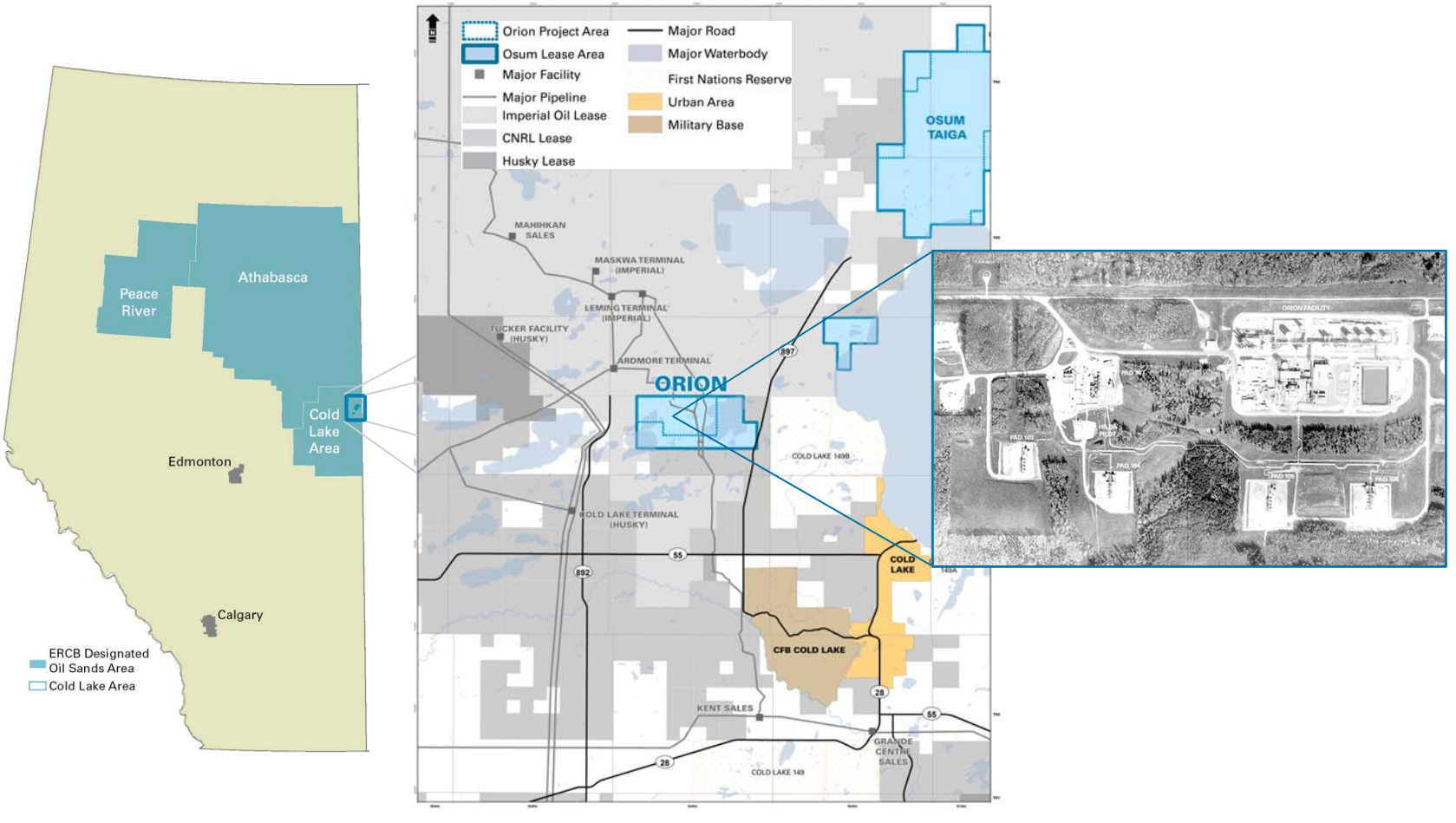
Orion In Situ Oil Sands 2016 Progress Update

Presented May 16, 2017

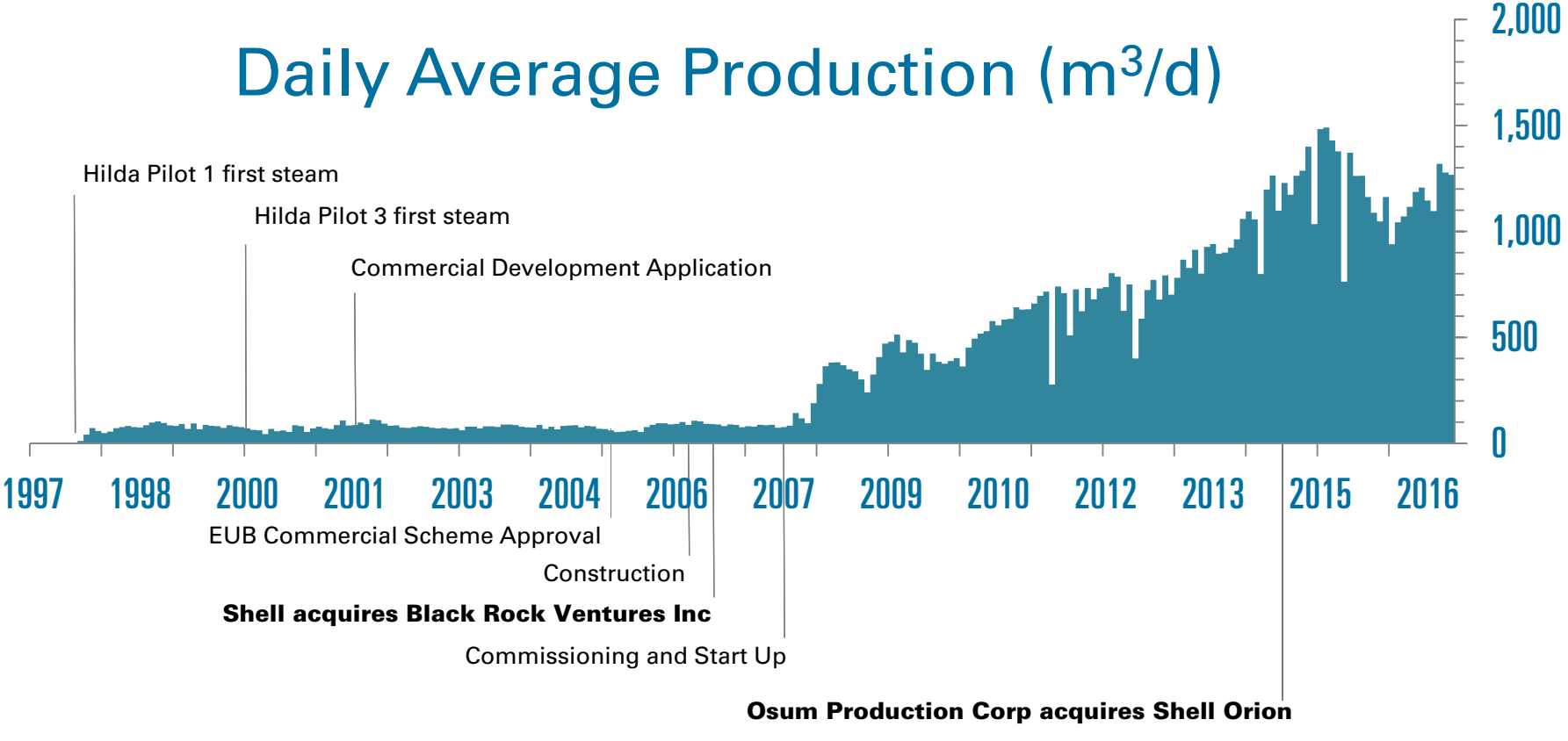
Agenda

Project Location



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

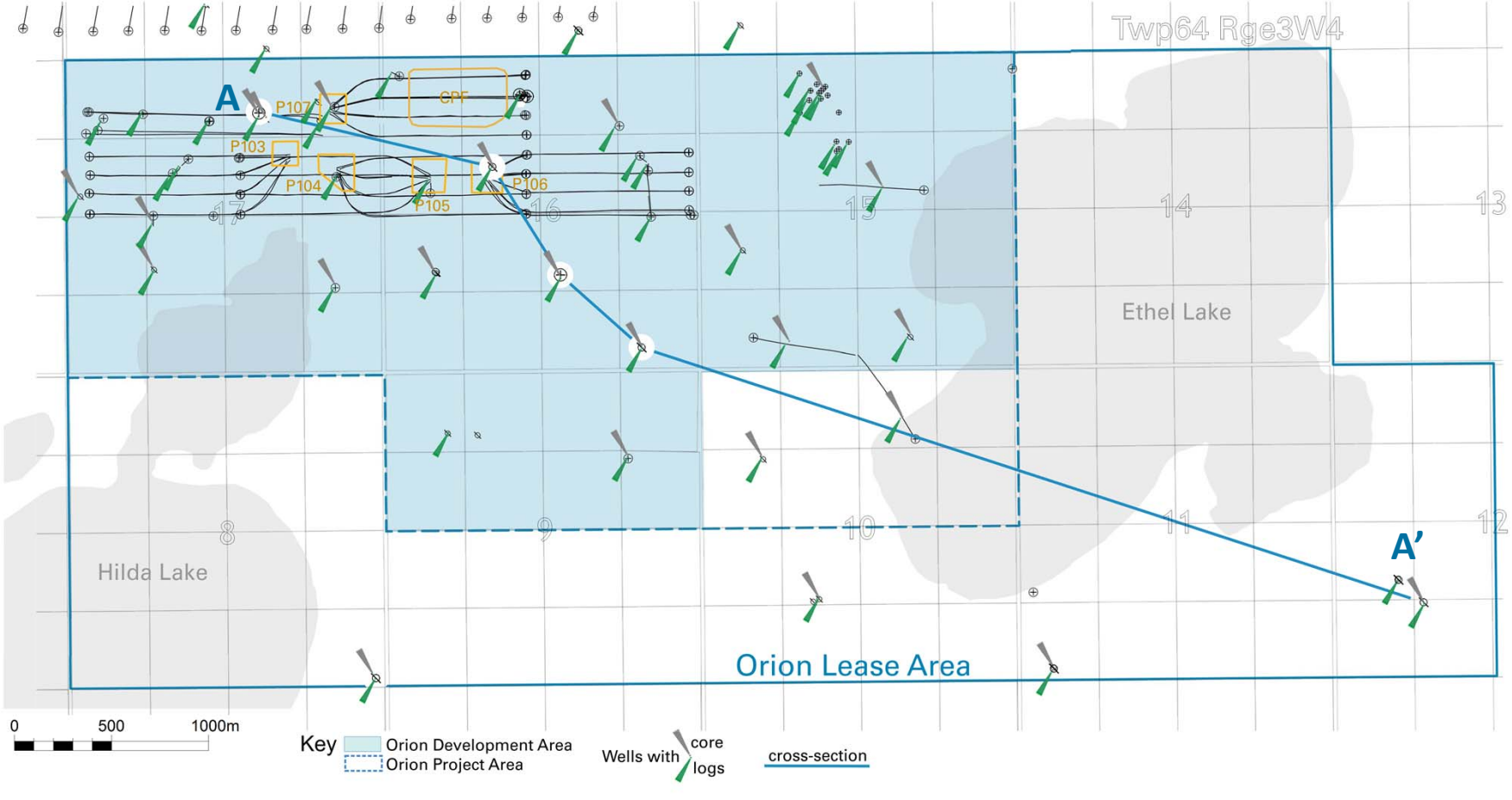
The Orion Project – History



Geoscience

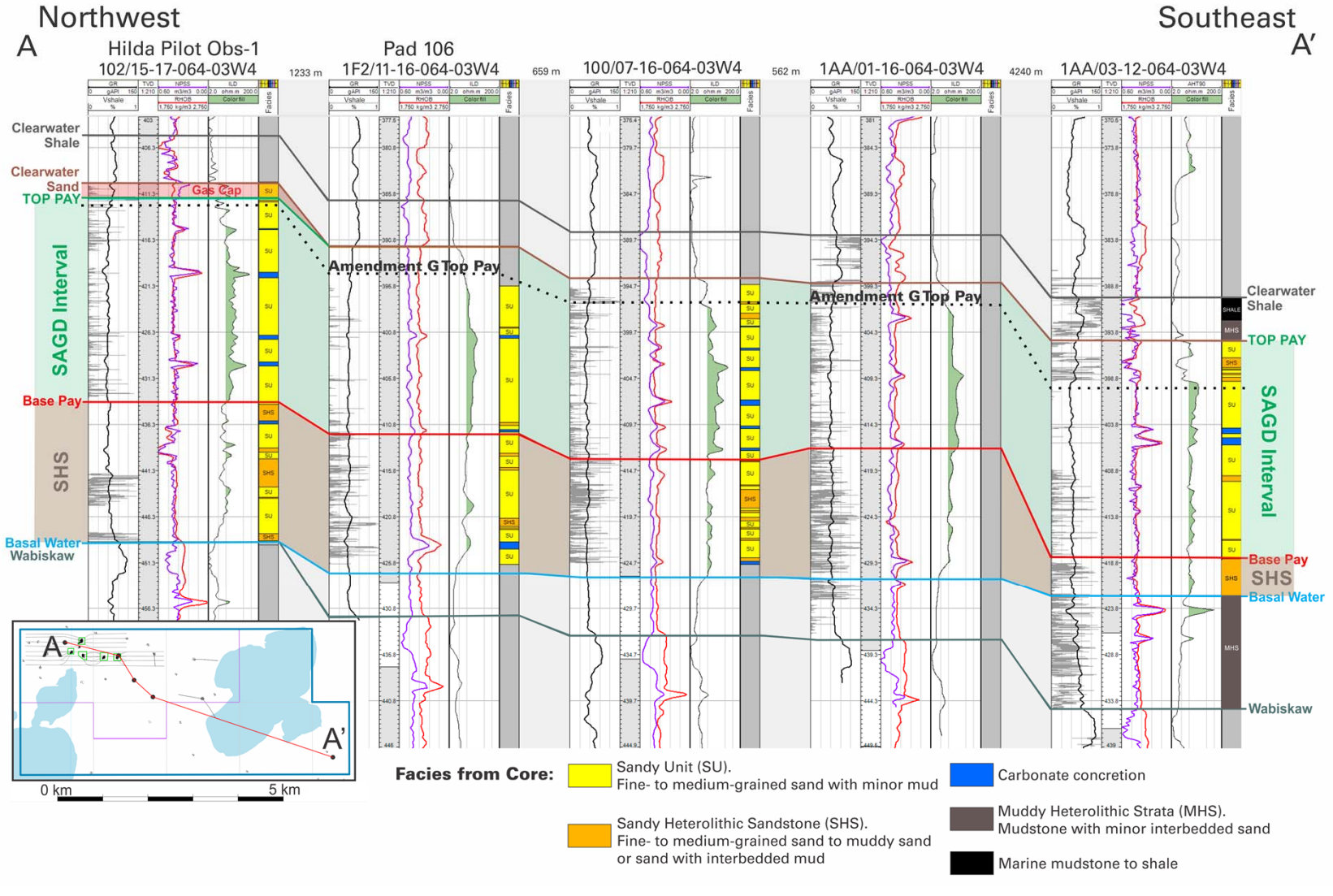
Delineation Well Data

- Fifty-four vertical or deviated wells across lease area; 42 with full suite of logs including 4 with FMI; 24 of the wells were cored
- Project area has 2-11 vertical or deviated wells per section
- Thirteen wells in the project area are observation wells (two abandoned in 2017)



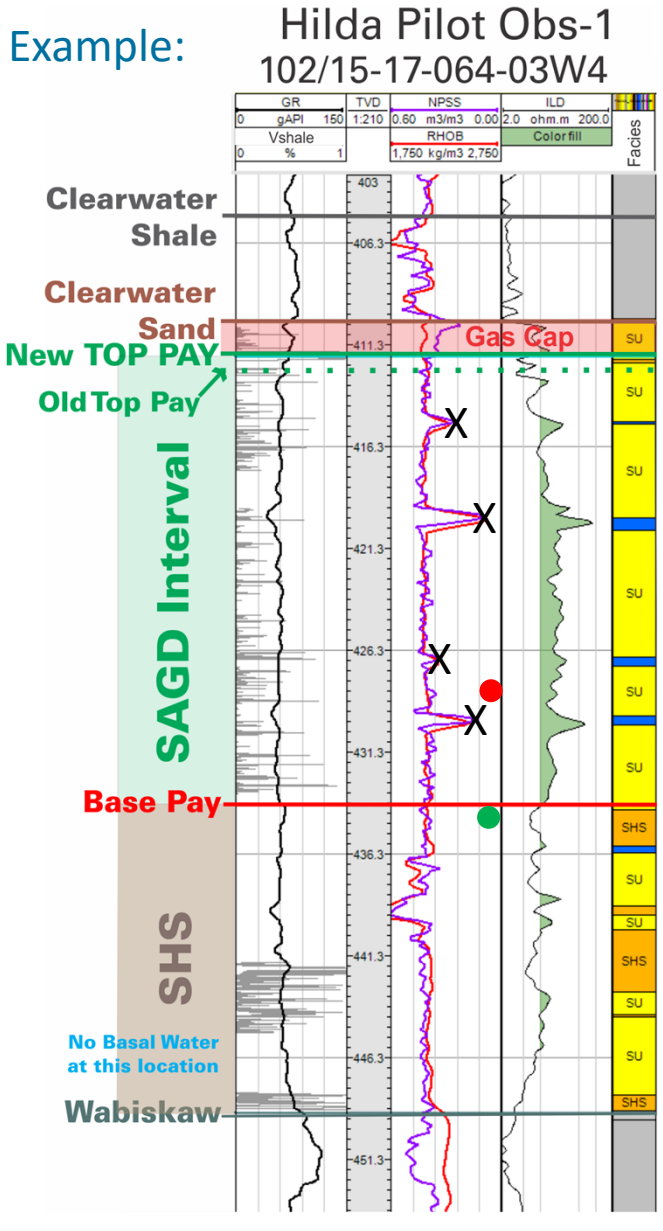
Representative Structural Cross-Section

- Definition of the SAGD interval has been revised to include upper part of the Clearwater sand



Method of Revised SAGD Interval Mapping

Example:



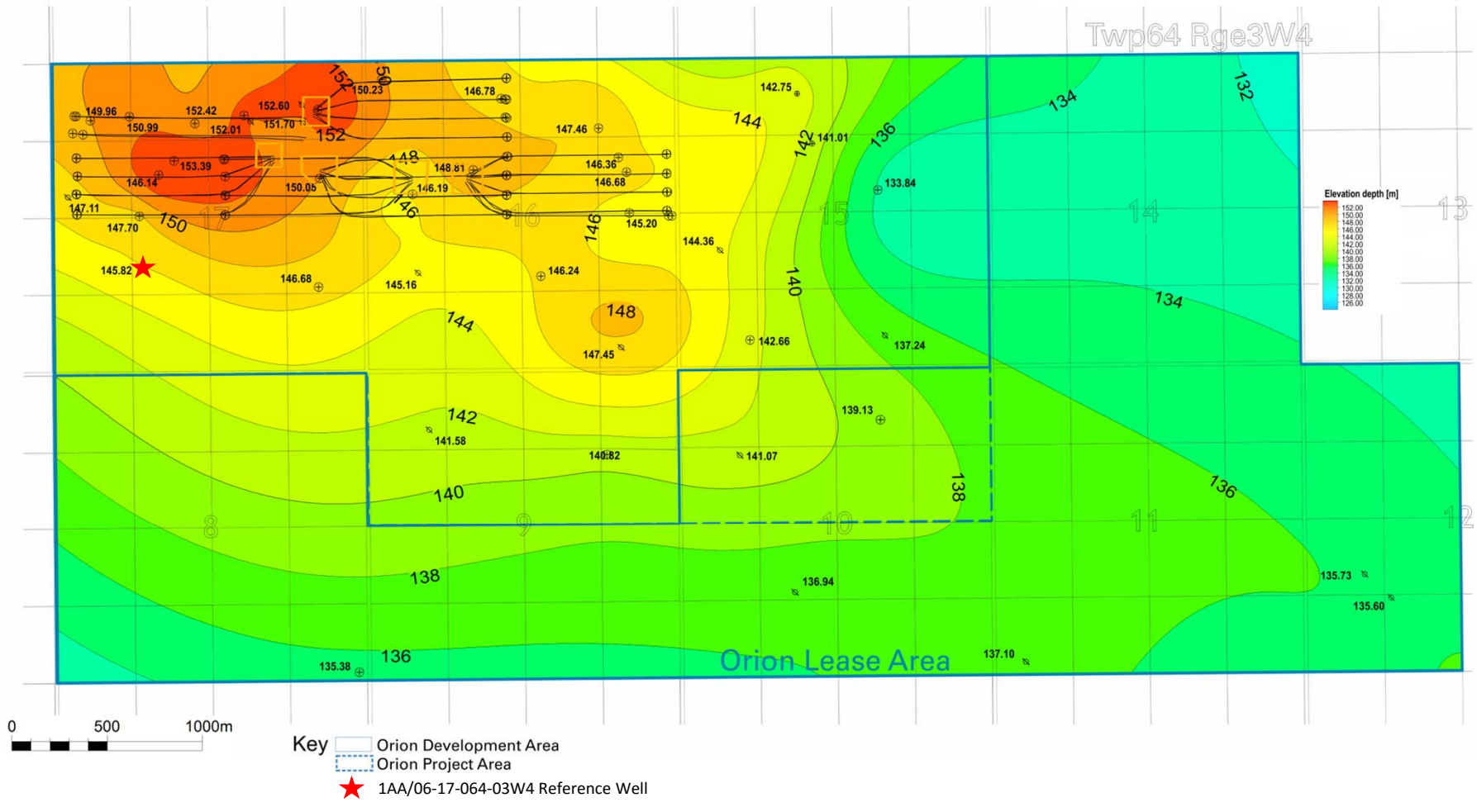
1. Top pay raised to top Clearwater sand or, when present, base gas cap. Net effect of reducing oil saturation as oil saturation of upper zone ~44%, porosity remains similar, and thickness increases
2. Concretions (X) removed from calculated thickness and a porosity cut-off of 28% applied to the log calculated porosity (increases average porosity)
3. For pad volumetrics, thickness calculated from average vertical position of the producers rather than base pay. If producers above base pay, reduces volumes. If producers below base pay, increases volumes (but may also reduce saturation)

Parameter	New	Old
Mapped Pay Thickness[1]	20.6	21.1
Actual Thickness*	22.8	20
Oil Saturation	0.66	0.70
Porosity	0.35	0.33

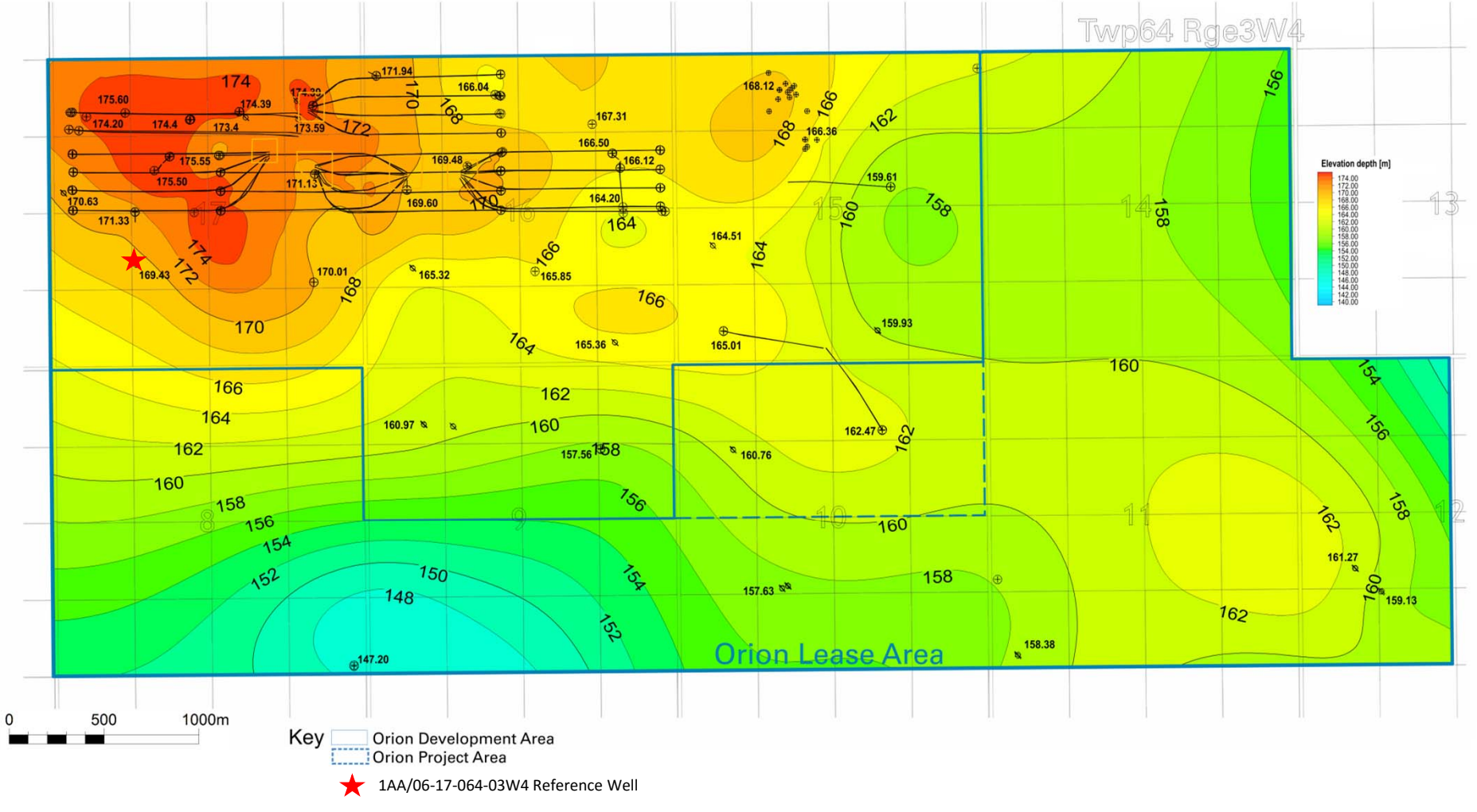
[1]= 21.1m+0.95m upper zone below gas cap - 1.45m of concretions = 20.6m

*Thickness measured from average producer position to top pay for the pad, not this specific well

