

ORION PROJECT

2020 ANNUAL PERFORMANCE REPORT | SUBMITTED APRIL 30, 2021



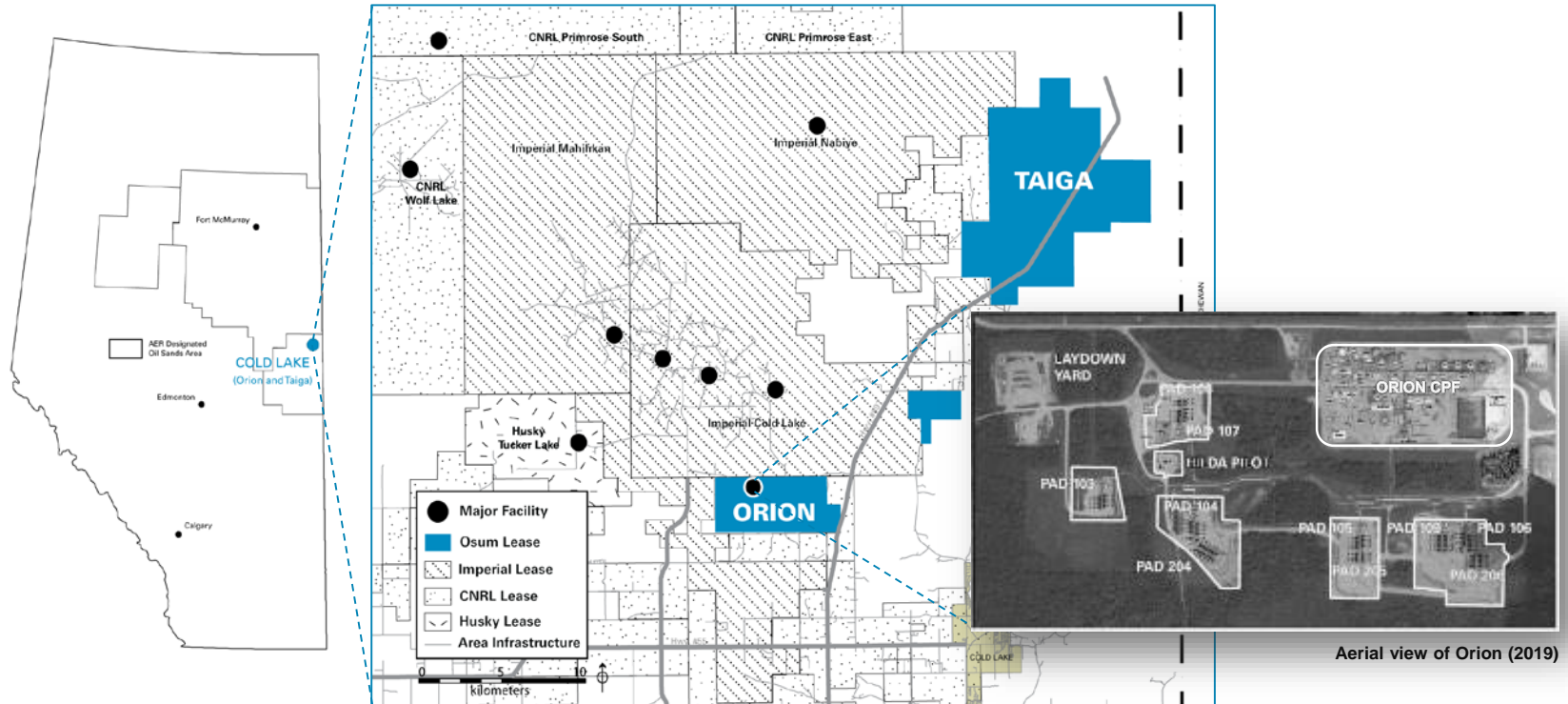
osum

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Introduction: Project Location



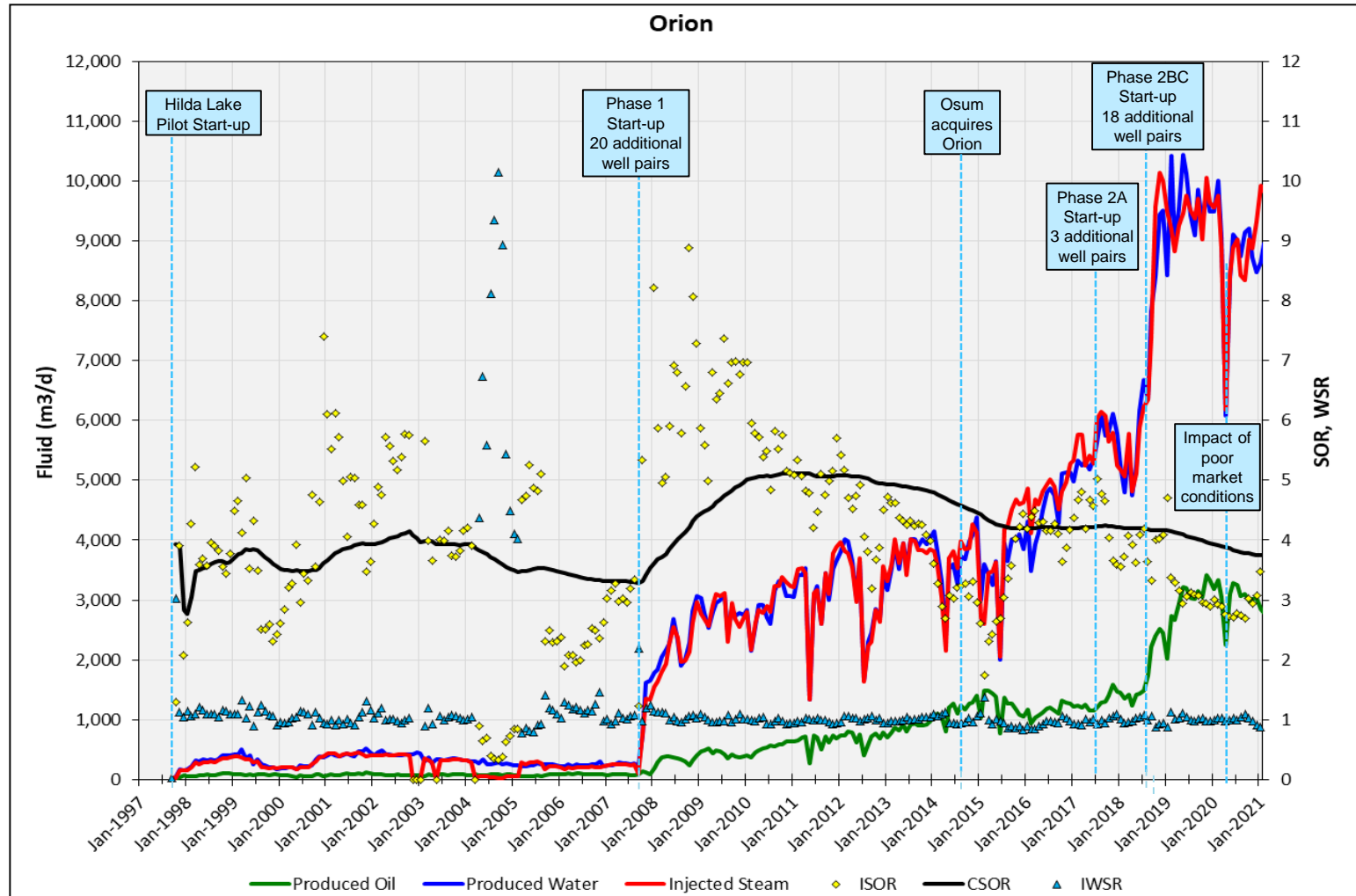
Orion is an in situ oil sands steam-assisted gravity drainage (SAGD) project consisting of a central processing facility (CPF) and five well pads situated in 13-16-064-03 W4M, approximately 30 km north-west of Cold Lake, Alberta.



