refer to applications 1875472 (Approval # 8870MMM) and 1925410 (Approval # 8870HHHH).

Firebag InSAR Cumulative Heave May 2013 - Oct 2019



- There are no geomechanical anomalies in the Firebag development area.
- Maximum heave of 336 mm observed at Pad 116
- Heave data is used to:
  - Calibrate geomechanical models
  - Monitor subsurface safety and flag areas that appear anomalous

Caprock Integrity Assurance



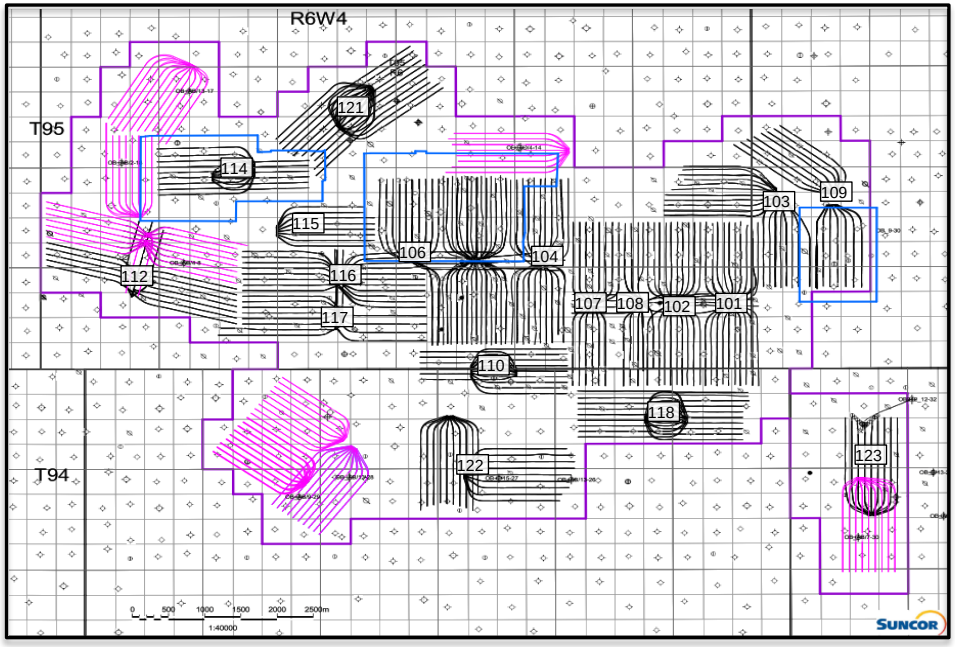
- Geomechanical simulations are developed to assess all new pad startups.
- These activities confirm that operating at the approved MOP does not impact Firebag caprock integrity.
- No new drilling activity of delineation or observation wells during the reporting period.
- No new caprock cores or micro-Frac's collected within the reporting period

Reservoir Fracture Closure Gradients

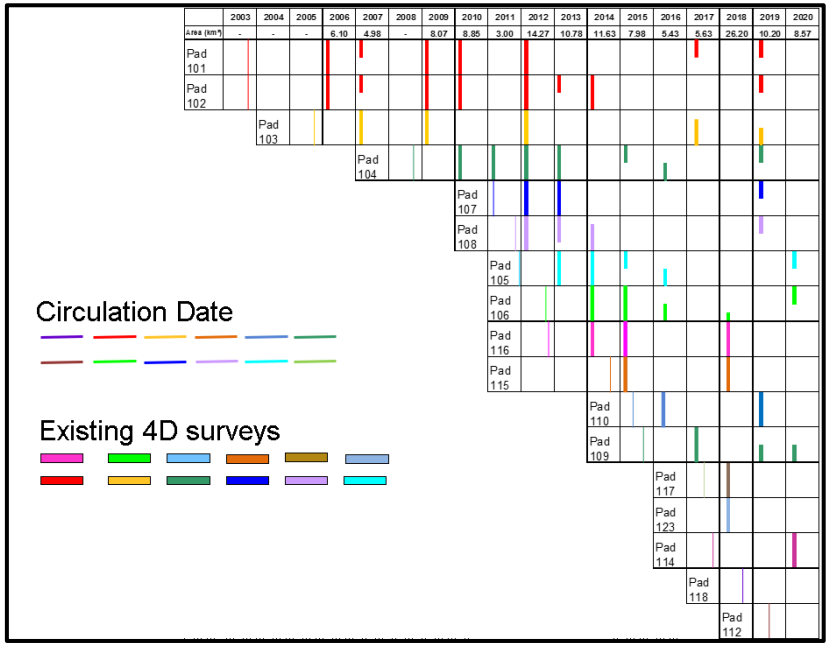
Date	Well	Well Alias	TVD Perforated Interval (mKB)	Target	Minimum Stress (kPaa)	Fracture Closure Gradient (kPag/mGL)
15-Mar-12	01-16-095-06W4	OB134	297-298	lower McMurray 3 sand	5238.9	17.6
17-Mar-12	09-09-095-06W4	OB135	263-264	middle McMurray sand	5106.1	19.3
13-Mar-12	11-10-095-06W4	OB136	268-269	middle McMurray sand	4835.6	18.0
23-Feb-14	16-07-095-05W4	OB205	273-274	lower McMurray 3 sand	4319.7	15.7
11-Feb-15	05-07-095-06W4	OB147	255-258	middle McMurray sand	3868.3	15.1
10-Feb-16	15-26-094-06W4	OB140	296-299	middle McMurray sand	6171.9	20.6
8-Jan-19	03-32-094-06W4	OB145	272-275	middle McMurray sand	5330.4	19.5
16-Mar-12	01-16-095-06W4	OB134	277-278	middle McMurray mudstone	5398.7	19.4
18-Mar-12	09-09-095-06W4	OB135	247.5-248.5	middle McMurray mudstone	4020.2	16.1
13-Mar-12	11-10-095-06W4	OB136	257-258	middle McMurray mudstone	4910.0	19.0
24-Feb-14	16-07-095-05W4	OB205	247-248	middle McMurray IHS	4407.6	17.7
12-Feb-15	05-07-095-06W4	OB147	227-228	middle McMurray mudstone	4111.5	18.0
10-Feb-16	15-26-094-06W4	OB140	276-277	middle McMurray mudstone	4731.0	16.9
16-Mar-12	01-16-095-06W4	OB134	253.5-254.5	Wabiskaw/lower Clearwater	5482.5	21.6
18-Mar-12	09-09-095-06W4	OB135	231-232	Wabiskaw/lower Clearwater	5060.2	21.9
14-Mar-12	11-10-095-06W4	OB136	238-239	Wabiskaw/lower Clearwater	4532.7	19.0
5-Mar-13	01-09-095-06W4	OB182	232.5-233.5	Wabiskaw/lower Clearwater	5237.2	22.5
25-Feb-14	16-07-095-05W4	OB205	225.5-226.5	Wabiskaw/lower Clearwater	4952.2	22.0
12-Feb-15	05-07-095-06W4	OB147	209.5-210.5	Wabiskaw/lower Clearwater	4679.0	22.3
11-Feb-16	15-26-094-06W4	OB140	250.5-251.5	Wabiskaw/lower Clearwater	5434.6	22.3
16-Feb-17	07-31-094-05W4	OB184	225.5-226.5	Wabiskaw/lower Clearwater	4915.9	22.2
10-Jan-19	03-32-094-06W4	OB145	229.0-230.0	Wabiskaw/lower Clearwater	5464.9	23.8
3-Feb-19	04-17-095-06W4	OB148	219.5-220.5	Wabiskaw/lower Clearwater	4993.3	22.7
6-Feb-20	04-14-095-06W4	N/A	256.0-257.0	Wabiskaw/lower Clearwater	5335.2	20.8
Note - Suncor limits Fracture Closure Gradient to Overburden Gradient (~21.5 kPag/mGL)						