Clearwater SAGD Reservoir – Base Pay

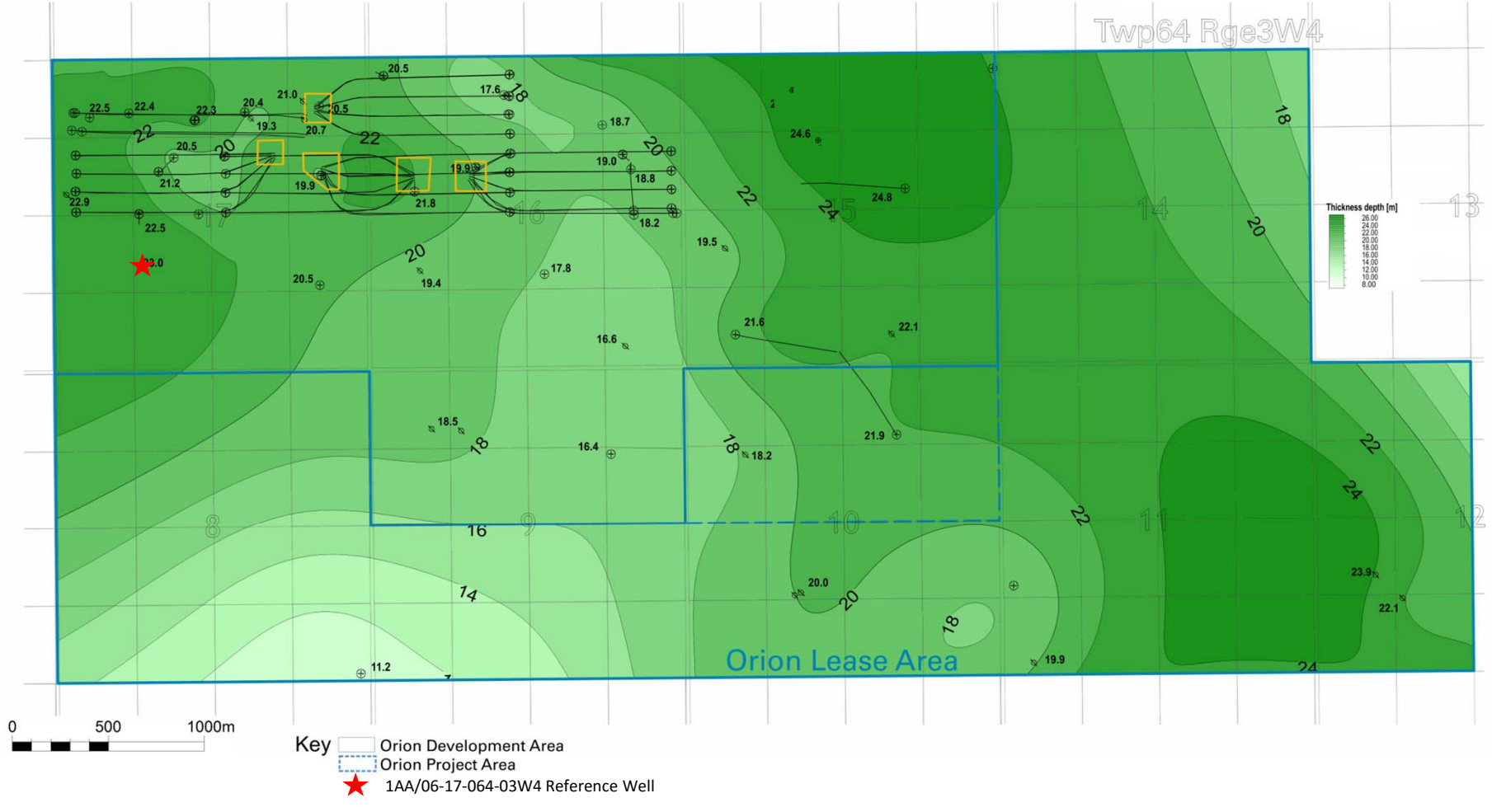


Clearwater SAGD Reservoir – Top Pay

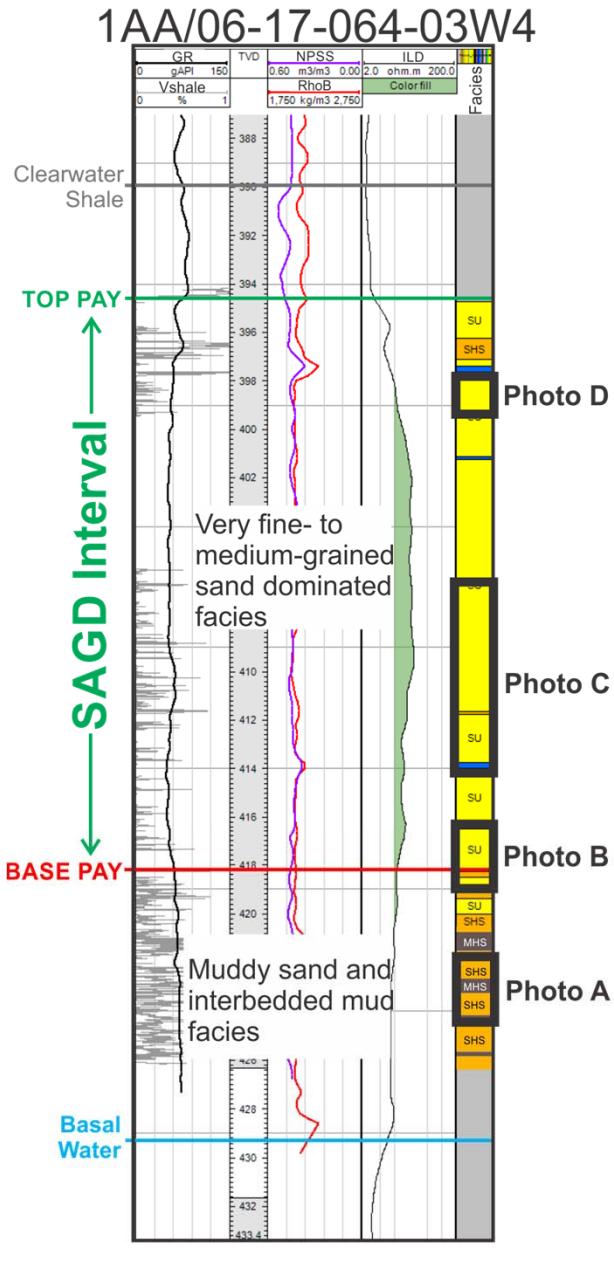


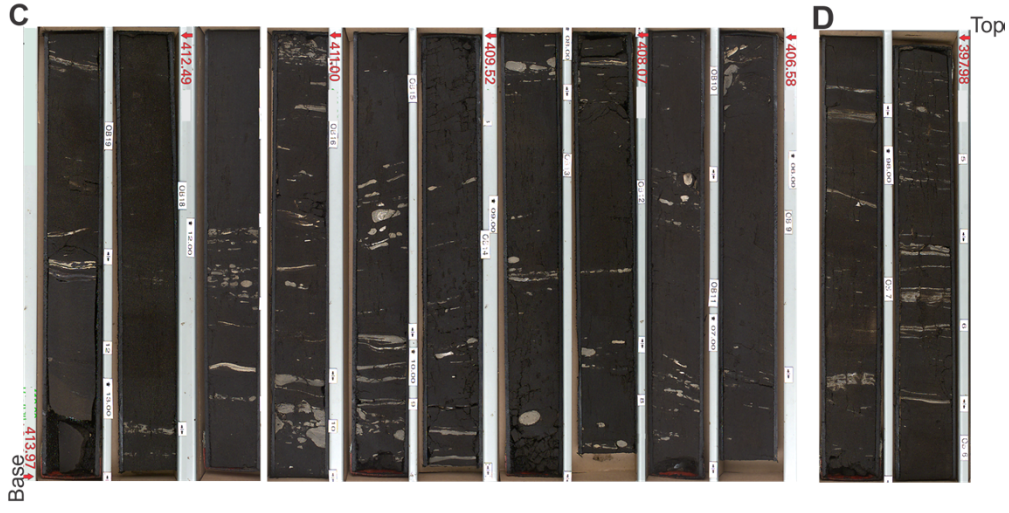
Clearwater SAGD Reservoir Net Pay

- Carbonate concretions removed from thickness and 28% porosity cutoff



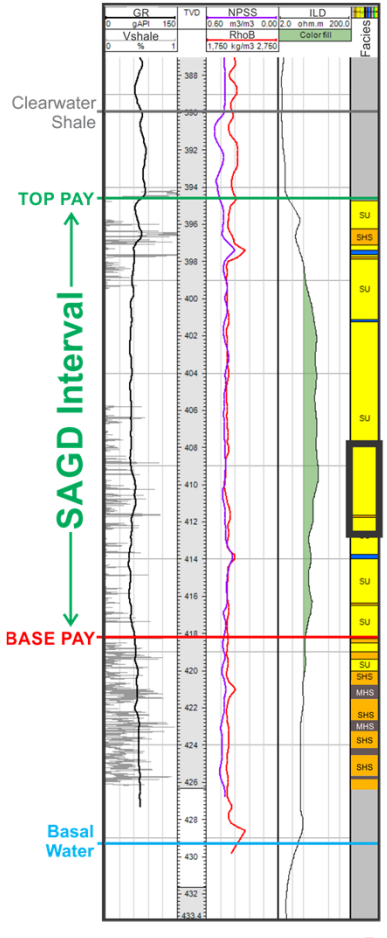
Orion Type Log

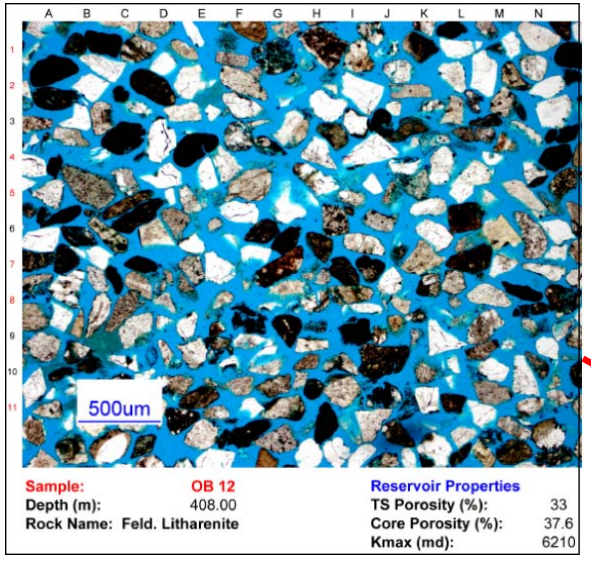




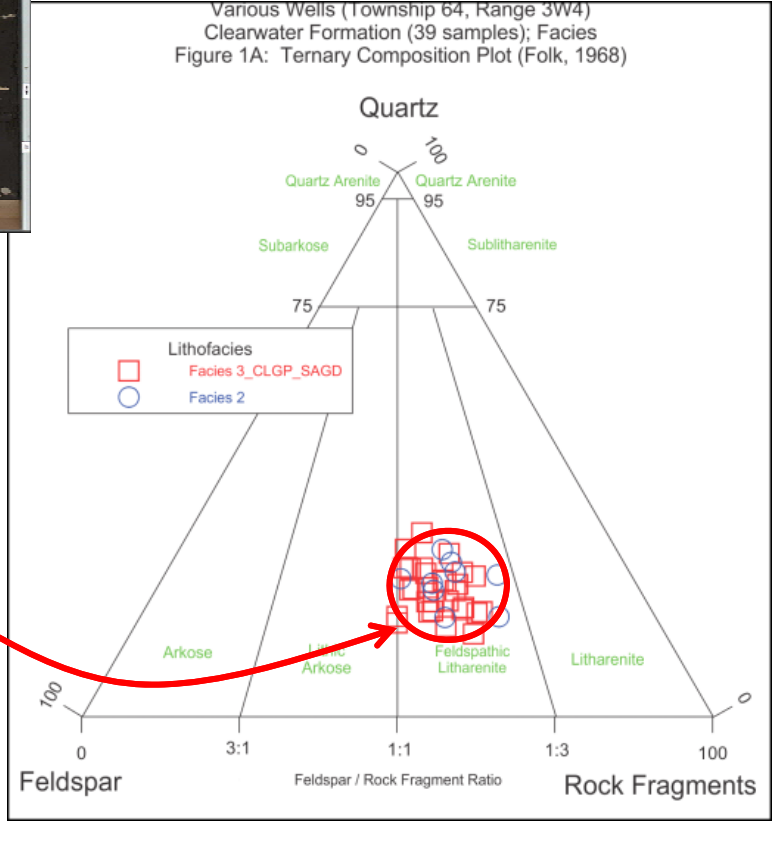
Clearwater Sand Mineralogy

1AA/06-17-064-03W4





- 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



Reservoir Properties

- Horizontal Permeability ~2 – 6 D
- Vertical Permeability ~1.7 - 5.1 D (Kv/Kh = 0.85)
- Viscosity ~100,000 cP
- Oil Saturation 66%
- Porosity 35%
- Thickness 16 – 25 m
- Reservoir Depth ~ 425 m KB
- Initial Reservoir Pressure 3.2 MPa
- Initial Reservoir Temp 15^{o}C
- Basal water ~10 m below base pay
- Sandy heterolithic strata (SHS) facies between pay and basal water

Producible Bitumen in Place (PBIP) and Recovery

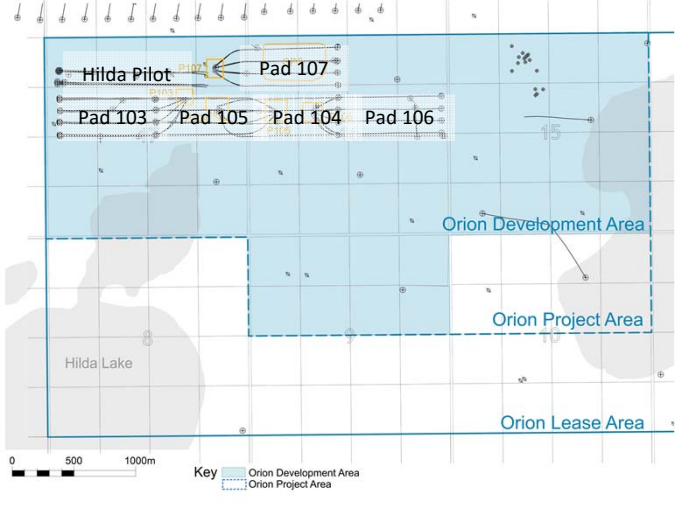
	Drainage Area, 50 m boundary (10^3 m ^{2})	Average Net Thickness (m)	Porosity (frac)	Oil Saturation (frac)	Total PBIP* (10^6 m^3)	Current Recovery %
Pad 103	290	22.8	0.35	0.66	1.53	36%
Pad 104	320	25	0.35	0.64	1.79	16%
Pad 105	300	21.1	0.35	0.66	1.46	42%
Pad 106	350	22.5	0.35	0.64	1.76	17%
Pad 107	350	21	0.35	0.65	1.67	30%
Hilda Lake Pilot	220	22.8	0.35	0.66	1.16	52%
Orion Operating Area	1830	22.5	0.35	0.65	9.37	
Orion Development Area	9208	20.6	0.35	0.66	43.82	
Orion Project Area	10523	20.6	0.35	0.66	50.1	

*PBIP = Producible bitumen in place (calculated using average net thickness measured from producers to top pay).

- All SAGD Pairs ~ 100 m spacing

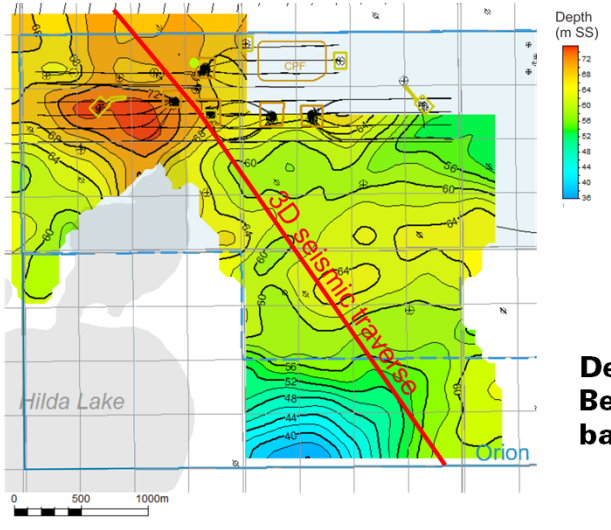
- Porosity and oil saturation from logs and core

PBIP = Area x Net Pay x porosity x oil saturation

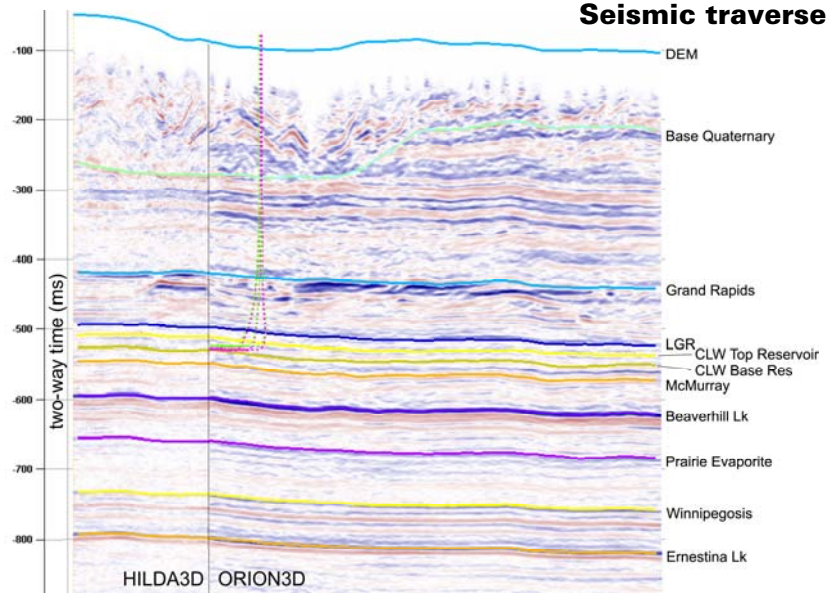


Caprock

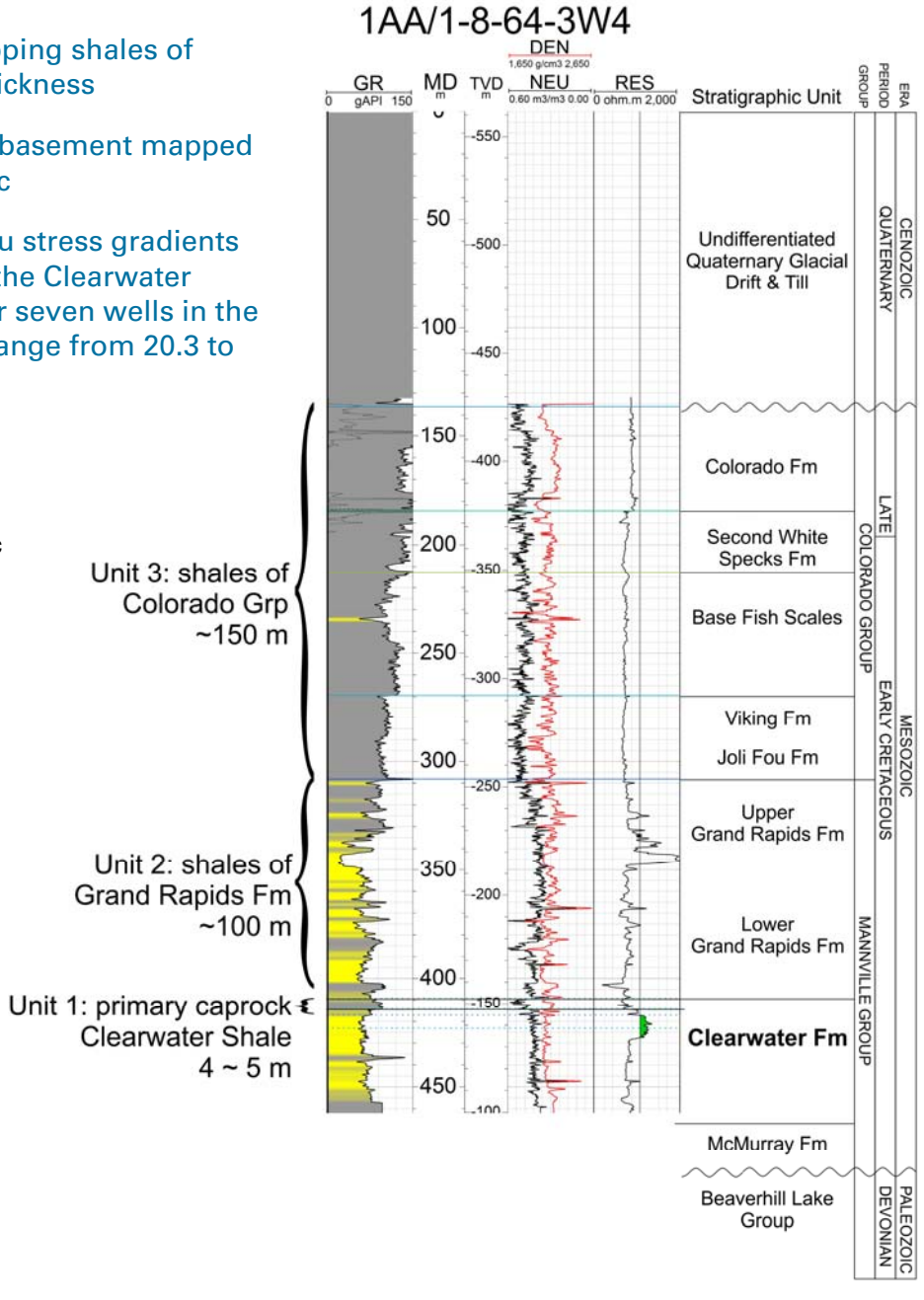
- 3 units of capping shales of significant thickness
- Undisturbed basement mapped on 3D seismic
- Vertical in-situ stress gradients at the top of the Clearwater Formation for seven wells in the Orion lease range from 20.3 to 20.8 kPa/m



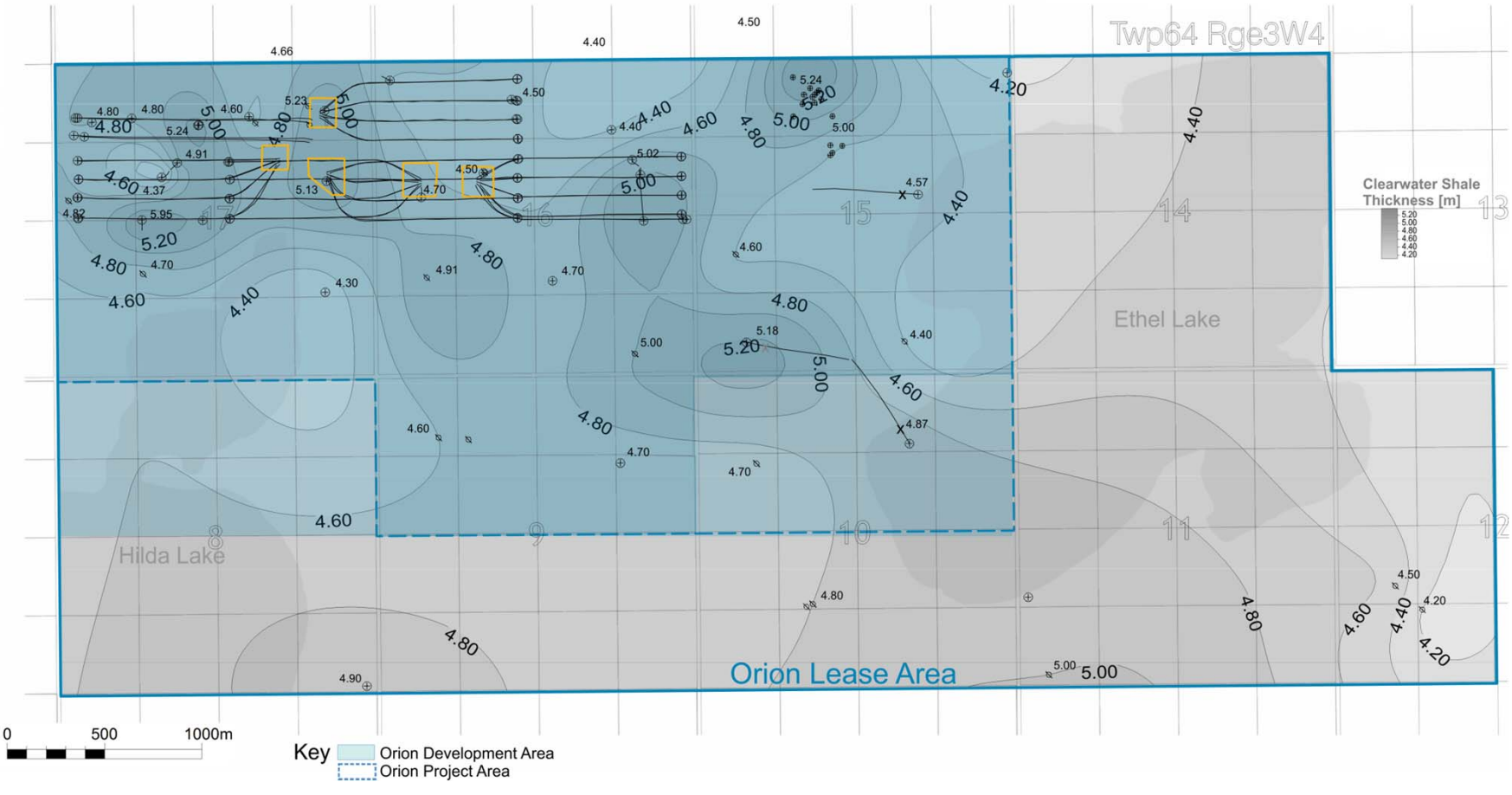
Depth Structure of Beaverhill Lake based on 3D seismic



Seismic traverse

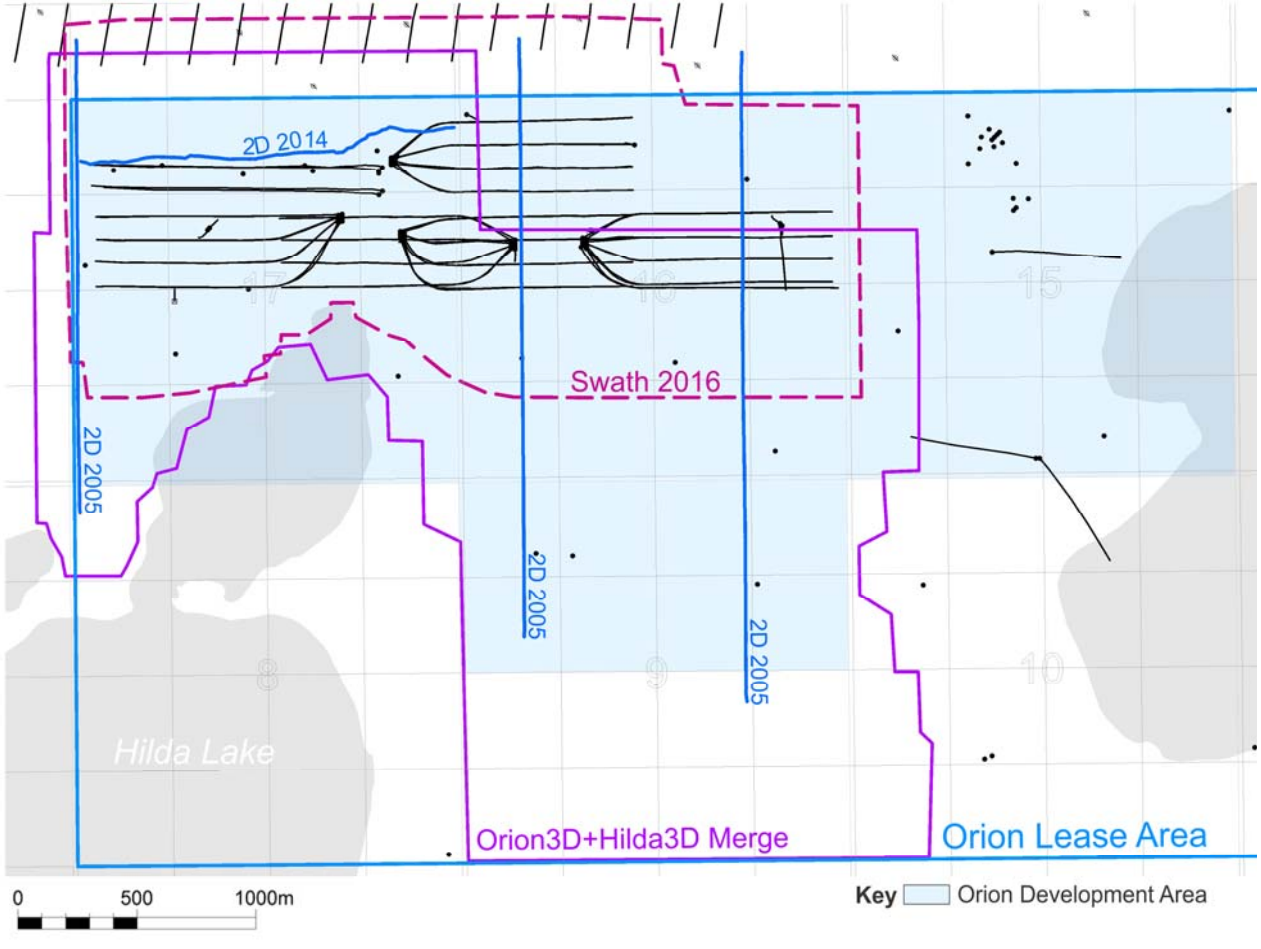


Clearwater Shale – Caprock Thickness



- Caprock mapping is consistent with previous years interpretation

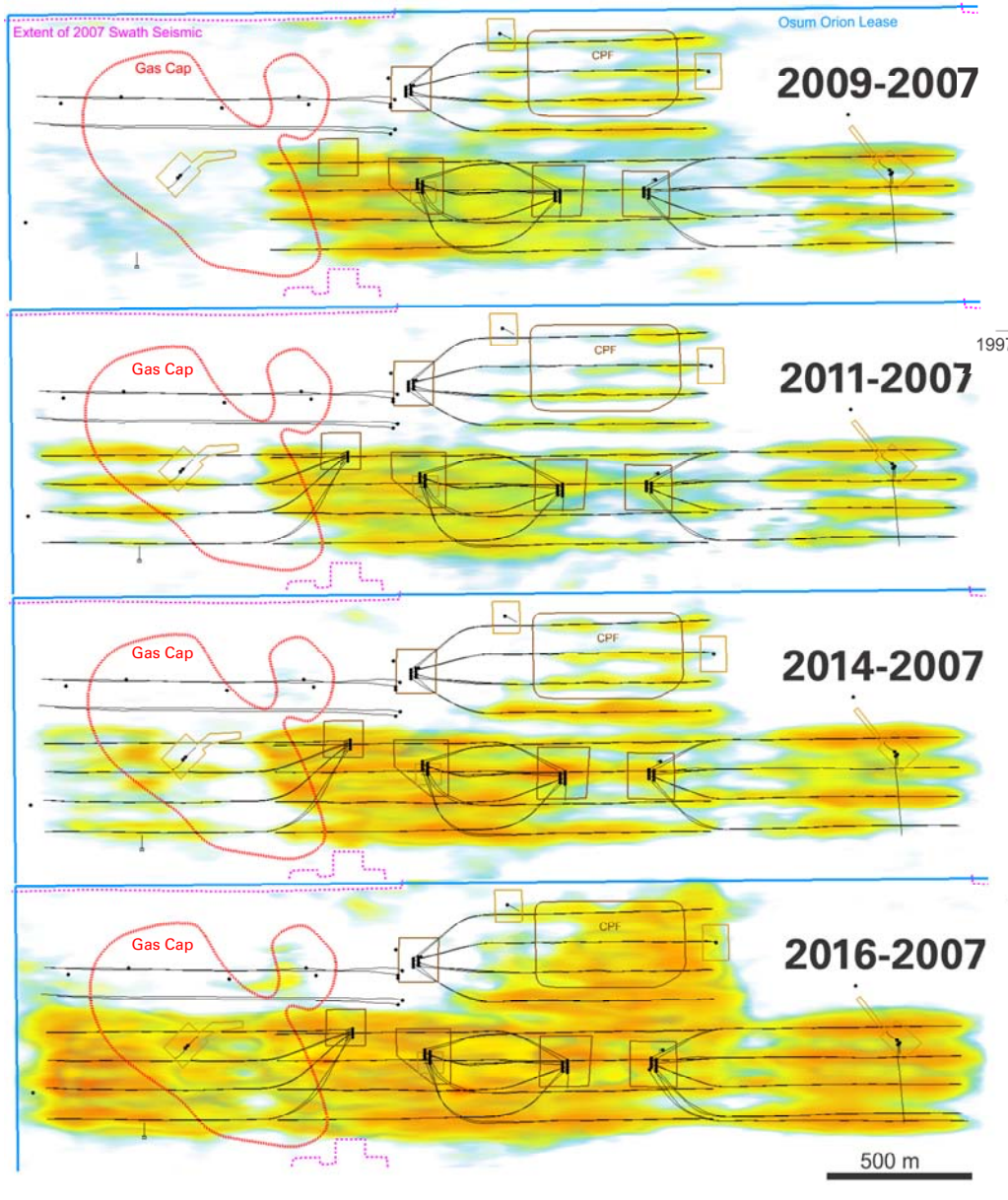
Seismic Data

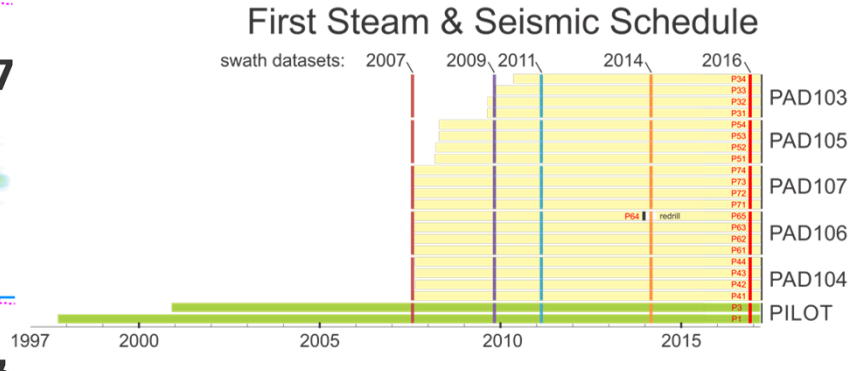


3D, 2D, Swath

- 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
- 2D 2014, 1 line
- Swath 2014, 1708 records
- Orion 3D & Hilda 3D merged 2015
- Swath 2016, 1688 records

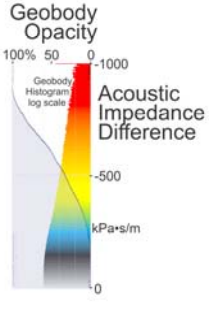
Repeat Swath Seismic





Observations:

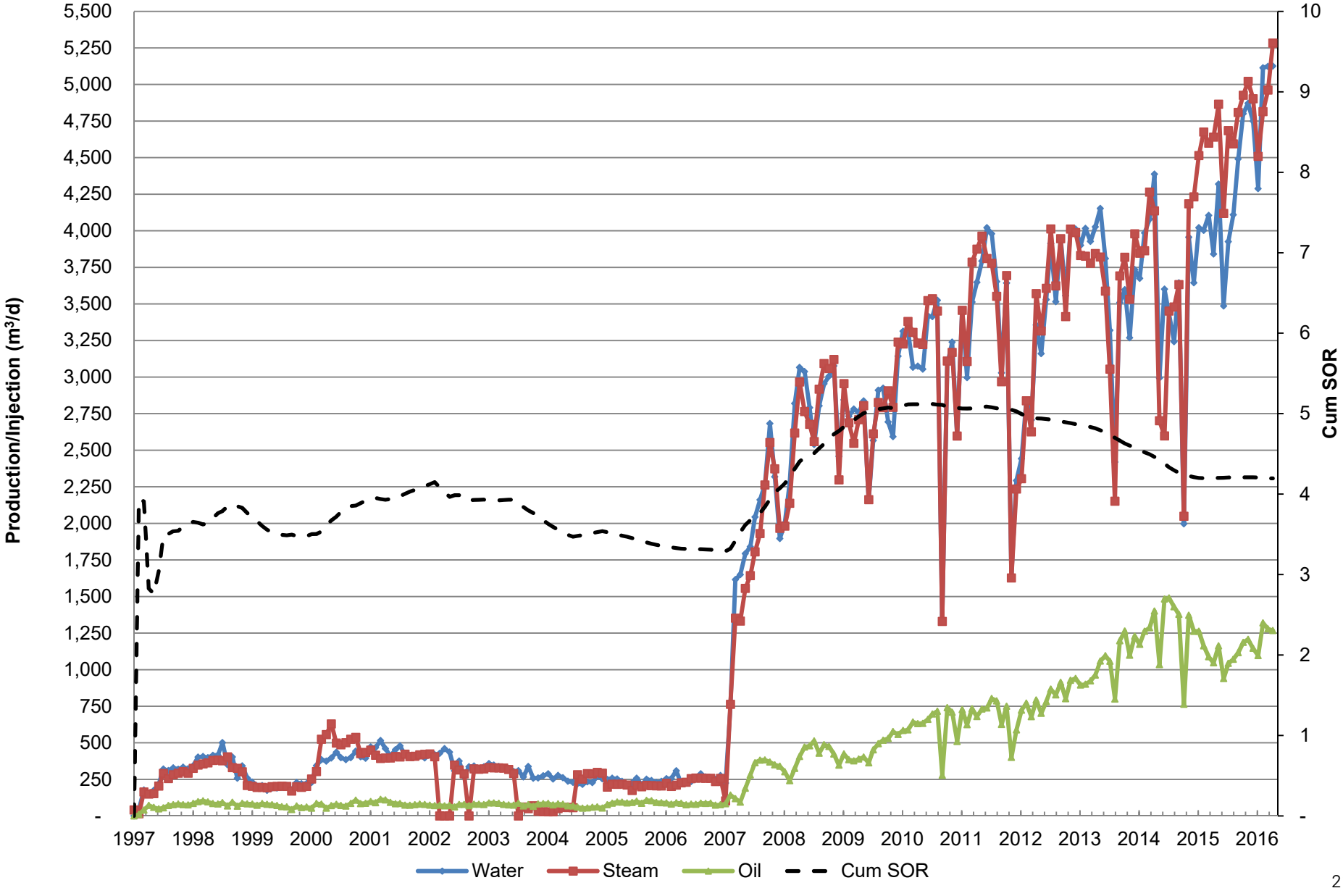
- November 2016 seismic acquisition reveals good thermal conformance along all thermal pairs
- Gas Cap effects seismic resolution at Pad103
- Good lateral resolution allows estimates of steam chamber growth



*Map views of the Clearwater reservoir interval rendered as an opaque geobody. Colour and opacity are indexed to the **acoustic impedance difference** from the 2007 Base swath seismic survey.*

Scheme Performance

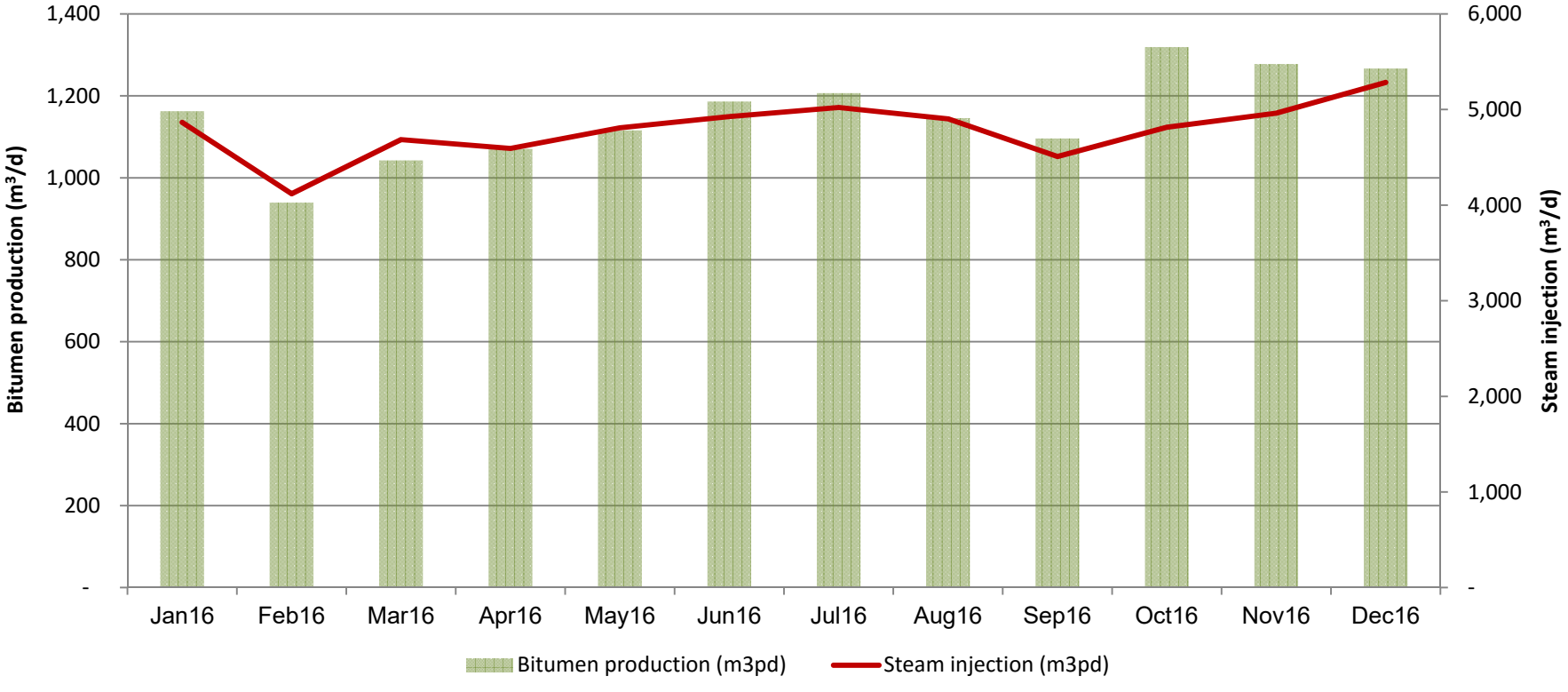
Orion Field Production – Since Inception