Subsurface

Orion In Situ Oil Sands
2020 Annual Performance Report

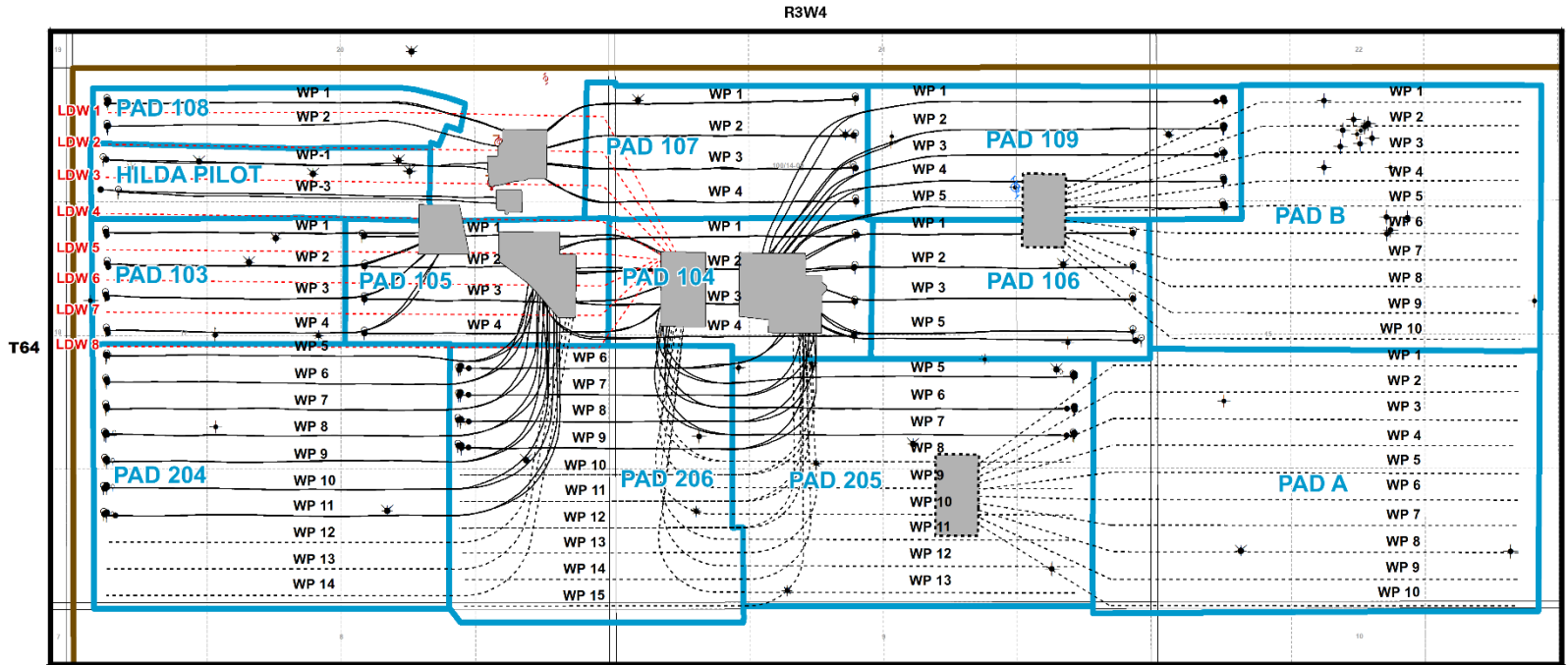
Scheme Lifespan Production Plot



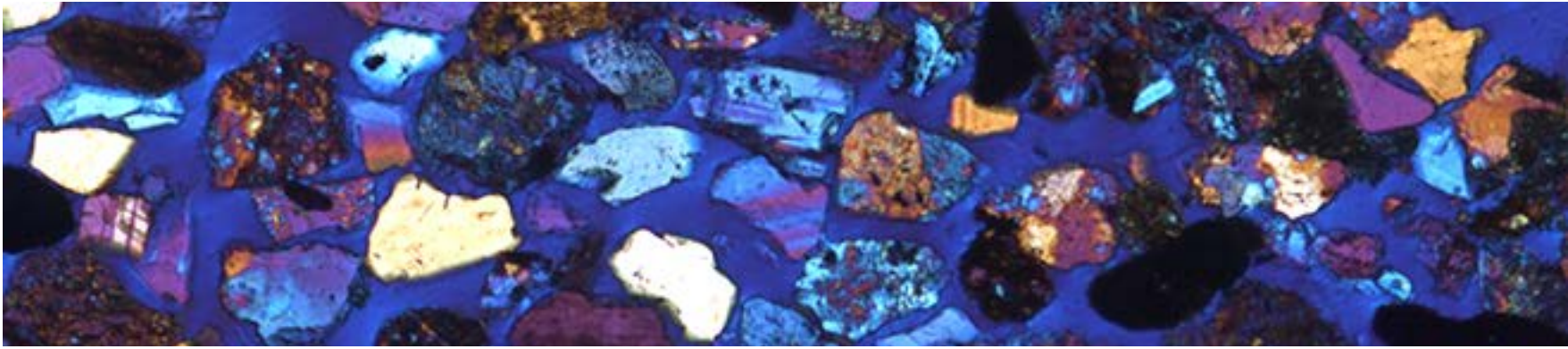
From inception to December 31, 2020.

Provincial production curtailment impact in 2018 and 2019; reduced production in Mar-Apr 2020 due to poor market conditions.

Drilled and Approved Drainage Patterns



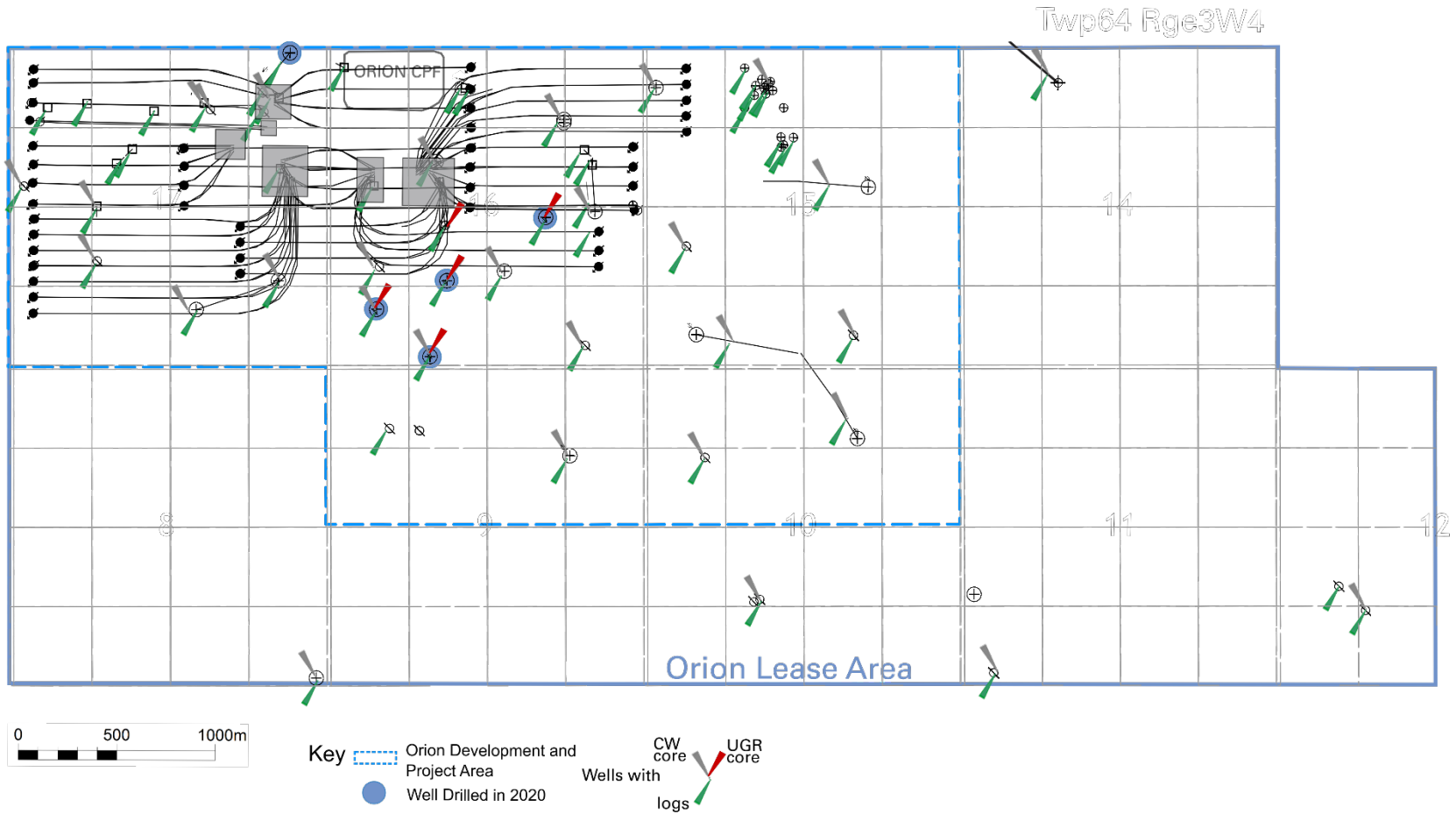
- Producing SAGD Pair - - - - - Approved Lower Drainage Well ■ Developed Surface Pad □ Subsurface Drainage Area
- · · · · Approved SAGD Pair ▨ Approved Surface Pad ▭ Osum Project Lease Area



Geoscience

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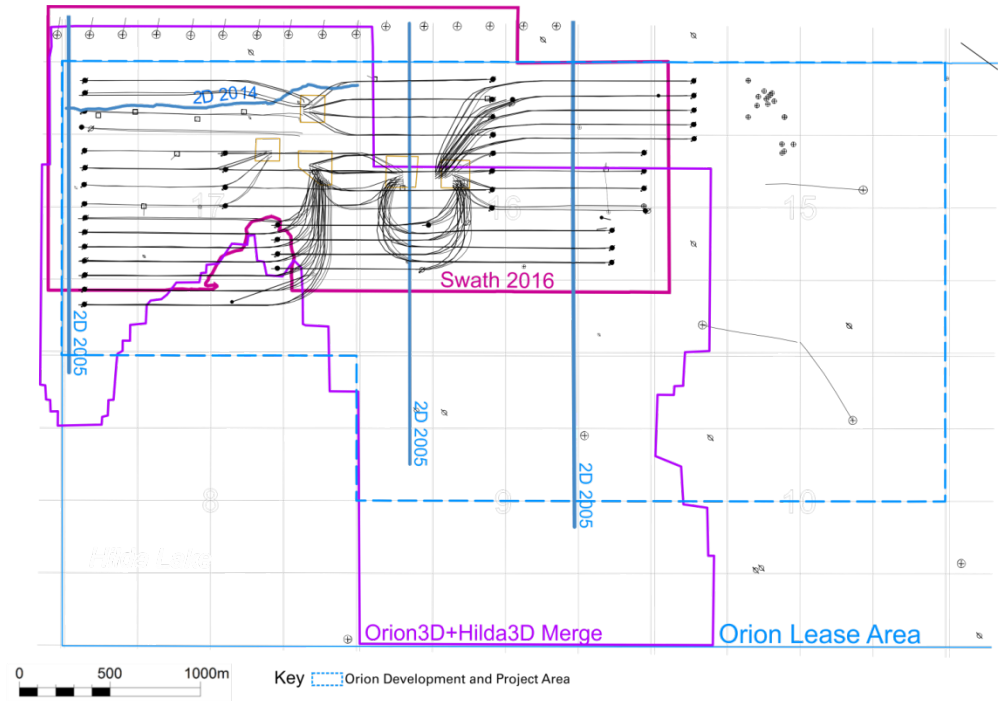
Project Area and Well Data



Seismic Data

3D, 2D & Swath Datasets:

- Hilda 3D – 2005, 1.8 km²
- 2D – 2005, 3 lines
- Swath – 2007, 1522 records
- Orion 3D – 2009, 6.6 km²
- Swath – 2009, 1705 records
- Swath – 2011, 1074 records
- Swath – 2014, 1708 records
- 2D – 2014, 1 lines
- Orion 3D & Hilda 3D Merged - 2015
- Swath – 2016, 1688 records



