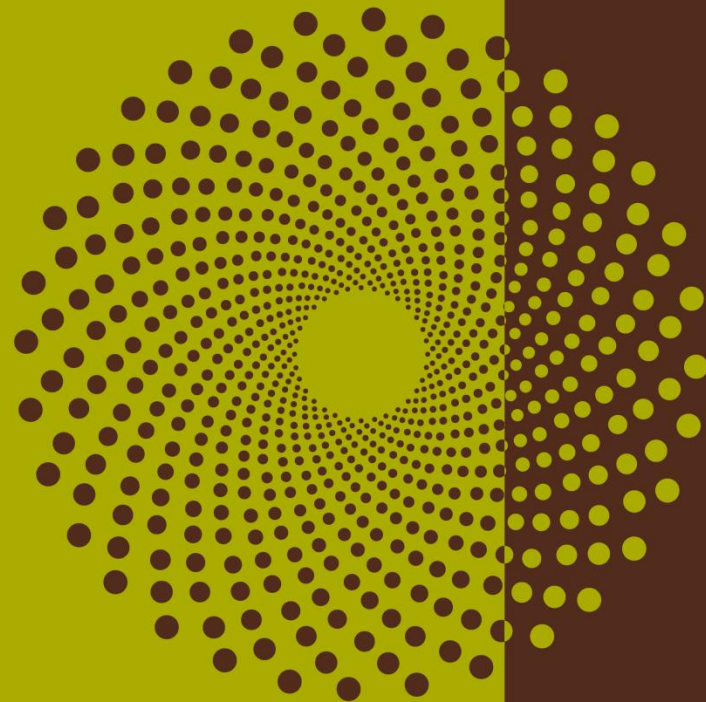


Cenovus FCCL Ltd.  
Christina Lake In-situ Progress Report  
Scheme 8591  
2016 Update

Surface Presentation  
June 6, 2017



# Oil & gas and financial information

## Oil & gas information

The estimates of reserves and contingent resources were prepared effective December 31, 2016 and the estimates of bitumen initially-in-place were prepared effective December 31, 2012. All estimates were prepared by independent qualified reserves evaluators, based on definitions contained in the Canadian Oil and Gas Evaluation Handbook and in accordance with National Instrument 51-101 *Standards of Disclosure for Oil and Gas Activities*. Additional information with respect to the significant factors relevant to the resources estimates, the specific contingencies which prevent the classification of the contingent resources as reserves, pricing and additional reserves and other oil and gas information, including the material risks and uncertainties associated with reserves and resources estimates, is contained in our AIF and Form 40-F for the year ended December 31, 2016 and in our Statement of Contingent and Prospective Resources for the year ended December 31, 2016, available on SEDAR at [www.sedar.com](http://www.sedar.com), EDGAR at [www.sec.gov](http://www.sec.gov) and on our website at [cenovus.com](http://cenovus.com).

There is uncertainty that it will be commercially viable to produce any portion of the contingent resources. There is no certainty that any portion of the prospective resources will be discovered. If discovered, there is no certainty that it will be commercially viable to produce any portion of those resources. Actual resources may be greater than or less than the estimates provided.

Certain natural gas volumes have been converted to barrels of oil equivalent (BOE) on the basis of one barrel (bbl) to six thousand cubic feet (Mcf). BOE may be misleading, particularly if used in isolation. A conversion ratio of one bbl to six Mcf is based on an energy equivalency conversion method primarily applicable at the burner tip and does not represent value equivalency at the well head.

™ denotes a trademark of Cenovus Energy Inc.

© 2017 Cenovus Energy Inc.

# Advisory

This presentation contains information in compliance with:

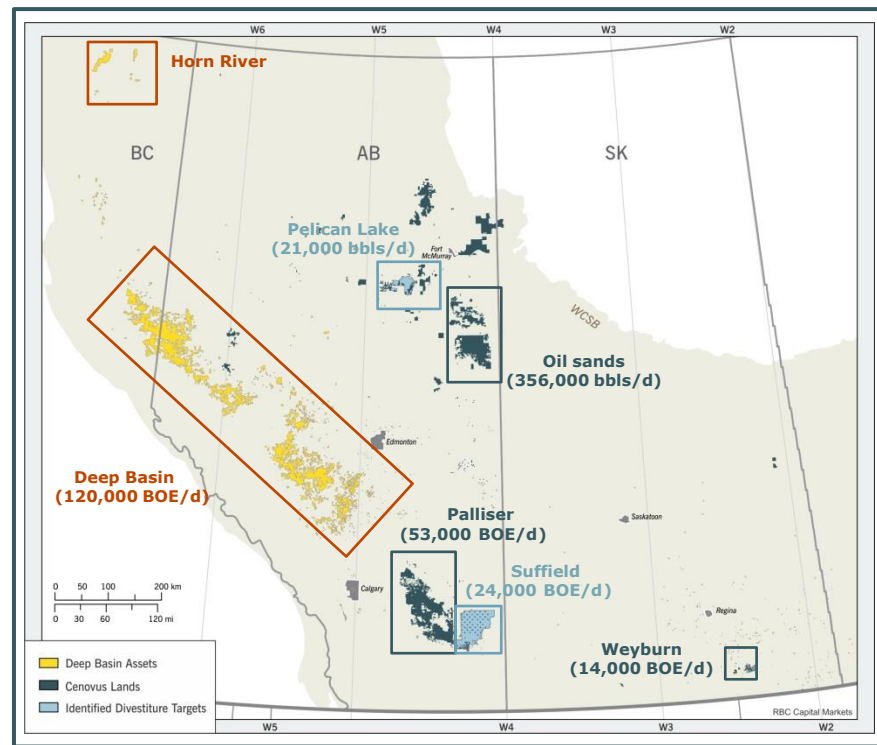
*AER Directive 054 - Performance Presentations, Auditing, and Surveillance of In Situ Oil Sands Schemes*

This document contains forward-looking information prepared and submitted pursuant to Alberta regulatory requirements and is not intended to be relied upon for the purpose of making investment decisions, including without limitation, to purchase, hold or sell any securities of Cenovus Energy Inc.

# About Cenovus

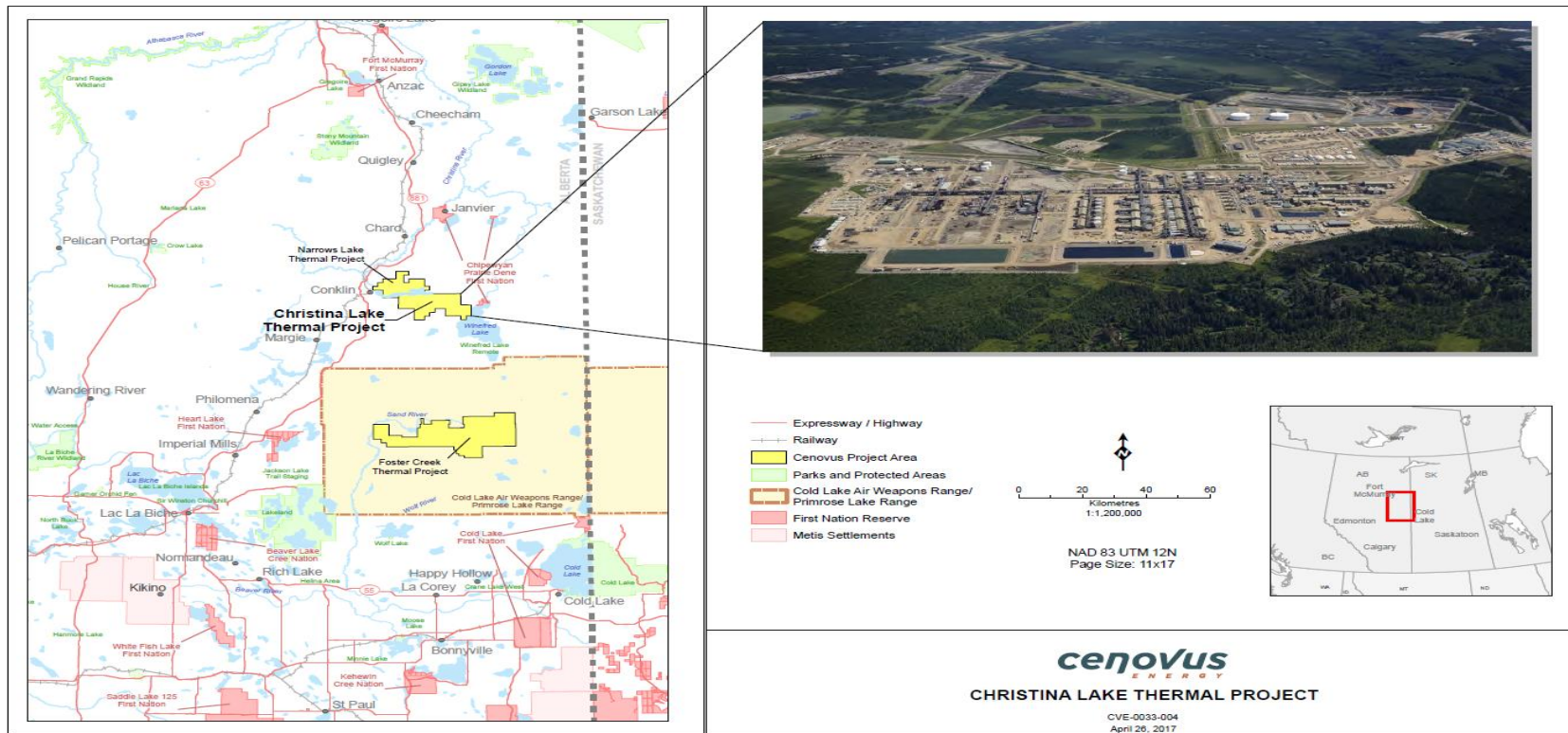
## TSX, NYSE | CVE

Enterprise value	C\$29 billion
Shares outstanding	1,229 million
2017F production <sup>(1)</sup>	
Oil sands	178 Mbbls/d
Conventional	54 Mbbls/d
Total liquids	232 Mbbls/d
Natural gas	350 MMcf/d
Acquired assets	
Oil sands	178 Mbbls/d <sup>(1)</sup>
Deep Basin	120 MBOE/d <sup>(1)</sup>
<b>Total production</b>	<b>588 MBOE/d<sup>(1)</sup></b>
2016 proved & probable reserves	7.8 BBOE
Bitumen	
Economic contingent resources	10.7 Bbbls
Lease rights*	5.0 MM net acres
P&NG rights	7.0 MM net acres
Refining capacity	230 Mbbls/d net

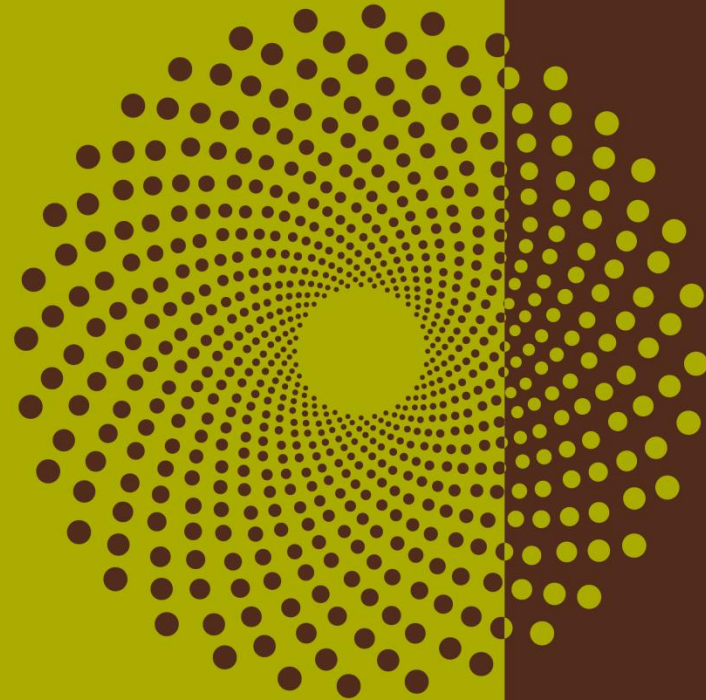


Values are approximate. <sup>(1)</sup> Forecast production based on December 8, 2016 guidance and reflects 2017 forecast production for the acquired assets as though the acquisition closed on January 1, 2017 and full year volumes were contributed; acquisition closed on May 17, 2017 and pro rata volumes will be reflected in reported results. \*Includes an additional 0.5 million net acres of exclusive lease rights to lease on our behalf and our assignee's behalf.

# Area map



## Subsection 3.1.2 – 1) Facilities



# Facility summary

## Phase F Commissioning and Start-Up

Major Facility modification was the addition of Phase F. Key milestones were:

- First Steam - August 2016
- First Water - October 2016
- First Oil – November 2016

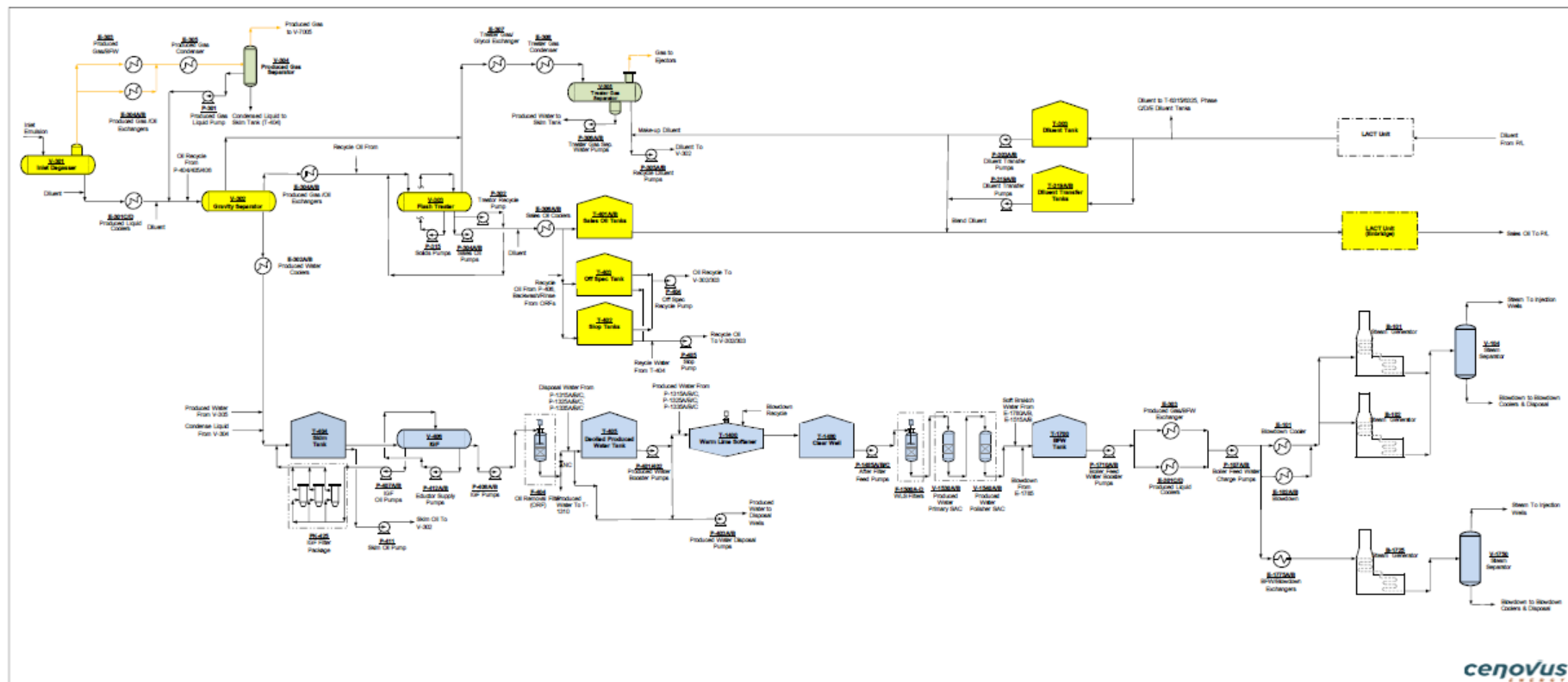


This architectural site plan shows a residential development with various building footprints and landscaping. A central building complex is highlighted in purple, and a large building to the right is highlighted in pink. The plan includes numerous smaller structures, parking areas, and green spaces. The entire drawing is overlaid on a grid.

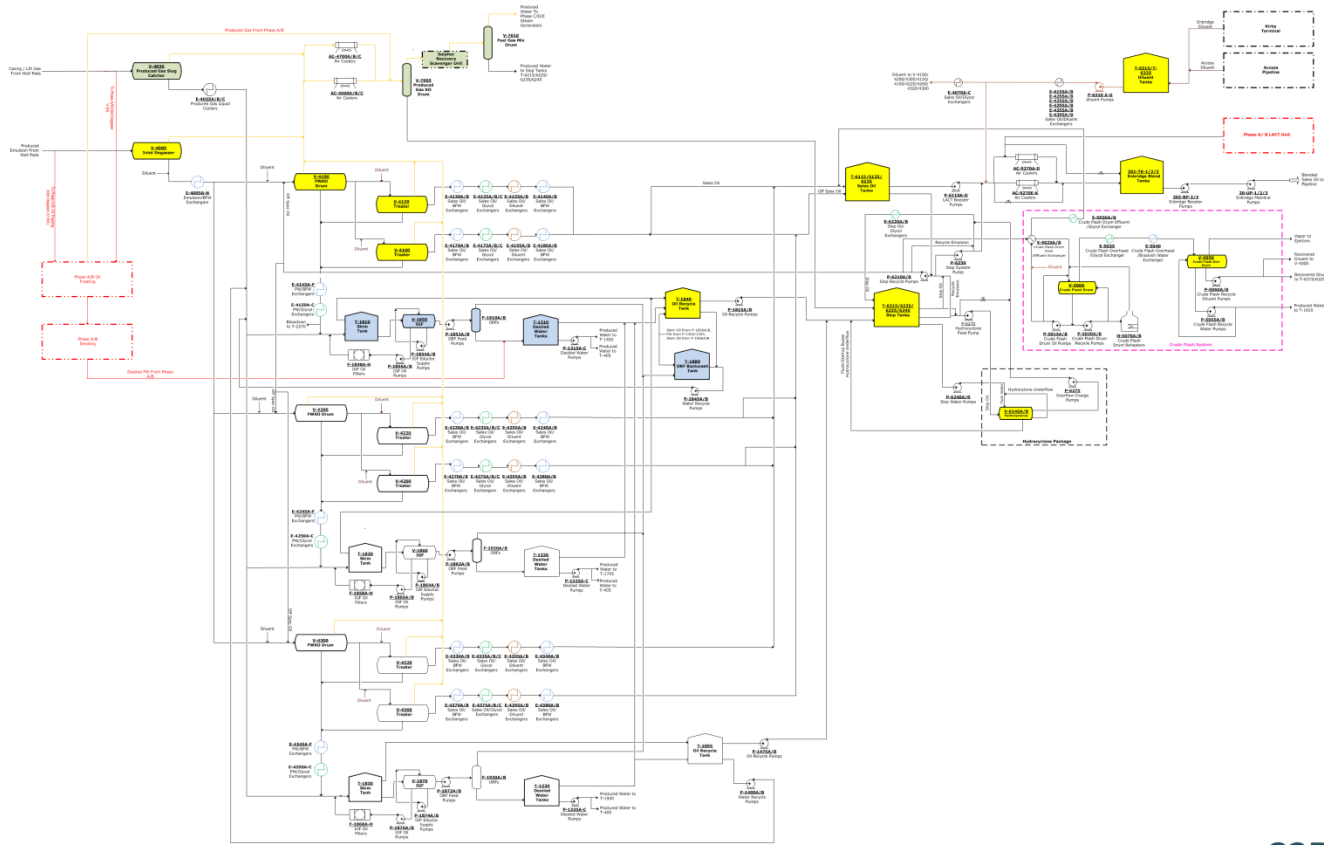
- © 2017 Cenovus Energy Inc.  
Subsection 3.1.2-1a)  
June 6, 2017