Orion Production Performance

- 2016 production averaged 1,154 m^3/d (7,256 bbl/d) with peak monthly production of 1,319 m^3/d (8,297 bbl/d) in October
- Overall rates trended upward during the year as a result of:
  - Leveling of declines associated with previous year's pressure drops; and
  - Rate increases from perforations and other well interventions
- Historical differences in production performance amongst the Orion wells has been significantly impacted by each well pair's placement within the Clearwater formation
- Examples of good, low and moderate well placement are shown in the slides that follow

Orion Field Production – 2016



Central Plant Facility

- Average bitumen production 1,154 m^3/d (7,256 bbl/d)
- Consistent steam gen reliability (no material boiler outages) – average steam injection 4,795 m^3/d
- 3rd boiler commissioned mid-November

Well interventions

- Perforation operations

Orion SAGD Pressure Scheme

- Osum would ideally have liked to maintain a constant SAGD chamber pressure of ~3 MPa until late life SAGD operations. However the Q1/2 2015 boiler reliability challenges led to end-2015 pressures ranging from 2.4 – 3.2 MPa
- Osum has significantly improved boiler reliability and overall capacity, thus increasing the overall steam injection for the latter half of 2015 and through 2016
- Osum has stabilized reservoir pressures and is gradually building pressure in several areas of the field
- Rebuild of reservoir pressure has resulted in a temporarily higher SOR

Well Interventions – 2016

- Perforation operations were conducted on the following wells in 2016:

Description	Well	Timing
Slotted liner perforation 105-P4 Last remaining slotted liner to be perforated	105-P4	Mar/16
Heel section perforations Any short horizontal sections which were not perforated (i.e. often 50-100m at heels)	107-P1	Apr/16
	105-P1	May/16
	107-P2	Aug/16
	107-P3	Aug/16
	107-P4	Aug/16
	103-P2	Oct/16
	106-P3	Dec/16
	103-P3	Dec/16

- Where practical coordinated above well interventions with pump changes
- Acid stimulation conducted on oldest perforated liner, confirmed that subsequent rescaling was not significant

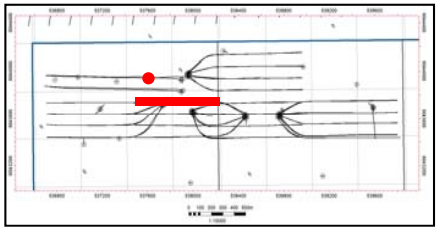
Pilot Well Gas Injection (scheme approval number 10103N)

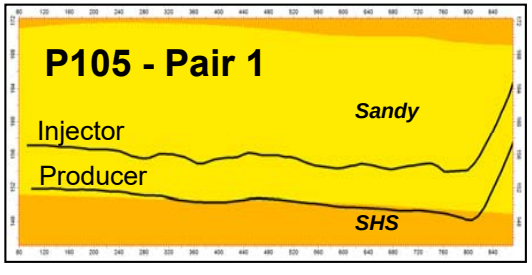
- In early 2016, Osum applied for approval to install a compressor to inject gas into the Orion Pilot wells at I1 and I3
- By injecting gas into the Pilot wells Osum was attempting to increase pressure in the Pilot area and thereby reduce pressure leak-off from the adjacent Pad 103/105 SAGD well pairs into the Pilot
- Approval to inject was issued on February 17, 2016
- As shown below, between February and September 2016, a total of 2,582 e^3m^3 was injected into the Pilot wells
- Pilot gas injection ceased in early September 2016
- Reduction of pressure differential between Pilot wells and Pad 103/105 was achieved

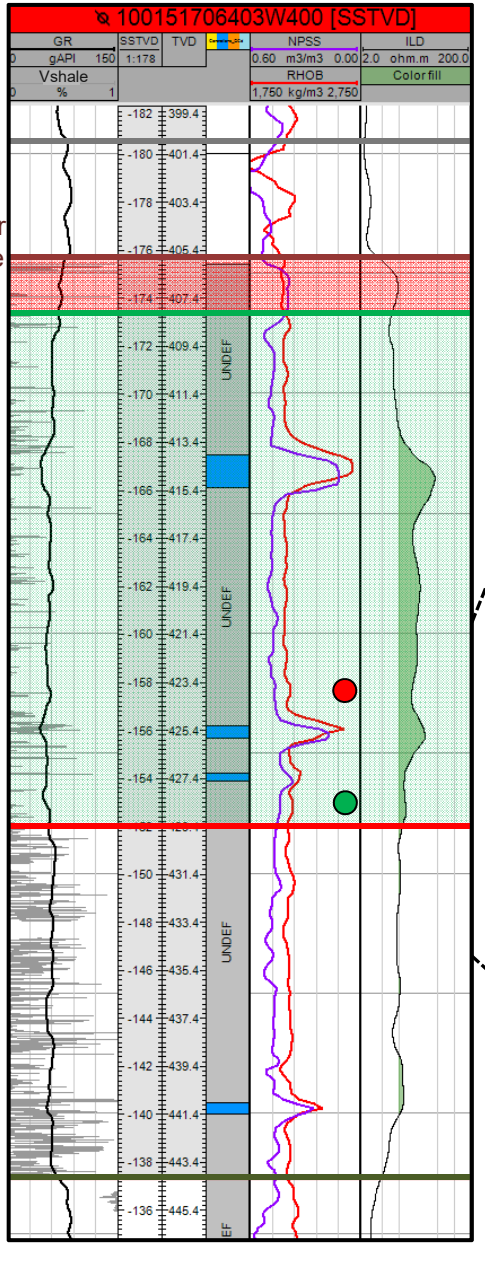
Summary of Pilot gas injection (e^3m^3)

Sum of Gas Row Labels	2016-02	2016-03	2016-04	2016-05	2016-06	2016-07	2016-08	2016-09	Grand Total
INJ	**28.2**	**648.1**	**677.9**	**278.5**	**410.2**	**381.0**	**155.1**	**2.9**	**2,581.9**
AB WI 104131706403W400	8.2	354.8	566.7	160.8	218.1	202.3	0.3		1,511.2
AB WI 107131706403W400	20.0	293.3	111.2	117.7	192.1	178.7	154.8	2.9	1,070.7
Grand Total	**28.2**	**648.1**	**677.9**	**278.5**	**410.2**	**381.0**	**155.1**	**2.9**	**2,581.9**

Good Well Placement – Pilot, Pad 103, Pad 105

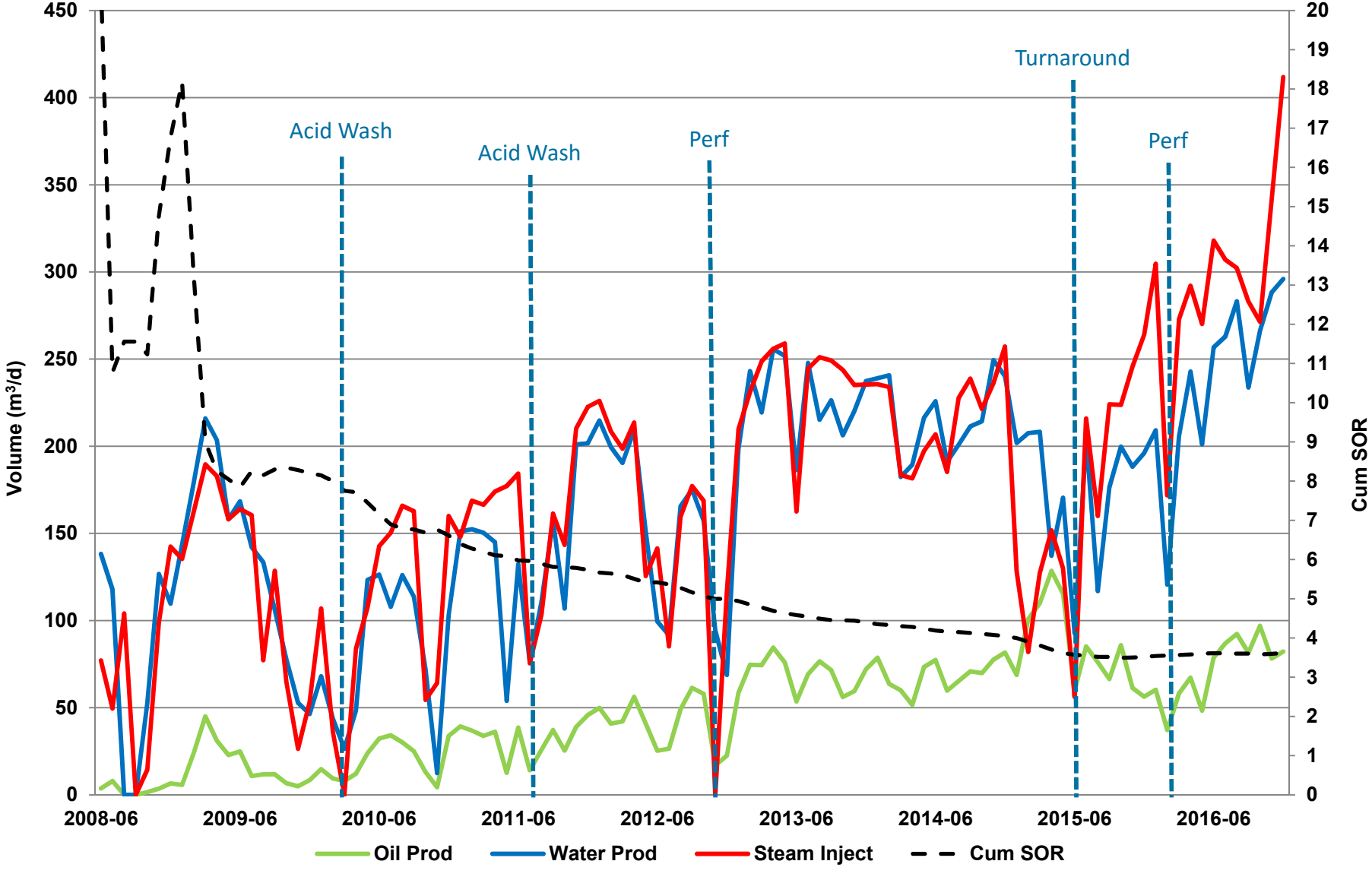




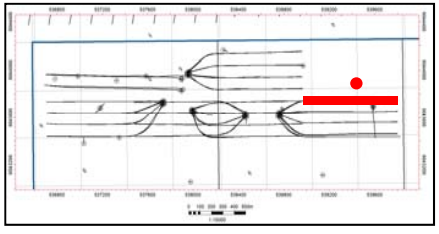


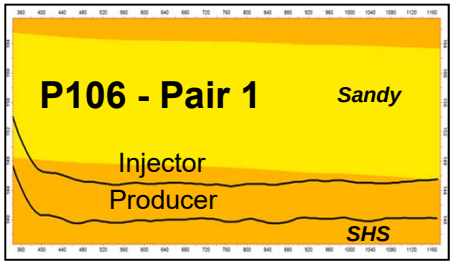
Well 105-P1 – Good Performance Well Pair

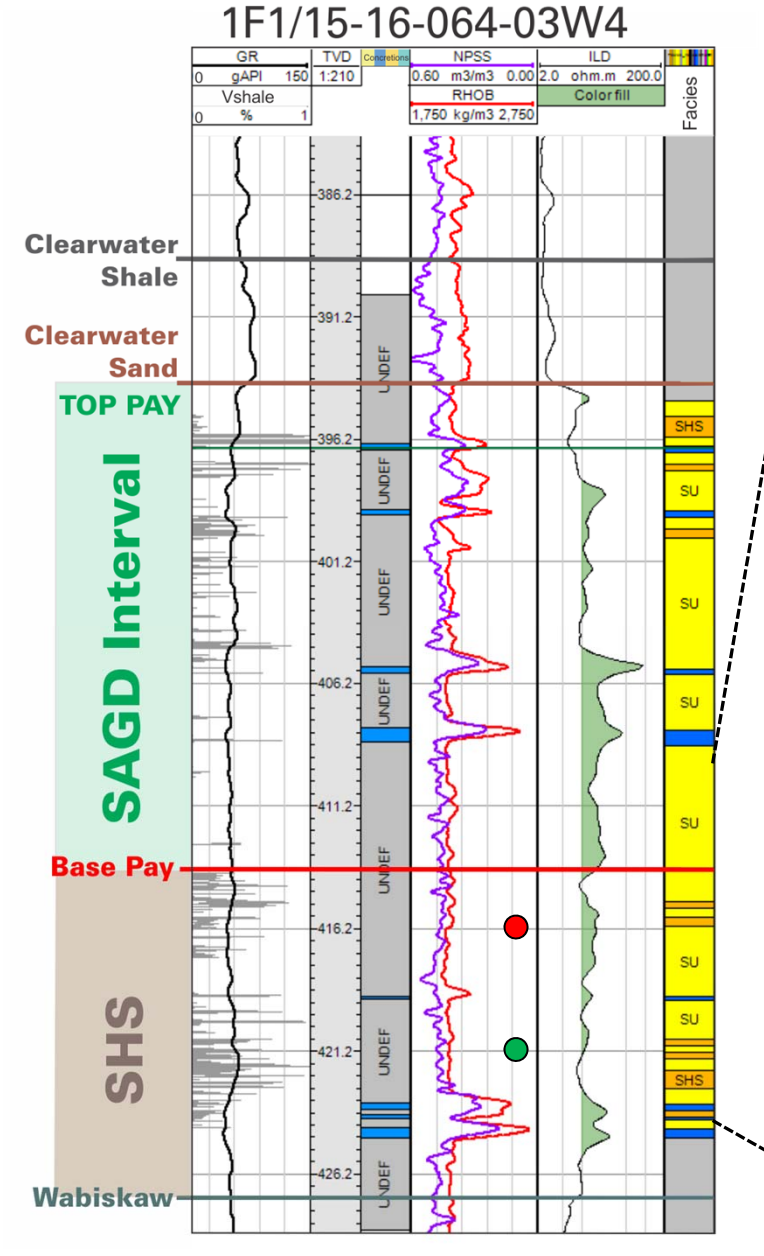
Well placed in high quality facies, high rate potential

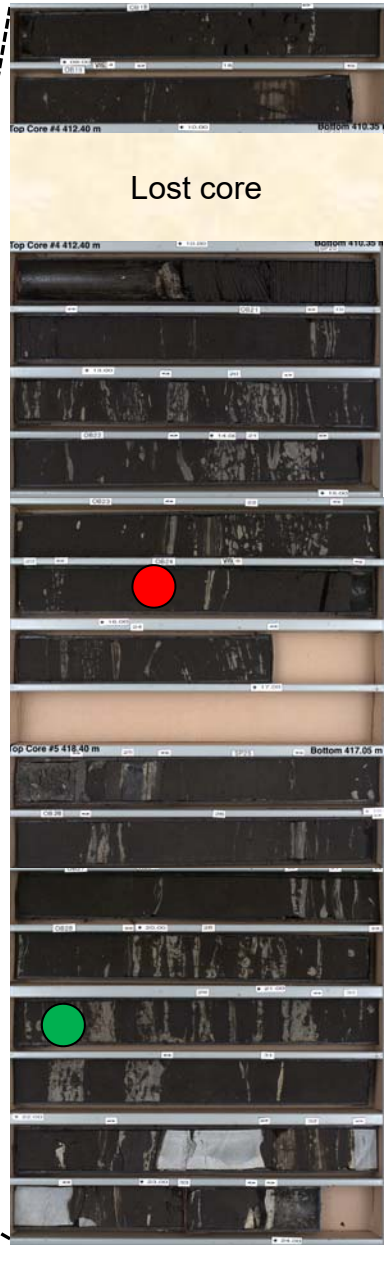


Well Placement Too Low – Pads 104 & 106



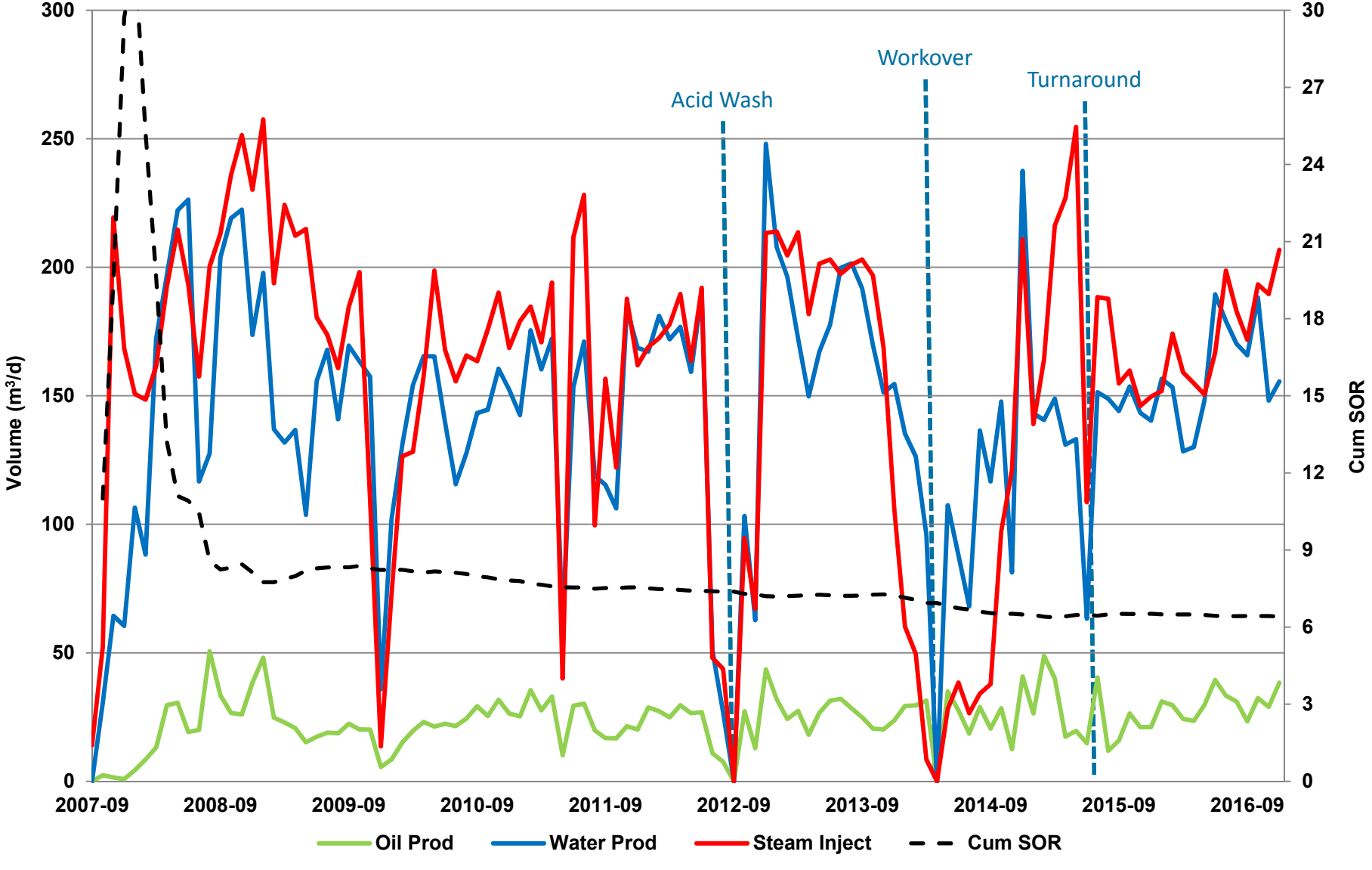




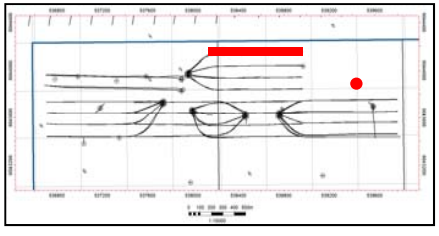


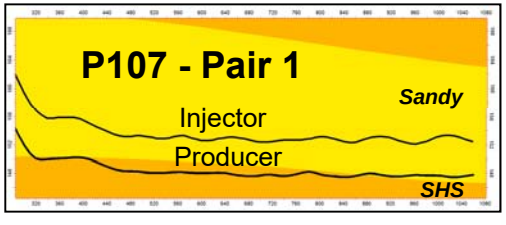
Well 106-P1 – Poor Performance Well Pair

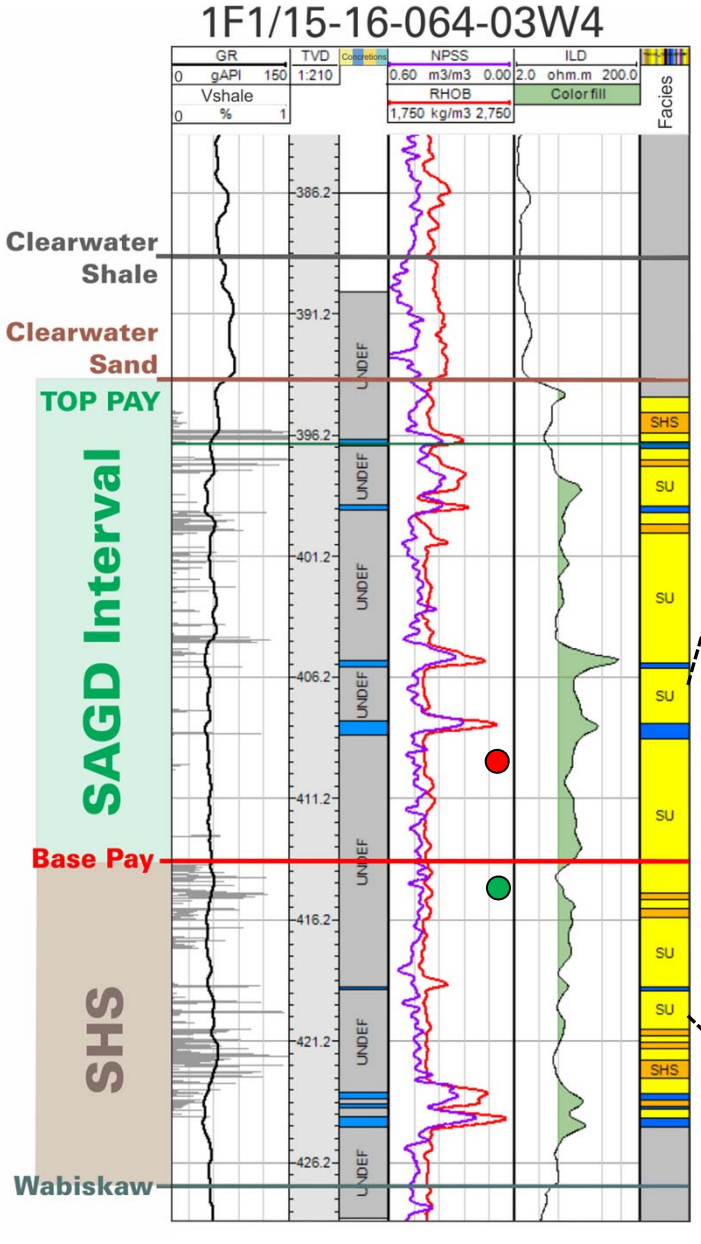
Injector producer placed in sandy heterolithic sands, impact on production

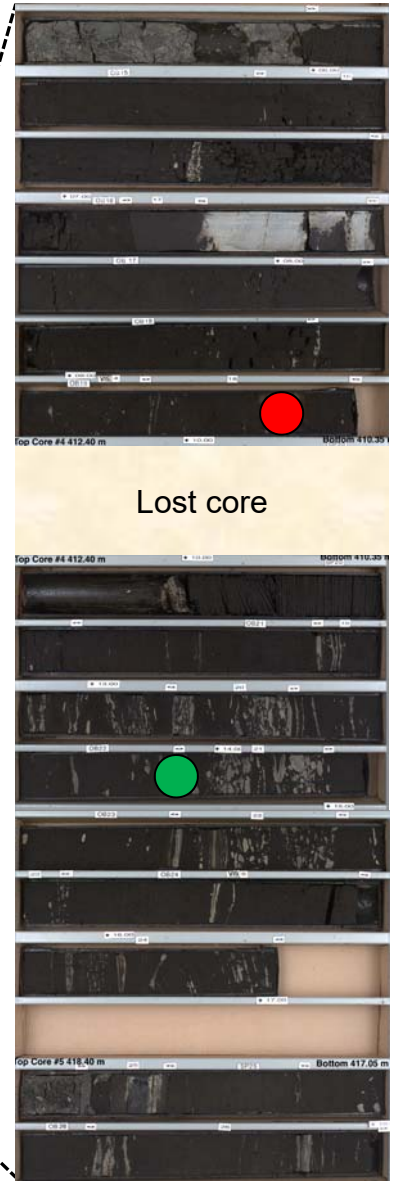


Moderate Well Placement – Pad 107



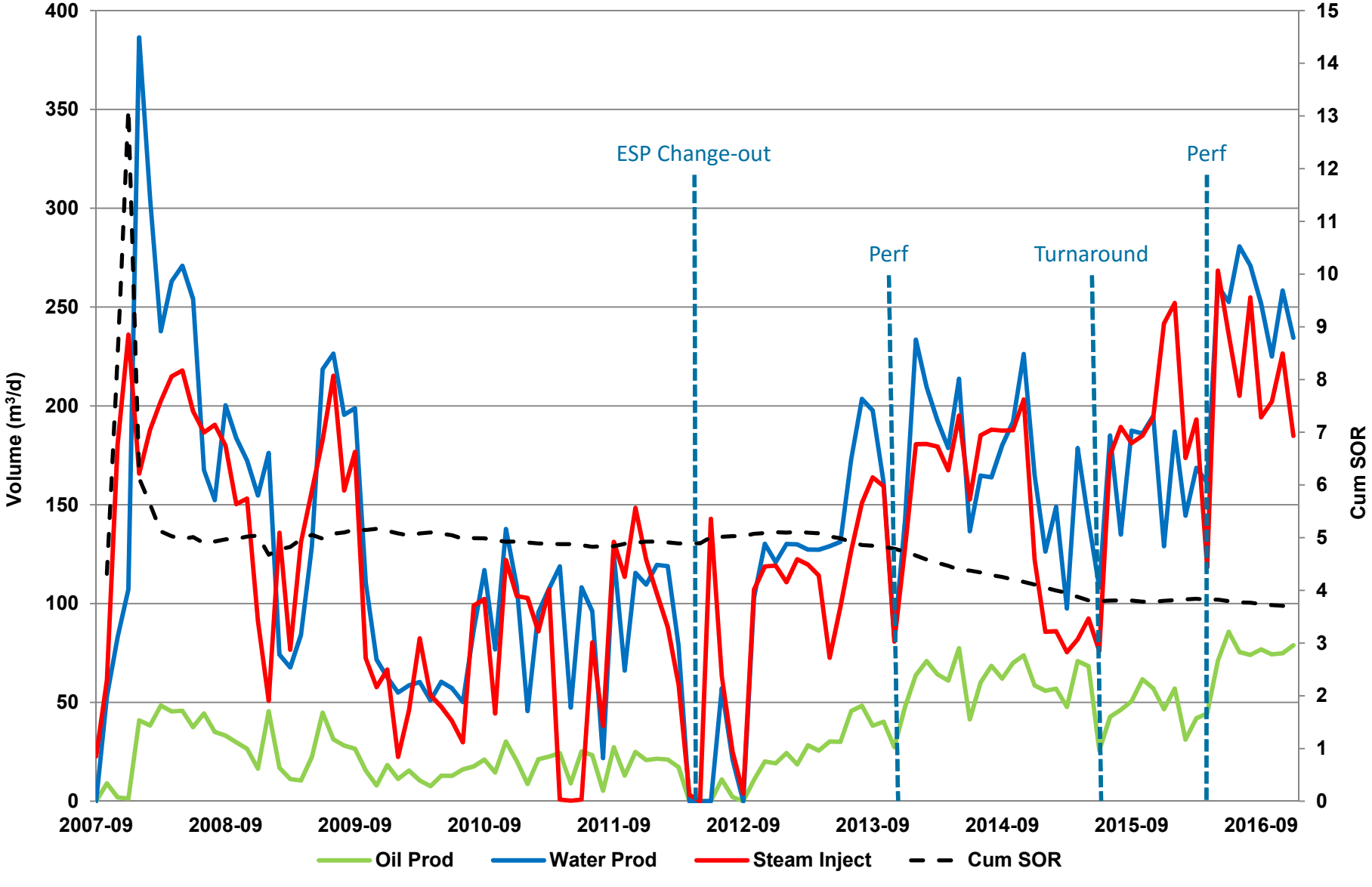




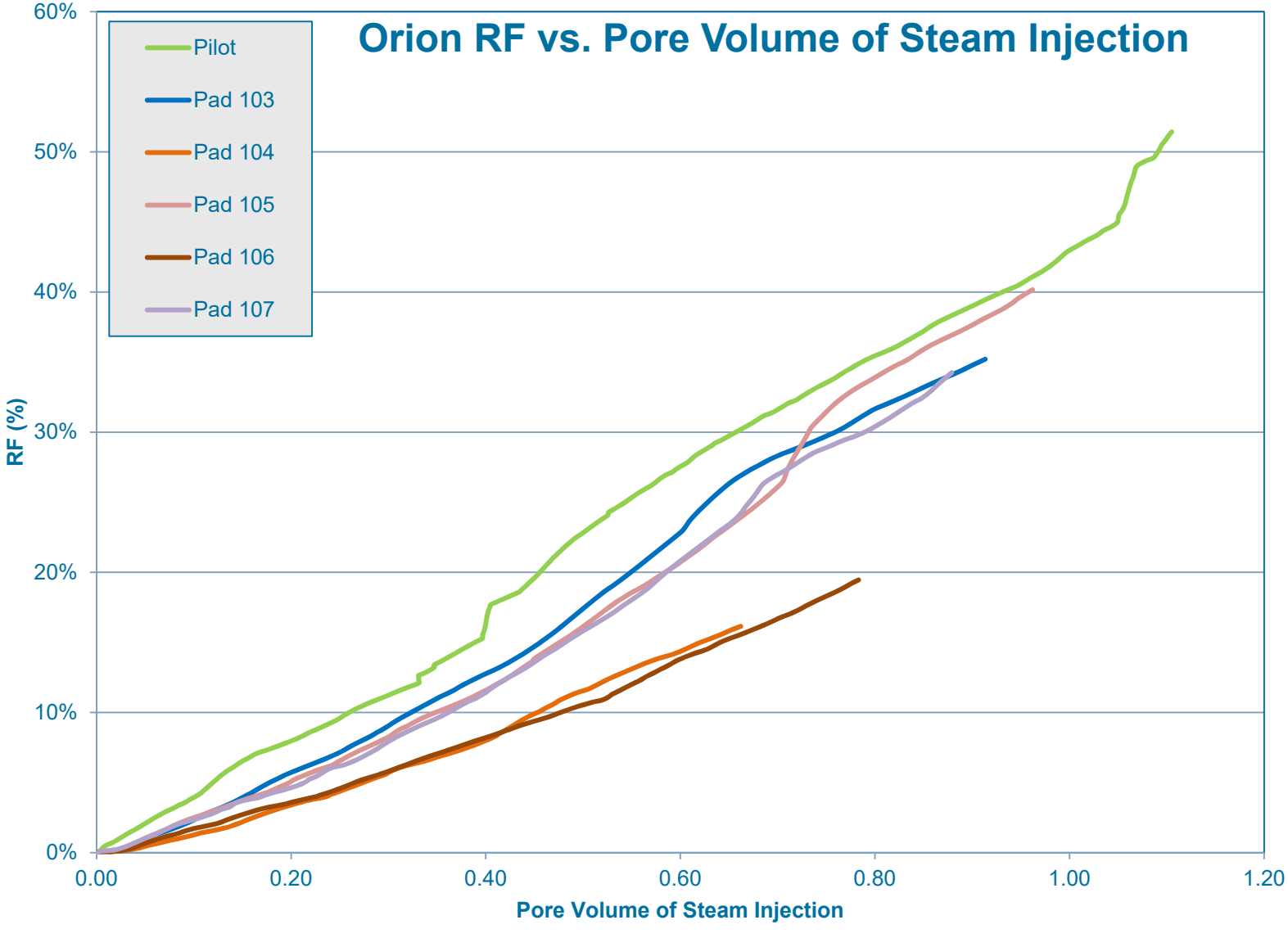


Well 107-P1 – Medium Performance Well Pair

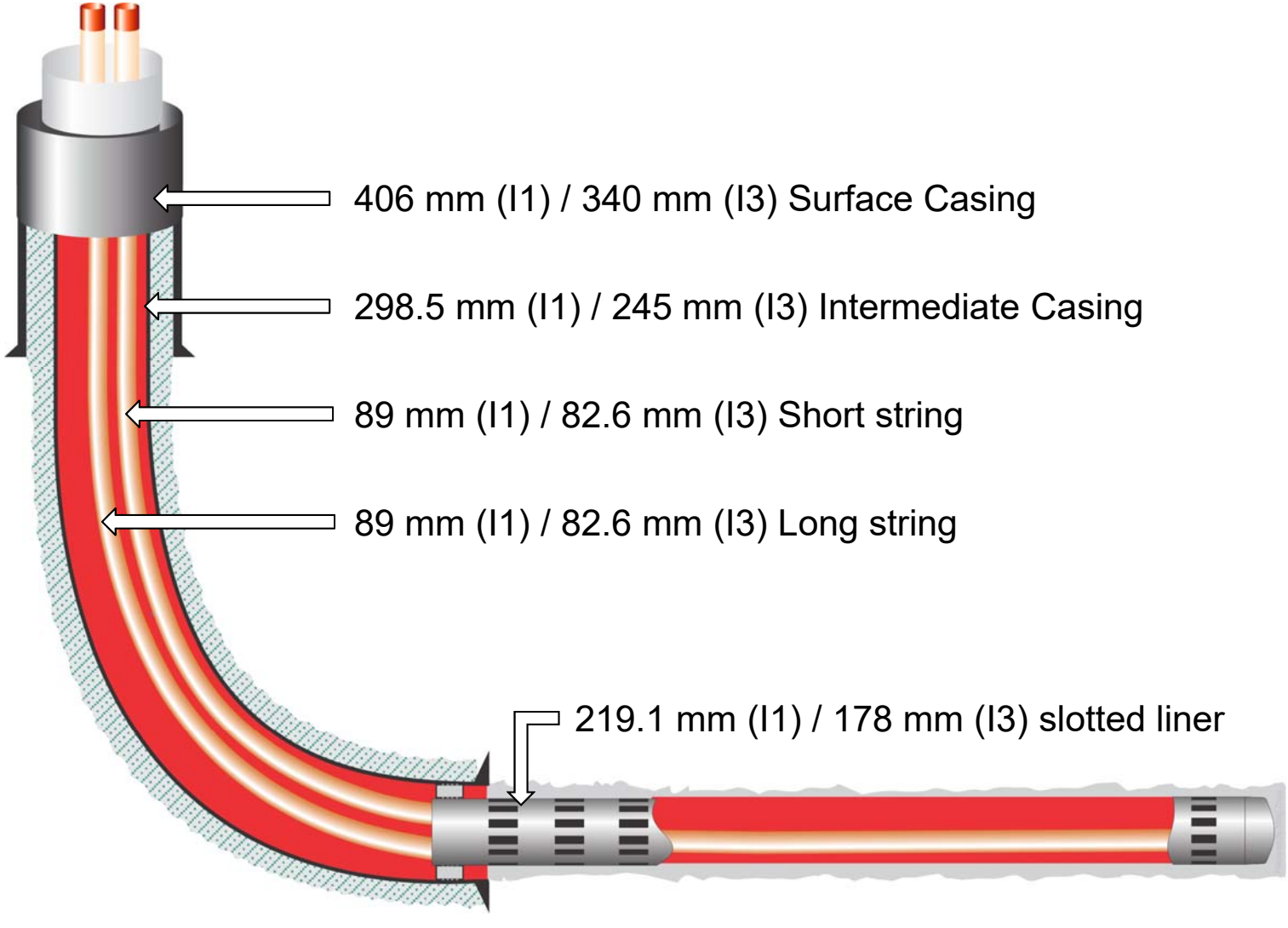
Production well placed marginally too low in the sandy heterolithic sands, reasonable rates