No Seismic Data Acquired Since 2016

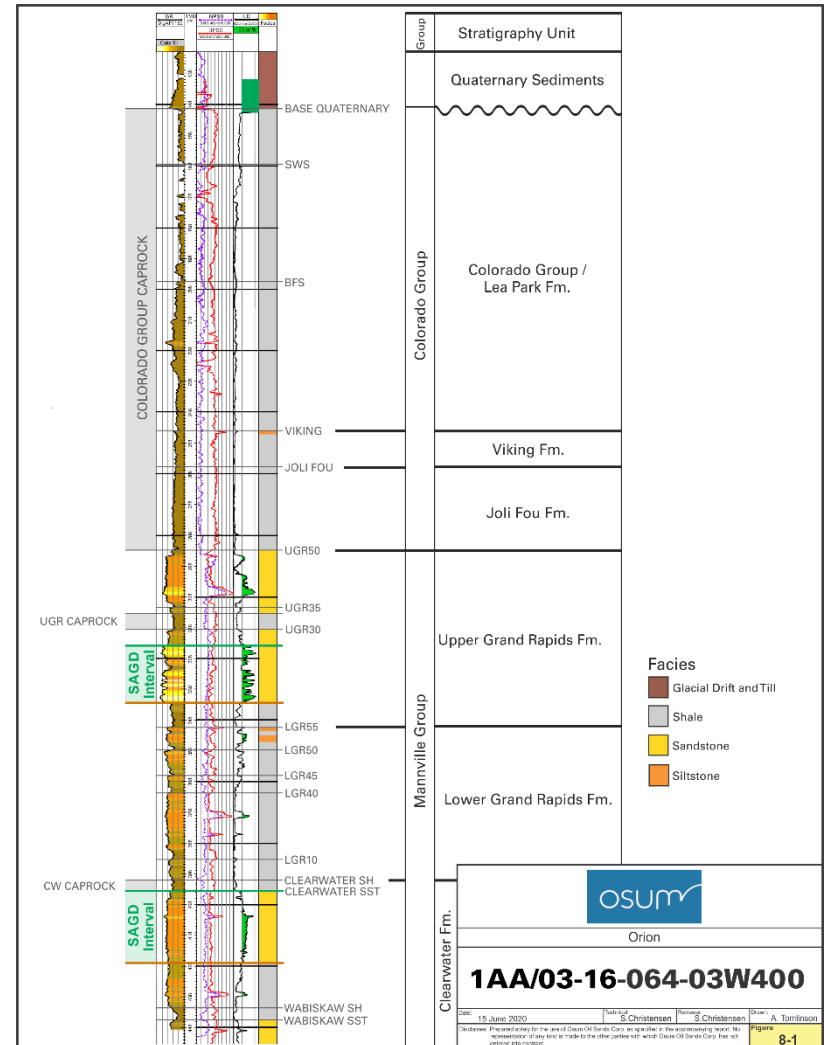
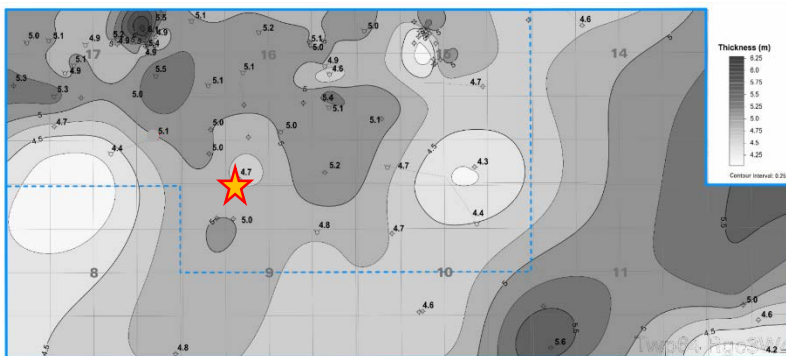
New Data Acquisition Update – Mini-frac Test

Mini-frac testing completed in well 1AA/03-16-064-03W4/00 on March 5, 2020

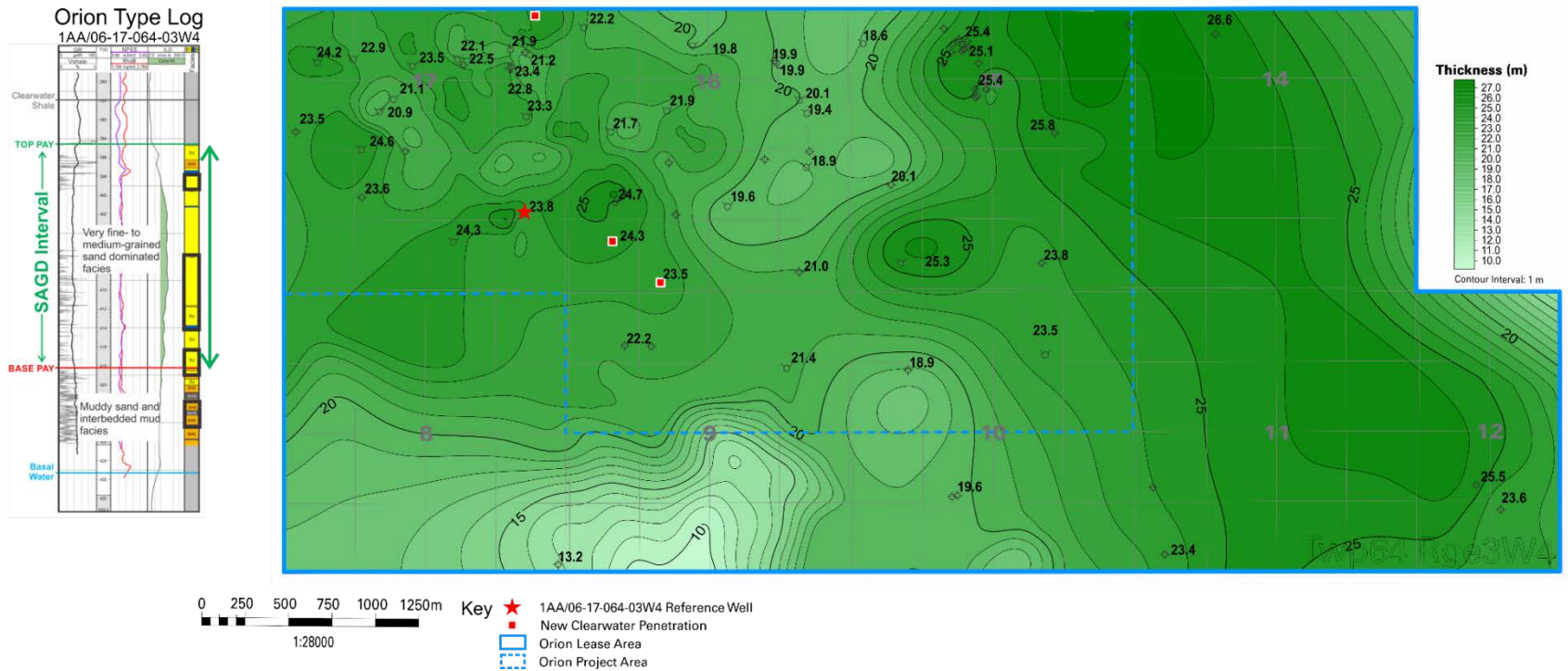
Objective: To determine the minimum stress gradient in the Joli Fou, Grand Rapids, and Clearwater caprock intervals

Results Summary:

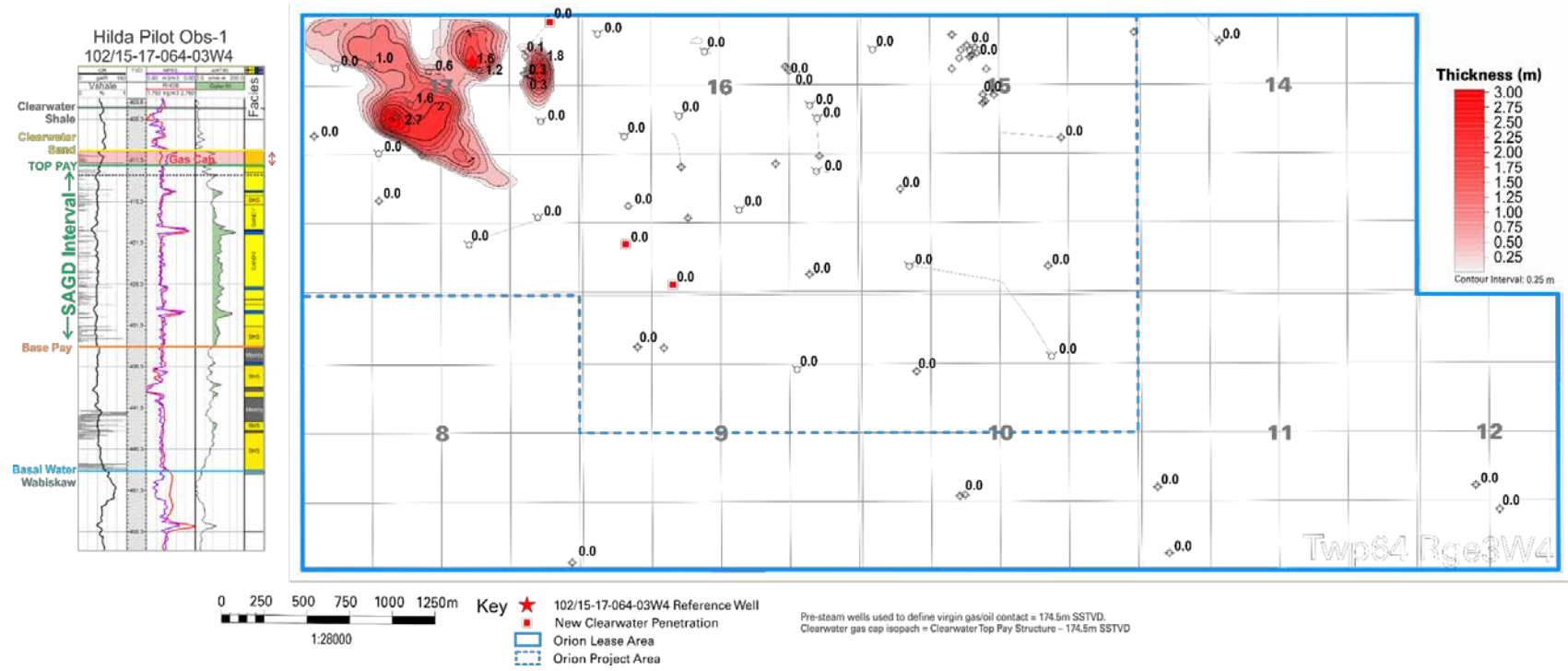
Zone	Test Depth (m MD)	Minimum Stress Gradient (kPa/m)
Joli Fou Shale	269.0	19.9
Grand Rapids Shale	312.0 315.5	19.0
Clearwater Shale	401.0	20.9