4D Seismic Survey Outlines

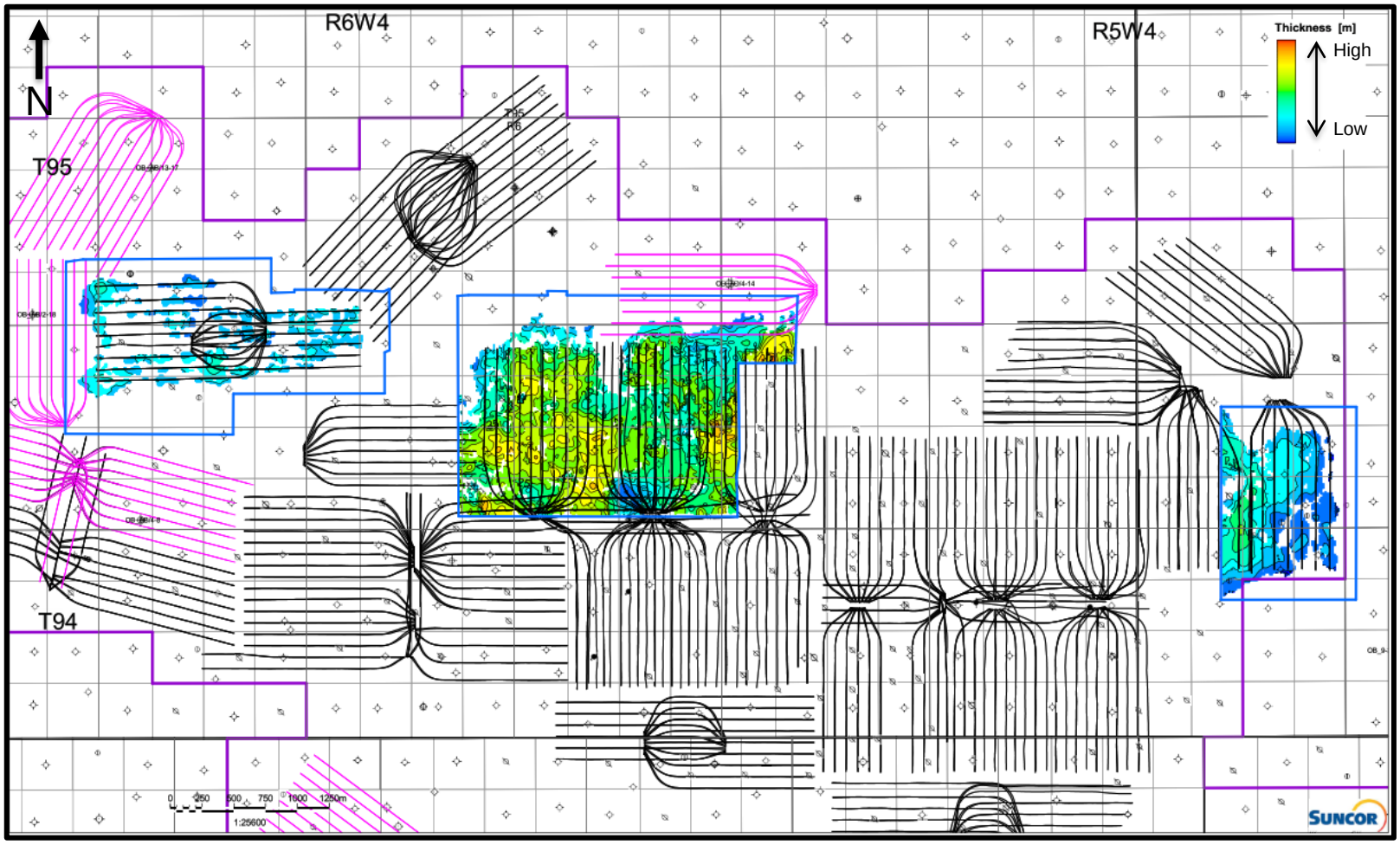
- Data was collected in the year indicated, while the associated interpretation is reported the following year. This is to allow for required processing and interpretation time.



Current Horizontal Wells
Planned Horizontal Wells
2020 4D Seismic



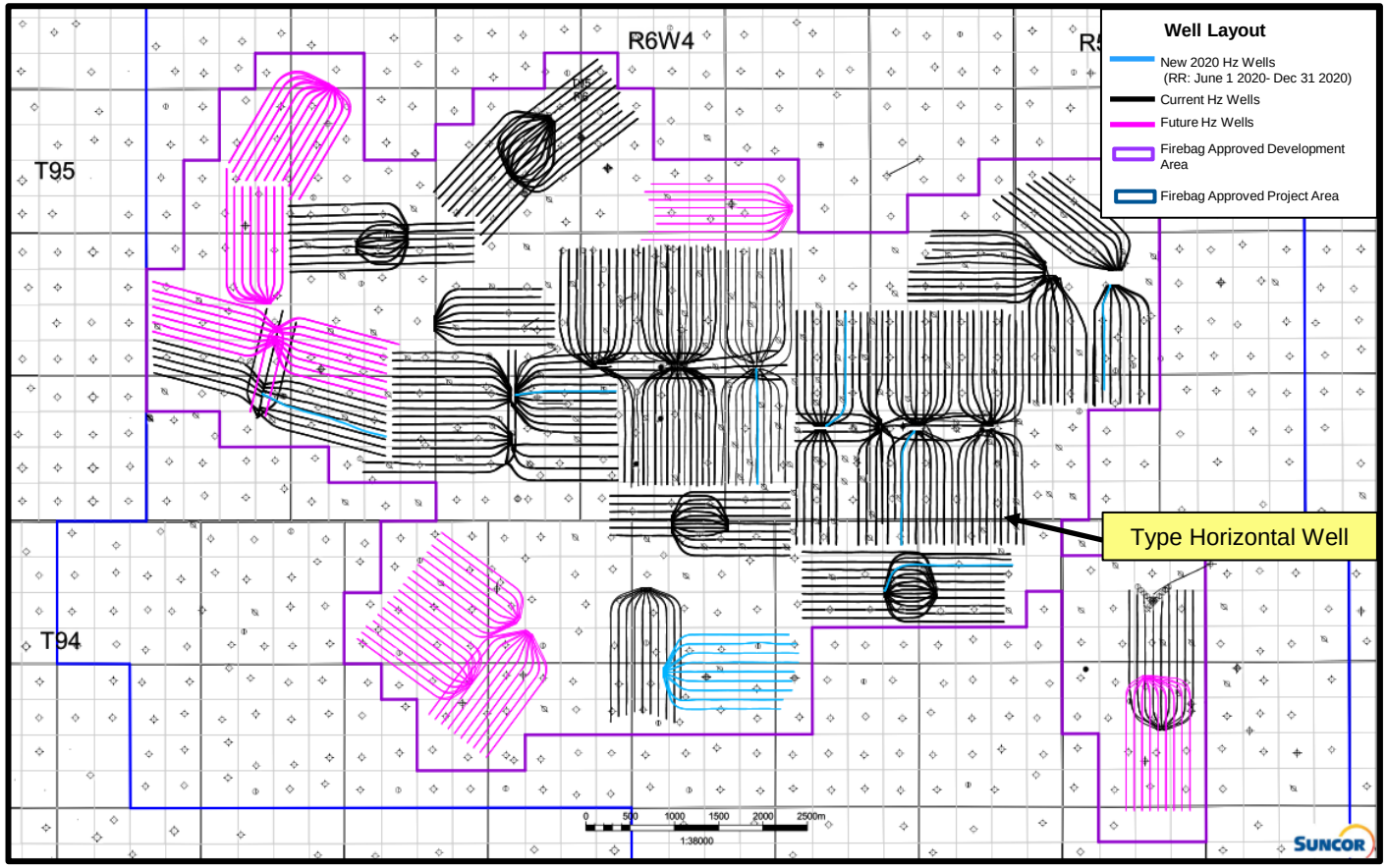
2020 4D Seismic – Steam Chamber Thickness Map



