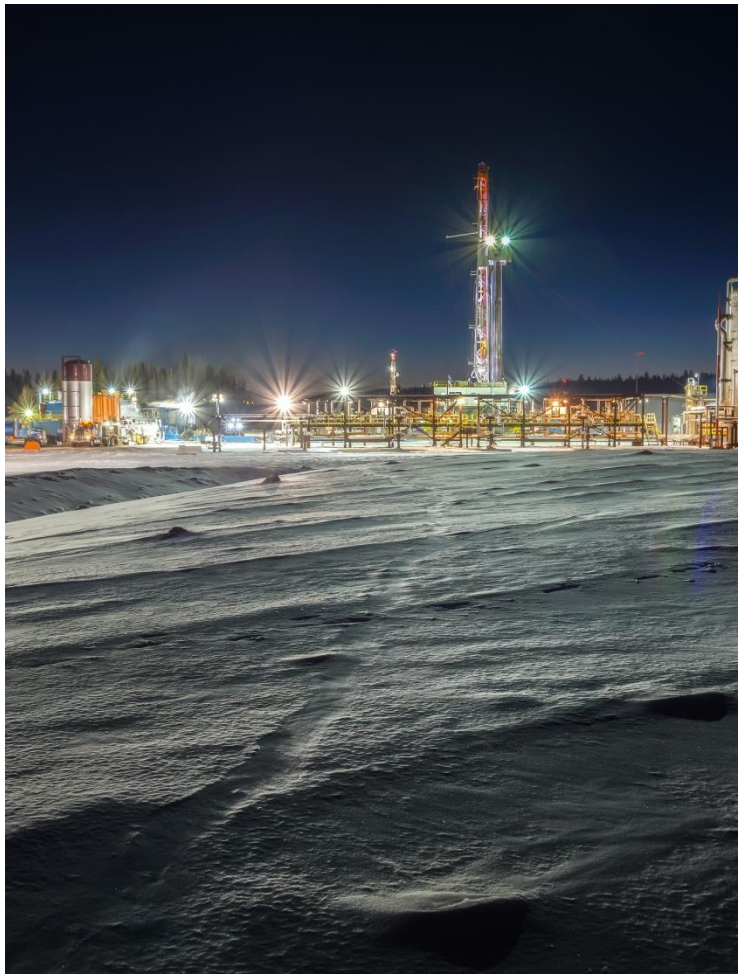
ORION IN SITU OIL SANDS

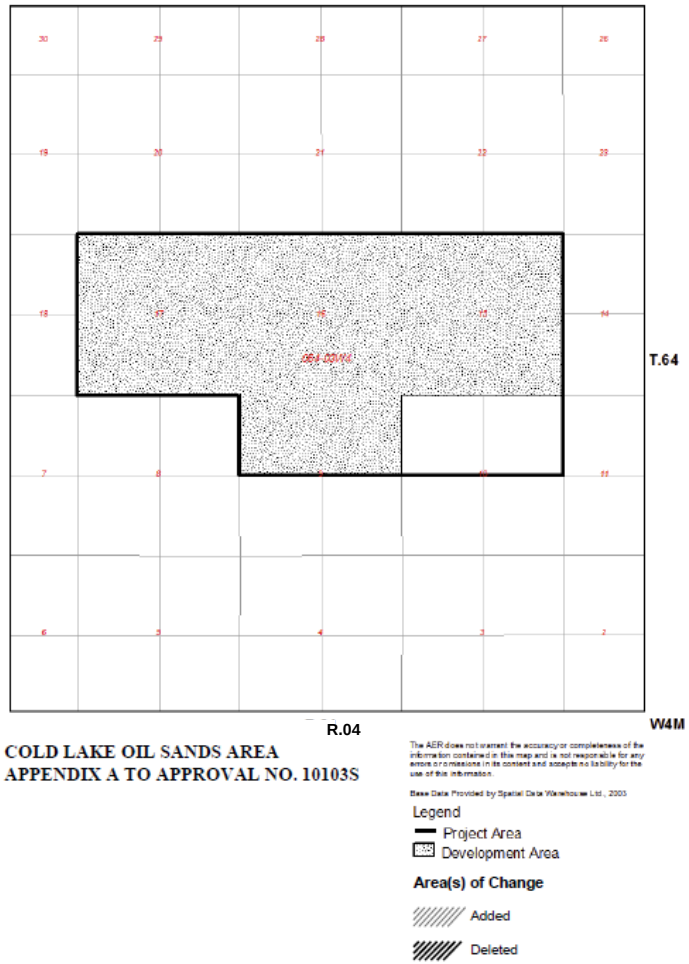
2017 ANNUAL PERFORMANCE REPORT | MAY 2018



Phase 2BC expansion drilling

Agenda

AER Amendment Approvals

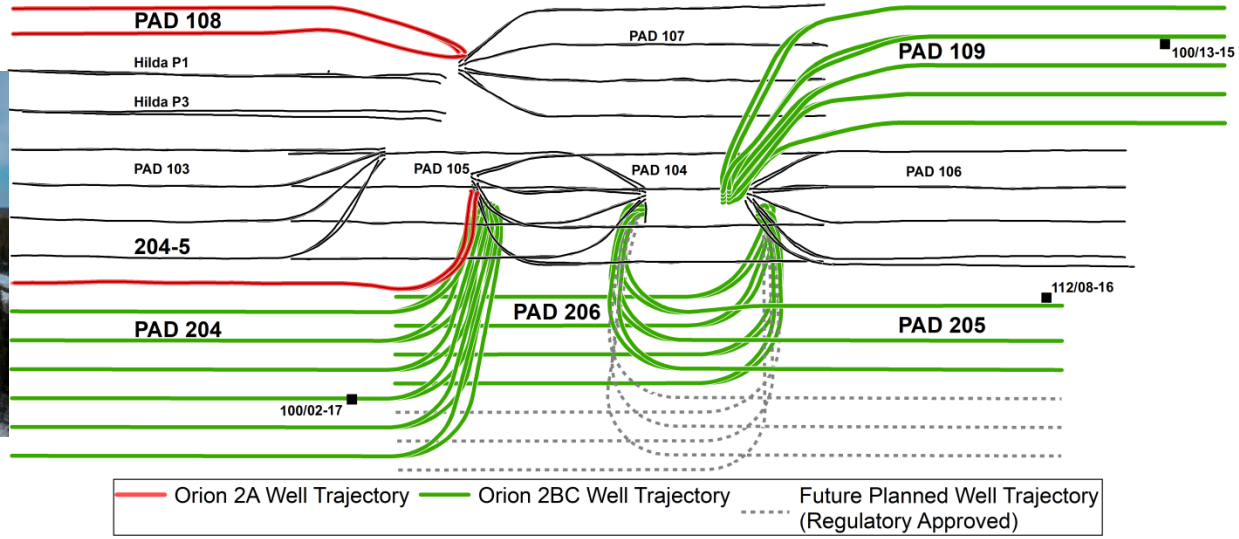


- **Osum Production Corp. is currently working under Approval 10103S**
  - Production allowance of 3180 m^3/d on an annual average basis
  - Approved for SAGD Recovery Process

    - **Submitted Appl. #1873119**; Nov. 15th, 2016; Sustaining Well Pair Addition Amendment for Well Pair 204-05. Approval 10103P received: Jan. 30th, 2017
    - **Submitted Appl. #1884644**; April 10th, 2017; Application for 24 Well Pair Additions 204 (6-11), 205(5-10), 206(6-12) and 109(1-5): April 10th, 2017. Approval 10103Q received: Aug. 28th, 2017
    - **Submitted Appl. #1902870**; Nov. 20th, 2017; Amendment for Pad 204 surface well location and Pads 205/206 trajectory modification. Approval 10103R received Dec. 20th, 2017.
    - **Submitted Appl. # 1903727**; Dec. 7th, 2017; Amendment for Pad 109 well trajectories. Approval 10103S received Jan. 29th, 2018.

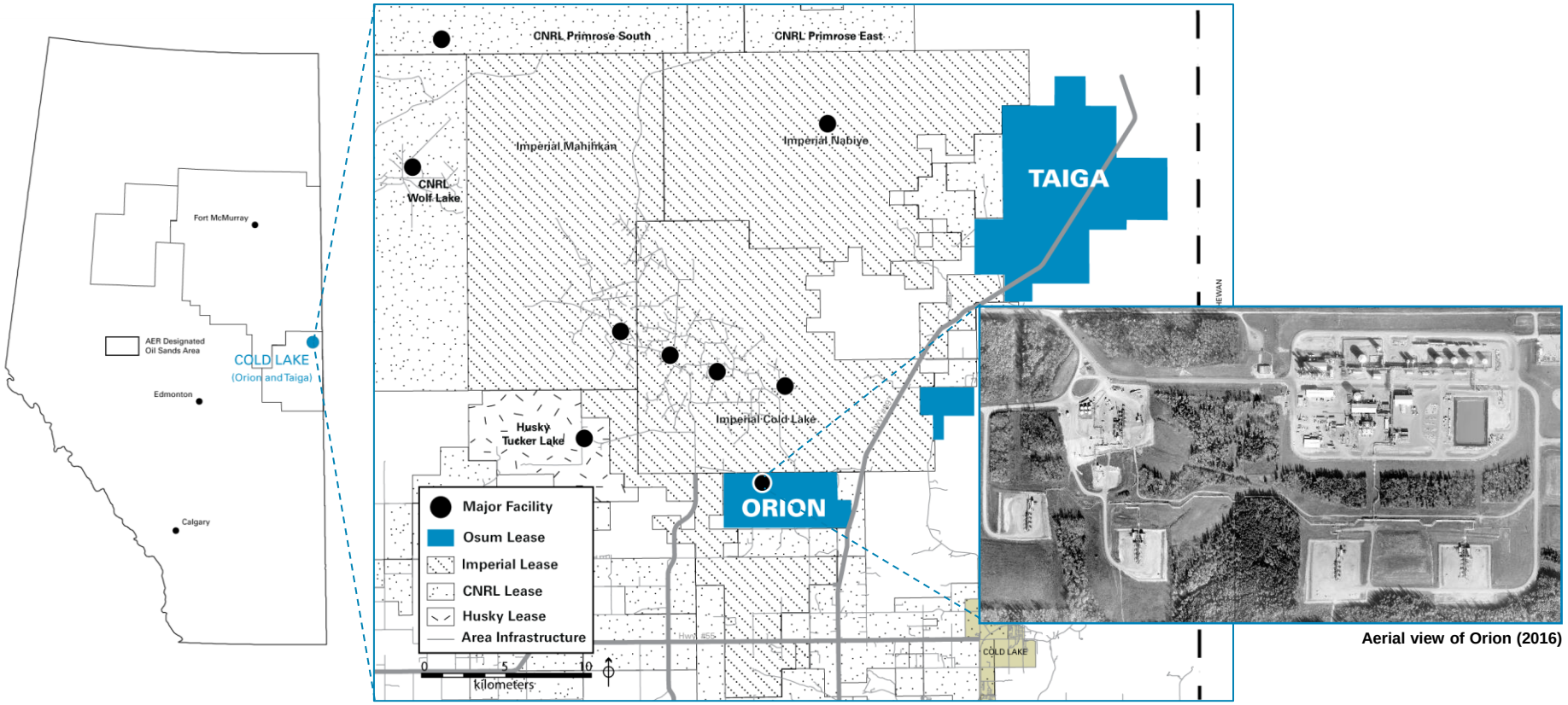
Orion Development – the path to 3,180 m3/d (20,000 bbl/d)

- Executing a plan to double production by the end of 2019. Phase 2A was executed in 2017. Phase 2BC currently being executed.
- New wells incorporate key geological and completion design lessons from Phase 1 successes.



Phase	Well Pairs	Facilities Scope	Available Steam Capacity (m^3/d)	Installed Capacity (m^3/d)	Expansion Completed
2A	3	3rd Boiler, RO Package, Crystallizer #1	6,040	1,590	Oct 2017
2BC	18	3rd & 4th Evaporators, 4th Boiler, De-oiling, Bitumen Treating and Utilities System	10,350	2,860	Oct 2018

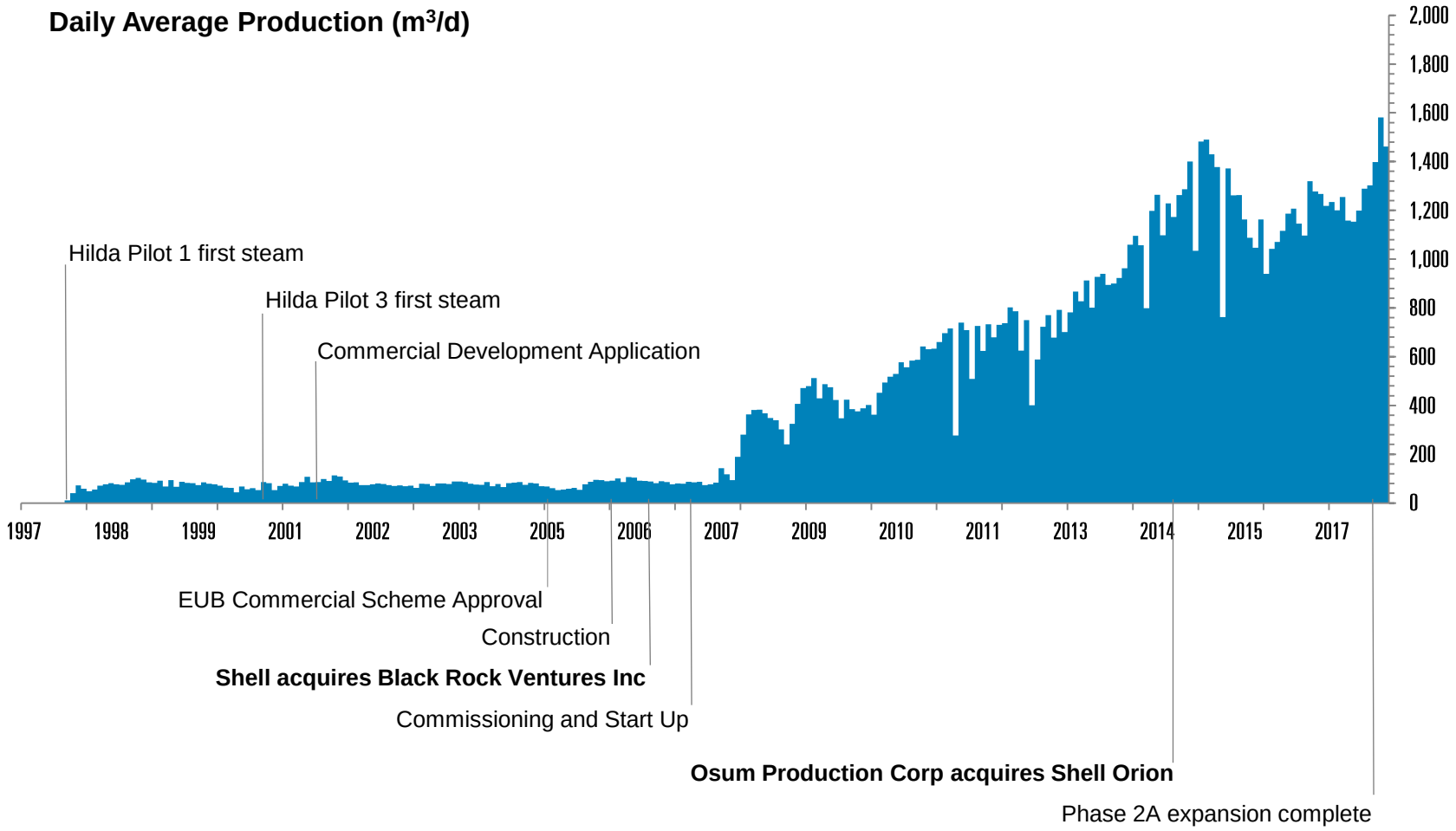
Introduction – Project Location

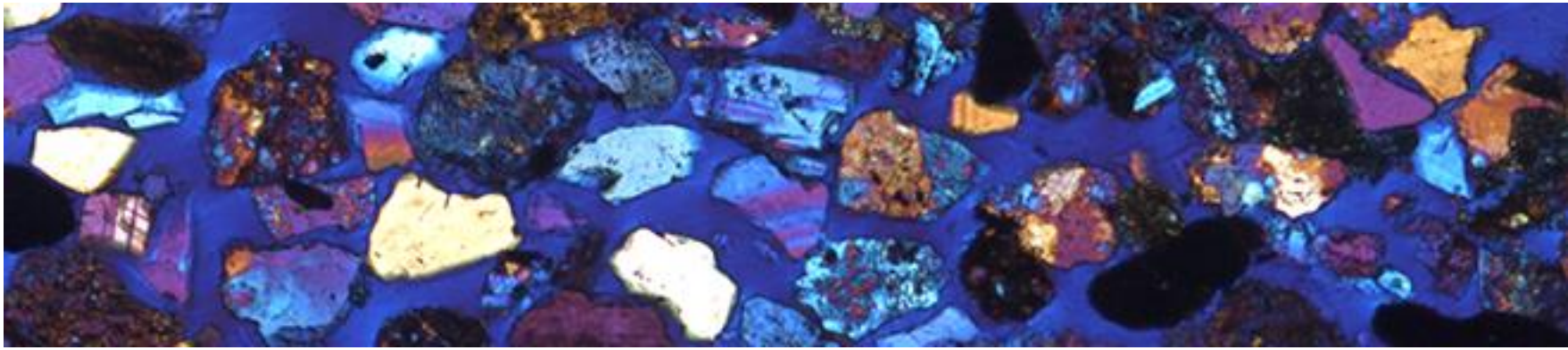


Aerial view of Orion (2016)

Orion is a Steam-Assisted Gravity Drainage (SAGD) facility consisting of a central processing facility and five (commercial) well pads situated in 13-16-064-03 W4M, approximately 40 km north-west of Cold Lake, Alberta

The Orion Project – History





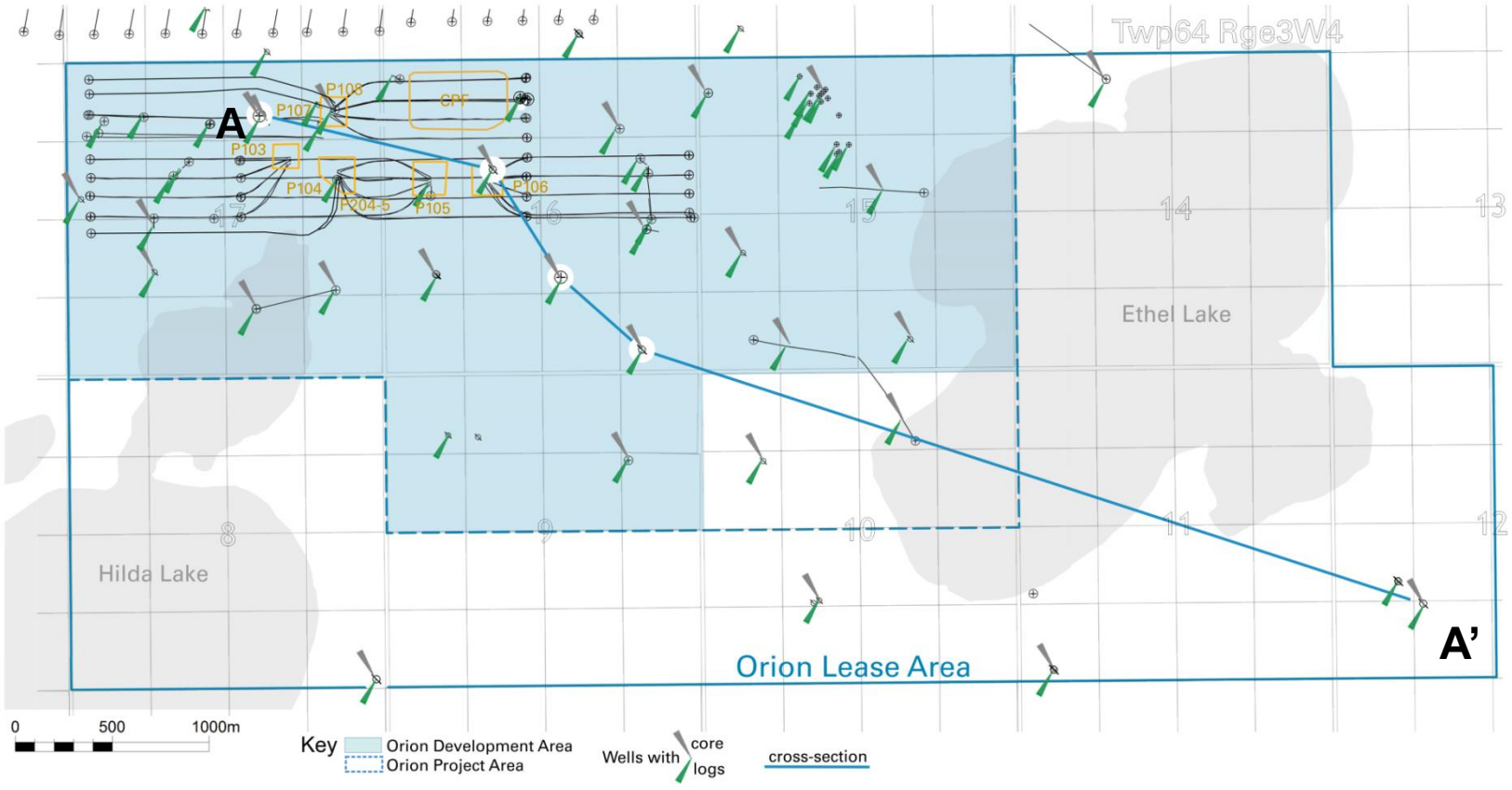
Geoscience

Orion In Situ Oil Sands

2017 Annual Performance Report

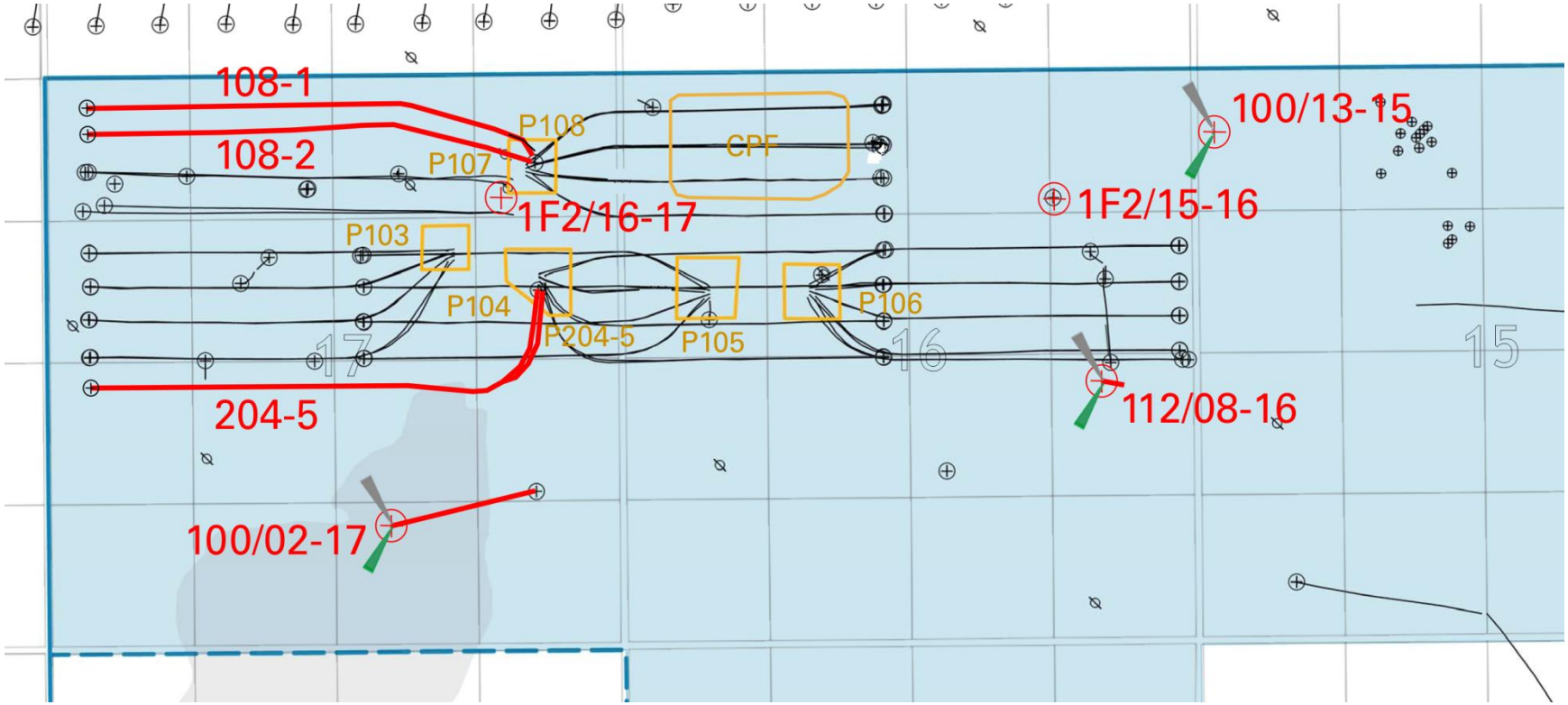
Delineation Well Data

- Fifty-six vertical or deviated wells across lease area; 44 with full suite of logs including 8 with FMI; 28 of the wells were cored
- Fourteen wells in the Project Area are observation wells (11 existing + 3 new wells for 2BC)

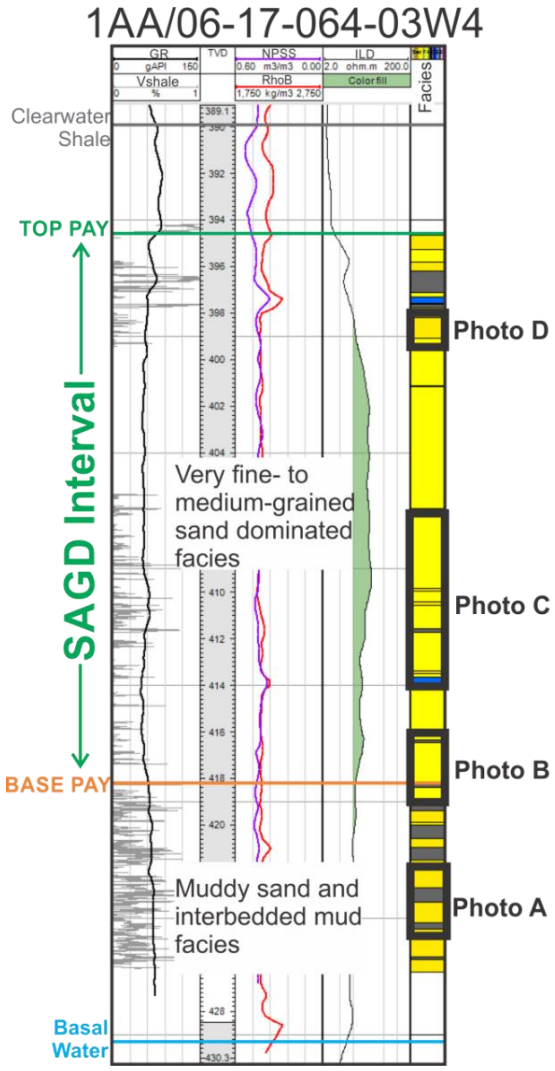


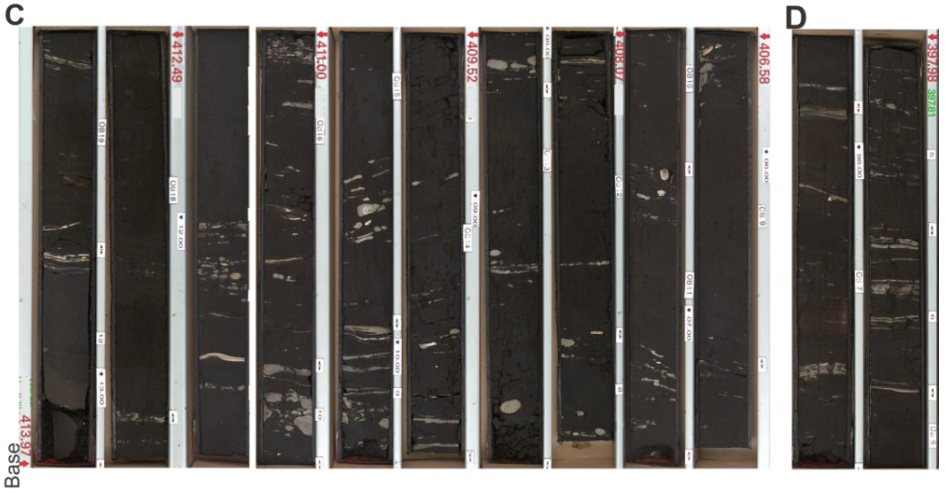
2017 New Well Data

- Phase 2A SAGD Well Pairs: 108-1, 108-2, 204-5
- Two Brackish Water Wells: 1F2/15-16, 1F2/16-17
- Phase 2BC Observation Wells: 100/02-17, 112/08-16, 100/13-15
- Phase 2BC SAGD well drilling began in late 2017.