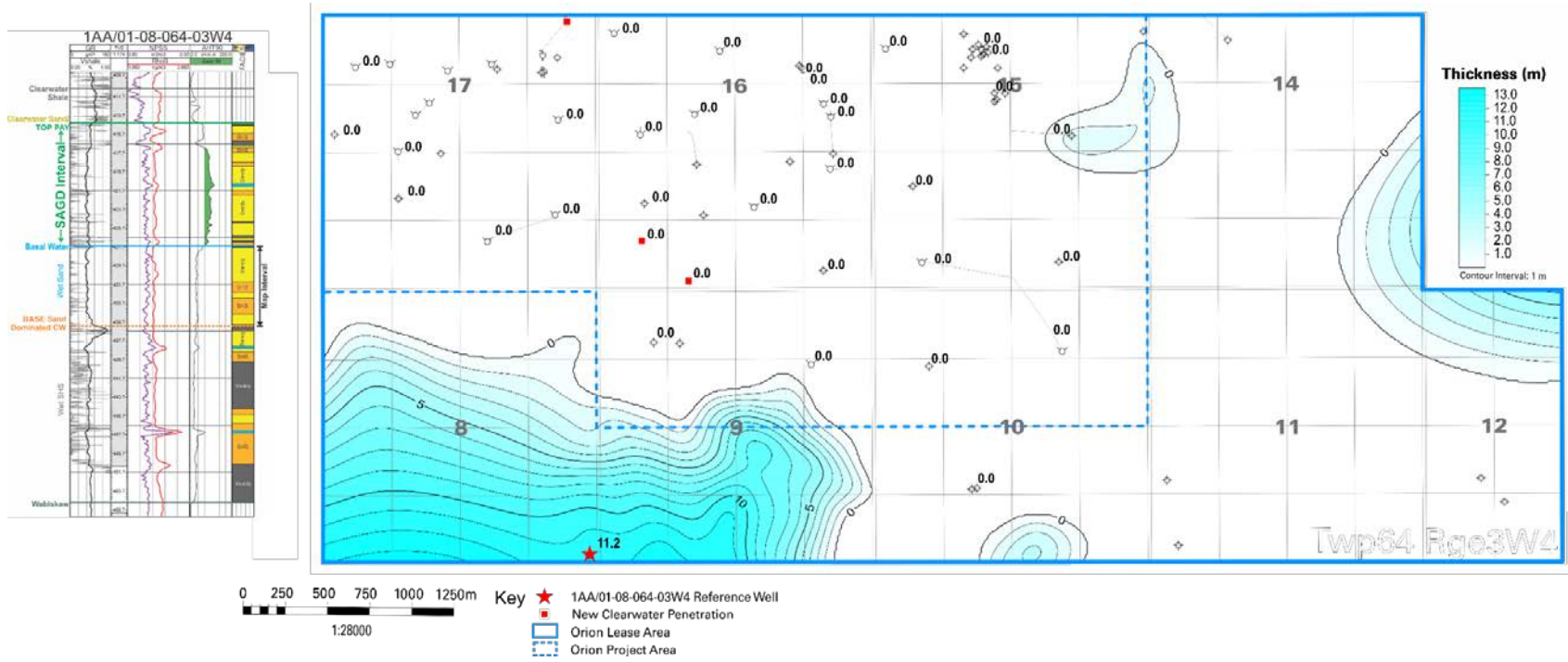
Clearwater SAGD Reservoir Isopach



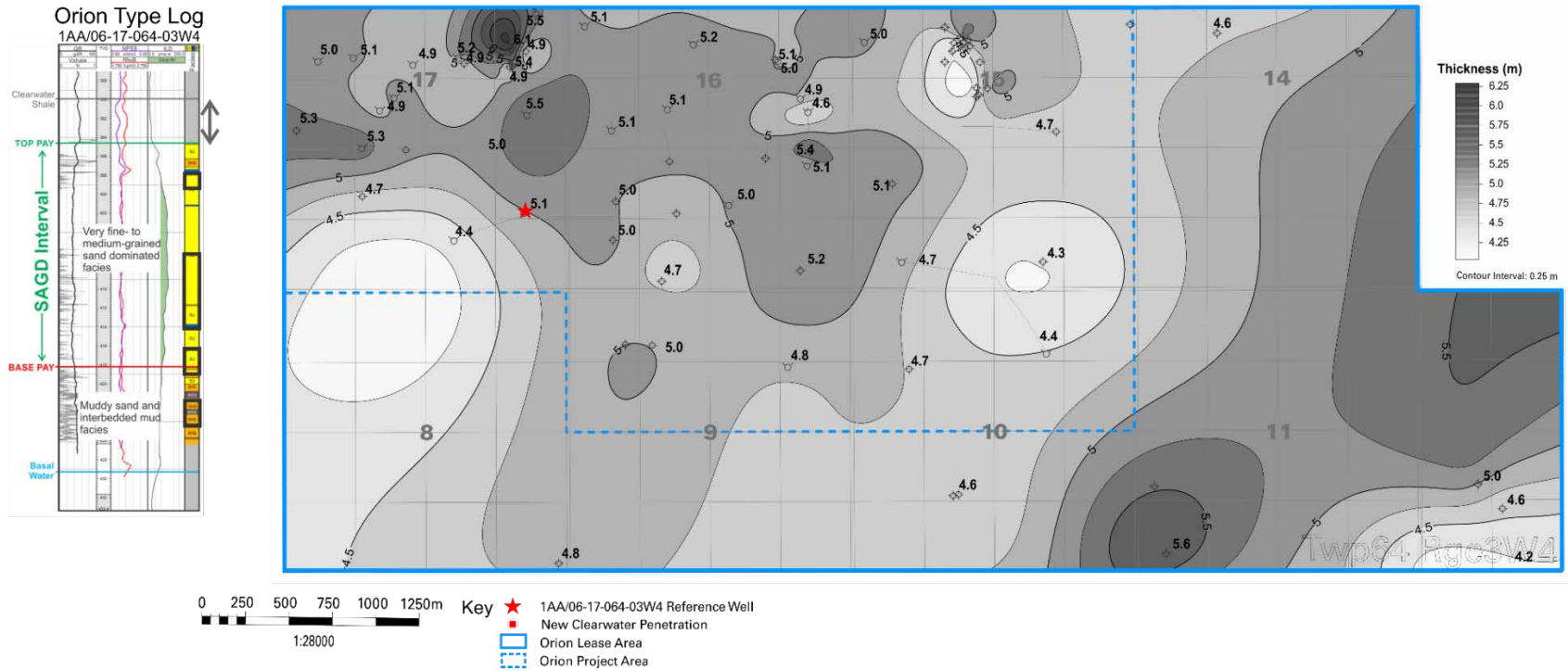
Clearwater Gas Cap Isopach



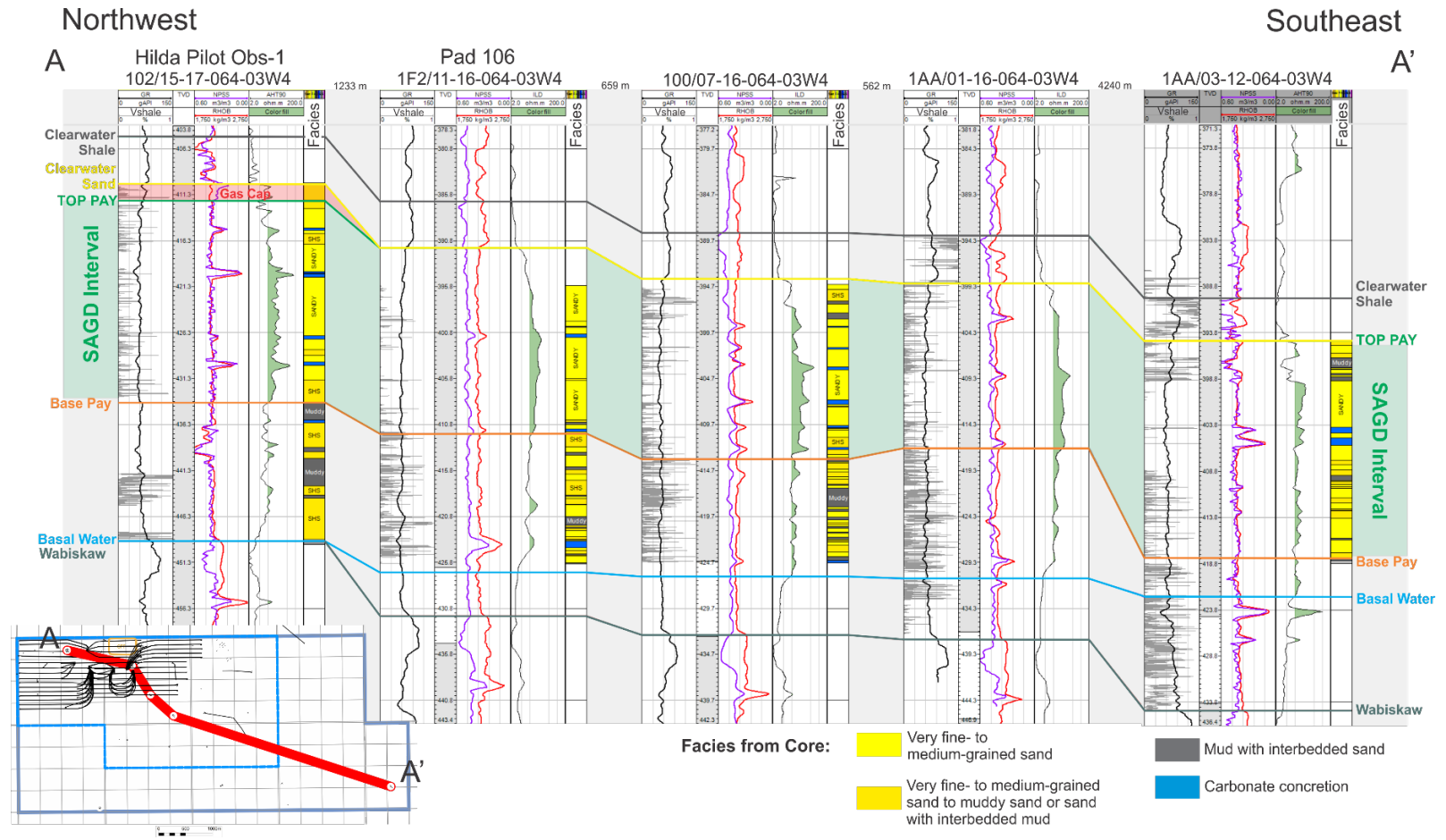
Clearwater Reservoir Basal Water Isopach



