Annual Surmont SAGD Performance Review Approvals 9426, 11596, and 9460

April 6, 2016

Calgary, Alberta, Canada

Introduction, Overview and Highlights

Subsection 3.1.1 (1)

Ownership and Approvals

Ownership

- The Surmont In Situ Oil Sands Project is a 50/50 joint venture between ConocoPhillips Canada Resources Corp. and TOTAL E&P Canada Ltd; Operated by ConocoPhillips Canada.

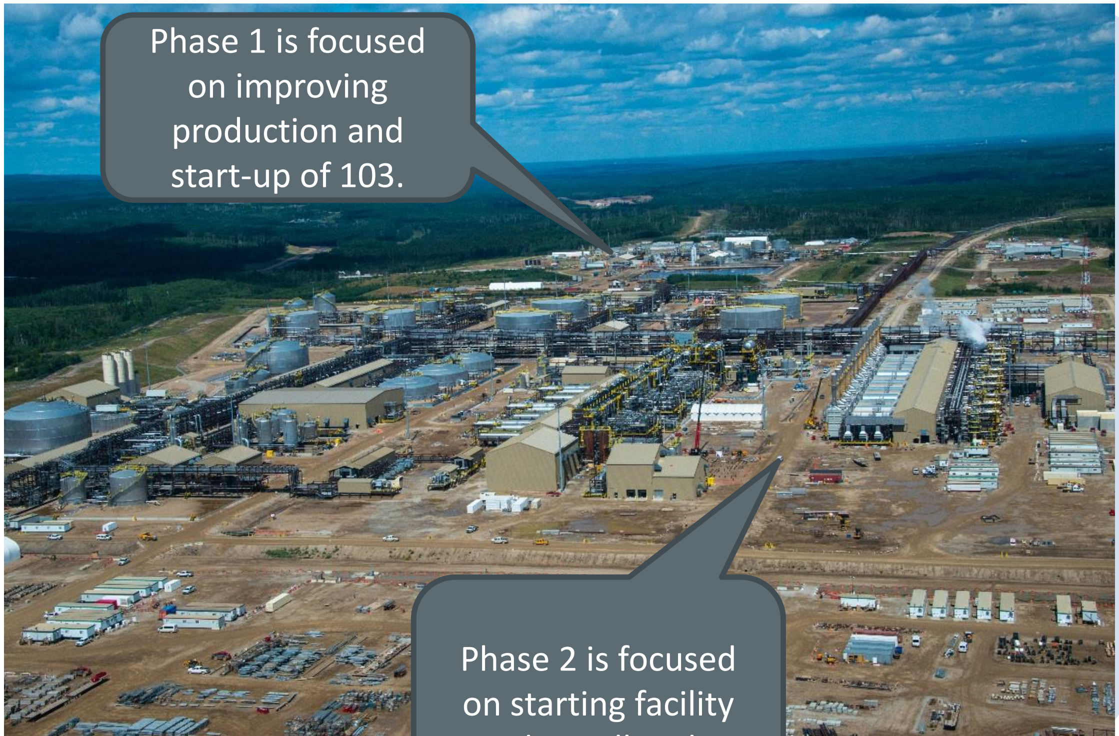
Project History

- 1997 - First steam at pilot project
- 2007 - First steam at Phase 1
- 2010 - Construction start at Phase 2
- 2015 - Start-up of Phase 2, solvent soak on well pairs 7&8 on pad 103
- 2016 - Start-up of liquid scavenging system

Approval Update - AER Approval No. 9426

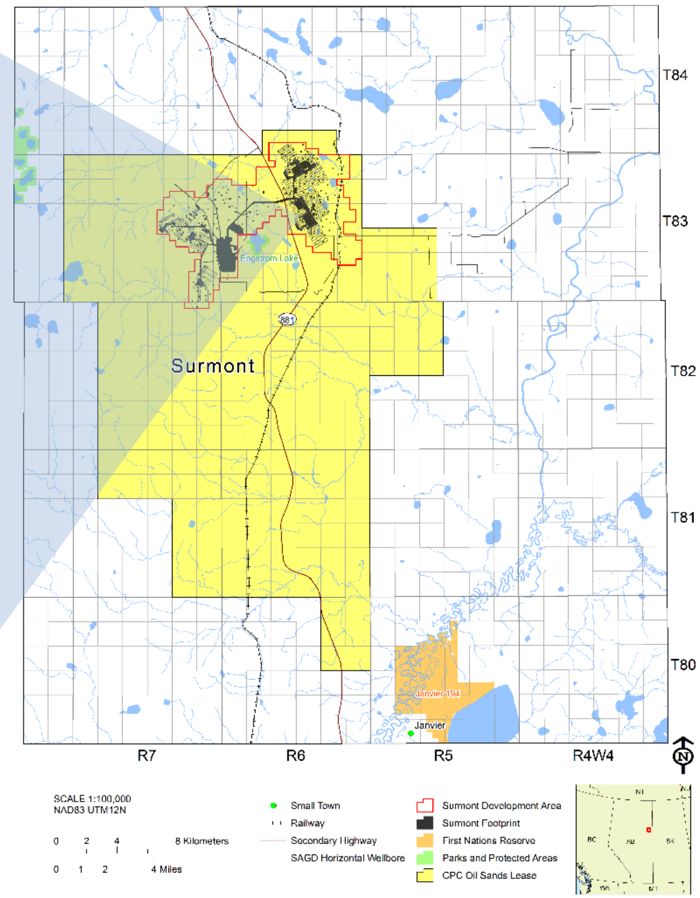
- Amendment 9426DD – February 26, 2015
  - Sustaining Pad 268
- Amendment 9426EE – March 25, 2015
  - Inclusion of well pairs from Well Pad 103 in solvent soak trial at Well Pad 101
- Amendment 9426FF – April 10, 2015
  - Replace SulFerox® unit (not yet operating) with liquid scavenging equipment (Phase 2)
- Amendment 9426GG – May 13, 2015
  - Surmont 2 Debottleneck Project
- Amendment 9426HH – October 22, 2015
  - Add well 12 well pairs at Pad 267 and develop subsurface DA 267-3 (Phase 2)
- Amendment 9426II – February 12, 2016
  - Outboard wells at Well Pads 265 and 266 (Phase 2)
- Amendment 9426JJ – February 24, 2016
  - Non-condensable gas injection at Well Pad 102 (Phase 1)

Surmont Overview



Phase 1 is focused on improving production and start-up of 103.

Phase 2 is focused on starting facility and 7 well pads.



Moving to a "One Surmont" philosophy

Surmont combined approved capacity is 29,964 m³/cd (188,700 bbl/cd)*
***(where cd is calendar day on an annual average basis)**

2015 Highlights

Phase 1 production recovery

- Increased OTSG fouling and economizer box replacement.
- Steam allocation constraints from start up of 103.
- Treating constraints after chemical well treatments.
- Extra steam from Phase 2.

Phase 2 start-up

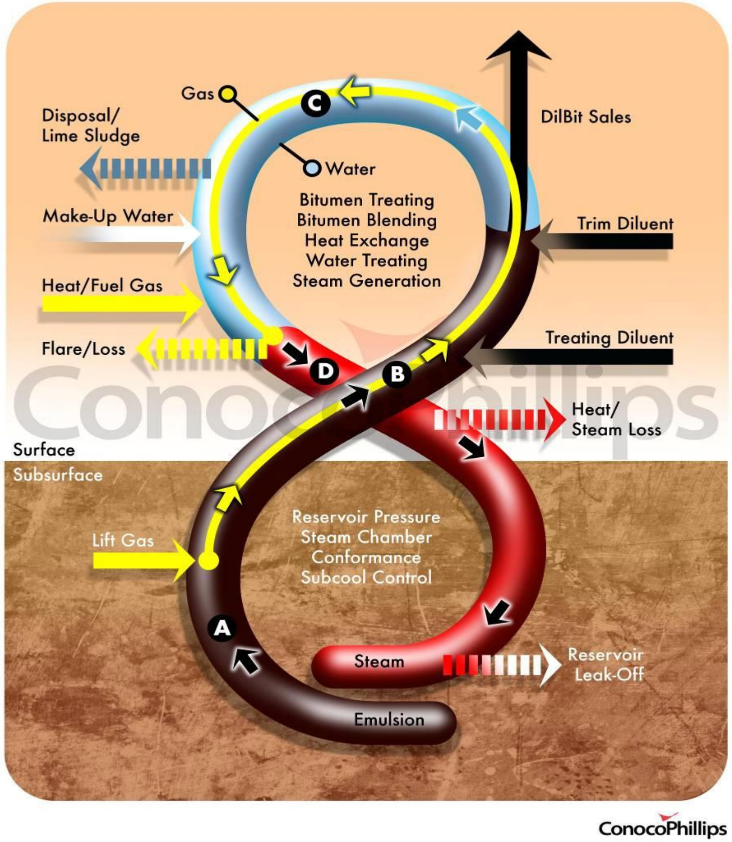
- First steam May 2015 (using interconnect to send steam to pad 103).
- Bitumen treating started August 2015 (using interconnect to send S1 emulsion to S2),
- First sales oil shipped September 2015.
- Start up of 7 pads.

Sustaining pads

- Pad 101-24/25/26 deferred to 2017 – reassessing economics.
- Pad 103 start-up April 2015.
- Outboard wells at pads 265 and 266 deferred – reassessing economics.

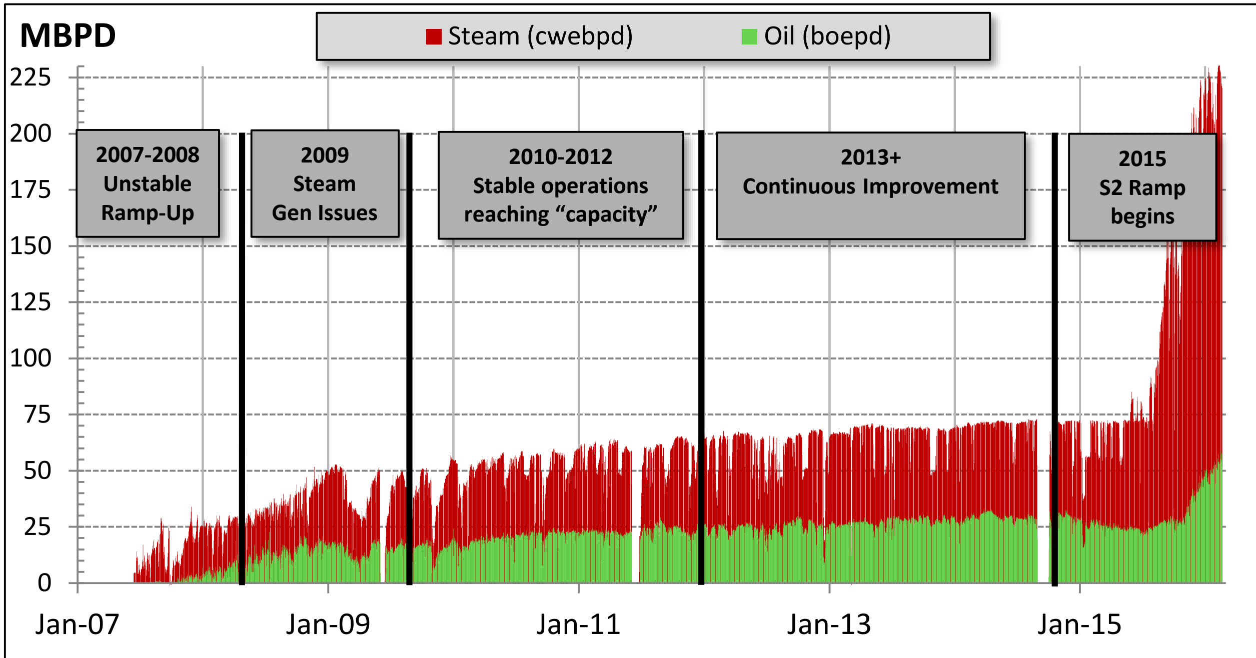
Additional steam (from debottlenecking) deferred to 2018

- Commodity Price response defers steam expansions.



Surmont Performance

Historical Steam Injection and Bitumen Production



2007-2008 Key Issues
- Commissioning
- Manpower
- Off-spec product
- Freezing
- Plant Instability
- Minimum Turndown

2009 Key Issues
- OTSG integrity
- Front-end treatment
- 1st turnaround
- Well Constraints

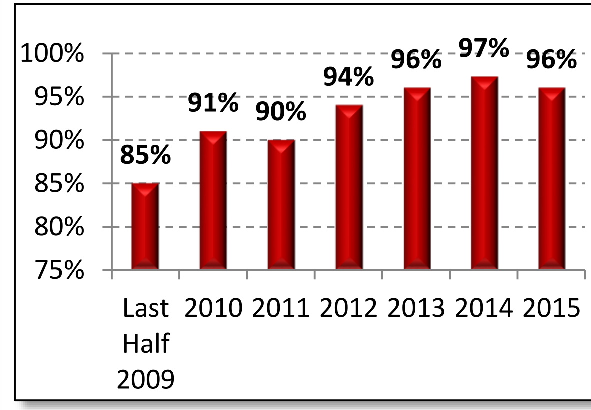
2010-2012 Key Issues
- ESP installations/ repair
- OTSG maintenance
- 2011 Turnaround
- Well Constraints

2013/2014 Key Issues
- ESP installations/ repair
- OTSG maintenance
- 2014 Turnaround
- Well & Facility Optimization

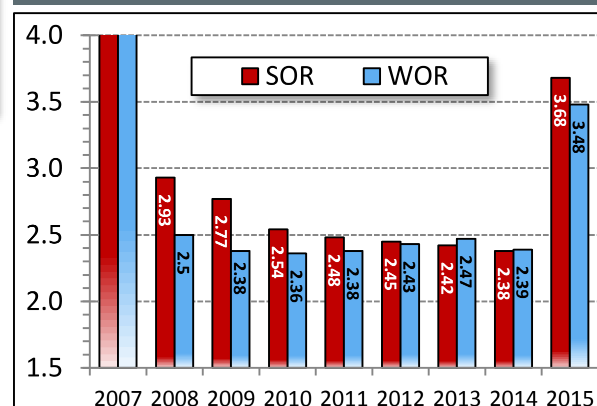
2015 Key Issues
- OTSG fouling
- Front-end treatment
- Pressure drop from 2014 T/A
- Steam constraints (PAD 103 accelerated S/U)

2016 Key Issues
- Slotted liner Ramp-up performance
- Horizontal liner deformation
- Increased performance on S1 base due to re-pressurization

Average Steam Uptime

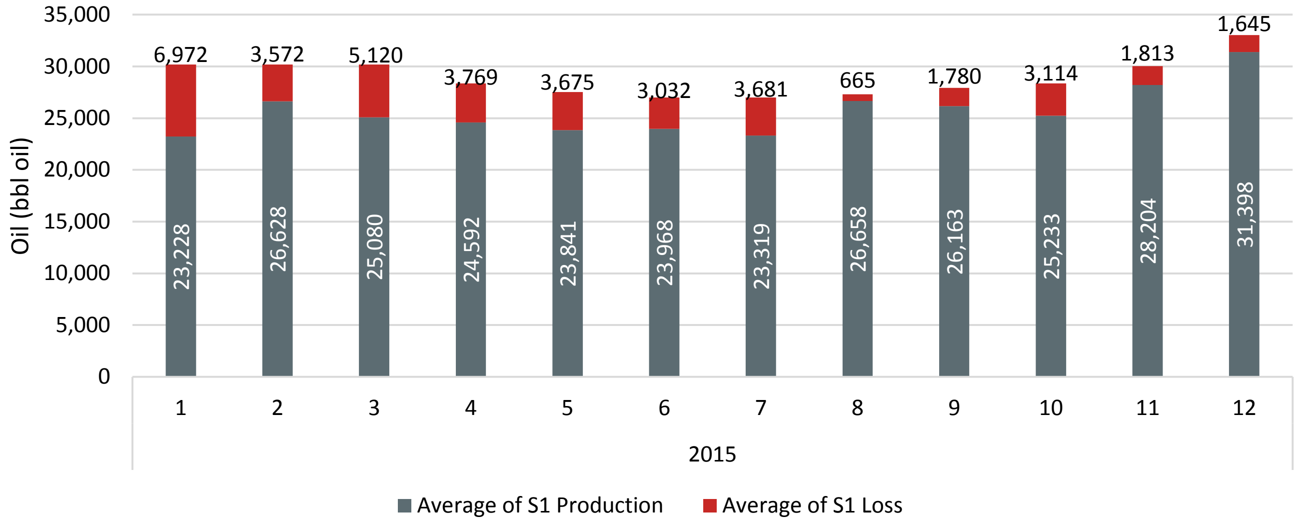


SOR and WOR



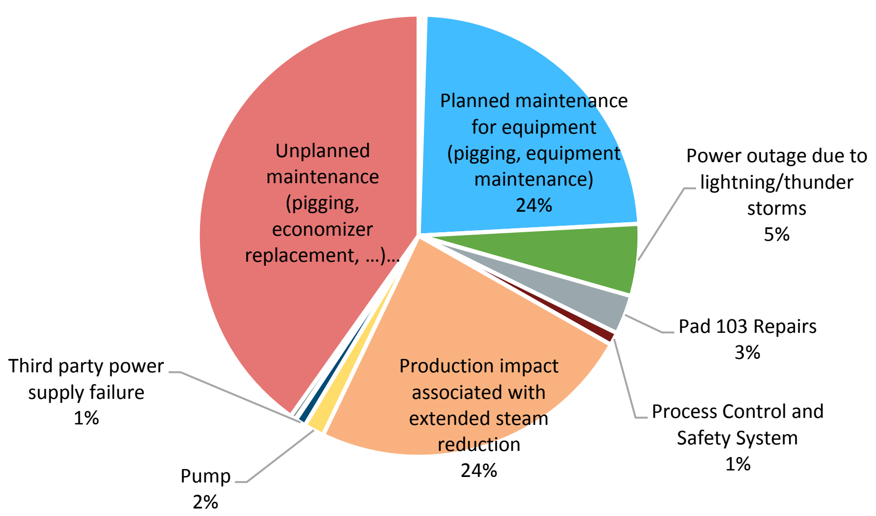
S1 2015 SOR = 2.88

2015 Loss Production Summary

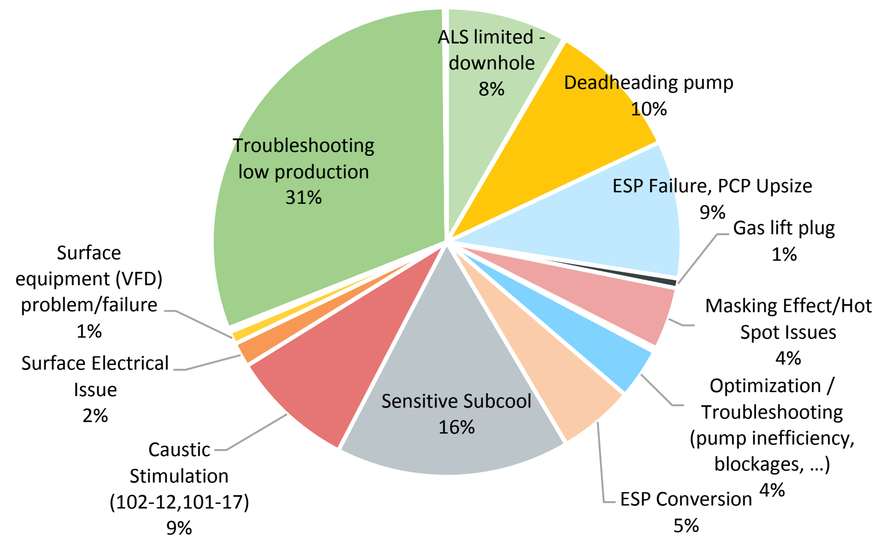


Average Performance	
Oil Production (bbl/d)	25,701
Oil Loss (bbl/d)	3,241
DOE	89%
ASC (bbl/d)	28,925
Steam Uptime	95.7%

Facilities/Other
32% of losses



Wells
68% of losses

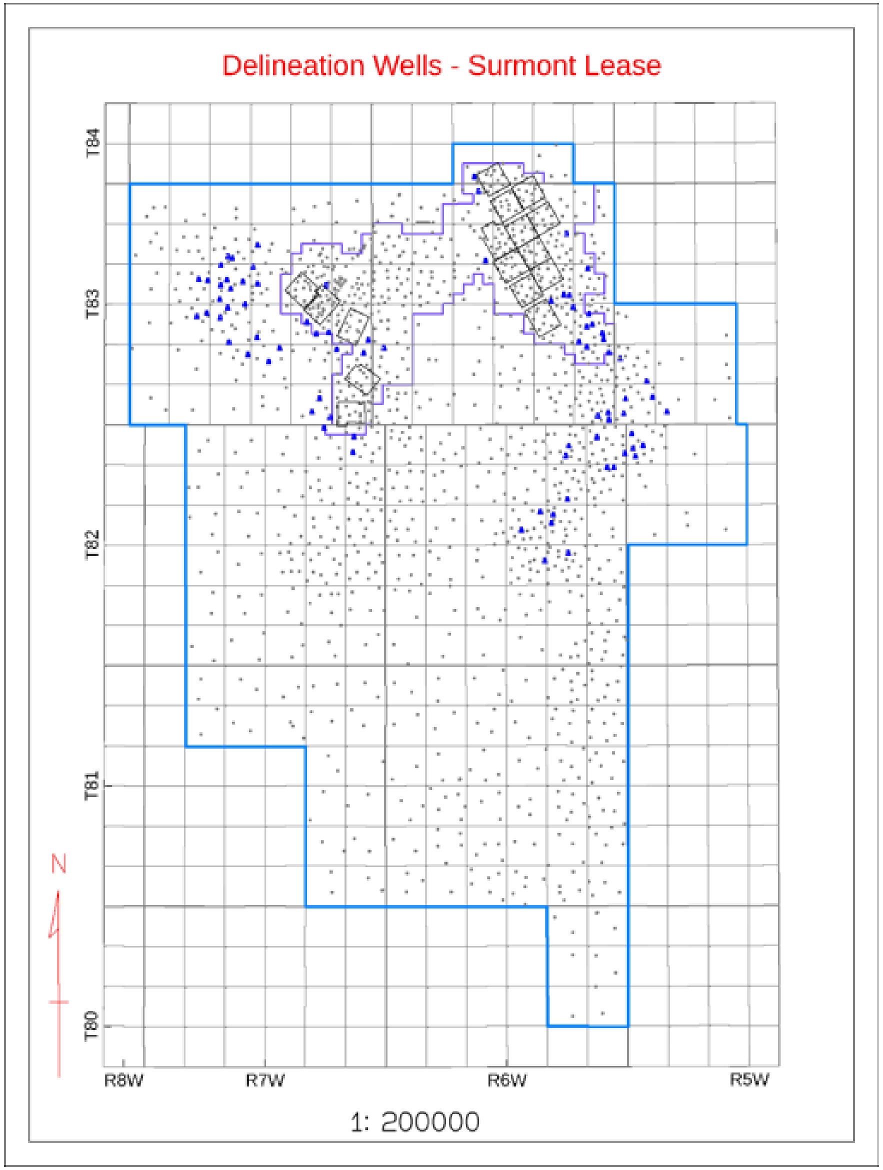


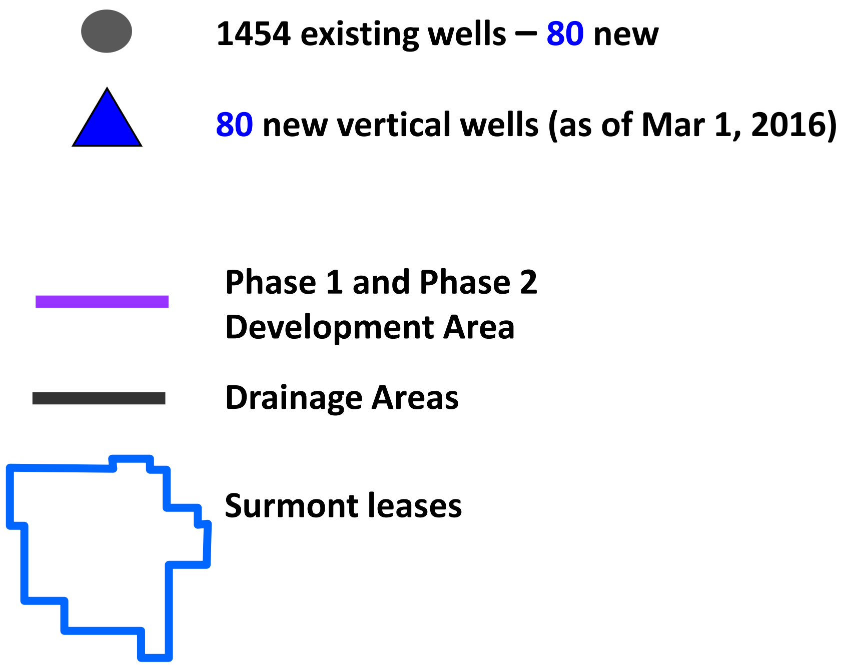
Subsurface Resource Evaluation and Recovery

Geology and Geophysics

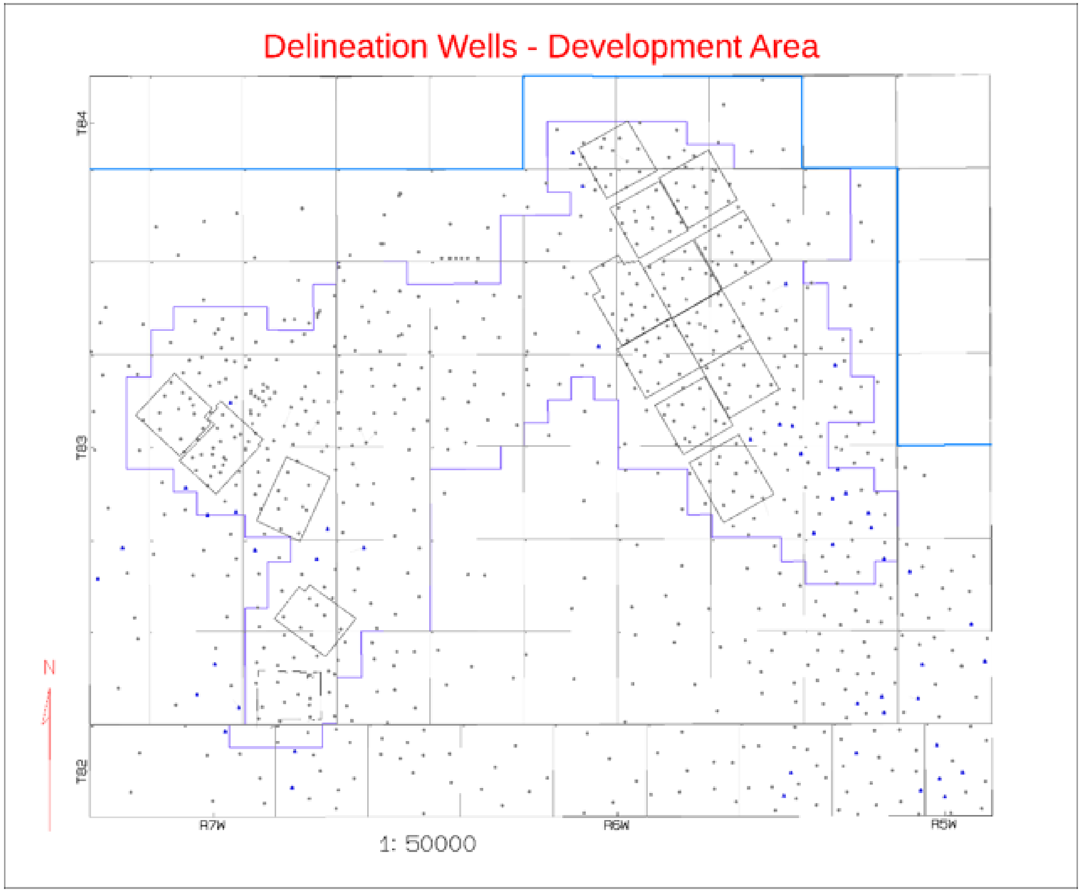
Subsection 3.1.1 (2)

2015-2016 Delineation Campaign and Well Density





2015-2016 Delineation Campaign and Well Density



Focus on Surmont Phase 1 sustaining pad locations as well as delineation of Phase 3

(only wells that penetrate the McMurray)

Existing wells

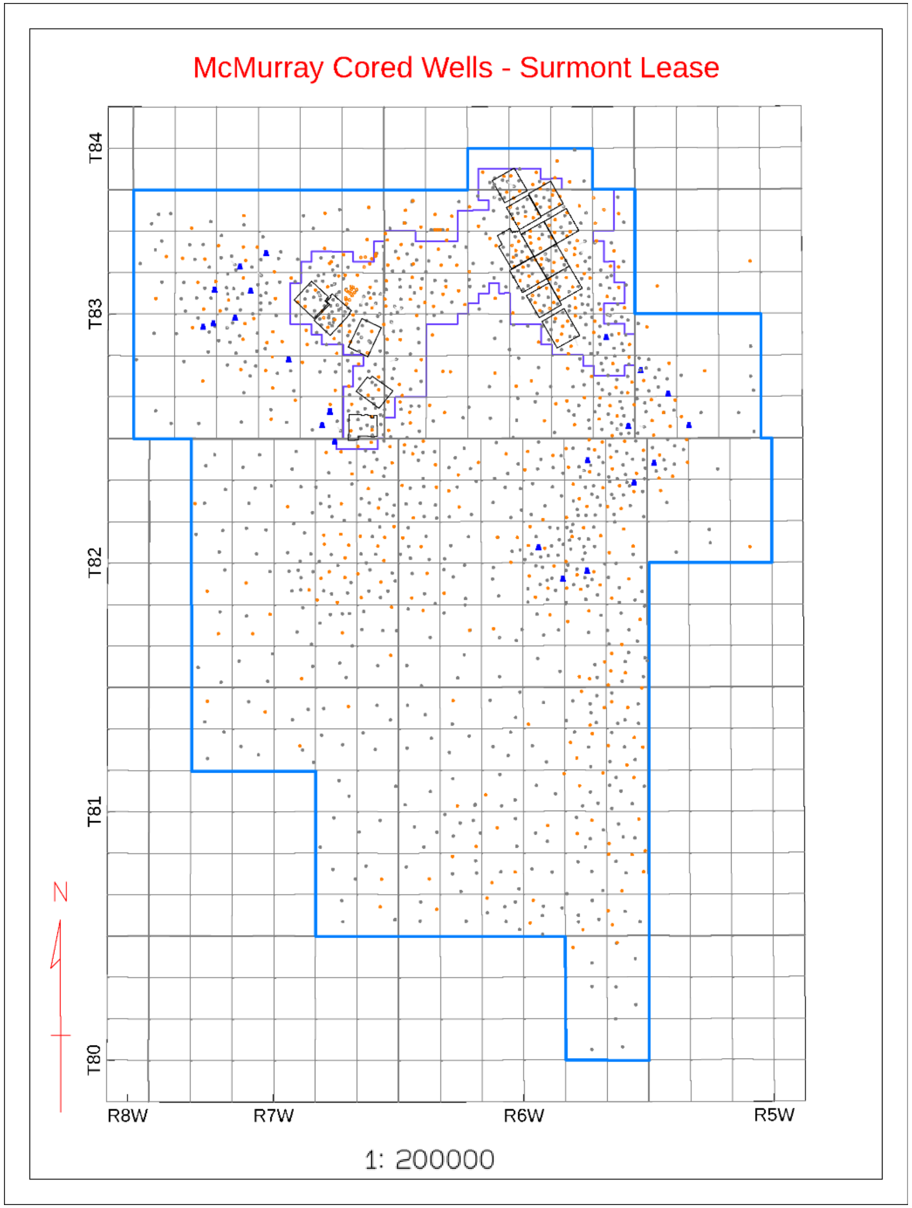
New vertical wells (as of Mar 1, 2016)

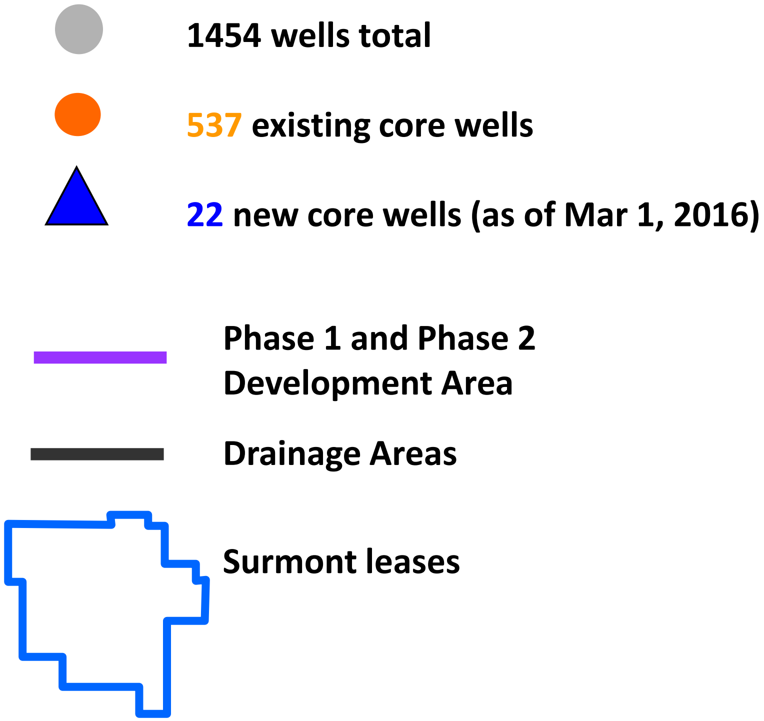
Phase 1 and Phase 2 Development Area

Drainage Areas

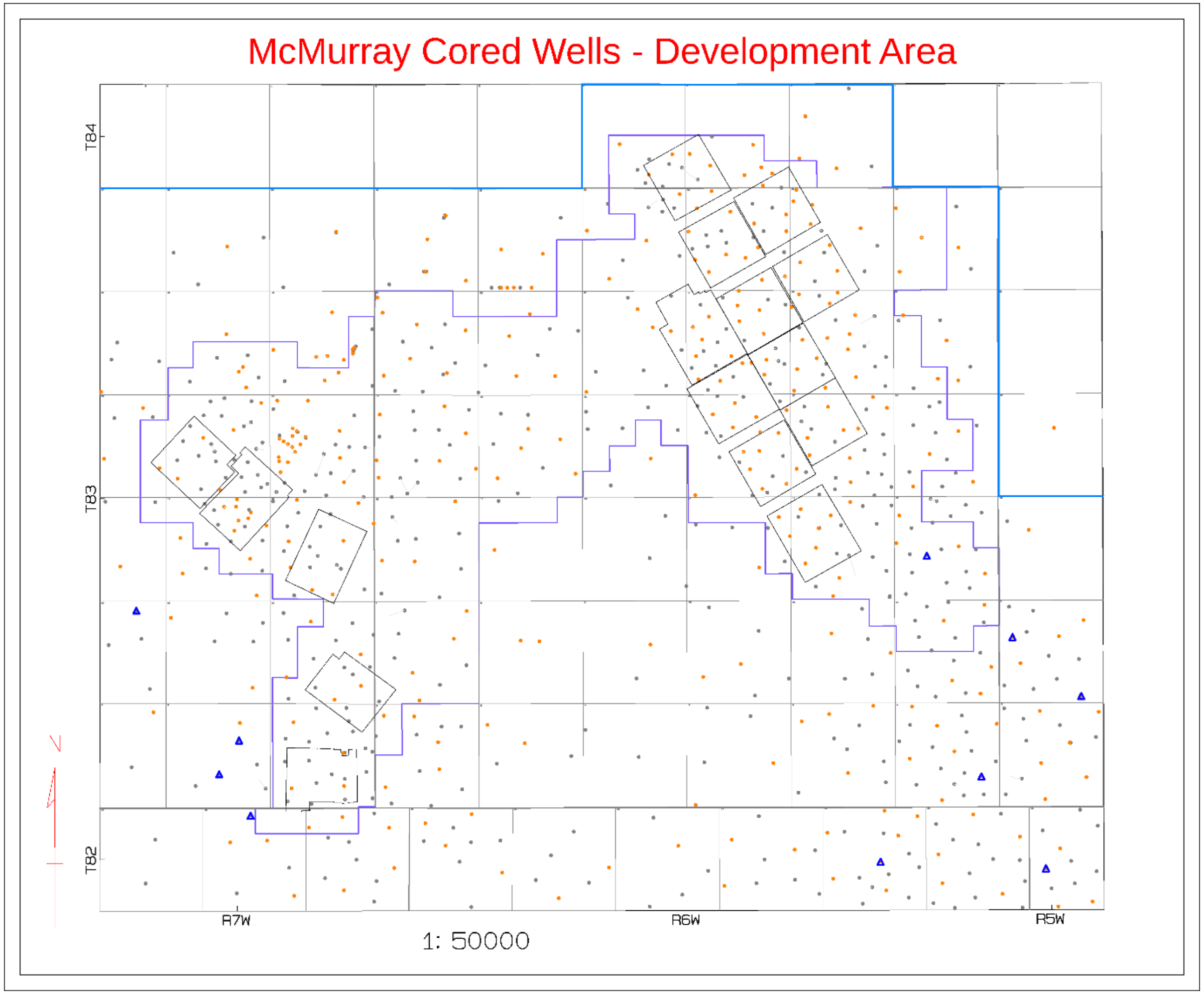
Surmont leases

2015-2016 Delineation Campaign and Core Density





2015-2016 Delineation Campaign and Core Density



Existing wells

Existing cored wells

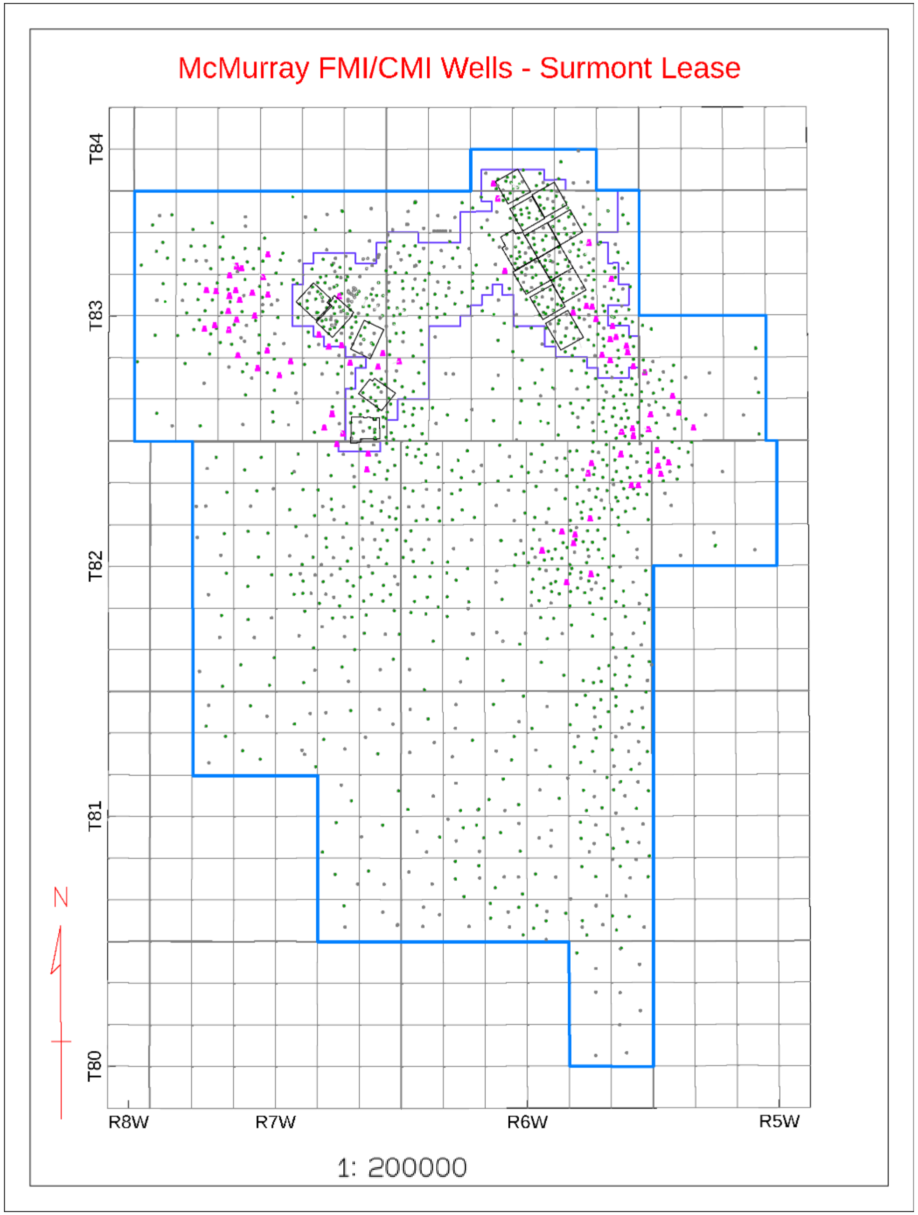
New core wells (as of Mar 1, 2016)

Phase 1 and Phase 2 Development Area

Drainage Areas

Surmont leases

2015-2016 Delineation Campaign and FMI/CMI Logs



100% Coverage of FMI/CMI Data in 2015/2016 program

- **Important for breccia identification**

1454 wells total

1073 existing FMI/CMI wells

80 new FMI/CMI wells (as of Mar 1, 2016)

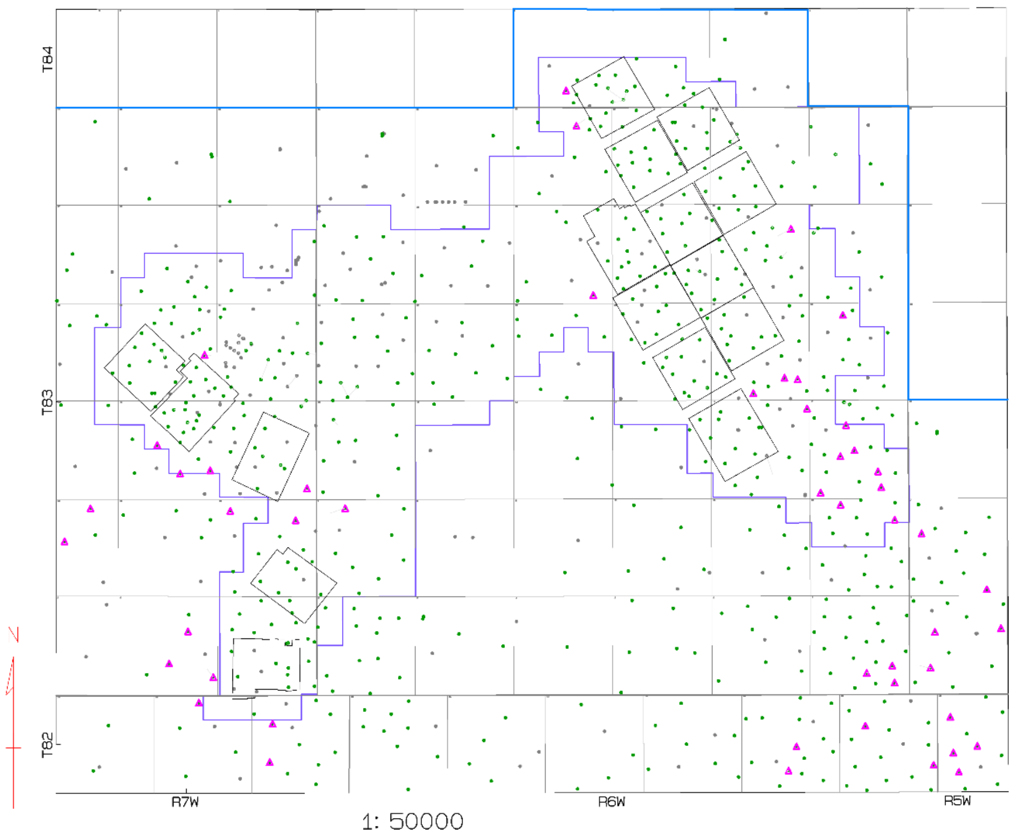
Phase 1 and Phase 2 Development Area

Drainage Areas

Surmont leases

2015-2016 Delineation Campaign and FMI/CMI Logs

McMurray FMI/CMI Wells – Development Area



100% Coverage of FMI/CMI Data in 2015/2016 program

- **Important for breccia identification**
- **Geomechanical Modeling**

Existing wells

Existing FMI wells

New FMI wells (as of Mar 1, 2016)

Phase 1 and Phase 2 Development Area

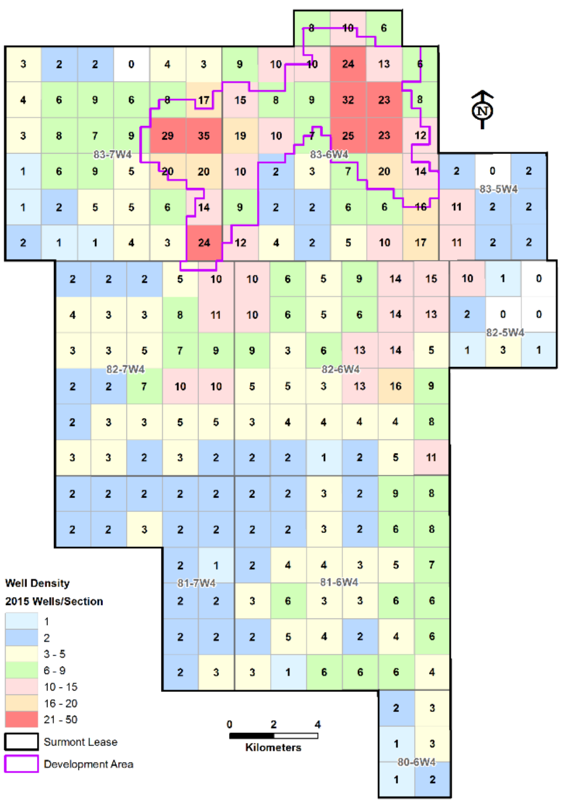
Drainage Areas

Surmont leases

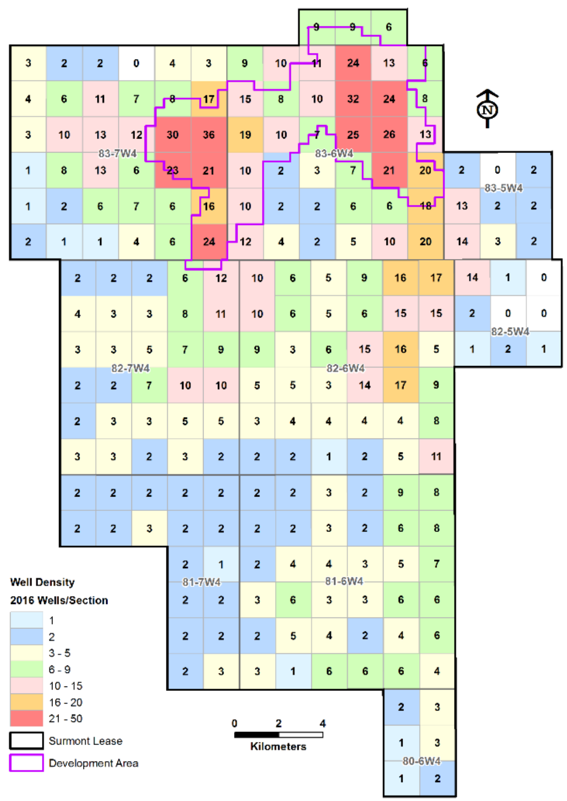
2015-2016 Delineation Campaign and Well Density

Delineation across Phase 1, 2, and 3

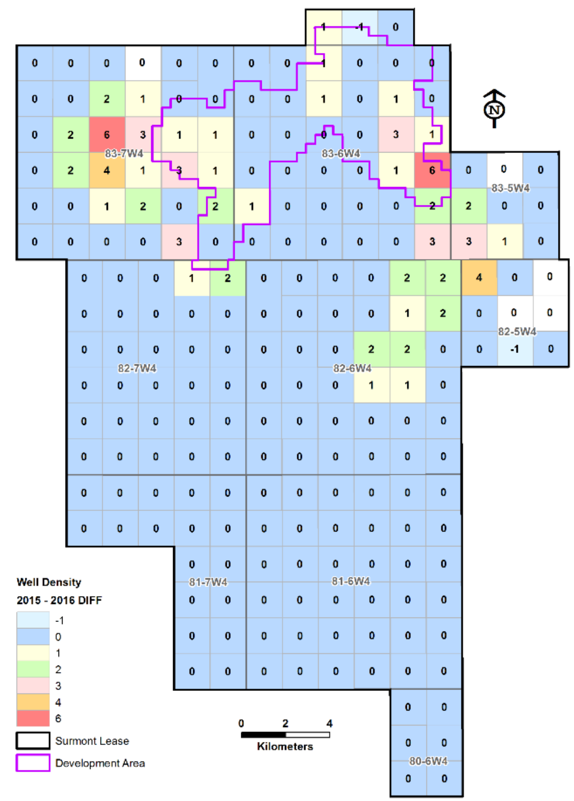
Delineation Well Density Map - Jan 2015



Delineation Well Density Map - Mar 2016



Density Map Difference

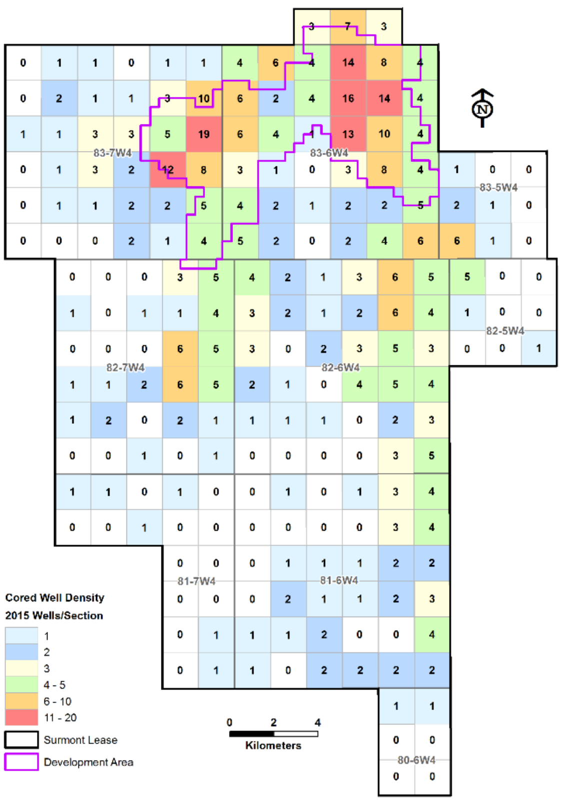


McMurray penetrated wells only

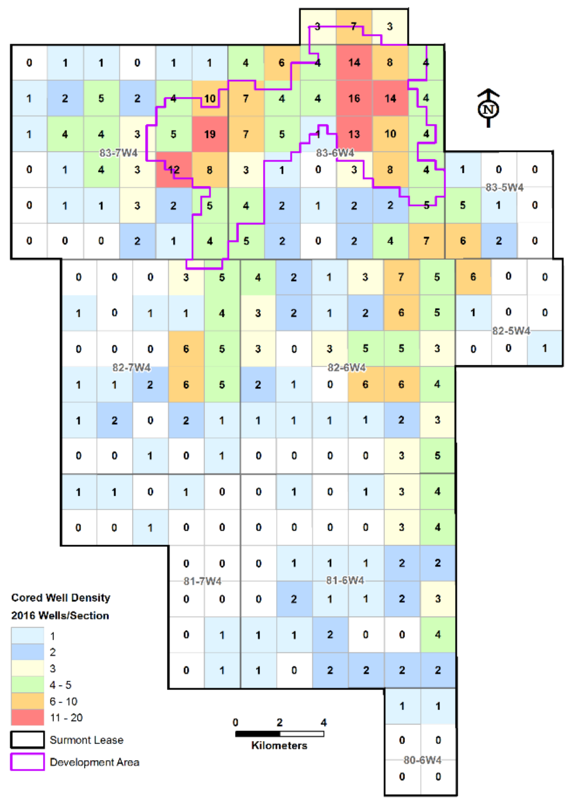
ConocoPhillips

Increased core density with latest drilling

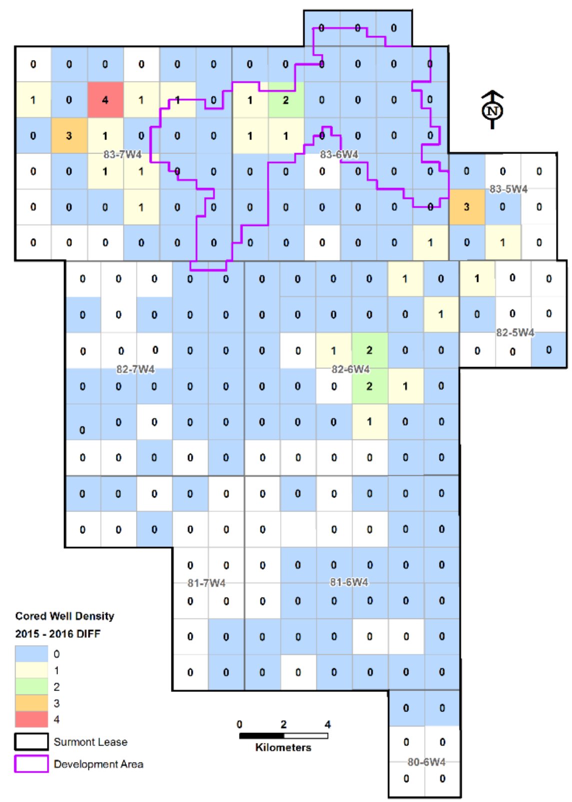
Cored Wells Density Map - Jan 2015



Cored Wells Density Map - Mar 2016



Cored Density Map Difference



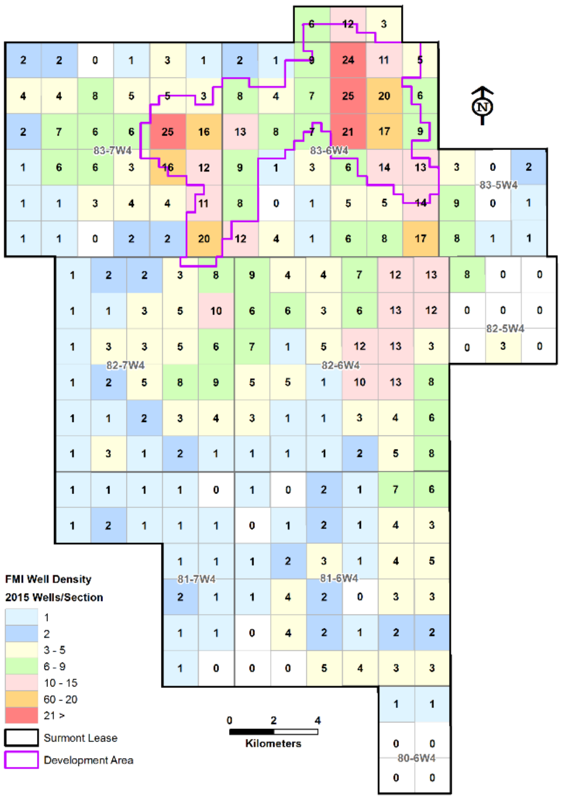
McMurray penetrated wells only

ConocoPhillips

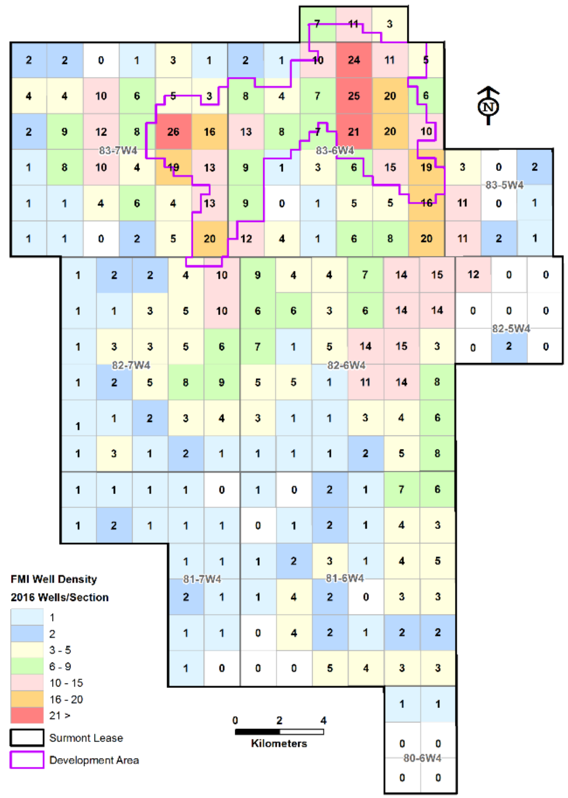
2015-2016 Delineation Campaign and Well Density

Increased Formation Micro Imaging density with latest drilling

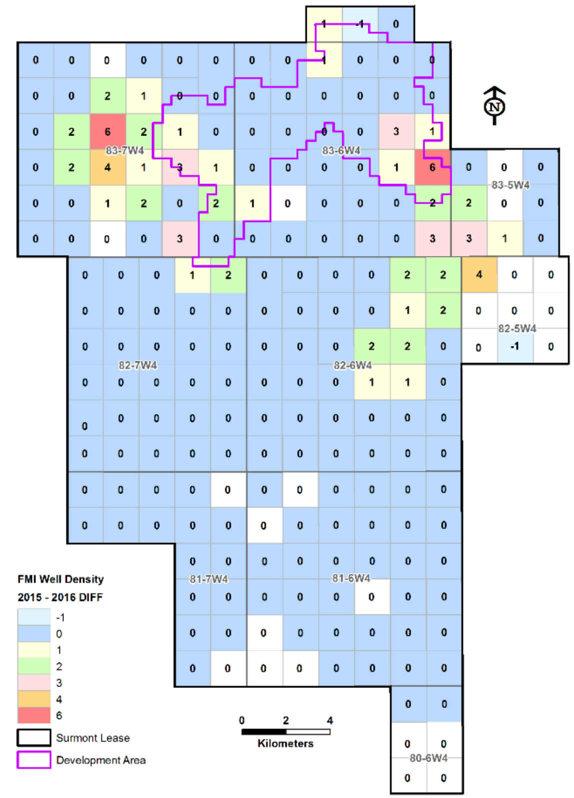
FMI Well Log Density Map – Jan 2015



FMI Well Log Density Map – Mar 2016

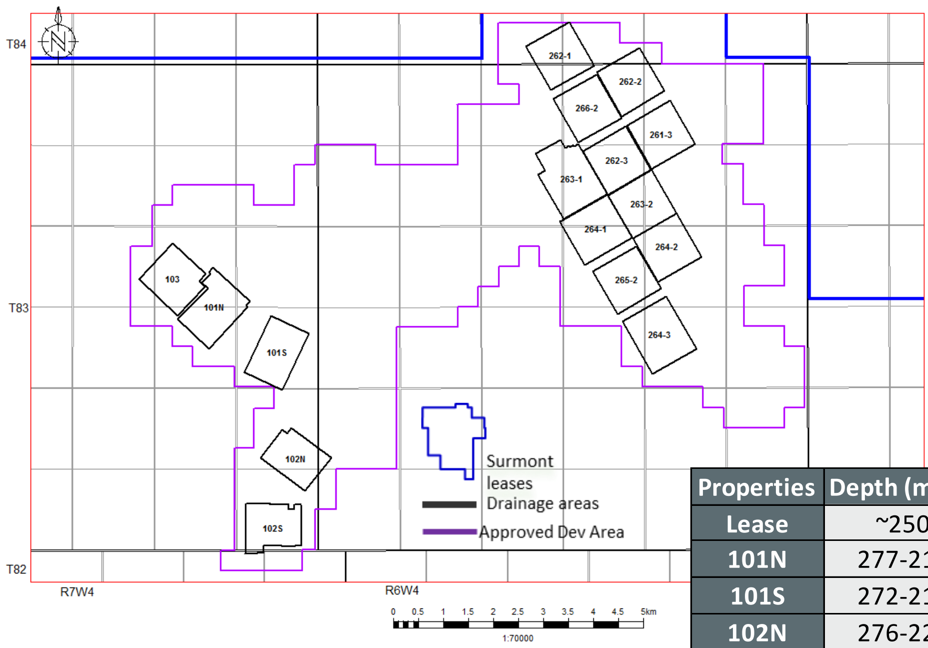


FMI Density Map Difference



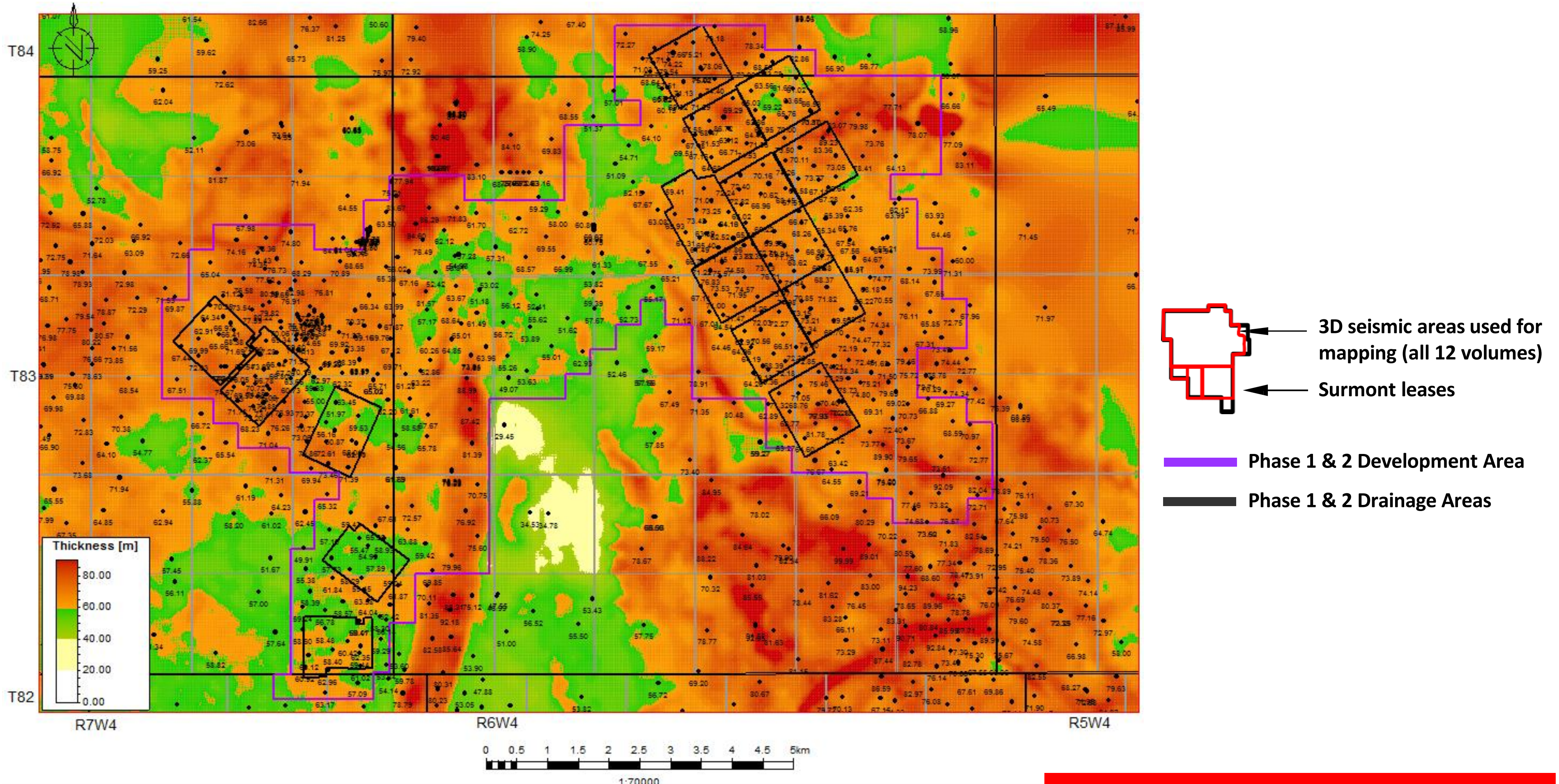
McMurray penetrated wells only

Reservoir Characteristics



Properties	Depth (masl)	Phie in NCB	So in NCB	KH in NCB	KV in NCB	Initial Pressure (KPa)
Lease	~250	32%	77%	4094	3402	1700
101N	277-212	33%	82%	4342	3603	1690
101S	272-218	33%	81%	5418	4550	1684
102N	276-222	33%	81%	4866	4078	1735
102S	285-223	31%	74%	4043	3331	1800
103	272-212	32%	84%	4451	3705	1691
261-3	271-202	32%	78%	4319	3537	1328
262-1	273-206	32%	80%	4160	3440	1307
262-2	272-212	33%	79%	5257	4435	1296
262-3	271-208	33%	78%	4938	4119	1368
263-1	272-211	33%	79%	5028	4225	1404
263-2	275-213	32%	78%	4773	3978	1397
264-1	271-213	33%	80%	5105	4302	1444
264-2	269-214	33%	78%	4791	3994	1437
264-3	281-208	32%	76%	4470	3703	1564
265-2	271-215	33%	77%	5094	4251	1496
266-2	276-210	33%	80%	4804	4013	1337

McMurray Gross Isopach

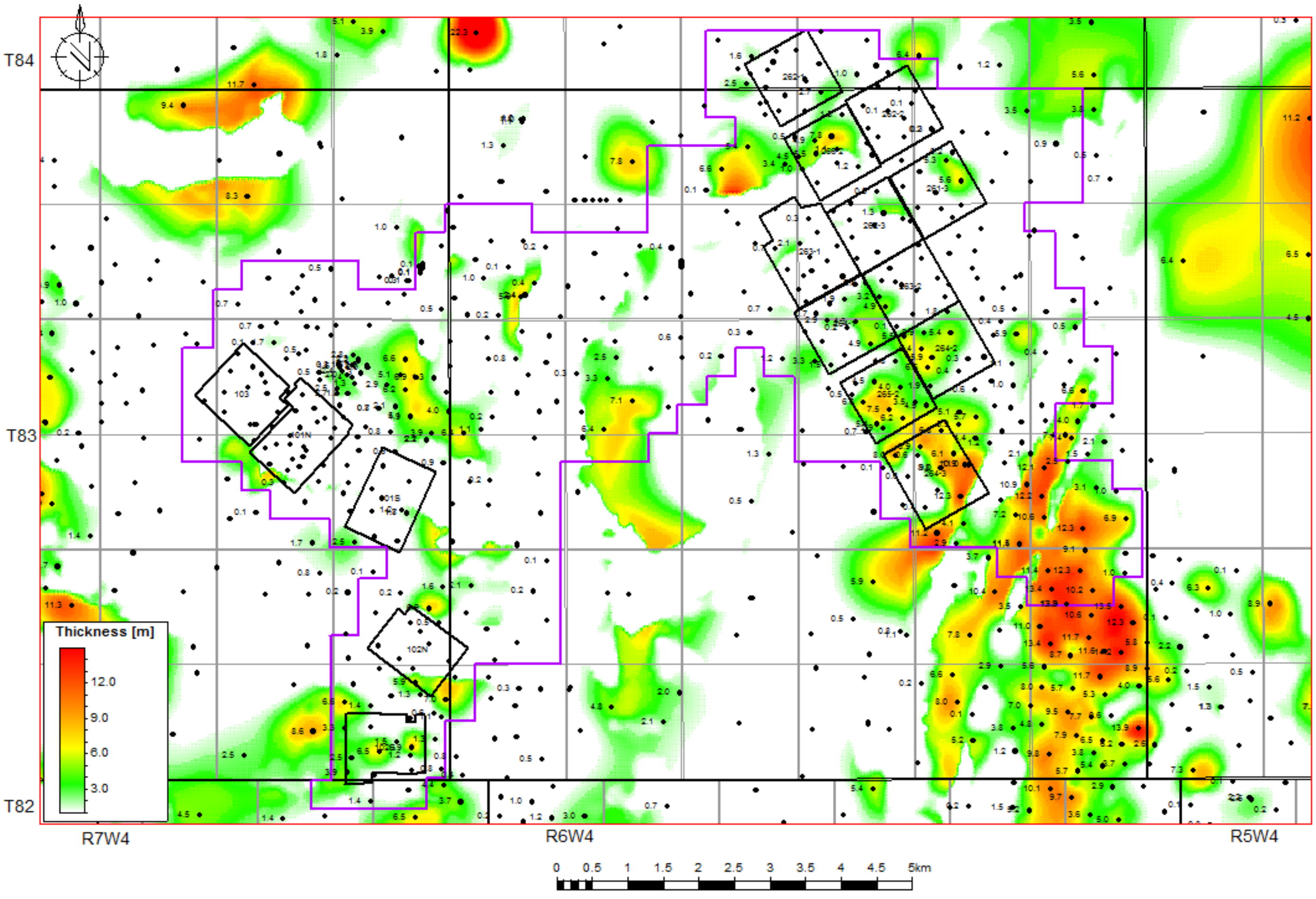


McMurray Gross Isopach

2015/2016 Delineation Campaign Update

- **December 2015 – minor changes due to:**
  - **Re-evaluated/unified geologic picks**
  - **Revised Seismic Interpretation**

McMurray Net Gas Isopach



3D seismic areas used for mapping (all 12 volumes)

Surmont leases

Phase 1 & 2 Development Area

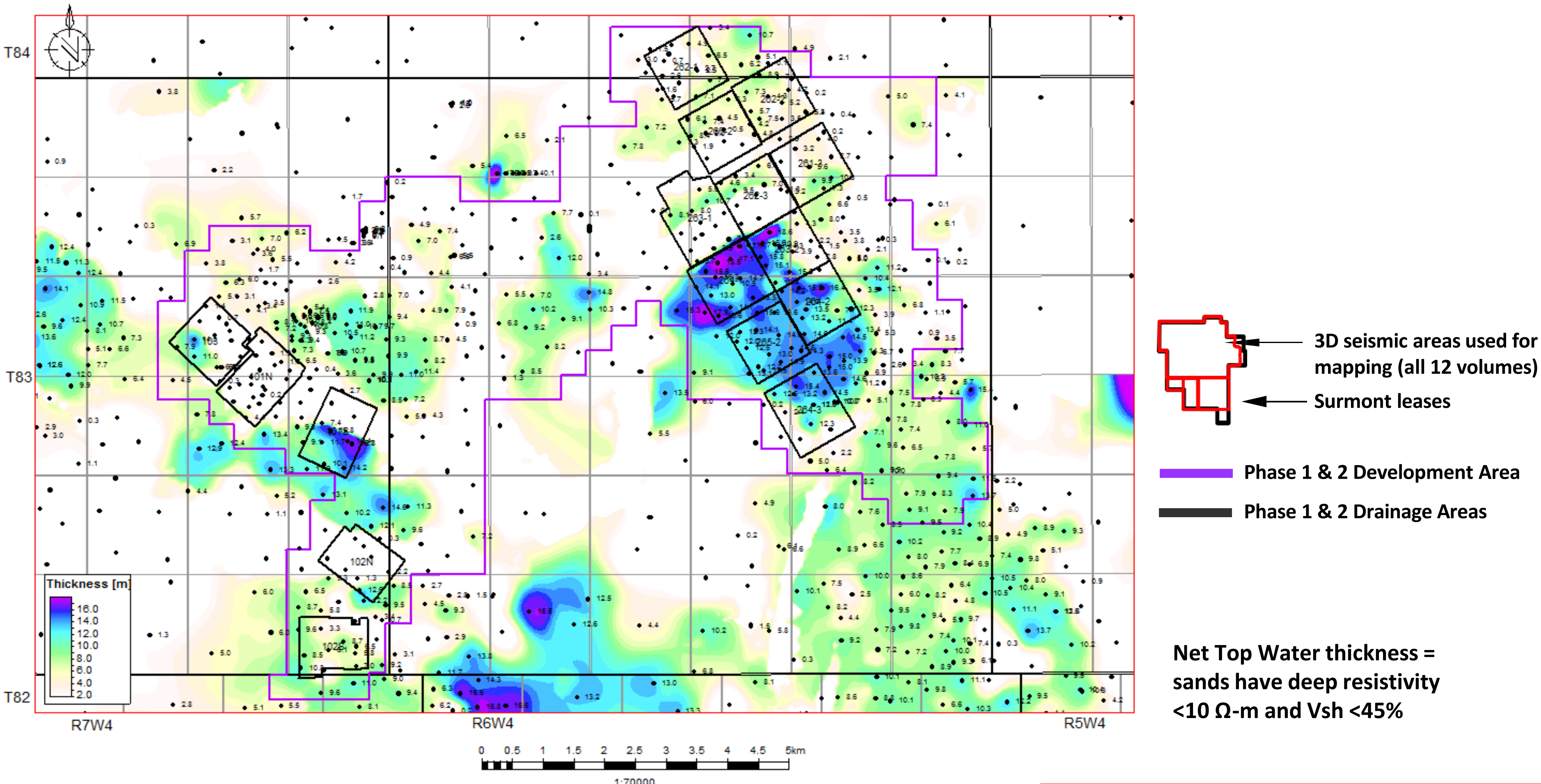
Phase 1 & 2 Drainage Areas

Net Top Gas thickness = sands have deep resistivity ≥10 Ω-m and Vsh <65%

McMurray Net Gas Isopach

2015/2016 Delineation Campaign Update

- December 2015 – minor changes due to:
  - Re-evaluated/unified geologic picks
  - Revised Seismic Interpretation



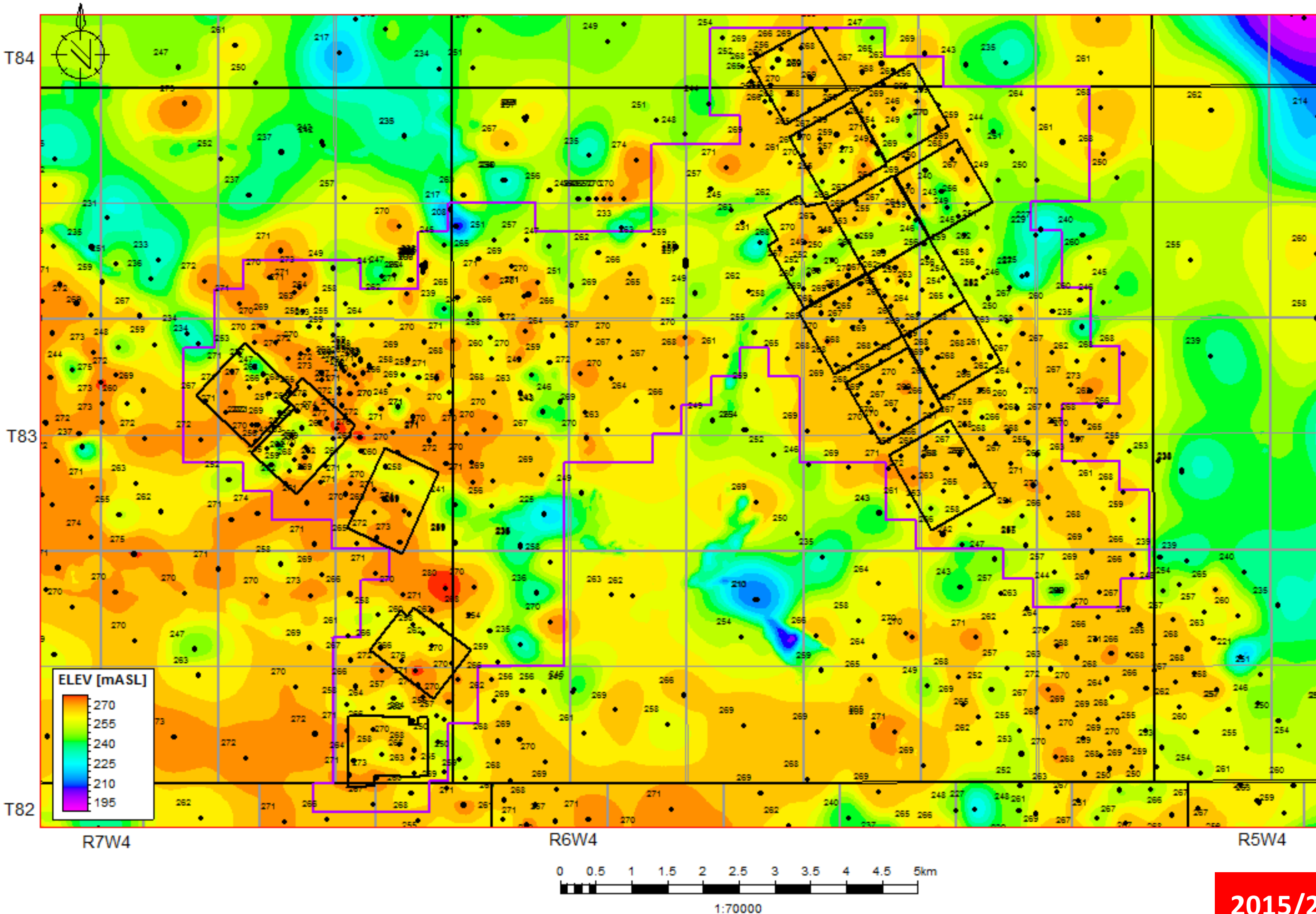
Net Top Water thickness = sands have deep resistivity <10 Ω-m and Vsh <45%

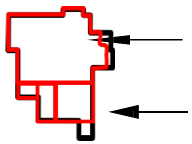
McMurray Net Top Water Isopach

2015/2016 Delineation Campaign Update

- December 2015 – minor changes due to:
  - Re-evaluated/unified geologic picks
  - Revised Seismic Interpretation

McMurray Top Continuous Bitumen Structure





3D seismic areas used for mapping (all 12 volumes)

Surmont leases

Phase 1 & 2 Development Area

Phase 1 & 2 Drainage Areas

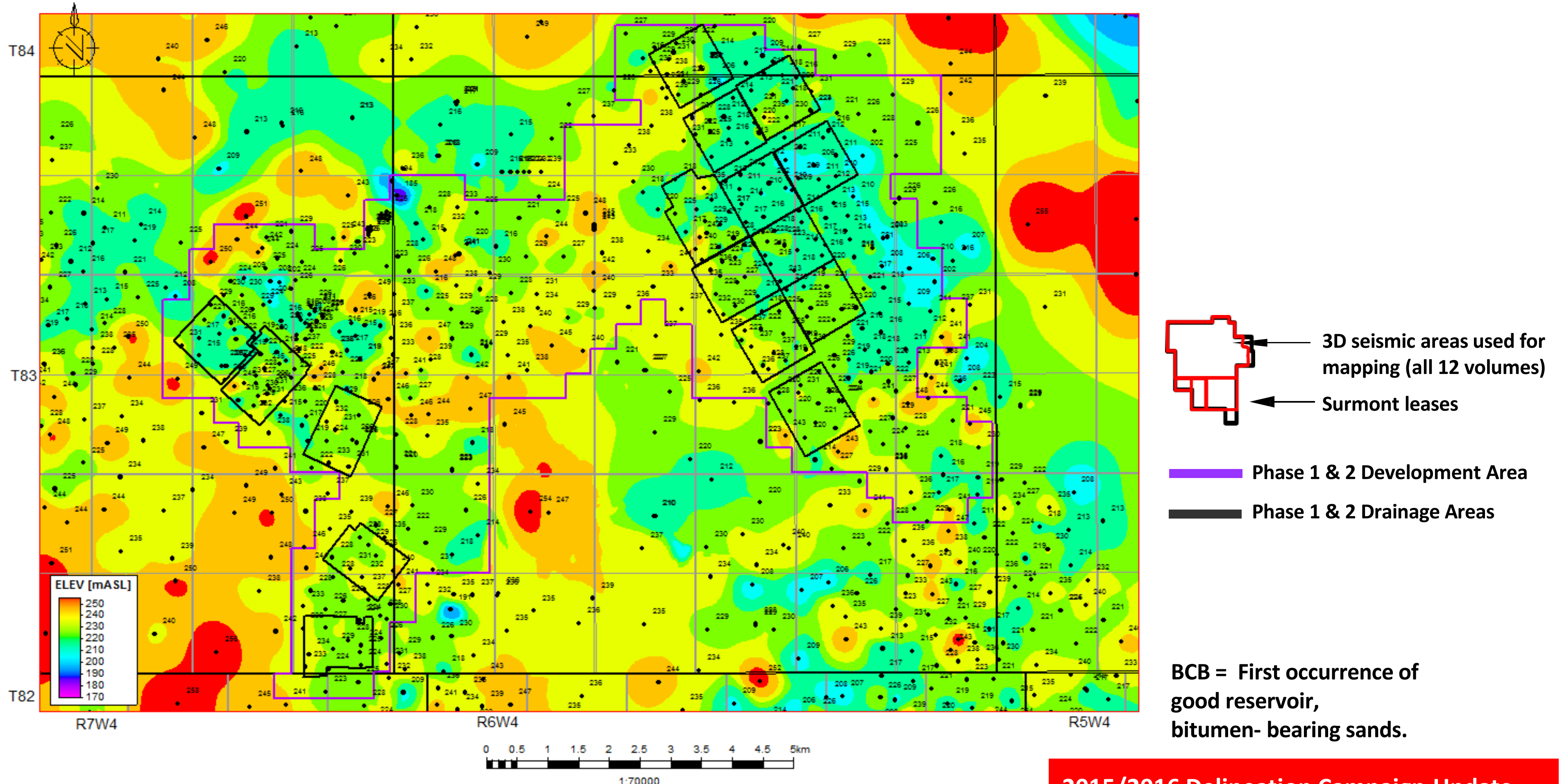
TCB = The uppermost limit of good reservoir, bitumen- bearing sands.