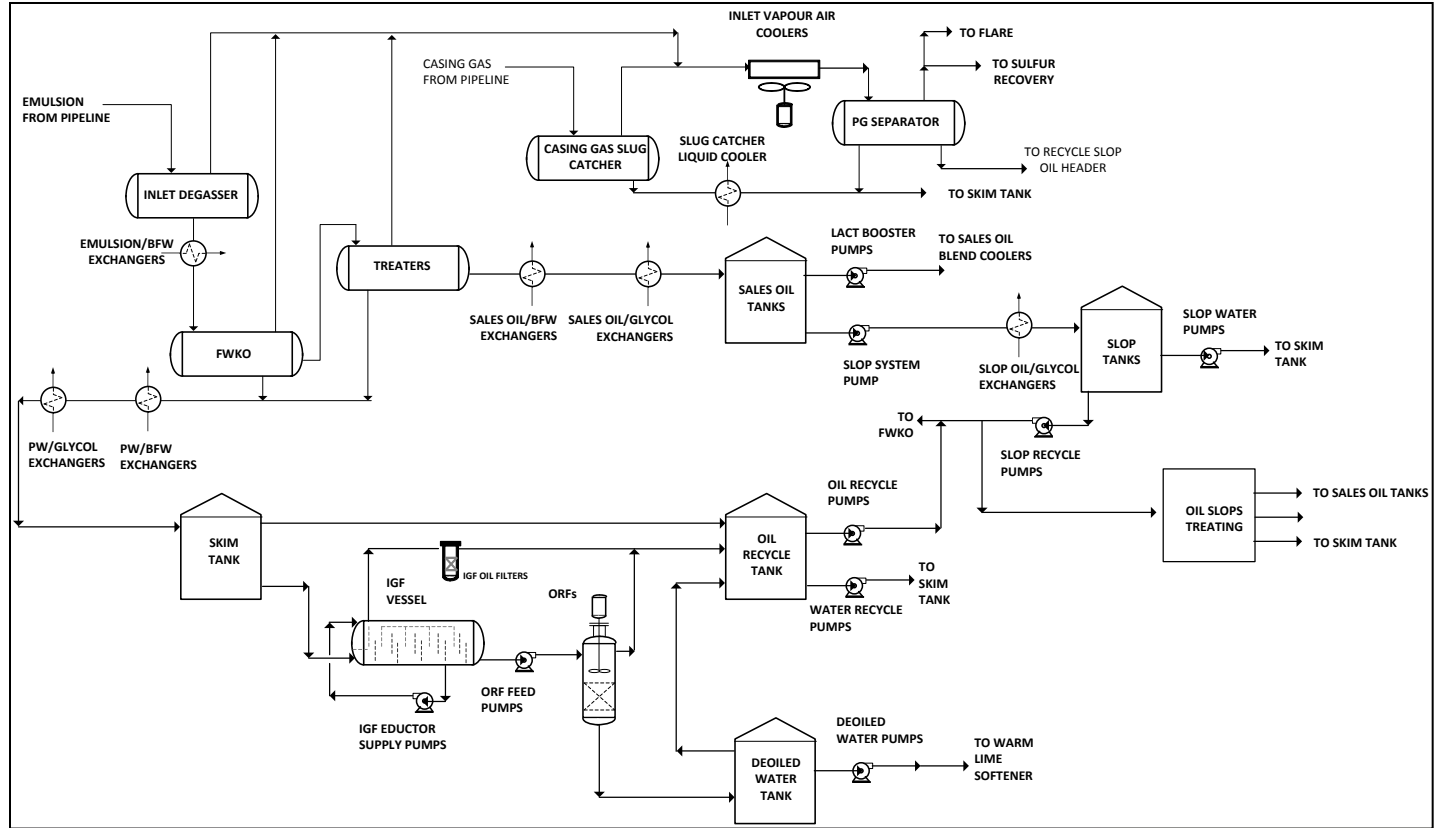
# Phase A/B process de-oiling, steam & water system



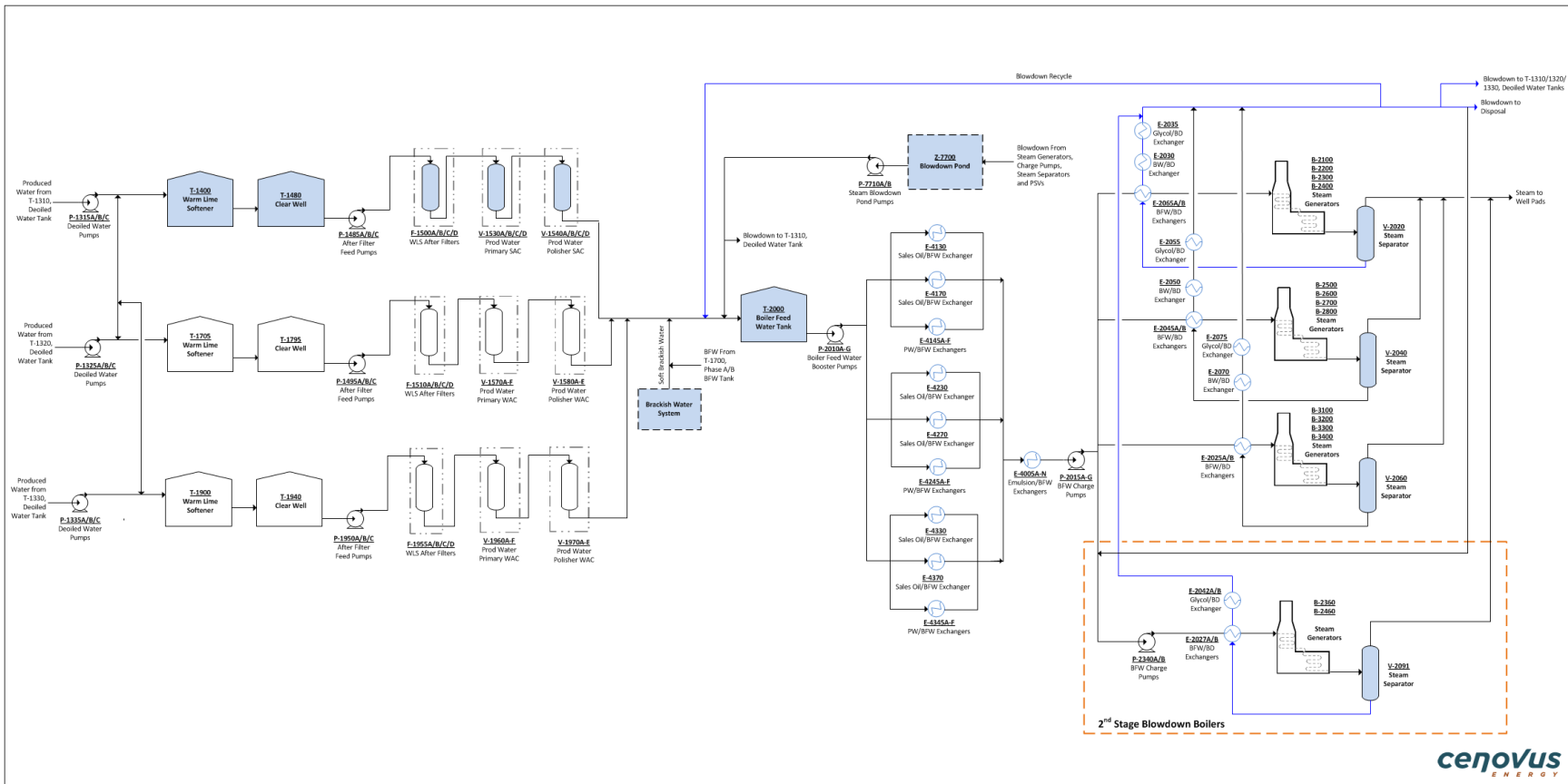
## Phase C/D/E Process De-oiling



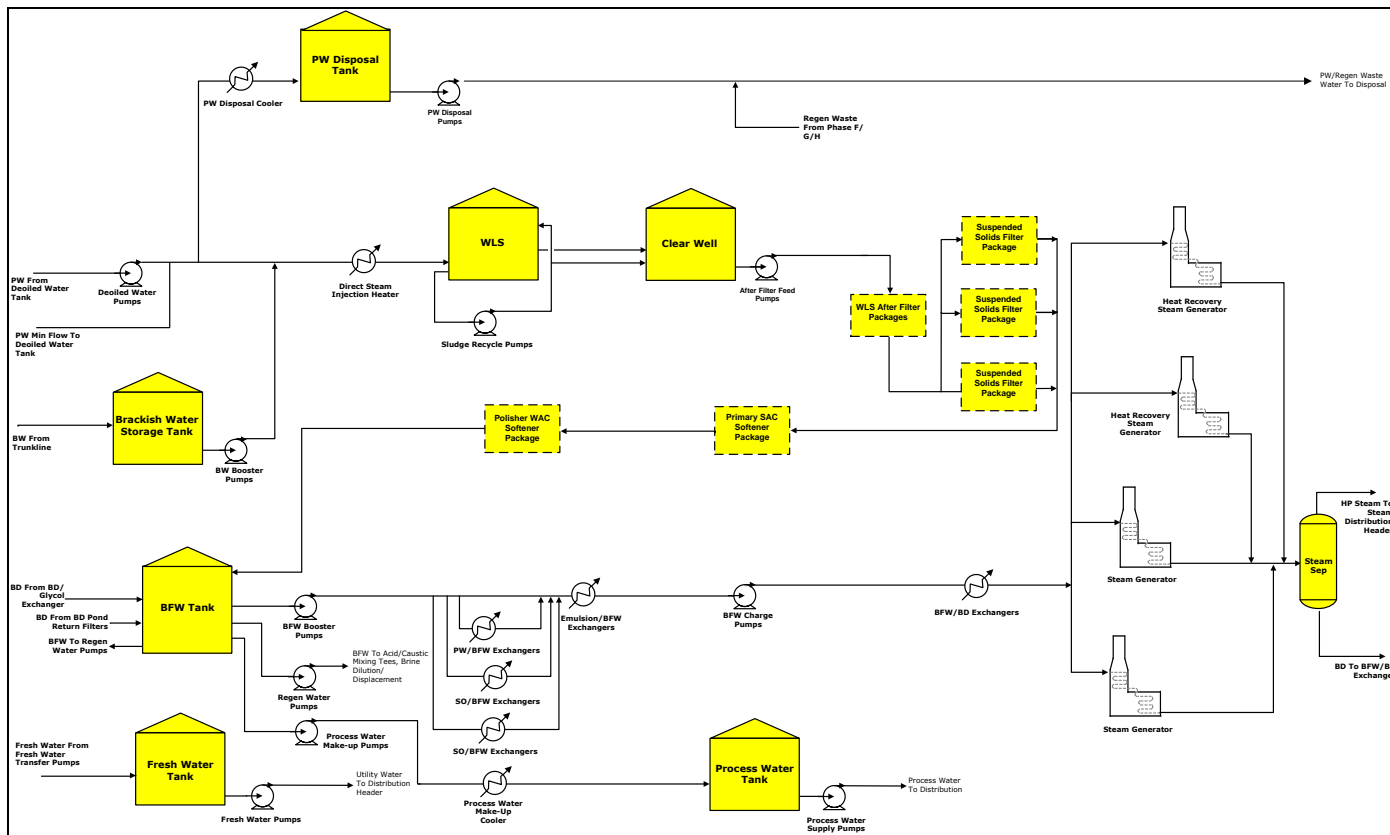
# Phase F Process De-oiling System



## Phase C/D/E Steam & Water System



# Phase F steam & water system

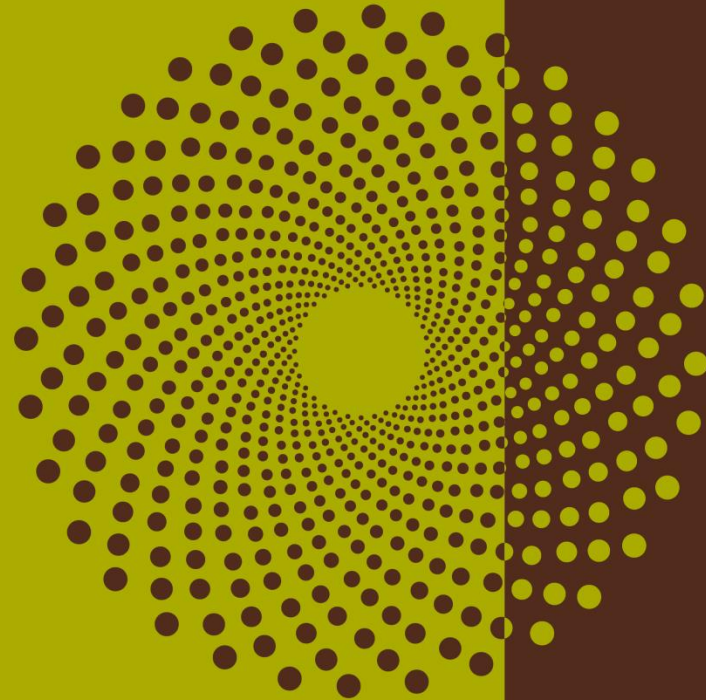


# Facility modifications

- No additional major modifications made to Phase A-E outside of Phase F commissioning and start-up already mentioned
- Commissioning and start-up of Produced Water / Boiler Feed Water crossover line to enable water sharing across Phase A-E and Phase F. Started operating Aug 2016
- CL1F expansion started operating end of 2016
  - Includes addition of cogeneration
- Addition of three blend coolers completed in June 2016



## Subsection 3.1.2 – 2) Facility Performance



# Plant performance

## Exceeded Available System Capacity performance:

- Steam plant has achieved higher rates than available system capacity (**102%**, **65,221** t/d vs system capacity 63,860 t/d)
- Oil treating has achieved higher rates than available system capacity (**102%**, **34,706** m<sup>3</sup>/d vs 34,101 m<sup>3</sup>/d)

# Bitumen treatment

## Process

- Available System Capacity of 34,101 m<sup>3</sup>/d
- Have reduced issues with treating and water quality due to:
  - Further improvements to chemical treating program
  - Improved operating procedures and monitoring programs
  - Modifications to control logic and increased automation
- Continued success of treating program to minimize slop production
- Slop handling is internalized within the facility, with little to no offsite management

# Water treatment

## De-oiling

- Capacity of 65,567 t/d of water
- Flowed up to 61,016 t/d of water
- Issues in de-oiling are:
  - Water cooling at high flow rates
  - Fouling of heat exchangers

## Water treatment

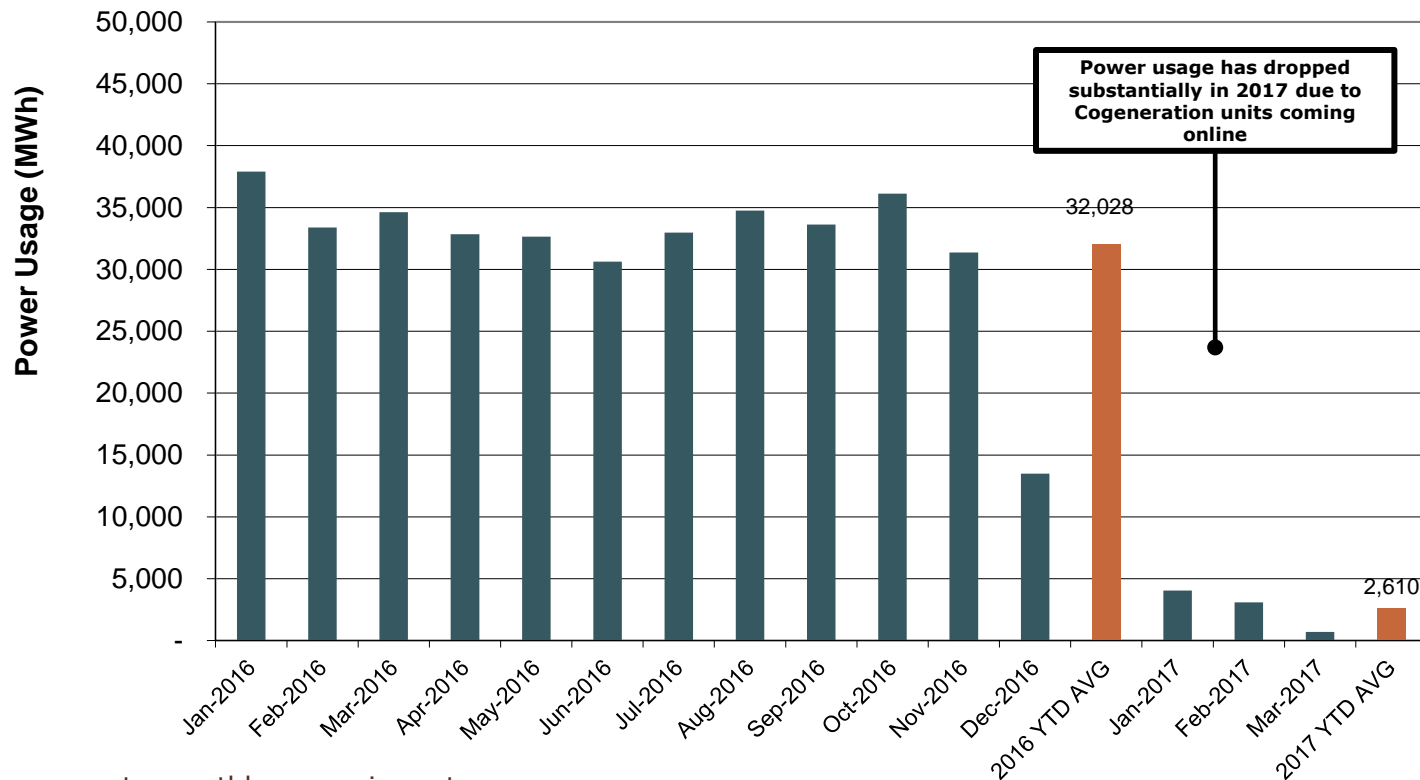
- Capacity of 78,240 t/d of water
- Flowed up to 72,608 t/d of water
- Blowdown recycle into the produced water treatment trains and boiler feed water tank with no adverse impacts up to 50% of total blowdown volumes produced
- Chemical optimization continues to be a focus in water treatment

# Steam generation

## Steam generation via 19 OTSGs and 2 HRSGs

- Available system capacity of 63,860 t/d dry steam
- Have achieved rates in excess of 65,221 t/d dry steam
- Typical operation: 82% quality
  - Worked with vendor to re-rate CDE OTSGs
  - Rigorous monitoring program including continuous boiler performance monitoring

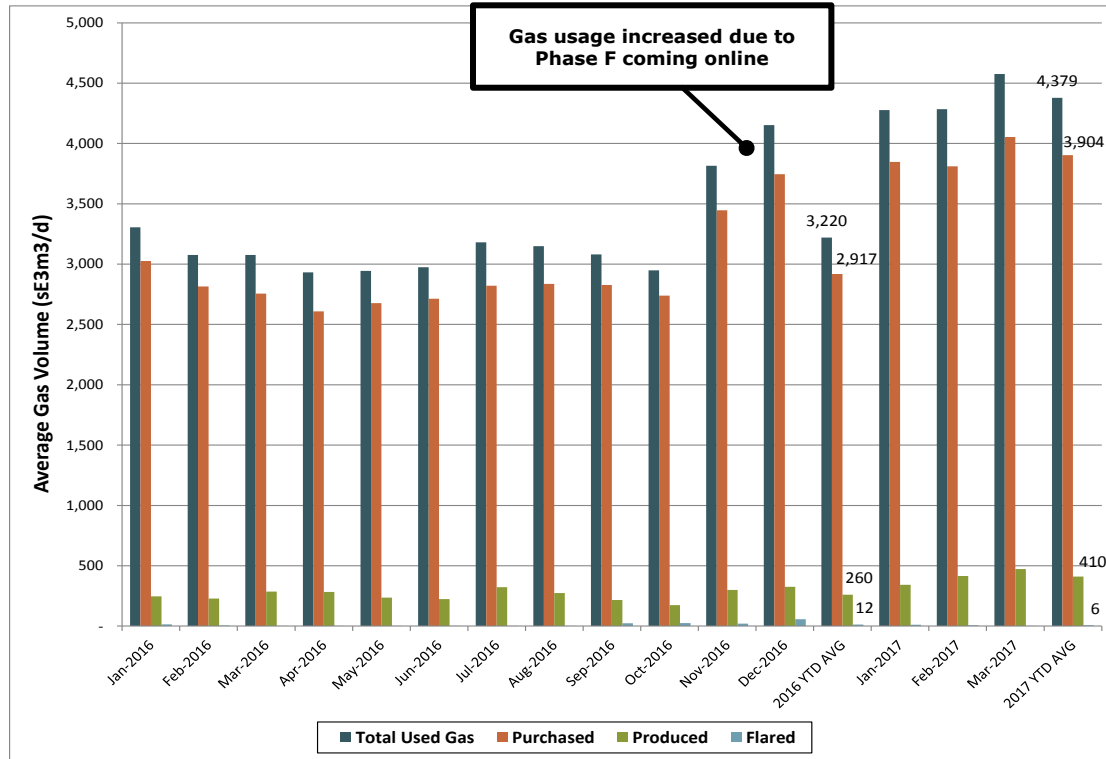
# Power usage



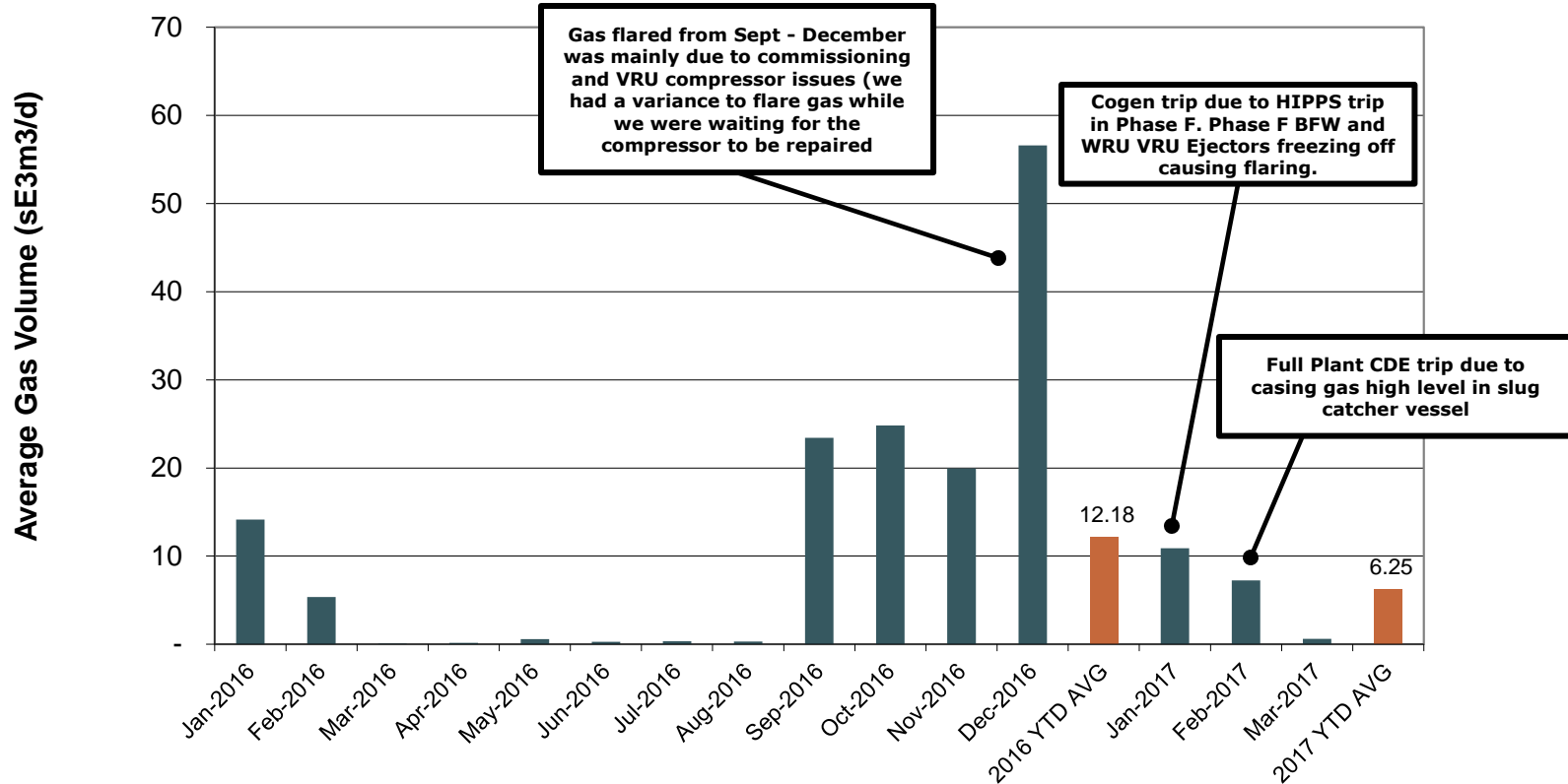
\*Note – Plot represents monthly power imports.