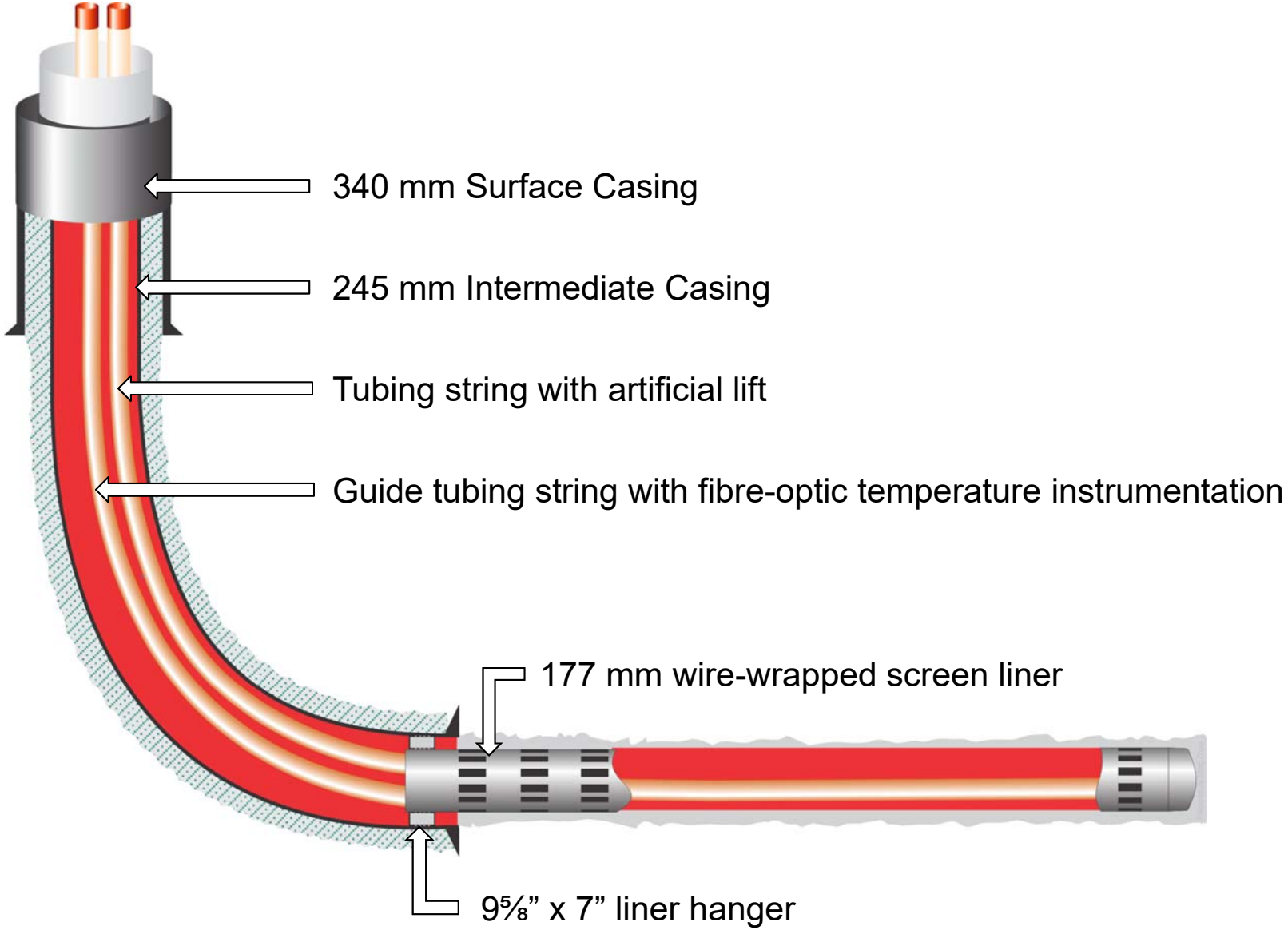
Pad Recovery and Performance



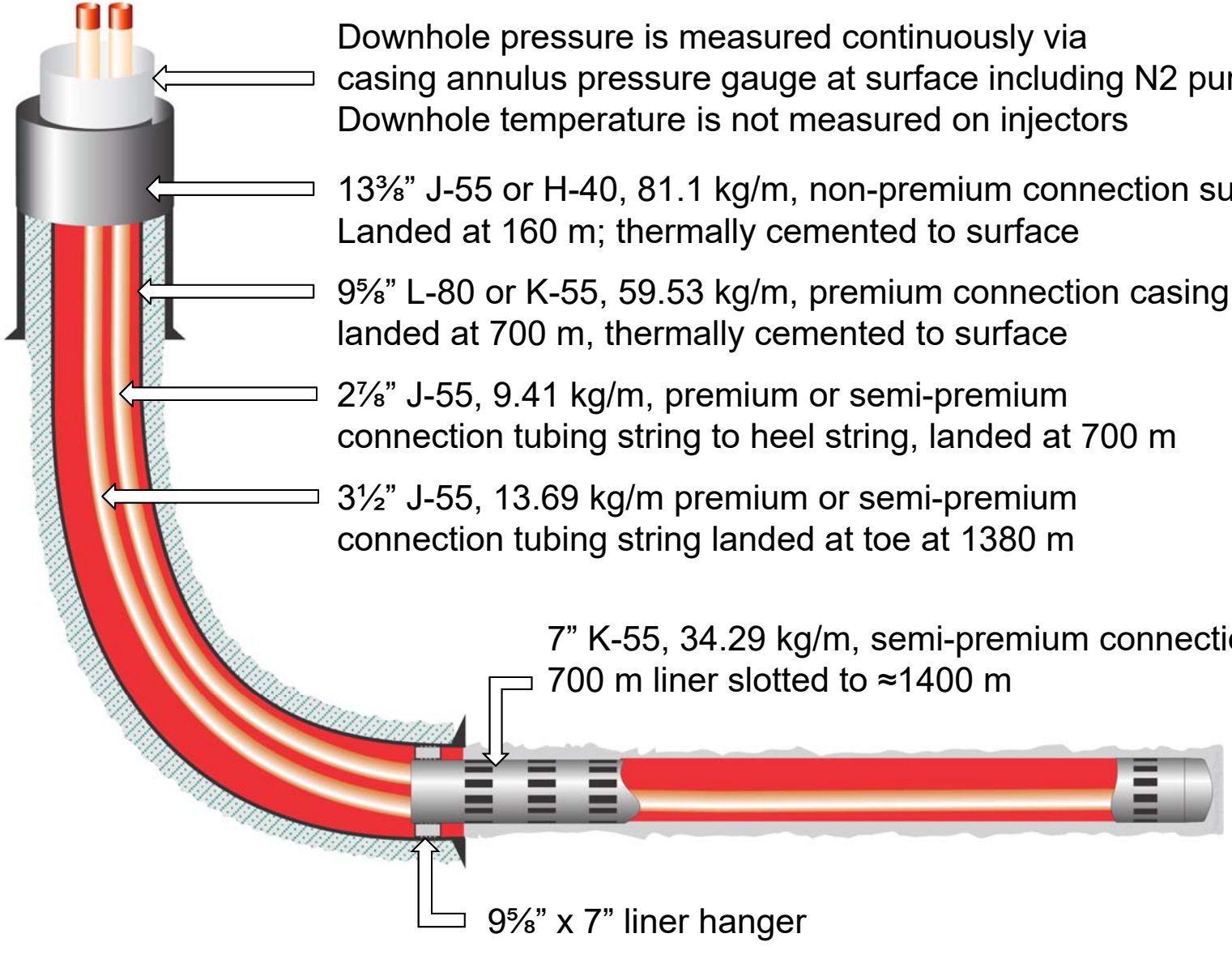
Hilda Lake Pilot Injector Schematic



Hilda Lake Pilot Producer Schematic



Typical Phase 1 Injector Completion



Downhole pressure is measured continuously via casing annulus pressure gauge at surface including N2 purges. Downhole temperature is not measured on injectors

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

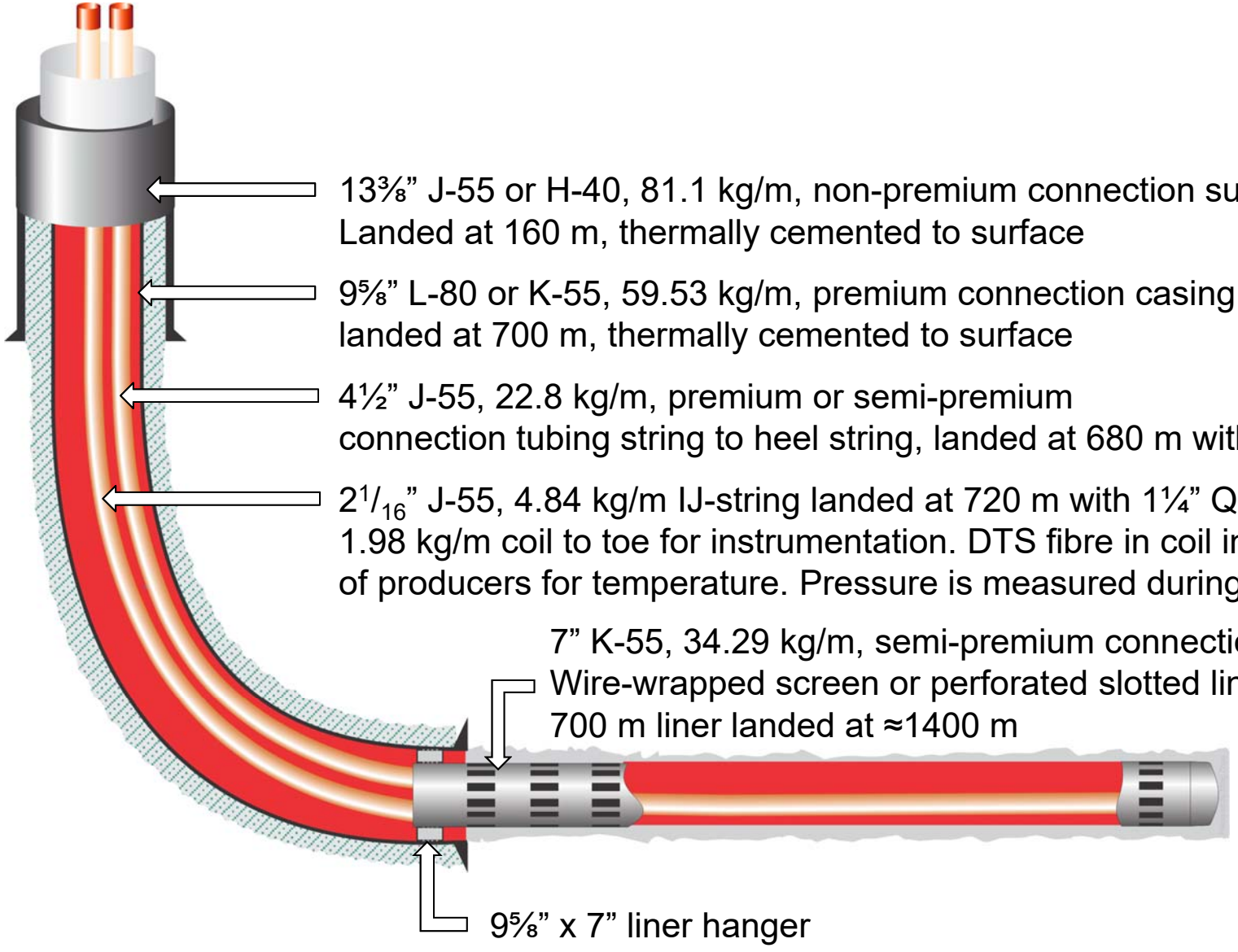
2⅞” J-55, 9.41 kg/m, premium or semi-premium connection tubing string to heel string, landed at 700 m

3½” J-55, 13.69 kg/m premium or semi-premium connection tubing string landed at toe at 1380 m

7” K-55, 34.29 kg/m, semi-premium connection liner. 700 m liner slotted to ≈1400 m

9⅝” x 7” liner hanger

Typical Phase 1 Producer Completion – PCP



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

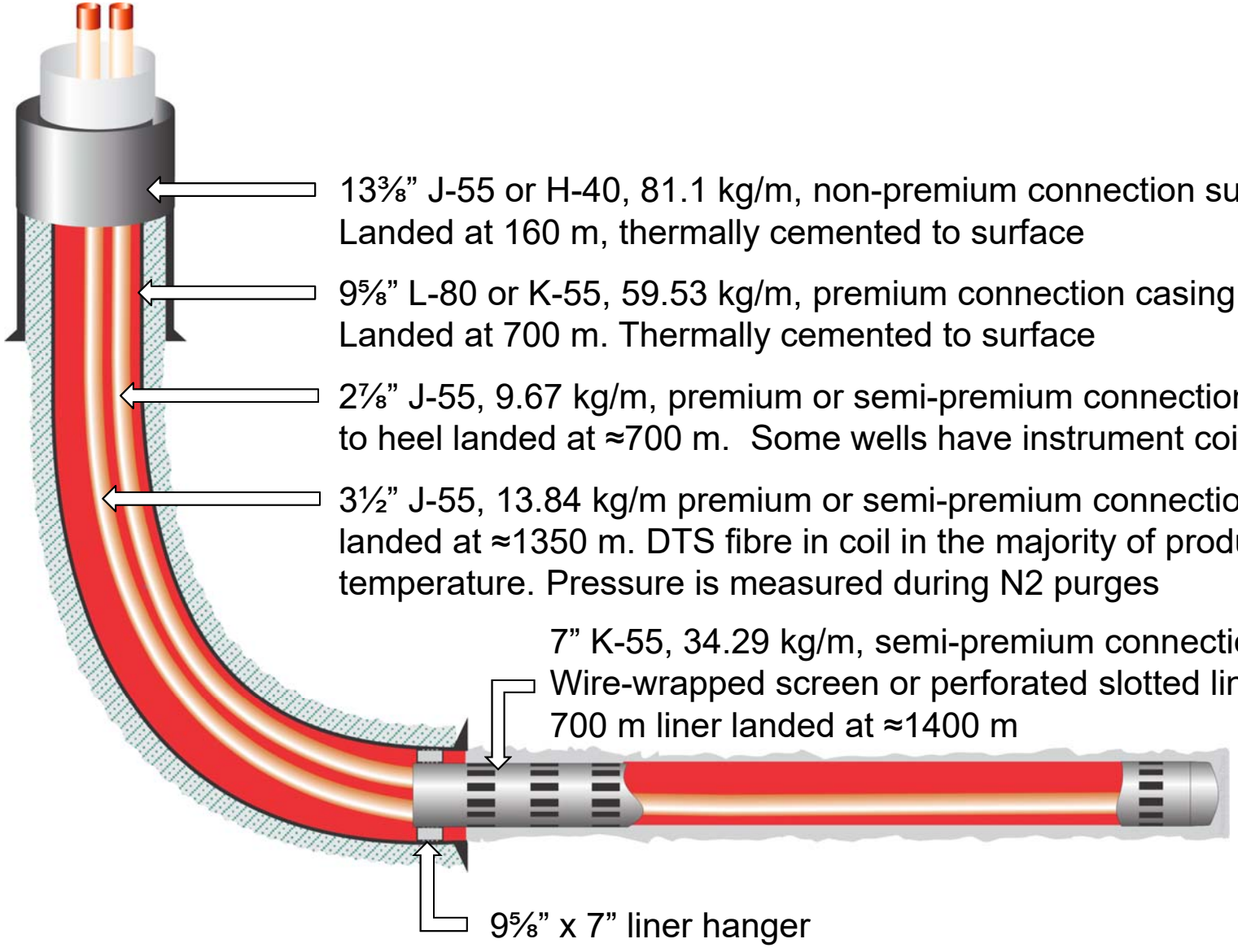
4½” J-55, 22.8 kg/m, premium or semi-premium connection tubing string to heel string, landed at 680 m with PCP

$2^{1}/_{16}$” J-55, 4.84 kg/m IJ-string landed at 720 m with 1¼” QT-70, 1.98 kg/m coil to toe for instrumentation. 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 – 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

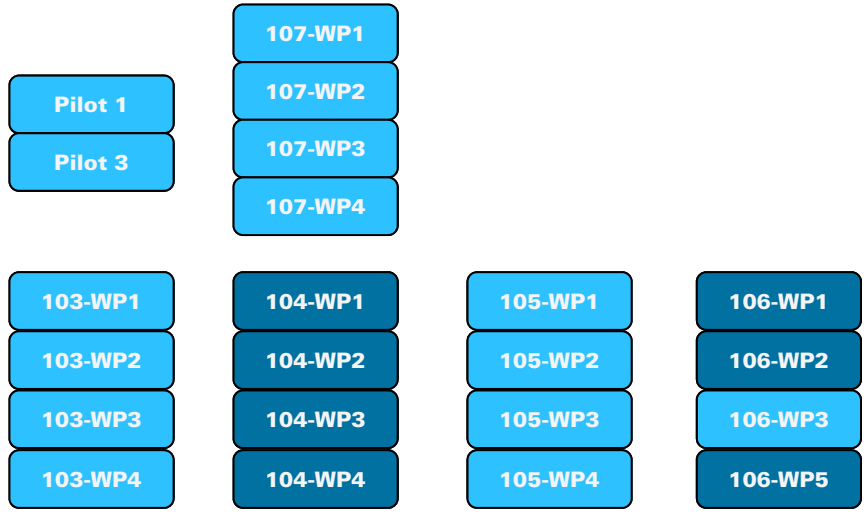
3½” J-55, 13.84 kg/m premium or semi-premium connection tubing string landed at ≈1350 m. DTS fibre in coil in the majority of producers for temperature. Pressure is measured during N2 purges

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

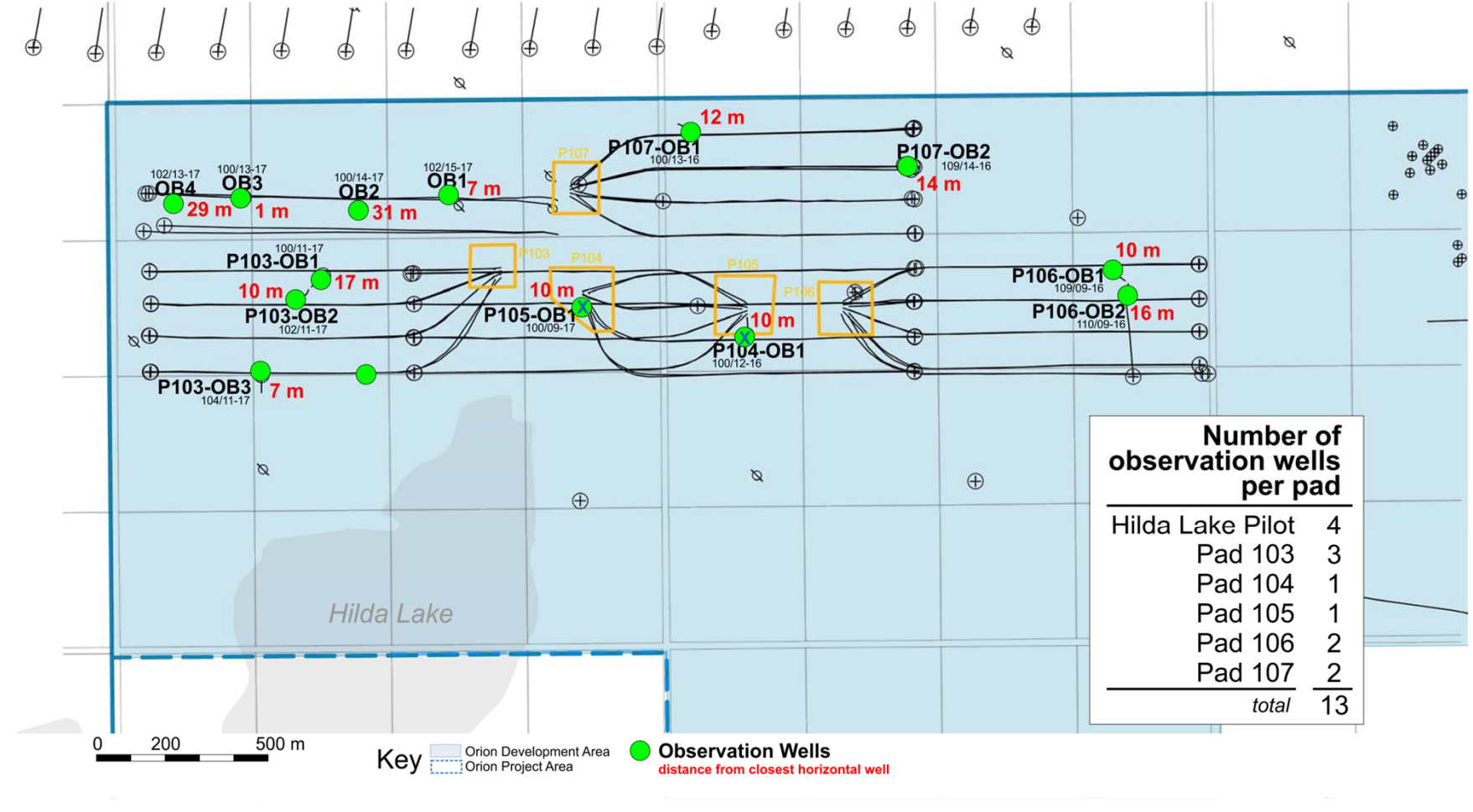
Artificial Lift – Orion Wells

PCP SAGD	15 Wells
Natural Lift SAGD	7 Wells



Criteria	All Metal PCP
Operating Temperature Range	350 °C
Rate	100 -370 m3/d 100 -350 RPM

Orion Observation Wells Location Map



Orion Observation Wells Status

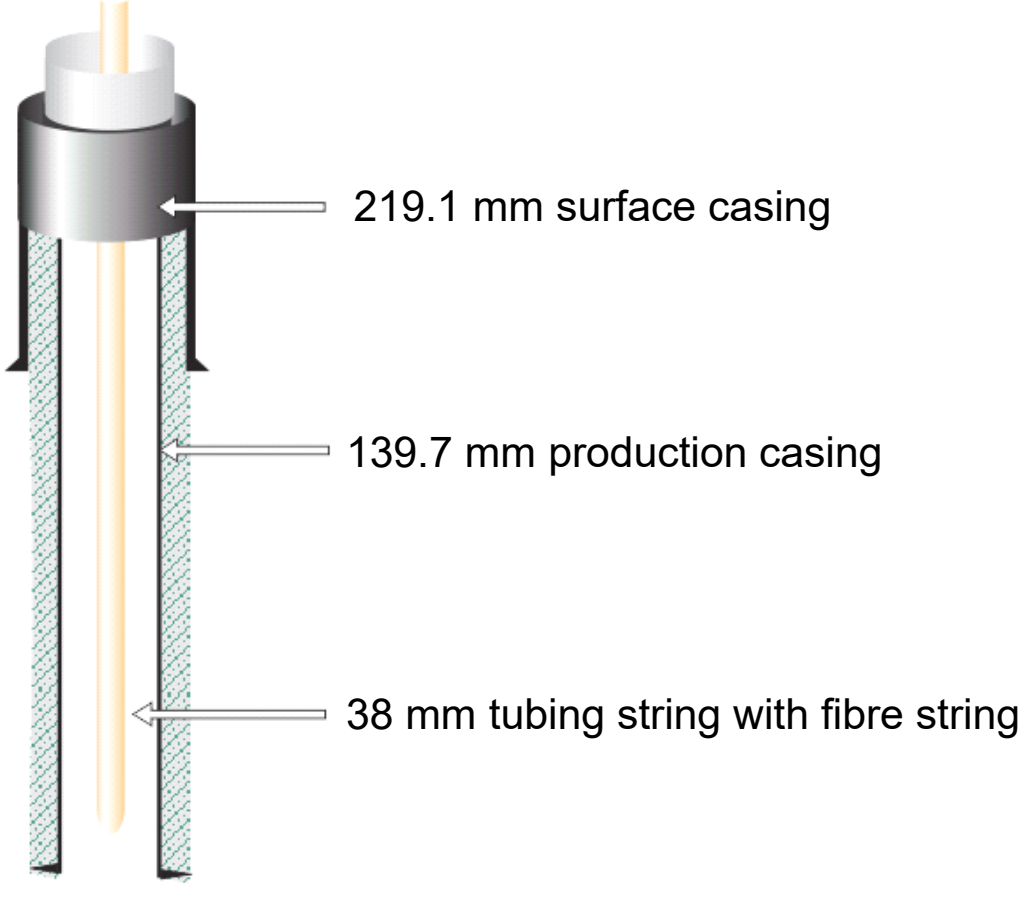
- The DTS unit failed on December 26, 2015 and came back online on November 22, 2016
- Thus no temperature data collected between January 2016 to November 2016
- Some of the wells were temperature logged in April and May 2016
- Two wells were abandoned in 2017 due to casing integrity issues

Well	Temperature Monitoring	Temperature Logged	Data Quality	Abandoned
Hilda OB1	✓	✓	-	-
Hilda OB2	✓	✓	Poor	-
Hilda OB3	✓	-	-	-
Hilda OB4	✓	-	-	-
103 OB1	-	-	-	-
103 OB2	✓	-	Poor	-
103 OB3	✓	-	-	-
104 OB1	-	✓	-	✓
105 OB1	-	-	-	✓
106 OB1	✓	-	-	-
106 OB2	-	✓	Poor	-
107 OB1	✓	-	-	-
107 OB2	✓	✓	Poor	-

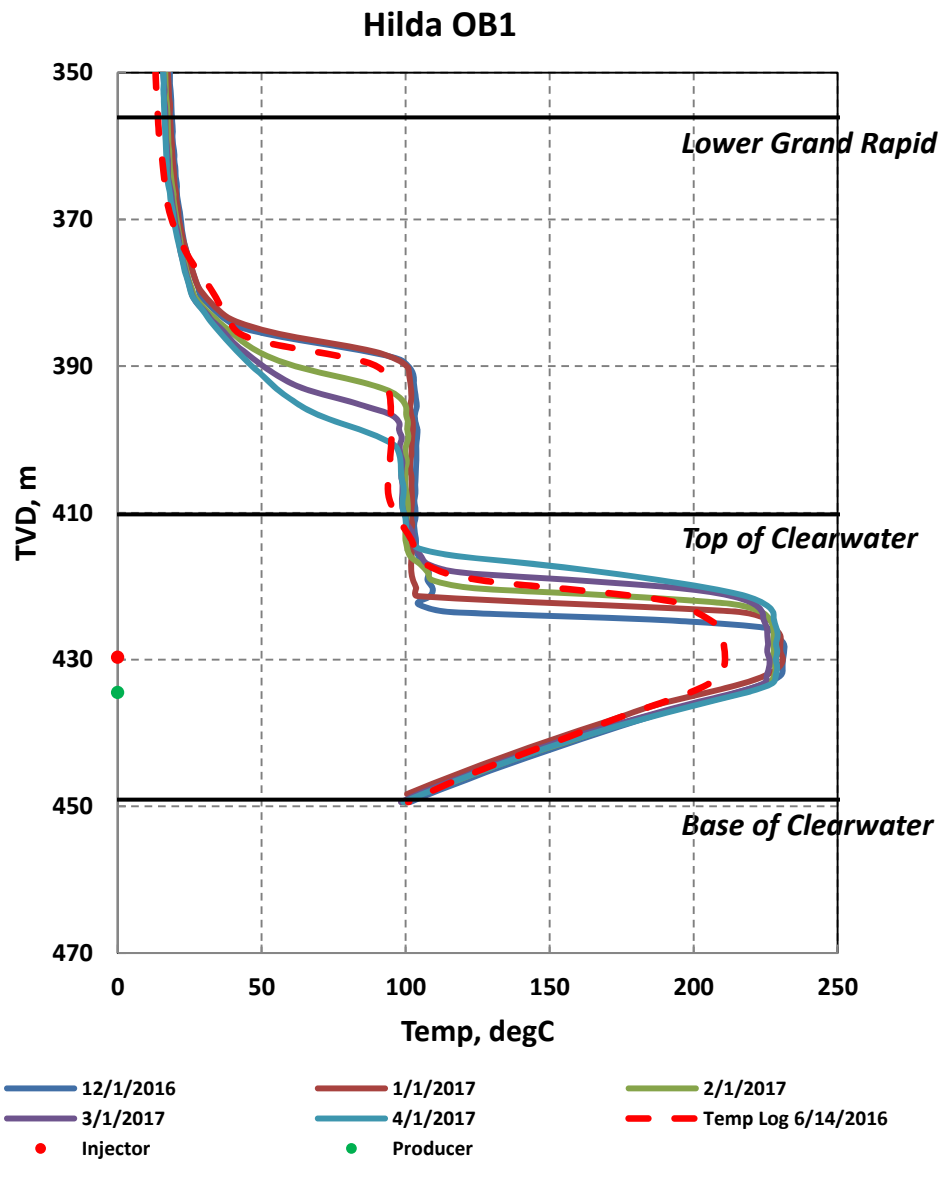
Orion Observation Wells Remediation Plan

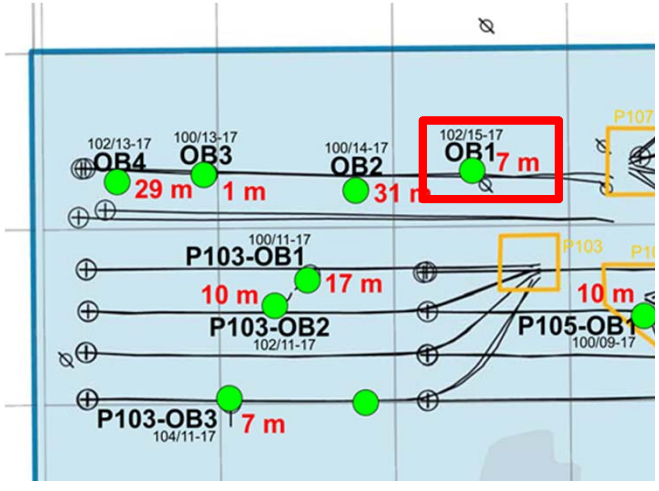
- Temperature profile of below wells indicates wet condition downhole
  - Hilda OB2
  - 103 OB2
  - 106 OB2
  - 107 OB2
- Well plan is in place to pressure test and assess these wells
- Planning to re-install fiber in 103 OB1 and 106 OB2