Top Continuous Bitumen Structure

2015/2016 Delineation Campaign Update

- December 2015 – minor changes due to:
  - Re-evaluated/unified geologic picks
  - Revised Seismic Interpretation

McMurray Base Continuous Bitumen Structure



BCB = First occurrence of good reservoir, bitumen- bearing sands.

Base Continuous Bitumen Structure

2015/2016 Delineation Campaign Update

- December 2015 – minor changes due to:
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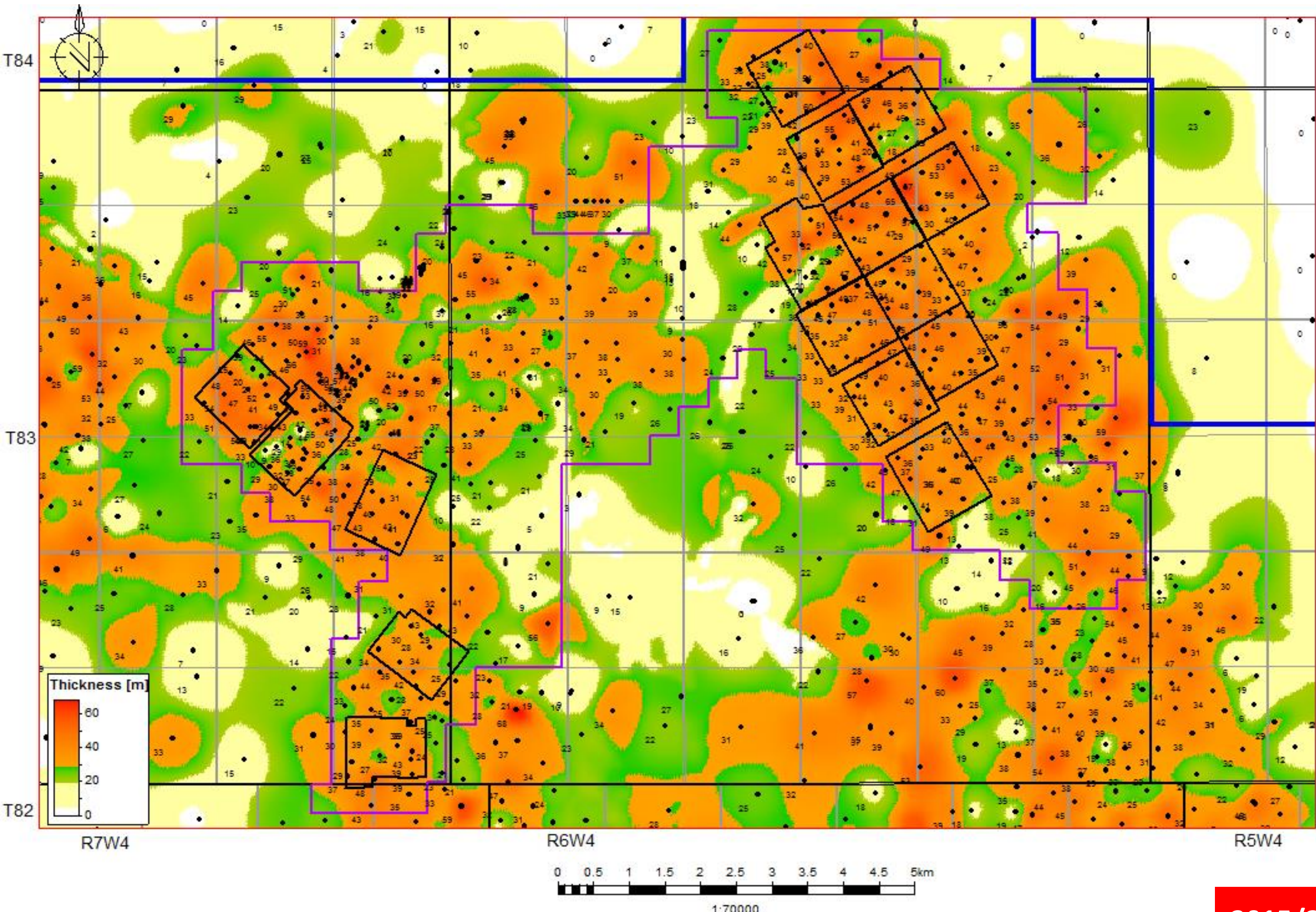
  - Revised Seismic Interpretation

McMurray Net Continuous Bitumen Thickness



3D seismic areas used for mapping (all 12 volumes)

Surmont leases

Phase 1 & 2 Development Area

Phase 1 & 2 Drainage Areas

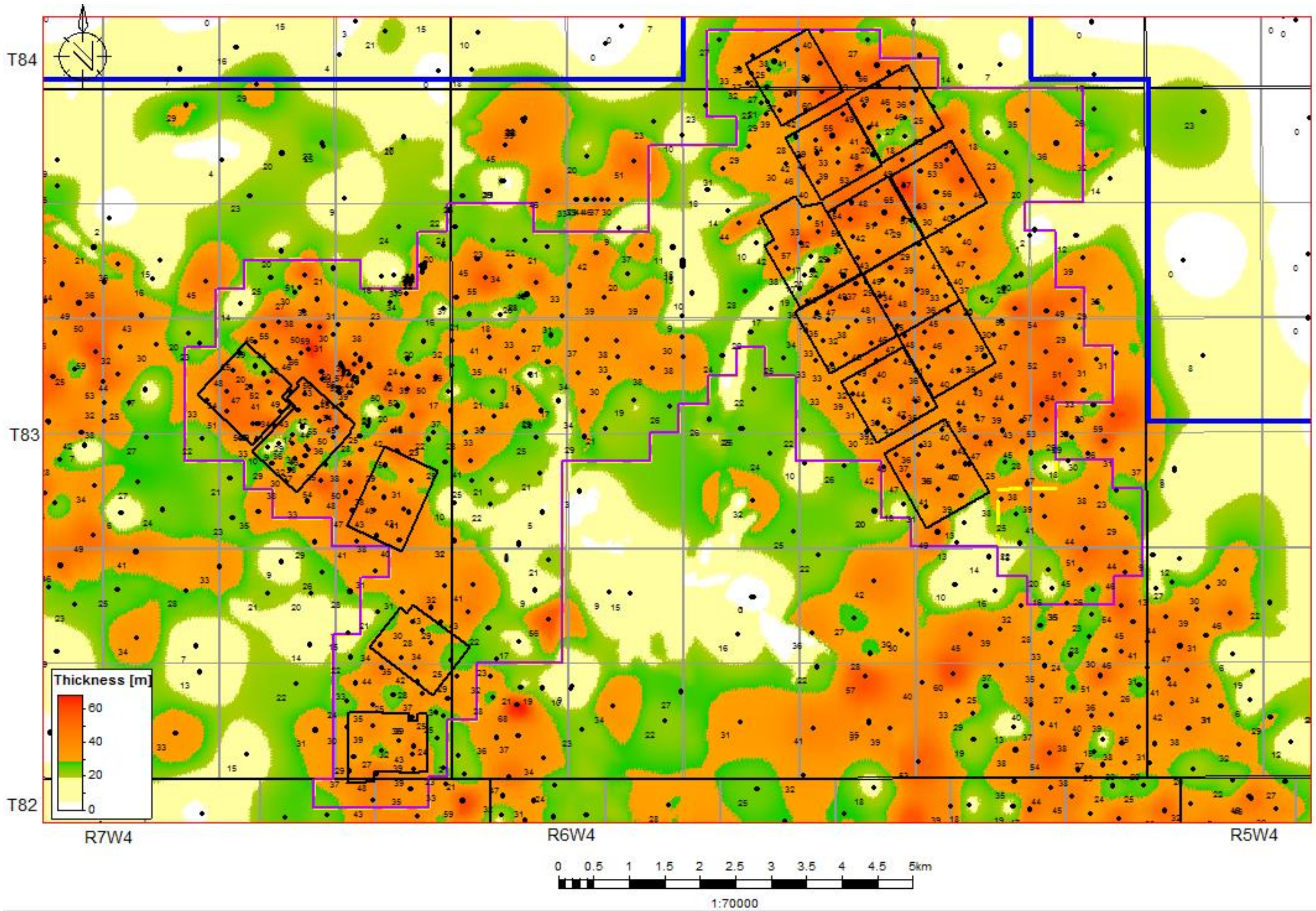
Net continuous bitumen = sands have deep resistivity > 40 Ω-m and Vsh <33%, and no shale greater than 3 m thick

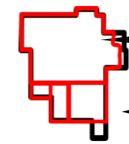
McMurray Net Continuous Bitumen Pay

2015/2016 Delineation Campaign Update

- **December 2015 – minor changes due to:**
  - **Re-evaluated/unified geologic picks**
  - **Revised Seismic Interpretation**

Surmont Leases OBIP





3D seismic areas used for mapping (all 12 volumes)

Surmont leases

Phase 1 & 2 Development Area

Phase 1 & 2 Drainage Areas

Previous Dev Area

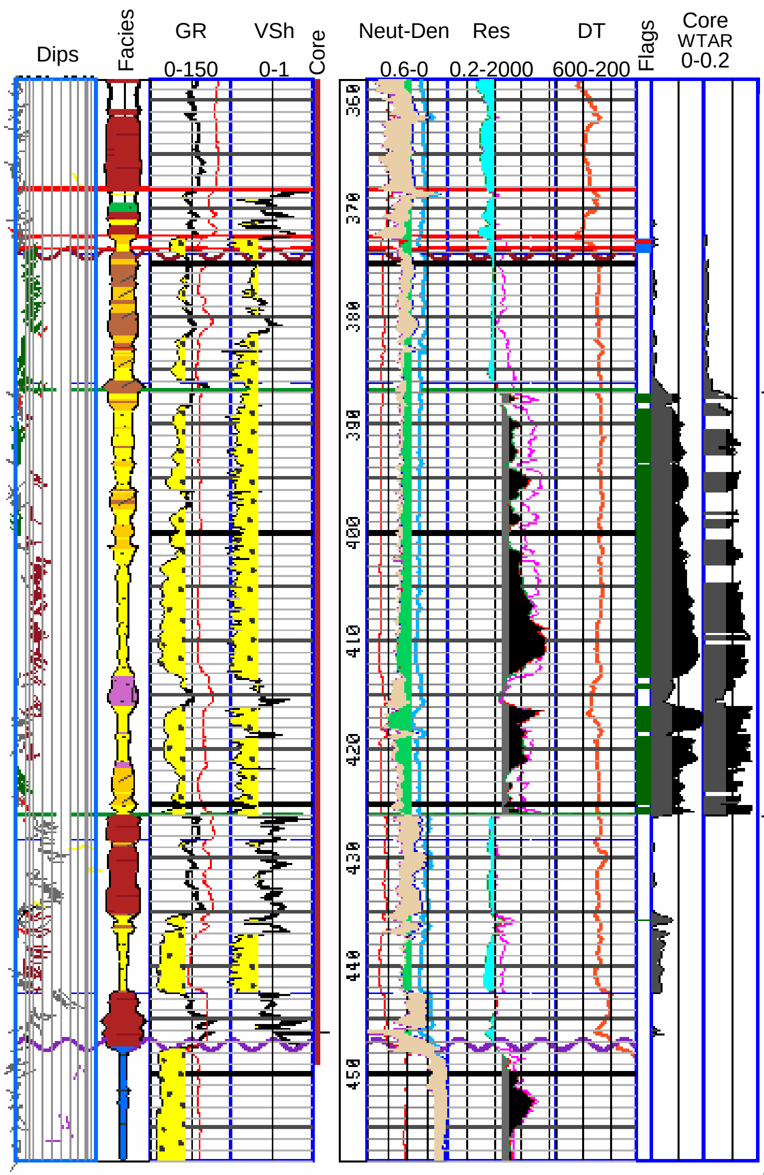
Surmont Development Area OBIP

Properties	Development Area
NCB Thickness Range	0 to Greater than 30 m
Phie in NCB	32.42%
So in NCB	78.84%
OOIP in NCB > 18m	3507.27 MMbbls Deterministic

OBIP = Thickness x Phie x So x Area

ConocoPhillips

Phase 1 Type Log Well Pad 101



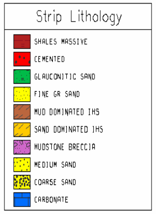
McMurray

High Sw

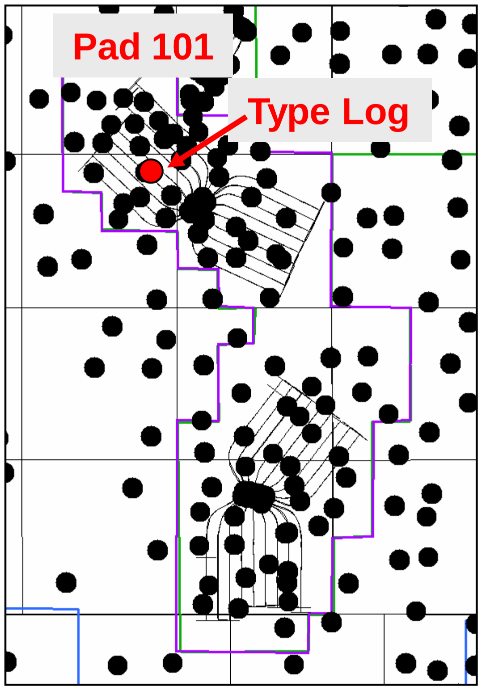
Continuous Bitumen

High Sw

Devonian

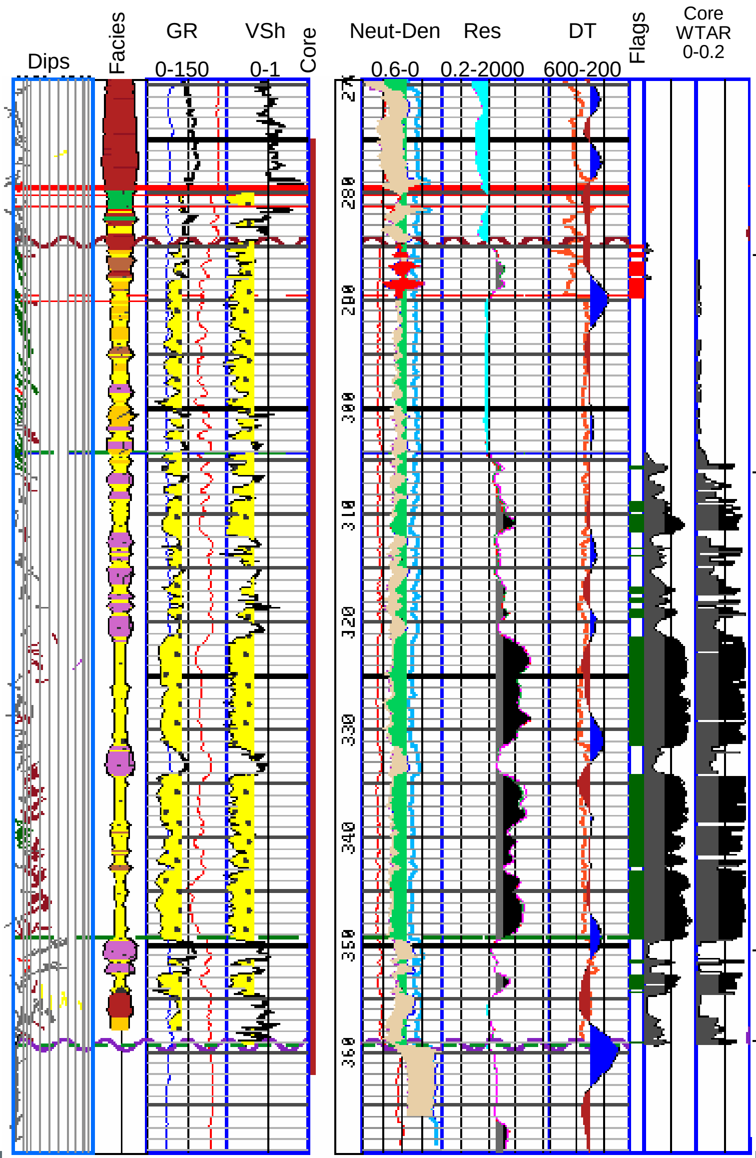


Example Log 100161408307w400



Phase 1 Area

Phase 2 Type Log – Well Pad 264-2



Example Log 100162208306w400

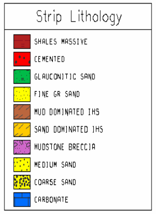
McMurray

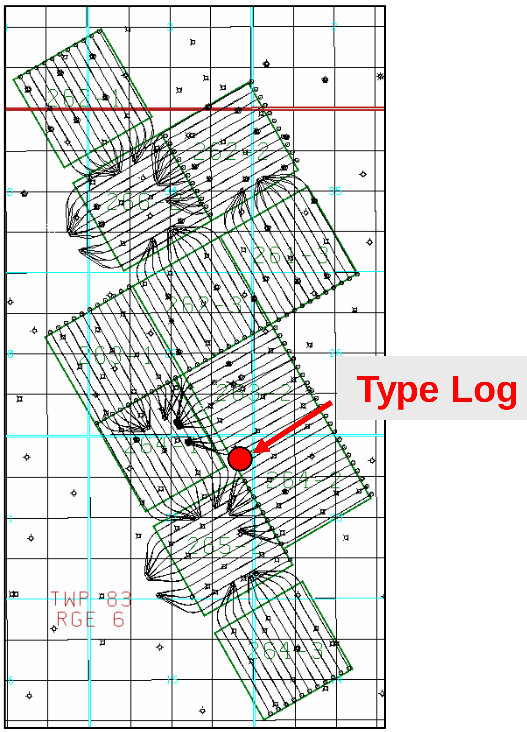
Top Gas

High Sw

Continuous Bitumen

Devonian





Phase 2 Area

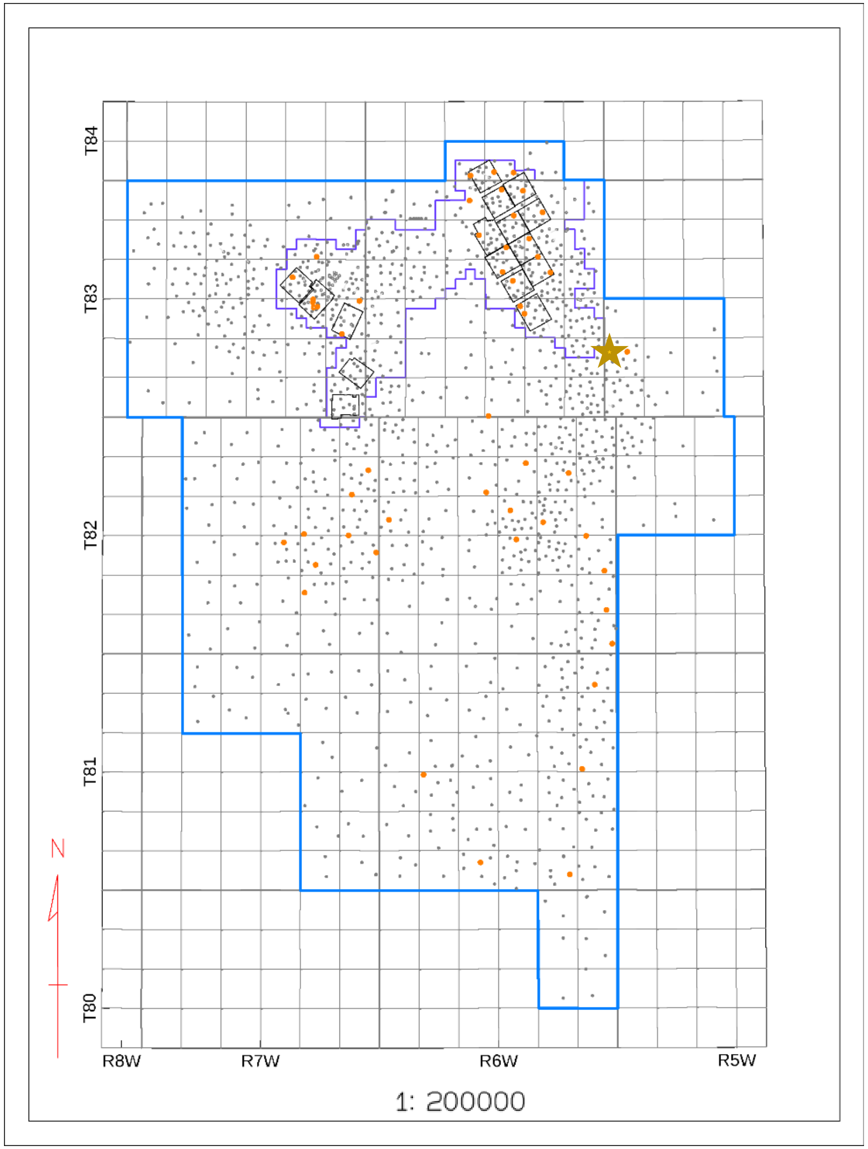
Special Core Analyses Bitumen Viscosity Sampling

- Objectives:
  - Characterize vertical and lateral variance in viscosity at different temperatures.
  - Model the variance in bitumen properties and its implications for bitumen production rates during SAGD.
  - Characterize relationship between viscosity, density and geochemical composition.

Viscosity increases with depth in the McMurray Formation.

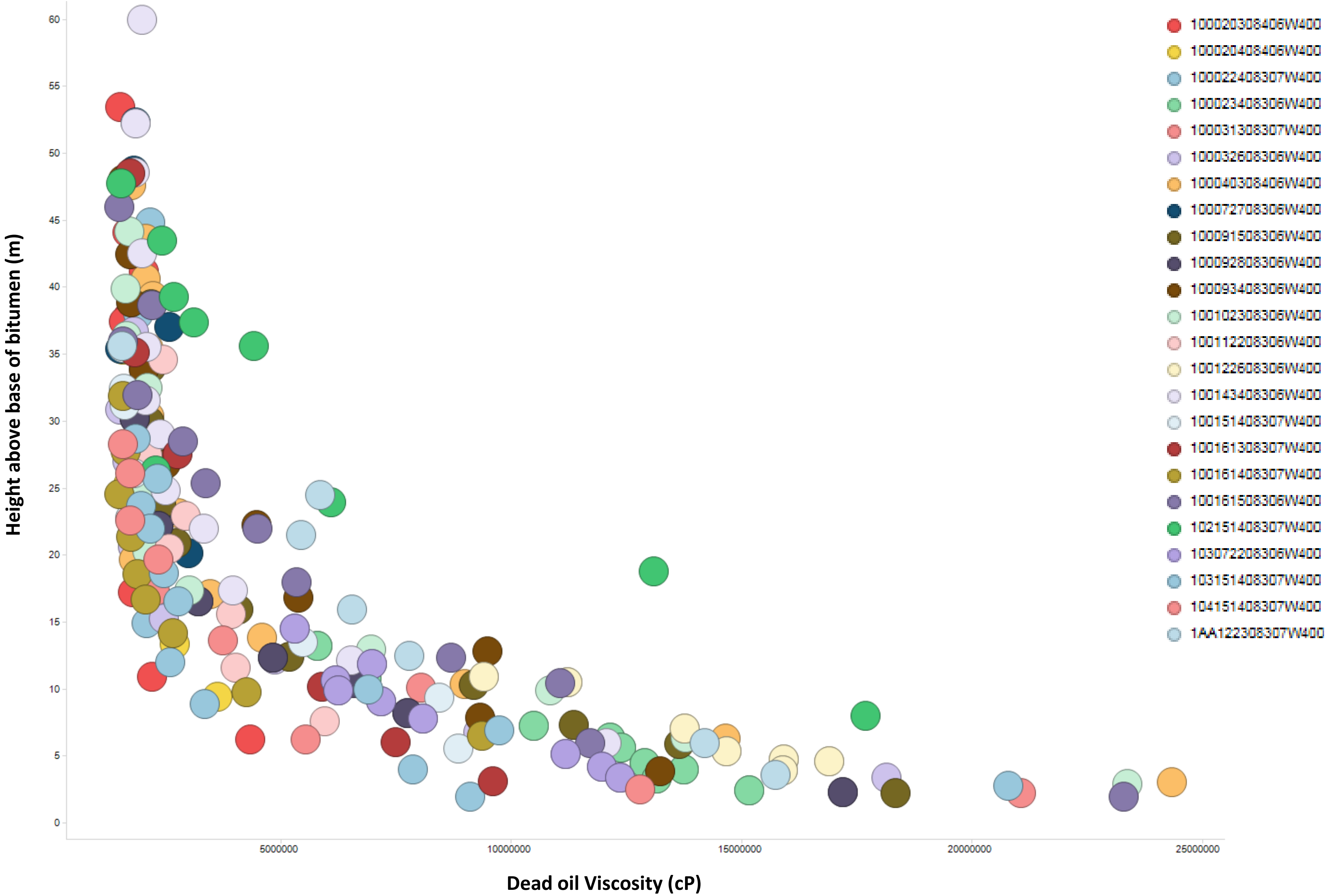
52 existing viscosity sample wells

Delineated Wells - Surmont

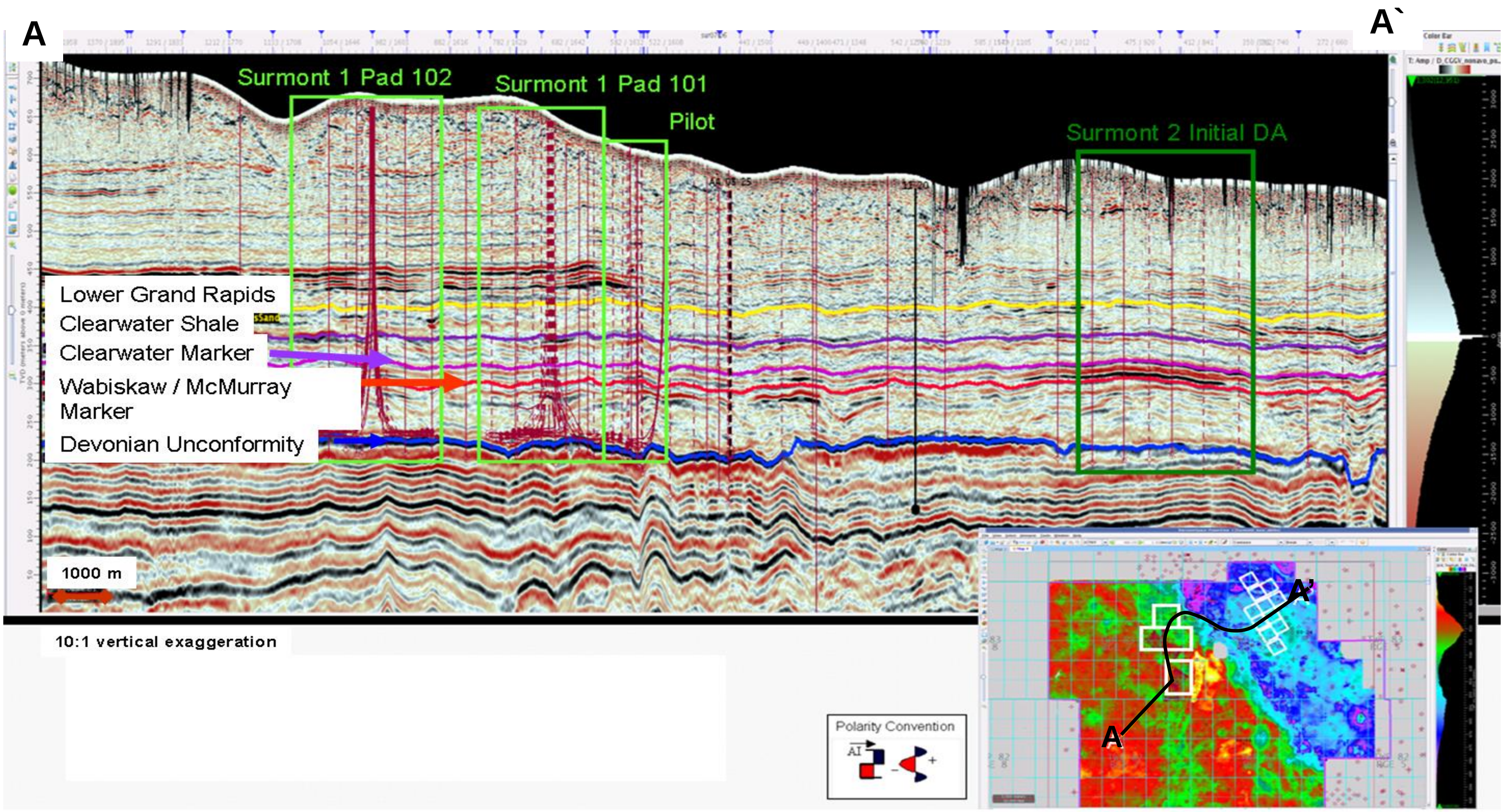


2015 – 2016 Delineation

Viscosity Gradient



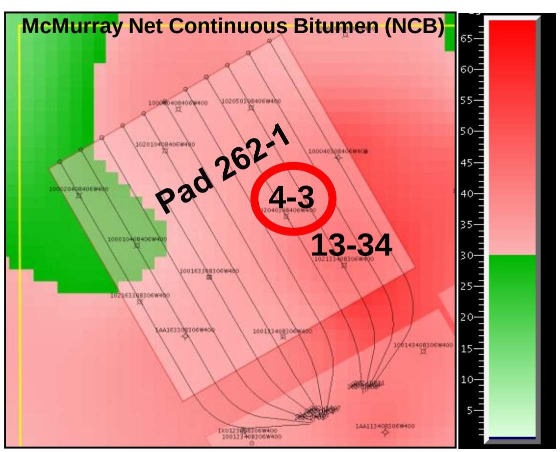
Representative Structural Cross Section

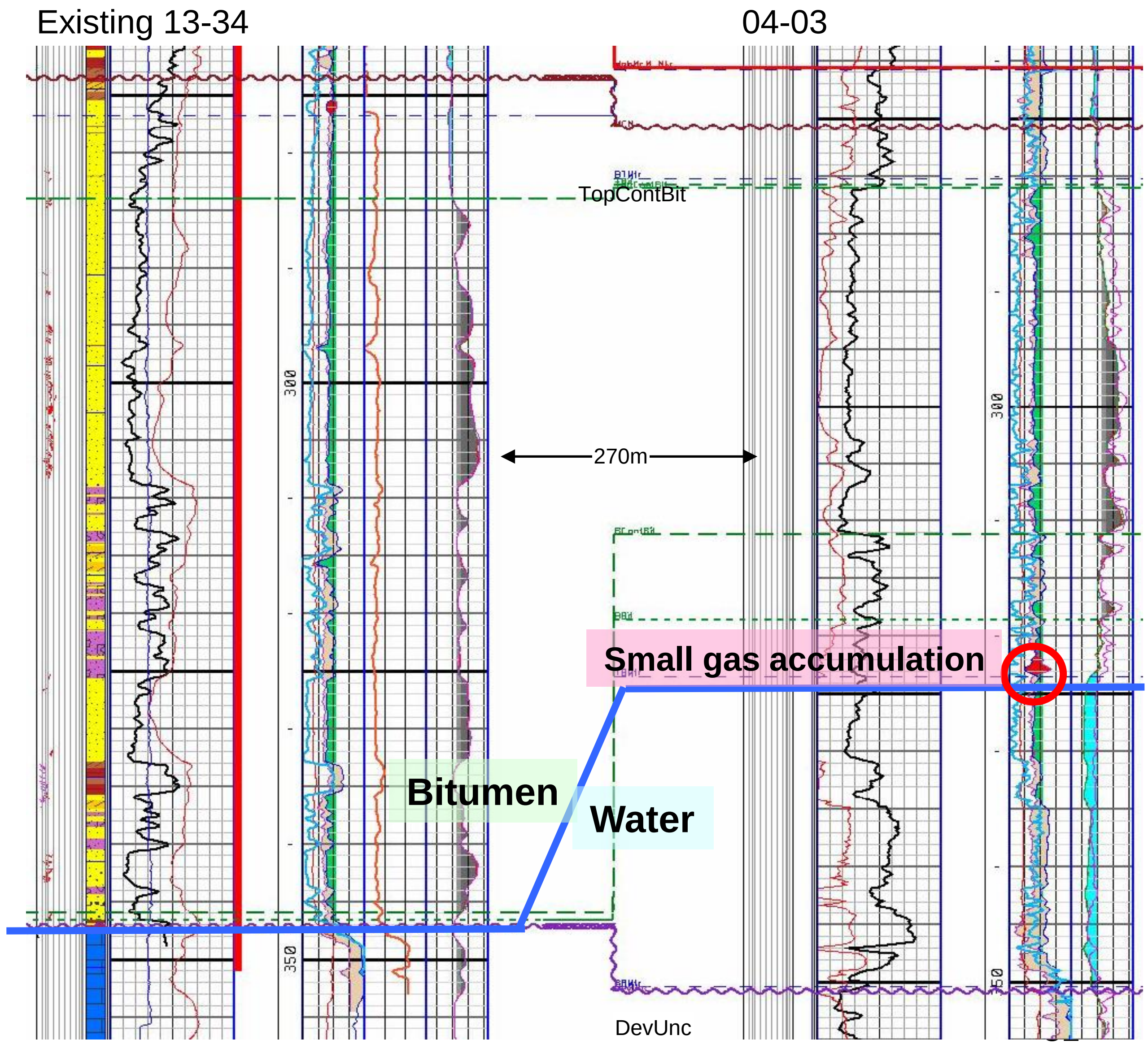


Well Pad 262-1 Variable Bitumen-Water Contact

- A well at 4-3-84-6 W4M intersected a raised bitumen/water contact, the contact is ~ 12 m higher than the nearest offset.
- The well also intersected a small gas pool under the bitumen.

> - **The presence of basal water becomes a potential impact on production performance on Well Pad 262-1**



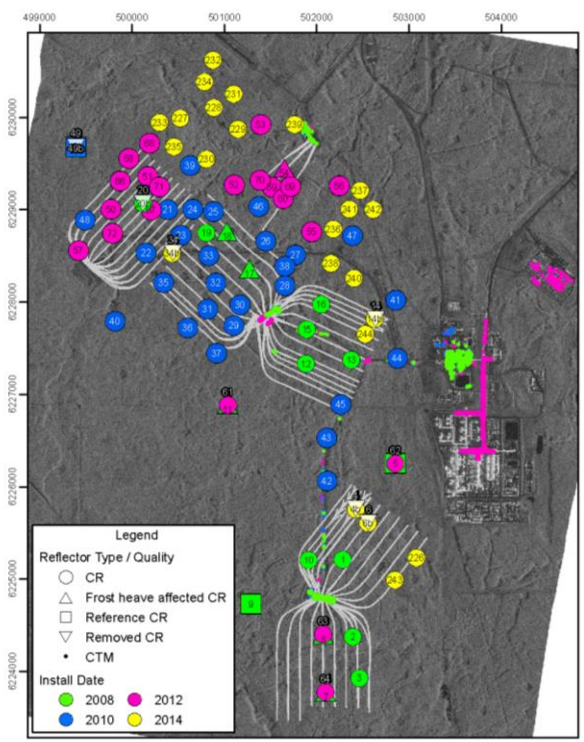


INSAR Surface Deformation Monitoring

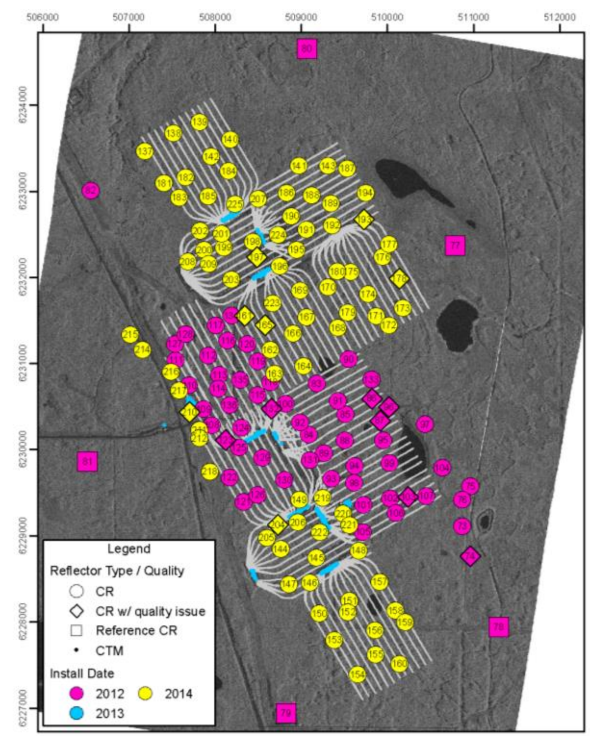
- Interferometric Synthetic Aperture Radar Images:
  - Data is collected every 24 days
- Data acquisition initiated after first steam in 2008:
  - Data used for Geomechanical Model Calibration
  - CRs 1 to 20 installed March 2008
  - CRs 21 to 47 installed March 2010
  - CRs 48 to 136 installed March 2012
  - CRs 137 to 244 installed March 2014
  - CRs 246 to 249 & CRs 251-252 installed December 2015

- **CRs 20 and 49 were replaced in March 2015**

Location Map of CR Points (Surmont 1)

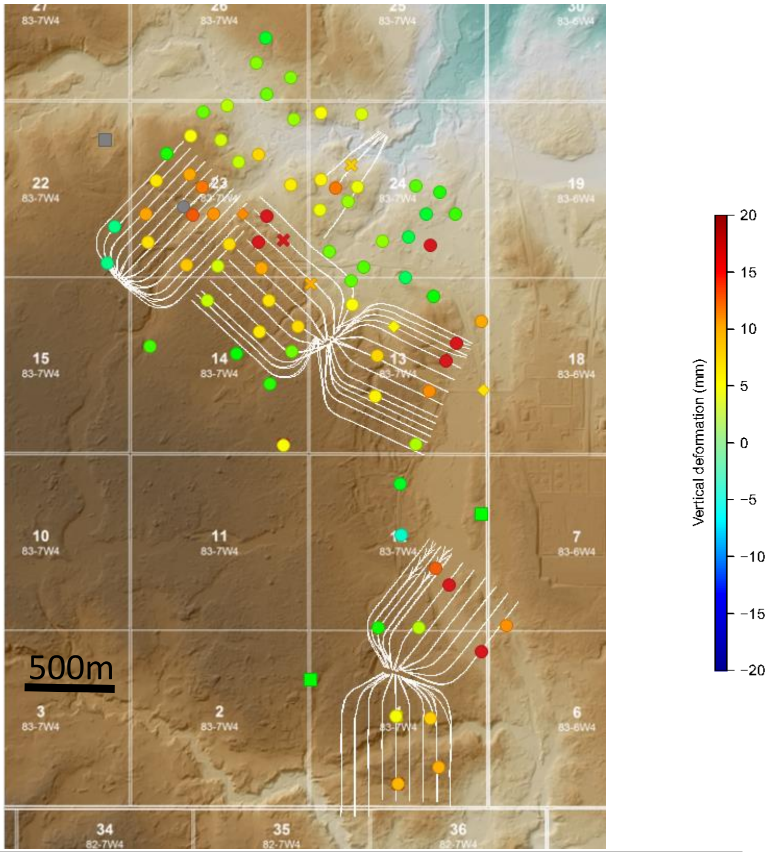


Location Map of CR Points (Surmont 2)



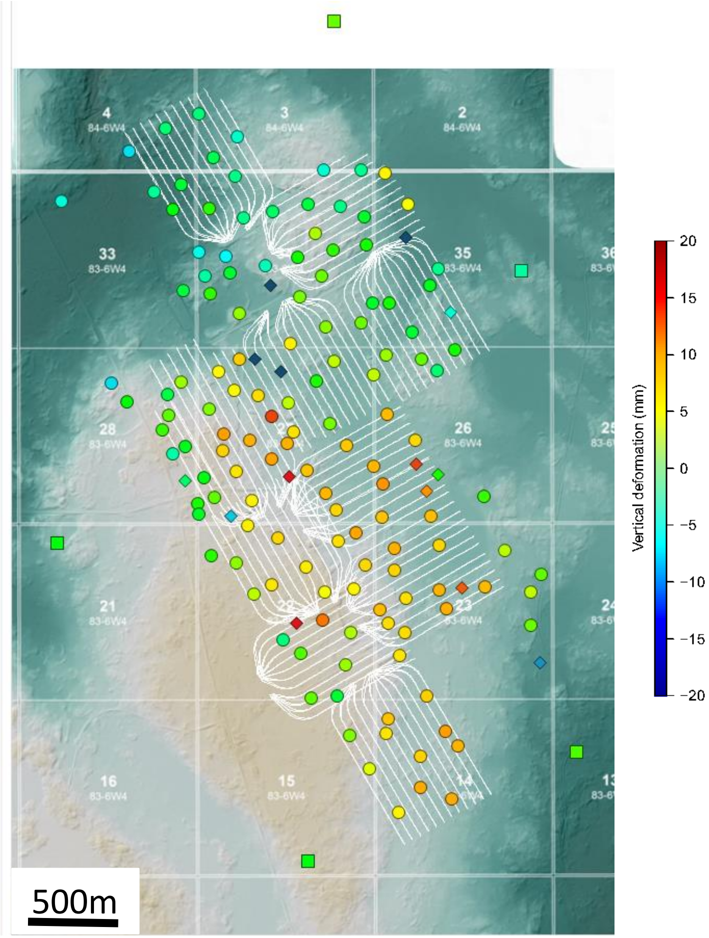
INSAR Surface Deformation Monitoring

Vertical Deformation *Dec 30 2014 to Mar 06 2016* (Surmont 1)



- **Deformation currently in line with expectations**
- **Maximum deformation seen in CRs 13, 244,14b over pad 101S.**

Vertical Deformation *Dec 30 2014 to Mar 06 2016* (Surmont 2)



Corner Reflector
Reference Corner Reflector
Corner Reflector w/quality issue

INSAR Update for CN Rail

- Overall, cumulative deformation is around ± 5 mm, and none of the corner reflectors show deformation values close to the 25 mm disclosure limit defined by CN Rail.
- Annual report will be provided to CN Rail containing:
    - Map of Railway Corner Reflectors and horizontal wells
    - Table of data containing the Railway CRs

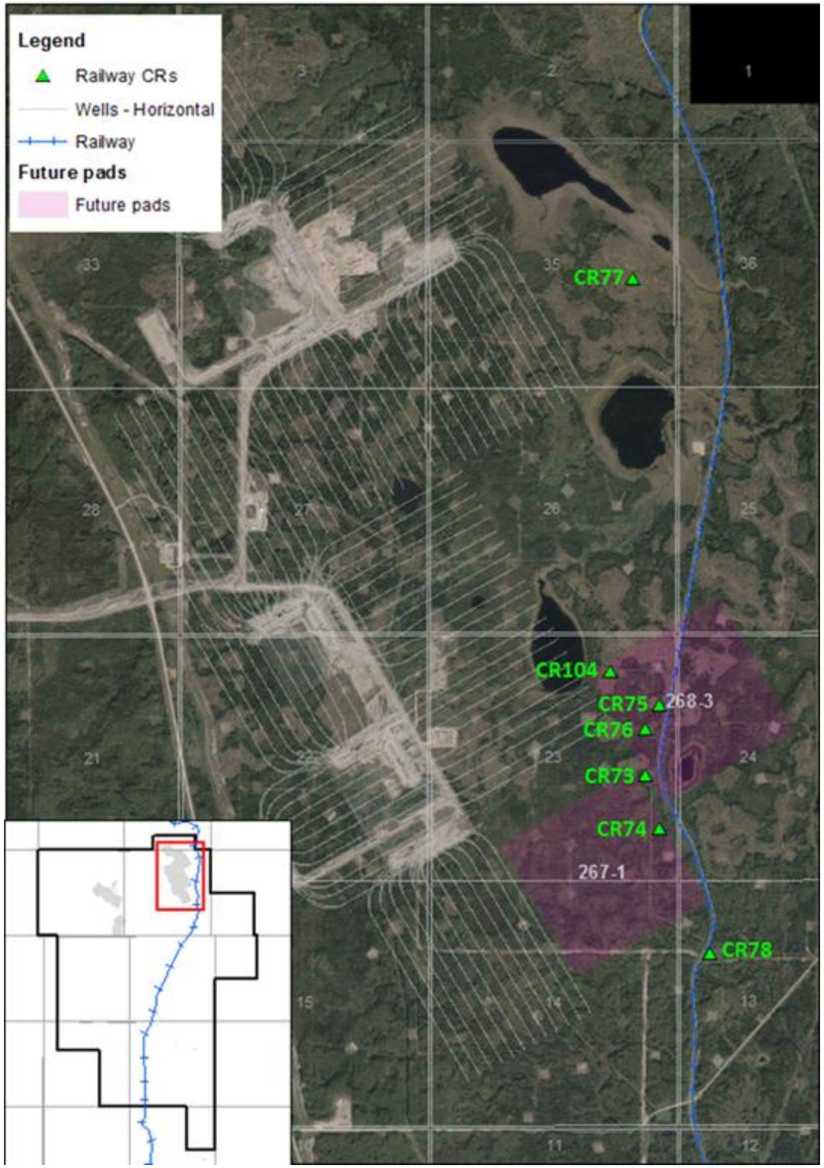
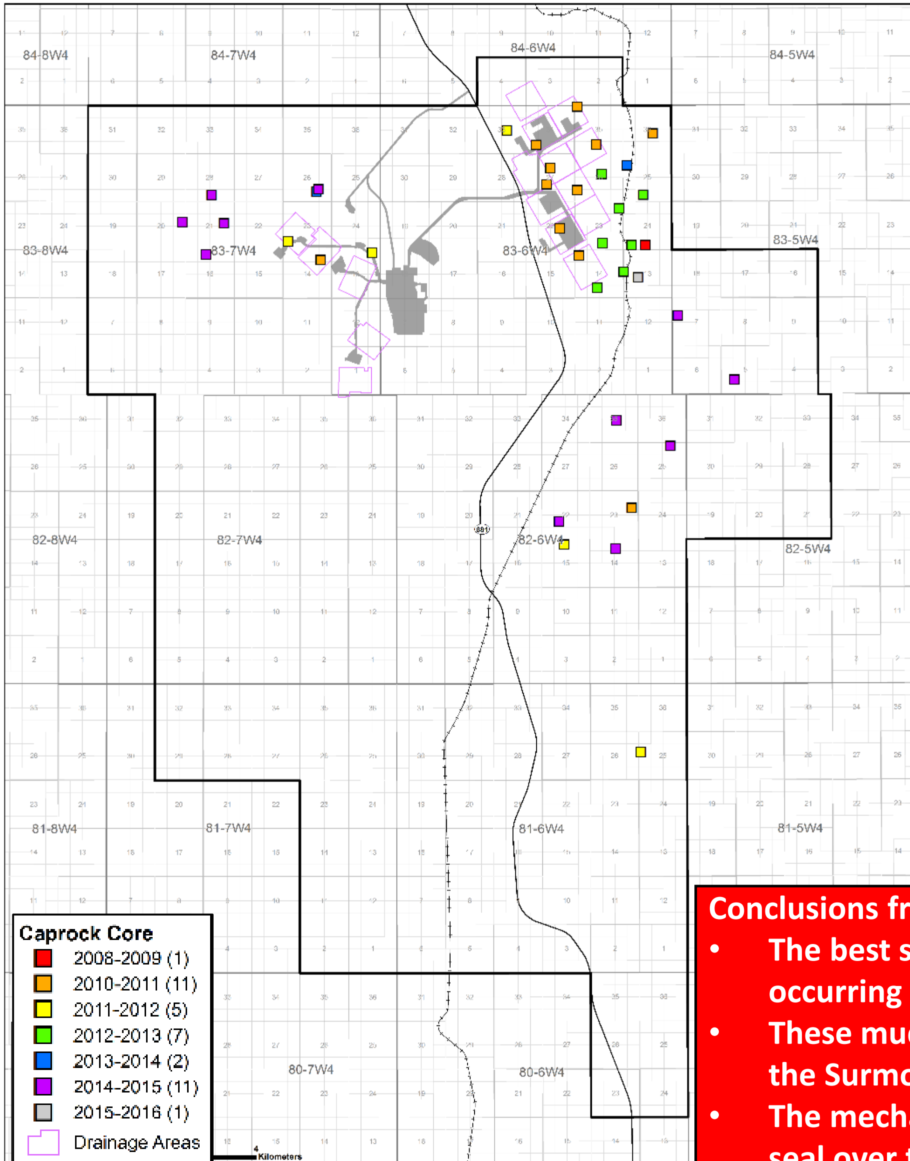


Figure 1: InSAR Corner Reflector points along the railway–Township 083, Range 06, W4M

Caprock Integrity



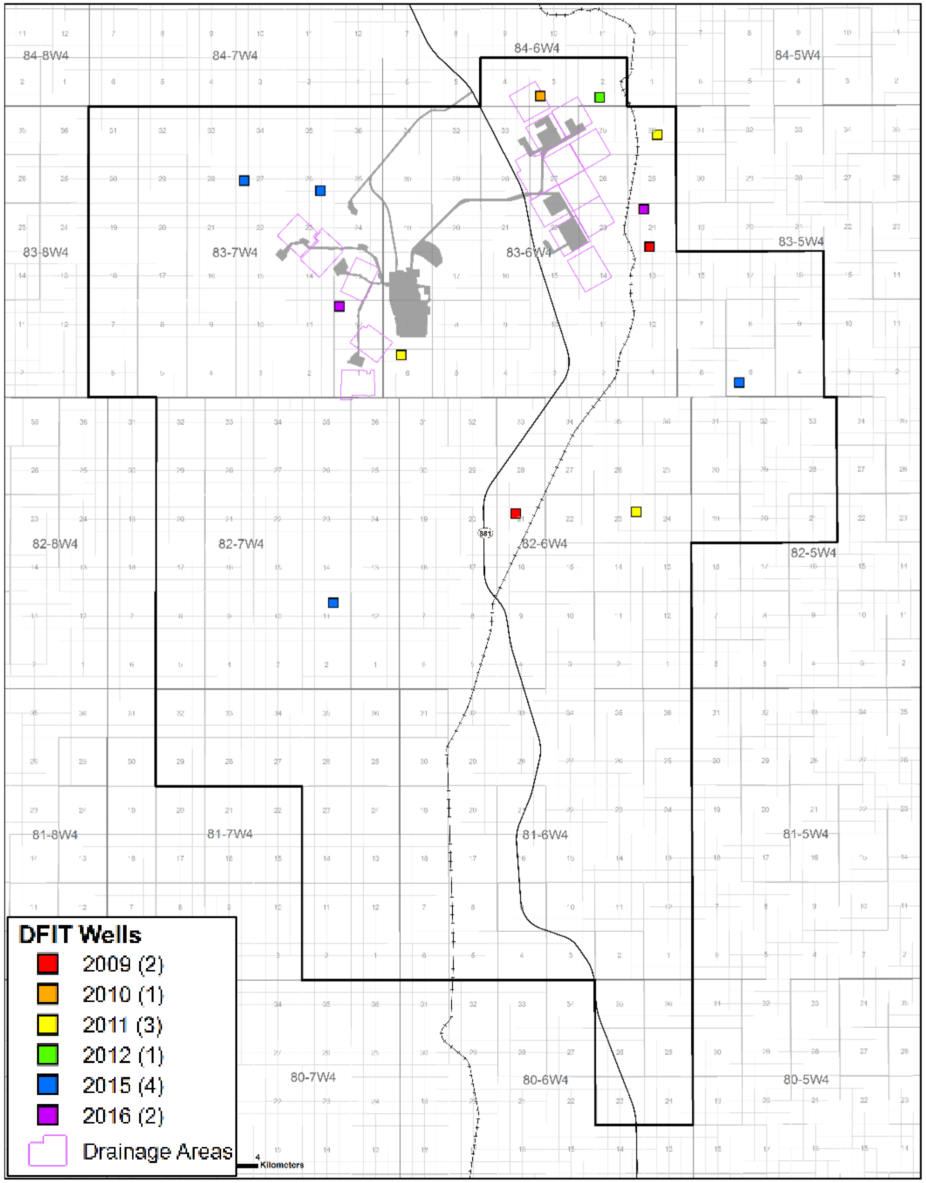
- 12 cap rock cores in 2015 and 2016, three of which were used for rock mechanics testing.
- 1 caprock core was used for rock mechanics testing in 2014.
- Cap rock interval investigation included:
  - Core description and analyses
  - Log interpretation and correlation
  - Seismic interpretation and correlation
- Analytical methods included:
  - Rock mechanics testing
  - Visual core examination
  - Reflected light microscopy
  - Laser particle size analysis
  - Biostratigraphic analyses
  - X-ray diffraction for clay species
  - QEMSCAN (quantitative mineralogy)
  - Chemostratigraphy (bulk geochemistry)
  - MICP (mercury injection capillary pressure)

  analyses to determine seal capacity

Conclusions from the study:

- **The best seals within the cap rock interval are the deeper water deposits occurring on maximum flooding surfaces.**
- **These muds can be over 80% clay and are correlated throughout and beyond the Surmont leases.**
- **The mechanical properties of the caprock allow for providing a continuous seal over the steam chamber.**

Maximum Operating Pressure

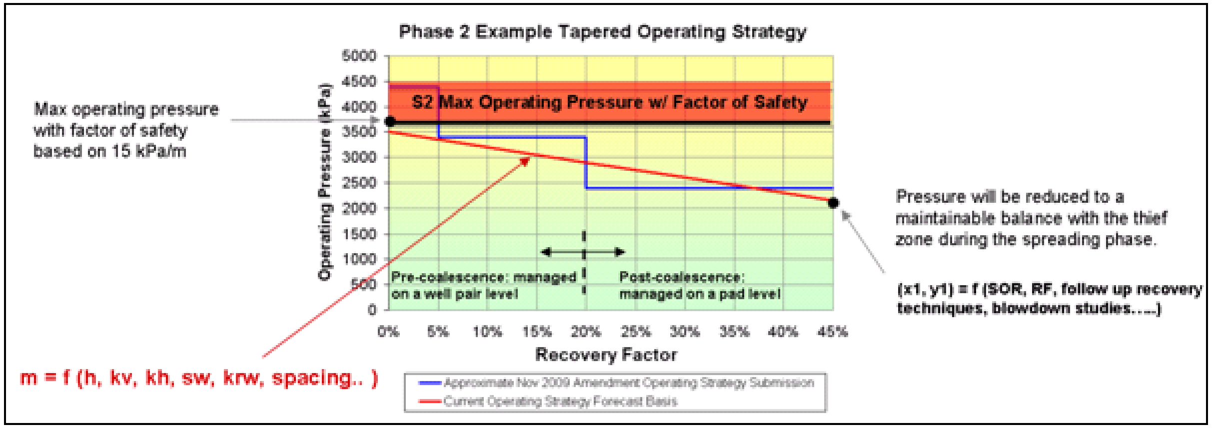


- Three mini-fracs were conducted in 2011, one in 2012, four in 2015 and two in 2016. Structurally complex areas as well as new developments were targeted.
- Wellbore image log and other open-hole logs were analyzed in detail for stress analysis and natural fractures characterization.
- The results suggest while the previously used value of 18.4 kPa/m is valid, the minimum horizontal stress is higher in several drainage areas.
- ConocoPhillips Canada is going to submit an application in the near future, recommending higher Maximum Operating Pressure in select drainage areas.

Conclusions from the study:

- **The results suggest that in many parts of Surmont the caprock minimum horizontal stress is above the used value of 18.4 kPa/m in the MOP calculation.**
- **While the recommended 15 kPa/m MOP gradient is verified and valid, higher MOP gradient will be requested for select drainage areas.**

Operating Strategy



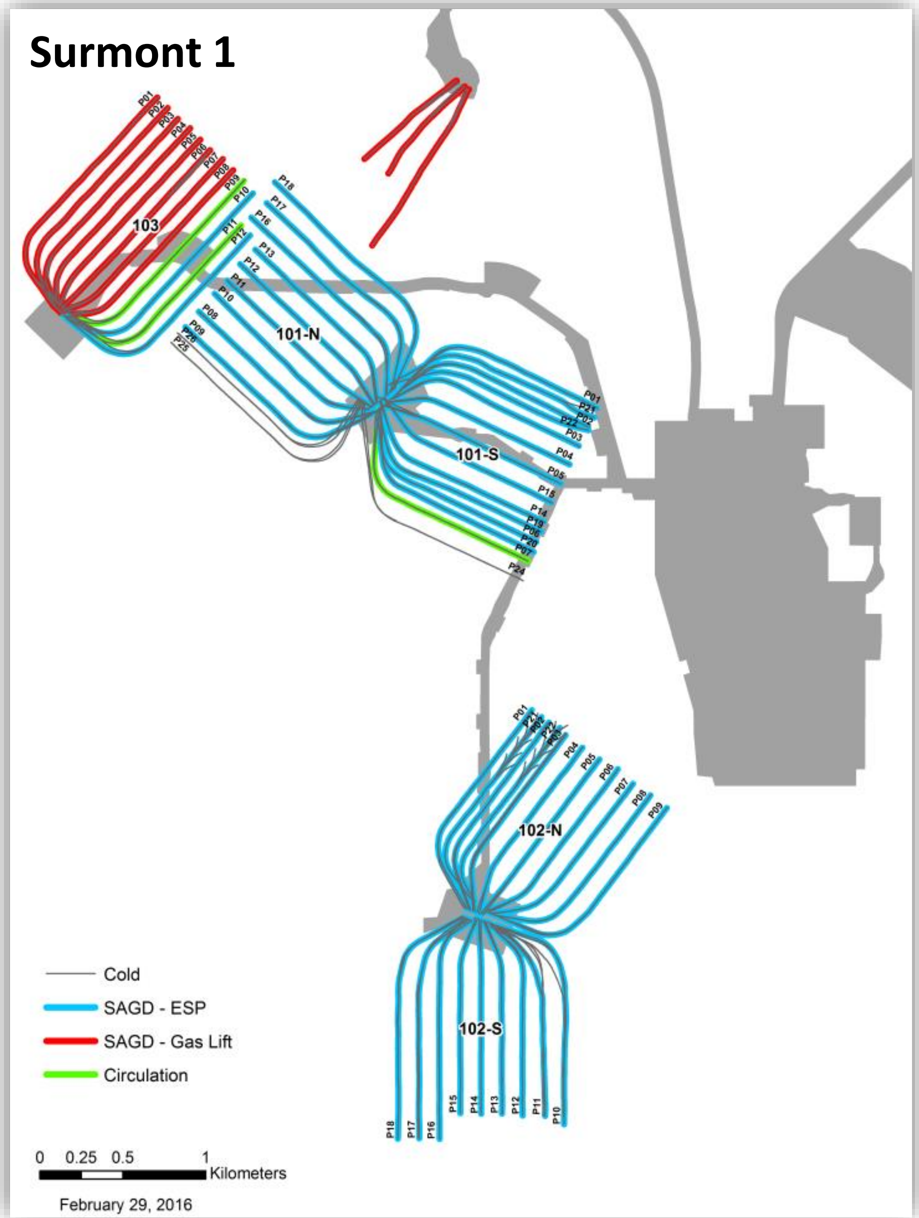
- Based on the cap rock integrity studies, ConocoPhillips Canada proposed a maximum pressure of 15kpa/m in 2011. This MOP is going to be revised for select drainage areas, where the caprock can withstand higher MOP with the same safety factor. Applications related to revised MOP will be submitted to the AER in a near future.
- Circulation optimization including dilation is an area of ongoing study.
- Pace of pressure drops will be largely driven by:
  - Specific, local reservoir properties
  - Thief zone interactions
  - Economics
  - ESP installations
  - Plant capacity
  - Global steam optimization

- **ConocoPhillips Canada continues to propose a flexible tapered strategy envelope bound by the cap rock integrity study and the associated MOP on one side and economic achievable pressures on the low side.**

Drilling and Completions

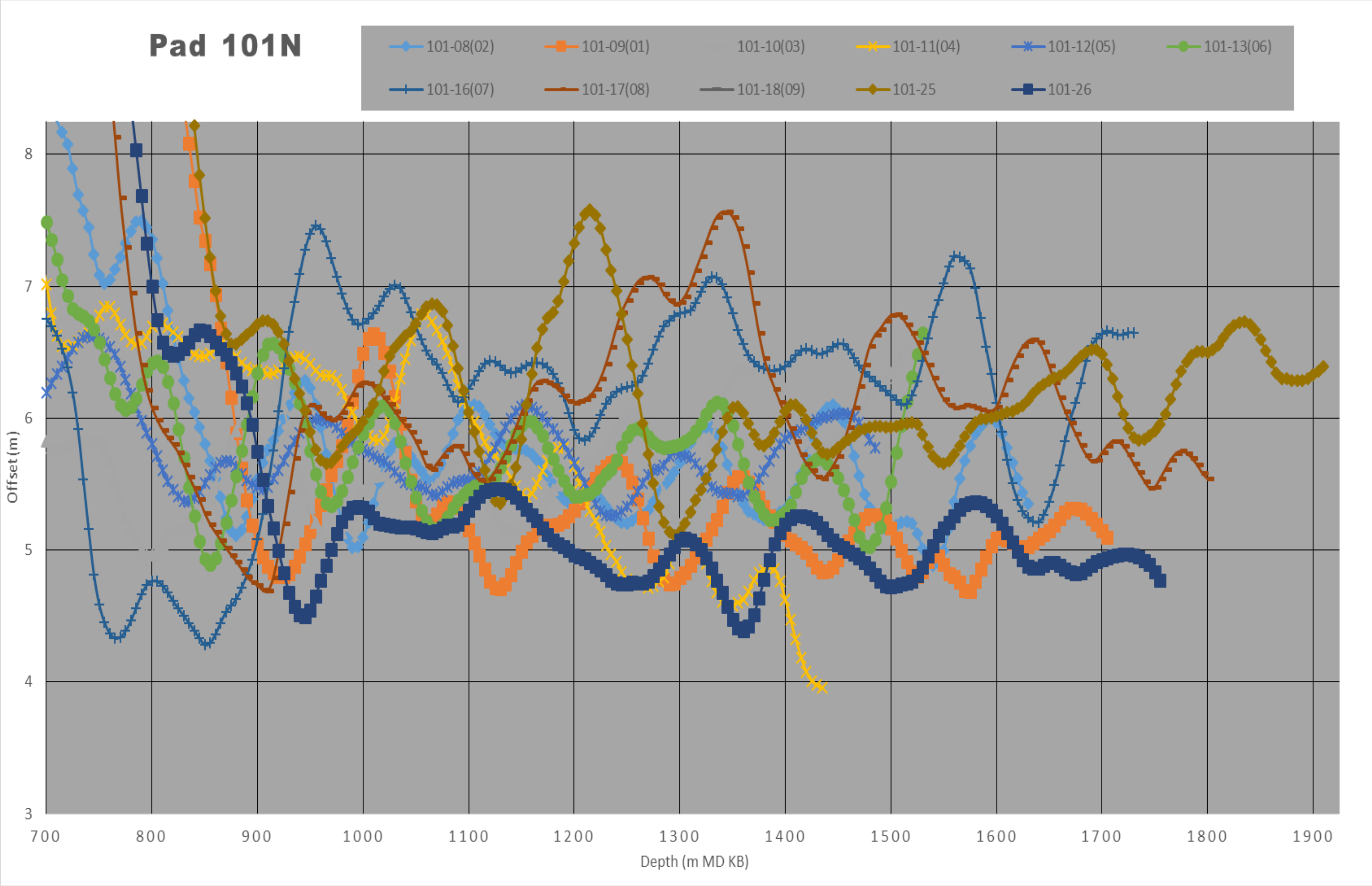
Subsection 3.1.1 (3)