Type Well Location Map

Type Horizontal Well

- Pad 101 Pair 7



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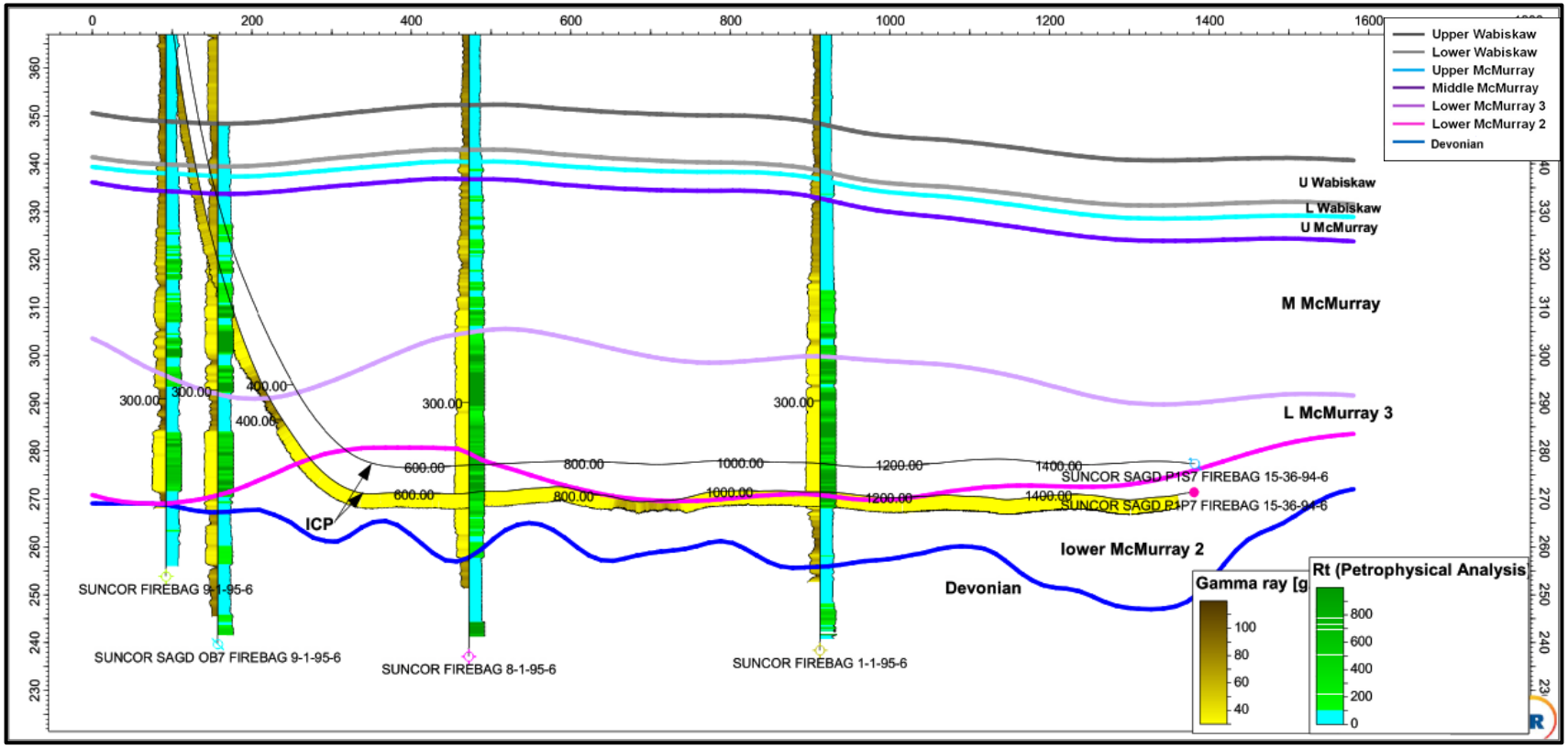
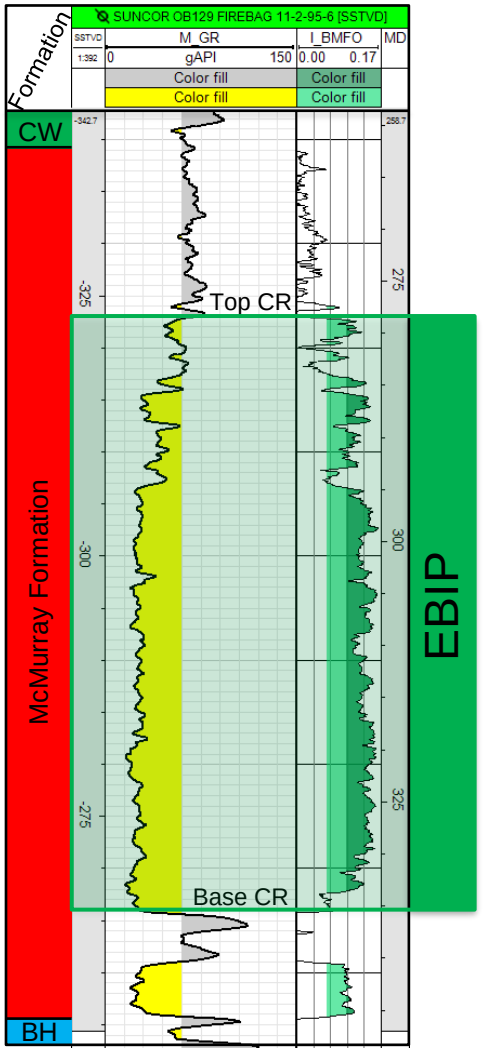
Structural Cross Section Example



Pad 101 Well Pair 7
*Coreholes are projected onto cross section

EBIP Methodology

- 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 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.



CW: Clearwater Formation
BH: Beaverhill Lake Group

Exploitable Bitumen in Place & Average Reservoir Properties

	HC Area (m^2)	Continuous Reservoir Thickness (m)	Porosity	Average Permeability (mD)	Oil Saturation	EBIP (e^6m^3)	EBIP (MMbbl)
SAGD Pad 101	1,758,270	52.6	0.320	5000 - 8000	0.78	23.2	146.0
SAGD Pad 102	1,605,060	56.3	0.317	5000 - 7000	0.74	21.0	132.3
SAGD Pad 103	1,912,850	42.2	0.317	5000 - 7000	0.73	19.5	122.5
SAGD Pad 104	1,909,790	45.0	0.320	5000 - 8000	0.77	21.1	132.9
SAGD Pad 105	2,625,430	37.5	0.326	5000 - 8000	0.78	24.5	154.4
SAGD Pad 106	1,601,710	37.1	0.324	5000 - 8000	0.80	16.1	101.5
SAGD Pad 107	1,381,100	41.7	0.319	5000 - 8000	0.74	13.5	85.1
SAGD Pad 108	1,726,240	45.0	0.322	5000 - 7000	0.75	19.2	121.0
SAGD Pad 109	1,485,780	23.6	0.329	5000 - 7000	0.77	8.9	56.3
SAGD Pad 110	1,449,000	33.2	0.322	4000 - 6000	0.70	10.9	68.6
SAGD Pad 111	1,603,840	41.3	0.325	5000 - 8000	0.79	14.7	92.5
SAGD Pad 112	1,453,330	39.1	0.334	5000 - 8000	0.78	15.9	100.3
SAGD Pad 114	1,472,970	34.1	0.323	5000 - 7000	0.77	12.5	78.6
SAGD Pad 115	749,260	30.1	0.325	4000 - 7000	0.72	5.3	33.4
SAGD Pad 116	1,660,640	39.2	0.327	5000 - 8000	0.78	16.7	104.9
SAGD Pad 117	1,573,170	33.3	0.321	5000 - 8000	0.72	12.6	79.3
SAGD Pad 118	2,027,660	38.8	0.312	5000 - 8000	0.75	18.5	116.2
SAGD Pad 119	852,310	42.8	0.327	5000-8000	0.74	8.9	55.8
SAGD Pad 121	2,078,530	40.6	0.324	5000 - 8000	0.72	19.6	123.6
SAGD Pad 122	2,116,270	36.6	0.313	5000 - 8000	0.69	16.8	105.9
SAGD Pad 123	997,810	42.4	0.318	6000 - 9000	0.75	10.2	64.0
SAGD Pad 124	1,043,610	30.3	0.317	5000 - 8000	0.74	7.4	46.3
SAGD Pad 125	885,320	33.2	0.326	6000 - 9000	0.75	7.2	45.3
SAGD Pad 126	940,360	44.6	0.323	5000 - 8000	0.75	10.2	63.8
SAGD Pad 128	796,430	34.1	0.328	5000 - 8000	0.77	6.8	42.9
SAGD Pad 129	1,037,860	30.5	0.322	5000 - 8000	0.77	7.9	49.5
SAGD Pad 131	919,910	36.1	0.324	5000 - 8000	0.80	8.6	54.2
SAGD TOTAL	**39,664,510**	**38.6**	**0.322**	N/A	**0.75**	**377.9**	**2,376.9**
Firebag Approved Project Area	**194,039,420**	**30.2**	**0.319**	N/A	**0.71**	**1,321**	**8,309**

EBIP: Exploitable Bitumen In Place. Without modification this generally stands for SAGD EBIP or producible bitumen in place.
HC: Hydrocarbon

Changes from last year reflect data from new coreholes, observation wells, time lapse seismic and some reinterpretation. EBIP procedure remains unchanged.

Pad Recoveries

Pad	101	102	103	104	Stage 1 & 2 Totals
Recovery to Date, e3m3	16,637	13,995	11,697	11,832	54,161
Recovery Factor to Date, %	72%	67%	60%	56%	64%
Expected Ultimate Recovery, e3m3	20,990	17,322	14,897	16,757	69,966
Expected Ultimate Recovery Factor, %	90%	82%	76%	79%	82%
EBIP, e3m3	23,216	21,000	19,482	21,138	84,836

Pad	105	106	107	108	109
Recovery to Date, e3m3	12,079	7,265	6,747	5,702	2,396
Recovery Factor to Date, %	49%	45%	50%	30%	27%
Expected Ultimate Recovery, e3m3	17,665	11,337	9,770	9,336	5,407
Expected Ultimate Recovery Factor, %	72%	70%	72%	49%	60%
EBIP e3m3	24,547	16,141	13,529	19,237	8,948

