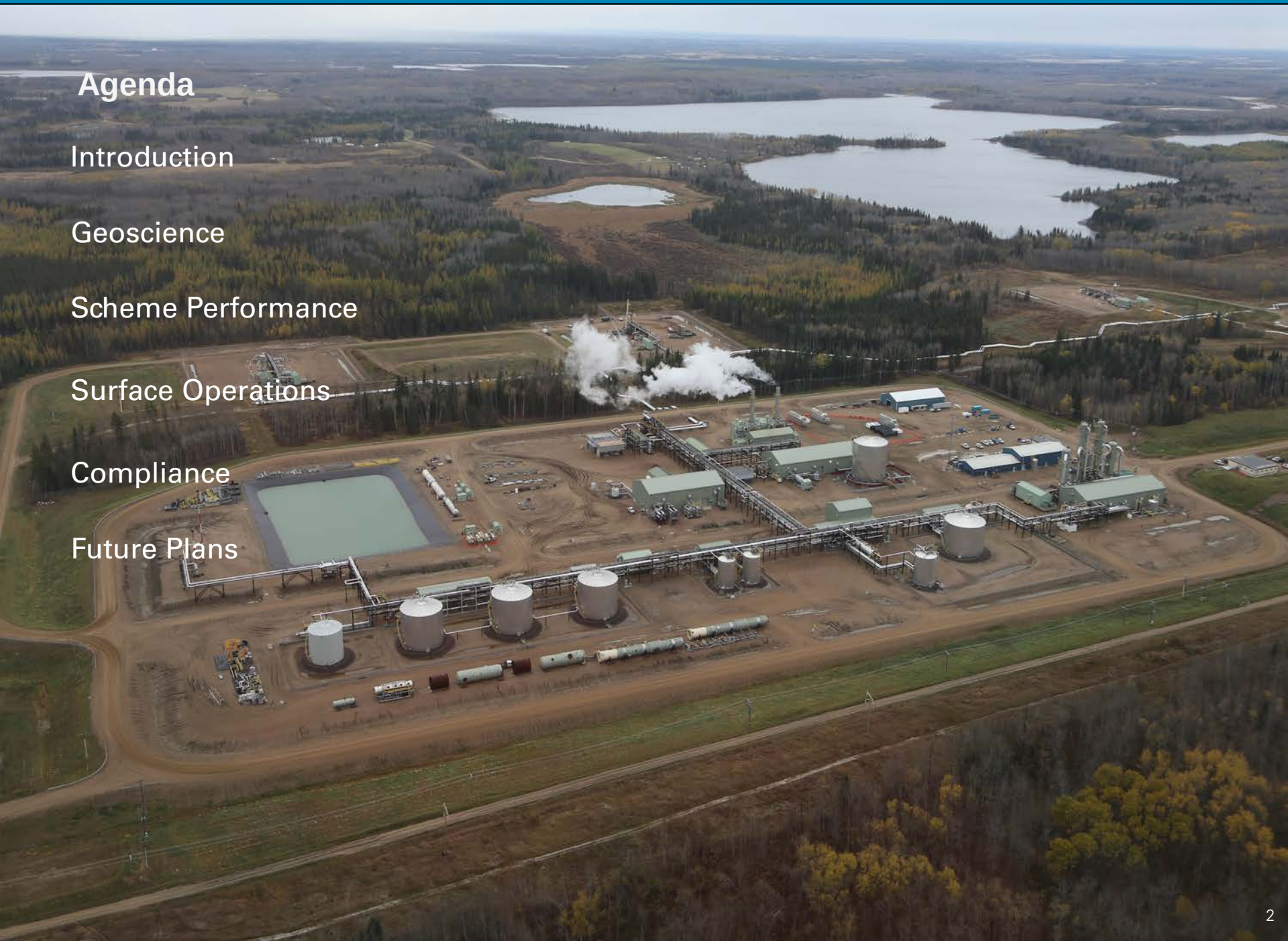
Orion In Situ Oil Sands 2015 Progress Update

Presented May 25, 2016



Agenda

Introduction

Geoscience

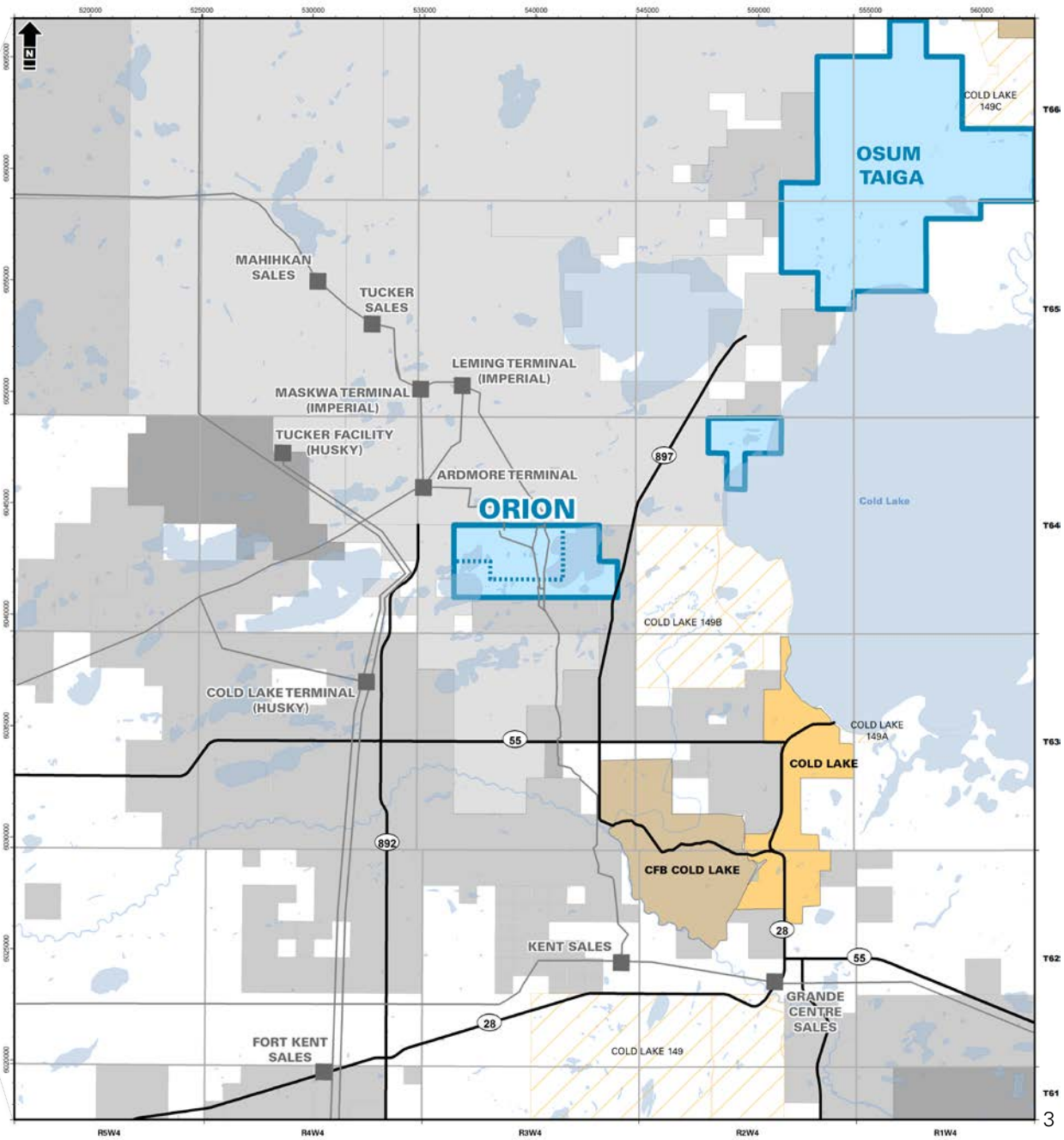
Scheme Performance

Surface Operations

Compliance

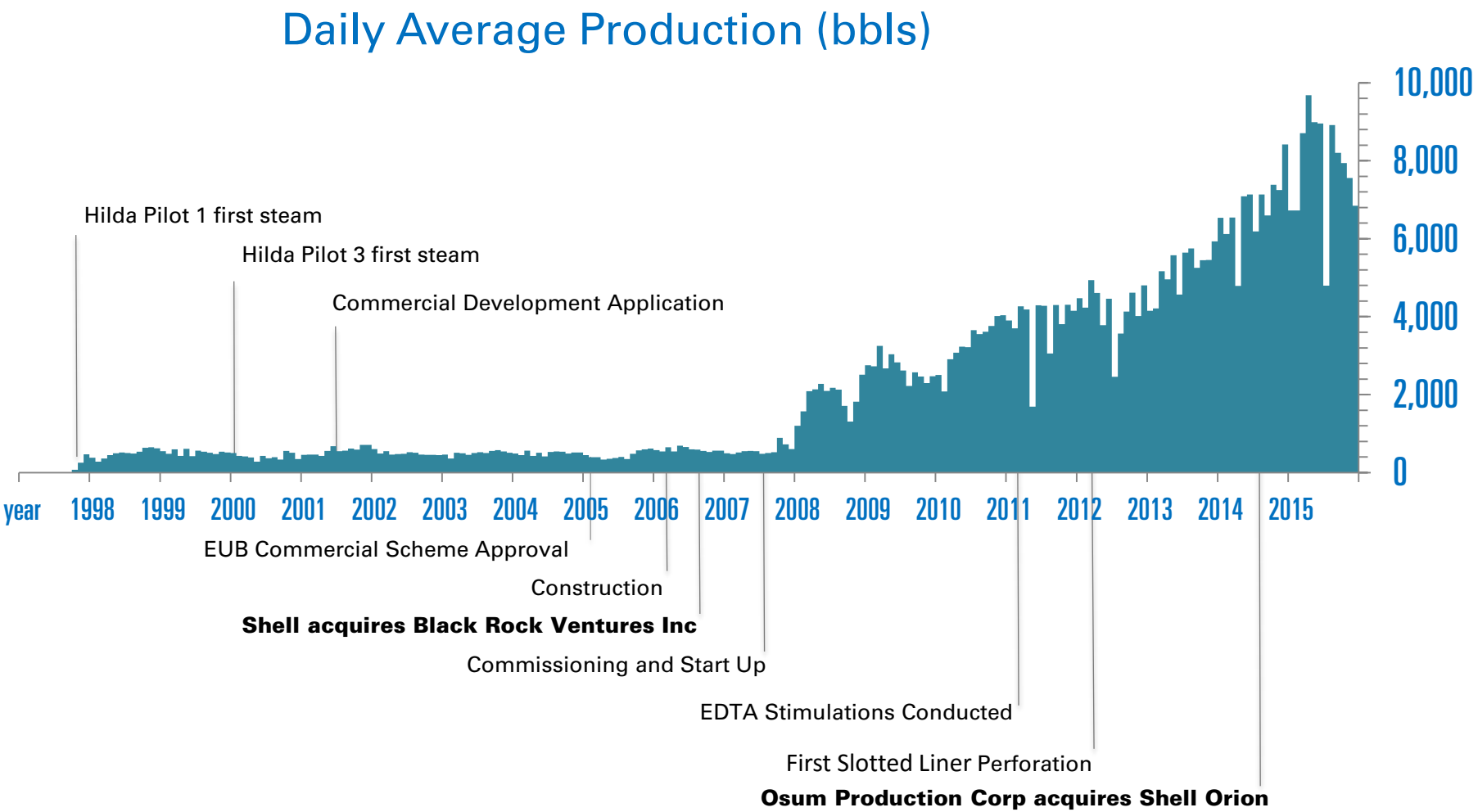
Future Plans

Project Location



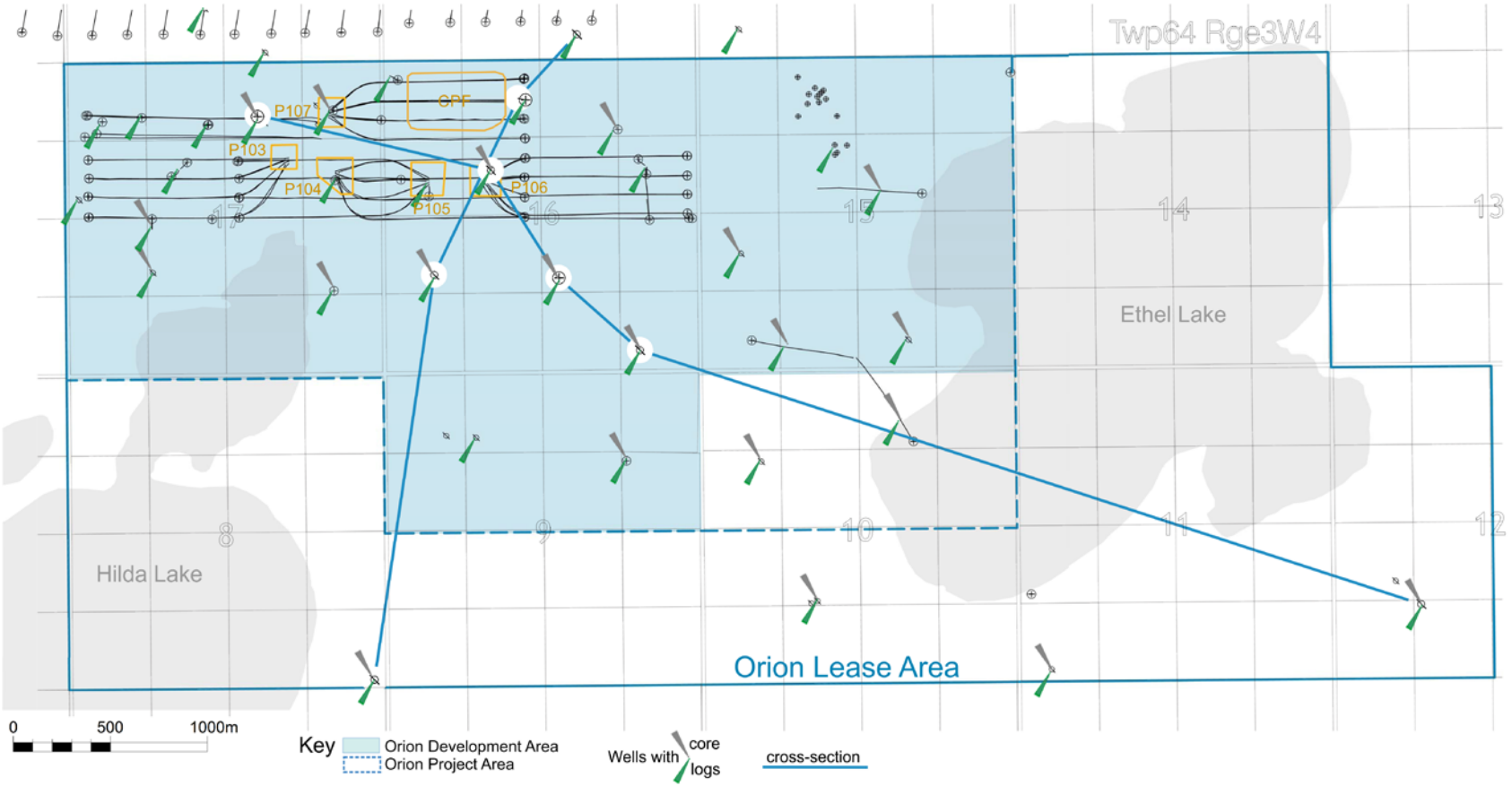
- Major Facility
- Major Pipeline
- Orion Project Area
- Osum Project Lease Area
- Imperial Oil Lease
- CNRL Lease
- Husky Lease
- Major Road
- Major Waterbody
- First Nations Reserve
- Provincial Park Boundary
- Urban Area
- Military Base

The Orion Project - History

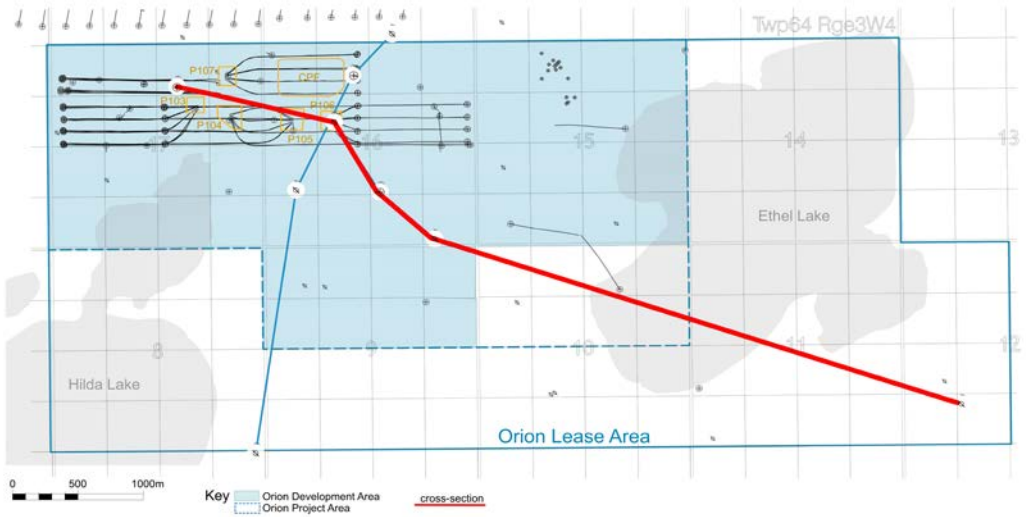


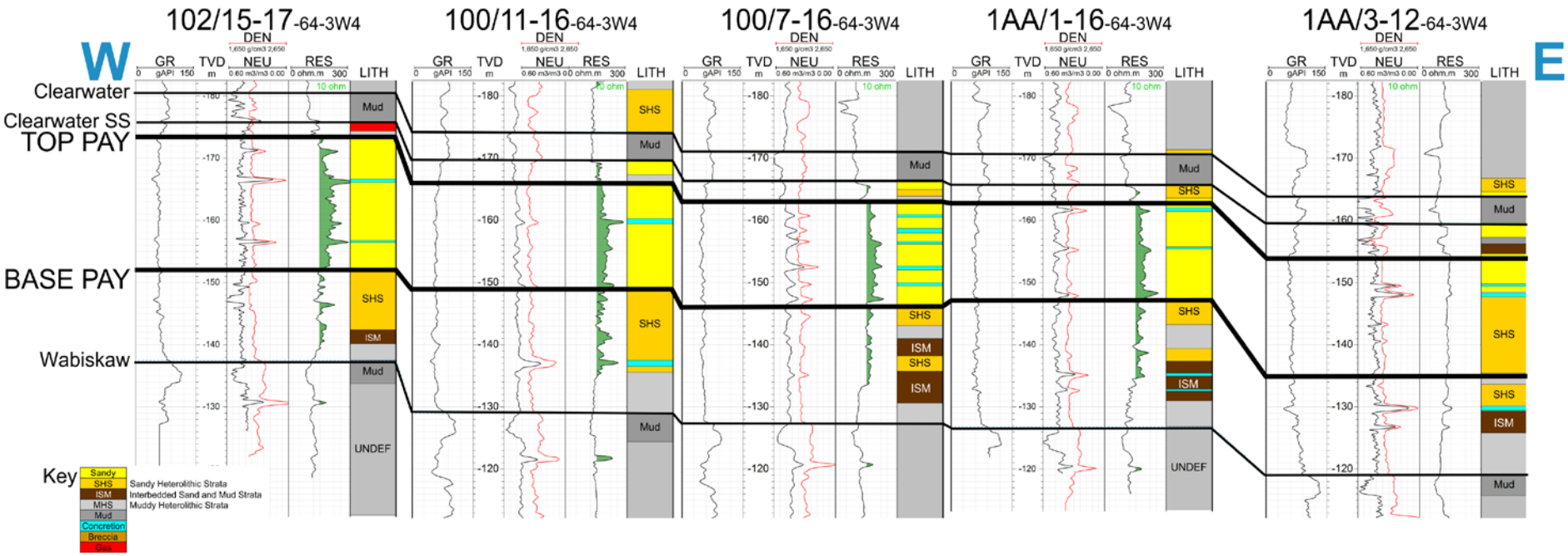
Geoscience

Well Data

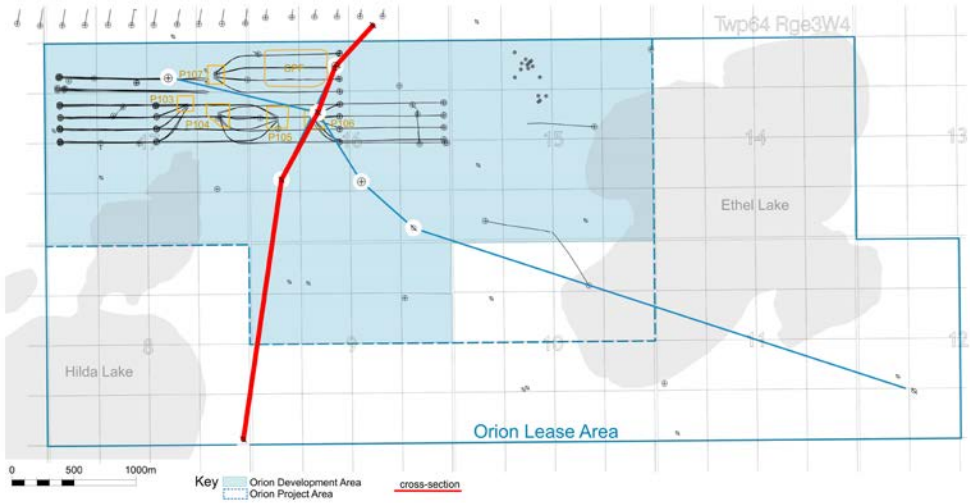

Twp64 Rge3W4
CPF
P107
P103
P104
P105
P106
Ethel Lake
Hilda Lake
Orion Lease Area
13
14
15
16
8
9
10
11
12
0
500
1000m
Key
Orion Development Area
Orion Project Area
Wells with
core
logs
cross-section