One Surmont - Well Summary



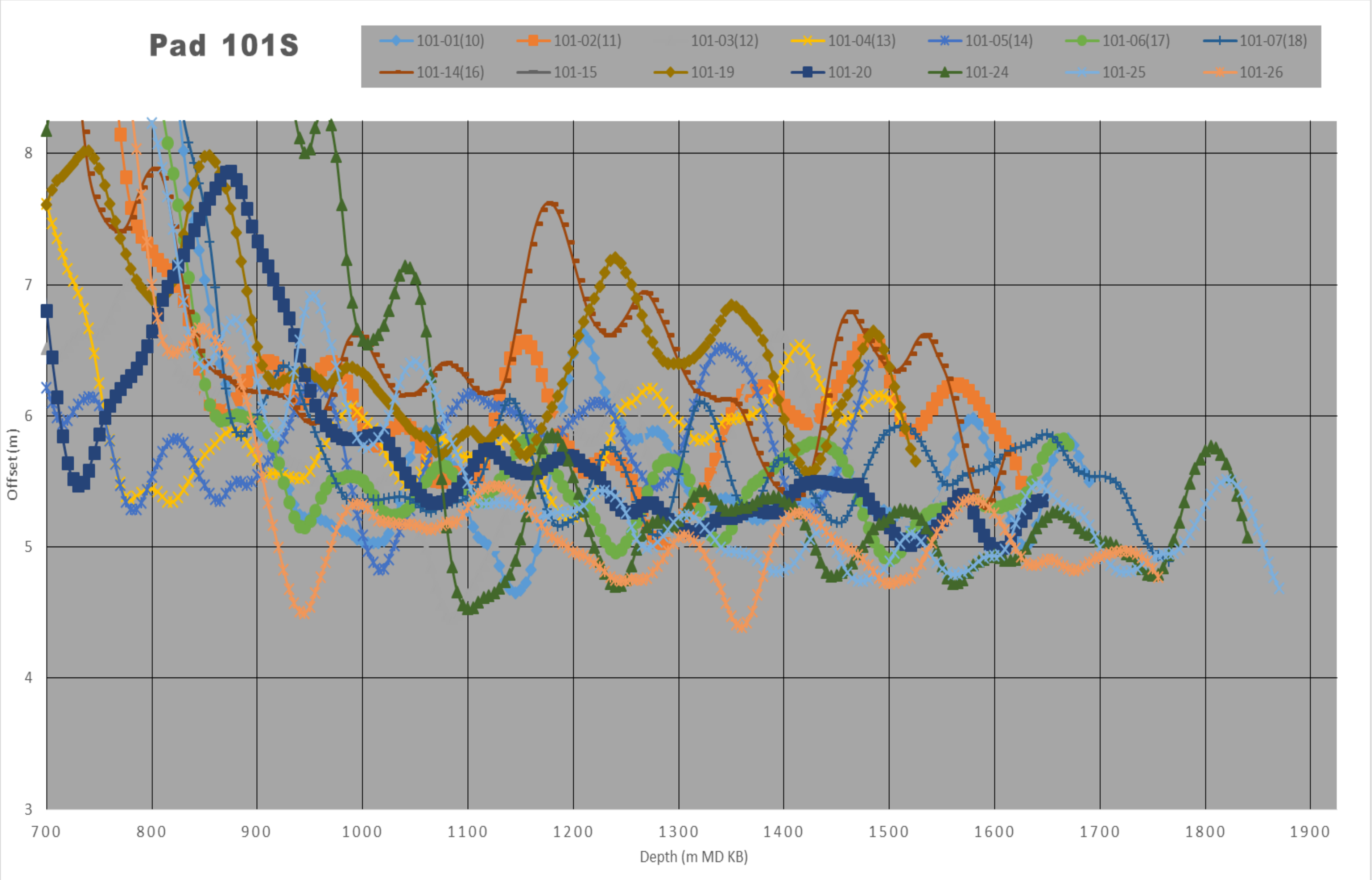
ConocoPhillips

Well Pad 101 North
Producer and Injector Vertical Offset

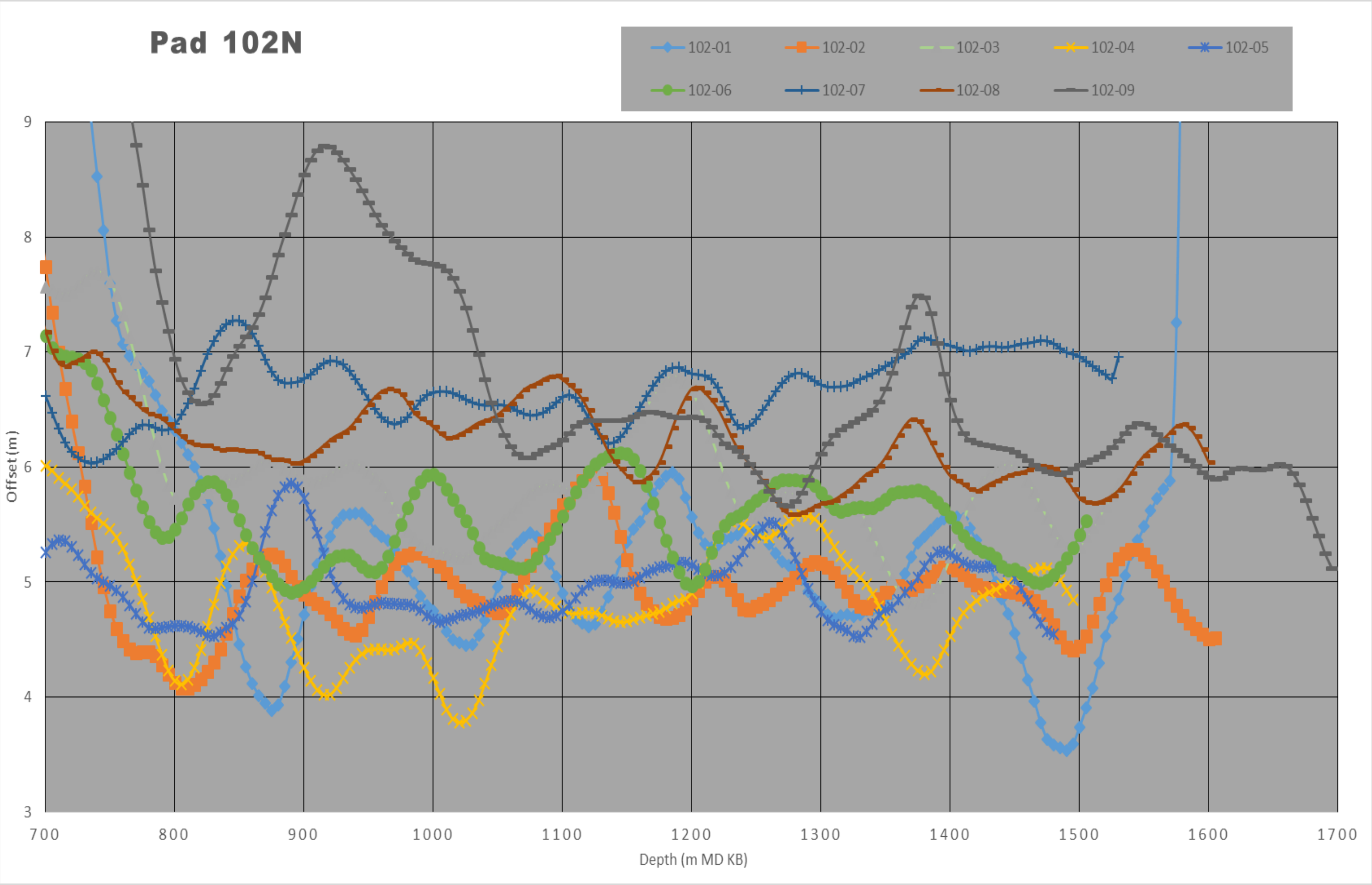


ConocoPhillips

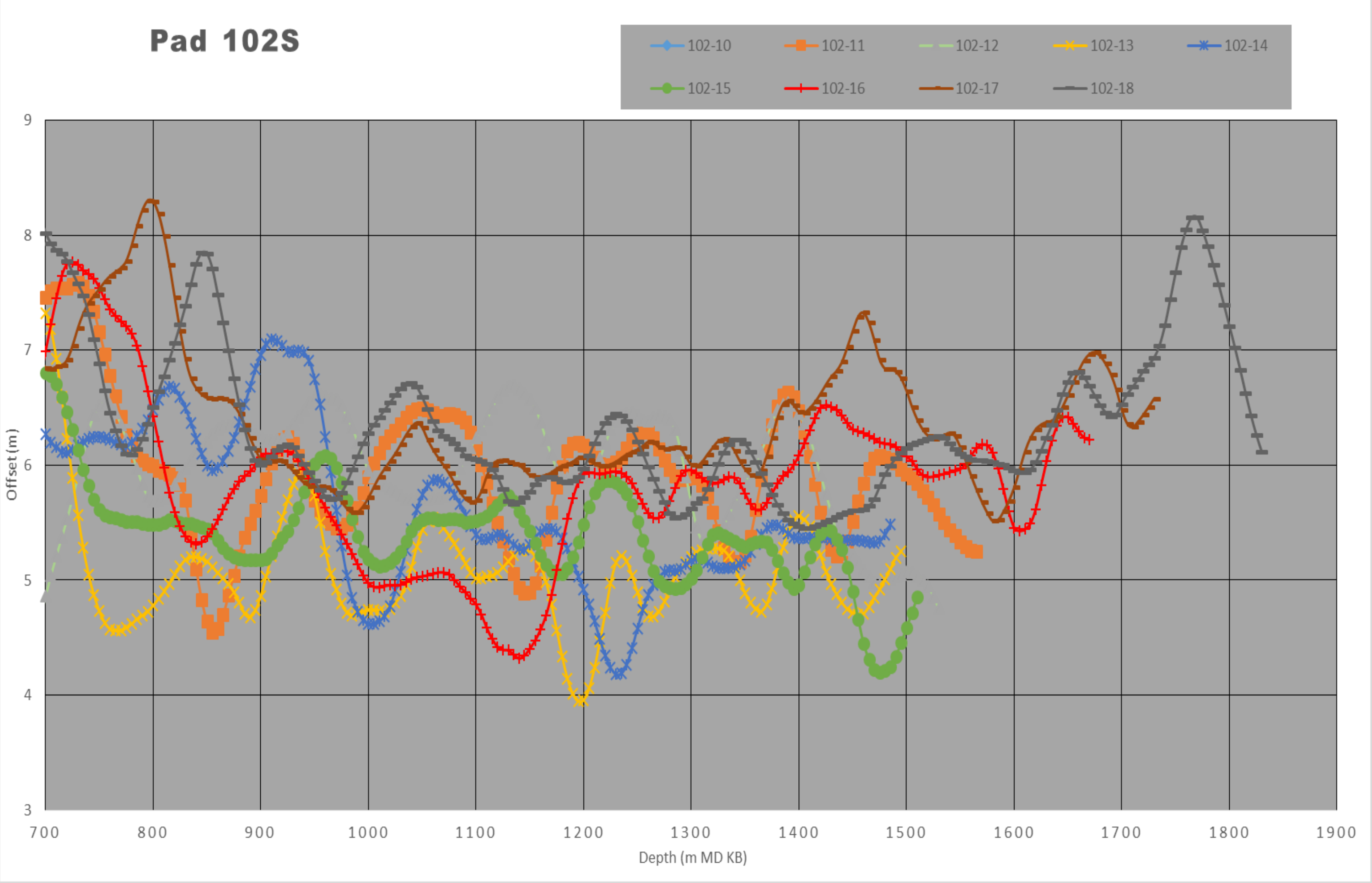
Well Pad 101 South
Producer and Injector Vertical Offset



Well Pad 102 North
Producer and Injector Vertical Offset

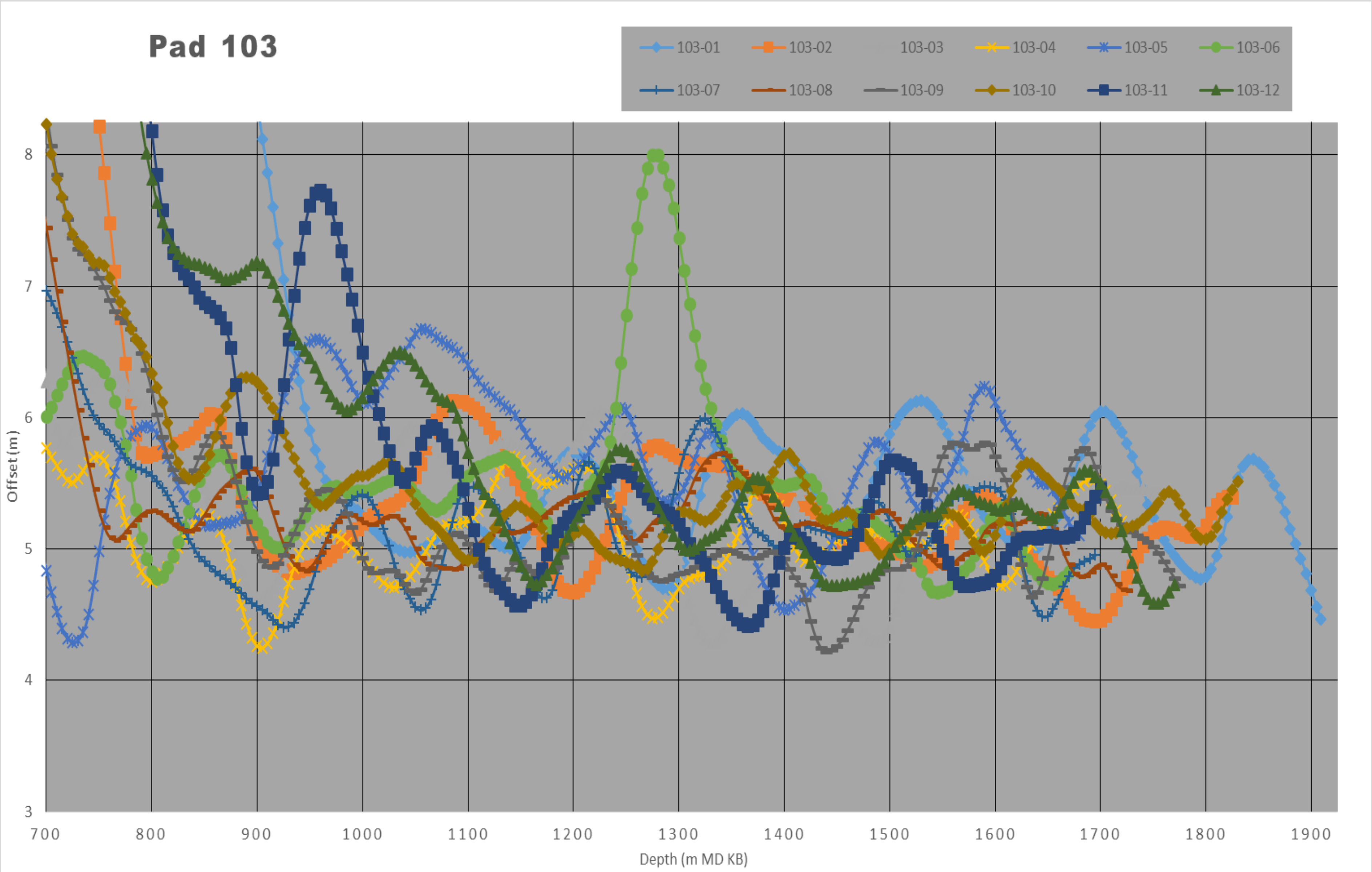


Well Pad 102 South
Producer and Injector Vertical Offset

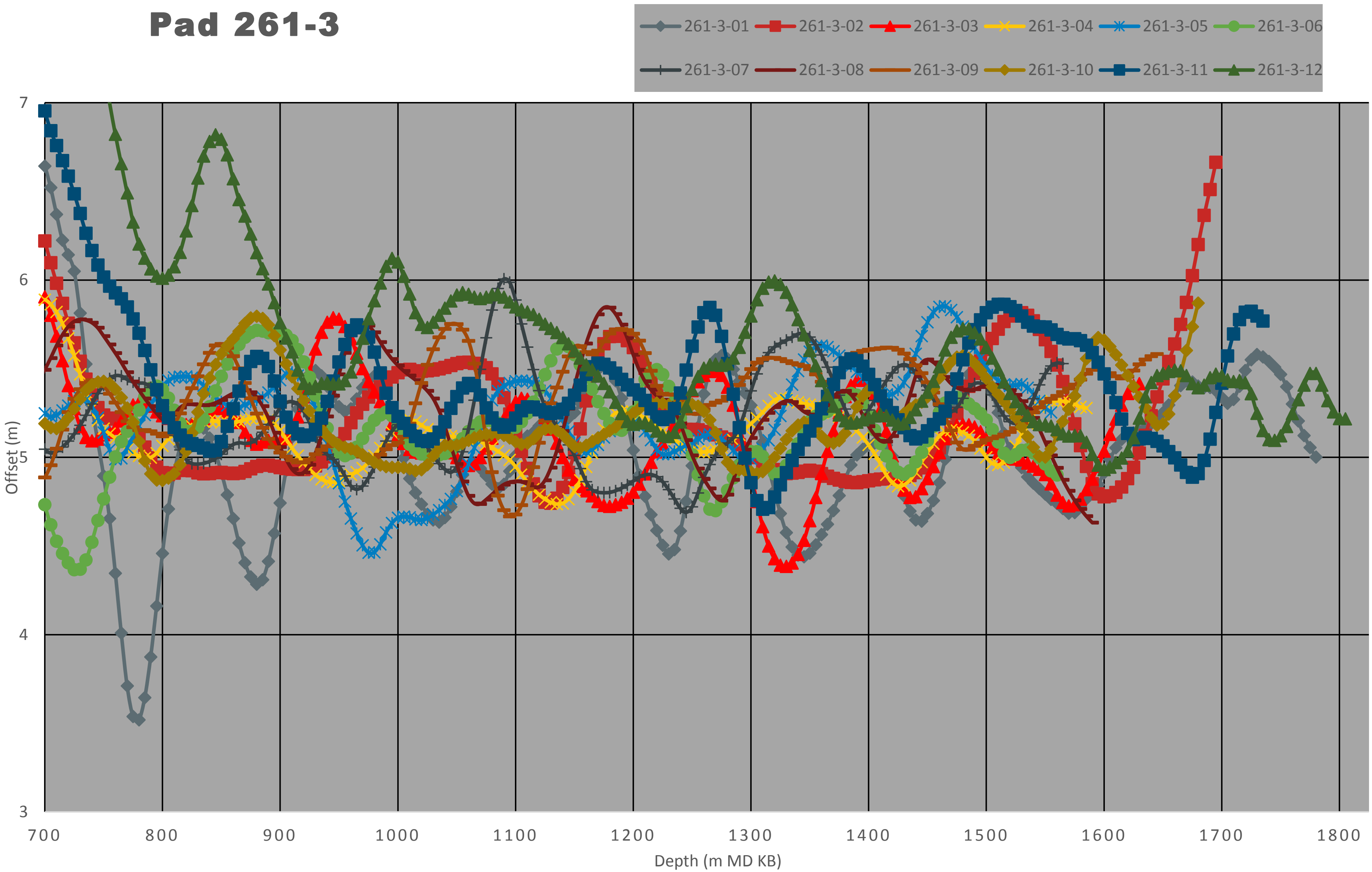


ConocoPhillips

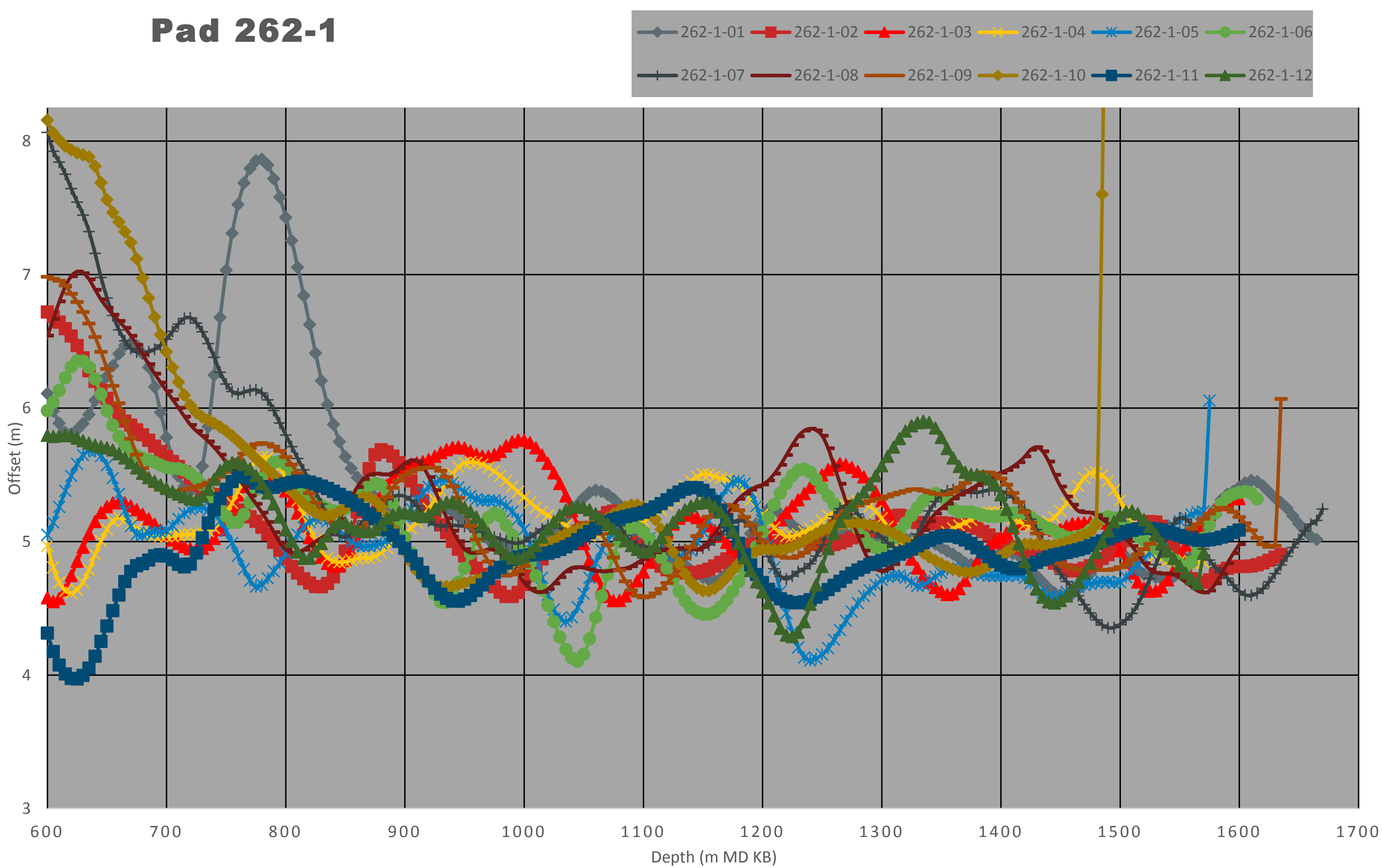
Well Pad 103
Producer and Injector Vertical Offset



Well Pad 261-3
Producer and Injector Vertical Offset

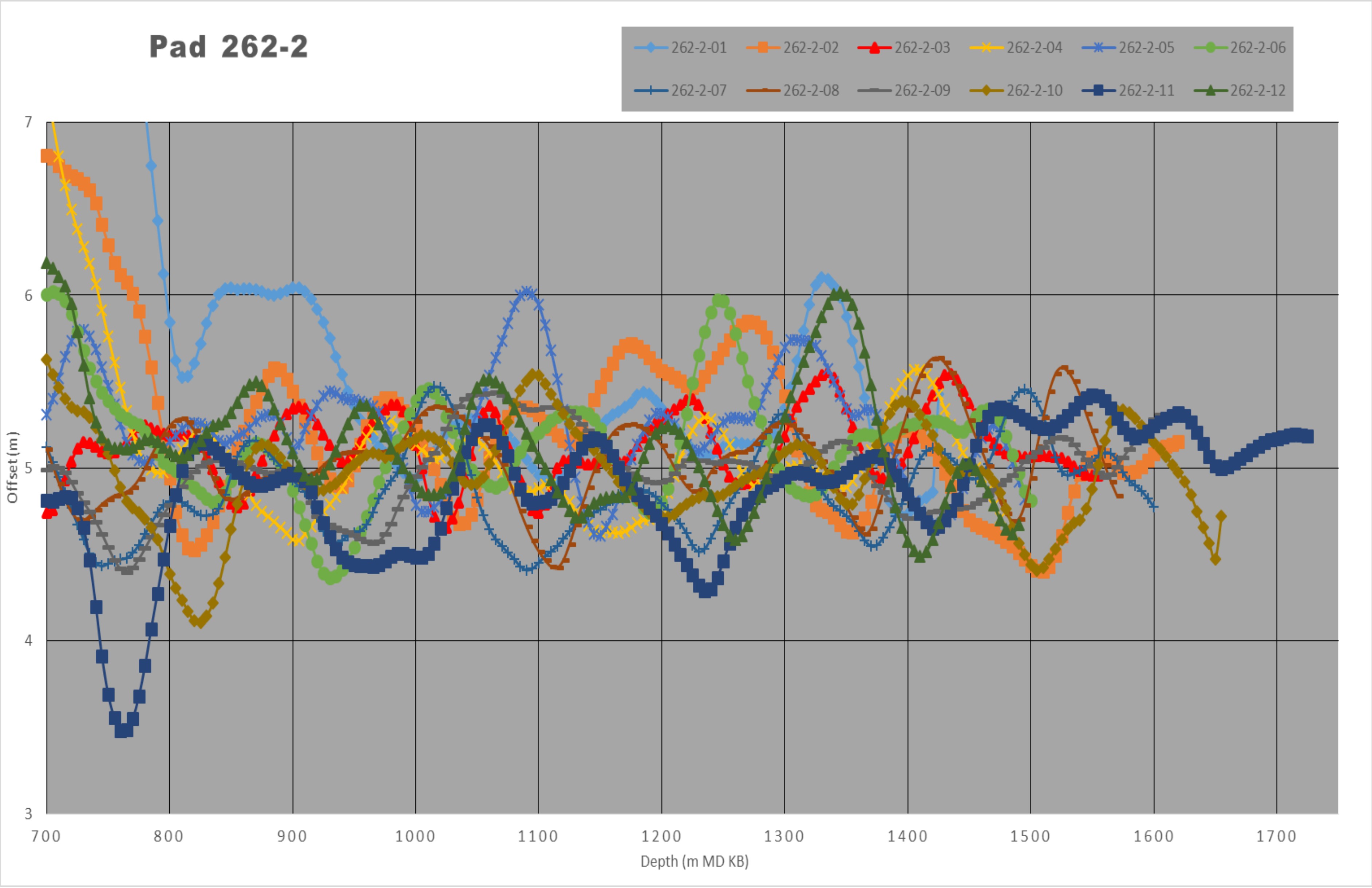


Well Pad 262-1
Producer and Injector Vertical Offset



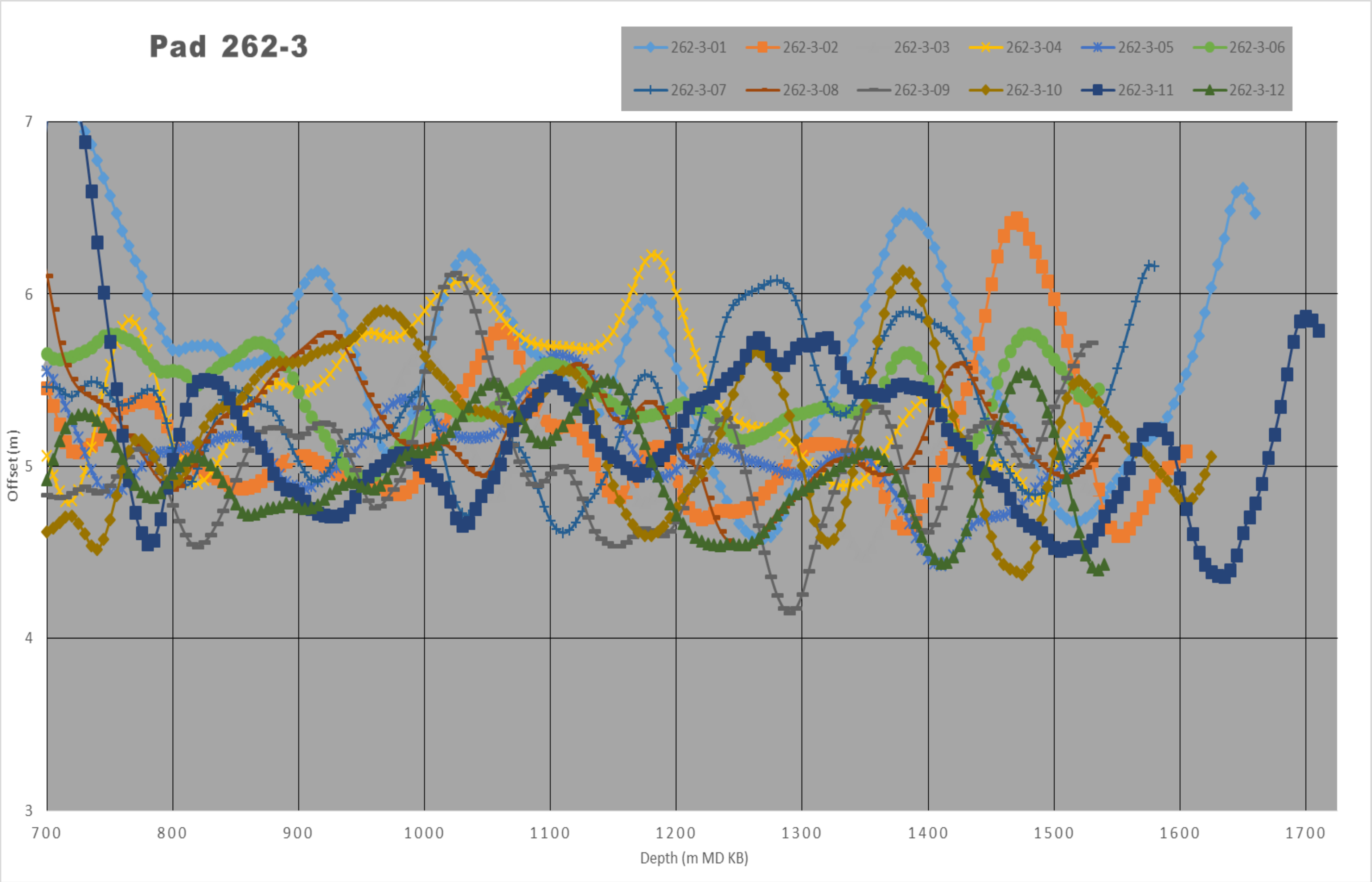
ConocoPhillips

Well Pad 262-2
Producer and Injector Vertical Offset



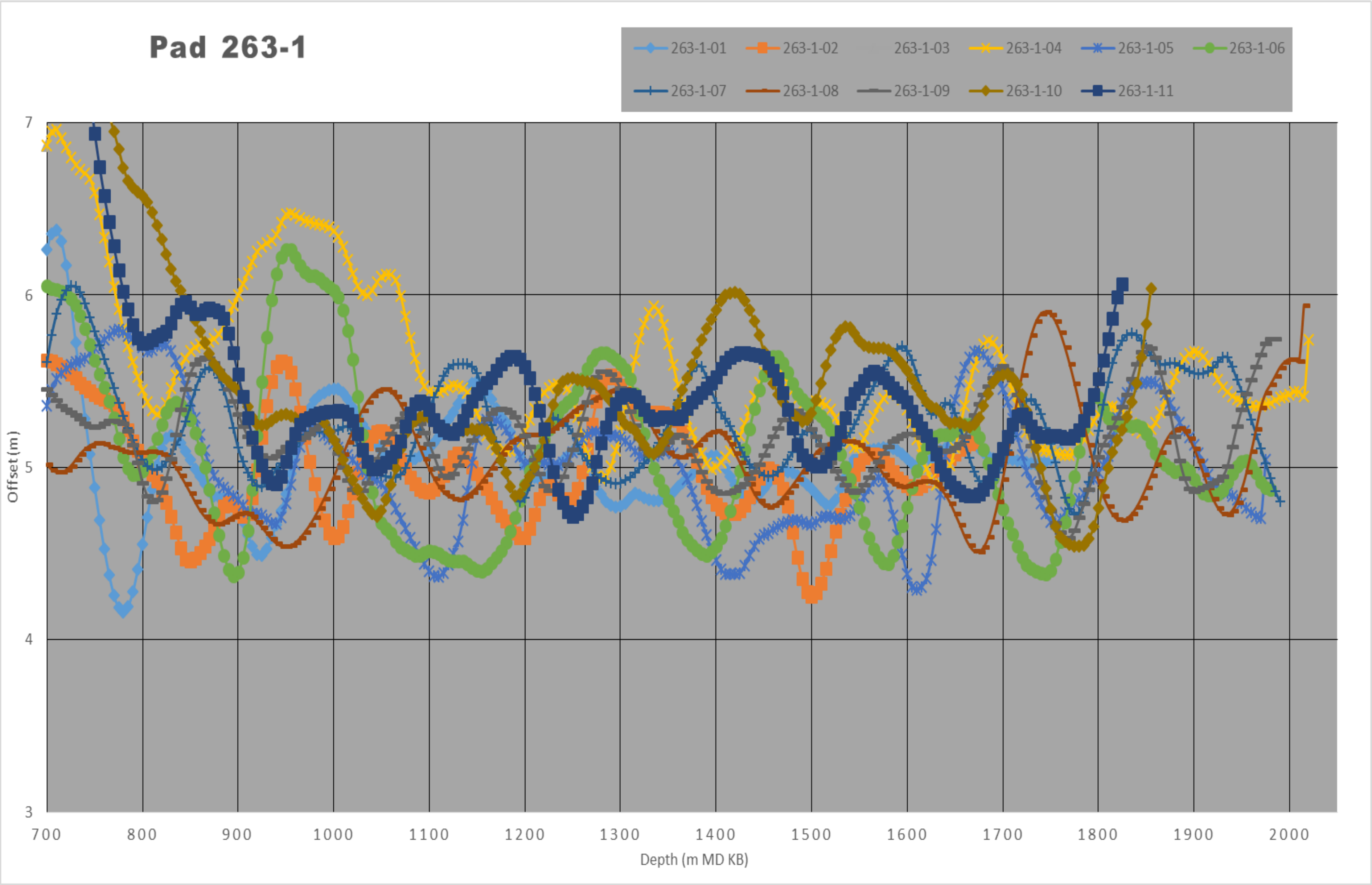
ConocoPhillips

Well Pad 262-3
Producer and Injector Vertical Offset



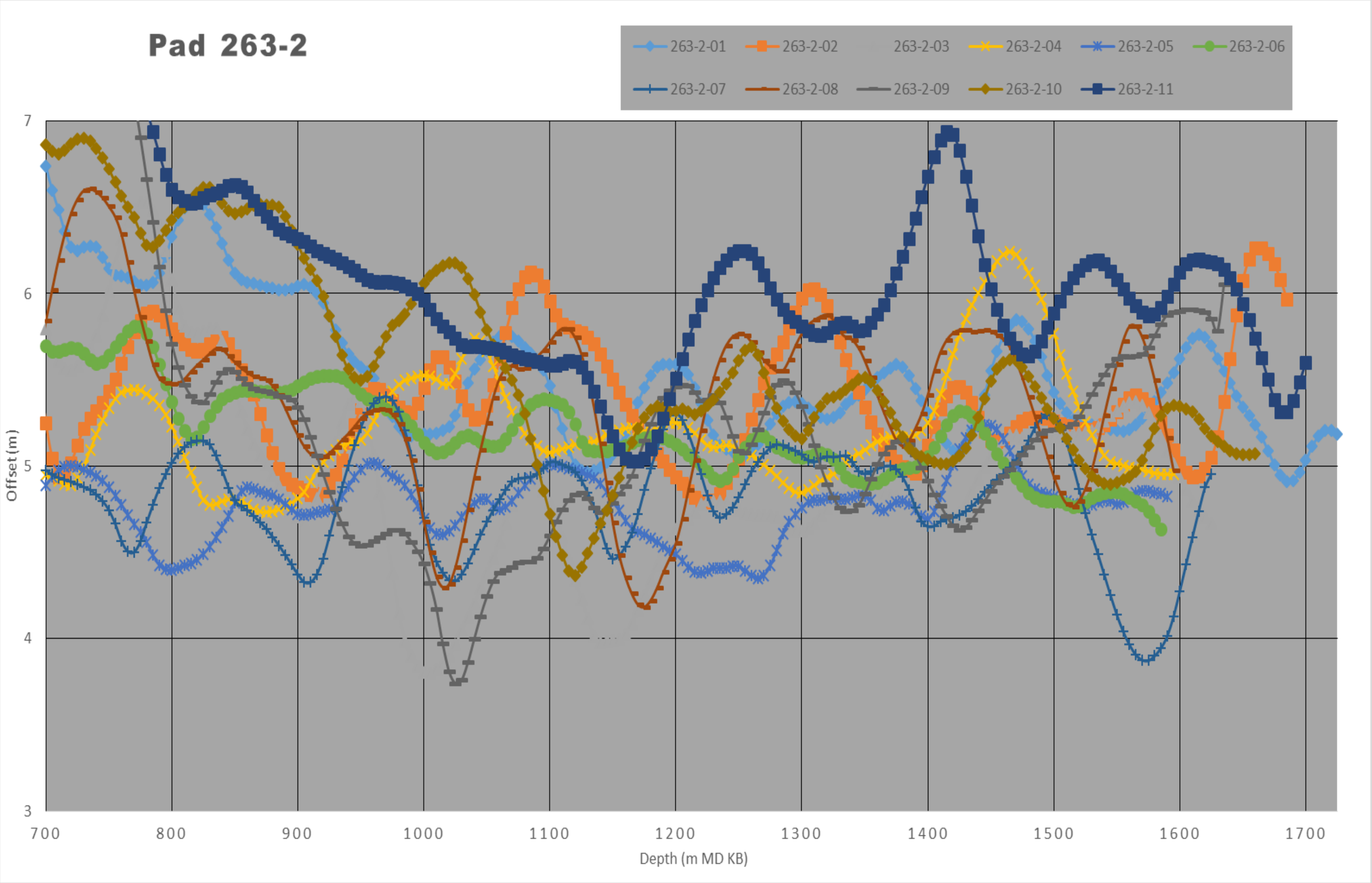
ConocoPhillips

Well Pad 263-1
Producer and Injector Vertical Offset



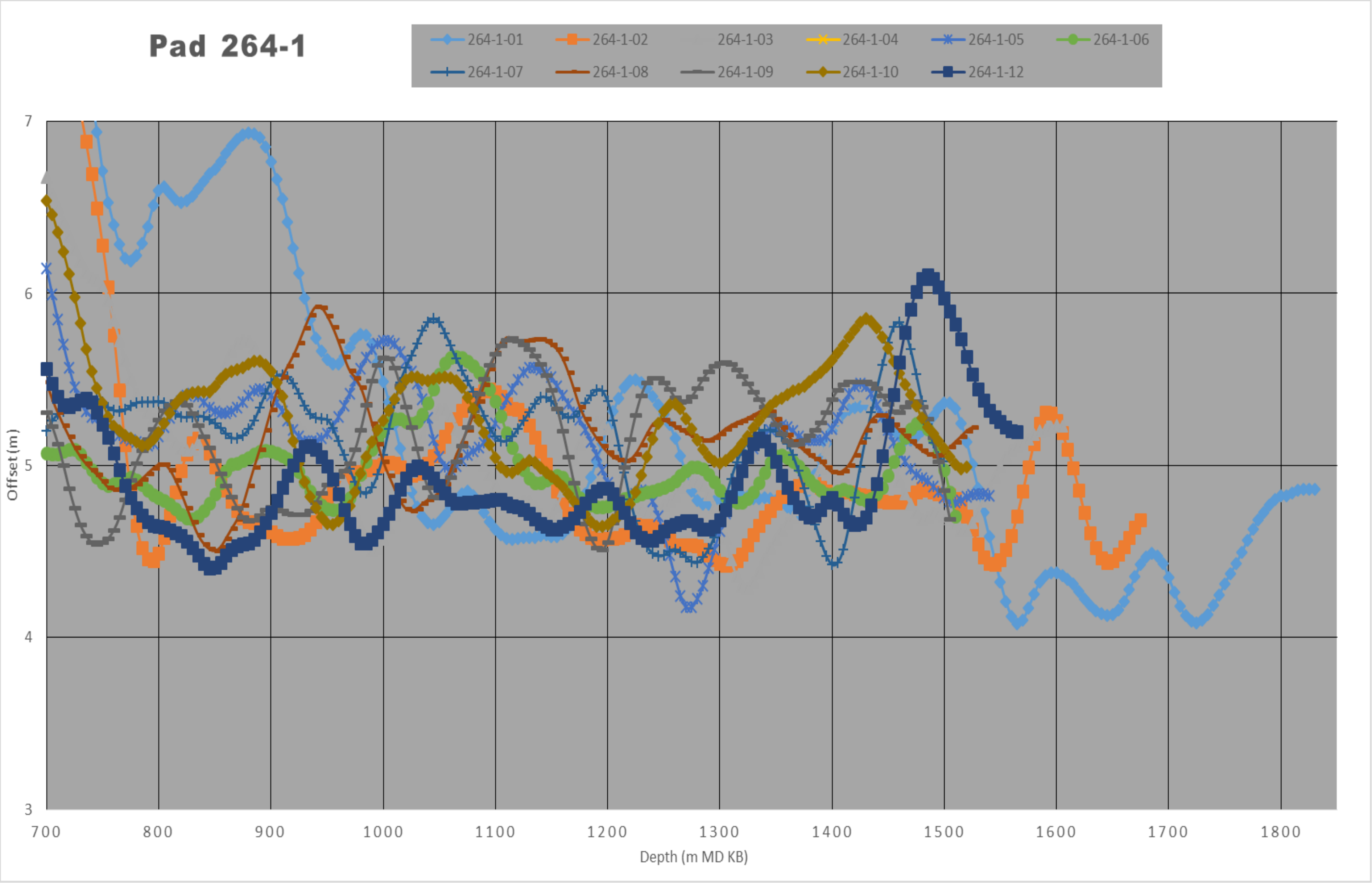
ConocoPhillips

Well Pad 263-2
Producer and Injector Vertical Offset

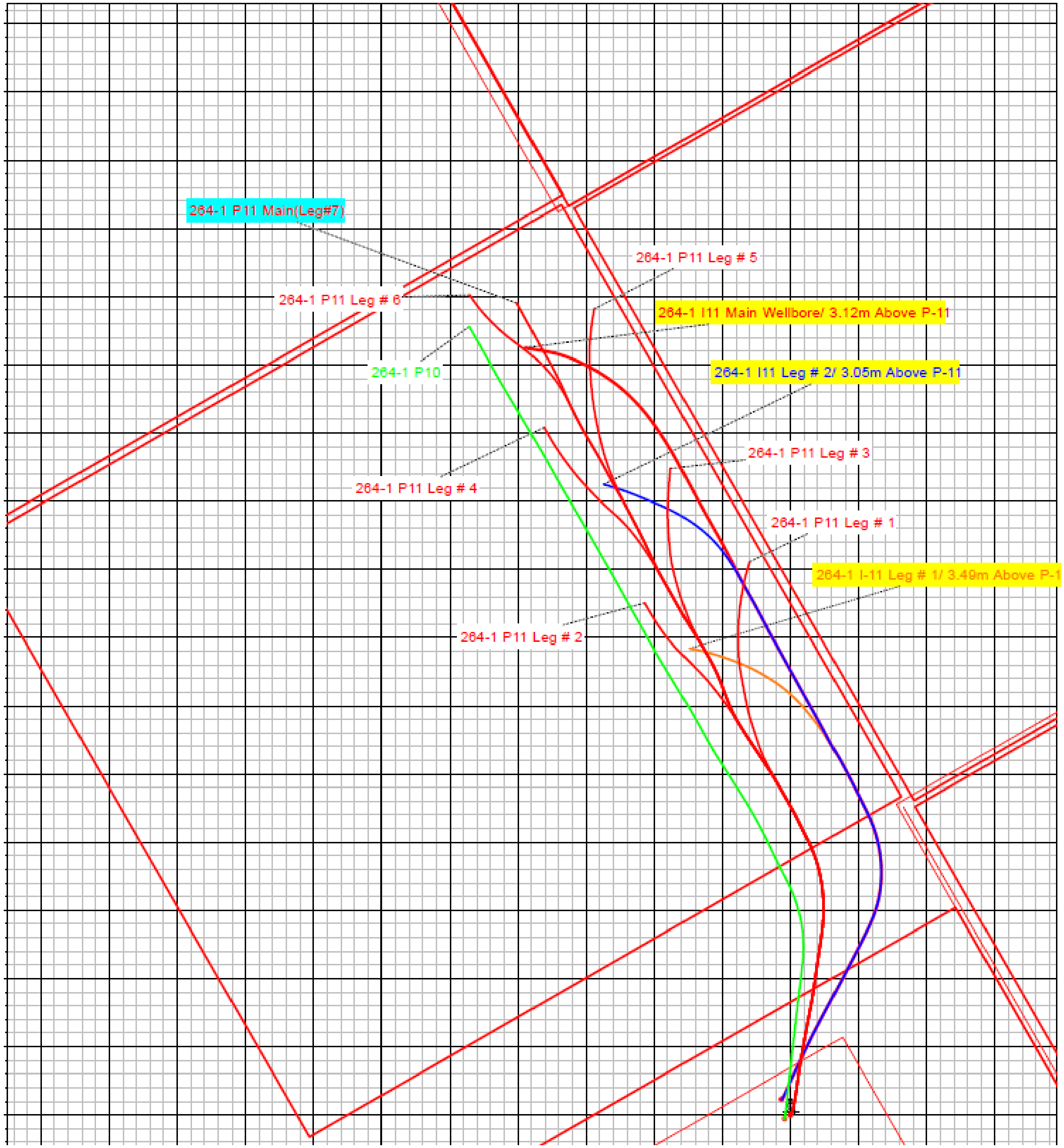


ConocoPhillips

Well Pad 264-1
Producer and Injector Vertical Offset

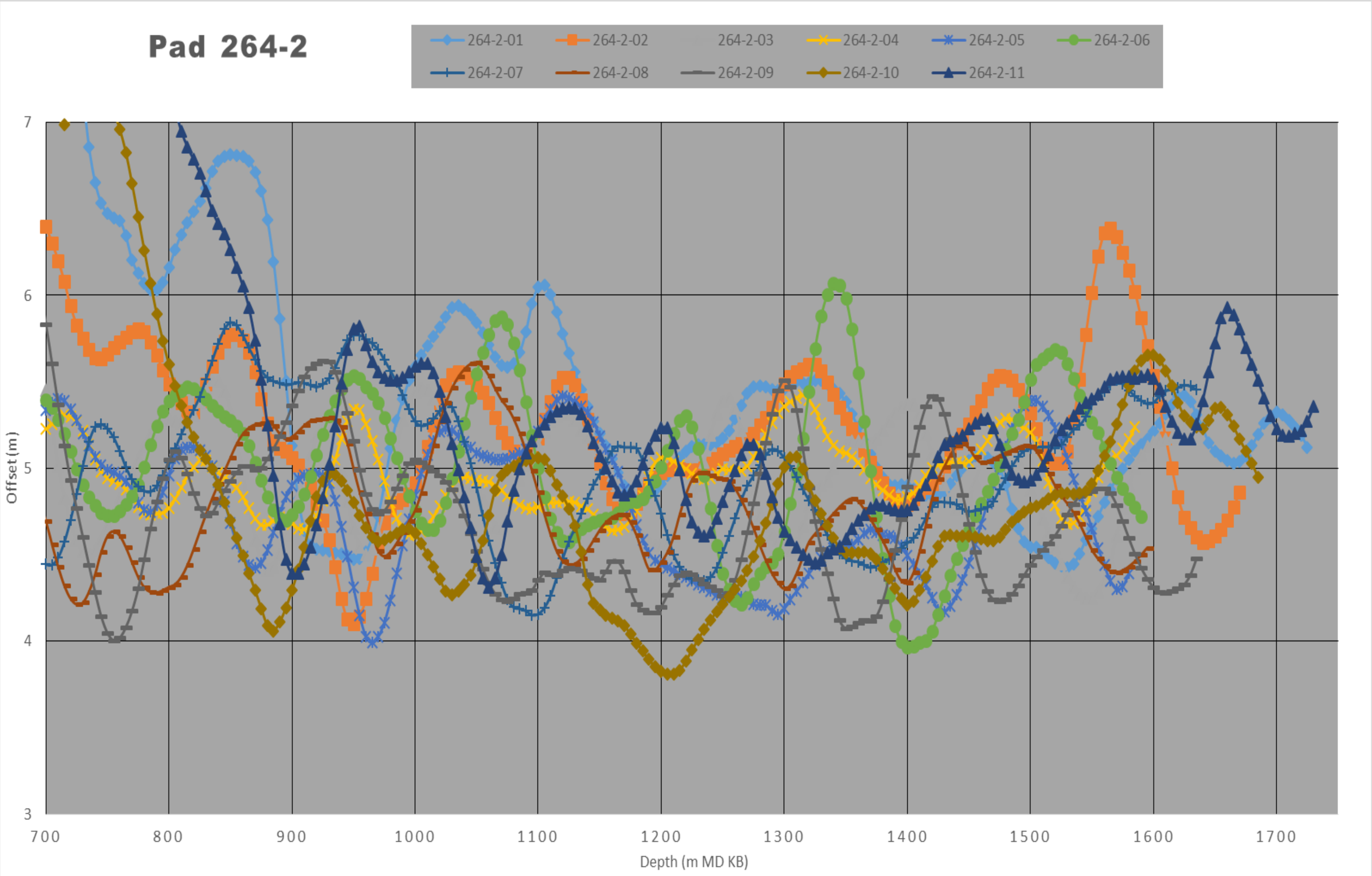


Well Pad 264-1-11 Fishbones
Producer and Injector Vertical Offset

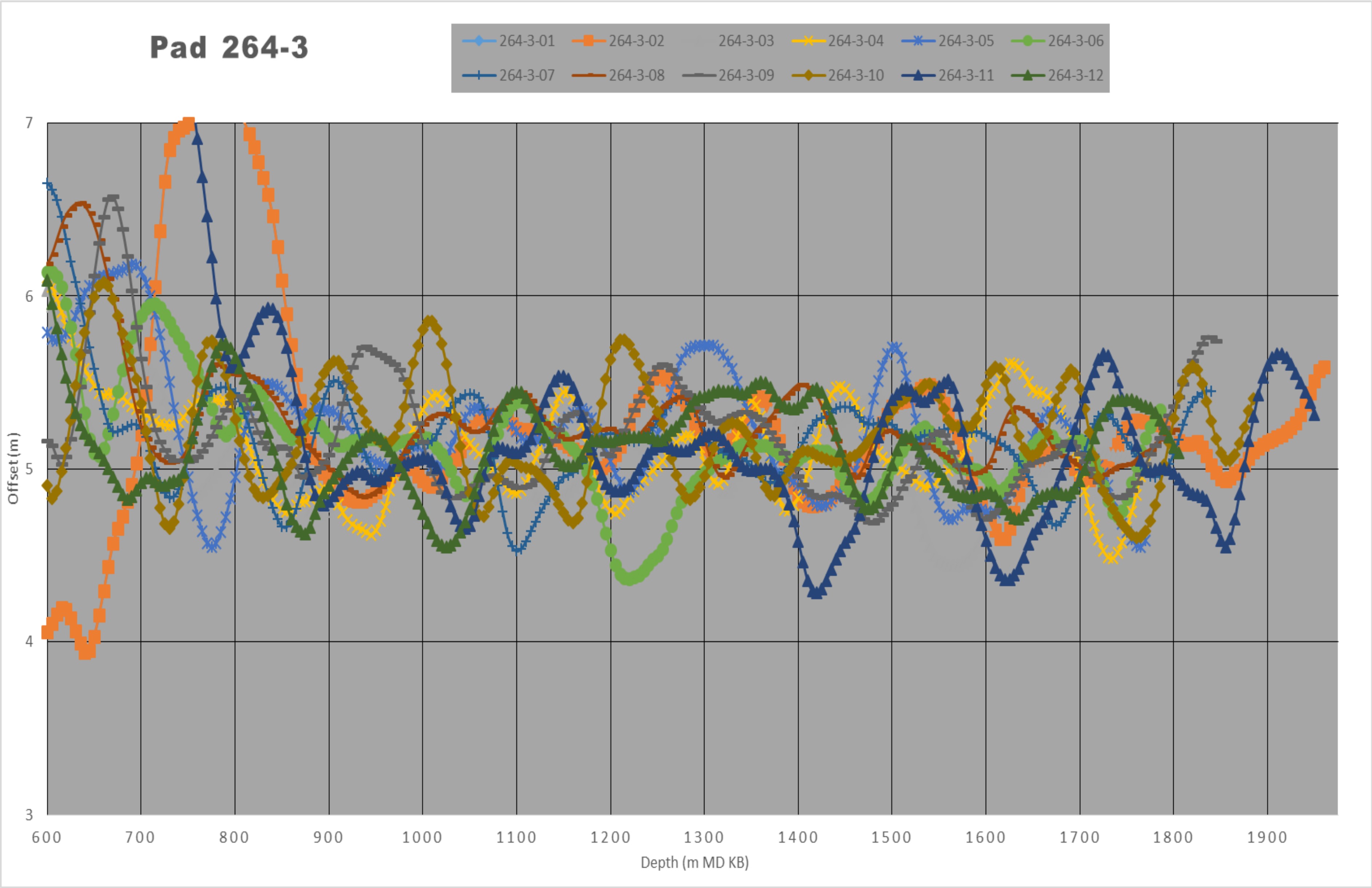


Injector has 3 legs while producer has 7 legs. 3 vertical offsets.

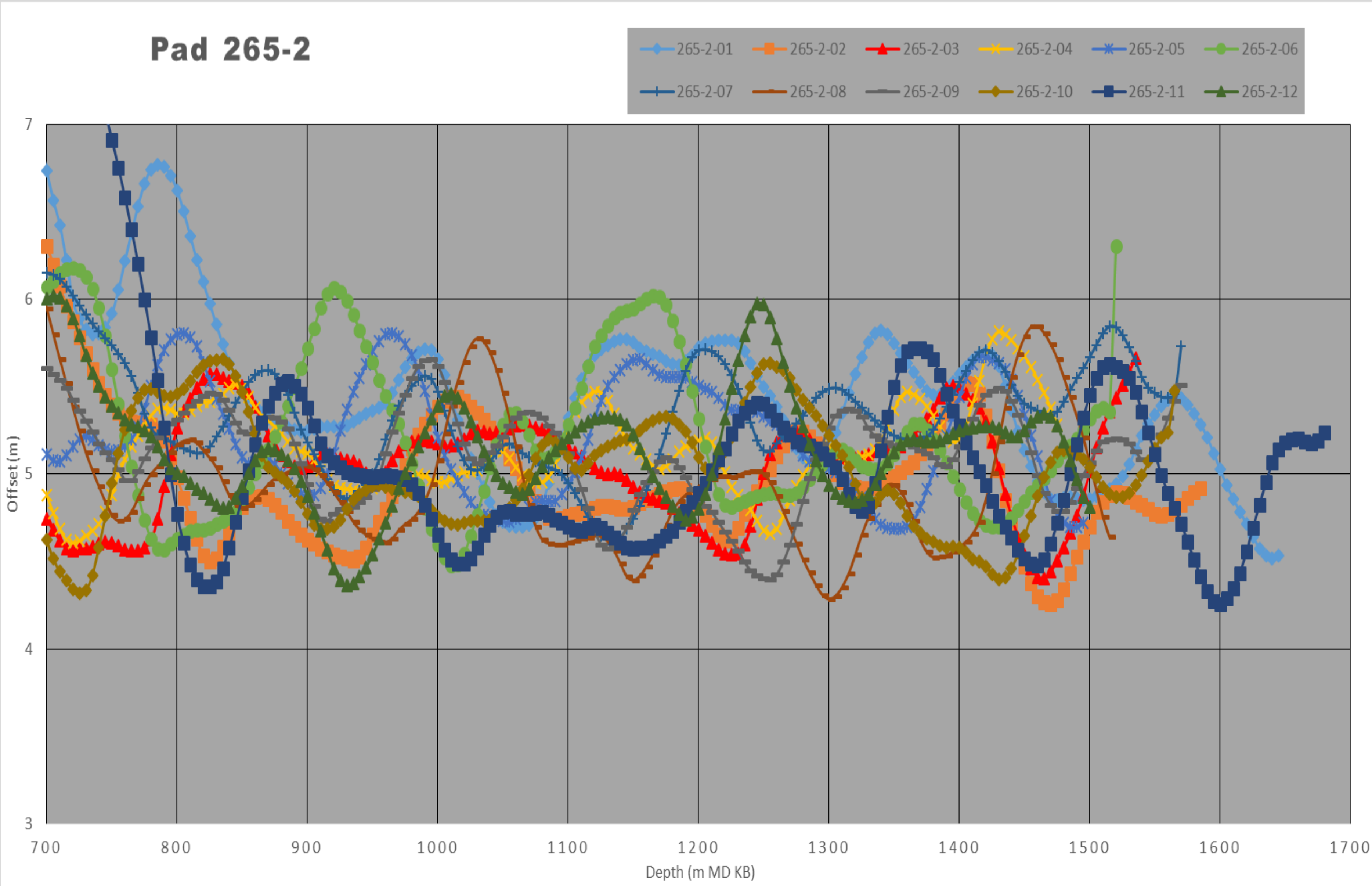
Well Pad 264-2
Producer and Injector Vertical Offset



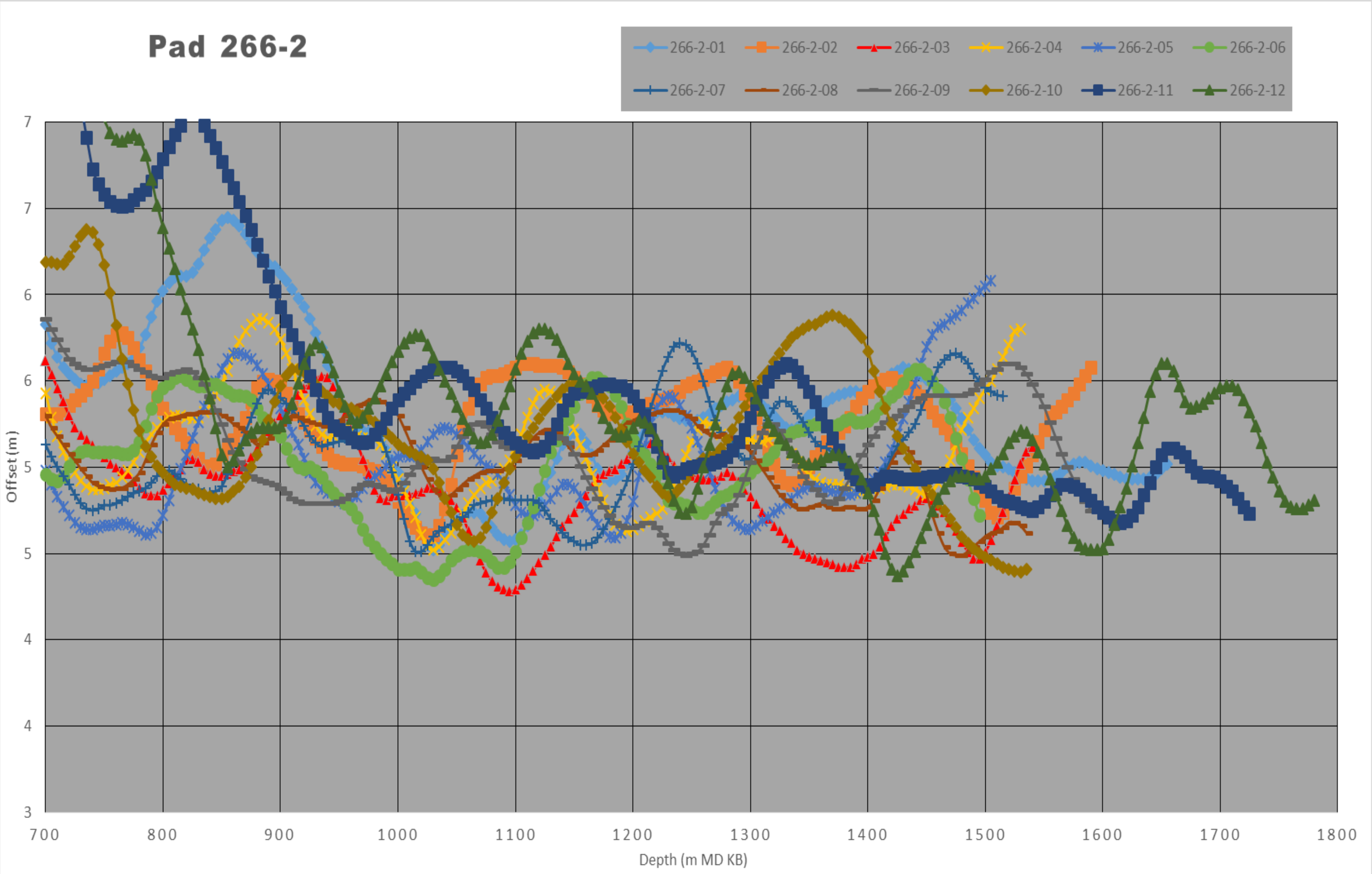
Well Pad 264-3
Producer and Injector Vertical Offset



Well Pad 265-2
Producer and Injector Vertical Offset

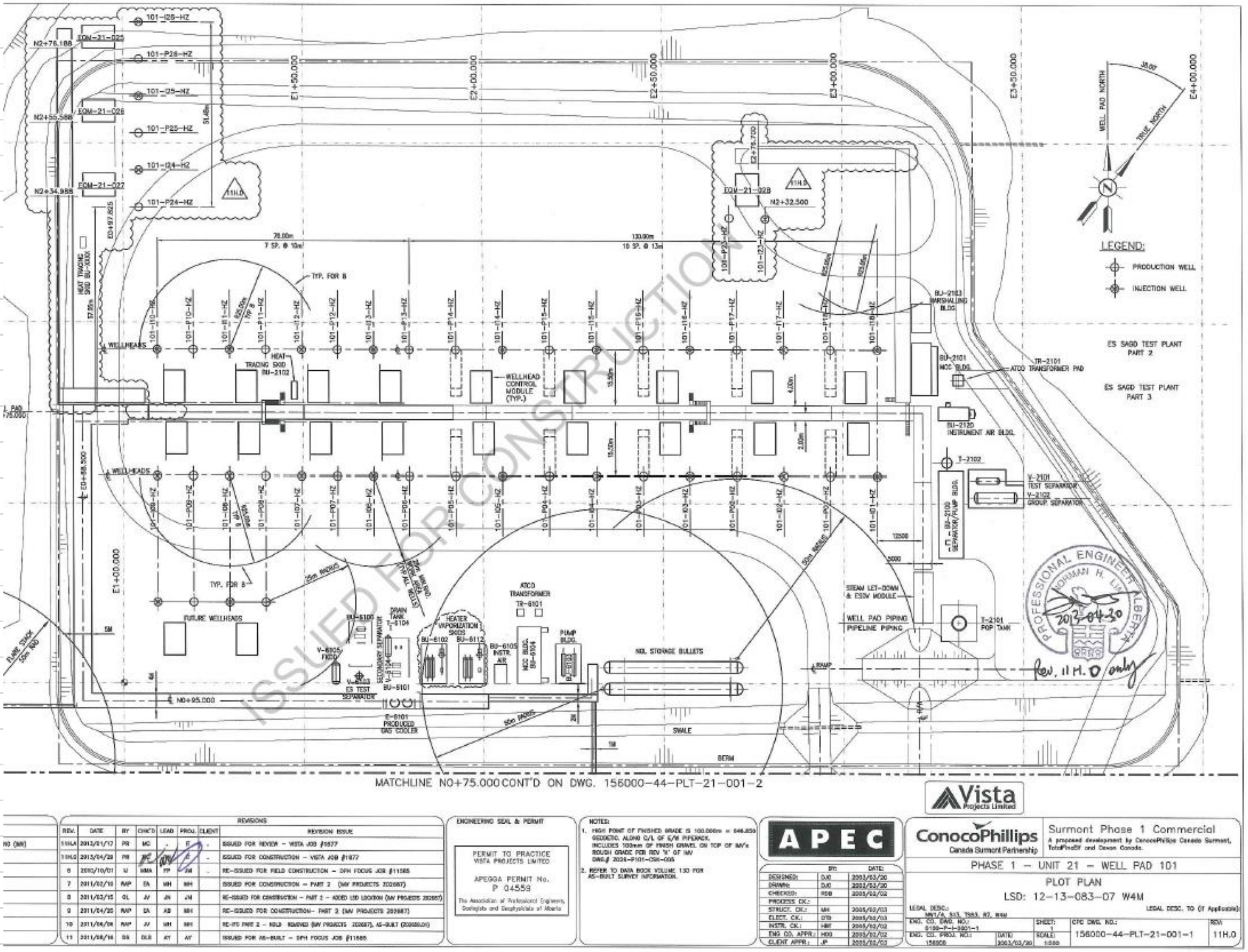


Well Pad 266-2
Producer and Injector Vertical Offset



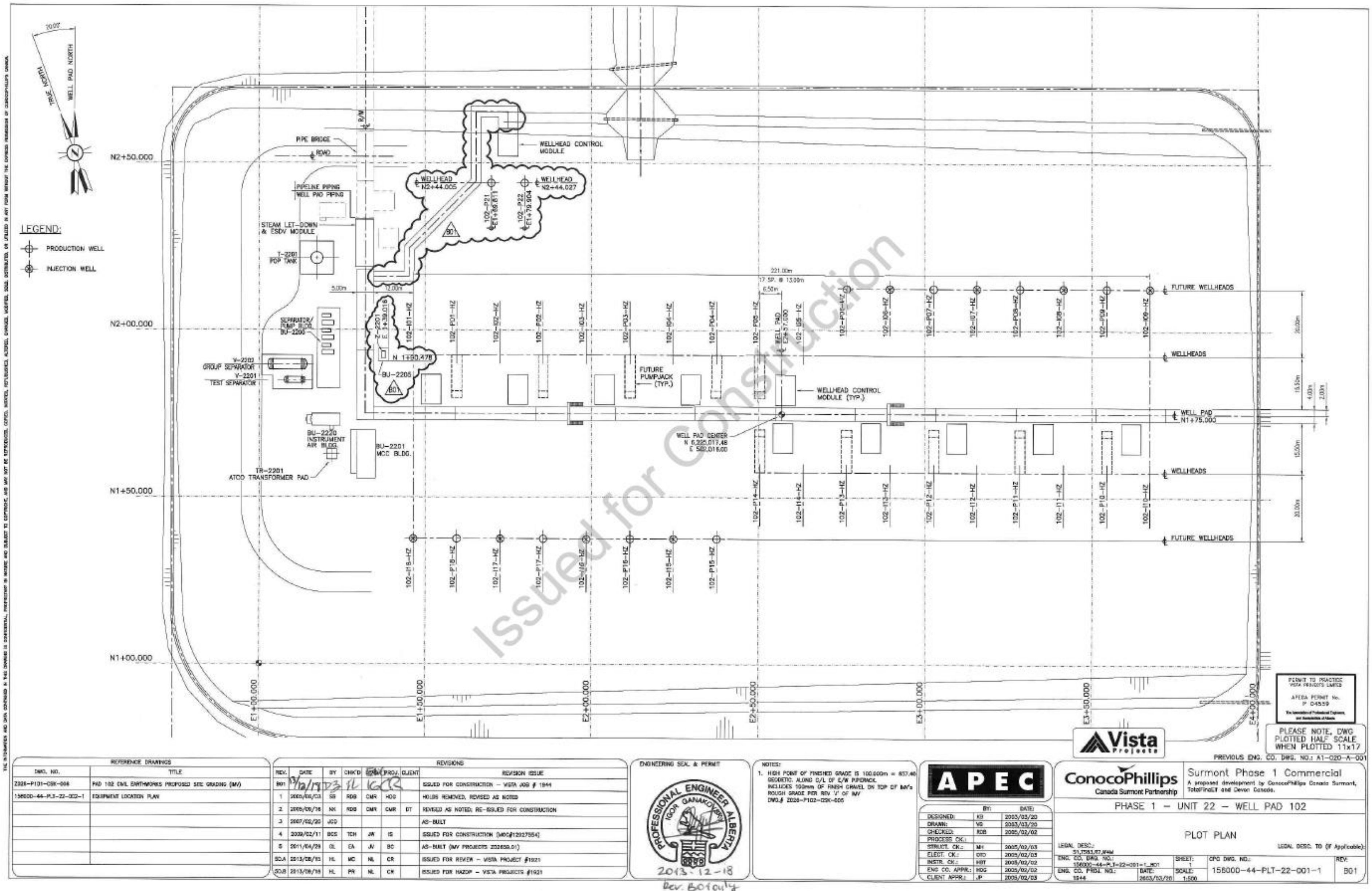
Pad 101 Plot Plan

Surface Well Name	Downhole Well Name
101-01	101-10
101-02	101-11
101-03	101-12
101-04	101-13
101-05	101-14
101-06	101-17
101-07	101-18
101-08	101-02
101-09	101-01
101-10	101-03
101-11	101-04
101-12	101-05
101-13	101-06
101-14	101-16
101-15	101-15
101-16	101-07
101-17	101-08
101-18	101-09
101-19	101S16INF1
101-20	101S17INF1
101-21	101S10INF1
101-22	101S11INF1
101-24	101-24
101-25	101-25
101-26	101-26

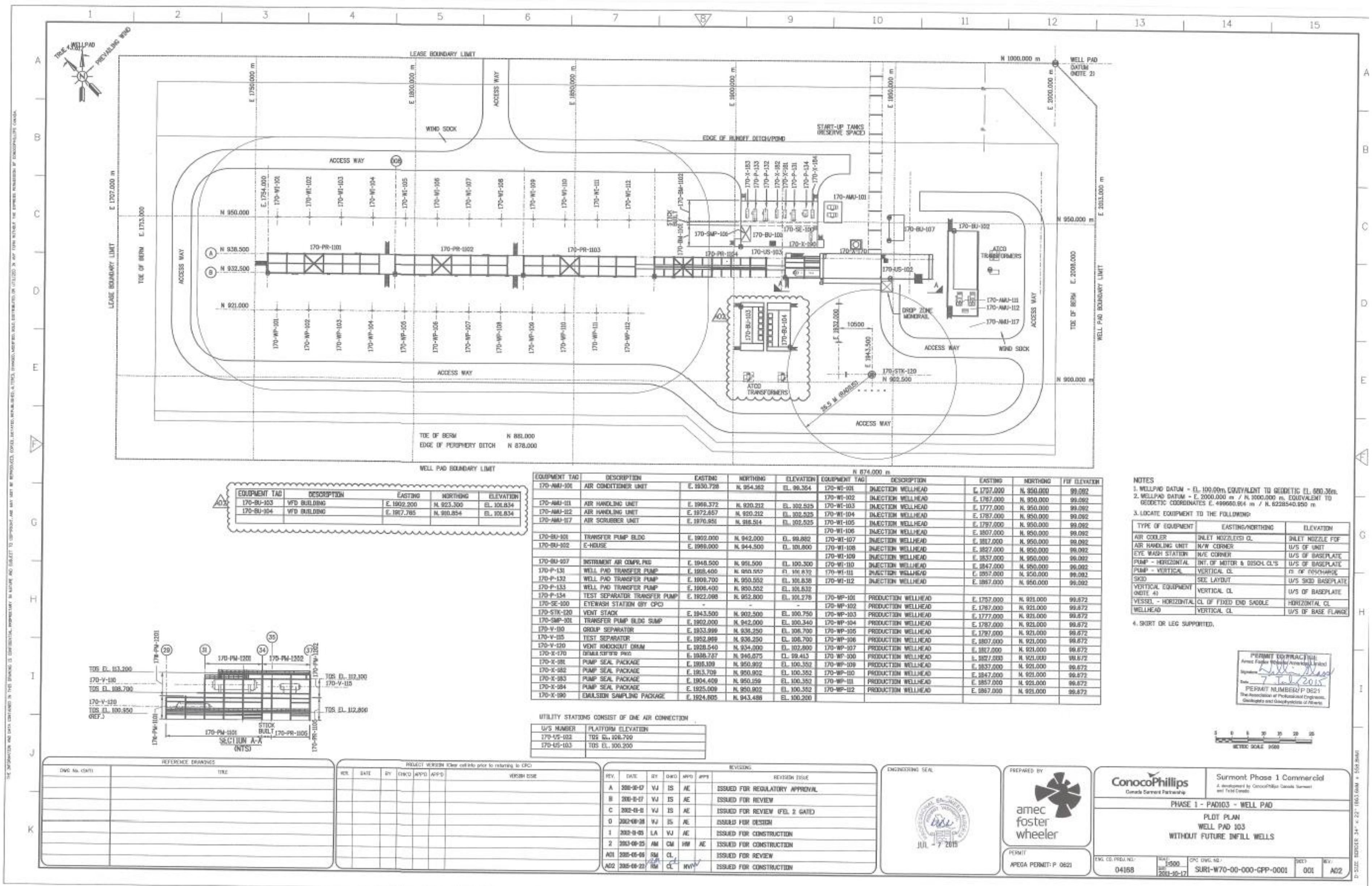


ConocoPhillips

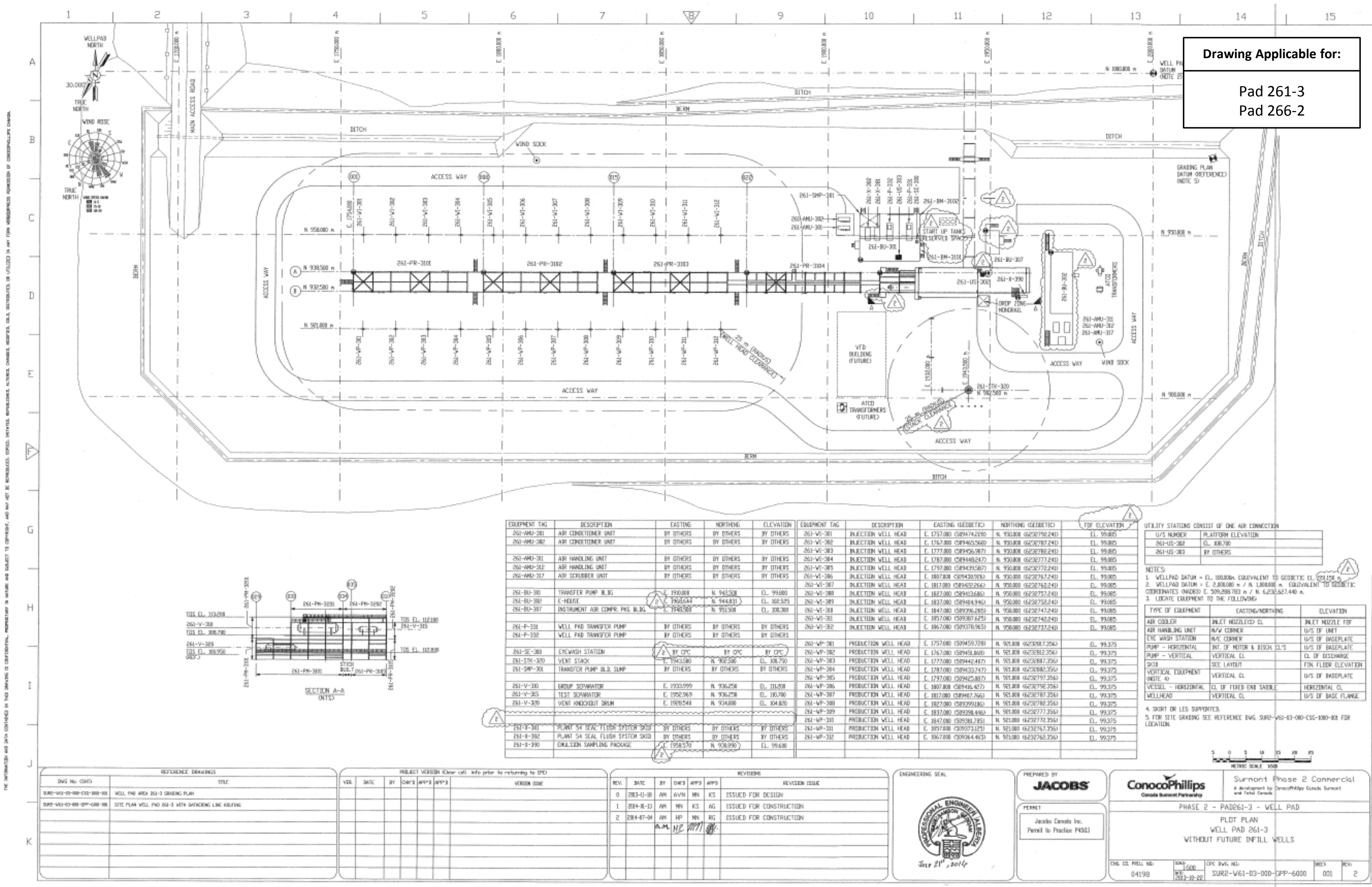
Pad 102 Plot Plan



Pad 103 Plot Plan



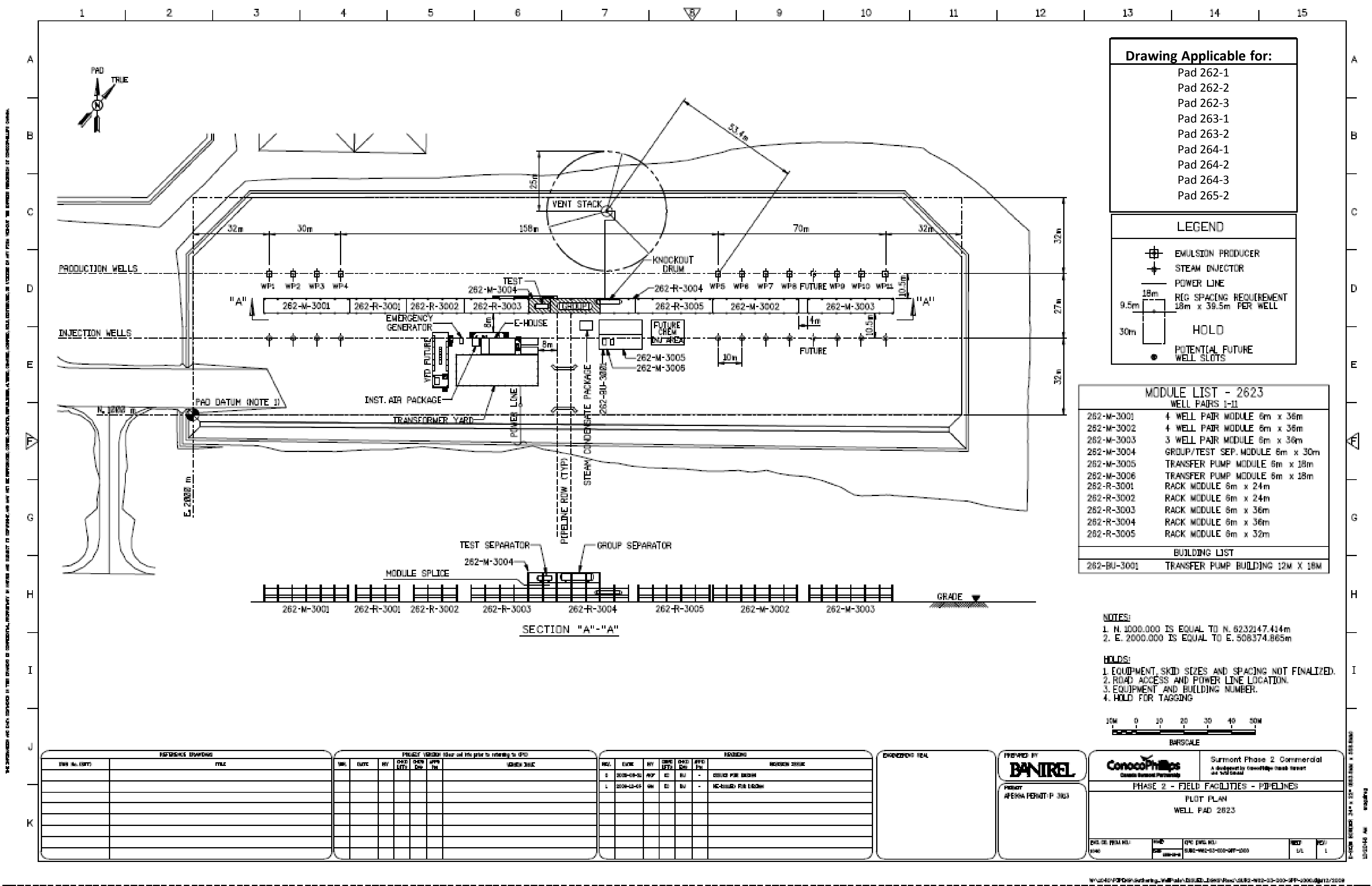
Jacobs S2 Pad Design



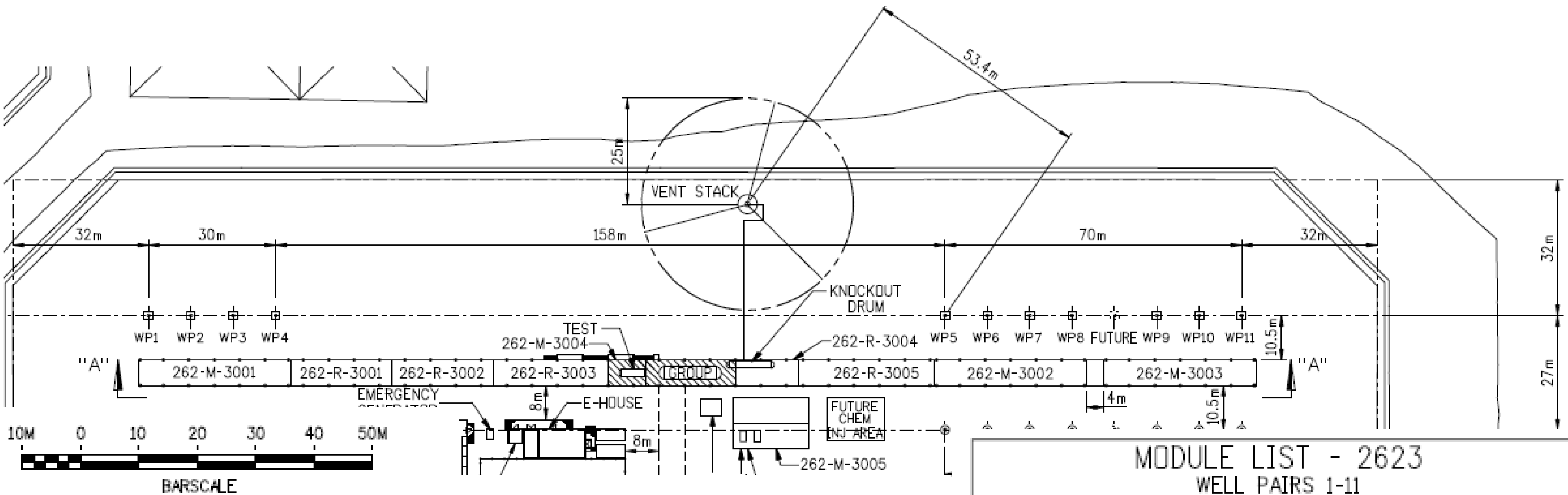
Drawing Applicable for:

Pad 261-3
Pad 266-2

Bantrel S2 Pad Design



Bantrel S2 Pad Design



Drawing Applicable for:
Pad 262-1
Pad 262-2
Pad 262-3
Pad 263-1
Pad 263-2
Pad 264-1
Pad 264-2
Pad 264-3
Pad 265-2

LEGEND

- EMULSION PRODUCER
- STEAM INJECTOR
- POWER LINE
- RIG SPACING REQUIREMENT 18m x 39.5m PER WELL (18m, 9.5m, 30m)
- HOLD
- POTENTIAL FUTURE WELL SLOTS

MODULE LIST - 2623 WELL PAIRS 1-11	
262-M-3001	4 WELL PAIR MODULE 6m x 36m
262-M-3002	4 WELL PAIR MODULE 6m x 36m
262-M-3003	3 WELL PAIR MODULE 6m x 36m
262-M-3004	GROUP/TEST SEP. MODULE 6m x 30m
262-M-3005	TRANSFER PUMP MODULE 6m x 18m
262-M-3006	TRANSFER PUMP MODULE 6m x 18m
262-R-3001	RACK MODULE 6m x 24m
262-R-3002	RACK MODULE 6m x 24m
262-R-3003	RACK MODULE 6m x 36m
262-R-3004	RACK MODULE 6m x 36m
262-R-3005	RACK MODULE 6m x 32m
BUILDING LIST	
262-BU-3001	TRANSFER PUMP BUILDING 12M X 18M

Pad 101, 102 & 103 Well Completions

Well Identifier - Surface (Downhole)	Producer Completion	Injector Completion	Well Identifier - Surface	Producer Completion (no concentric or parallel producing strings)	Injector Completion	Well Identifier - Surface	Producer Completion (no concentric or parallel producing strings)	Injector Completion
101-01 (10DH)	ESP	Parallel	102-1	ESP	Parallel	103-1	GL	Concentric
101-02 (11DH)	ESP	Parallel	102-2	ESP	Parallel	103-2	GL(FCD)	Concentric (FCD)
101-03 (12DH)	ESP	Concentric	102-3	PCP	Parallel	103-3	GL	Concentric
101-04 (13DH)	ESP	Parallel	102-4	ESP	Parallel	103-4	GL(FCD)	Concentric (FCD)
101-05 (14DH)	ESP	Parallel	102-5	ESP	Parallel	103-5	GL	Concentric
101-06 (17DH)	ESP	Concentric	102-6	ESP (FCD)	Parallel (FCD)	103-6	GL(FCD)	Concentric (FCD)
101-07 (18DH)	Circulation	Concentric	102-7	ESP	Concentric	103-7	GL	Concentric
101-08 (02DH)	ESP	Concentric	102-8	ESP	Concentric	103-8	GL(FCD)	Concentric (FCD)
101-09 (01DH)	ESP	Concentric	102-9	ESP	Concentric	103-9	ESP Day 1	Concentric
101-10 03DH)	ESP	Concentric	102-10	ESP	Concentric	103-10	ESP Day 1(FCD)	Concentric (FCD)
101-11 (04DH)	ESP	Concentric	102-11	ESP	Concentric	103-11	Circulation	Concentric
101-12 (05DH)	ESP	Concentric	102-12	ESP	Parallel	103-12	ESP Day 1(FCD)	Concentric (FCD)
101-13 (06DH)	ESP	Concentric	102-13	ESP	Parallel			
101-14 (16DH)	ESP	Parallel	102-14	ESP	Parallel			
101-15 (15DH)	ESP	Parallel	102-15	ESP	Concentric			
101-16 (07DH)	ESP	Parallel	102-16	ESP	Concentric			
101-17 (08DH)	ESP	Parallel	102-17	ESP	Concentric			
101-18 (09DH)	ESP	Parallel	102-18	ESP	Concentric			
101-19 (17INF)	ESP	Concentric	102-21 (INF)	PCP	N/A			
101-20 (16INF)	ESP	Concentric	102-22 (INF)	PCP	N/A			
101-21 (10INF)	PCP	N/A						
101-22 (11INF)	PCP	N/A						

Pad 262-3 & 265-2 Well Completions

Well Identifier - Surface (Downhole)	Producer Completion	Injector Completion	Well Identifier - Surface (Downhole)	Producer Completion	Injector Completion
262-3-01	Circulation	Concentric	**265-2-01**	Circulation	Concentric
262-3-02	Circulation	Concentric	**265-2-02**	Circulation	Concentric
262-3-03	Circulation	Concentric	**265-2-03**	Circulation	Concentric
262-3-04	Circulation	Concentric	**265-2-04**	Circulation	Concentric
262-3-05	Circulation	Concentric	**265-2-05**	Circulation	Concentric
262-3-06	Circulation	Concentric	**265-2-06**	Circulation	Concentric
262-3-07	Circulation	Concentric	**265-2-07**	Circulation	Concentric
262-3-08	Circulation	Concentric	**265-2-08**	Circulation	Concentric
262-3-09	Circulation	Concentric	**265-2-09**	Circulation	Concentric
262-3-10	Circulation	Concentric	**265-2-10**	Circulation	Concentric
262-3-11	Circulation	Concentric	**265-2-11**	Circulation	Concentric
262-3-12	Circulation	Concentric	**265-2-12**	Circulation	Concentric

Pad 263-1 & 263-2 Well Completions

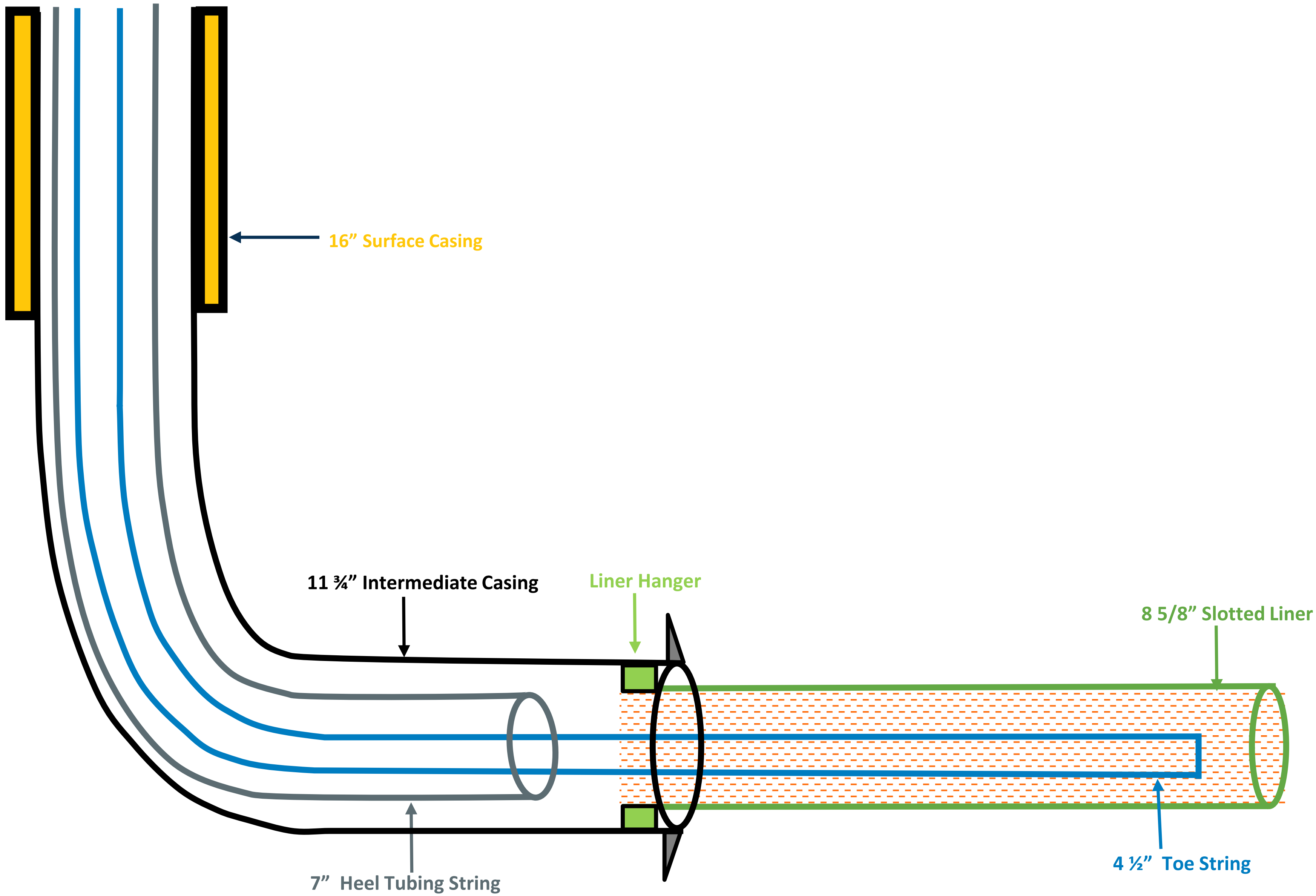
Well Identifier - Surface (Downhole)	Producer Completion	Injector Completion	Well Identifier - Surface (Downhole)	Producer Completion	Injector Completion
263-1-01	GL(FCD)	Concentric	**263-2-01**	GL	Concentric
263-1-02	GL(FCD)	Concentric	**263-2-02**	GL	Concentric
263-1-03	GL	Concentric	**263-2-03**	GL	Concentric
263-1-04	GL	Concentric	**263-2-04**	GL	Concentric
263-1-05	Circulation	Concentric	**263-2-05**	GL	Concentric
263-1-06	GL(FCD)	Concentric	**263-2-06**	GL	Concentric
263-1-07	GL(FCD)	Concentric	**263-2-07**	GL	Concentric
263-1-08	GL(FCD)	Concentric	**263-2-08**	GL	Concentric
263-1-09	GL(FCD)	Concentric	**263-2-09**	GL	Concentric
263-1-10	GL	Concentric	**263-2-10**	GL	Concentric
263-1-11	GL(FCD)	Concentric	**263-2-11**	Circulation	Concentric

Pad 264-1, 264-2 & 264-3 Well Completions

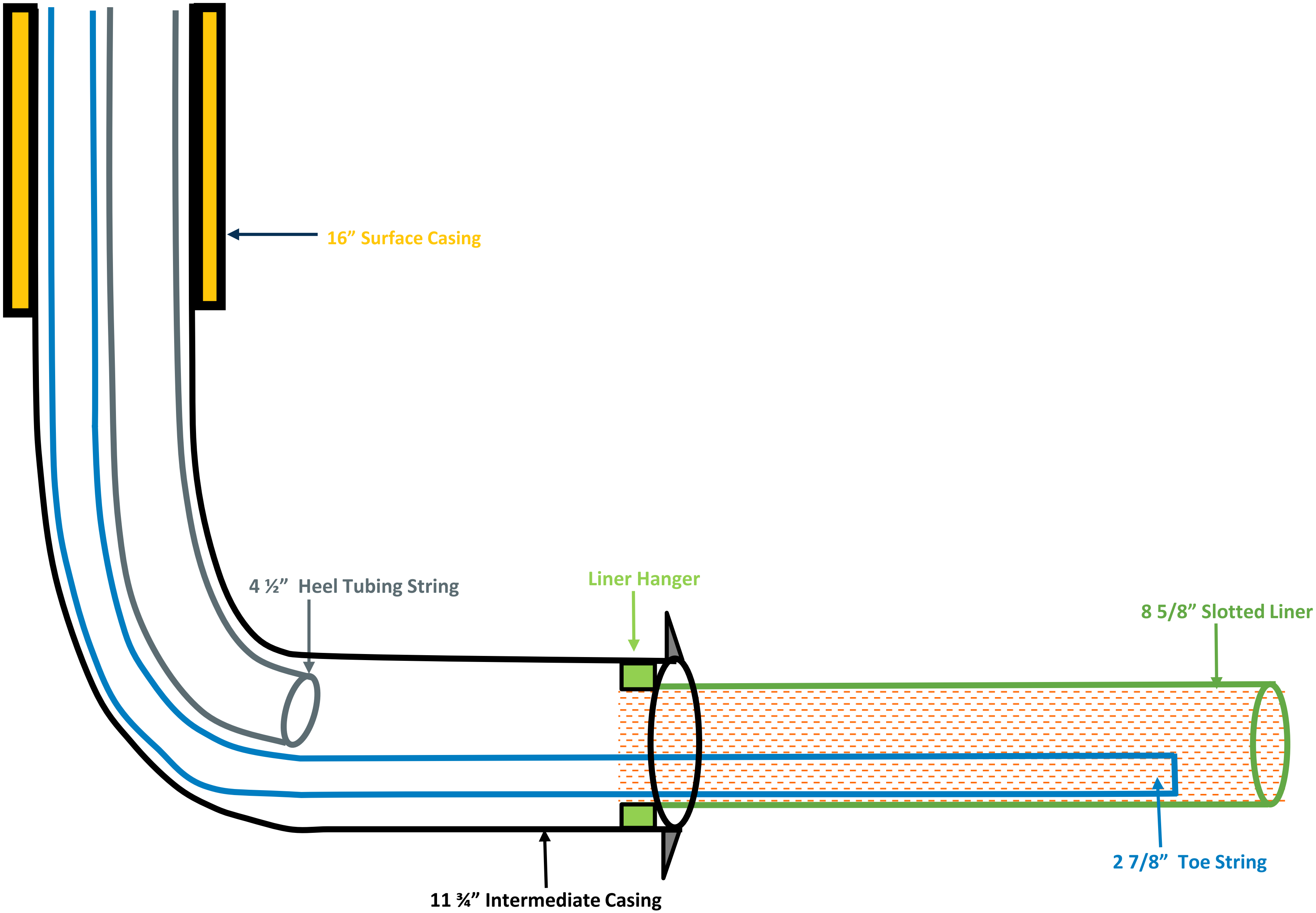
Well Identifier - Surface (Downhole)	Producer Completion	Injector Completion	Well Identifier - Surface (Downhole)	Producer Completion	Injector Completion	Well Identifier - Surface (Downhole)	Producer Completion	Injector Completion
264-1-01	GL	Concentric	264-2-01	GL	Concentric	264-3-01	GL	Concentric
264-1-02	GL	Concentric	264-2-02	Circulation	Concentric	264-3-02	GL(FCD)	Concentric
264-1-03	GL	Concentric	264-2-03	Circulation	Concentric	264-3-03	GL	Concentric
264-1-04	GL	Concentric	264-2-04	GL	Concentric	264-3-04	GL	Concentric
264-1-05	GL	Concentric	264-2-05	GL	Concentric	264-3-05	Circulation	Concentric
264-1-06	GL	Concentric	264-2-06	GL	Concentric	264-3-06	GL(FCD)	Concentric
264-1-07	Circulation	Concentric	264-2-07	GL	Concentric	264-3-07	Circulation	Concentric
264-1-08	GL	Concentric	264-2-08	GL	Concentric	264-3-08	GL(FCD)	Concentric
264-1-09	GL	Concentric	264-2-09	Circulation	Concentric	264-3-09	Circulation	Concentric
264-1-10	GL	Concentric	264-2-10	GL	Concentric	264-3-10	Circulation(FCD)	Concentric
264-1-11*	Circulation(FCD)	Concentric	264-2-11	GL	Concentric	264-3-11	GL(FCD)	Concentric
264-1-12	GL	Concentric				264-3-12	Circulation(FCD)	Concentric

*Fishbone well which will be started at a later date

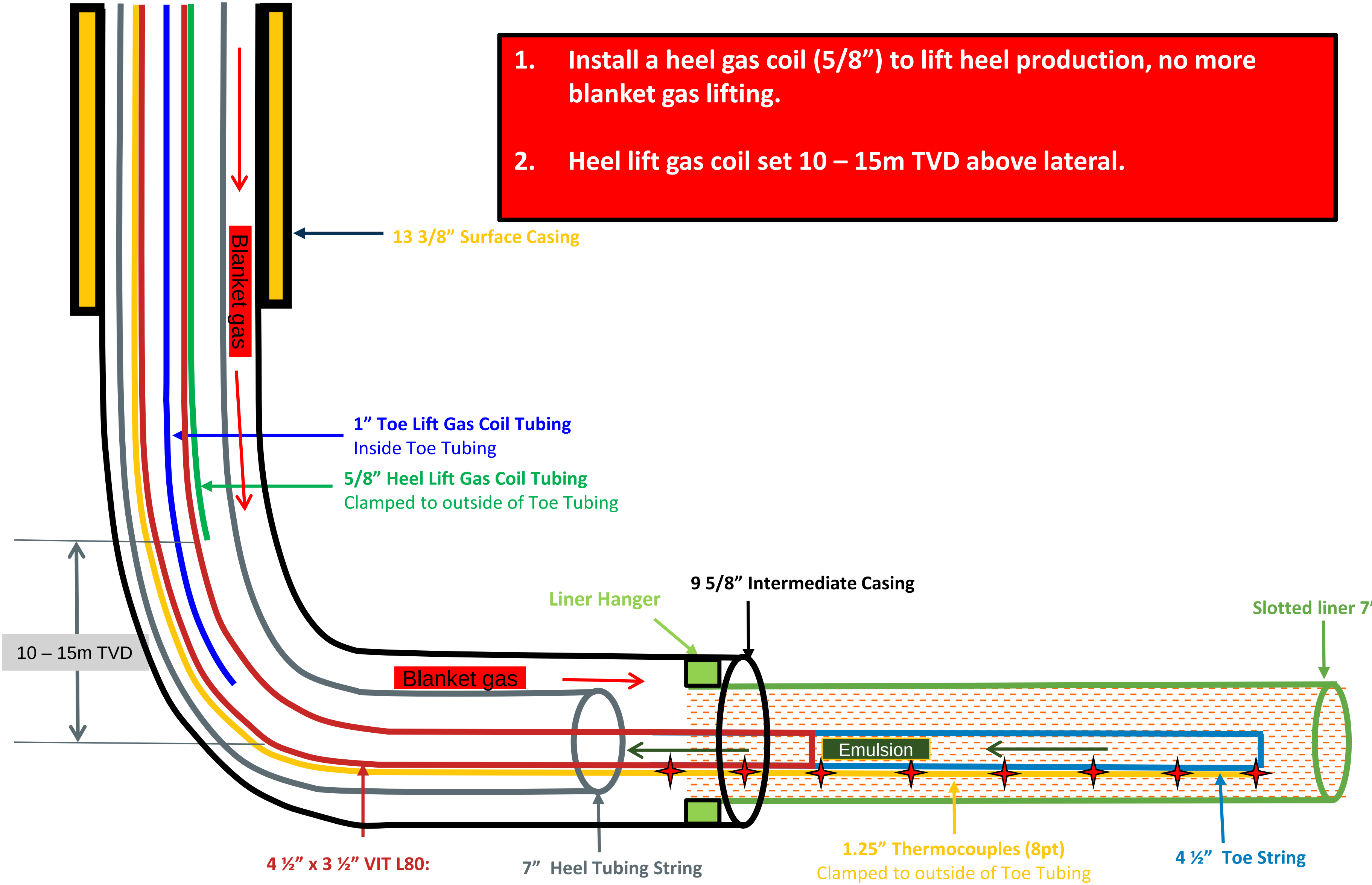
Typical Concentric Injector



Typical Parallel Injector

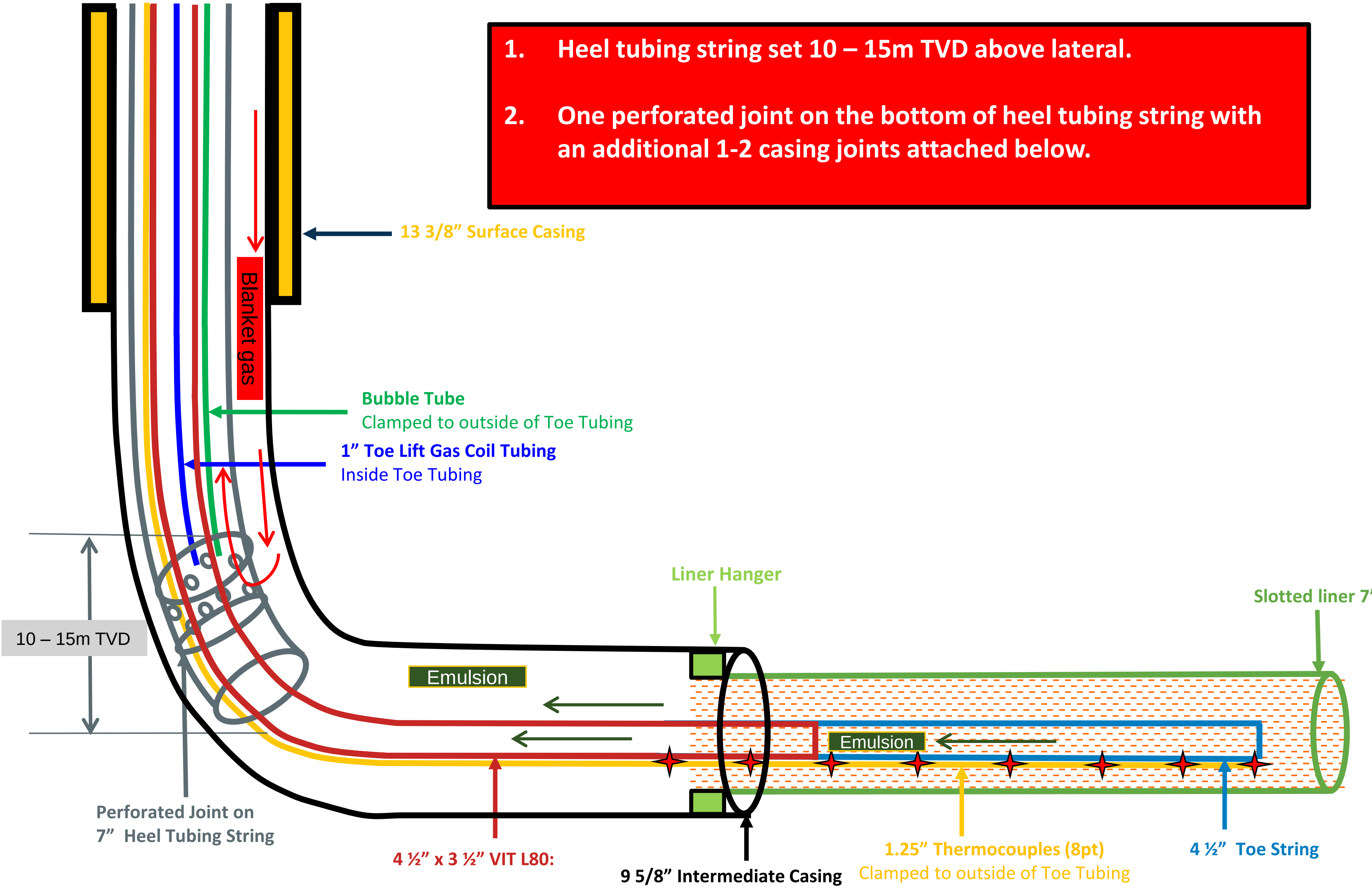


Improved Gas Lift Producer Design – Surmont 2



Improved Gas Lift Producer Design, 264-2, 263-2 & 263-1

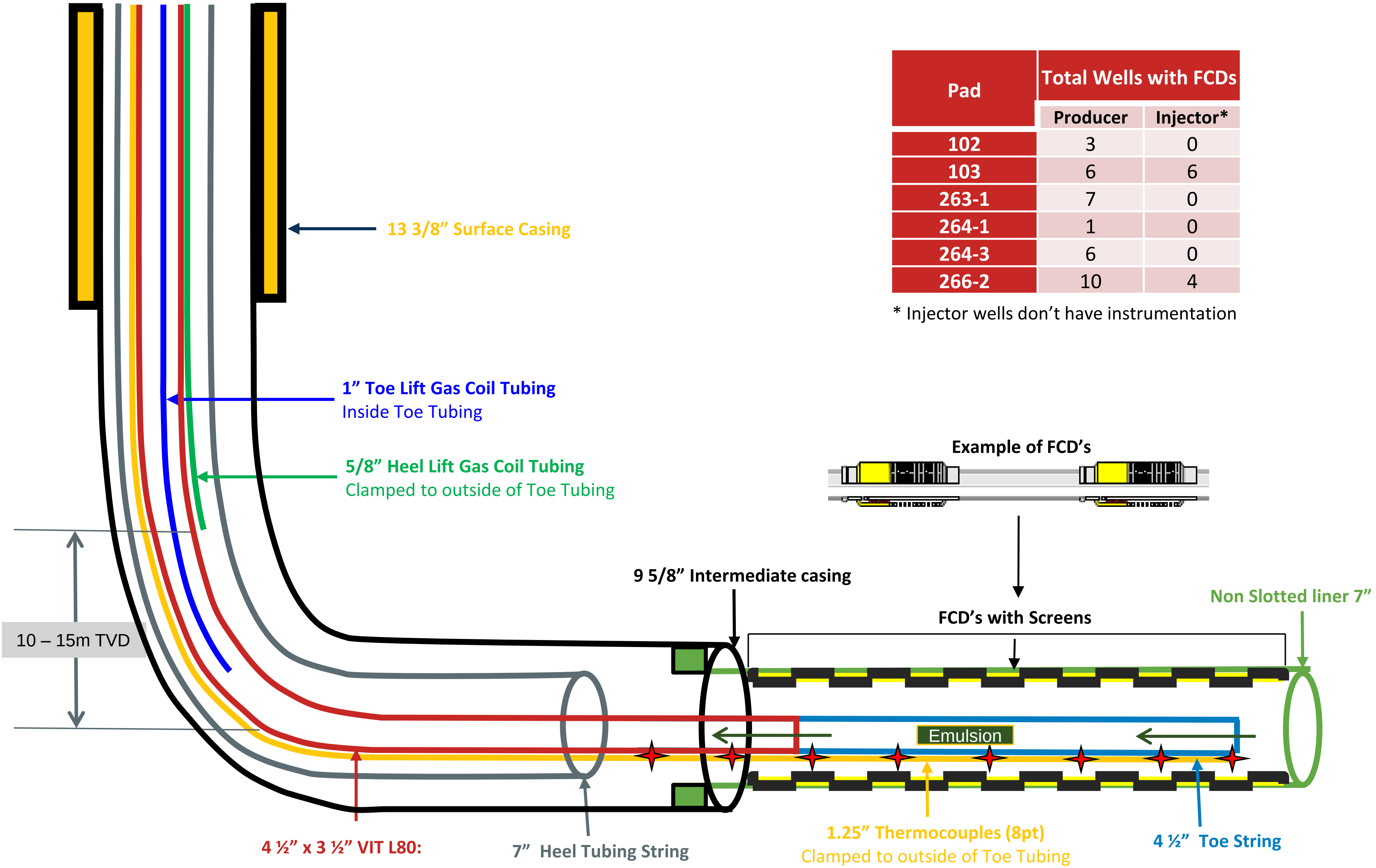
1. **Heel tubing string set 10 – 15m TVD above lateral.**
2. **One perforated joint on the bottom of heel tubing string with an additional 1-2 casing joints attached below.**



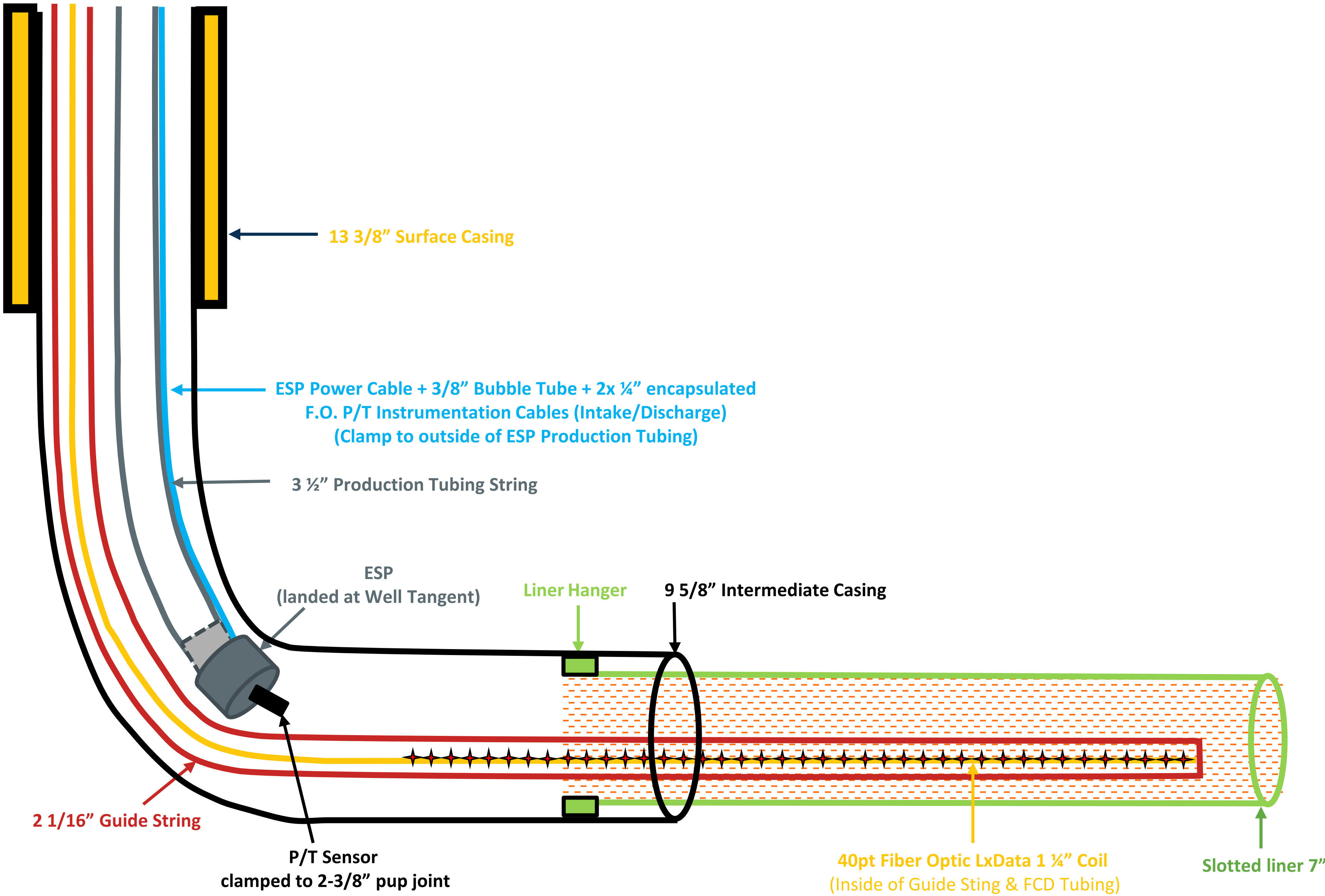
Typical Flow Control Device (FCD) Completion

Pad	Total Wells with FCDs	
	Producer	Injector*
102	3	0
103	6	6
263-1	7	0
264-1	1	0
264-3	6	0
266-2	10	4

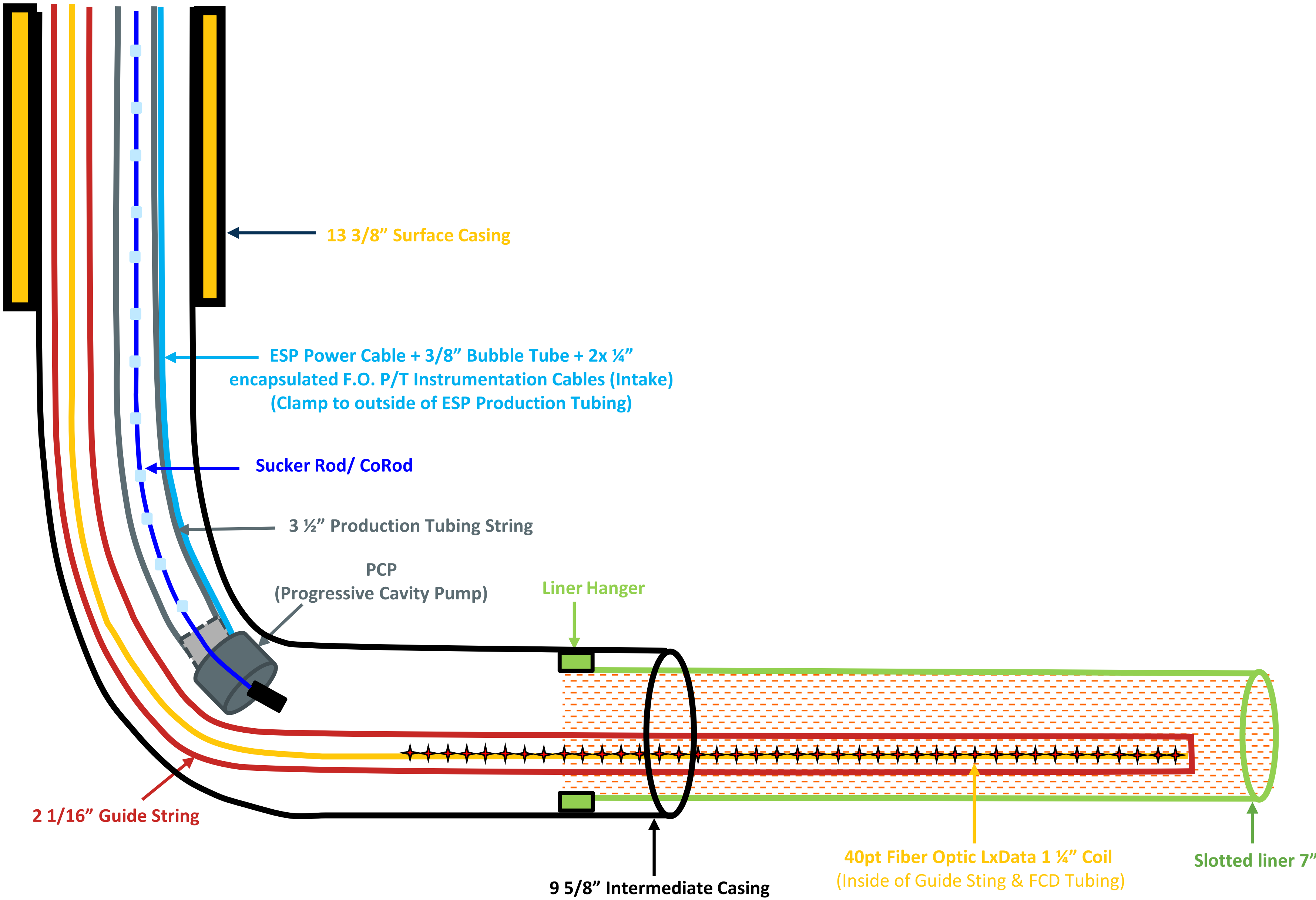
* Injector wells don't have instrumentation



Typical ESP Producer



Typical PCP Producer



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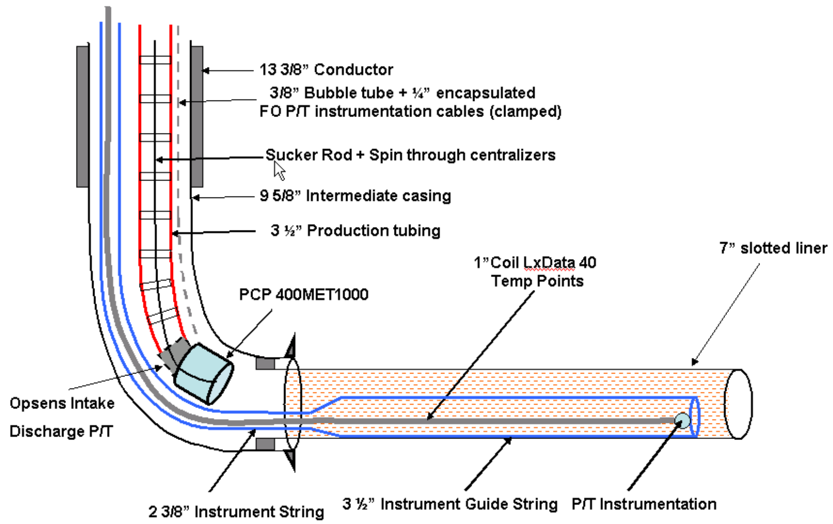
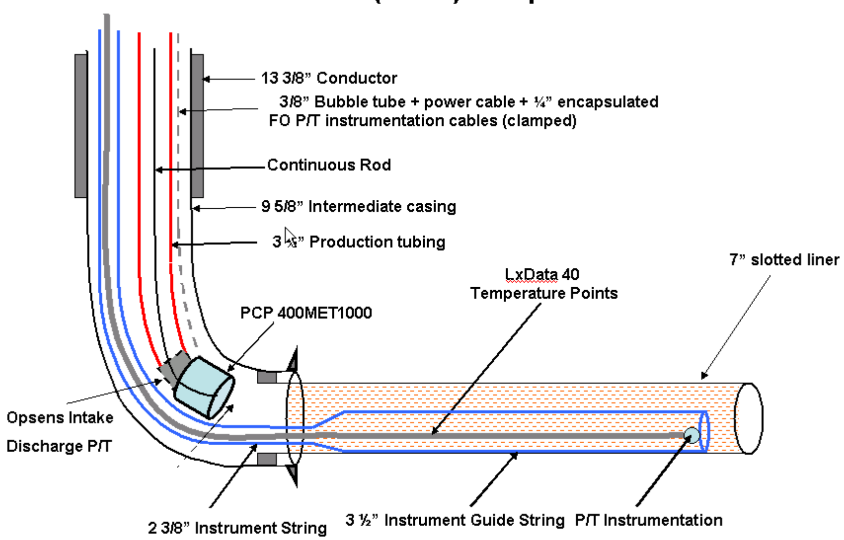
Fishbone Completion Pad 101-P21 & P22



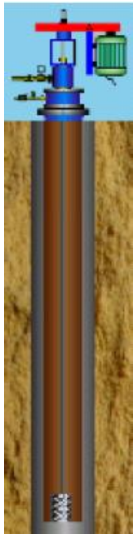
101-P21 (10INF)

- Rod String: Sucker Rods with ConocoPhillips Canada tested spin through centralizers.
- Lined to toe with sidetrack to "hook" towards P01 (10) taking-off at 1404MD.
- Guide/steam injection string: 2 3/8" by 3½" to toe.
- Instrumentation consisting of: Intake/Discharge P/T + 40 pts Lxdata + Toe P/T gauge.



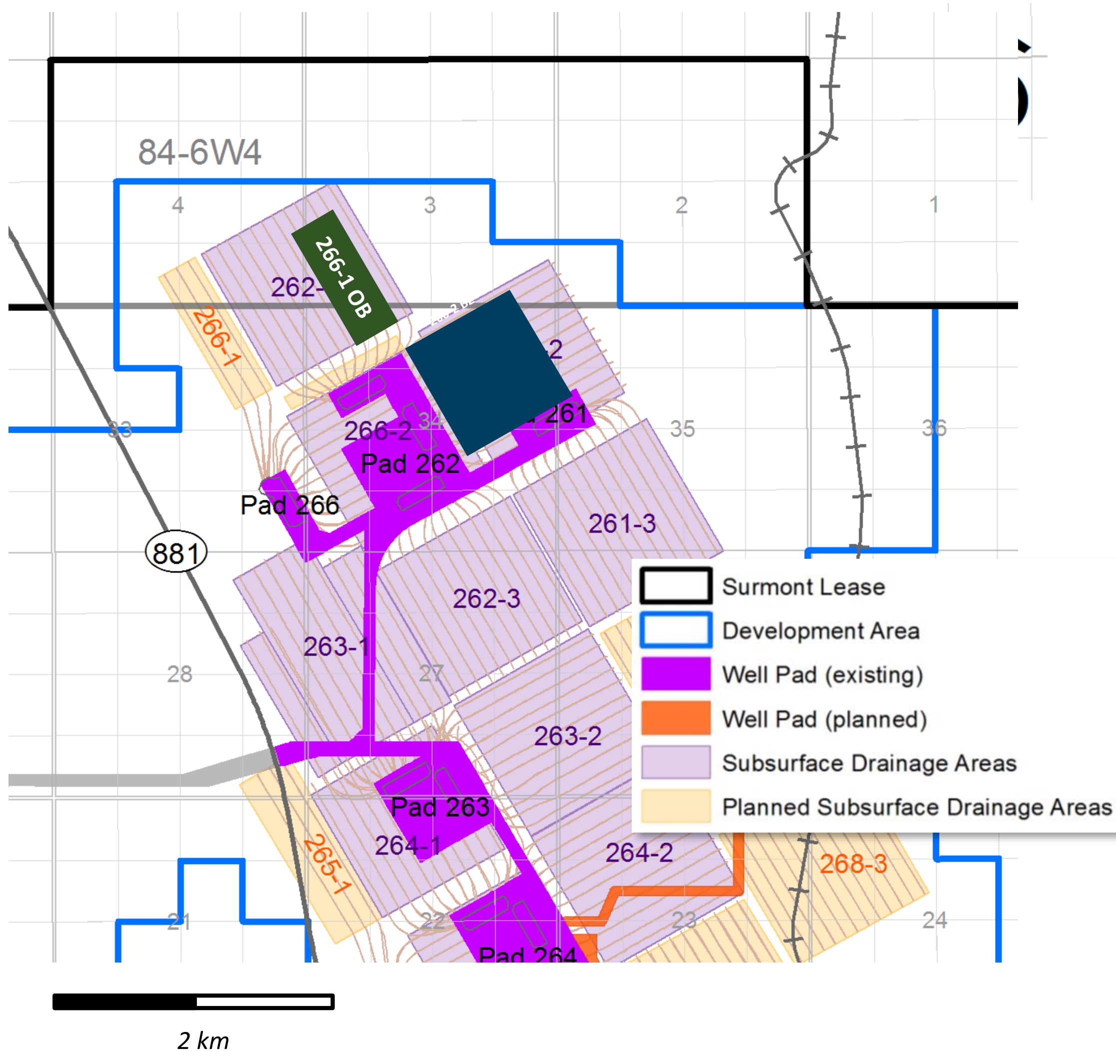
101-P22 (11INF)

- Rod String: Continuous Rod.
- Lined and 'hooked" towards P02 (11) at toe.
- Guide/steam injection string: 2 3/8" by 3 ½" to toe.
- Instrumentation consisting of: Intake/Discharge P/T + 40 pts Lxdata + Toe P/T gauge.



Fishbone Proposal Pad 266

- DA 266-2, the 266-1 Outboards(OB), and the 266-2 Buffer Zone(BZ) well to be drilled from 266 pad
- Three “fishbone” wells were planned as a component of DA 266-2 but replaced with conventional SAGD well pairs prior to spud in Q4 2015. Fishbone trial deferred pending additional results from 102P21,22 producers
- The 266-2 OB and BZ wells were built together as a single project for execution, with a single 4-well surface module
- The OB/BZ project, due to drill in Q3 2016, has been deferred



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Artificial Lift

Subsection 3.1.1 (4)

Artificial Lift Current Pad Overview

Pad	On Stream Year	Well Pairs Completed	Wells on Circulation	Gas Lift Producing Wells	ESP Producing Wells	PCP Producing Wells	Total Wells with FCDs	
							Producer	Injector
101	2008	22	1	0	19	2	0	0
102	2008	20	0	0	17	3	3	0
103	2015	12	2	8	2 ESP Day 1	0	6	6
262-3	2015	12	12	0	0	0	0	0
263-1	2015	11	1	10	0	0	7	0
263-2	2015	11	1	10	0	0	0	0
264-1*	2015	12	1	10	0	0	1	0
264-2	2015	11	3	8	0	0	0	0
264-3	2015	12	5	7	0	0	6	0
265-2	2015	12	12	0	0	0	0	0
261-3	2016	12	0	0	0	0	0	0
262-1	2016	12	0	0	0	0	0	0
262-2**	2016	12	0	0	0	0	0	0
266-2**	2016	12	0	0	0	0	10	4

*264-1 WP 11: Complete but no steam, Cold well
**262-2, 266-2: Pad’s currently under construction

Artificial Lift Types

- **Gas Lift**
  - Gas lift is effective with bottom hole flowing pressures >2,700 kPa with Pwh approx. 1000 kPa.
  - Lifting from heel and toe with gas assist at start of vertical section.
  - Current production rates range from 100 m3/d to 700 m3/d of emulsion targeting 3,500 kPa.

- **Electric Submersible Pump (ESP)**
  - ESP for thermal SAGD applications can be sized to meet the specific deliverability of the well.
  - Operating temperatures typically below 215°C.
  - Typically Series 500 installed, and Series 400 pumps installed due to casing restrictions.

- **Progressive Cavity Pumps (PCP)**
  - Generally PCPs have been used for low deliverability wells and where potential solids may be produced.*
  - Installation of metal to metal pumps.

* ConocoPhillips Canada initial strategy for PCPs was to use them on low deliverability wells where the current ESP designs were deemed less appropriate. However, installation of larger PCPs are being considered for wells that may produce relatively “cold” viscous fluid for some time.

ESP Run Life Definitions

- **MTTF:** This run-life measure is calculated as the total exposure time of all systems (running, pulled and failed) divided by the number of failed systems.

- **Average Runtime:** This run-life measure is calculated as the total exposure time of all systems (running, pulled and failed) divided by the number of systems (running, pulled and failed).

- **Average run life running ESP:** This run-life measure is calculated as the total exposure time of running systems divided by the number of running systems.

- **Window:** Window time allows for changes in average run-life to be more apparent, as they are less obscured by previous data.

ESP Performance

KPI's

Population: 39 ESP's**

Cumulative MTTF: 30.1 months

Windowed* MTTF: 41. months

Average Runtime: 17.1 months

Windowed Runtime: 20.5 months

Average run life running ESP: 18.0 months

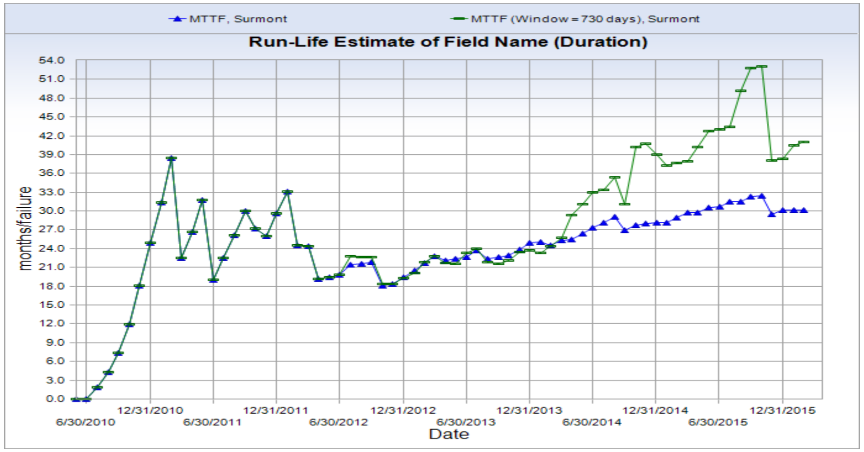
2015: 12 ESP failures

2016: 1 ESP failure

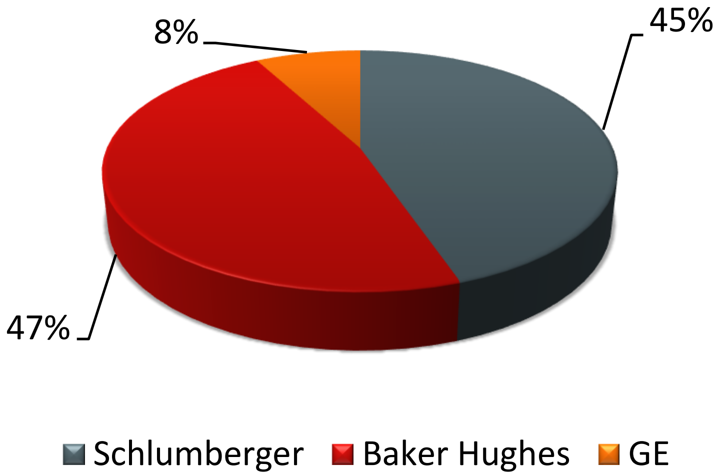
*(730 day window)

**2 ESP failures from December 2015 were started back up in January 2016

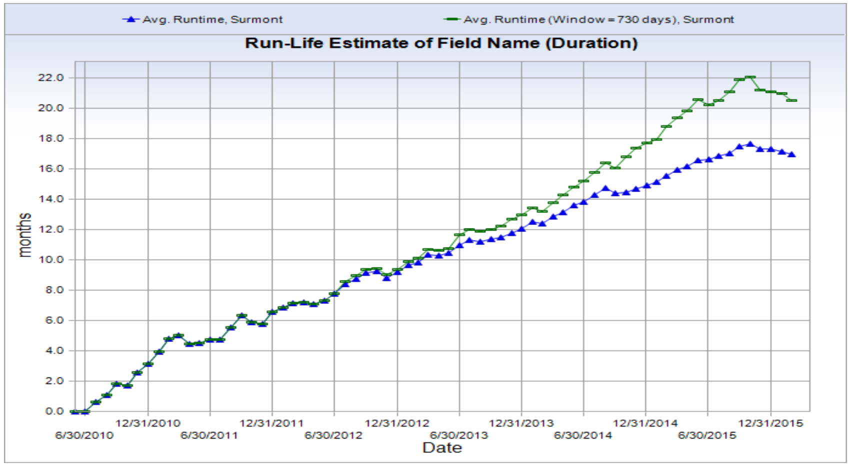
MTTF



ESP Distribution by Company



Average Runtime



Artificial Lift Strategy & Performance

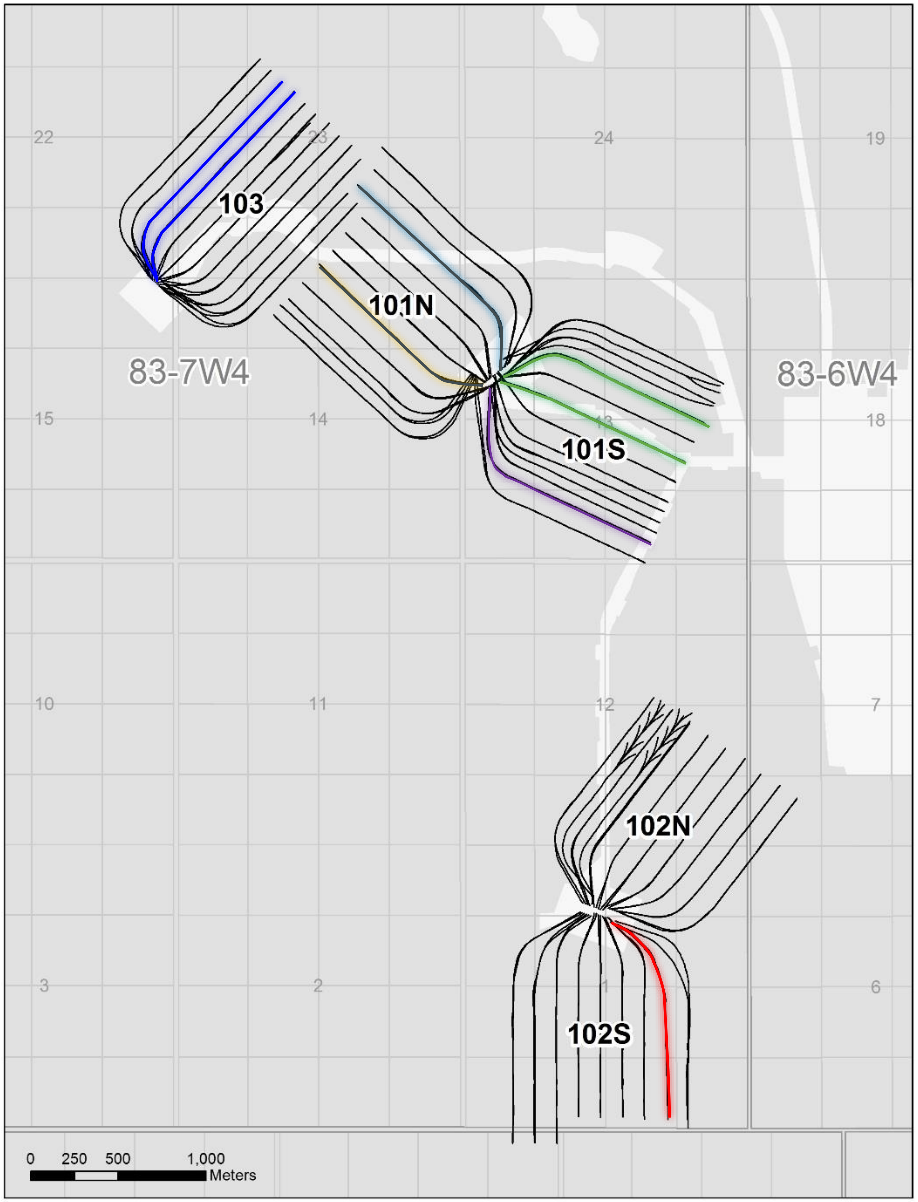
- The artificial lift mode selection is reliant on the pressure strategy for any given well, or drainage area (DA).
  - Phase 2 wells currently utilize Gas Lift (GL) and then will be converted to ESP when the flowing bottom hole pressure is below the effective GL operating point.
  - Four wells in Pad 103 will be ESP day 1. This means that following the circulation time the well will be converted directly to ESP. 266-2 will be an ESP Day 1 pad.

- 2015 Key Decisions:
  - Removal of all single point pump pressure and temperature measurement from design due to cost and reliability.

Instrumentation in Wells

Subsection 3.1.1 (5)

SAGD Well Instrumentation



- **All wells on pads contain 40 point fiber optics strings in the producers unless otherwise noted.**

120 points
80 points
76 points
74 points
6 points
0 points

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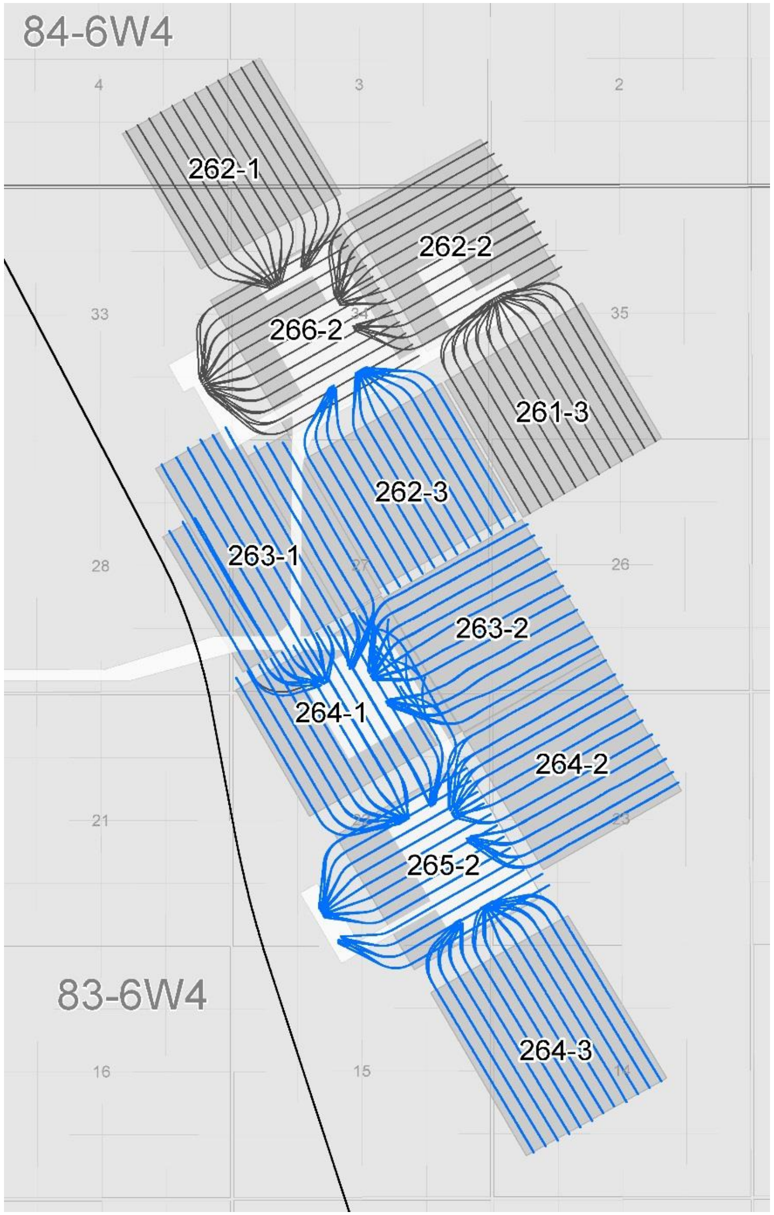
S2 SAGD Well Instrumentation

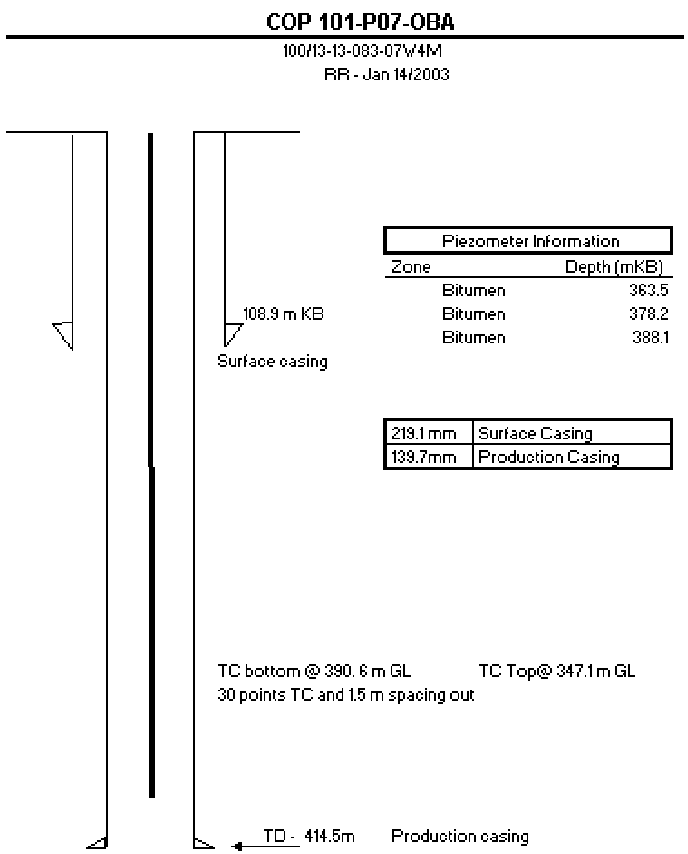


- **All wells on pads currently online contain 8 thermocouples in the producers.**
- **Pads online as of Feb. 2016:**
  - **262-3**
  - **263-1**
  - **263-2**
  - **264-1**
  - **264-2**
  - **264-3**
  - **265-2**

Typical Observation Well Measurement

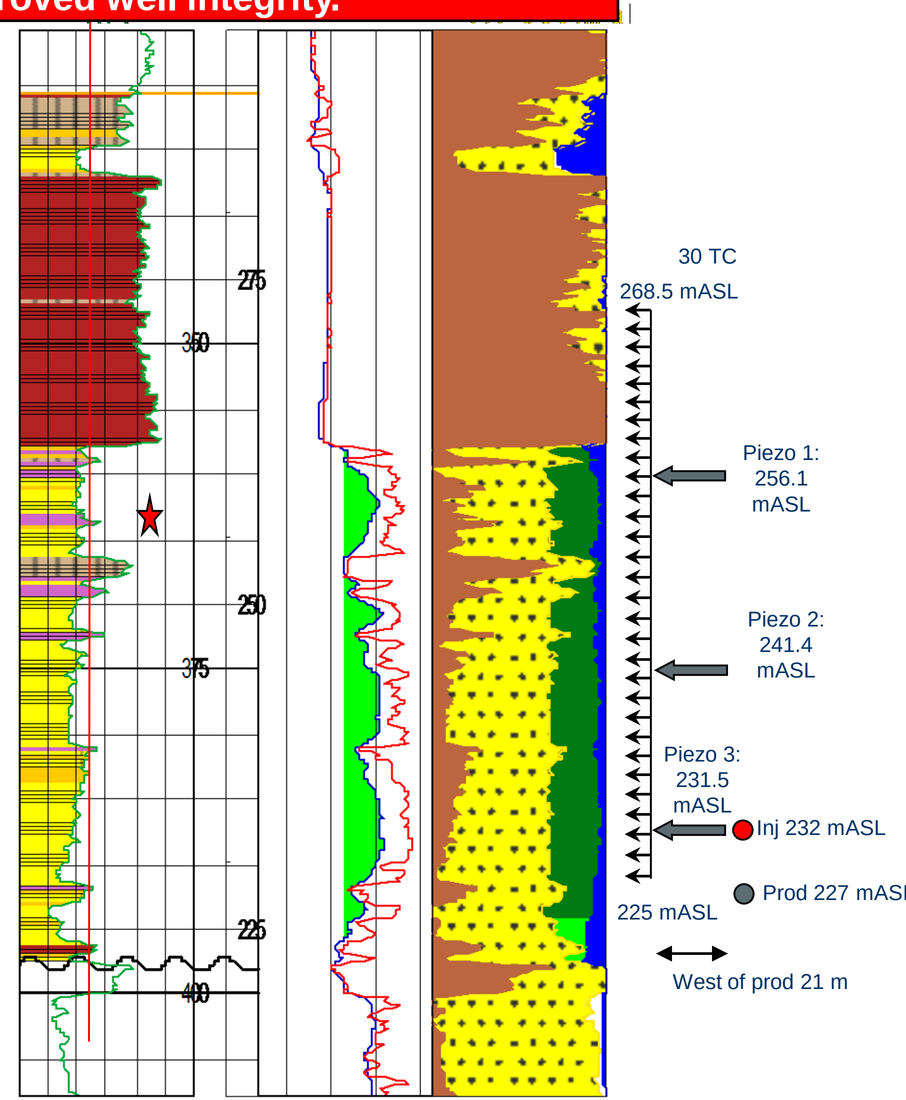
Soft cable Thermocouple (TC) strings were replaced by hard cable TC strings for improved well integrity.

- Example thermocouple and piezometer (101-P07-OBA).
- Typically 30TC (Surmont 1), 40 TC (Surmont 2).
- 0-10 piezometers placed at varying intervals.