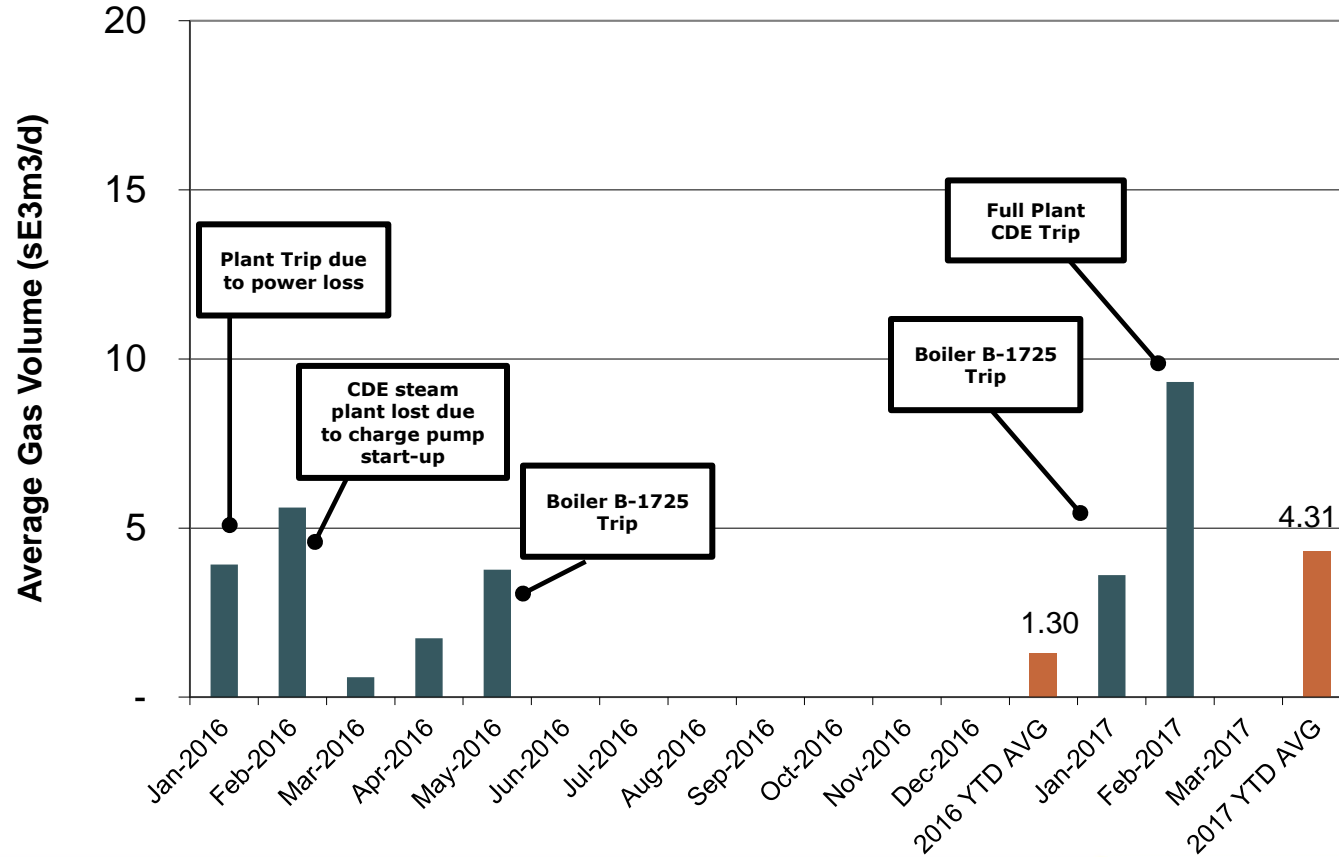
# Gas usage



# Gas flared



# Gas vented



# Greenhouse gas emissions

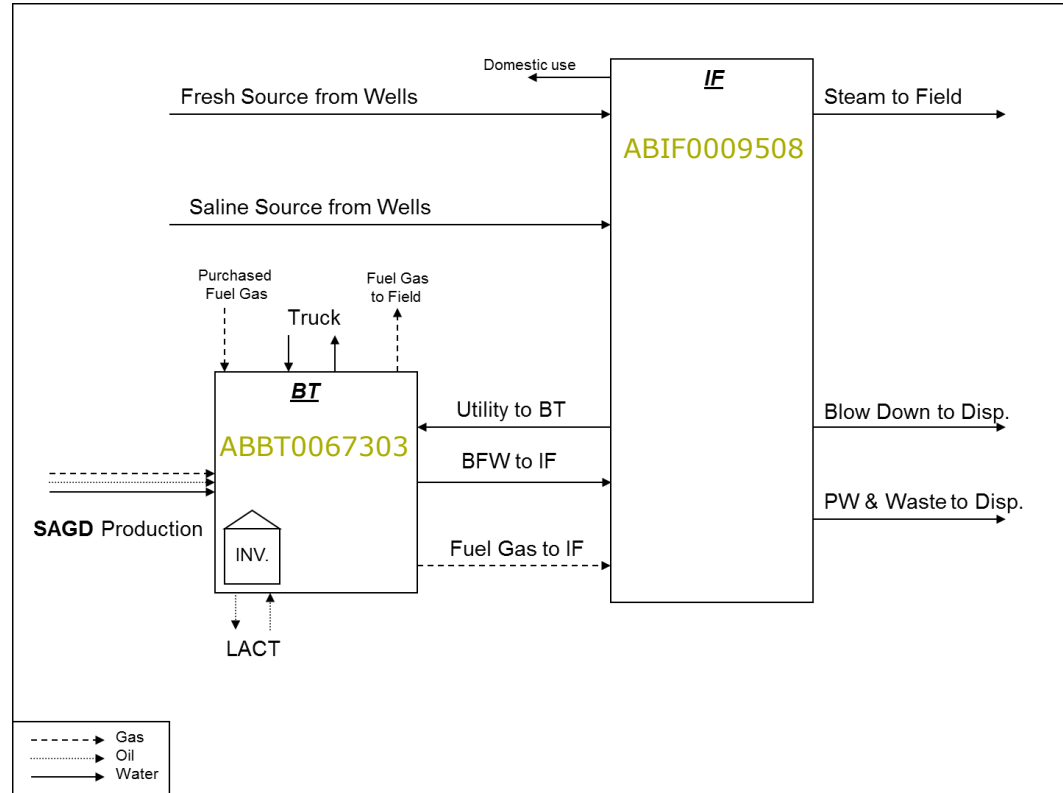
**Greenhouse gas emissions are reported to AEP on yearly basis for review**

- 2016 total direct emissions by gas type
  - CO<sub>2</sub> – 2,317,352 tonnes CO<sub>2</sub>e
  - CH<sub>4</sub> – 17,580 tonnes CO<sub>2</sub>e
  - NO<sub>2</sub> – 3,959 tonnes CO<sub>2</sub>e

## Subsection 3.1.2 – 3) Measurement and reporting



# Simplified MARP schematic





# Production volumes

## Bitumen Production

- Estimate by well tests (2 phase test separators with BSW%)
  - 8-12 wells per separator
  - ~10 hour cycles + purges
  - 1 hour of testing for every 40 hours of well operations

## Gas Production

- Produced gas volumes are calculated using consumed and purchased gas volumes within the facility.
- A Facility Level GOR is calculated based on total bitumen production. The calculated GOR value is then used to allocate gas production on a well basis.

Battery GOR = Total monthly measured produced gas at battery ÷ Total monthly measured produced oil at battery

Well gas volume = Battery GOR × Well prorated (reported) oil volume

# Injection Volumes

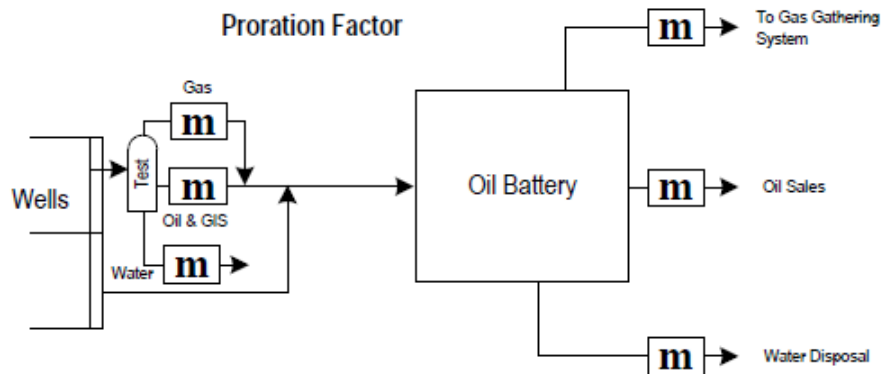
## Steam Injection

- Measured on an individual well basis.
- Steam proration is calculated using the sum of the total wellhead injection volumes and the total steam volume measured at the Injection Facility.

## Gas Co-Injection

- Measured on a well basis

# Proration factors



Test rates are used to estimate monthly well production volumes of each product.

Estimated monthly battery production of each product is determined by totalling all wells' estimated production.

Actual monthly battery production volume of each product is determined by measured delivery and inventory changes.

For each product,  

$$\text{Proration Factor} = \text{Actual Battery Production} / \text{Estimated Battery Production}$$

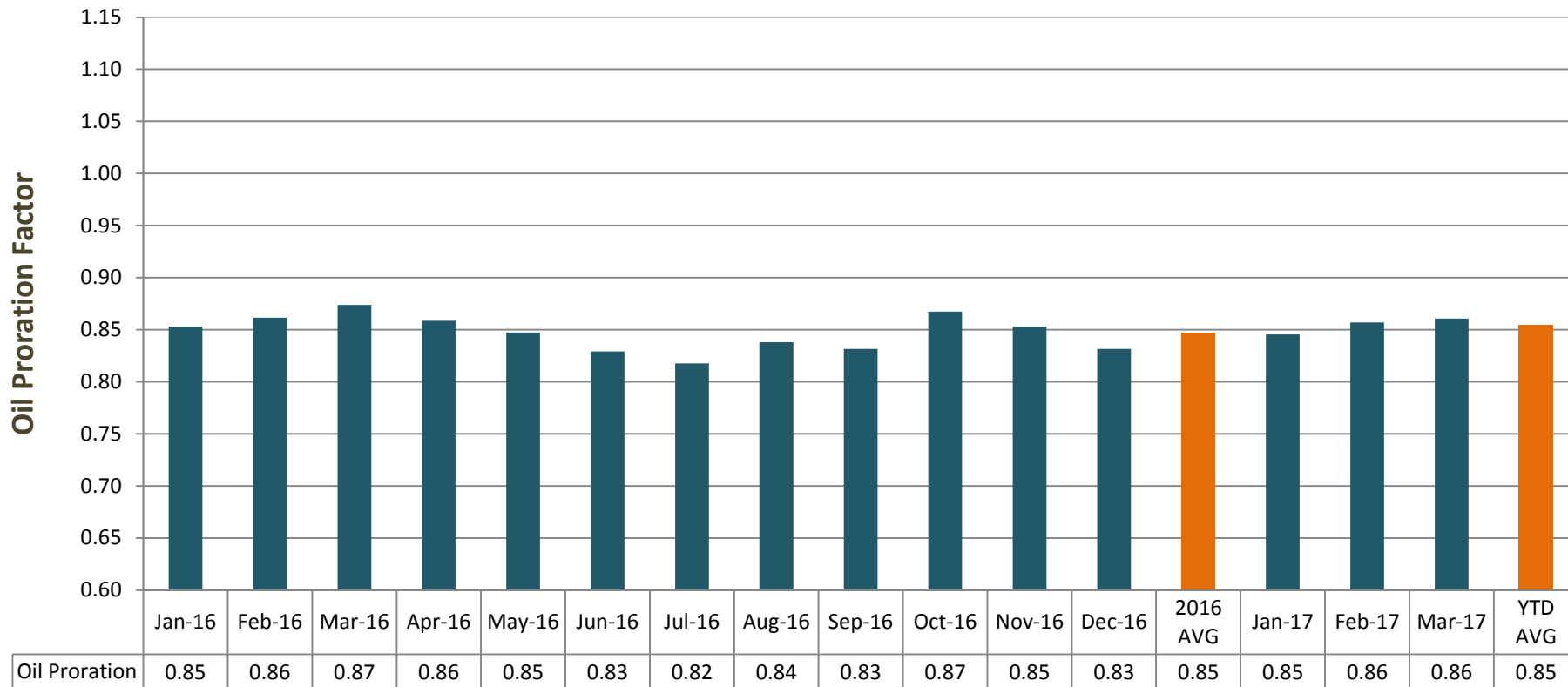
For each product for each well,  

$$\text{Actual Monthly Well Production} = \text{Estimated Monthly Well Production} \times \text{Proration Factor}$$