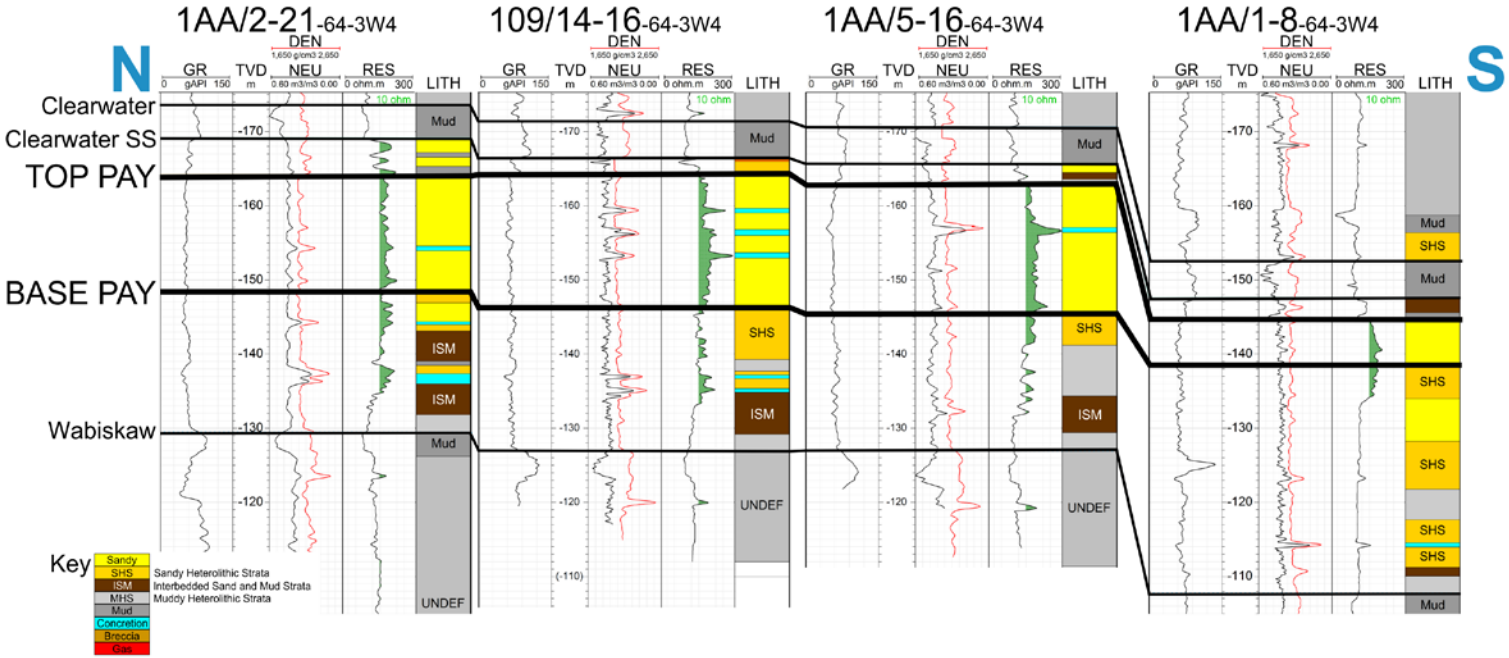
Cross Section W-E





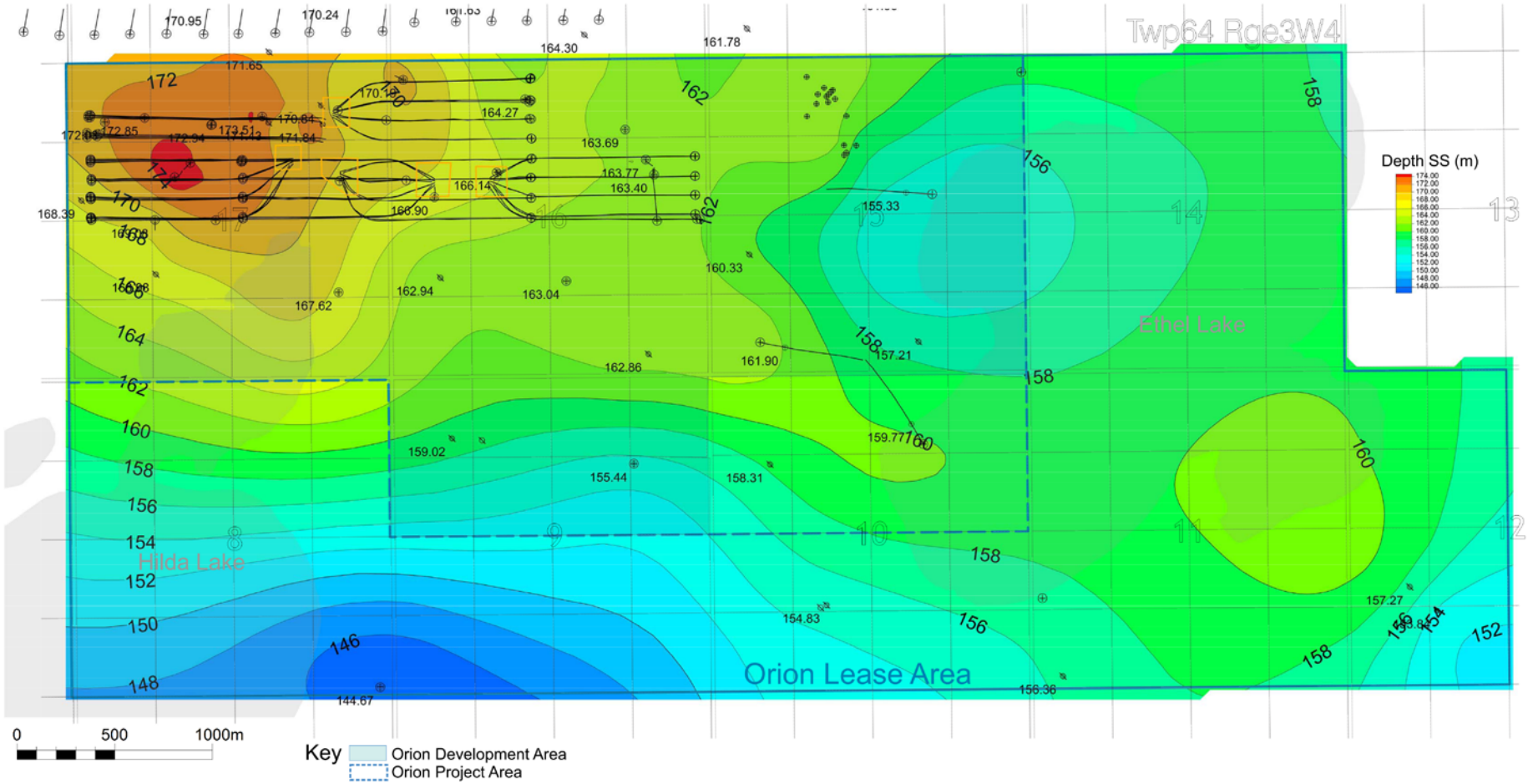
Cross Section N-S





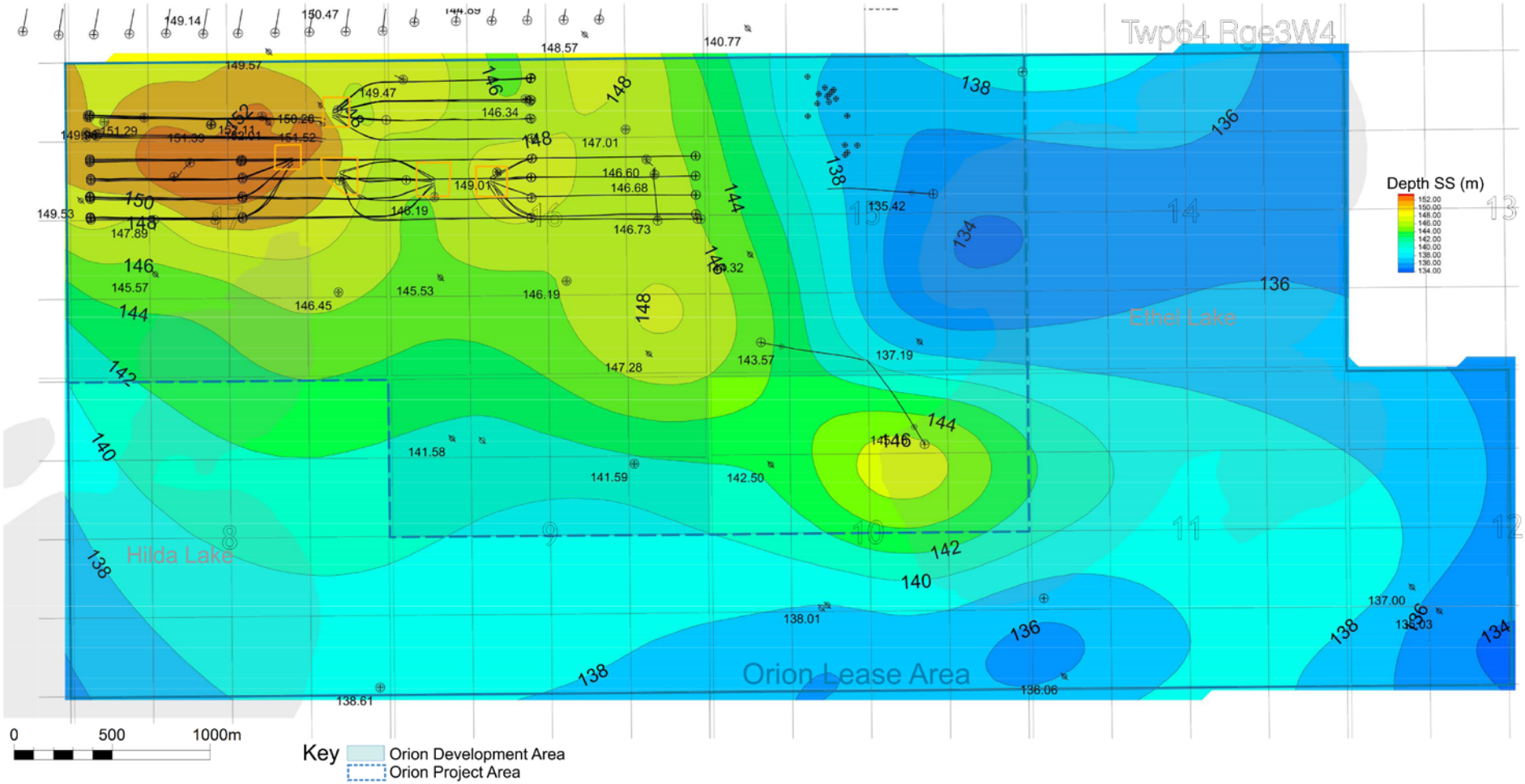
Clearwater SAGD Reservoir – Top Pay

as per Commercial Scheme Approval 10103G



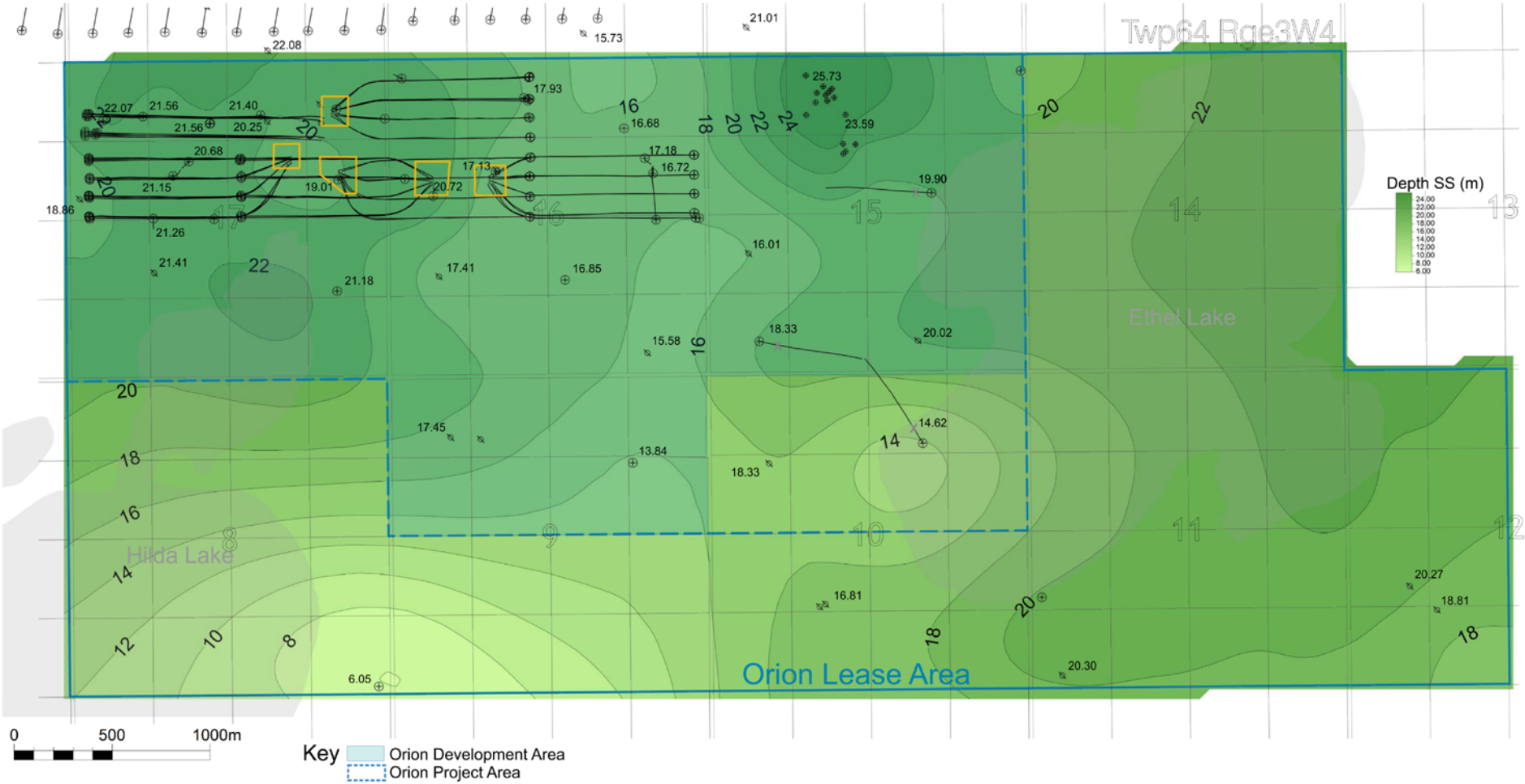
Clearwater SAGD Reservoir – Base Pay

as per Commercial Scheme Approval 10103G

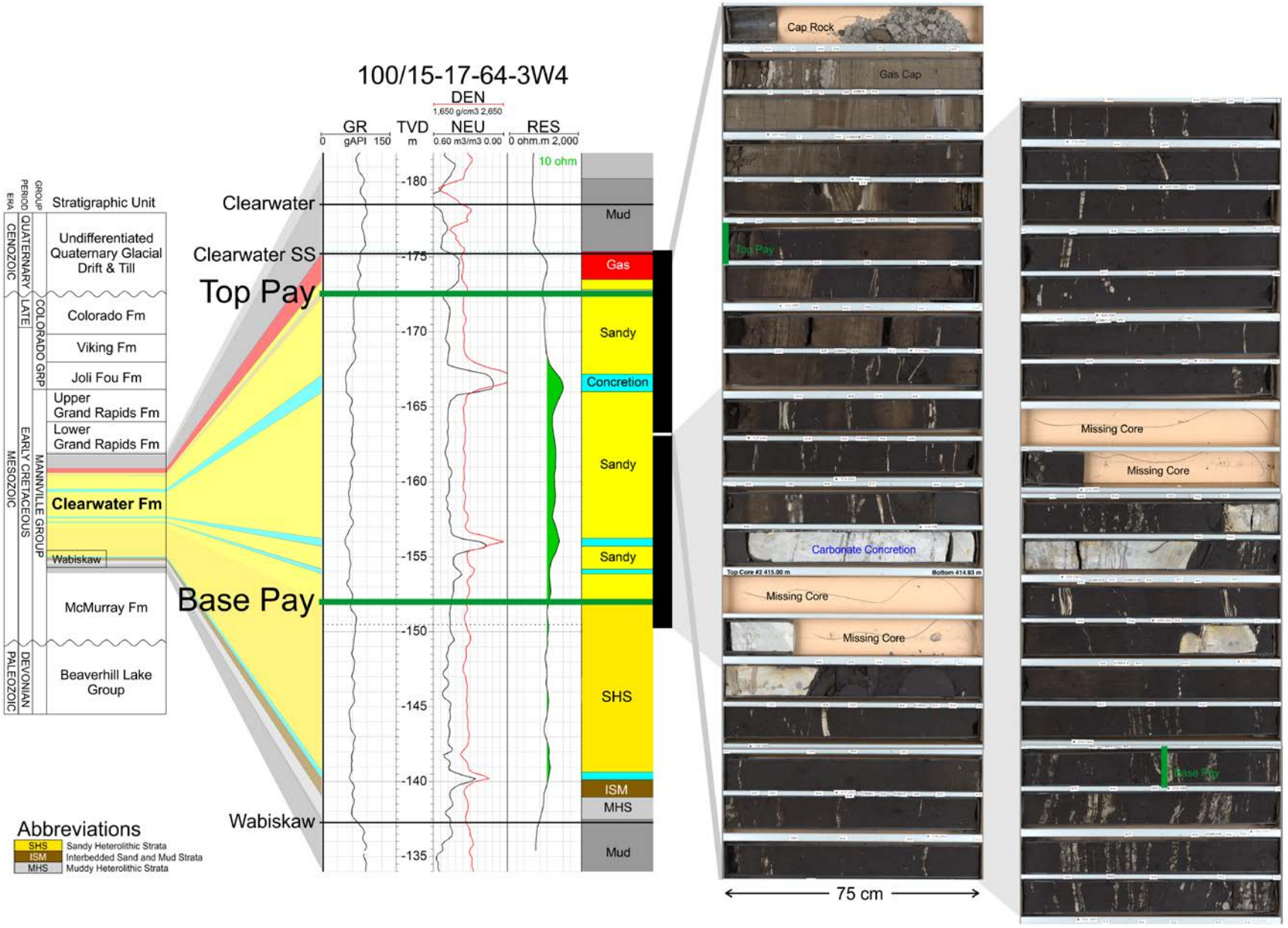


Clearwater SAGD Reservoir – Pay Thickness

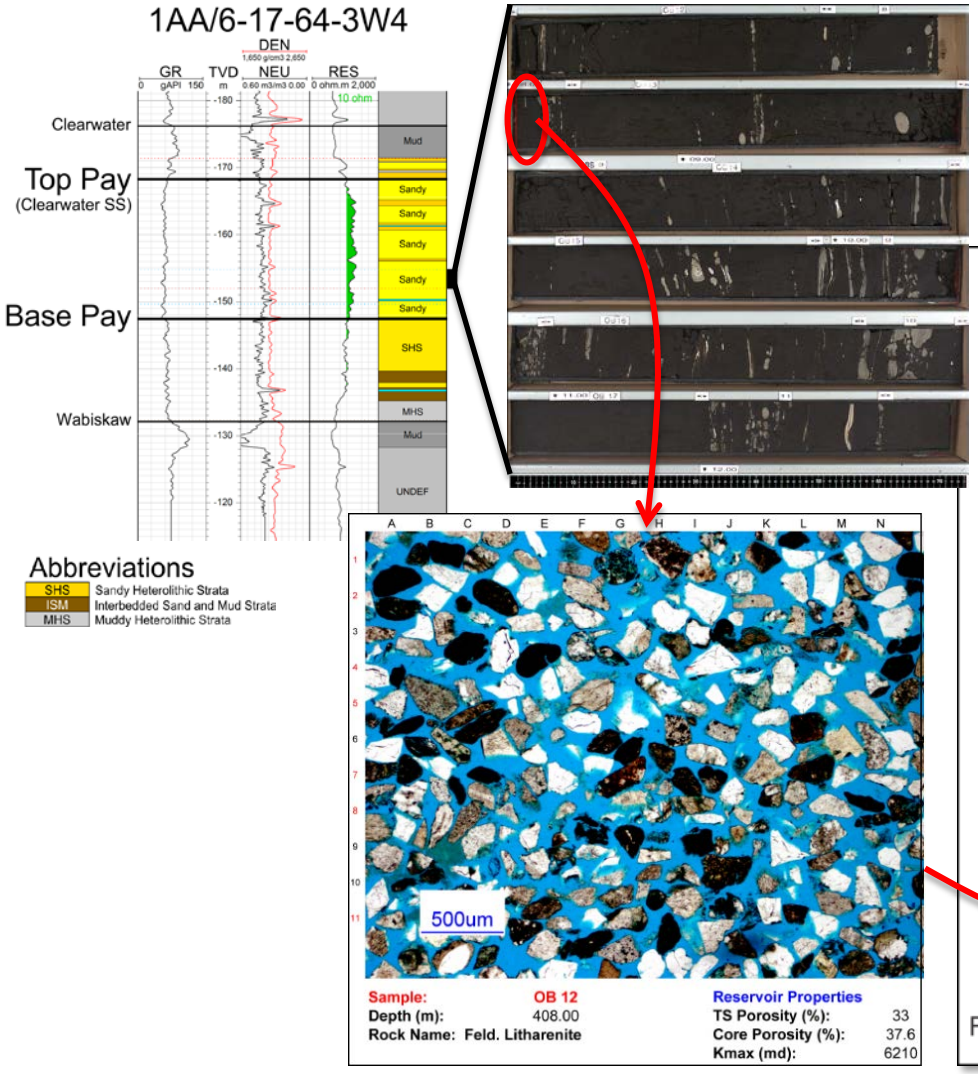
as per Commercial Scheme Approval 10103G



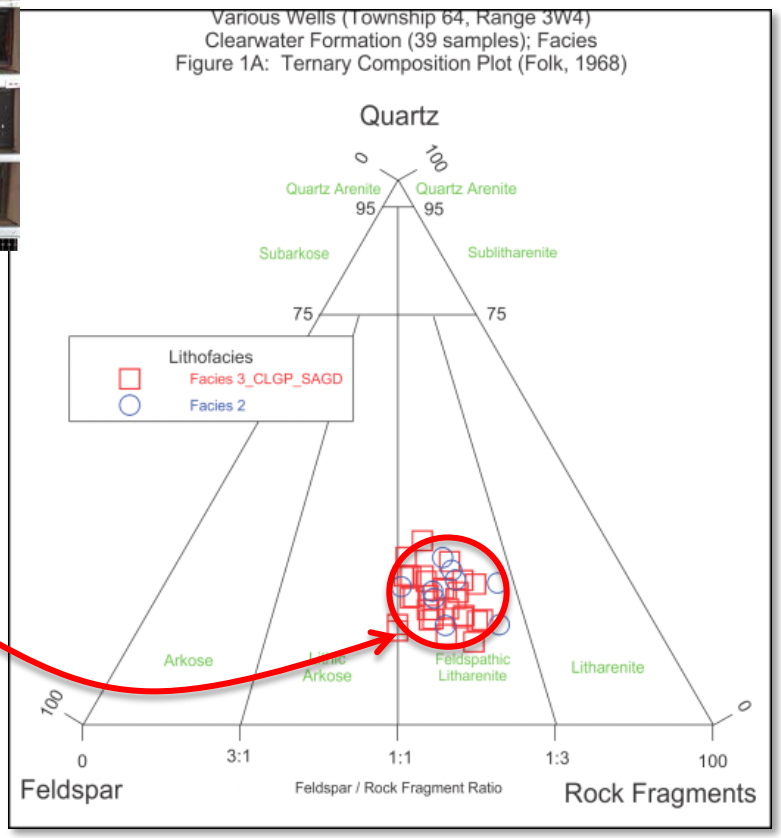
Clearwater Reservoir



Clearwater Sand Mineralogy



- Sand is angular very fine- to fine-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 67 – 70%
- Porosity 32 – 34%
- Thickness 14 – 23 m
- Reservoir Depth ~425 m KB
- Initial Reservoir Pressure 3.2 MPa
- Initial Reservoir Temp 15°C
- Basal water ~10 m below base pay
- Sandy heterolithic strata (SHS) facies between pay and basal water

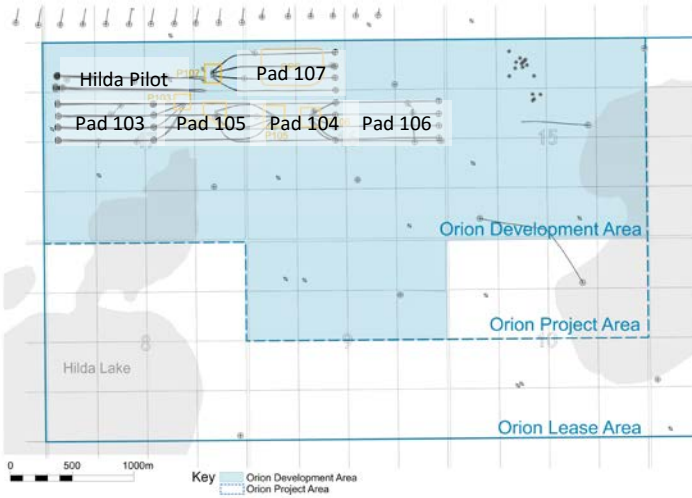
Original Bitumen in Place (OBIP) and Recovery

	Drainage Area, 50 m boundary (10^3 m ^{2})	Average Net Thickness (m)	Porosity (frac)	Oil Saturation (frac)	Total OBIP (10^6 m^2)	Current Recovery %	Estimated Recovery %
Pad 103	300	21.0	0.33	0.70	1.46	31%	60%
Pad 104 *	300	23.0	0.33	0.67	1.53	14%	50%
Pad 105	300	20.0	0.33	0.70	1.39	33%	60%
Pad 106 *	300	23.0	0.33	0.67	1.53	17%	50%
Pad 107	300	20.0	0.33	0.69	1.37	31%	60%
Hilda Lake Pilot	223	20.0	0.33	0.70	1.03	55%	60%
Orion Operating Area	1723	21.02	0.33	0.69	8.29		
Orion Development Area	9208	18.9	0.33	0.69	40.33		
Orion Project Area	10523	18.5	0.33	0.69	45.04		

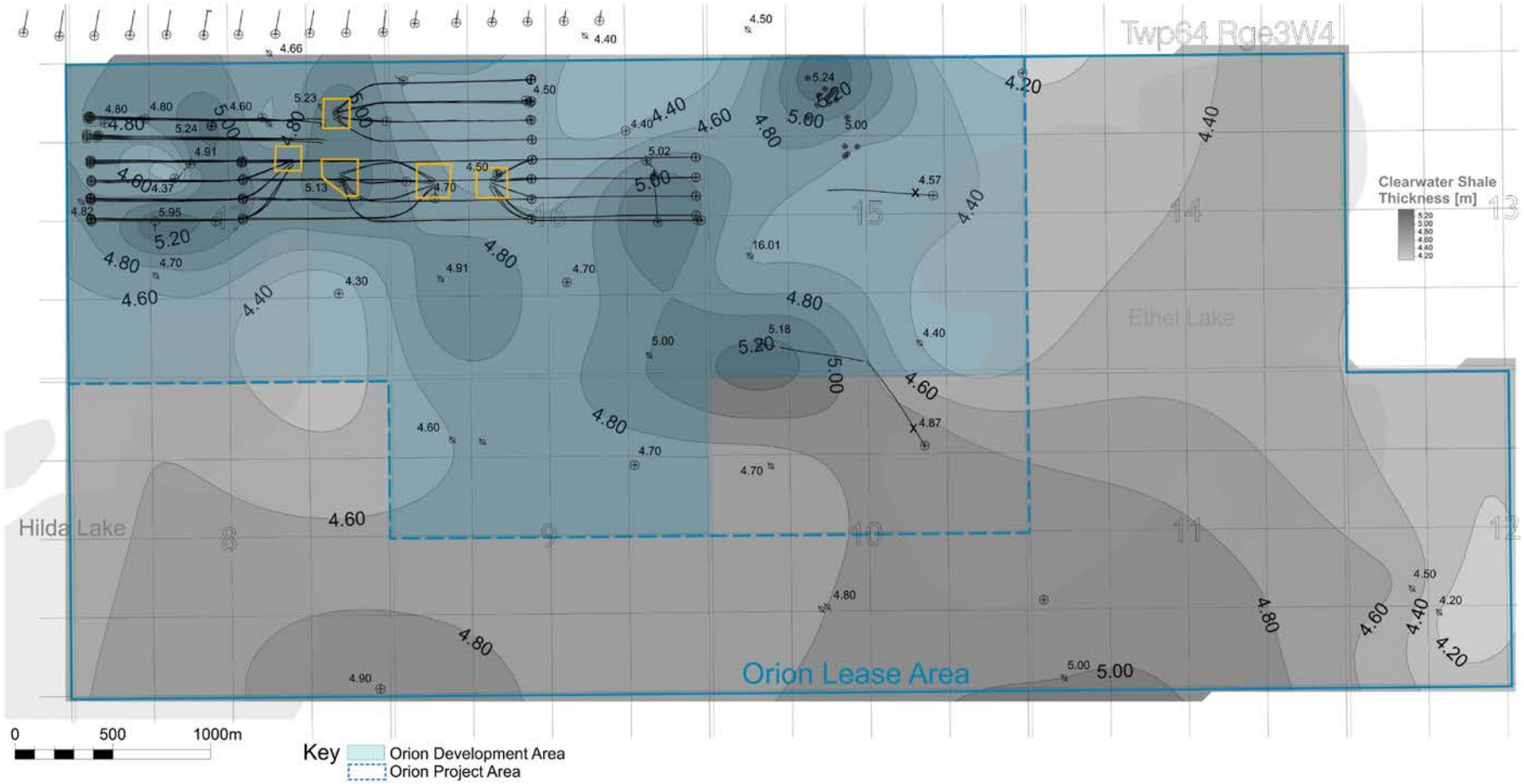
- Net thickness measured from production well to top pay
- All SAGD Pairs ~ 100 m spacing

- Net thickness based on maps TOP to BASE of interpreted Clearwater SAGD Reservoir
- Porosity and oil saturation from logs and core; formation volume factor (FVF) = 1

OBIP = Area x Net Pay x porosity x oil saturation x FVF

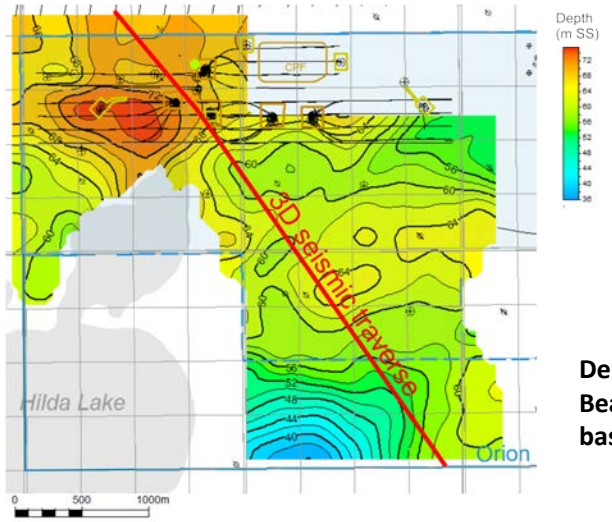


Clearwater Shale – Caprock Thickness



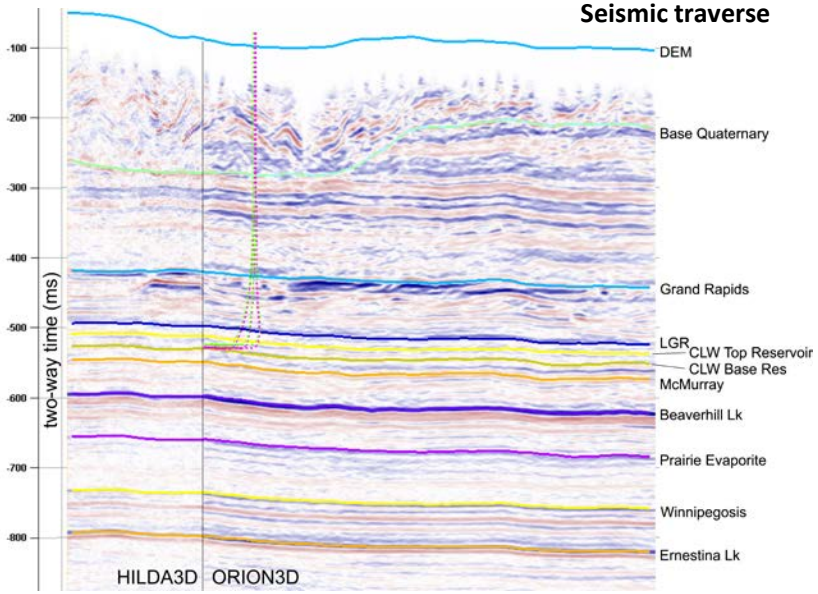
Caprock

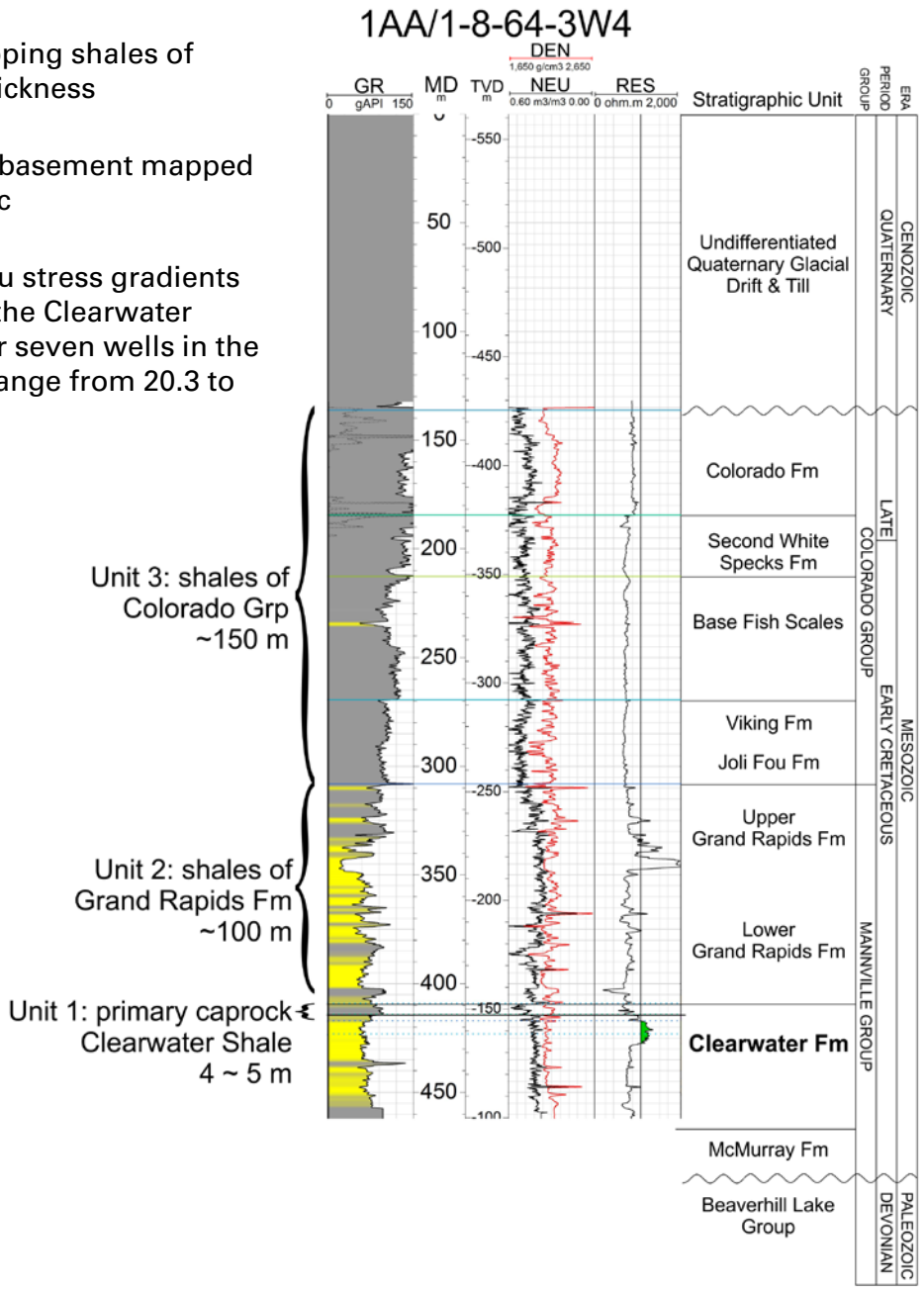
- 3 units of capping shales of significant thickness
- Undisturbed basement mapped on 3D seismic
- Vertical in-situ stress gradients at the top of the Clearwater Formation for seven wells in the Orion lease range from 20.3 to 20.8 kPa/m