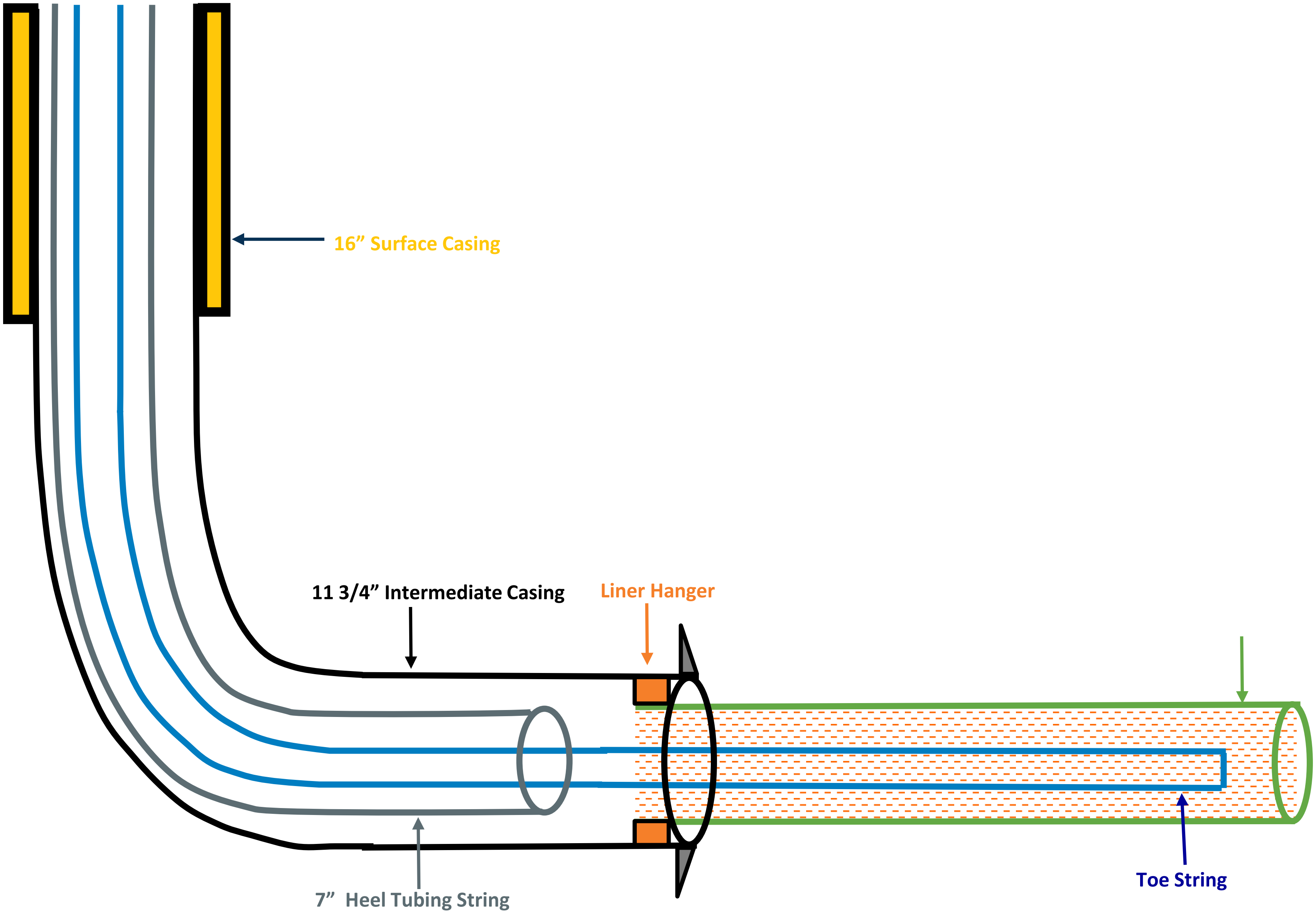


Piezometer Information	
Zone	Depth (mKB)
Bitumen	363.5
Bitumen	378.2
Bitumen	388.1

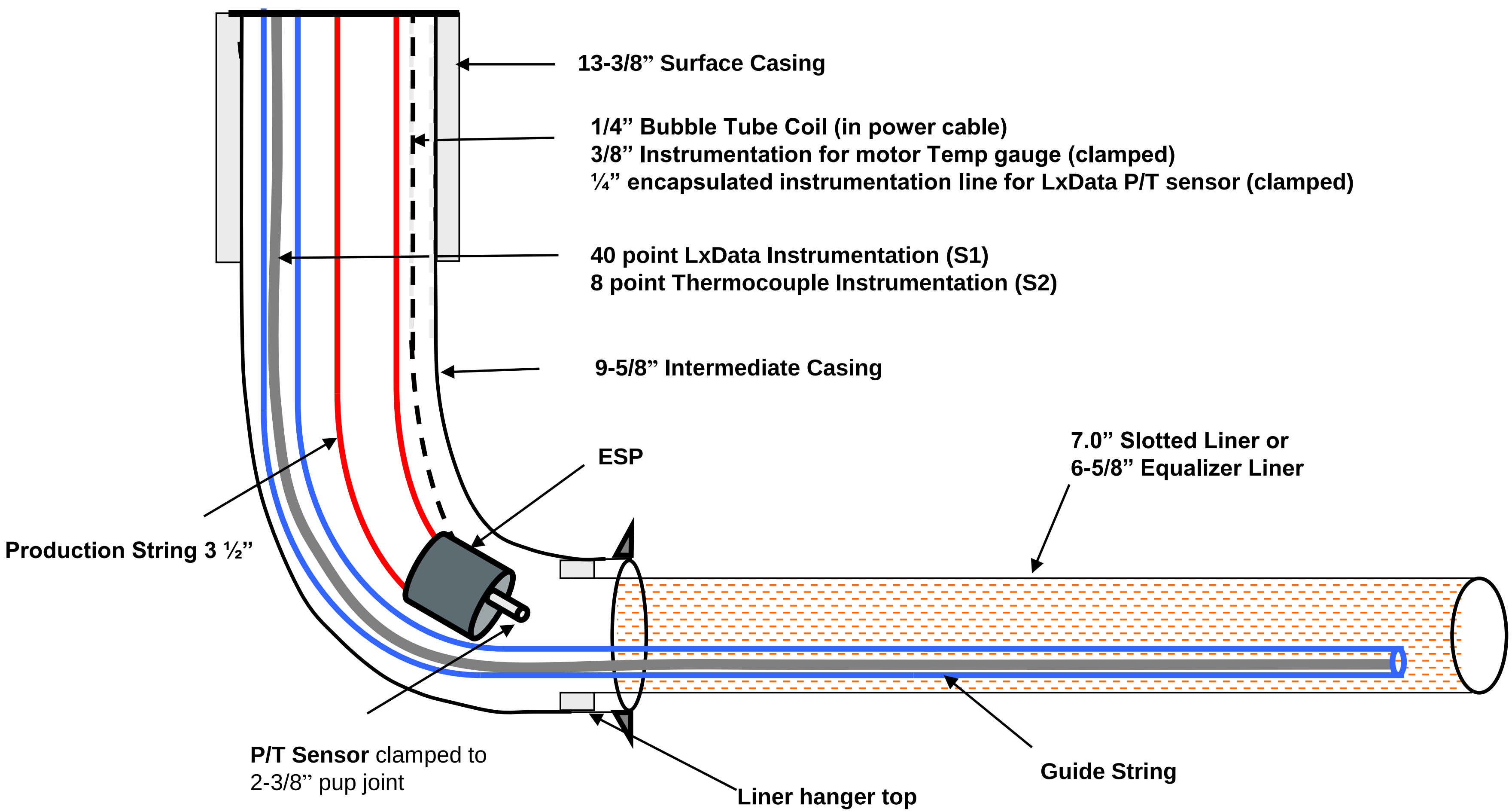
219.1 mm	Surface Casing
139.7mm	Production Casing



Typical Injector Well Configuration



Typical ESP Well Configuration



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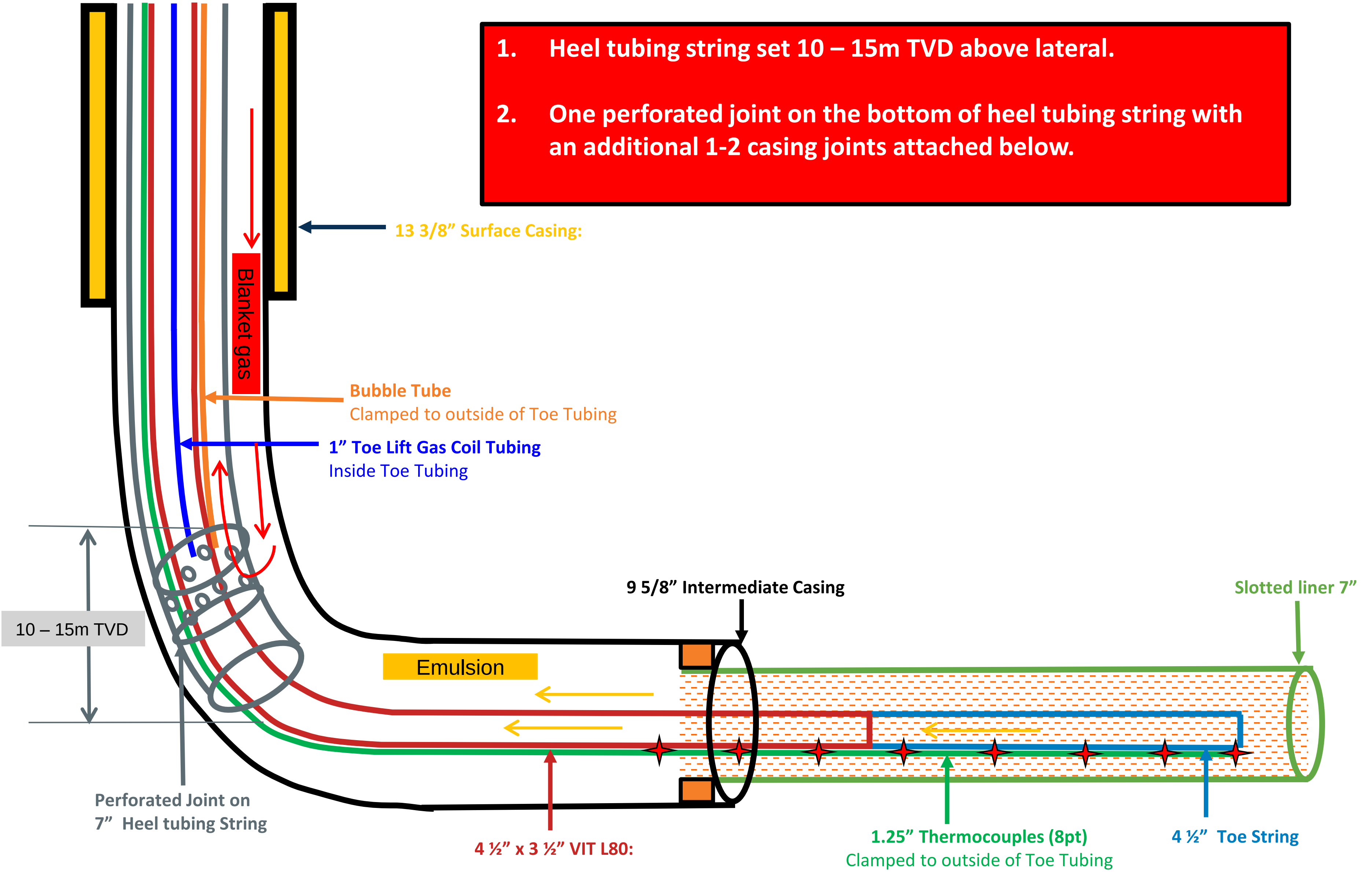
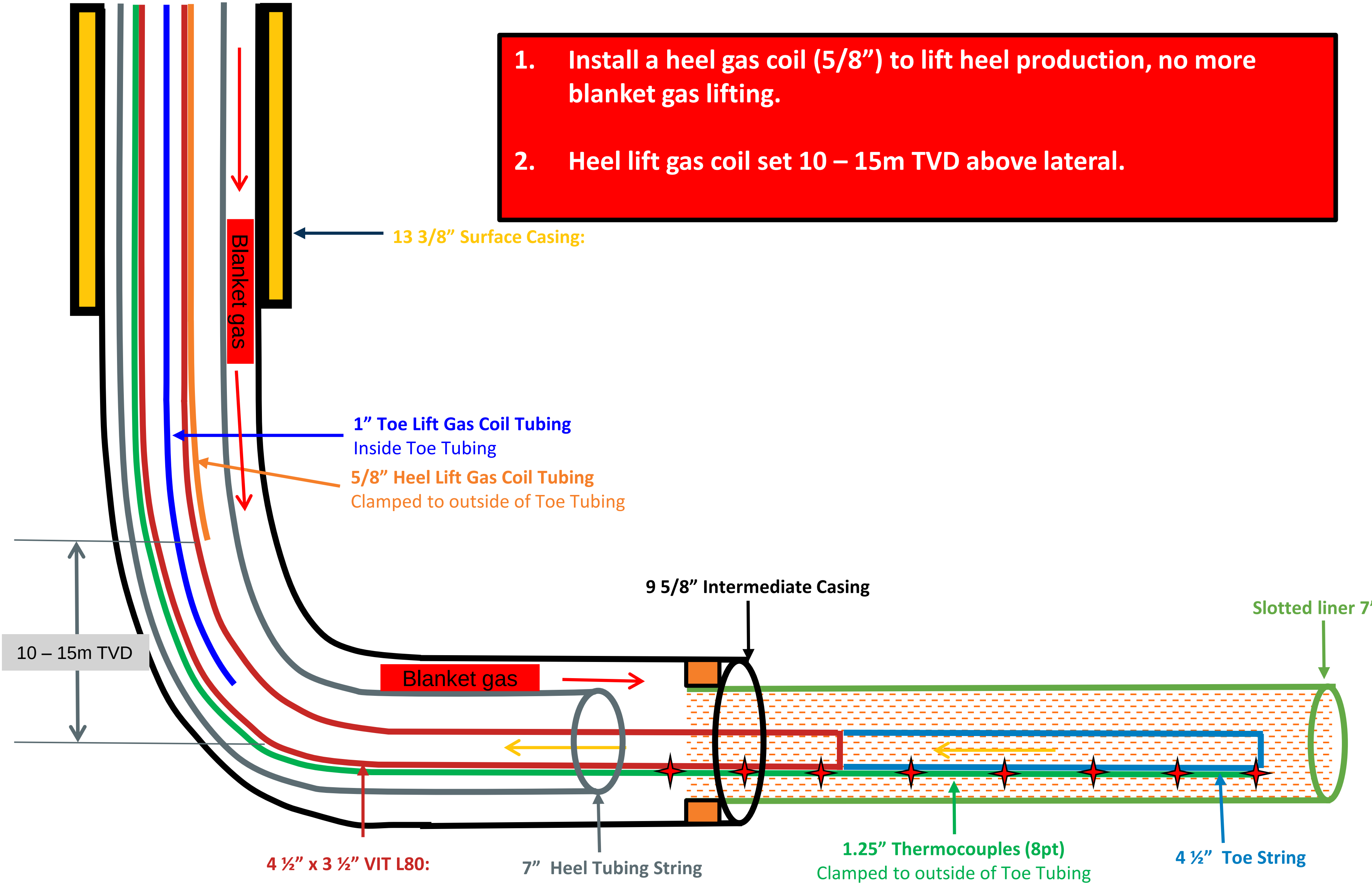
Gas Lift Producer Design, 263-1, 263-2 & 264-2



Gas Lift Producer Design, 262-3, 264-1, 264-3, 265-2

1. **Install a heel gas coil (5/8") to lift heel production, no more blanket gas lifting.**
2. **Heel lift gas coil set 10 – 15m TVD above lateral.**

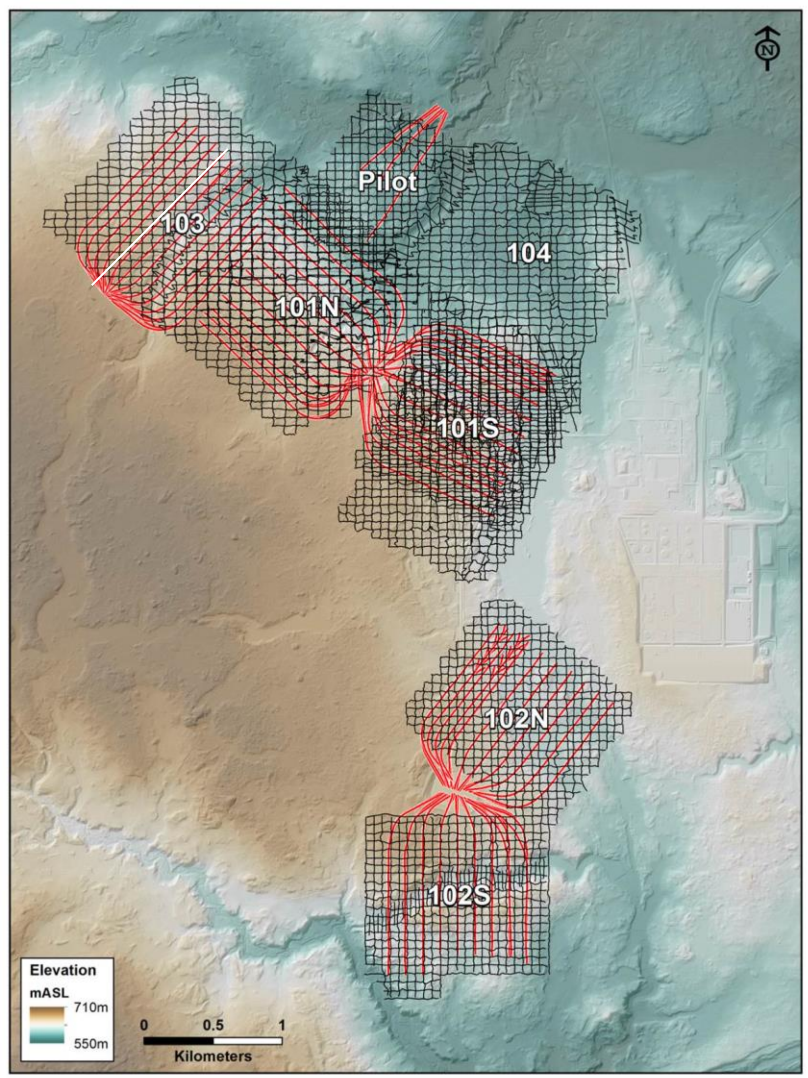


4D Seismic

Subsection 3.1.1 (6)

4D Seismic Location Map

Phase 1 Area



Pilot

- Buried analog single component geophones
- Cased dynamite shots (1/4 Kg) @ 9 m
- 14th monitor acquired in September 2015

Pad 101N

- Buried analog single component geophones
- Cased dynamite shots (1/8 Kg) @ 6 m
- 8th monitor acquired in March 2015

Pad 101S

- Buried analog single component geophones
- Cased dynamite shots (1/8 Kg) @ 6 m
- 9th monitor acquired in March 2015

Pad 102N

- Buried analog single component geophones
- Cased dynamite shots (1/8 Kg) @ 6 m
- 9th monitor acquired in April 2015

Pad 102S

- Buried analog single component geophones
- Cased dynamite shots (1/8 Kg) @ 6 m
- 5th monitor acquired in April 2014

Pads 103 and 104

- Buried analog single component geophones
- Cased dynamite shots (1/8 Kg) @ 6 m
- Baseline acquired in April 2012

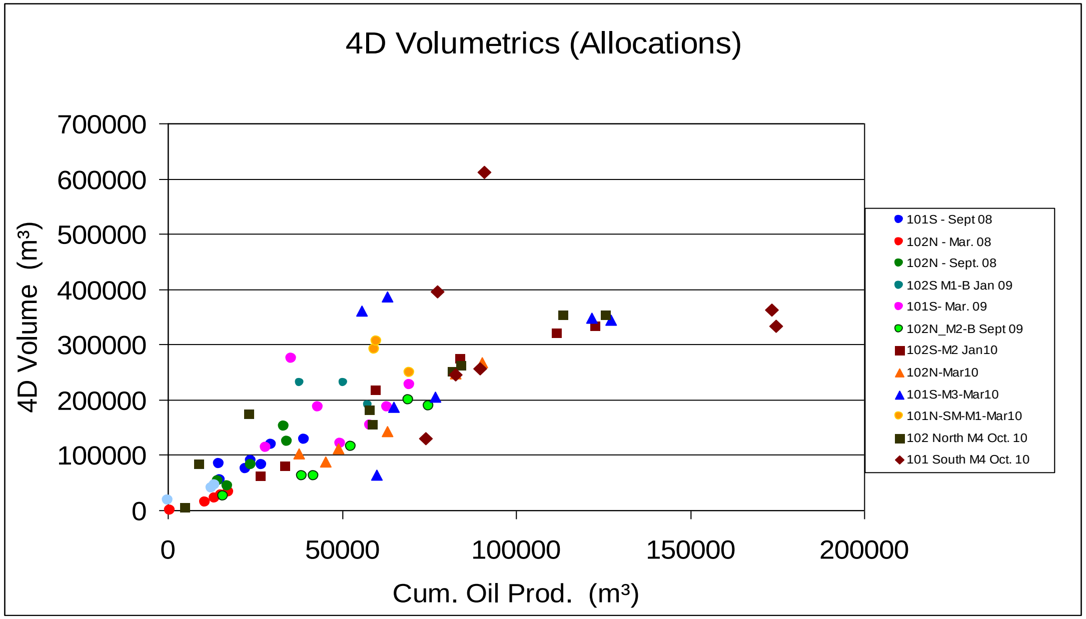
Phase 1 4D Seismic Program

PAD	2012		2013		2014		2015	
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
101N	M	M	M	M	M	M	M	
101S	M		M		M		M	
102N	M		M		M		M	
102S	M				M			
Pilot		M		M		M		M
103	B							
104	B							

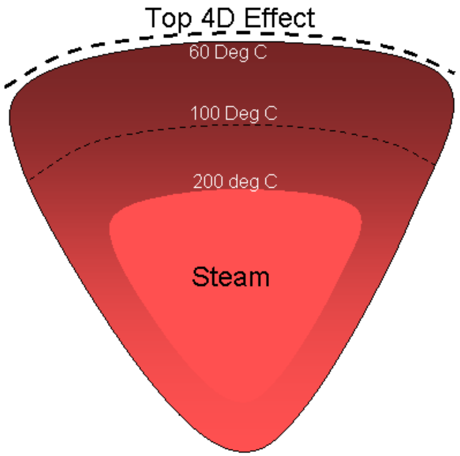
B **Baseline** M **Monitor**

4D Seismic Workflow

- **Cross-plot of 4D anomaly volumes versus allocated SAGD oil production volumes from select Phase 1 well pairs.**



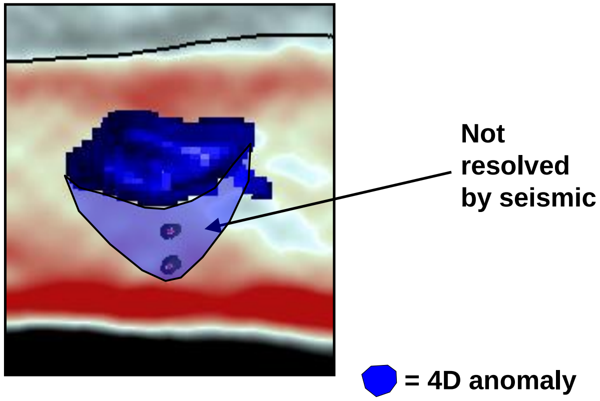
4D Observation



Temperature

Conceptual models for SAGD 4D Response

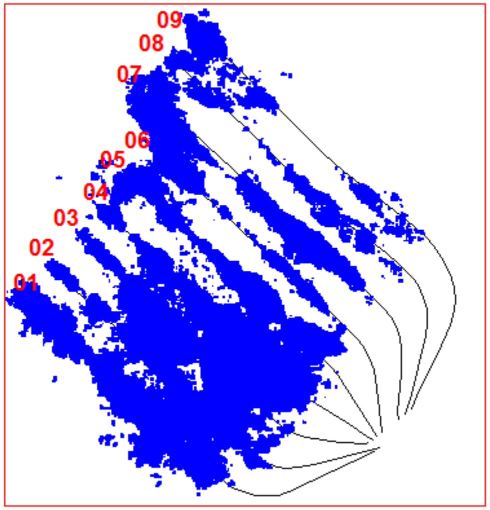
- **Because of seismic resolution there are some discrepancies between the total oil produced and the volume of 4D anomalies.**



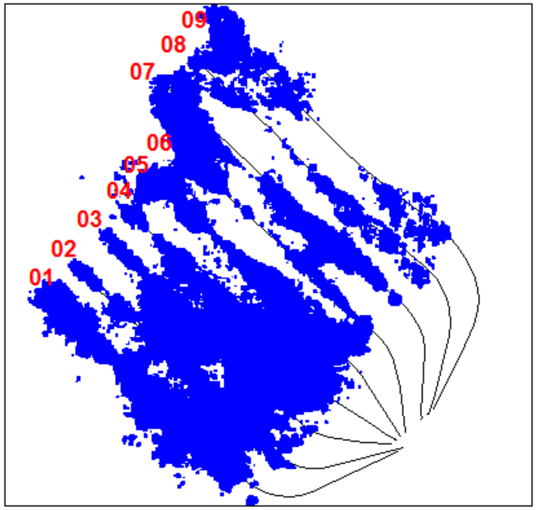
2015 4D Seismic Results Pad 101

- Well Pad 07/08/09, without a true baseline.
- 4D anomaly volume have increased for the remaining well pairs.
- Good conformance, especially at the heel.
- Well Pads 02/03 are E-SAGD pilot.

101 North 7th monitor - September 2014

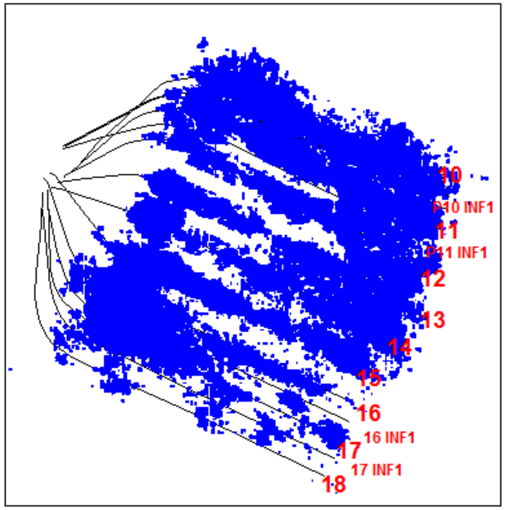


101 North 8th monitor - March 2015

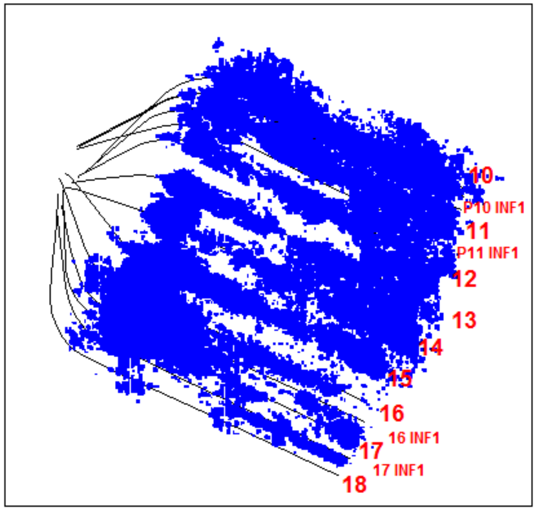


- 4D anomaly volumes have increased.
- Continued conformance improvement along Well Pad 10, 11, 16, 17.
- Infill wells drilled between Well Pads 10, 11, 12, 16, 17 and 18 to optimize production in a geological more complex zone.

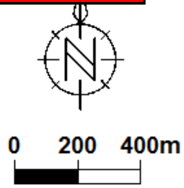
101 South 8th monitor - March 2014



101 South 9th monitor - March 2015



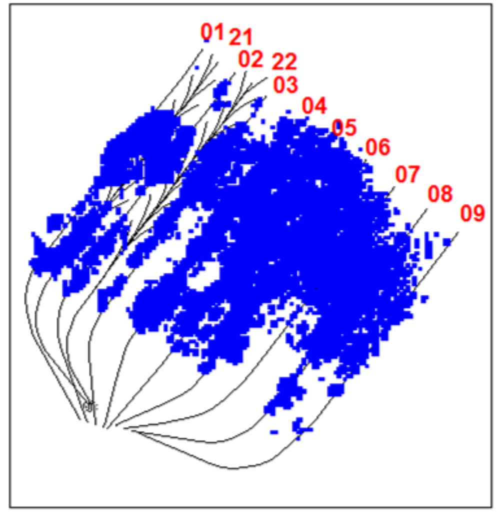
= 4D anomaly
~60 deg C Isotherm



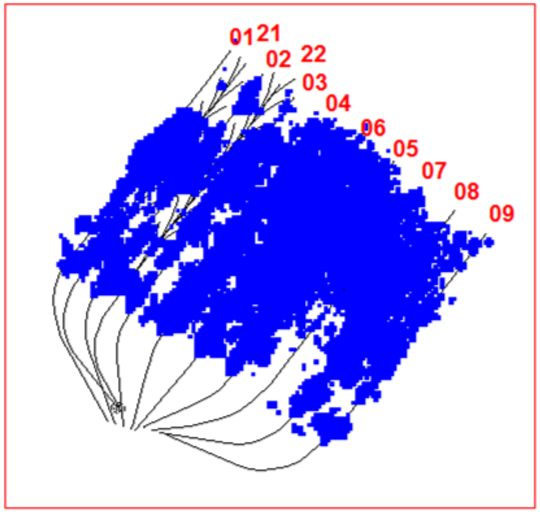
2014 4D Seismic Results Pad 102

- **4D anomaly volumes have increased. Improved conformance along well pairs 1 to 9.**

102 North 8th monitor - April 2014

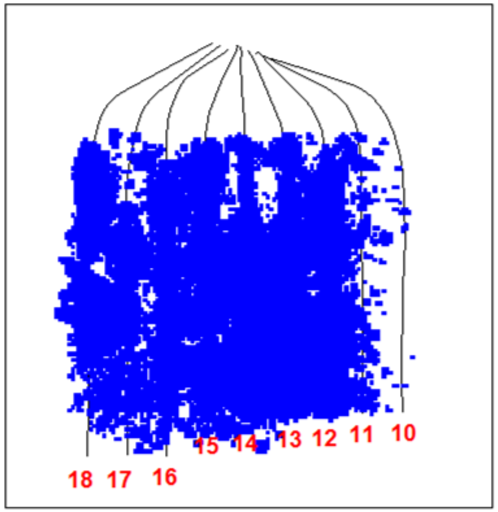


102 North 9th monitor - April 2015

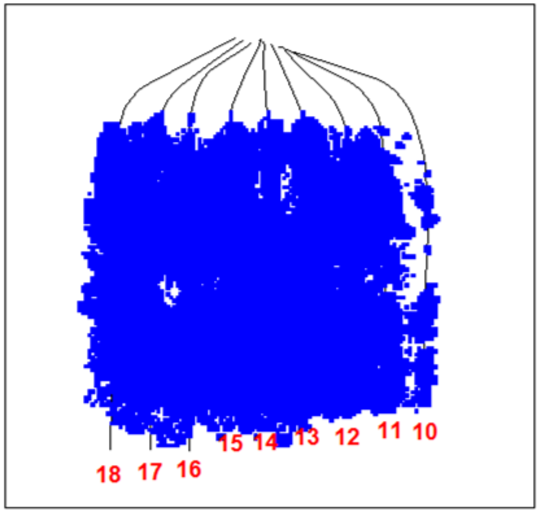


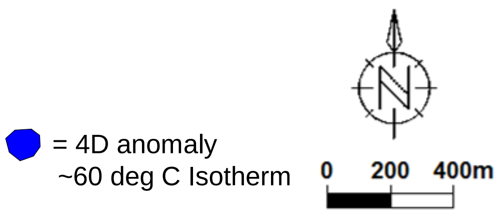
- **4D anomaly volume have increased. Improved conformance along well pairs 10 to 18.**

102 South 4th monitor -March 2012



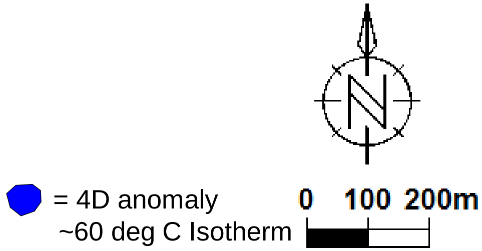
102 South 5th monitor - April 2014



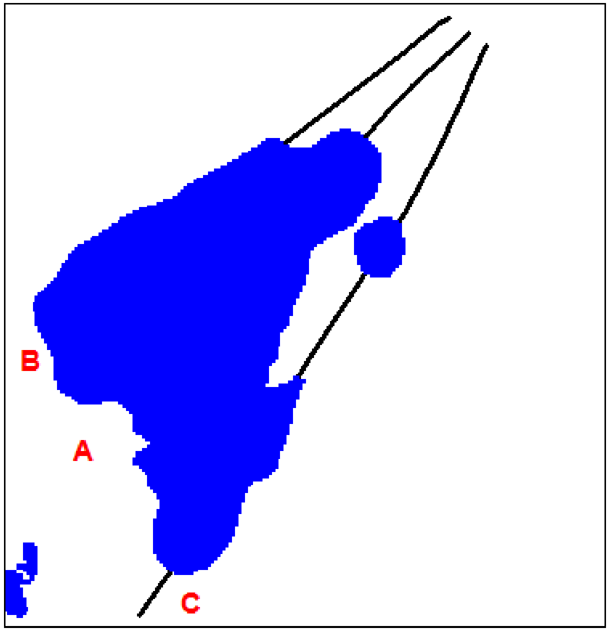


2015 4D Seismic Results Pilot

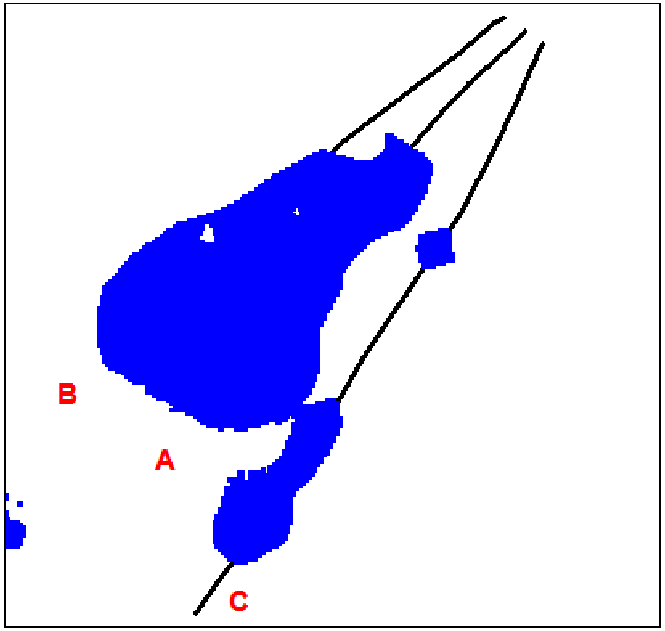
- Poor SAGD conformance in middle of well pair “C”.
- Coalescence between well pair B/A and C.



Pilot 13th monitor - September 2014



Pilot 14th monitor - September 2015



Seismic Examples: 101-P16 Conformance (Toe)

Problem:

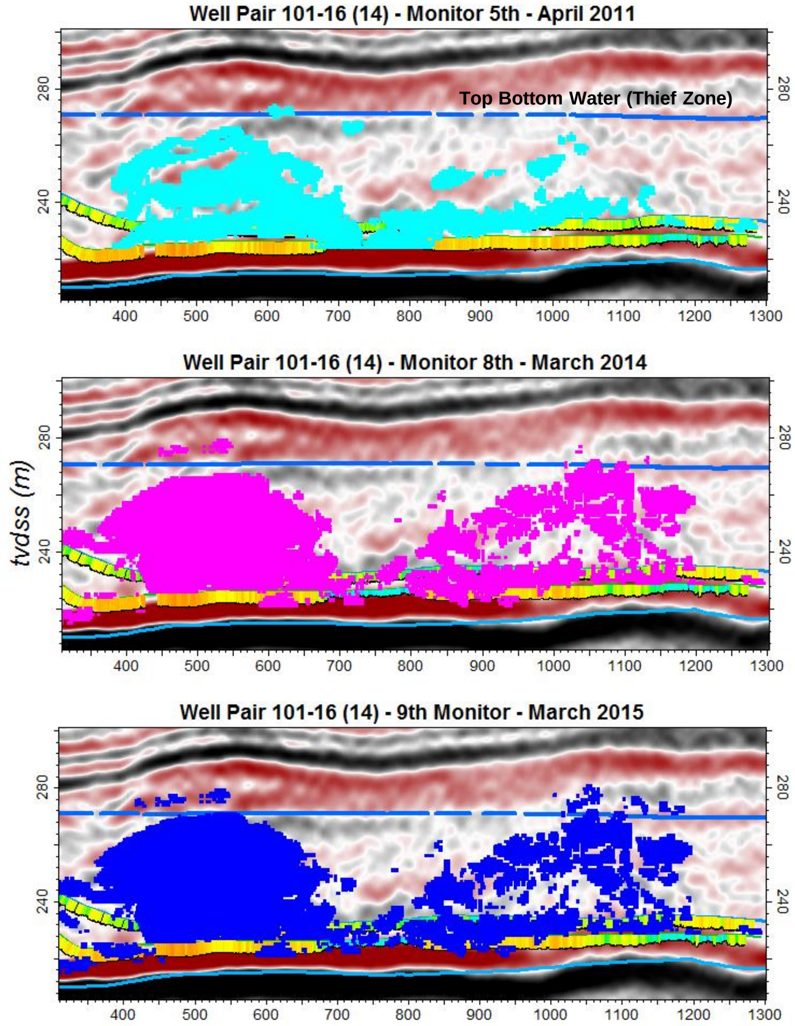
- **Well pair 101-P16 lacking good conformance along well pair.**

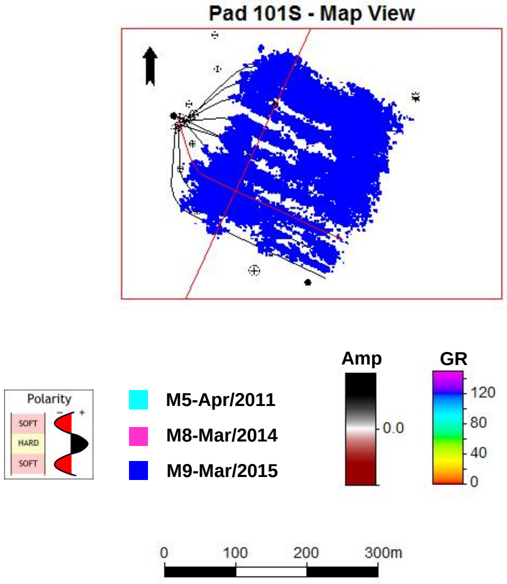
Action:

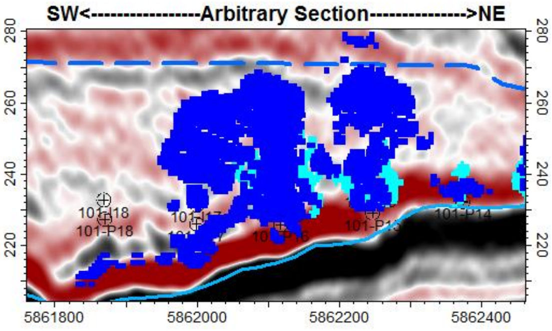
- **Increase pressure of steam injection at toe.**

Results:

- **Conformance improved at toe.**







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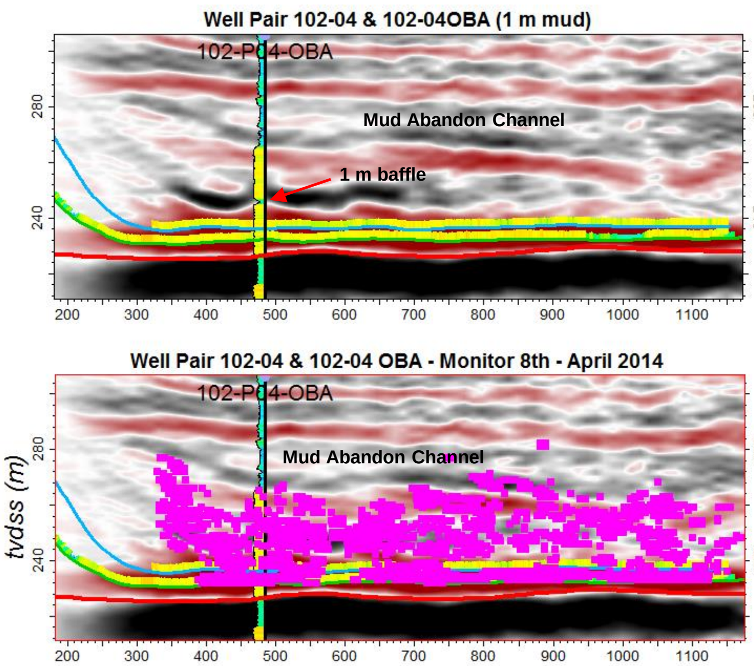
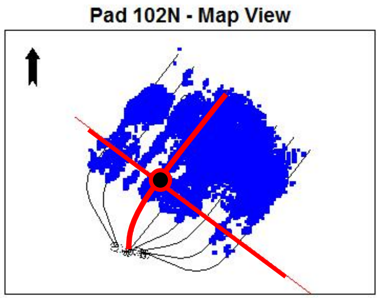
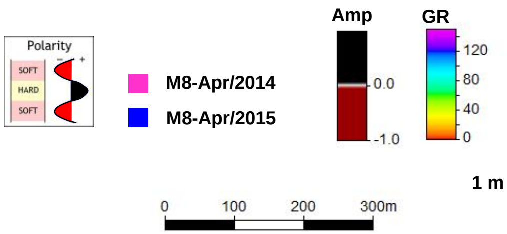
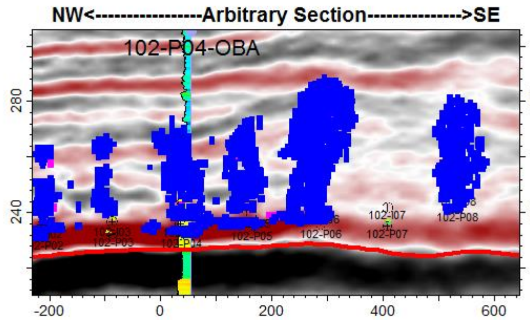
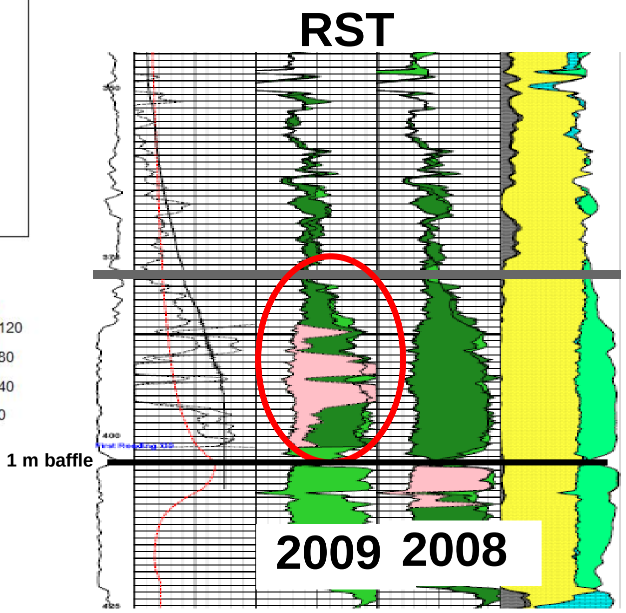
Seismic Examples: 102-04 OBA Baffle Breakthrough (Heel)







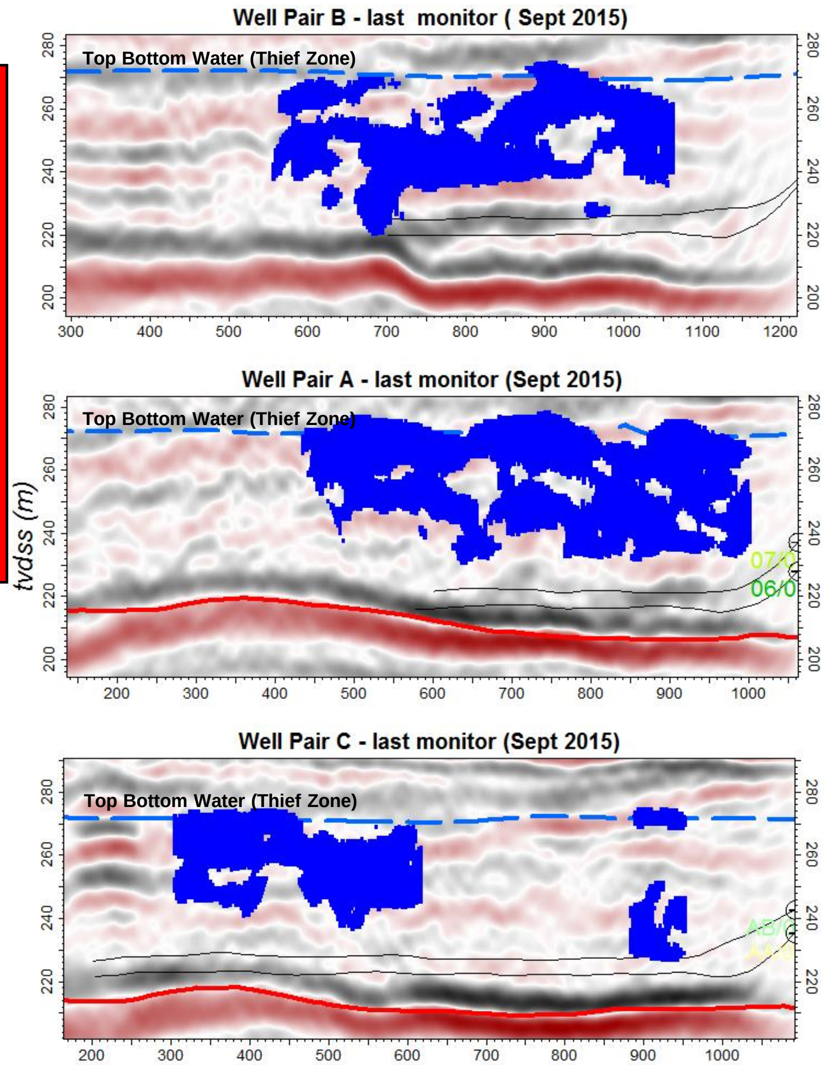


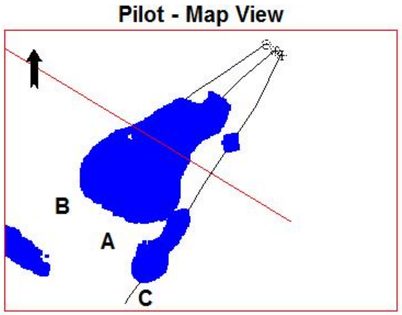


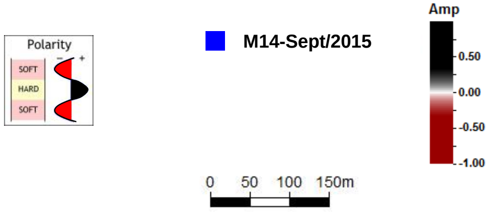
- **2009 RST and 4D surveys confirmed recovery above mudstone.**
- **Operating pressure reduced to manage thief zone interactions.**

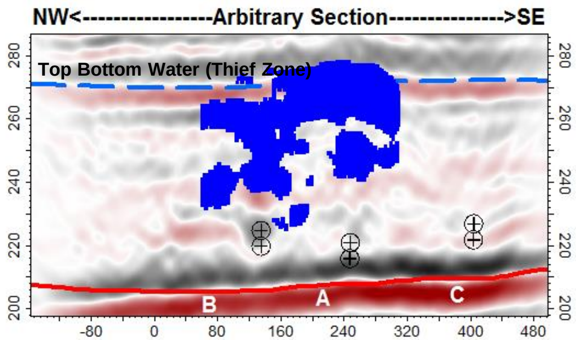
Pilot 4D Seismic 14th Monitor (Sept-2015)

- **Objectives - Top water and gas thief zone interaction.**
- **Poor SAGD conformance in middle of well pair C.**
- **Coalescence between WP B/A and C.**









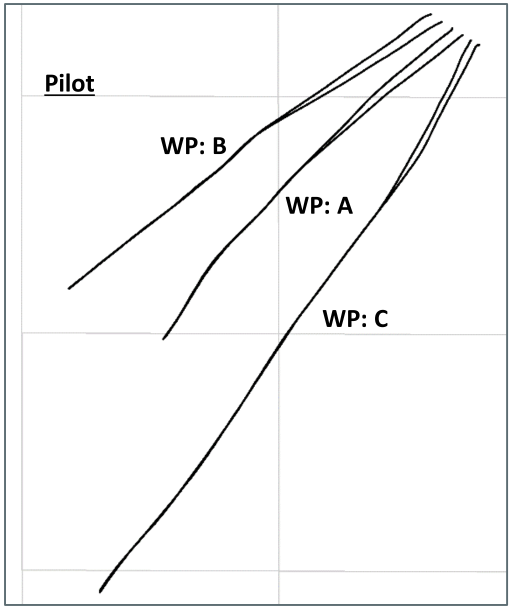
4D Seismic Program 2015

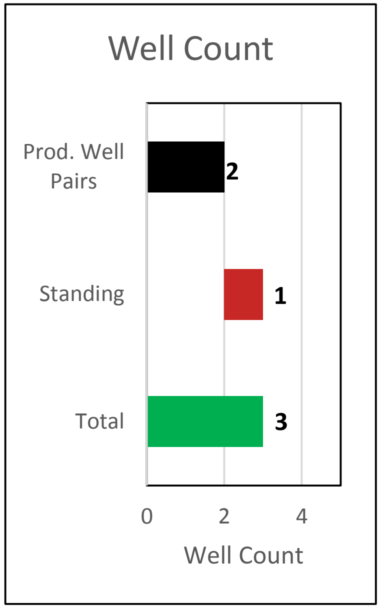
- 4D seismic has proven very useful in monitoring and optimizing conformance and pressure strategy.
- 4D correlates with observation well data.
- Continuing to optimize heel/toe production/injection splits using 4D results.
- Ongoing efforts to history match reservoir models using 4D seismic.

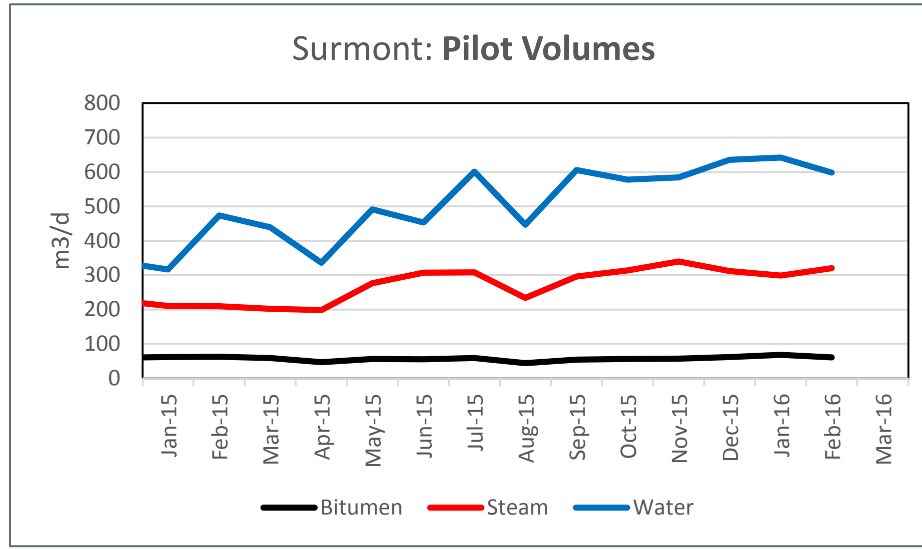
Scheme Performance

Subsection 3.1.1 (7)

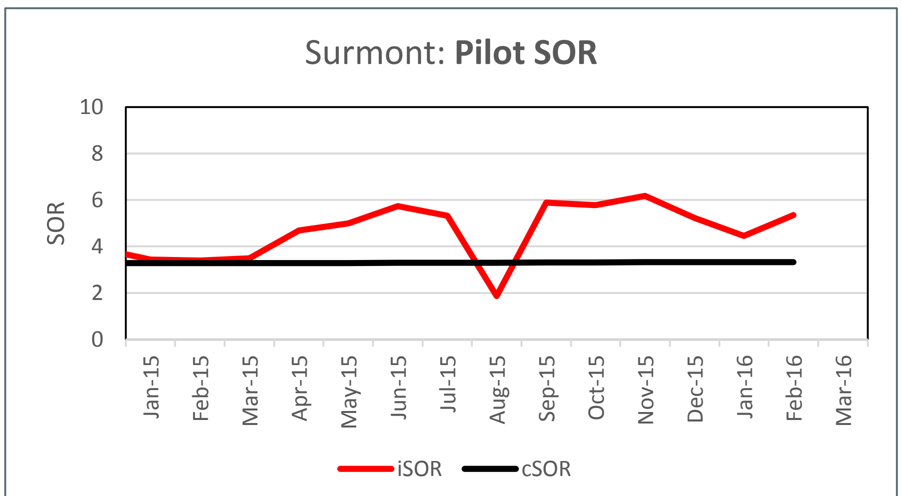
Surmont: Pilot Performance Plot







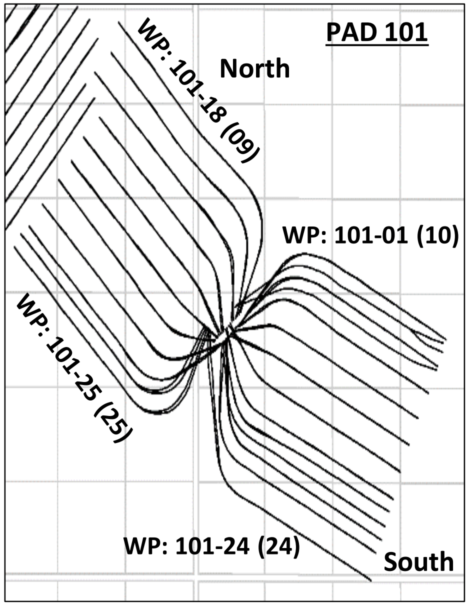
Volumes (Jan, 2015 – Feb, 2016, E3M3) – Oil: 24.3; Steam: 218.5; Water: 116.1

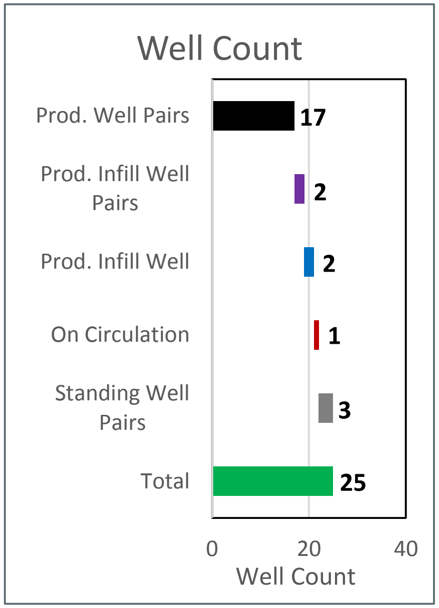


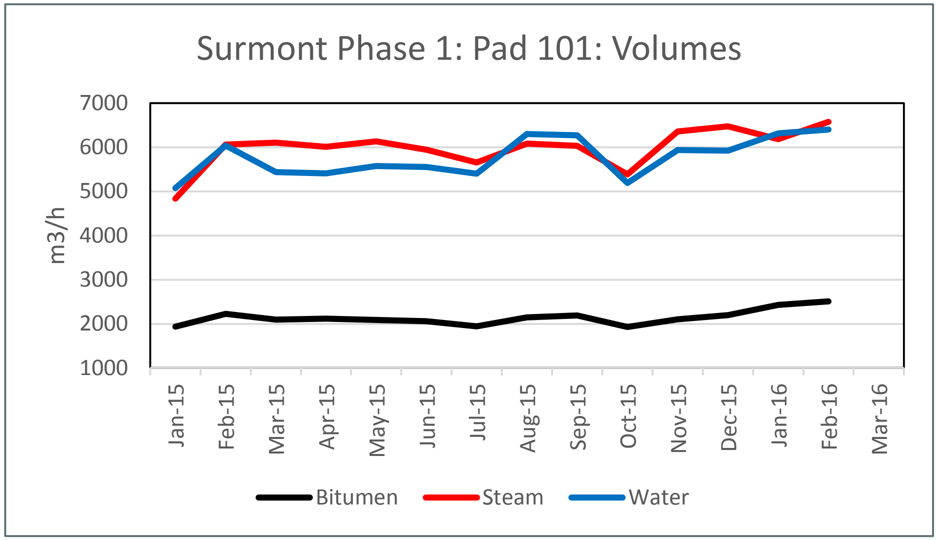
Ratio (Jan, 2015 – Feb, 2016) – SOR: 4.8; WOR: 9.0

- **Top water influx into the steam chamber is evident as seen in the increase in water production.**

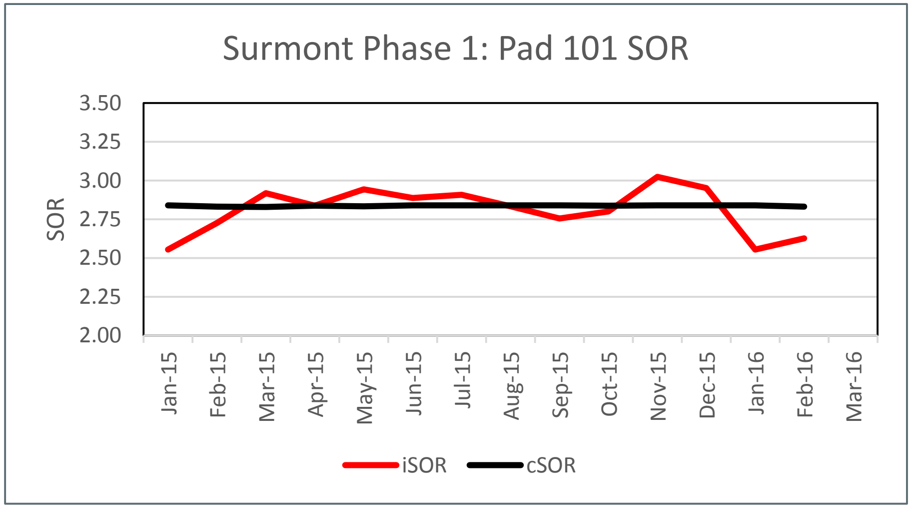
Surmont: Pad 101 Performance Plots







Volumes (Jan, 2015 – Feb, 2016, E3M3) – Oil: 909.8; Steam: 2543.7; Water: 2451.0

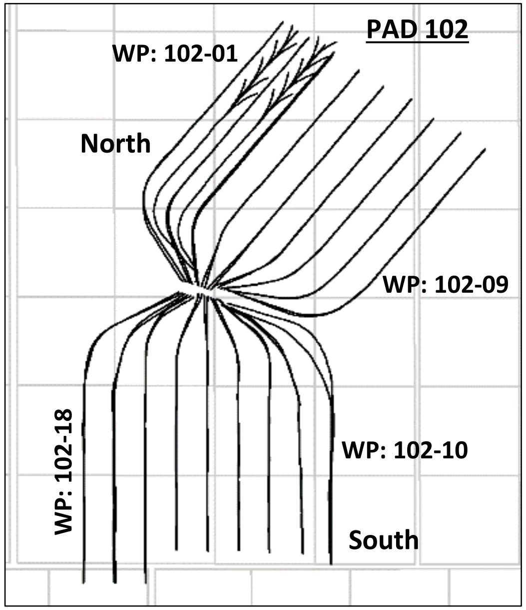


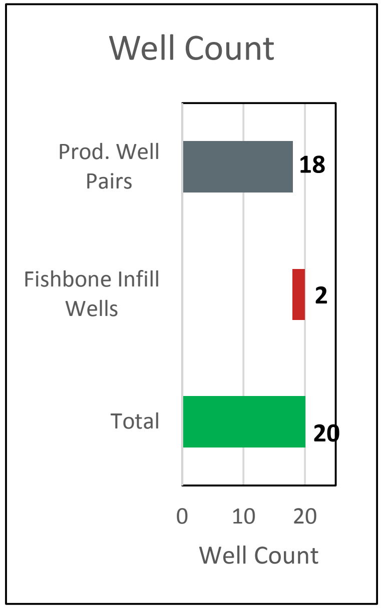
Ratio (Jan, 2015 – Feb, 2016) – SOR: 2.8; WOR: 2.7

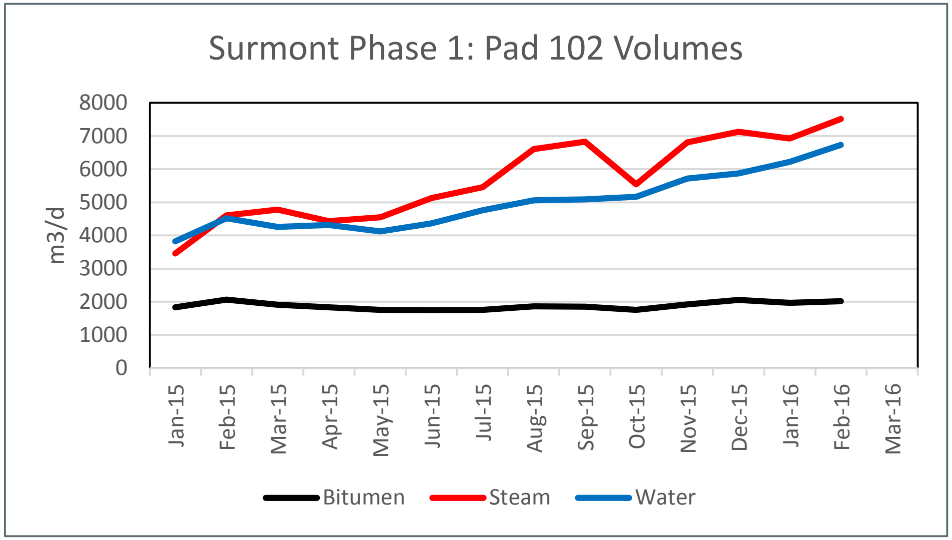
- **101-24/25/26 have been deferred**
- **101-07(18) on circulation**

- **Increased steam injection has resulted in incremental bitumen production as the iSOR has remained flat or decreased**
  - **Refer to section Subsection 3.1.1 (7g)**

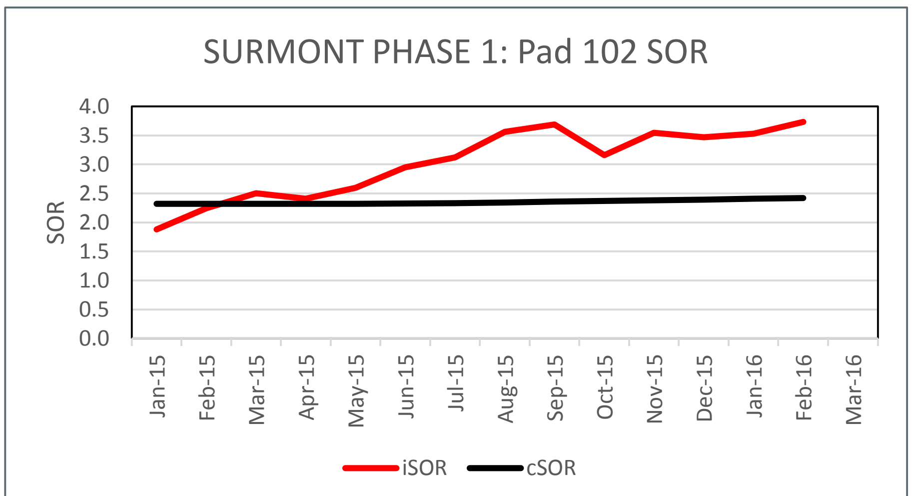
Surmont: Pad 102 Performance Plots







Volumes (Jan 2015 – Feb, 2016, E3M3) – Oil: 798.2; Steam: 2421.0; Water: 2124.5

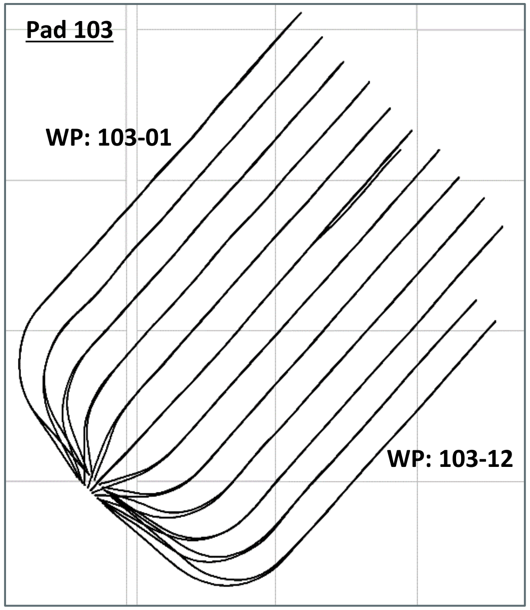


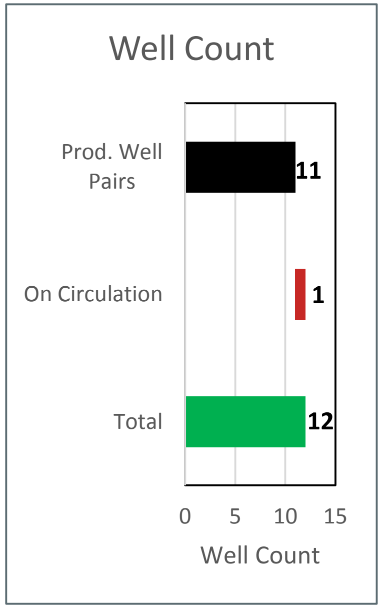
Ratio (Jan, 2015 – Feb, 2016) – SOR: 3.0; WOR: 2.7

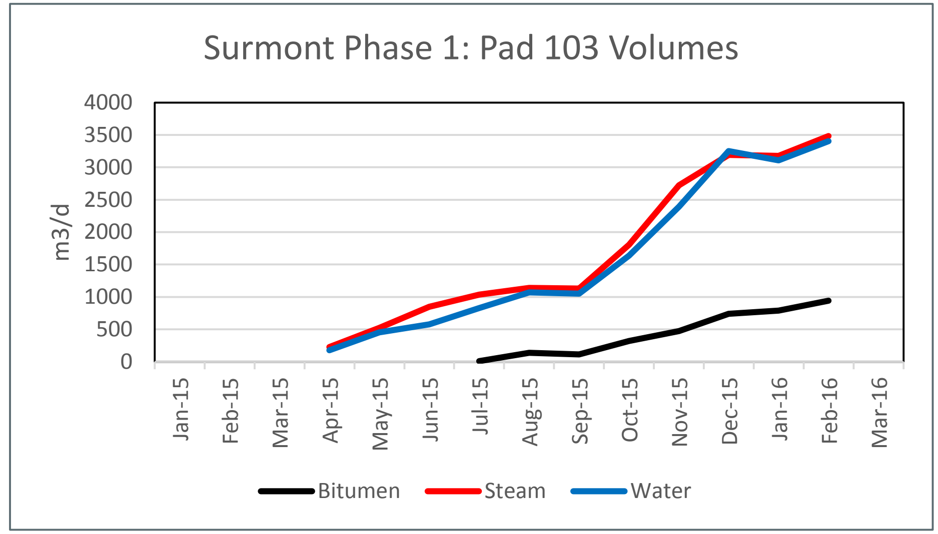
- **Steam stimulating fishbone well 102-21**
  - **Evaluation is on-going**
- **Fishbone well 102-22 remains standing**

- **iSOR continues to climb as expected with increased steam injection – marginal gains in bitumen production but upward trend expected to continue in 2016**
  - **Refer to section Subsection 3.1.1 (7g)**

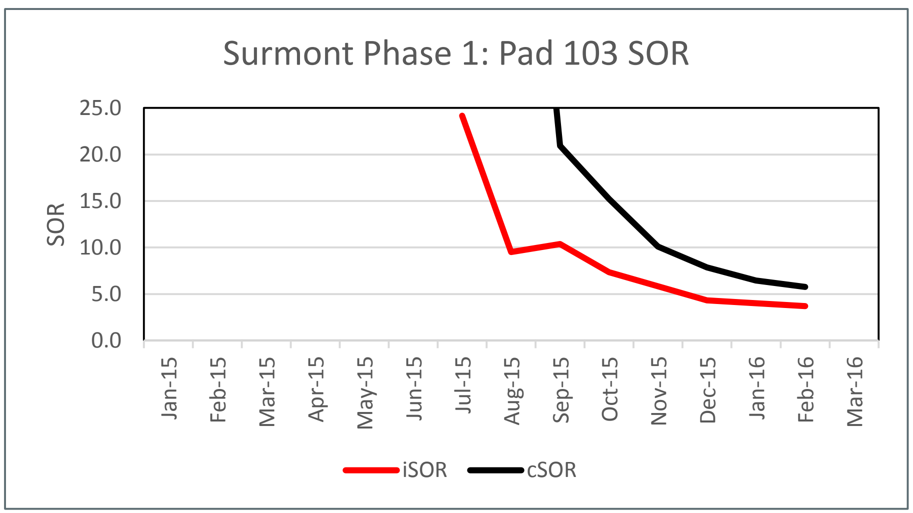
Surmont: Pad 103 Performance Plots







Volumes (Jan, 2015 – Feb, 2016, E3M3) – Oil: 106.9; Steam: 585.9; Water: 545.7

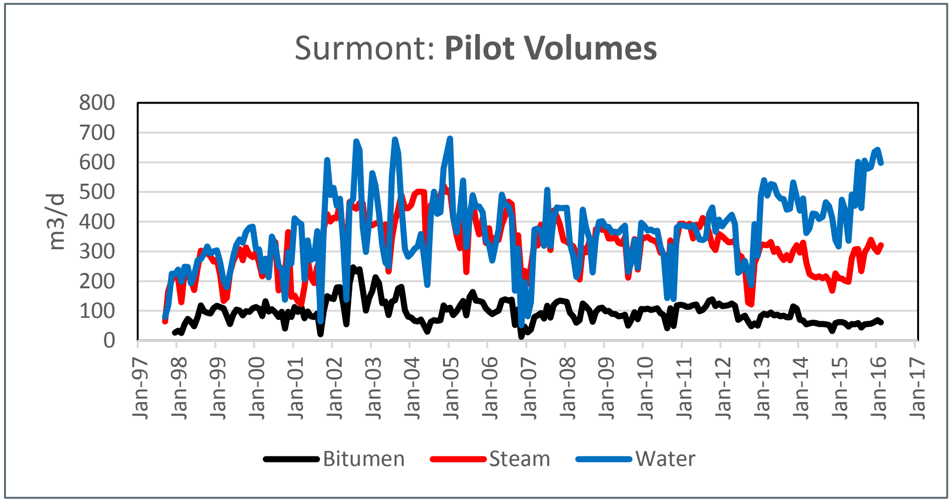


Ratio (Jan, 2015 – Feb, 2016) – SOR: 5.5; WOR: 5.1

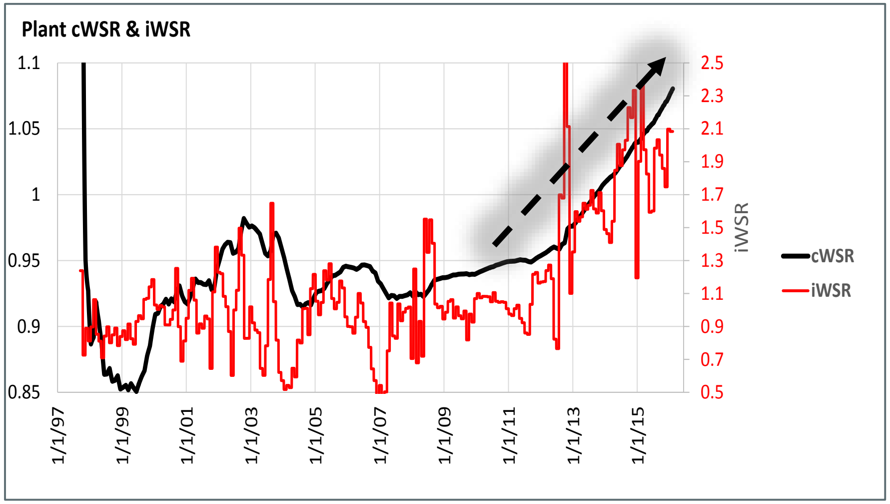
- **Initial production performance in line with forecasted expectations.**
- **ISOR continues to decline as expected with a new pad startup.**

Surmont: Historical Pilot Performance Plot

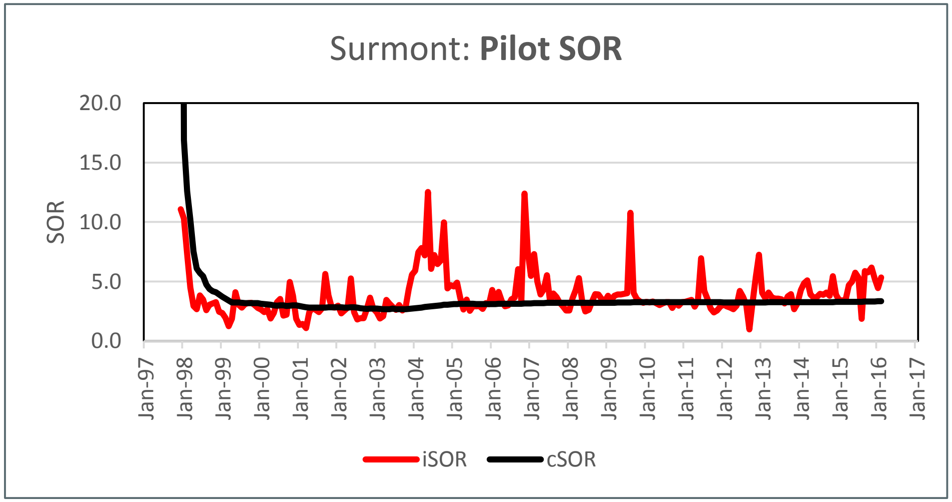
SURMONT PILOT– WELL PAIRS A, B, C



AGGREGATE VOLUMES (E3M3) - OIL: 638.6; STEAM: 2129.7; WATER: 2491.4



TOP WATER INFLUX INTO STEAM CHAMBER

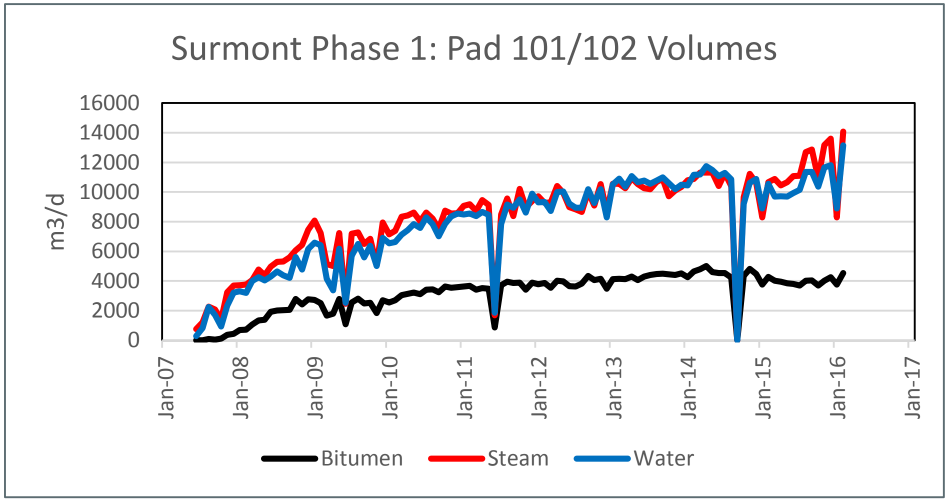


AGGREGATE RATIOS- cSOR: 3.3; cWOR: 3.9

- **Pilot performance impacted by thief zone (top water).**
- **Resulted in reduced thermal efficiency.**

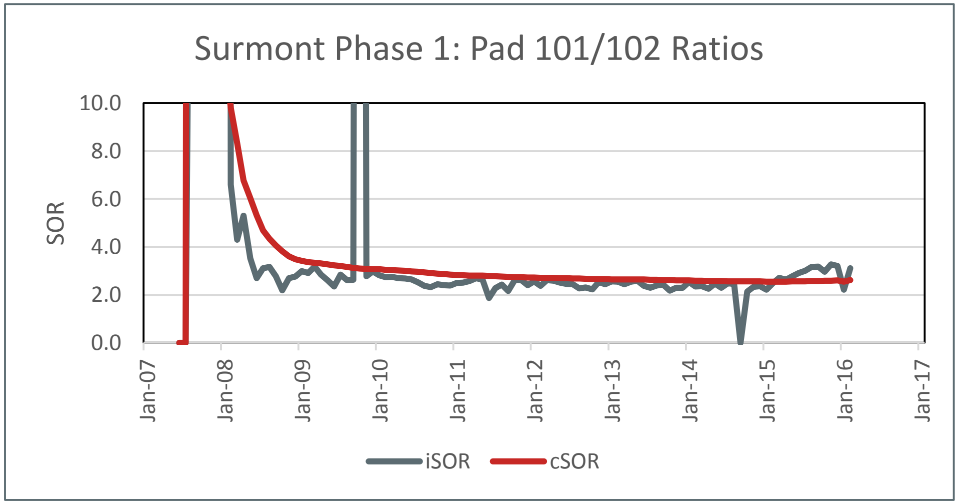
Surmont: Phase 1 Historical Performance Plots

MATURING BASE – PADS 101 / 102



- **Phase 1 continues to regain production post 2014 turnaround - refer to Subsection 3.1.1 (7g).**
- **Focus remains on sustaining and optimizing base production.**

AGGREGATE VOLUMES (E6M3) - OIL: 10.2; STEAM: 26.6; WATER: 25.3

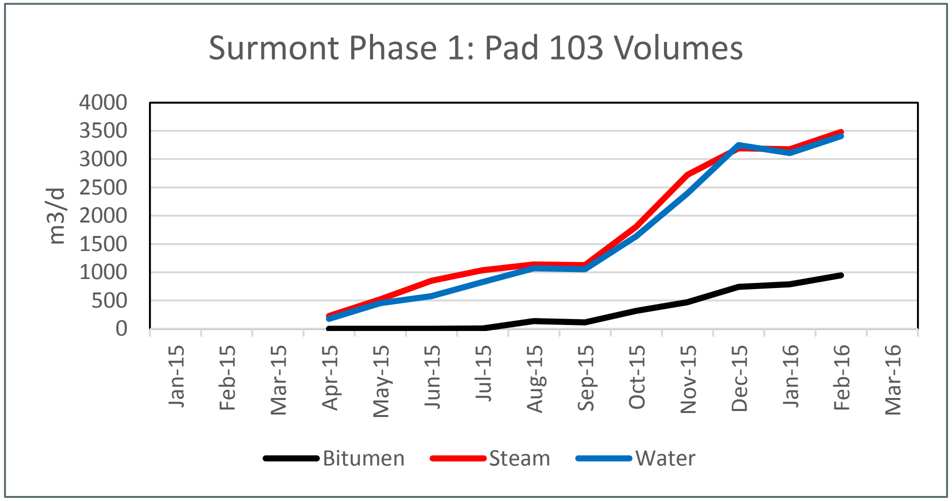


- **Recent increase due to incremental steam injection - refer to Subsection 3.1.1 (7g).**
- **iSOR remains within expectations.**

AGGREGATE RATIOS – cSOR: 2.6; cWOR: 2.5

Surmont: Phase 1 Historical Performance Plots

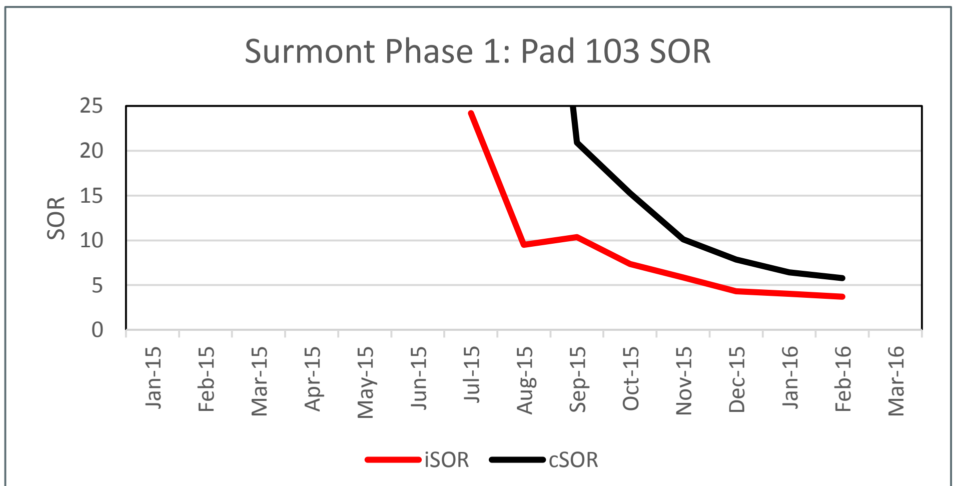
SUSTAINING PAD(S) – PAD 103



AGGREGATE VOLUMES (E3M3) - OIL: 106.9; STEAM: 585.9; WATER: 545.7

- **Pad 103 brought online in April, 2015.**
- **FCD completion outperforms slotted liner.**
  - **– Refer to Subsection 3.1.1 7(g)**

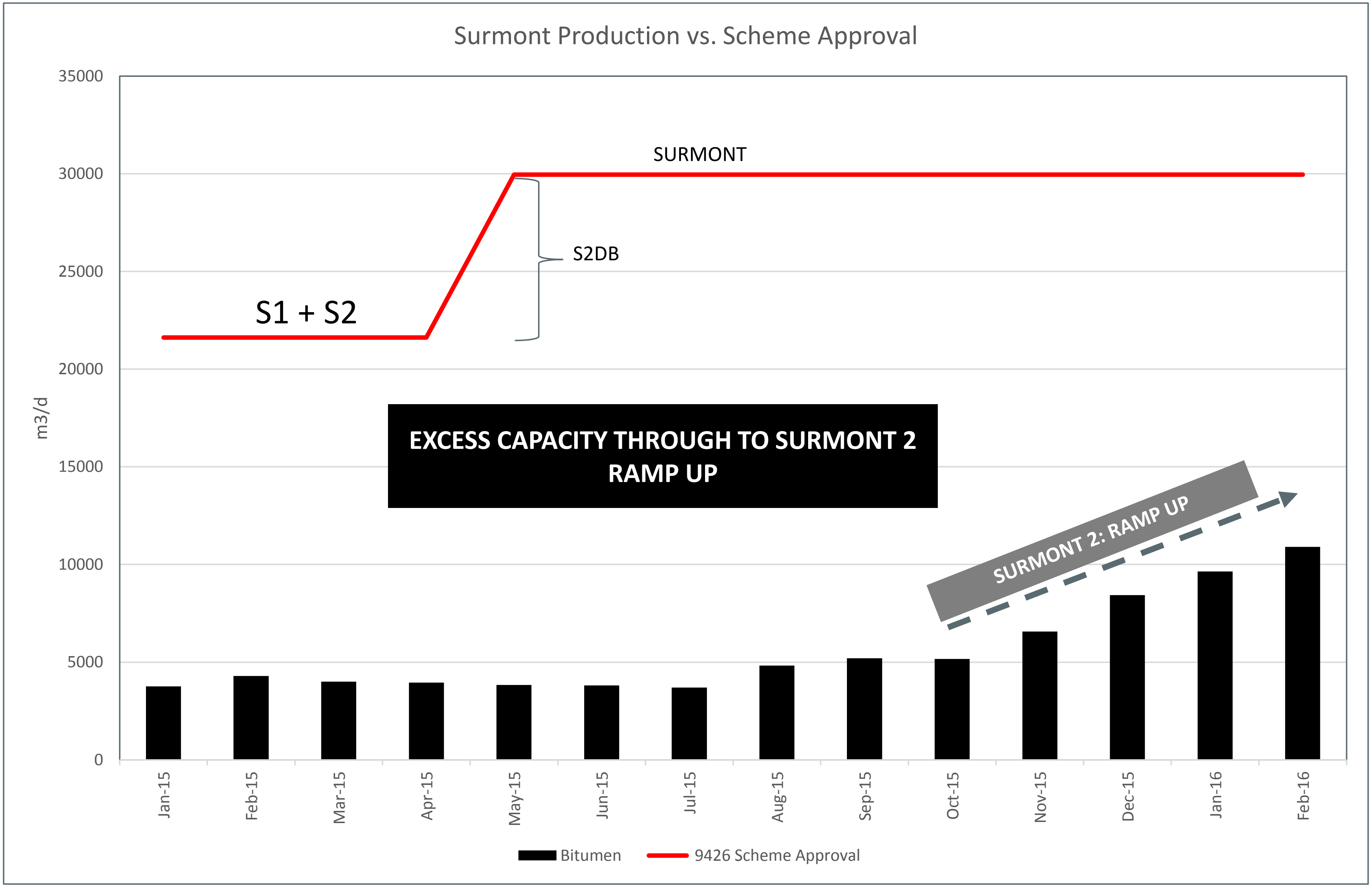
- **Initial production performance in-line with forecasted expectations.**



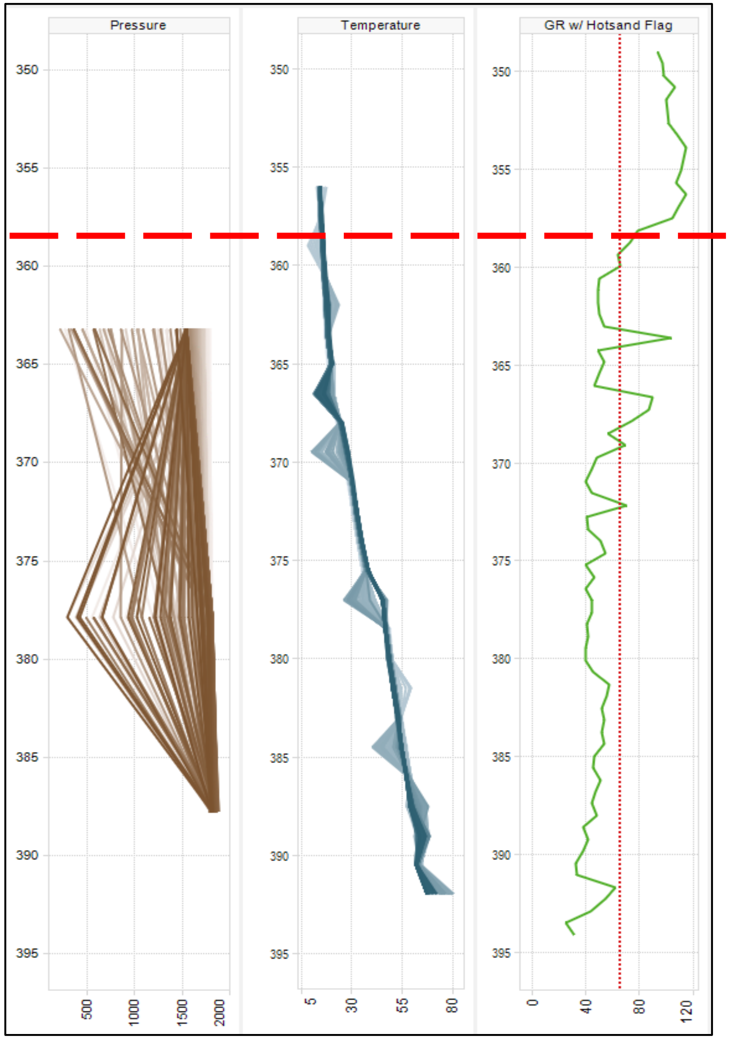
AGGREGATE RATIOS- cSOR: 5.69; cWOR: 5.28

- **iSOR continues to decline as expected with a new pad startup.**

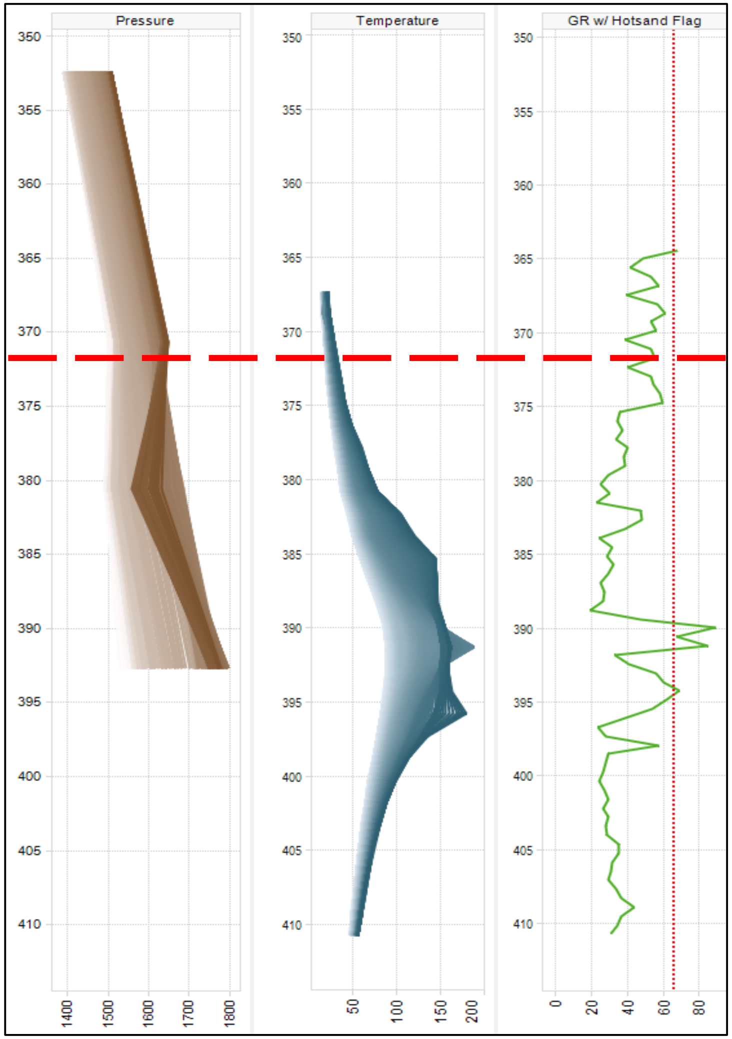
Surmont: Production vs. Scheme Approval



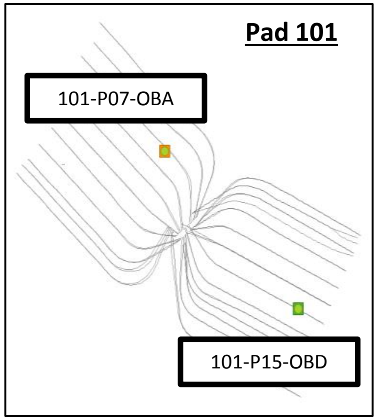
Obs Wells Temp & GR – 101-P07-OBA, 101-P15-OBD



101-P07-OBA 100-13-13-083-07W4 / *21.9m offset*



101-P15-OBD 105/07-13-083-07W4 / *5.0m offset*



- Temperature and pressure development; No significant changes.