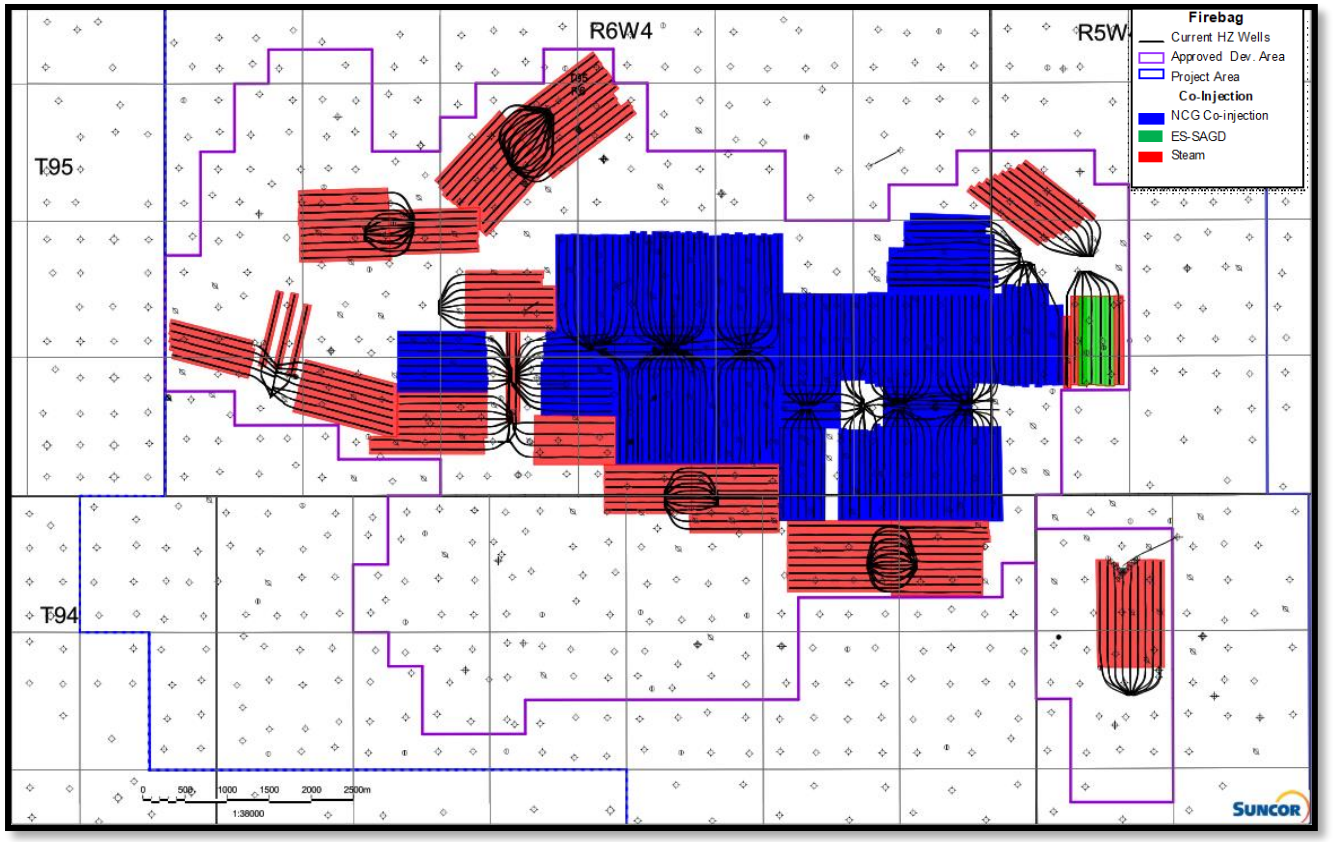
Pad	110	114	115	116	117	118	112	121	Stage 3 & 4 Totals
Recovery to Date, e3m3	2,914	1,523	2,165	7,884	2,174	1,126	522	405	18,713
Recovery Factor to Date, %	27%	12%	41%	47%	17%	6%	3%	2%	17%
Expected Ultimate Recovery, e3m3	6,011	6,537	3,539	11,605	7,519	9,820	8,753	10,668	64,452
Expected Ultimate Recovery Factor, %	55%	52%	67%	70%	60%	53%	55%	54%	58%
EBIP e3m3	10,905	12,498	5,313	16,680	12,606	18,479	15,945	19,648	112,074

Average Reservoir Properties

- Average reservoir properties for the operating portion of the scheme (Pads ***101-110, 112*** and Pads ***114-118, 121,123***)

  - Initial reservoir pressure: 800kPa
  - Initial reservoir temperature: 8°C
  - Average continuous reservoir: 39.5 m
  - Average porosity: 0.322
  - Average oil saturation: 0.76
  - Effective horizontal permeability: 3 to 4 D
  - Effective vertical permeability: 2 to 3 D
  - Viscosity: ~ 11-13.5 cp @ 215°C

Co-Injection Overview



Non-condensable gas (NCG) co-injection has been implemented on the following well pads at Firebag:

Phase 1
- Pad 101
- Pad 102
- Pad 103
- Pad 104
- Pad 107

Phase 2
- Pad 105
- Pad 106
- Pad 108
- Pad 116

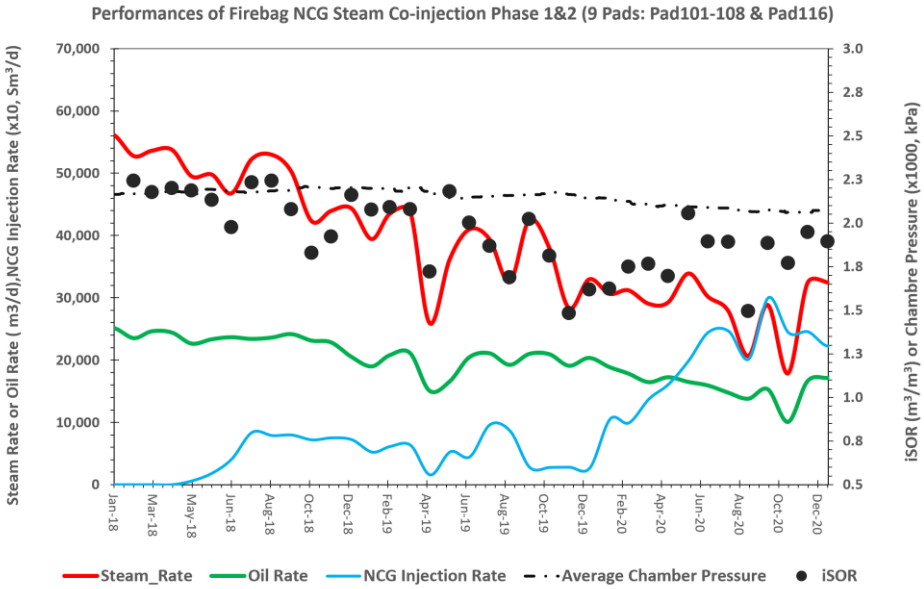
ES-SAGD Co-injection completed May 1, 2020

Co-Injection Strategies

- Non-Condensable-Gas (i.e. methane fuel gas) co-injected with steam has been implemented into 9 mature pads (Pad101-108 and Pad116) since May of 2018.
- Non-Condensable-Gas (NCG) and steam co-injection typically commence on a well pad when recovery has exceeded 50% through means of normal SAGD operations. Geological characteristics, production performance and optimization of surface infrastructure are also considered when evaluating timelines for NCG co-injection.
- Many factors are considered when determining target NCG injection rates:
  - Desired operating pressures (e.g. maturity of the subject steam chamber(s))
  - Field wide strategies for steam allocation
  - Predicted leak off of injected NCG or migration within the reservoir
- Key components of the NCG co-injection strategy at Firebag include:
  - Regularly targeting both steam/NCG injection rates and evaluating the specified performance KPIs.
  - Continuously monitoring and justifying operational strategies where required, depending on observed reservoir response.
  - Collecting data that can be analyzed against the baseline to develop a better understanding of the extent of NCG migration within coalesced steam chambers.