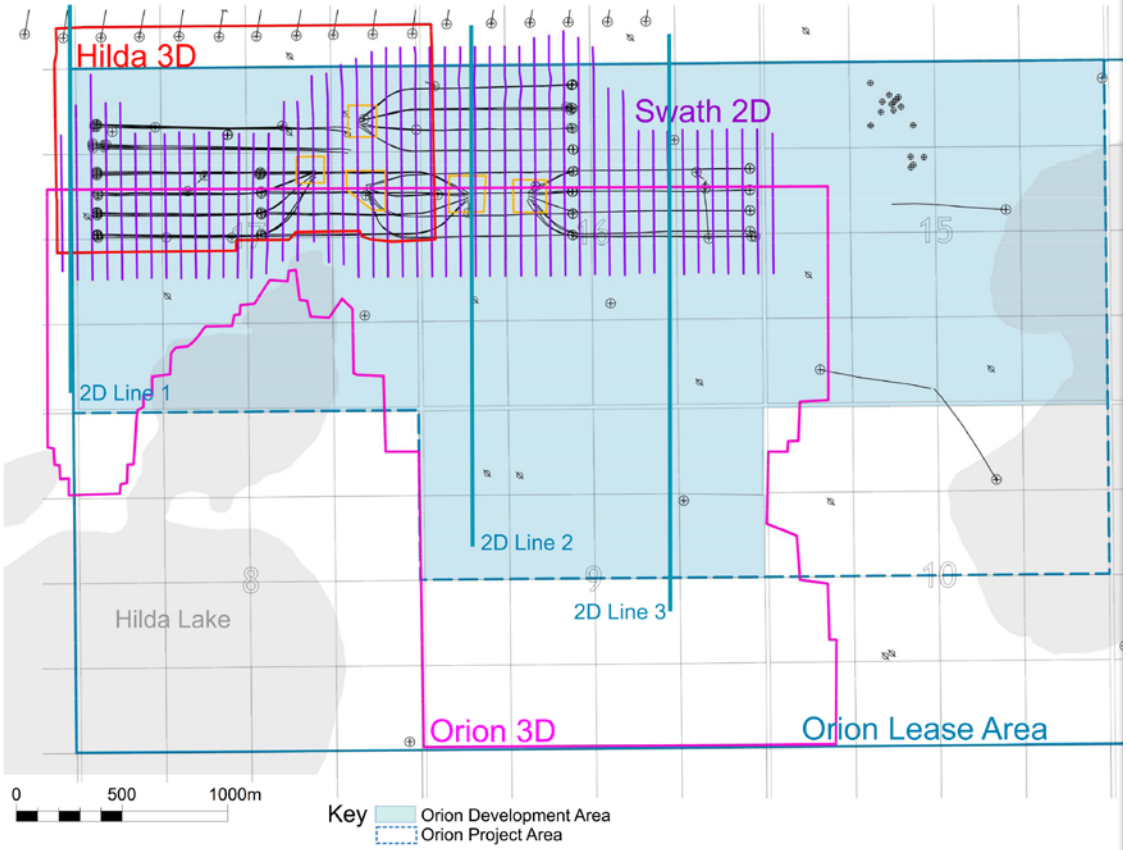
Depth Structure of Beaverhill Lake based on 3D seismic

Seismic traverse





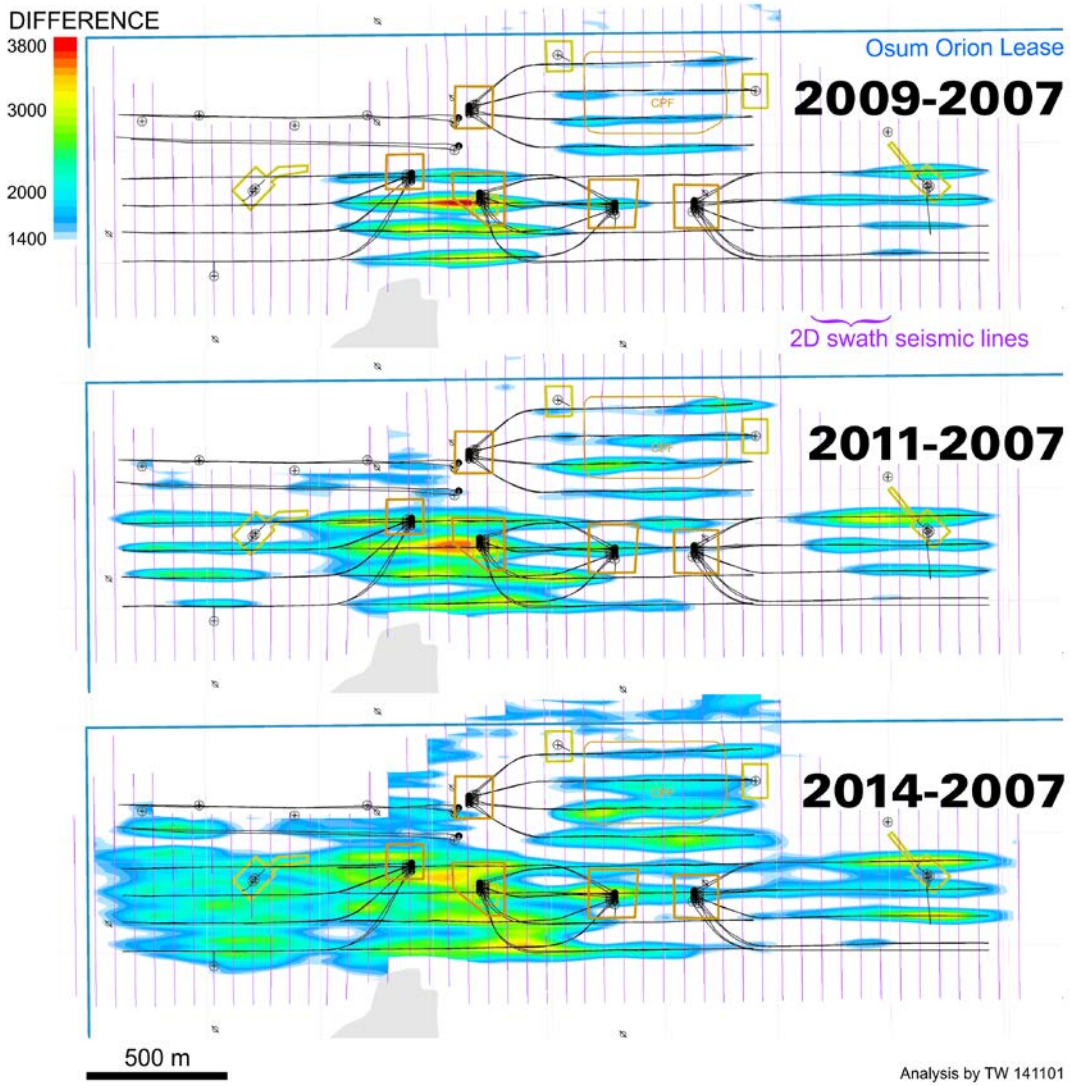
Seismic Data



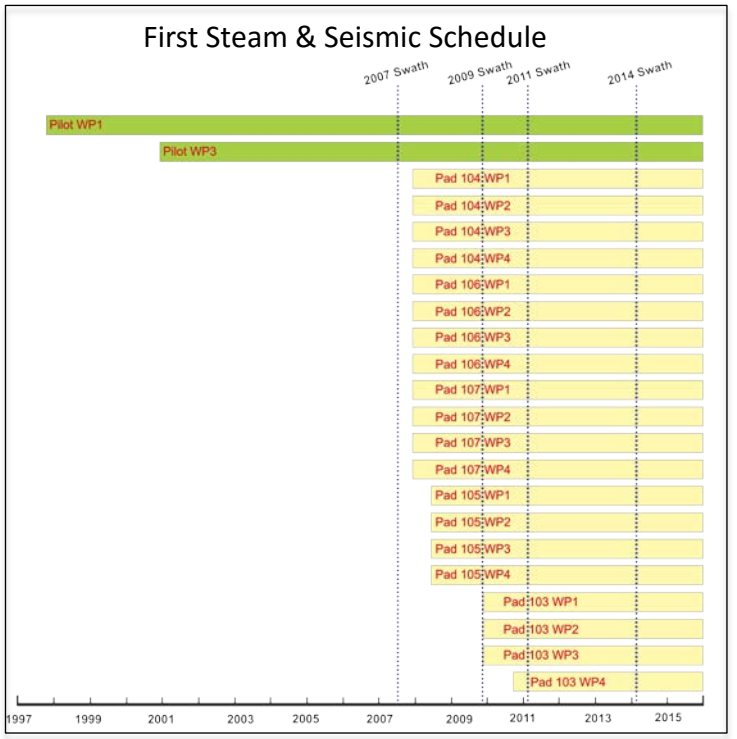
3D, 2D, Swath2D

- Hilda 3D
  March 2005, 1.8 km^2
- 2D seismic
  Blackrock, 2005
- Orion baseline Swath 2D
  July 2007, 50 km
- Orion 3D
  April 2009, 8.4 km^2
  - Orion 3D and Hilda Lake 3D merged December 2015
- Orion monitor1 Swath 2D
  November 2009, 50 km
- Orion monitor2 Swath 2D
  February 2011, 40 km
- Orion monitor3 Swath 2D
  February 2014, 66 km

Repeat Seismic 2D Swath



RMS extractions of quadrature trace amplitude difference in the Clearwater Reservoir interval: 5 ms above to 3 ms below.

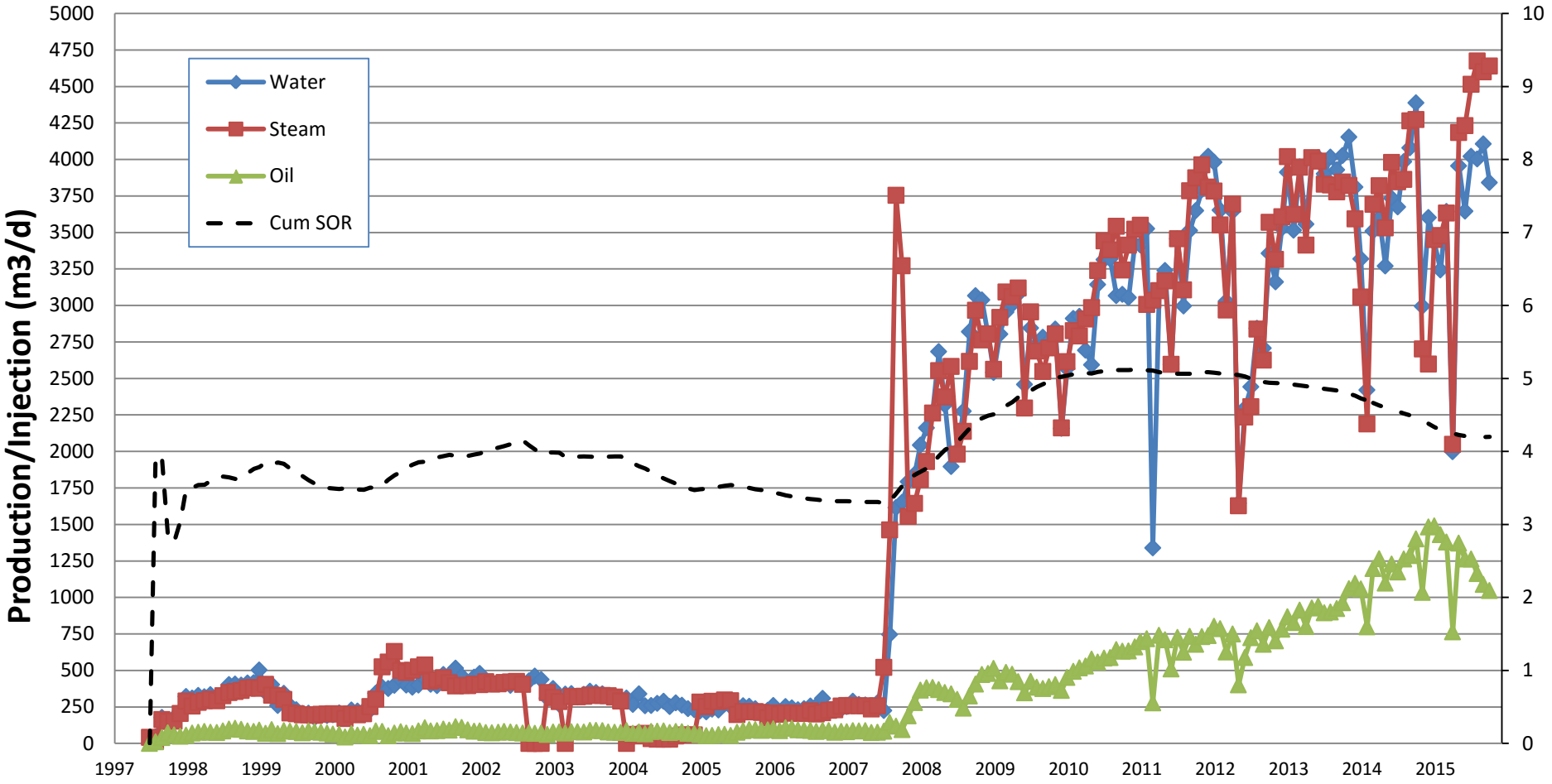


Observations:

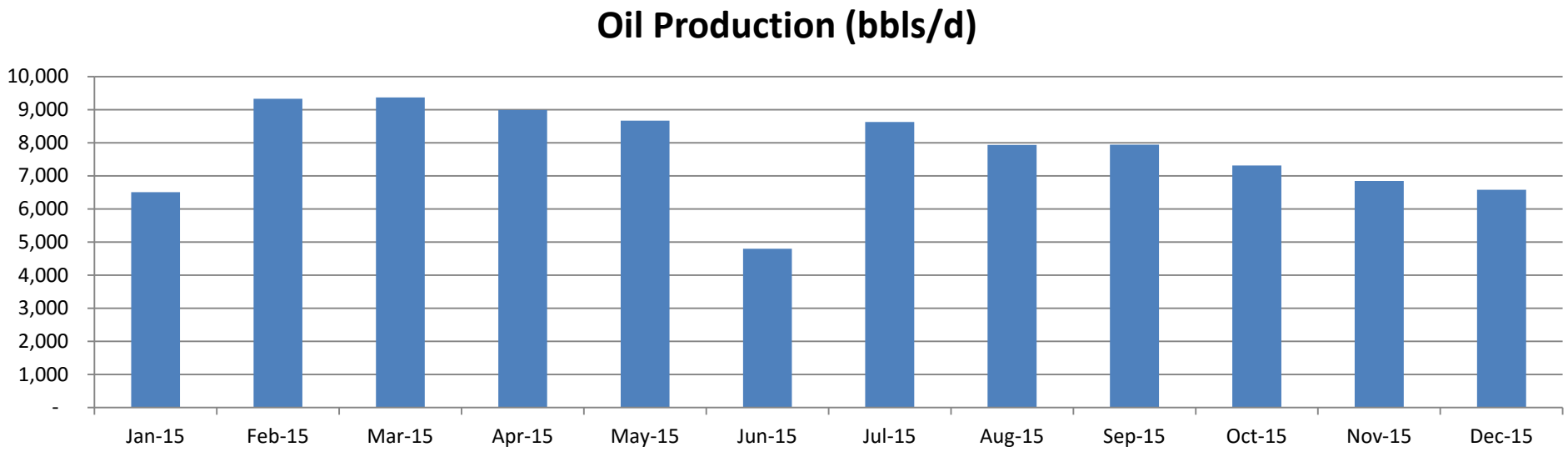
- Good thermal conformance and steam-chamber growth along most of the horizontal well bores
- Good lateral resolution allow estimates of perpendicular reach of steam chambers, to enable in-fill planning

Scheme Performance

Orion Field Production



Orion Update 2015 Production



Well Interventions

- 3 stimulation jobs in 2015
- 5 PCP conversions

Central Plant Facility

- 2015 average production 7736 bopd
- Full facility Turnaround performed in June 2015

Well Stimulations

- 3 EDTA stimulations were conducted on the following wells in 2015:
  - P105-P4: 60 m3 10% EDTA Solution; Feb. 2015
  - P105-P4: 40 m3 10% EDTA Solution; Oct. 2015
  - Pilot P3: 18 m3 10% EDTA Solution April 2015

  These stimulations were conducted on producer wells that had not been perforated, mainly to improve inflow by removing suspected calcium carbonate scaling.

Orion Production Performance

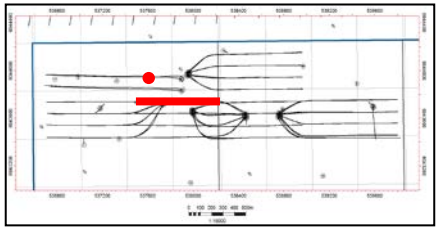
- 2015 production averaged 7736 bbl/d, peak monthly production of 9326 bbl/d
- Rates declined Q3/4 2015 as pressure dropped in the reservoir, and lift issues were encountered on some pads.
- Pressure declined as a result of boiler reliability issues resulting in steam injection shortfalls in the latter part of 2014 and the first half of 2015.
- Following comprehensive mechanical remediation of the (two) boilers, boiler reliability and steam injection rates have significantly improved and averaged ~4600 m3/d for Q3/4 2015.
- High, consistent steam rates will be utilized to re-pressure steam chambers
- With the pressure decline in the steam chambers the following occurred:
    - Production from wells on natural flow dropped off sharply. Four of these wells were equipped with PCP pumps in December in order to improve production rates.
    - There was also a loss of thermal energy within the steam chambers leading to a temperature decline and increased viscosity of the mobilized bitumen.

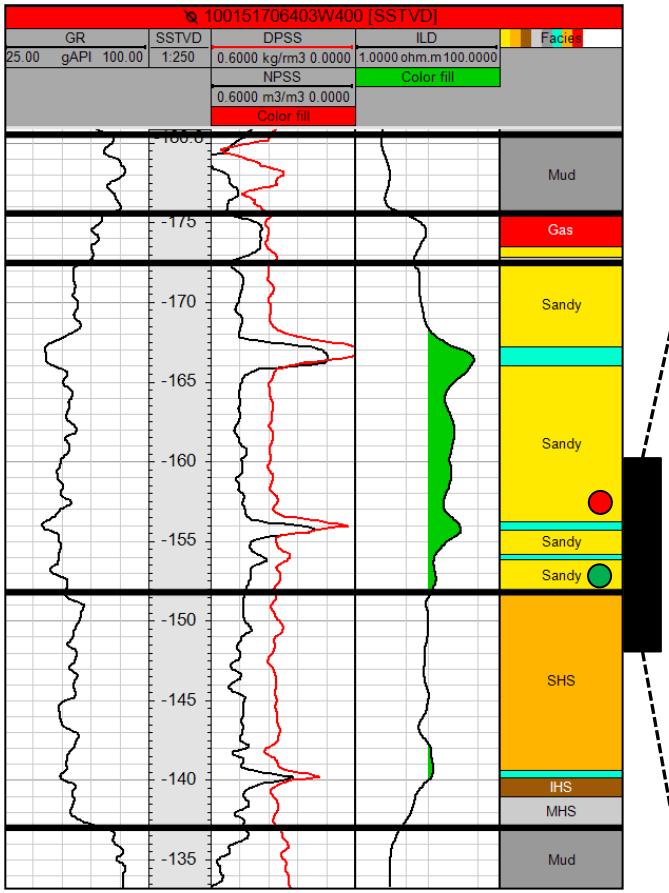
Orion SAGD Pressure Scheme

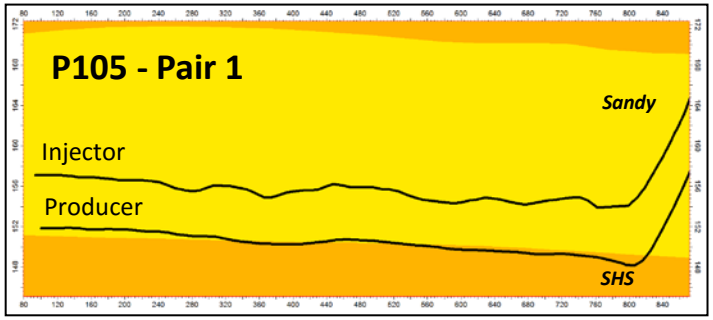
- Osum would ideally have liked to maintain a constant SAGD chamber pressure of 3.0 - 3.7 MPa until late life SAGD operations. However the Q1/2 2015 boiler reliability challenges led to end-2015 pressures ranging from 2.4 – 3.2 MPa.

- Osum has significantly improved boiler reliability and overall capacity, thus increasing the overall steam injection for the latter half of 2015. Osum has stabilized reservoir pressures and is gradually building pressure in several areas of the field.

Good Well Placement – Pilot, Pad 103, Pad 105

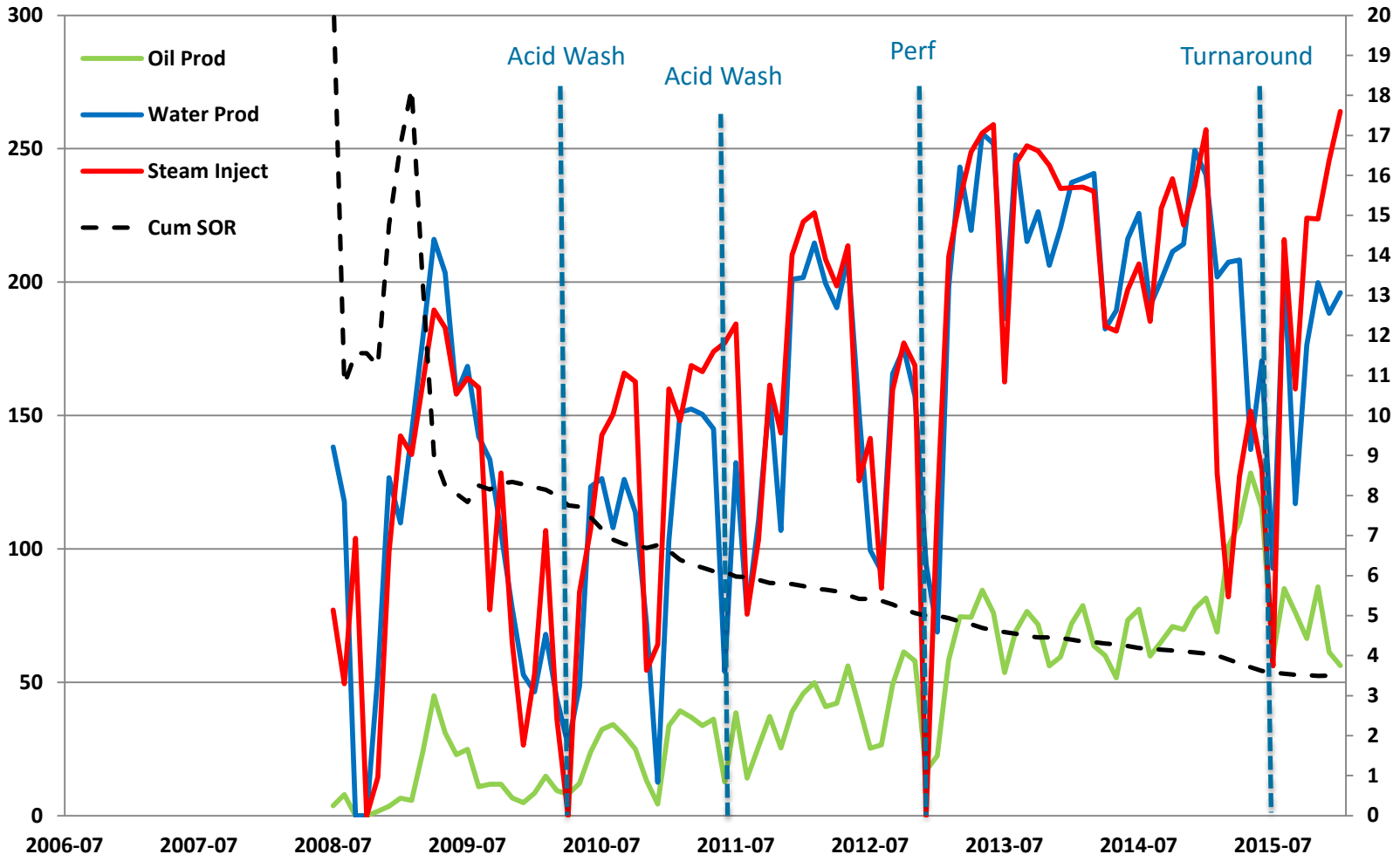




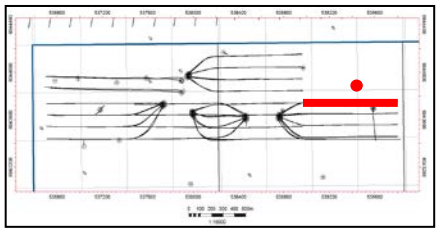


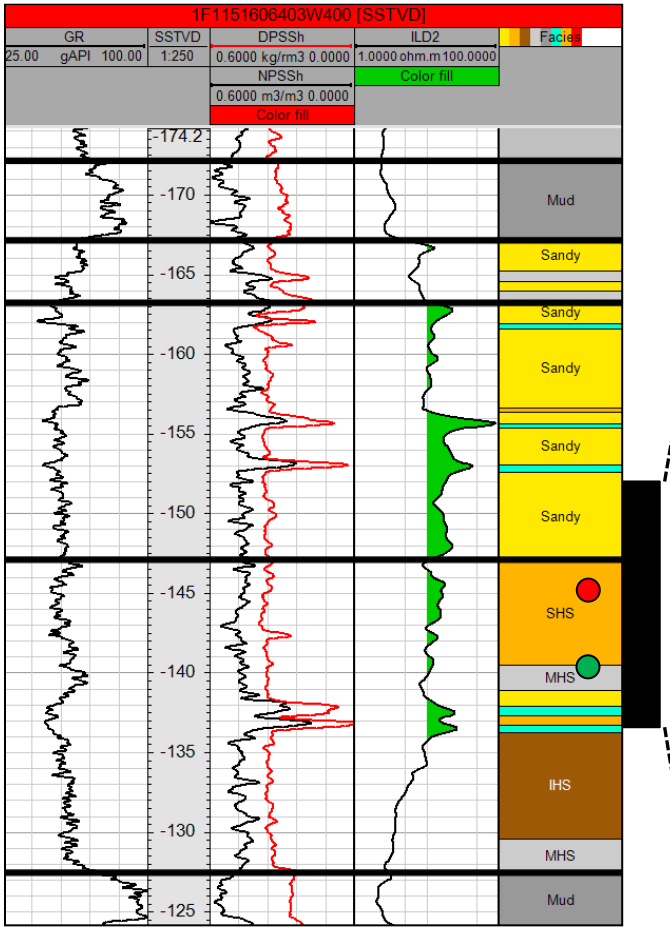
Well 105-P1 - Good Performance Well Pair

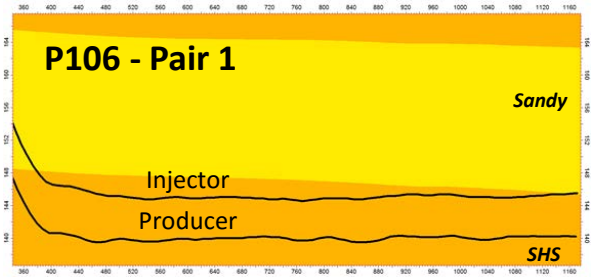
Well placed in high quality facies, high rate potential