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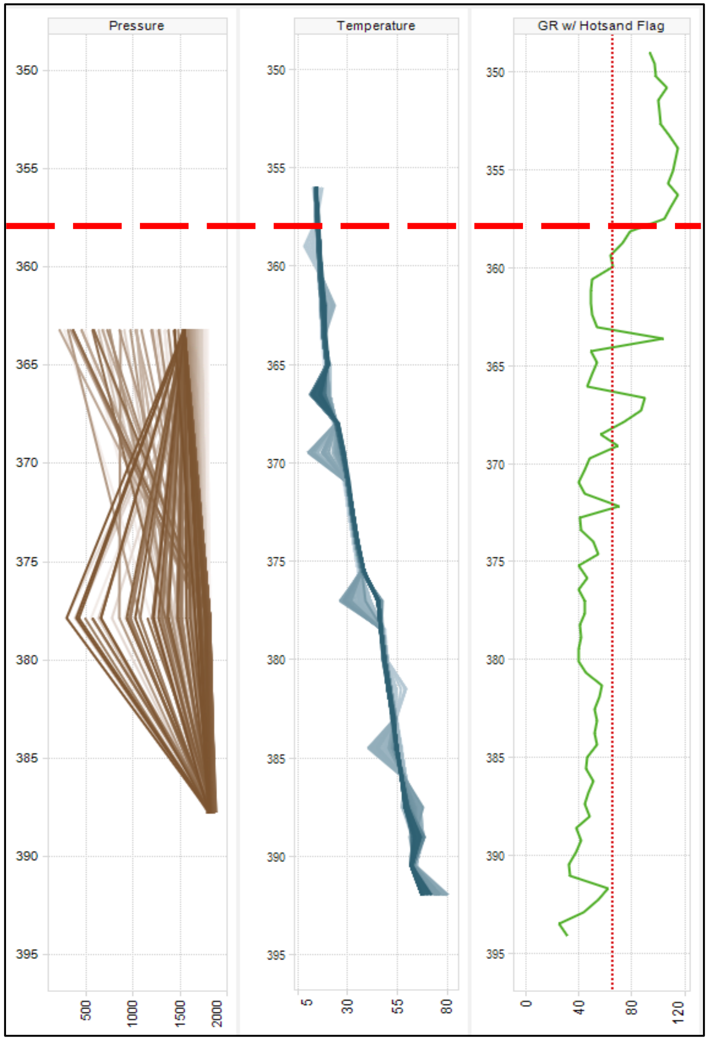
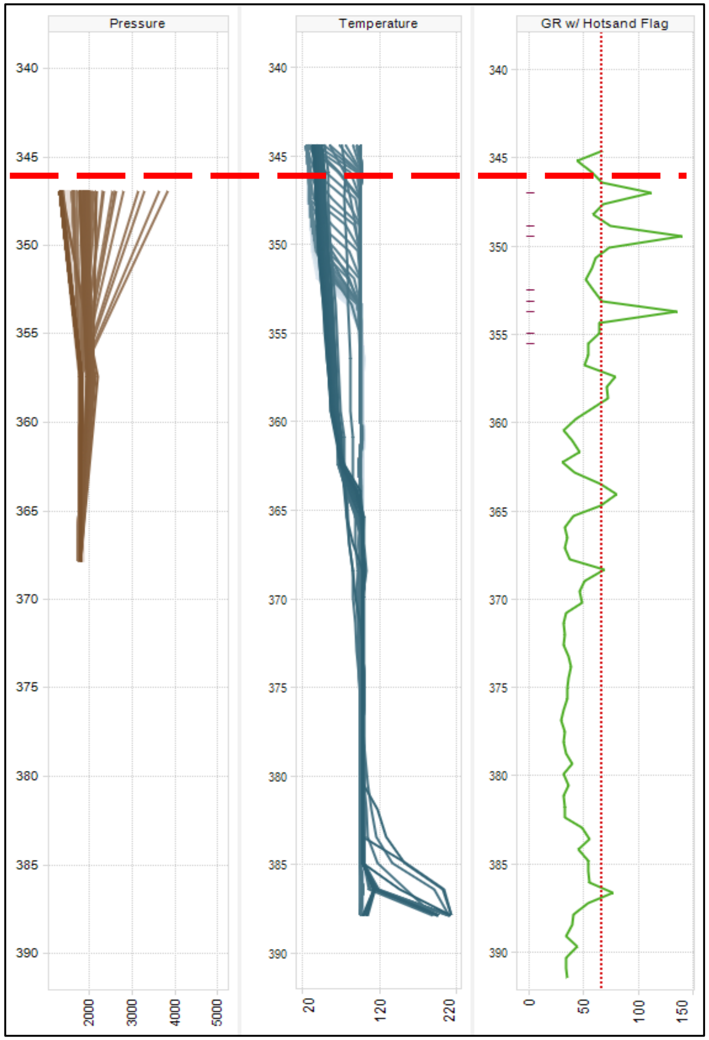
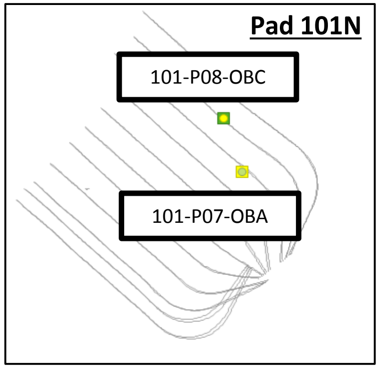
Surmont: Obs Wells Temp & GR – 101-P07-OBA, 101-P08-OBC







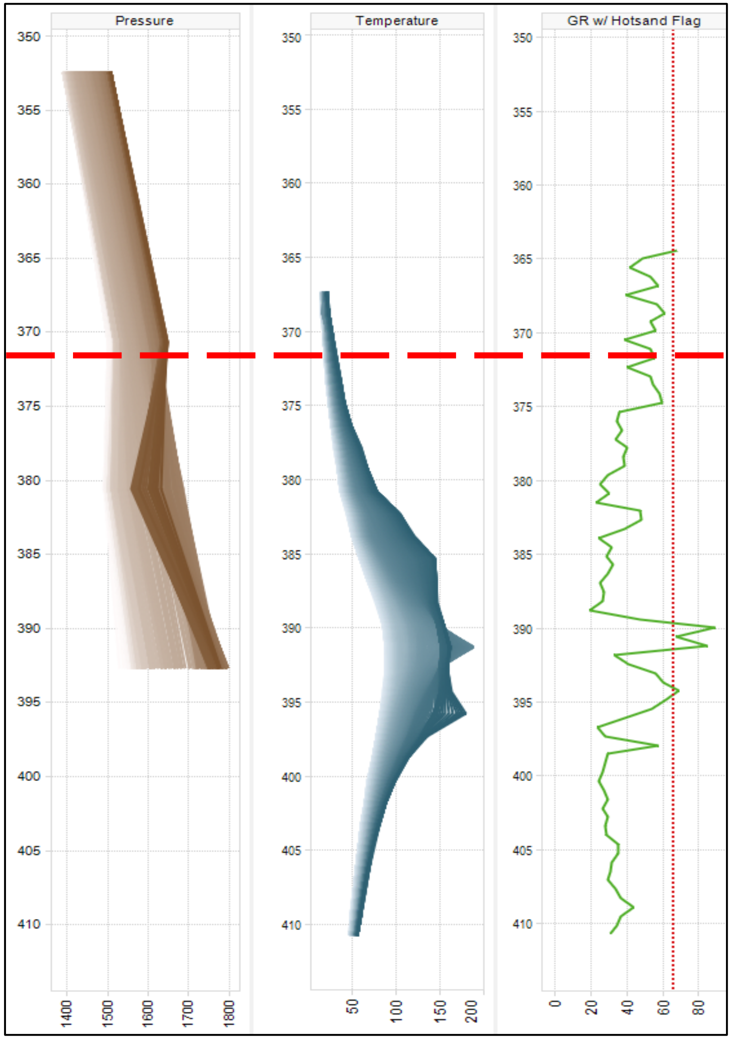
101-P07-OBA 100/13-13-083-07W4 *21.9m offset*

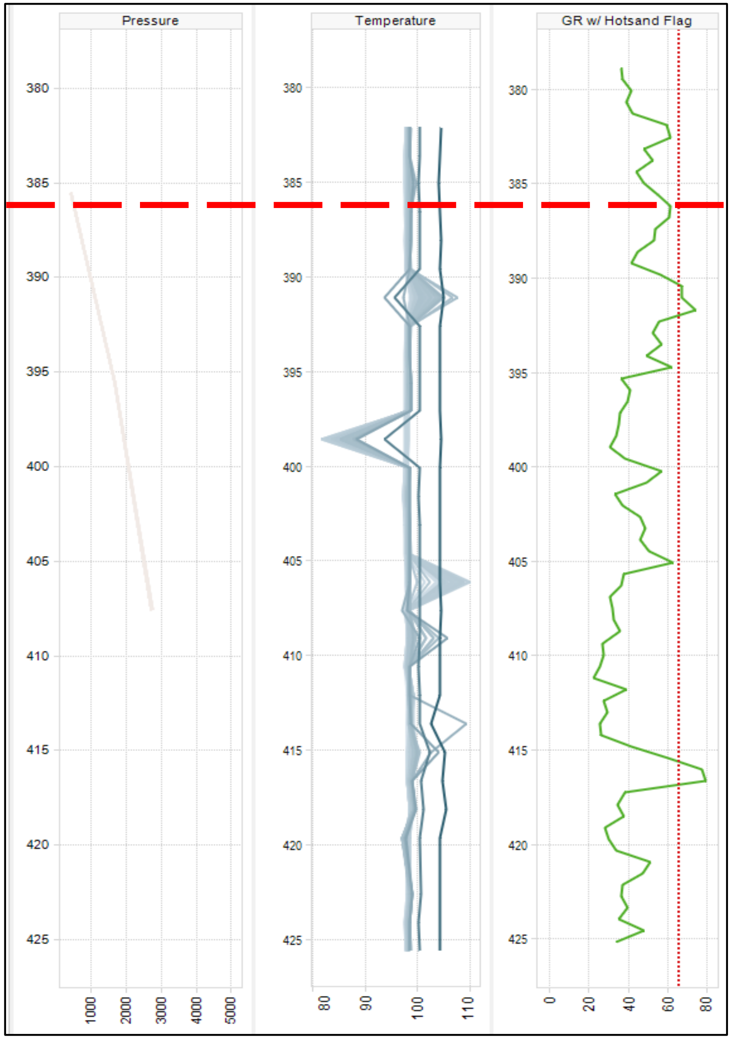
101-P08-OBC 103/01-23-083-07W4 *8.41m offset*

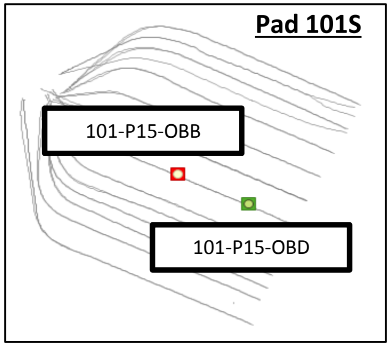
- Temperature and pressure development; No significant changes.

ConocoPhillips

Surmont: Obs Wells Temp & GR – 101-P15-OBD, 101-P15-OBB





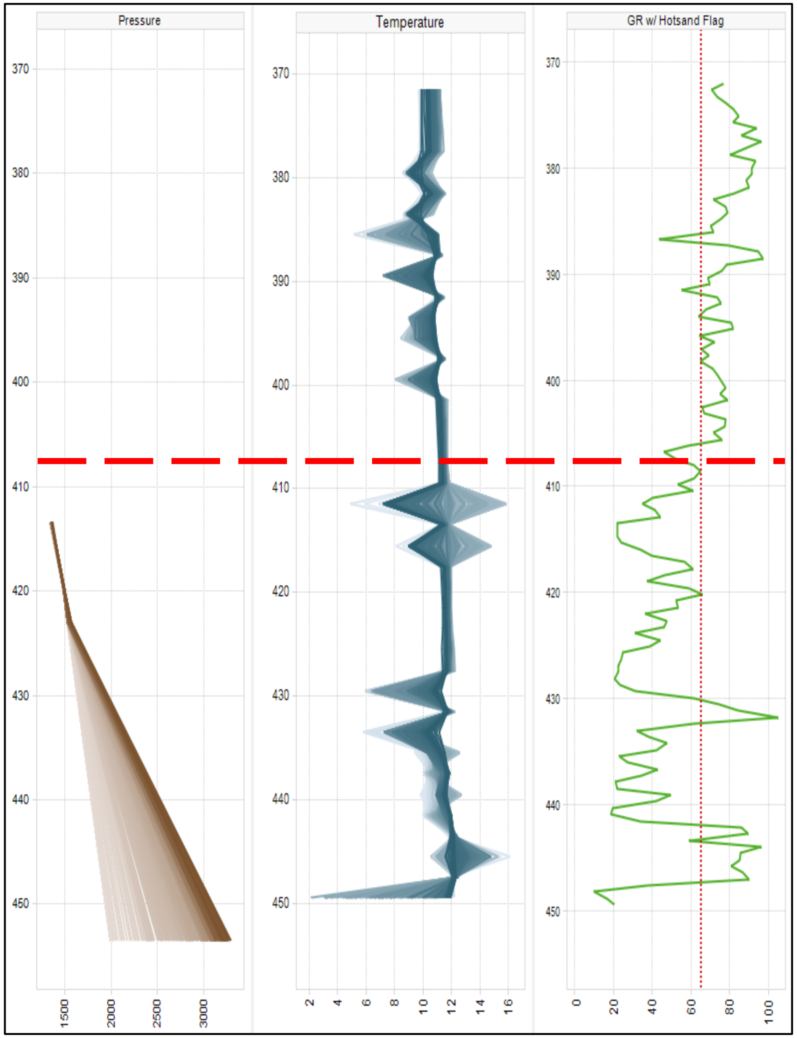


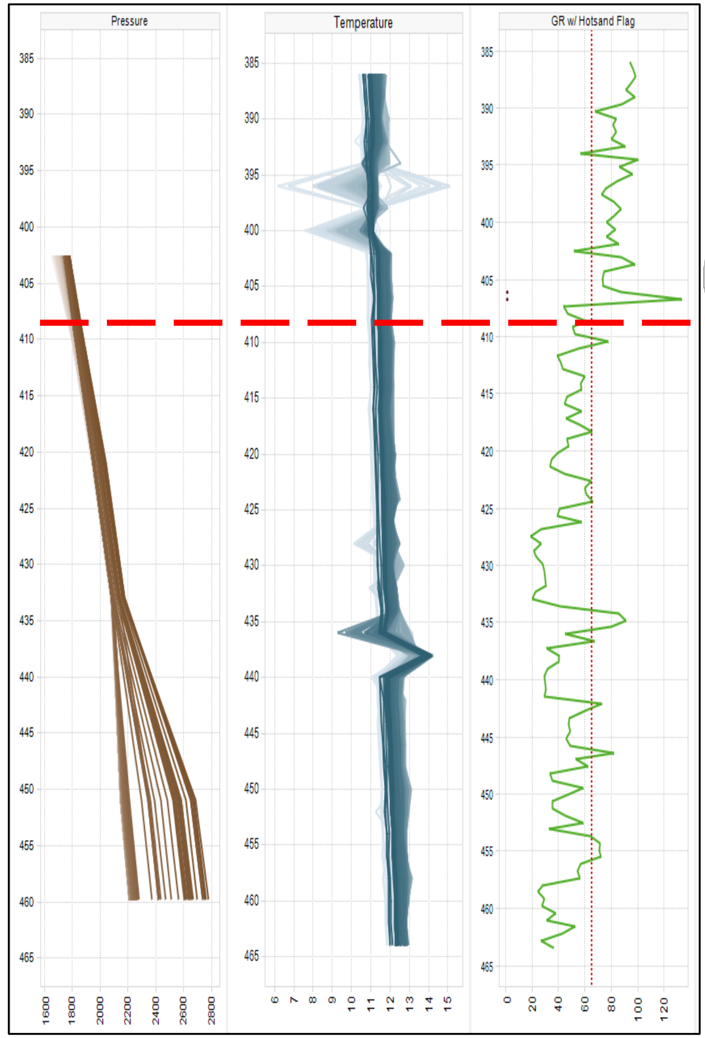
101-P15-OBD 105/07-13-083-07W4 *5.0m offset*

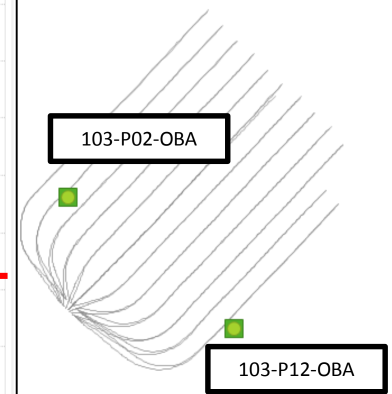
101-P15-OBB 100/06-13-083-07W4 *8.38m offset*

- Temperature and pressure development; No significant changes.

Obs Wells Temp & GR – 103-P02-OBA, 103-P12-OBA





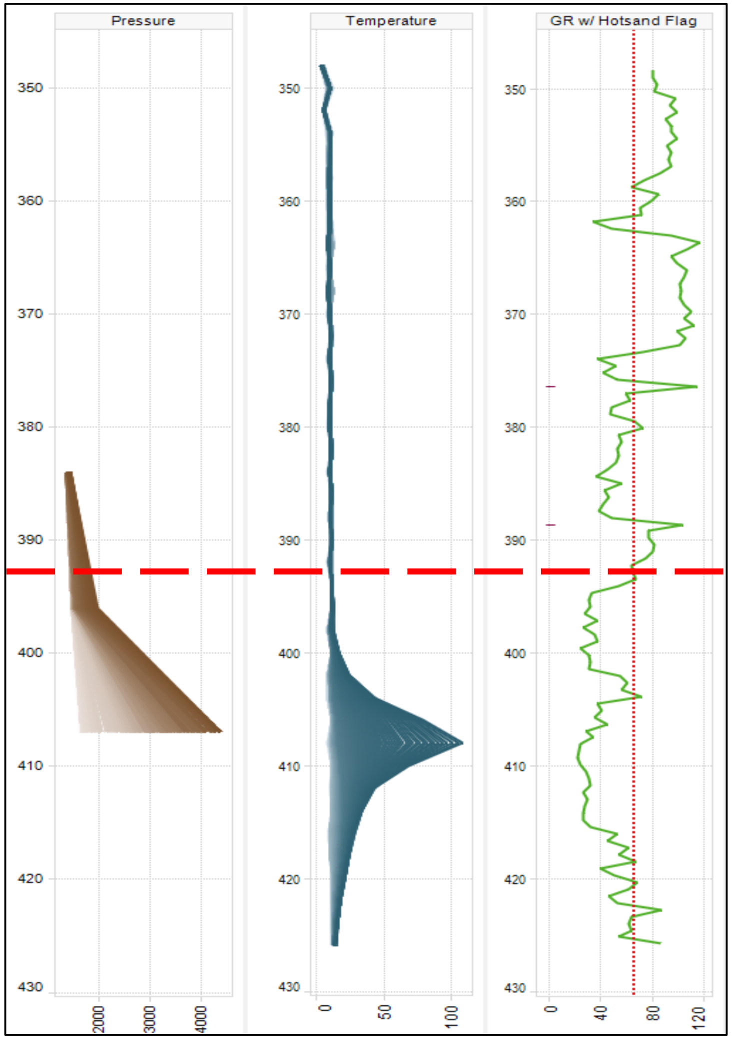


103-P02-OBA 100/08-22-083-07W4 / *20.7m offset*

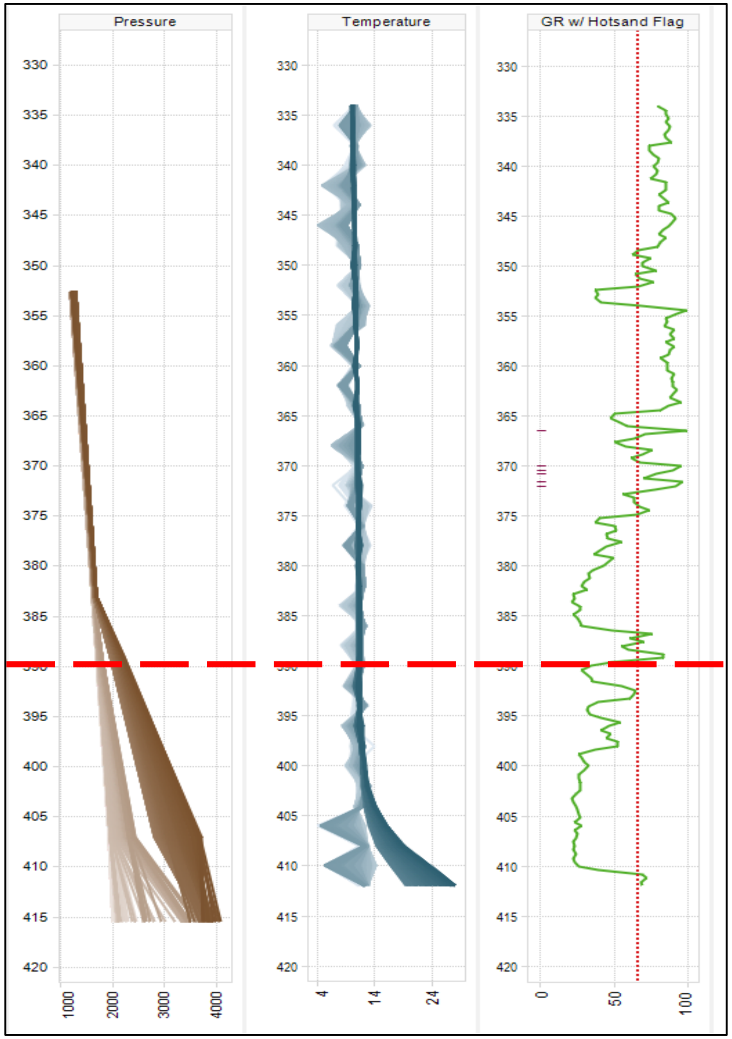
103-P12-OBA 105/14-14-083-07W4 / *41.3m offset*

- Temperature and pressure development; No significant changes.

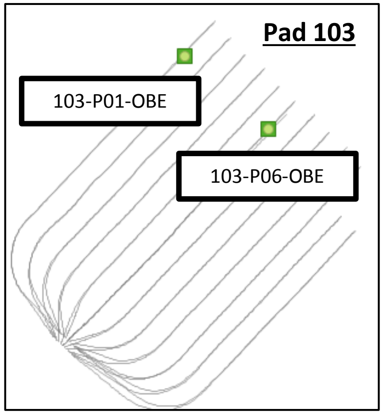
Surmont: Obs Wells Temp & GR – 103-P01-OBE, 103-P06-OBE



103-P01-OBE 100/12-23-083-07W4 *10.2m offset*



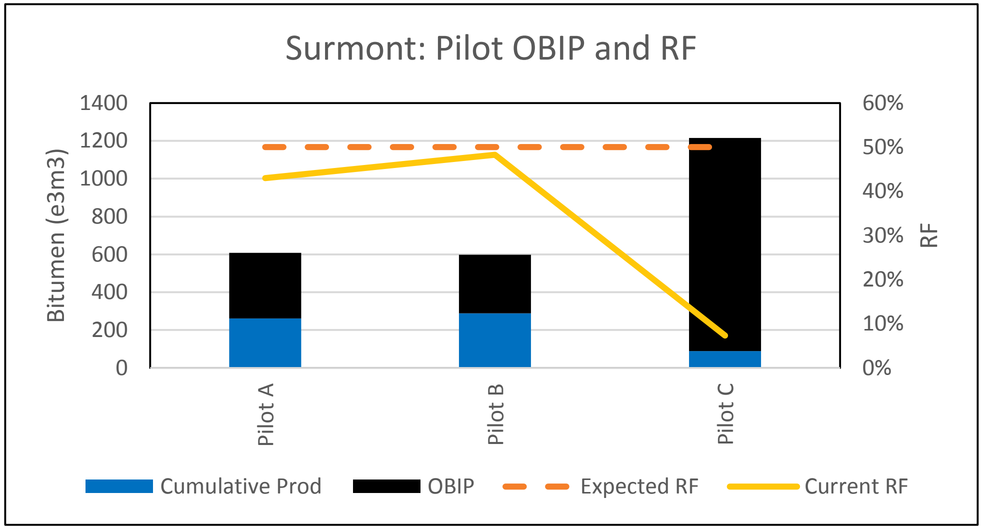
103-P06-OBE 100/11-23-083-07W4 *2.5m offset*



- Temperature and pressure development; No significant changes.

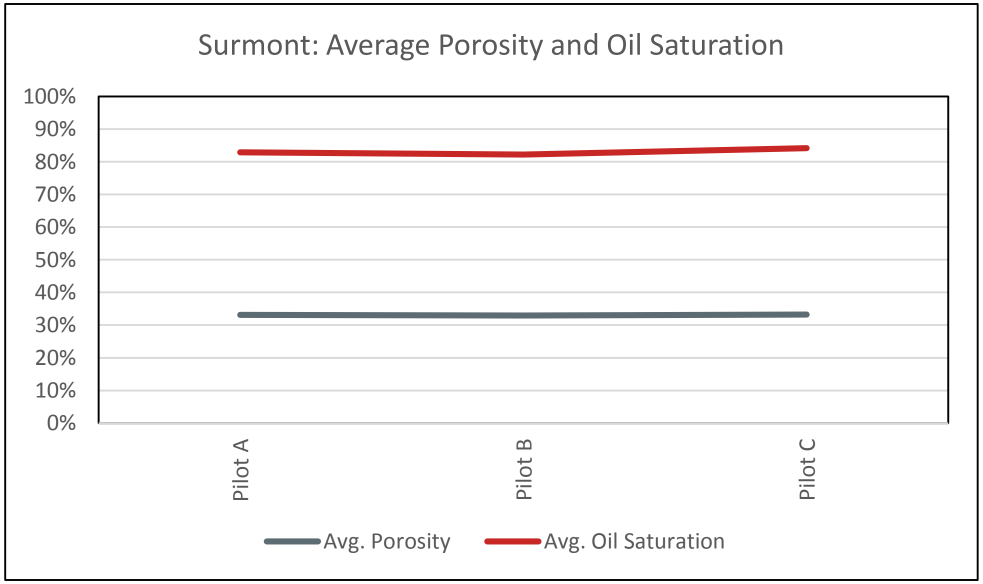
Surmont: Pilot – OBIP and RF

OBIP = (BV)(Φ)(So)



DA	Cumulative Prod E3m3	OBIP E3m3	Expected RF	Current RF	Avg Phi	Avg So
Pilot A	261	609	50%	43%	33.1%	82.9%
Pilot B	288	597	50%	48%	33.0%	82.2%
Pilot C	89	1,215	50%	7%	33.3%	84.1%

- **OBIP: 597 – 1215 E3M3**
- **Current RF: 7% - 48%**



- **Porosity: 33%**
- **Oil saturation: 82% - 84%**

- **Pilot Well C remains shut in**

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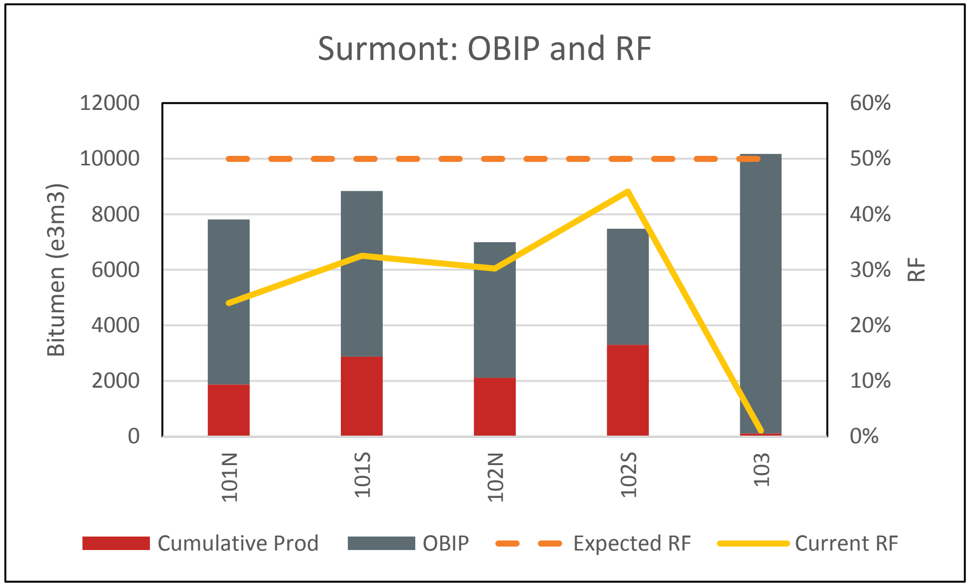
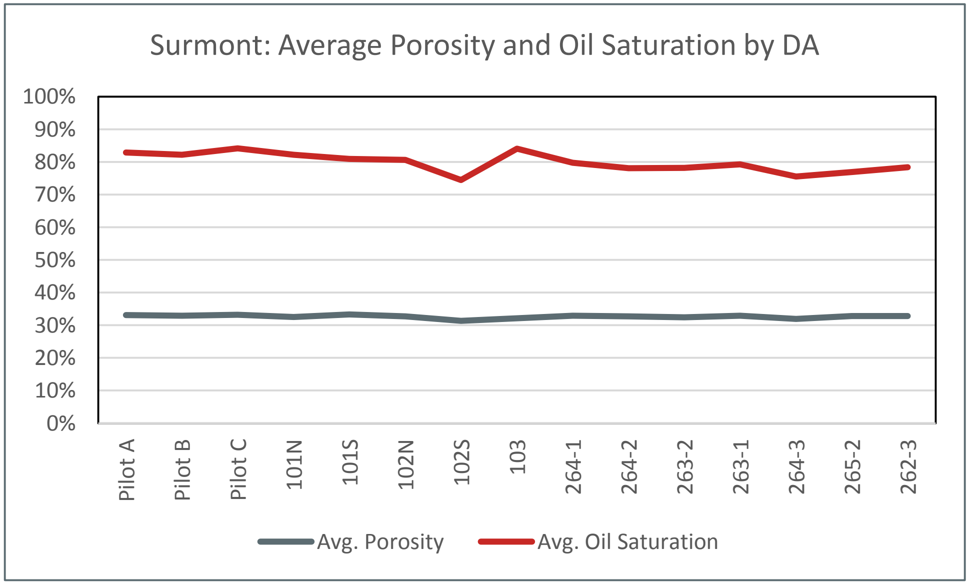
Surmont: Phase 1 - OBIP and RF



DA	Cumulative Prod E3m3	OBIP E3m3	Expected RF	Current RF	Avg Phi	Avg So
101N	1878	7,817	50%	24.0%	32.5%	82.2%
101S	2874	8,842	50%	32.5%	33.4%	80.9%
102N	2115	6,998	50%	30.2%	32.7%	80.7%
102S	3299	7,481	50%	44.1%	31.4%	74.4%
103	108	10,176	50%	1.1%	32.2%	84.1%

- **OBIP: 6,998 – 10,176 E3M3**
- **Current RF: 1% - 44%**



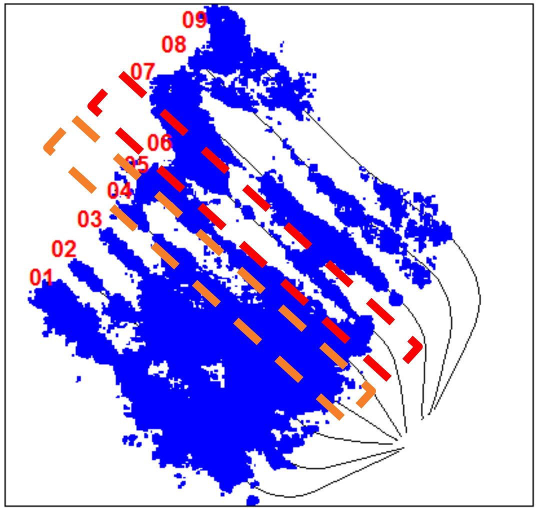
- **Porosity: 31% - 33%**
- **Oil saturation: 82% - 84%**

- **Cumulative volumes and recoveries align with internal forecasts. Blowdown timing will determine final EUR/RF.**

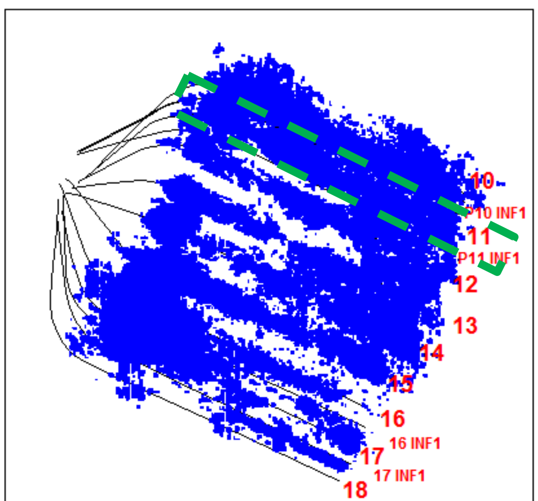
Surmont: Low, Medium, High Recovery

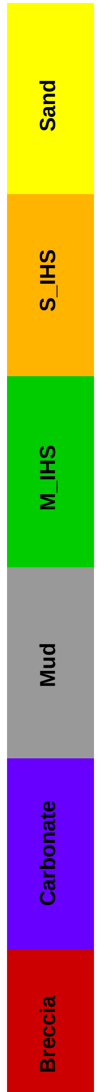
- Low Recovery: 101-13(06) - Medium Recovery: 101-11(04) - High Recovery 101-02(11)

101 North 8th monitor - March 2015

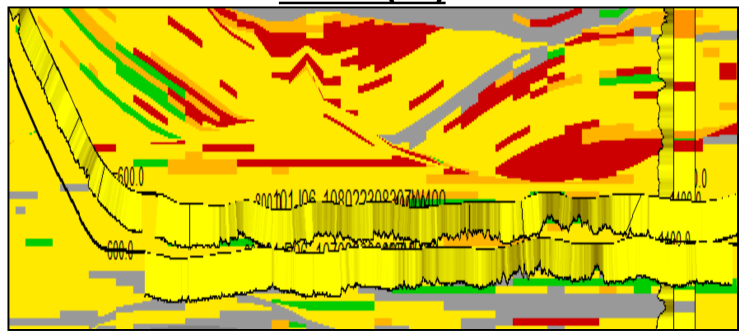


101 South 9th monitor - March 2015



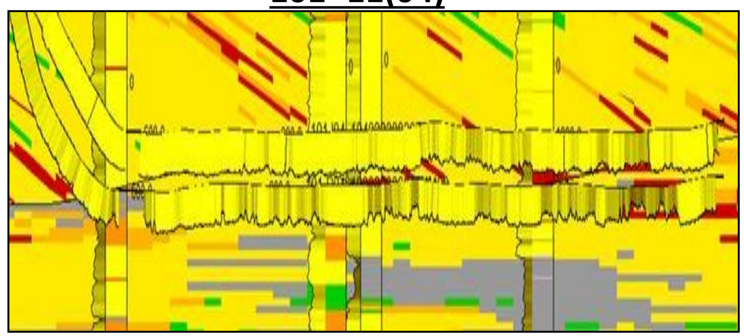


101-13(06)



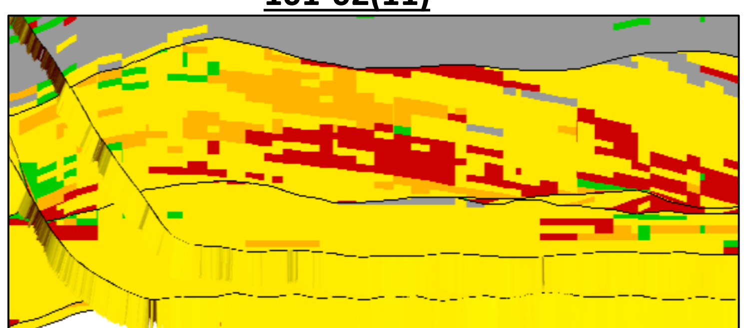
- Low ceiling in the middle.
- Poor geology a significant driver behind overall well performance.
- Injector toe tubing landed in the middle.

101- 11(04)



- Low quality at the producer toe.
- Good steam chamber development along wellbore.

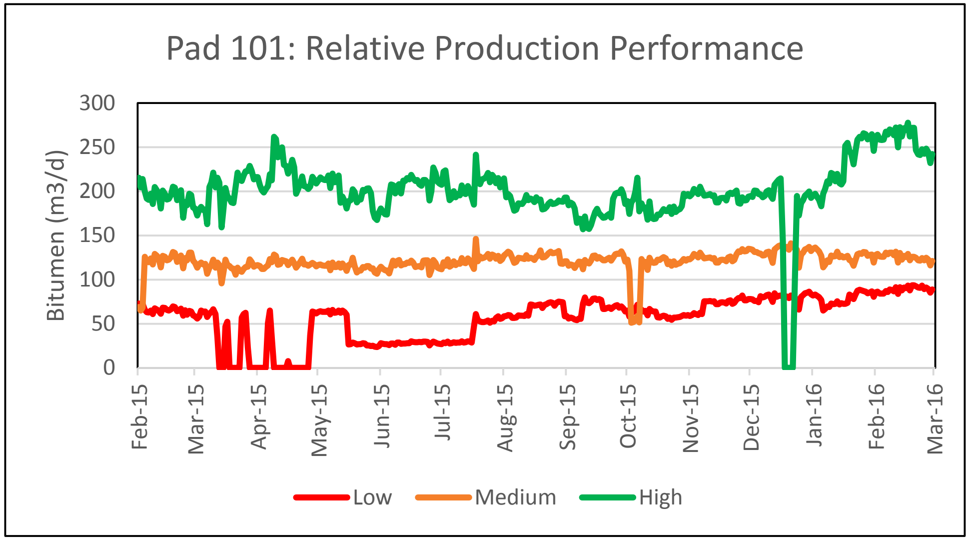
101-02(11)



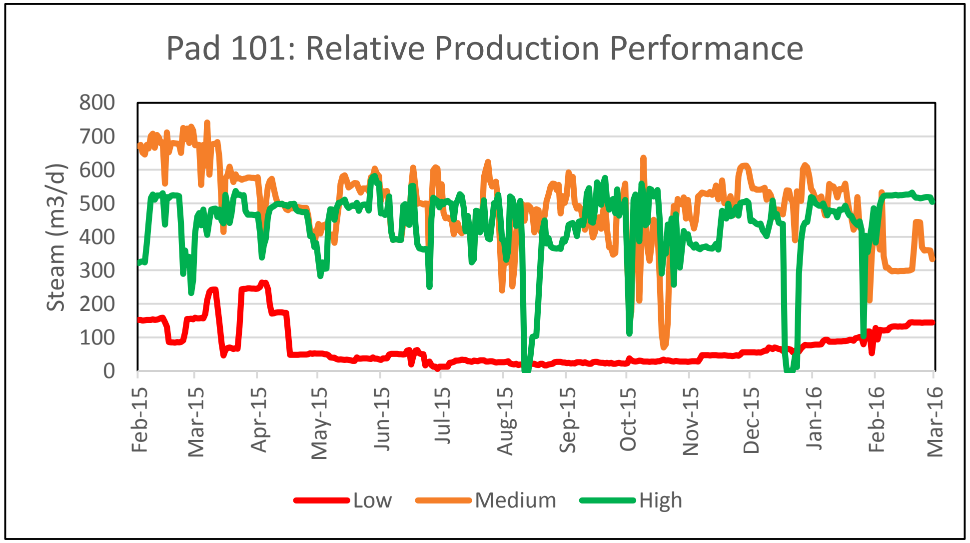
- Very good steam chamber development along wellbore.
- Clean I/P.

Surmont: Low, Medium, High Recovery

- Low Recovery: 101-13(06)   - Medium Recovery: 101-11(04)   - High Recovery: 101-02(11)



- **Sustained / increased bitumen production from subject wells.**

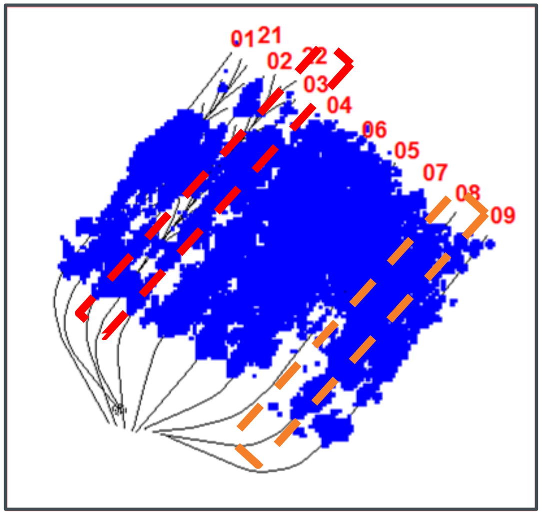


- **Effective steam management improved performance of 101-06.**

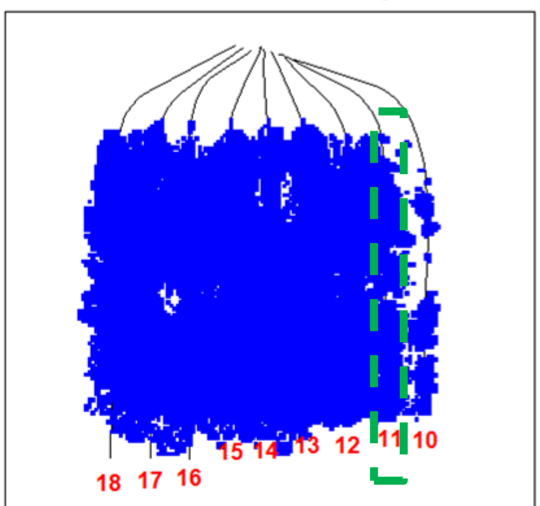
Surmont: Low, Medium, High Recovery

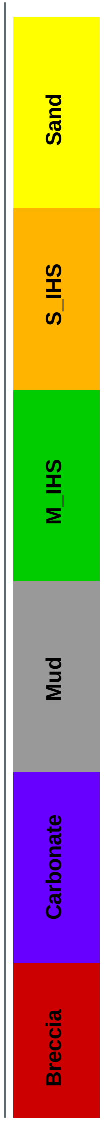
- Low Recovery: 102-03 | - Medium Recovery: 102-08 | - High Recovery: 102-11

102 North 9th monitor - April 2015

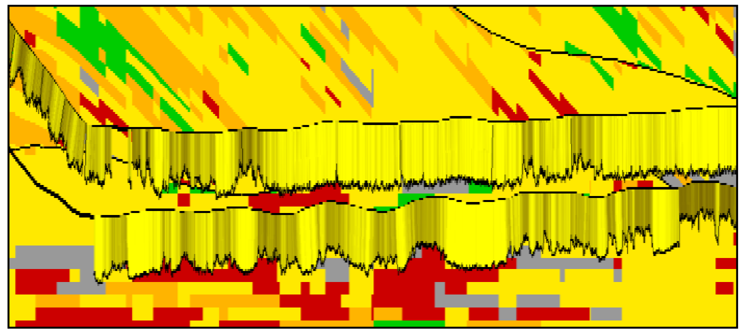


102 South 5th monitor - April 2014



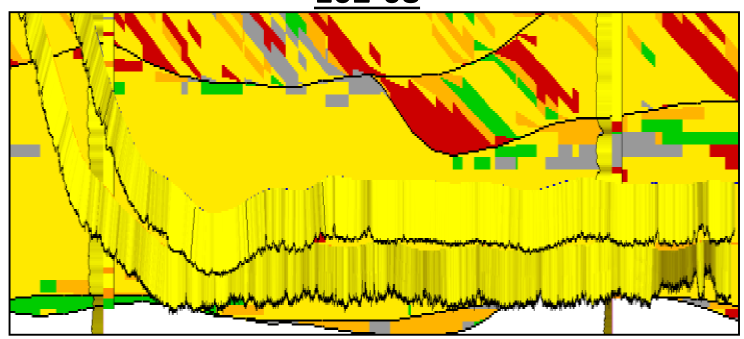


102-03



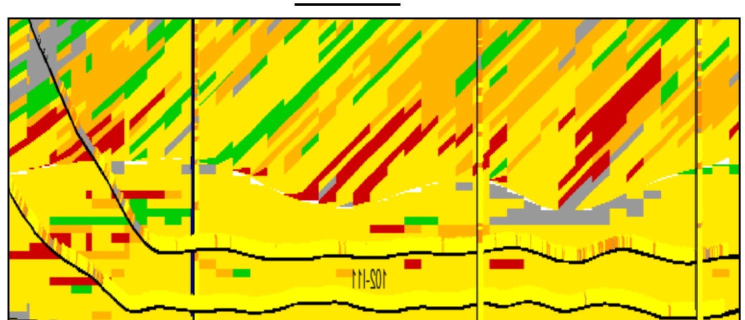
- Limited steam chamber development
- Poor geology a significant driver behind overall well performance
- I/P landed in muddy sands

102-08



- Significant steam chamber development
- I/P landed in marginal geology

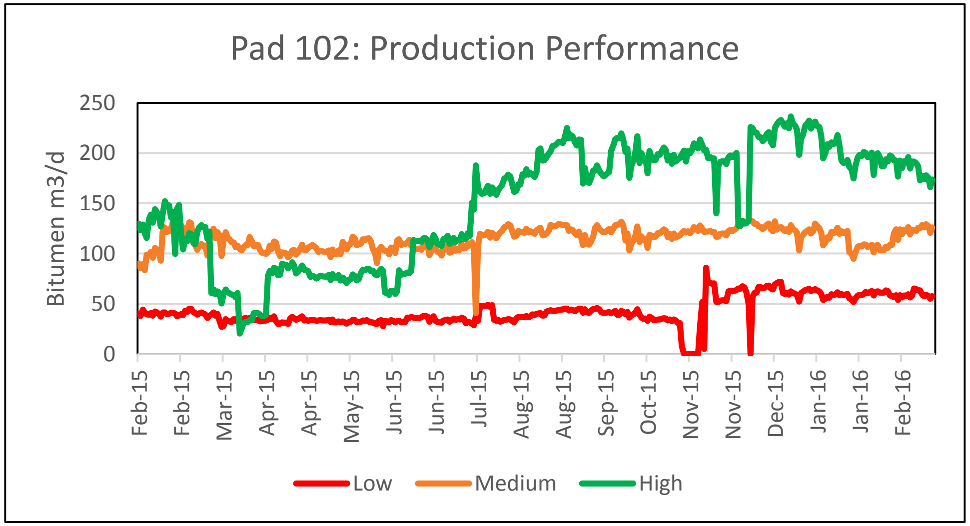
102-11



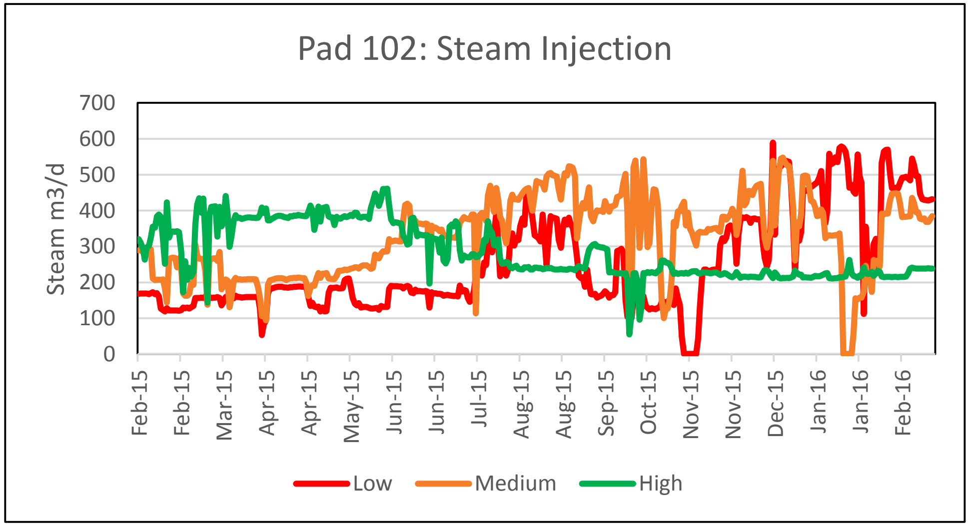
- Significant steam chamber development
- I/P landed in good geology
- Toe impacted by low muddy ceiling

Surmont: Low, Medium, High Recovery

- Low Recovery (102-03) - Medium Recovery (102-08) - High Recovery (102-11)



- **Sustained / increased bitumen production from subject wells.**



- **Optimized steam injection to maximize bitumen production from 102-11.**

Solvent Soak – AER request

Provide a list of wells that had solvent soaking with name of solvent, duration of soaking, volume of soaking and temperature of solvent. Also, include any learnings achieved.

	101-I24	101-P24	101-I26	101-P26	103-I07	103-P07	103-I08	103-P08
Solvent Type	Xylene	Xylene	Xylene	N/A	Xylene	Xylene	Xylene	Xylene
Soak Period (days)	NOT APPLICABLE (N/A)				93	94	93	95
Volume (m3)	40	40	40	N/A	71	37	34.5	36
Temperature (C)	Ambient	Ambient	Ambient	N/A	Ambient	Ambient	Ambient	Ambient

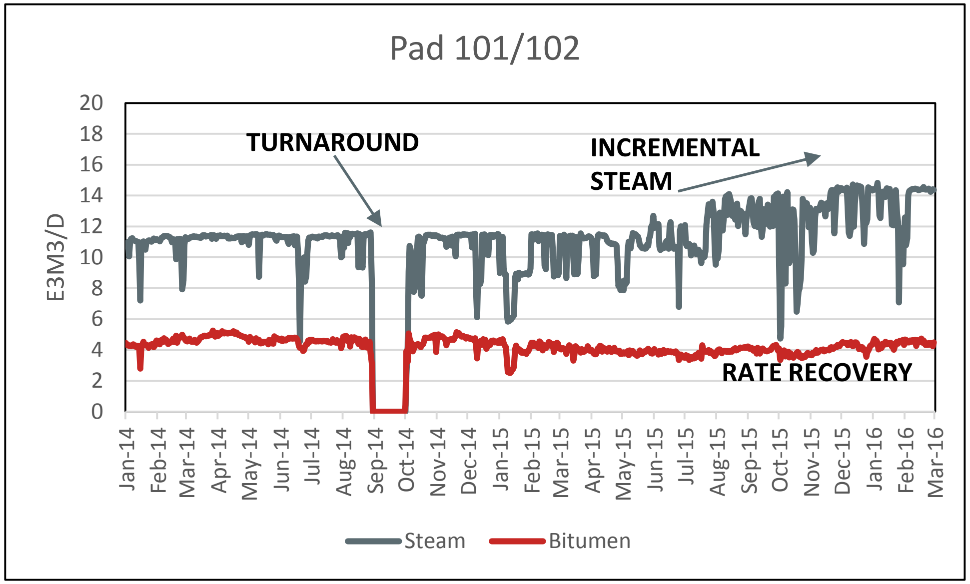
NOTES:

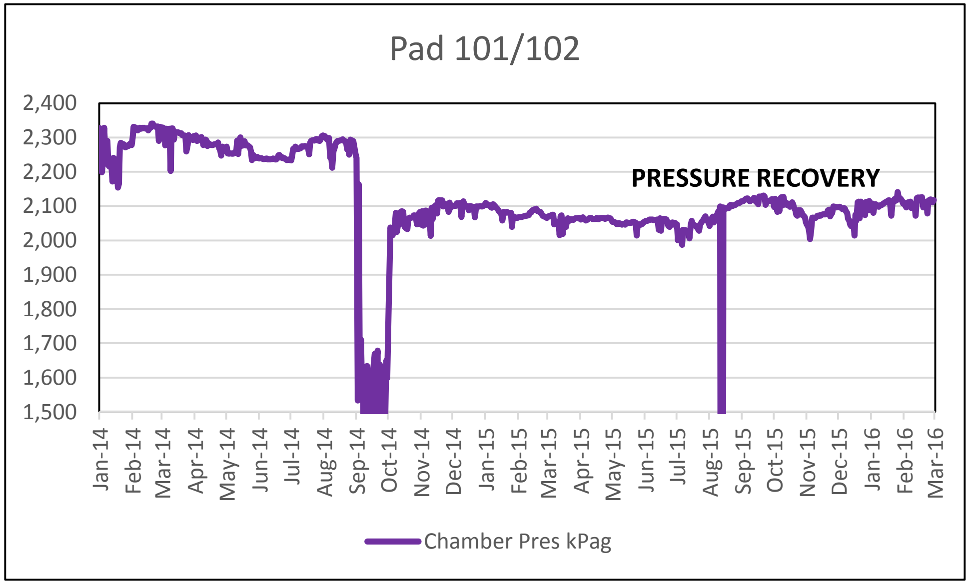
- Could not spot solvent in 101-P26 due to downhole plugging.
- Wells pairs 101-24 and 101-26 will not be tied in. There is no applicable soak period for these wells
- Solvent was not pre-heated prior to being injected.

LEARNINGS:

- N/A for well pair 101-24 and 101-I26
- No additional benefit was observed at Pad 103
    - Small sample size
    - No measurable improvement in number of circulation days during startup

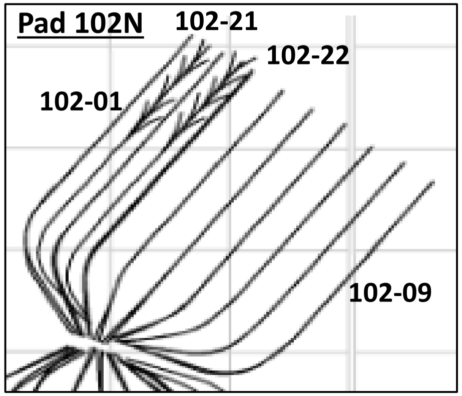
Surmont: Post Turnaround Performance Plots

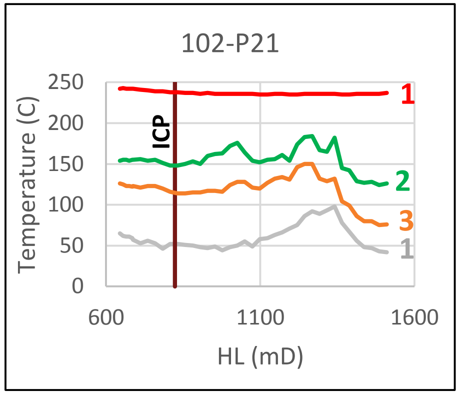




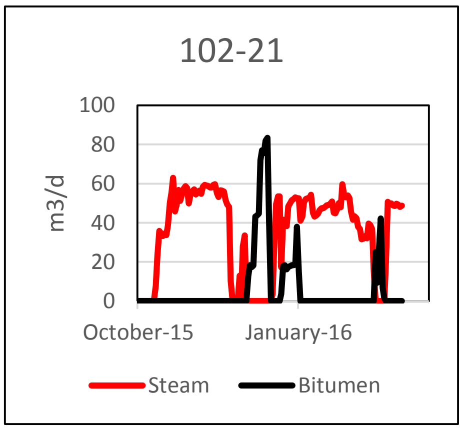
- **Pad 101 and pad 102 continue to benefit from incremental steam / reservoir pressurization.**
- **Reservoir performance on trend with pre-turnaround baseline.**

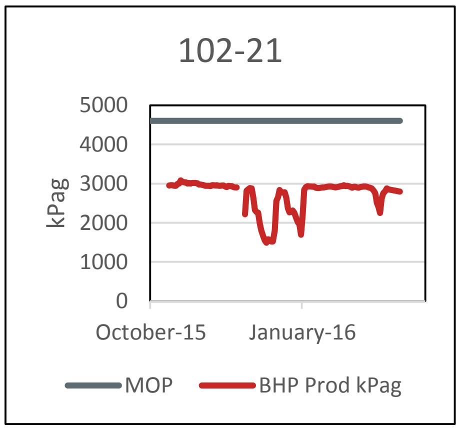
Surmont: Pad 102 Fishbone Well





1 – Initial baseline temperature
2 – Achieved Tsat along the length of the lateral
3 – 24 hours after steam injection cessation
4 – Well shut in on high torque





- **Have been able to successfully produce bitumen through continued steam stimulation trials.**
- **Able to establish a second hot spot/communication point at the top of the steam chamber.**
- **Early indications of additional fluid displacement to the adjacent 102-01 well pair.**
- **Continue with steam stimulation trials until able to establish steady state production.**
- **Apply learnings to Pad 102-22.**

AS OF FEB 29, 2016: ∑BIT = 941 M3; ∑STEAM = 5345 M3; SOR = 5.7

Pad 102N Drilled Fishbone Infills Wells

P21 Shut-In

P21 Shut-In

Aug, 2012 | **Aug, 2013** | **Oct 10, 2015** | **Dec 3, 2015** | **Dec 10, 2015** | **Jan 2, 2015** | **Feb 14, 2016** | **Feb 18, 2016** | **Feb 19, 2016**

Pad 101 Single Hook Wells

Steam P21

P21 On-Stream

Steam P21

P21 On-Stream

Steam P21

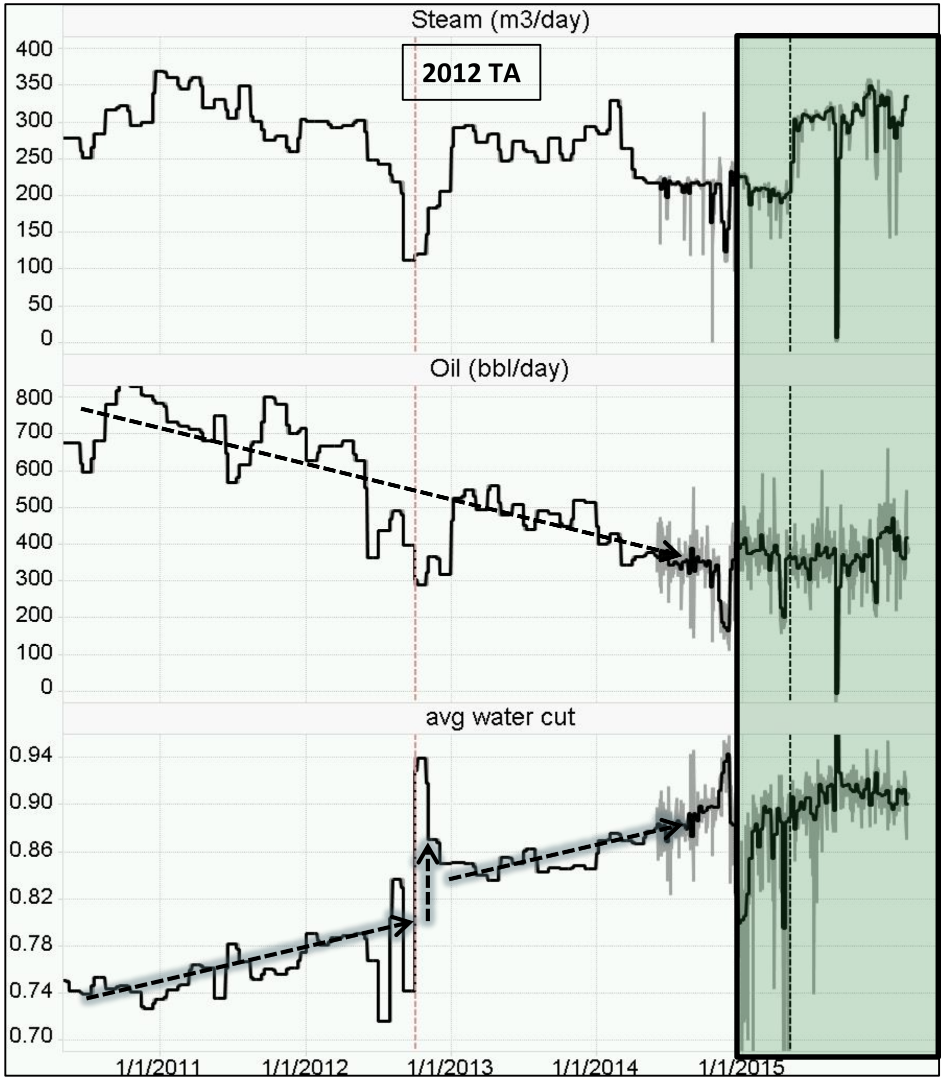
FIRST STEAM STIMULATION

SECOND

THIRD

Pilot Scheme Steam Injection Trial

Objective: mitigate top water influx into steam chamber; improve/stabilize WCUT & bitumen rate

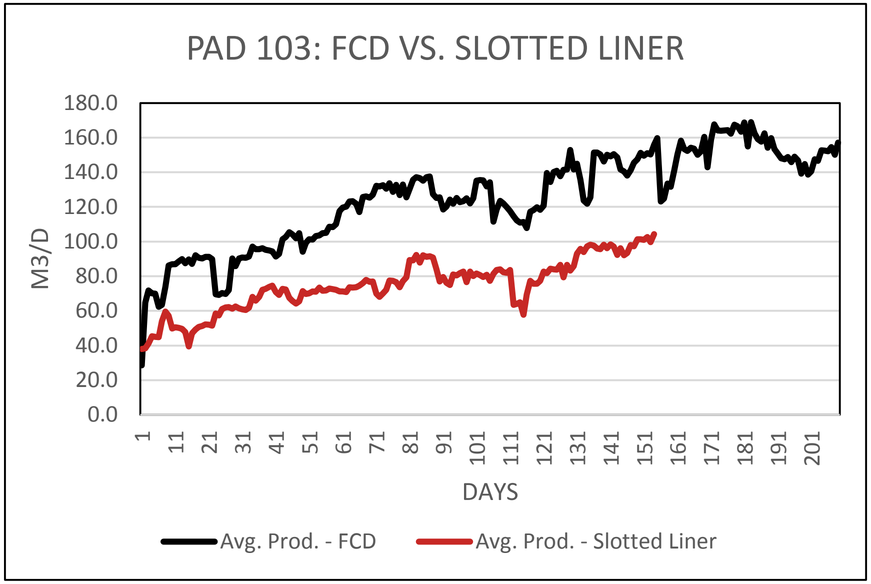


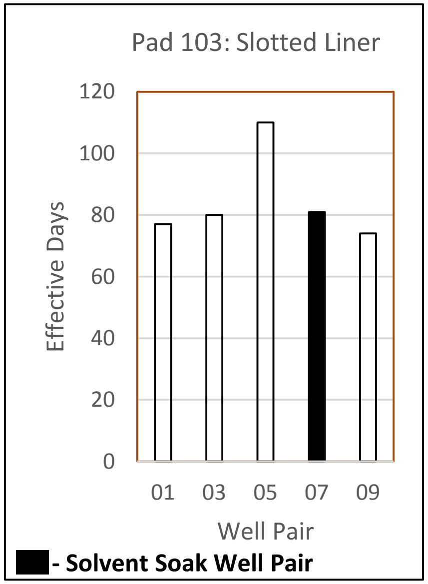
Actions Taken For Thief Zone

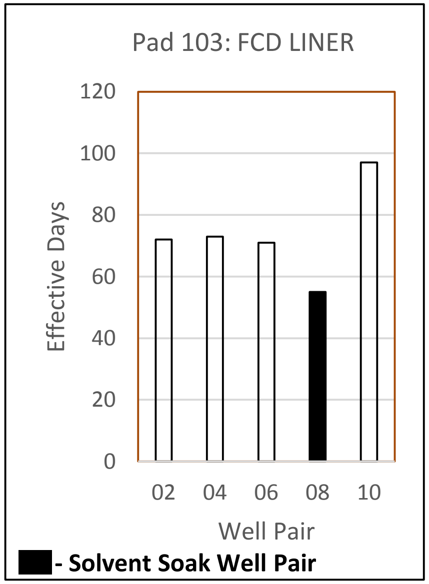
- **Mitigations/learnings:**
  - **Bigger pump for both well pairs:**
    - **A: replaced Dec 2014**
    - **B: replaced May 2015**
- **Increased steam injection by 50% (May 2015)**
  - **Operation issues during first 2 months of trial (pump issues)**
  - **Increase in iSOR and injection BHP (50-100 kPa)**

- **Learnings from trial:**
  - **Stabilized bitumen production**
  - **Improvement in water cut started**
  - **Improvement in iWSR**
  - **Increase in iSOR**

Surmont: Pad 103 Technology Trials







TECH TRIALS INCLUDED FCDS AND SOLVENT SOAKS

- **Initial assessment are that FCDs are beneficial.**

LIMITED EVALUATION PERIOD

- **Continuing to assess solvent soak treatments.**

WELLS OPERATE NEAR 0C SUBCOOL TARGET

- **FCD wells outperforming slotted liners.**

PAD GEOLOGY CONSIDERED TO BE UNIFORM

- **Continue to evaluate performance of Pad 103.**

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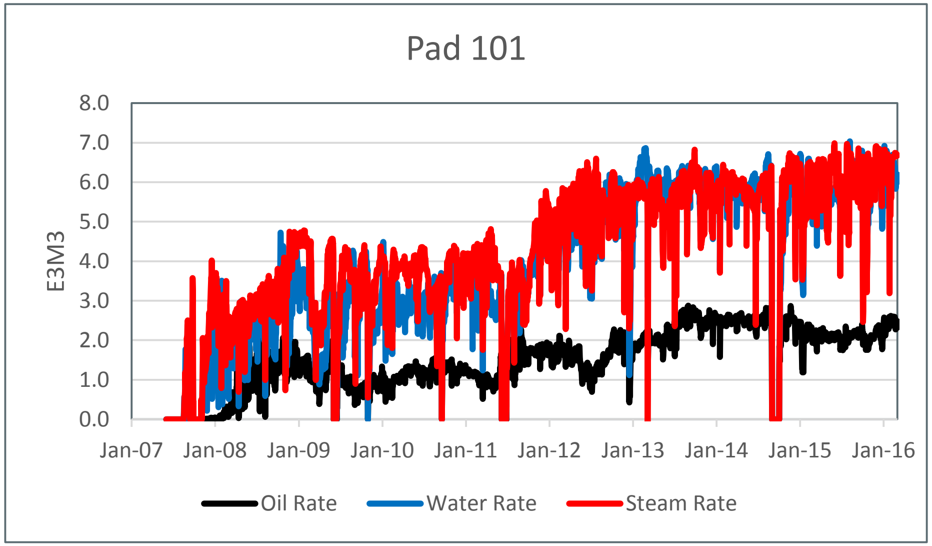
Surmont 1 – Key Learnings

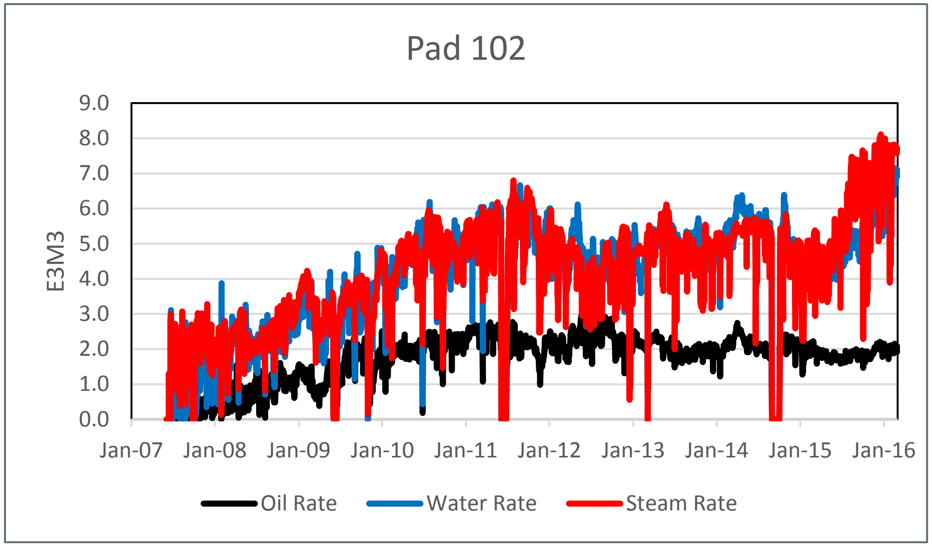
- Incremental steam continues to optimize performance at Phase 1 through pressure support and subsequent rate recovery.