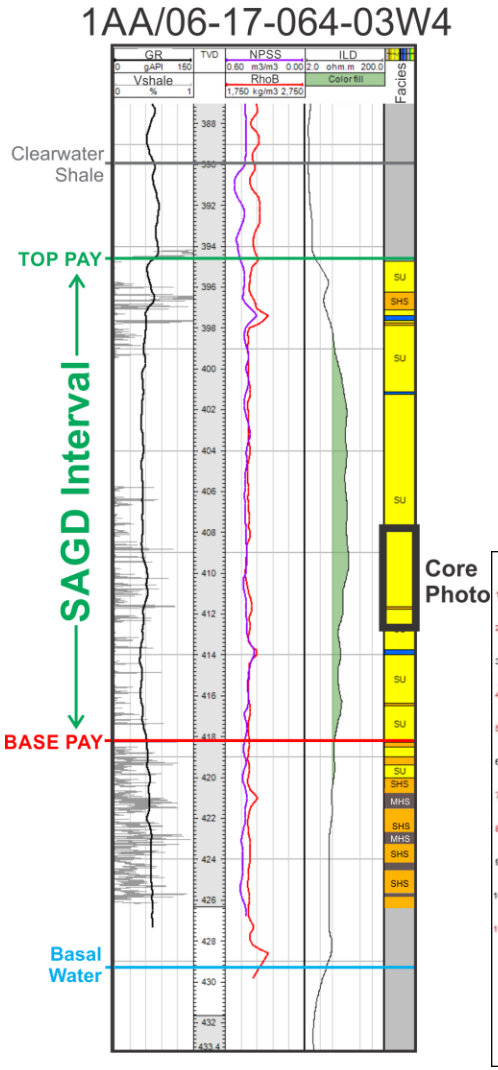


Clearwater Type Log



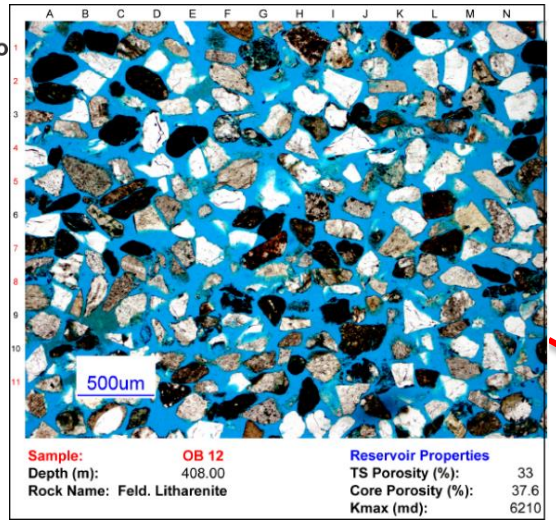


Clearwater Sand Minerology

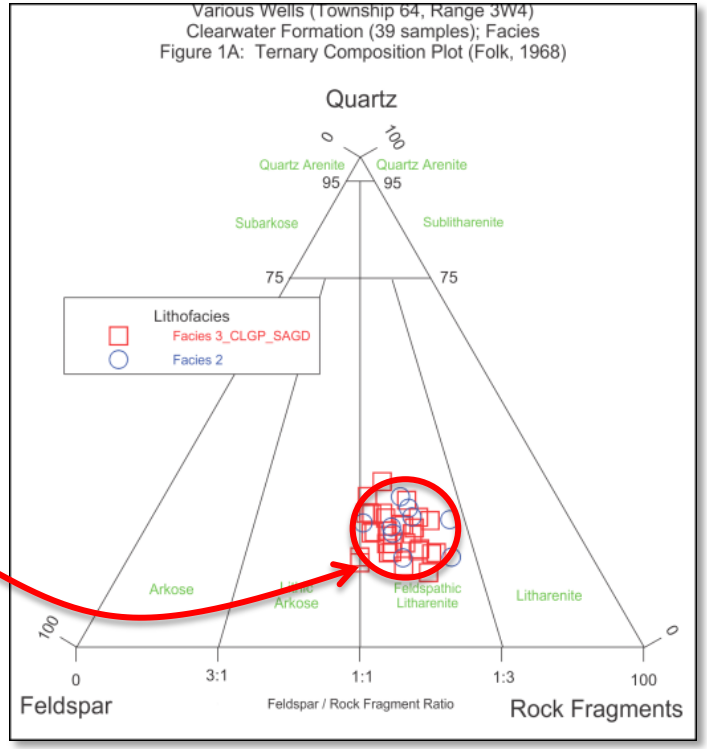


Photomicrograph

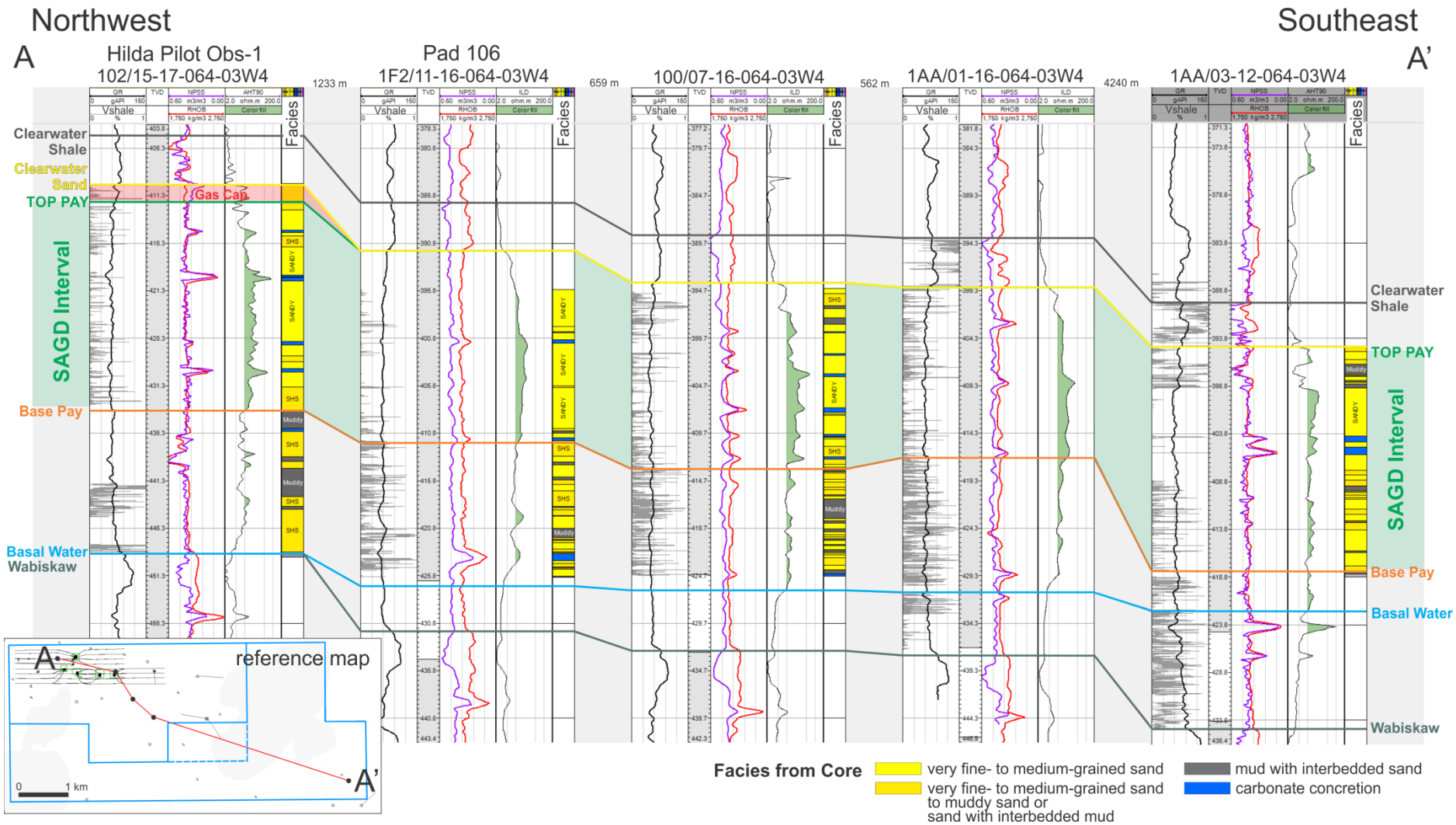
Photomicrograph



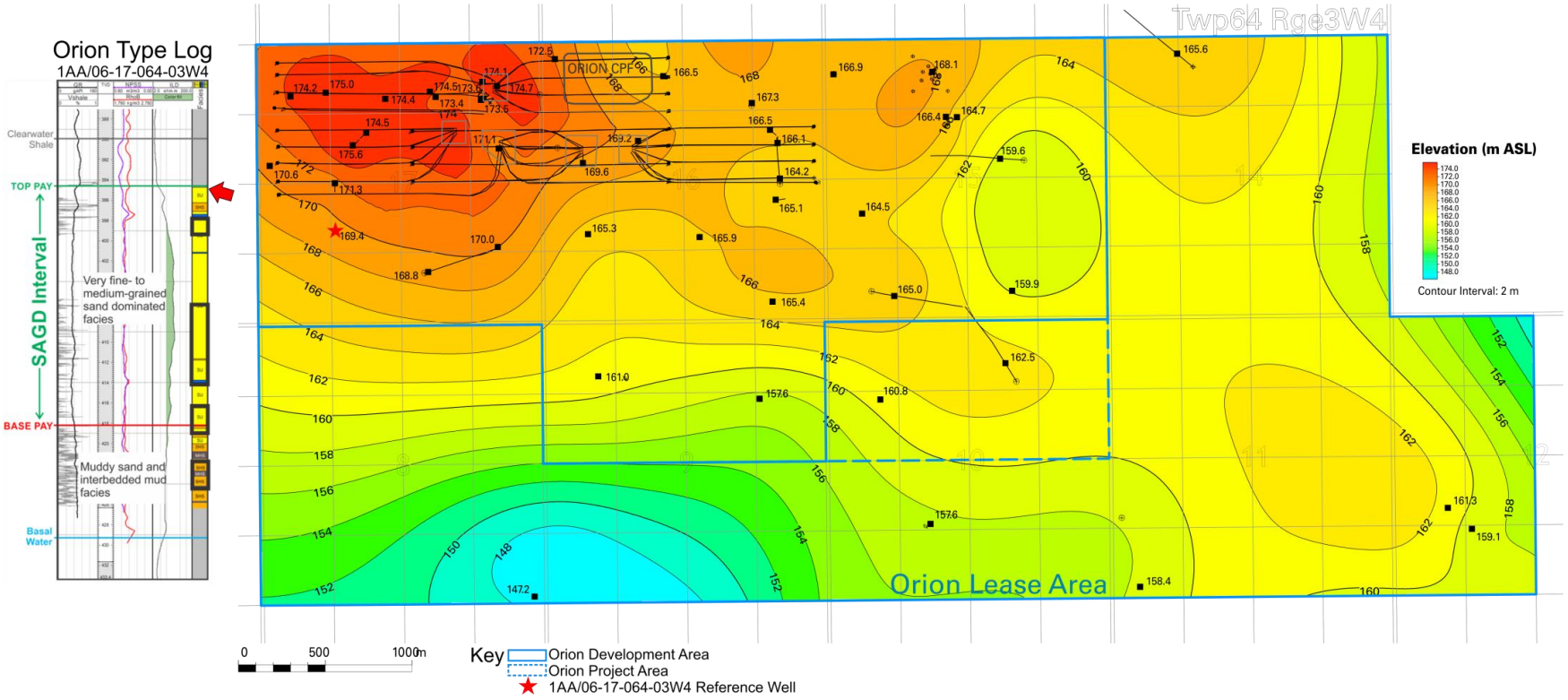
- Sand is angular very fine- to medium-grained feldspathic litharenite
- Clay content is less than 2% of total rock
- Clay composition is kaolinite, illite, chlorite, and smectite



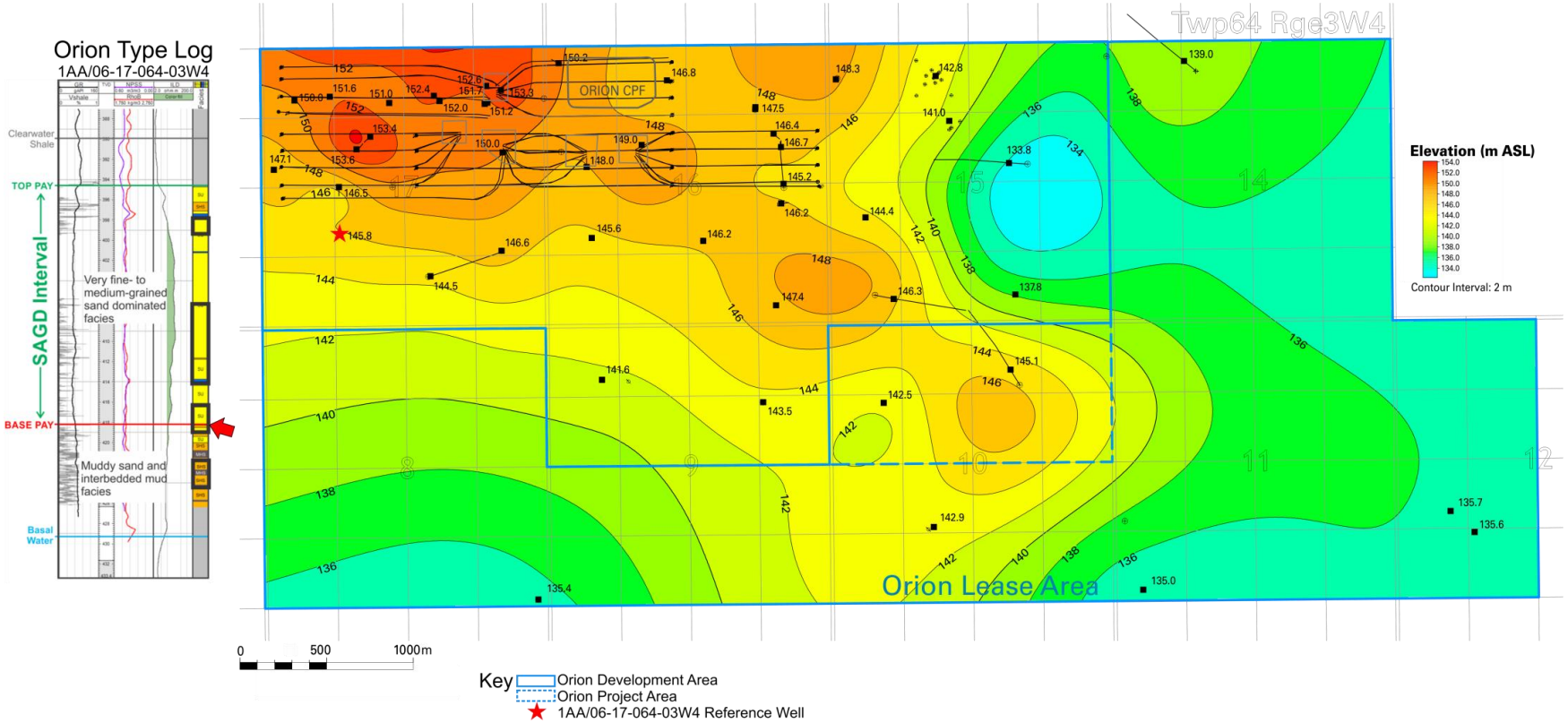
Structural Cross-Section



Clearwater SAGD Reservoir
Top Pay Structure

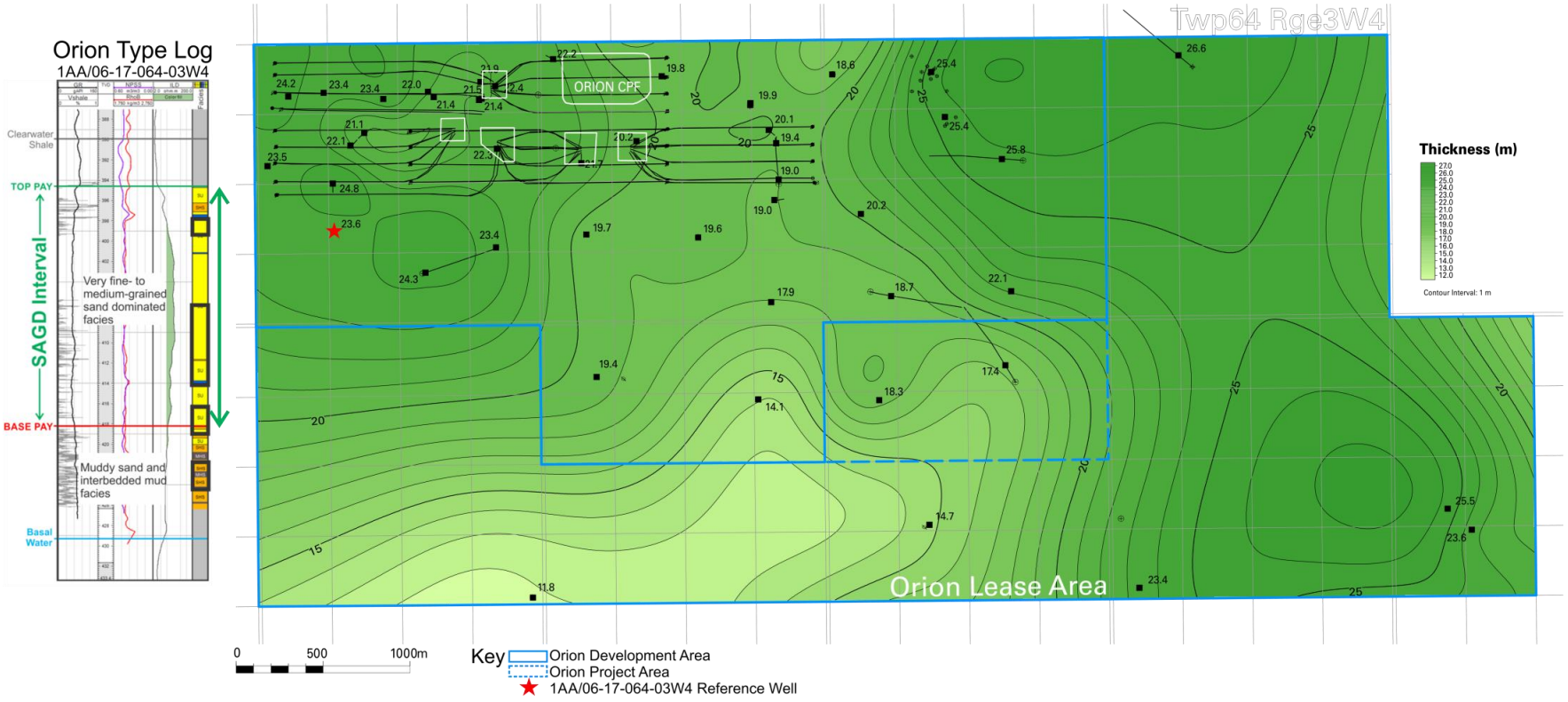


Clearwater SAGD Reservoir
Base Pay Structure

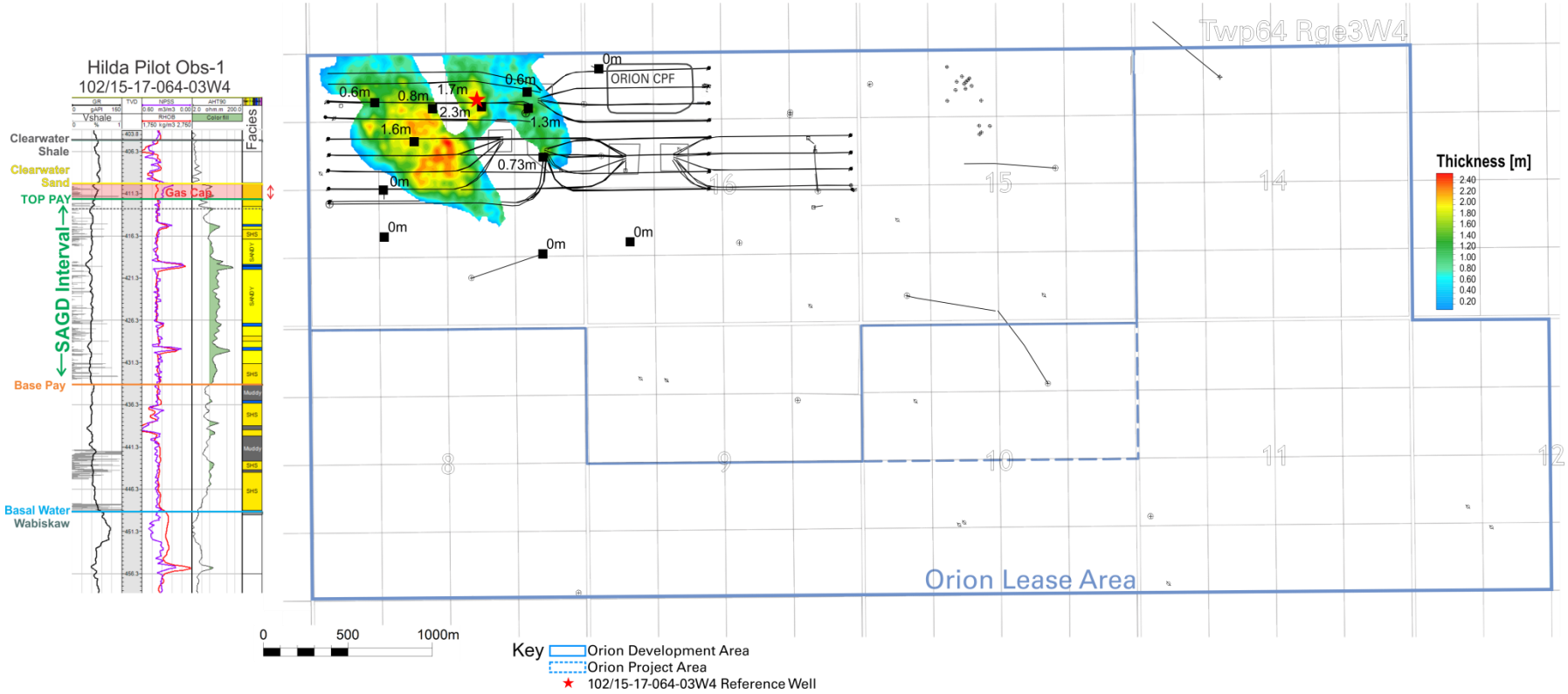


Clearwater SAGD Reservoir

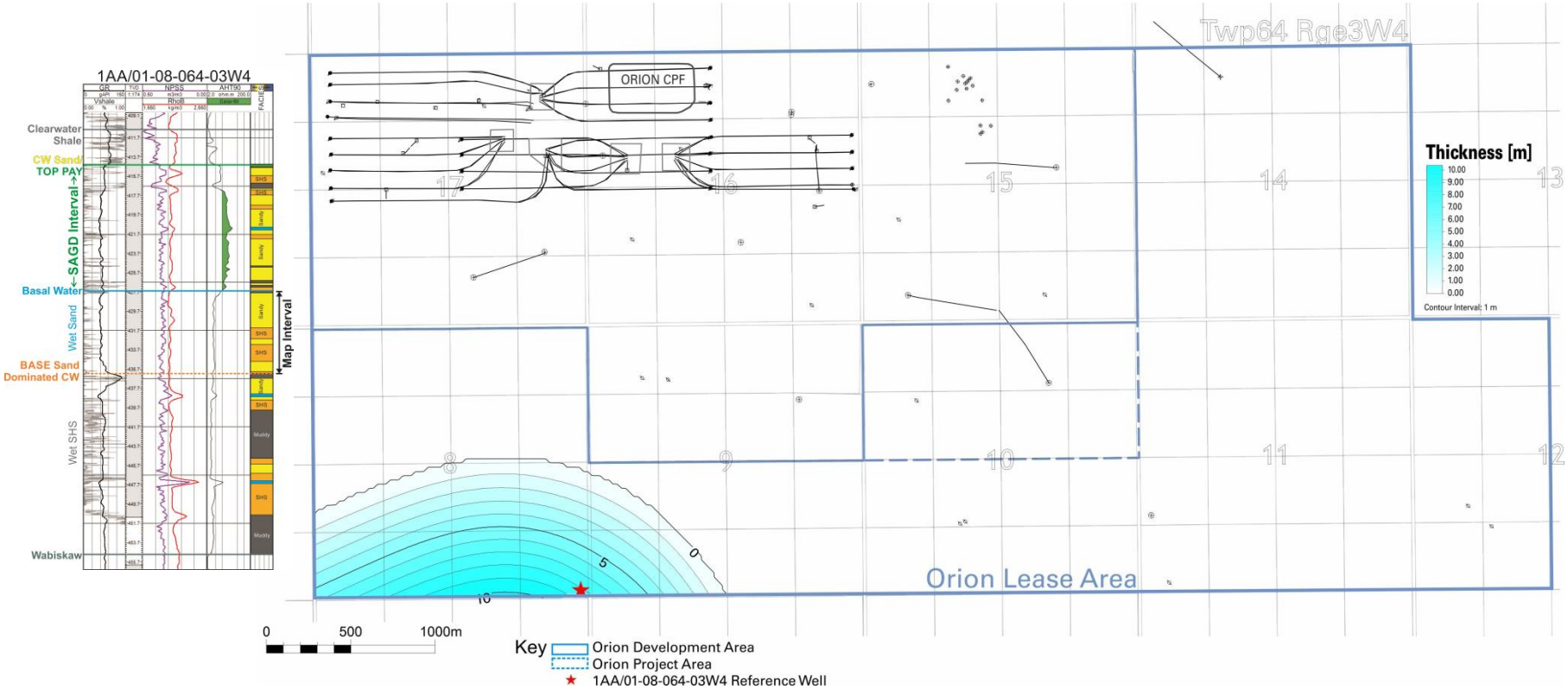
Gross thickness including concretions (concretions <3% of reservoir)



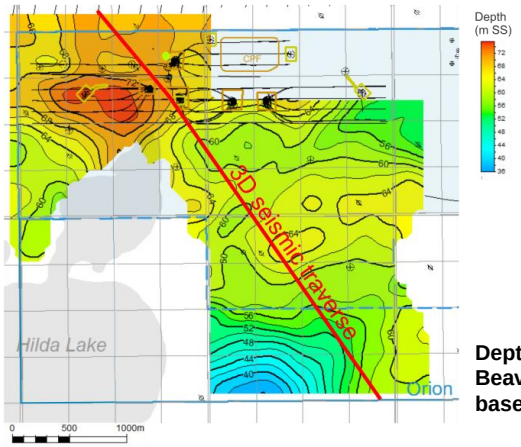
Clearwater Gas Cap Isopach



Clearwater Reservoir Basal Water Isopach

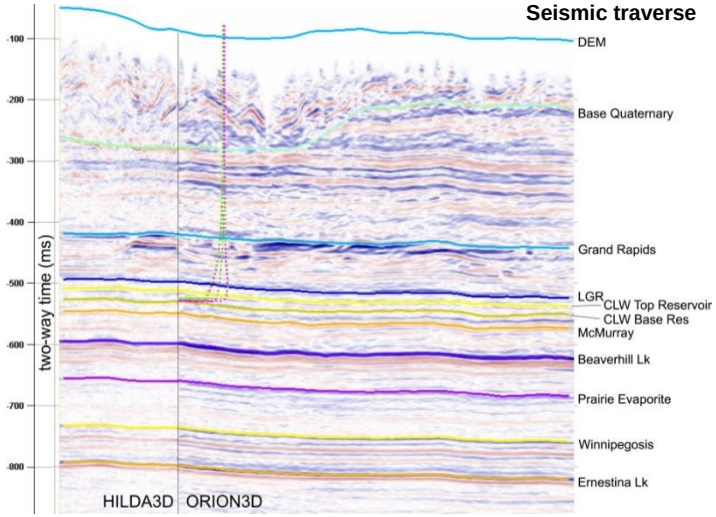


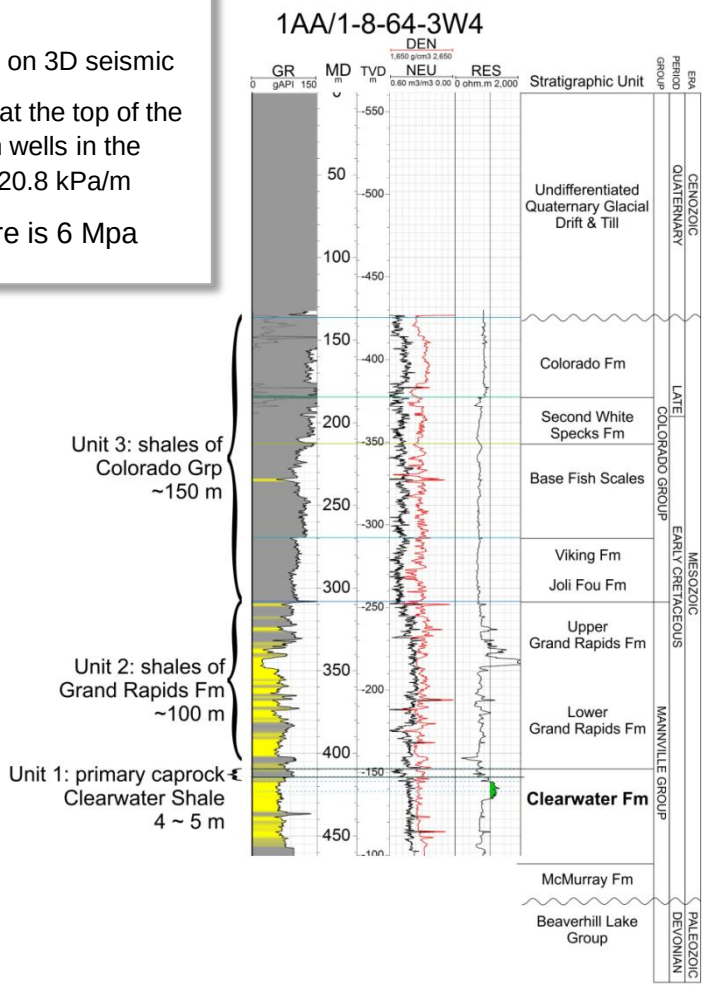
Clearwater Reservoir Caprock



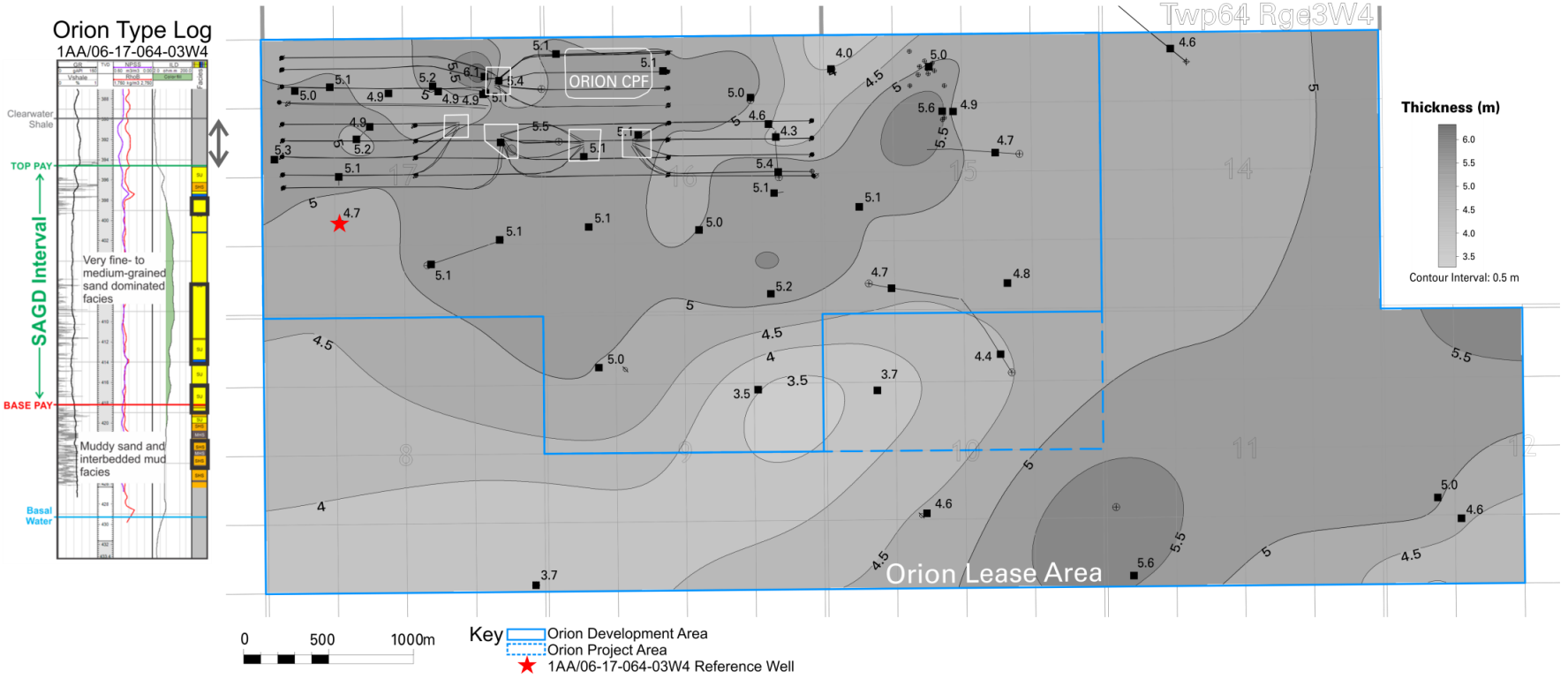
Depth Structure of Beaverhill Lake based on 3D seismic

- 3 units of capping shales of significant thickness
- Undisturbed basement mapped on 3D seismic
- Vertical in-situ stress gradients at the top of the Clearwater Formation for seven wells in the Orion lease range from 20.3 to 20.8 kPa/m
- Maximum Operating Pressure is 6 Mpa

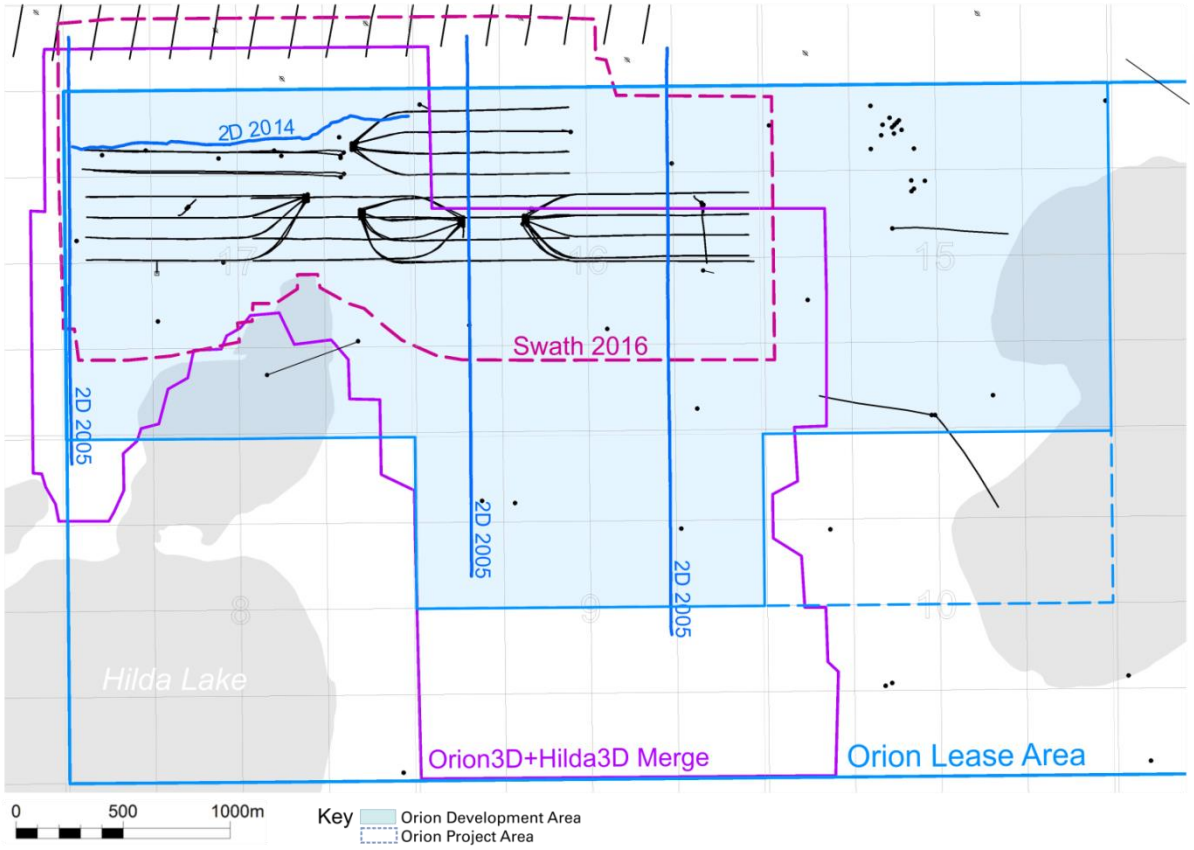




Clearwater Caprock
Clearwater Shale Isopach



Seismic Data



3D, 2D & Swath Datasets

Hilda 3D – 2005, 1.8 km^2

2D – 2005, 3 lines

Swath – 2007, 1522 records

Orion 3D – 2009, 6.6 km^2

Swath – 2009, 1705 records

Swath – 2011, 1074 records

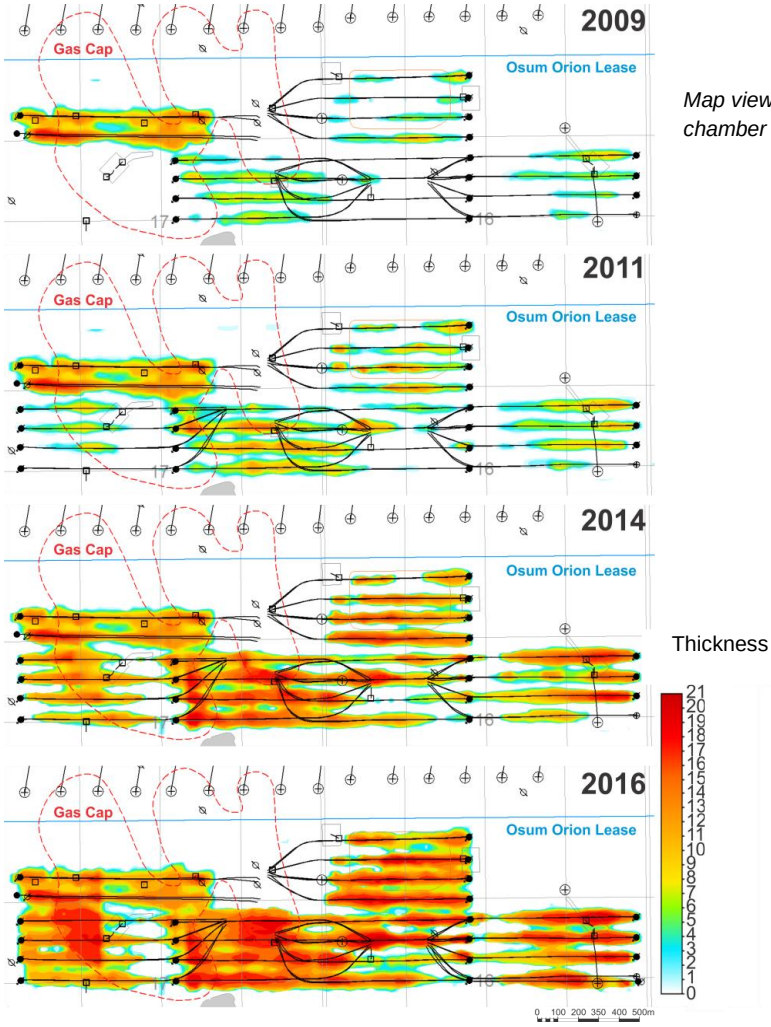
Swath – 2014, 1708 records

2D – 2014, 1 lines

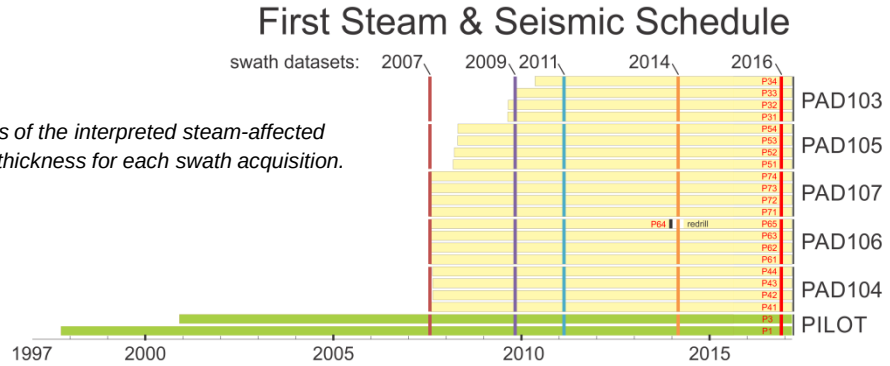
Orion 3D & Hilda 3D Merged - 2015

Swath – 2016, 1688 records

Repeat 2D Swath Seismic



Map views of the interpreted steam-affected chamber thickness for each swath acquisition.