Caprock Isopach



Structural Cross-Section



Reservoir Properties and Producible Bitumen in Place (PBIP)

PBIP and Recovery to Date ⁽¹⁾							
Pad	Start Date	Operating Well Pairs	Well Length	Well Pair Spacing ⁽²⁾	Total PBIP ⁽³⁾	Current Recovery ⁽⁴⁾	Estimated Ultimate Recovery
Name	Date	#	m	m	10 ⁶ m ³	%	%
Pilot	Sep 1997	2	950	100	1.14	69	>70
Pad 103	Oct 2009	4	670	100	1.53	65	>70
Pad 104	Oct 2007	4	695	100	1.79	33	50-60
Pad 105	May 2008	4	675	100	1.46	67	>70
Pad 106	Sep 2007	4	730	100	1.76	32	50-60
Pad 107	Sep 2007	4	700	100	1.67	50	50-60
Pad 108	Jun 2017	2	1,000	70	0.88	24	50-60
Pad 109	Sep 2018	5	1,000	80	1.74	13	50-60
Pad 204	Jun 2017	7	1,000	80	2.76	22	50-60
Pad 205	Jul 2018	3	1,000	80	1.00	18	50-60
Pad 206	Sep 2018	4	800	80	1.21	17	50-60

SAGD Reservoir Properties		
Depth	metres	425
Pay Thickness	metres	16-25
Average Porosity	%	35
Average Oil Saturation	%	66
Average Bitumen Weight	%	10
Horizontal Permeability	Darcies	2 to 6
Kv:Kh	X	0.8-0.9
Temperature	°C	15
Pressure	MPa	3.2
Oil Gravity	°API	10 to 11
Viscosity at 16°C	cP	200,000

(1) As of December 2020

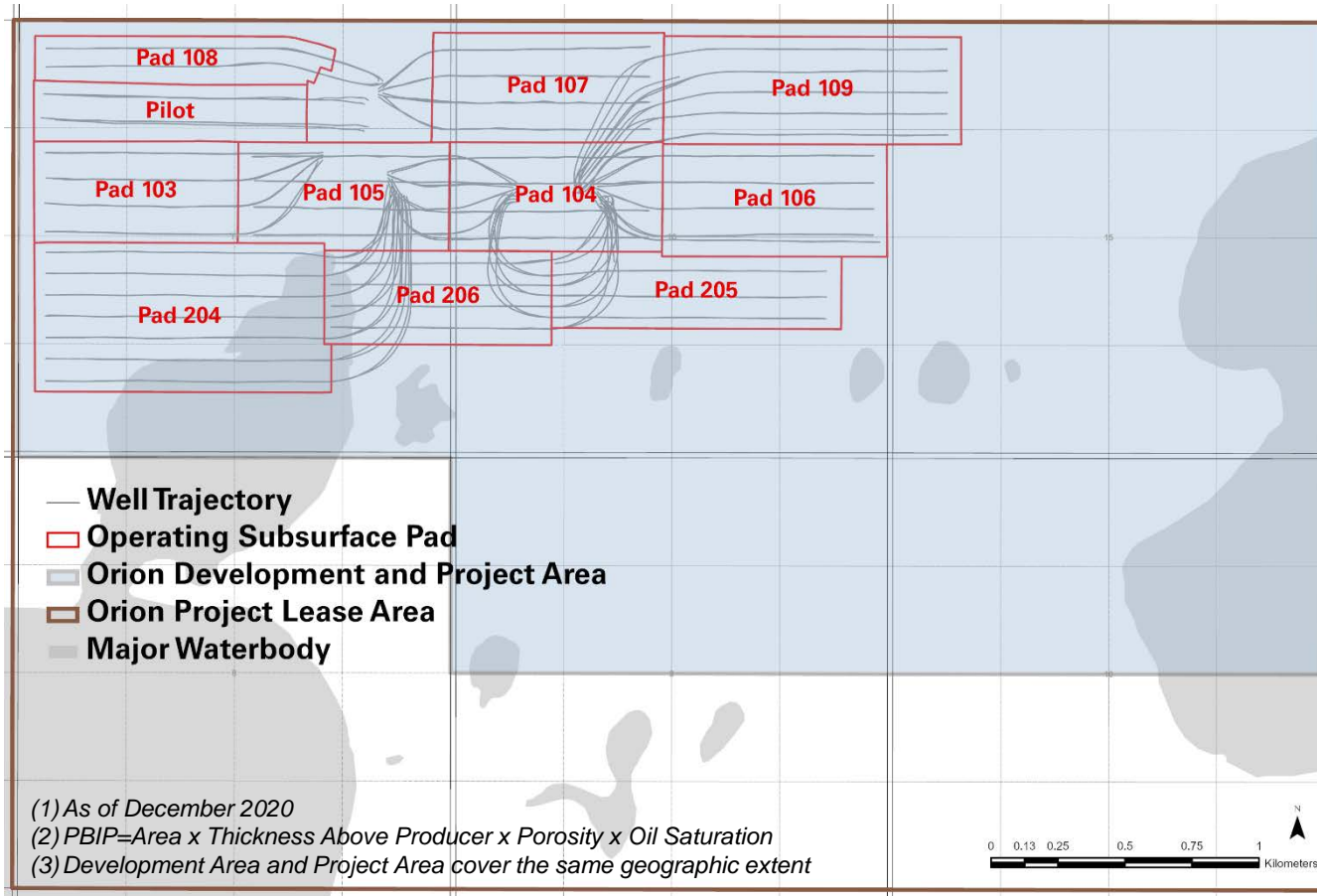
(2) Approximate Well Pair Spacing, m

(3) $PBIP = \text{Area} \times \text{Thickness Above Producer} \times \text{Porosity} \times \text{Oil Saturation}$

(4) Recovery as of December 2020, on PBIP basis

Producible Bitumen in Place Continued (PBIP)

Area	Drainage Size	Operating Well Pairs	Total PBIP ^(1,2)
	10 ³ m ²	#	10 ⁶ m ³
Operating area	3681	43	16.9
Development and Project Area ⁽³⁾	10523	43	50.1





Surface Operations

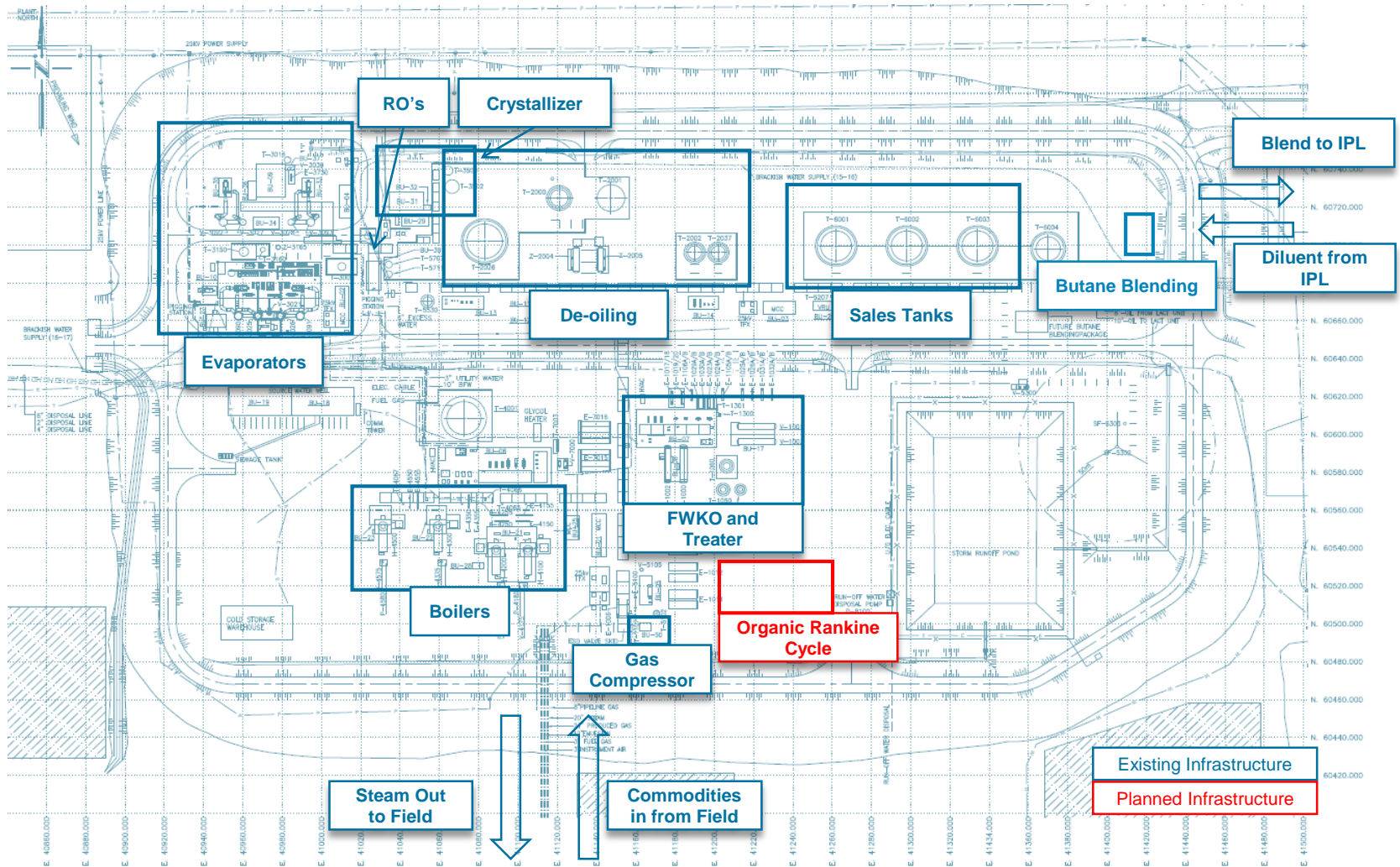
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Facility Highlights