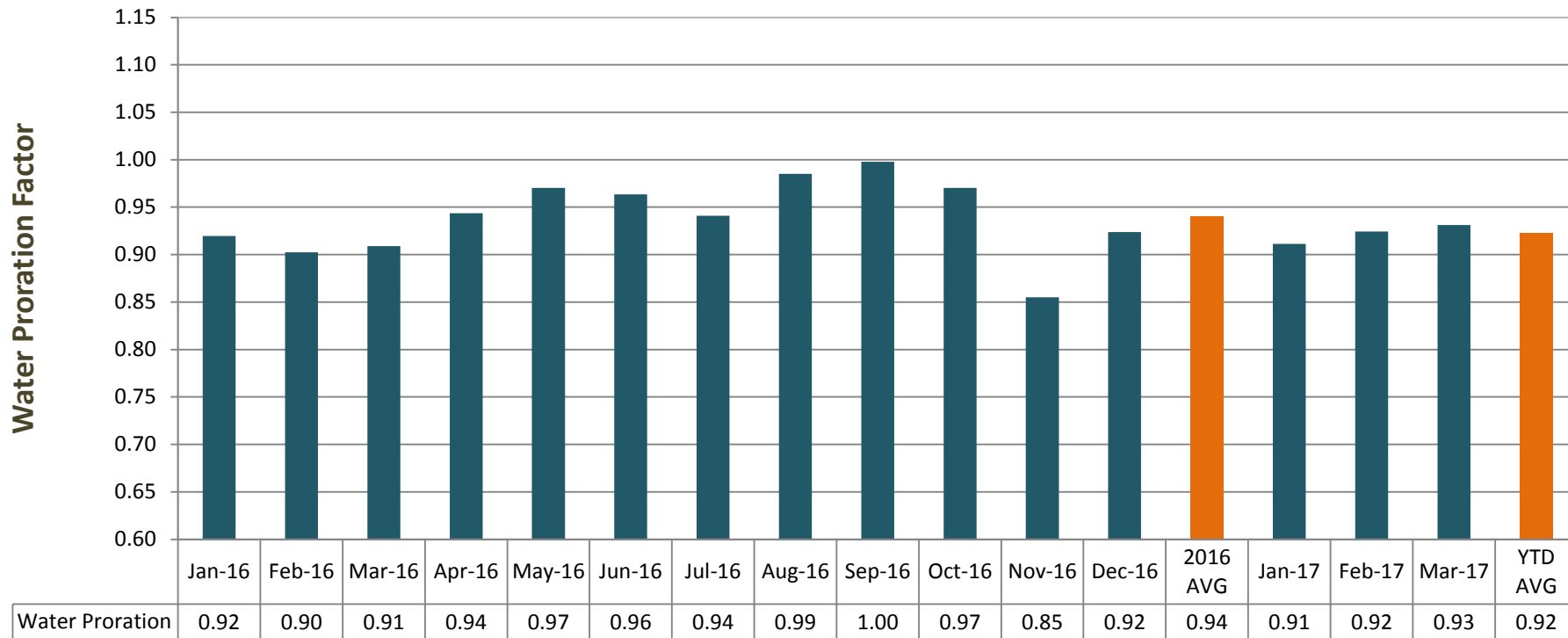
**m** = Measurement Point

Courtesy of AER

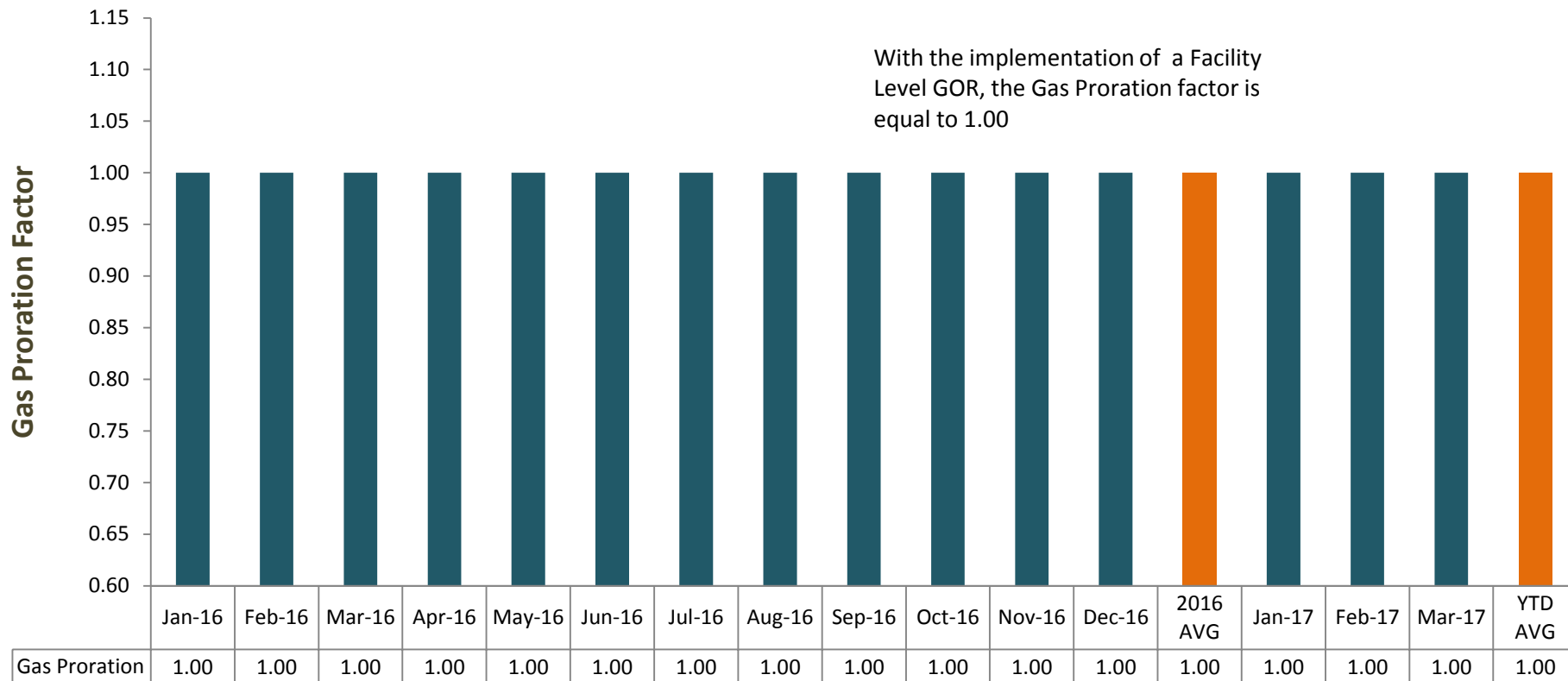
# Oil Proration Factor



# Water proration factor

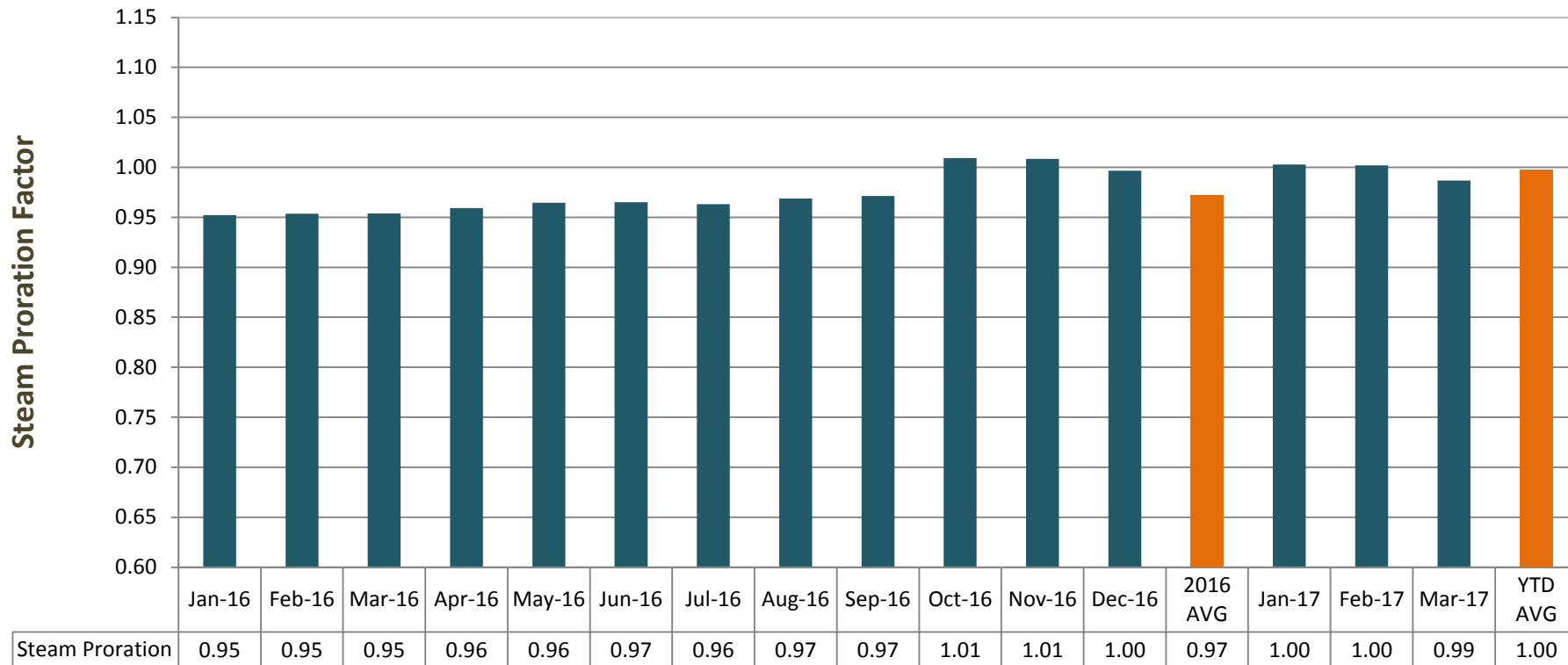


# Gas proration factor

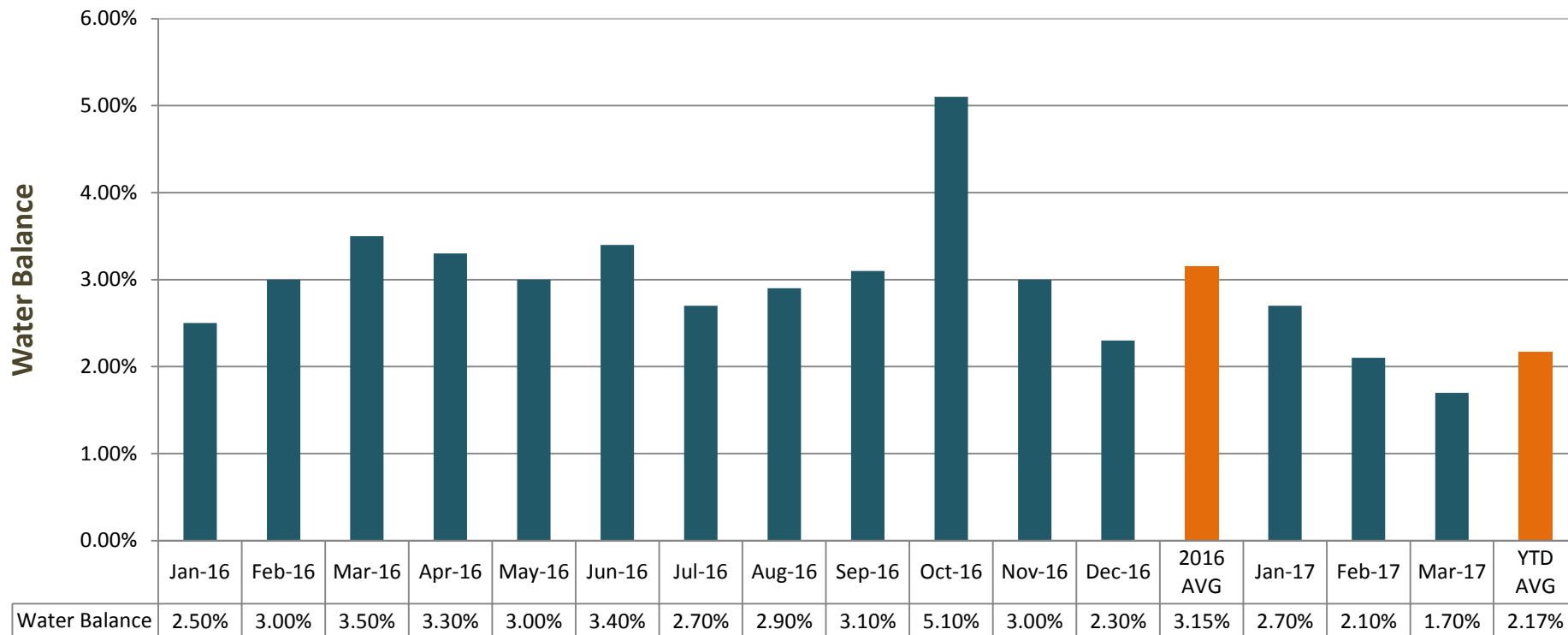




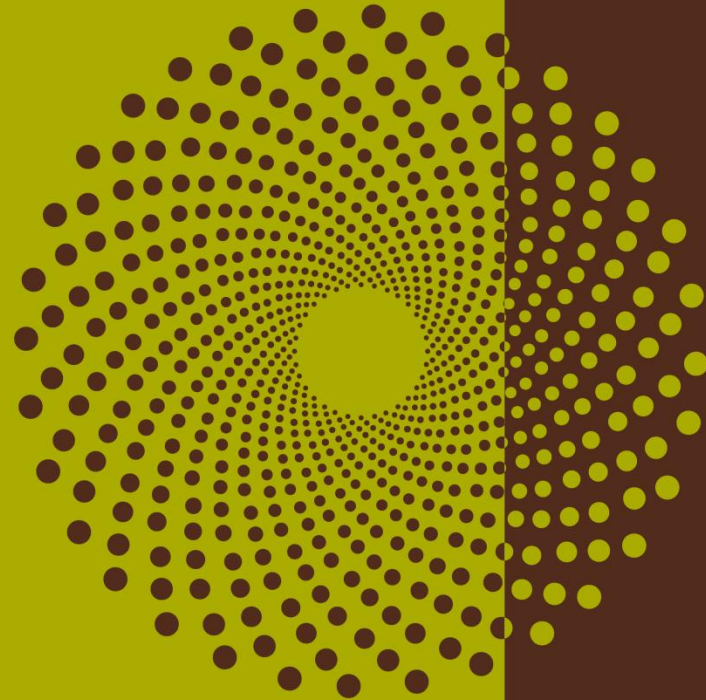
# Steam proration factor



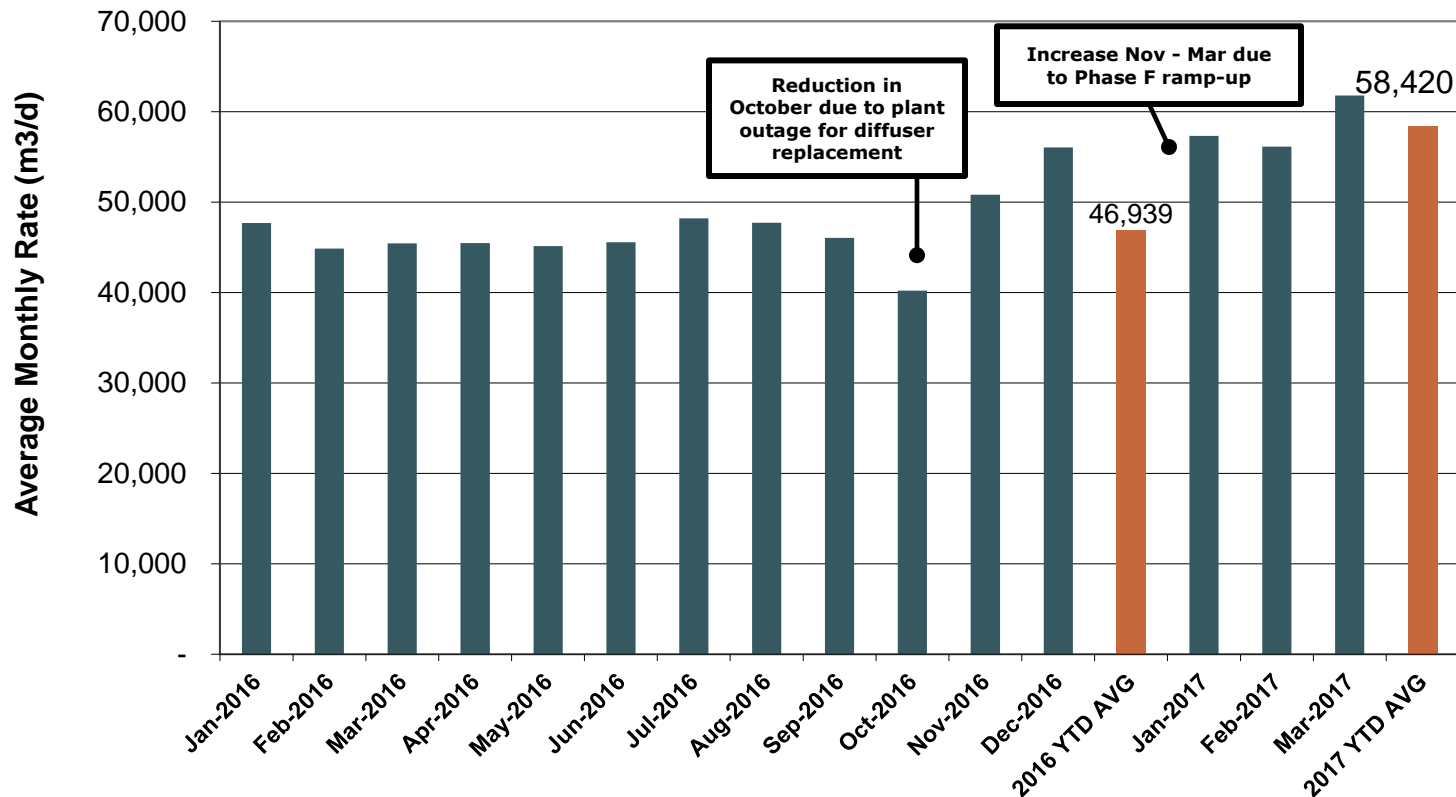
# Water balance



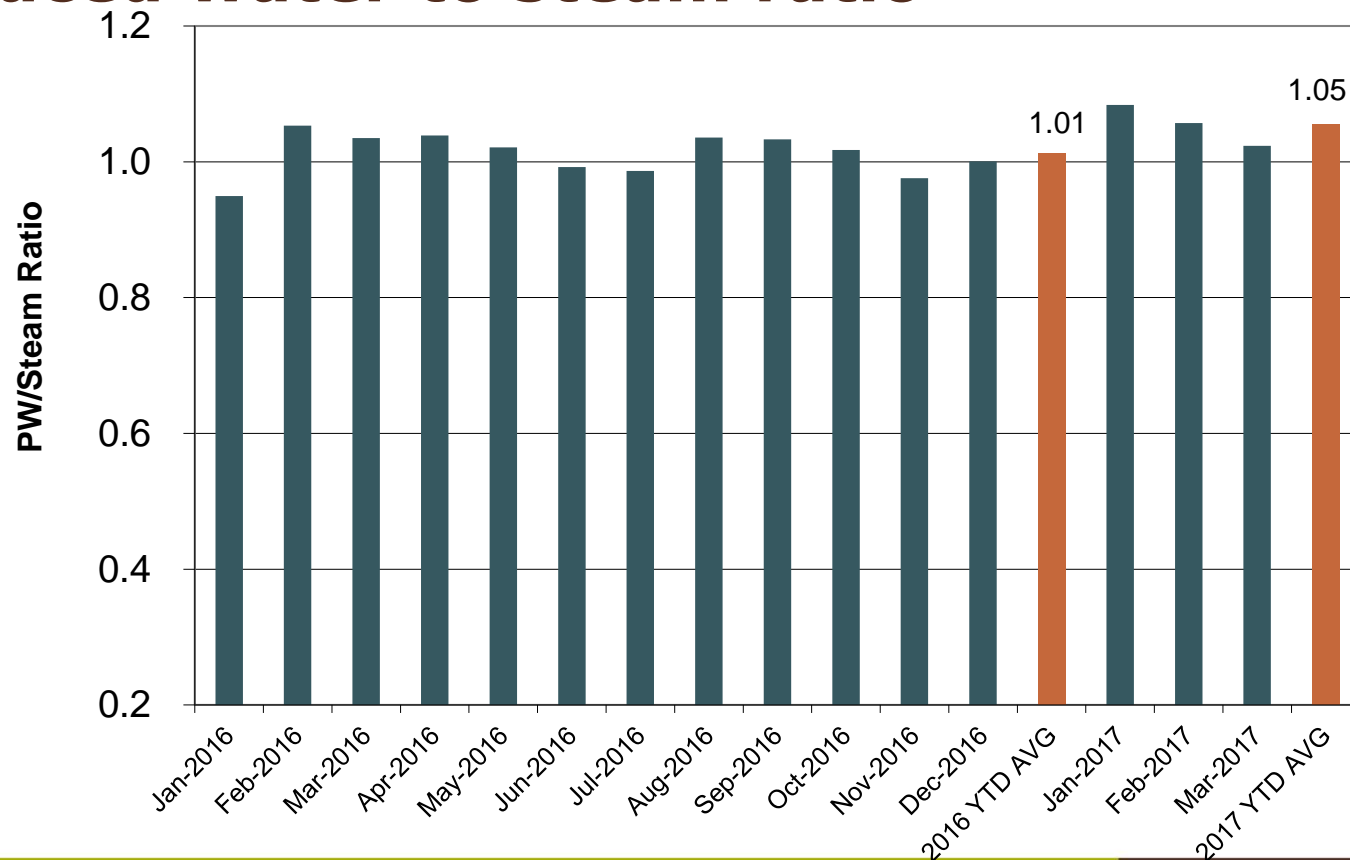
## Subsection 3.1.2 – 4) Water Production, Injection and Uses



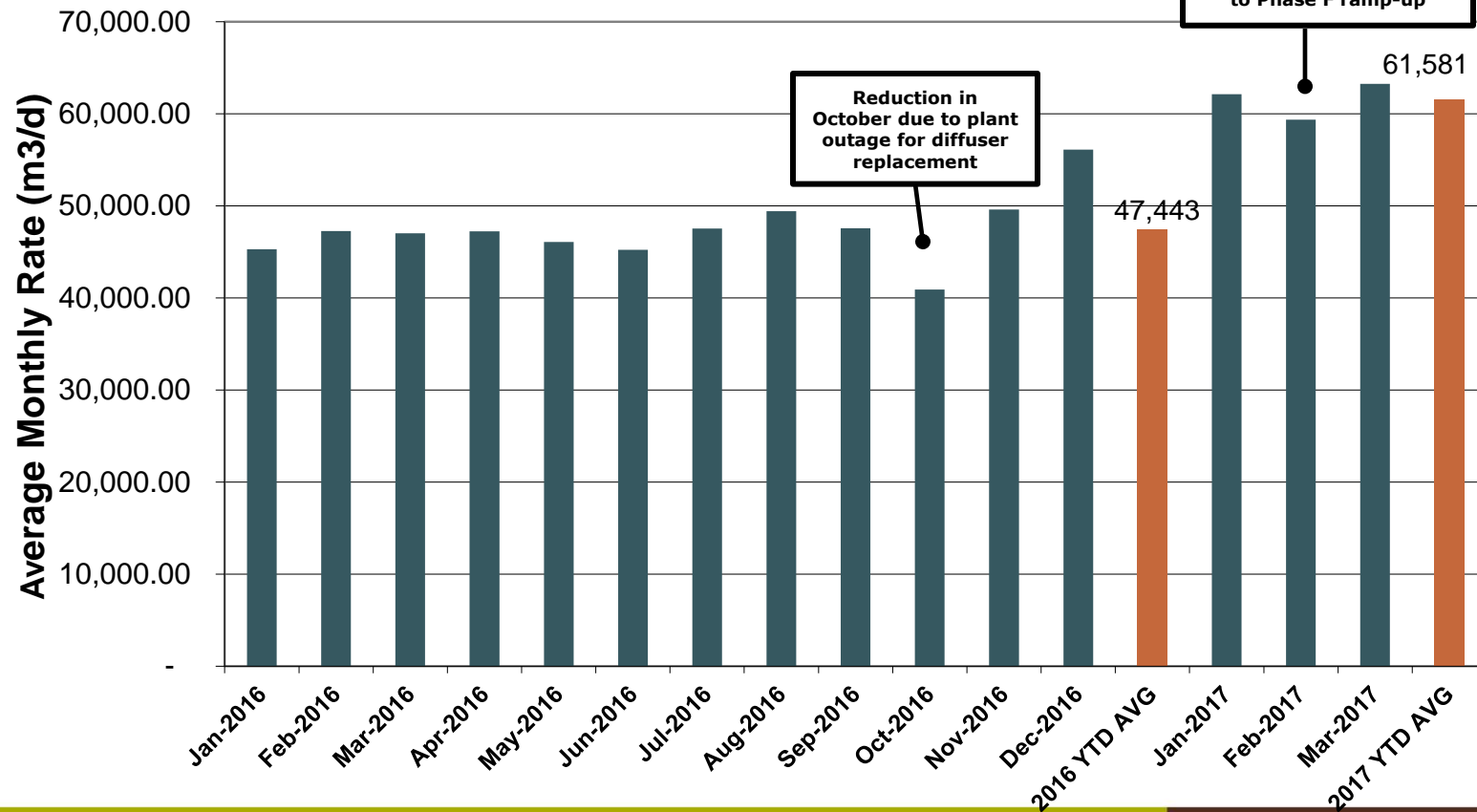
# Steam volumes



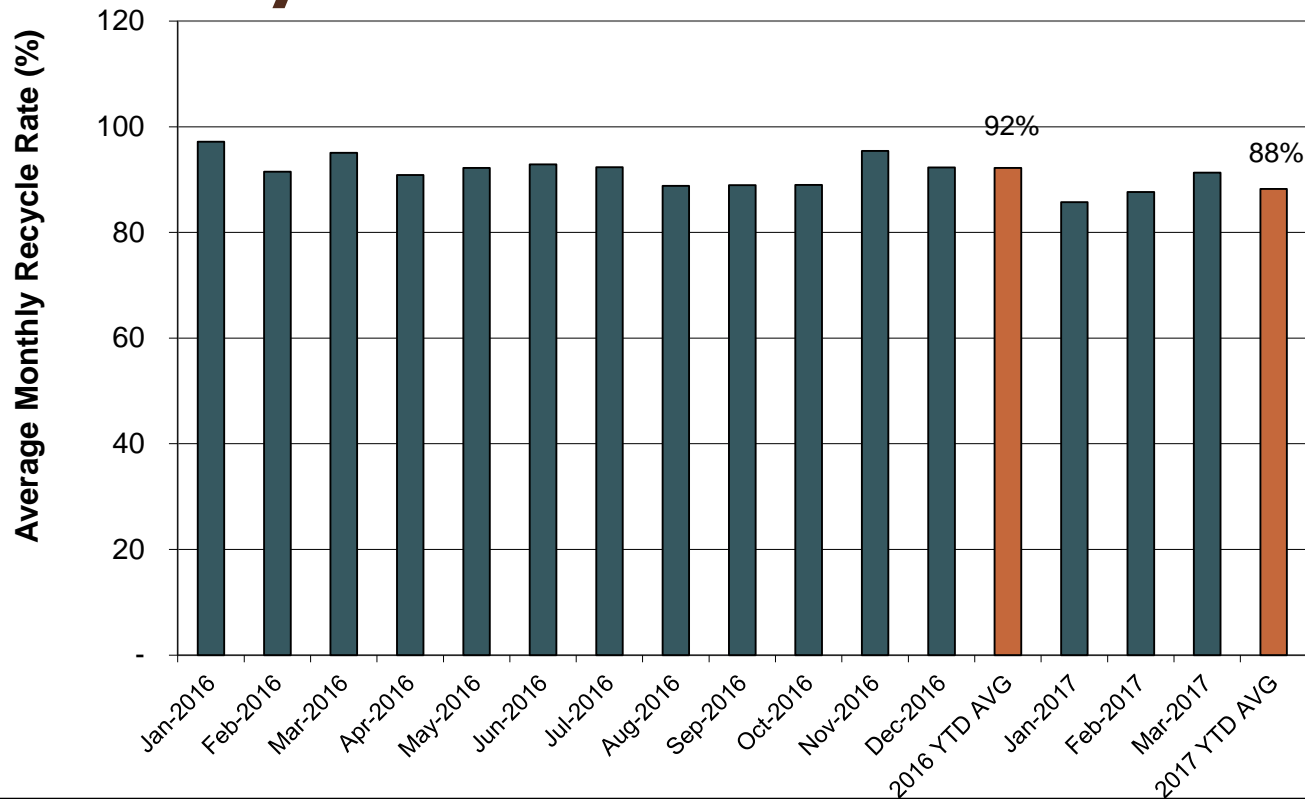
# Produced water to steam ratio



# Produced water volumes



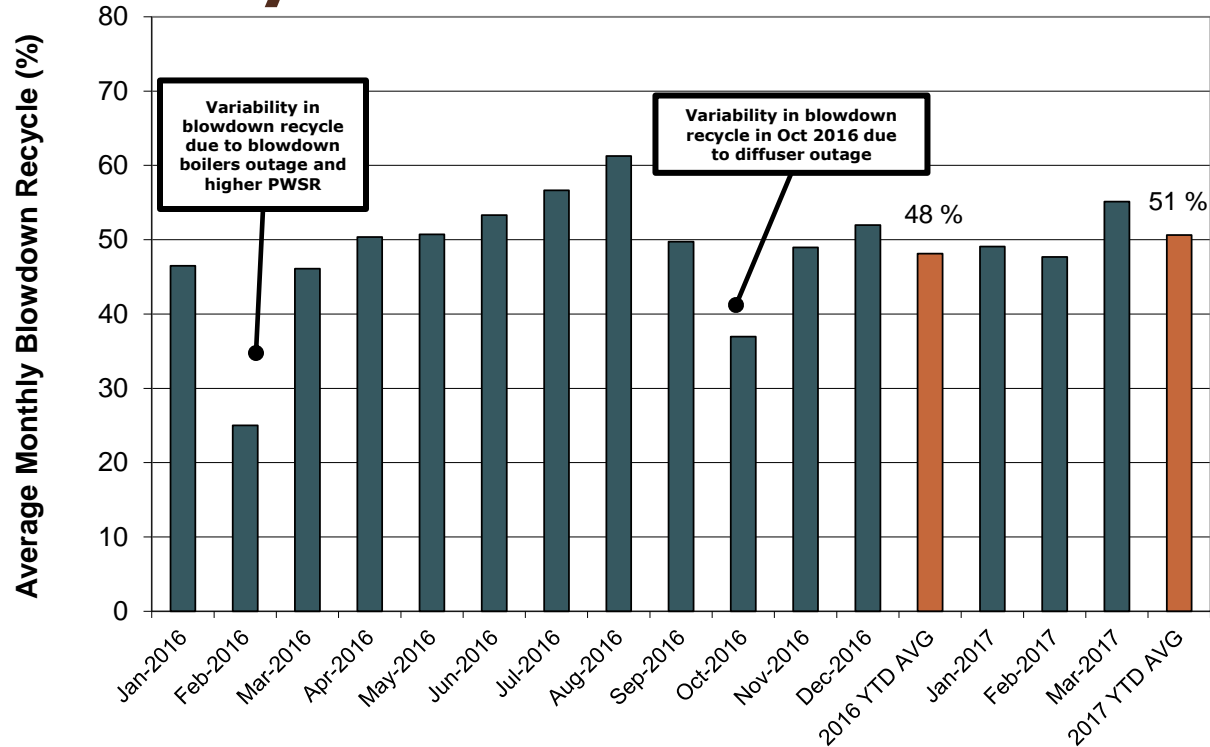
# Water recycle ratio



- Slight decline in recycle ratio in Q1 2017 due to Phase F ramp-up and new well pad start ups
- Challenges with treating stability and O&G excursions resulted in increased PW disposal to preserve equipment while trying to stabilize production

$$\text{Produced-Water Recycle (\%)} = [(\text{Produced Water In} - \text{Disposal Total}) / (\text{Produced Water In})] \times 100$$