Hilda Lake Pilot Observation Wells



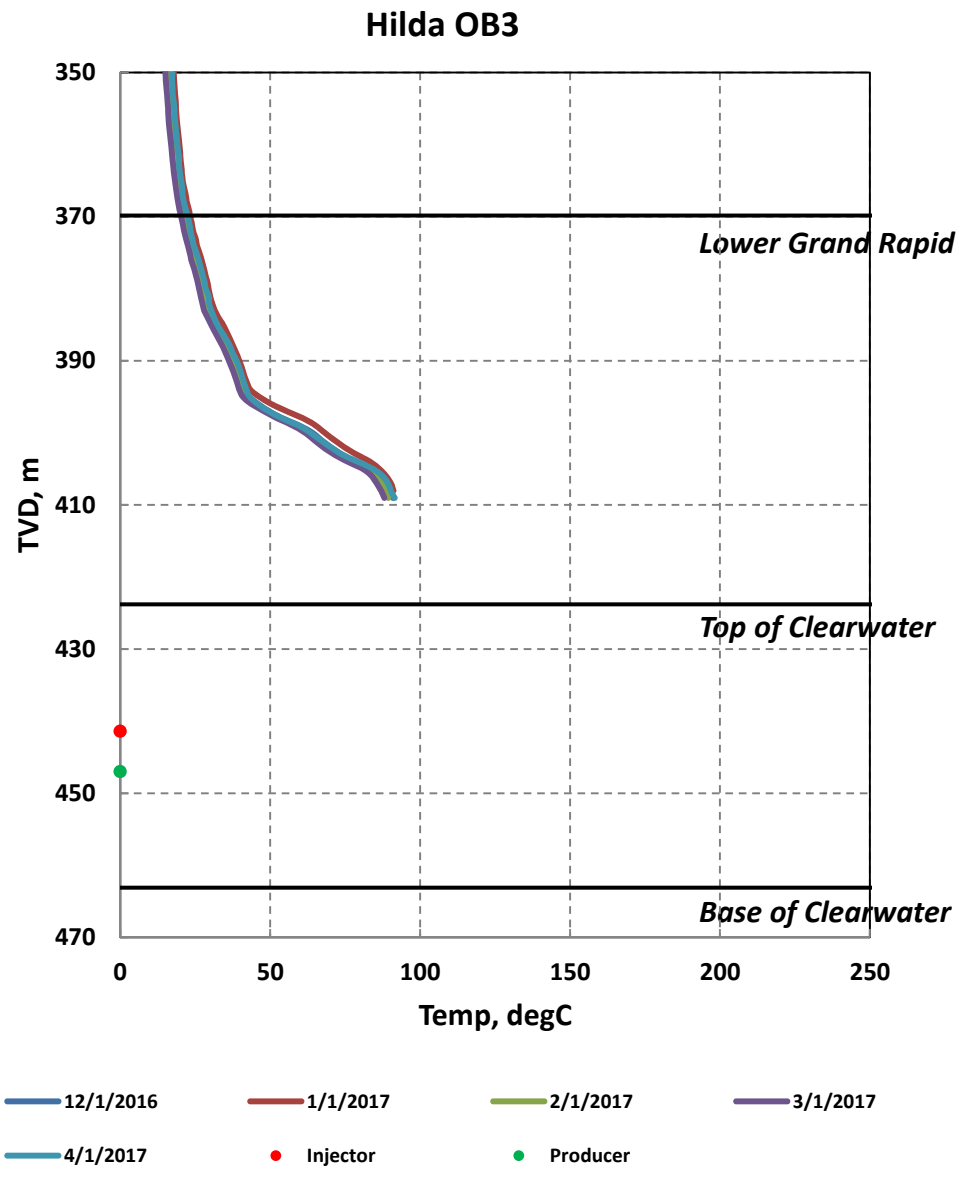
Hilda OB1

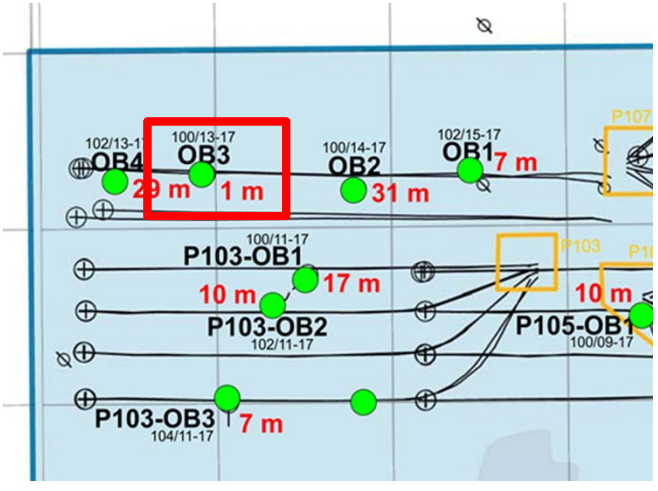




- June 2/3, 2016: Radial cement bond log and casing pressure test showed good result
- June 5 temperature logged with well blown dry
- Flat temperature profile of ~100 deg C observed above the Clearwater formation
- The height of this effect has reduced since early 2017
- Will keep temperature monitoring above top of Clearwater

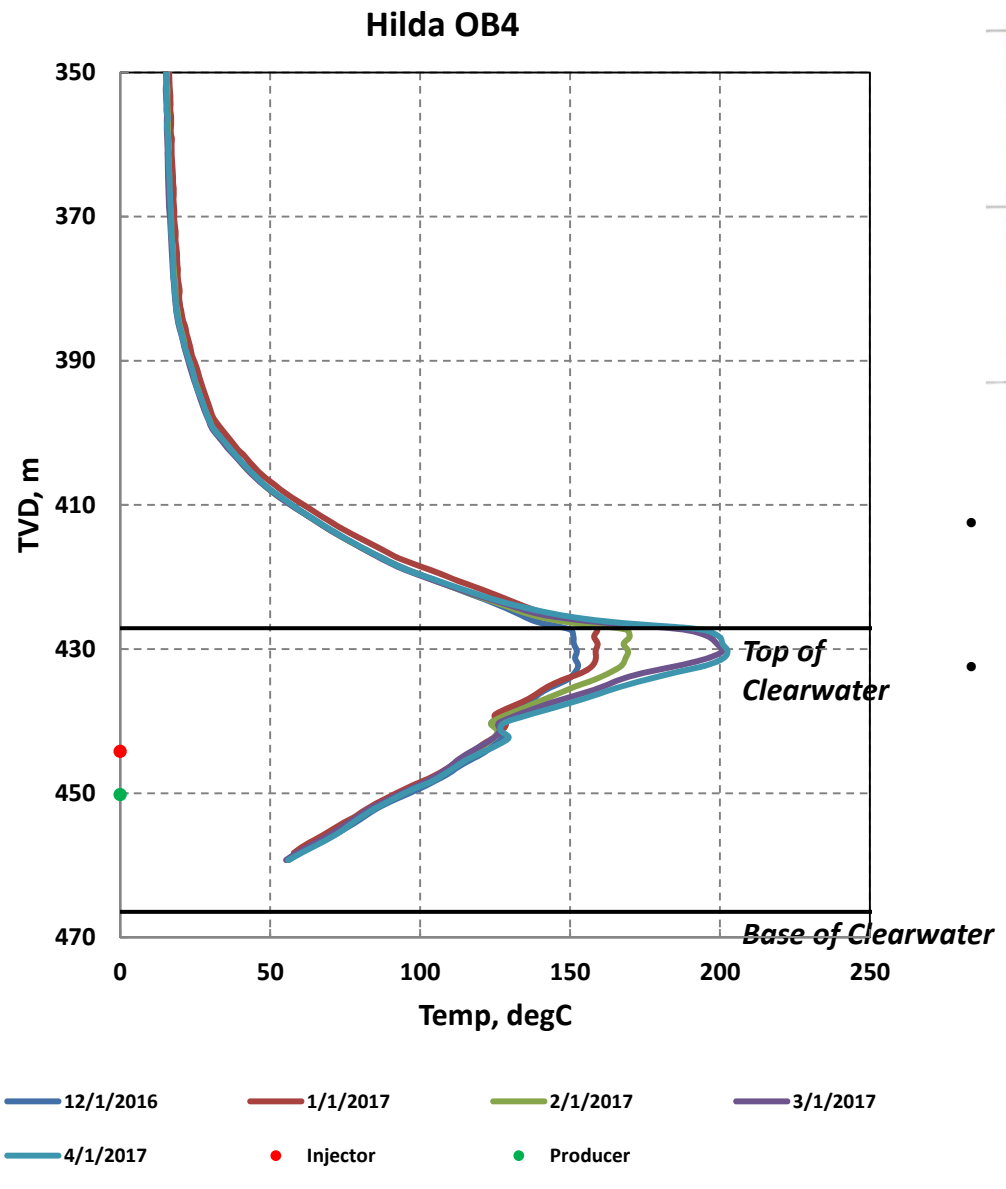
Hilda OB3

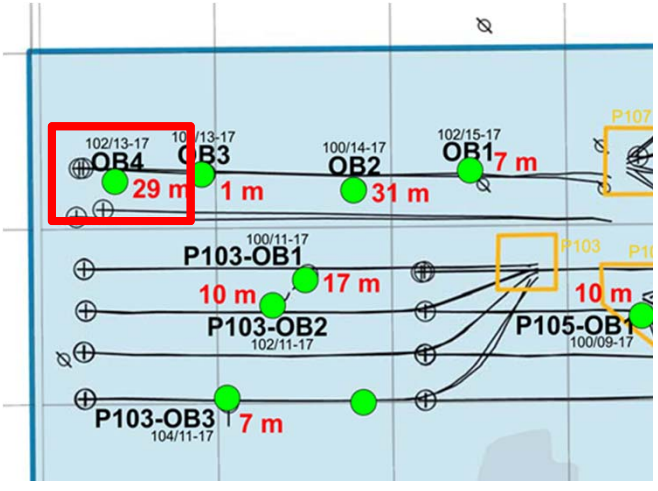




- Temperature measurement above top of Clearwater showing conduction heating profile

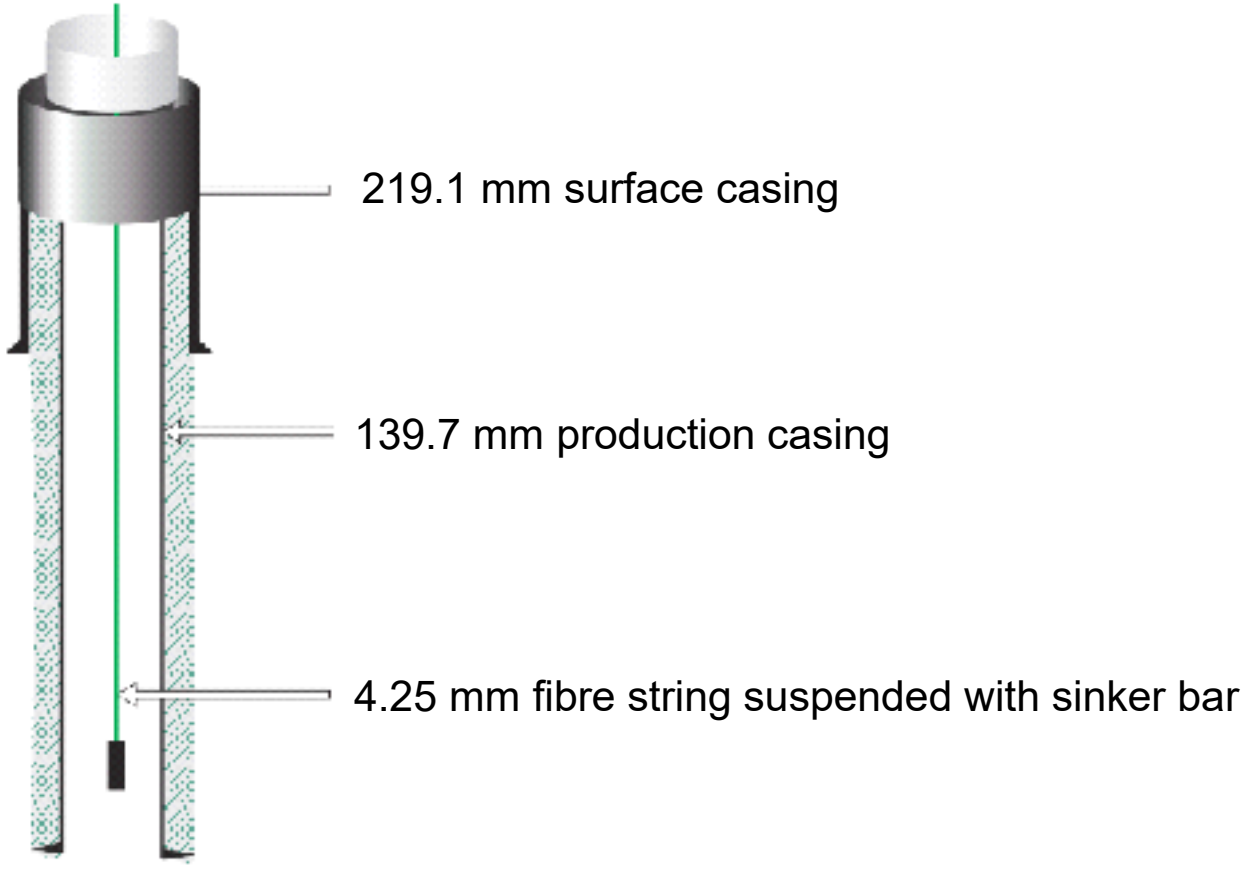
Hilda OB4



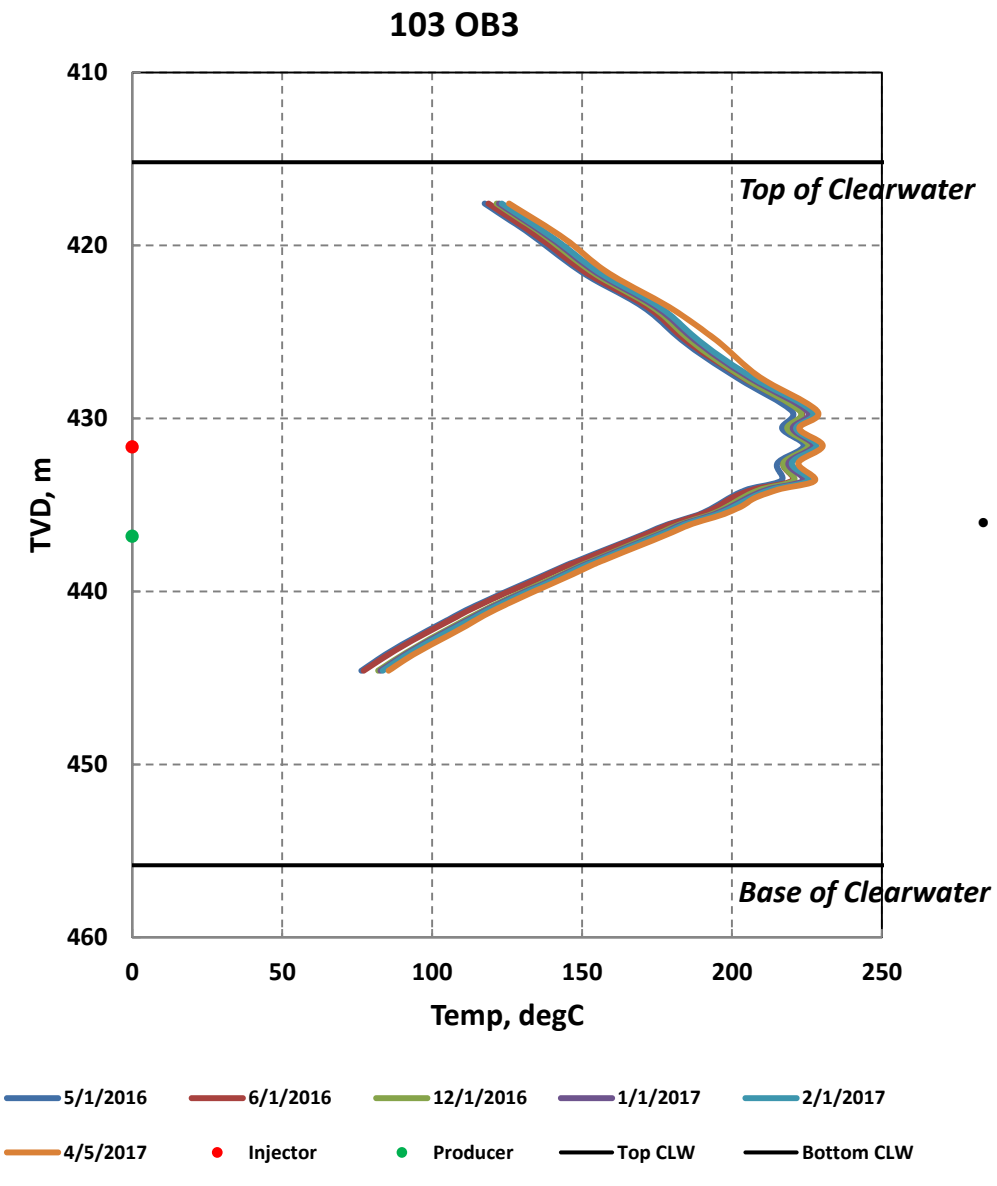


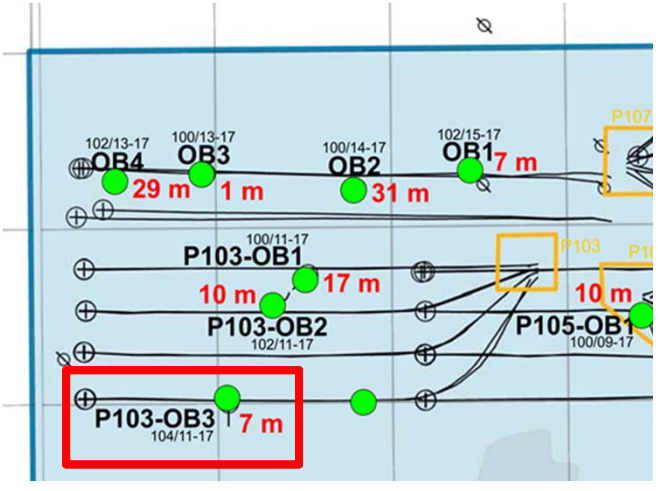
- Dec 2016 temperature measurement of ~150°C near top of Clearwater
- Steam chamber growth has reached the top of Clearwater

Typical Phase 1 Observation Well



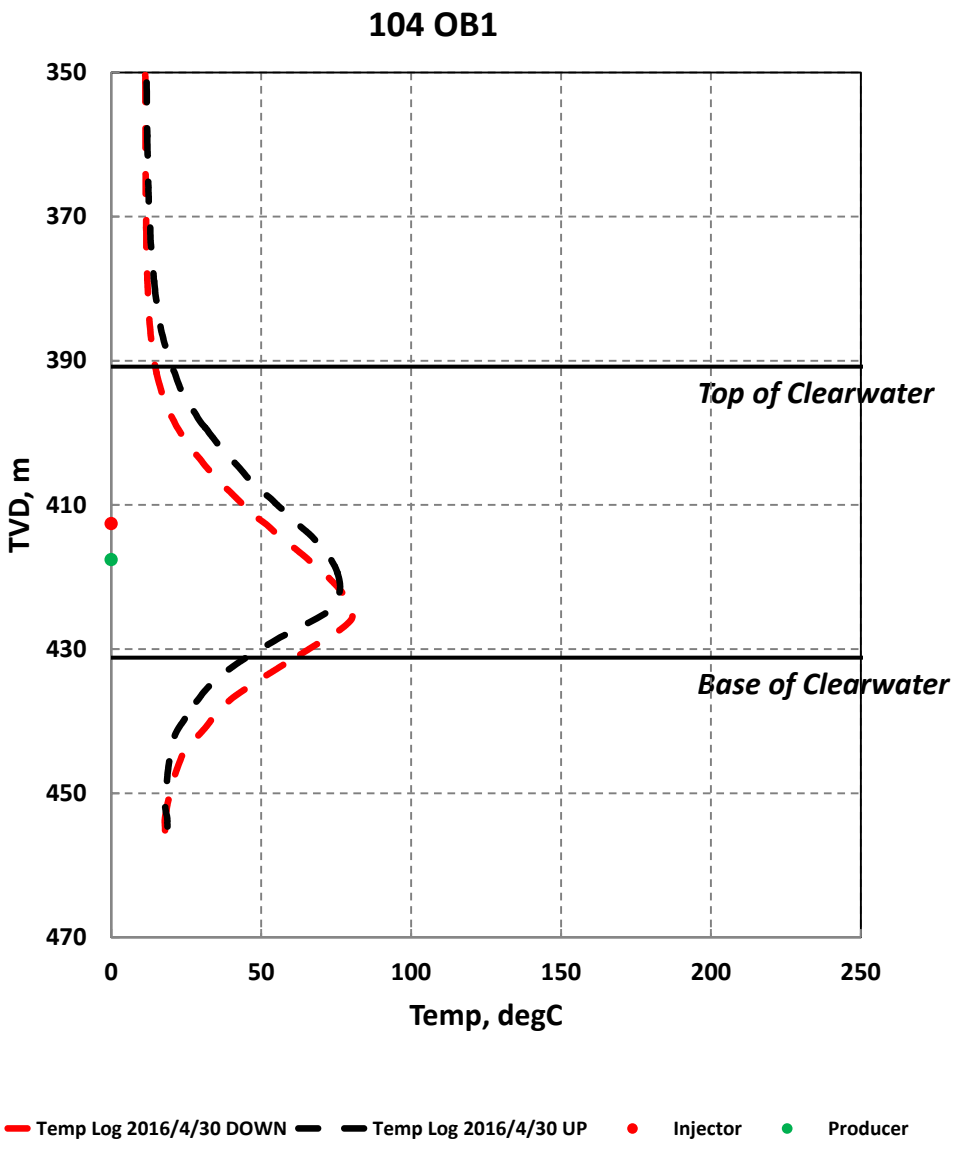
103 OB3

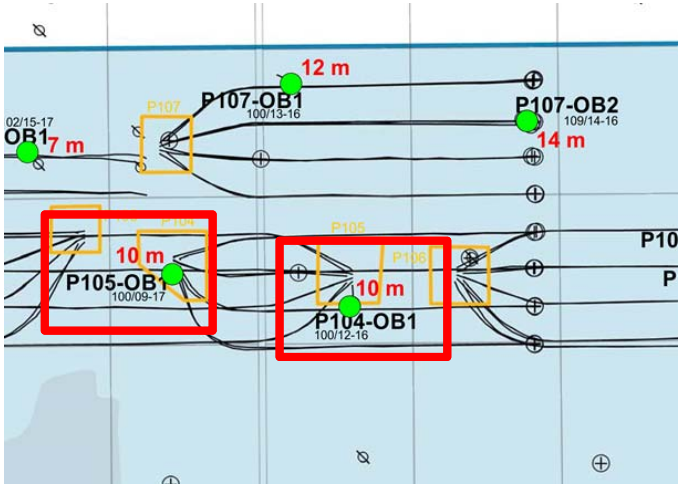




- Good steam chamber development at the mid section of 103 WP4 area

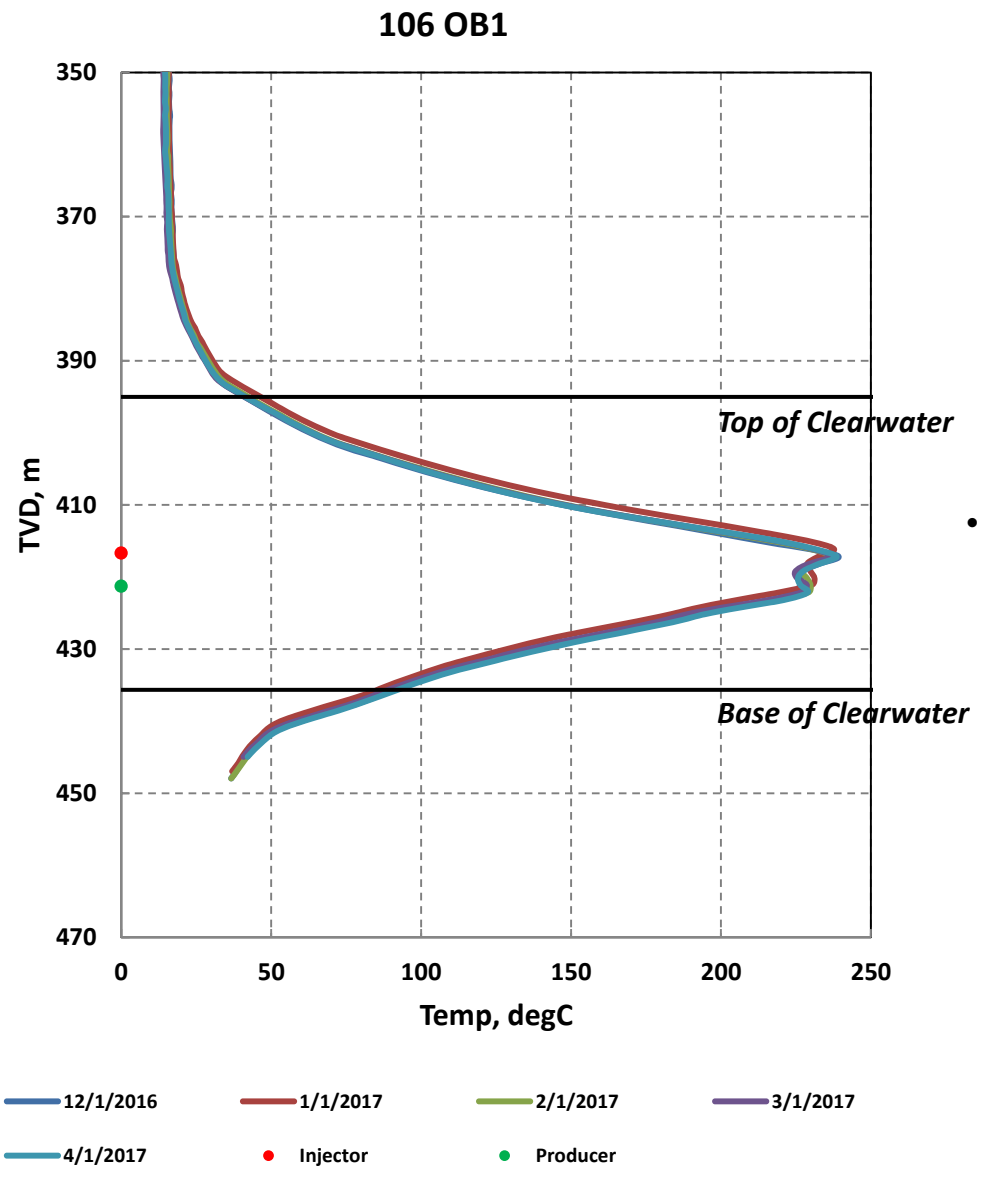
104 and 105 OB1

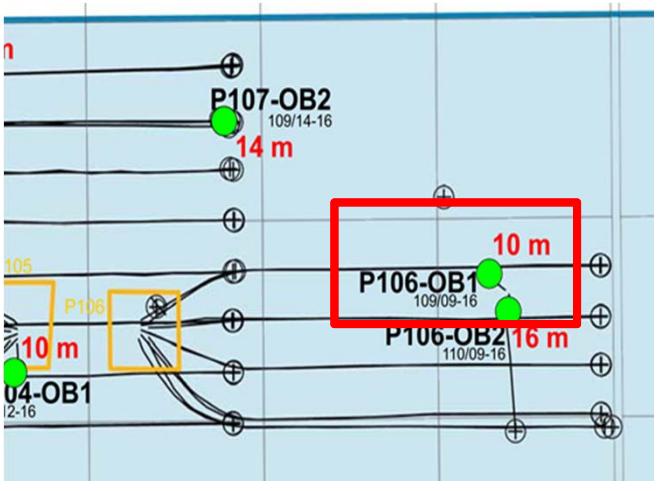




- Due to integrity issues both observation wells were abandoned Feb 26, 2017

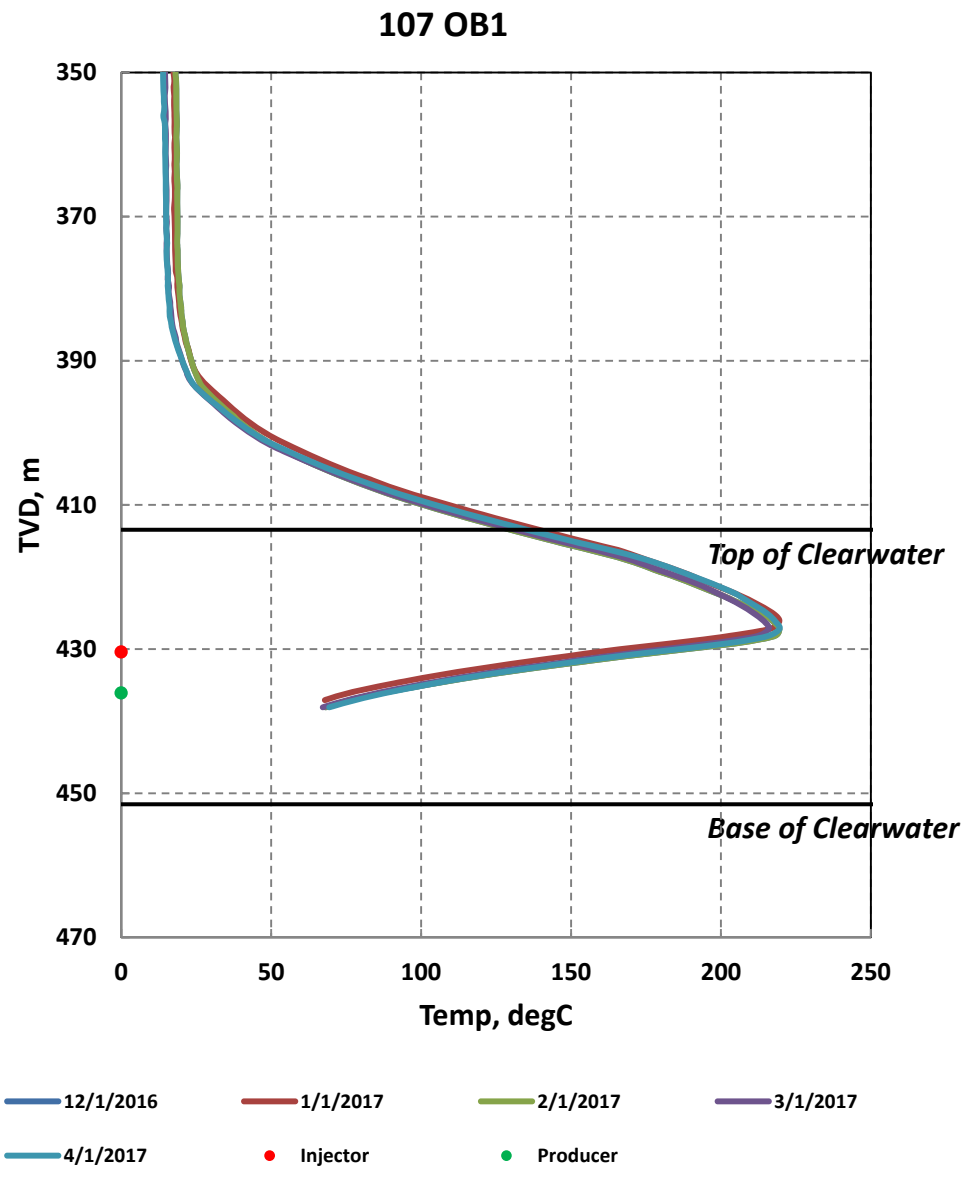
106 OB1

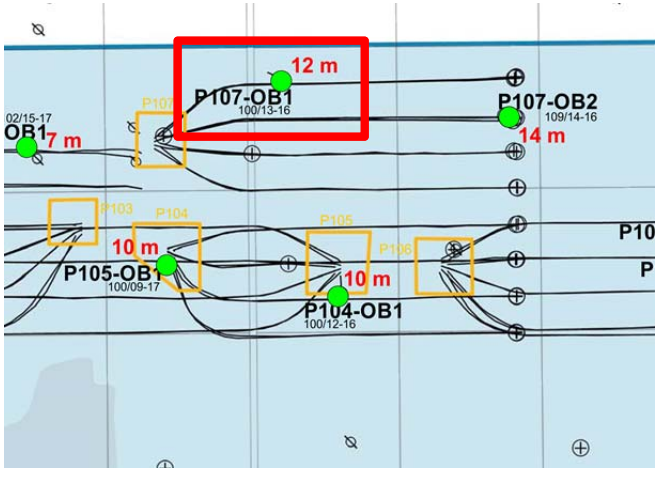




- Good chamber development near the toe of 106 WP1 area

107 OB1





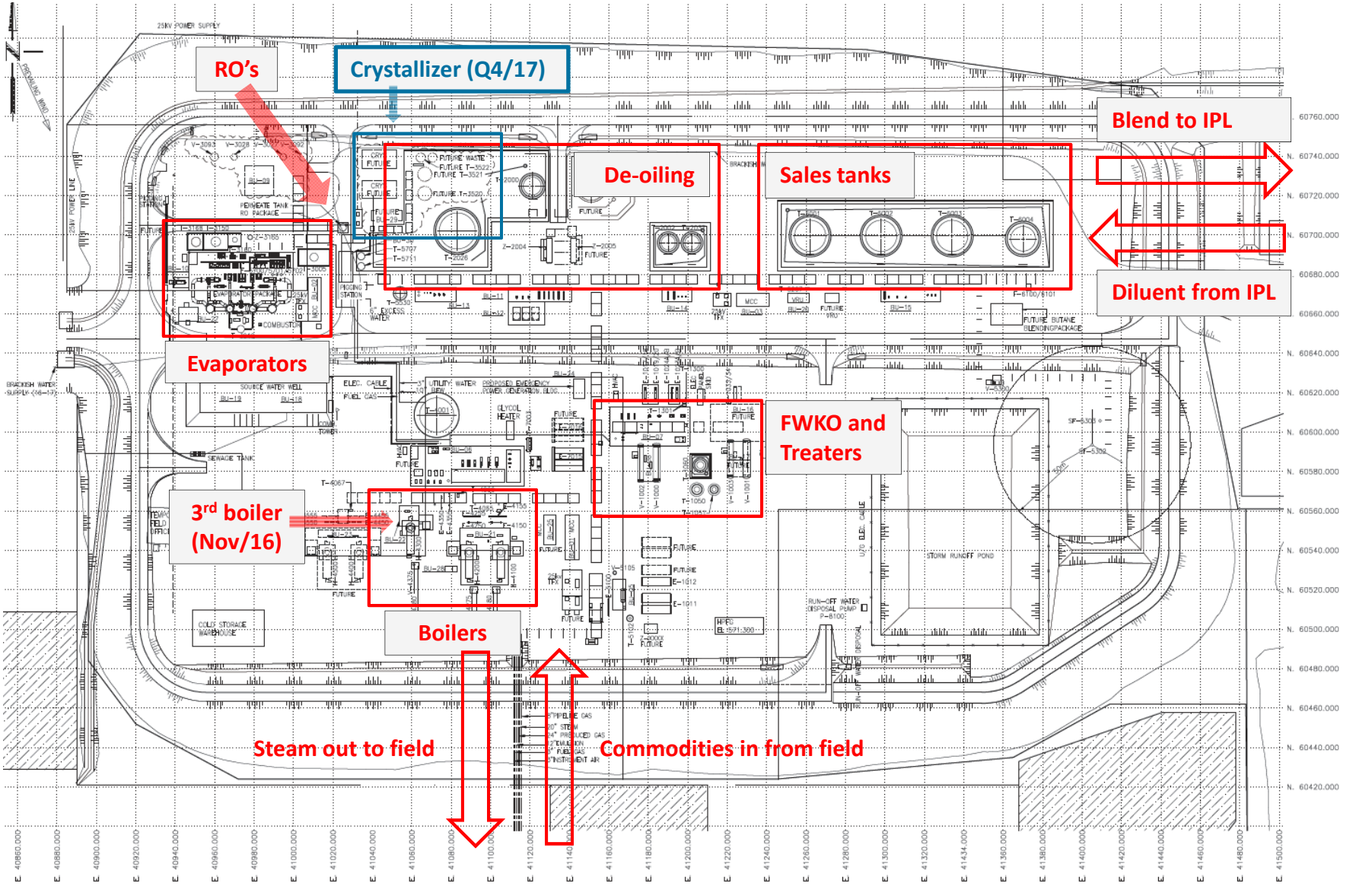
- Good chamber development at the heel of 107 WP1 area