Isopach maps represent an interpretation of the thermal zone from p-impedance volumes for each swath acquisition.

Good lateral resolution allows estimates of steam chamber growth

Thermal chambers have grown vertically, as well as laterally through the years

November 2016 seismic acquisition reveals good thermal conformance along all thermal well pairs

Gas cap affects seismic resolution. The thickest portion of the gas cap overlies Pad 103 and impacts seismic imaging of the thermal chamber below.

2016 repeat seismic provides baseline for 2ABC well pairs.

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]	Ultimate Recovery Estimate
Name	Date	#	m	m	10^6m^3	%	%
Pilot	Sep-1997	2	950	100	1.14	58	>60
Pad 103	Oct-2009	4	670	100	1.53	43	50-60
Pad 104	Oct-2007	4	695	100	1.79	19	50-60
Pad 105	May-2008	4	675	100	1.46	48	50-60
Pad 106	Sep-2007	4	730	100	1.76	20	50-60
Pad 107	Sep-2007	4	700	100	1.67	36	50-60
Pad 108	Jun-2017	2	1,000	70	0.88	2	50-60
Pad 204[5]	Jun-2017	1	1,000	80	2.76	<1	50-60

(1) As of December 2017
(2) Approximate Well Pair Spacing, m
(3) PBIP=Area x Thickness Above Producer x Porosity x Oil Saturation
(4) Recovery as of December 2017, on PBIP basis
(5) Pad 204 PBIP is for 7 Well Pairs; 6 of the Well Pairs to be started in 2018

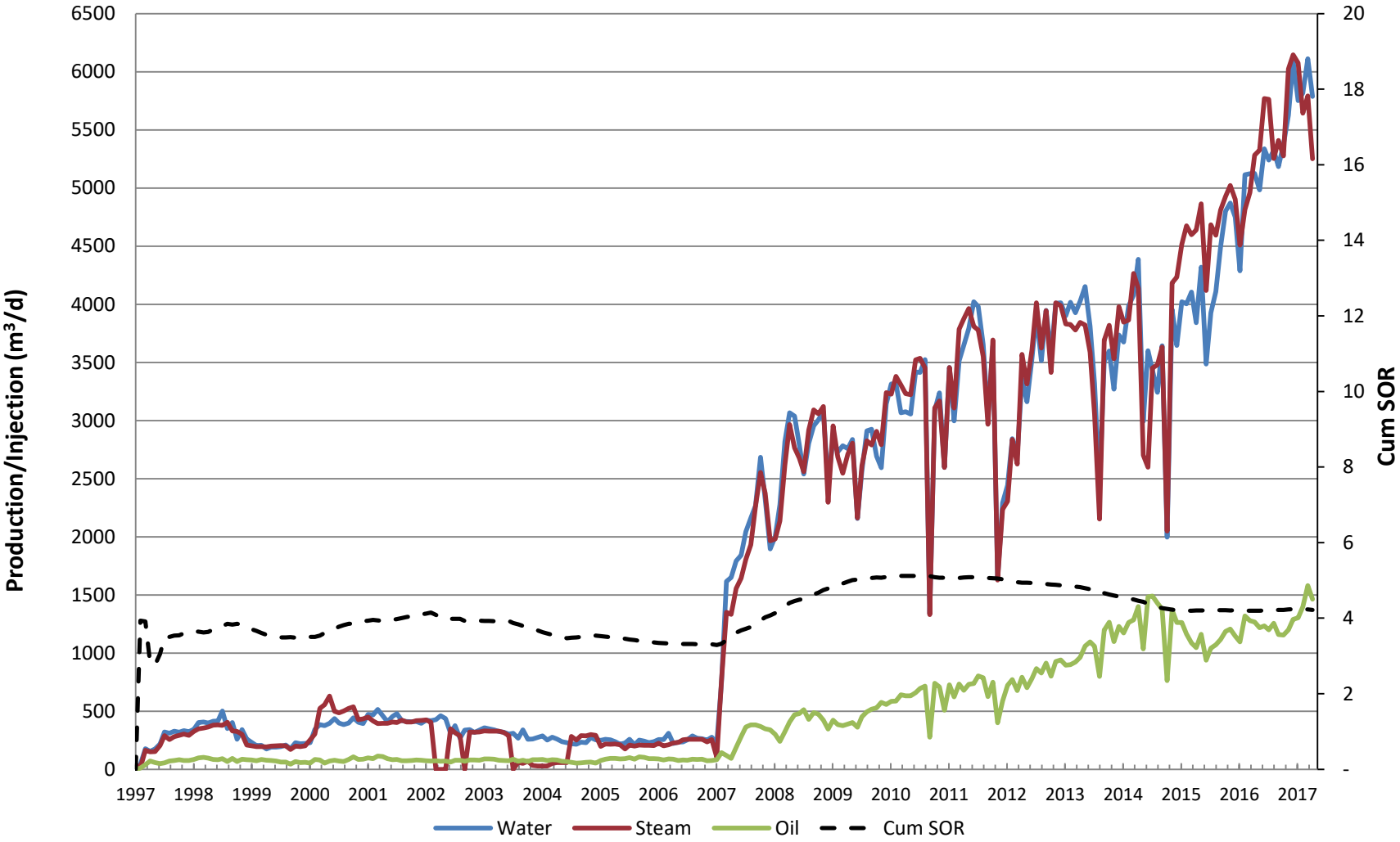
SAGD RESERVOIR PROPERTIES		
Depth	metres	425
Pay Thickness	metres	16-25
Average Porosity	%	35
Average Oil Saturation	%	66
Average Bitumen Weight	%	10
Horizontal Permeability	Darcies	2 to 6
Kv:Kh	X	0.8-0.9
Temperature	°C	15
Pressure	MPa	3.2
Oil Gravity	°API	10 to 11
Viscosity	cP	100,000

Scheme Performance

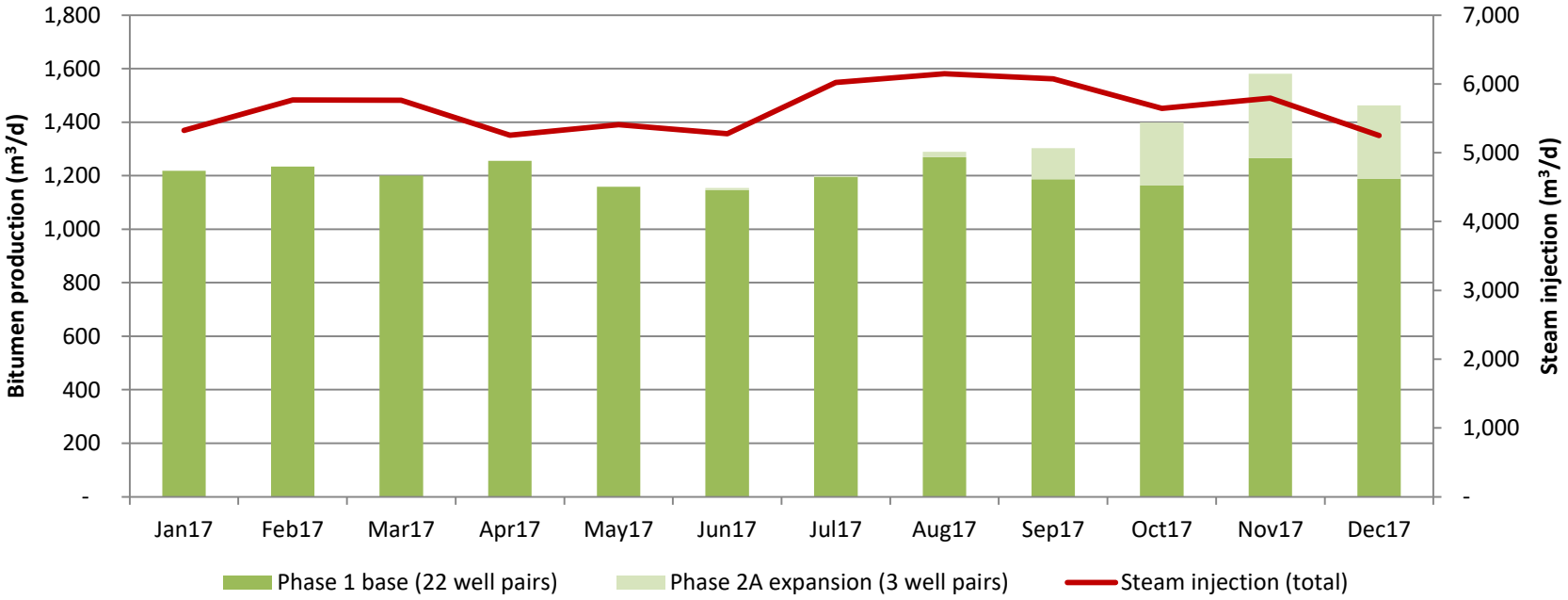
Orion In Situ Oil Sands

2017 Annual Performance Report

Orion Field Production – Since Inception



Orion Field Production – 2017



- 2017 production averaged 1,287 m^3/d (8,100 bbl/d) with peak monthly production of 1,581 m^3/d (9,945 bbl/d) in November
- Maintained stable production levels from Phase 1 base (averaged 1,188 m^3/d)
- Incremental volumes from Phase 2A expansion well pairs resulted in higher exit rate
- 2017 steam injection averaged 5,643 m^3/d vs. 4,975 m^3/d in 2016 (full year with 3rd boiler)
- Operational issues in late December resulted in lower exit rate (planned production reductions)

Orion SAGD Pressure Scheme

- Steam injection volume increased with additional boiler in November 2016
- Higher 2017 steam rates allowed some pressure increase to be achieved in Phase 1 wells prior to 2A startup
- Stable pressures in Phase 1
  - Pad Pressures: 2200-3000kPa
- 2A well startup in June utilized incremental steam
- 2A chamber pressures initially 4000-4500kPa
  - Production lift is achieved with higher reservoir pressure

Orion SAGD Startup Strategy

- Circulation is utilized to startup all SAGD well pairs (similar to Orion Phase1)
  - Circulation time frame 3-4 months
  - Both injectors and producers are tested and monitored
    - Producers monitor liner temperatures

- Chamber pressures initially 4000-4500kPa
  - Production lift is achieved with higher reservoir pressure
  - Balanced circulation pressures initially, small differentials induced nearing completion

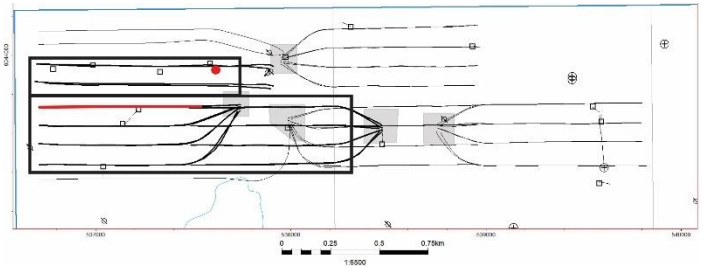
Well Interventions – 2017

Perforations:

- Short sections – saw continued benefit with short heel section previously not perforated (eg. 50-150m)
  - P105-2, P105-4, P103-1, P103-4
- Larger sections – wells previously unperforated
  - P106-5 – full liner length perforated
  - Pilot 1 and Pilot 3 – approximately 1/3 of liner lengths were perforated
- Continued success noted in all perforated wells
  - Majority of all Phase 1 slotted liners are now perforated full length
  - Pilot wells showed improvement

High Recovery Well Example, Good Well Placement Pilot, Pad 103, Pad 105

Pilot and Pads 103, 105

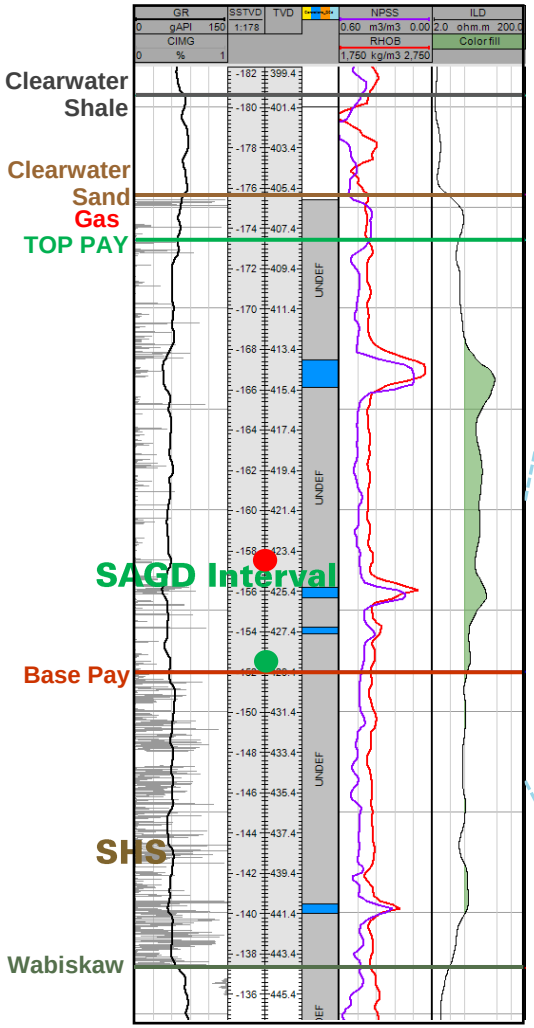


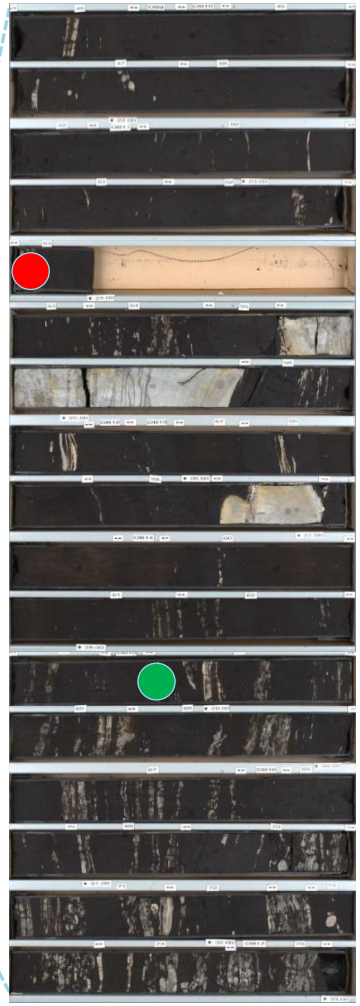
100/15-17 location

103-P1

- Producer wells generally above SHS - Sandy Facies interface
- Slotted liner design, later perforated

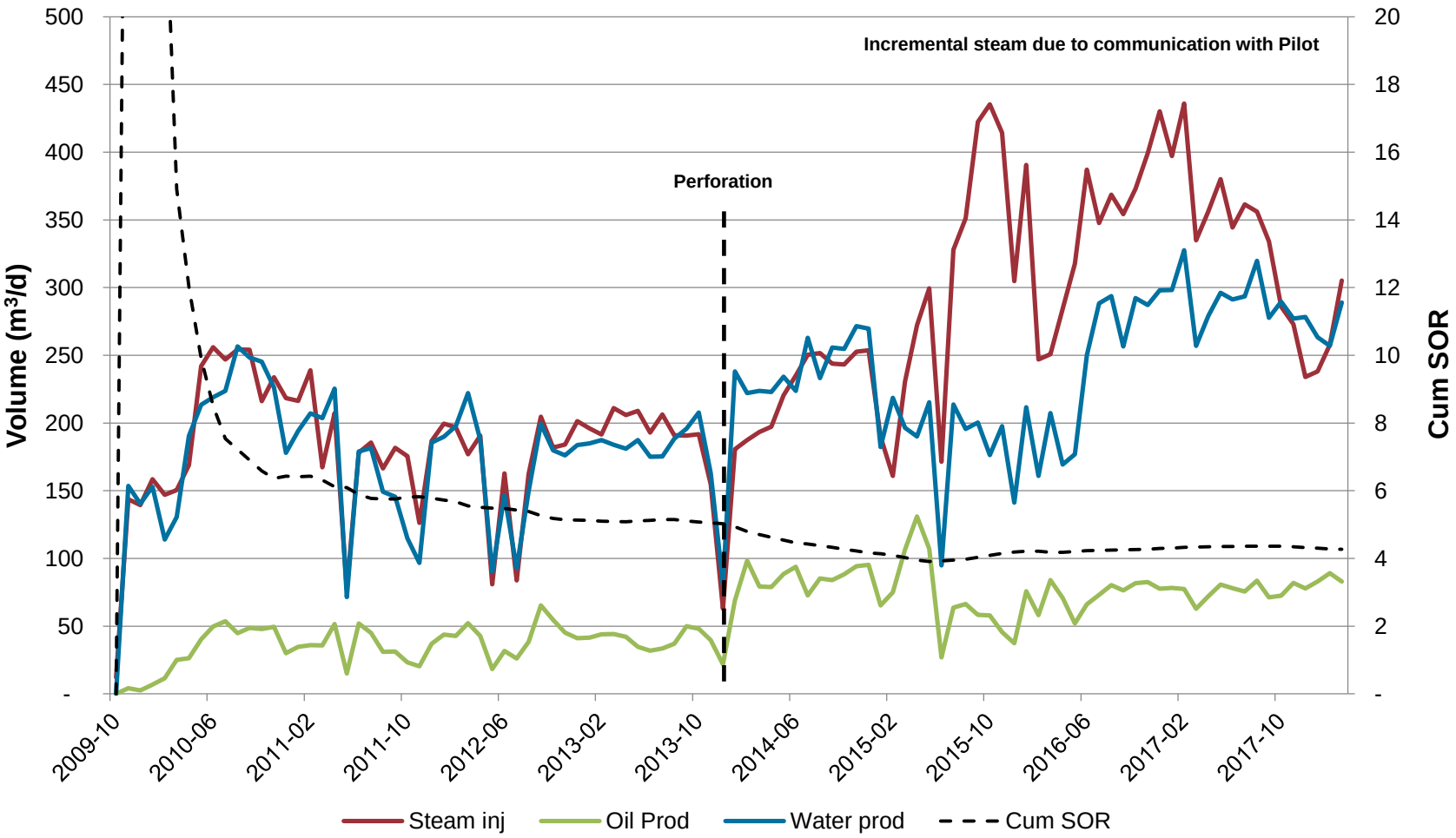
100151706403W4





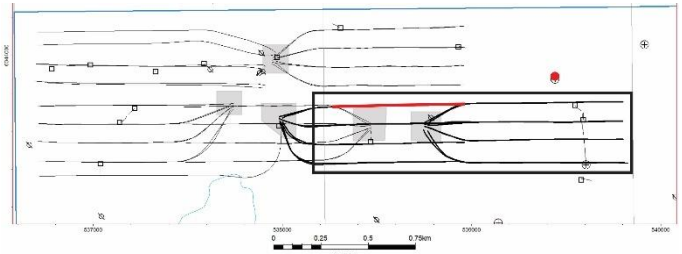
Well 103-P1 – High Recovery, Good Performance

Well placed in high quality facies, high rate potential



Low Recovery Example, Low Well Placement Pads 104 & 106

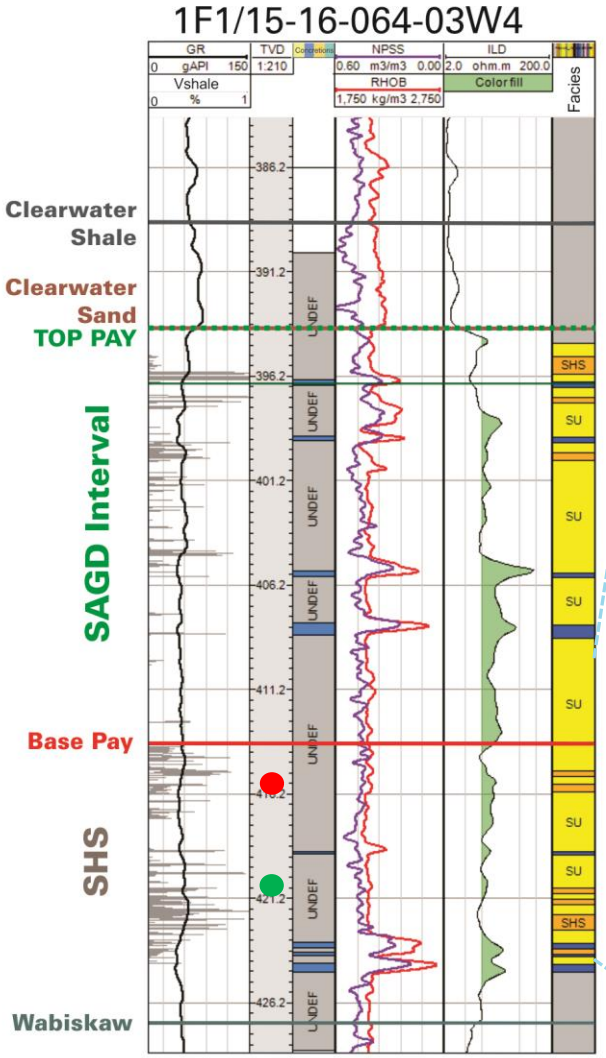
Pads 104 and 106

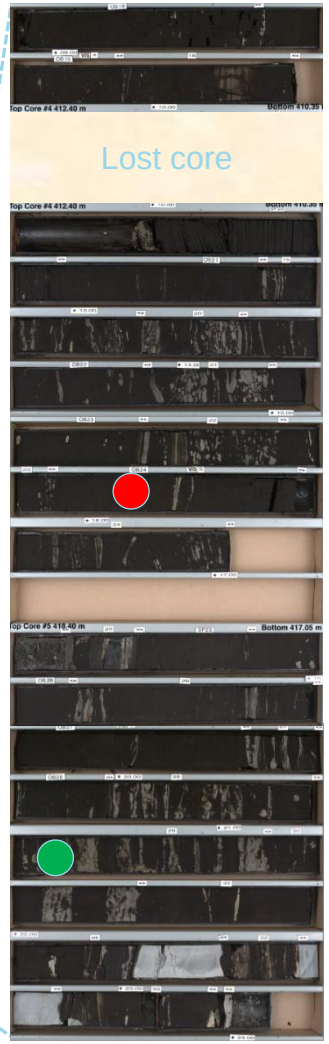


1F1/15-16 location

104-P1

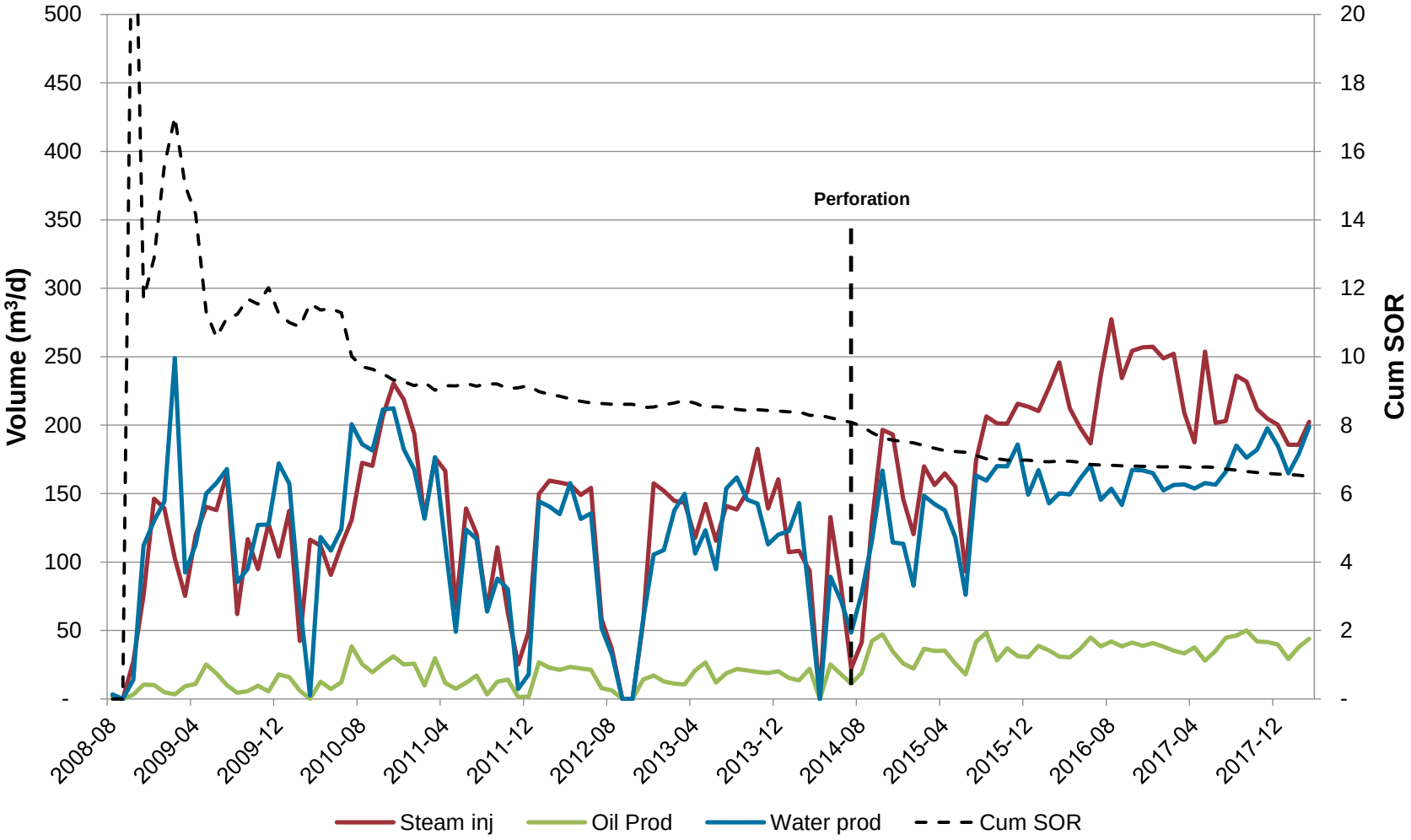
- Producer wells placed beneath SHS - Sandy Facies interface
- Slotted liner design, later perforated





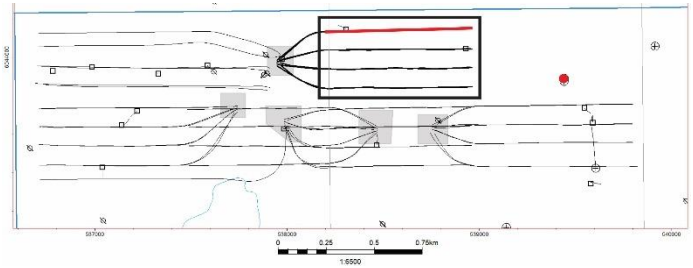
Well 104-P1 – Low Recovery, Low Performance

Injector producer placed in sandy heterolithic sands, impact on production



Moderate Recovery Well Example - Pad 107

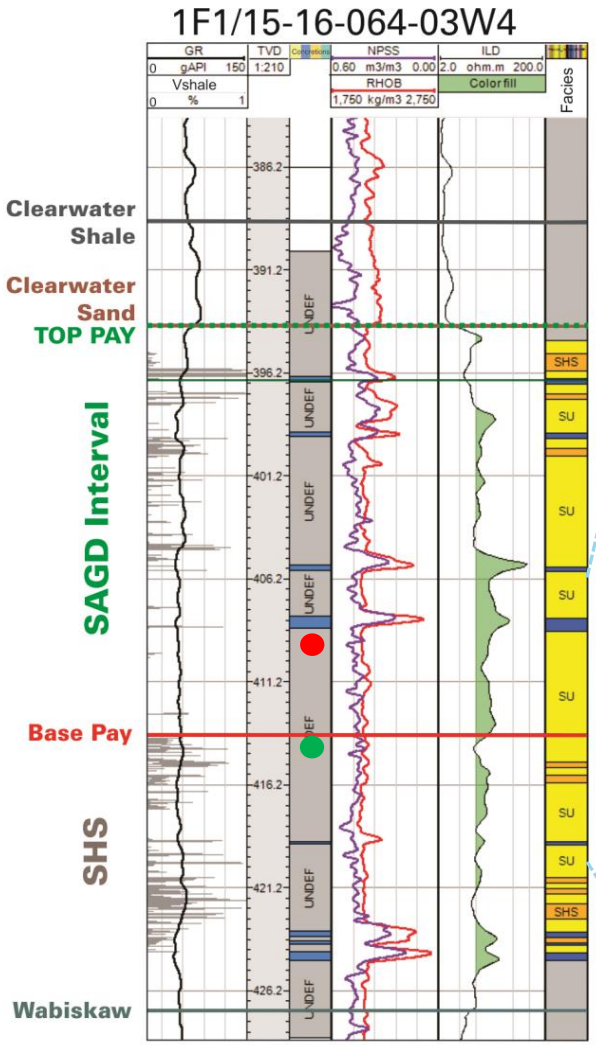
Pad 107

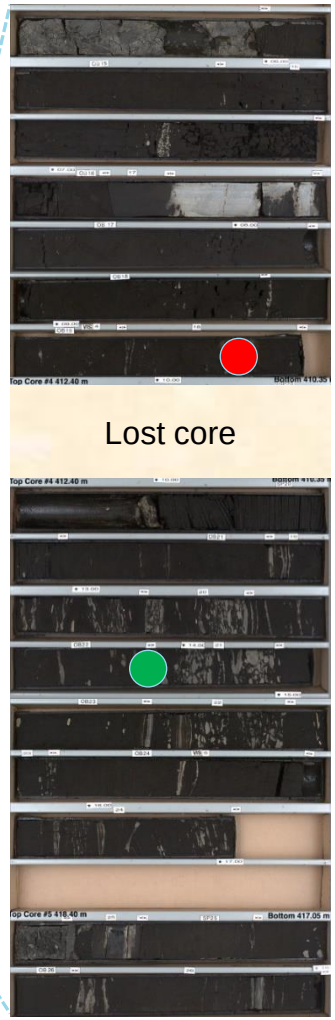


1F1/15-16 location

107-P1

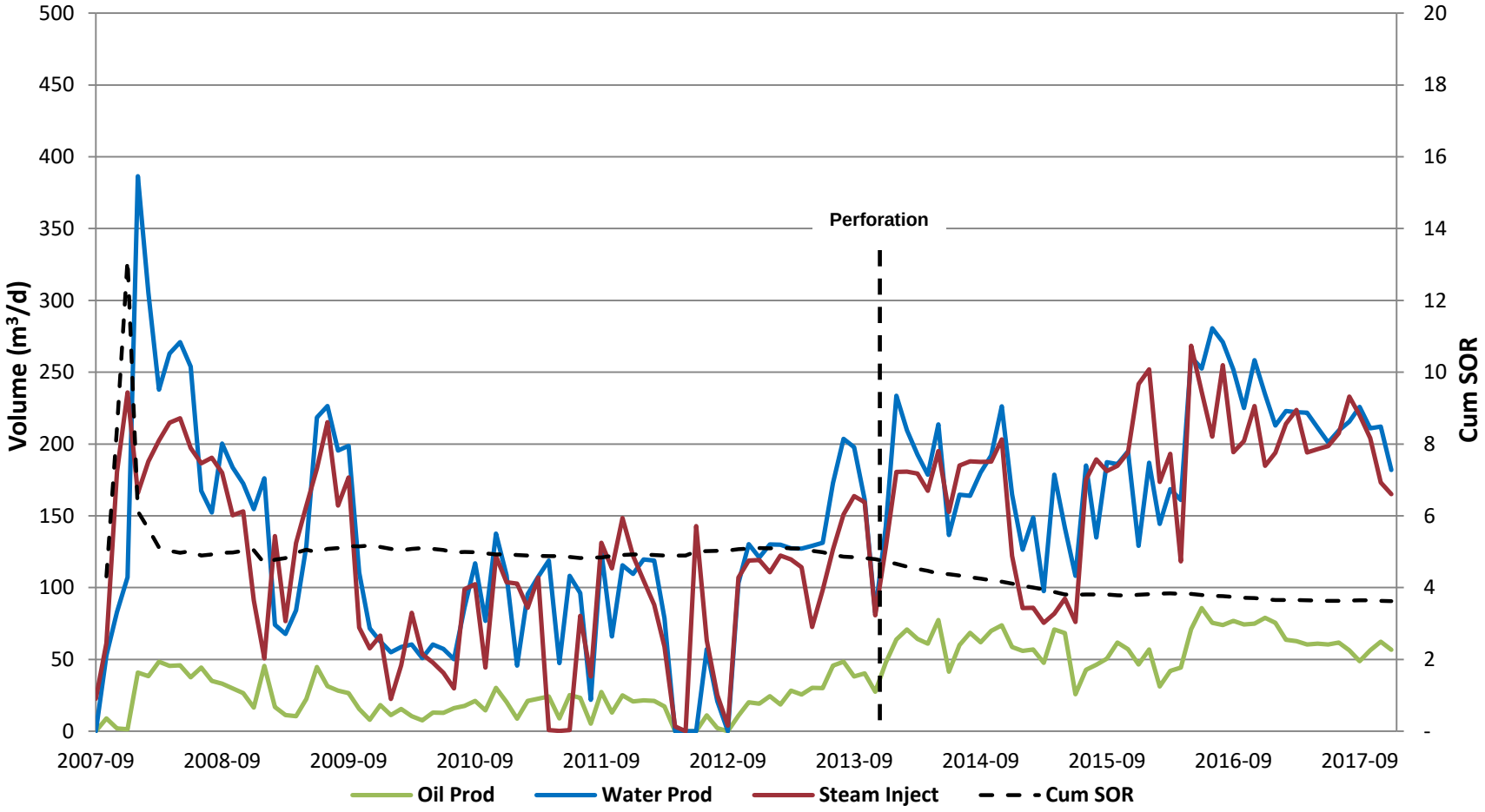
- Producer wells placed close to SHS - Sandy Facies interface
- Slotted liner design, later perforated





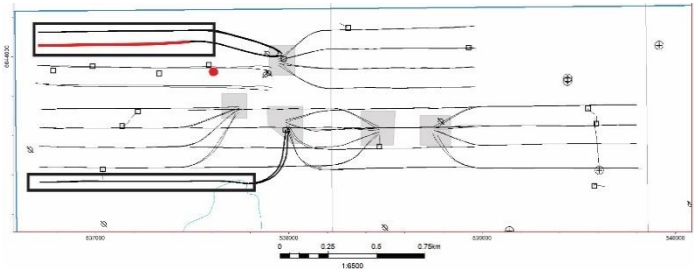
Well 107-P1 – Medium Recovery, Medium Performance

Production well placed marginally low in the sandy heterolithic sands, reasonable rates