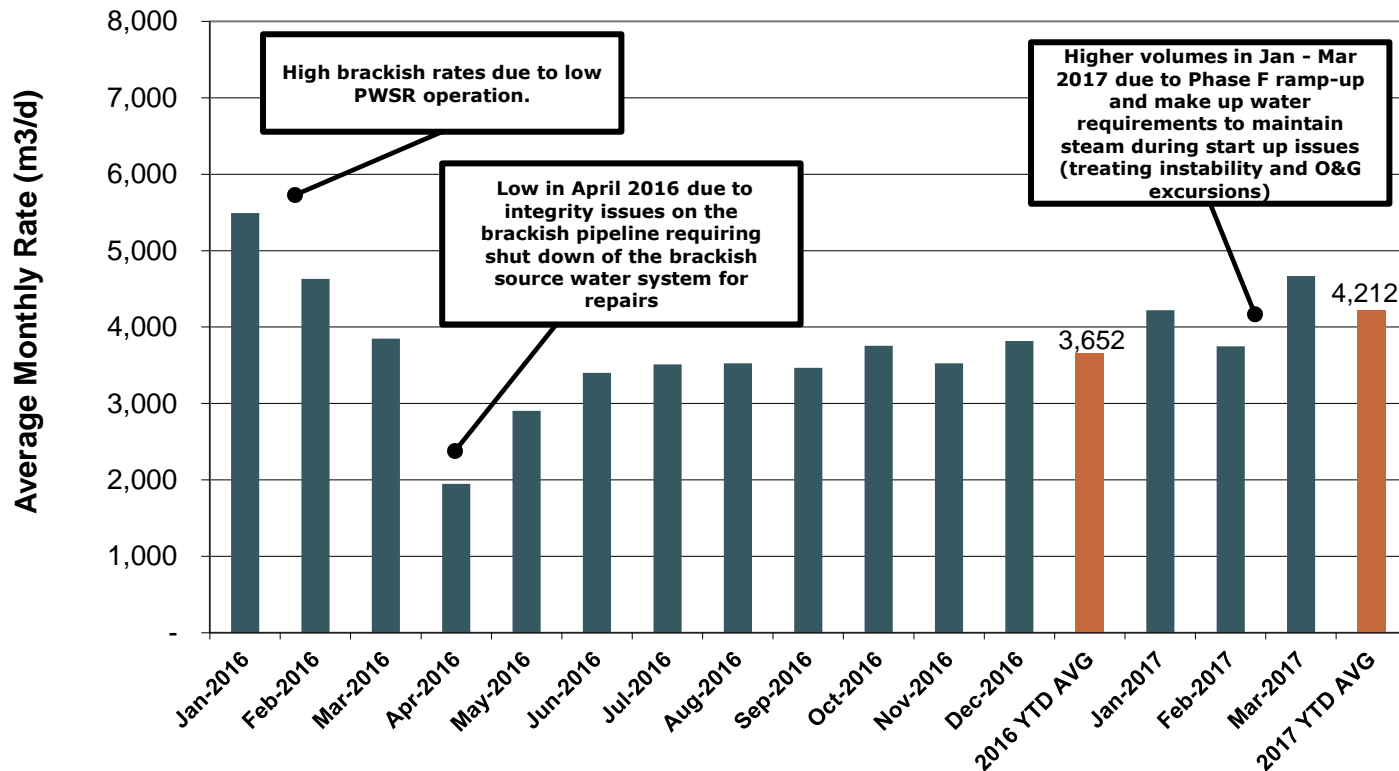
# Blowdown recycle



**Note:** Blowdown recycle rates vary depending on Produced Water:Steam ratio and make-up water demand, in addition to BFW quality.



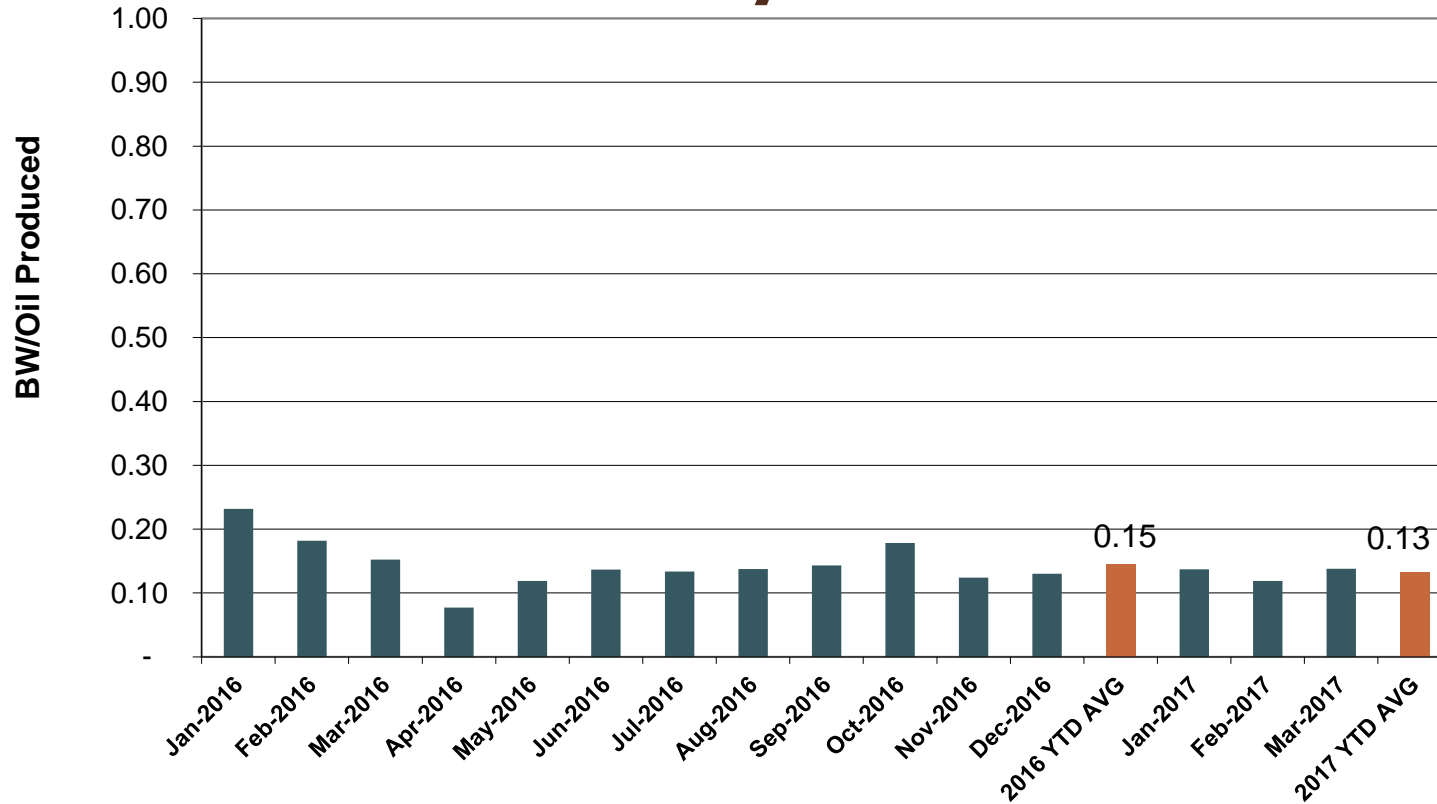
# Brackish water use



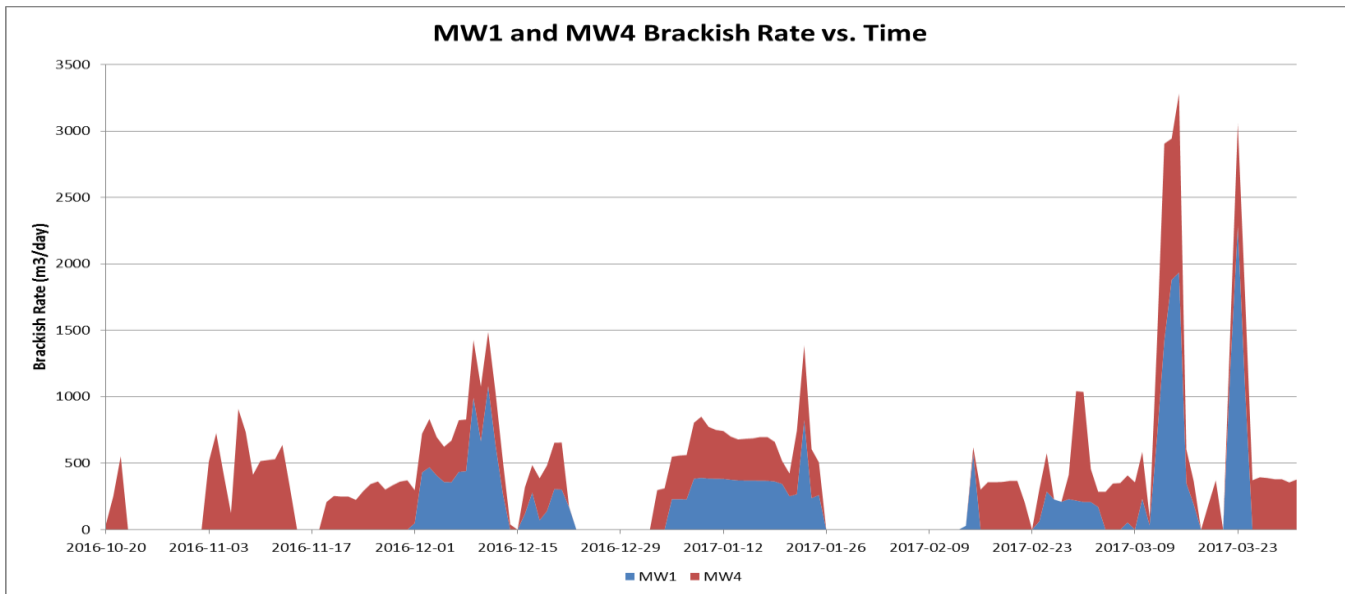
## Uses:

- Make-up water for steam generation
- Produced water and produced emulsion cooling in Phase A-E
- Softened water used for slurry make-up, seal flushes etc.

# Brackish water intensity

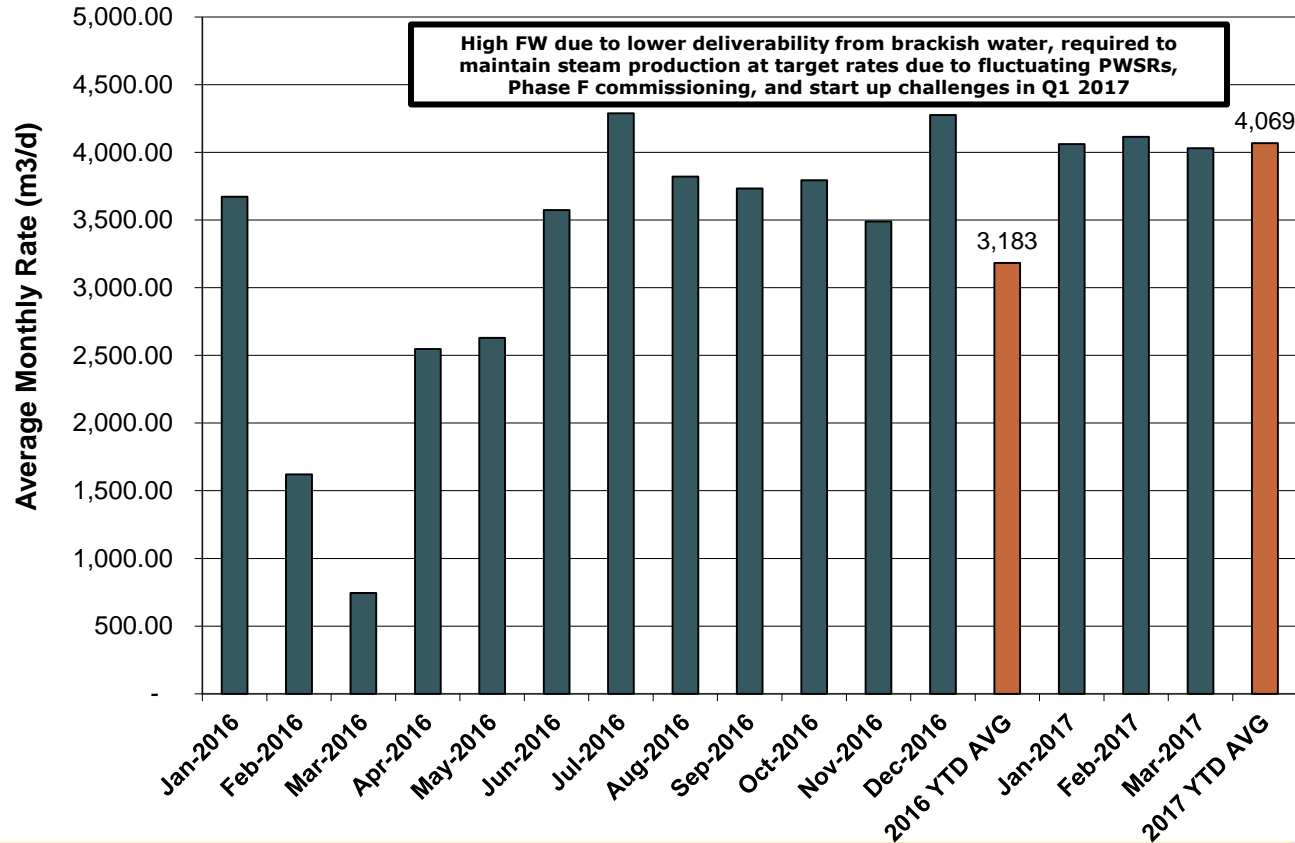


# Brackish rate



- MW4 pad start-up in late October 2016
- MW1 pad started up in late November 2016
- Brackish production has been intermittent with the ramp-up of Phase F.

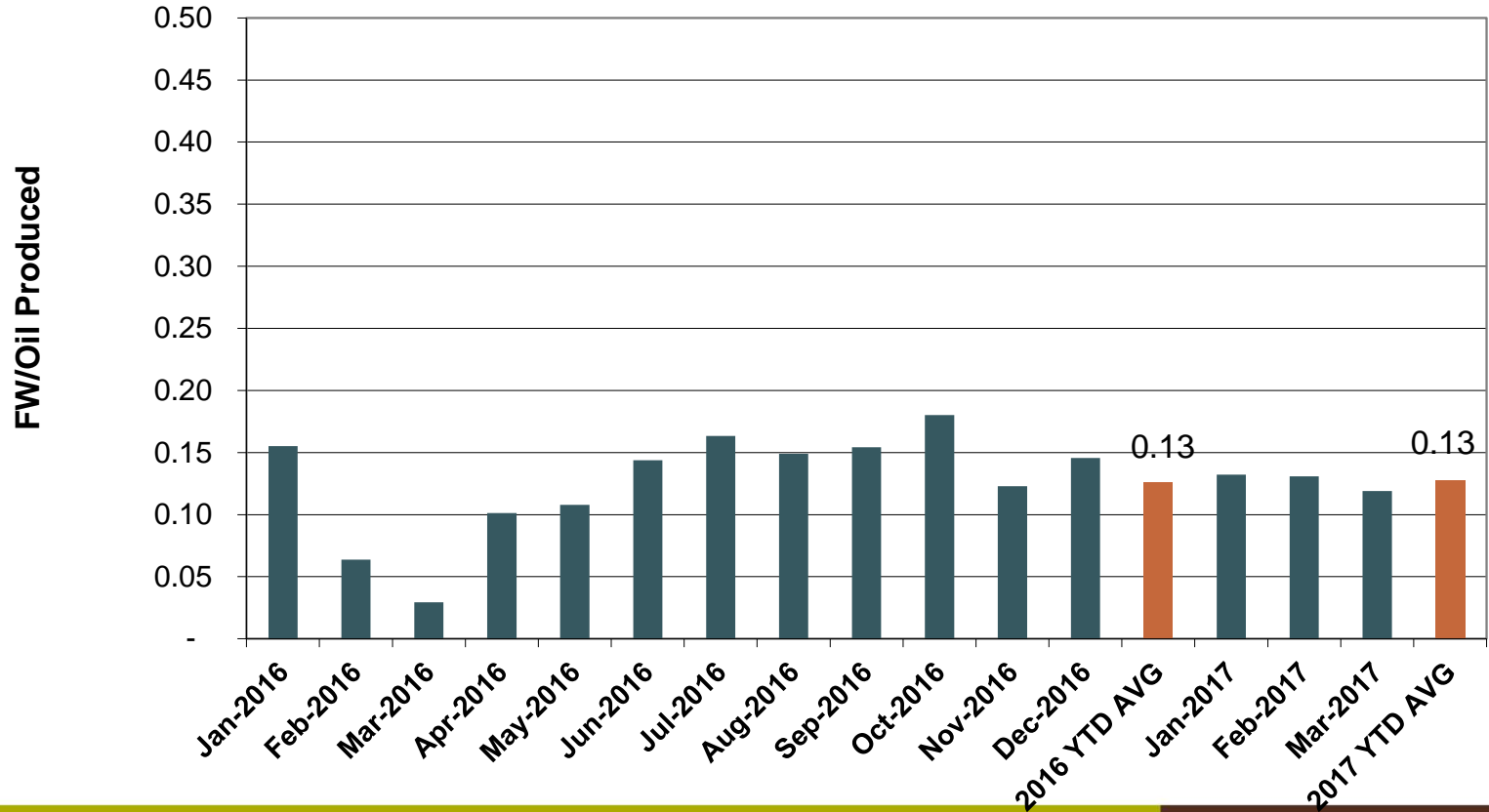
# Fresh water use



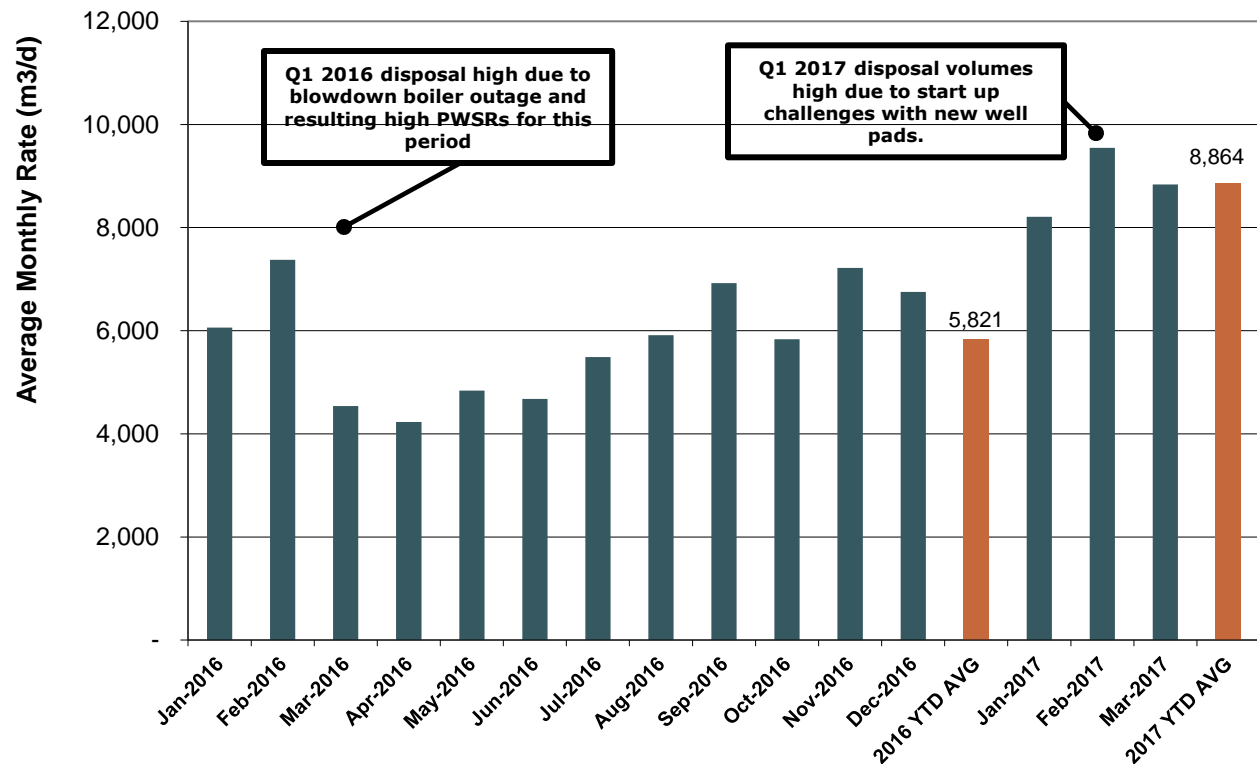
## Uses:

- Was used for make-up water for steam generation during commissioning and start up of Phase F OTSGs.
- Includes camp and domestic use, utilities, etc. All attempts are made to minimize fresh water usage when not required as make-up water.