Co-Injection Observations

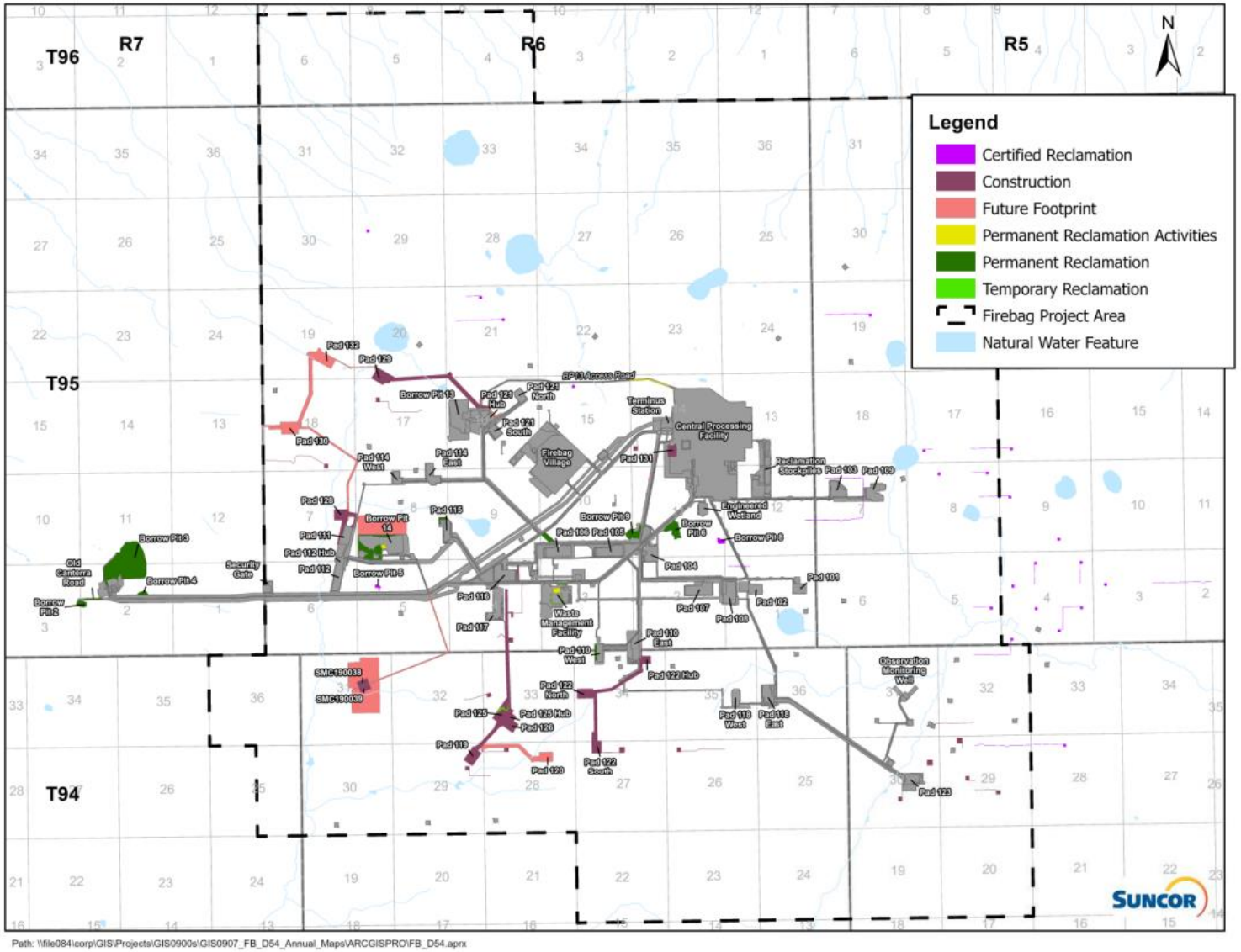
- NCG has been injected continuously injected into Firebag 9 pads.
- No negative impacts.
  - Oil production has continued to follow forecasted natural decline trends while gas rates have been gradually increased.
- SOR has been reduced. Field wide steam injection has been optimized via reallocation to less mature SAGD pads.
- Reservoir pressure targets have been maintained with NCG co-injection after steam cut.
- Produced gas gradually increases from reservoir (~26% of injected NCG is produced back).
- No significant temperature reductions have been observed within existing steam chambers from observation well data.



Surface

4.3

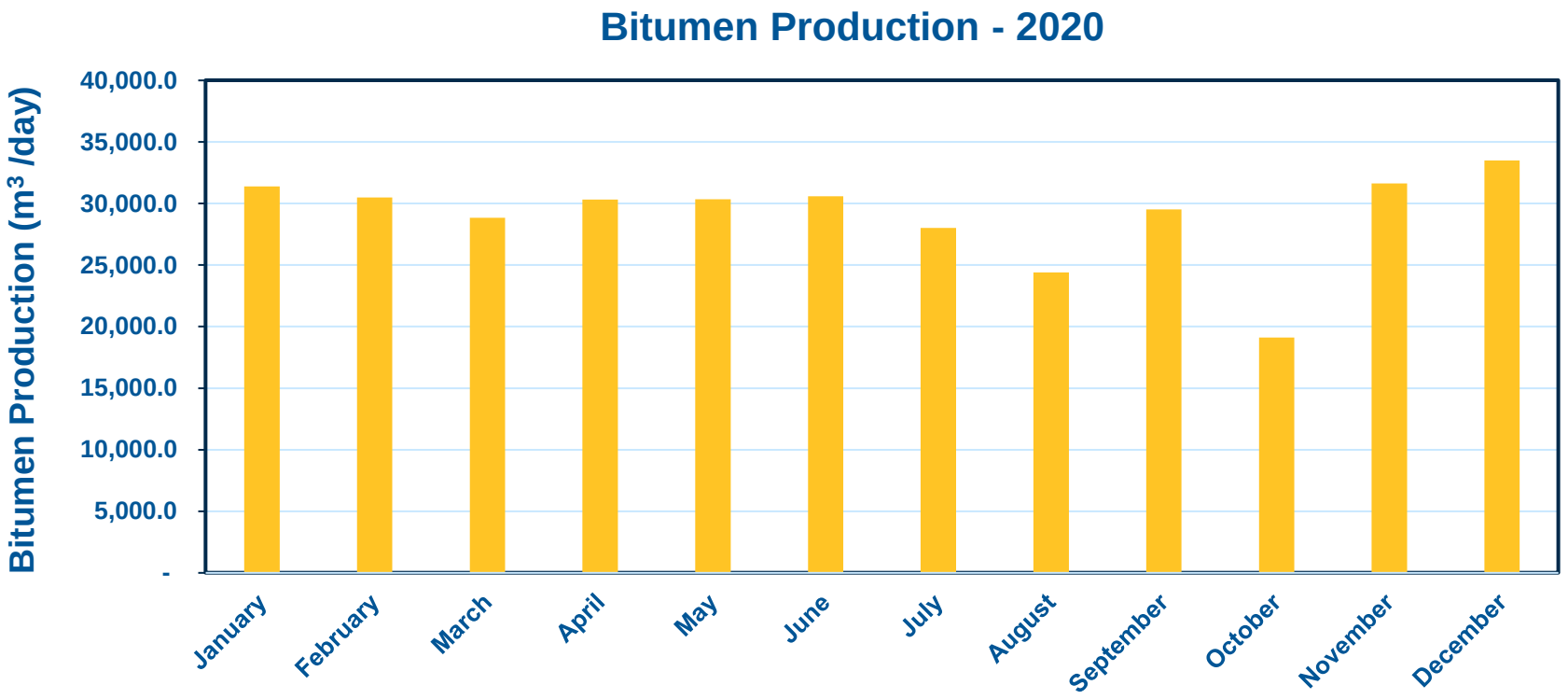
Overview of Surface Infrastructure (Aerial Photo)



There have been no modifications to the Central Processing Plant (CPF) during the reporting period that have required an AER application approval.

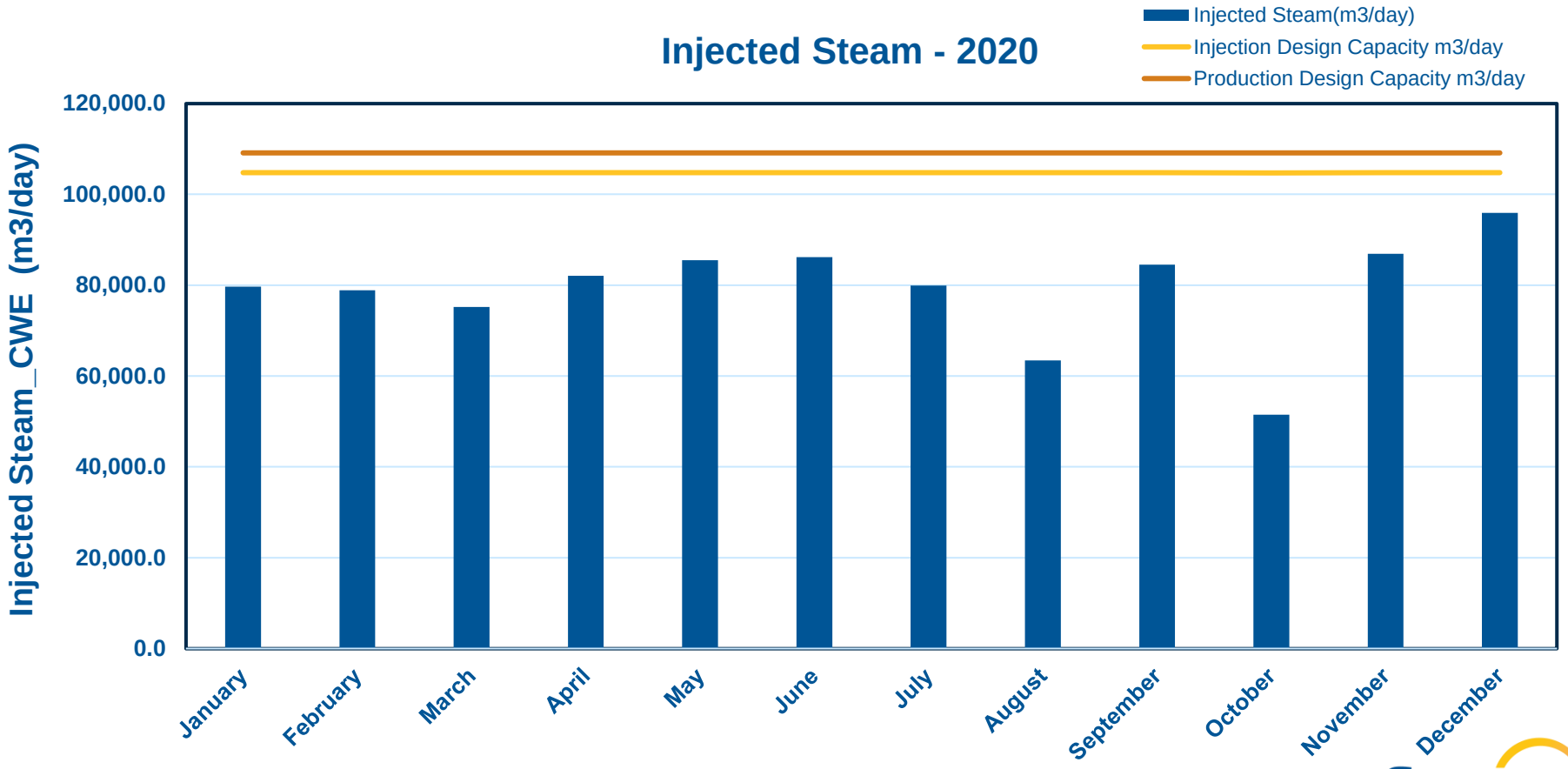
Annual Rates – Bitumen

- From January 2020 to December 2020 Firebag averaged 28,986 m3/day (182319 bbl/d) of bitumen production. The Design rate for Firebag is 203 kbbl/d at 2.8 SOR.