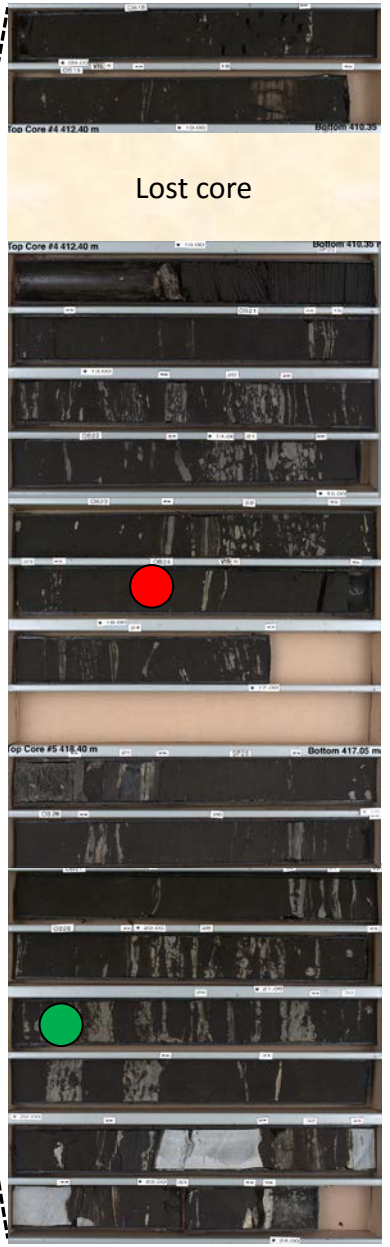


Well Placement
Too Low – Pads 104 & 106



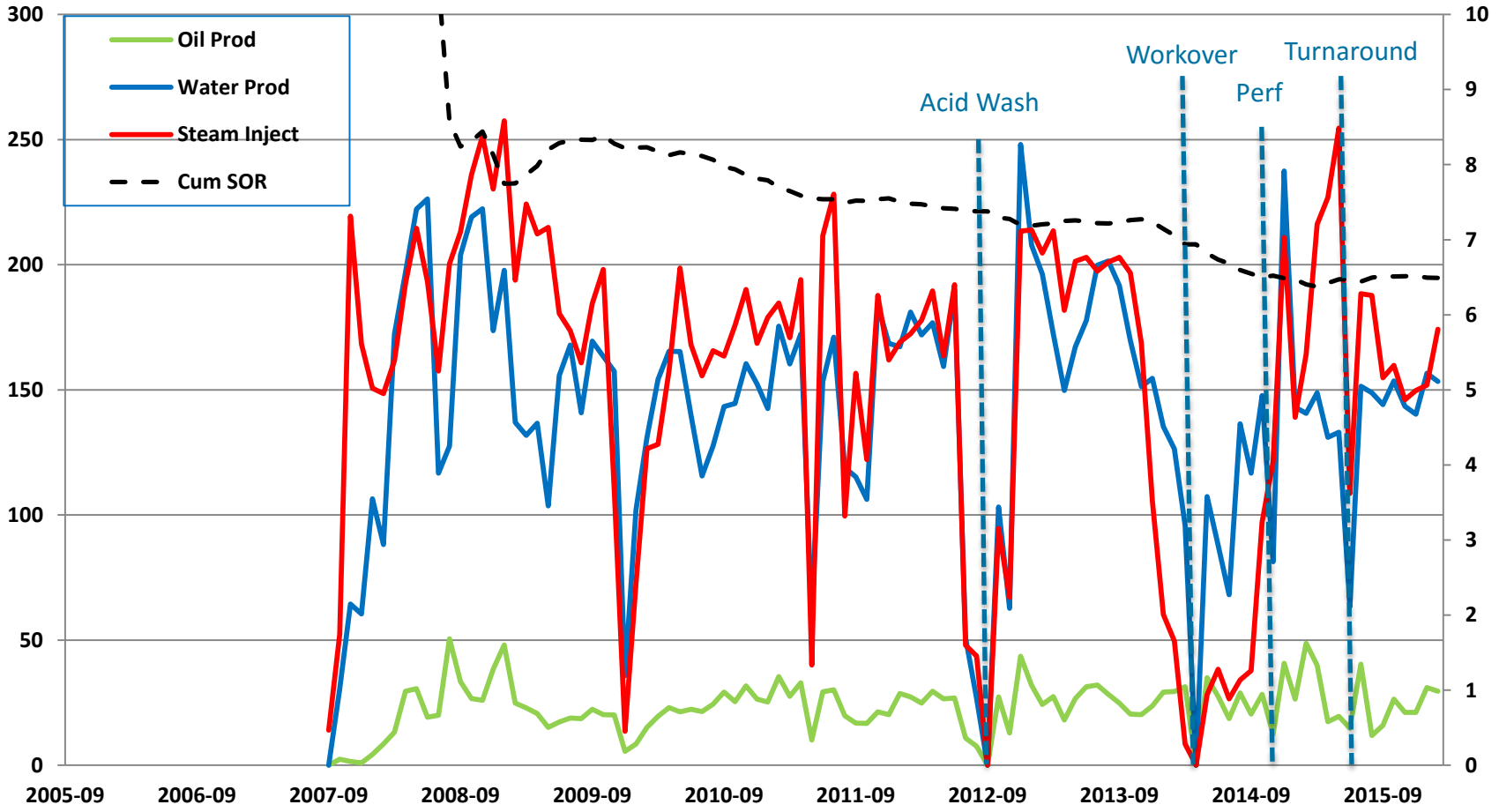




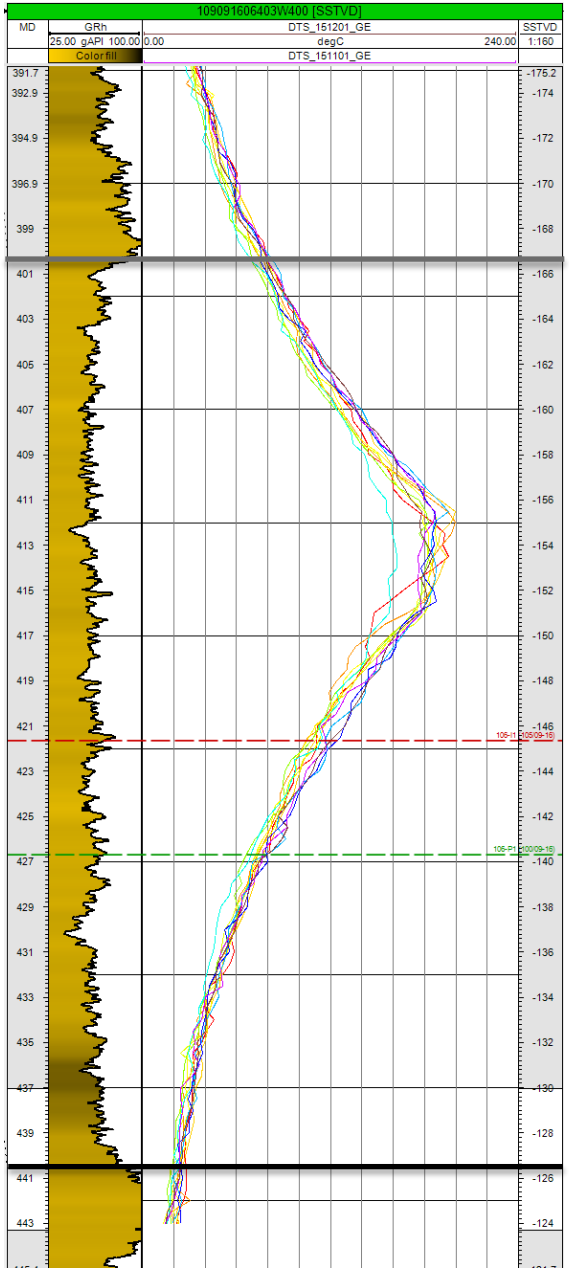


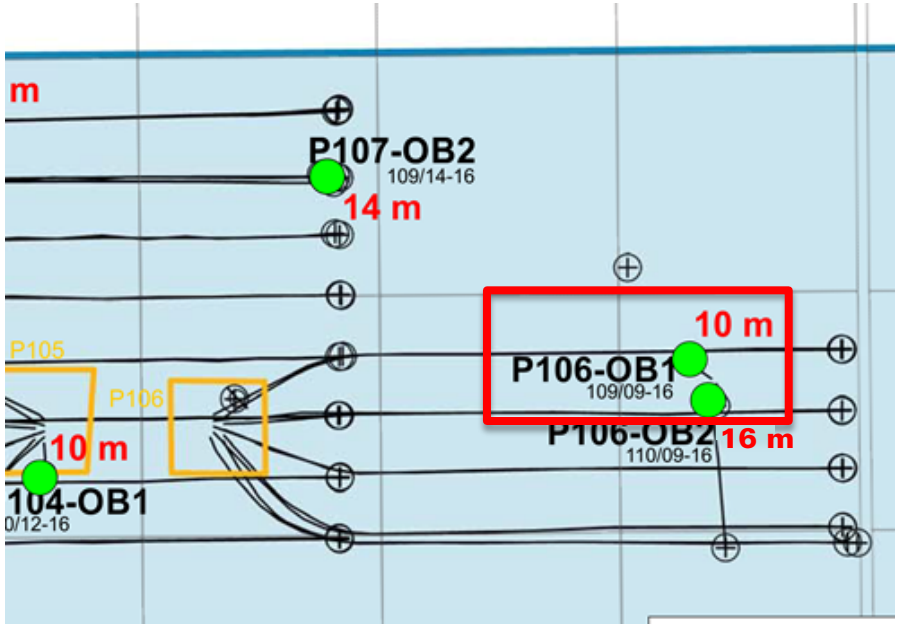
Well 106-P1 - Poor Performance Well Pair

*injector and producer placed in sandy heterolithic sands, impact on production



P106-OB1 (109/09-16-064-03W400)

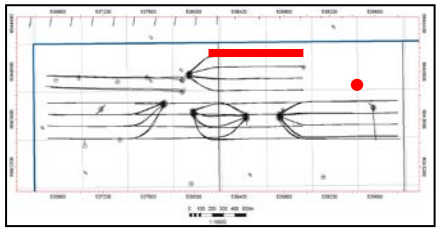


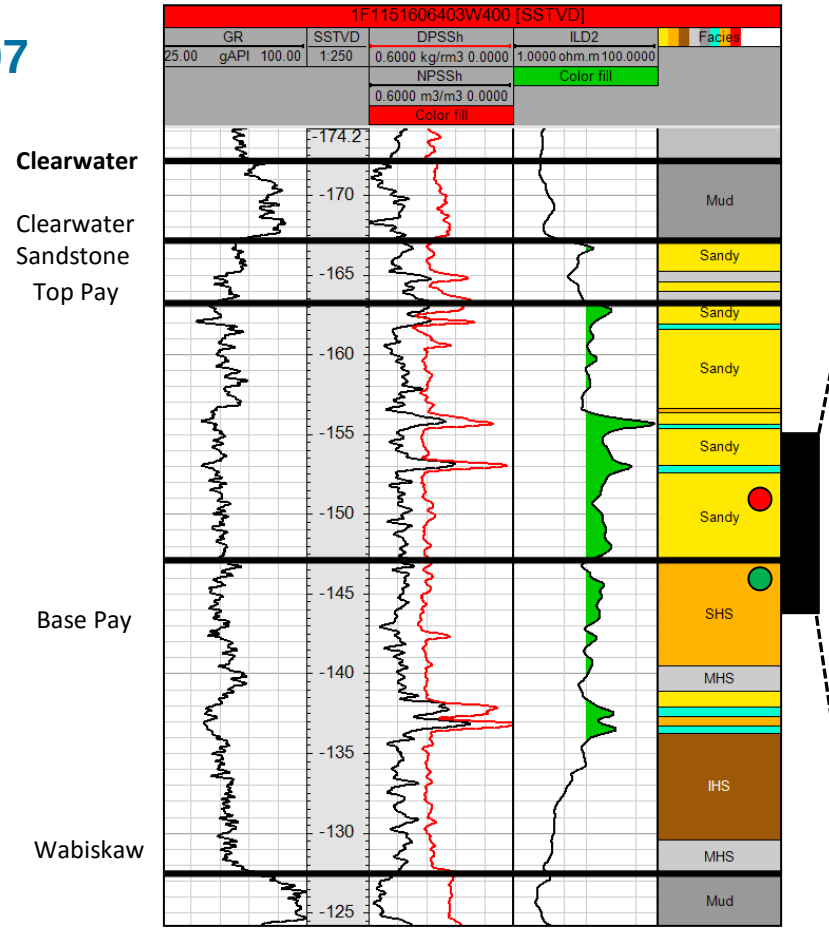


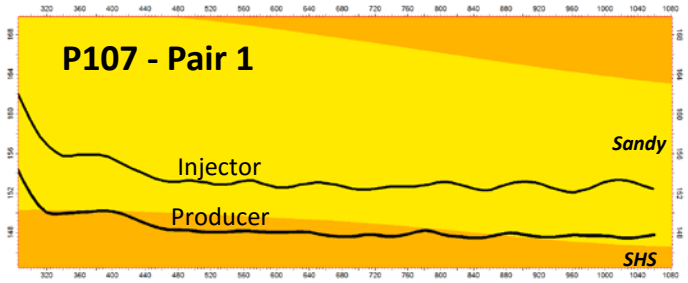
- Distance to Nearest Horizontal: 10m
  - (105/09-16 – P106-I1)
- Steam chamber development occurring

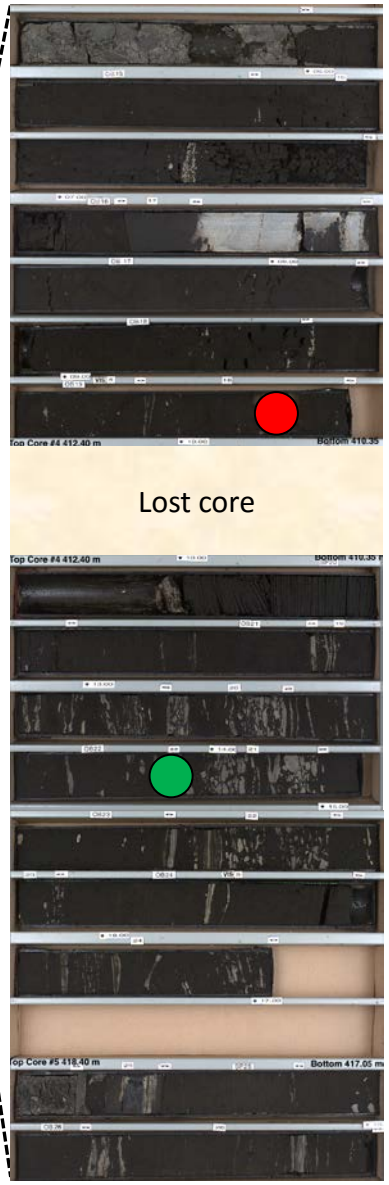
01-Jan-2015	01-Sep-2015
01-Feb-2015	01-Oct-2015
01-Mar-2015	01-Nov-2015
01-Apr-2015	01-Dec-2015
01-May-2015	Top of CLW
01-Jun-2015	Base of CLW
01-Jul-2015	Injector - **P106-I1 (105/09-16)**
01-Aug-2105	Producer - **P106-P1 (100/09-16)**

Moderate Well Placement – Pad 107



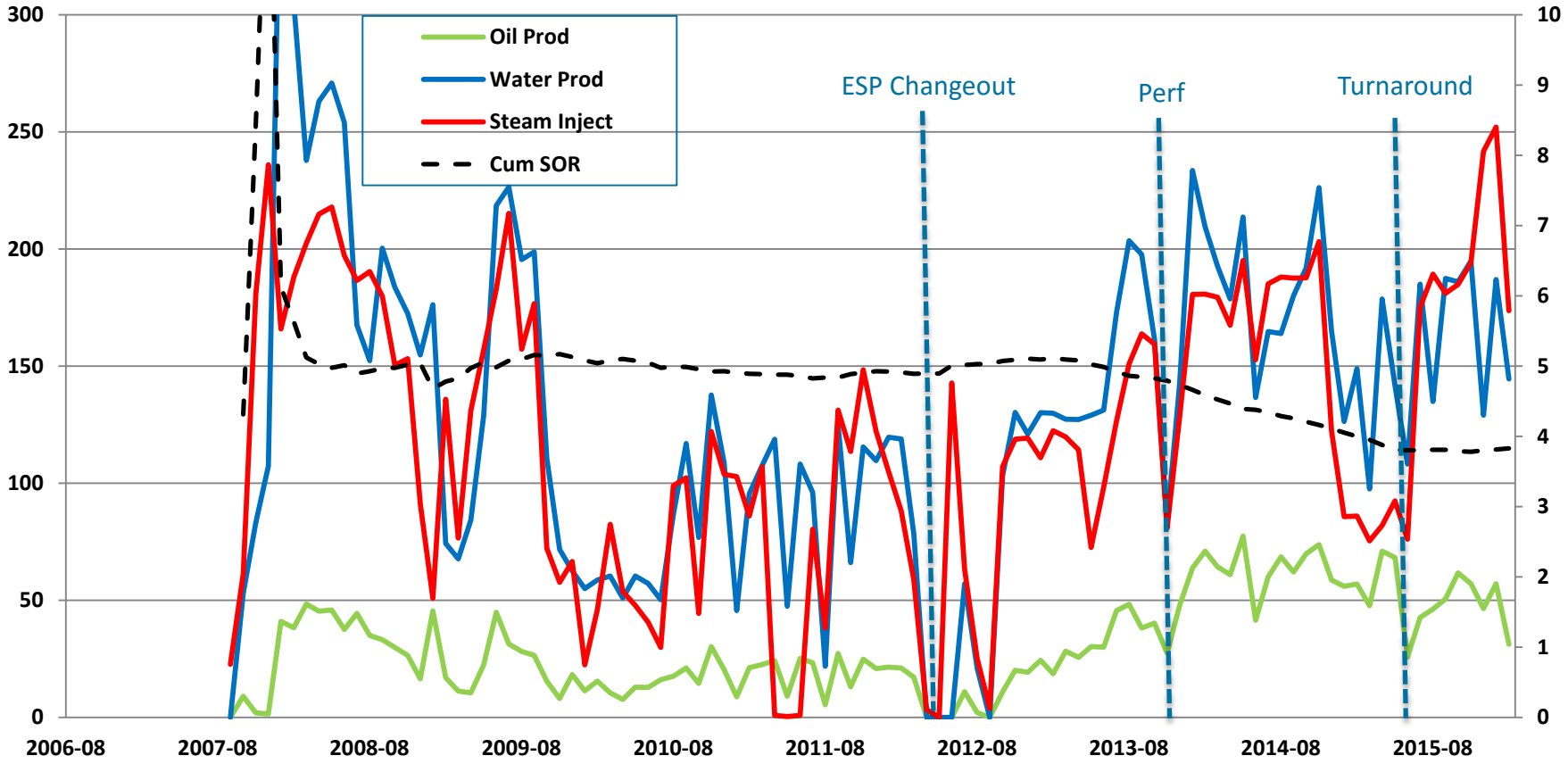




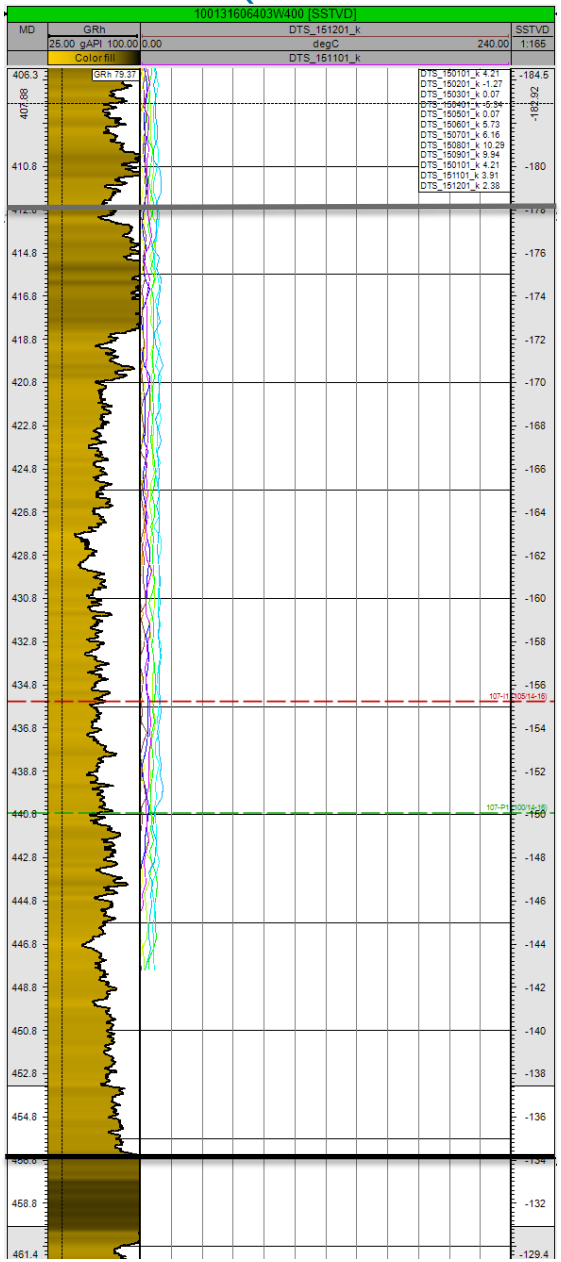


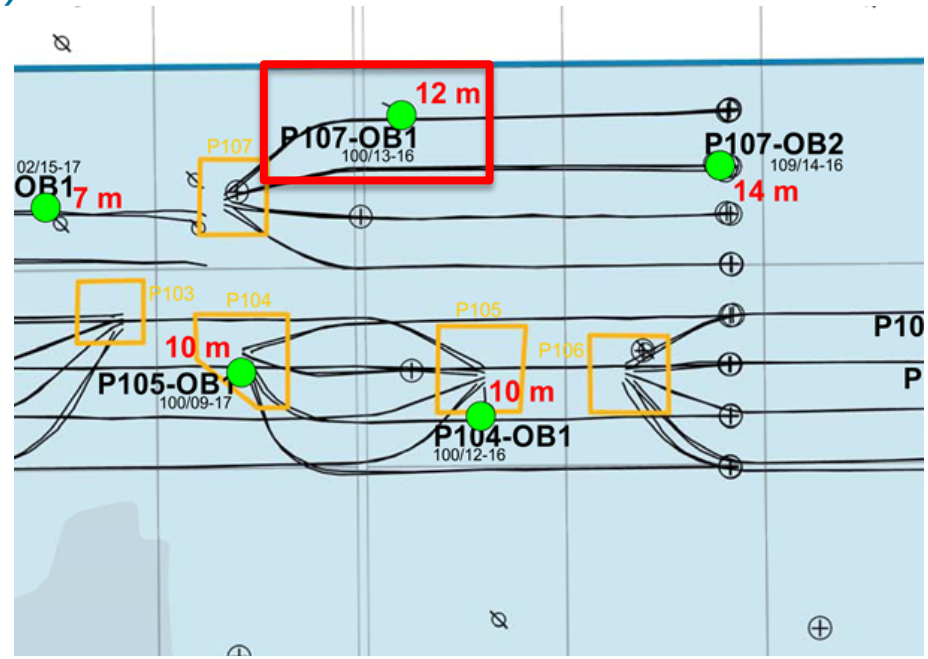
Well 107-P1 - Medium Performance Well Pair

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



P107-OB1 (100/13-16-064-03W400)

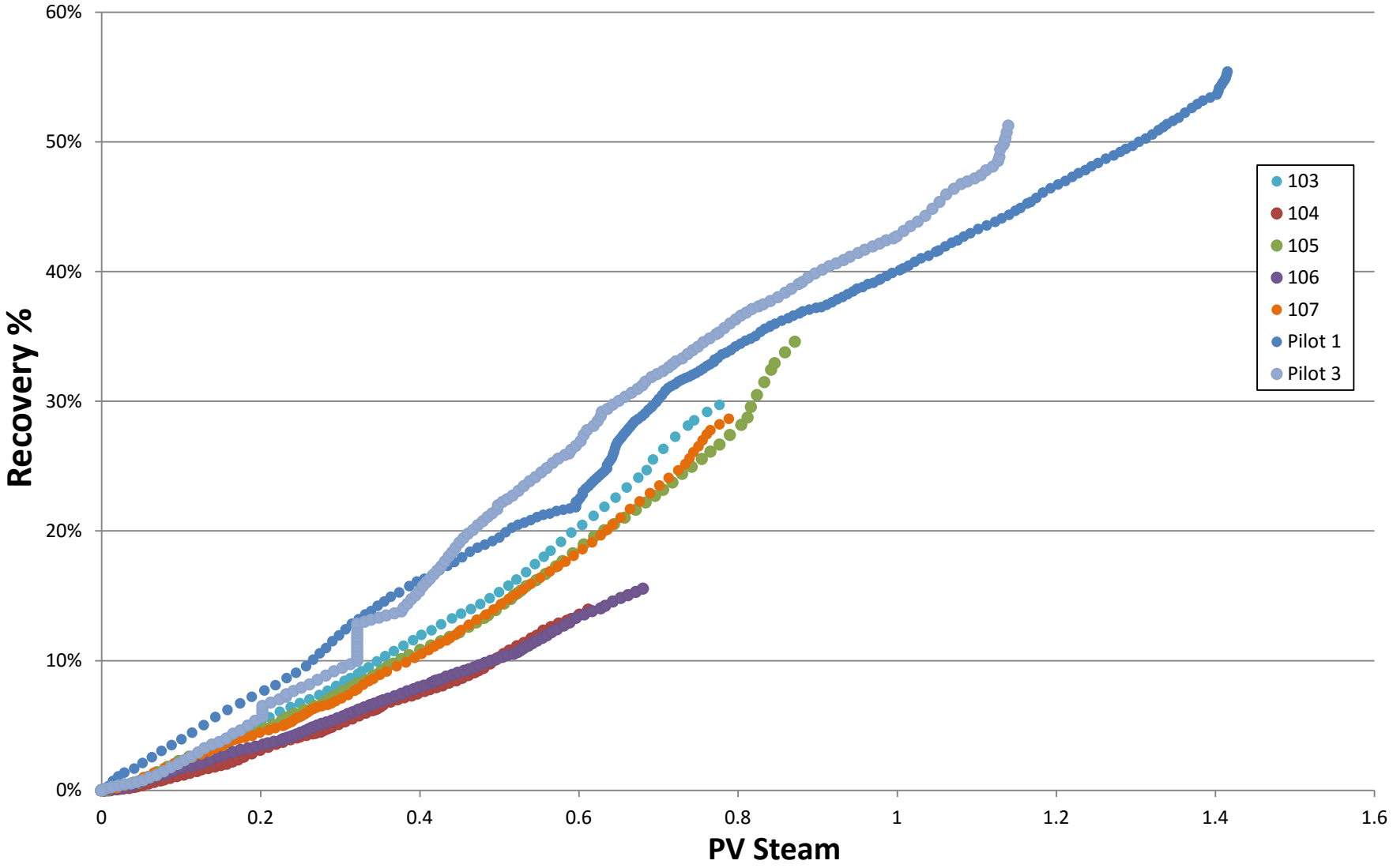




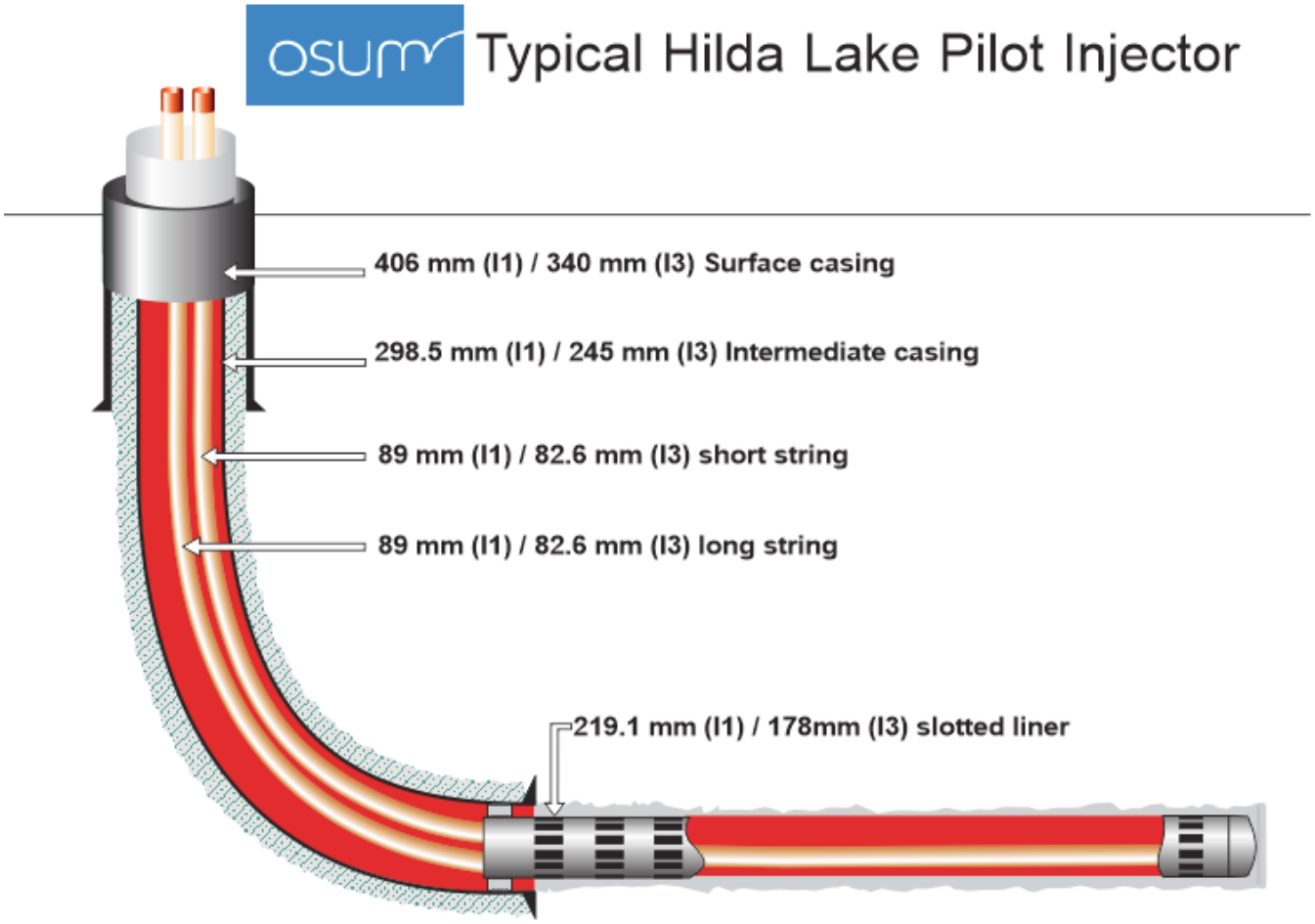
- Distance to Nearest Horizontal: 12m
- (105/14-16 – P107-I1)
- Confirm calibration; fiber failed