Surface Operations

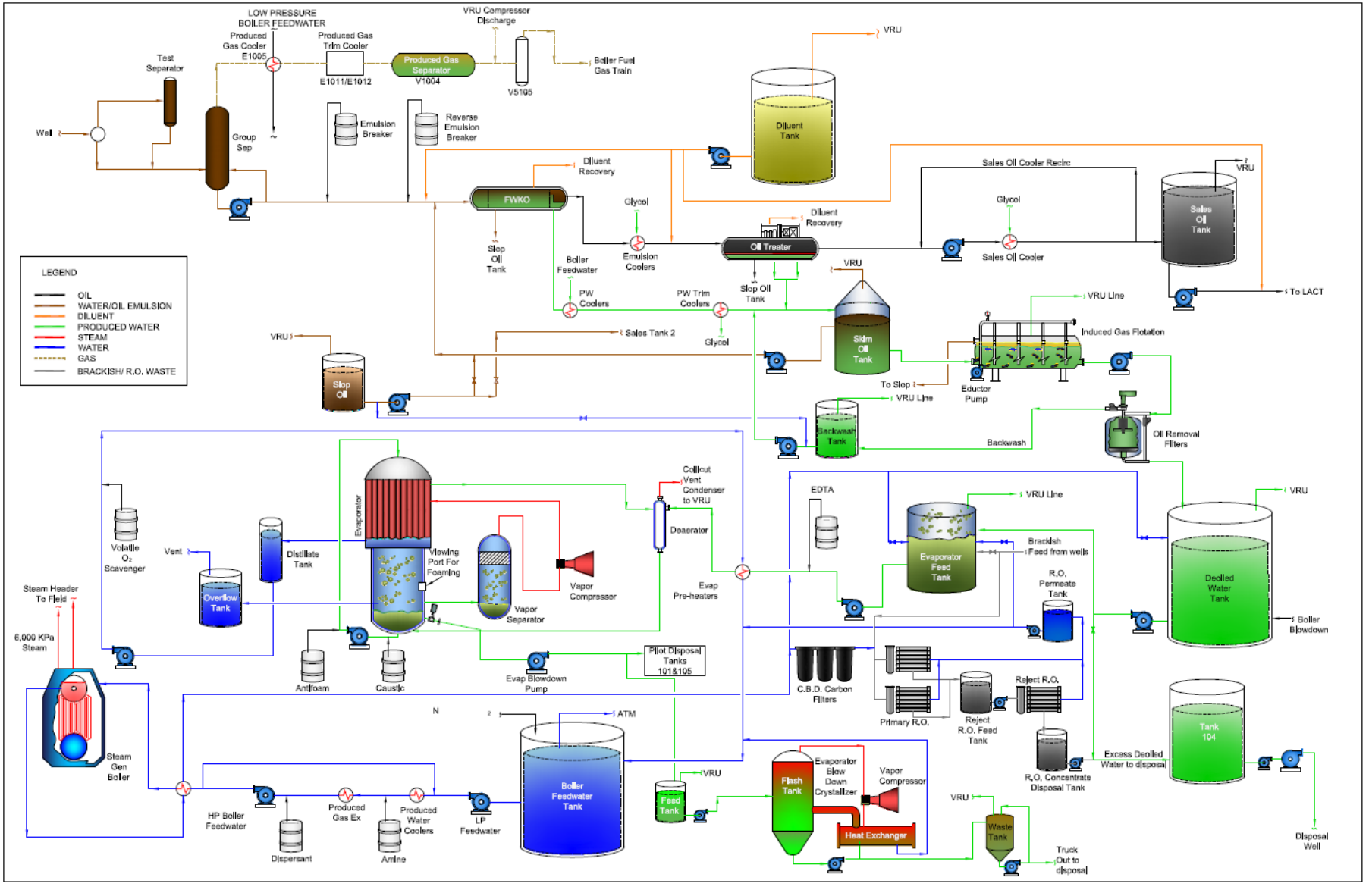
Plant & Facilities Summary

- Boiler reliability and steam generation capacity:
  - Maintained consistent boiler reliability (minimal downtime)
  - Installed a third boiler (commissioned in mid-November), increasing the plant's total steam generation capacity to approximately 7,500 m^3/d (steam output currently limited by (boiler feed quality) water availability)
- Water treatment and delivery:
  - Two Reverse Osmosis (RO) units were installed to:
    - Maximize brackish water supply (improving D81 limits)
    - Minimize evaporator fouling by removing brackish water from evaporator feed stream
  - Installed an additional brackish water pipeline (16-17) to increase RO brackish water supply
  - Installed drain line from Evaporator 1 to vapour separator to address brine carryover issue
  - VRU passivation chemical program executed to minimize corrosion issues

Orion Central Processing Facility – Plot Plan



Orion Water Usage and Treatment



Orion Central Processing Facilities (CPF)

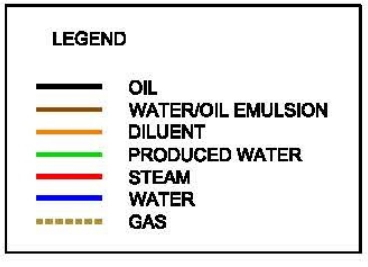
General process description:

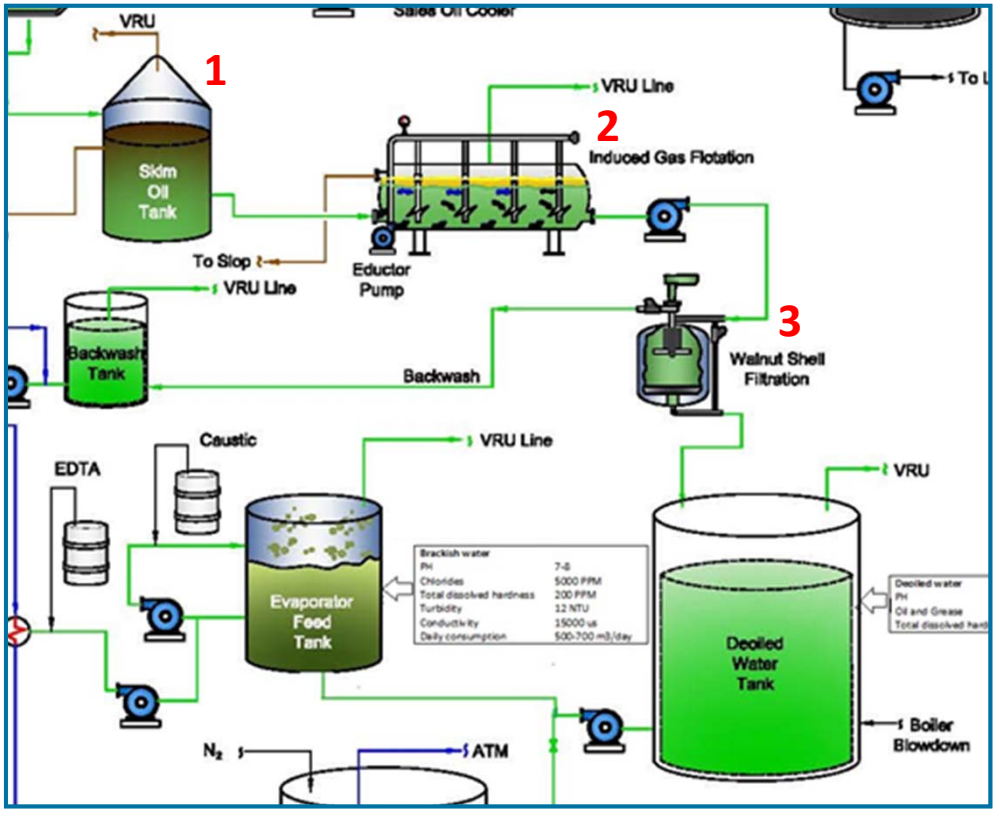
- Three conventional drum boilers are used to generate steam, which is sent via steam pipelines to the field for injection into the reservoir (third boiler was commissioned in mid-November 2016)
- Emulsion returns to the CPF by pipeline, produced gas is separated at the well pad and separately piped 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 in excess of 90% of the produced water (2016 produced water recycle ratio averaged 92%)
- 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 2016, 69% 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 trucked offsite to an AER approved waste disposal facility (Tervita Lindbergh)
- Total disposal was 17% under directive 81 limits in 2016

De-oiling Facilities

Produced water from the production treating train is de-oiled using:

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





Water Treatment

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)

Orion evaporators

Steam Generation

Description

Conventional drum boilers (third boiler commissioned mid-November 2016) 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

2016 Focus

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

Both were achieved:

1. Minimal downtime in 2016 – the boilers were able to consistently generate steam averaging 4,795 m^3/d
2. The third boiler was commissioned on time and on budget

3rd boiler addition

Orion's 3 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
- 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

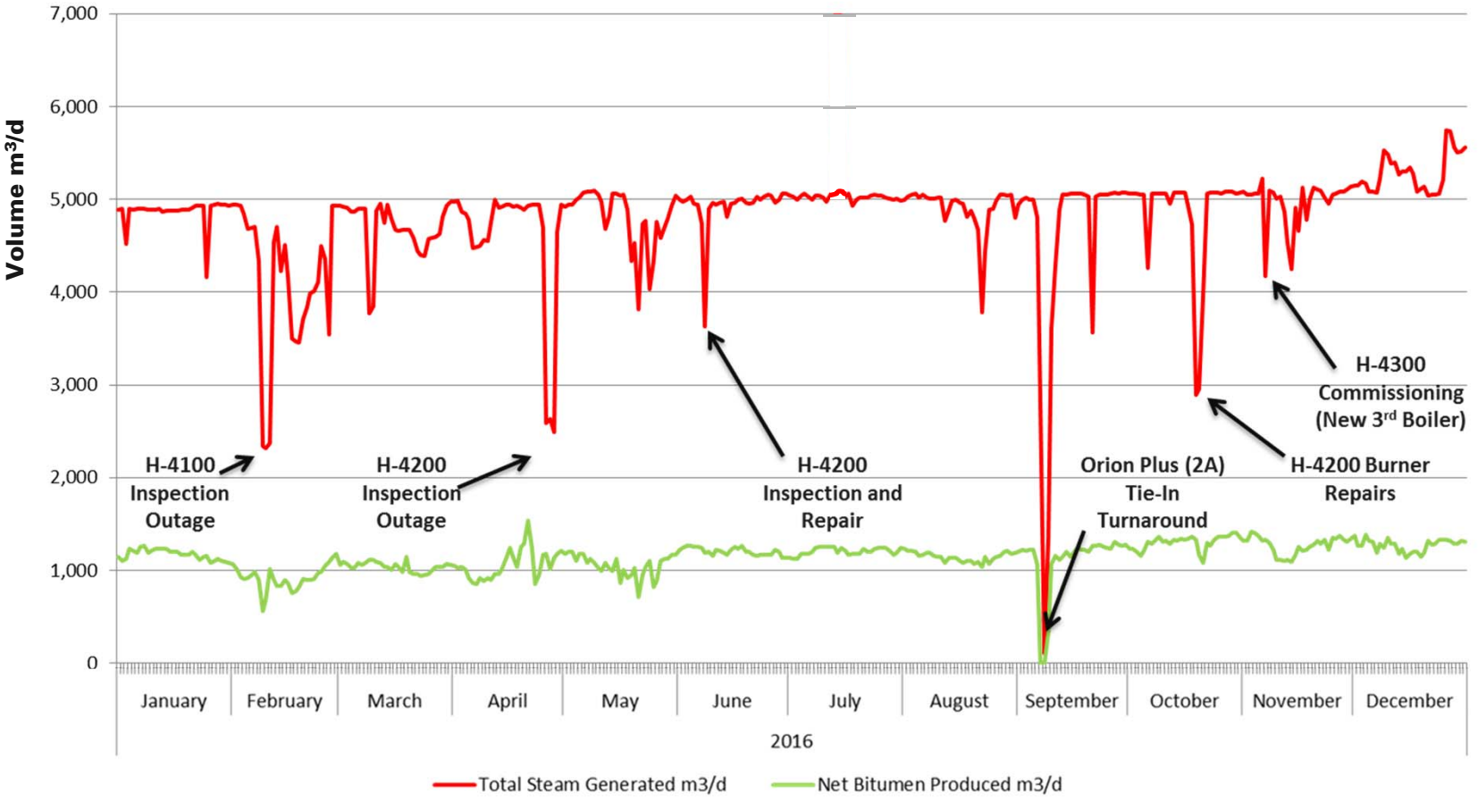
2016 operational issues: sulphur blockage due to O_2 ingress

- The VRU sulphur precipitate was removed through chemical treatment

Orion Well Pad Facilities

- The facility has 5 well pads (in addition to the Hilda Lake Pilot) with a total of 22 SAGD well pairs
- Typical well pad configuration is 4 SAGD well pairs, which consists of 4 injector and 4 producer wells

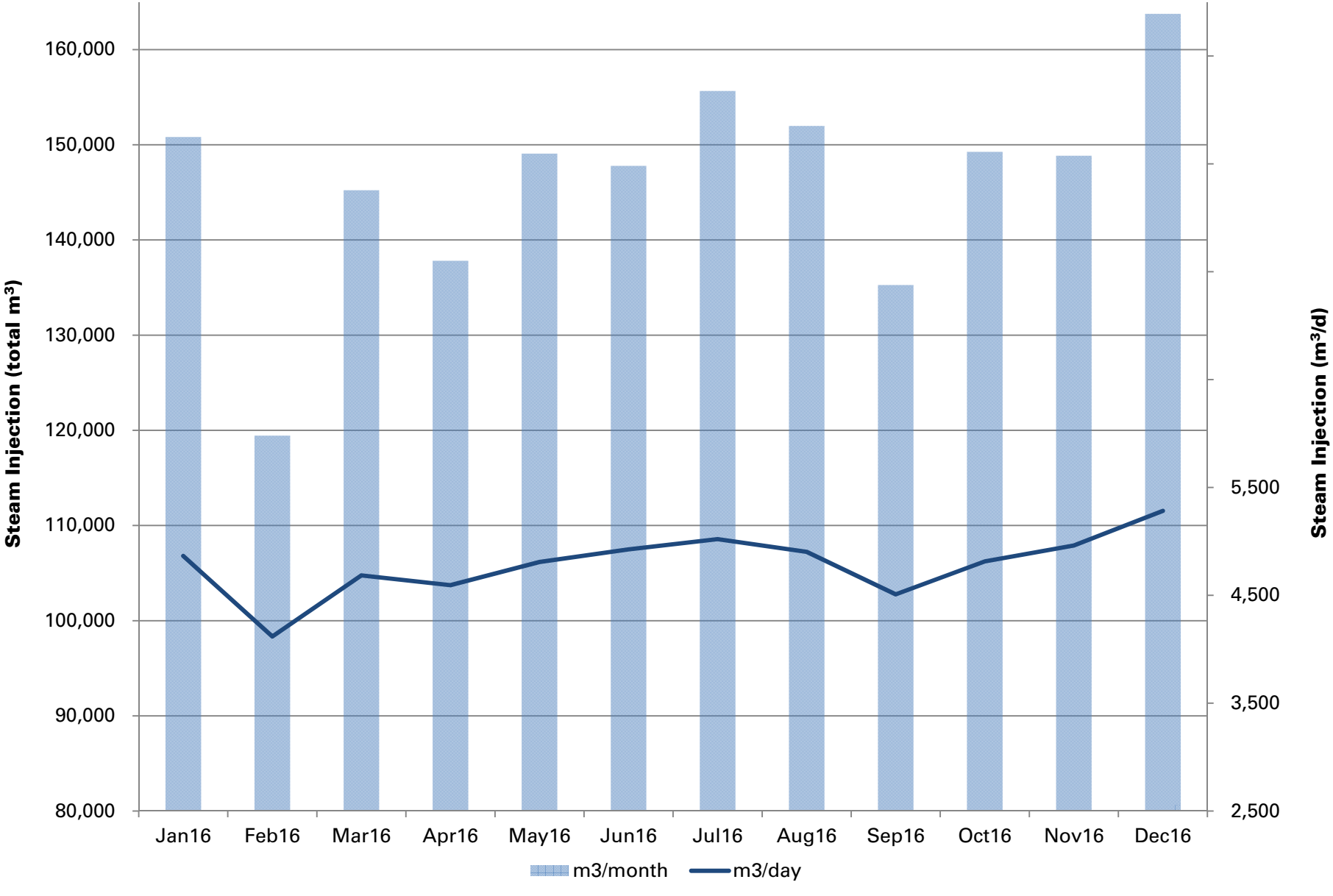
Plant Reliability – 98.3%



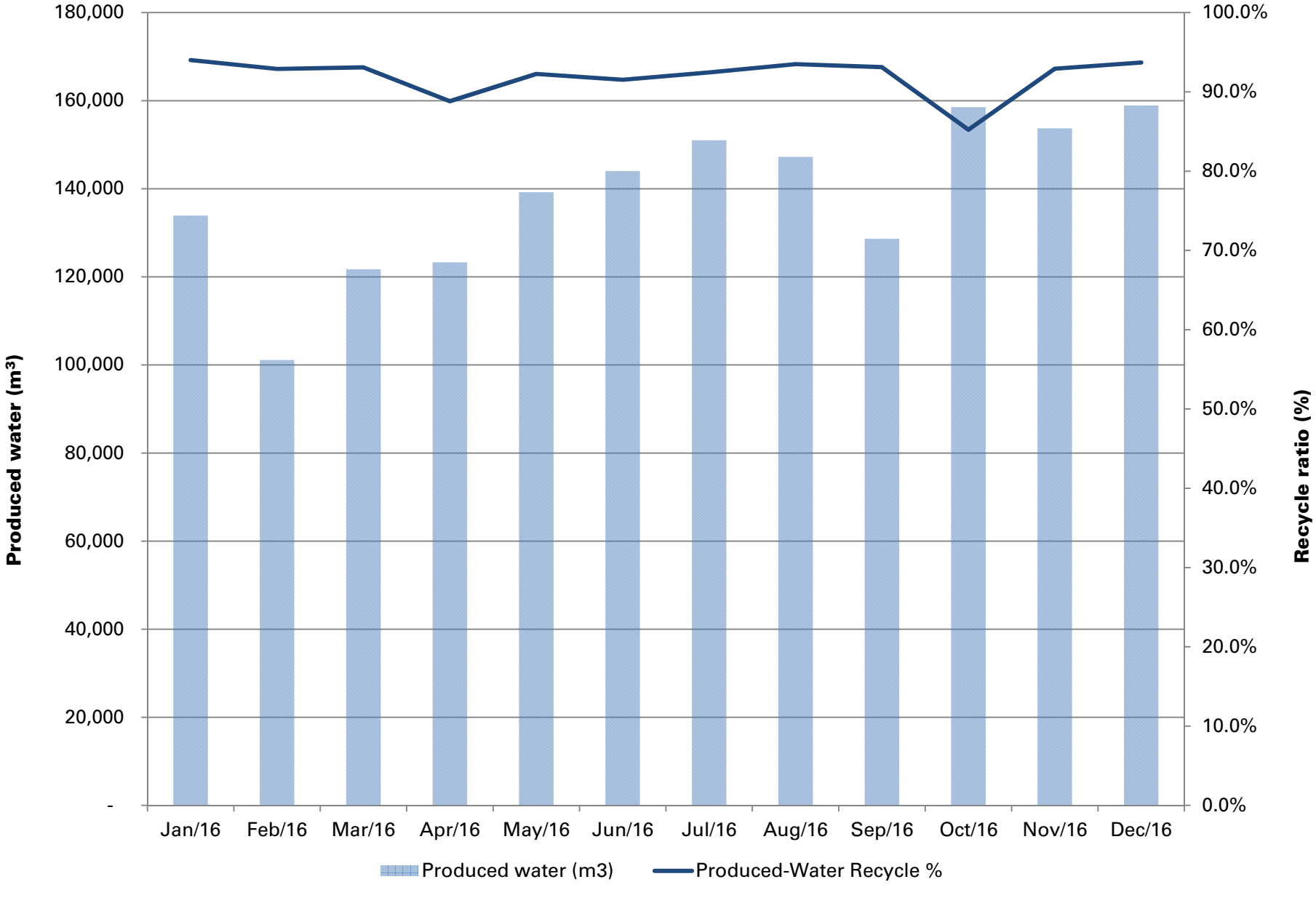
Downtime breakdown:

- Boiler inspection outage – 0.82%
- Boiler repairs – 0.39%
- Orion Plus (2A) tie-in T/A – 0.32%
- Plant upsets and power outages – 0.18%

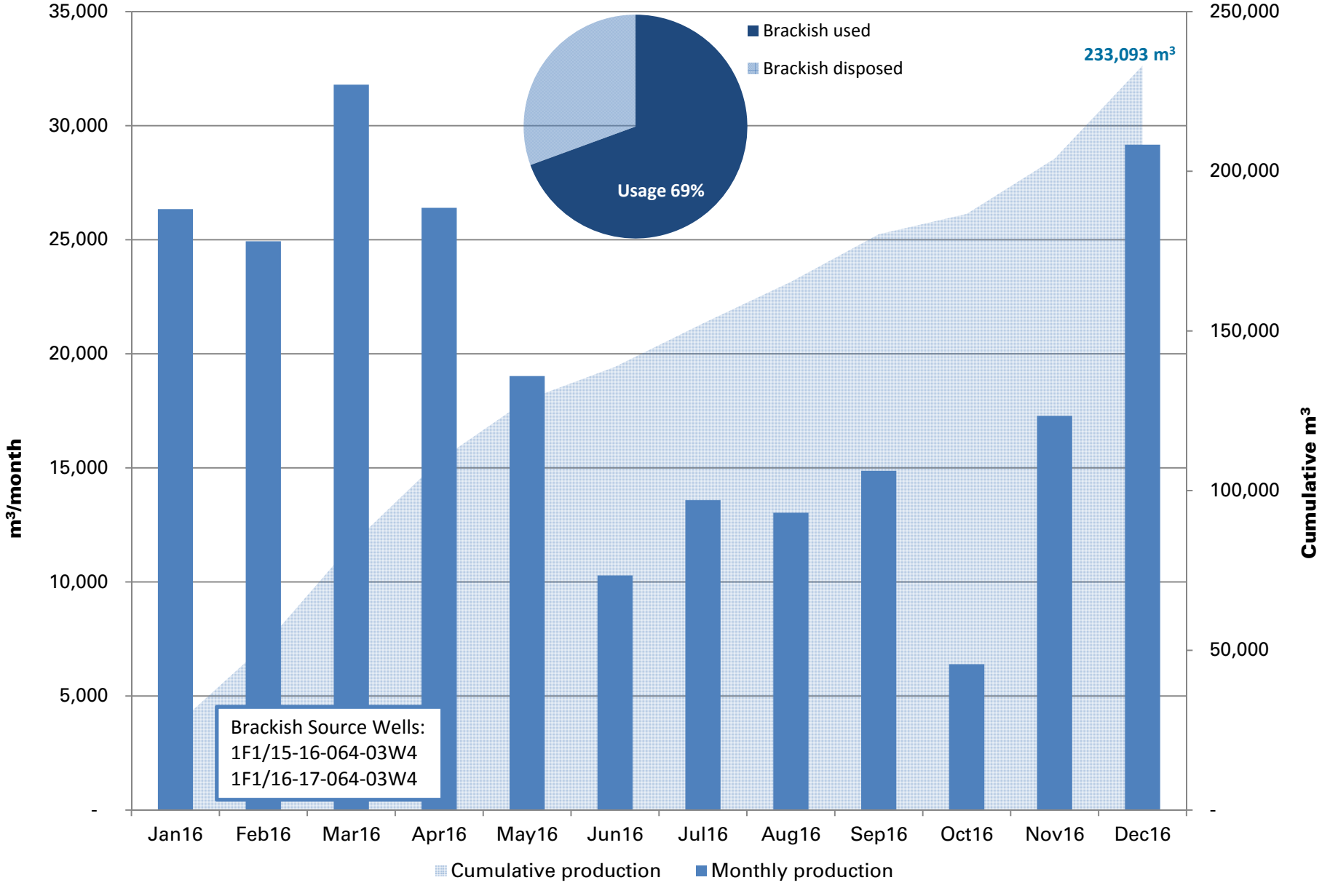
Monthly steam production – 2016 (averaged 4,795 m^3/d)



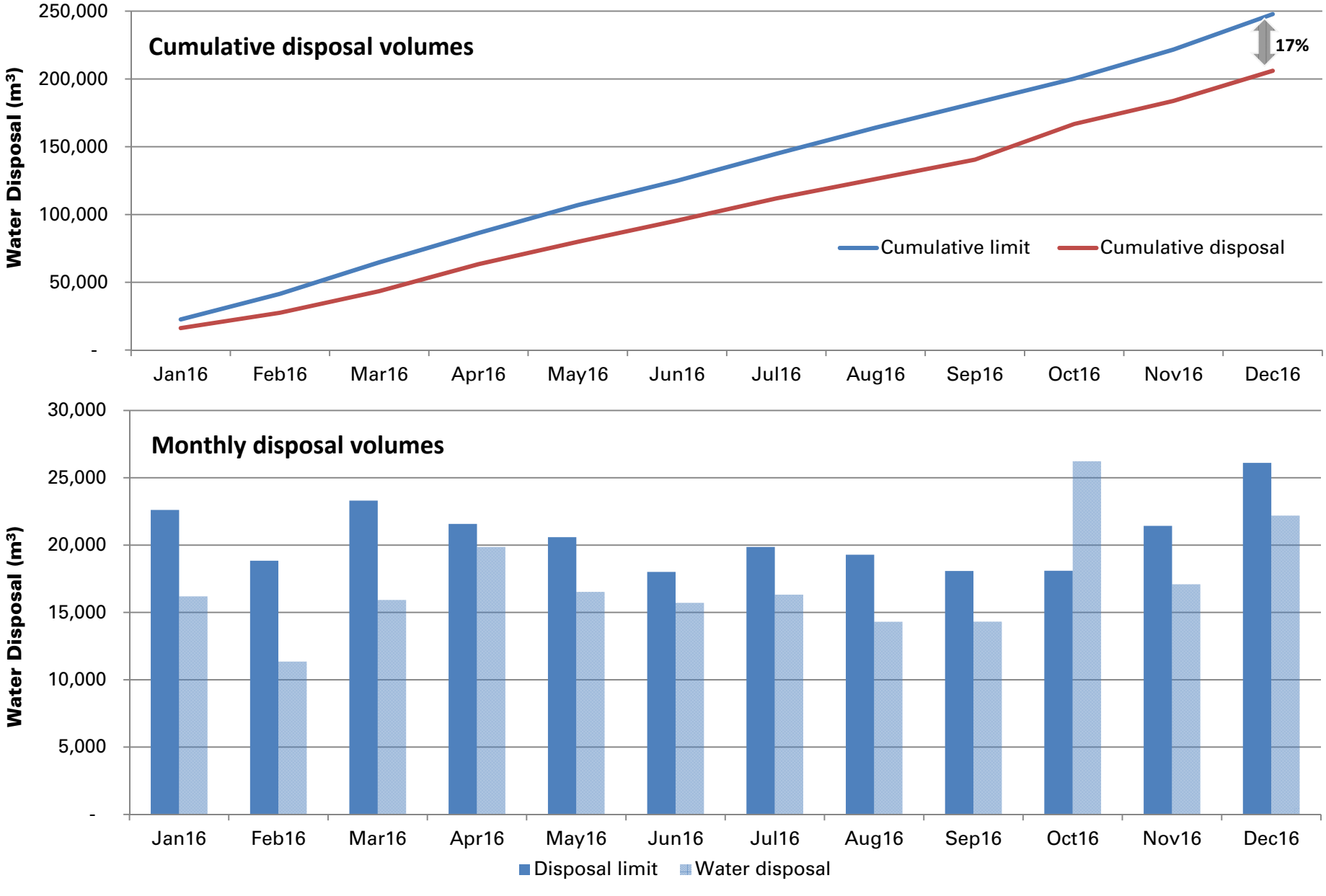
Produced water – 2016 (average recycle ratio 92%)



Brackish water usage – 2016 (total production 233,093 m³)



Water disposal vs. limits – 2016 (17% under limit)

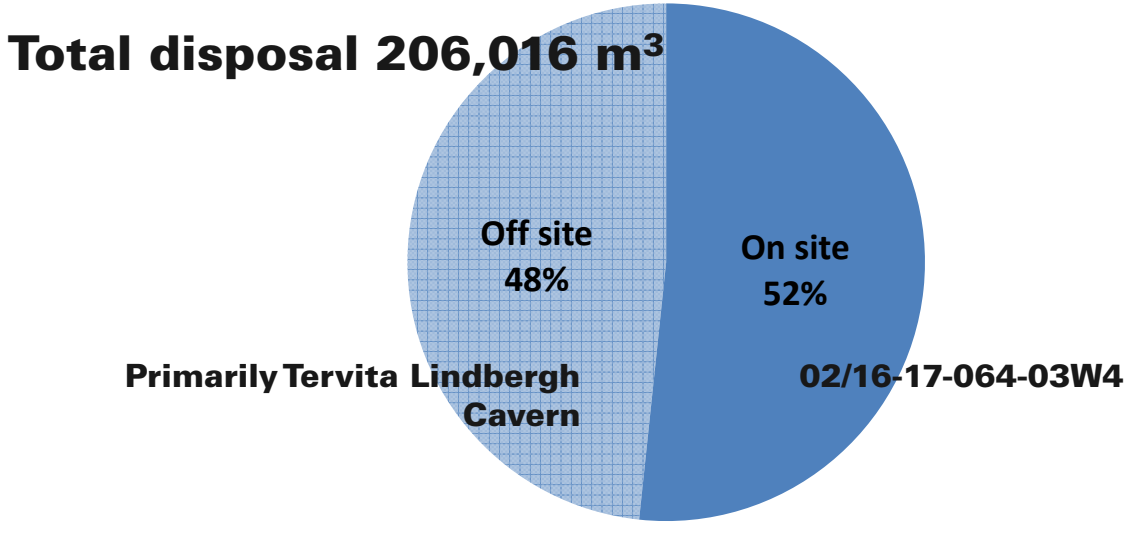


On site water disposal – 2016 (106,443 m^3 total)

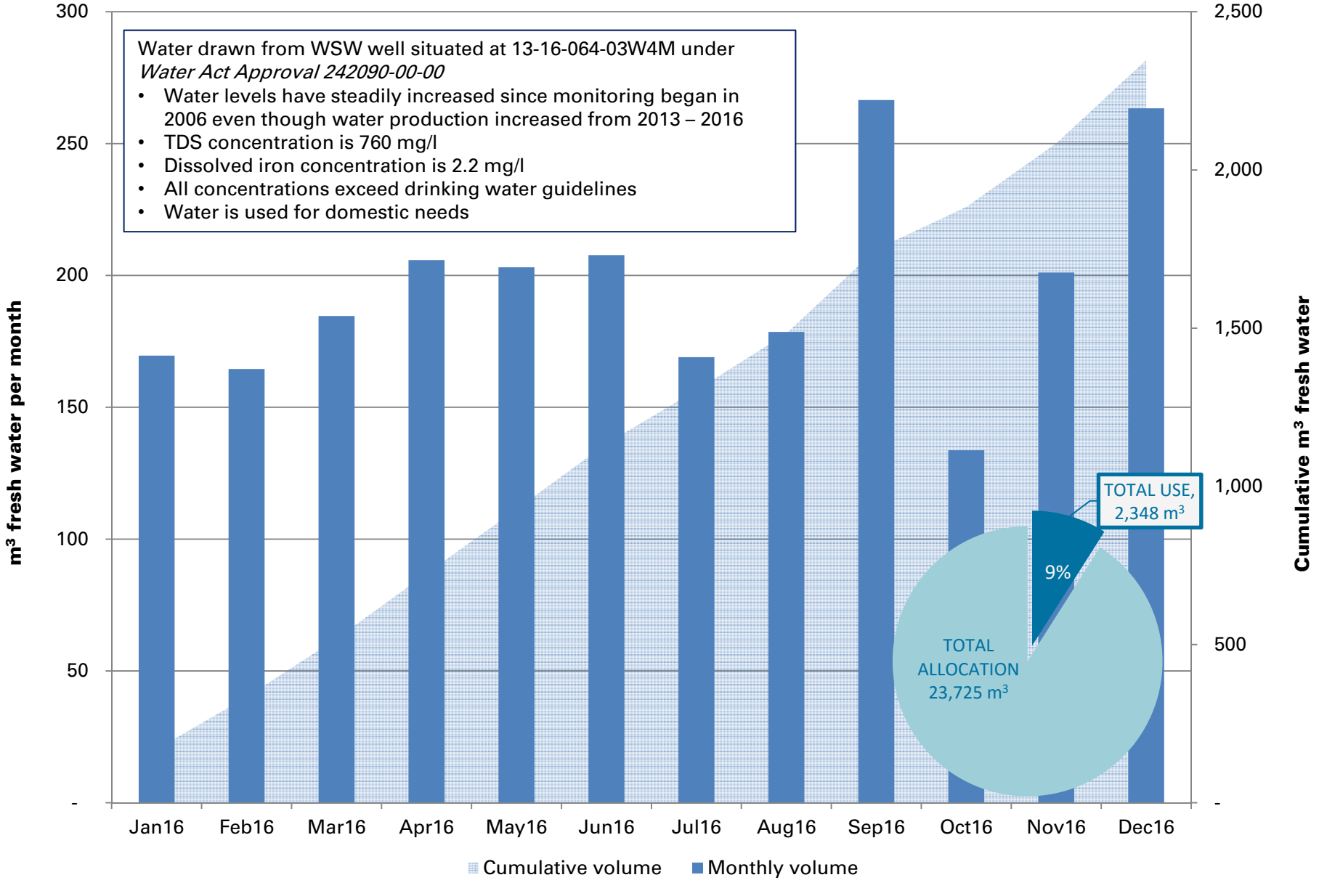
- License permits produced water and recovered steam condensate to be disposed into the Granite Wash formation. Disposal Approval #8175