2A Expansion – Typical Well Placement

Phase 2A

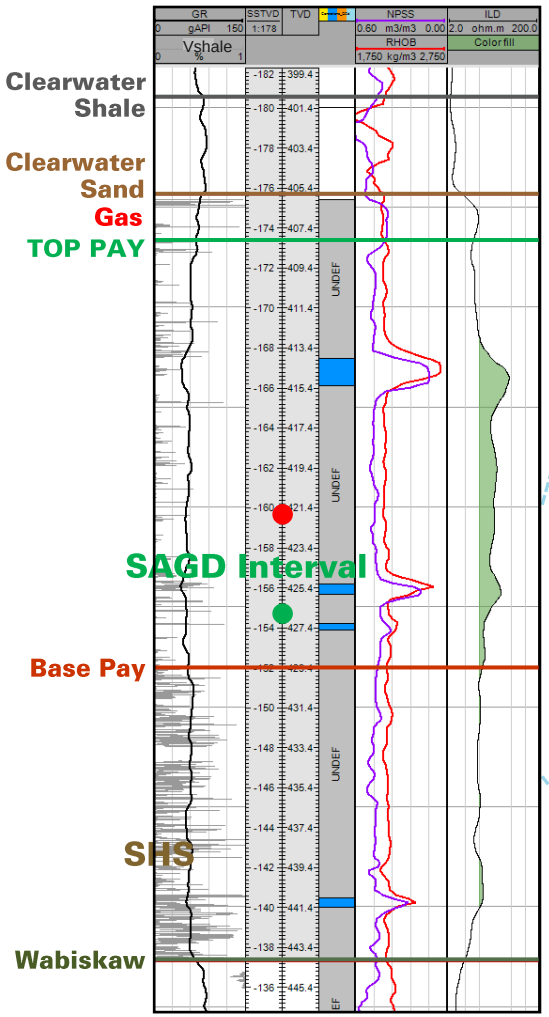


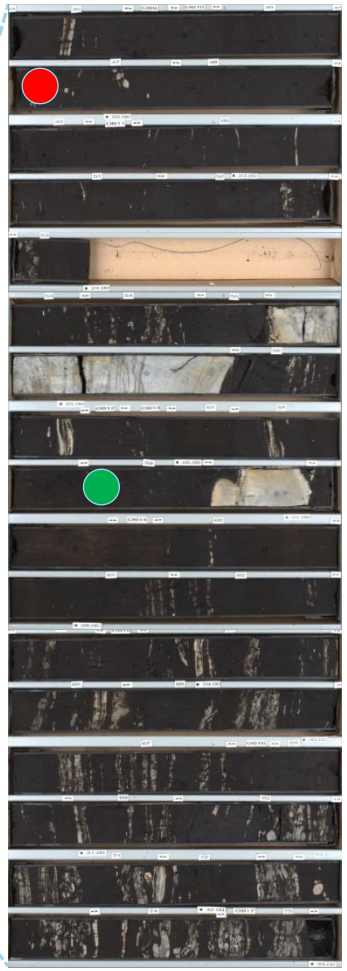
100/15-17 location

P108-2

- Producer wells placed in Sandy Facies
- Wire-wrapped liner design to minimize pressure drop

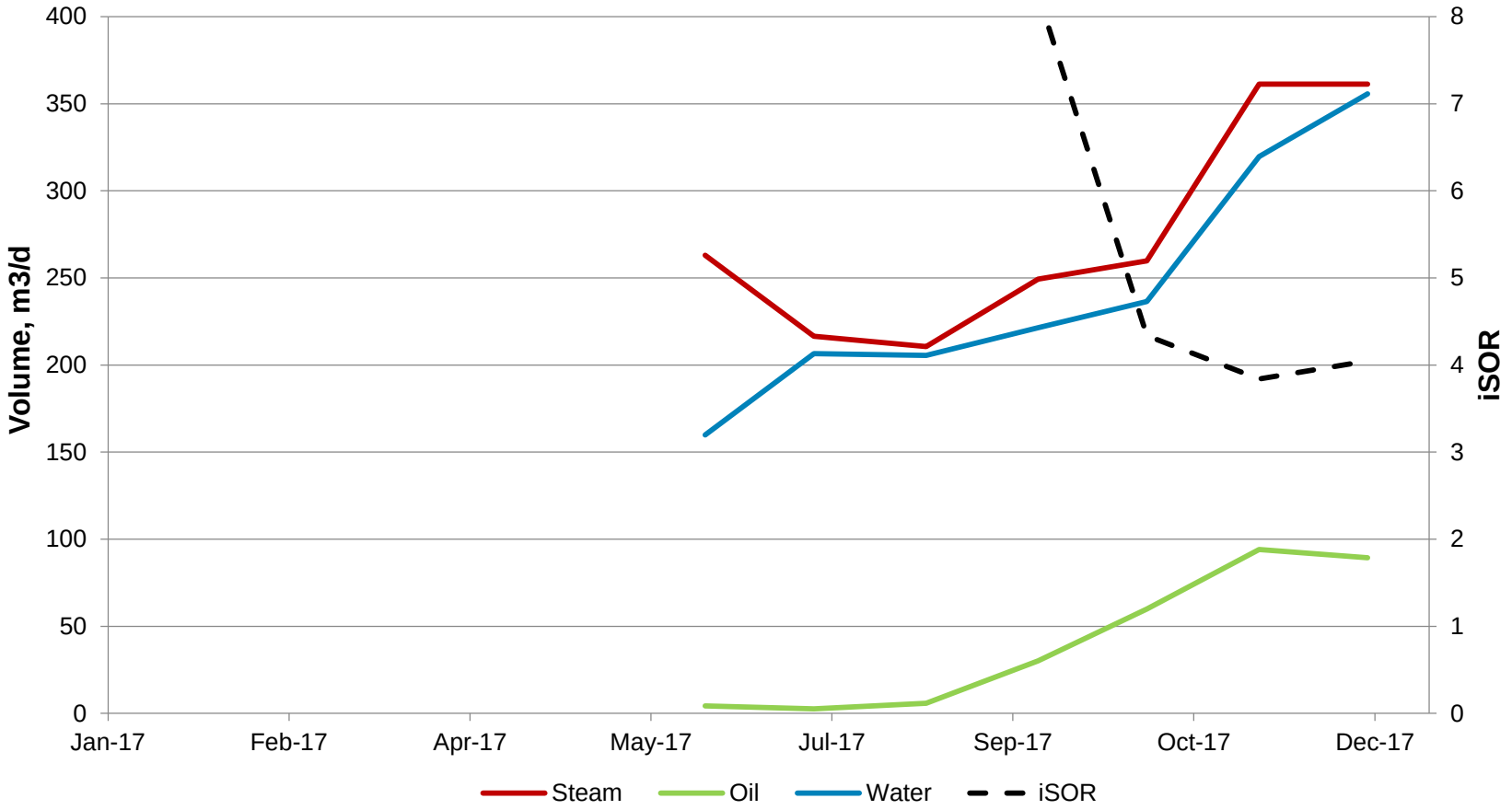
100151706403W4



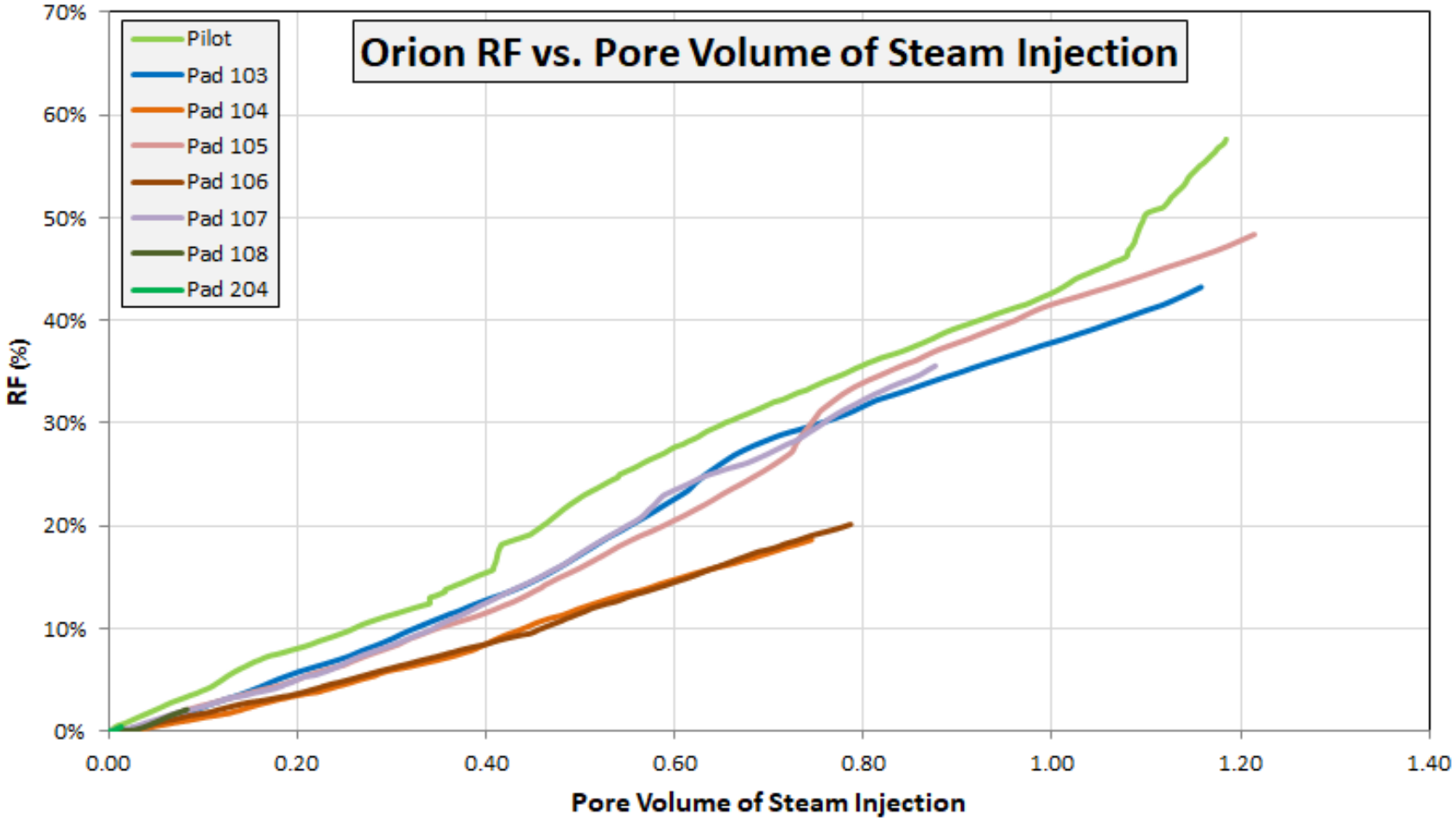


Phase 2A Expansion Well Pairs

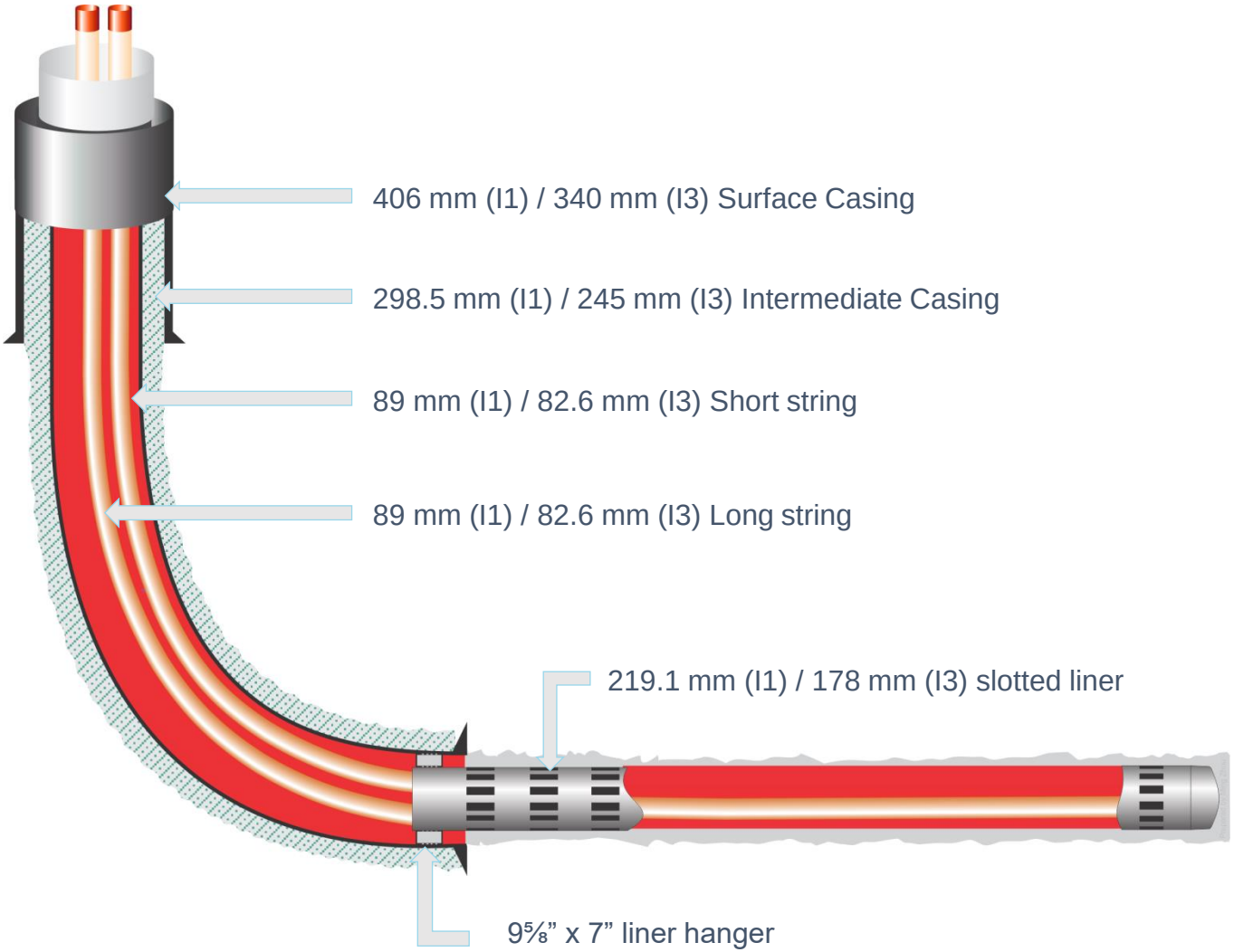
Typical expansion well performance, well pair P108-2



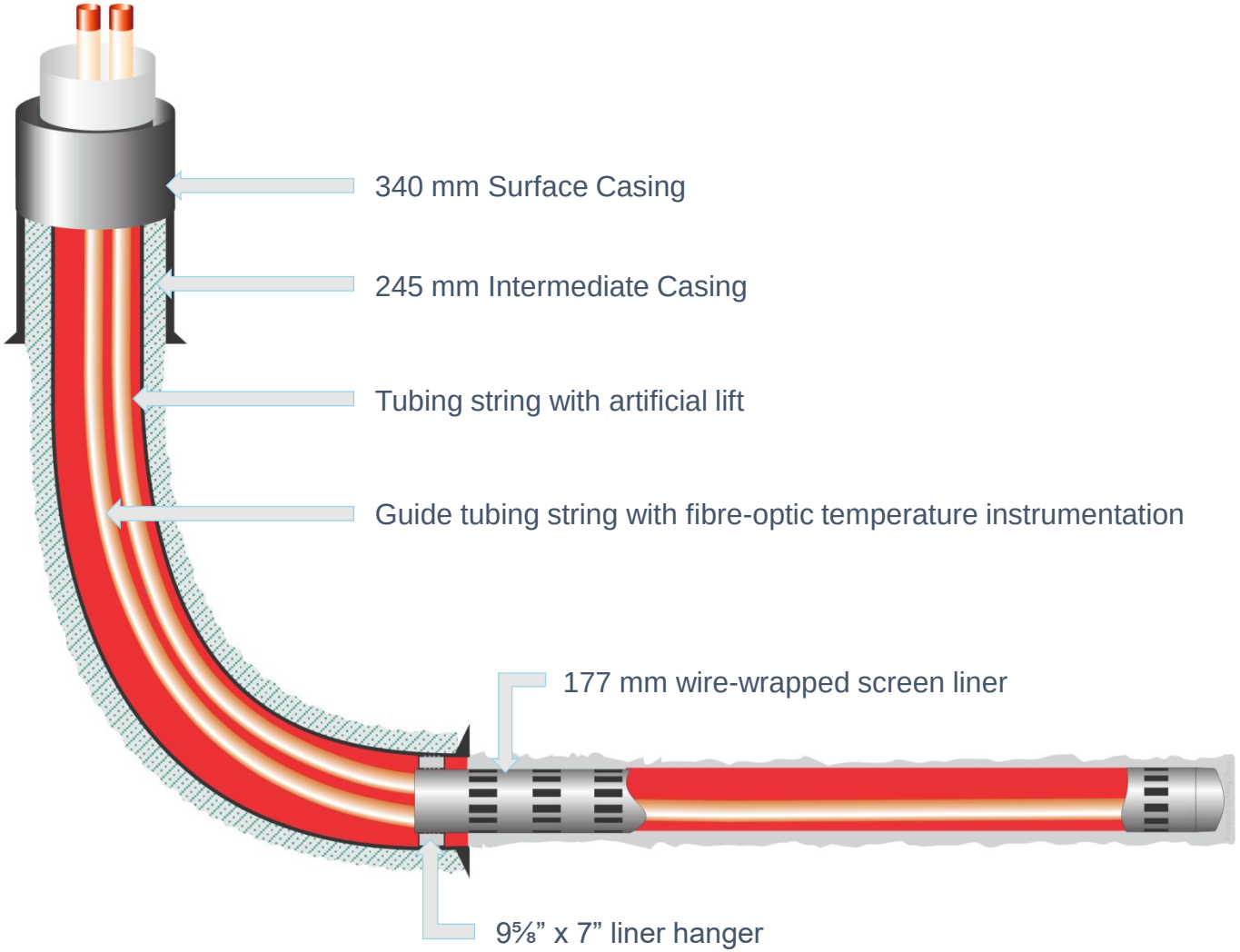
Pad Recovery and Performance



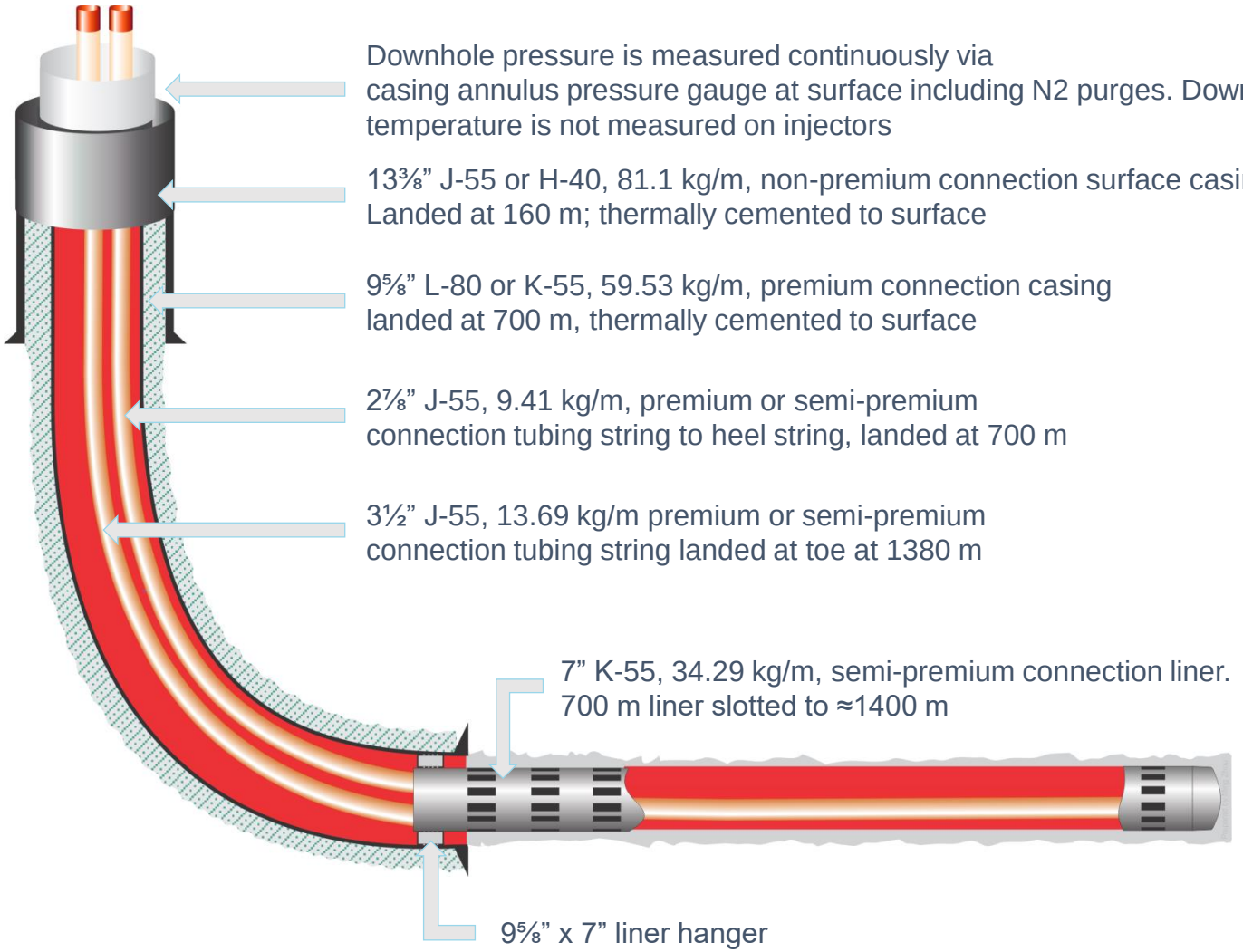
Hilda Lake Pilot Injector Schematic



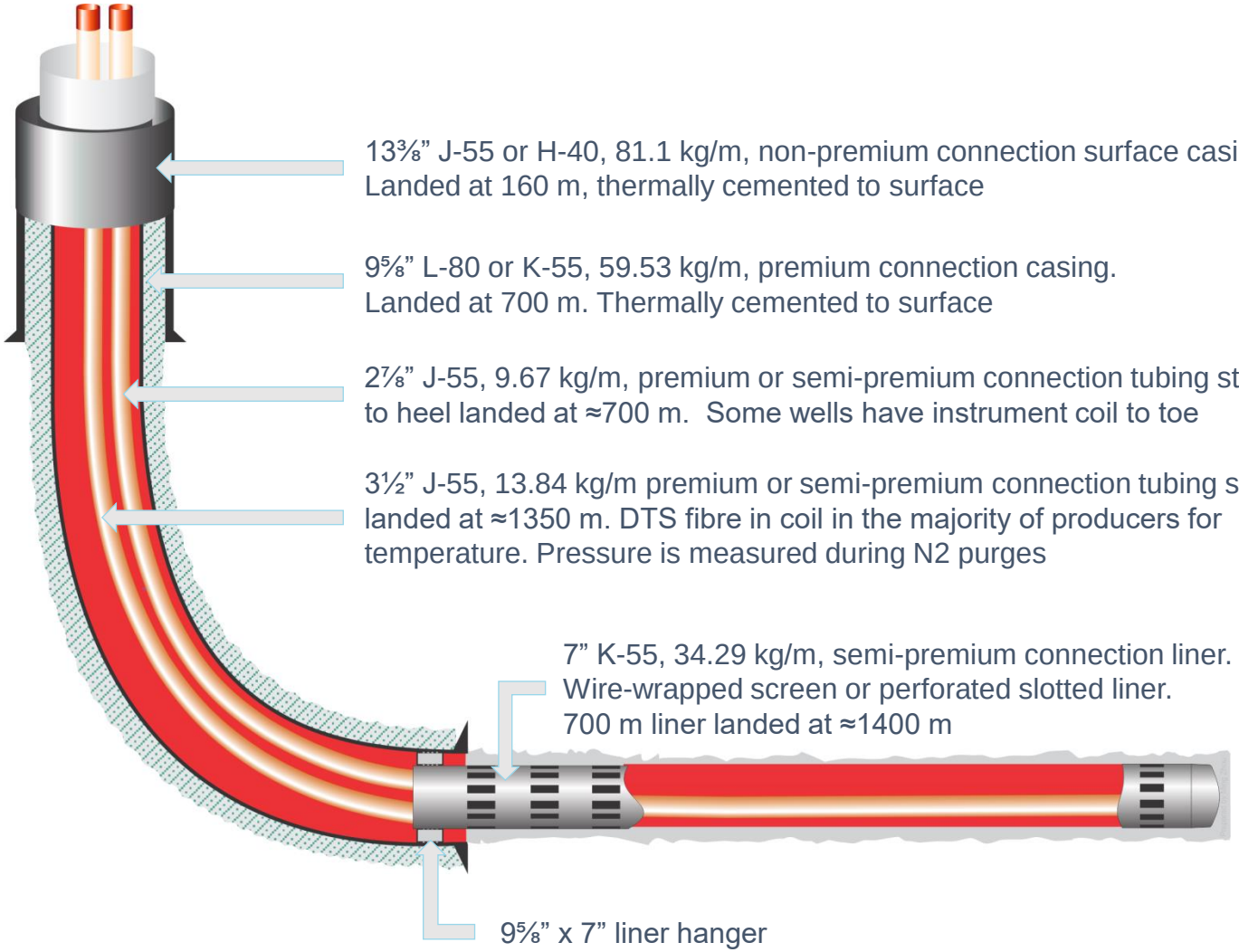
Hilda Lake Producer Schematic



Typical Phase 1 Injector Completion



Typical Phase 1 Producer Completion – Steam Lift



13⅜” J-55 or H-40, 81.1 kg/m, non-premium connection surface casing.
Landed at 160 m, thermally cemented to surface

9⅝” L-80 or K-55, 59.53 kg/m, premium connection casing.
Landed at 700 m. Thermally cemented to surface

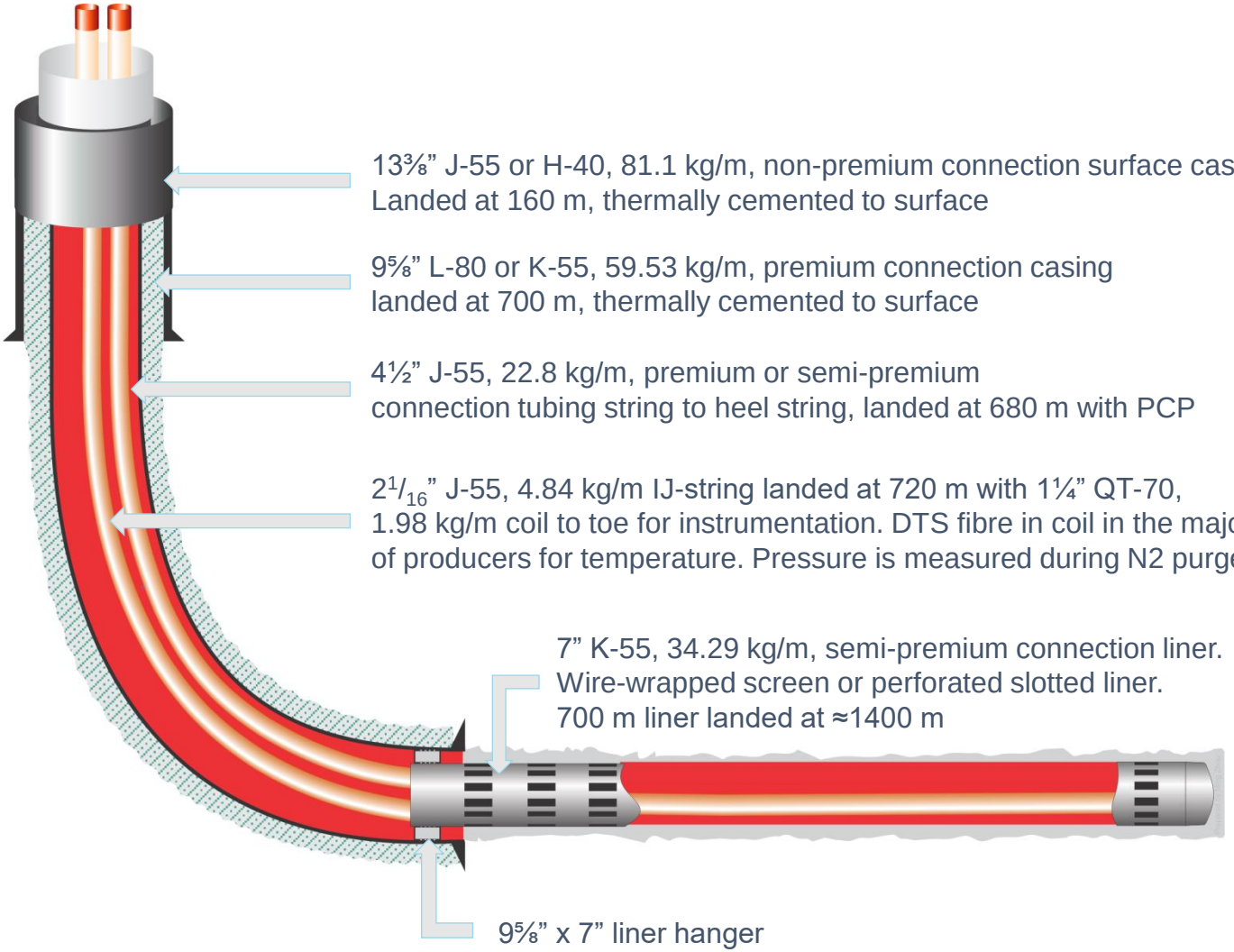
2⅞” J-55, 9.67 kg/m, premium or semi-premium connection tubing string to heel landed at ≈700 m. Some wells have instrument coil to toe

3½” J-55, 13.84 kg/m premium or semi-premium connection tubing string landed at ≈1350 m. DTS fibre in coil in the majority of producers for temperature. Pressure is measured during N2 purges

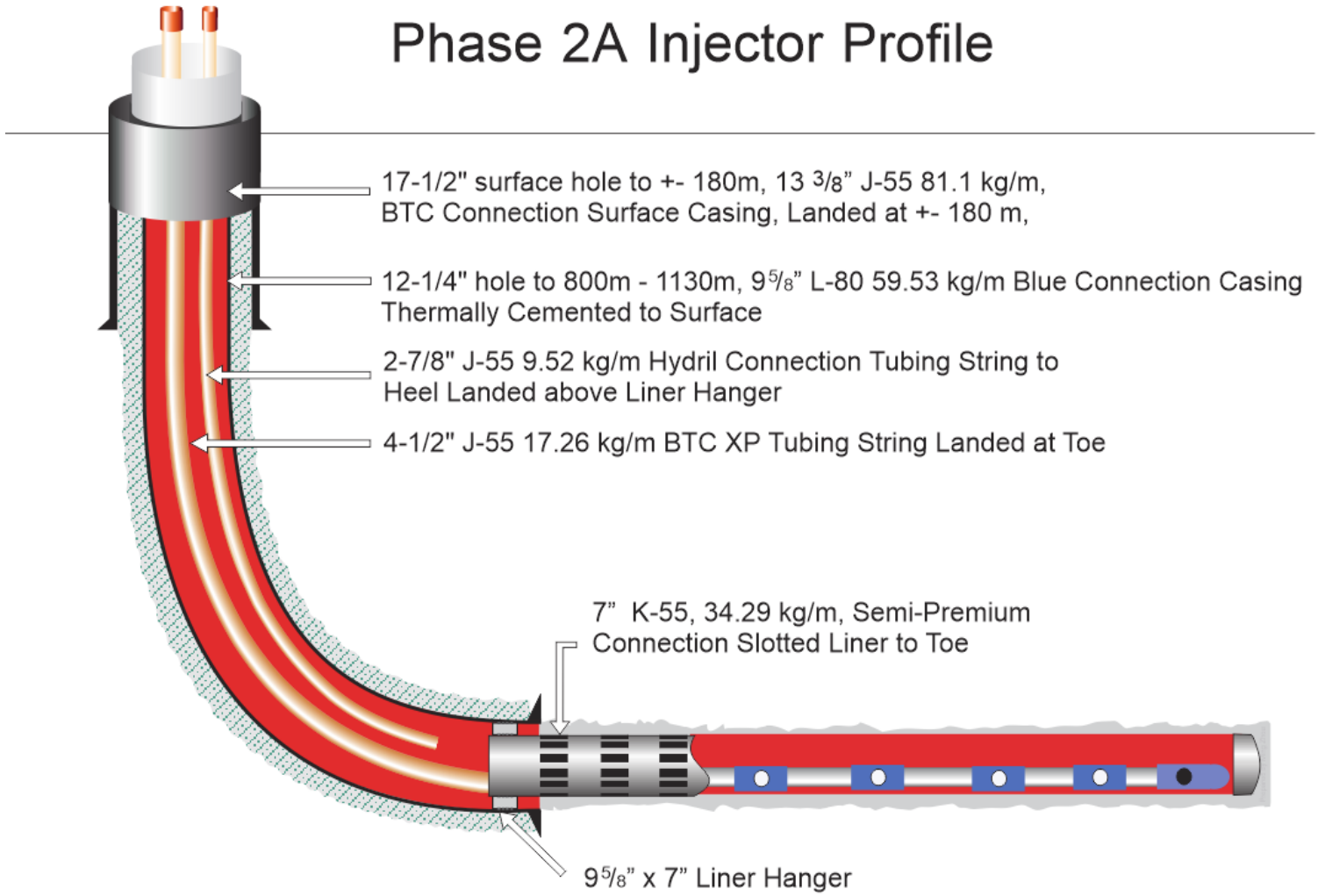
7” K-55, 34.29 kg/m, semi-premium connection liner.
Wire-wrapped screen or perforated slotted liner.
700 m liner landed at ≈1400 m