01-Jan-2015	01-Sep-2015
01-Feb-2015	01-Oct-2015
01-Mar-2015	01-Nov-2015
01-Apr-2015	01-Dec-2015
01-May-2015	Top of CLW
01-Jun-2015	Base of CLW
01-Jul-2015	Injector - **P107-I1 (105/14-16)**
01-Aug-2105	Producer - **P107-P1 (105/14-16)**

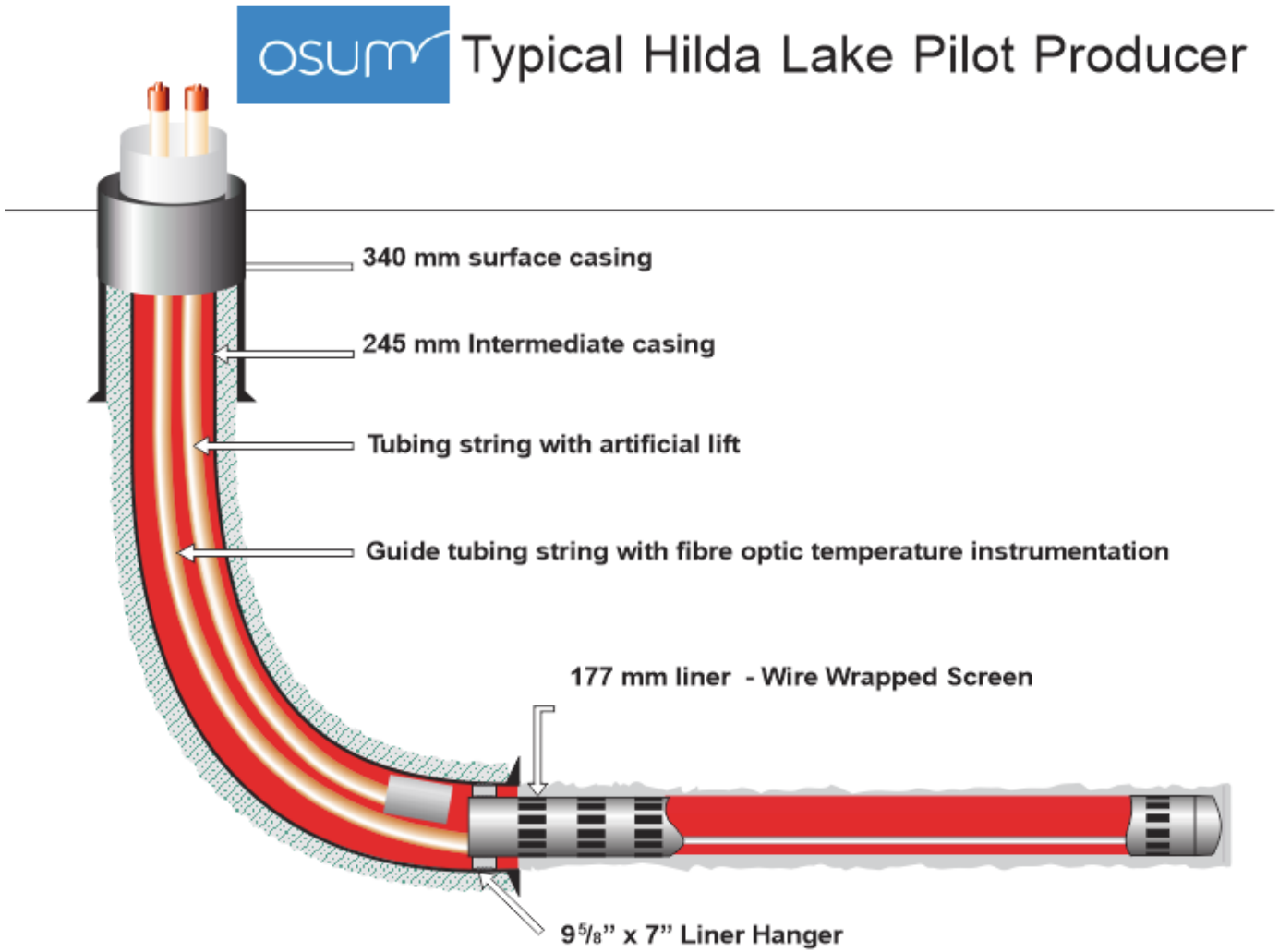
Pad Recovery & Performance



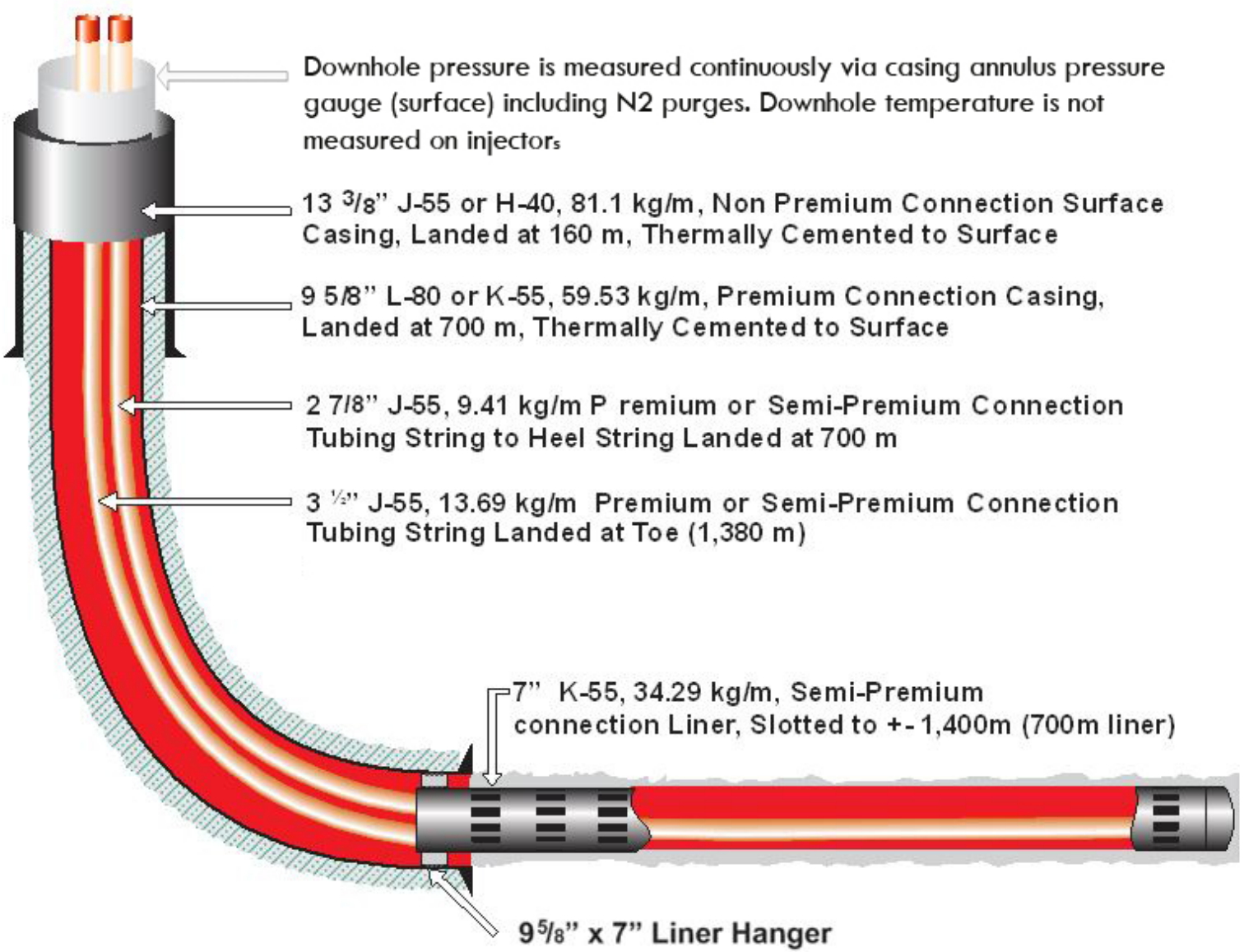
Hilda Lake Pilot Injector Schematic



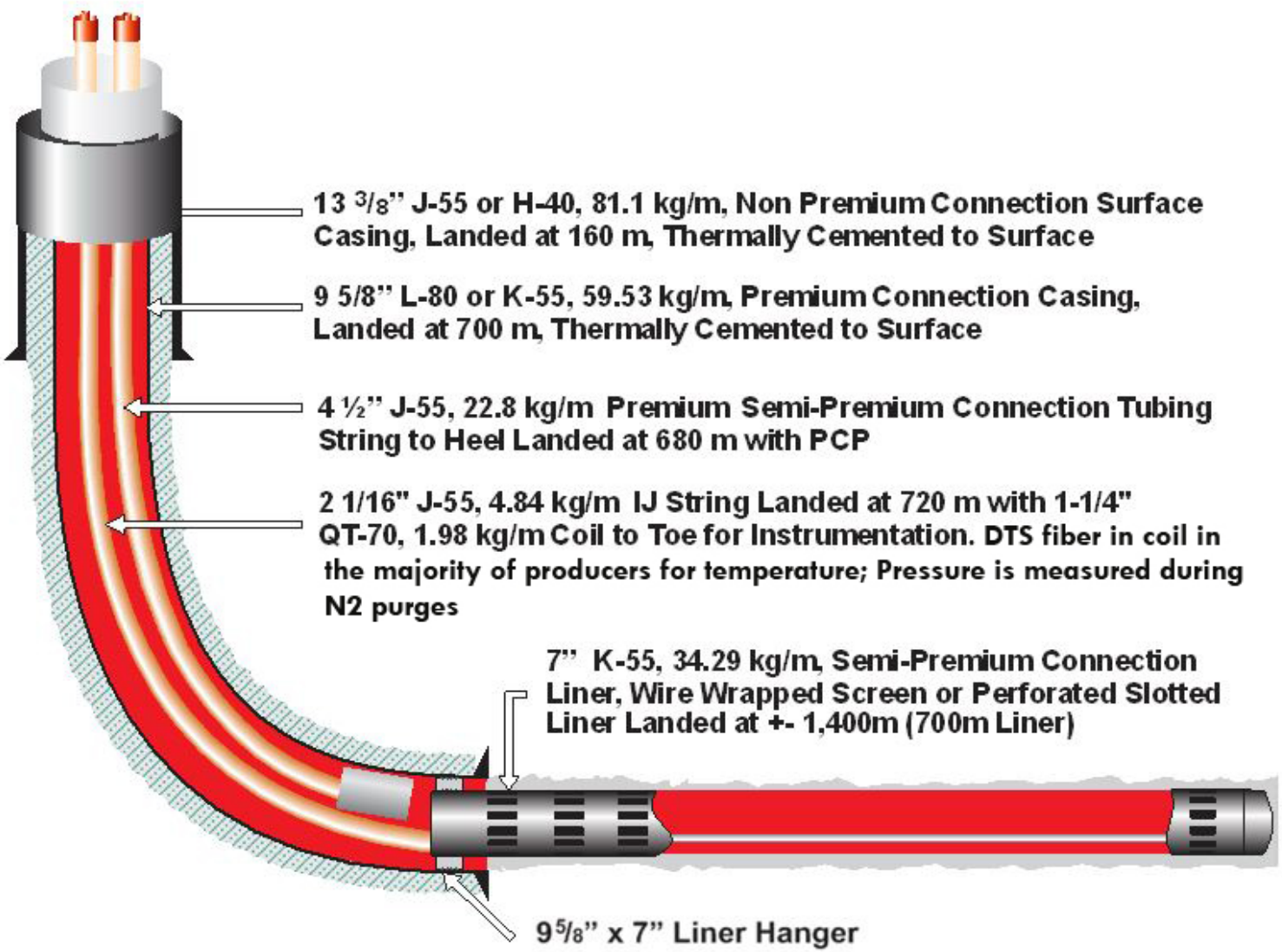
Hilda Lake Pilot Producer Schematic



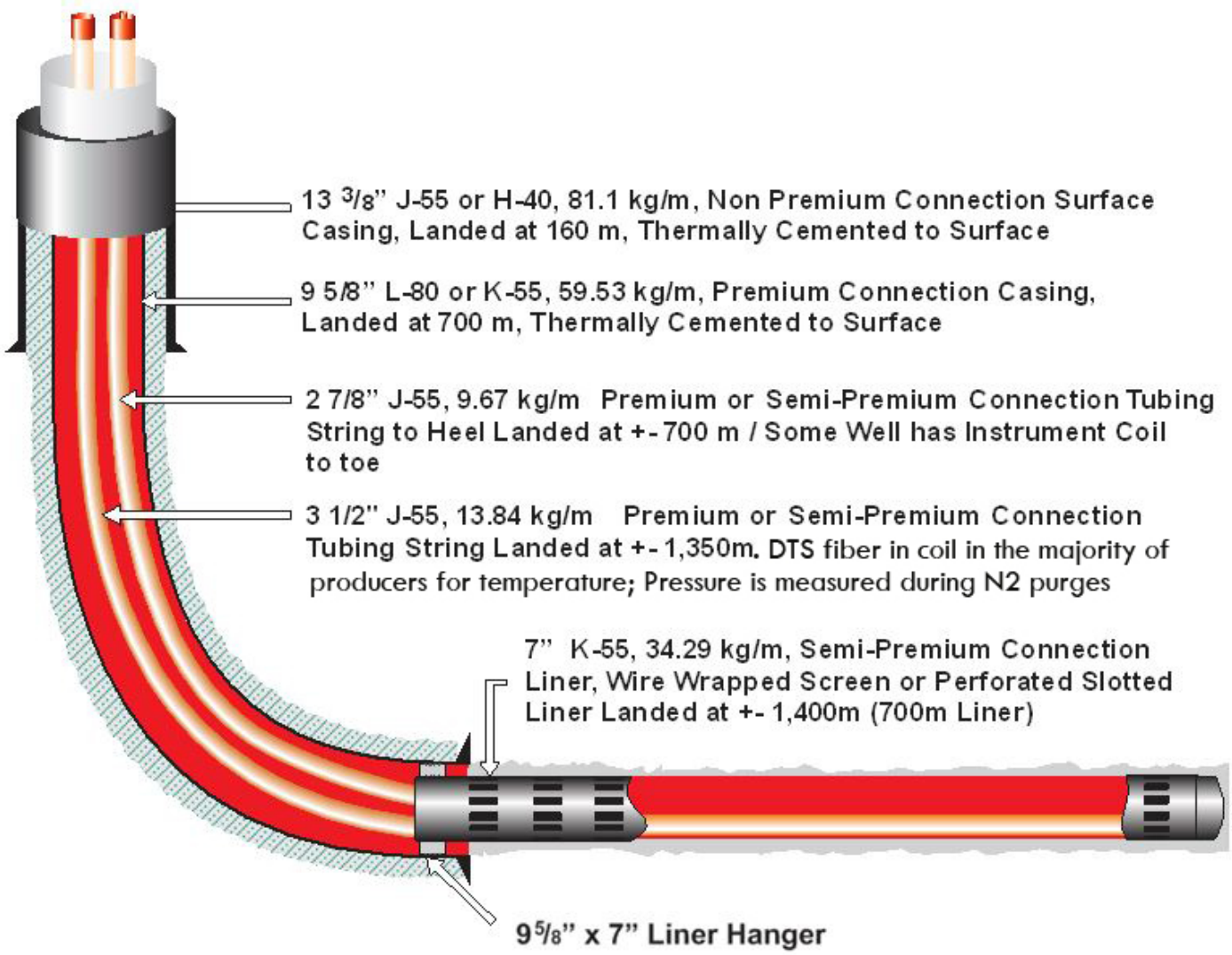
Typical Phase 1 Injector Completion



Typical Phase 1 Producer Completion – PCP

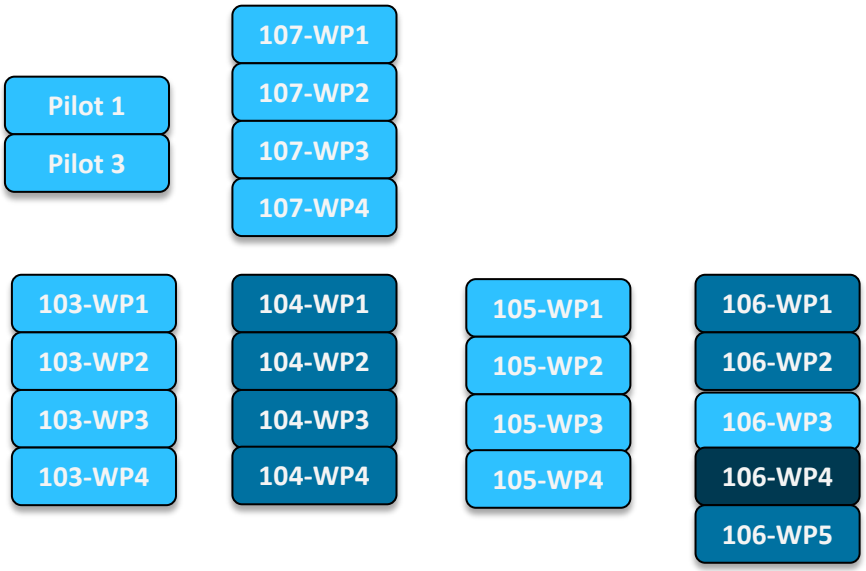


Typical Phase 1 Producer Completion – Steam Lift



Artificial Lift – Orion Wells

PCP SAGD	15 Wells
Natural Lift SAGD	7 Wells
Redrilled	1 Well

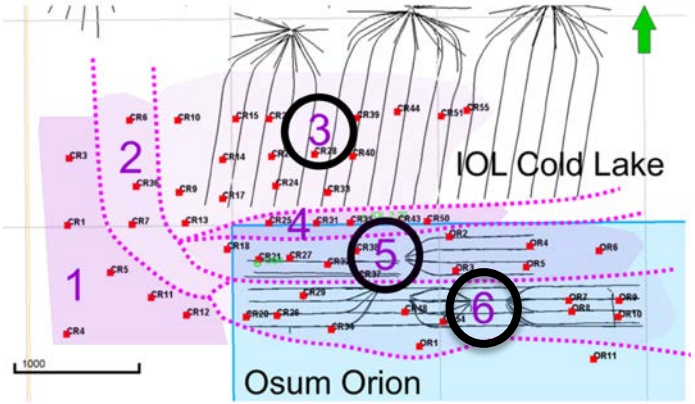


Criteria	All Metal PCP
Operating Temperature Range	350 °C
Rate	100 -370 m3/d 100 -350 RPM

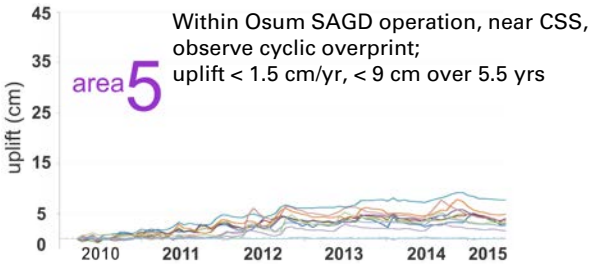
2015 Conversions	
P3	ESP to MTM
103P1	Natural Lift to MTM
103P3	
103P4	
105P2	

Ground Uplift Monitoring

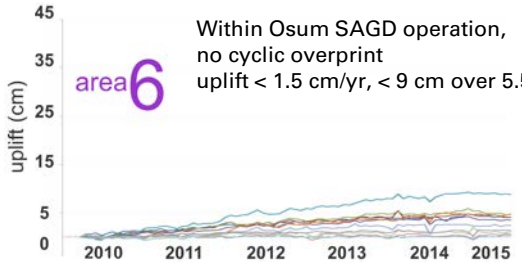
- Ground deformation measured with InSAR since March, 2010
- 53 corner reflectors; 938 coherent targets



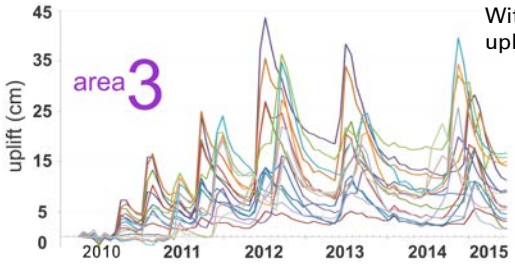
Map location of InSAR corner reflectors assigned to areas 1-6



Within Osum SAGD operation, near CSS, observe cyclic overprint;
uplift < 1.5 cm/yr, < 9 cm over 5.5 yrs



Within Osum SAGD operation, no cyclic overprint
uplift < 1.5 cm/yr, < 9 cm over 5.5 yrs

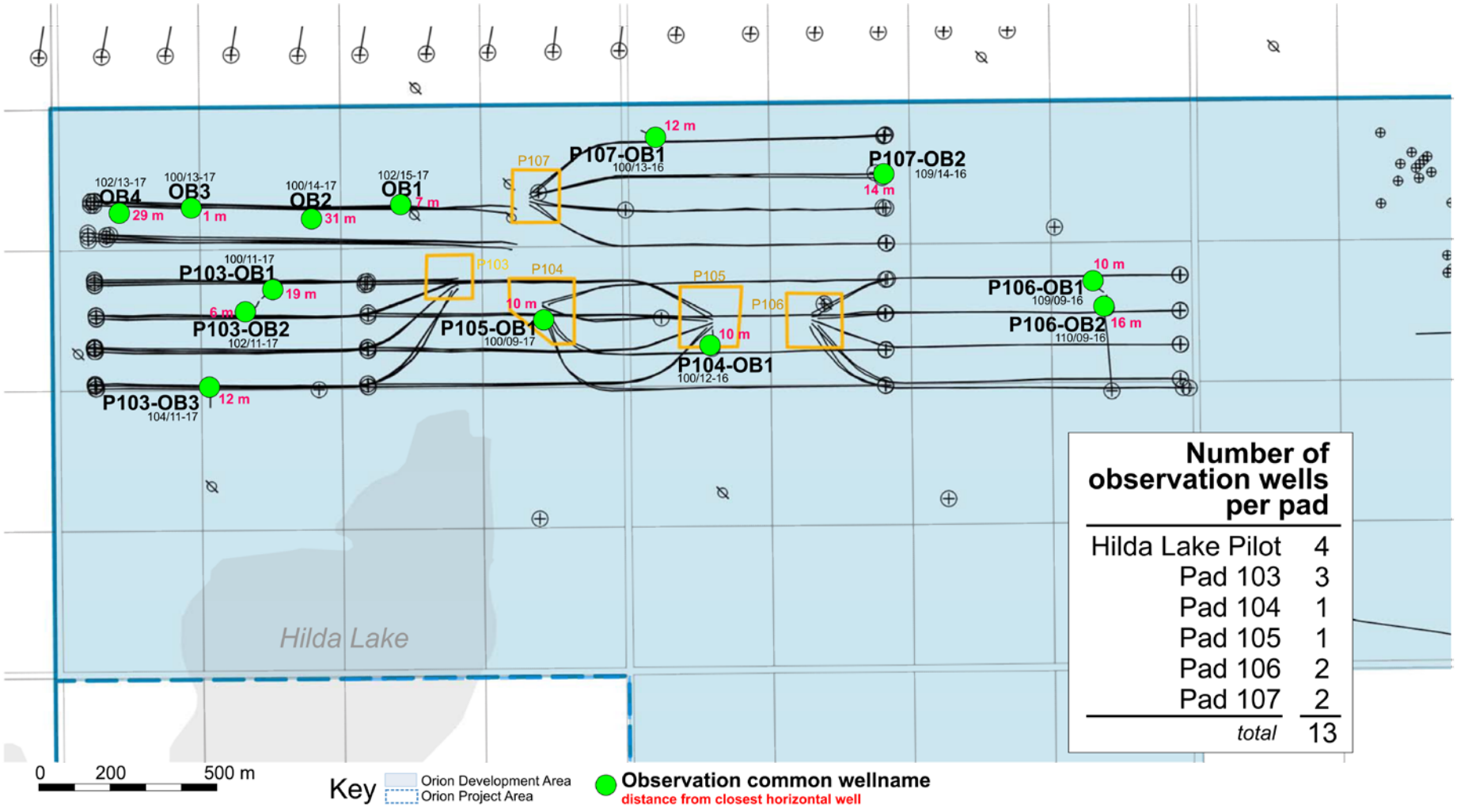


Within Imperial CSS operations, uplift up to 45 cm/cycle

- Ground uplift is normal and expected with thermal operations
- Osum Orion SAGD operations coincides with < 1.5 cm/yr uplift
- Imperial Oil Ltd CSS operations coincides with < 45 cm/cycle uplift
- No detrimental cap-rock, production or HSE impact reported, or expected
- Five years of monitoring have confirmed SAGD operations result in minimal, < 9 cm, uplift
- As a result, InSAR acquisition was suspended June 20, 2015
- Monitoring equipment is still in place and data can be collected if deemed necessary

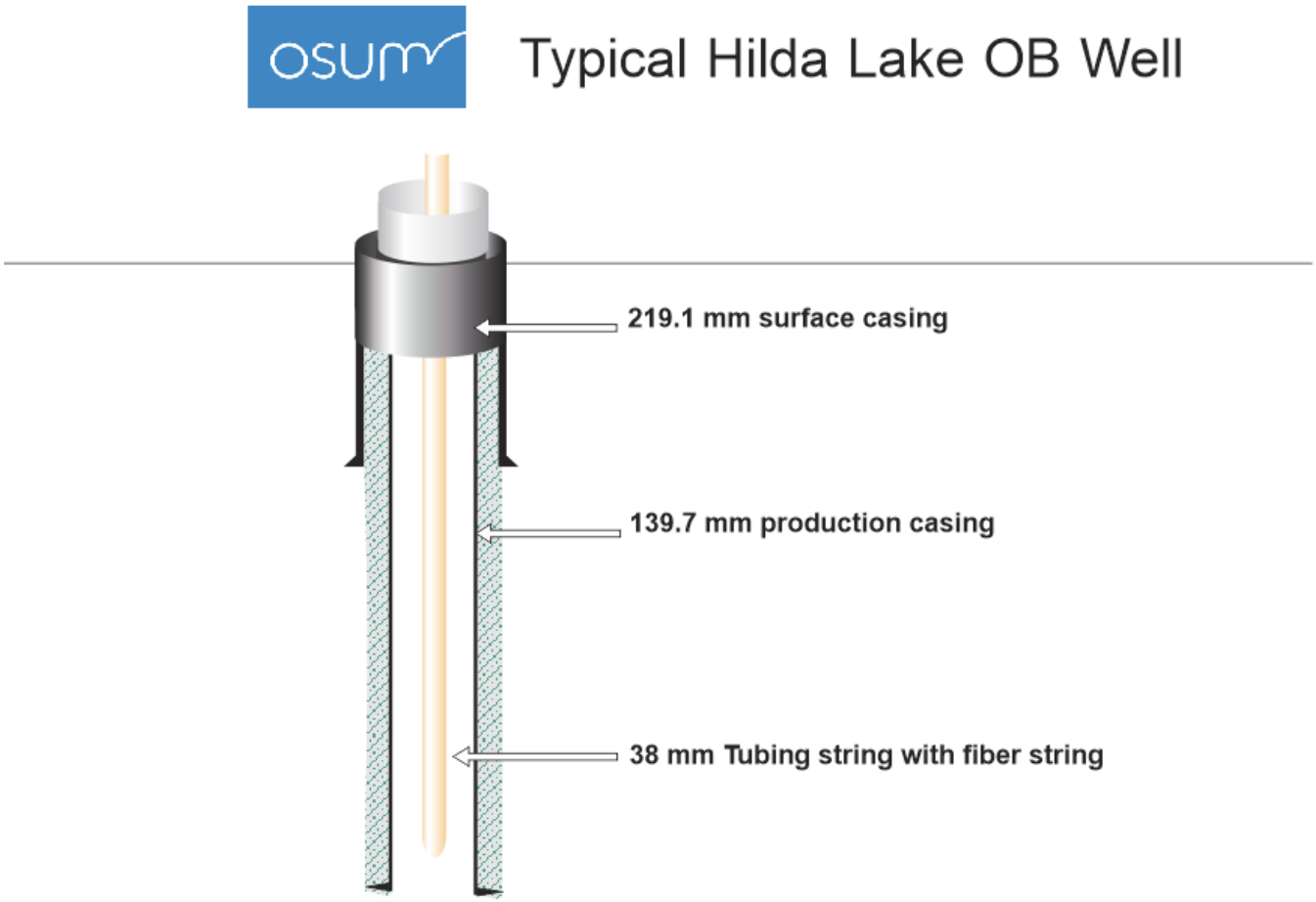
Source
InSAR Deformation Monitoring Osum Orion and Boundary 2015, Quarter 2, MDA Geospatial Services, June 20, 2015