# Fresh water intensity

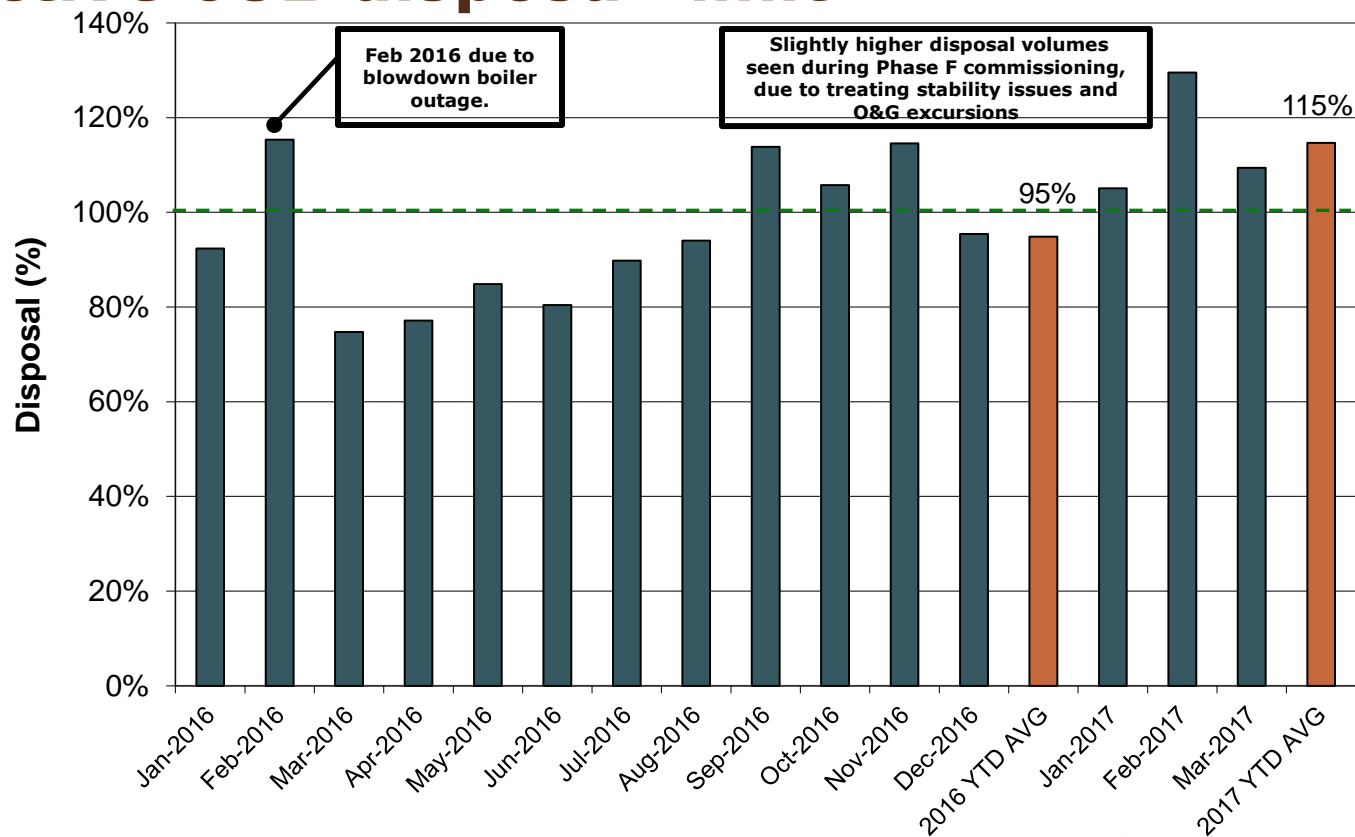


# Total disposal volumes (PW, RW, BD)



Notes: Operating philosophy is to minimize disposal volumes at all times and maximize produced water re-use. Specifically, blowdown recycle, regeneration optimization, and minimizing brackish make-up requirements have been areas of focus to reduce disposal.

# Directive 081 disposal limit



## Fresh wells:

- Two Quaternary wells (Empress Formation) at 09-17-076-06W4M
- AER - Licensed for up to 5,000 m<sup>3</sup>/day
- TDS = 500-600 mg/L
- 1 Quaternary well (Empress Formation) at 06-16-076-06W4M with licensed up to 100,000 m<sup>3</sup>/year

## Brackish water source wells:

### •Clearwater B Aquifer

- 10-34A 1F1/13-35-075-06W4/00 TDS= 7,400 mg/L
- 10-34B 1F1/13-34-075-06W4/00 TDS= 5,070 mg/L
- 10-34C 1F1/15-27-075-06W4/00 TDS= 7,780 mg/L
- 10-3A 1F1/16-03-076-06W4/00 TDS= 4,600 mg/L
- 10-3B 1F1/02-03-076-06W4/00 TDS= 5,580 mg/L
- 10-27A 100/04-35-075-06W4/00 TDS= 9,730 mg/L
- 10-27B 100/13-27-075-06W4/00 TDS= 8,900 mg/L
- 10-27C 100/02-27-075-06W4/00 TDS= 11,700 mg/L
- CW4-A 1F1/01-35-075-06W4 TDS= 13,200 mg/L
- CW4-B 1F1/06-01-076-06W4 TDS= 8,800 mg/L

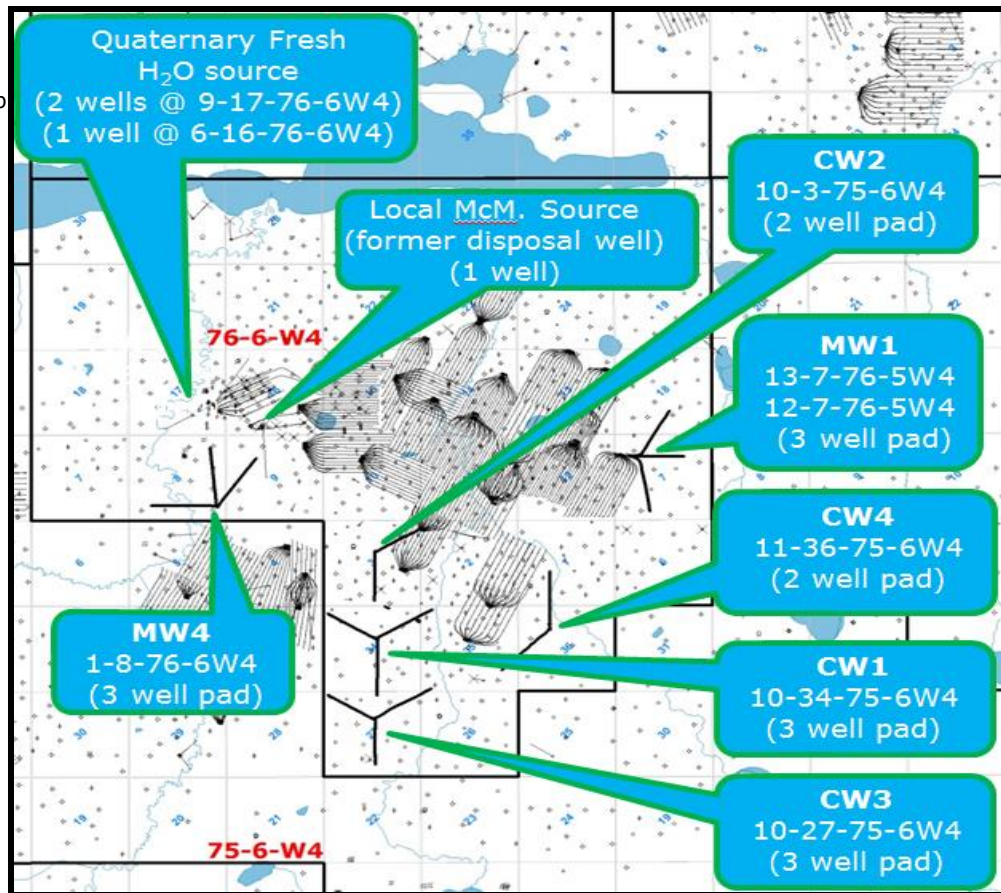
### •Disposal reversal well

- 3-16 1F5/03-16-076-06W4/00 TDS= 8,400 mg/L

### •McMurray Aquifer: Online Q4 2016

- MW1-A 1F1/07-18-076-05W4 TDS=16,880mg/L
- MW1-B 1F1/03-07-076-05W4 TDS=16,520mg/L
- MW1-C 1F1/09-07-076-05W4 TDS=16,420mg/L
- MW4-A 1F3/11-09-076-06W4 TDS=10,850mg/L
- MW4-B 1F1/04-08-076-06W4 TDS=11,300mg/L
- MW4-C 1F1/16-08-076-06W4 TDS=10,990mg/L

## Fresh and brackish sources





# McMurray water disposal wells

Former Water Disposal  
100/04-16-76-6W4  
100/03-16-76-6W4  
Converted to water prod well  
1F5/03-16-76-6W4

Existing Water  
Disposal Wells  
RD1 Pad

102/15-35-76-4W4  
103/15-35-76-4W4  
104/15-35-76-4W4  
105/15-35-76-4W4  
106/15-35-76-4W4  
107/15-35-76-4W4

Existing  
Disposal Wells  
RD2 Pad

100/13-34-76-3W4  
102/13-34-76-3W4  
103/13-34-76-3W4  
104/13-34-76-3W4  
105/13-34-76-3W4  
100/04-03-77-3W4  
100/12-34-76-3W4

# Water disposal operations

**Injecting into McMurray water sands at 13-34 since April 2015**

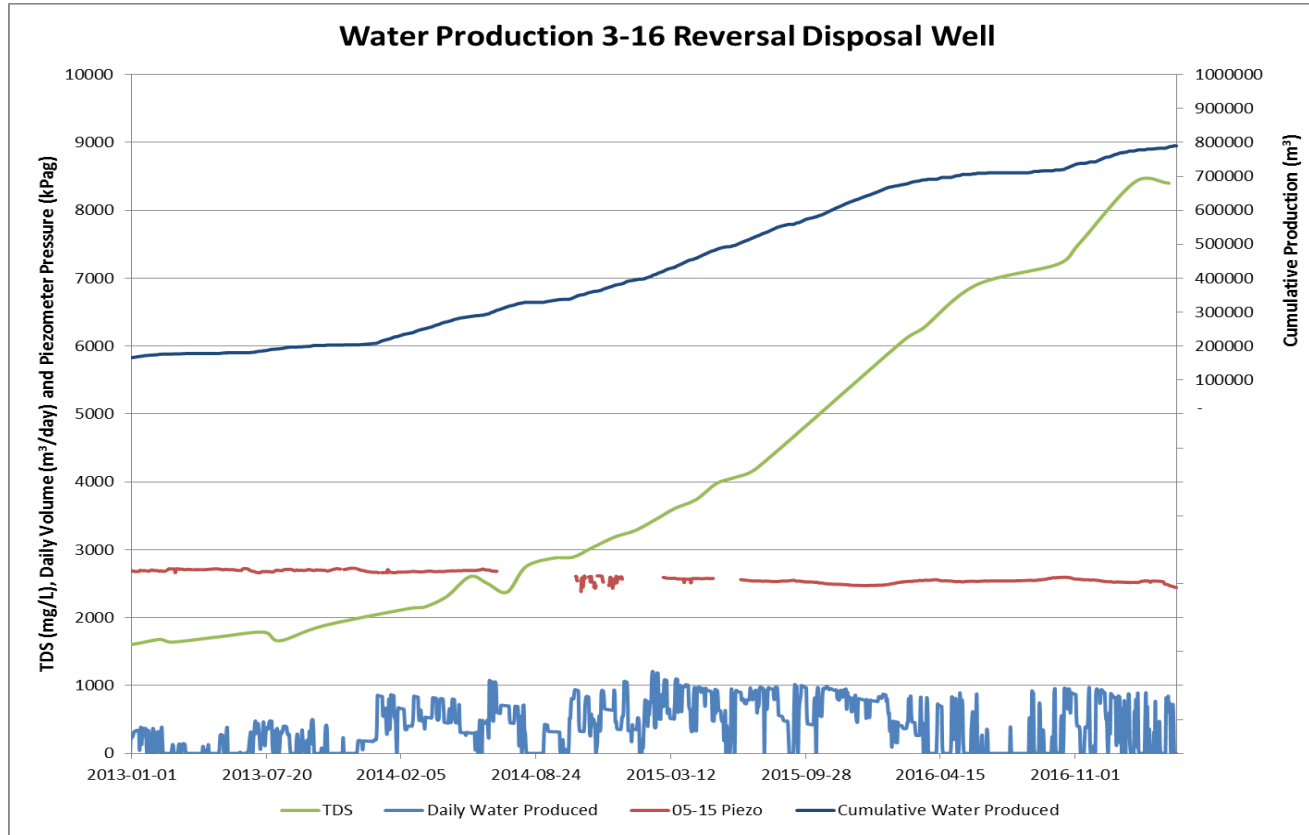
**Approval No. 9712, 10627C and 10627D (Class 1b Disposal)**

**Sixteen disposal wells (all Class 1b)**

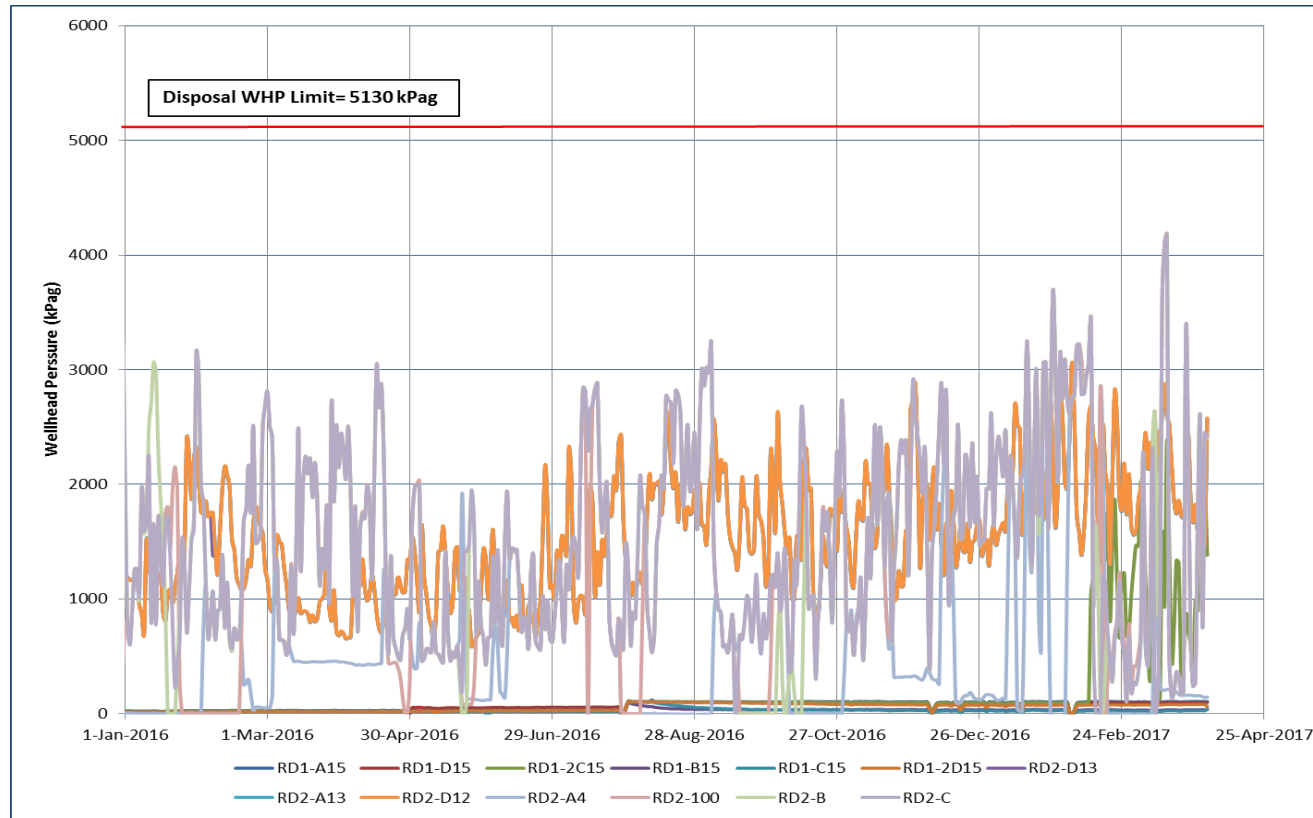
- Three disposal wells located near the facility 3-16-1, 4-16, and 7-16 (now abandoned)
- One well located near the facility (3-16-2) has been converted for disposal reversal
- Six disposal wells located at 15-35 utilized for upset scenarios
- Seven disposal wells in service located at 13-34