Annual Rates – Steam

- From January 2020 to Dec 2020 Firebag injected on average 79085 CWE m3/day of steam into the wells.
- The average injection design capacity is 104772 m3/d
- The average production design capacity is 109100 m3/d



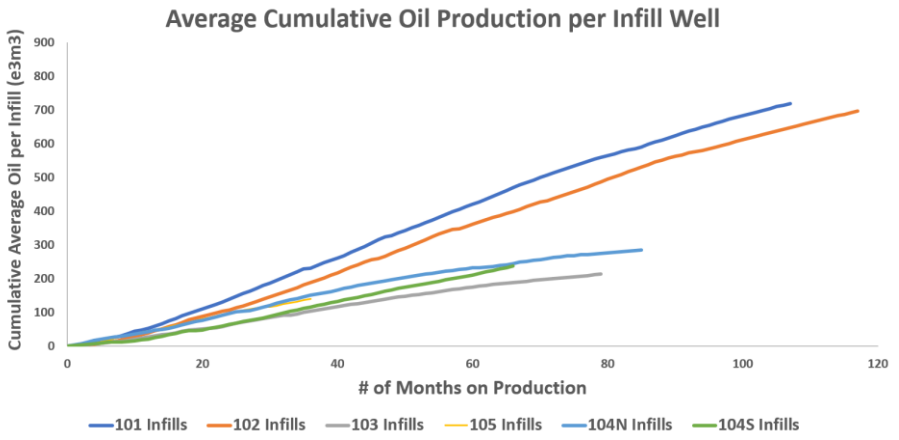
Historical and Upcoming Activity

4.4

Summary of Key Learnings

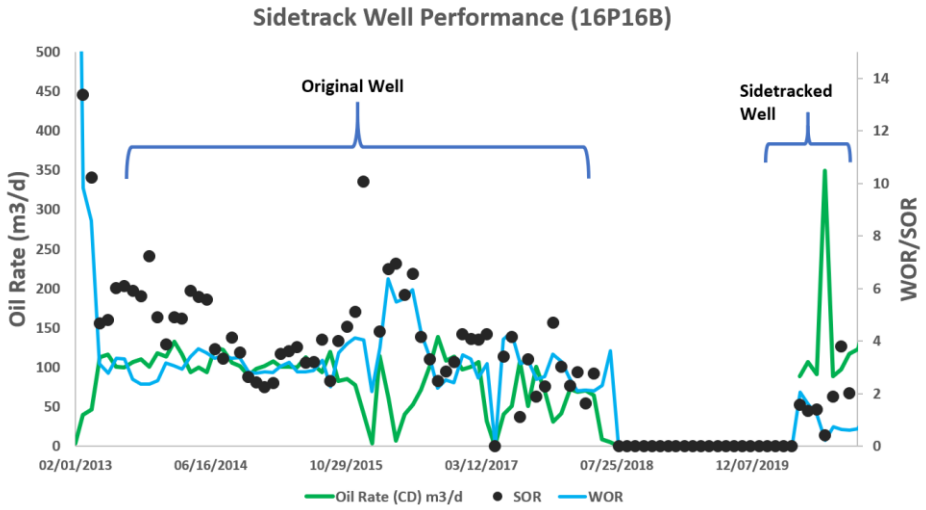
Infill Well Performance

- 51 infill wells are currently in operation at Firebag with average oil production of 849 bbl/d (135 m^3/d) per well.
- Infill well performance is optimized through effective management of infill and base well interactions at the steam chamber level.



Sidetrack Well Performance

- 3 sidetrack wells were brought on production during the reporting period as a part of brownfield development program.
- These sidetrack wells are demonstrating beneficial WOR and SOR metrics as a result of their pre-heated steam chambers.



Summary of Key Learnings

Observation Well Monitoring

- Observation wells continue to be utilized for both caprock integrity monitoring and optimization in the current operating area at Firebag. They also continue to be incorporated into development planning and are drilled for new pads prior to first steam.
- Standard completion designs include a thermocouple string that spans the reservoir zone and into the caprock and/or individual pressure and temperature gauges in specific zones.
- Observation wells around Pad 123 have been useful in assessing reservoir connectivity and mobility using pressure monitoring gauges.

Pad Start Up

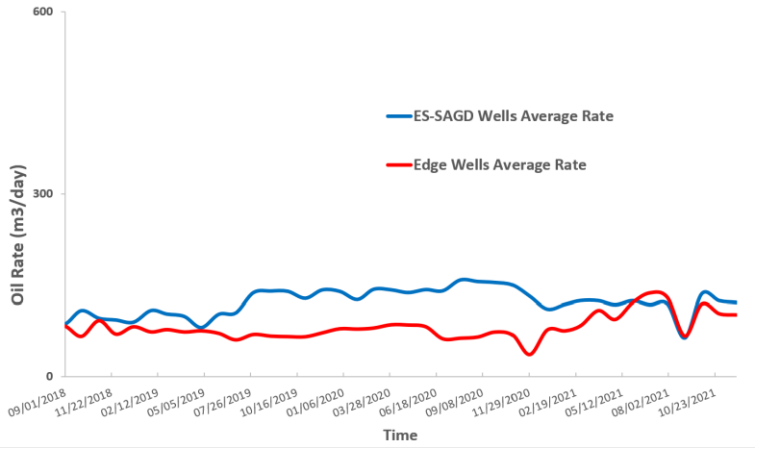
- Combined circulation and bullheading (i.e. without circulating a portion of the steam back to surface) methods have been applied to new pad start ups from Firebag Stage 3 onwards.
- Bullheading requires less cumulative steam to achieve the same reservoir heating as circulation. This reduces cSOR and emissions produced.
- Learnings from Pad 123 show that pay zones with higher bitumen saturations can impact ability to bullhead.

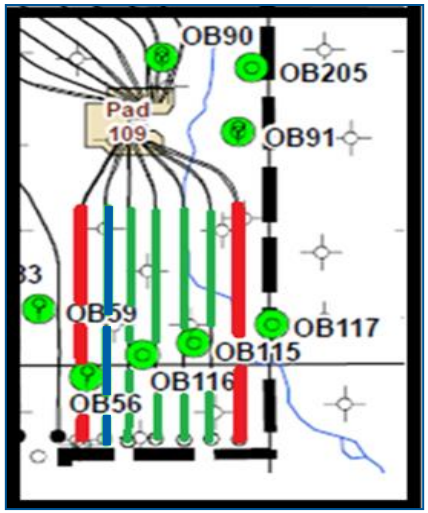
Advanced Reservoir Management for Improved Energy Efficiency

- Firebag is actively exploring opportunities that incorporate data analytics to further optimize steam allocation and subsequently energy efficiency.
- Regional optimization has proven successful in leak-off management strategies, which mitigate the loss of injected energy.
- Steam chamber pressures are balanced between pads to optimize heat efficiency.