Orion Observation Well Location Map

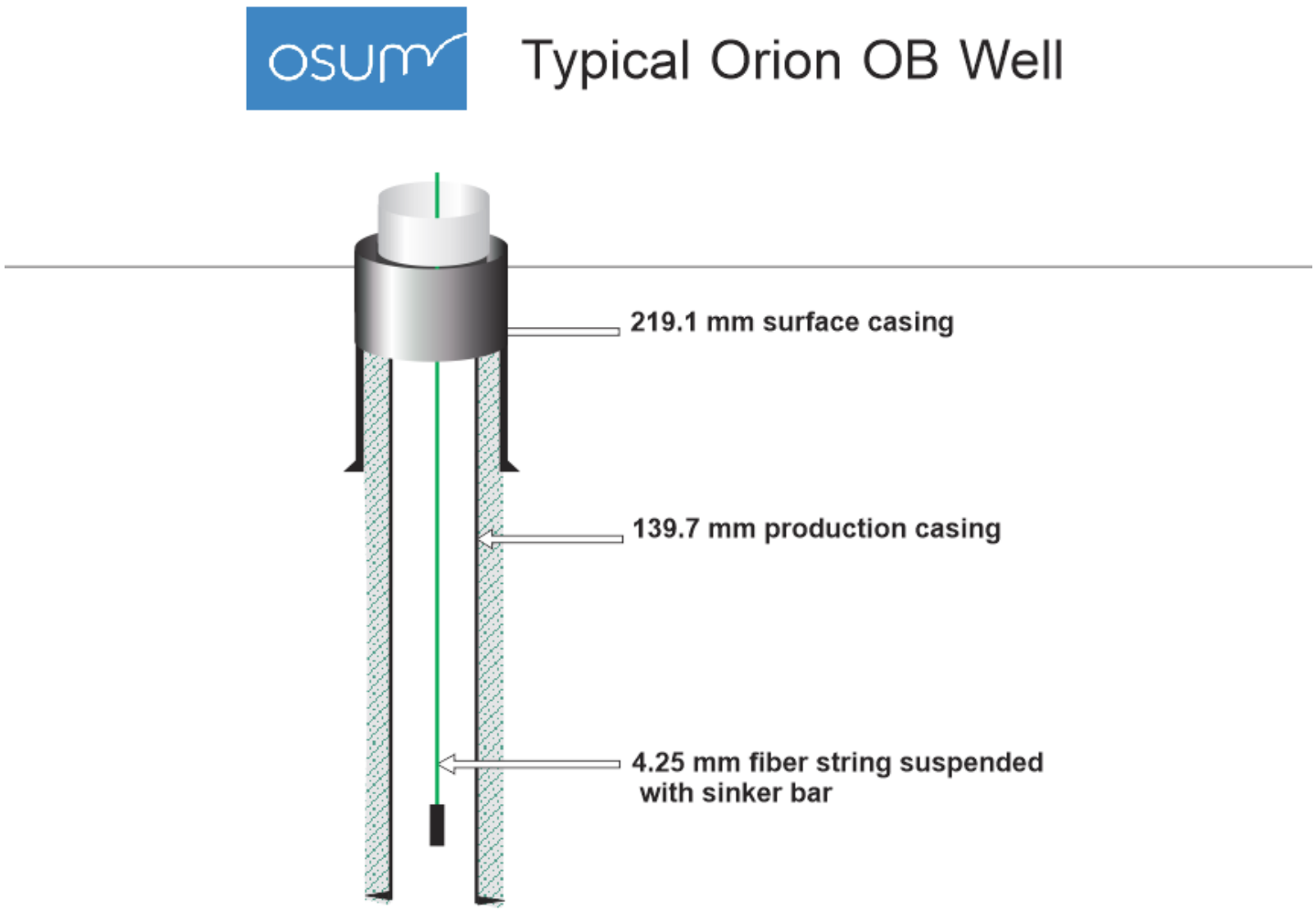


Number of observation wells per pad	
Hilda Lake Pilot	4
Pad 103	3
Pad 104	1
Pad 105	1
Pad 106	2
Pad 107	2
total	13

Hilda Lake Pilot Observation Wells



Typical Phase 1 Observation Well



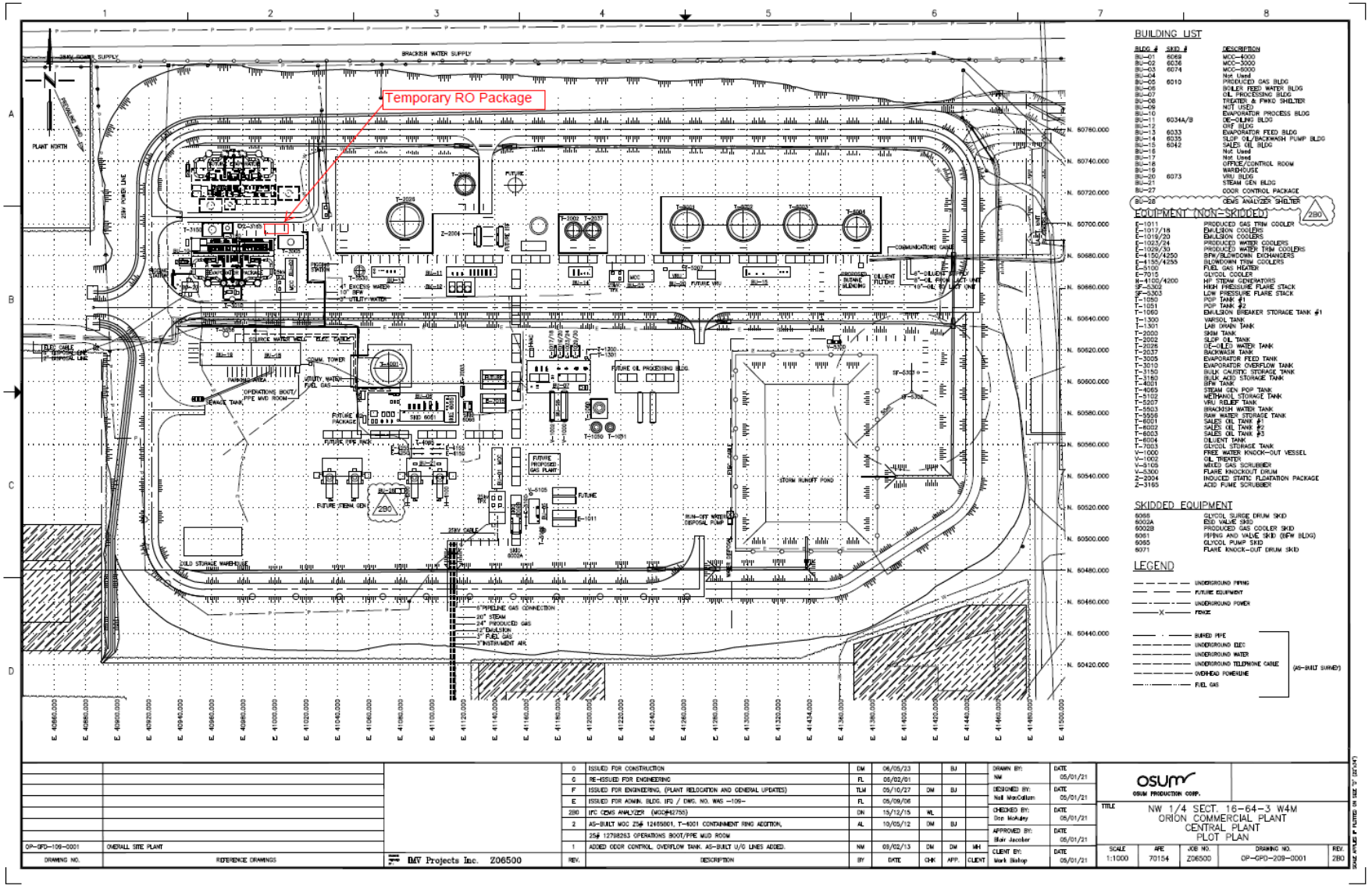
Surface Operations

Plant & Facilities Summary

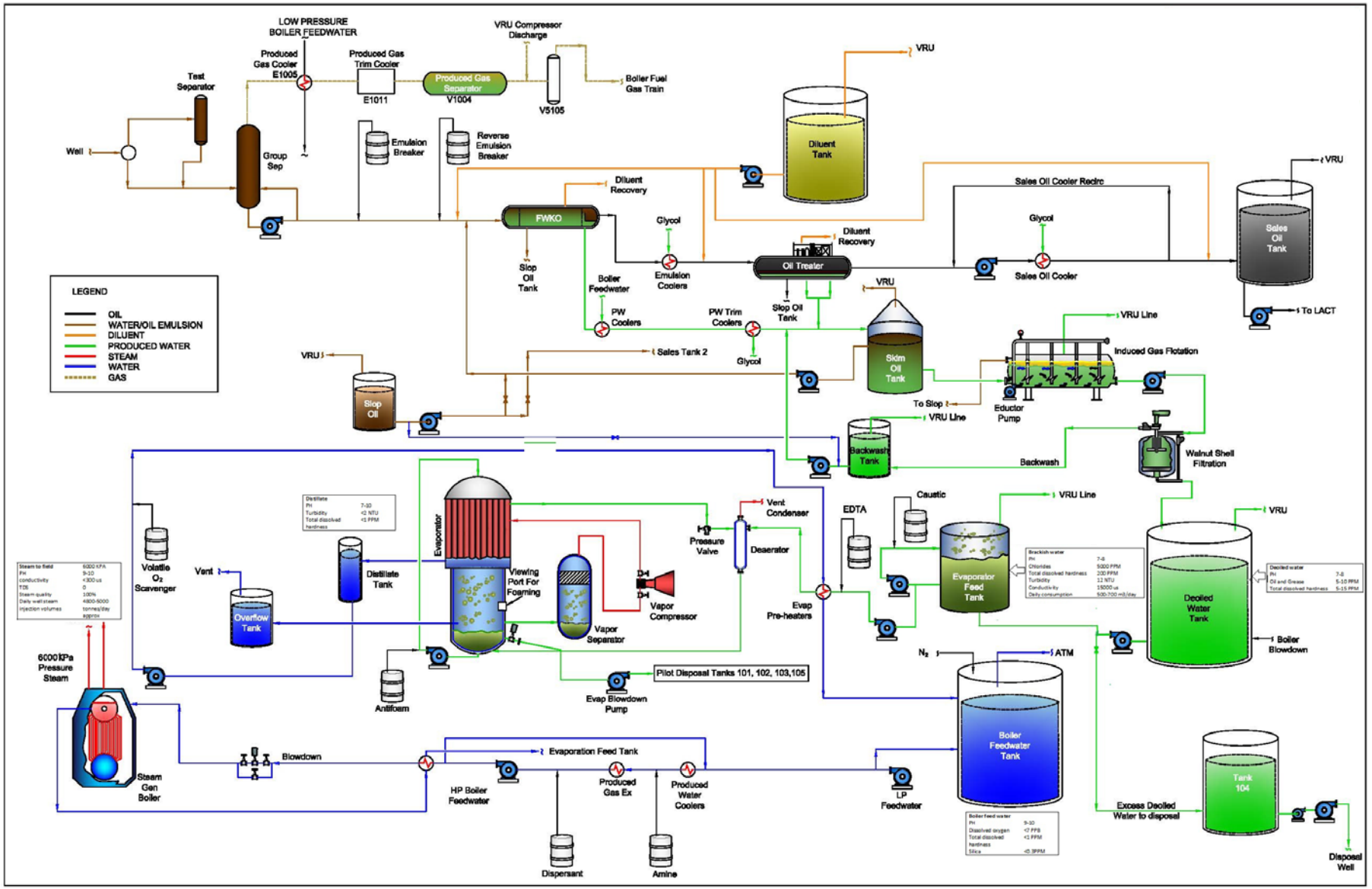
- Osum has focused on maintaining:
  - A safe operating environment
  - Increasing asset reliability
  - Maintaining/Improving production performance
  - Meeting or exceeding regulatory license requirements
- Increasing the reliability of the two steam generation boilers was a primary focus in 2015

Orion CPF Plot Plan

A Reverse Osmosis water treatment unit was added to treat brackish water.



Orion Water Usage and Treatment



Orion Central Processing Facilities (CPF)

- Two 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 FWKO 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 allowing it to be re-used to generate steam. The process allows us to reuse almost all of the produced water (95.5%).
- Brackish water is drawn from two McMurray formation source wells to supply required make-up water .
- The waste produced in the evaporative water treatment process is trucked offsite to an AER approved waste disposal facility.

De-Oiling

- Produced water from the production treating train is de-oiled using the following equipment:
  - Skim Tank – Designed to maximize retention time.
  - Induced Gas Flotation Vessel – Micro-Bubble Flotation (Hydrocarbon Content < 10ppm oil/water)
  - 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 the water criteria set out by ASME
  - Generate a concentrated brine waste stream that is disposed of at an AER approved facility
  - Have a 95% design conversion rate of feed to distillate (BFW)

Steam Generation

- Conventional Boilers generate 100% quality steam at 6,000 kPag for injection at the Well Pads.
- A small concentrated blowdown of 3-5% of the inlet mass flow is recycled back to the Evaporator Feed Tank for re-use.
- Boiler Reliability was a key focus for Orion in 2015.
  - Mud drum (tube-end to drum joints) fully welded out in both boilers.
  - Re-configured Fuel Gas Control philosophy, to incorporate produced gas heating value.
  - Tuning of boilers to address vibration issues at start up conditions and low firing rates.
  - Boiler stress reduction improvements.

Orion Vapour Recovery System

- The vapour recovery system allows for collection, compression and utilization of produced vapours. All recovered vapour is used as fuel in the steam generation system. The sources of vapour are:
  - Evaporator vent recovery
  - Ten storage tanks
  - Diluent recovery system
  - Induced Gas Flotation system
- The vapour recovery system is integrated with the Low Pressure (LP) flare system. If the vapour recovery system is not available the recovered vapour is diverted to the LP flare system

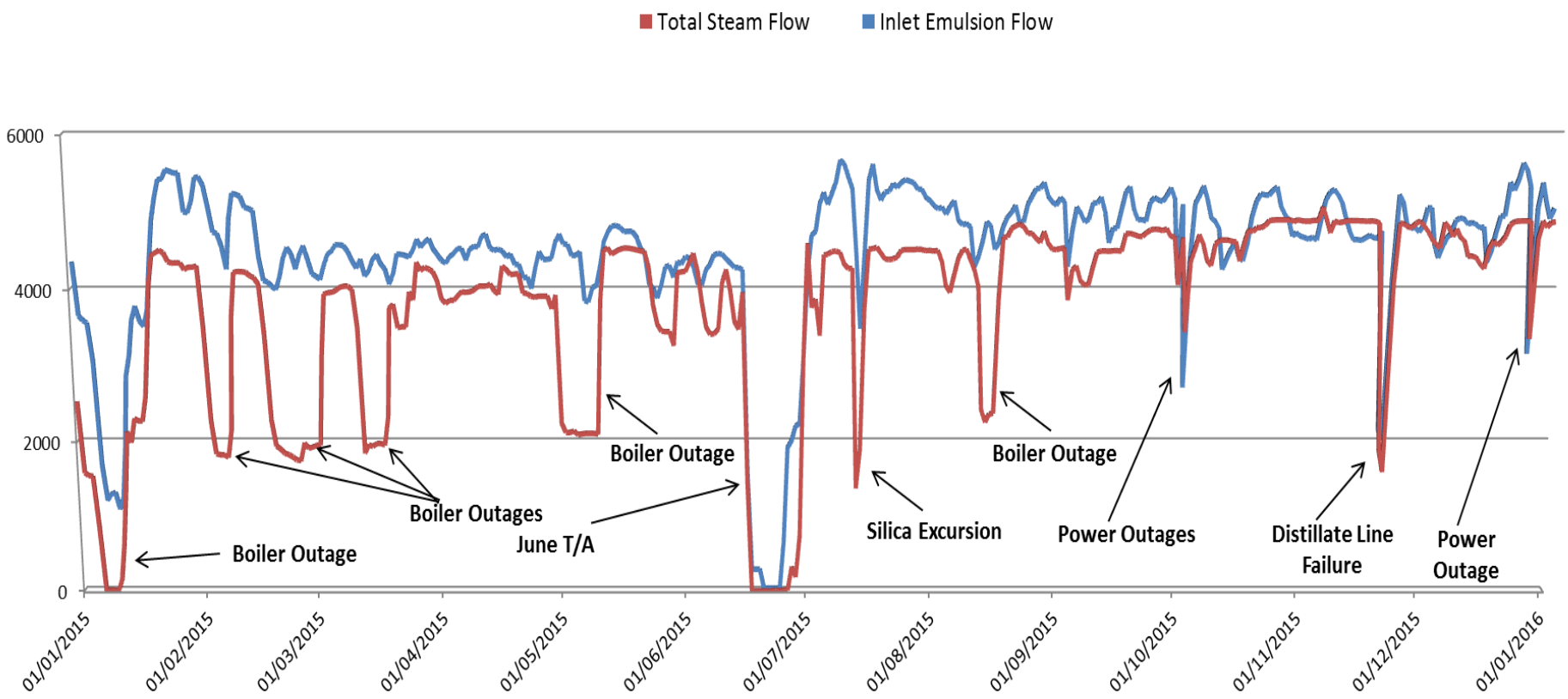
Orion Well Pad Facilities

- The facility has 6 well pads 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 & Facilities Summary

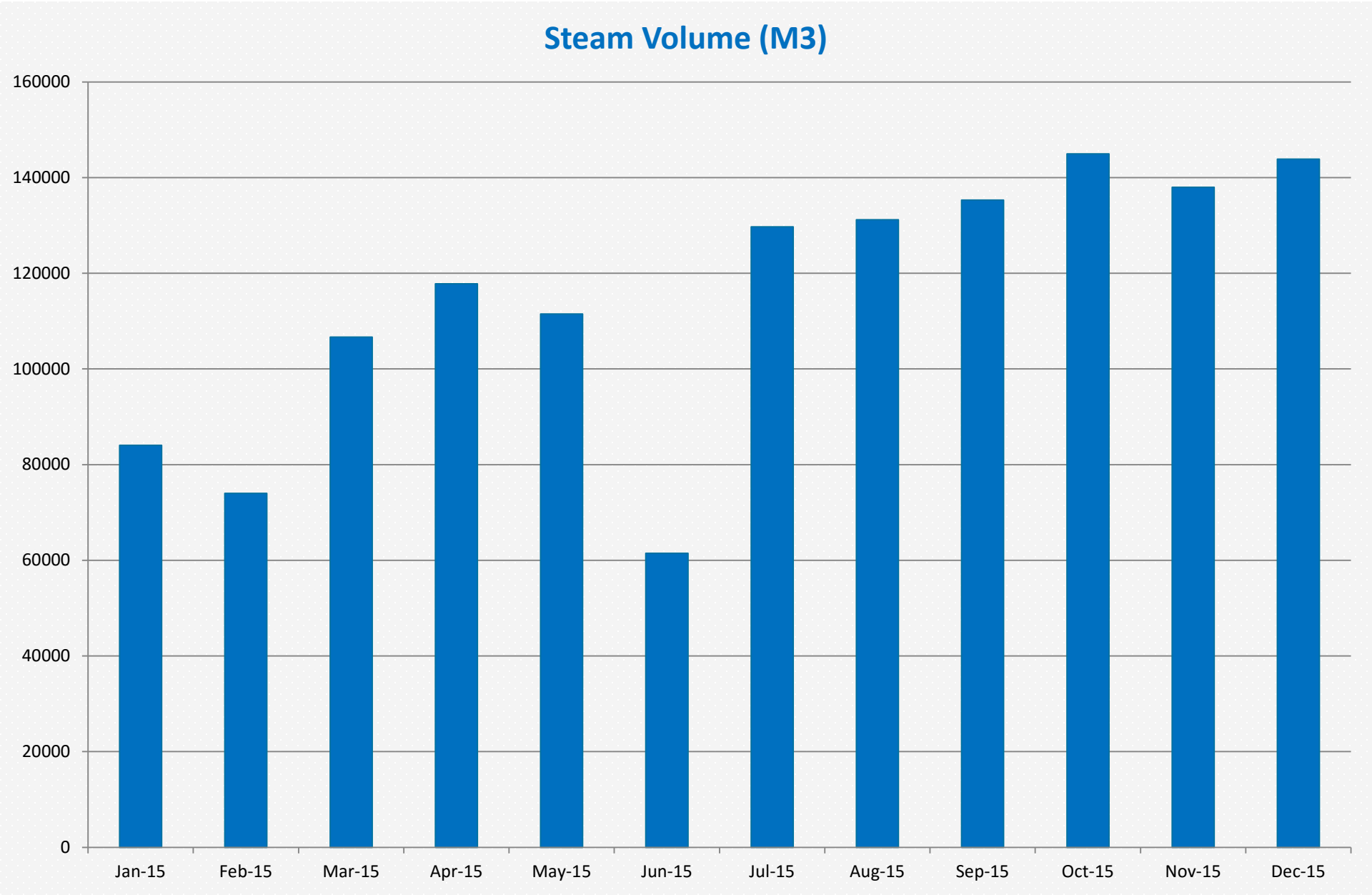
- Boiler reliability improvement and maximizing Boiler Feed Water (BFW) supply in 2015 was a major focus:
  - Increased boiler and overall plant reliability to target measures mainly after the turnaround in June 2015
  - Installed an Reverse Osmosis (RO) unit to increase BFW and steam supply
  - Utilization of pH and Silica carrier chemical for Evaporator fouling reduction and increase in BFW supply
- Facility performance and site condition improvements:
  - Well pad berm rebuild for improved containment capability
  - Site grounds grading for better run-off management
  - Improved Well pad maintenance program
  - Improvements to boiler control parameters yielding higher steam production rates

2015 Plant Reliability – 94.2%



Plant Reliability Downtime due to:
June Turnaround – 2.9%
Boiler Outages – 2.2%
Power Outages – 0.3%
Others – 0.4%

Monthly Steam Production – 2015

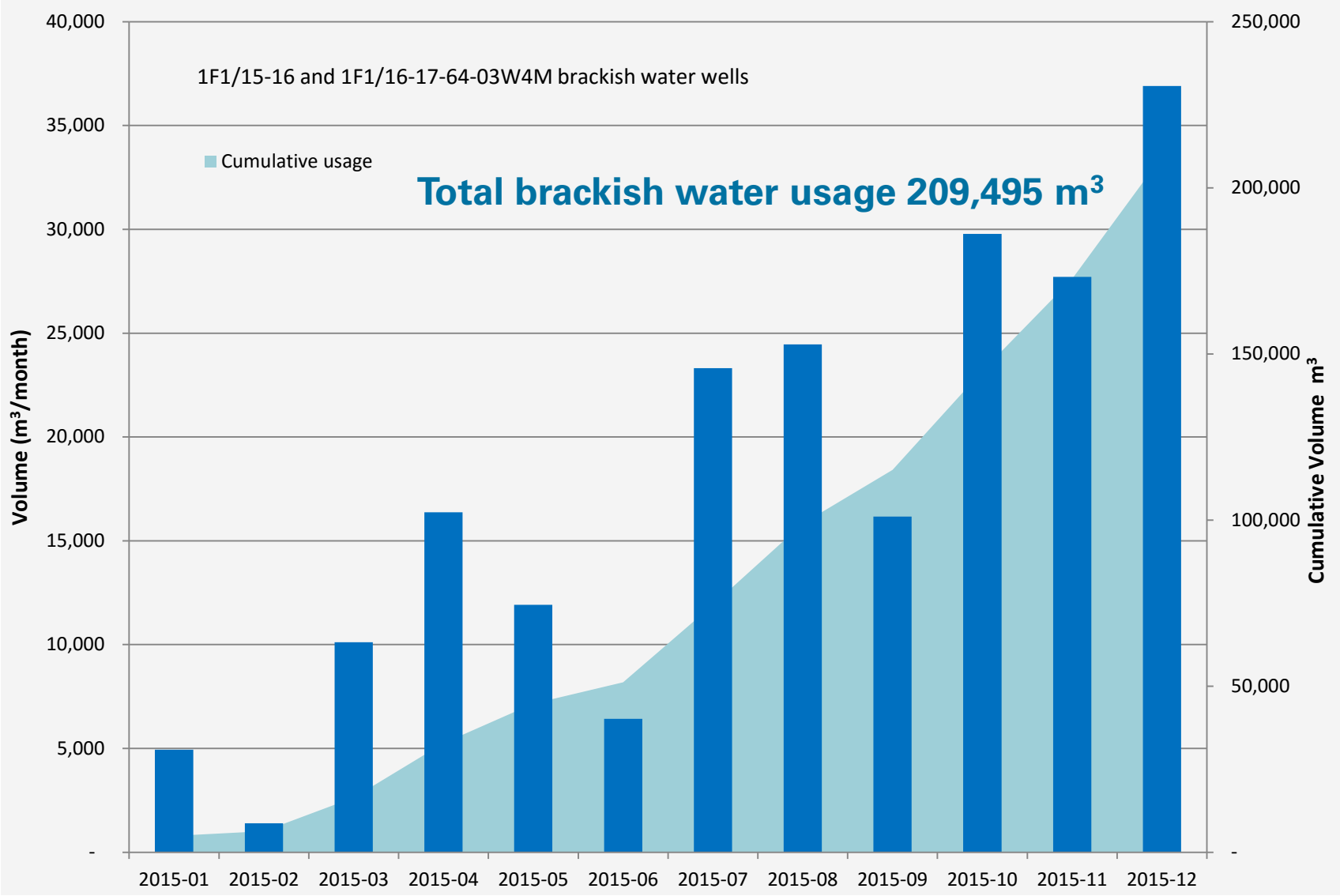


Brackish Water Modifications

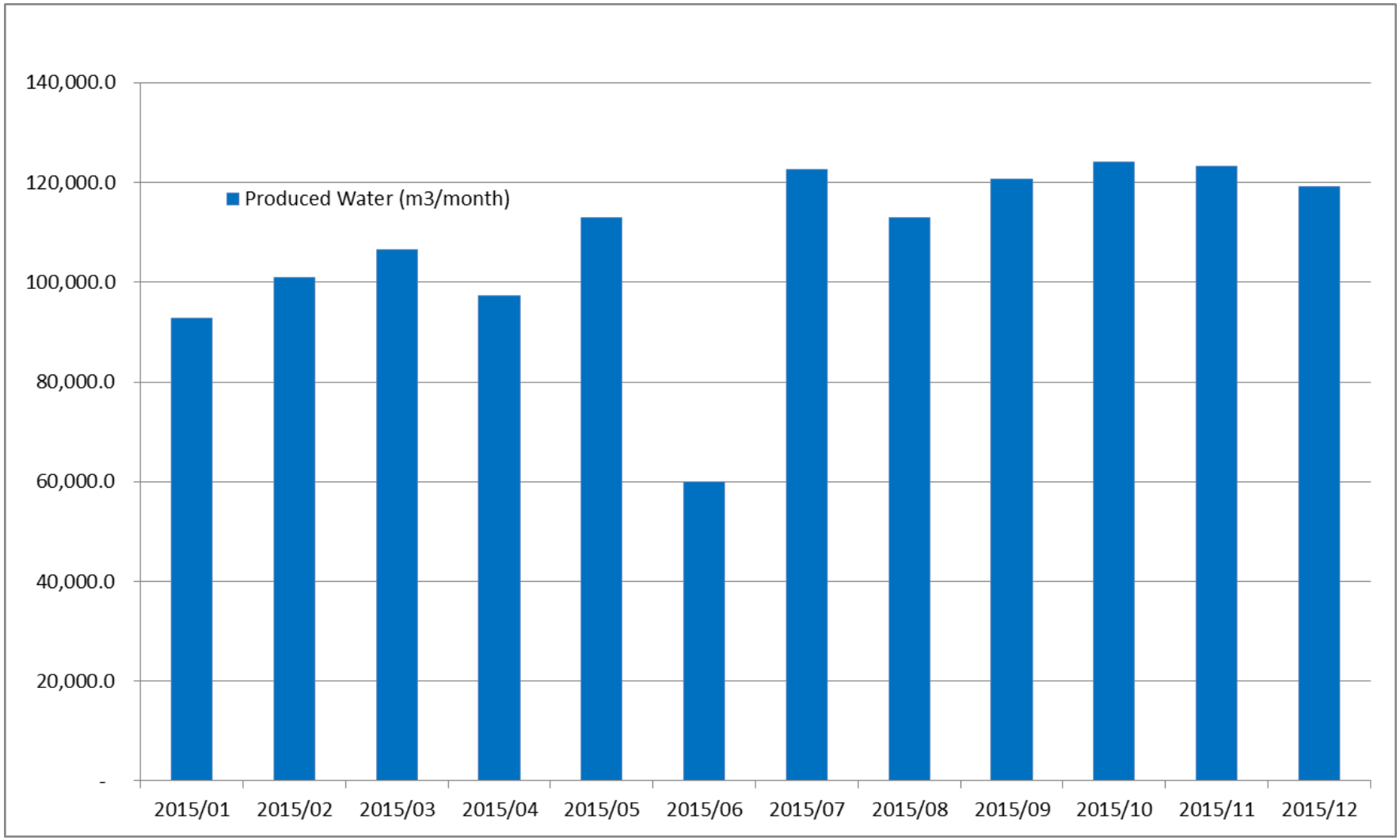
- June 2015 - 16-17 brackish water well was tied into production line, increasing brackish water capacity.

- Sept 2015 - rental RO package installed to support boiler feed water demand.