**13-34 disposal is main disposal location with 15-35 location used as back-up**

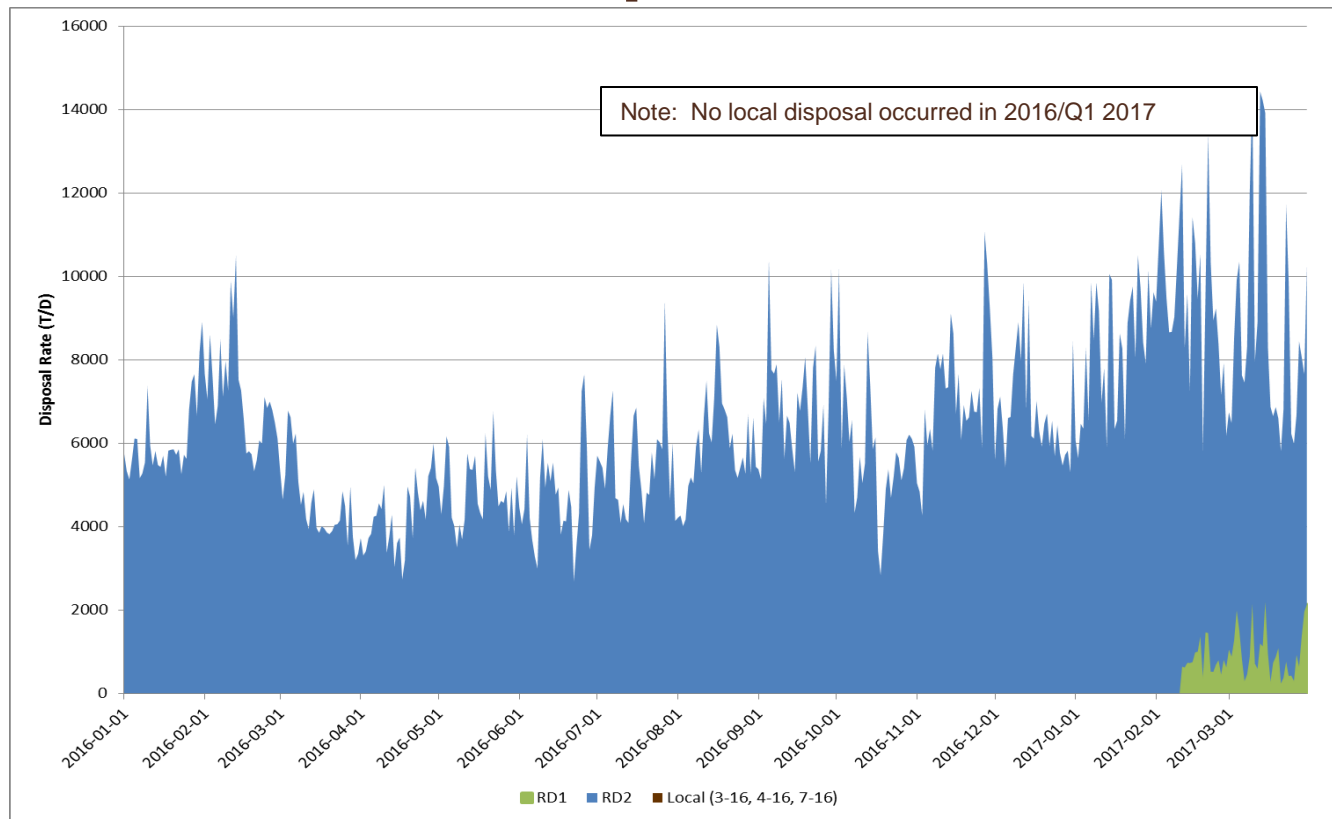
# 3-16 well reversal



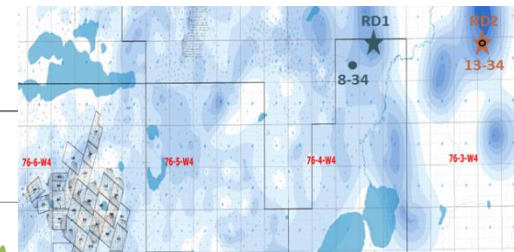
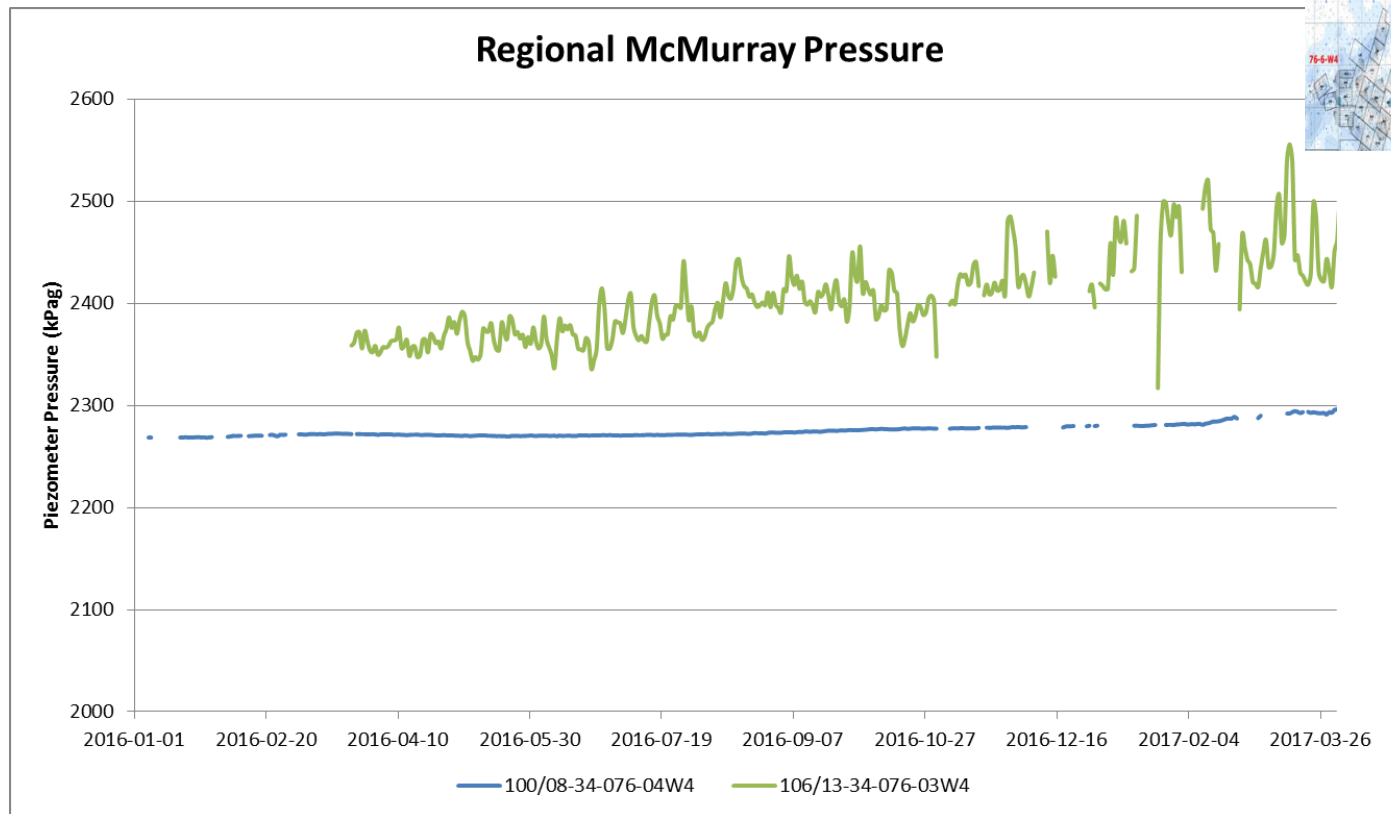
# Disposal well head pressures



# Christina Lake disposal totals



# Water disposal operations continued





# Waste disposal volumes

Type	2016	2015	2014
Slop Oil / Production Fluids (m <sup>3</sup> )	47,021	31,502	86,054
Drilling Waste (m <sup>3</sup> )	32,893	63,664	55,610
Lime Sludge (m <sup>3</sup> )	17,247	16,220	16,279
Contaminated Soils (m <sup>3</sup> )	156	159	160
Spent Scavenger (m <sup>3</sup> )	5,745	6,613	5,346
<b>Total (m<sup>3</sup>)</b>	<b>103,060</b>	<b>118,158</b>	<b>162,448</b>

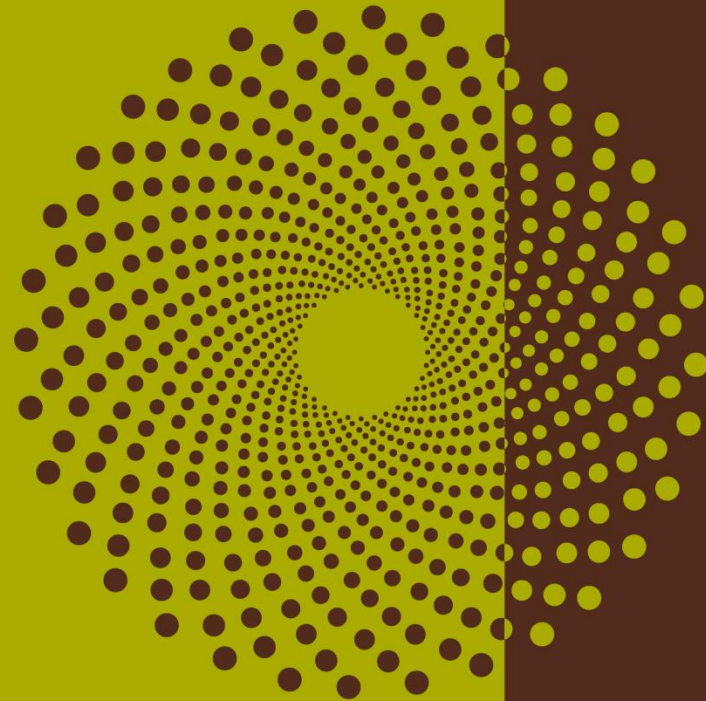
# Waste disposal sites 2016

Facility	Total (m <sup>3</sup> )
Tervita Janvier Landfill	28,974
Newalta Elk Point	17,744
Tervita Bonnyville Landfill	17,060
Tervita Lindbergh Cavern	15,971
Cancen New Sarepta Disposal Well	13,604
White Swan - Atmore	8,515
Newalta Fort MacMurray	1,158
R.B.W. Edmonton	719
Newalta Kitscoty	187
<b>TOTAL</b>	<b>103,932</b>

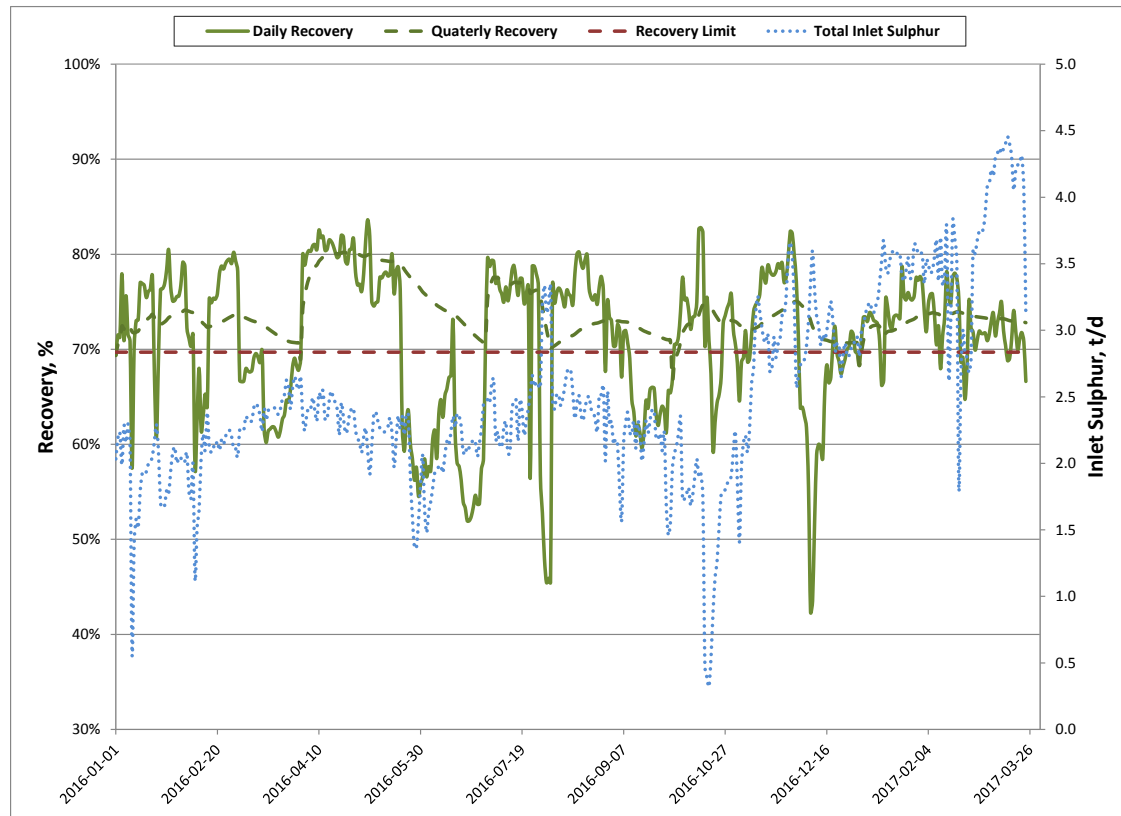
Cenovus Christina Lake trucks all disposal waste to licensed third party facilities



## Subsection 3.1.2 – 5) Sulphur Production

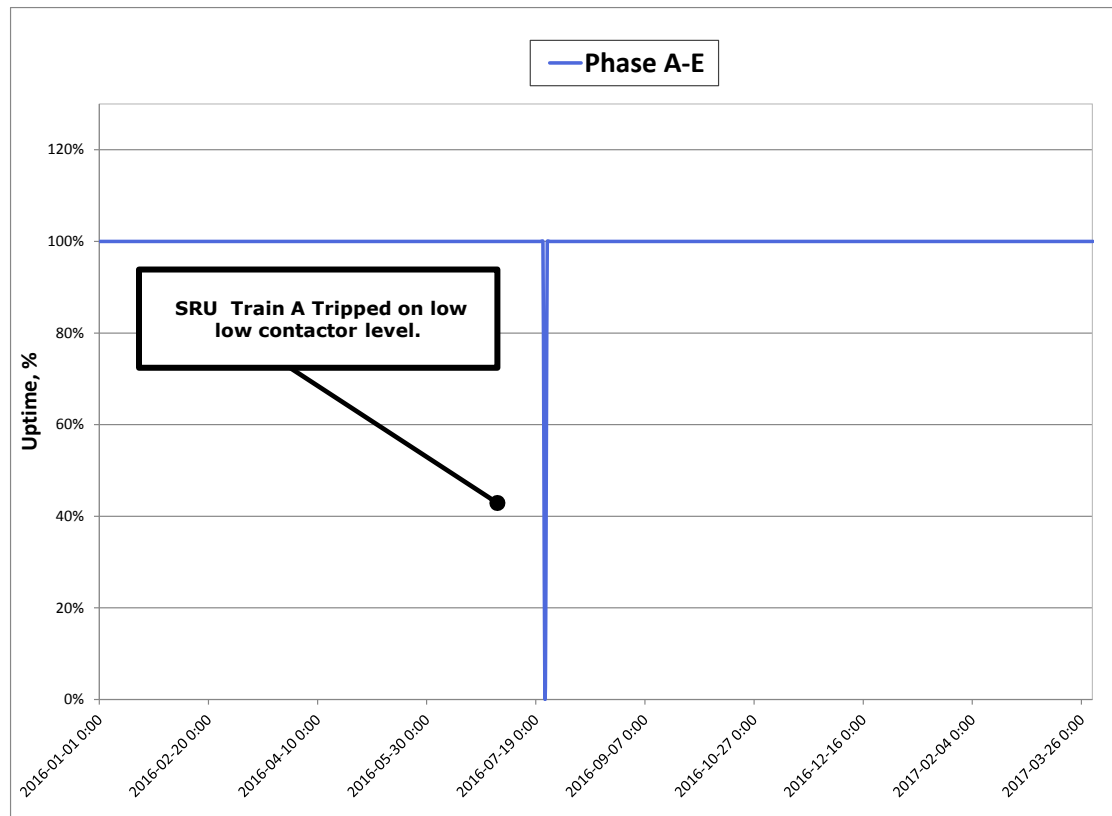


# Scavenger recovery details

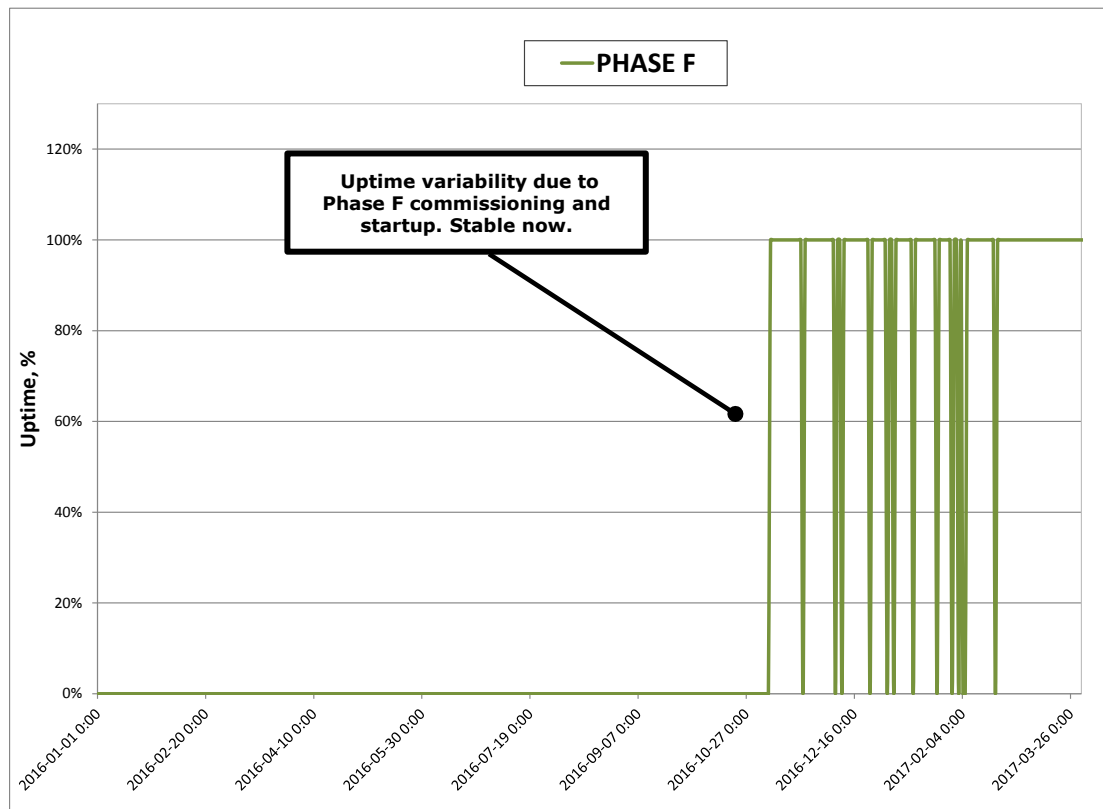


Quarter	Recovery
Q1 2016	70.60%
Q2 2016	70.73%
Q3 2016	70.96%
Q4 2016	70.53%
Q1 2017	72.42%

# Scavenger uptime details



# Scavenger uptime details



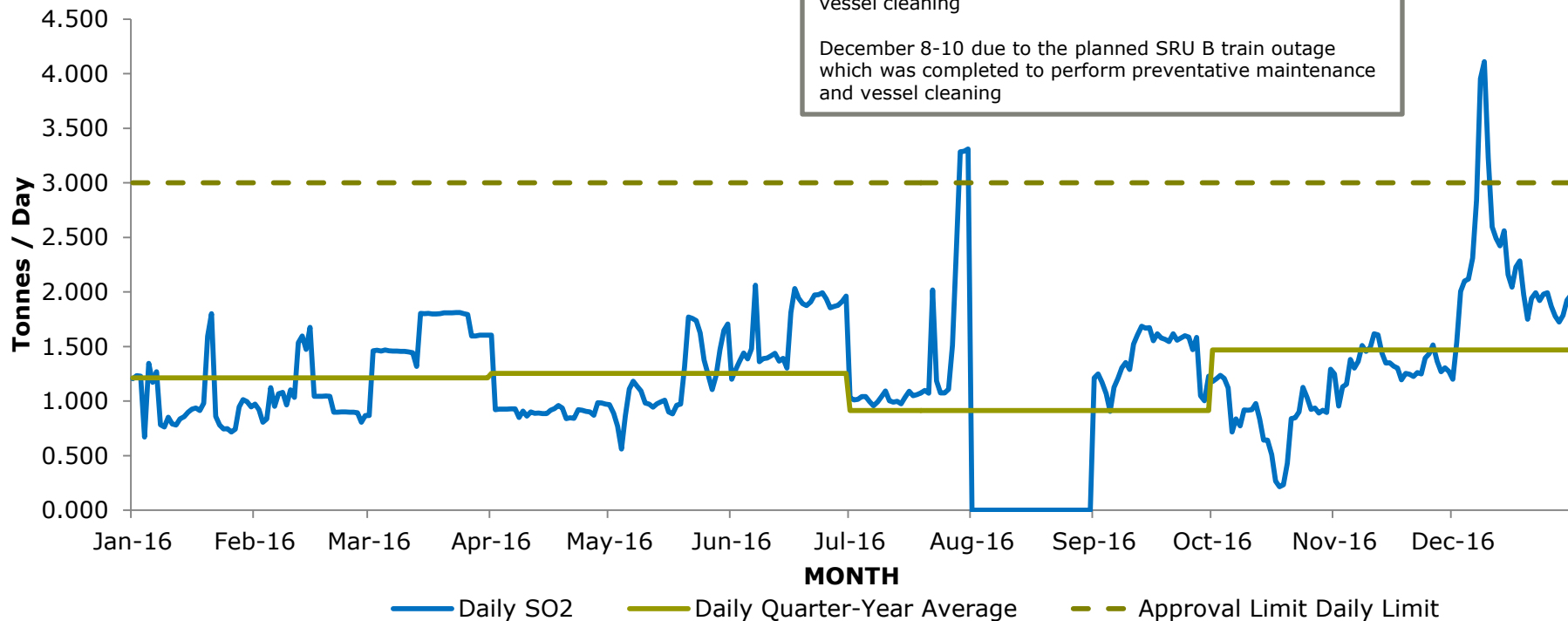
# Sulphur recovery operation

## Preventative measures

- Chemical injection continues to be operated in counter current configuration
- Each train is on a 6-12 month PM to be cleaned (contactor, internal distributor, outlet separator demister inspected)
  - Cleaning has been postponed following change in SO<sub>2</sub> emissions limit to daily rather than calendar quarter year average as of Dec 16, 2015.
  - Require Phase F SRU to be operable before a train can be taken down for cleaning to prevent exceeding daily limit.
- Cleaning frequency determined based on process monitoring (pressure drop, spent chemical quality, gas temperature)



# SO<sub>2</sub> emissions



# Ambient air quality monitoring

## Passive exposure monitoring

- As per the Approval (Table 3.3), Christina Lake is required to maintain a network of twelve passive monitoring exposure stations to obtain monthly static exposures of H<sub>2</sub>S and SO<sub>2</sub>. Effective March 31, 2017, this was reduced in the Approval from twelve to seven.
- The passive monitoring results in 2016 did not identify any significant air quality issues related to Plant operations

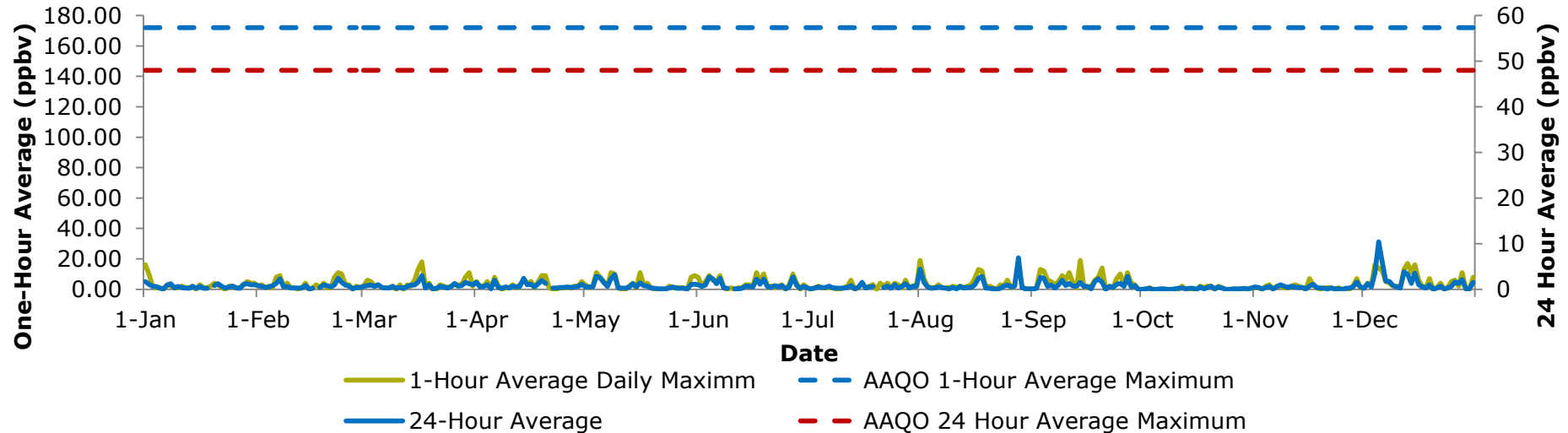
## Continuous air quality monitoring

- CLTP is required in the Approval (Table 3.3) to maintain one continuous ambient air monitoring station 12 months per year to measure ambient levels of SO<sub>2</sub>, H<sub>2</sub>S, and NO<sub>2</sub> concentrations in addition to wind speed and wind direction. Effective March 31, 2017, this was reduced in the Approval from twelve to seven.
- In 2016, continuous air quality monitoring was conducted from Jan 1 to December 31 by WBEA. The continuous ambient air monitoring station is located at 03-16-076-06-W4M. This location is the same as the passive monitoring station C10.
- There were no operational issues relating to the ambient air monitoring equipment during the monitoring period
- The continuous ambient air quality monitoring in 2016 did not identify any significant air quality issues related to Plant operations