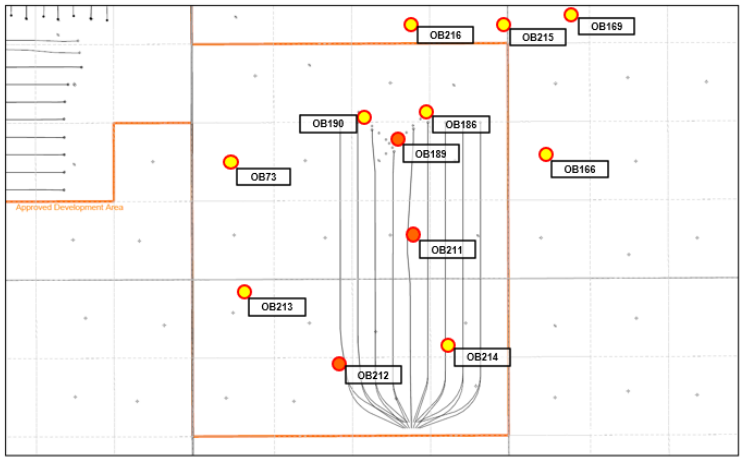
New Technology Update: Pad 109 South ES-SAGD (Hydrocarbon Co-Injection)

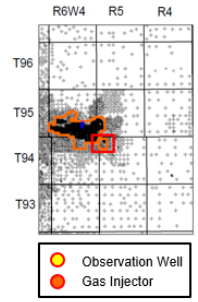
- Baseline data collection at Pad 109S started in July 2018, which included flow measurements and sample collection.
- A dedicated test separator has been operating since the beginning of the baseline at Pad 109S to enable enhanced surveillance of the demo.
- 4 out of 7 well pairs at Pad 109S were used for ES-SAGD, while edge wells were left in SAGD mode for control and pressure fencing. Continuous hydrocarbon co-injection started on April 3, 2019 and finished on May 1, 2020.
- Hydrocarbon co-injection concentration was achieved at 5-15%, within the approved limit.
- Injected hydrocarbon is a multicomponent diluent that is used at the Firebag CPF to dilute the bitumen for processing and transportation.
- Oil rate improvement was observed in the hydrocarbon co-injecting well pairs, while the edge SAGD well oil rates remained at the baseline level. A corresponding reduction in SOR has also been confirmed.
- Early diluent return trends have been established. Suncor continues the surveillance program to collect more data for ultimate diluent recovery factor forecasting.

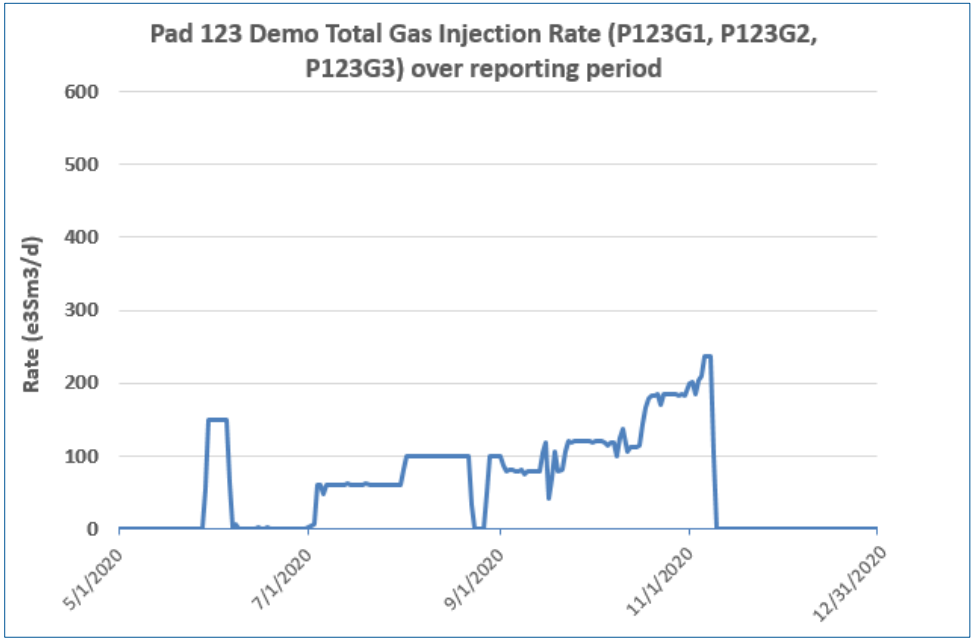




New Technology Update: Pad 123 Gas Injection Demonstration







- Suncor started gas injection in Pad 123 on August 5, 2017 as per AER approval.
- Suncor has safely ramped up to the total injection rate of 480 e3Sm3/d of gas while adhering to the terms of the AER approval with respect to containment of gas in the McMurray zone.
- Firebag fuel gas (primarily methane) is used for the current injection scheme.
- All 3 gas injectors (P123G1, P123G2, P123G3) are utilized. Injection pressure has been monitored and kept below approved MOP during operation.
- Suncor has optimized the gas injection rate/pressure in accordance with long term steam chamber operation associated with Pad 123 SAGD.
- Optimized gas injection schedule is being implemented in support of Pad 123 start-up (first steam was in November 2020).

Summary of Events

- The following horizontal wells were drilled during the reporting period:
  - Pad 122 South (9 well pairs)
  - Sidetrack program (18P3B,12P7B, 7P7B, 9P6B,16P6B, 2P9B, 4P8B)

- The following SAGD well pads were started up during the reporting period:
  - Pad 123: Q4 2020

Suspension and Abandonment Activity

License	Well Type	Well Name	UWI	Spud Date	Activity	ABN/SUSP Date	Justification	Remaining Reserves
462748	SAGD	SUNCOR P112P7 FIREBAG 10-5-95-6	116/10-05-095-06W4/00	2014-06-06	Suspension	16-Sep-2020	Sidetracked to access cellar oil	953,525
457369	SAGD	SUNCOR P109P6 FIREBAG 15-6-95-5	104/15-06-095-05W4/00	2013-07-13	Suspension	27-Sep-2020	Sidetracked to access cellar oil	510,750
421716	SAGD	SUNCOR SAGD P16P6 FIREBAG 13-3-95-6	102/13-03-095-06W4/00	2010-08-19	Suspension	16-Oct-2020	Sidetracked to access cellar oil	626,486
291139	SAGD	SUNCOR SAGD P4P8 FIREBAG 4-2-95-6	100/04-02-095-06W4/00	2004-06-02	Suspension	4-Oct-2020	Sidetracked to access cellar oil	1,561,659
365823	SAGD	SUNCOR SAGD P7P7 FIREBAG 8-11-95-6	102/08-11-095-06W4/00	2006-12-19	Suspension	9-Oct-2020	Sidetracked to access cellar oil	601,950

- Suncor does not anticipate abandonment of any Firebag SAGD pads within the next 5 years.

Future Plans

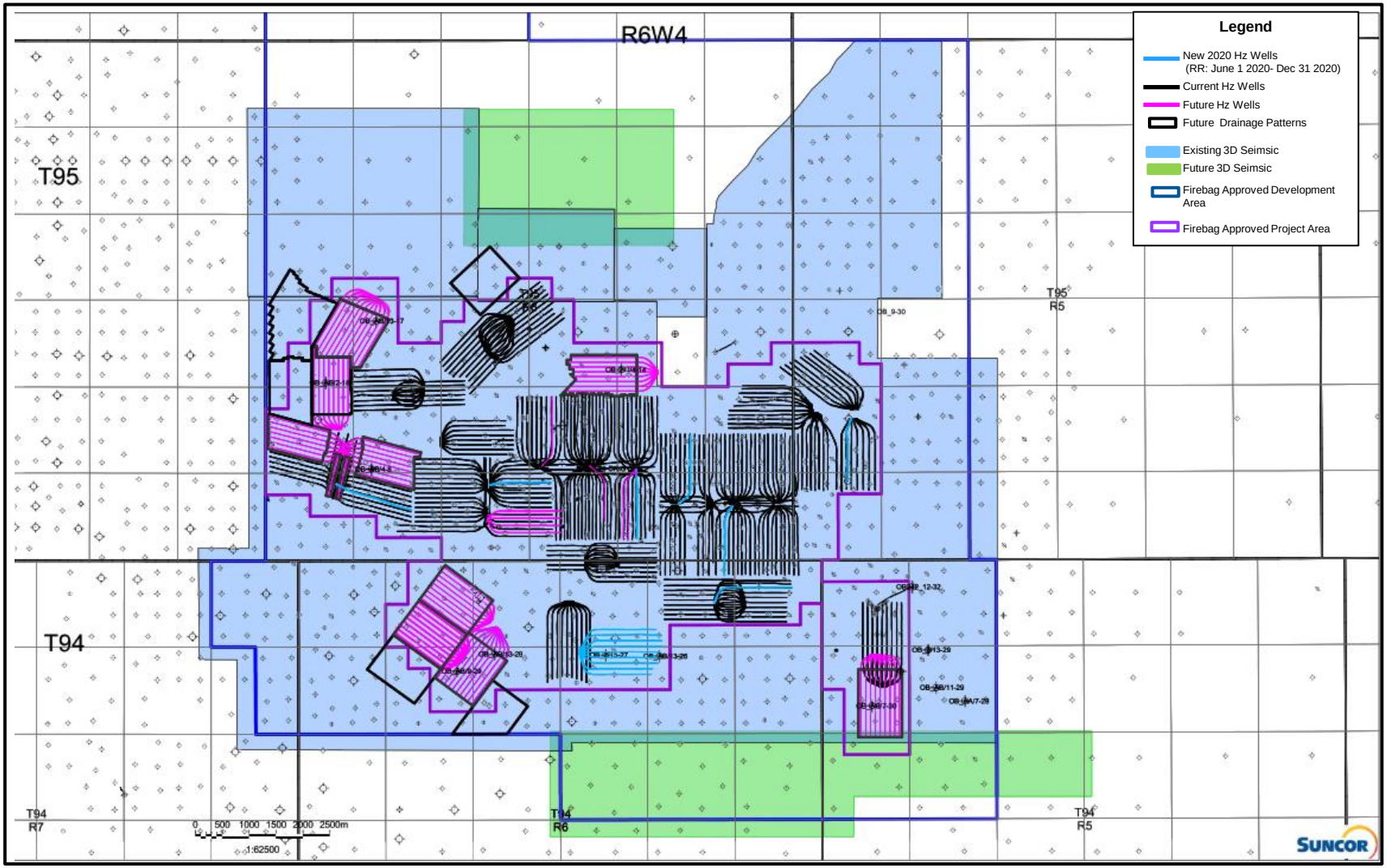
- The following horizontal drilling activities are expected to commence within the next year:
  - Pad 131 (8 well pairs)
  - Sidetrack Program (4N11B, 4P9B, 5P13B, 6P8B,17P3B)
  - Pad 117 Infills
  - Pad 111 (17 well pairs)
  - Pad 125 (9 well pairs)