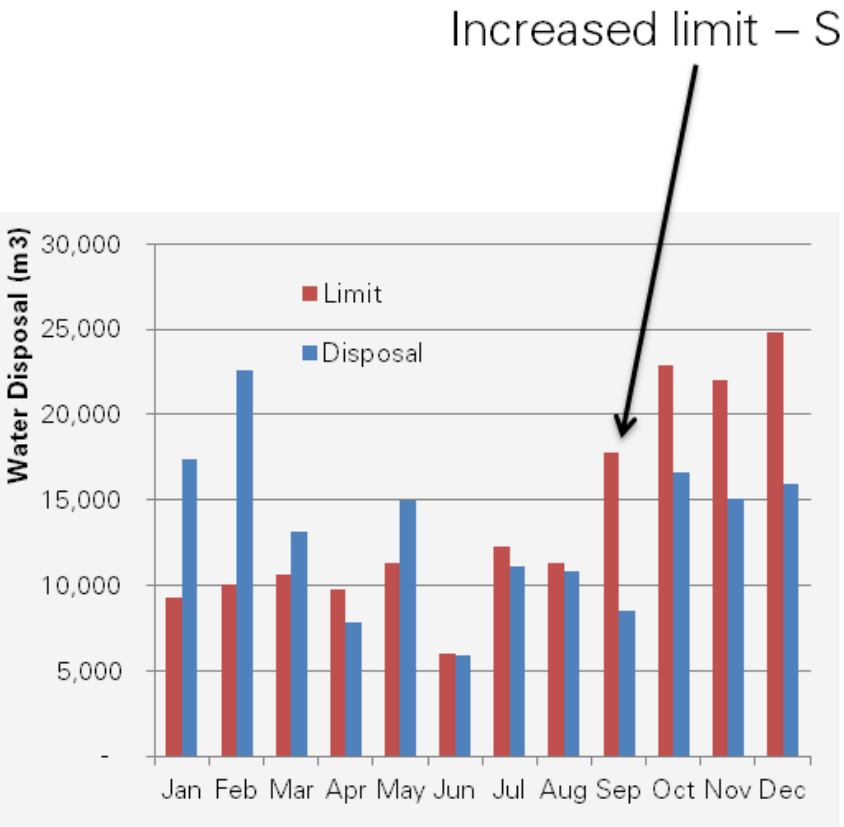
Brackish Water Usage - 2015

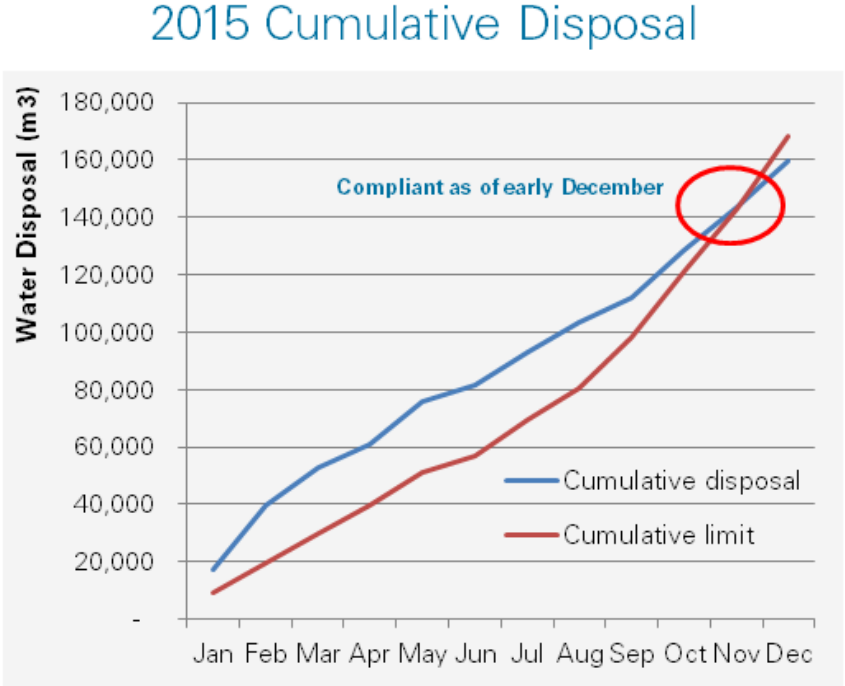


Produced Water - 2015



Water Disposal Limits - 2015





- Effective September 1st, 2015 water disposal limit calculation changed to the Directive 81 formula from a 90% produced water recycle rate:
  - In early December our cumulative disposal was within acceptable limits.

On-Site Water Disposal – 2015

- 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 (AER License # 0192346)
  - 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 (AER License # 0196880)
  - Suspended Nov. 2011

Measurement, Accounting & Reporting Plan (MARP)
Enhanced Production Audit Program (EPAP)

MARP

- Annual MARP revision prepared in conjunction with third-party specialist April 2015
- Accounting meters calibrated / verified on an annual basis

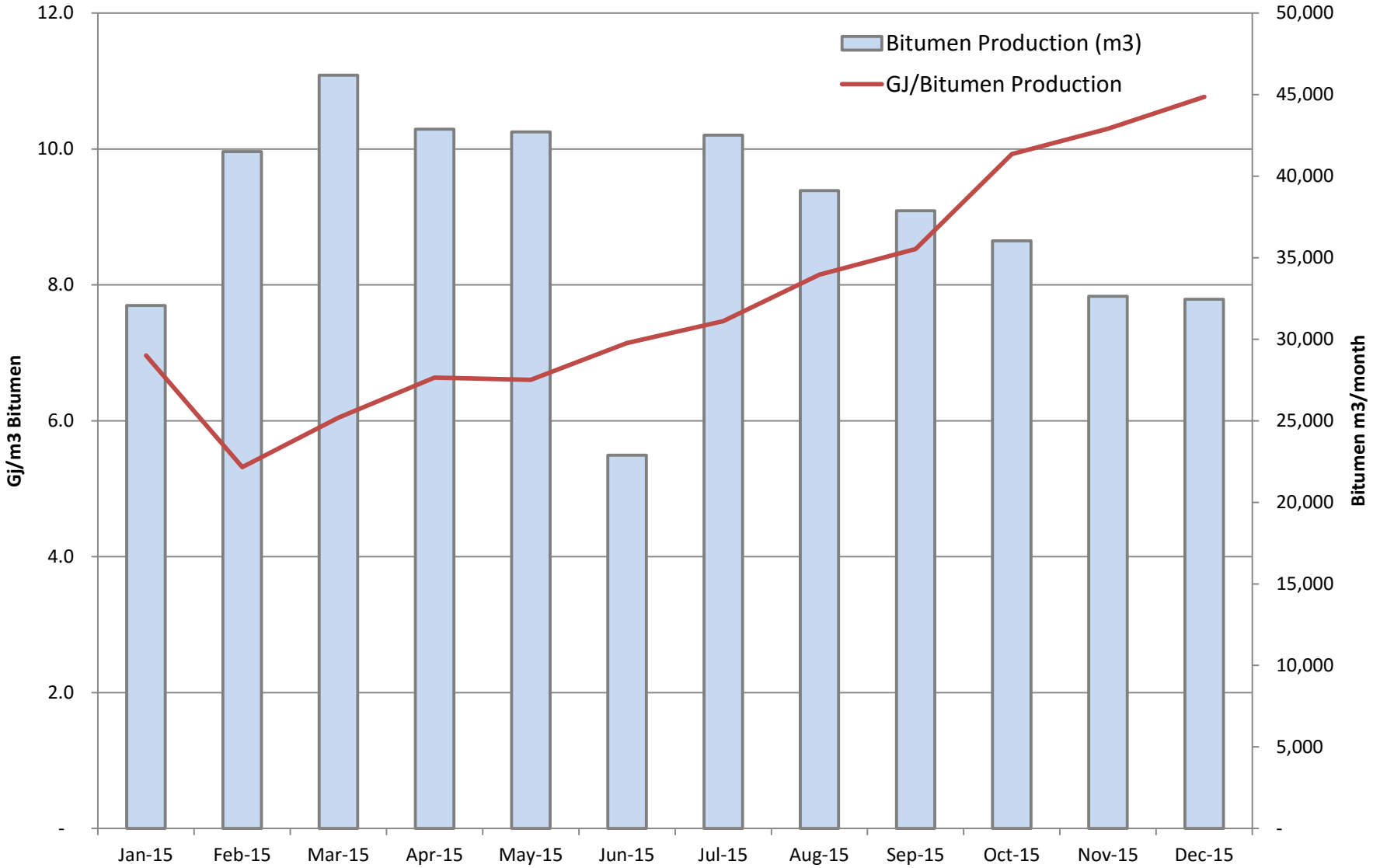
EPAP

- EPAP initial declaration for reporting facilities (treating, injection and water disposal) effective March 2016
- Utilized third-party controls specialist to complete initial controls documentation, evaluation and testing
- Remediation of identified deficiencies is underway

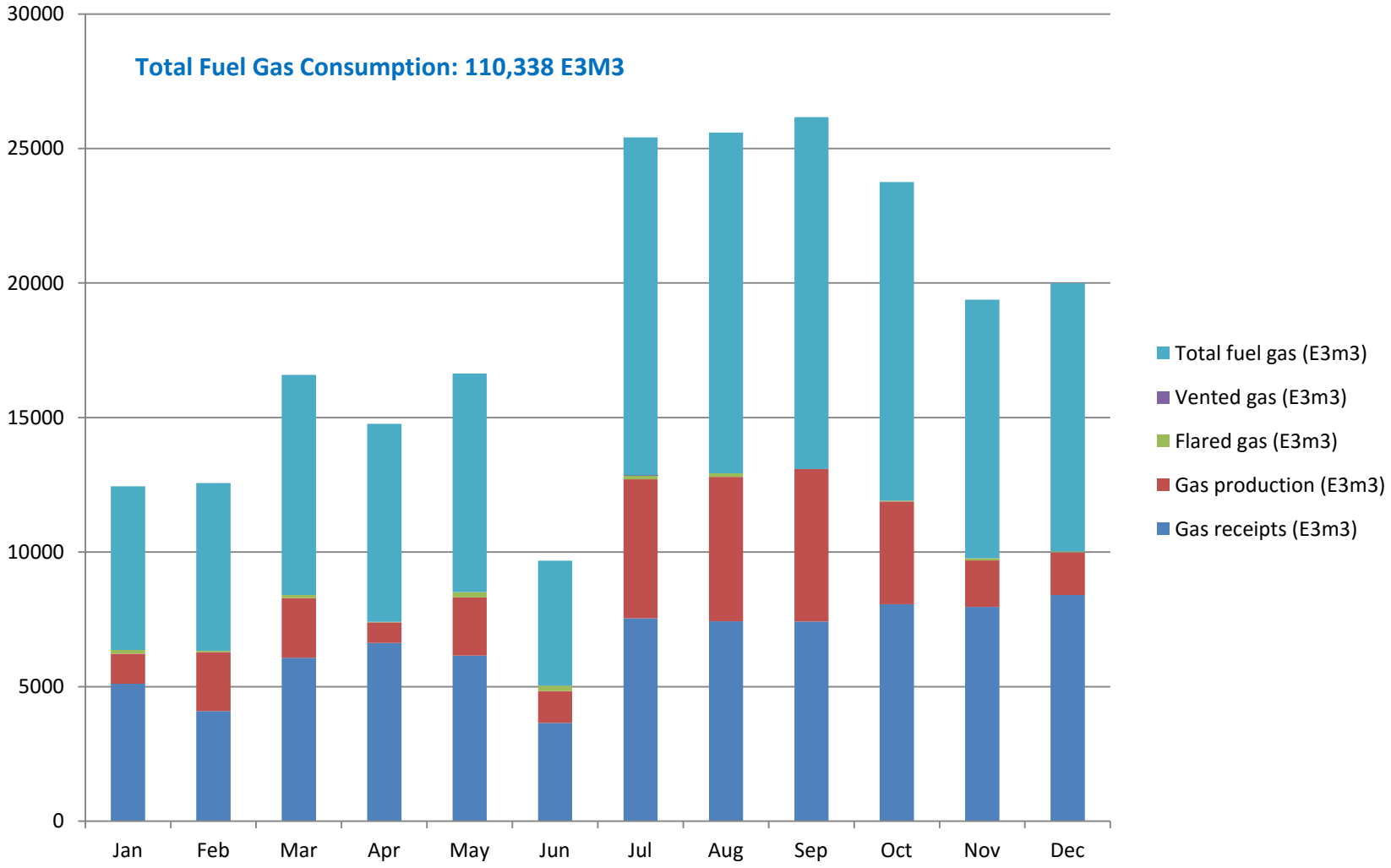
Orion Well Integrity

- Wellhead Integrity Maintenance
  - Include wellhead integrity checks as part of all completions activities
  - Yearly wellhead integrity maintenance completed June, 2015. All thermal wellheads and components visually inspected and re-torqued to specification
  - Wellhead components inventory and tracking system components specifications, up-to-date pictures, scheduled maintenance information will be available online through service provider's website
- During 2015
  - Conducted Multi-finger Caliper and/or Vertilog on five wells – well casings on all five wells checked out satisfactory

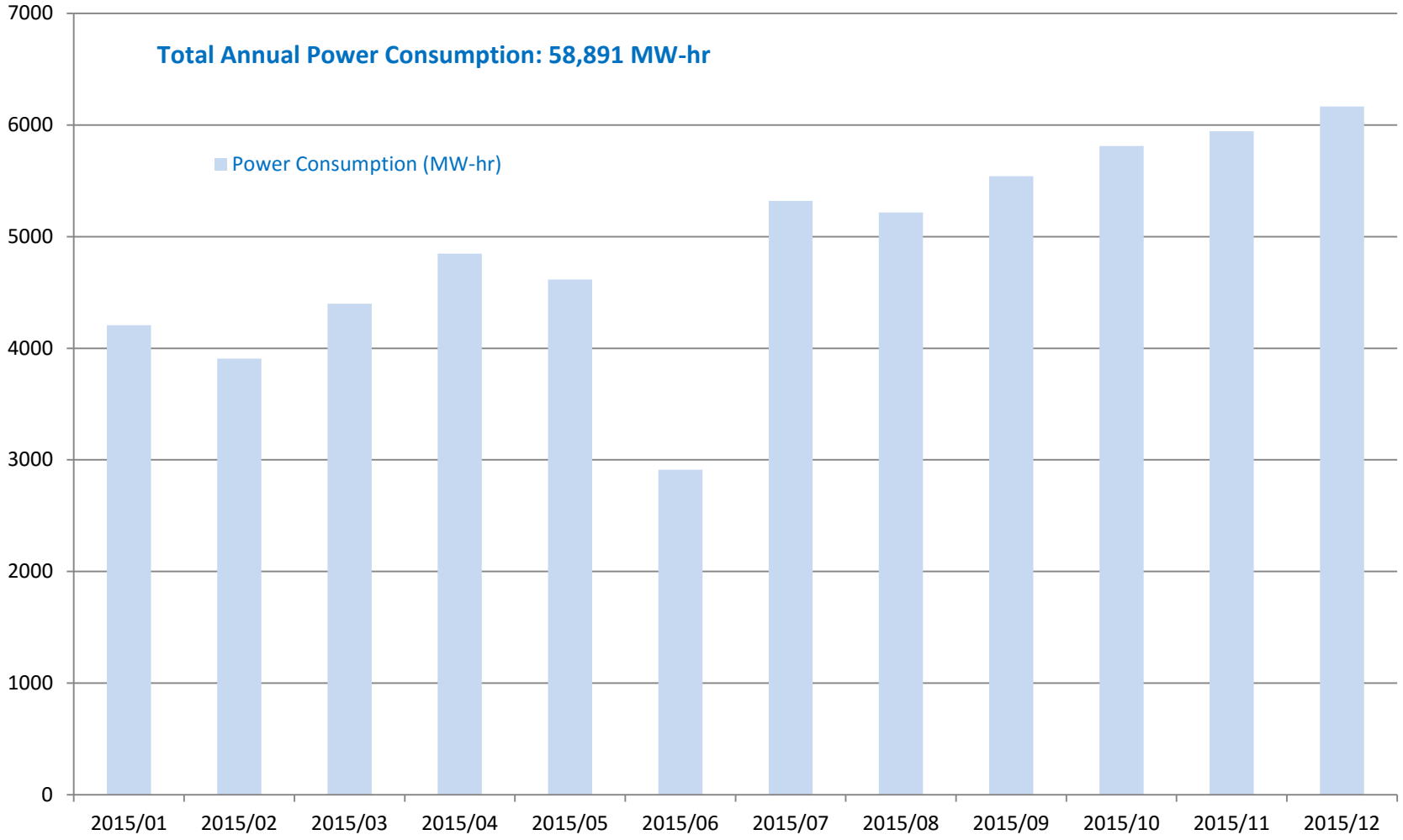
Monthly Energy Intensity – 2015



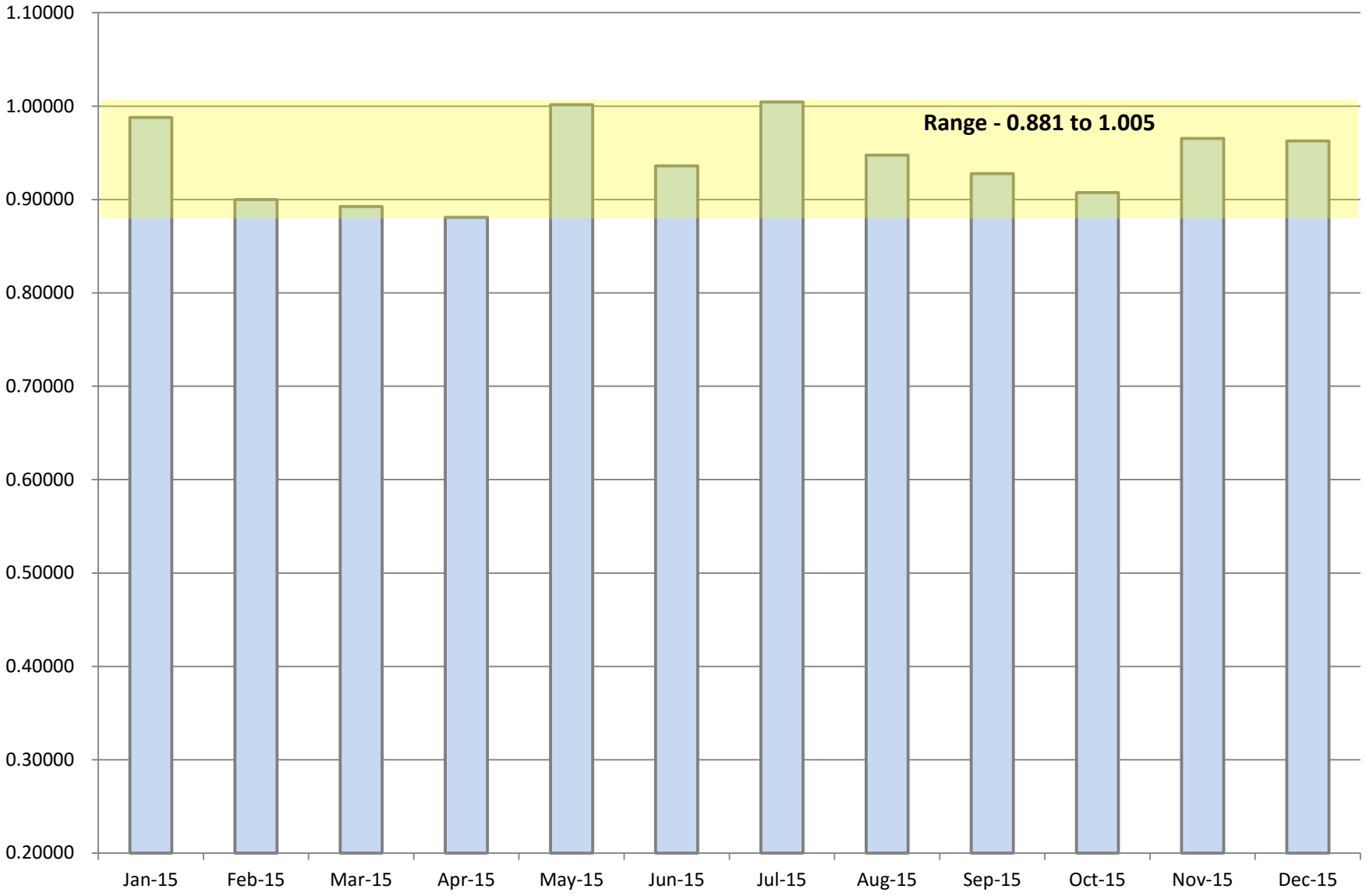
Monthly Gas Usage – 2015



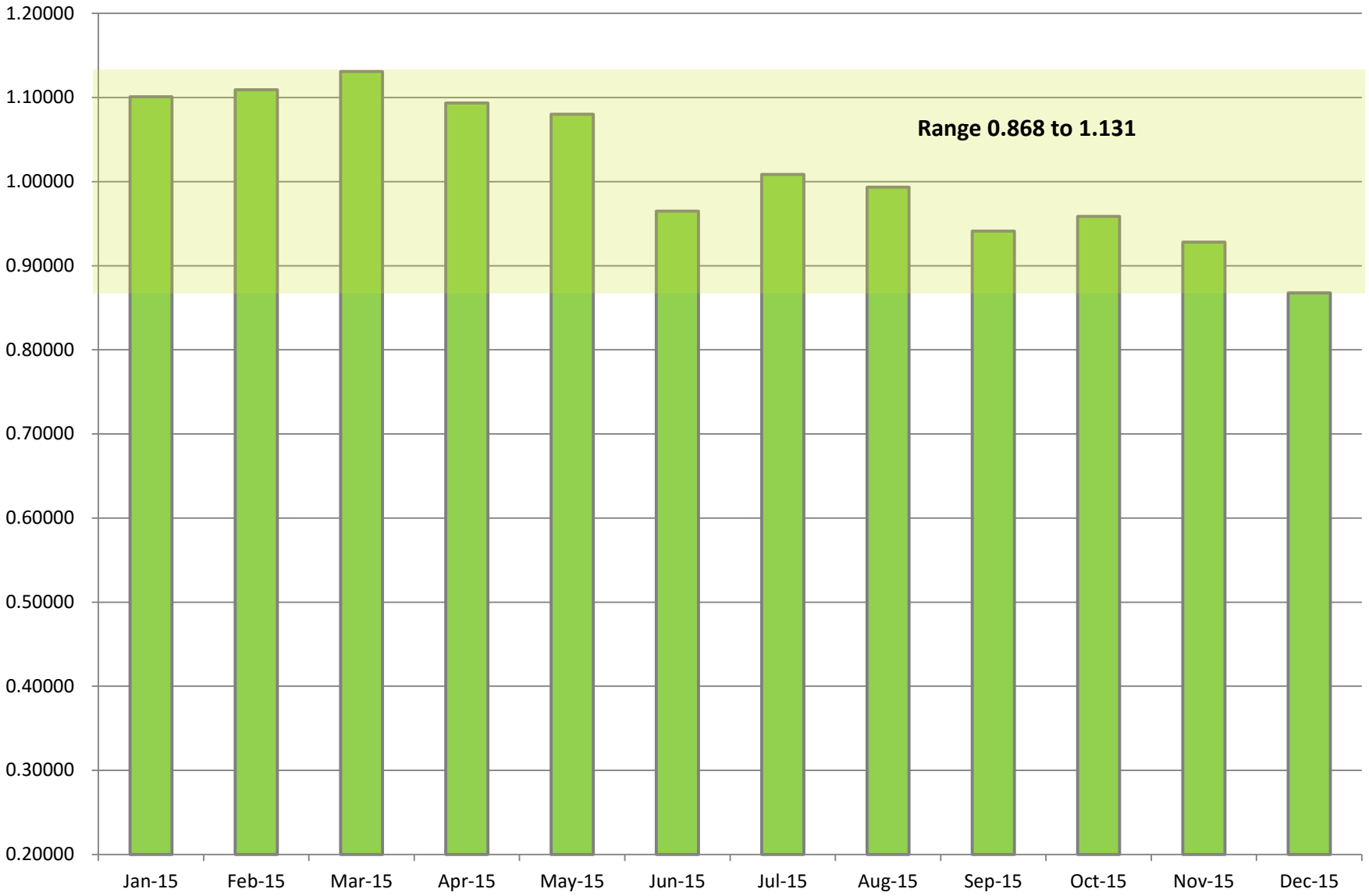
Monthly Power Consumption – 2015



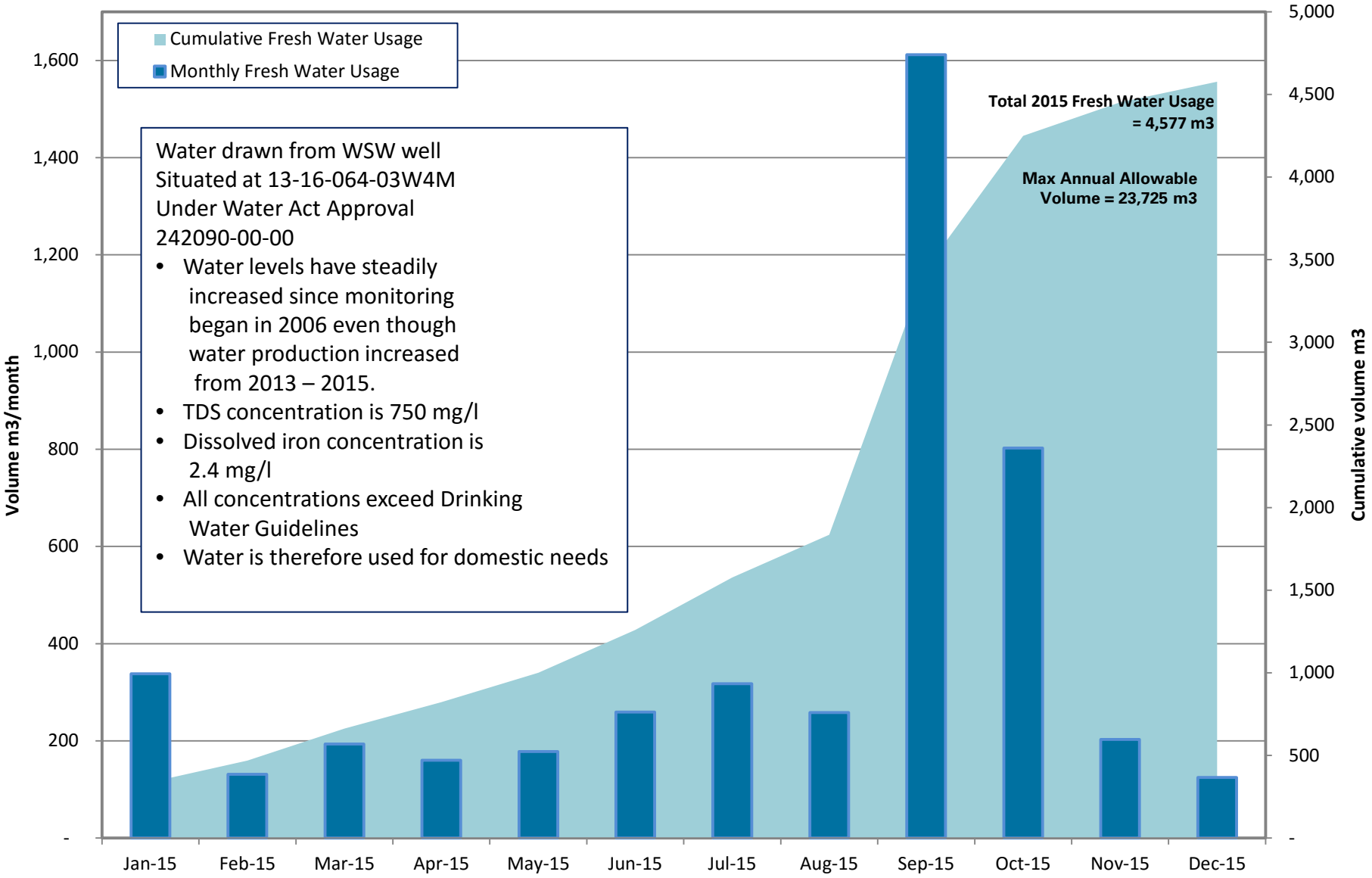
Water Proration Factors – 2015



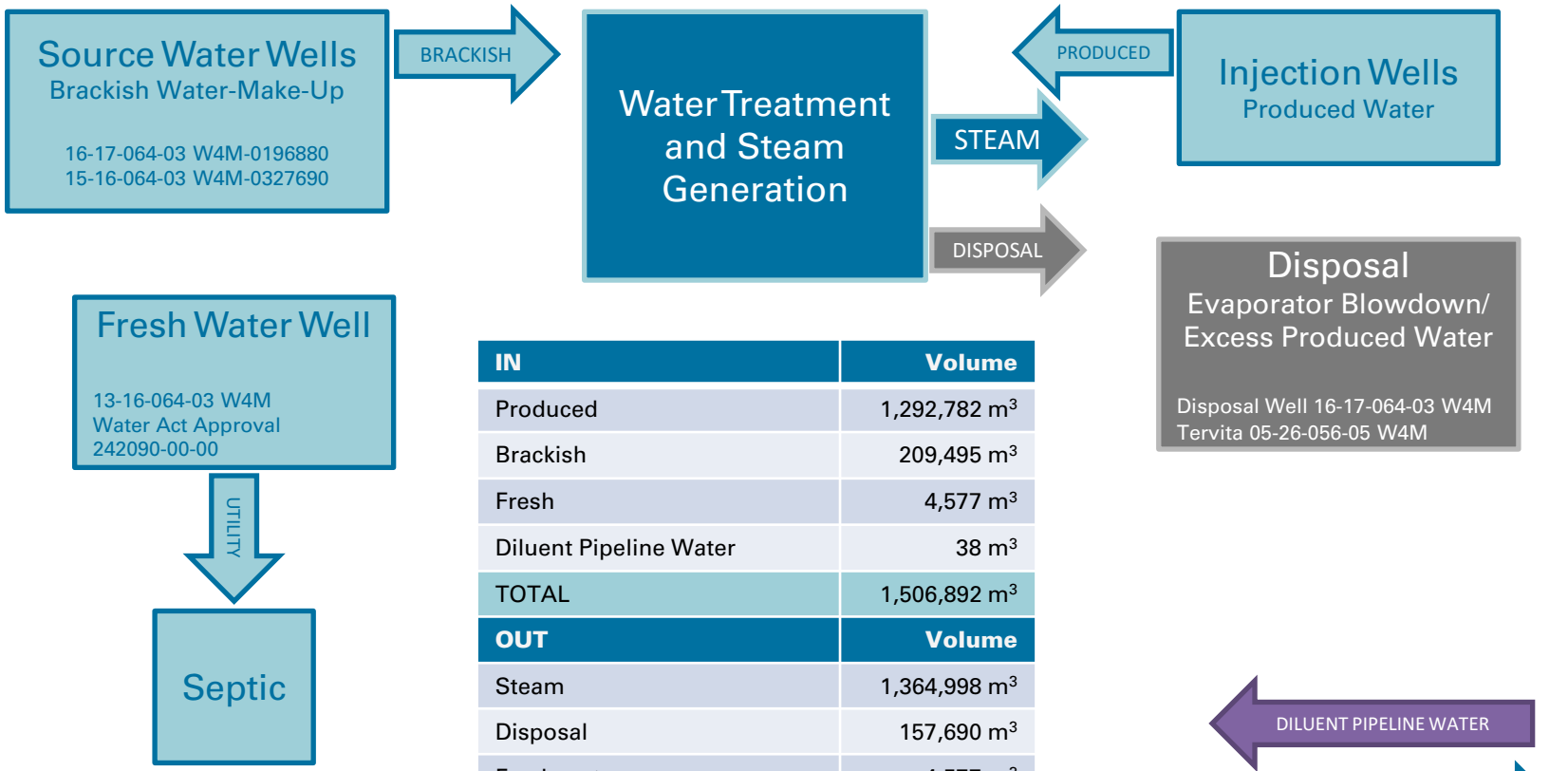
Oil Proration Factors – 2015



Fresh Non-Potable Water Usage – 2015



2015 Cumulative Water Balance



IN	Volume
Produced	1,292,782 m^3
Brackish	209,495 m^3
Fresh	4,577 m^3
Diluent Pipeline Water	38 m^3
TOTAL	1,506,892 m^3
OUT	**Volume**
Steam	1,364,998 m^3
Disposal	157,690 m^3
Fresh water usage	4,577 m^3
IPF Pipeline Water	2,087 m^3
TOTAL	1,529,352 m^3
Difference (as a percentage of total in's)	22,460 m^3 1.5%
Disposal Limit	**13 %**
Actual Disposal	**12 %**