9⅝” x 7” liner hanger

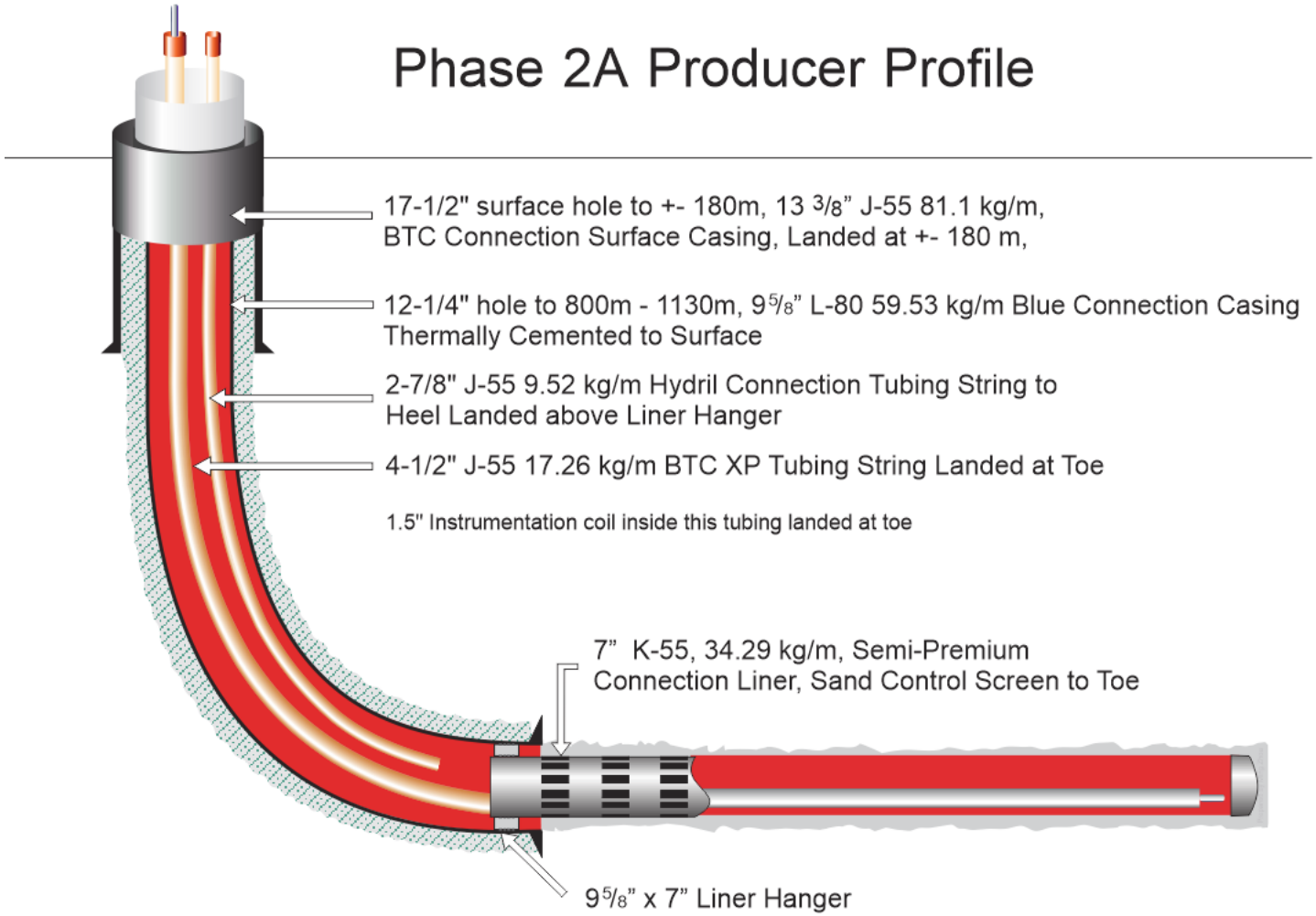
Typical Phase 1 Producer Completion – PCP



Typical Phase 2A Injector Completion (108-1, 108-2 + 204-5)

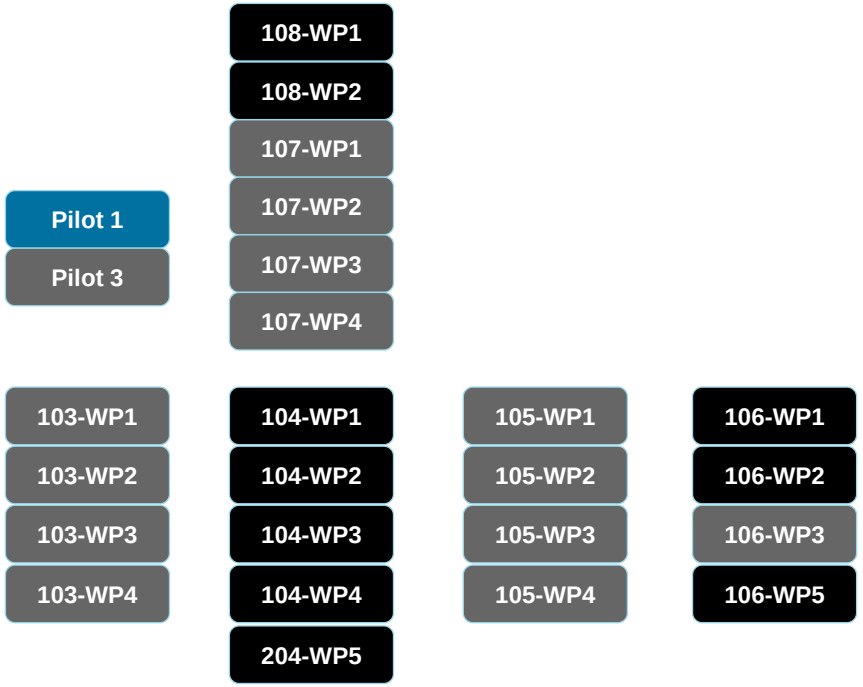


Typical Phase 2A Producer Completion – Steam Lift



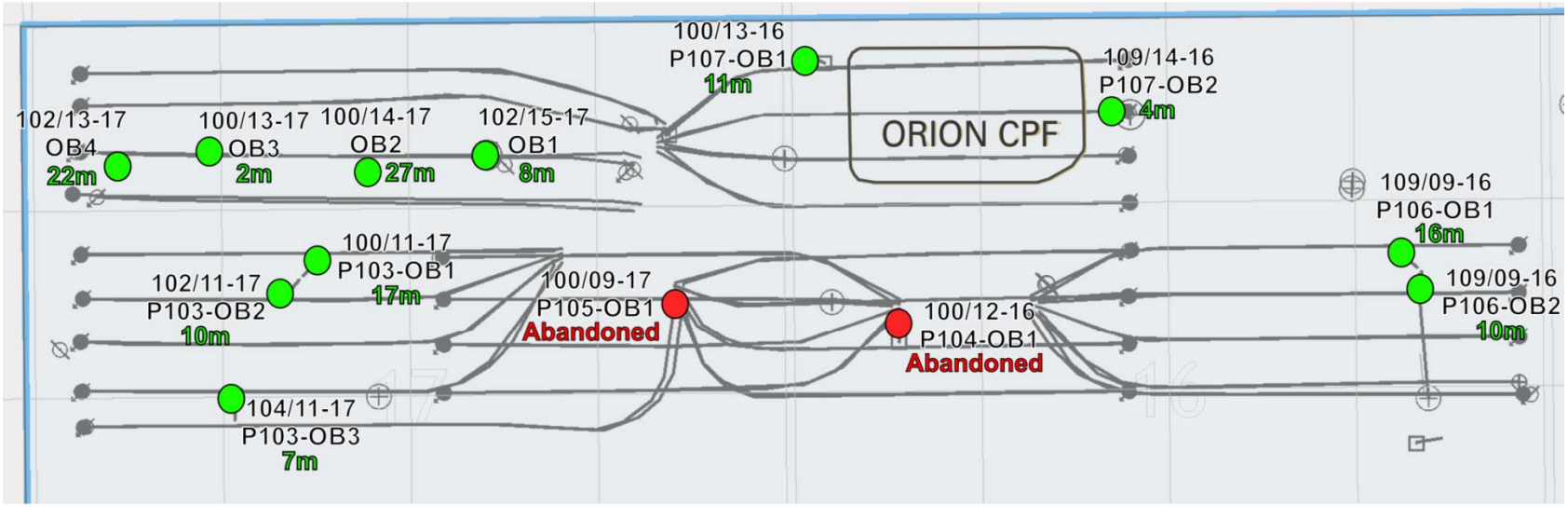
Artificial Lift – Orion Wells

PCP SAGD	14 Wells
Natural Lift SAGD	10 Wells
ESP SAGD	1 Well



Criteria	All Metal PCP
Maximum Operating Temperature	350 ^{o}C
Rate	100 -370 m^3/d 100 -350 RPM

Orion Observation Wells Location Map



Key

104/11-17
P103-OB3
7m

Observation Well

Distance from closest horizontal well

Number of Observation Wells per Pad

Hilda Pilot - 4
Pad 103 - 3
Pad 106 - 2
Pad 107 - 2

Total - 11

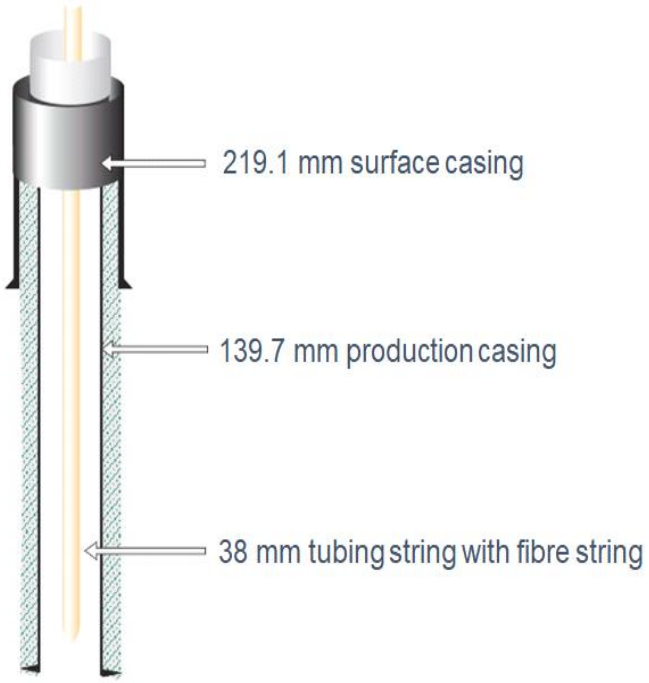
Orion Observation Wells Remediation

2017 was a significant year for remediation and improvement of the observation wells and data gathering

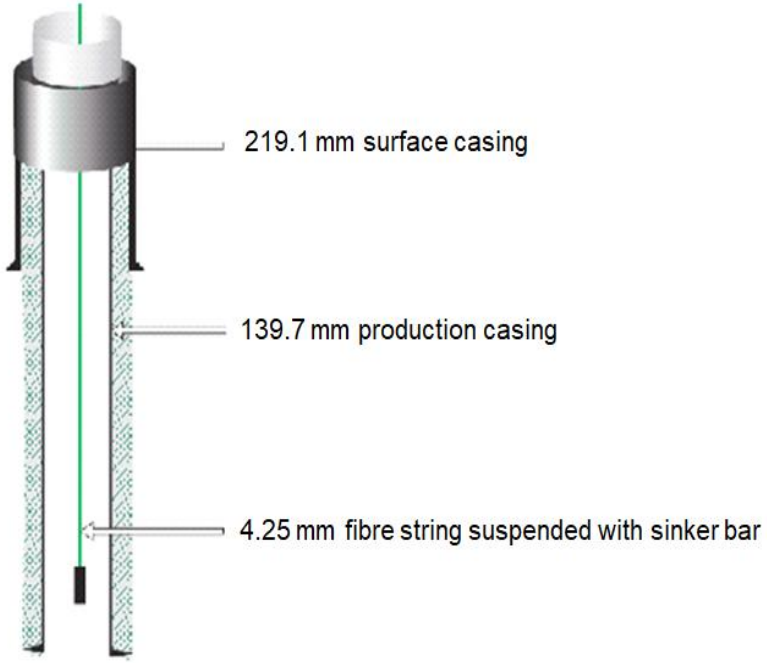
- Installed new DTS interrogator November 2016. Temperatures started to drift May 2017, interrogator was recalibrated, reinstalled, and operating properly by February 2018
- Ran new or re-ran thermal fiber capillary line in Hilda OB1, Hilda OB2, 103-OB1, 103-OB2, 106-OB2 and 107-OB2
- Reconfigured tubing for pressure monitoring: Hilda OB3
- Abandoned wellbores: 104-OB1 and 105-OB1

Hilda Lake and Phase 1 Observation Wells

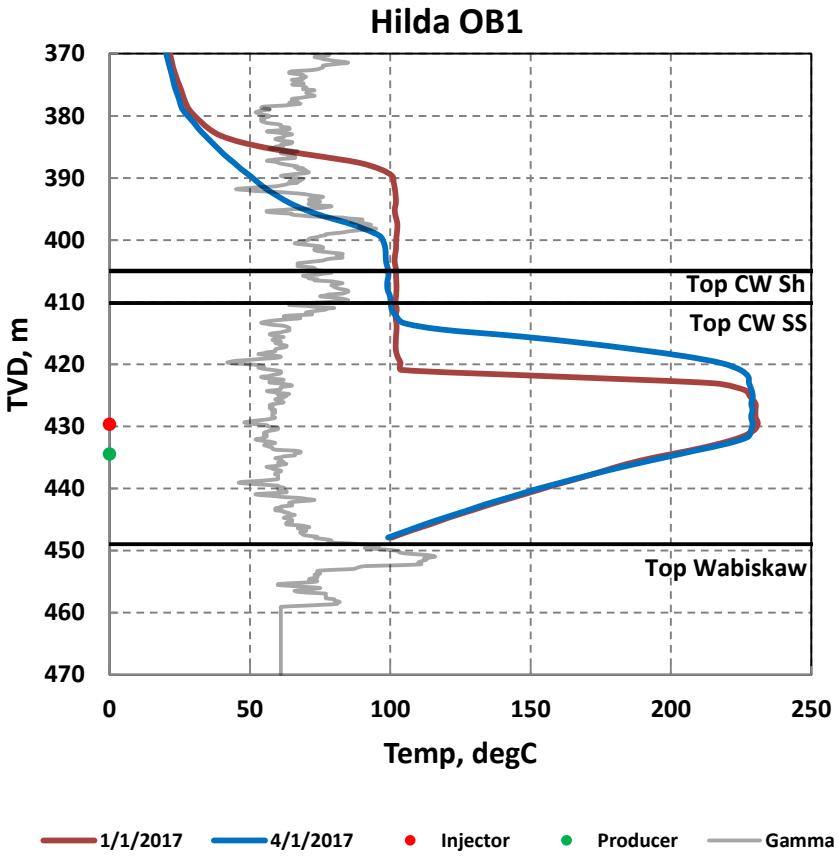
Hilda Lake Observation Well

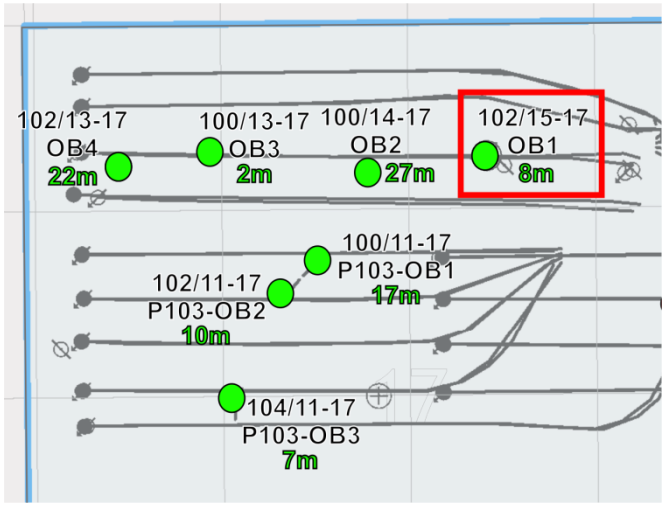


Phase 1 Observation Well



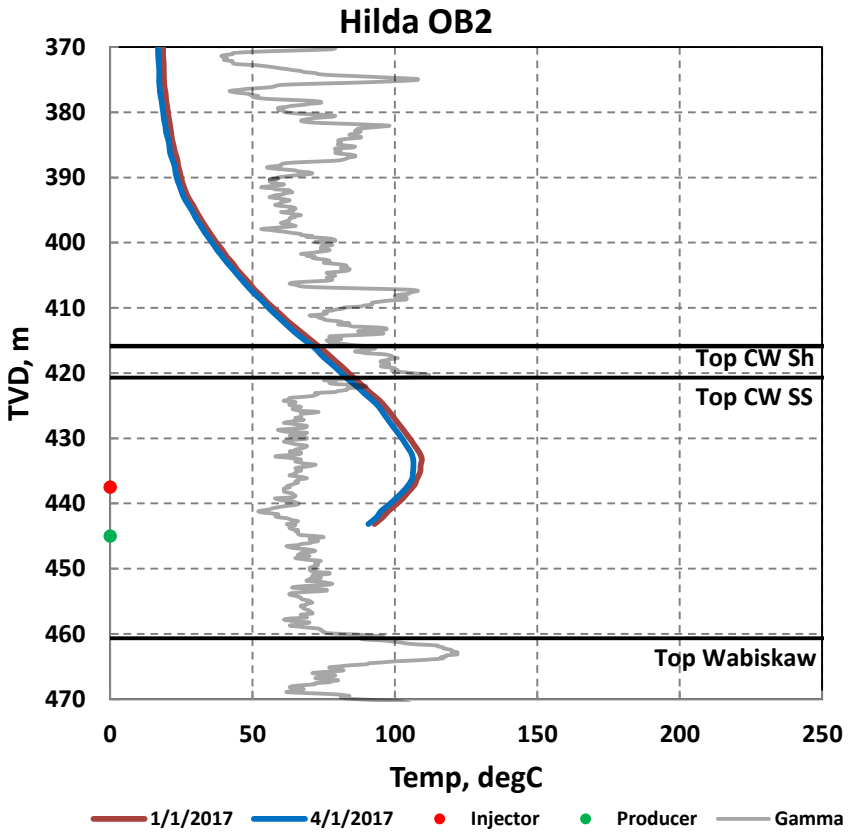
Hilda OB1

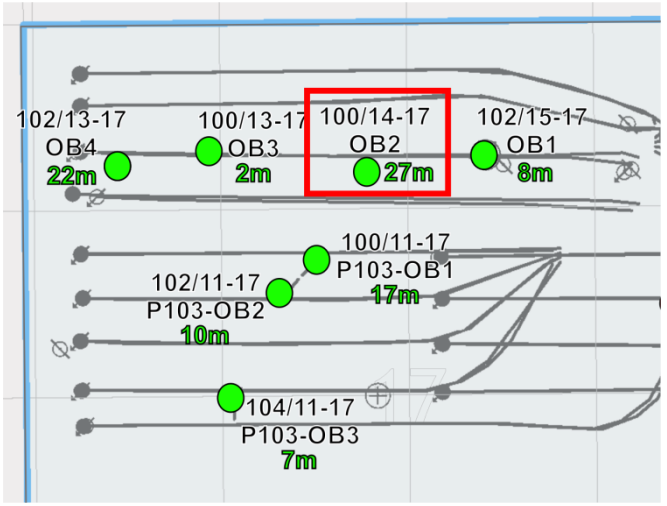




- Flat temperature profile of ~100 deg C observed above the Clearwater formation
- The height of this effect reduced early 2017 and no longer noticeable late May 2017

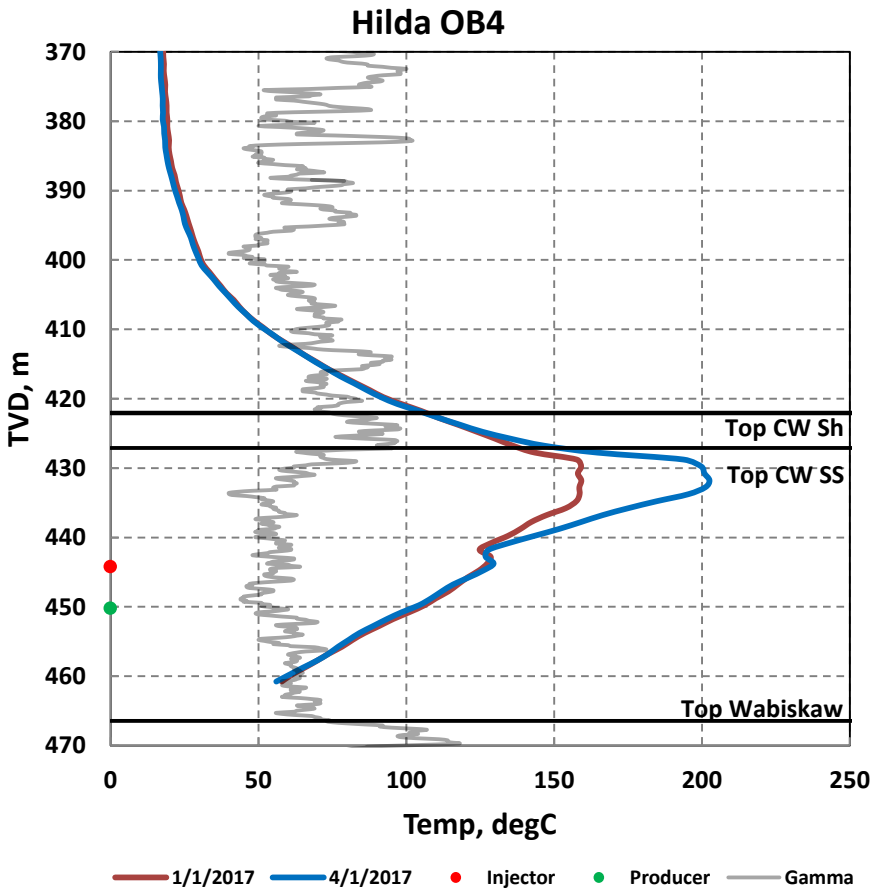
Hilda OB2

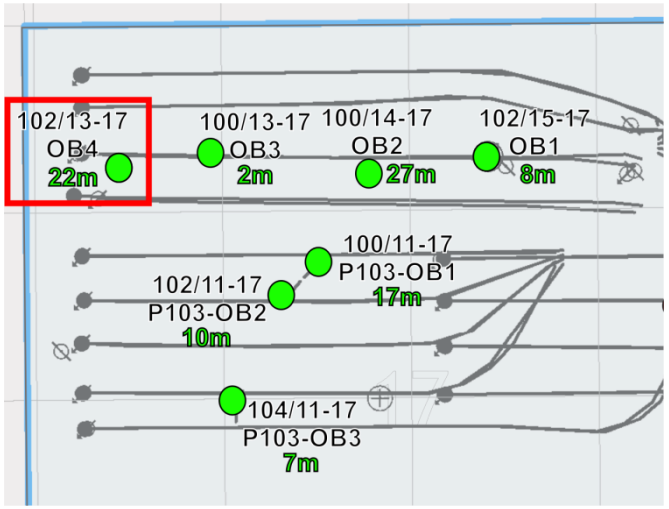




- Minimal change in height or temperature from 2016.

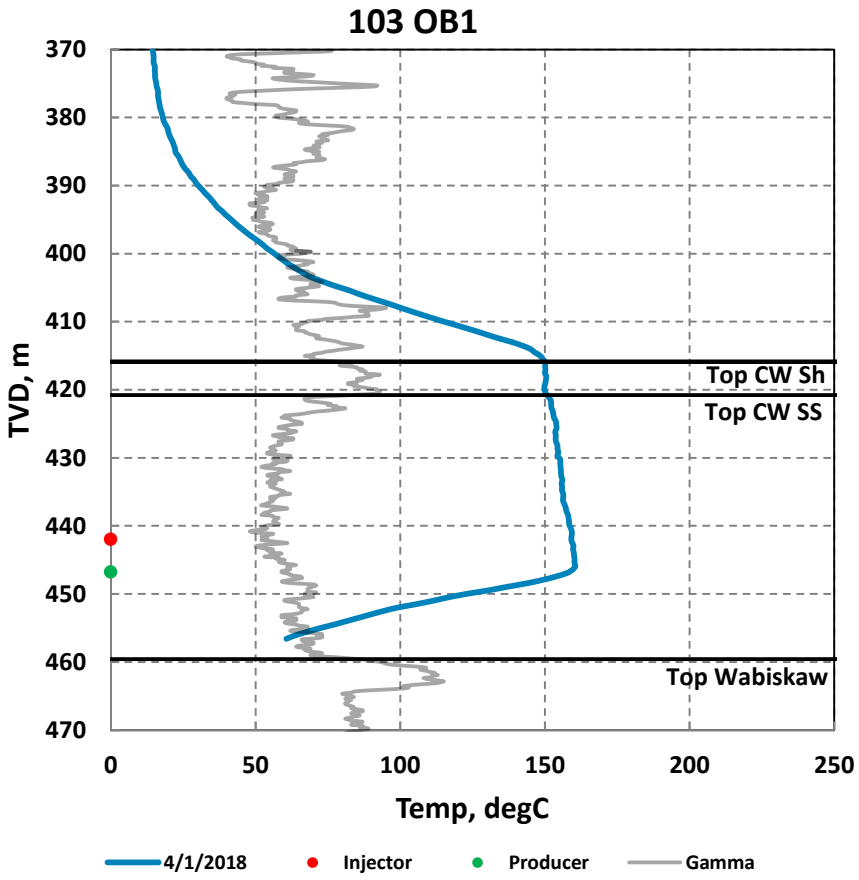
Hilda OB4

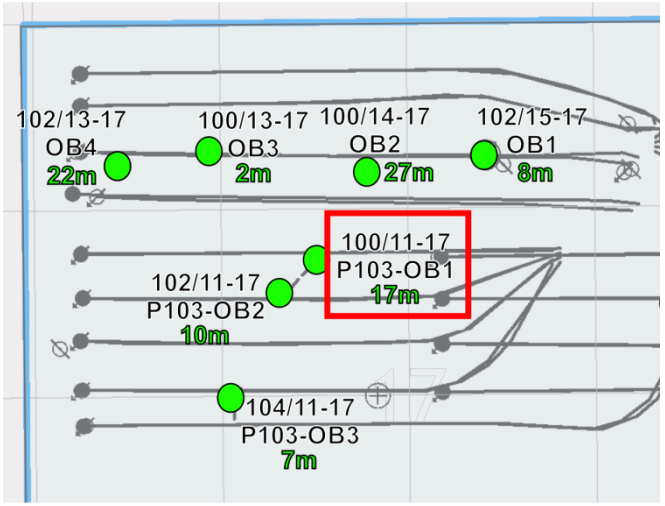




- Steam chamber growth has reached the top of Clearwater Reservoir
- Increased temperature through 2017.

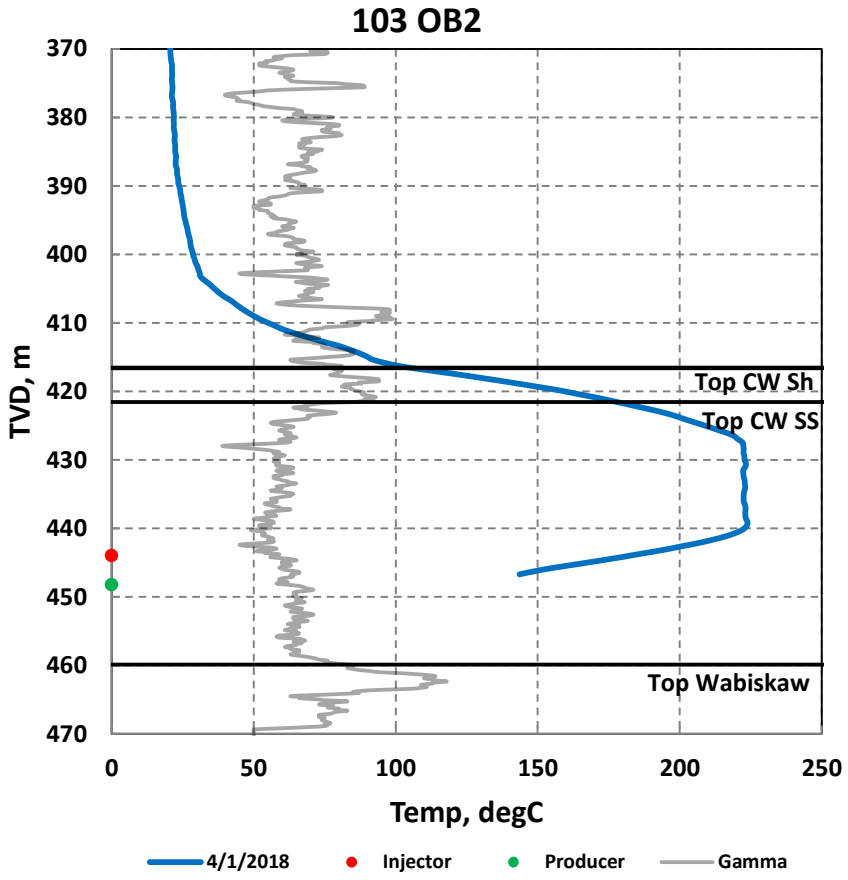
103 OB1

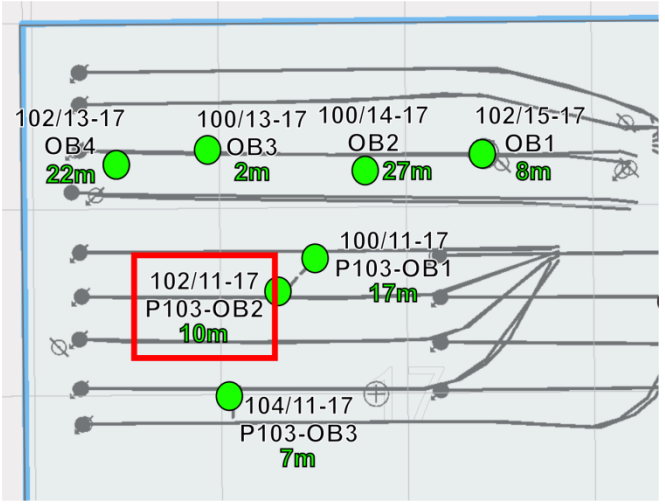




- Steam Chamber has not intersected wellbore to date
- Investigating completion to determine if fluid present in wellbore
- Previous data poor for comparison

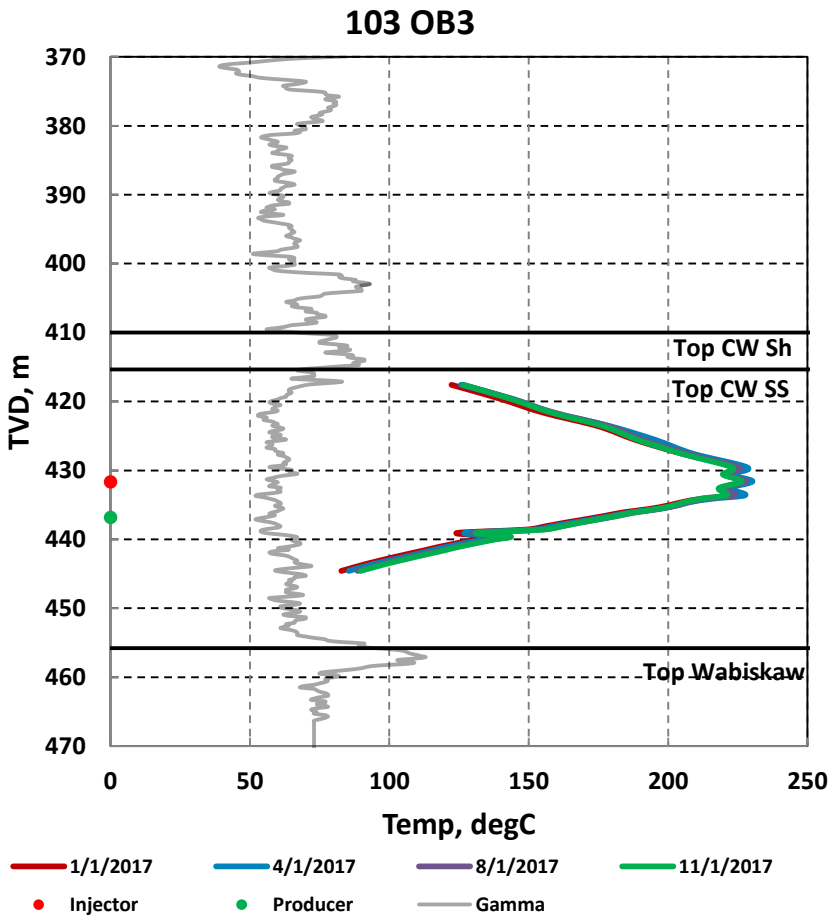
103 OB2

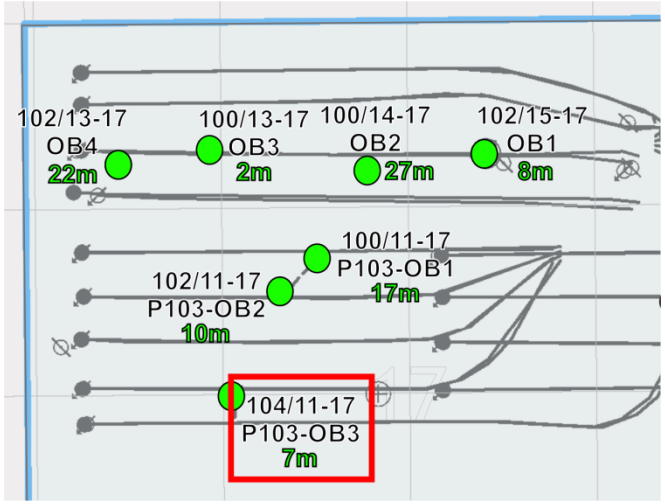




- Workover completed May 2017 to remove fluid from wellbore
- Good chamber development near mid section of 103 WP1 and 103 WP2
- Previous data poor for comparison

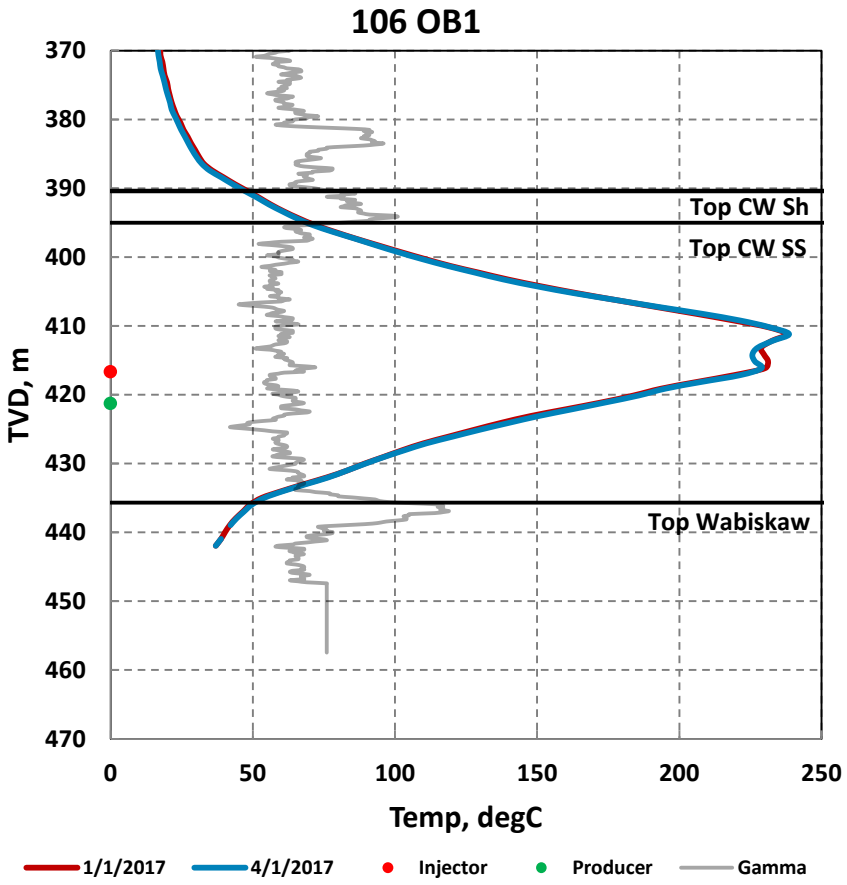
103 OB3

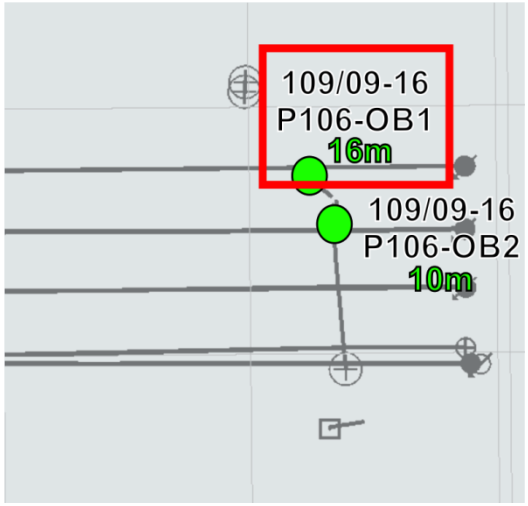




- Thermal-couple data, truncated dataset.
- Good steam chamber development at the mid section of 103 WP4 area
- Minimal change in height or temperature from 2016.