- The following first steam dates are planned to occur within the next year:
  - Pad 122: Q3 2021
  - Pad 131: Q4 2021

- Coreholes, observation wells, and 4D monitor surveys will be planned as necessary to:
  - Monitor SAGD operations
  - Adequately delineate the resource
  - Further caprock integrity analysis
  - Conduct hydrogeology analysis
  - Conduct water disposal analysis

- Development plans are evaluated annually and are therefore subject to change.

Future Plans- 5 Year Outlook



The above map highlights development activities that are planned at Firebag for the next 5 years. Development plans are evaluated annually and are therefore subject to change.

Regulatory Applications

Approved Applications:

Application No.	Application Name	Date Filed	Date Approved	Application Type
1929412	2020 Five Sidetrack Wells	19-Aug-20	21-Aug-20	Directive 78 Category 1
1930363	2021 Five Sidetrack Wells	18-Nov-20	30-Nov-20	Directive 78 Category 1
1929641	2021 Injectivity test (Lean Zone)	9-Sep-20	25-Sep-20	Directive 23 Category 1

Future Applications:

- N/A

Wellbore Integrity Failure

Well	Date of Failure	Cause
14P10	2019-Mar-01	Intermediate Casing Corrosion
10P1	2020-May-28	Intermediate Casing Corrosion
8S3	2019-Dec-09	Surface casing vent flow

* All repair work is underway according to plan and has been reported. Wells being monitored with a vent nanny

Intermediate Casing Corrosion Prevention:

- Proactive corrosion batch inhibition performed semi-annually on wells that show signs of corrosion during pump changes
- Corrosion analysis logs like caliper, darkvision etc. planned on wells that show signs of corrosion during pump changes

Surface Casing Vent Flow Prevention:

- Following general industry best practices such as good thermal cementing, premium connections on intermediate casing, monitoring CBL logs

Initiatives for Improving Well Integrity:

- Various initiatives are underway and consideration such as proactively changing the wellhead wing valves to improve design (ported AV types) to prevent any freezing occurances

Compliance History

1-June-20 to 31-December-20	Number of Occurences	Reference Number(s)	Date(s) of Occurrence	Details of Occurrence	Suncor Actions
NOx CEMS Exceedance	4	367965 368086 368253 373892	Various Dates	There were 4 incidents where the NOx limit was exceeded on various units including our steam generators and cogeneration units.	Many of the incidents included our cogenerations units going into extended lean-lean mode. The Extended Lean Lean mode is essentially a safe mode with a more stable combustion but results in higher NOx emitted from the unit to the atmosphere.
CEMS Availability Violation	1	374637	November 2020	CEMS Code Section 5.4 Minimum System Availability Requirements and Approval Number 80105-01-00 Schedule III 2 (i) (D).	SRU1 malfunctioned and the trains were switched from 99F-1113 (SRU1) to 99F-1213 (SRU2). The SRU2 analyzer system malfunctioned (pump on analyzer); which resulted in 8 hours of downtime during the switch. The system was switched back to SRU1 after the equipment was repaired on SRU1 (approximately 10 hours). The SRU2 was only operational for a total of 46 hours in the month of November, so the total availability time was 82.61%.
SO2 CEMS Exceedance	1	371835	20-Sep-20	The Sulphur Recovery Unit (SRU) tail gas thermal oxidizer stack 99F-1113 had a one-hour average stack top exceedance on September 20, 2020 from 09:00 hours to 09:59 hours. Value of exceedance was 164.9 kg SO2 per hour average, and the limit is ≤ 133 kg SO2 per hour average.	Inadequate train B performance led to the contamination of the sweet gas analyzer cell causing it to go out of its operating range and that the venturi on the acid gas flow rate analyzer partially plugged off causing the lower than actual flow rate readings. Both the sweet gas analyzer and acid gas flow rate analyzer will be thoroughly inspected.
SRU Incinerator Stack Temperature Violation	1	373599	11-Nov-20	The SRU Incinerator 99F-1113, tripped on high temperature. This then caused the incinerator to lose the required heating, and the temperature started to drop. Operations tried to restart the incinerator, but were unsuccessful. The Electrical and Instrumentation team were then called out to troubleshoot.	The E&I team tightened down the cable on the temperature controller, restarted the device to clear the error, and placed the incinerator back in service. Operations were then able to switch back to the 99F-1113 incinerator. Suncor's maintenance (E&I) department has been assigned the investigation

Compliance History

1-June-20 to 31-December-20	Number of Occurences	Reference Number(s)	Date(s) of Occurrence	Details of Occurrence	Suncor Actions
Venting	9	371261 371445 371769 372414 372422 373173 373256 374029 374465	Various Dates	There were 9 venting incident reported to the AER during this reporting period	Suncor continues to address the number and duration of venting incidents by identifying root causes and implementing corrective actions for each venting event to prevent future occurrances.
Flaring	2	3101156 30978002	11/30/2020 12/17/2020	There were 2 flaring incidents reported to the AER through the "One Stop" system, during this reporting period	1. Acid gas flaring due to the reaction furnaces tripping. The cause was initially from Amine Stripping Unit upset. During re-start ops had troubles with the flame scanner. 2. A cooler on Pad 108 froze in extreme cold temperatures causing flaring.
Ecopit Unapproved Fluids	1	367580	11-Jun-20	IAR 2027929_3572936 - Oilfield Waste Storage Component, known as the "Eco-Pit". Section 2 - Produced fluids/waste must be from within the same production system as the location NE 11-95-06W4M. Both the receiving and the originating site must have the same licensee or approval holder.	On June 11, 2020, a water truck was brought to the Firebag main gate and switched out with the onsite Unit 790479 water truck. Unit 790494 arrived with 16.3 m3 of raw water in its tank that had been loaded at RMWB water station in Fort McMurray. After switching units at the gate, the Clean Harbors Water Truck Operator drove the unit to the Clean Harbor's laydown yard, and parked the unit. This Operator then was given instructions by the Clean Harbors Supervisor to offload the raw water into the Eco-Pit.

Compliance with Daily Average Maximum Operating Pressure

The following occurrences have taken place from June 1, 2020 – Dec 31, 2020 and are reported as per the daily average Maximum Well Head Injection Pressure (MWHIP) Approval (No. 8870LLL):

- During the uploading phase of Pad 123, approved MOP (4040 kPa) was exceeded for a short period of time in WP4 from blanket gas reading.
  - P123P4 exceeded Maximum Operating Pressure (MOP) of 4,040 kPa on Dec 7 at 2:14am. On Dec 7 at 10:18 pm returns were opened on the producer well and pressures dropped.
  - P123S4 exceeded maximum operating pressure (MOP) of 4,040 kPa on Dec 7 at 7:47 am. Pressure trended below 4,040 kPa on Dec 8 at 9:11am.
- 123P4 & 123S4 were both on blanket gas injection for bottomhole pressure monitoring (No steam injection).
  - Injectivity on pad 123 was low and there were challenges unloading/displacing the fluid in the tubing.

Update on Deferral Approval for 4P10 Repair of SCVF

- As per Nov 10, 2016 Approval, Suncor has drilled 3 Quaternary monitoring wells on Pad 104 to determine groundwater flow direction and monitor potential for groundwater impacts around the SCVF at 4P10.

- Based on Statistical and Geochemical Analyses conducted to date, results indicate increasing trends of a few parameters are due to heating as opposed to SCVF gases (2020 Groundwater Compliance Monitoring Report, Suncor Firebag Facility, Central Processing Facility and Well Pads, Approval No. 0080105-01-00, March 2021).

- In 2021, Suncor installed wells QW23 and QW25 upgradient of 4P10A, 4P10B and 4P10C as per the requirements of the Directive for the Assessment of Thermally-Mobilized Constituents for Thermal In Situ Operations.

- Suncor has received permission to remove sampling of 4P10A and 4P10B from the sampling program and continue with the sampling of the new upgradient wells.

- Results of groundwater sampling at 4P10C, QW23 and QW25 are to be reported in detail within the Firebag Annual Groundwater Compliance Monitoring Report as per Approval No. 0080105-01-00 going.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