Compliance

Off-Site Waste Disposal

- Tervita-Lindbergh – Class 1b – 05-26-056-05W4M
  - Evaporator Blowdown – 83,591 m^3
  - Turnaround Volumes from Vessel Cleaning- Sludge 520 m^3
- RBW Waste Management
  - Contaminated soil from housekeeping and hydro-vac activities 50 m^3
  - Recycle-Glycol, Lube oil, Filters, Oily rags, Aerosols, Methanol 33.6m^3
  - Recycle-Scrap metal 0.2 m^3
  - NORM from refractory brick 2.3 m^3

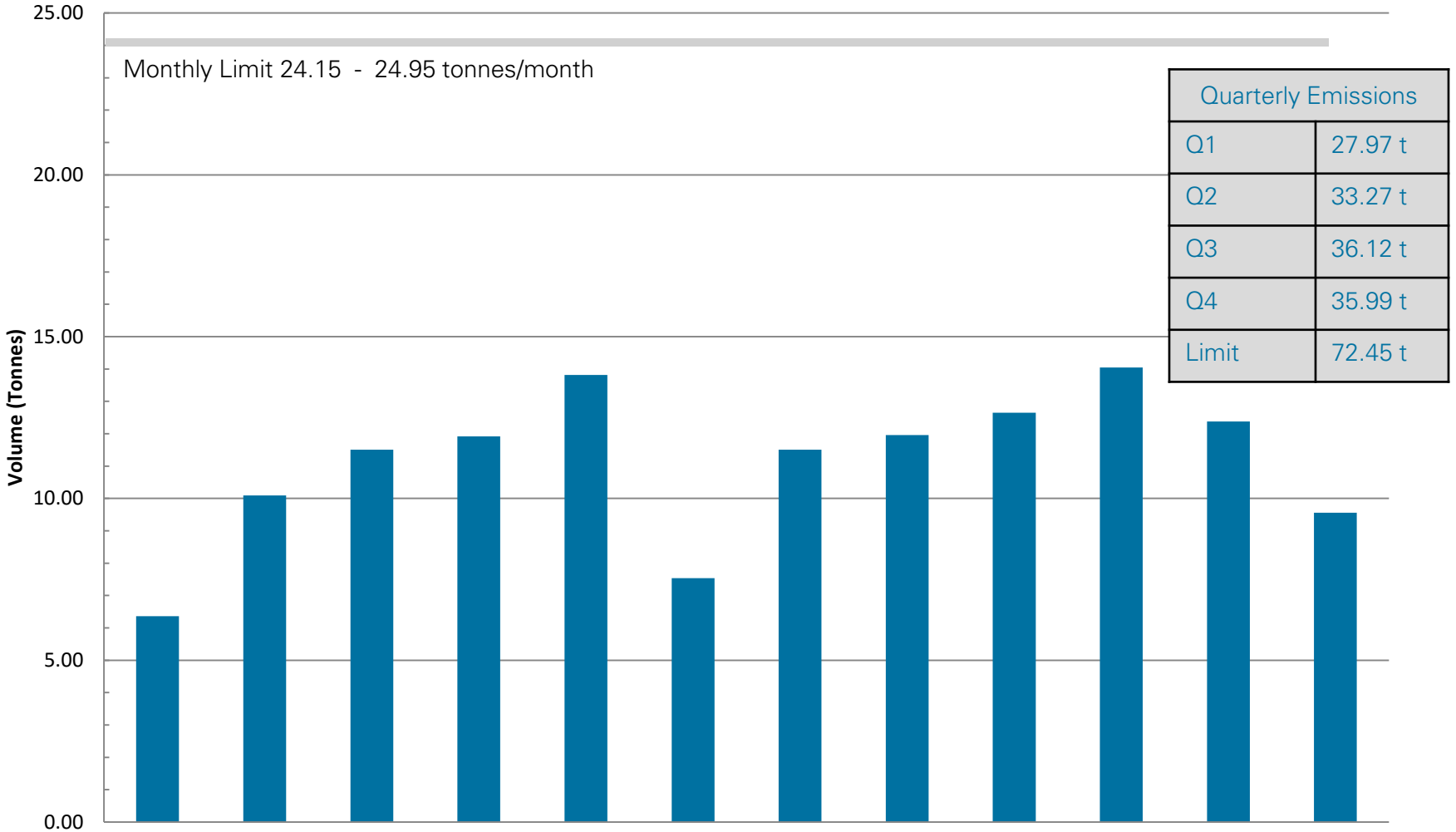
Domestic Waste Disposal

- 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 1297 m^3
- Domestic waste is hauled to municipal landfills in either Cold Lake or Bonnyville. Approximately 262 kilograms was disposed.
- Paper, cardboard and steel recycling program processed 1077 kg of material.

Air Monitoring Programs

- Monthly air contaminant concentrations for SO_2/NOx, annual manual stack survey results, fugitive emissions, greenhouse gas emission and summarized monthly emission reporting is submitted in accordance with EPEA Approval requirements.
- Sulphur emissions at the facility peaked at 0.45 t/d in May 2015 and averages 0.34 t/d. This trend is not anticipated to change in the near term.
- Sulphur dioxide emissions peaked at 0.9 t/d in May which prompted a request to raise the facility EPEA limit from 0.9 t/d to 1.61 t/d based on modelling results the average daily emission rate for SO_2 is 0.67 t/d.
- The 2015 fugitive emissions survey noted 22 leaks - all were repaired within a week of determination.

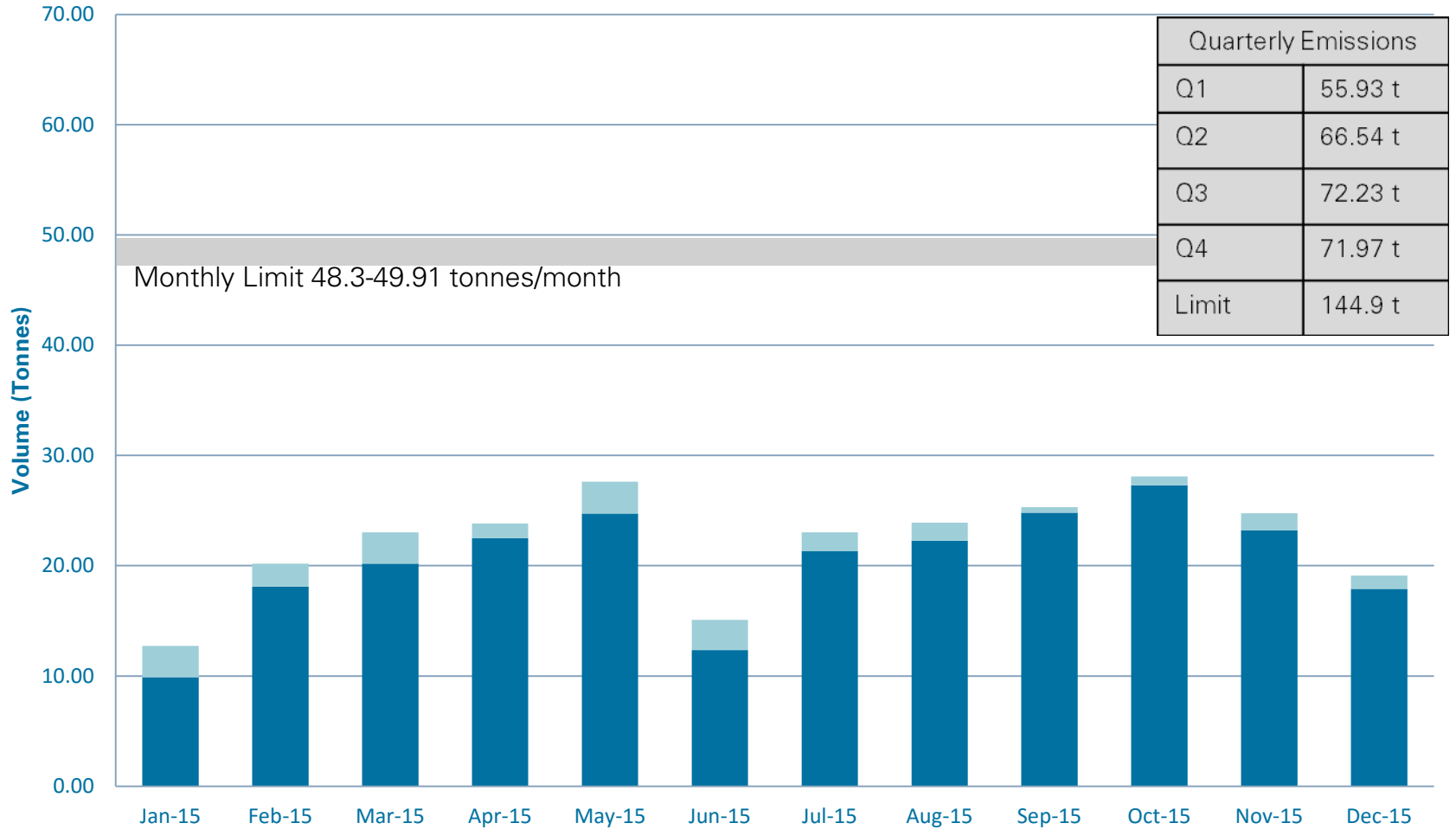
Sulphur Emissions (Tonnes)



Quarterly Emissions	
Q1	27.97 t
Q2	33.27 t
Q3	36.12 t
Q4	35.99 t
Limit	72.45 t

	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15
Sulphur	6.36	10.10	11.51	11.91	13.81	7.54	11.51	11.96	12.65	14.05	12.38	9.56

SO2 Volumes Monthly/Quarterly (Tonnes)



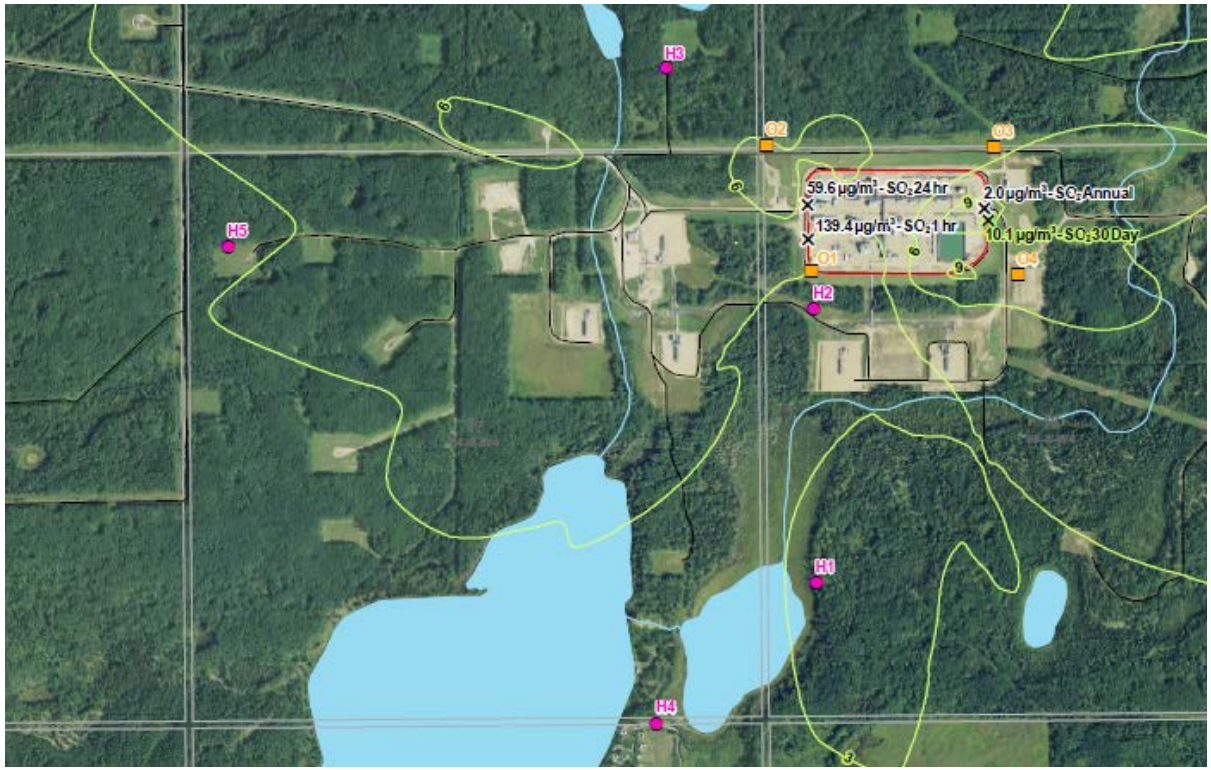
Quarterly Emissions	
Q1	55.93 t
Q2	66.54 t
Q3	72.23 t
Q4	71.97 t
Limit	144.9 t

	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15
Flare	2.82	2.09	2.84	1.34	2.89	2.72	1.67	1.64	0.49	0.80	1.53	1.22
Stack	9.90	18.10	20.18	22.49	24.74	12.36	21.35	22.27	24.81	27.30	23.22	17.90

Monthly NOx Emissions Per Boiler

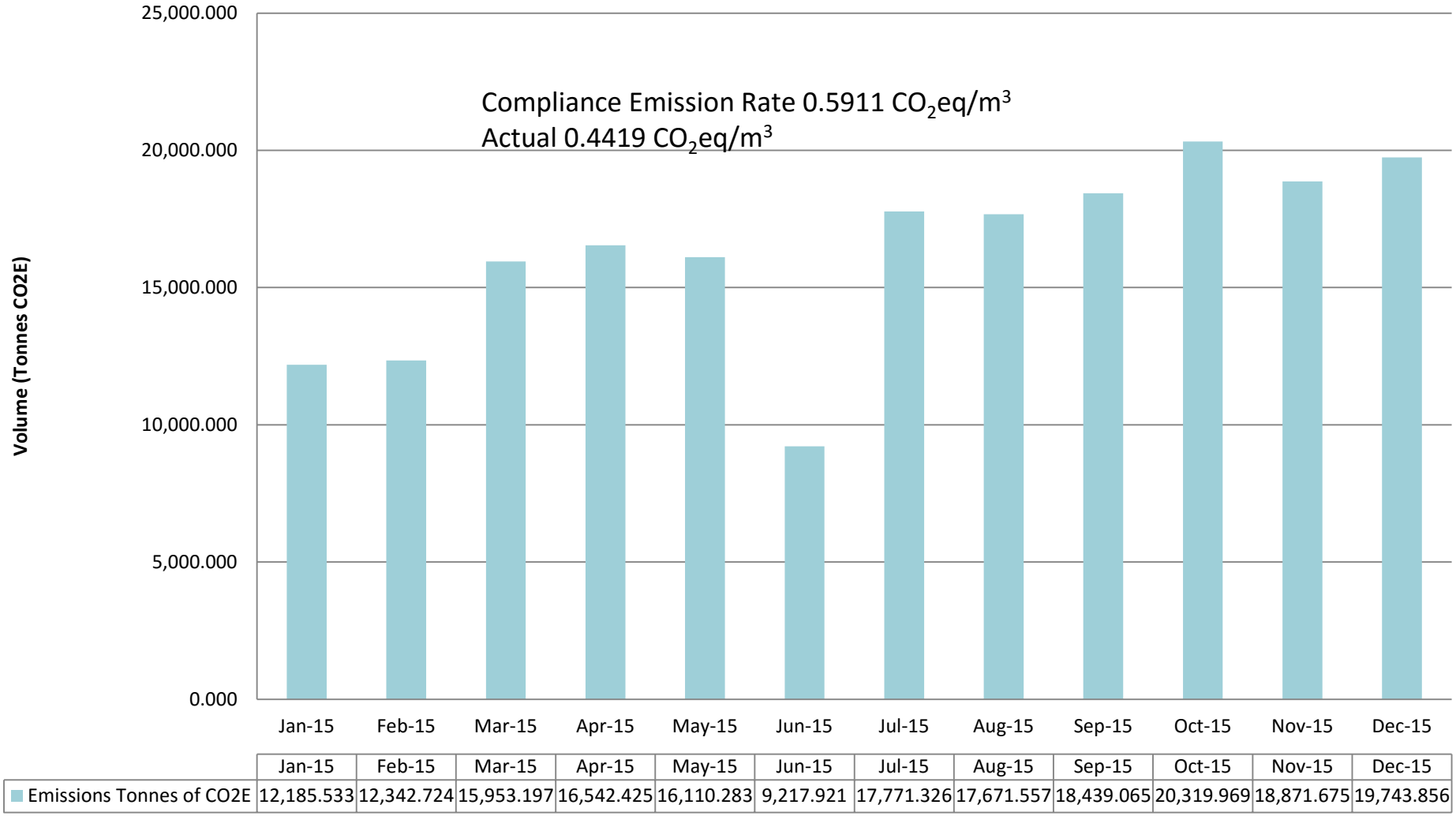
	January	February	March	April	May	June	July	August	September	October	November	December
Boiler 4100	3.21	1.89	3.13	3.60	3.97	1.98	3.96	4.43	4.38	4.60	4.49	4.71
Boiler 4200	2.39	3.27	3.61	3.50	3.73	1.98	3.82	3.48	4.08	4.29	4.24	4.37

Air Monitoring Program 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 and one at landowners request.

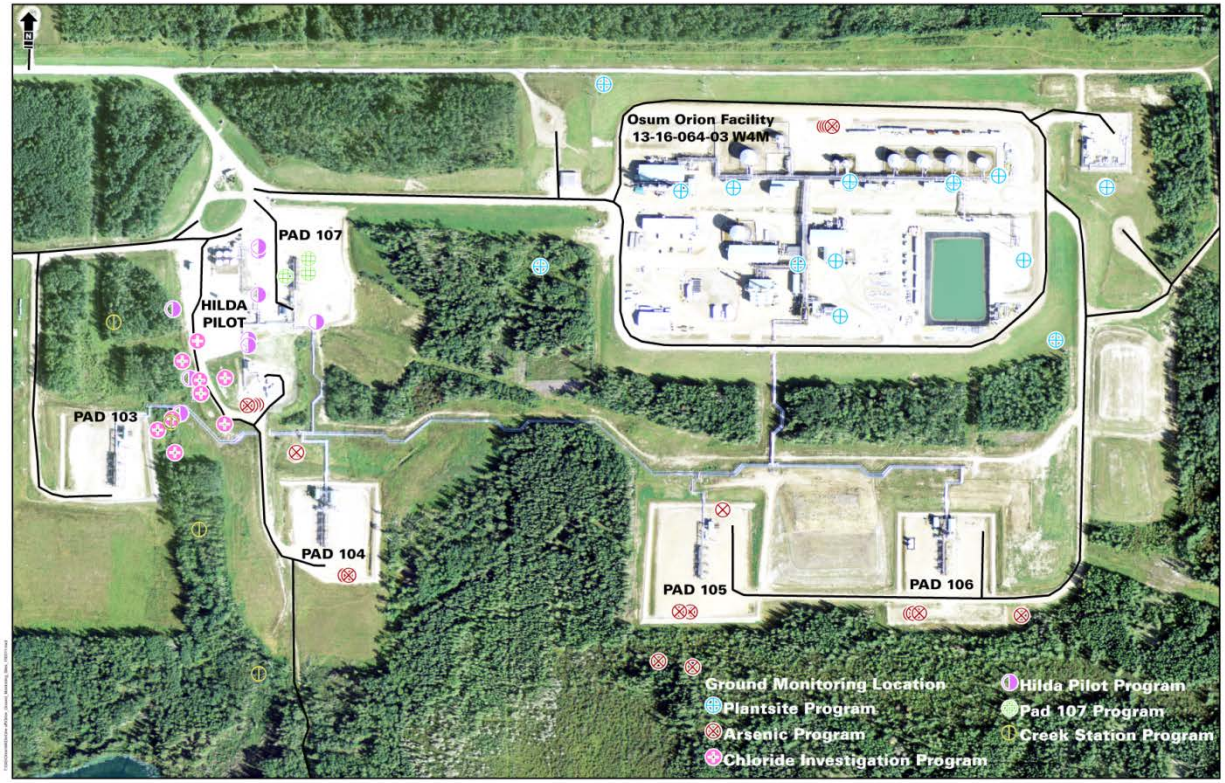
Monthly Greenhouse Gas Emissions (Tonnes of CO2E)



	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15
Emissions Tonnes of CO2E	12,185.533	12,342.724	15,953.197	16,542.425	16,110.283	9,217.921	17,771.326	17,671.557	18,439.065	20,319.969	18,871.675	19,743.856

Groundwater Monitoring Program

- The groundwater monitoring program was consistent with previous years, no negative trends were detected
- No new wells were added
- Arsenic well program sampling events were increased to quarterly and a solute transport model was commissioned



Wildlife Monitoring Program

- The wildlife monitoring program included a breeding bird, yellow rail and amphibian survey and a winter tracking event;
- A comprehensive report summarizing the last 7 years of monitoring was submitted in 2016; and
- The 2015 monitoring program was augmented with the addition of remote cameras for above ground pipeline crossing utilization and acoustical recorders in addition to the approved program. The additions increased the species richness captured over previous years.

Environmental Monitoring Program

- In accordance with Conditions outlined in EPEA Approval 141258-00-00 and Water Act Approval 242090-00-00 the remaining annual reports were prepared and submitted for:
  - Industrial Waste Water and Surface Water
  - Surface Water Quality-Ethel and Hilda Lake
  - Conservation and Reclamation
  - Domestic Water Use
- Conditions were reflective of previous years for these reports.

Amendments to Existing Approvals

- EPEA Approval 141258-00-04 was issued in response to increasing sulphur dioxide daily emissions from 0.9 t/d to 1.61 t/d.

- An extension of the existing approval was issued on July 21 to move expiry of current approvals to July 31, 2016 or upon issuance of EPEA Approval 141258-01-00.

- Changes to Scheme Approval for 2015

  - 10103 J/M- Phase 2 development (Pads 301,302,403,404) and amendment to well layout and addition of 103 wells.
  - 10103 K- Installation of Reverse Osmosis Unit
  - 10103 L- Rescinding of Condition 8-Regarding Long-Term Supply Pumping Test

Compliance

- Sulphur dioxide emissions were exceeded on May 18th. This prompted both the investigation into the source of the increased volume of produced gas entering the facility and applying to increase the limit to reflect modelled tolerances.

- Osum requested a joint audit of the facility by the AER to ensure continued compliance efforts and identify any gaps requiring correction. This was conducted on March 8 and 9th, 2016.

Future Plans

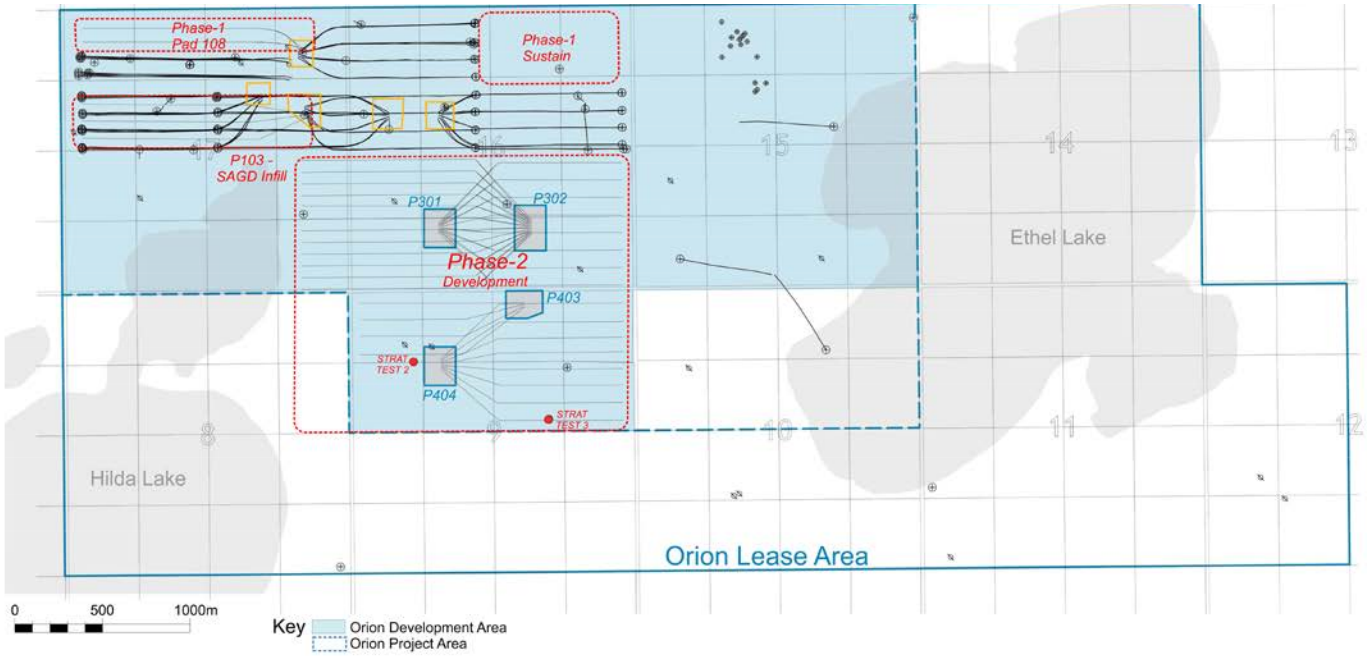
Future Plans – Field Development for Orion Phase 2

- AER Category 2 Amendment Application for Orion Phase 2 was submitted November 2015 and approved Jan 6th 2016. Included the full development plan as submitted previously (for Pads 301, 302, 403 and 404) but with the following changes:

  –Pad 302: Changed from 8 SAGD well pairs with 100 m spacing to 12 SAGD well pairs with 67 m spacing and 990m well length

  –Pad 103 Infill wells: 3 Producer wells drilled between existing Pad 103 and the toe end of Pad 105 SAGD well pairs; total well length 980 m

- The timing of executing this development is under review



Future Plans – CPF Debottlenecking

- Debottlenecking projects under consideration for near term implementation.
  Objectives include:
  - Reduce time to build reservoir pressure across the field back into the target range
  - Provide incremental production
  - Reduce OPEX through on-site treatment of evaporator blowdown waste stream which will:
    - Reduce off-site disposal volumes
    - Increase water recycle rates to be used for additional steam generation

Within Existing AER Scheme Approvals from Orion Phase 2 Expansion:

- Installation of 3rd Boiler (H-4300)
- Installation of new underground brackish water pipeline from well 16-17 to CPF

AER Scheme Amendment Approval Required (D78 submission ~ July 2016):

- Crystallizer addition to treat evaporator blowdown waste
- Additional Reverse Osmosis (RO) unit for brackish well 16-17 feed
- Polisher addition for boiler continuous blowdown to remove loading on evaporators for additional steam generation

Thank you