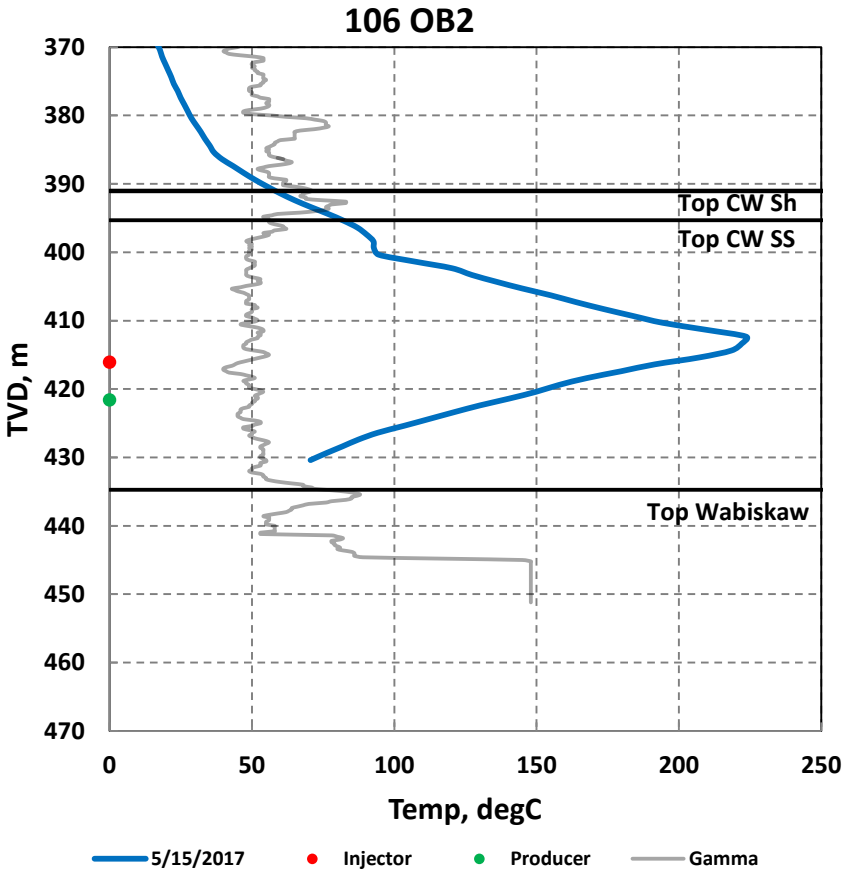
106 OB1

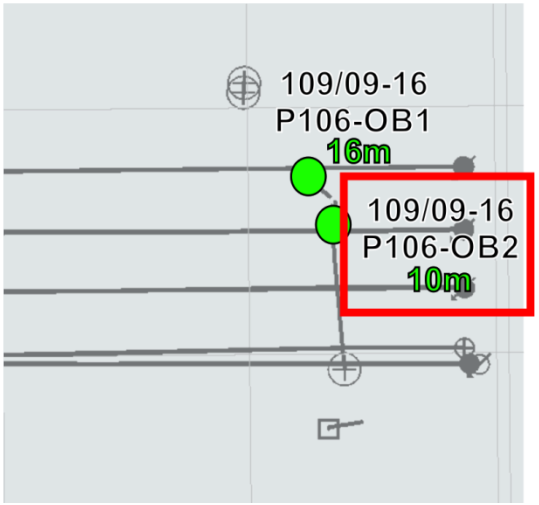




- Good chamber development near the toe of 106 WP1 area
- Minimal change in height or temperature from 2016.

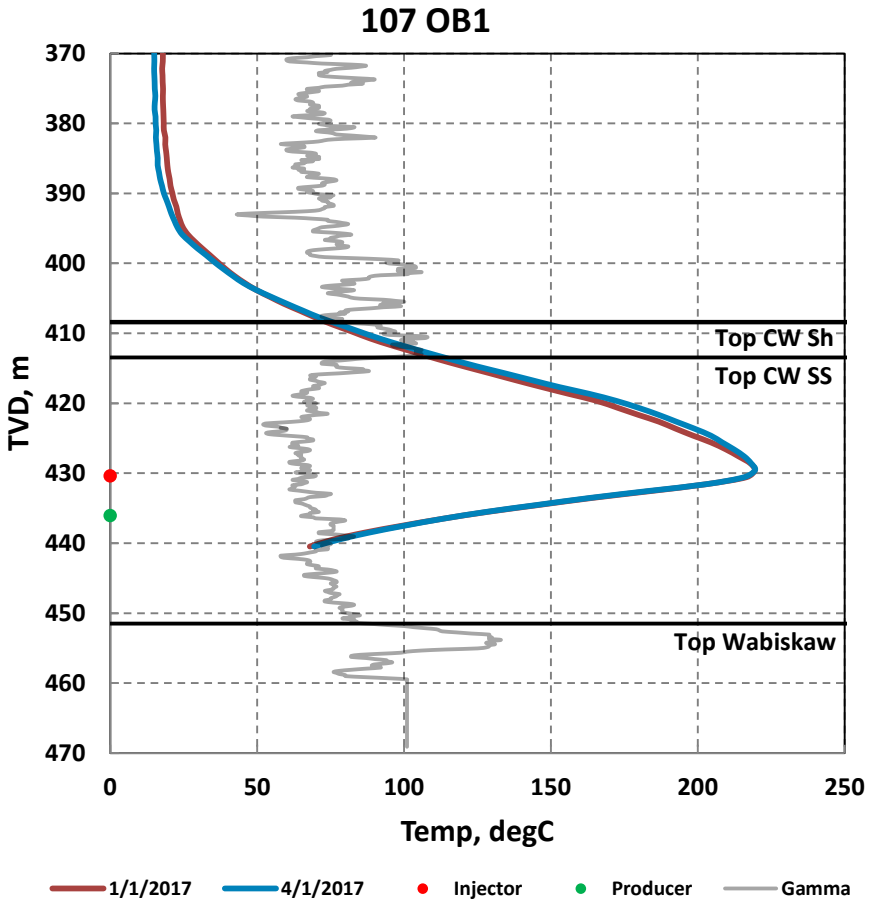
106 OB2

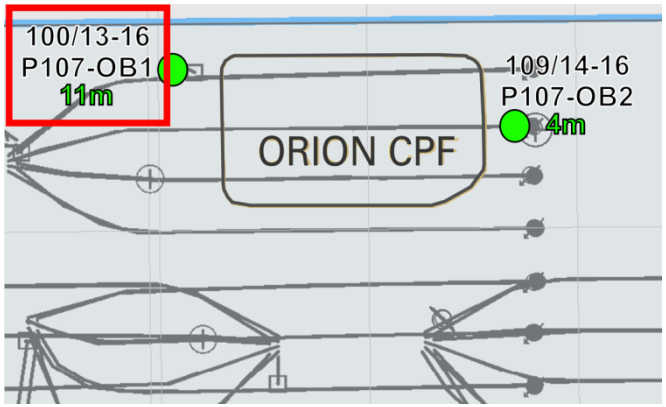




- Workover completed May 2017 to remove fluid from wellbore
- Chamber development near the toe of 106 WP2 area
- Previous data poor for comparison

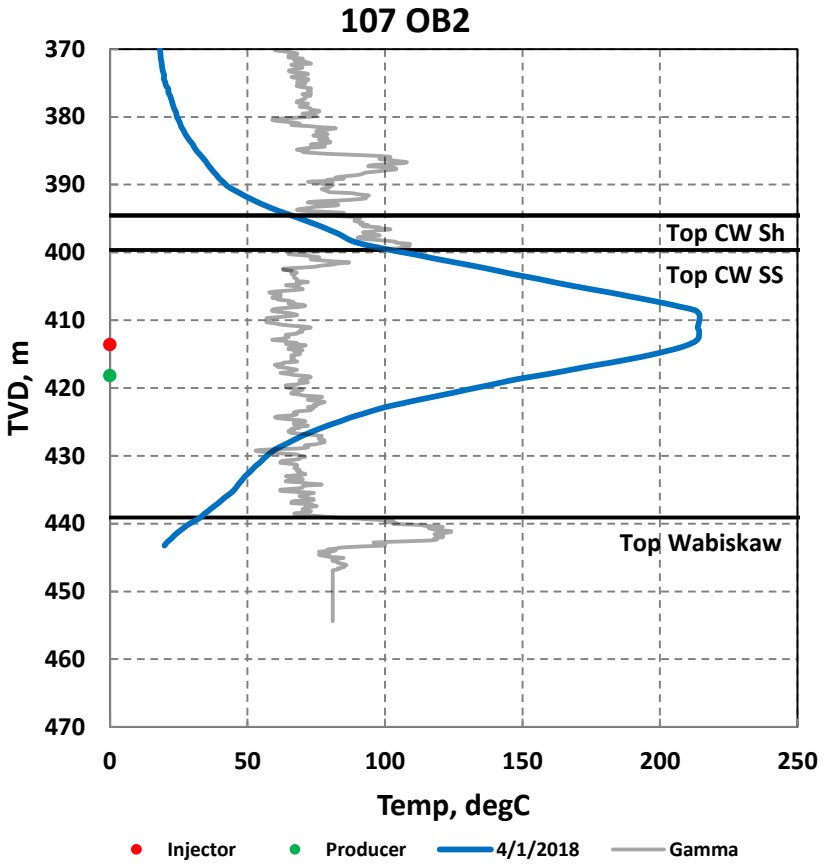
107 OB1

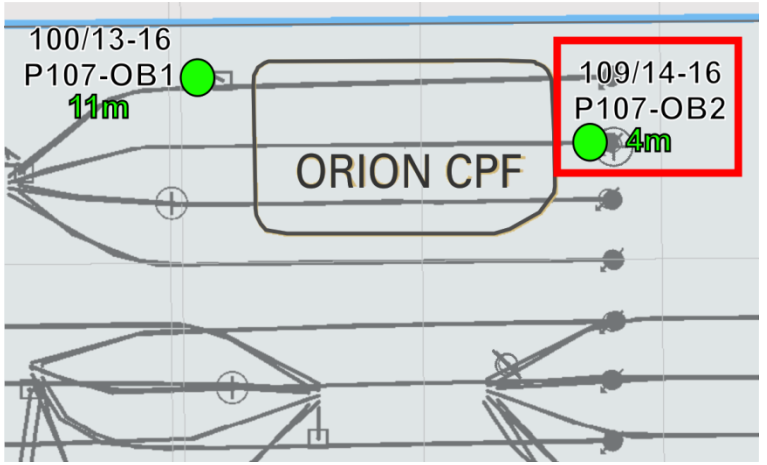




- Good chamber development at the heel of 107 WP1 area

107 OB2





- Workover completed May 2017 to remove fluid from wellbore
- Good chamber development at the toe of 107 WP2 area

Wellbore Integrity

Surface Casing and Liner Integrity

- In 2016/ 2017 Osum conducted a complete inspection of all Phase 1 and Hilda Lake pilot SAGD well pairs for surface casing corrosion.
    - Nine wells had external near surface casing corrosion which required repairs.
    - No significant corrosion was observed on any production casings.
    - Corrosion issues were mainly caused by low cement tops or degradation at surface over time in the presence of a saturated water layer.
    - None of the wells with surface casing waivers had significant casing corrosion at surface.
- In future surface casing corrosion checks will be conducted every second year on a single well on each of our pads. If significant corrosion is found then additional wells will be examined.
- New wells will be checked for cement to surface. Bentonite top ups will be done if required.
- Osum has not experienced liner failures on any Phase 1 or Hilda Lake Pilot wells.
- Osum is currently updating the Well Integrity Management Plan which addresses design, integrity risks, corrosion mitigation, and monitoring and detection.
- Osum has both an Emergency Response Program and a Well intervention Plan in place which would mitigate the environmental impact of a near surface casing failure.

Surface Operations

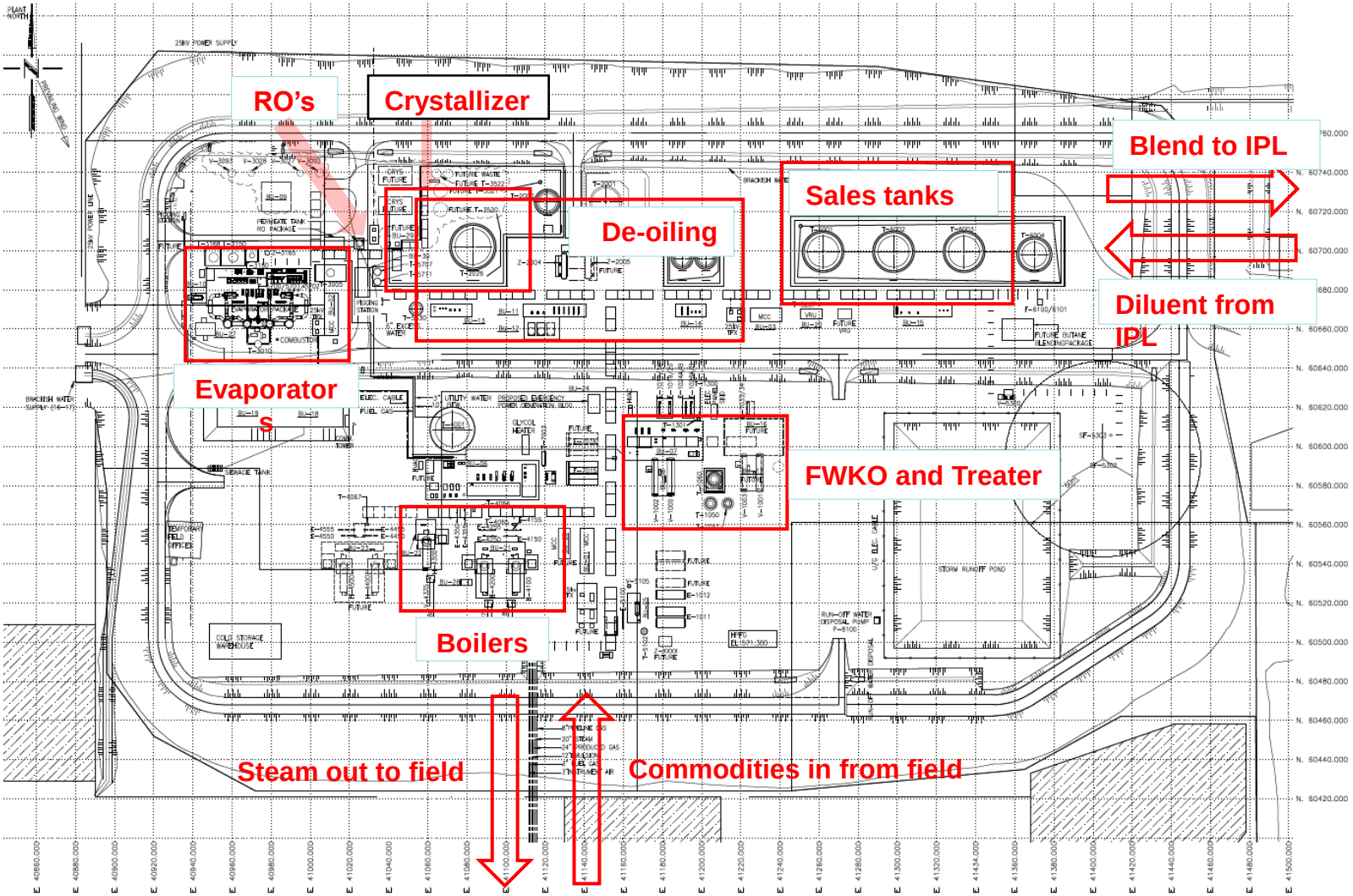
Orion In Situ Oil Sands

2017 Annual Performance Report

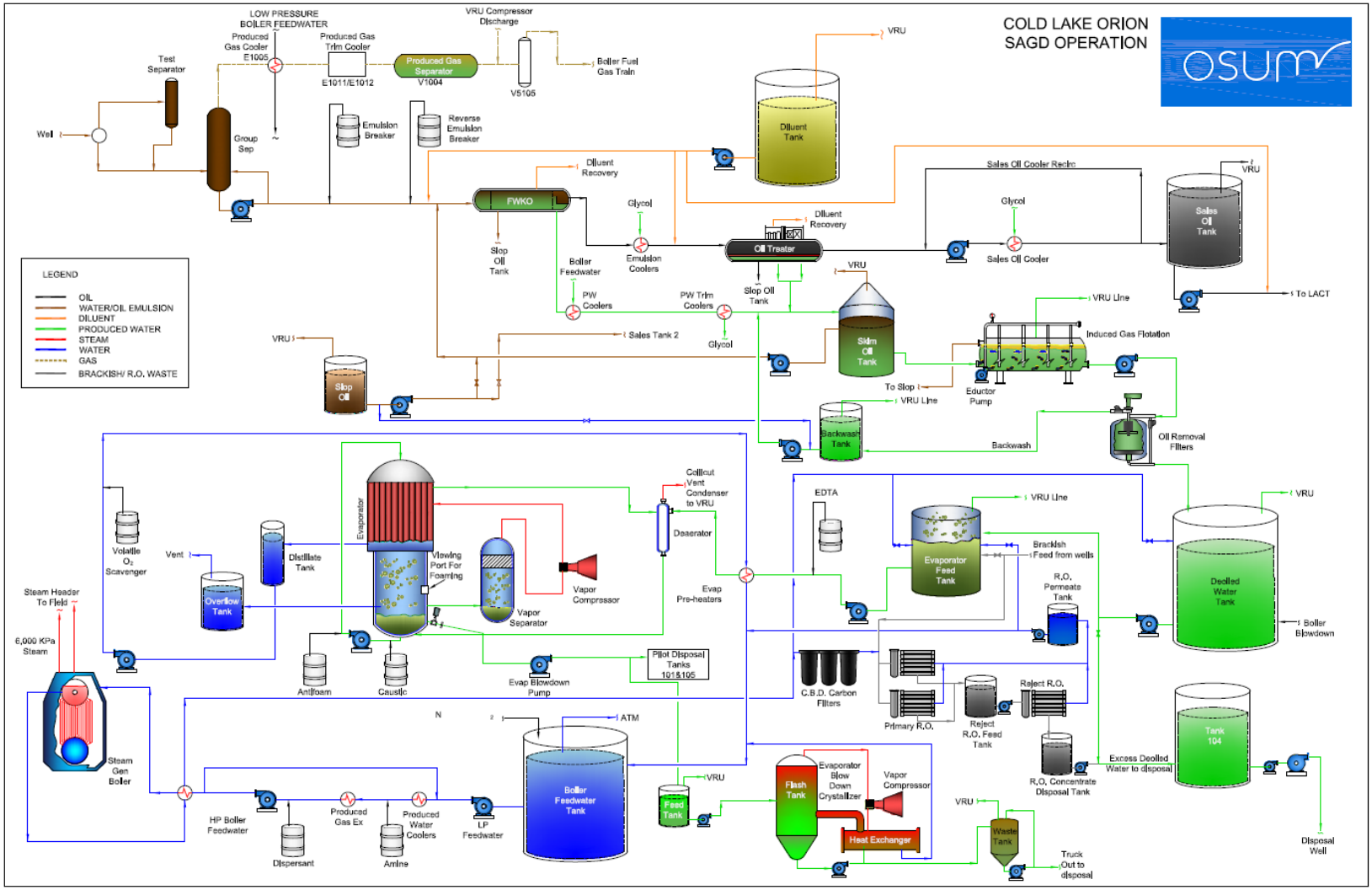
Plant & Facilities Summary

- Boiler reliability and steam generation capacity:
  - Maintained consistent boiler reliability (minimal downtime)
  - Boilers were tuned and internal inspections were completed
- Produced Gas & VRU:
  - Produced Gas Trim Cooler: ruptured tubes in January, frozen tubes in December
  - VRUs were repaired
  - Evaporator vent odor control vessels were replaced
- Water treatment and delivery:
  - Installed a Crystallizer (commissioned in October) to increase distillate to boiler feed and decrease evaporator blowdown disposal (200 m^3/d reduction)

Orion Central Processing Facility – Plot Plan



Orion Water Usage and Treatment



Orion Central Processing Facilities (CPF)

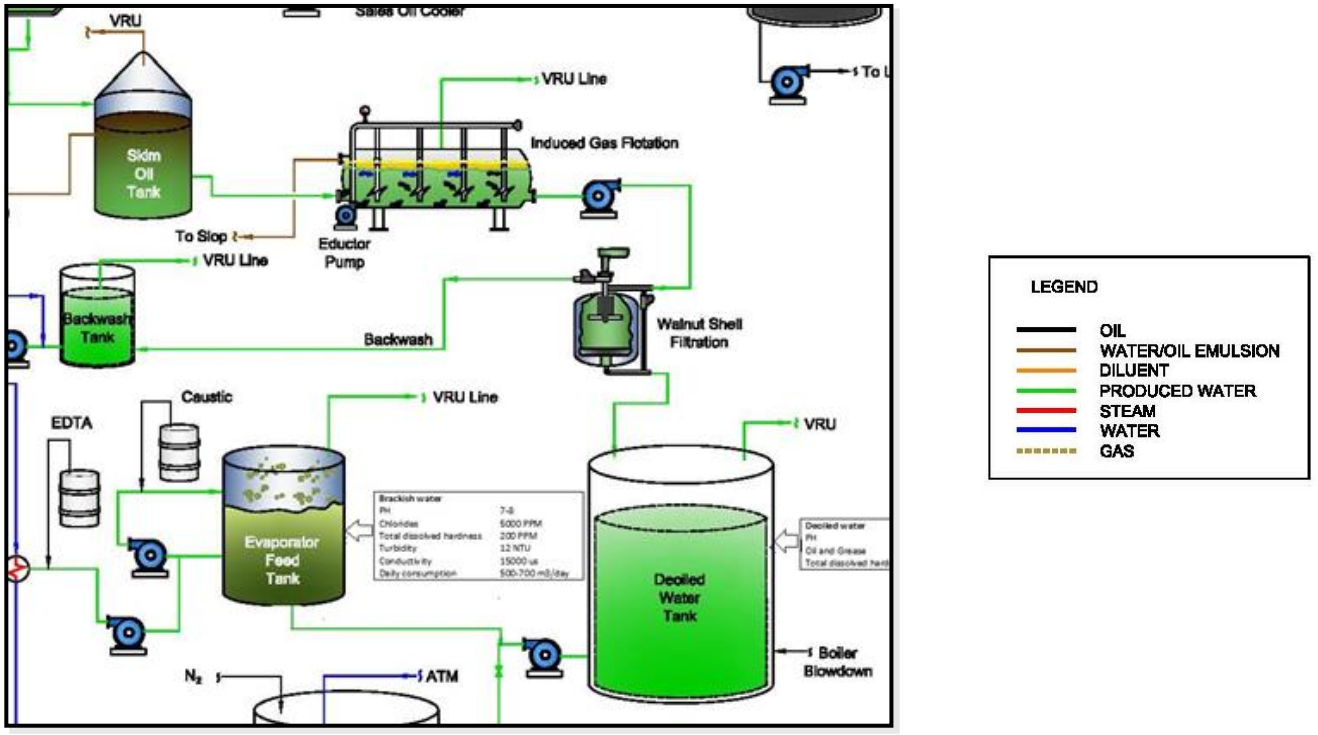
General process description:

- Three conventional drum boilers are used to generate steam, which is sent via steam pipelines to the field for injection into the reservoir
- Emulsion returns to the CPF by pipeline, produced gas is separated at the well pad and separately piped to the CPF where it is mixed with purchased natural gas for boiler fuel
- Oil separation occurs in the free-water knockout and treater vessels, produced water is cooled and sent to de-oiling while oil is transferred to sales storage
- The water treatment facilities treat produced water in order to be re-used to generate steam. The process results in reuse of about 90% of the produced water (2017 produced water recycle ratio averaged 90%)
- Brackish water is drawn from two McMurray formation source wells to supply required make-up water. Brackish water is processed through RO units prior to feeding the boilers. In 2017, 67% of produced brackish water was used to generate steam (RO reject water is sent to Osum's approved water disposal well)
- The waste produced in the evaporative water treatment process is fed to the Crystallizer unit (commissioned in October) which is converted into distillate to feed the boilers
- Waste produced in the Crystallizer unit is trucked offsite to an AER approved waste disposal facility (Tervita Lindbergh)

De-oiling Facilities

Produced water using:

1. Skim tank – designed to maximize retention time for adequate separation
2. Induced gas flotation vessel – micro-bubble from the production treating train is de-oiled flotation (hydrocarbon content <10ppm oil/water)
3. Oil removal filters – walnut shell deep bed filtration



Water Treatment: Evaporators

Evaporator technology is utilized to produce boiler feed water (BFW)

The evaporators at Orion:

- Produce BFW that meets or exceeds water treatment criteria
- Generate a concentrated brine waste stream that is disposed of at an AER approved facility (Tervita Lindbergh)
- Have a 95% design conversion rate of feed to distillate (BFW)

Water Treatment: Crystallizer

In October 2017 Osum commissioned a Forced Circulation Crystallizer Unit which converts approximately 73% of evaporator blowdown waste to BFW quality distillate.

This has significantly reduced the volume of off-site waste disposal to Tervita and increased the water recycle ratio of the facility.

Steam Generation

Description

Conventional drum boilers generate 100% quality steam at 6,000 kPag for injection at the well pads

A concentrated blowdown of 3-5% of the inlet mass flow to the boilers is sent to the de-oiled tank and can also be routed to the RO units

2017 Focus

Boiler reliability from existing equipment and the safe and successful commissioning of a third boiler installed in late 2016 were key steam generation related focus points in 2017.

Both were achieved:

1. Minimal downtime in 2017 – the boilers were able to consistently generate steam averaging 5,643 m^3/d
2. Internal inspection & tuning was completed on all boilers

Orion Vapor Recovery System

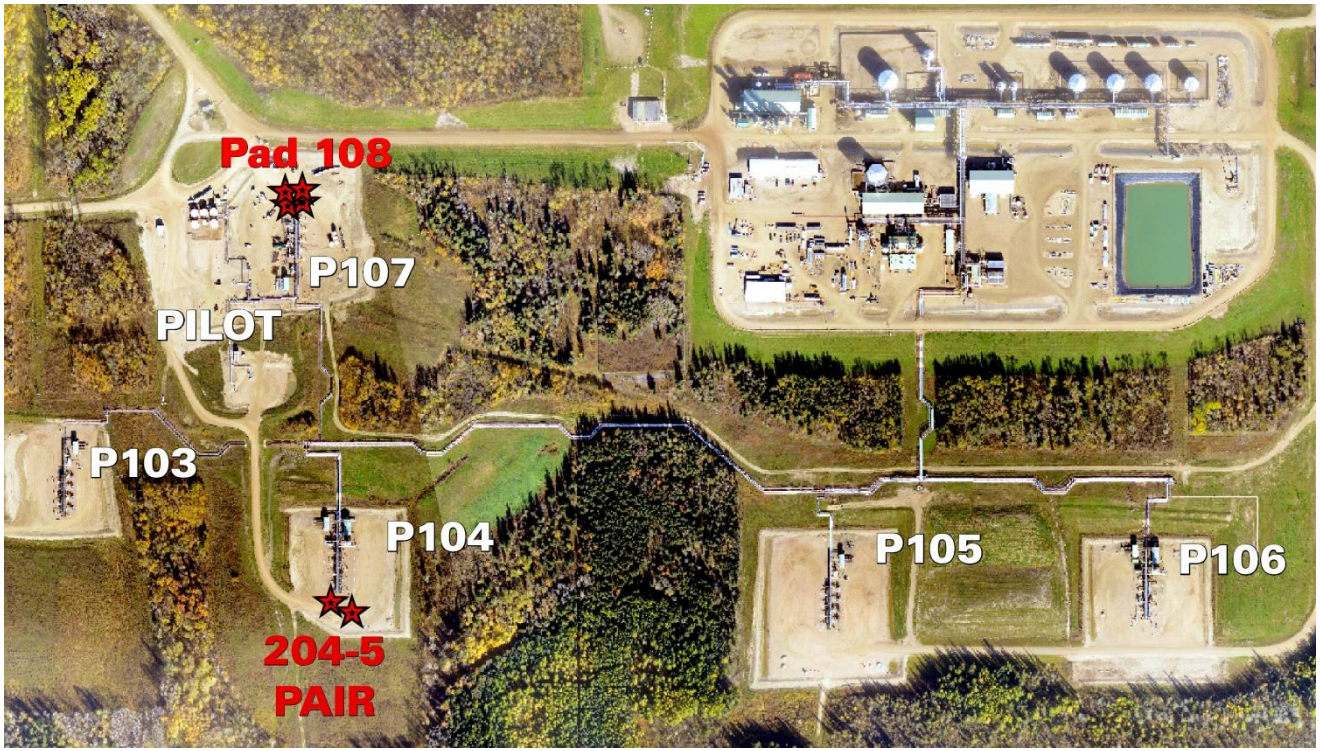
General process description

- The vapour recovery system collects and compresses produced gas vapours
- All recovered gas vapours are utilized in the steam generation fuel gas system
- VRU system is 2X100% redundant compressors
- The sources of gas vapour are:
  - Evaporator vent recovery
  - Ten storage tanks
  - Diluent recovery system
  - Induced gas flotation system
- The vapour recovery system feeds the low pressure (LP) flare system in upset conditions

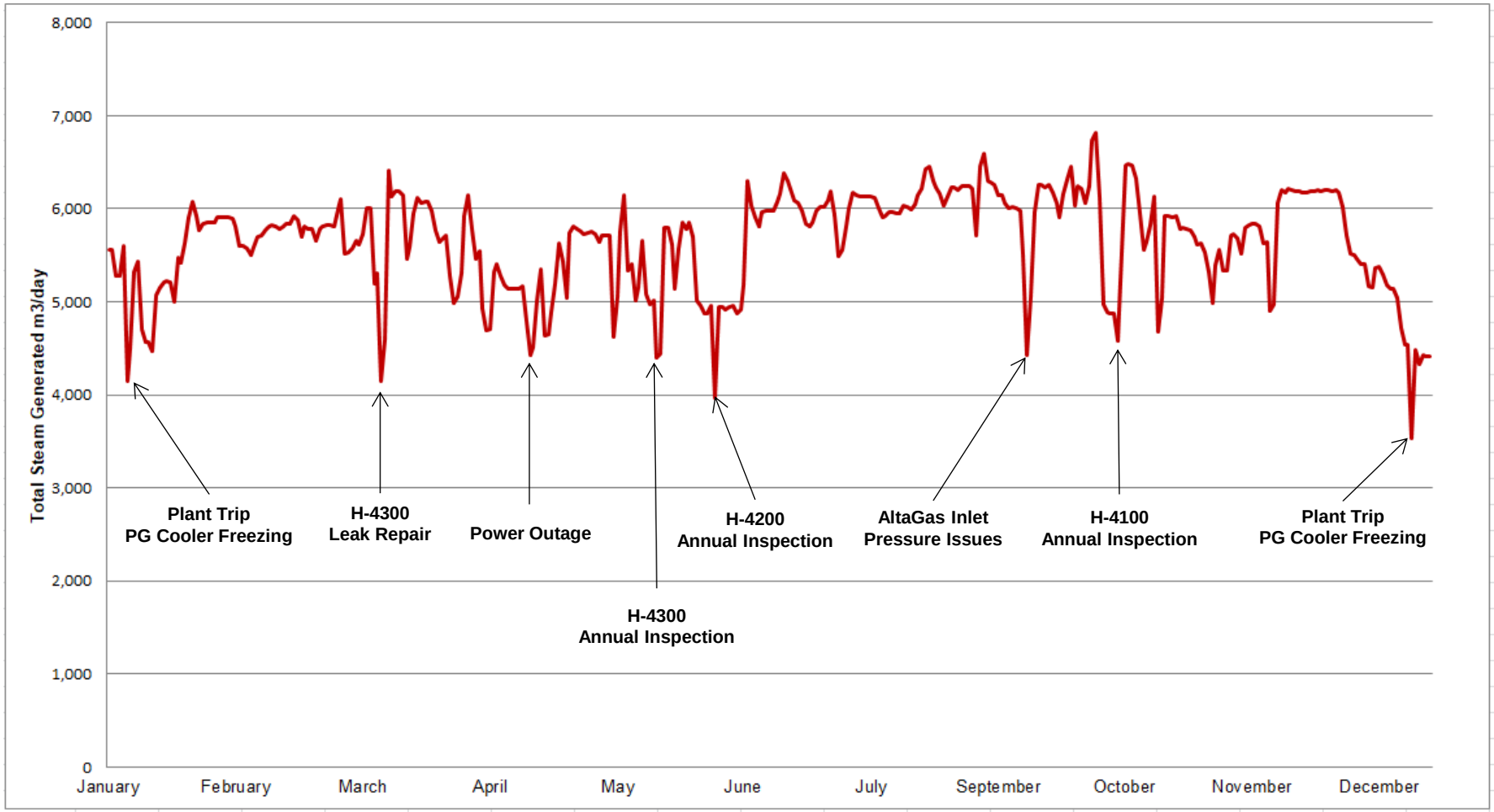
2017 operational issues: The VRU compressors were repaired

Orion Well Pad Facilities

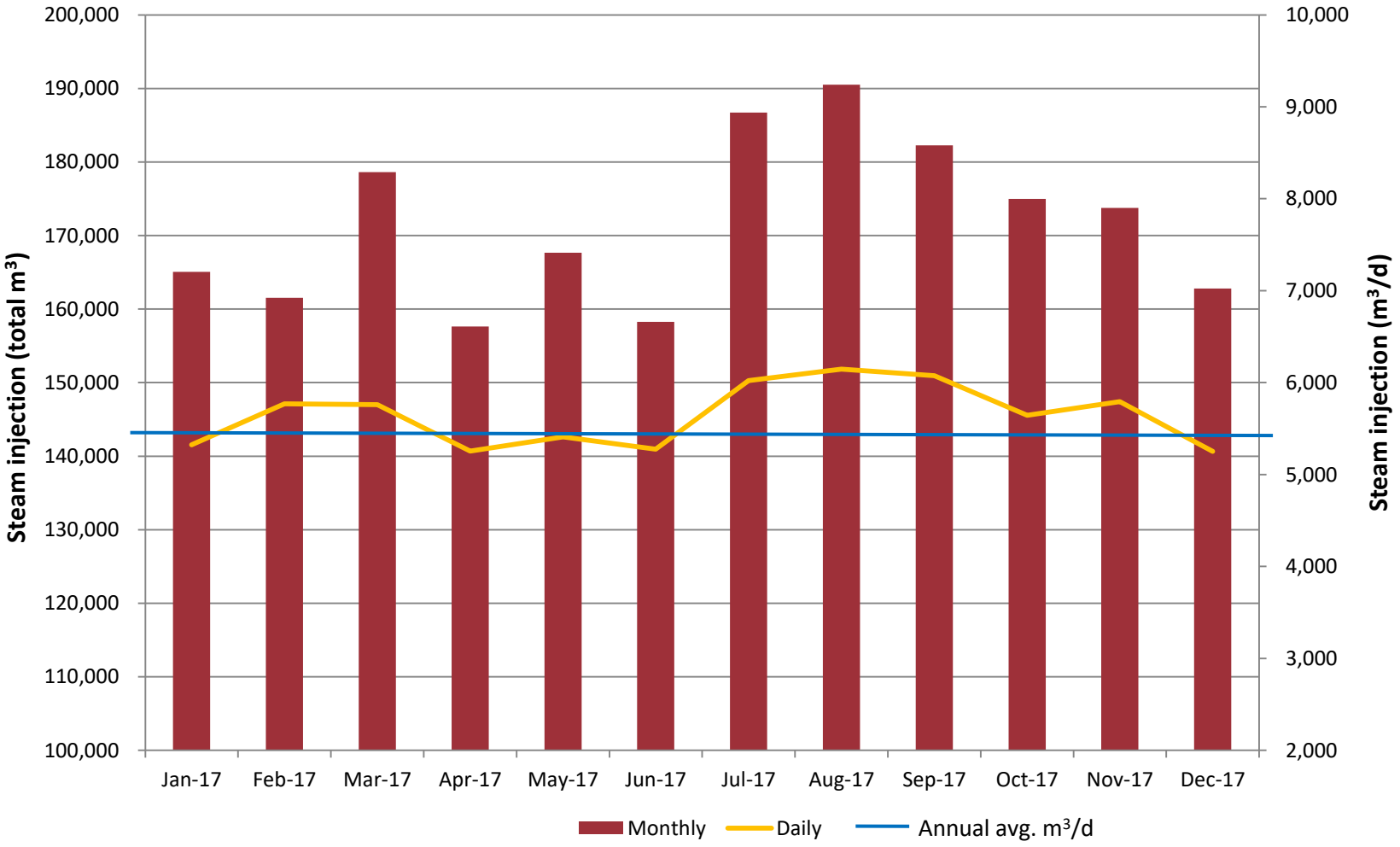
- The Facility has 5 well pads (in addition to the Hilda Lake Pilot) with a total of 25 SAGD well pairs.
- 3 new well pairs (P108-1, P108-2, P204-5) were added, 108 wells were drilled from the surface of Pad 107 and 204-5 well was drilled from surface Pad 104 in order to minimize cost and surface disturbance.
- Typical Phase 1 well pad configuration is four SAGD well pairs, which consists of 4 injector and 4 producer wells.