- Granite Wash water disposal well – 02/16-17-064-03W4M (Well License #192346)
  - Normal Operating Pressure Range: 11100 - 12500 KPa
  - Protected by a high pressure shutdown limit of 12600 KPa
  - Normal Disposal Temperature Range: 60 - 80 deg C

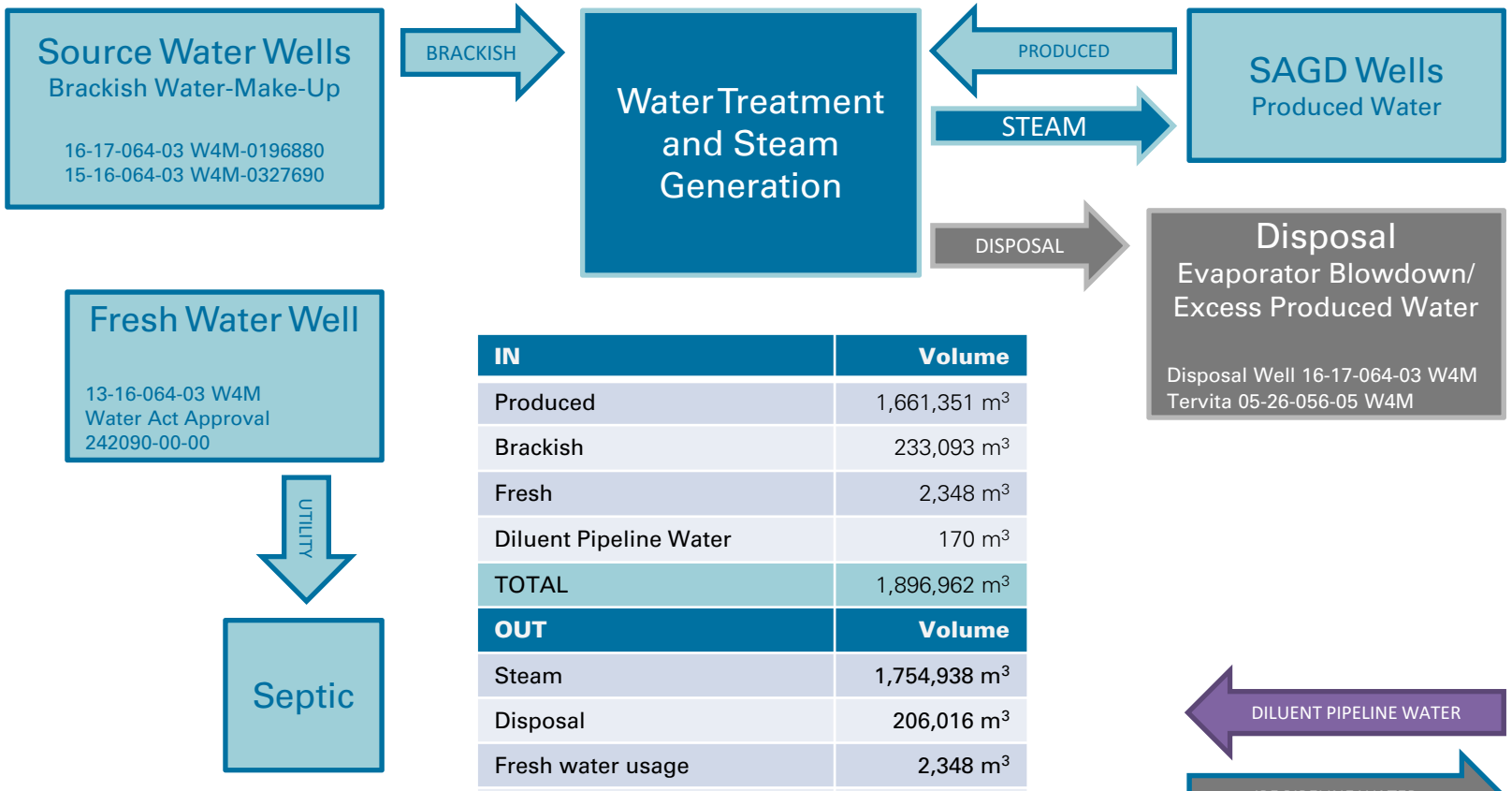
- McMurray water disposal well – 03/16-17-064-03W4M (Well License # 0196880)
  - Suspended as a disposal well Nov. 2011



Fresh non-potable water usage – 2016- Well ID 1420481

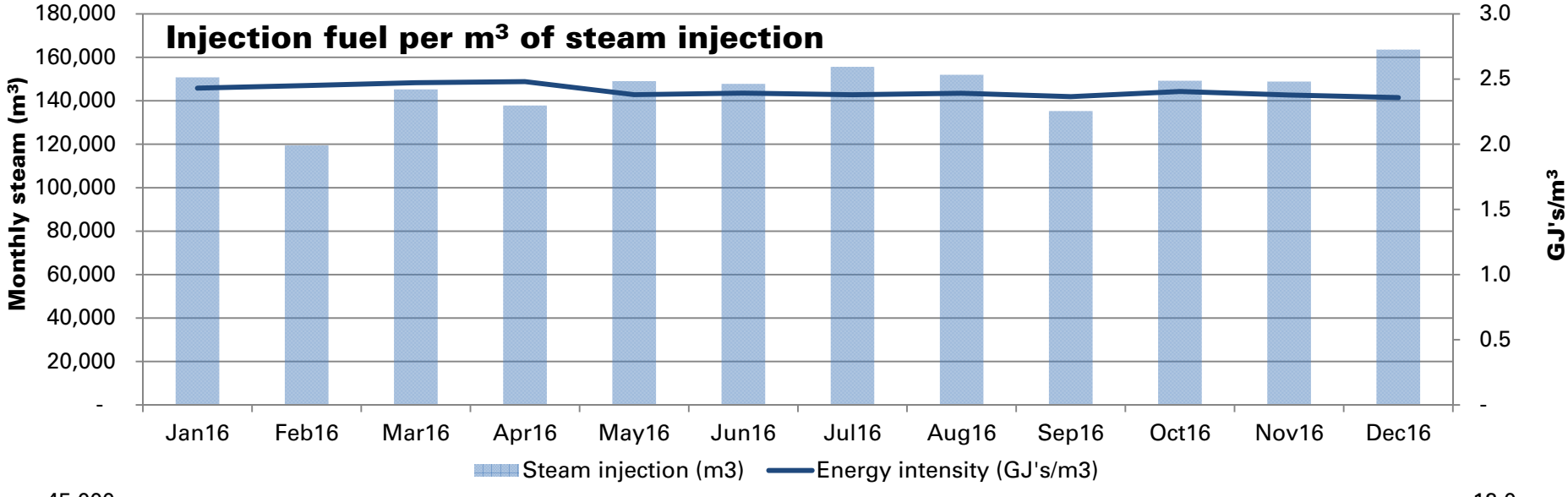


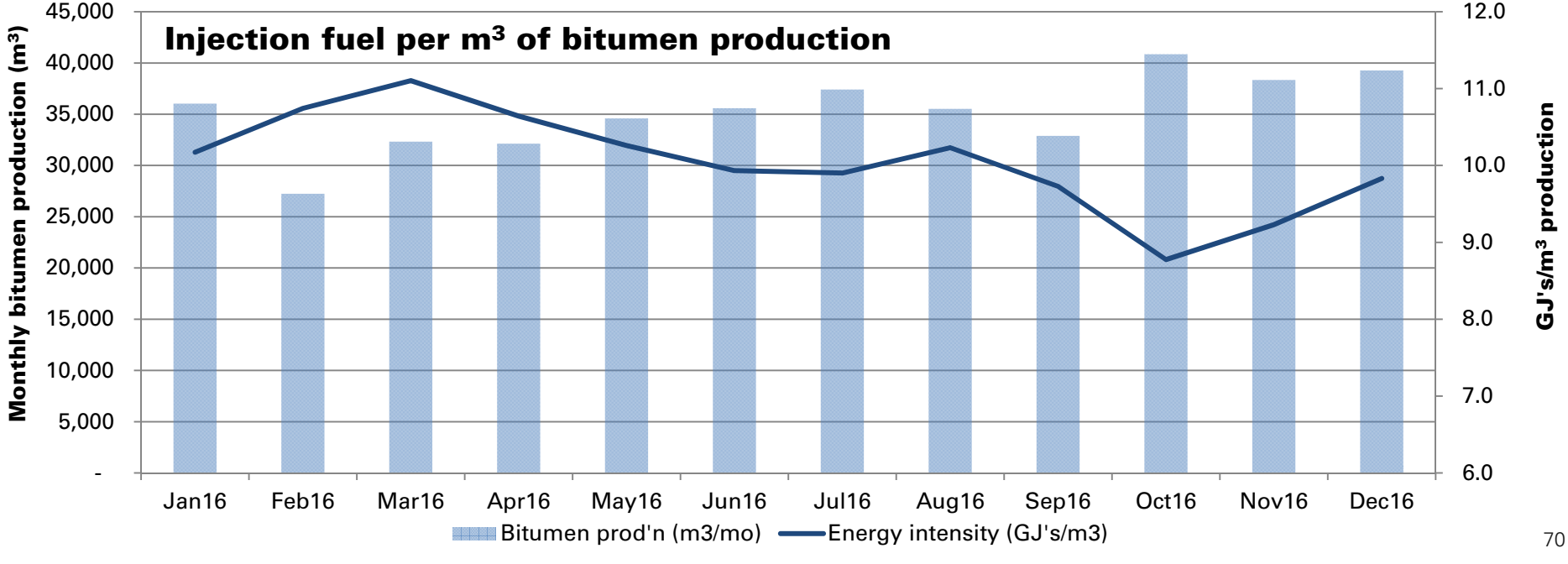
2016 cumulative water balance



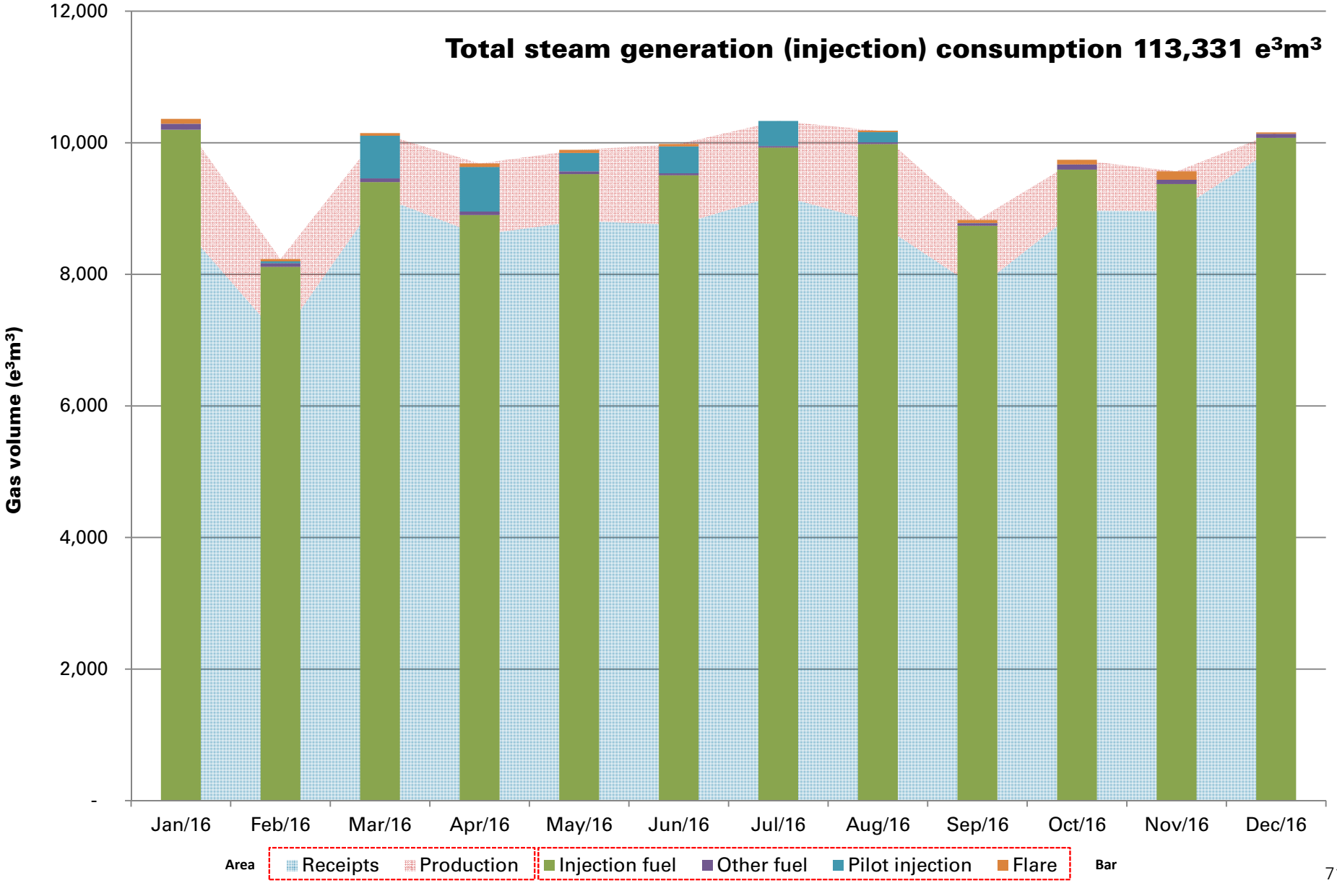
IN	Volume
Produced	1,661,351 m^3
Brackish	233,093 m^3
Fresh	2,348 m^3
Diluent Pipeline Water	170 m^3
TOTAL	1,896,962 m^3
OUT	**Volume**
Steam	1,754,938 m^3
Disposal	206,016 m^3
Fresh water usage	2,348 m^3
IPF Pipeline Water	1,915 m^3
TOTAL	1,965,217 m^3
Difference (as a percentage of total in's)	68,255 m^3 3.6%
Disposal Limit	**15 %**
Actual Disposal	**13 %**

Monthly natural gas intensity – 2016 (averaged 2.4 GJ's per m^3 of steam)

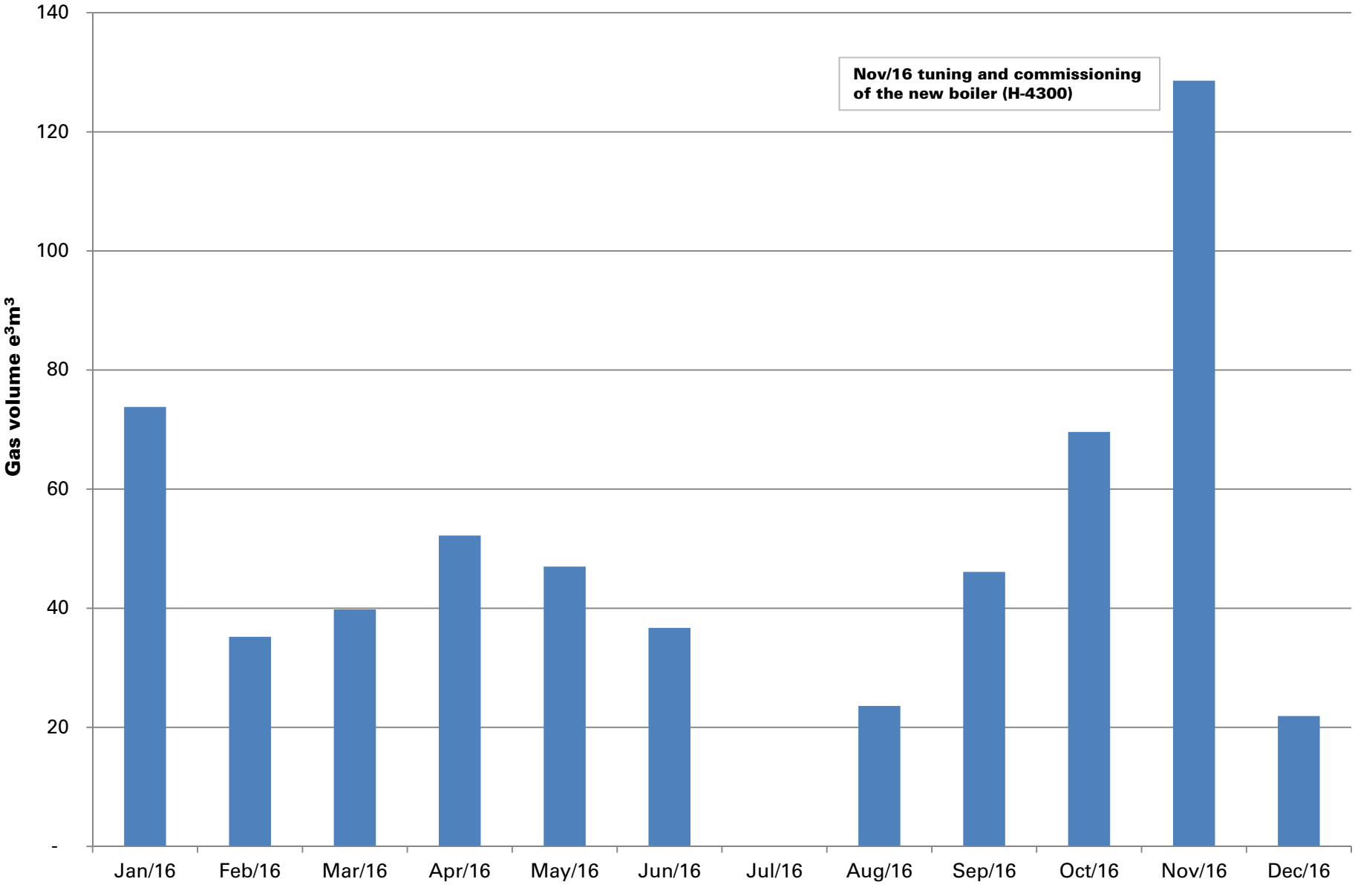




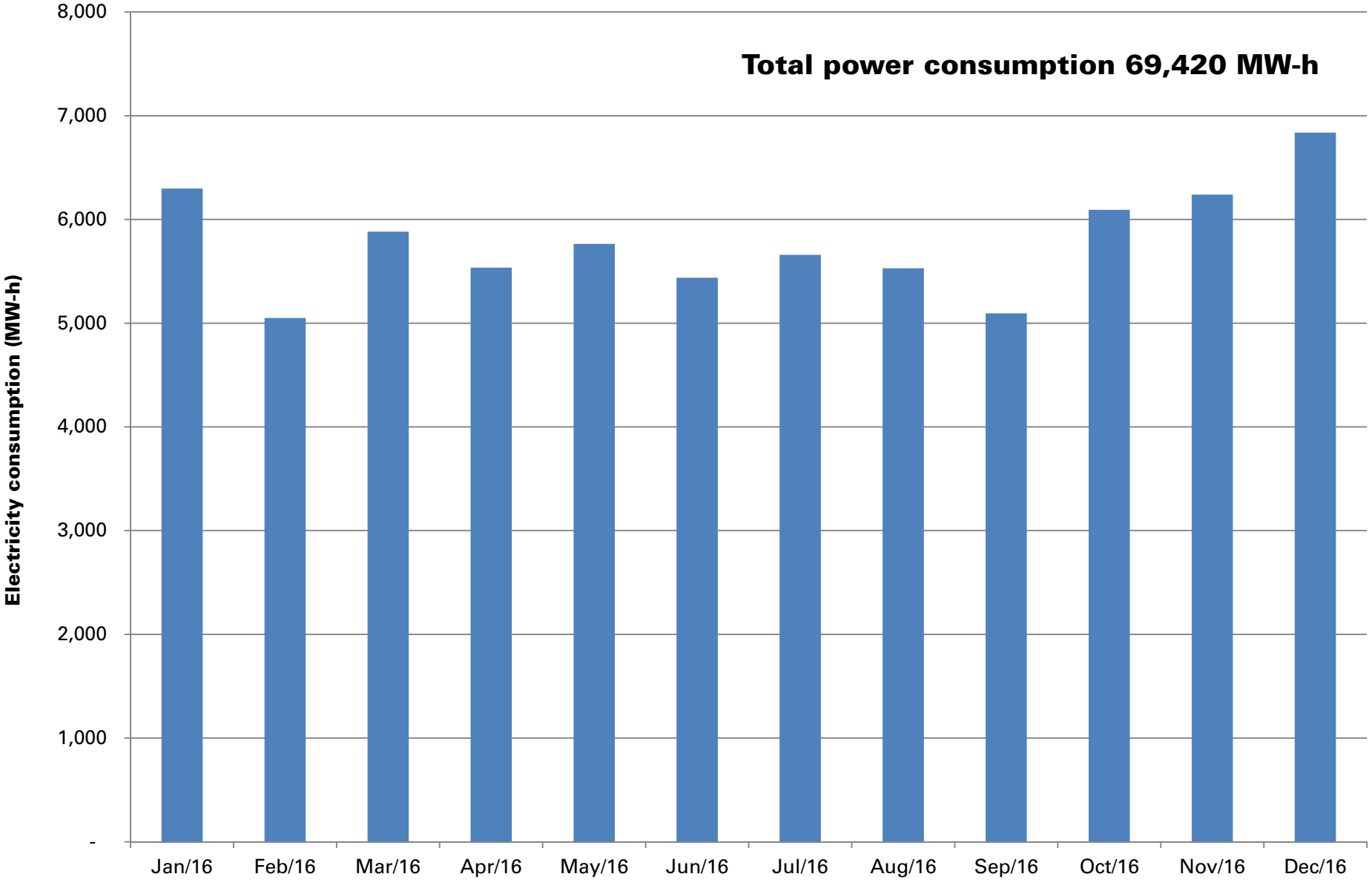
Monthly gas usage – 2016



Monthly Flaring Instances – 2016



Monthly power consumption – 2016



Measurement and reporting

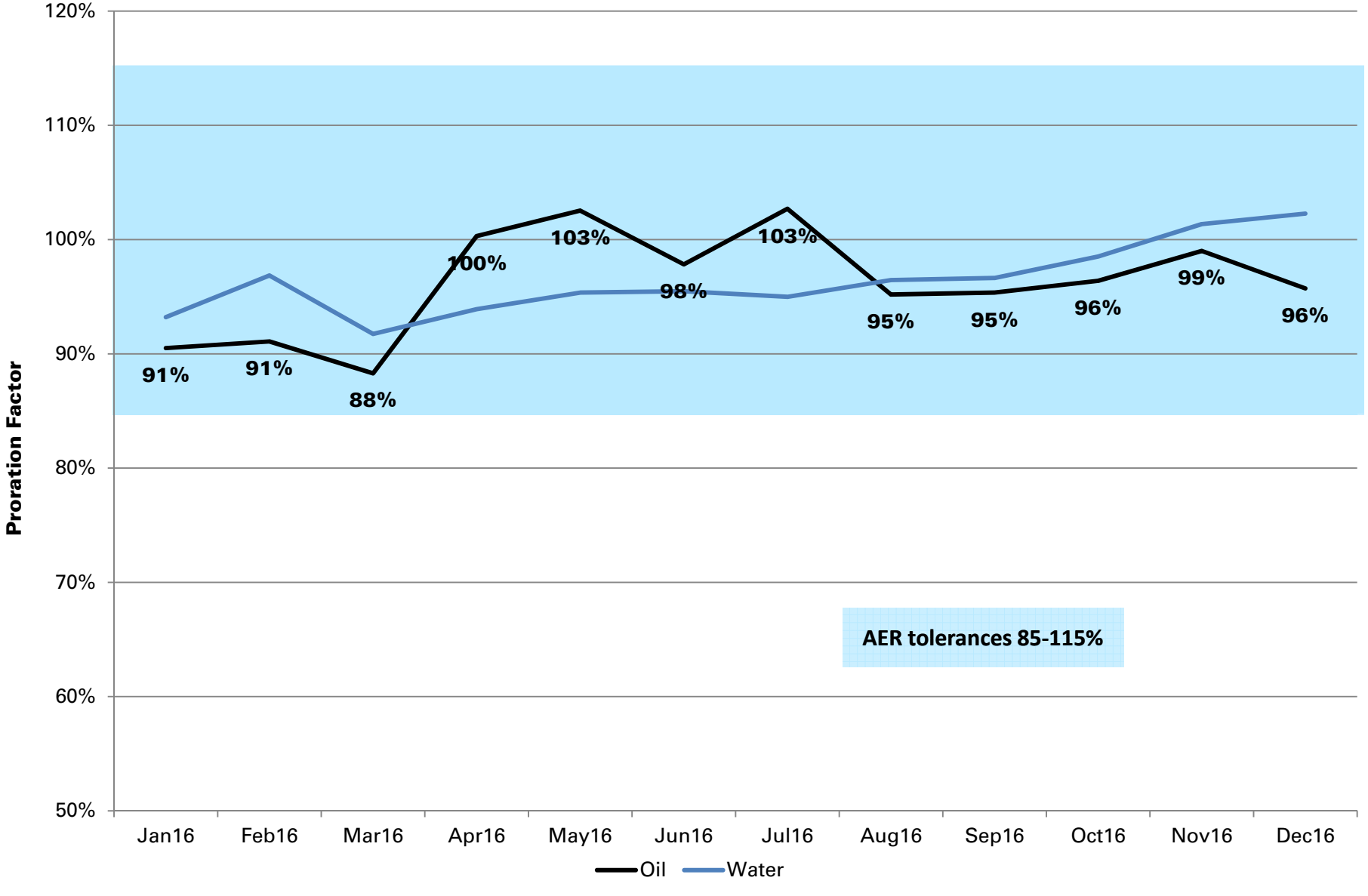
MARP

- Annual MARP revision prepared December 2016
- Changes included the addition of metering associated with a third boiler and additional water treatment capacity
- Accounting meters calibrated / verified on an annual basis

EPAP

- Declaration deadline May 31, 2017 for 2016 reporting period
- Controls documentation, evaluation and testing completed in-house (utilized third-party specialist for last years' initial declaration period)
- Noticeable improvements to proration factors from the start of the year

Oil and water proration factors – 2016

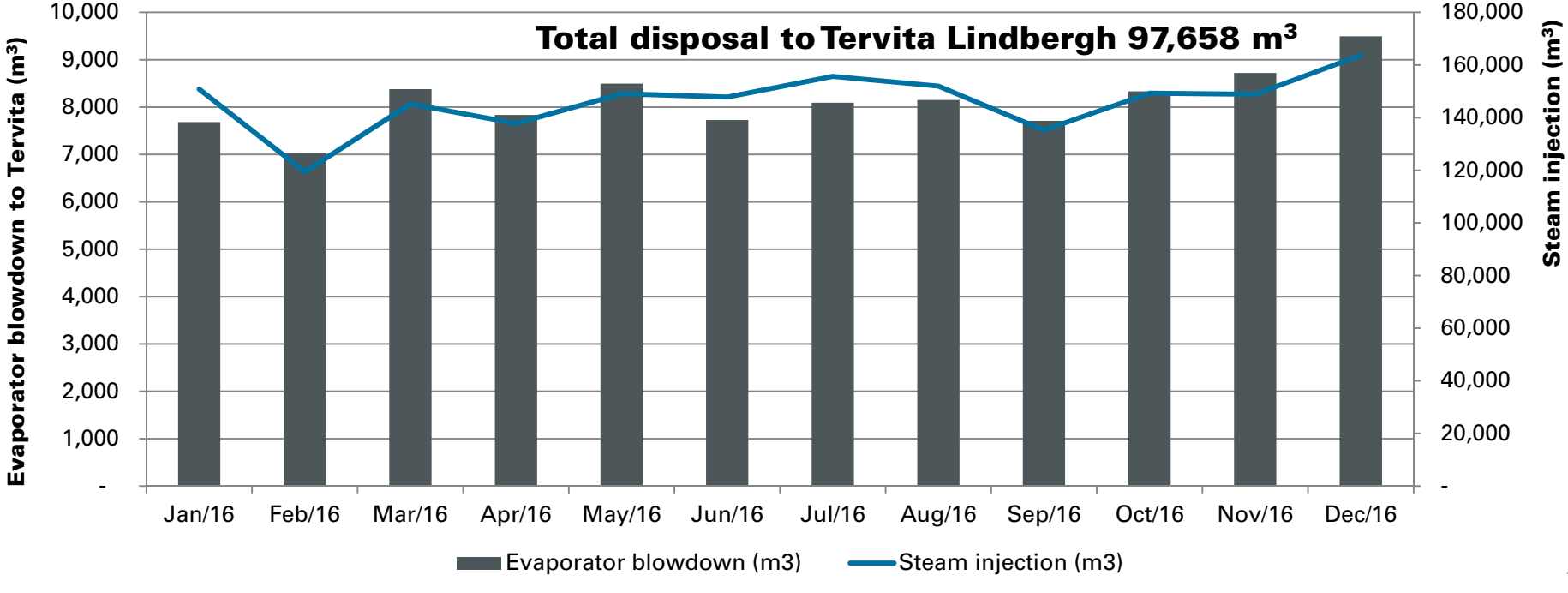


Compliance

Offsite Waste Disposal

- Tervita-Lindbergh – Class 1b – 05-26-056-05W4M
  - Evaporator Blowdown – 97,658 m^3
  - Crystallizer being installed in 2017. Expected to reduce evaporator blowdown by ~80%

- RBW Waste Management
  - Contaminated soil from housekeeping and hydro-vac activities 173 m^3
  - Well workover fluids 16,691 m^3
  - Recycle-Glycol, Lube oil, Filters, Oily rags, Aerosols, Methanol 72 m^3



Domestic Waste Recycling and Disposal

- Domestic waste water from the administrative offices washrooms and kitchens are 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 1105 m^3
- Domestic waste is hauled to municipal landfills in either Cold Lake or Bonnyville. Approximately 114 m^3
- Construction waste 229 m^3
- Paper, cardboard and steel recycling program processed 114 m^3
- Wood recycling 137 m^3
- Metal recycling 76 m^3

Environmental Protection and Enhancement Act 141258-01-00

Orion received a renewed *Environmental Protection and Enhancement Act (EPEA) Approval* on July 13th, 2016. Monitoring programs included in the *Approval* are as detailed:

EPEA Requirement	Report Name	Due Date
Terms and Conditions, Conditions 3.1-3.9	*Air Monitoring*	Continued from 141258-00 with addition of CEMS requirements
Schedule V, Conditions 8, 9	*Industrial Wastewater and Industrial Runoff*	Continued from 141258-00-00
Schedule VI, Condition 1	*Groundwater Monitoring*	Continued with update from 141258-00-00
Schedule VII, Condition 2,6	*Soil Monitoring and Management Program*	Continued with update from 141258-00-00
Schedule VIII, Conditions 4; 9	*Wildlife Monitoring and Mitigation Program*	Continued with update from 141258-00-00
Schedule IX, Condition 42	*Reclamation Monitoring Program*	December 31, 2016
Schedule XI, Condition 1	*Wetland and Waterbody Monitoring Program*	February 28, 2017
Schedule IX, Condition 24 (a,b)	*Project Level Conservation and Reclamation Closure Plan*	October 31, 2018
Schedule IX, Condition 37	*Wetlands Reclamation Trial*	December 31, 2021

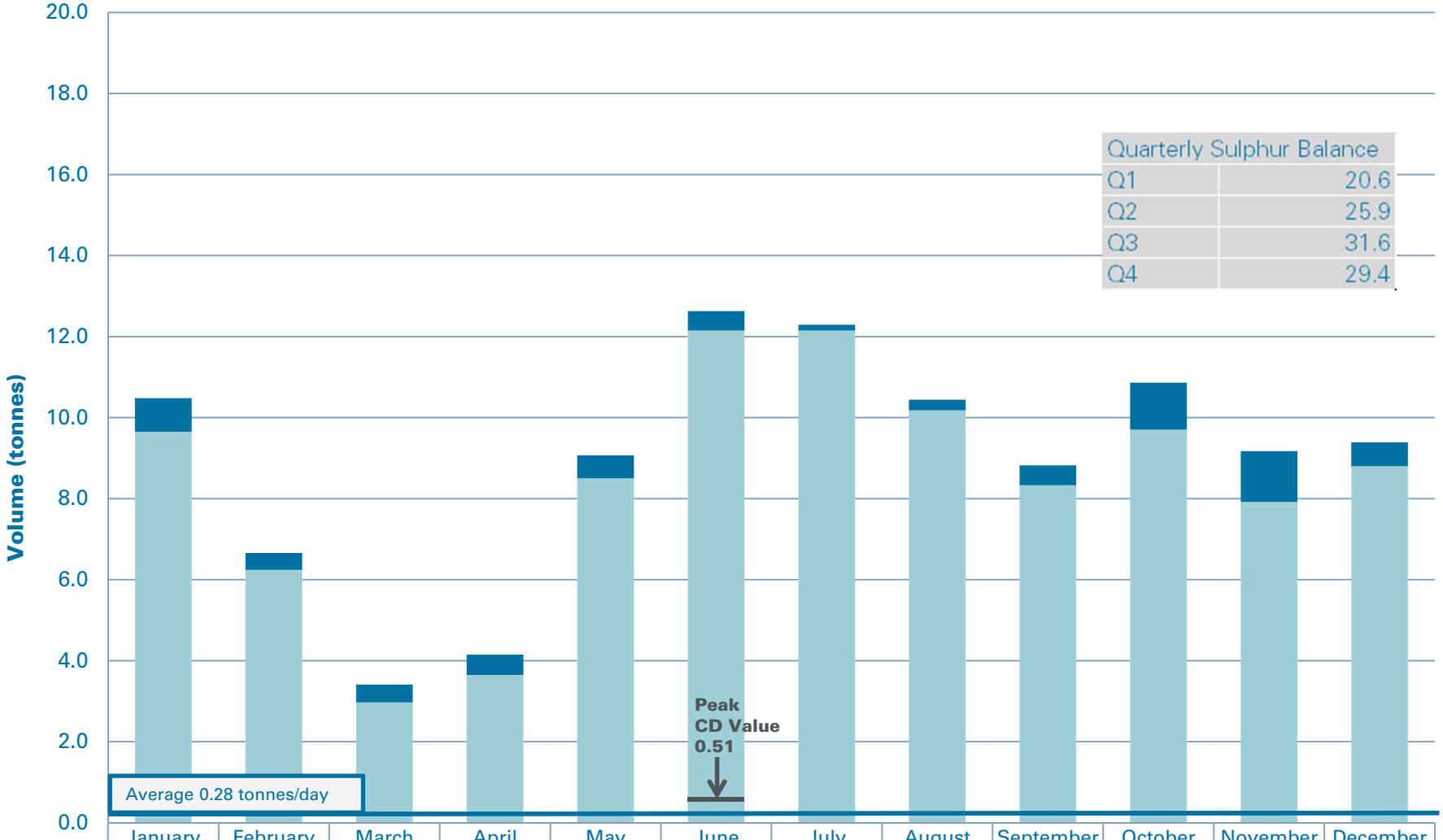
Air Monitoring Programs

- The following air monitoring and reporting is conducted at Orion in accordance with EPEA Approval requirements , *Specified Gas Emitters Regulation and the Air Monitoring Directive*