## No criteria exceedances were noted in either monitoring program

# Ambient air monitoring results - sulphur dioxide

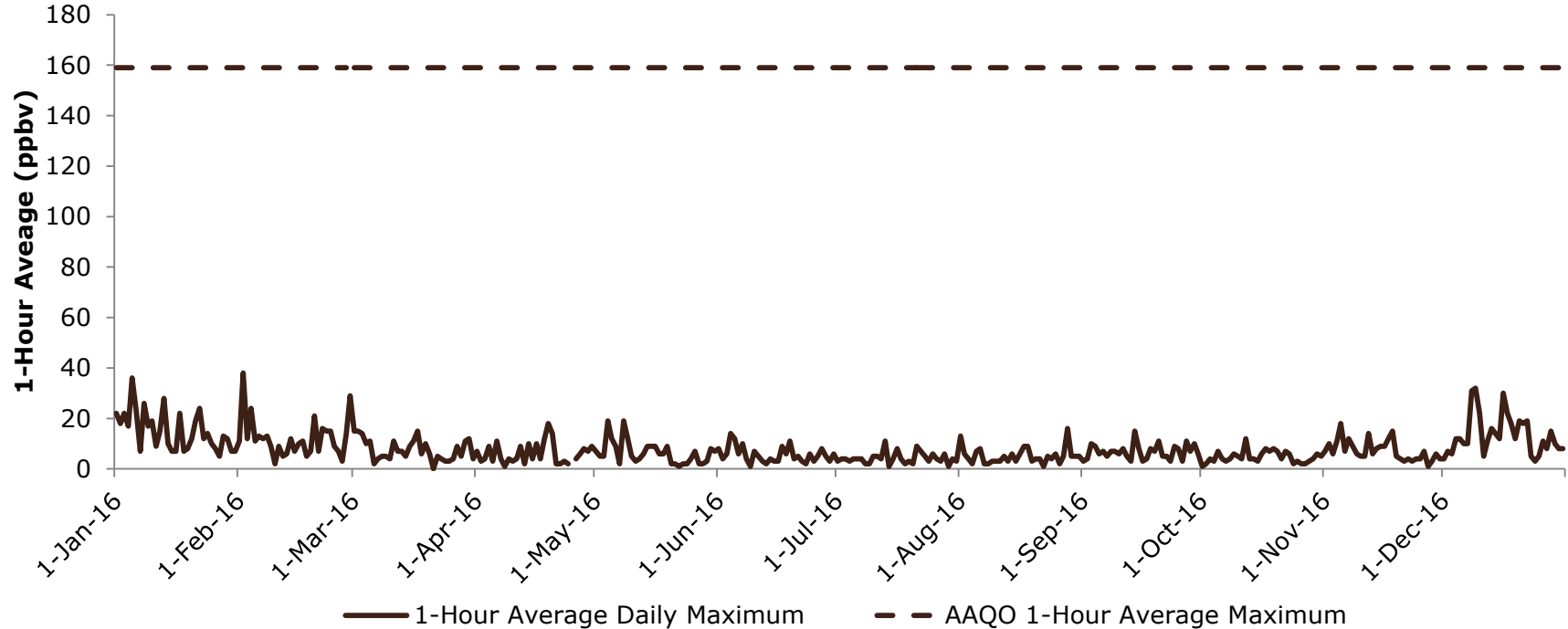
2016 Continuous Ambient Sulphur Dioxide Monitoring



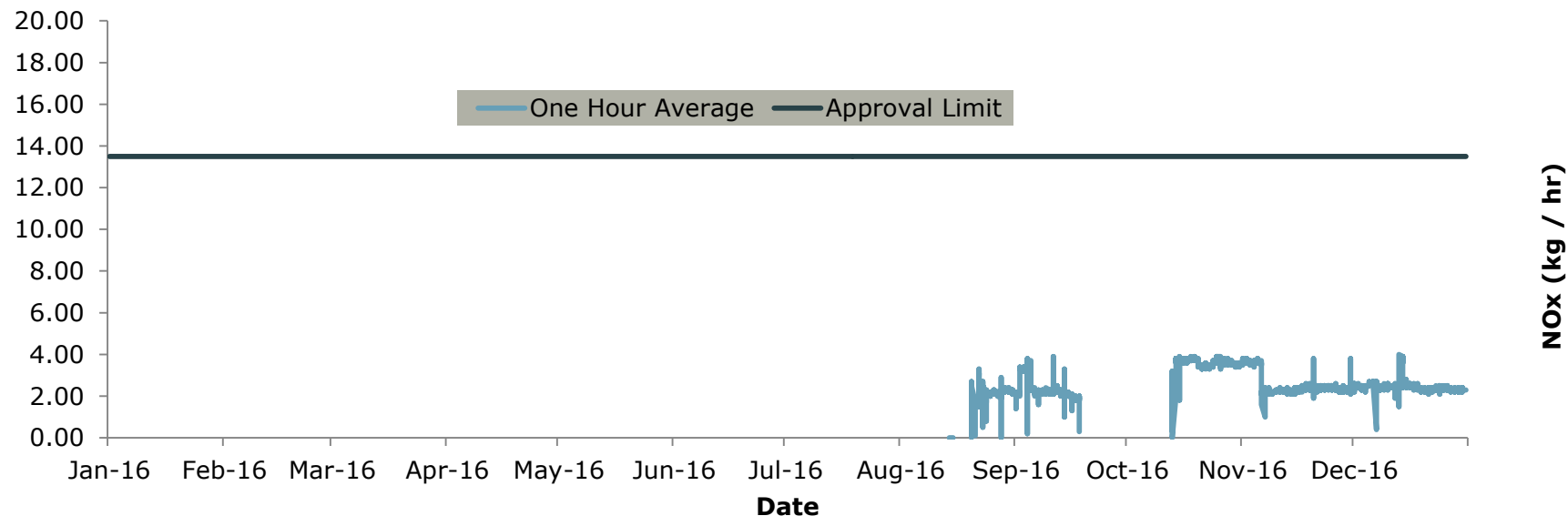


# Ambient air monitoring results – nitrogen dioxide

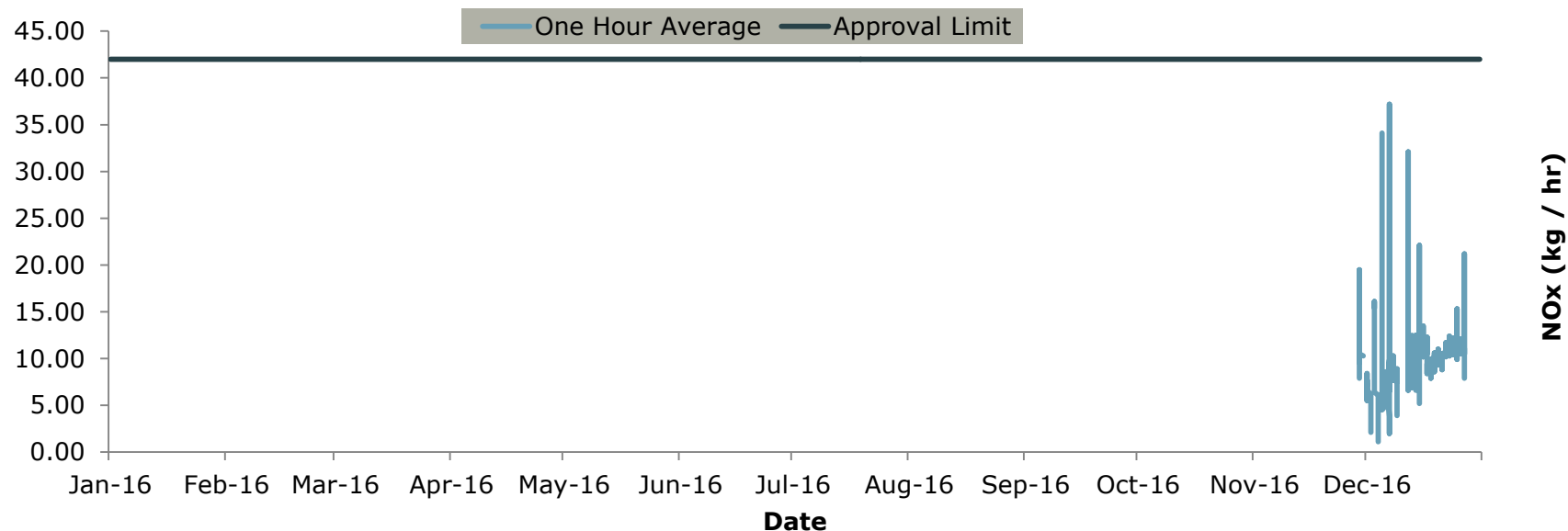
CLSF - 2016 Continuous Ambient Nitrogen Dioxide Monitoring



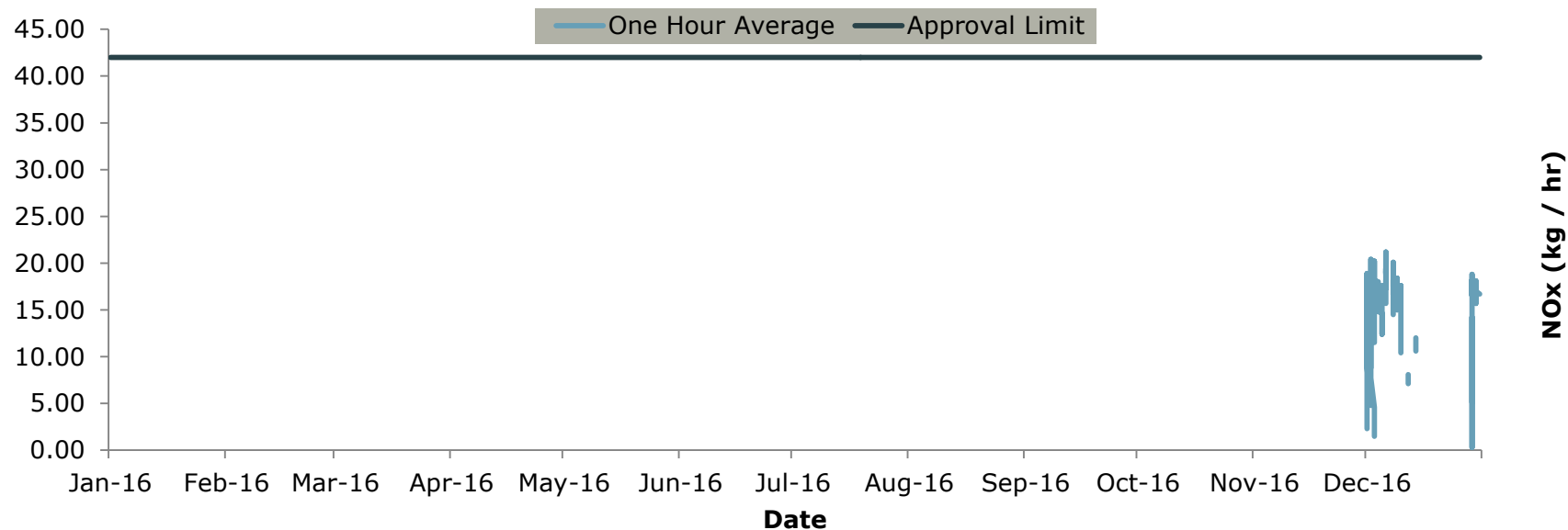
# 2016 oxides of Nitrogen (as NO<sub>2</sub>) for 93.8 MW steam generator Phase F optimization Unit B-3160



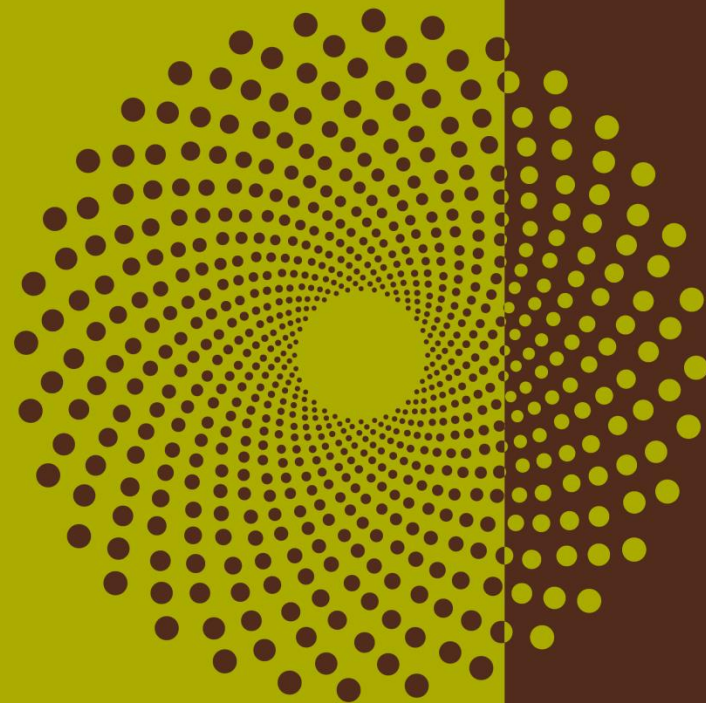
# 2016 oxides of Nitrogen (as NO<sub>2</sub>) for 153.4 MW steam generator Phase F HRSG1



# 2016 oxides of Nitrogen (as NO<sub>2</sub>) for 153.4 MW steam generator Phase F HRSG2



## Subsection 3.1.2 – 6) Environmental issues



# 2016 Compliance issues and amendments

Approval number	Amendments	Compliance issues
EPEA Approval 00048522-01-07, 08 & 09	07 – Clerical amendment 08 – SO <sub>2</sub> emission limit average 09 – Storm Pond	None to report
Water Act License 00293613-00-00 Water Act License 00293633-00-00 Water Act License 00365859-00-00 Water Act License 00381487-00-00	Licence cancelled in 2016	None to report
Water Act License 00343057-01-00	New license received June 2016	None to report

# Monitoring programs

Monitoring program	Progress and results
Air quality monitoring	<ul style="list-style-type: none"> <li>Air emissions increased slightly in late 2016 due to the commissioning Phase F</li> <li>No significant trends in ambient air monitoring observed</li> </ul>
Groundwater monitoring	<ul style="list-style-type: none"> <li>Groundwater Monitoring Program updated for Phase H and approved by the AER in July 2016</li> </ul>
Thermal metal mobilization monitoring	<ul style="list-style-type: none"> <li>Temperature increased as expected in the Empress and Ethel Lake formations related to heat conduction from the vertical well bore</li> <li>No significant trends in arsenic concentrations observed</li> </ul>
Soil monitoring program	<ul style="list-style-type: none"> <li>Soil Management letter update submitted March 31, 2017</li> </ul>
Wildlife and caribou mitigation and monitoring programs	<ul style="list-style-type: none"> <li>Proposed change to programs approved by the AER May 31, 2016</li> <li>Change incorporates remote cameras and acoustic recording units</li> </ul>
Wetland monitoring program	<ul style="list-style-type: none"> <li>Minor changes to program were approved by the AER in April 2016</li> </ul>

# Monitoring programs continued

Monitoring program	Progress and results
Reclamation monitoring Program	<ul style="list-style-type: none"><li>• Request submitted to Director to defer to 2018</li><li>• No permanent reclamation has occurred to date, however Cenovus continues to evaluate opportunities for permanent reclamation at the Project, including well pads</li></ul>
Wetland reclamation trial program	<ul style="list-style-type: none"><li>• Deferred until a candidate site becomes available</li></ul>
Project level conservation, reclamation and closure plan	<ul style="list-style-type: none"><li>• Cenovus received Director authorization to submit in October 2018</li></ul>



# Environmental initiatives

- Canadian Oil Sands Innovation Alliance (COSIA)
- Regional Industry Caribou Collaboration (RICC)
- Restoration Zone Prioritization with Alberta Biodiversity Monitoring Institute (ABMI)
- Amphibious restoration equipment development (COSIA JIP)
- Industrial Footprint Reduction Options Group (iFROG)
- Cenovus caribou habitat restoration project (world's largest)

# Subsection 3.1.2 – 7) Statement of compliance



# 2016 Compliance status

## How Cenovus maintains and tracks compliance:

- Incident Management System (IMS)
- Centrac (Cenovus database) for compliance, commitments and approval conditions management
- Integrated compliance assurance program
- Dedicated on-site Environmental Monitoring and Stewardship Advisors
- Embedded Assurance (field level and routine inspections and audits)
- Cenovus Operations Management System (COMS)

**Cenovus FCCL Ltd. believes existing CLTP operations are in compliance with AER approvals and regulatory requirements.**

## Subsection 3.1.2 – 8) Statement of non-compliance



# 2016 Non-compliance summary (AER)

Date	Non-compliance	Follow-up
2016-09-12	Notice of Noncompliance – Well Site Inspection @ @ 8-17-76-6W4 W0283207	Compliance achieved on Oct 13, 2016
2016-04-05	Notice of Noncompliance – Well Log Submission @ 1AC/9-21-76-6W4 W0478141	Compliance achieved on May 2, 2016
2016-05-05	Notice of Noncompliance – <i>Directive 013: Suspension Requirements for Wells</i>	Compliance achieved on Jan 17, 2017
2016-06-03	Notice of Noncompliance – <i>Directive 013: Suspension Requirements for Wells</i>	Compliance achieved on Sep 22, 2016
2016-07-15	Notice of Noncompliance – <i>Directive 013: Suspension Requirements for Wells</i>	Compliance achieved on Oct 12, 2016
2016-08-08	Notice of Noncompliance – <i>Directive 013: Suspension Requirements for Wells</i>	Compliance achieved on Nov 10, 2016

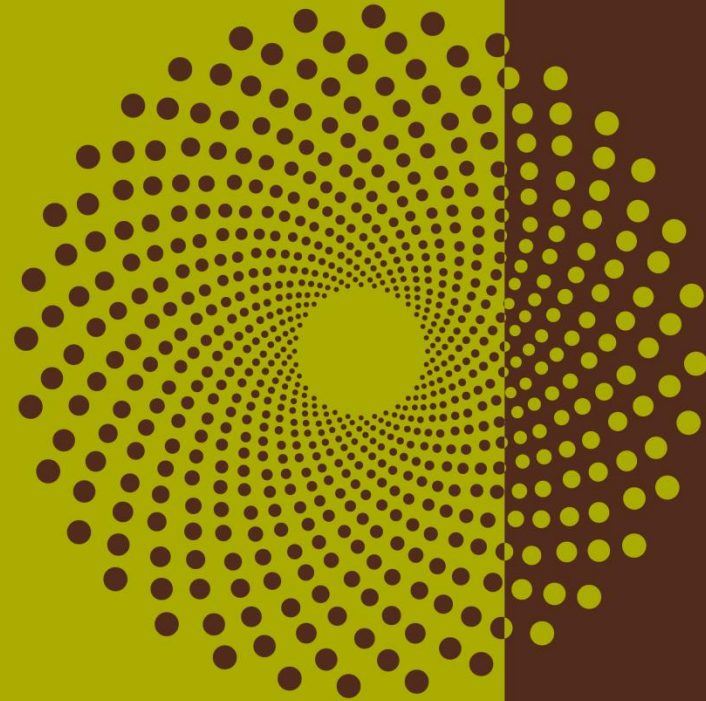
# 2016 Non-compliance summary (AER)

Date	Non-compliance	Follow-up
2016-09-22	Notice of Noncompliance – Failure to Comply: <i>Directive 013: Suspension Requirements for Wells</i>	Compliance achieved on Jan 17, 2017
2016-09-22	Notice of Noncompliance – <i>Directive 013: Suspension Requirements for Wells</i>	Compliance achieved on Jan 17, 2017
2016-10-22	Notice of Noncompliance – <i>Directive 013: Suspension Requirements for Wells</i>	Compliance achieved on Mar 7, 2017
2017-02-16	Notice of Noncompliance – <i>Directive 013: Suspension Requirements for Wells</i>	Active – Due date May 31, 2017

# 2016 Non-compliance self-disclosures (AER)

Date	Self-Disclosure	Follow-up
2016-05-17	Pipeline re-abandonment Licence Nos. 54925 (Lines 1 & 2) and 54926 (Line 2)	N/A
2016-06-09	Change of well purpose requirement within 30 days of rig release for the 2015-2016 winter drilling programs	N/A
2016-12-06	Change in well surface location @ 3-26-75-6W4 W1874404	Compliance achieved on Dec 12, 2016
2017-01-11	Complete well abandonment cut and cap operations @ 11-32-75-4W4 17167267 & 14-5-76-4W4 17167268	Compliance achieved on Mar 28, 2017

## Subsection 3.1.2 – 9) Future Plans





# Future plans

- Re-start construction of Phase G (50,000 bbl/d production capacity)
- Ensure reliability of full Phase F production (first oil in 2016)
- Planning and design for brackish well pad MWH
- 2017 planned well pad start-ups for B13, L05/L09, J01, J09 and J07