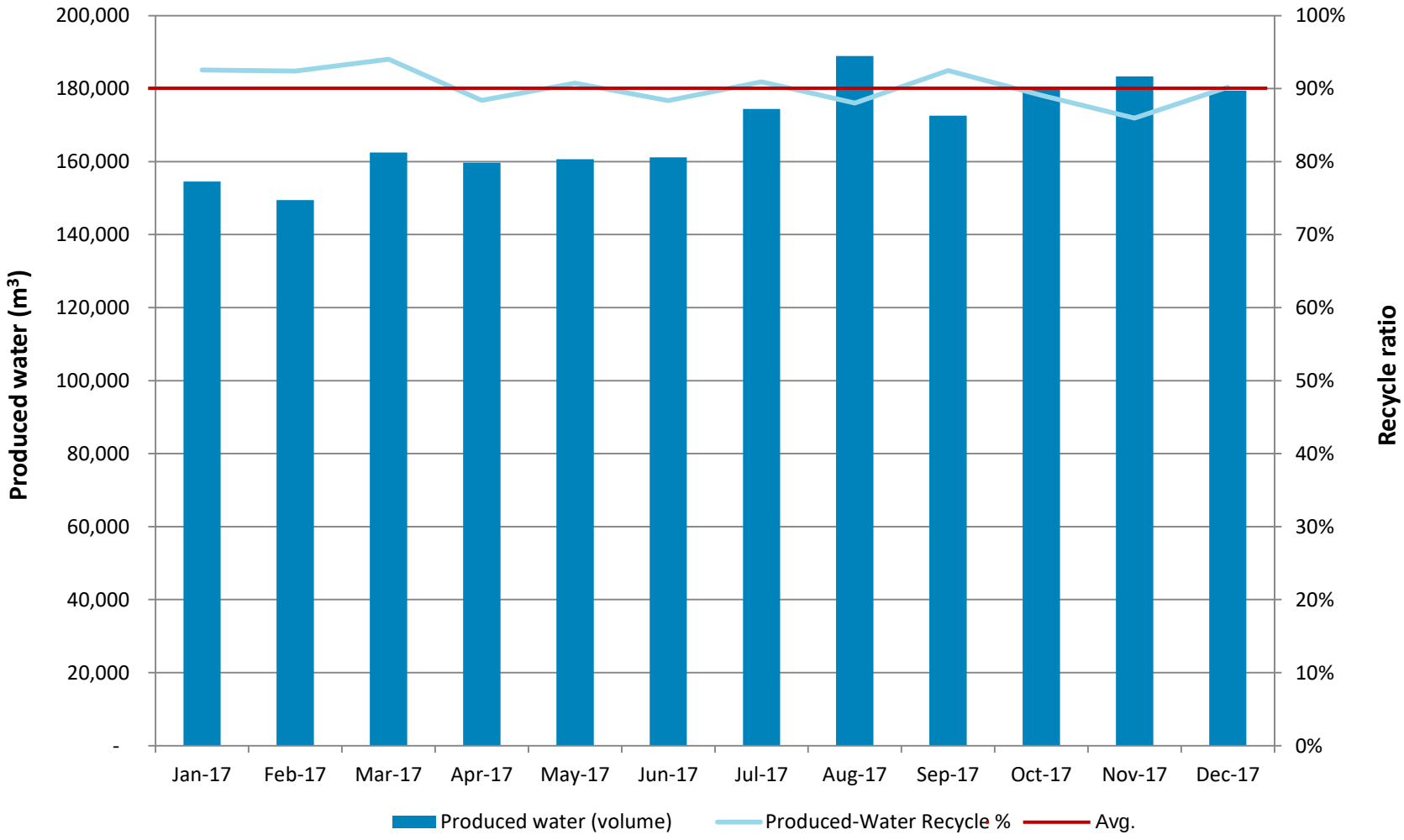
Plant Reliability – 98%



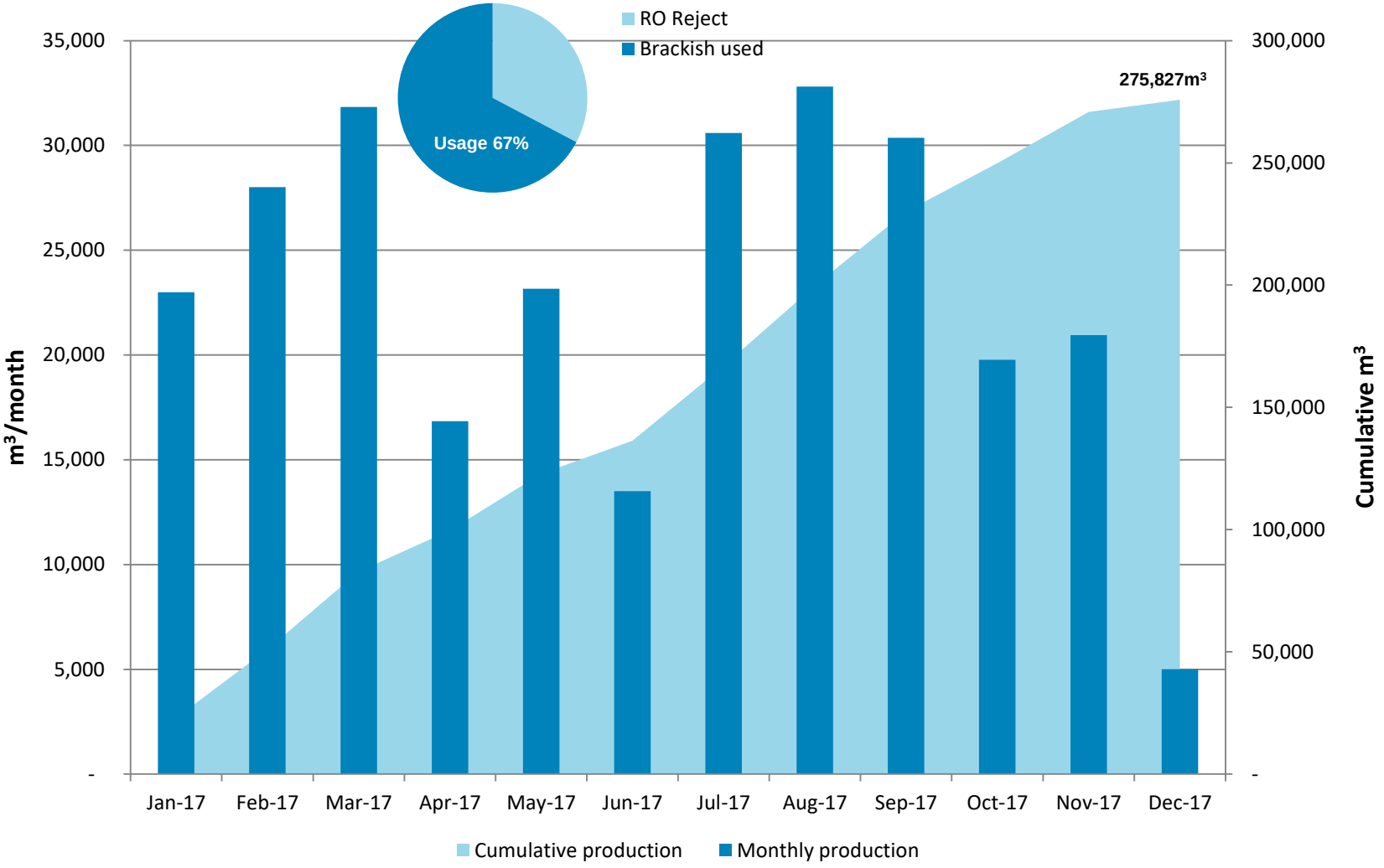
Monthly Steam Production



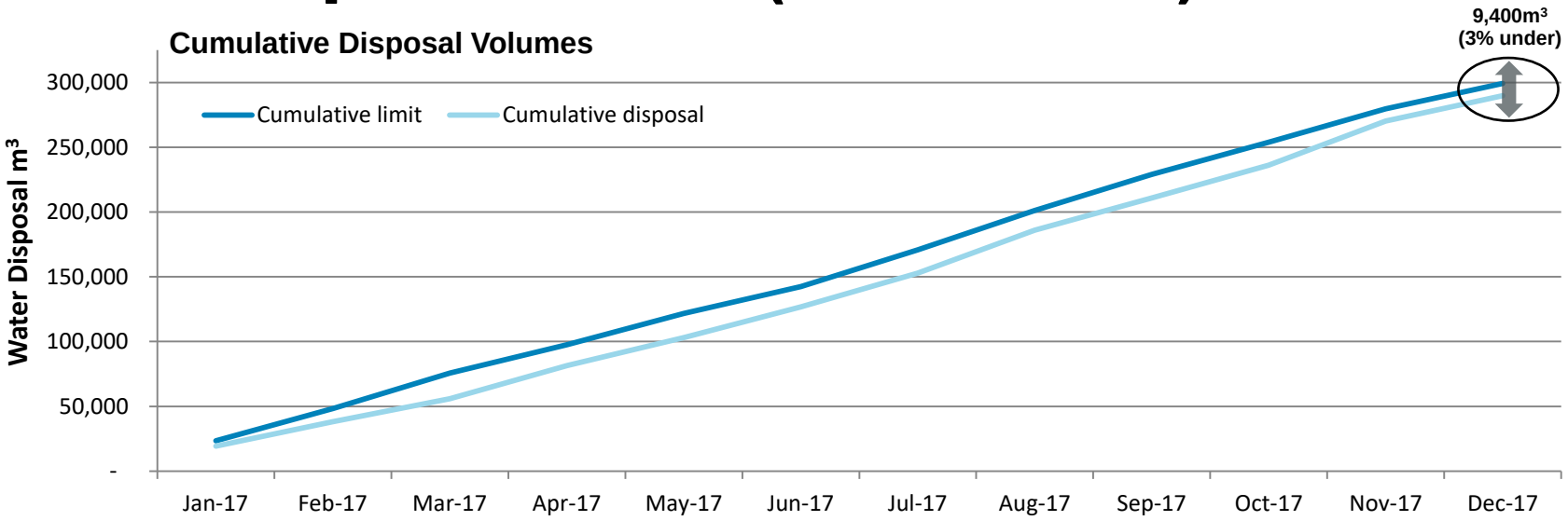
Produced Water

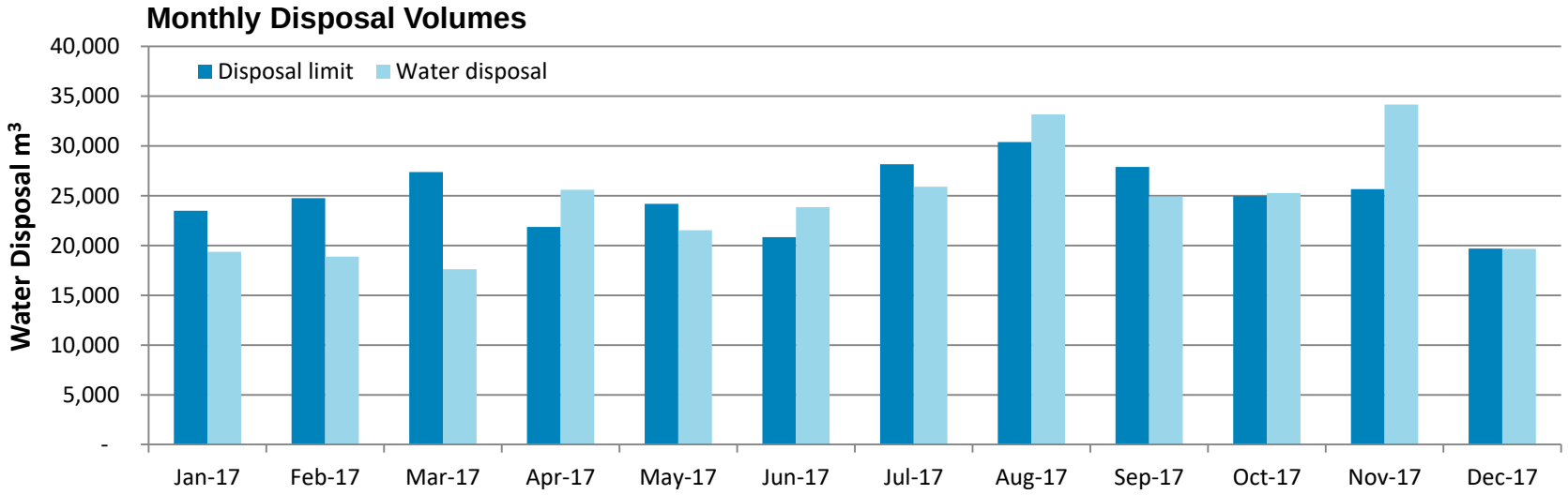


Brackish Water Usage (67% of production)



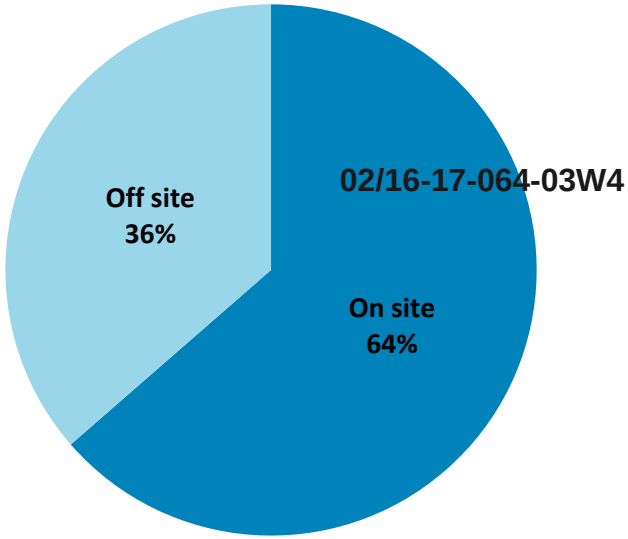
Water Disposal vs. Limits (3% under limit)





On-site Water Disposal

- License permits produced water and recovered steam condensate to be disposed into the Granite Wash formation. Disposal Approval #8175
- Granite Wash water disposal well 02/16-17-064-03W4M (Well License #192346)
  - Normal operating pressure range: 11100 - 12500 KPa (surface pressure)
  - Protected by a high pressure shutdown limit of 12600 KPa
  - Normal disposal temperature range: 60 - 80 deg C
- McMurray water disposal well 03/16-17-064-03W4M (Well License # 0196880)
  - Suspended as a disposal well Nov. 2011 and converted to a brackish water source well May 2013
  - Well was abandoned Dec. 2017. A new replacement disposal well application for 1F2/16-17-64-03W4M has been submitted which is currently being used as a brackish water well.
- Integration of Phase 2BC water treatment facilities will reduce future annual disposal volumes.

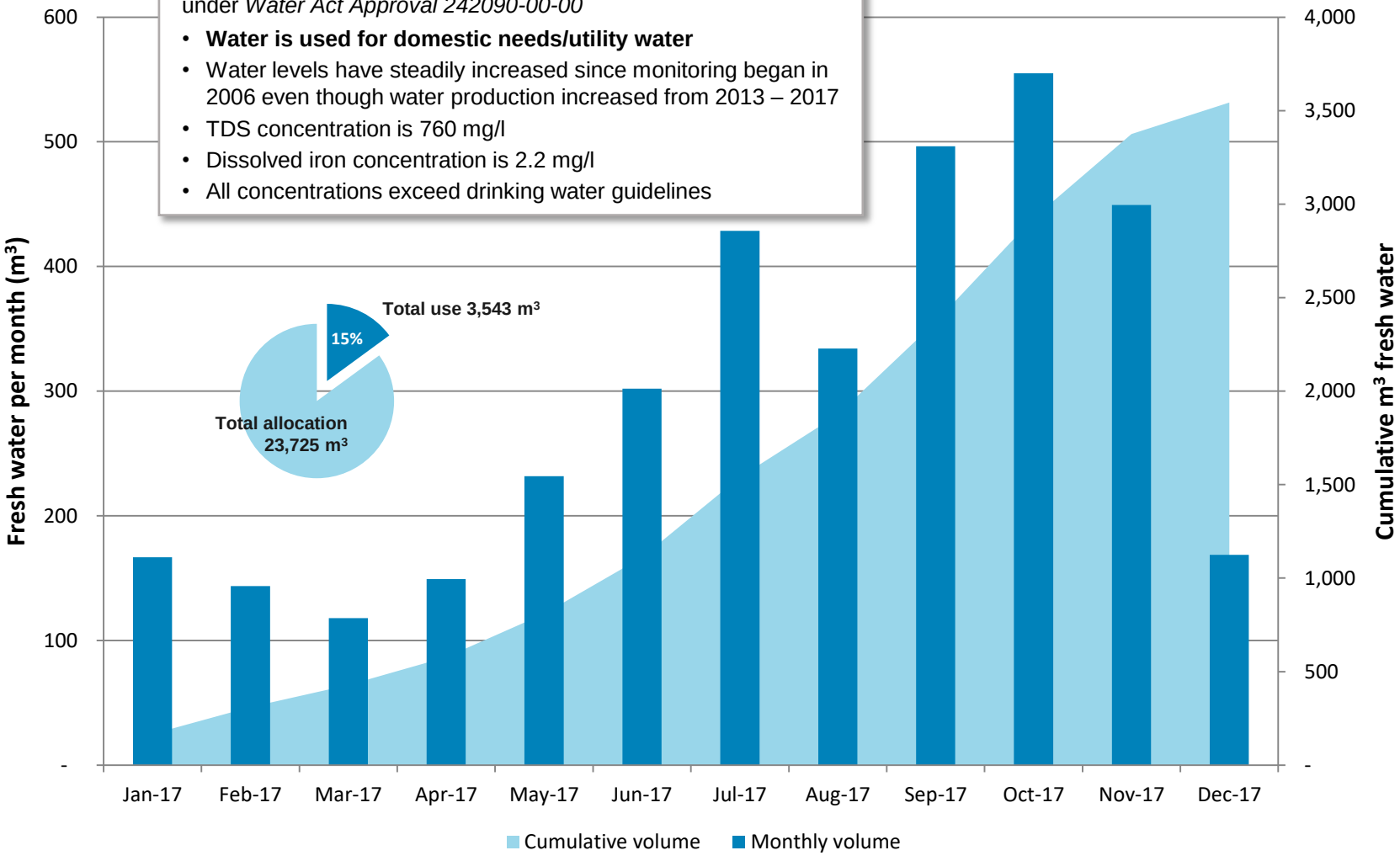


Total disposal
289,941 m^3

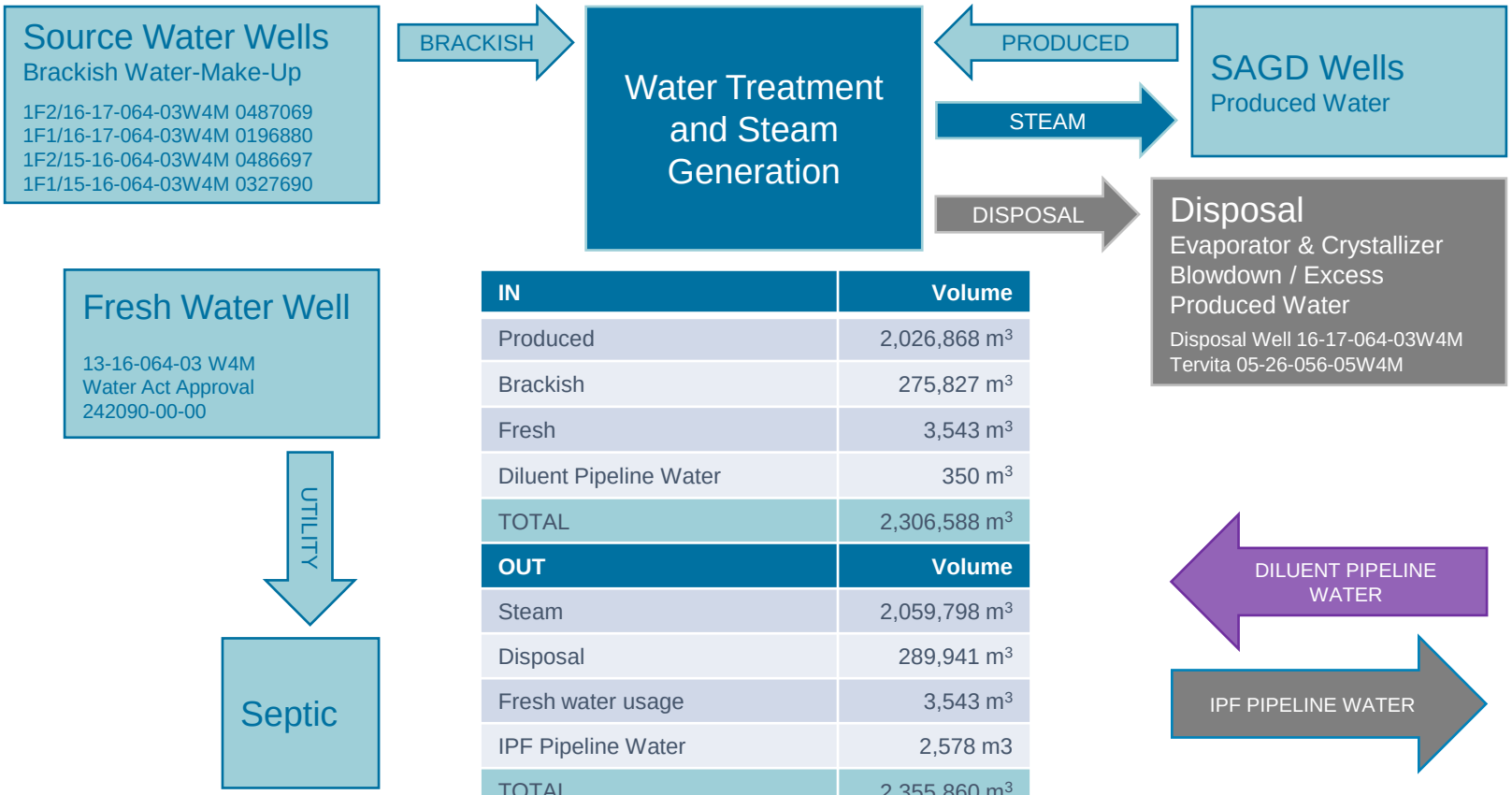
Fresh Non-Potable Water Usage (well ID 1420481)

Water drawn from water source well situated at 13-16-064-03W4M under *Water Act Approval 242090-00-00*

- **Water is used for domestic needs/utility water**
- Water levels have steadily increased since monitoring began in 2006 even though water production increased from 2013 – 2017
- TDS concentration is 760 mg/l
- Dissolved iron concentration is 2.2 mg/l
- All concentrations exceed drinking water guidelines

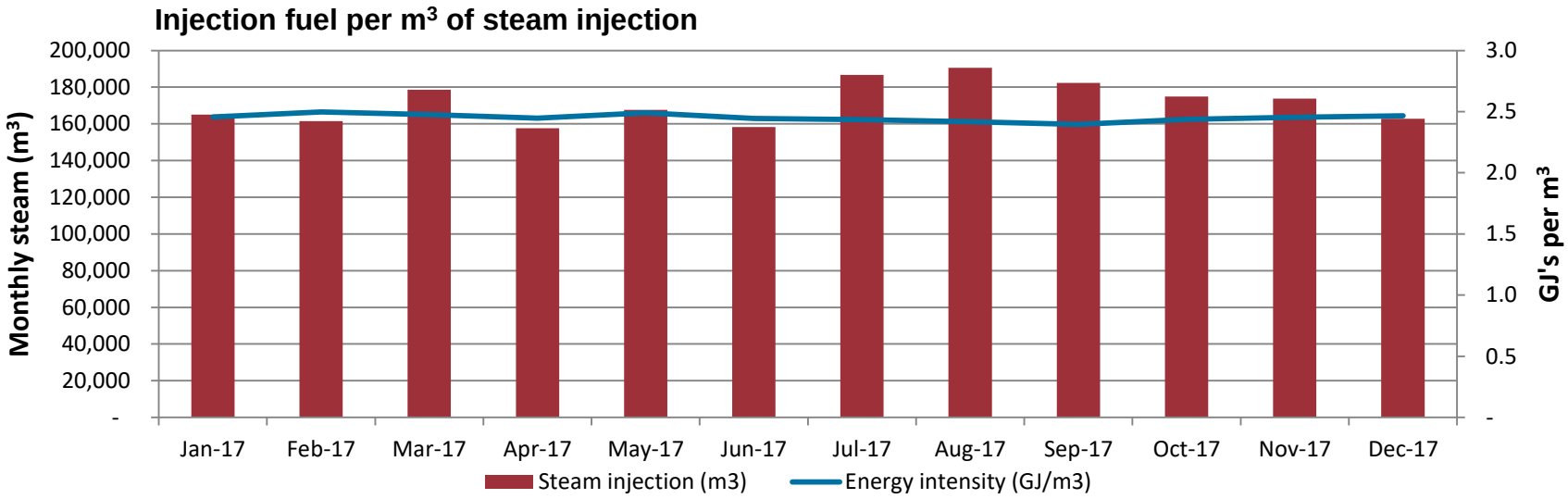


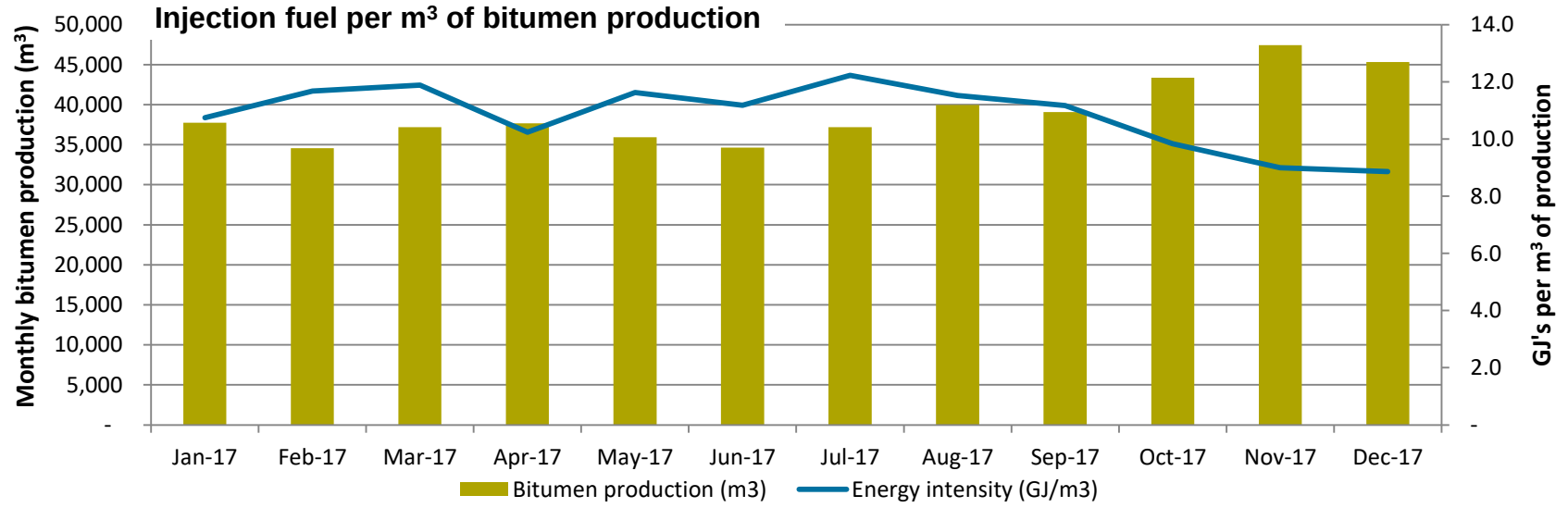
Cumulative Water Balance



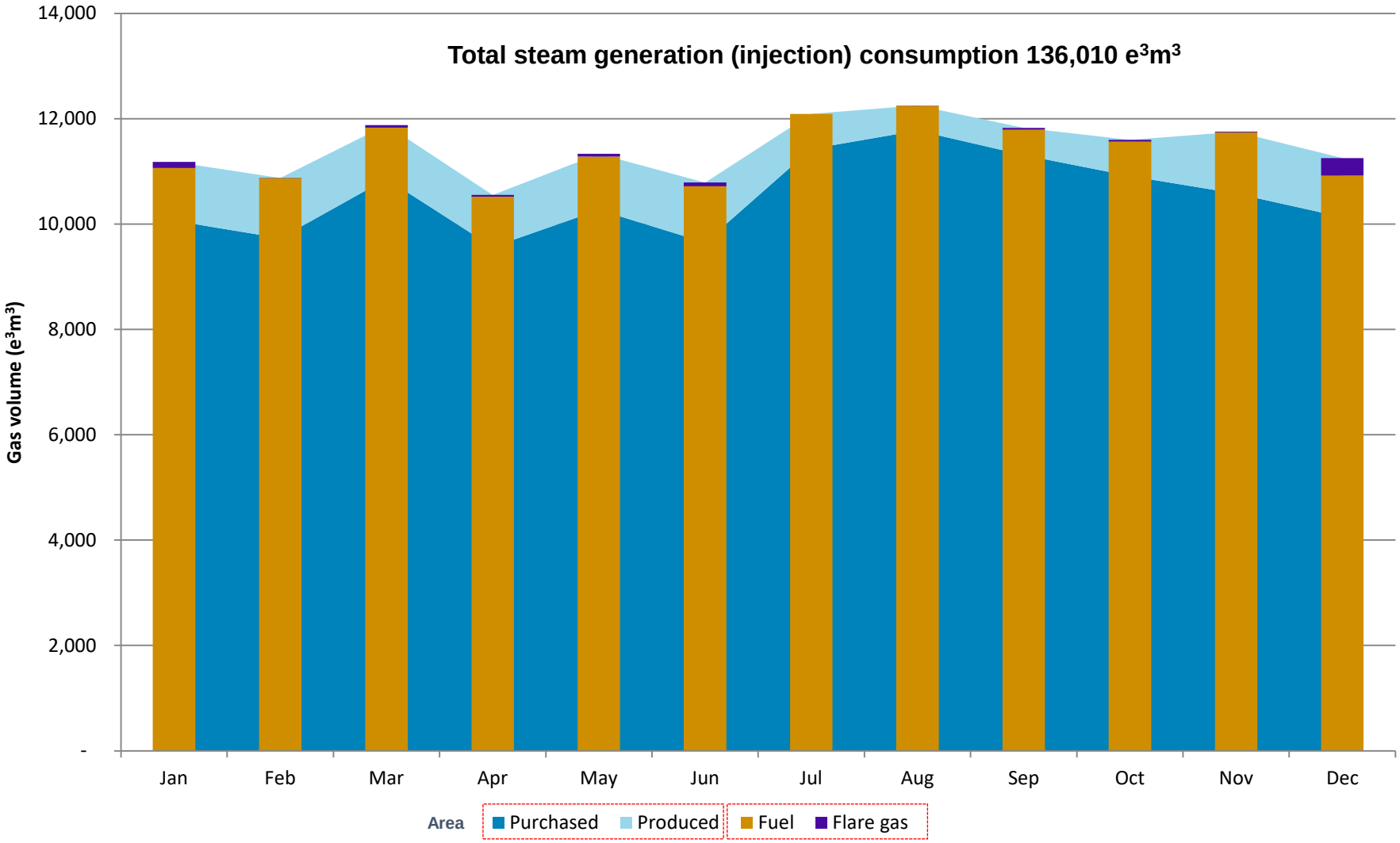
IN	Volume
Produced	2,026,868 m^3
Brackish	275,827 m^3
Fresh	3,543 m^3
Diluent Pipeline Water	350 m^3
TOTAL	2,306,588 m^3
OUT	**Volume**
Steam	2,059,798 m^3
Disposal	289,941 m^3
Fresh water usage	3,543 m^3
IPF Pipeline Water	2,578 m3
TOTAL	2,355,860 m^3
Difference (as a percentage of total in's)	49,272 m^3 2.1%
Disposal Limit	**15%**
Actual Disposal	**14%**