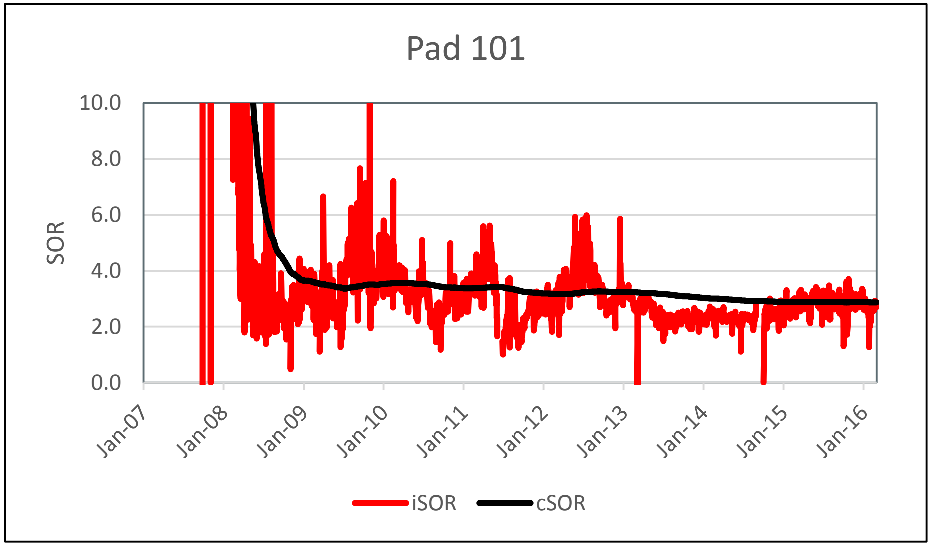
- Planned optimization has and will continue to improve performance of mature wells:
  - Steam injection optimization
  - ESP upsizing
  - Subcool management
  - Caustic jobs
  - Possible changes in tubing landing depths

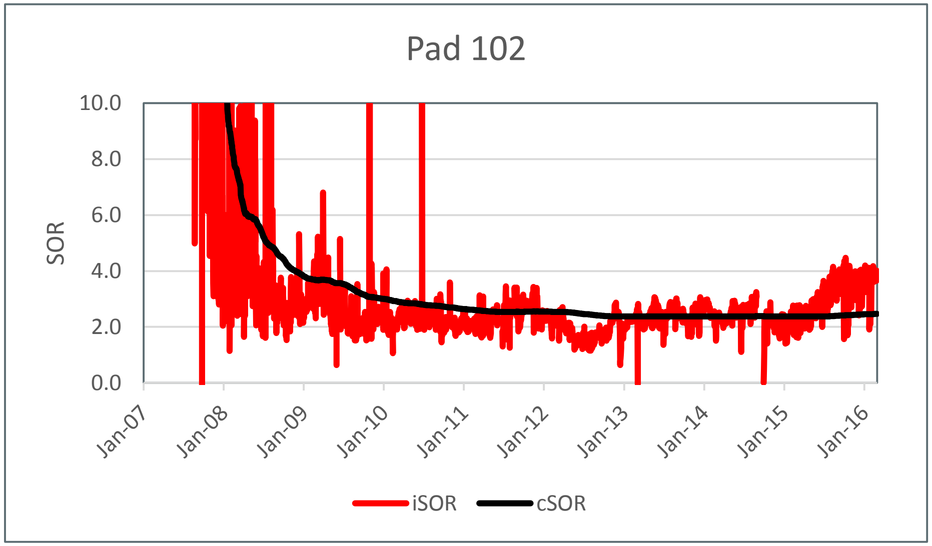
- Technology trials for FCDs, initially, are proving to be beneficial.
  - Continuing to assess how solvent soak impacted start up.

Surmont 1 Well Pad Rates and SOR

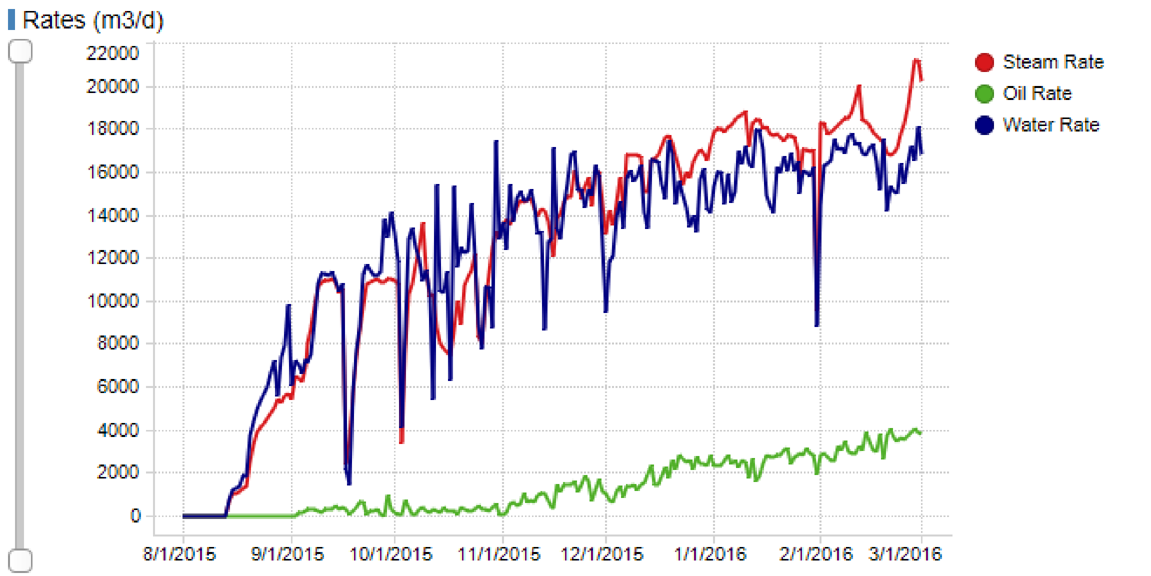


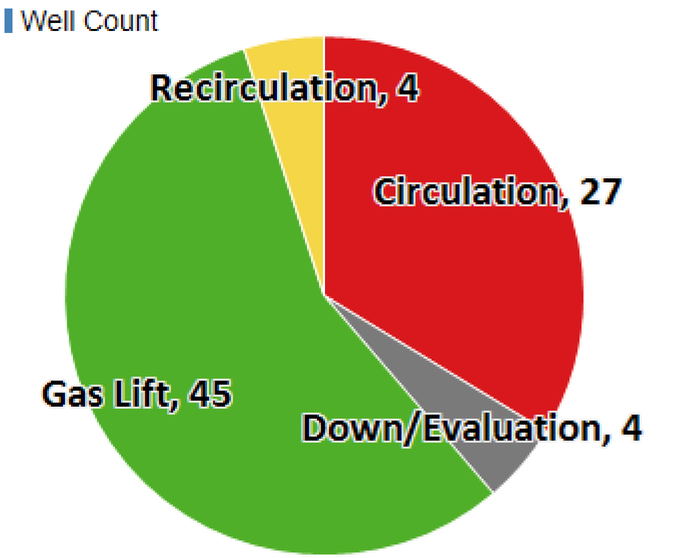


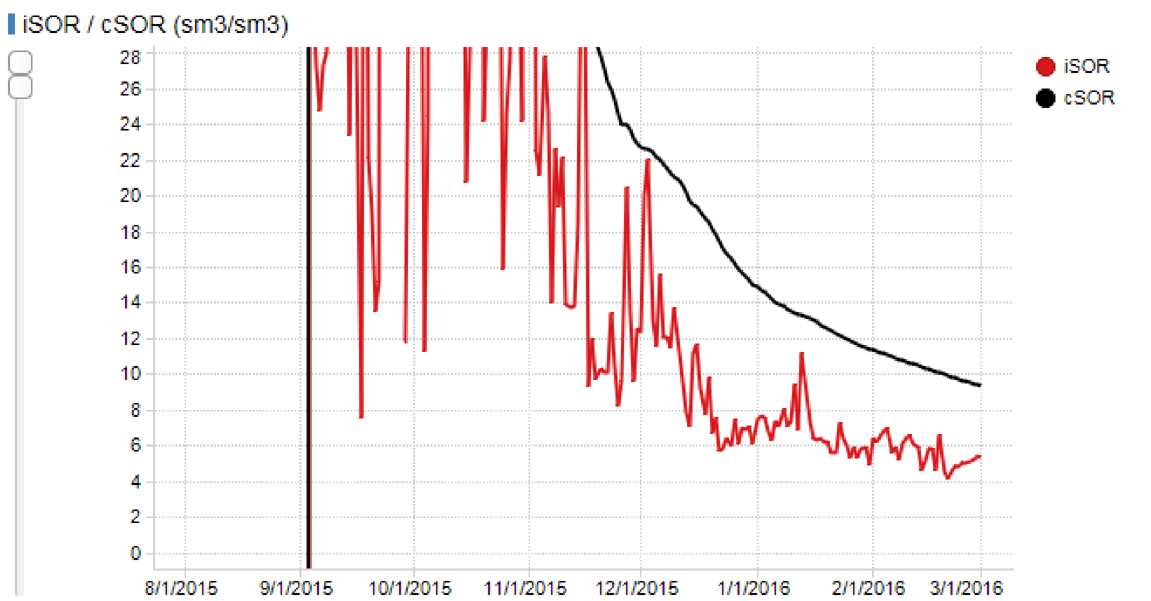




Surmont Phase 2 Aggregate Performance Plots



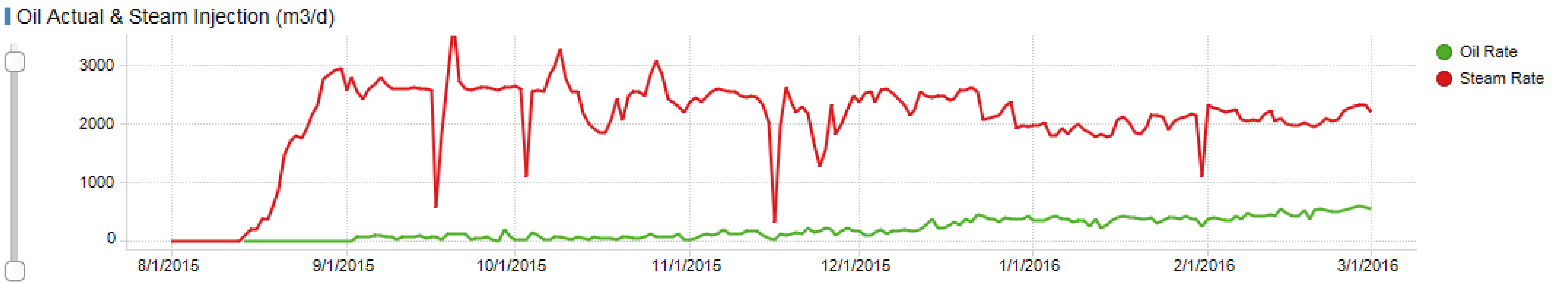


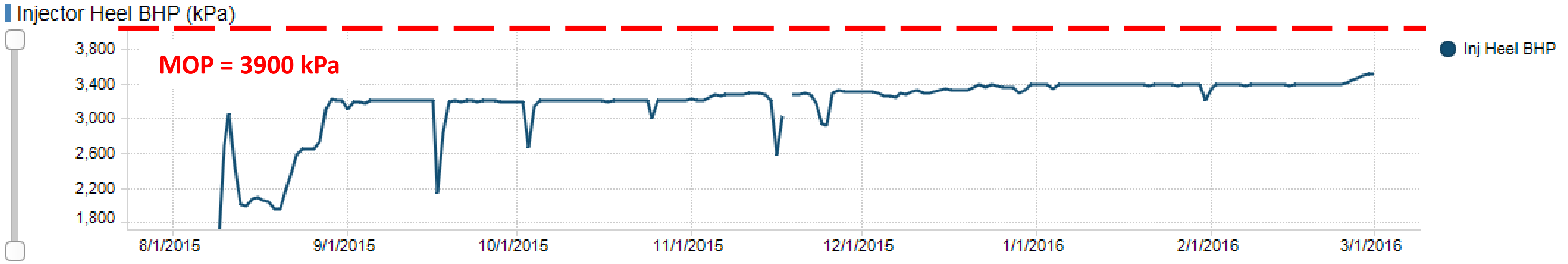


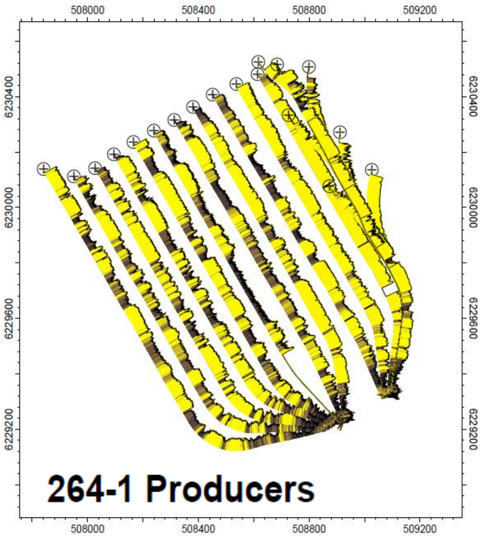
- Surmont 2 started circulation of wells on August 2015.
- Seven pads were started as of February 29, 2016.
- A total of 45 well pairs were converted to SAGD as of February 29, 2016.

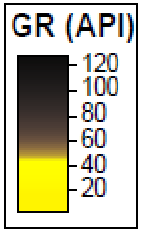
- Ramp-up ongoing.

Performance / Chamber Development Challenges – Pad 264-1





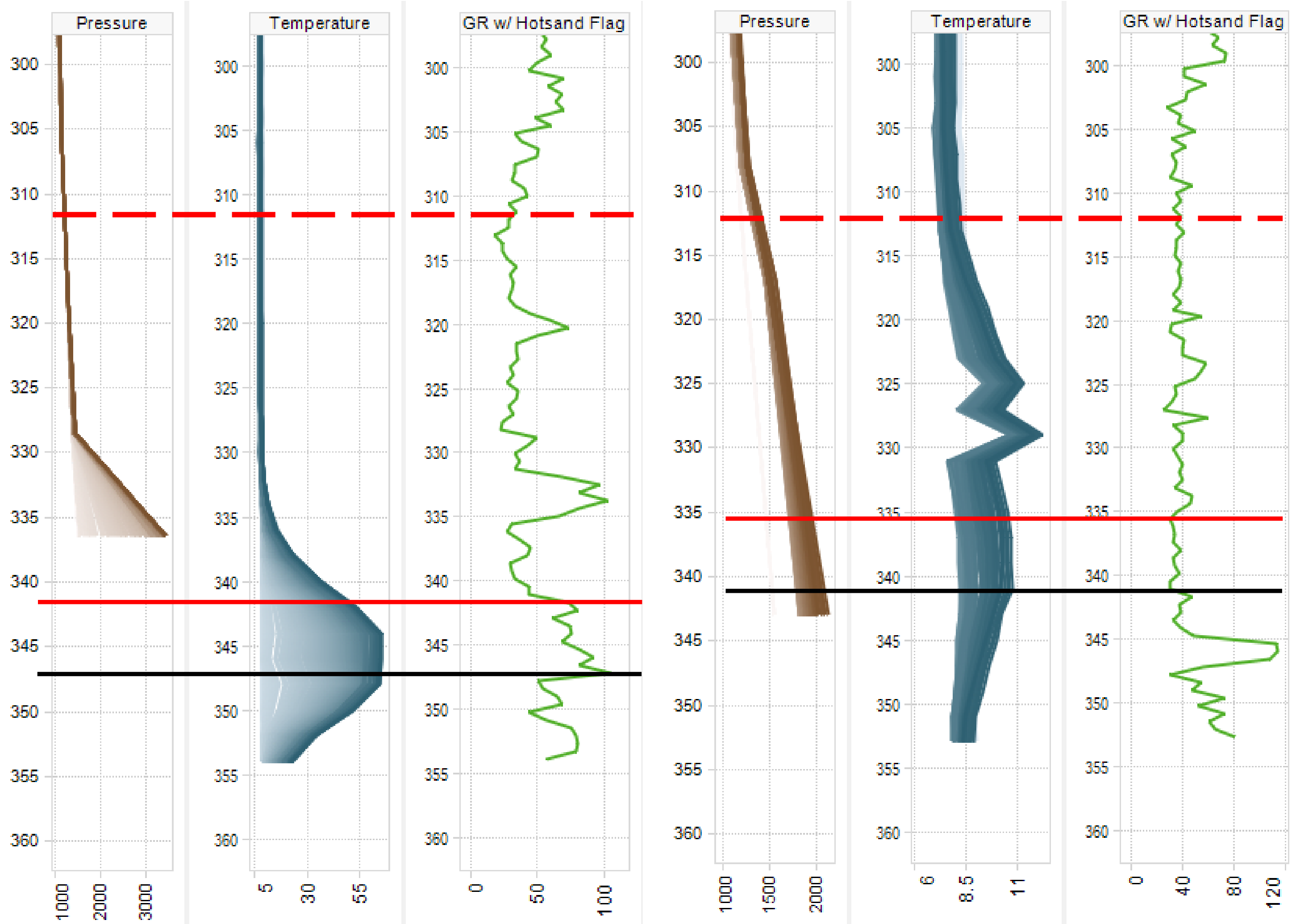


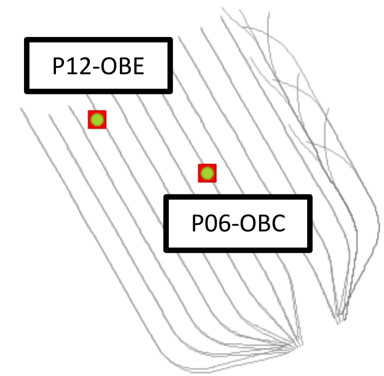


- 264-1 has been operating at a pressure of 3,400 kPa with a recent increase to 3,550 kPa.
- 8/12 wells converted to SAGD.
- 3 circulating wells with communication issues
- 1 cold well.

- Too early on SAGD to define performance issues.

Obs Wells Temp & GR - 264-1-P06-OBC, 264-1-P12-OBE





P06-OBC / 100142208306W400	1.5m		P12-OBE / 102042708306W400	12.8m

- Some wells start to see temperature increase, however far from chamber temperature.

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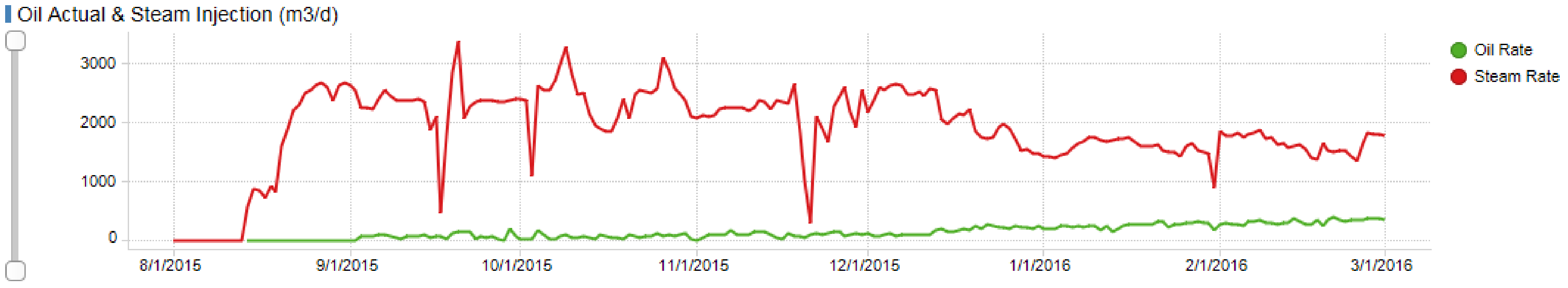
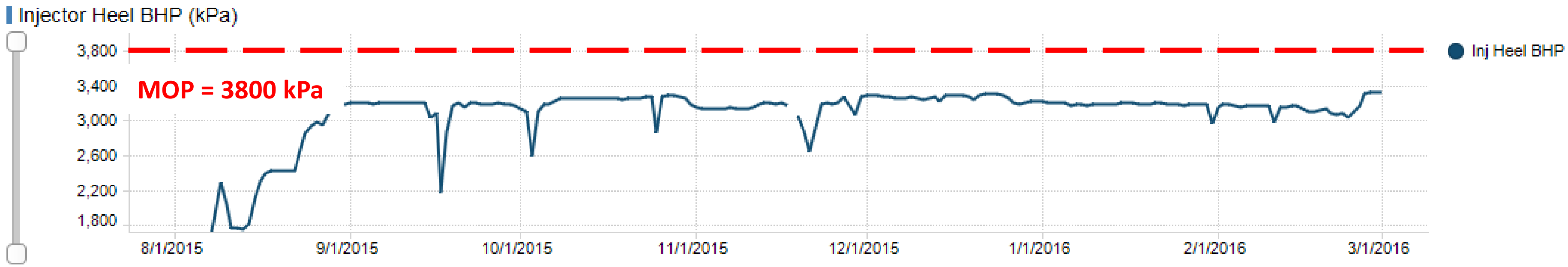
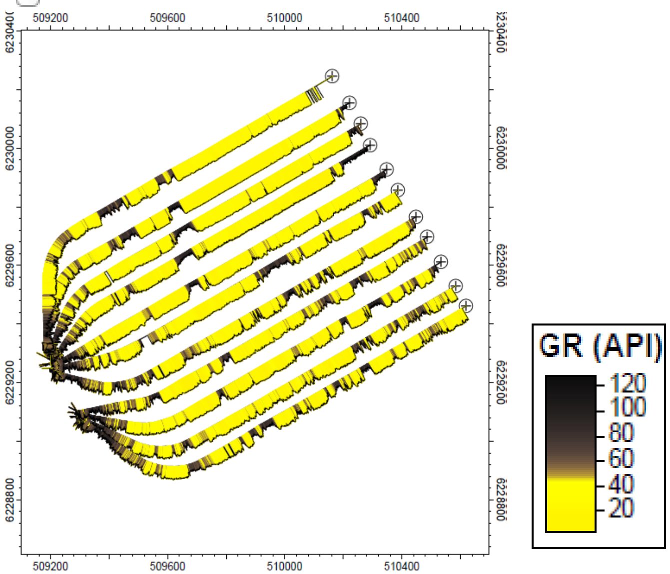
Performance / Chamber Development Challenges – Pad 264-2



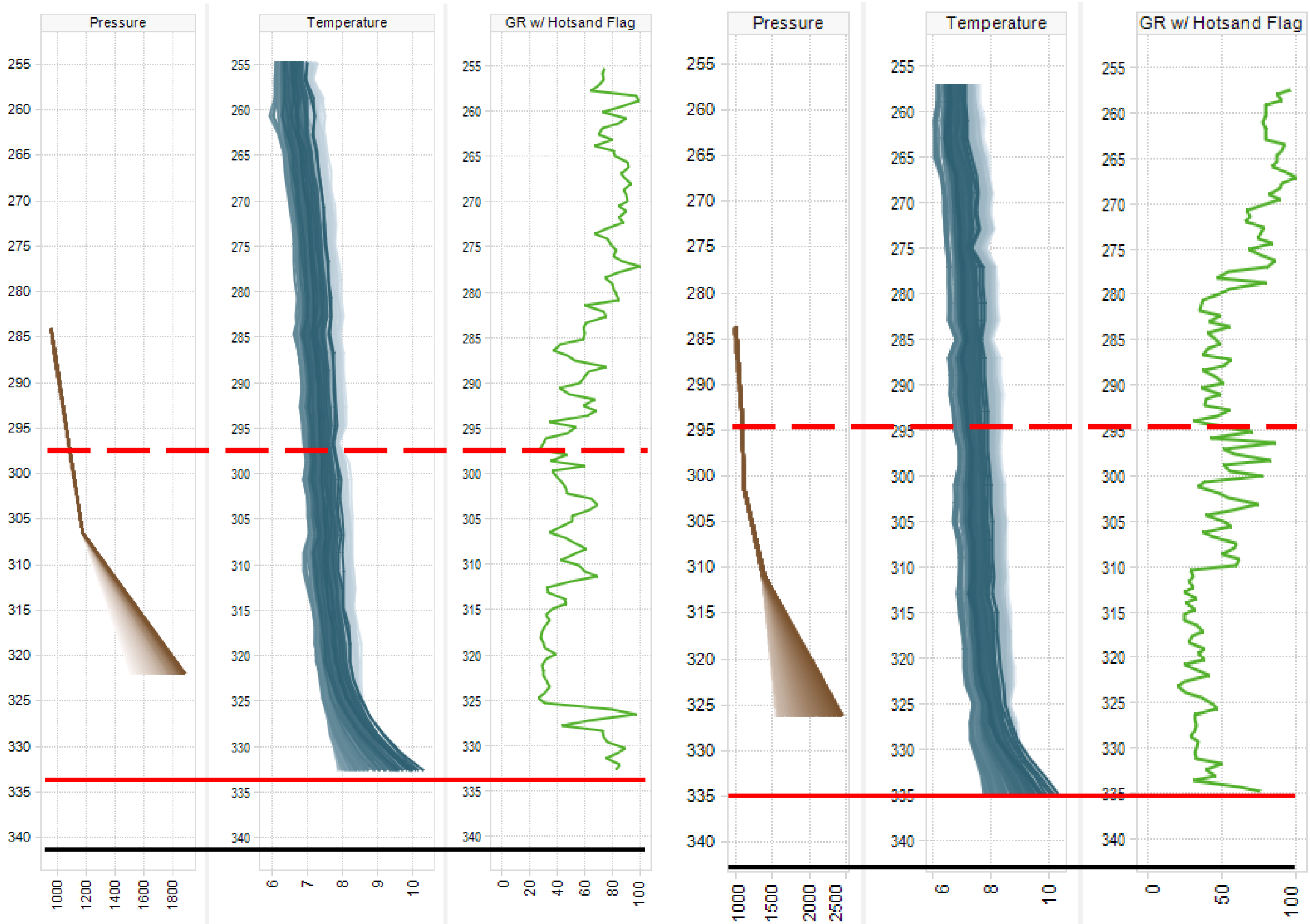


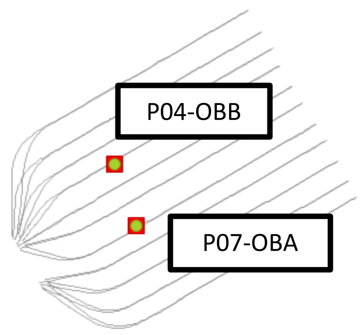


- 264-2 has been operating at a pressure of 3,300 kPa with a recent increase to 3,450 kPa.
- 8/11 wells converted to SAGD.
- 3 horizontal liner deformations (1 back on circulation after workover).

- Too early on SAGD to define performance issues.

Obs Wells Temp & GR -264-2-P07-OBA, 264-2-P04-OBB

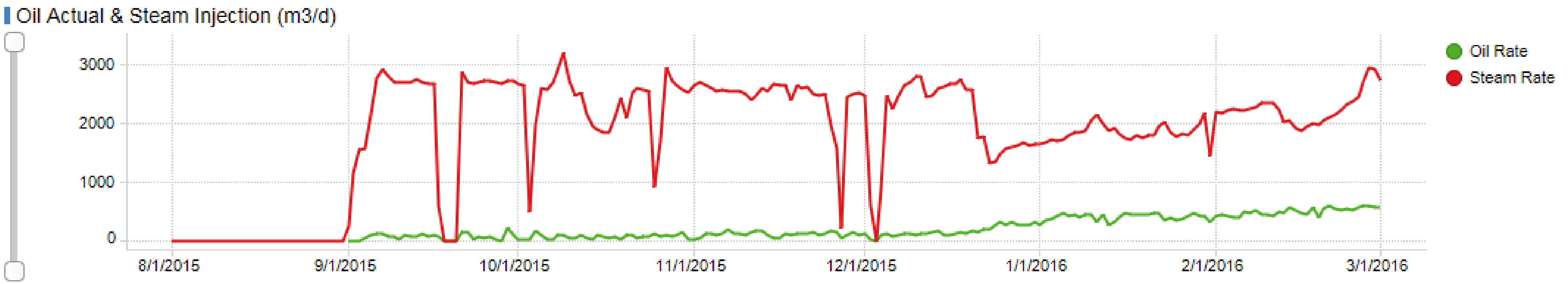


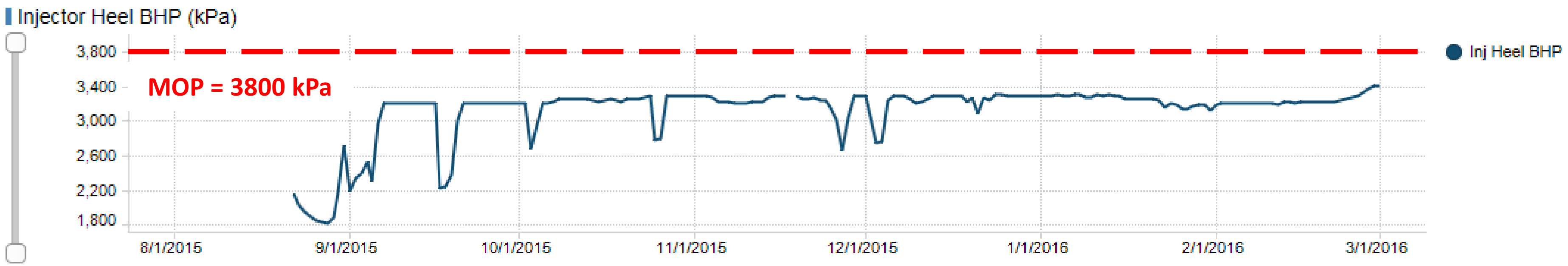


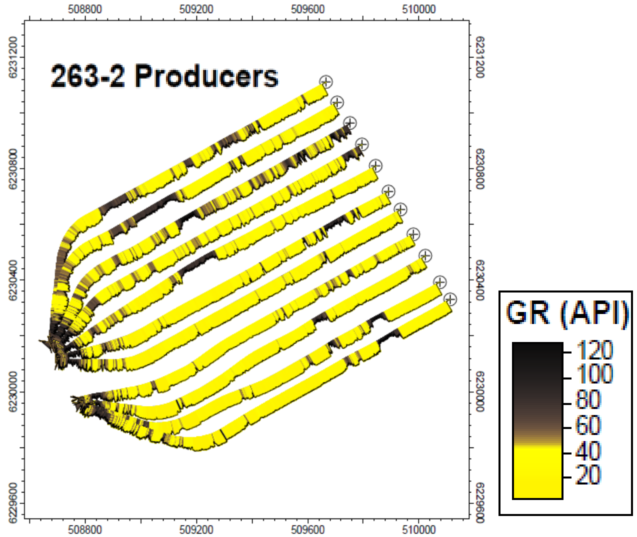
P07-OBA / 102122308306W400	8.3m	P04-OBB / 100122308306W400	11m

- Temperature response slower on this Pad.

Performance / Chamber Development Challenges – Pad 263-2



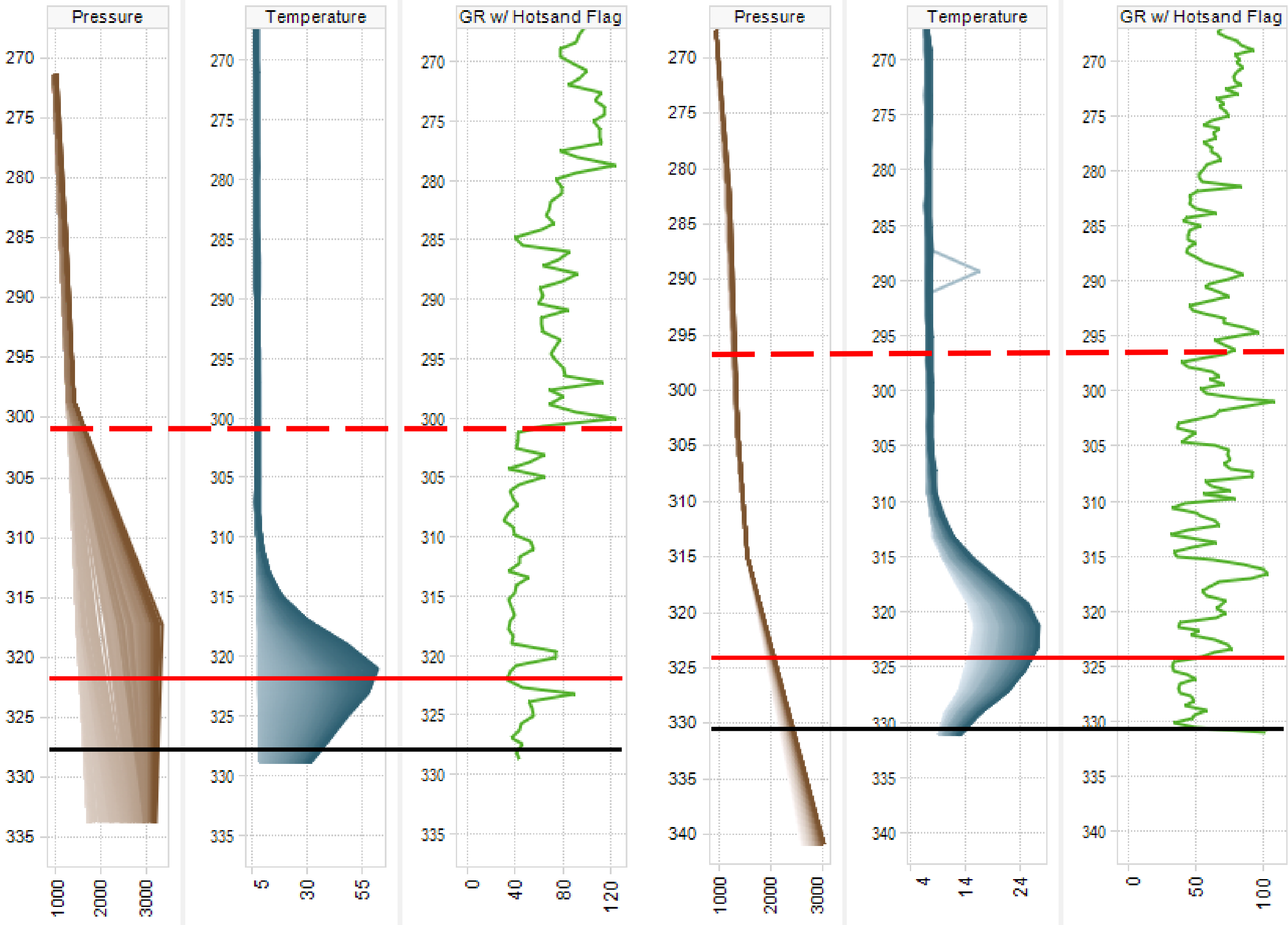


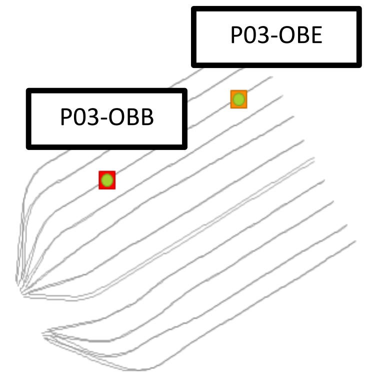


- 263-2 has been operating at a pressure of 3,300 kPa with a recent increase to 3,450 kPa.
- 9/11 wells converted to SAGD.
- 1 horizontal liner deformation.

- Too early on SAGD to define performance issues.

Obs Wells Temp & GR - 263-2-P03-OBE, 263-2-P03-OBB





P03-OBE / 100122608306W400	7.15m	P03-OBB / 102082708306W400	3.6m

- Some wells start to see temperature increase, however far from chamber temperature.

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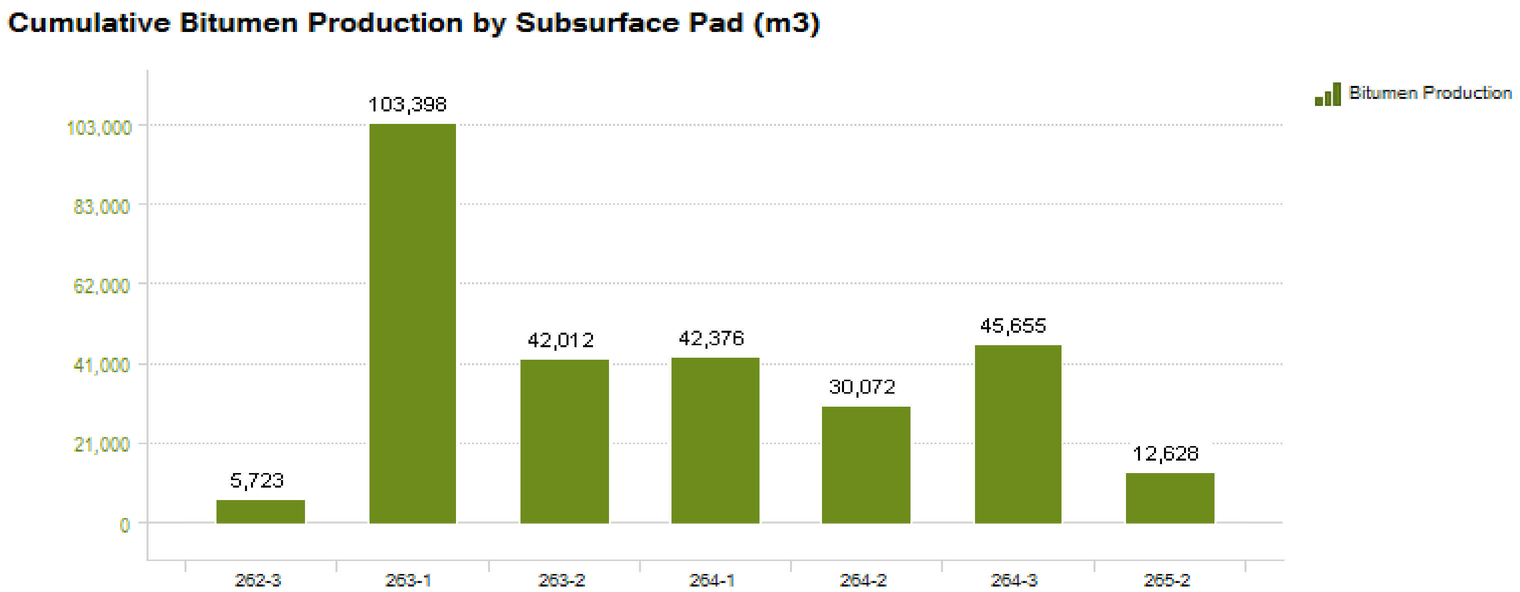
SOIP & Recovery Per Pad

DA	SOIP* (E3M3)	CUM OIL (E3M3)	RF
263-1	9,146	103.4	1.1%
263-2	8,954	42.0	0.5%
264-1	7,573	42.4	0.6%
264-2	9,845	30.1	0.3%
264-3	10,122	45.7	0.5%
265-2	6,839	12.6	0.2%
262-3	9,552	5.7	0.1%

*SOIP: SAGDable Oil in Place



- Pads ramping-up. Oil allocated during circulation accounted for RF.

Good Performance – WP 263-1-08

- Well Performance exceeds expectations.
- Very good injectivity translating into fast ramp-up and good production rate.
- Good temperature conformance along the well for a 1,400m horizontal.

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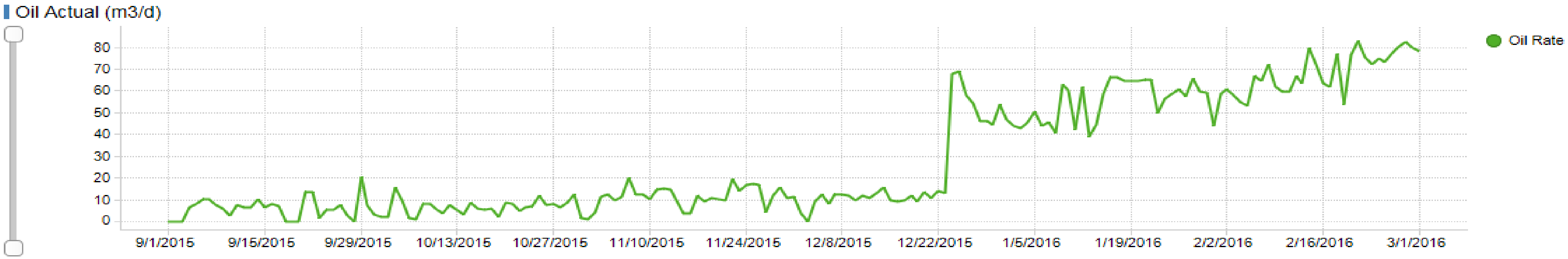
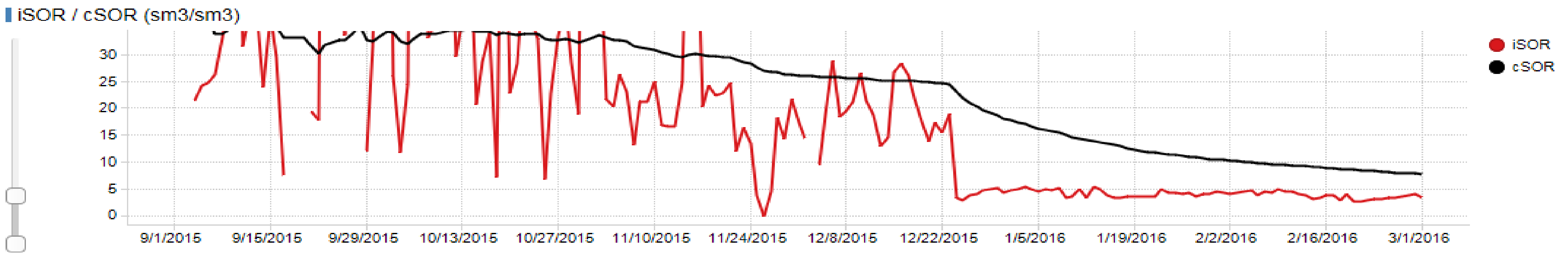
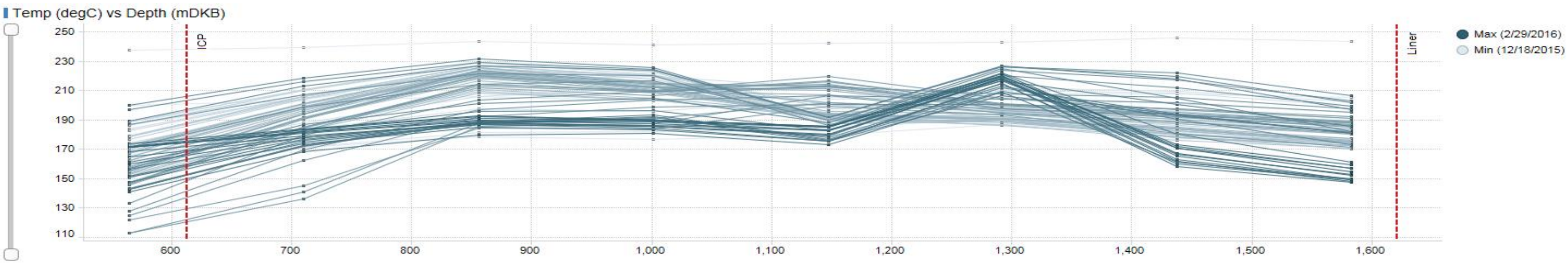
Average Performance – WP 263-2-03







- Well performance in line with expectations.
- Stable iSOR of <3.
- Hot spot developing near the Toe currently controlling well's subcool.

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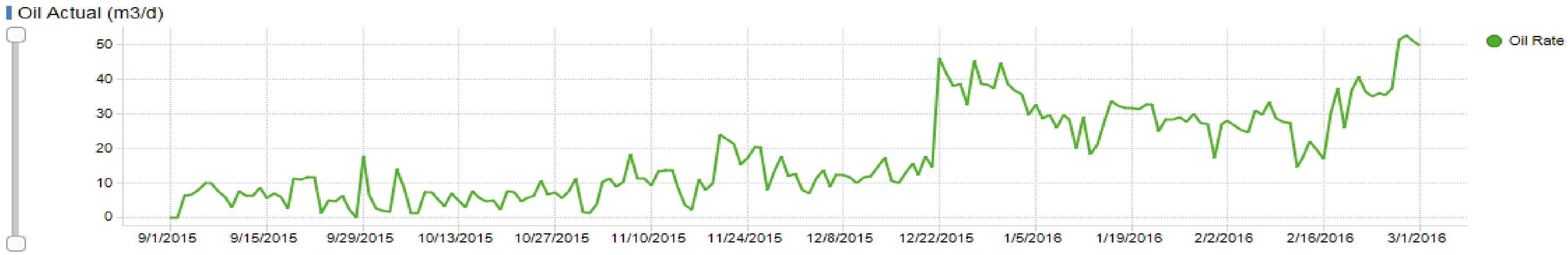
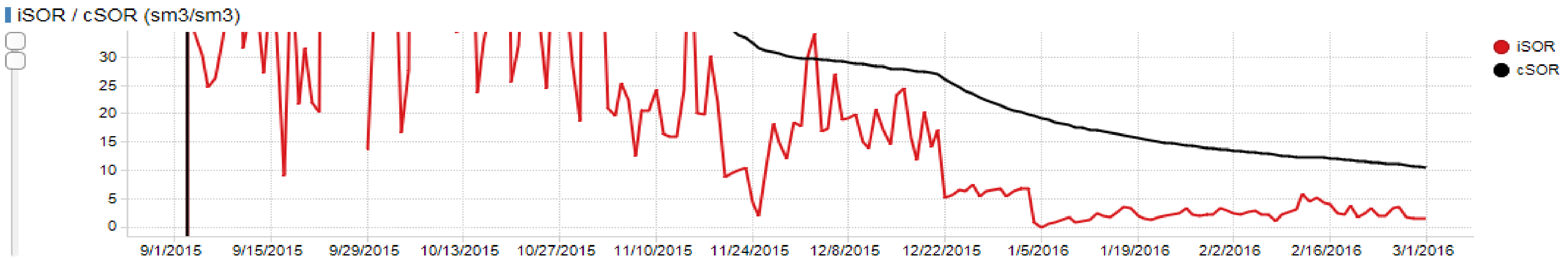
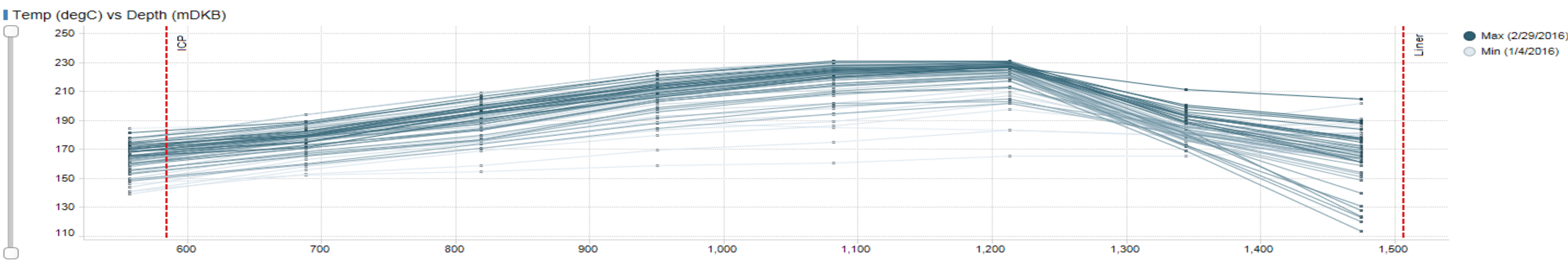
Poor Performance – WP 264-1-05







- Well performance under expectations.
- Very good iSOR of <2, indicates the wells has injectivity challenges similar to neighboring wells in this Pad.

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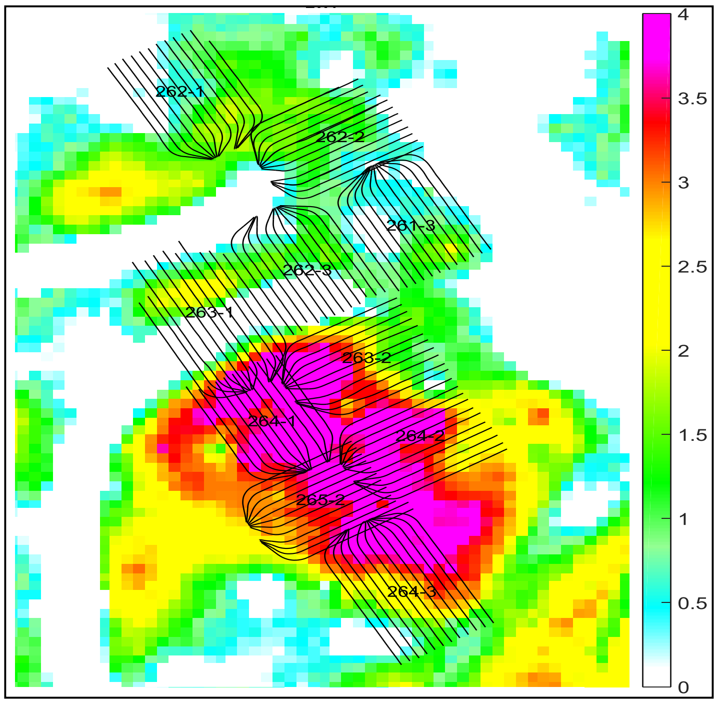
Surmont 2 – Pressure Operating Strategy

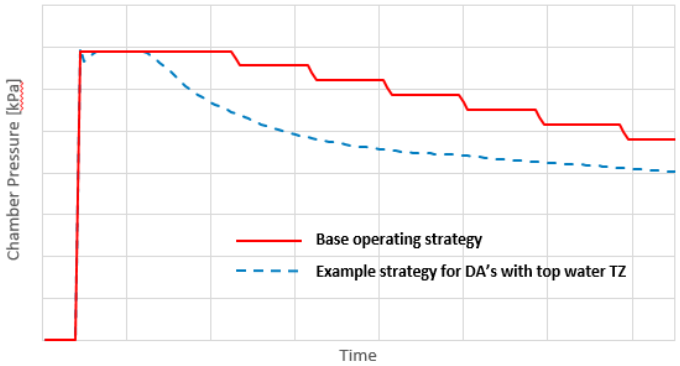
- S2 base case Operating Strategy follows a declining pressure profile, which is influenced by the efficiency of artificial lift, SOR, thief zone (TZ) interaction, etc.
- Some DA's have been identified at risk based on top water TZ interaction.
- Strategy for these DA's account for a more aggressive pressure drop to minimize steam loss into the TZ, but still keeping an overbalanced condition to avoid water influx into the chambers.
- Timing of pressure drop is dependent on each DA's condition. Chamber growth monitoring (Obs Wells, 4D, etc.) will aid in tailoring the strategy per Pad.

Learnings from Surmont Pilot TZ

- Pilot shows that water influx will occur if the steam chamber pressure is allowed to drop below the thief zone pressure
- The consequence of this is not a catastrophic loss of the steam chamber but an increase in water cut
- Raising pressure by increasing steam injection may mitigate thief zone invasion

Effective Top Water Thickness (meters)

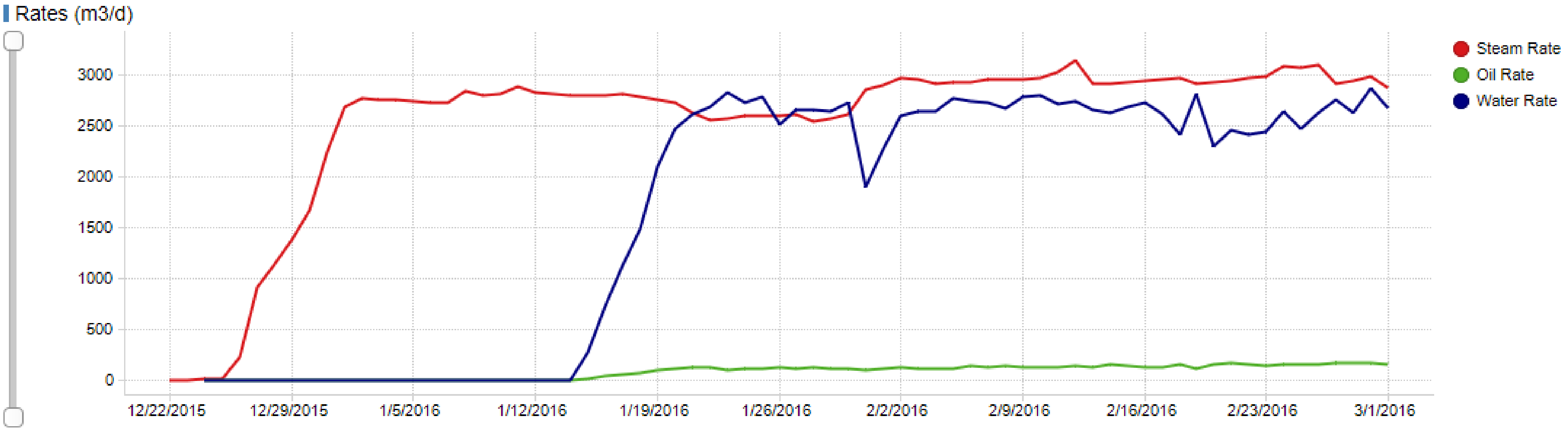


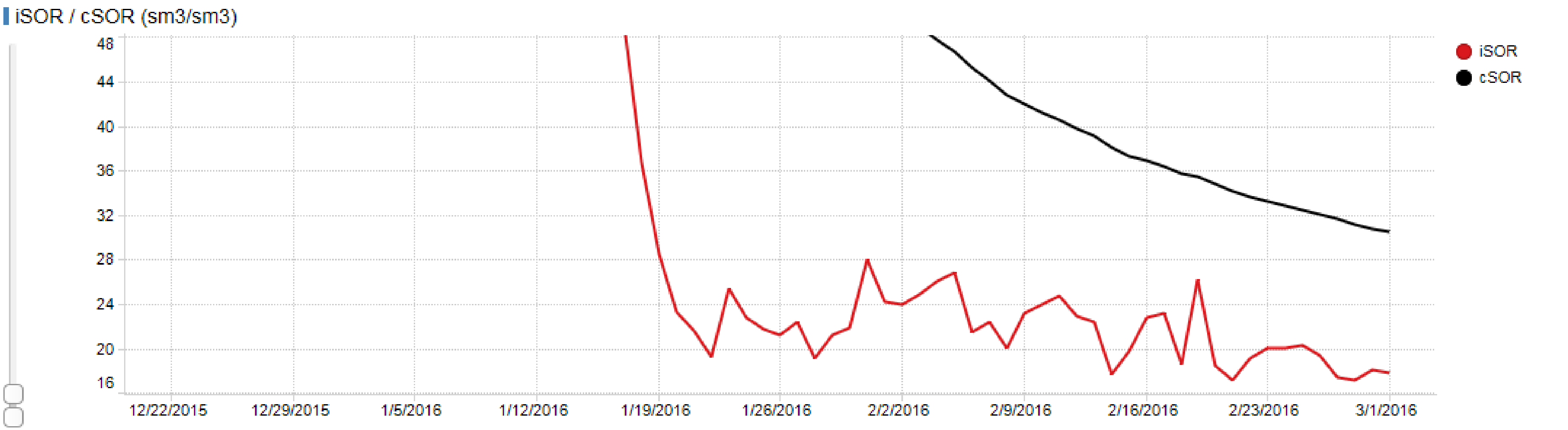


Surmont 2 - Key Learnings

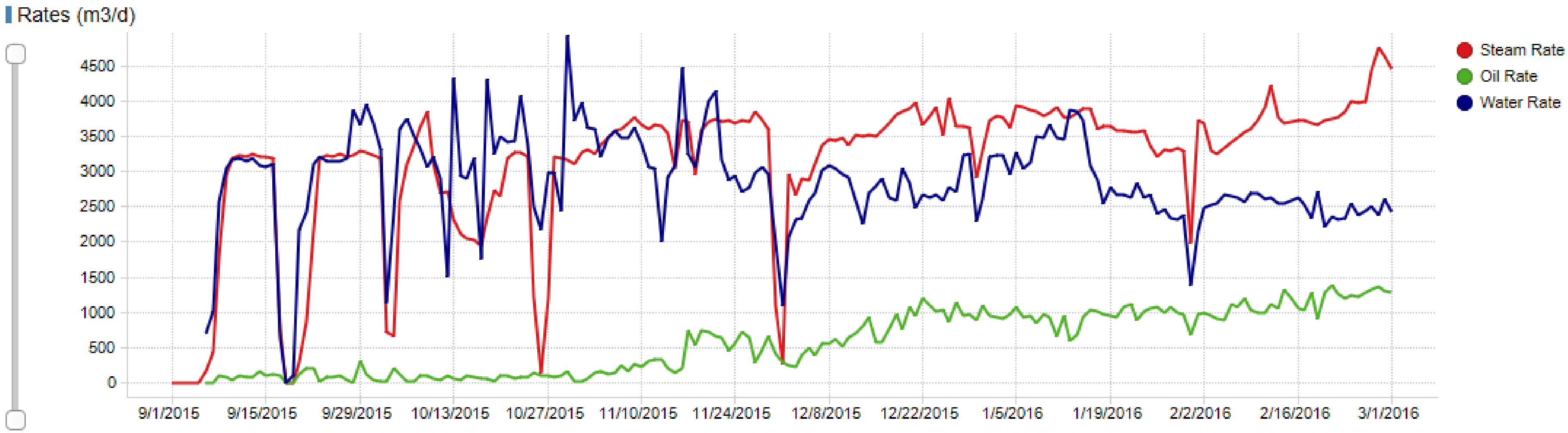
- Current performance difference between Pads and wells drilled in same Pads are under ongoing evaluation, due to the early stage of most wells.
- Some wells have been challenged with injectivity issues, which translates into a slower ramp-up. Analysis of different parameters (geology, operating pressure, operating strategy) is work in progress.

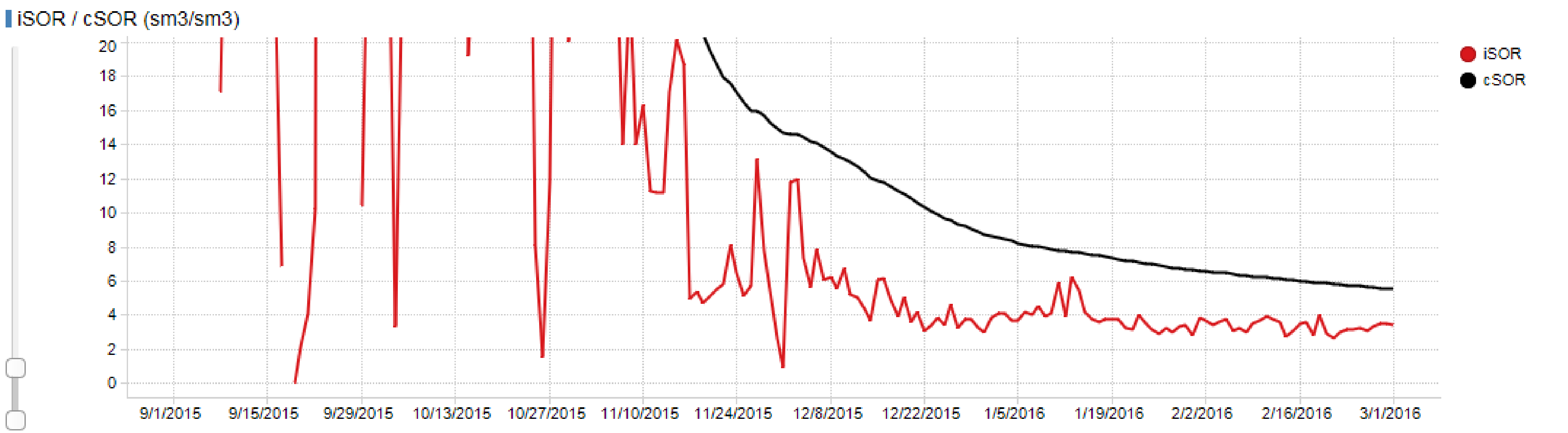
Pad 262-3 Rates & SOR



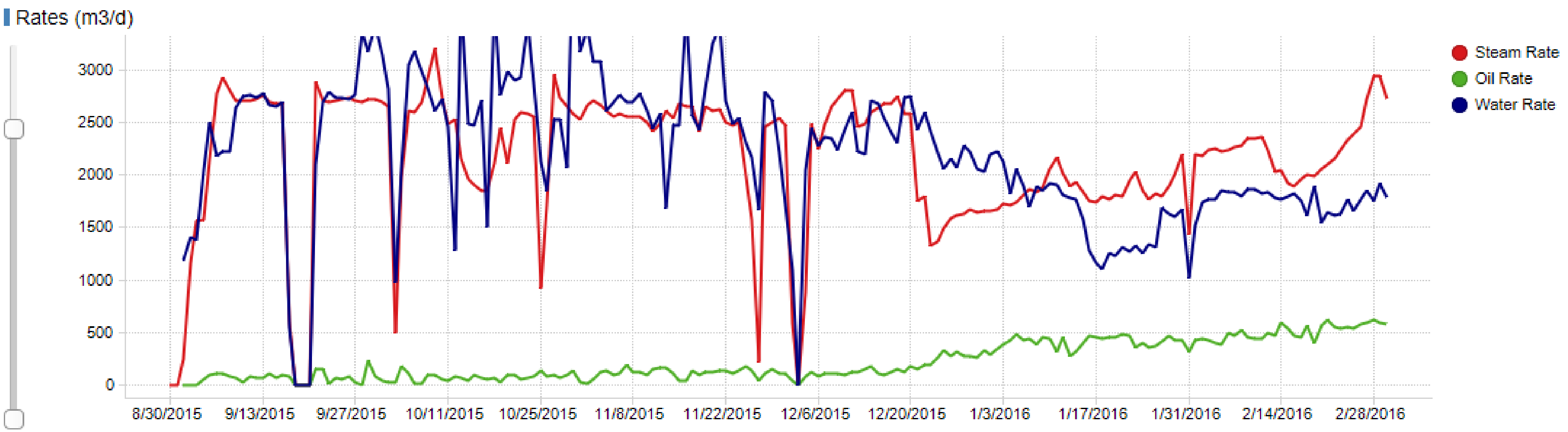


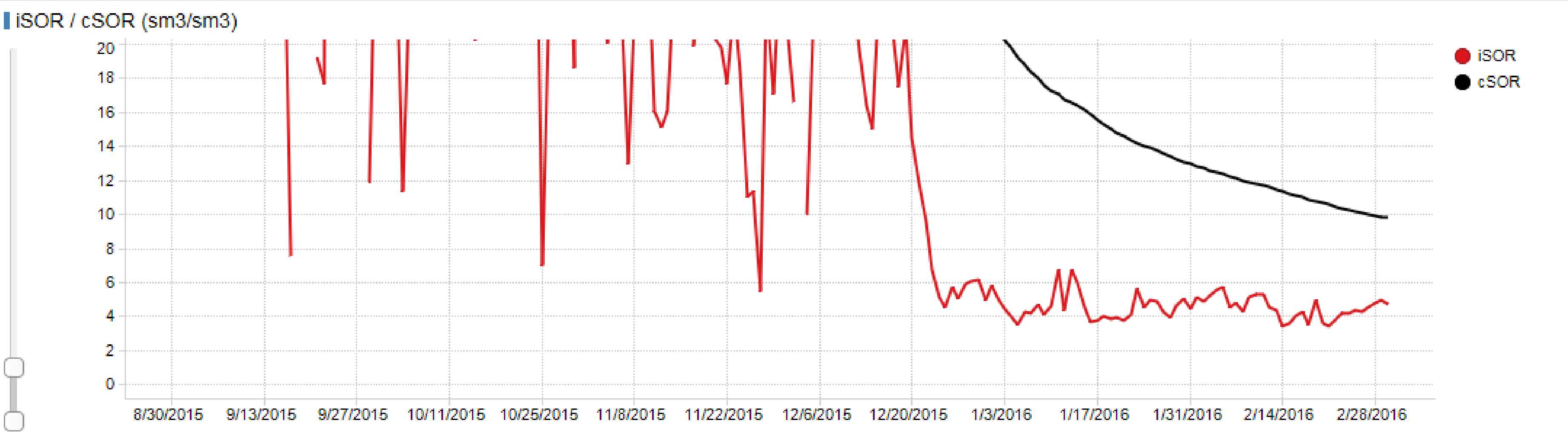
Pad 263-1 Rates & SOR





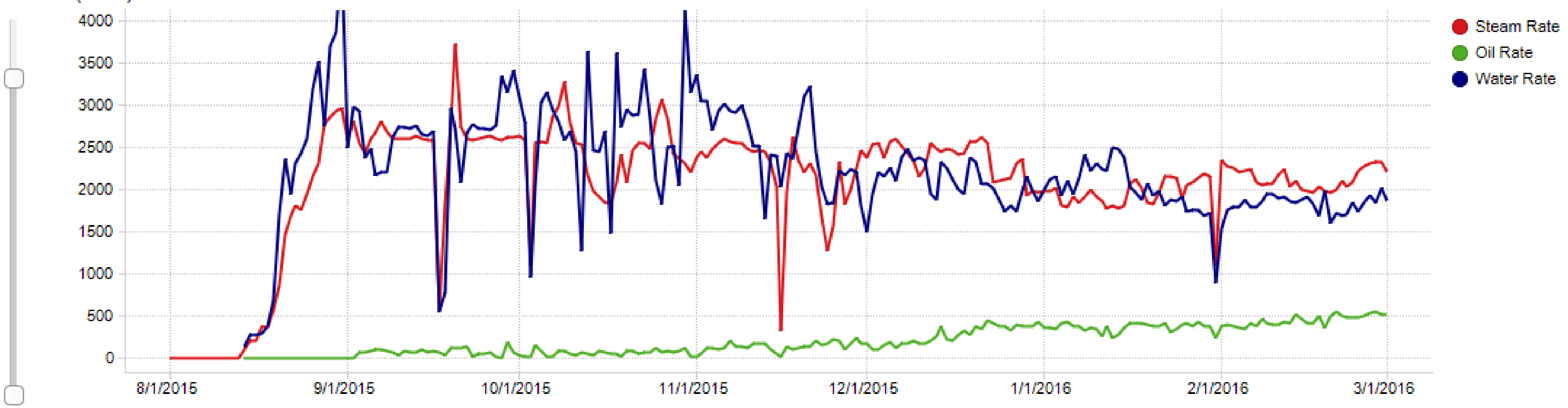
Pad 263-2 Rates & SOR



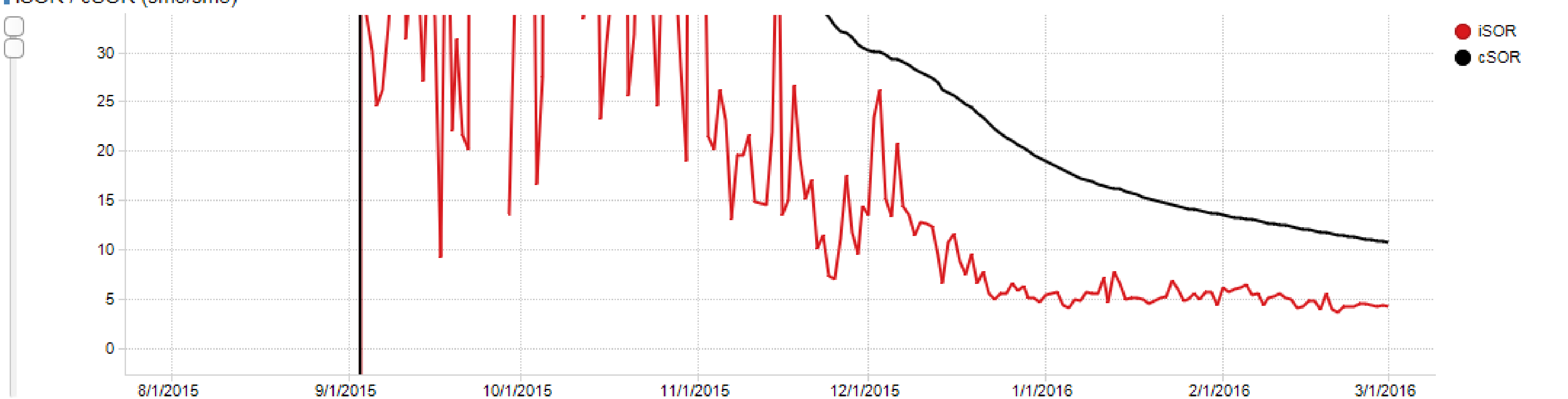


Pad 264-1 Rates & SOR

Rates (m3/d)

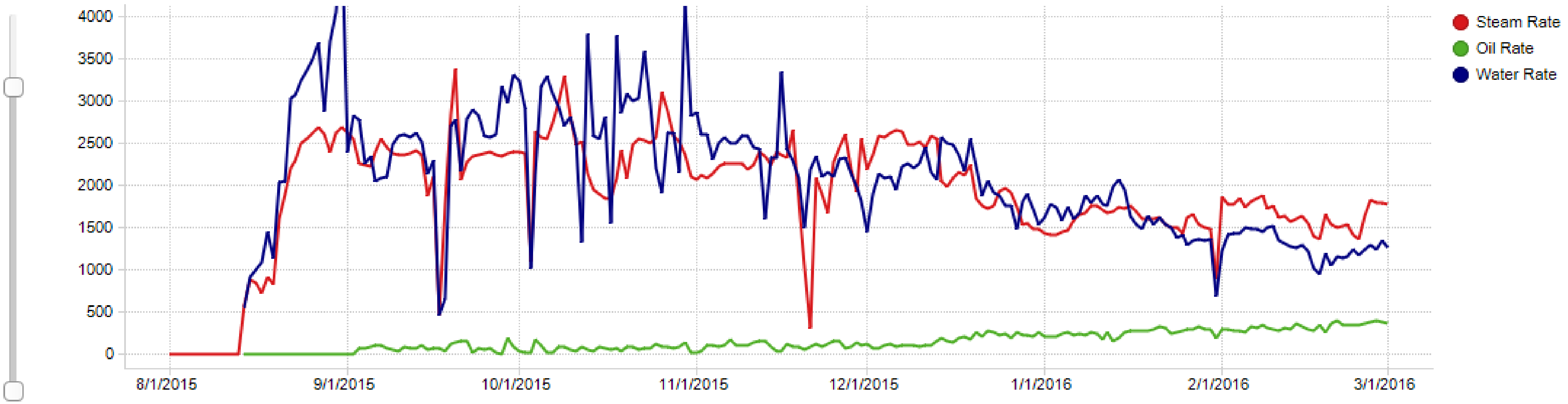


iSOR / cSOR (sm3/sm3)

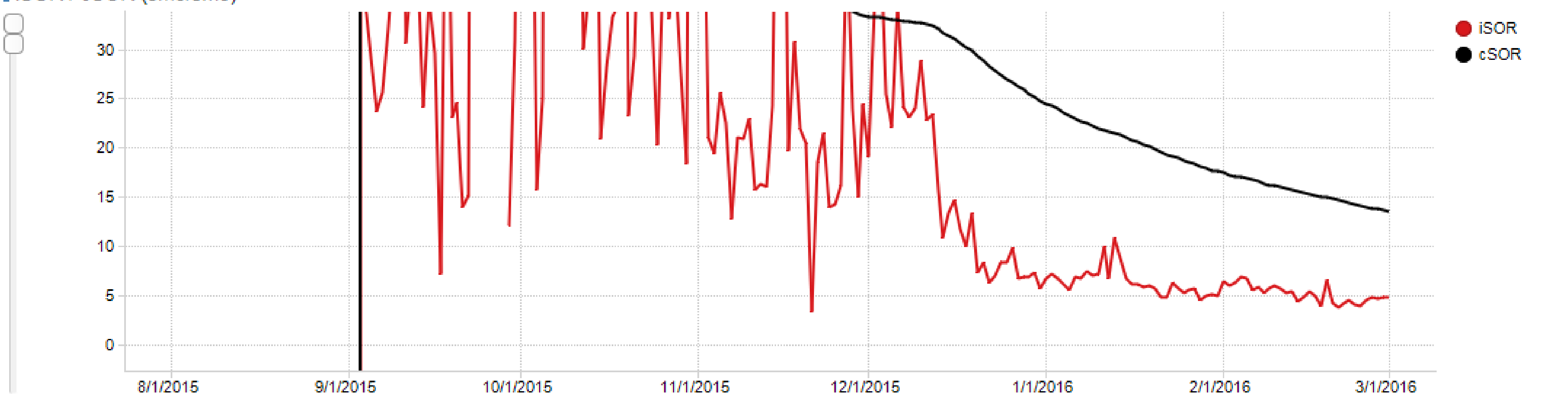


Pad 264-2 Rates & SOR

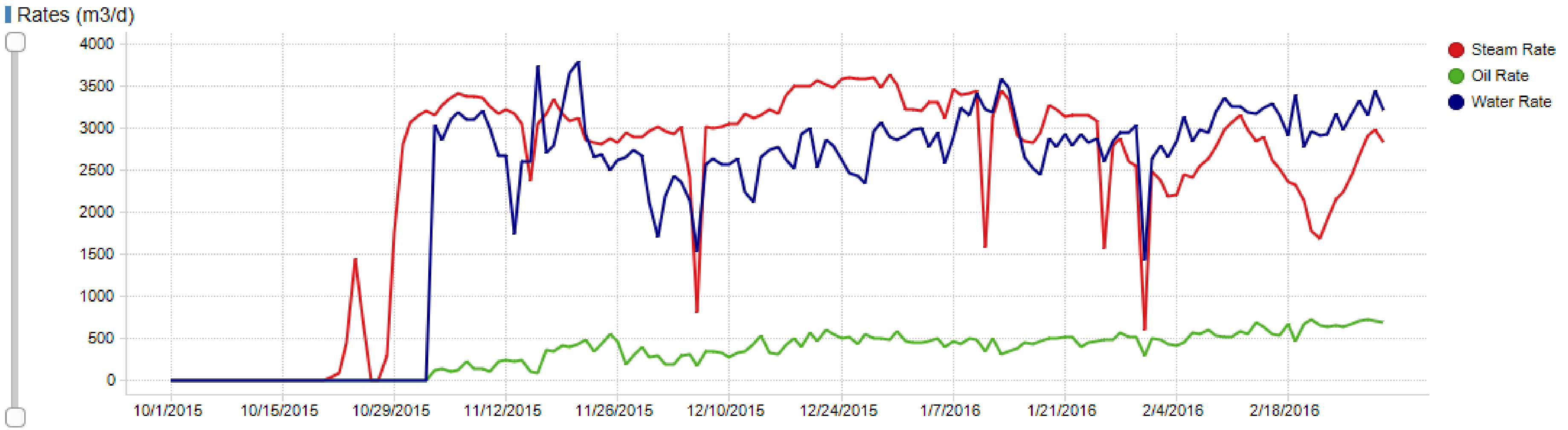
Rates (m3/d)

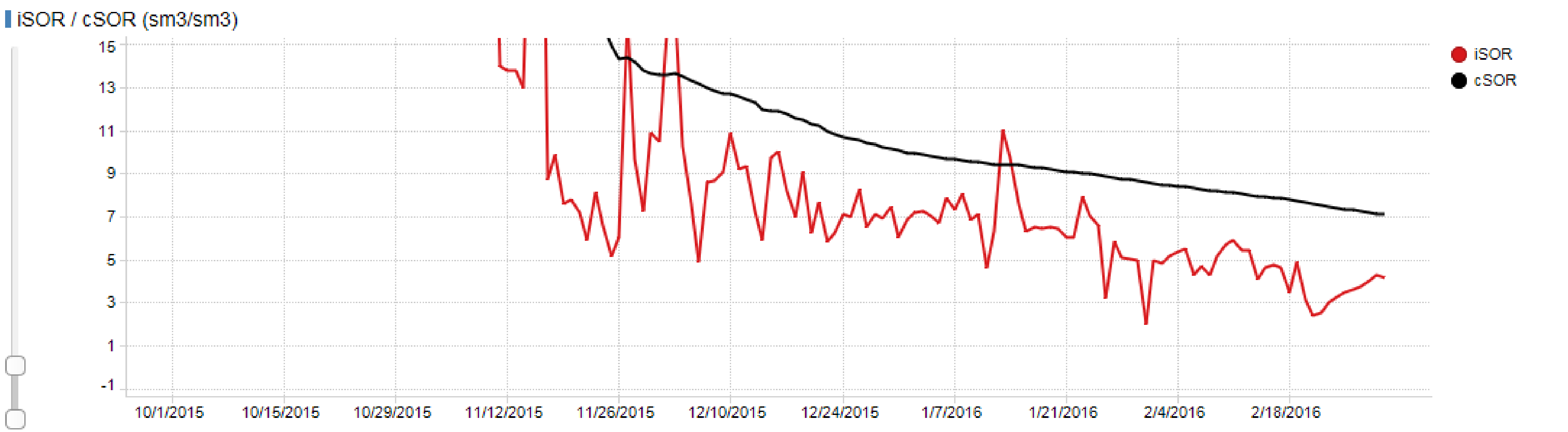


iSOR / cSOR (sm3/sm3)

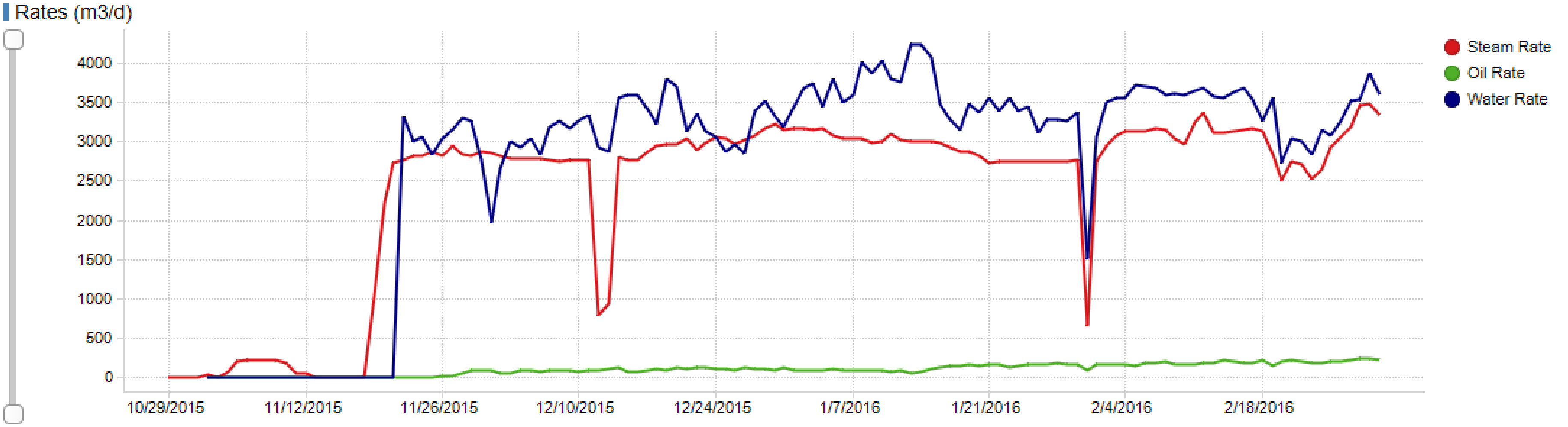


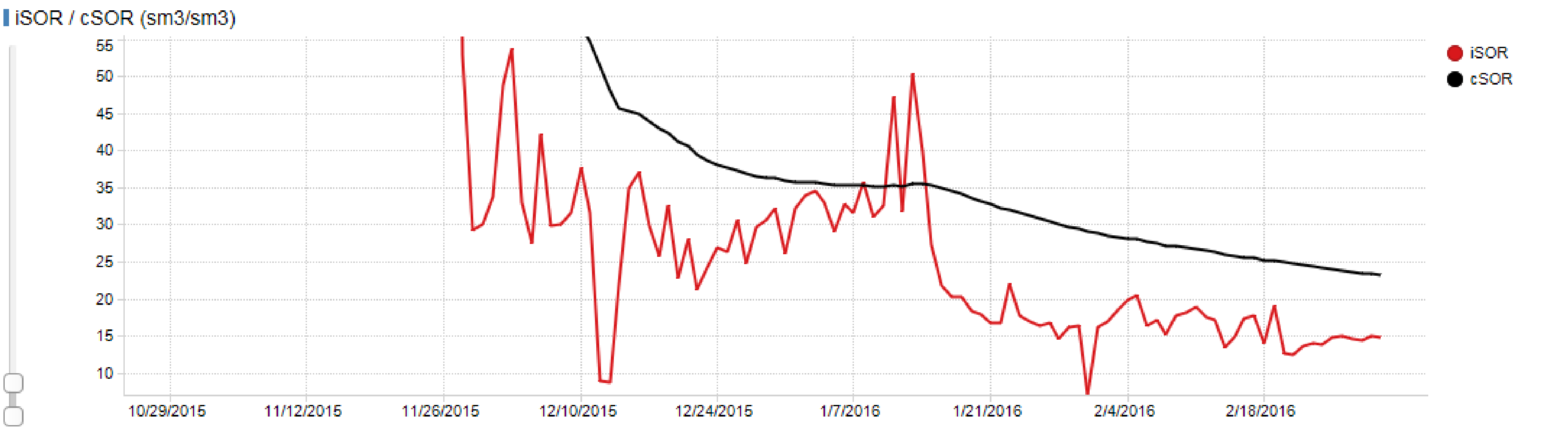
Pad 264-3 Rates & SOR





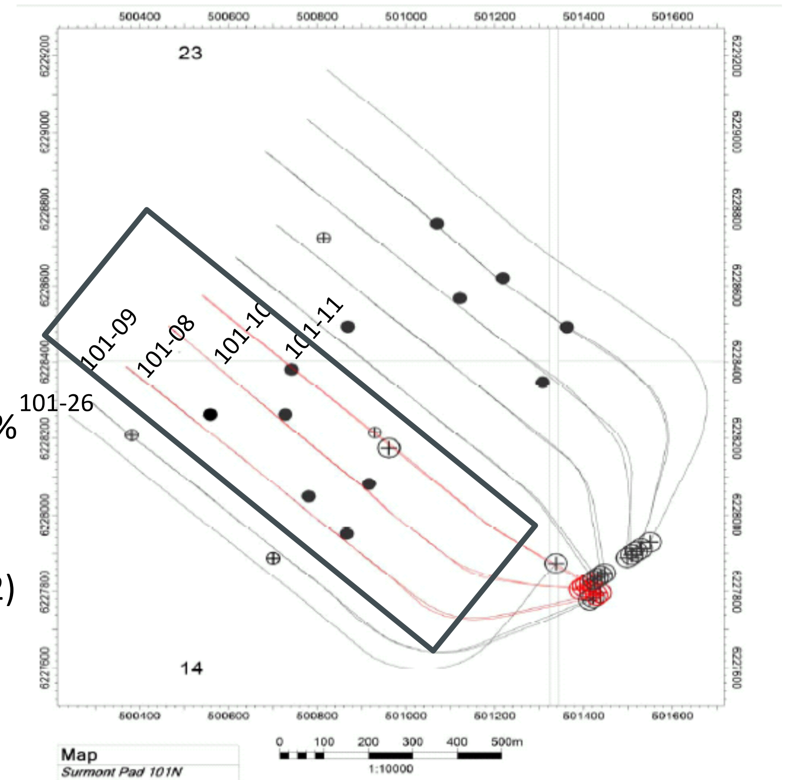
Pad 265-2 Rates & SOR





eSAGD Pilot: Approval #11596

- ConocoPhillips implemented eSAGD pilot in 2013 at Surmont 1
- Pilot area includes:
    - 2 eSAGD well pairs (101-08(02), 101-10(03))
    - 2 adjacent well pairs (101-09(01), 101-11(04))
    - 8 observation wells
    - Spacing 125 meters



- Cumulative Solvent recovery up until end of February 2016 is 50%

2015 Learnings:

- eSAGD had no impact to ESP conversions on well pairs 101-08(02) and 101-10 (03)

Well pairs	Start of production	Start of solvent co-injection	End of solvent co-injection
101-08	Aug. 2011	May 2013	Dec. 2013
101-10	Aug. 2011	Jan. 2013	Aug. 2013

Future Plans

Subsection 3.1.1 (8)

Future Plans – Surmont

Phase 1

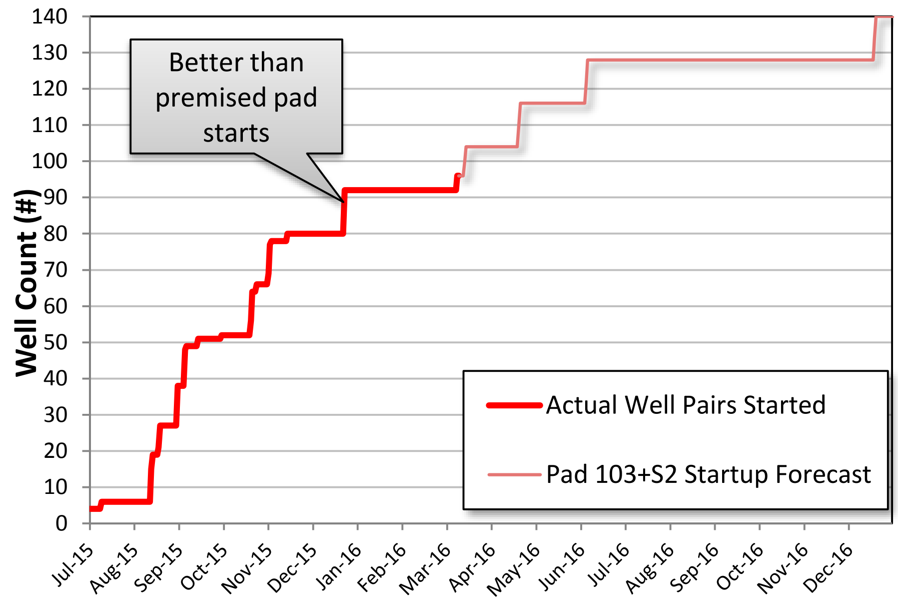
- 102-21/22 fish bone infill wells in 102N remained cold on startup. Steam squeezed 102-21 and placed on production. Preparing for a second steam squeeze.
- Phase 1 Infill Program: 101-24/25/26 alternative start-ups have been delayed. Work remains to tie in wells.
- NCG co-injection for 3 wells on 102S.