No major modifications were done to the CPF requiring AER approval for 2020; facility highlights are associated with operation optimization activities such as:

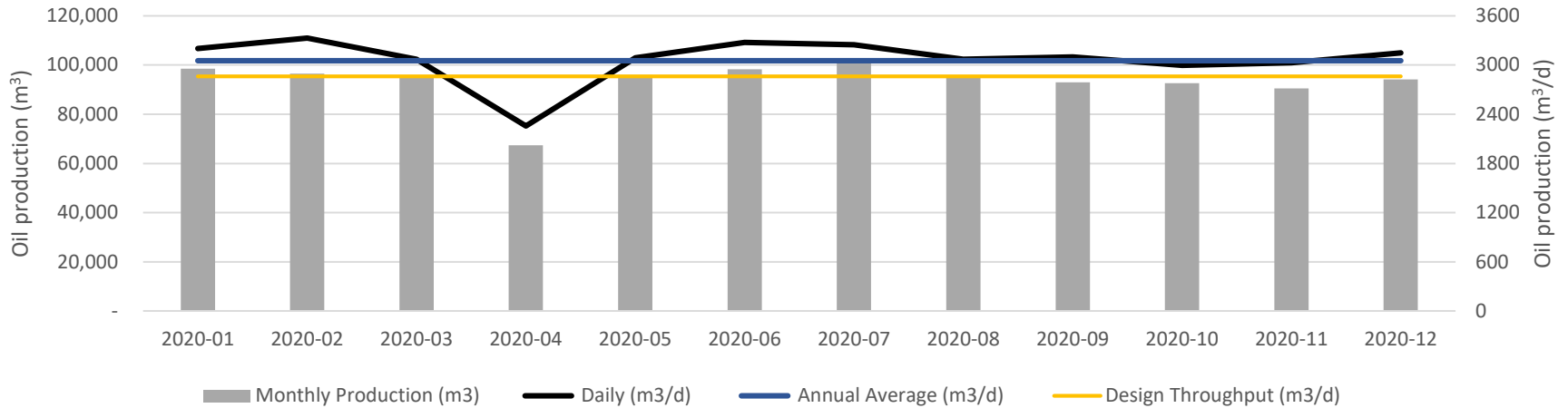
- Multiple chemical trials/pilots (Reverse Emulsion Breaker (REB), Emulsion Breaker (EB), viscosity reduction chemistry trial performed in the facility.)
- Gas lift completions: 15 Phase 2 wells converted in 2020
- Increased gas lift volumes from field into CPF, identified needs for enhanced boiler master control logic along with inlet control edits and tuning. Plant logic addition and tuning completed in June.
- Steam valve and bonnet leak issues resolved with material change on ring gaskets. Continuing with ongoing inspection and preventative maintenance program.
- 2020 facility turnaround deferred until Sept 2021 due to pandemic impacts.
- Pipeline sales butane trim injection system commissioned Nov 2020.

Orion Central Processing Facility Plot Plan

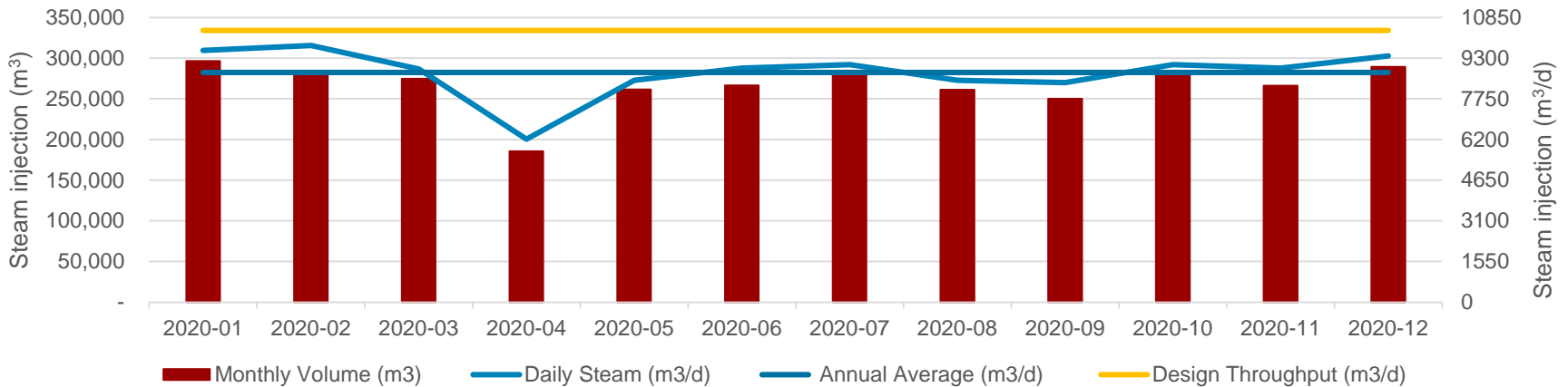


Orion Bitumen and Steam Performance

Annual Bitumen Rates against Design Throughput



Annual Steam Production against Design Throughput



2020 Compliance Summary

Approval Number	Compliance Reporting	Corrective Actions
EPEA 00141258	Compliant with all conditions of approval.	
Water Act License 00242090	Compliant with all conditions of approval.	
Directive 13/IWCP Program	Compliant.	Completed all required suspensions and abandonments

Wellbore Integrity

- Casing inspection logs were conducted on P107 P2 COLD LK 14-16-64-3W4 and OPC P3 ETHELLK 13-17-64-3 W4. The 9-5/8” intermediate casing was intact and corrosion was within specifications.
- Eight (8) damaged Surface Casing Vent Assemblies (SCVA) were repaired in 2020, six (6) more are planned to be repaired in middle of 2021.
- As a preventive measure, wellhead casing and tubing outlet valves were regularly inspected by a third party. Valves with bonnet gaps out of specification were repaired or replaced.
- Implemented a torque verification program targeting 20% of the serviced wells.

2020 Scheme Amendments

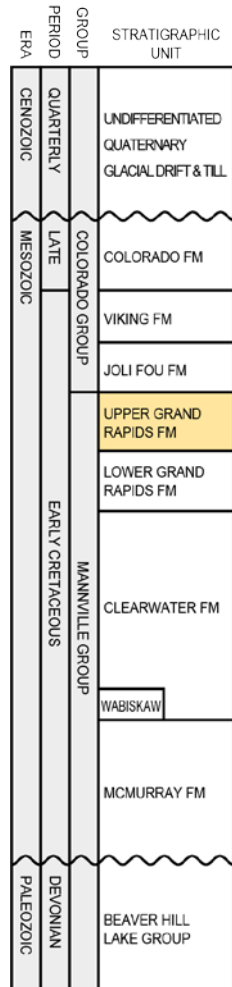
Approval/Application Number	Description	Approval/ Submission Date
10103Y App# 1925684	Request to install Purlucid Replaceable Skin Layer™ Ultra Filtration waste water treatment technology. Not currently pursuing.	Submitted Nov. 20 th , 2019 Approved Feb. 3 rd , 2020
8175G App# 1928432	Request to utilize Granite Wash (06/16-17-064-03W4) as Class II Disposal Well	Submitted April 29, 2020 Issued June 1, 2020
App # 1928691	Request approval to construct and integrate a Butane Blending Facility into the bitumen blending process. To supplement diluent with butane for blending bitumen to achieve pipeline transportation viscosity and density specifications.	Submitted May 19 th , 2020 Approved June 16 th , 2020
10103Z_141258-01-03 App# 1929312	Waste Heat (ORC) application. Joint Application to AER, EPEA to add an Organic Rankine Cycle Power Generation Plant.	Submitted July 30 th , 2020 Approved Nov. 18 th , 2020

2021 Scheme Amendments

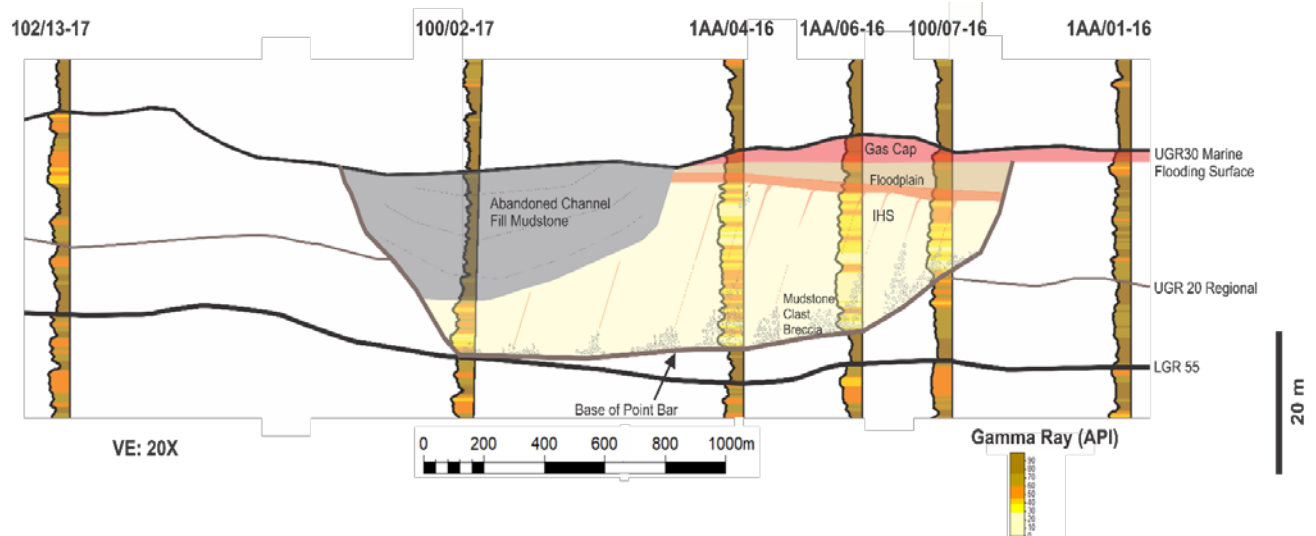
Scheme 10103 Amendments	Description	Submission Date
Upper Grand Rapids-Reservoir Addition App# 1929868	Request to add the Upper Grand Rapids Formation to the approved scheme for commercial production predominantly within the approved project area; additionally, request for addition of two legal subdivisions to the project area (LSD 9 and 16 in Section 08-064-03W4M).	Submitted Oct. 6 th , 2021 Pending Approval
10103AA App# 1932012	I3/P3 Pilot Pad NCG Injection. Revision of Condition 12 for maximum NCG injection rate to 40 E3M3/D and minimum steam injection rate to 0 m3/d.	Submitted Jan. 22 nd , 2021 Approved March 9 th , 2021