Monthly Natural Gas Intensity

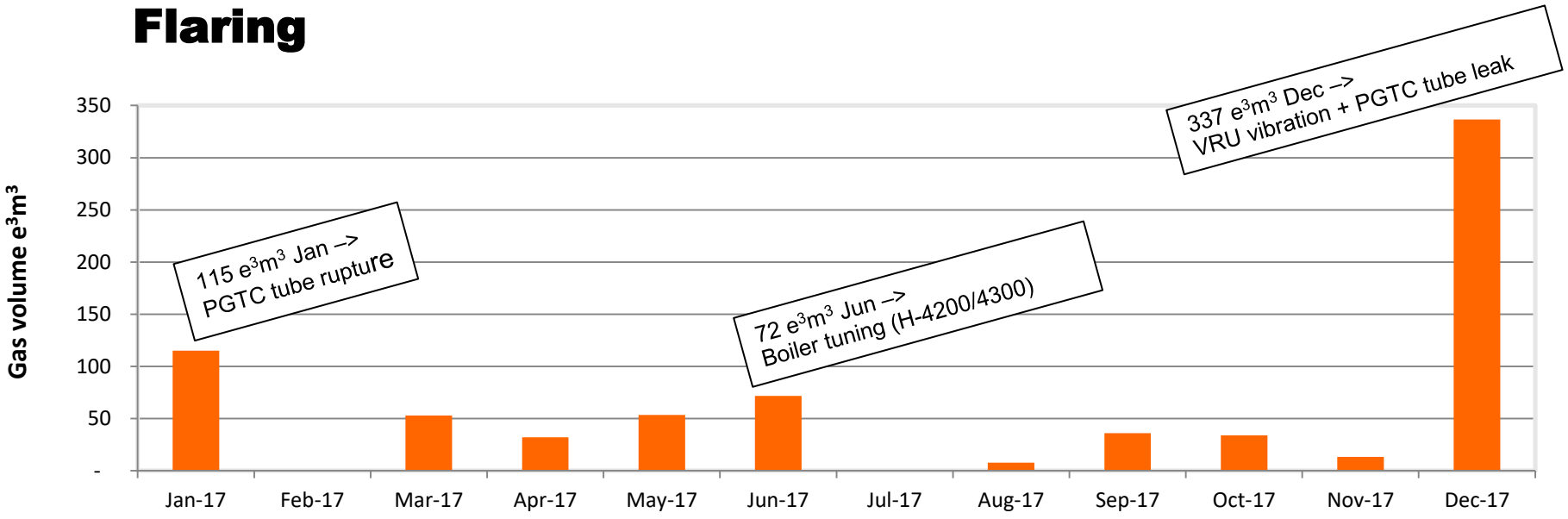




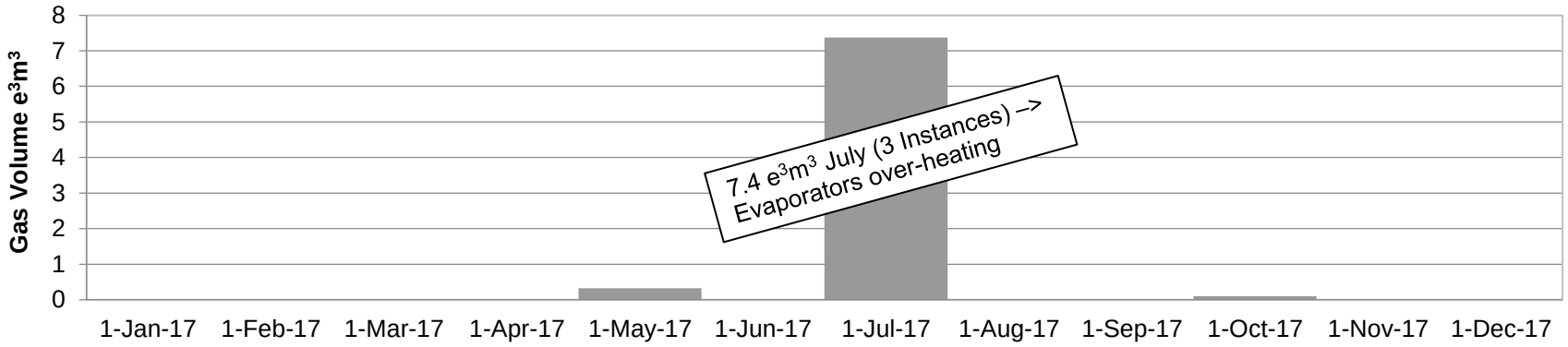
Monthly Gas Usage



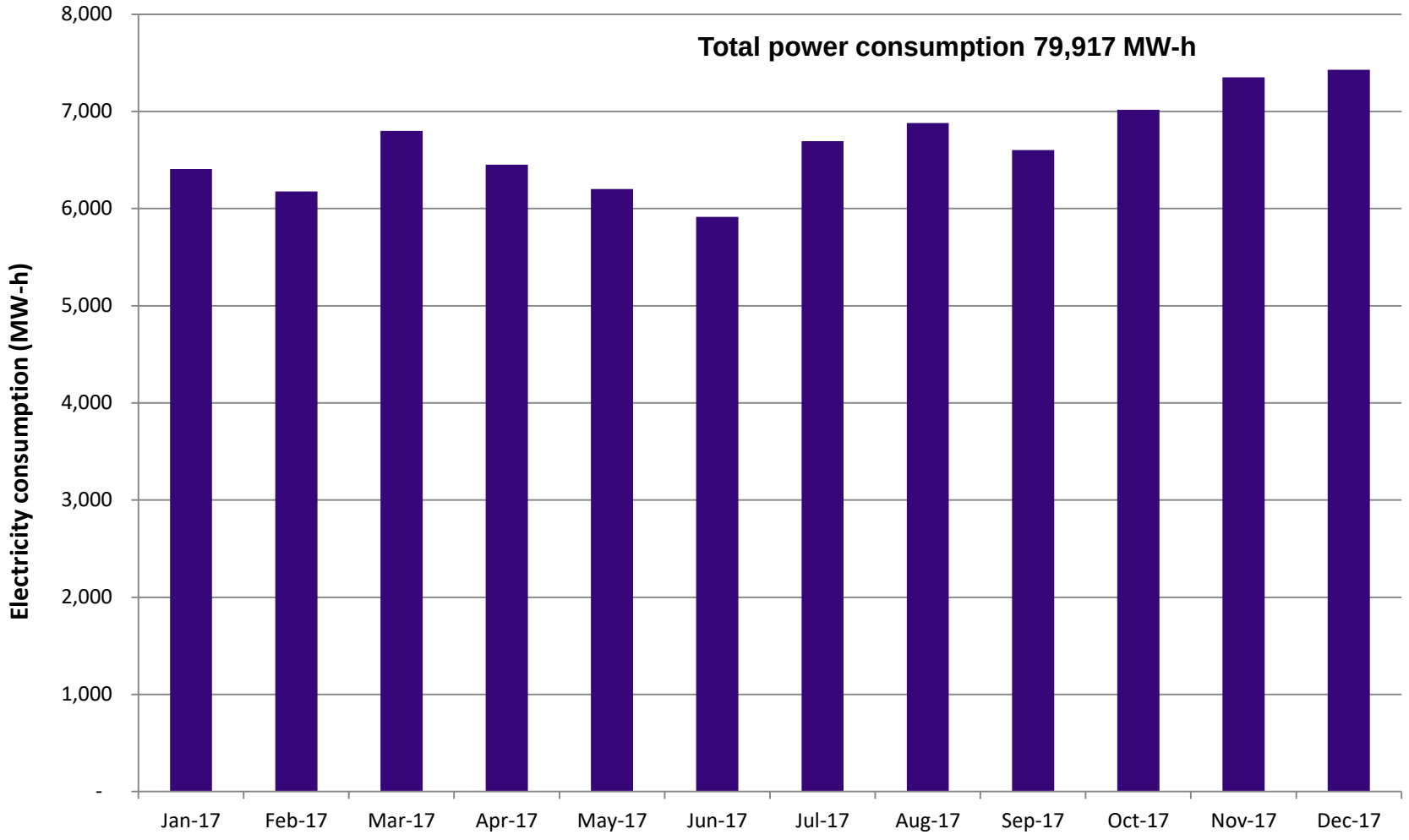
Flaring



Venting



Monthly Power Consumption



Measurement & Reporting

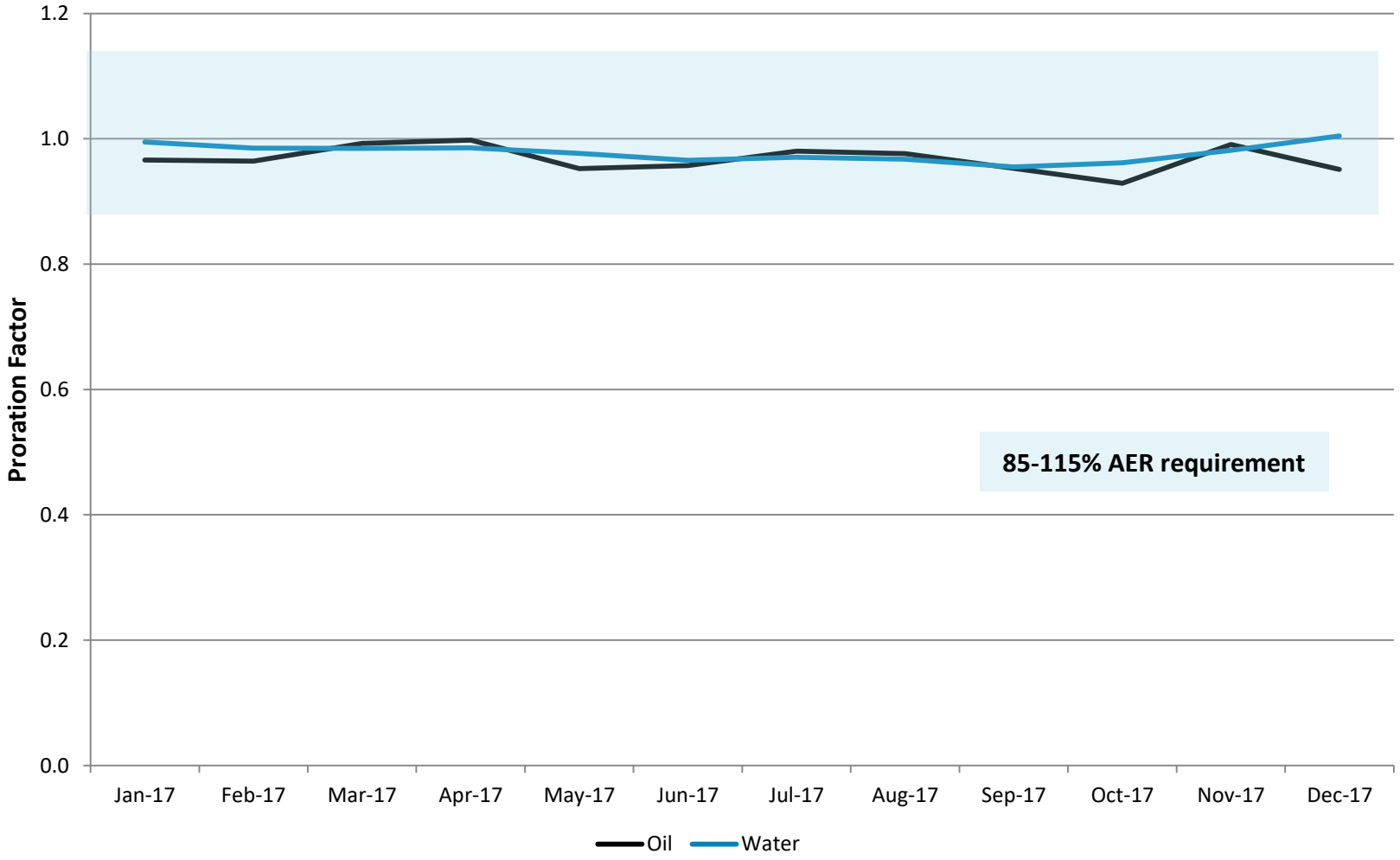
MARP

- May 2017 reported deviation from MARP related to trucking in condensate (IPL lateral pipeline maintenance outage)
- Annual MARP revision prepared September 2017
- Changes included the addition of metering associated with the completion of three new well pairs: WP108-1, WP108-2 and WP204-5
- Accounting meters calibrated / verified on an annual basis

EPAP

- Declaration deadline May 31, 2018 for 2017 reporting period
- Controls documentation, evaluation and testing being completed in-house
- Continued focus on the quality, accuracy and internal visibility of measurement data

Oil & Water Proration Factors



Compliance

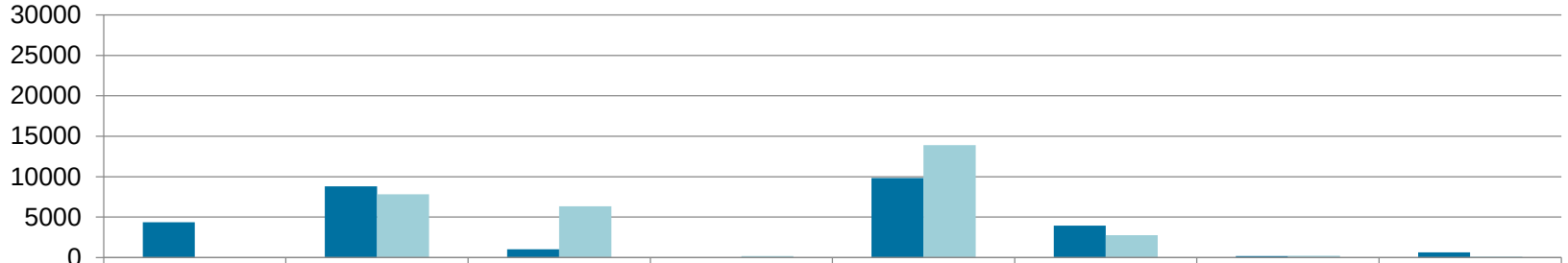
Orion In Situ Oil Sands

2017 Annual Performance Report

Offsite Waste Disposal and Recycling Program

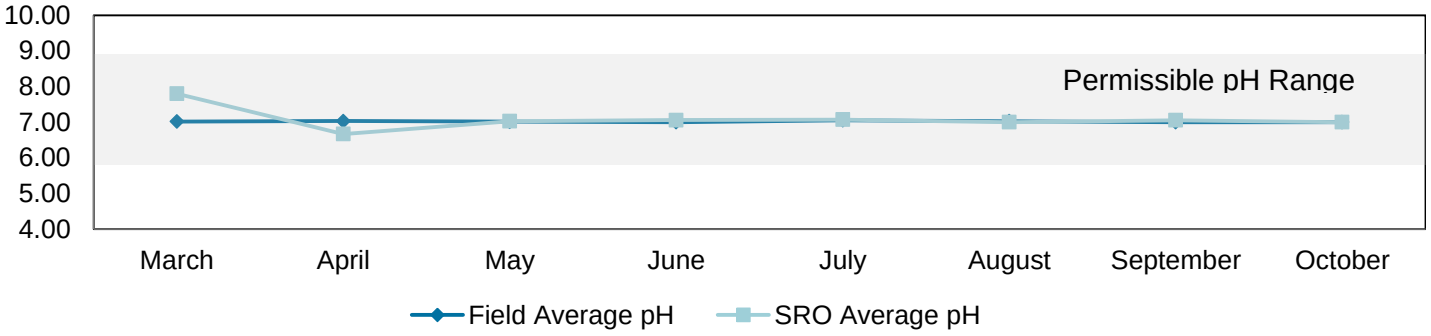
- Tervita-Lindbergh – Class 1b – 05-26-056-05W4M
  - Evaporator Blowdown – 102,955 m^3
- RBW Waste Management
  - Contaminated soil from housekeeping and hydro-vac activities 35 m^3
  - Well workover fluids 5,811 m^3
  - Recycle-Glycol, lube oil, filters, oily rags, aerosols, methanol 77 m^3
- Domestic waste water from the administrative offices washrooms and kitchens is collected in holding tanks and disposed of weekly by a commercial septic service. Total volume disposed of at a Town of Bonnyville Waste Facility was 1196 m^3
- Domestic waste is hauled to municipal landfills in either Cold Lake or Bonnyville, 160 m^3
- Paper, cardboard and steel recycling program processed 91 m^3
- Wood recycling 69 m^3
- Metal recycling 46 m^3

2017 Surface Fresh Water Release Volumes

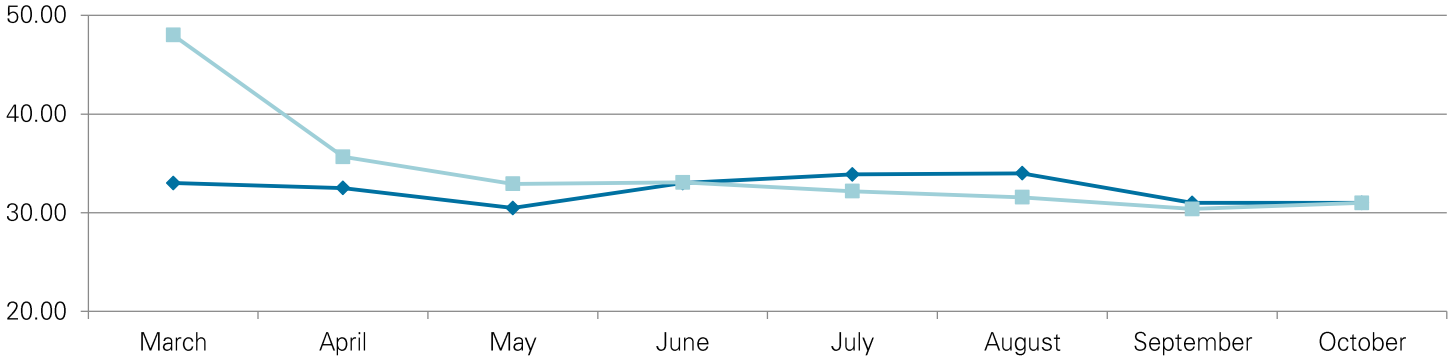


	March	April	May	June	July	August	September	October
Field Volume (m3)	4382	8808	1044	0	9857	3942	204	654
SRO Volume (m3)	0	7830	6335	195	13904	2765	225	100

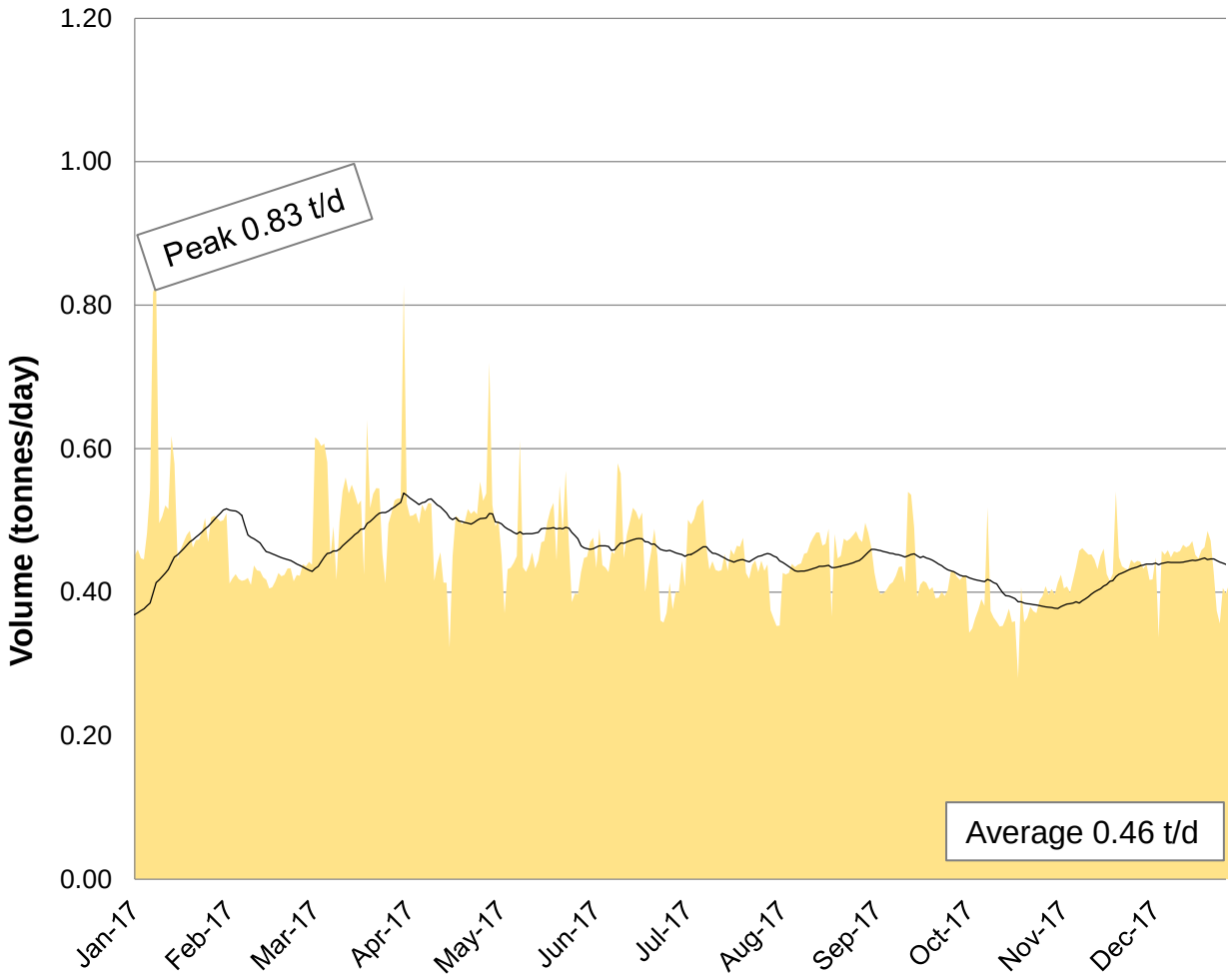
pH



Average Chlorides



Daily Sulphur (Tonnes)

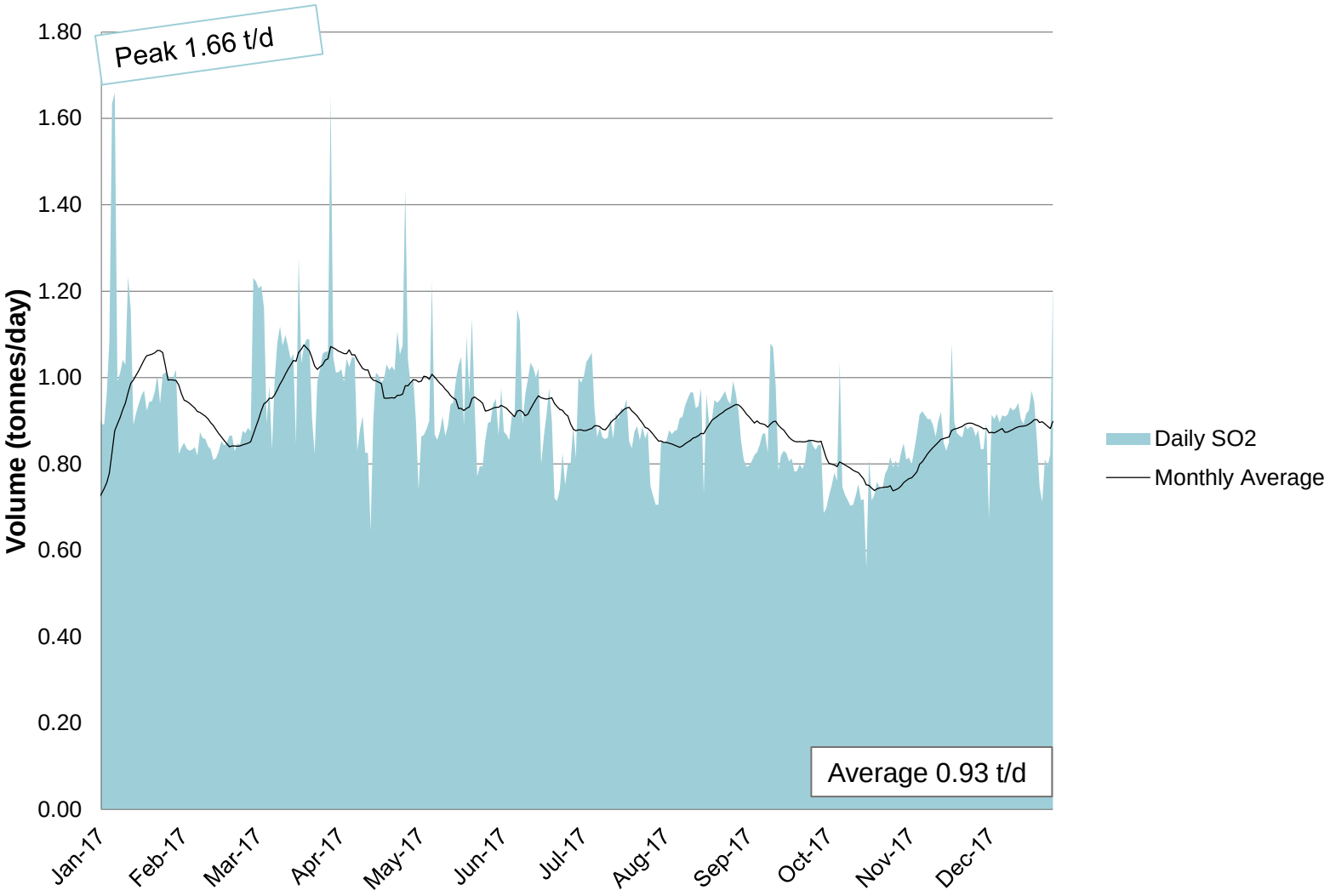


Quarterly Sulphur Balance (tonnes/qtr)	
Q1	43.94
Q2	42.18
Q3	40.69
Q4	41.23

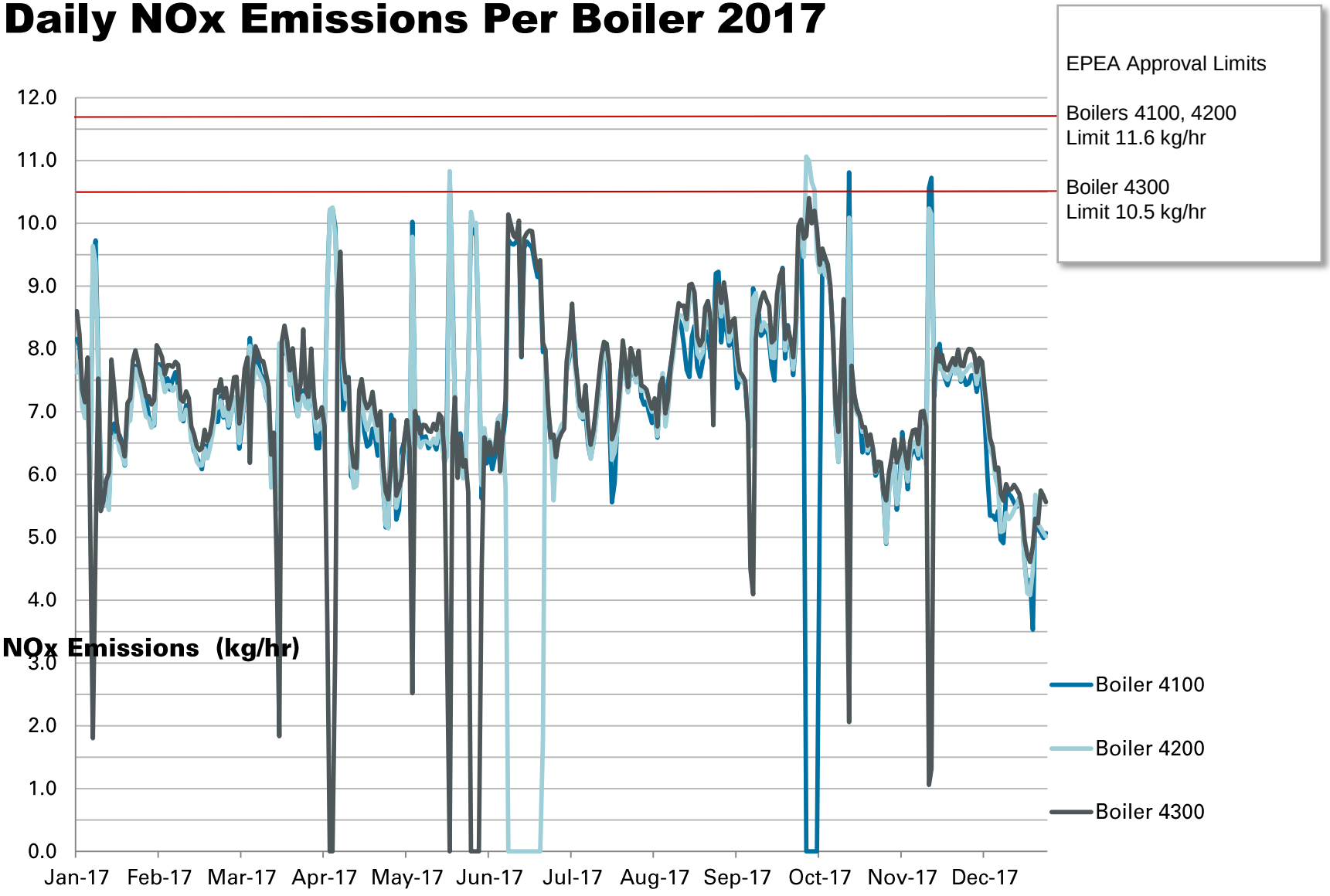
Daily Sulphur (Tonnes)

Monthly Average

SO_2 Volumes (Tonnes) – Daily



Daily NOx Emissions Per Boiler 2017



Monitoring Programs

Monitoring Program	Progress and Results
Air Quality	• Ambient air quality is monitored through the LICA Airshed • 5 passive monitors are situated at the Orion facility, maximum SO_2 2.70 ppb, H_2S 0.42 ppb
Groundwater Monitoring	• Implementation of renewed program • Results reflective of historical trends
Soils management and monitoring program	• Surficial management areas addressed • Monitoring program scheduled for Q3 2018
Wetland and Water Bodies Monitoring Program	• First year of program • Proximity to roads does not have an impact on vegetative community or environmental condition • Dewatering events have an observable and short-lived influence on wetland hydrology
Wildlife Monitoring and Mitigation Program	• Comprehensive report submitted May 2018 • Mitigation objectives met • Listed species observed: 2- may be risk, 15- sensitive , 2- threatened • Total number of species detected-74
Reclamation Monitoring	• Renewed reclamation monitoring program initiated in 2018.
Project Level Conservation and Closure Plan	• To be submitted October 2018

2017 Compliance Summary

Approval Number	Amendments	Compliance	Corrective Actions
EPEA 01141258	None	CIC 322418-late reporting	• Redundant reminder
		CIC 323952-venting	• Osum has identified the root cause for venting incidents and has implemented control logic to alleviate future occurrence.
		CIC 326556-venting	
		CIC 327046-venting	
		CIC 327807-venting	
		CIC 326039-NOx exceedence-1 h	• Change from automatic to manual control during boiler upset
Water Act License 00242090	03- Amended June 26 to add purpose	None	None
Directive 13/IWCP Program		Year 3 Compliant	Completed all required suspensions and abandonments for Osum Production Corp.

Regional Initiatives

Environmental

- Membership with LICA-Lakeland Industry and Community Association
    - Specifically, representation on:
        - LICA Governance Committee
        - LICA Education and Information Committee
        - LICA Oil Sands Industry Members Committee

Community

- Annual Lakeland Town Hall – November 30, 2017
- Annual Scholarships: Spark Award and Leader of Tomorrow Award
    - 9 Lakeland Recipients

2017 Compliance Status

Osum Production Corp. believes existing Orion operations are in compliance with all Approval conditions and regulatory requirements.

- Compliance is maintained through:
    - Incident Management System
    - Velocity EHS database for compliance commitments and approval condition management
    - Dedicated on-site professionally accredited environmental personnel
    - Embedded assurance (routine inspections, audits and preventative maintenance)

Future Plans

Orion In Situ Oil Sands

2017 Annual Performance Report

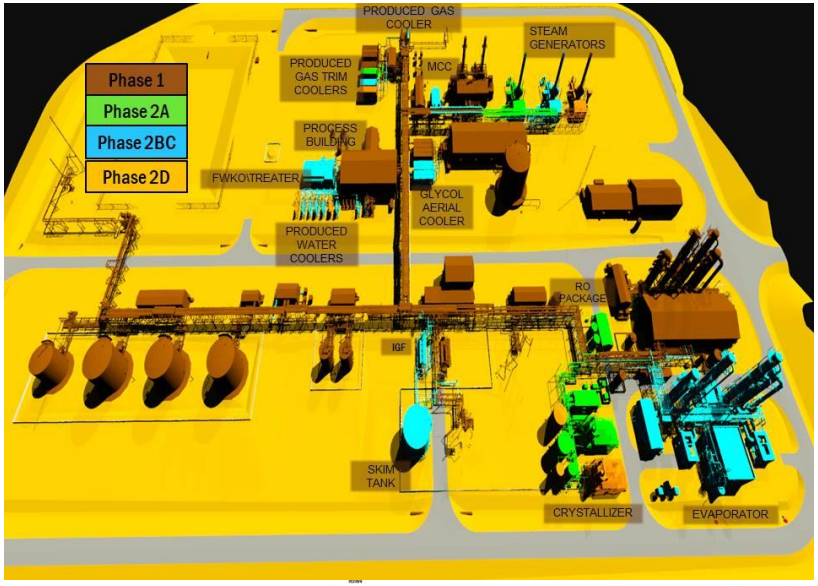
2BC Project Scope – Complete Q4 2018

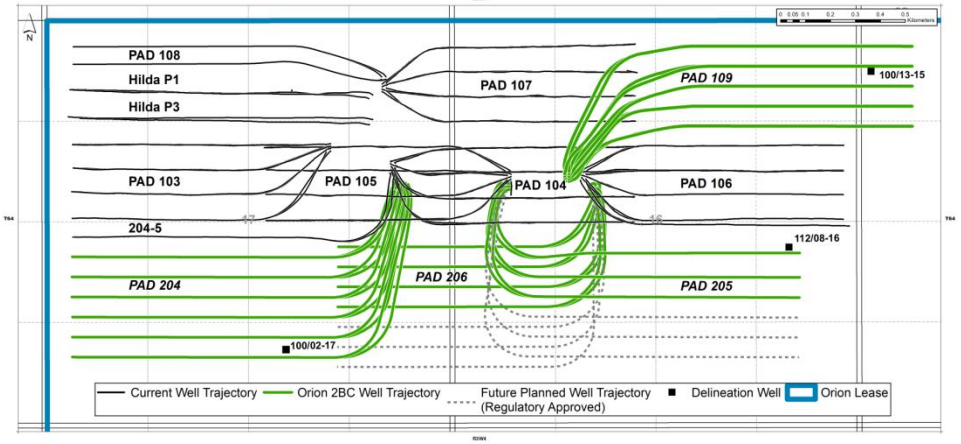
Unit Area	Installed Capacity
Evaporator	10,800 m^3/d (stream day)
Steam Generation	10,350 m^3/day CWE (stream day)
De-oiling	20,000+ bopd (equivalent)
Oil Processing	~18,000 bopd (equivalent)
Utilities & Heat Integration	~18,000 bopd (equivalent)

Three Observation wells

Eighteen new Horizontal SAGD Well Pairs:

- 5 Well Pairs on Pad 109 (01 to 05)
- 3 Well Pairs on Pad 205 (05 to 07)
- 4 Well Pairs on Pad 206 (06 to 09)
- 6 Well Pairs on Pad 204 (06 to 11)





Future Planned Amendment Applications

- Orion Oil Capacity Increase (including a fifth Boiler and second Crystallizer)
- Orion Pad Additions
- Orion Co-Injection Pilot

Osum Production Corp

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