Air Monitoring/Reporting Programs	
Continuous Emissions Monitoring	Greenhouse Gas Emissions
Manual Stack Survey	LICA Airshed Regional Monitoring
Fugitive Emission Survey	

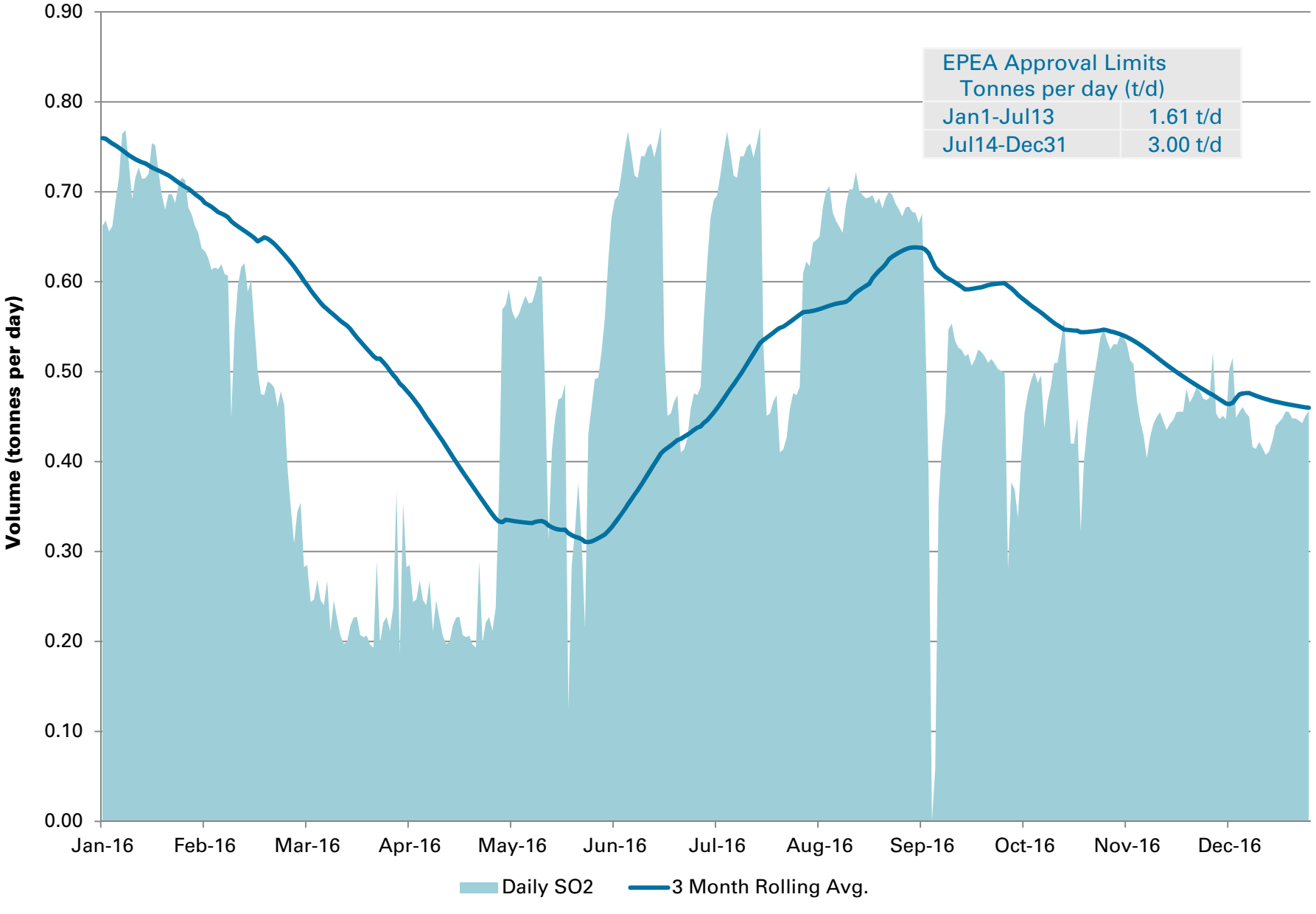
- The 2015 fugitive emissions survey noted 12 leaks - all were repaired

Sulphur Balance (tonnes/month/quarter)

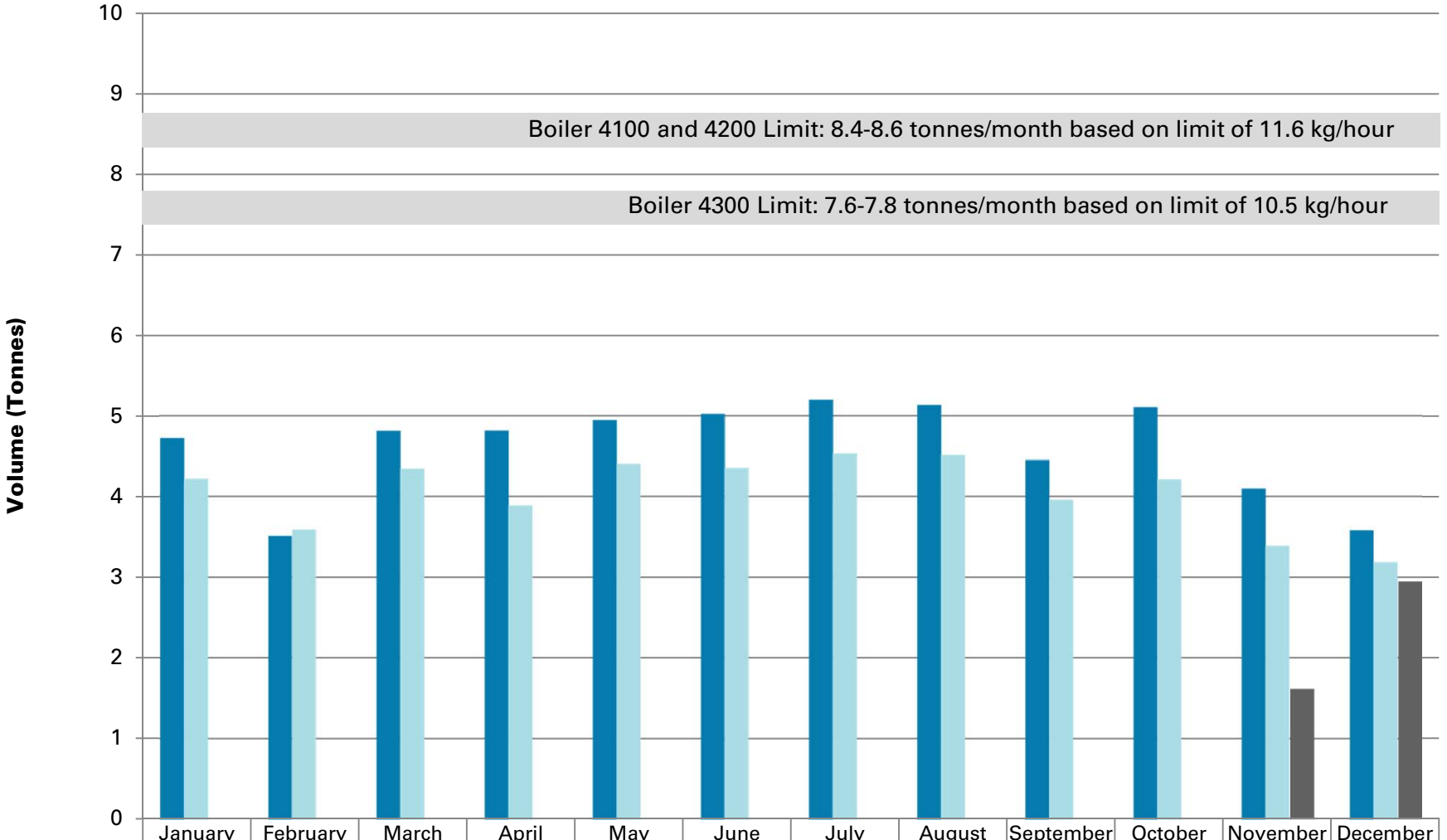


	January	February	March	April	May	June	July	August	September	October	November	December
flare	0.83	0.42	0.44	0.5	0.57	0.48	0.14	0.26	0.49	1.16	1.25	0.59
stack	9.7	6.2	3.0	3.7	8.5	12.2	12.2	10.2	8.3	9.7	7.9	8.8

SO_2 Volumes (Tonnes) – Daily vs. 3 Month Rolling Average

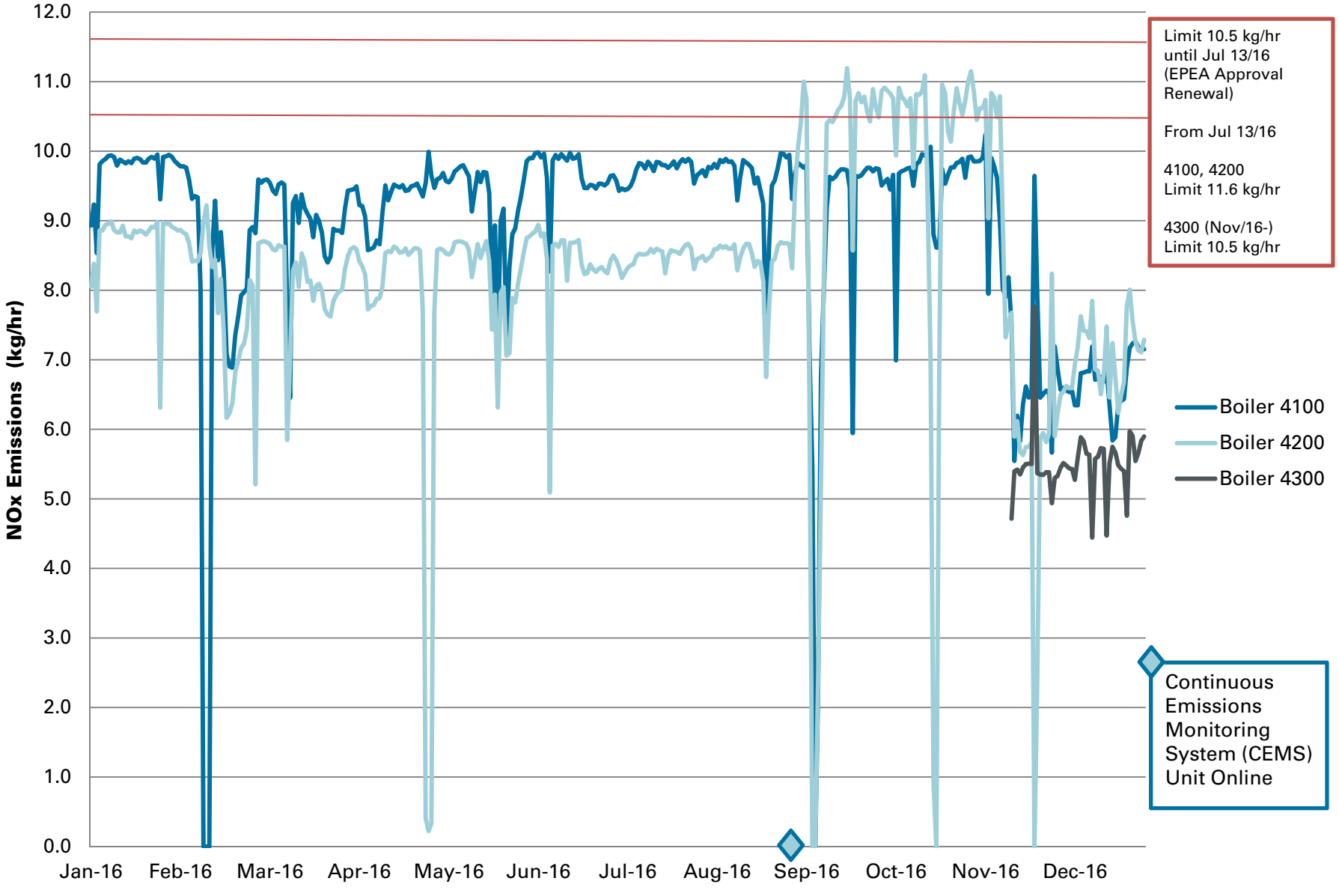


Monthly NOx Emissions Per Boiler 2016

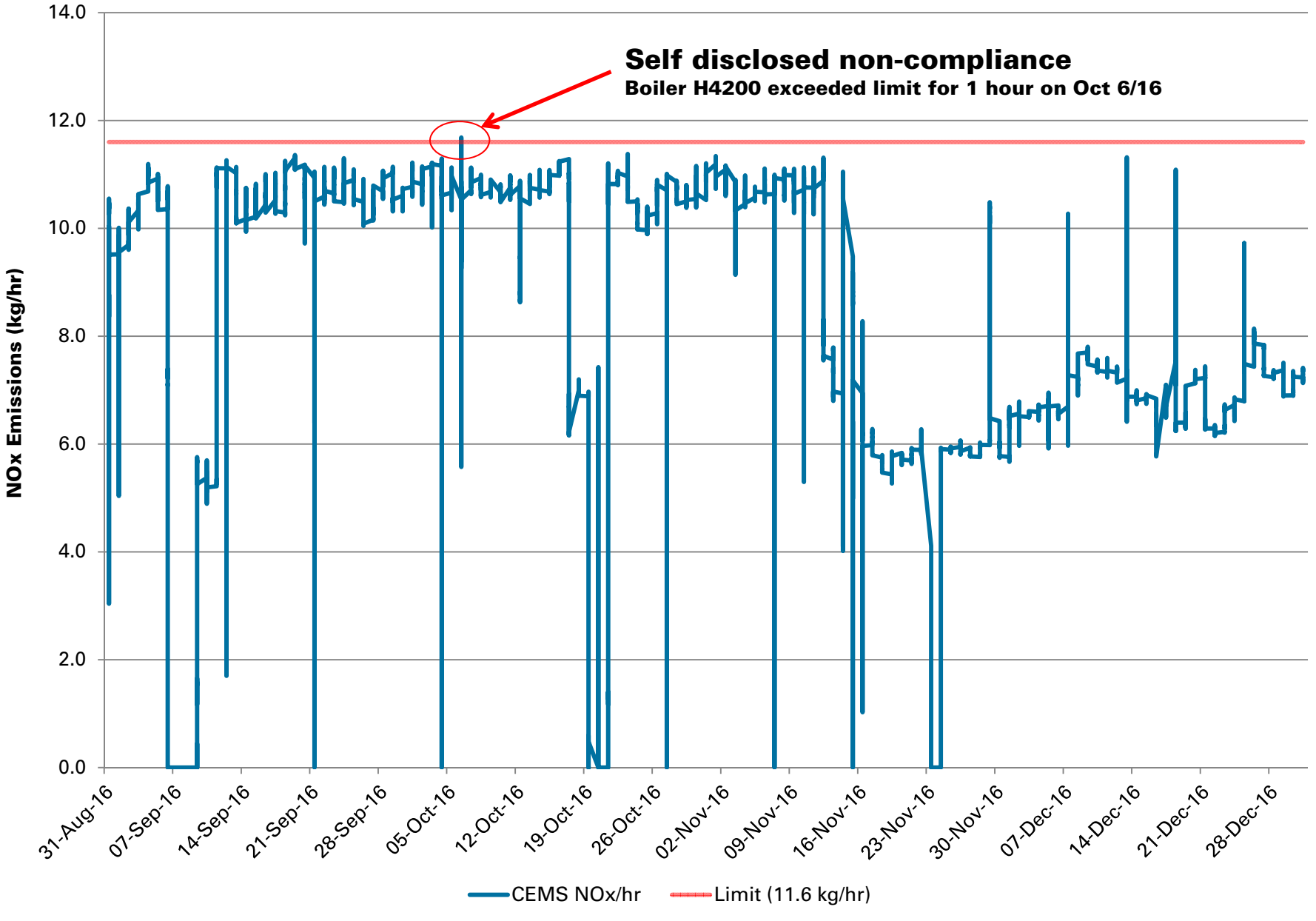


	January	February	March	April	May	June	July	August	September	October	November	December
Boiler 4100	4.73	3.52	4.82	4.82	4.95	5.03	5.20	5.14	4.46	5.11	4.10	3.59
Boiler 4200	4.22	3.59	4.35	3.90	4.41	4.36	4.54	4.52	3.96	4.21	3.39	3.19
Boiler 4300	0	0	0	0	0	0	0	0	0	0	1.62	2.95

Daily NOx Emissions Per Boiler 2016

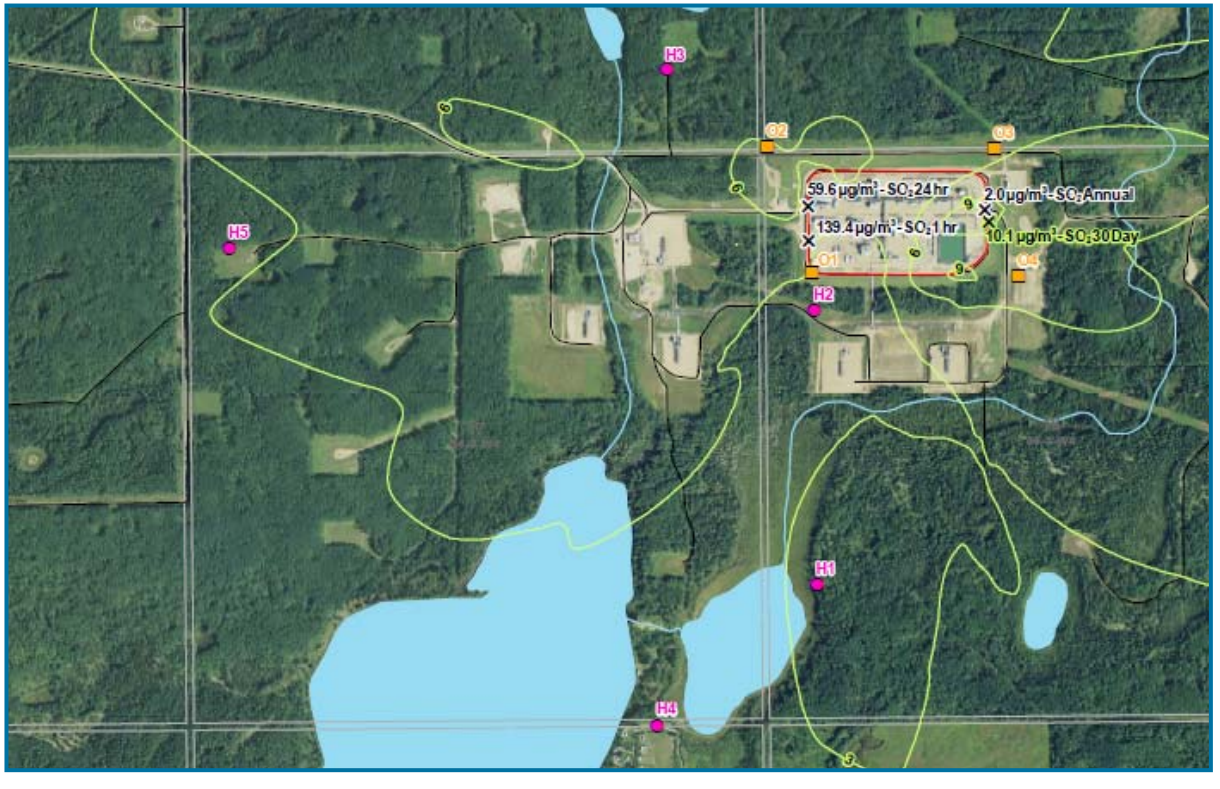


CEMS Hourly Data (Aug 31/16 onward)

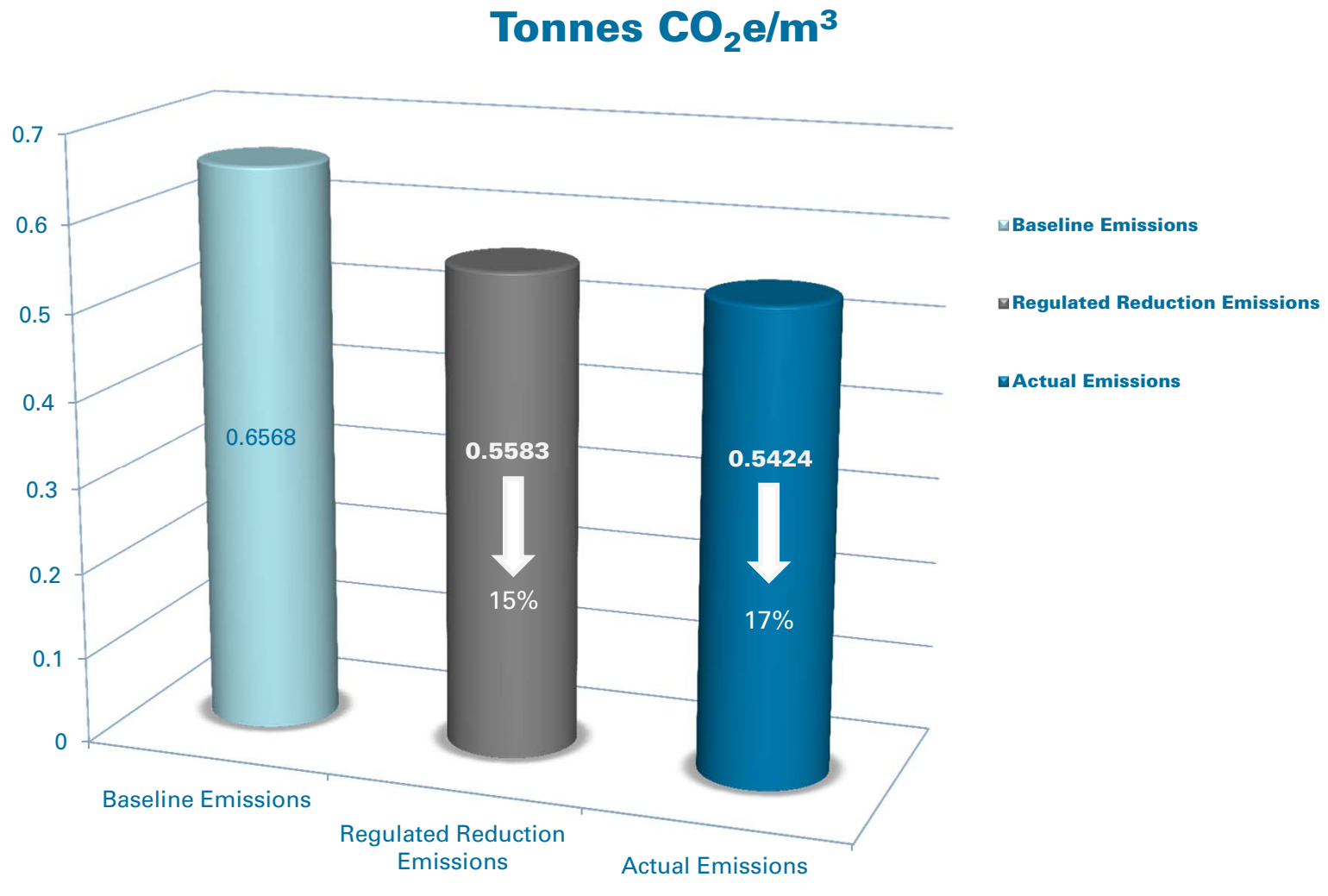


Air Monitoring Programs Passive

- Ambient air monitoring is fulfilled by supporting the LICA Airshed and participating on the Airshed steering committee. Osum continues to operate 5 passive monitoring stations – 4 fence-line (O1-O4)and one at landowners request (H4). Maximum H_2S value was 1ppb and maximum SO_2 value was 1.3 ppb

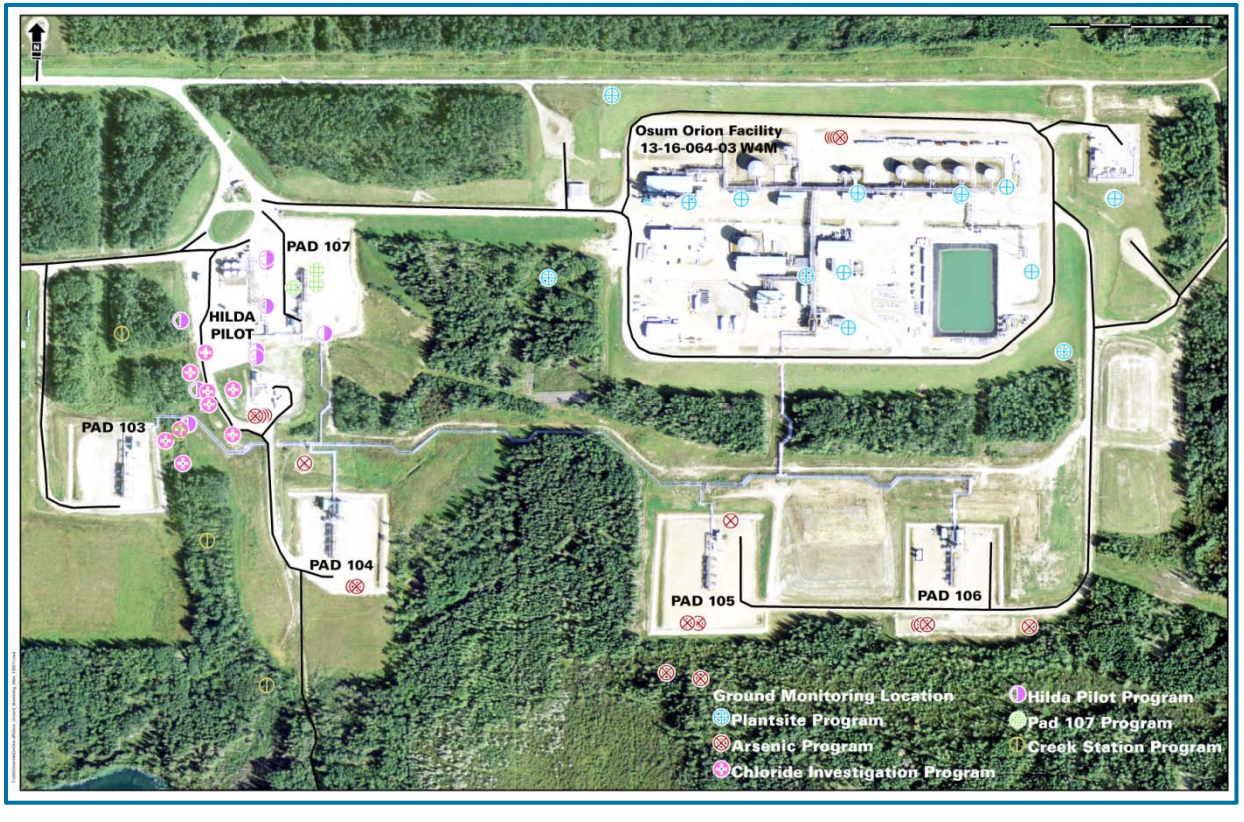


Greenhouse Gas (GHG) Emissions



Groundwater Monitoring Program

- The groundwater monitoring program was consistent with previous years, results did not exceed regulatory limits
- Updated groundwater monitoring program was submitted in accordance with renewed EPEA Approval



Wildlife Monitoring Program

- The comprehensive wildlife monitoring report for the period of 2009-2015 was submitted in March 2016
- 2016 monitoring effort was solely comprised of remote cameras and acoustic recorders to bridge the year between approved monitoring programs. Data collected from 2016 will be incorporated into the revised and approved Wildlife Monitoring and Mitigation Program commencing 2017
- 2016 data recorded a total of 92 species, 17 of which are listed under the *Species at Risk Act* :1 amphibian, 7 bat and 9 bird

Environmental Monitoring/Reporting Program

- In accordance with Conditions outlined in *EPEA Approval 141258-01-00, Water Act Approval 242090-00-00* and applicable regulations the remaining annual reports were prepared and submitted for:
  - Water Act License Diversion-Monitoring and Use
  - Industrial Waste Water and Surface Water
  - Surface Water Quality-Ethel and Hilda Lake-Comprehensive (2008-2016)
  - Conservation and Reclamation
  - National Pollutant Release Inventory

Conditions were reflective of previous years for these reports

Compliance

Met year 1 *Directive 13* / Inactive Well Compliance Program (IWCP) objective

Two self-disclosed non-compliance events:

- Contravention of Water Act- Removal of Level-logger from licensed well for extended period (Jan-Apr). April 27th- CIC 310744- Remedial action-Procedure change

- Contravention of EPEA (Environmental Protection and Enhancement Act) - Exceedance of NOx limit on Boiler 4200 (11.7 kg/hr for 1 hour-limit 11.6 kg/hr). October 6th- CIC 317006- Remedial action-Procedure change

One reportable incident:

- Reportable Brackish Water Pipeline Leak PL# 56484-1.0 m^3 brackish water August 10th - CIC 314915 - FIS 20162259 - Remediated and repaired

AER Inspections:

Satisfactory	- Detailed Site Inspection - March 7, 8
	- Pipeline Inspection - August 11
High Risk	- Internal Corrosion Mitigation Procedures - November 29
	- Remedial action - Revised procedure

Environmental Initiatives

LICA-Lakeland Industry and Community Association

- Representation on:
  - LICA Airshed Committee
  - LICA Education and Information Committee
  - Beaver River Watershed Planning and Advisory Council
  - LICA Oil Sands Industry Members Committee

Future Plans

Future Plans

Firm plans for 2017 include the completion of Orion Phase 2A which started with the addition of a third boiler and water treatment in 2016:

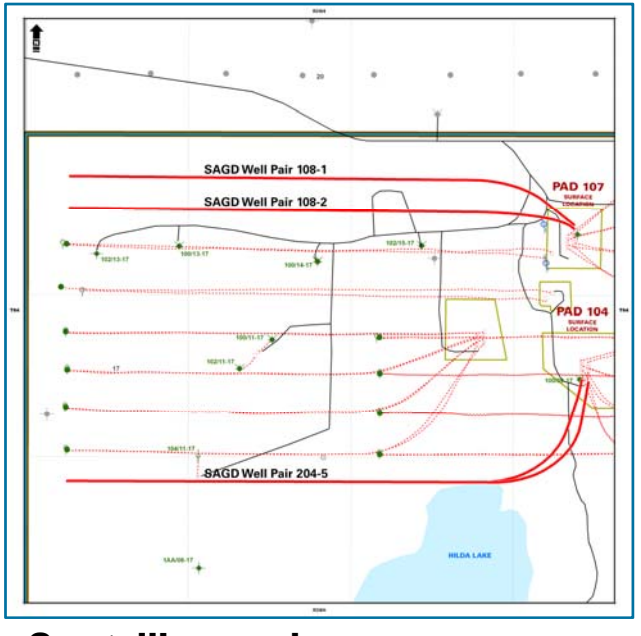
The drilling, completion and tie-in of 3 new SAGD well pairs

- All three well pairs are being drilled from existing pads (close proximity tie-ins, minimal surface disturbance, lower capital costs)
- Two of the three well pairs (P108-1 and P108-2) fall within pre-existing approvals. The third well (204-5) was approved on January 30, 2017 (10103P)
- All three well pairs were drilled by the end of April, 2017

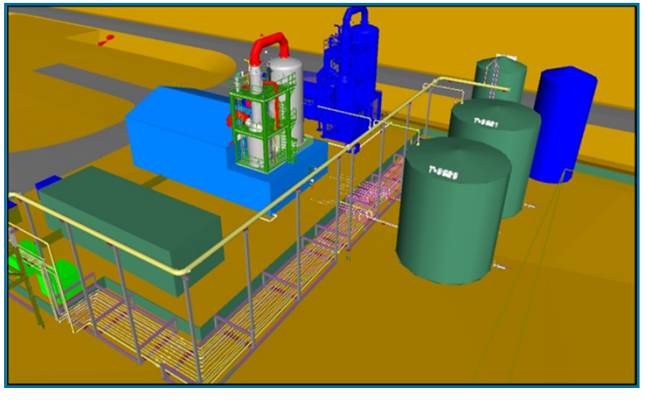
The installation of a crystallizer unit for on-site treatment of evaporator blowdown waste (refer to application #1867764 and approval #10103O). Commissioning of the unit is estimated to occur in Q4 2017. Benefits will include:

- Reduced off-site waste disposal (Tervita Lindbergh); and
- Increased water recycle to be used for additional steam generation

New SAGD well pairs



Crystallizer package



Future Plans – Beyond 2017

Background

- The Orion Project has commercial scheme regulatory approval for development to produce 3,180 m^3/d of bitumen
- Production in 2016 averaged 1,154 m^3/d with peak production hitting 1,319 m^3/d
- Osum has taken steps to increase steam generation (added a 3rd boiler) and water treatment capacity (use of multiple RO units) and has drilled 3 new well pairs to access more of the reservoir (as detailed on the previous slides)

The Future

- The Company is committed to pursuing "small, smart", phased expansions at Orion to maximize the Project's production potential while maintaining Osum's financial strength in a volatile business environment
- Orion 2B regulatory amendment was submitted to the AER for review in April 2017 which includes the drilling of 24 well pairs (sustaining and growth) over the next few years from existing well pads (minimizing environmental impact)
- The scope and timing of development beyond 2017 is expected to be staged in debottlenecking style capacity additions (subject to corporate sanction)

Thank you