2020 Scheme Amendments

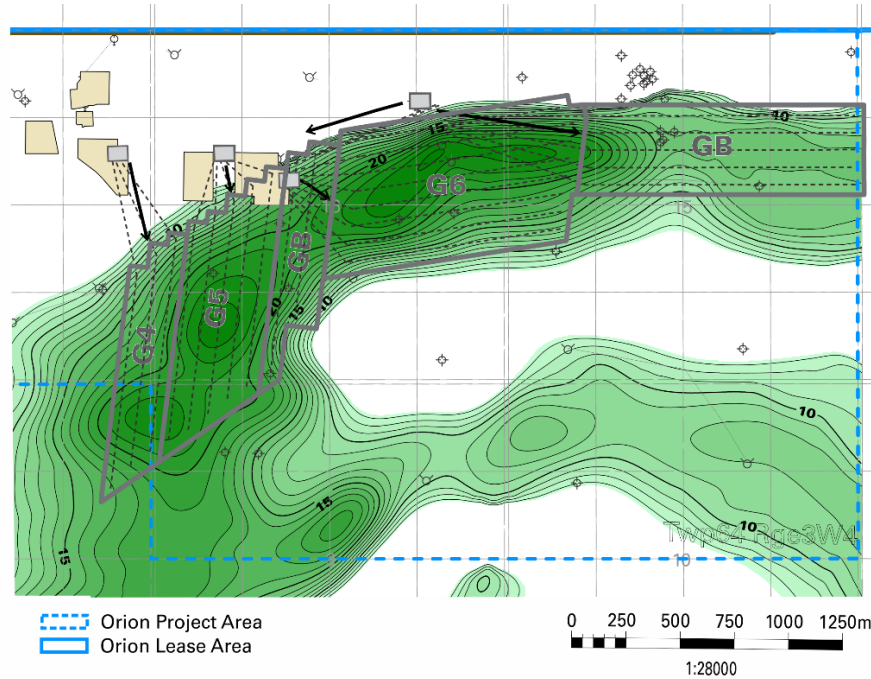
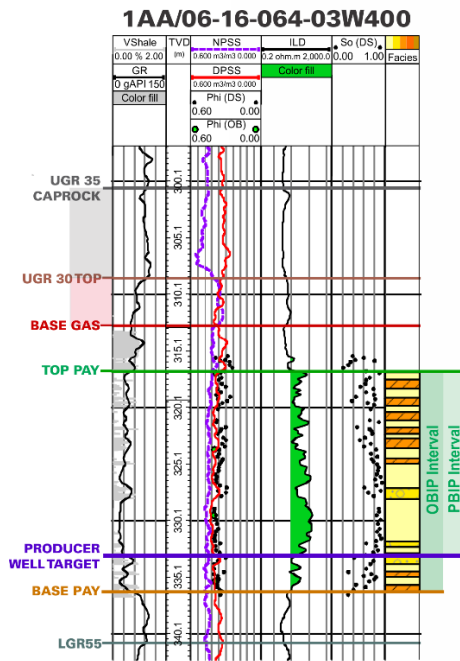
Upper Grand Rapids (UGR) Formation



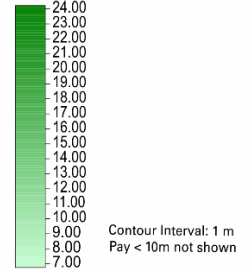
- Osum executed a four-well delineation program in 2020 to further understand the extent and quality of an Upper Grand Rapids Formation (UGR) channel-fill bitumen reservoir that overlies the Clearwater Formation.
- The UGR at Orion was deposited in a fluvial to estuarine environment and is a reservoir suited for SAGD development.
 - Up to 23 m thick
 - Porosity: 35%, Oil Saturation: 75%, Bitumen Viscosity: 65,000 cP at 16 °C
- Project amendment submitted in Oct. 6, 2020 included the addition of 23 UGR well pairs to be added to existing and approved Orion surface well pads.



2020 Scheme Amendments Upper Grand Rapids (UGR) Formation



Thickness (m)



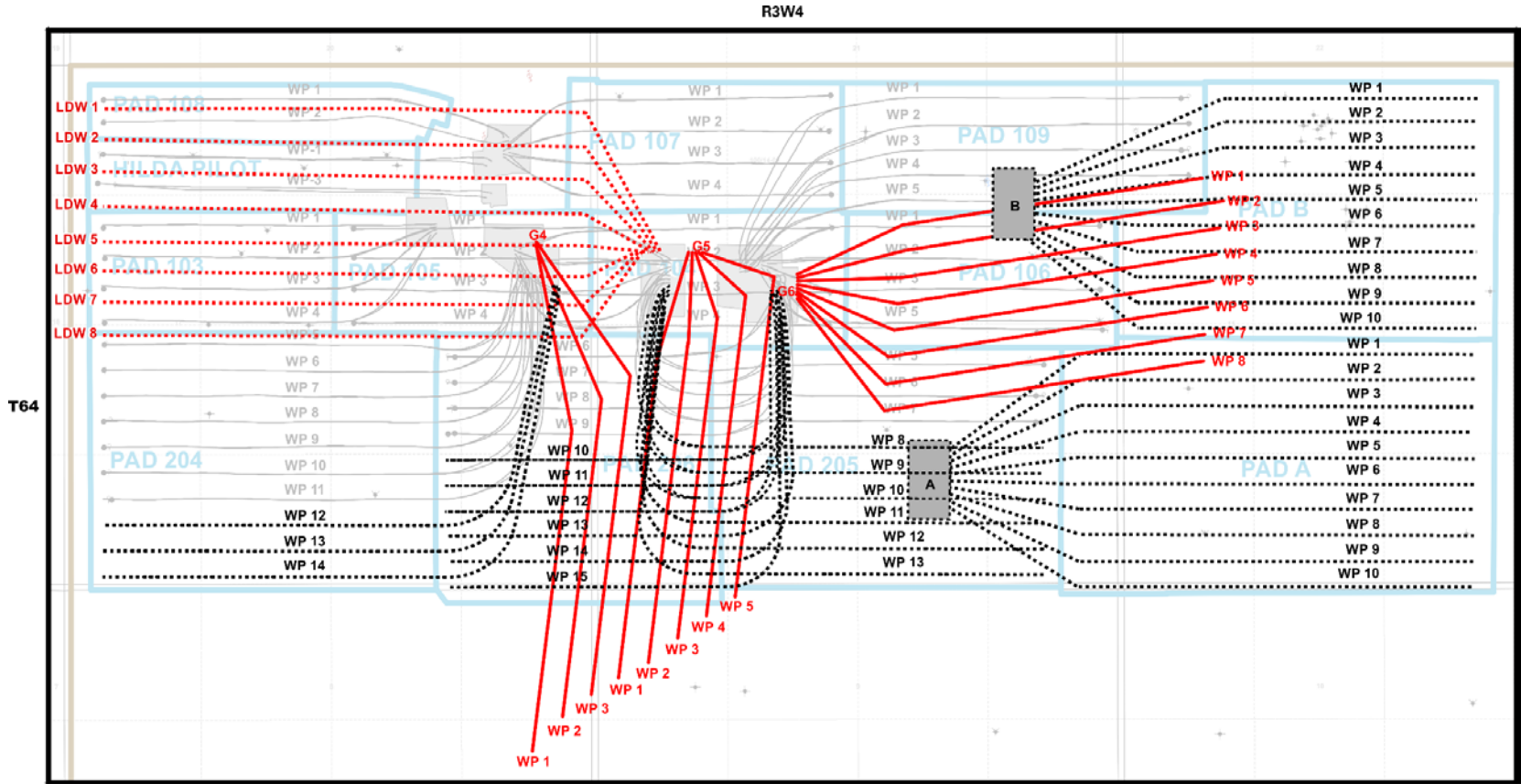
- Planned Wellbore
- ▭ Planned Drainage Area
- ▭ Planned UGR Surface Pad
- ▭ Current CW Surface Pad
- G4** — Pad Name

Upper Grand Rapids Isopach

5 Year Development Plan: Summary

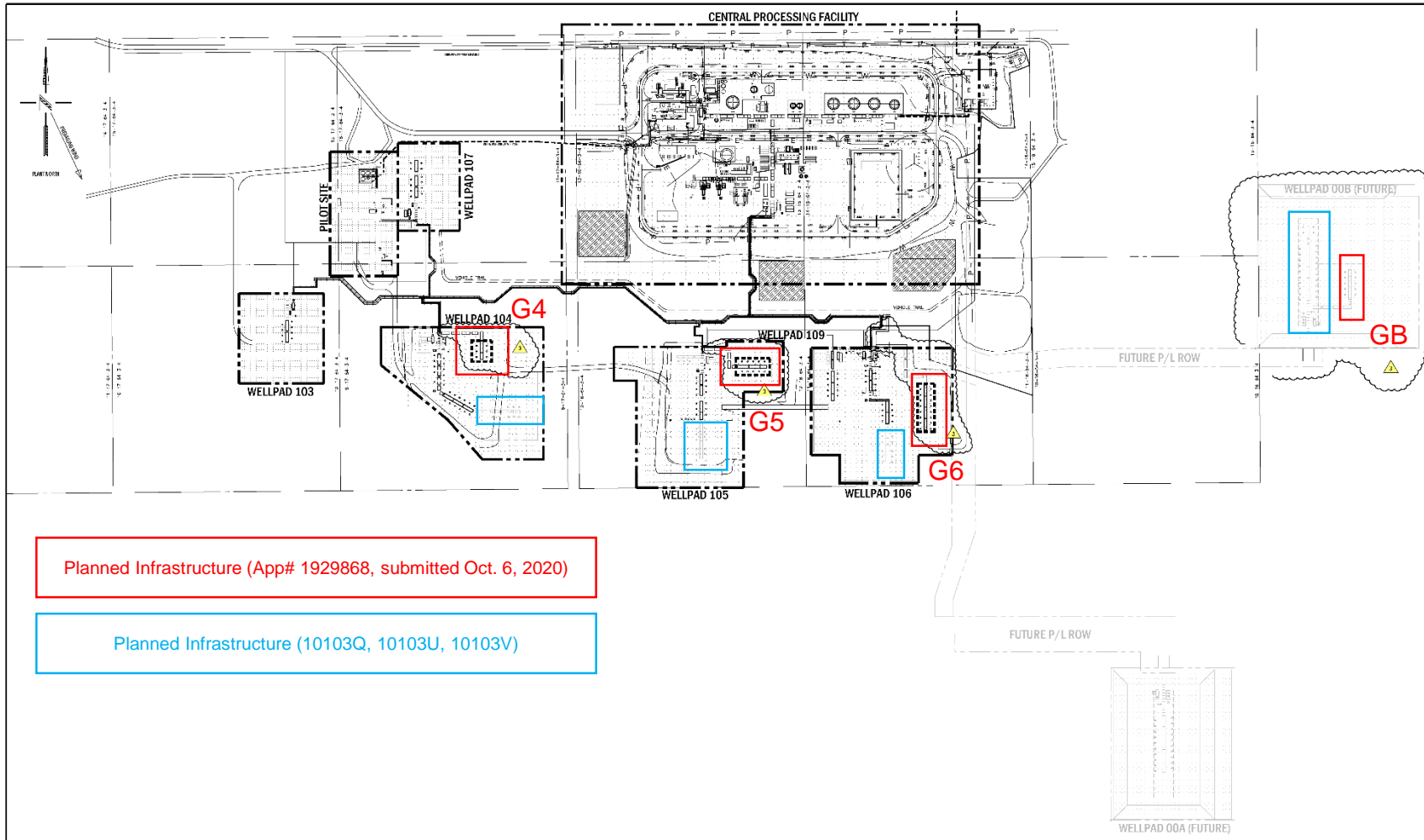
- Central Processing Facility (CPF): add remaining components for completion of approved Phase 2 development extent.
- Development Wells (map on next slide): continue project operations and resource recovery, subject to available CPF capacities, by adding production from a subset combination of (timing and number will depend on performance and declines of currently operating well pairs):
 - Approved 6 remaining Clearwater SAGD well pairs from existing surface pads;
(Commercial Scheme Approval 10103Q)
 - Approved 9 Clearwater SAGD well pairs from existing surface pads;
(Commercial Scheme Approval 10103U)
 - Approved 8 Clearwater Lower Drainage Wells (LDWs) from existing surface pads;
(Commercial Scheme Approval 10103U)
 - Approved 20 Clearwater SAGD well pairs from new surface pads A and B; and
(Commercial Scheme Approval 10103V);
 - Proposed 16 Upper Grand Rapids SAGD well pairs from existing surface pad extensions.
(Scheme amendment application 1929868 submitted in Q4 2020)
- Initiated Non-Condensable Gas (NCG) Co-injection (with steam) in mature Pilot pad in Q2 2021
(Commercial Scheme Approval 10103AA)
- Proposed initiation of NCG Co-injection (with steam) in rest of the mature Phase 1 well pairs for pressure maintenance and SOR reduction.
- Proposed eventual transition of mature Phase 1 well pairs to a terminal gas injection phase (no steam injection).

5 Year Development Plan: Map



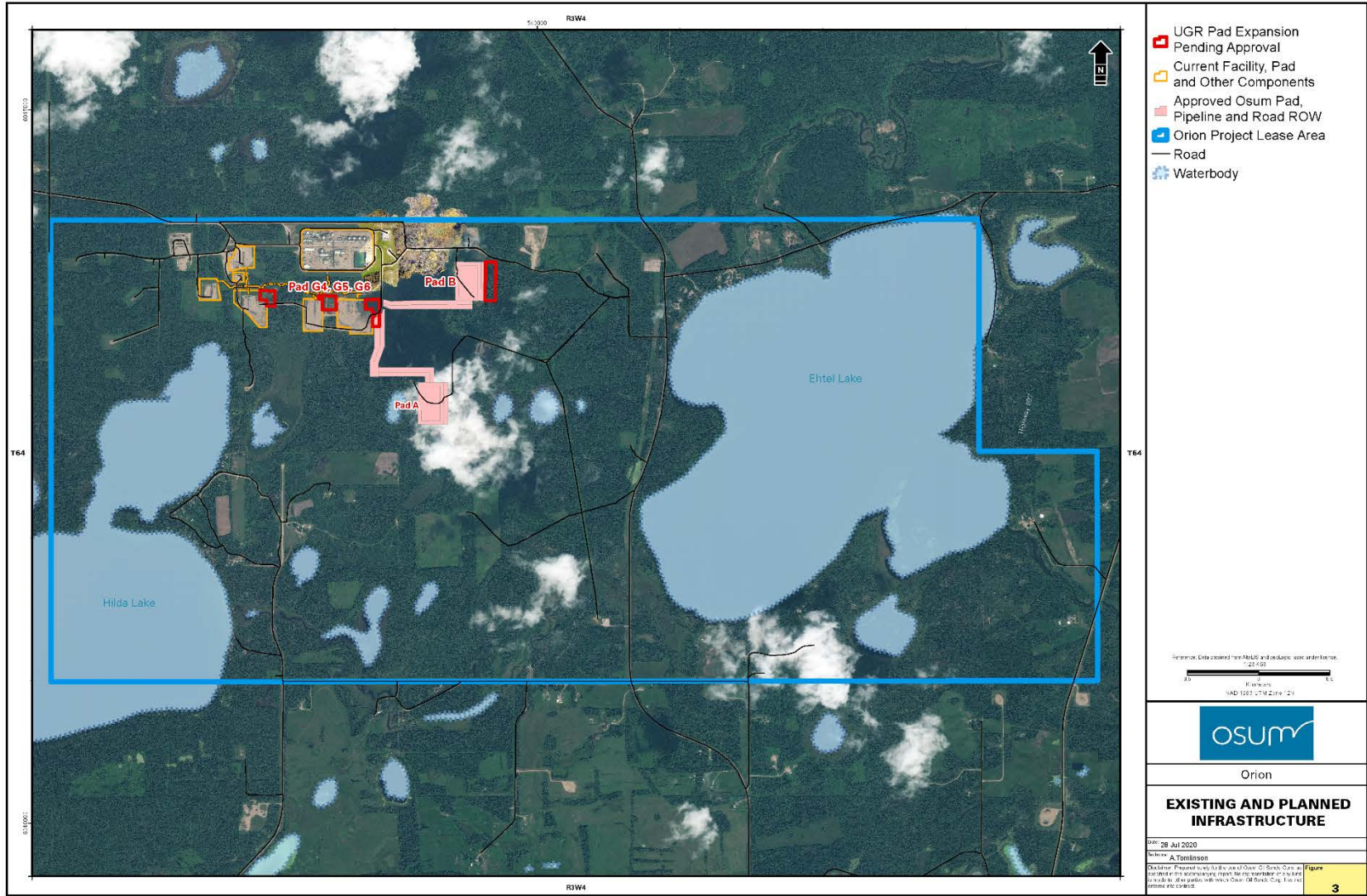
- Producing SAGD Pair Approved Lower Drainage Well [shaded] Developed Surface Pad [blue outline] Subsurface Drainage Area
- Approved SAGD Pair — Planned UGR Pair [dotted shaded] Approved Surface Pad [yellow outline] Osum Project Lease Area

5 Year Development Plan: Plot Plan



<p>OF-GFD-209-0001 CENTRAL FACILITY FLOOR PLAN</p>	<p>DATE: 07/03/23 BY: D CHK: D</p>	<p>3 ISSUED FOR REGULATORY APPROVAL (UPPER GRADE RAPIDS) 2020-09-20 2020-06-15 JCS RA 004 017</p> <p>2 ISSUED FOR INFORMATION 2017-05-11 2016-01-18 JCS RA 004 004</p> <p>10 ISSUED FOR DESIGN 2000-08-14 2000-01-10 R6 RB 001 001</p> <p>15 ISSUED FOR REVIEW 2000-08-14 2000-01-10 PP RB 001 001</p> <p>0 ISSUED FOR CONSTRUCTION 2000-08-14 2000-01-10 D0 D 000 000</p>	<p>osum OSUM PRODUCTION CORP.</p> <p>Scovan</p>	<p>ORION COMMERCIAL PLANT LSD: NW 1/4 SECT. 16-64-3 W4M OVERALL SITE PLAN</p> <p>33. SITE DRAWING NO. OF-GFD-109-0001 REV. 3</p>
<p>DATE: 07/03/23 BY: D CHK: D</p>	<p>DATE: 07/03/23 BY: D CHK: D</p>	<p>DATE: 07/03/23 BY: D CHK: D</p>	<p>DATE: 07/03/23 BY: D CHK: D</p>	<p>DATE: 07/03/23 BY: D CHK: D</p>

5 Year Development Plan: Surface



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