Phase 2

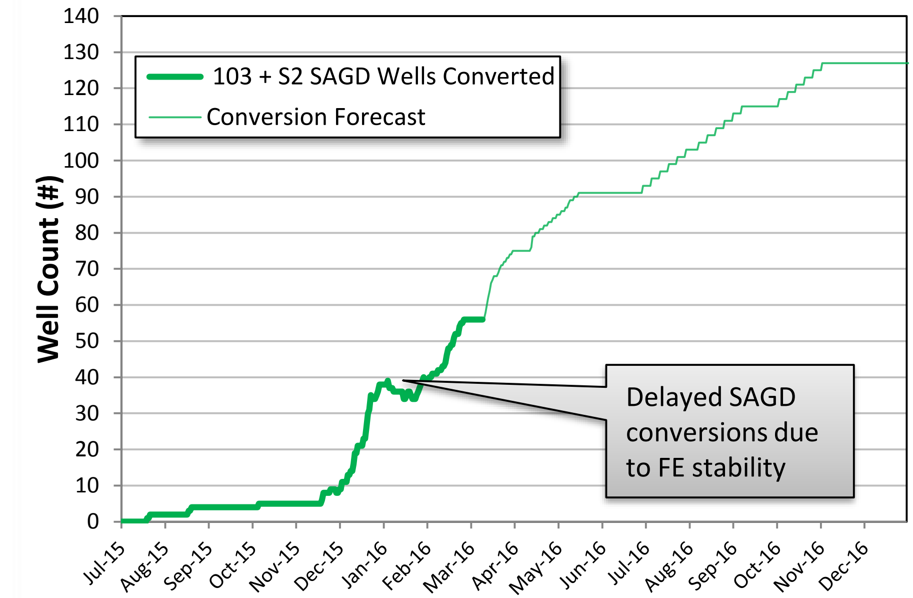
- Start-up 4 remaining pads ramp-up.
- CPF Debottleneck including one OTSG addition was deferred.
- Plan to start 3rd steam train March 2016.
- Well completions ongoing with only 266-2 remaining.
- Apply for an increase in MOP for two drainage areas (261-3, 262-3).

S2 Ramp-up

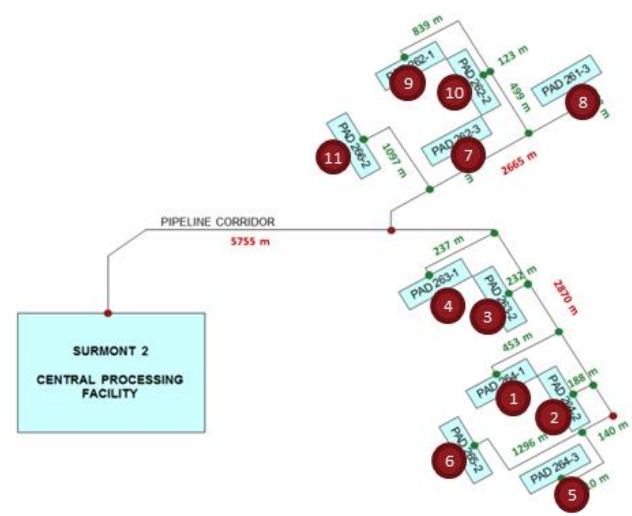
Surmont Well Circulation Start-up



Surmont SAGD Conversions



- Well pads 261-3, 262-2, 262-1 and 266-2 brought online before end of 2016.
- Continue to convert wells to SAGD when ready.
- The well start up base plan is primarily based on a conventional circulation pre-heat period of 90 days. Actual performance has taken longer.



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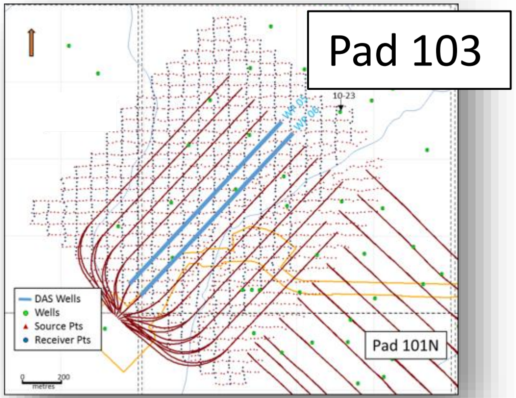
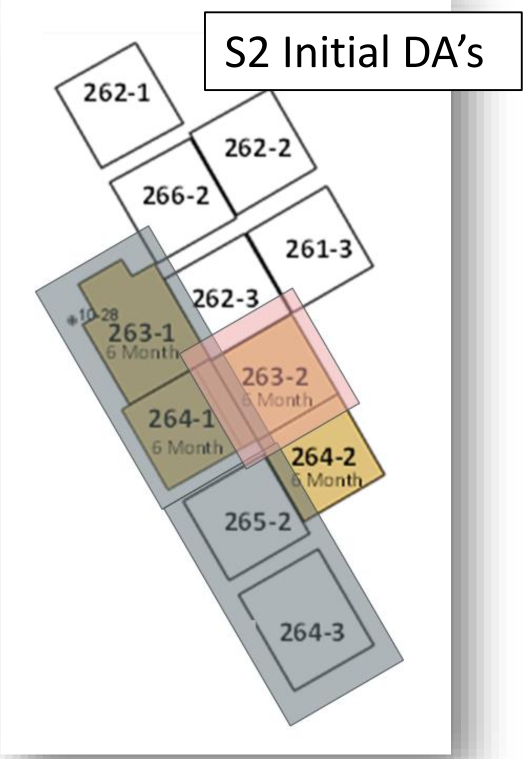
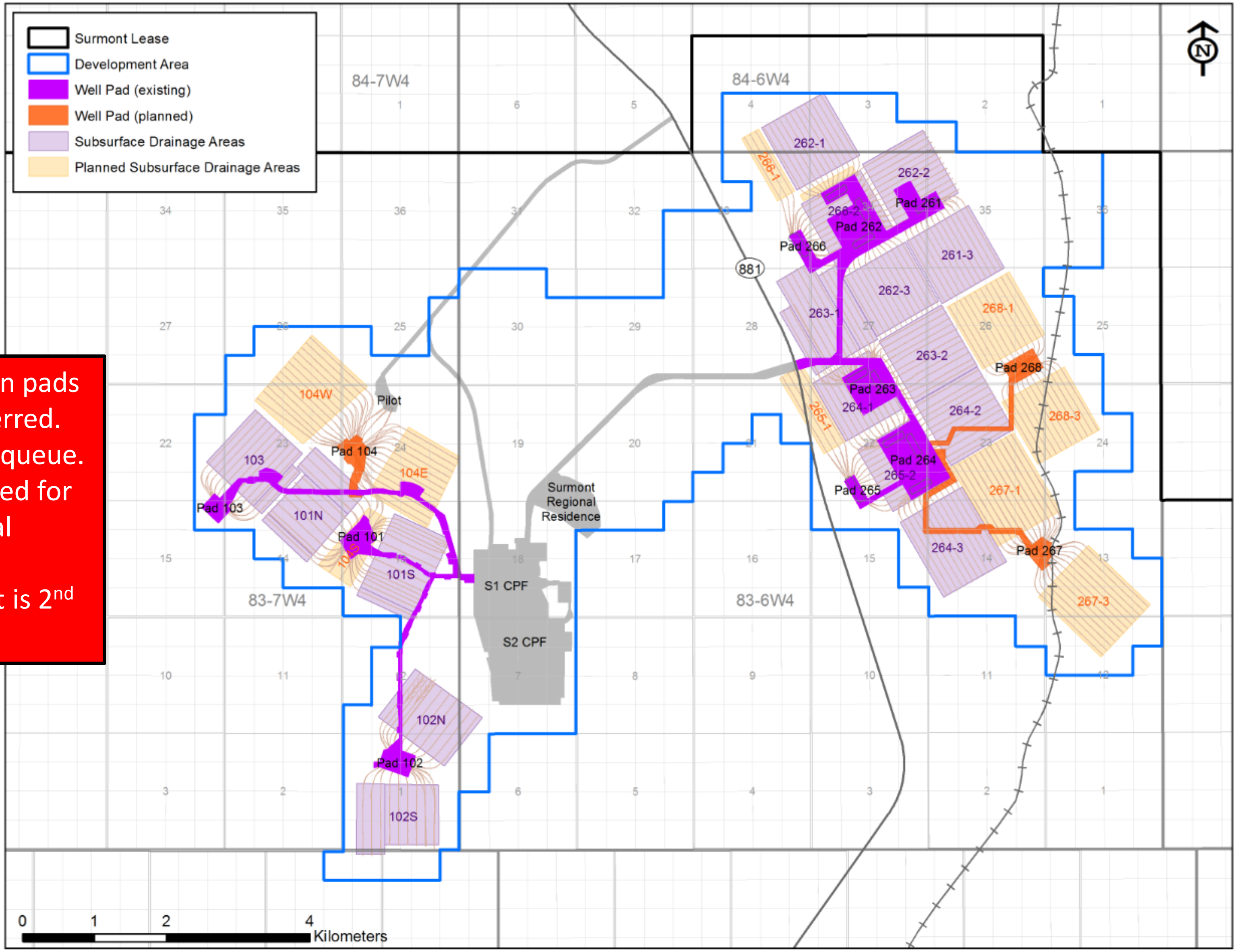
Planned 2016 4D campaign

- Spring Acquisition
  - Pad 103:
    - Regulatory requirement - Well10-23
    - First DAS Monitor (WP 05 & 06 FCD)
    - 101N Chamber
  - Pad 263-2:
    - Possible thief zone issue on well pair 4 (Winter access only)
- Fall Acquisition
  - Pad 263-1 / 264-1
    - Well on SAGD > 9 months
    - Regulatory requirement – Well 10-28 (263-1)
    - Thief Zone Risk
  - Pads 265-2 / 264-3
    - Should be on SAGD ~ 6 months
    - High to Moderate risk of Thief Zone





Future Pad Developments



- Outboard wells on pads 265 and 266 deferred.
- 267 is first in the queue.
- 268 being reviewed for impact of regional bottom water.
- 104 development is 2nd in the queue.

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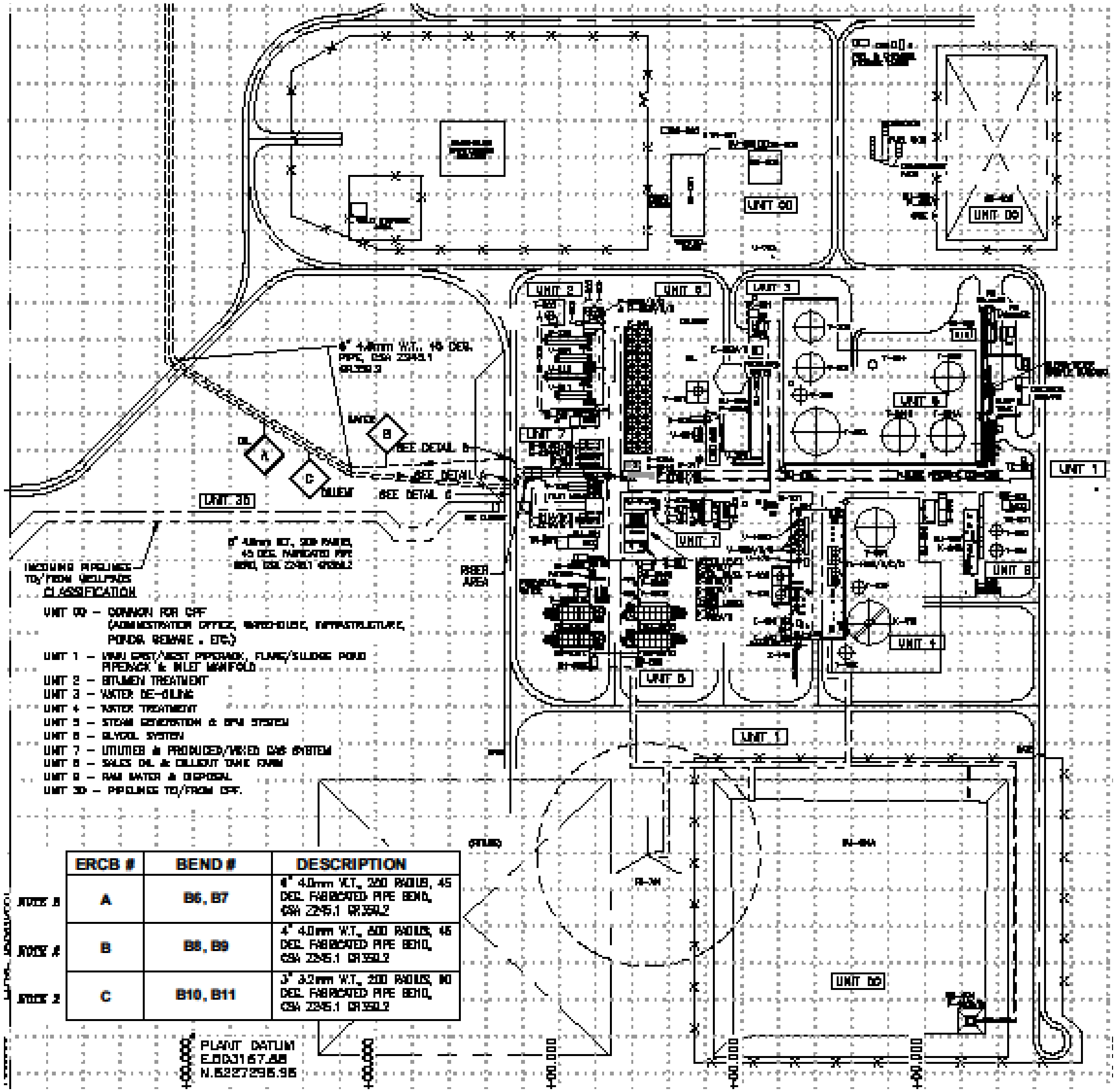
Surface Operations and Compliance Surmont Project Approval 9426

Facilities

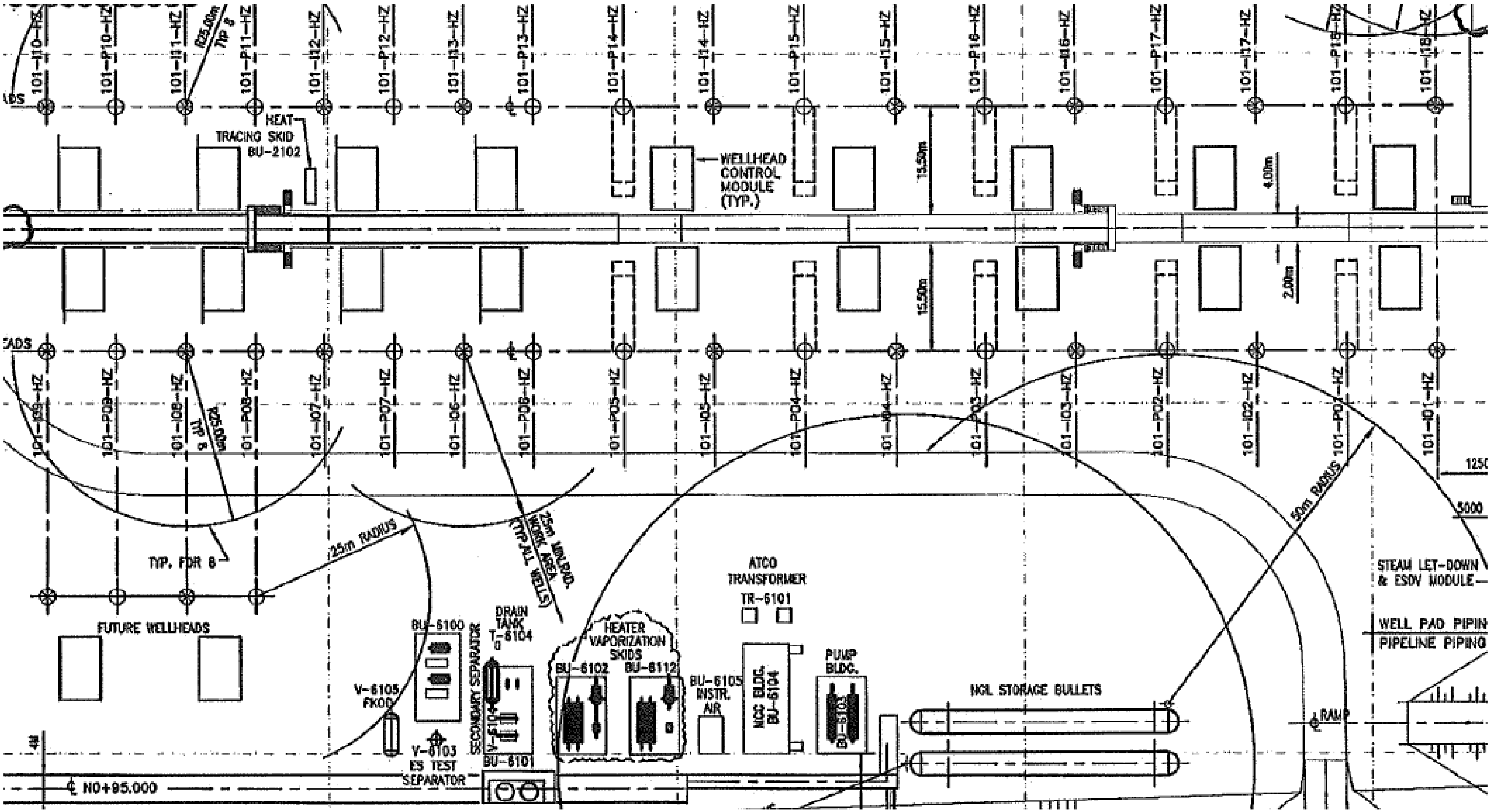
Subsection 3.1.2 (1)



ERCB #	BEND #	DESCRIPTION
A	B6, B7	4" 4.0mm W.T., 250 RADIUS, 45 DEG. FABRICATED PIPE BEND, CSA Z245.1 GR359.2
B	B8, B9	4" 4.0mm W.T., 600 RADIUS, 45 DEG. FABRICATED PIPE BEND, CSA Z245.1 GR359.2
C	B10, B11	3" 3.2mm W.T., 200 RADIUS, 90 DEG. FABRICATED PIPE BEND, CSA Z245.1 GR359.2

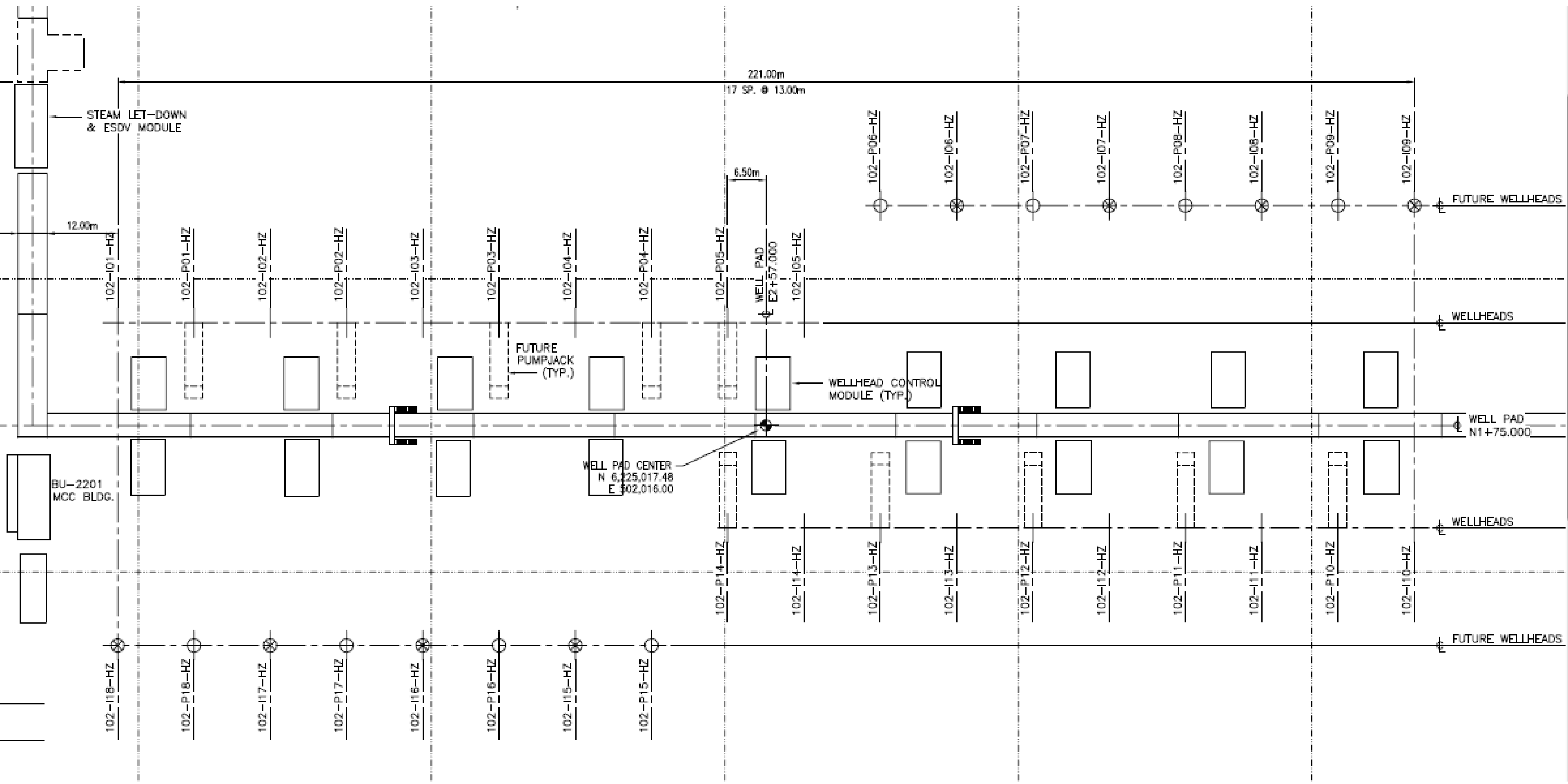
- **No Major Modifications at Phase 1 CPF in 2015.**

Phase 1 Plot Plan: Pad 101



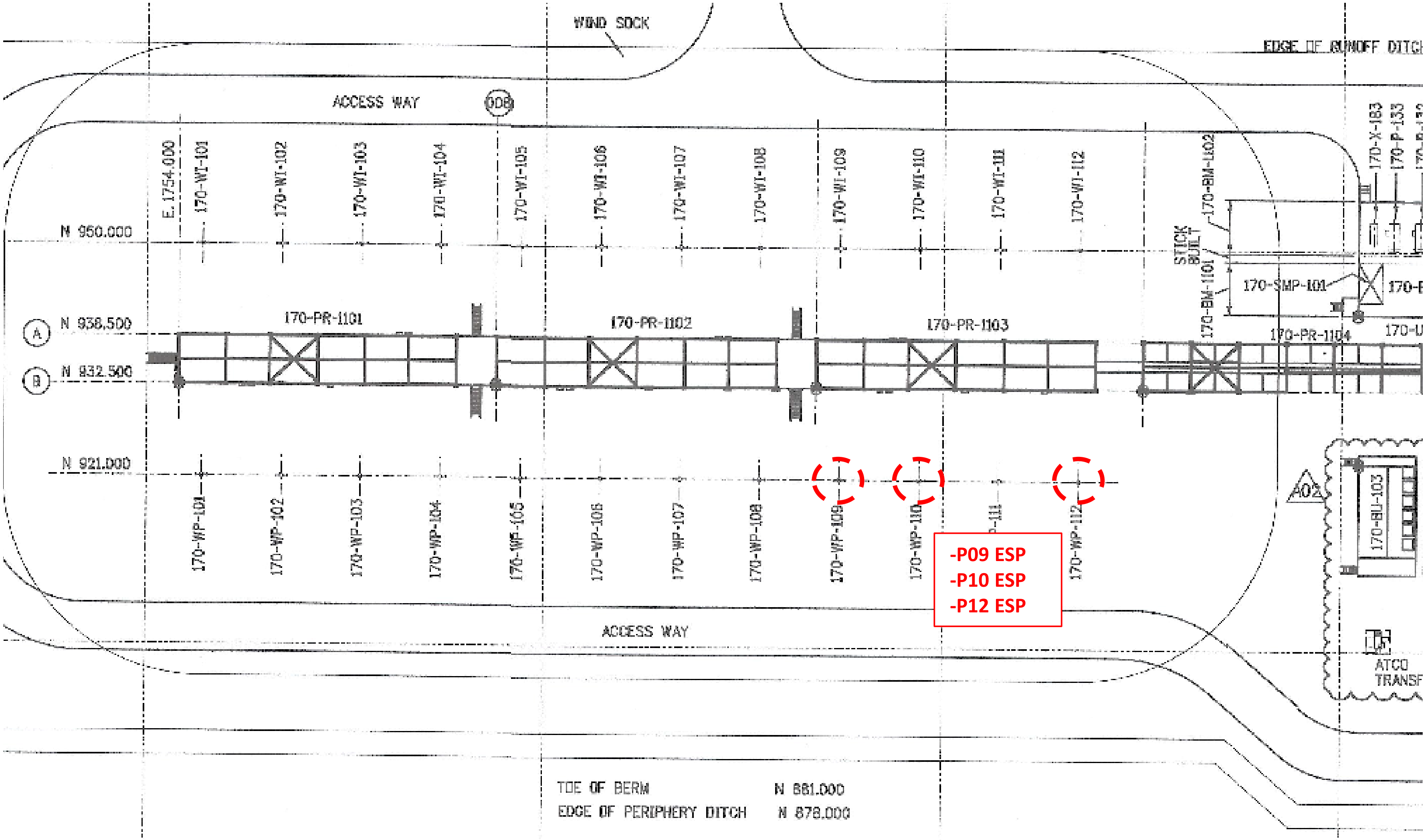
- **No ESP Conversions or Major Modifications at Pad 101.**

Phase 1 Plot Plan: Pad 102



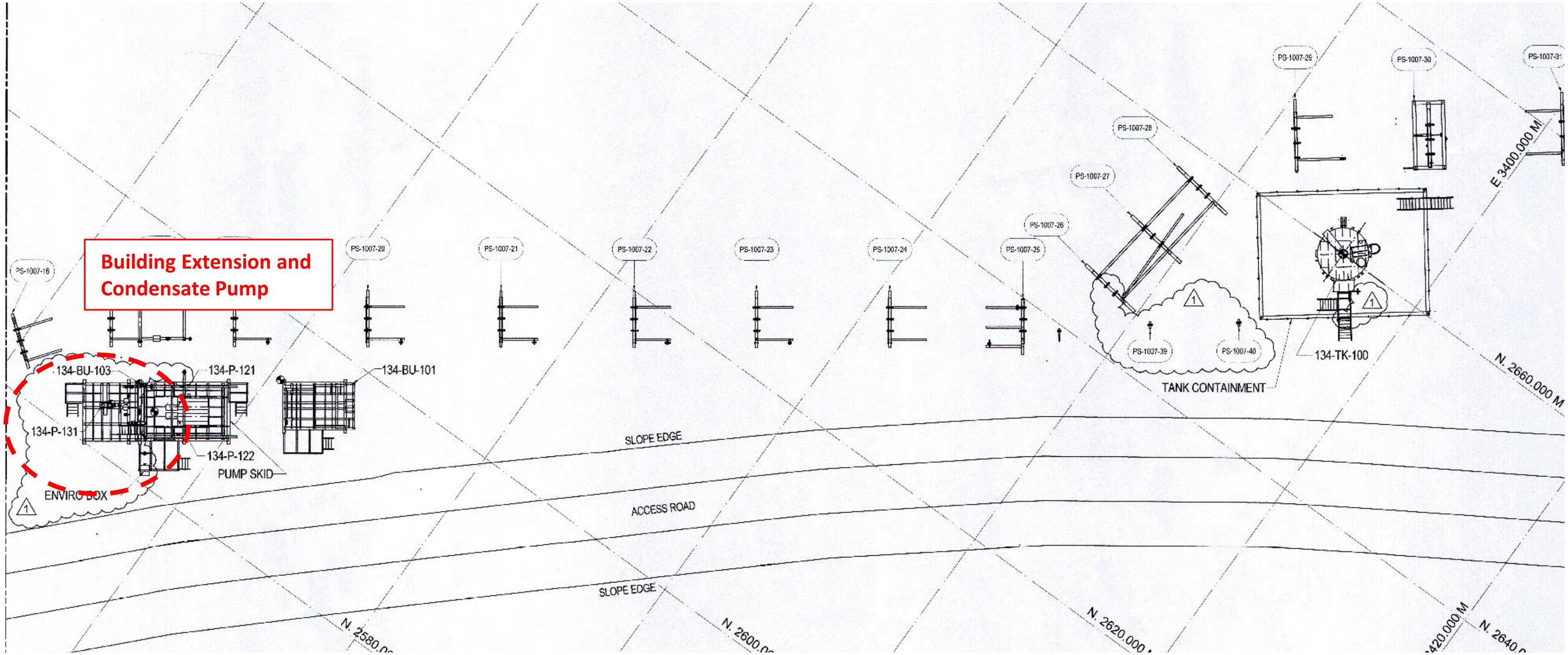
- **No ESP Conversions or Major Modifications at Pad 102**

Phase 1 Plot Plan: Pad 103



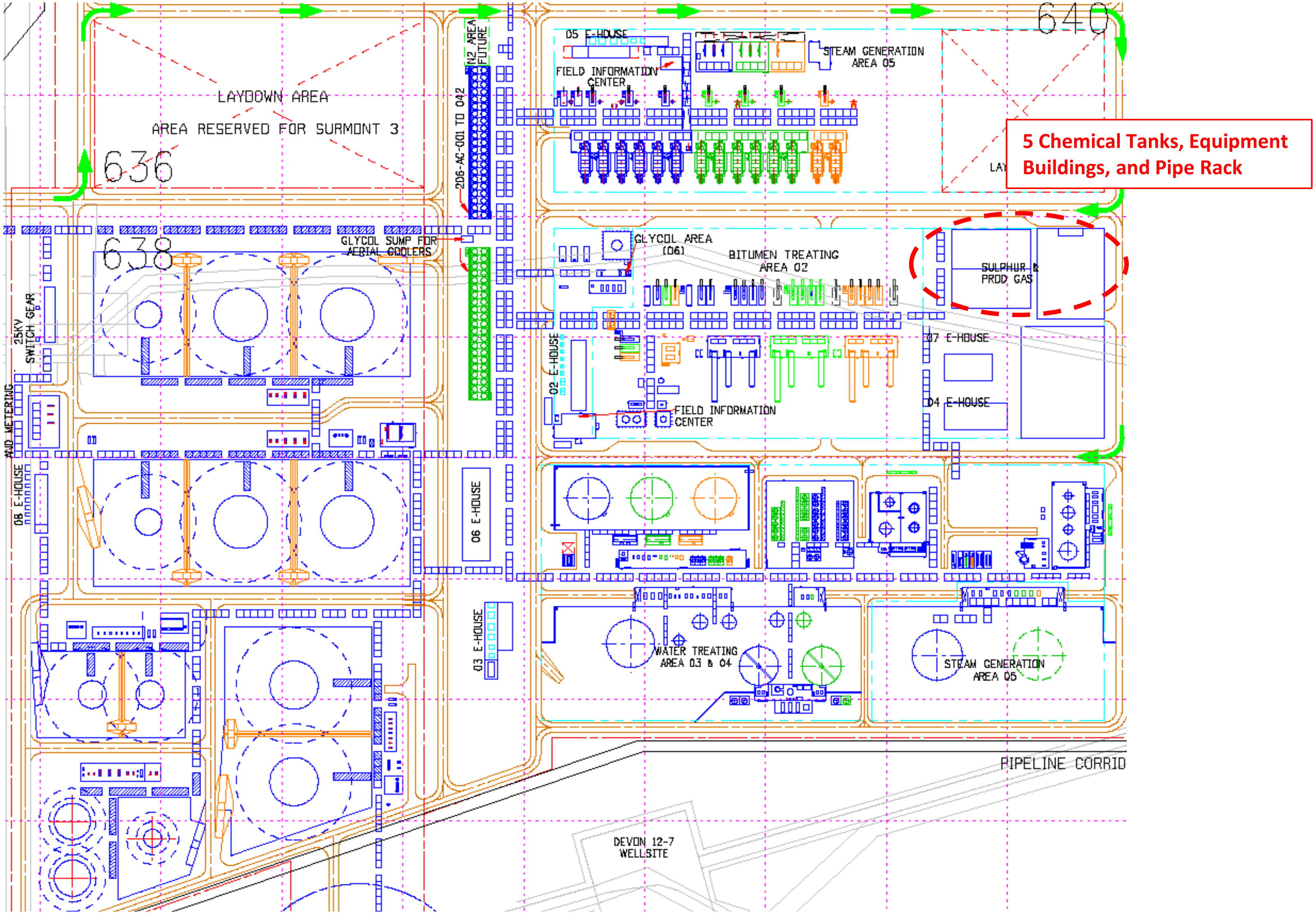
- **Pad 103 ESP Conversions added 3 ESPs in Feb 2016**

Phase 1 Plot Plan: Pad 103 Gathering Line



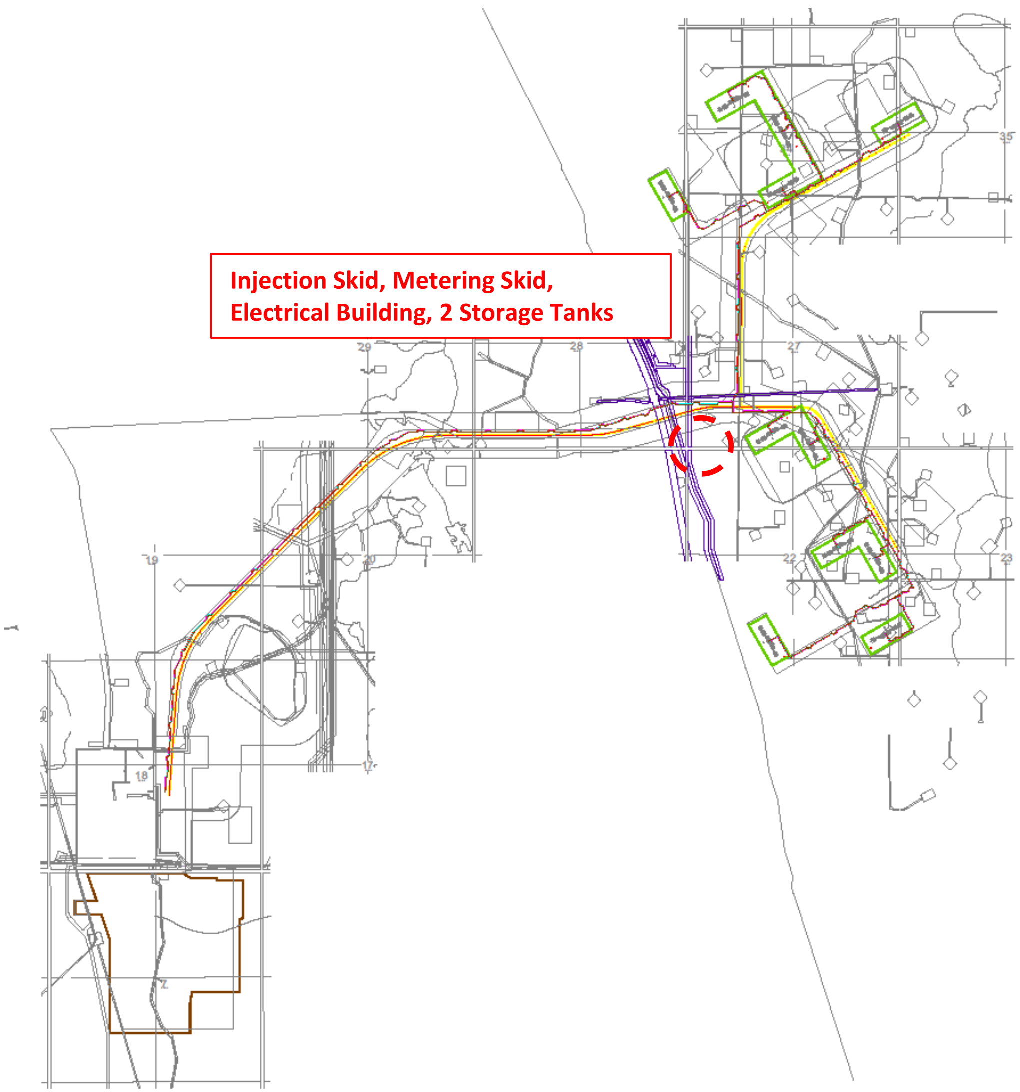
- **Completion and Start-up of Pad 103**

Phase 2 Plot Plan: CPF



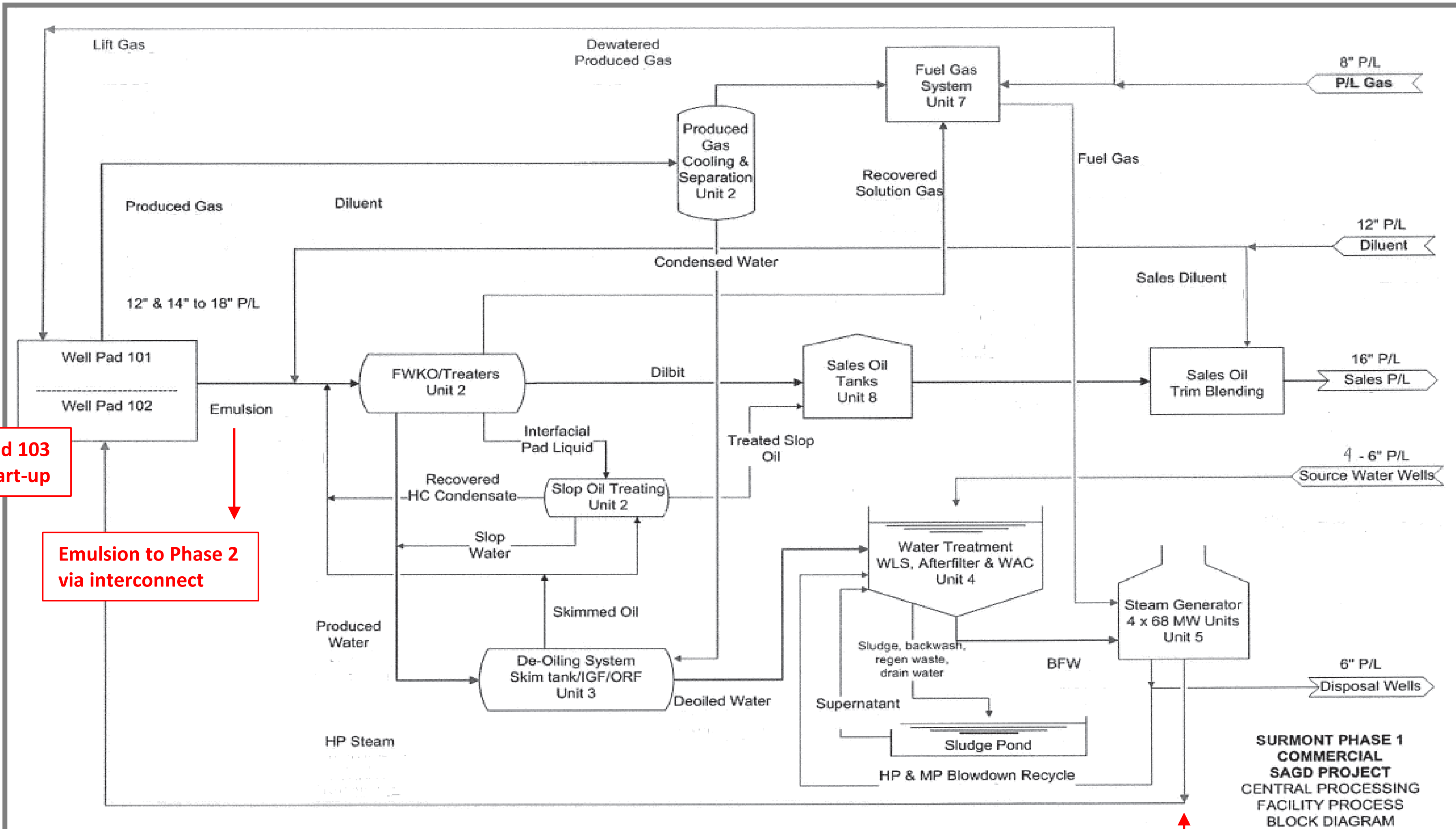
Focus on Start-up of Phase 2

Phase 2 Plot Plan: Distribution Pipeline & Pads



- **Focus on Start-up and Process Optimization**

Plant Schematic: Phase 1



Pad 103 start-up

Emulsion to Phase 2 via interconnect

Steam from Phase 2 via interconnect

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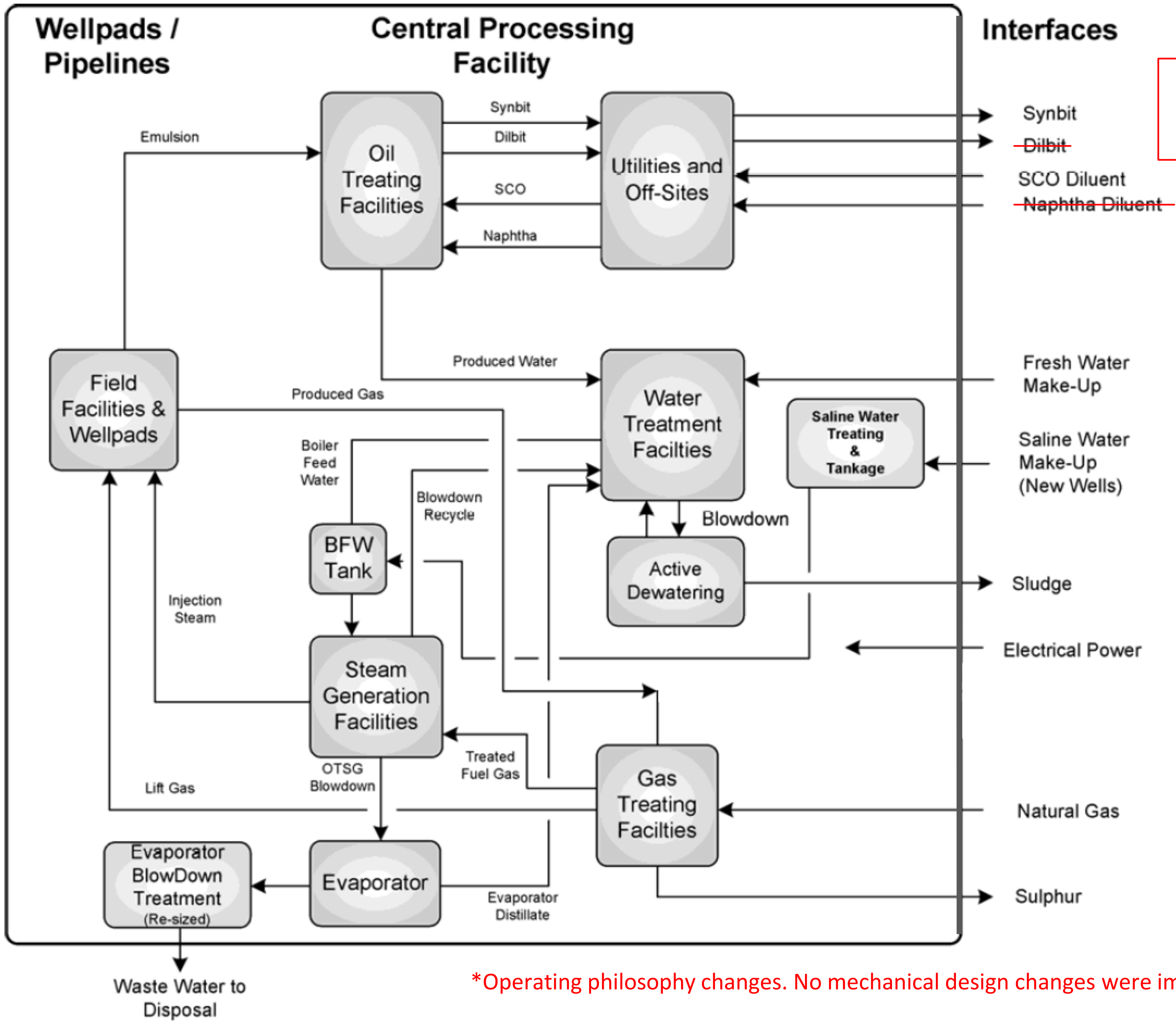
Plant Schematic: Phase 2



Currently not blending Naphtha to produce Dilbit*

*Operating philosophy changes. No mechanical design changes were implemented.

2015 Surmont Operations

2015 – Capital Projects:

- Steam Condensate Pump: Addition of pump and extension to condensate building as part of the Pad 103 project.
- Emulsion Breaker (EB) Injection Facility: Consists of an injection skid, metering skid, electrical building, and 2 storage tanks. Installed to improve operating conditions and reduce use of the EB chemical.
- Mercaptan Project: The original SulFerox system was not designed to handle mercaptans. Installed 5 chemical tanks, equipment buildings, and pipe rack so as to implement liquid scavenger technology in place of SulFerox.
- Completion and start-up of Pad 103. Three wells were converted from gas lift ESP as per Pad 103 Ramp-up and operating strategy.
- Start-up of Phase 2 facility and wells.

2015 – Optimization Focus Overview:

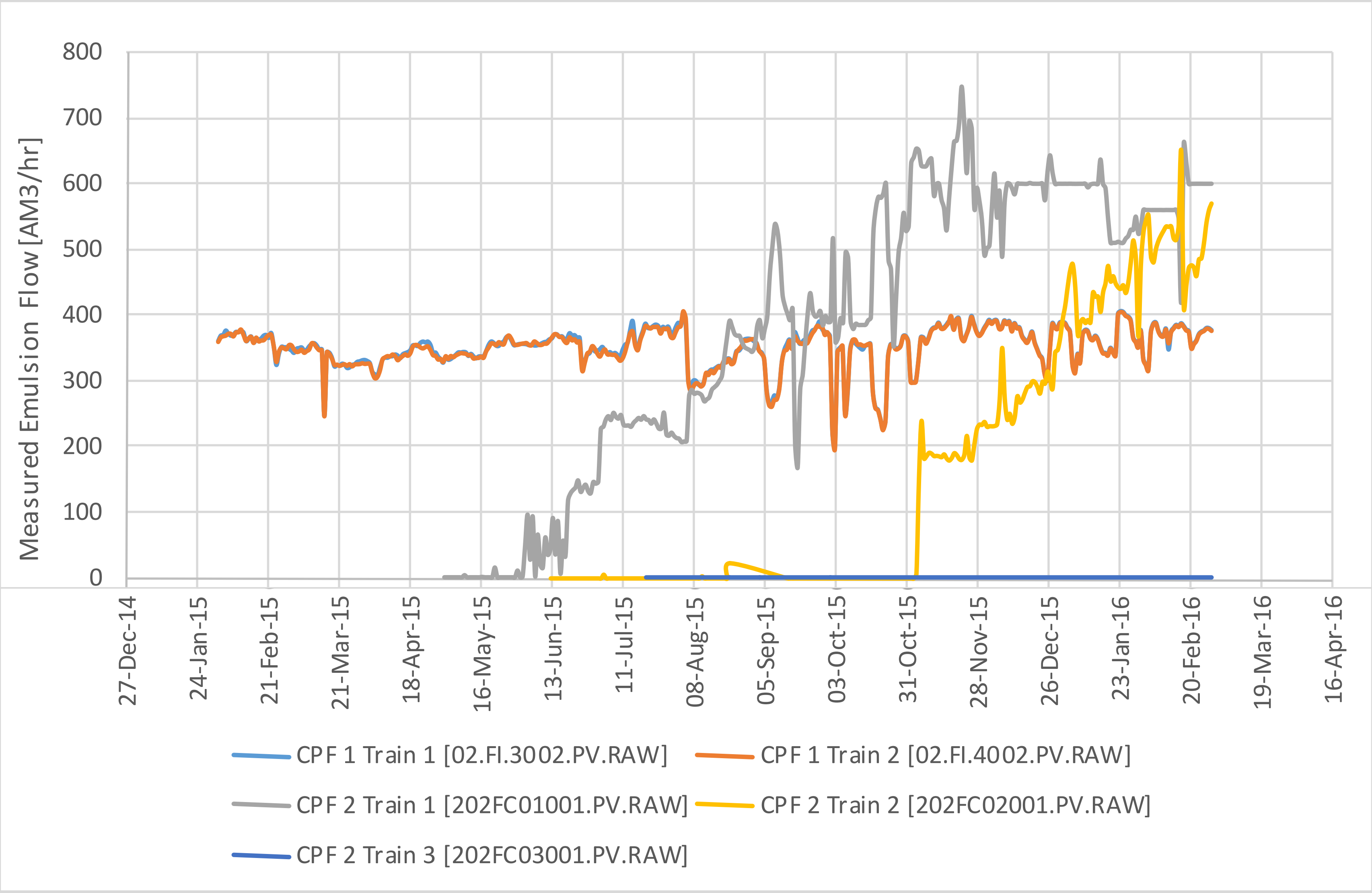
- Successful steam quality control trial completed on SG-531 C.
- Next step is to progress to Surmont wide steam quality improvement.
- Began water treatment injection trials.
- Completion of Heat Integration study at Phase 1; next step is implementation.

- **2015 Start-up and Optimization Focus**

Facility Performance

Subsection 3.1.2 (2)

Facility Performance: Bitumen Treatment



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Facility Performance: Phase 1 Water Treatment

- Phase 1 water treatment plant continues to operate as per design.
- Multiple chemical trials have been conducted which impact water treatment performance. Well stimulation trials in 2015 negatively impacted performance. Ongoing water treatment chemical trials are positively impacting water quality performance.

Boiler Feed Water Quality (Feb 1, 2015 to Feb 29, 2016)

Parameter	BFW Specification	Avg. Value	% of time on Spec
Hardness (Dissolved), mg/L	<0.3	0.13	95.7*
Silica, as SiO2, mg/L	<50	19.1	99.2
Bitumen in Water, ppm	<0.5	0.34	98.8
Turbidity, NTU	<3.5	1.51	98.5

* 99.8% excluding chemical trials

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Facility Performance: Phase 2 Water Treatment

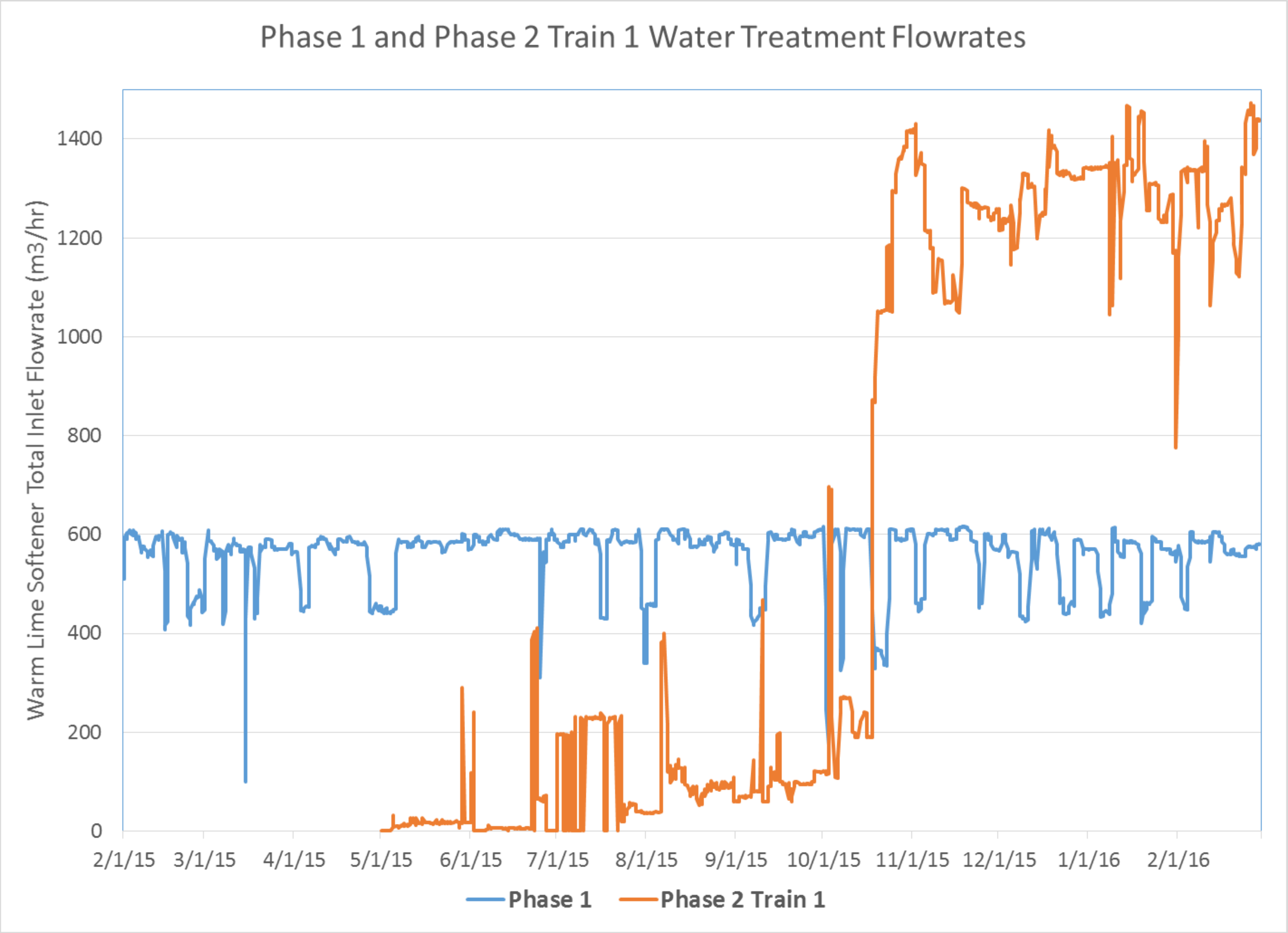
- Phase 2 water treatment plant successfully started up in 2015.
- Train 1 operating at near design capacity. Train 2 startup ongoing.

Boiler Feed Water Quality (July, 2015* to Feb 29, 2016)

Parameter	BFW Specification	Avg. Value	% of time on Spec
Hardness (Dissolved), mg/L	<0.3	0.17	96.7
Silica, as SiO2, mg/L	<50	24.9	100
Bitumen in Water, ppm	<0.5	0.28	97.3
Turbidity, NTU	<3.5	0.84	99.1

* Phase 2 water treatment plant started up in July 2015

Facility Performance: Water Treatment



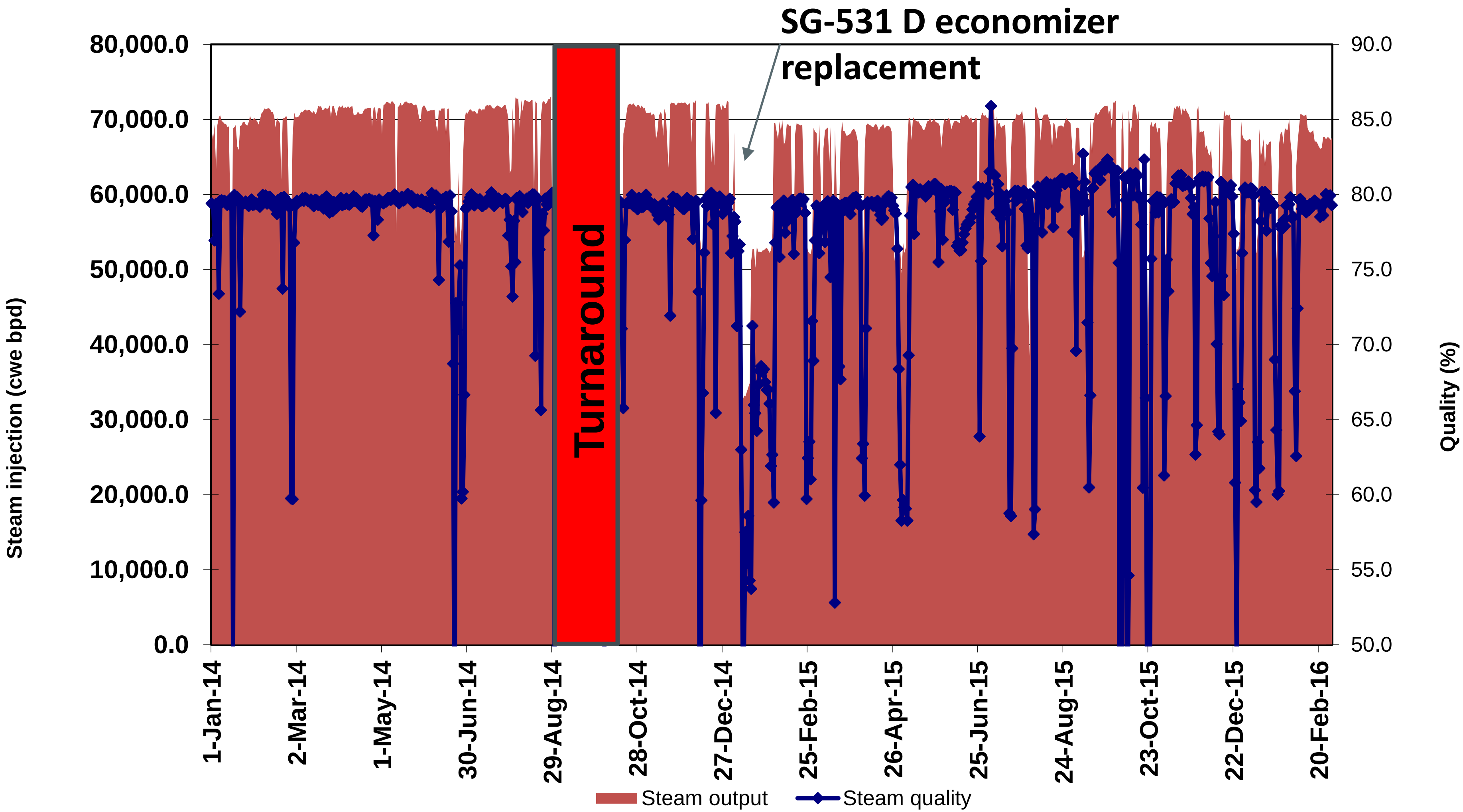
Plant Performance Steam Generation Phase 1

2014:

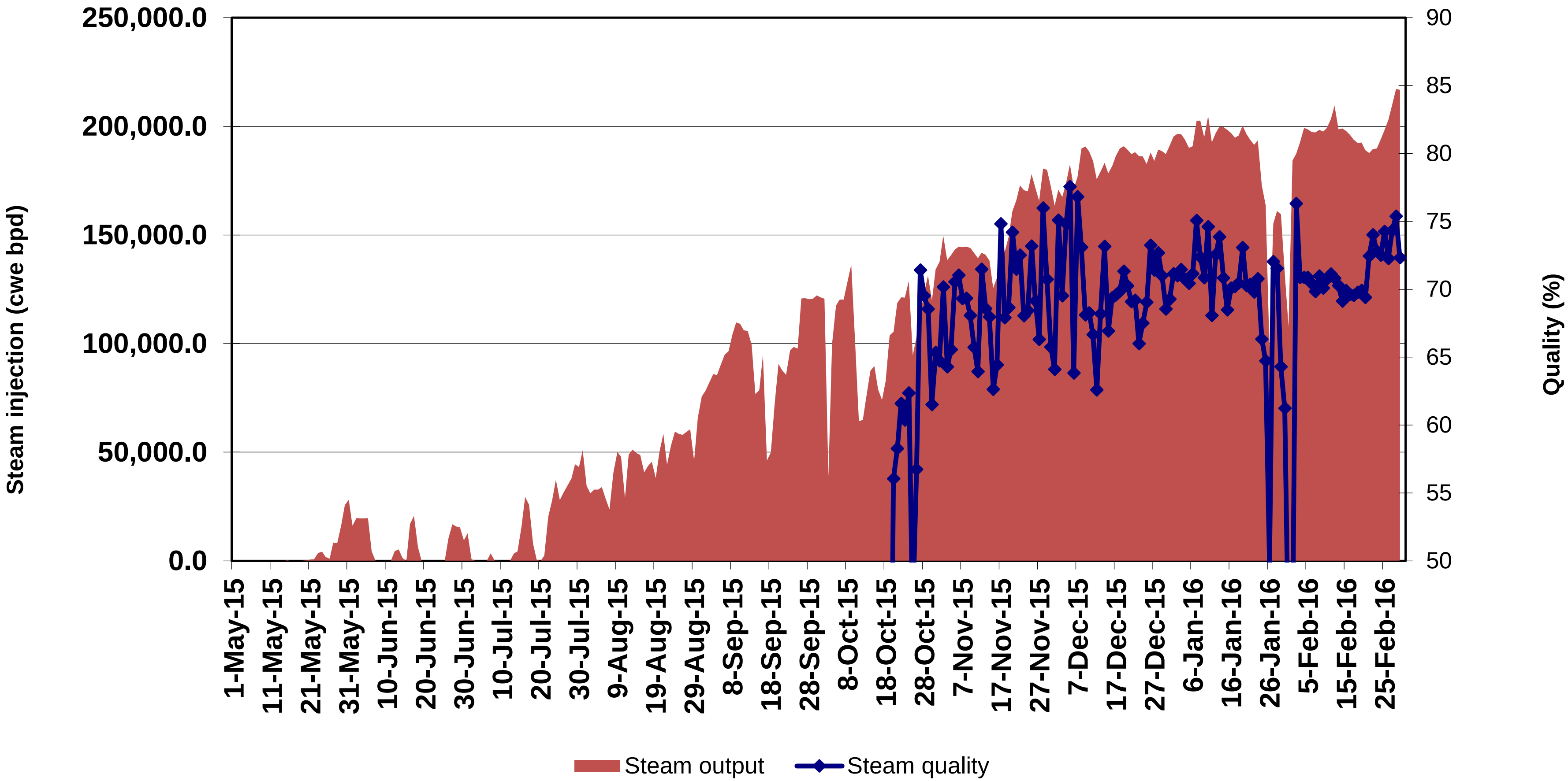
Operating BDR @ 25%
Max rate 73,100 bpd
Average: 62,600 bpd

2015:

Operating BDR @ 25%
Max rate: 74,700 bpd
Average: 66,300 bpd



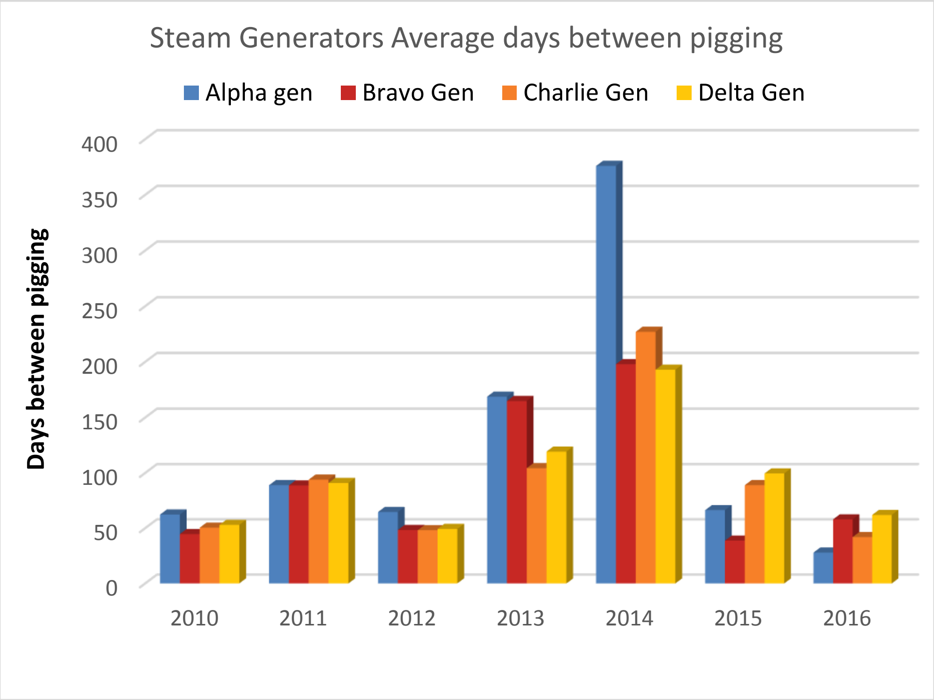
Plant Performance Steam Generation Phase 2

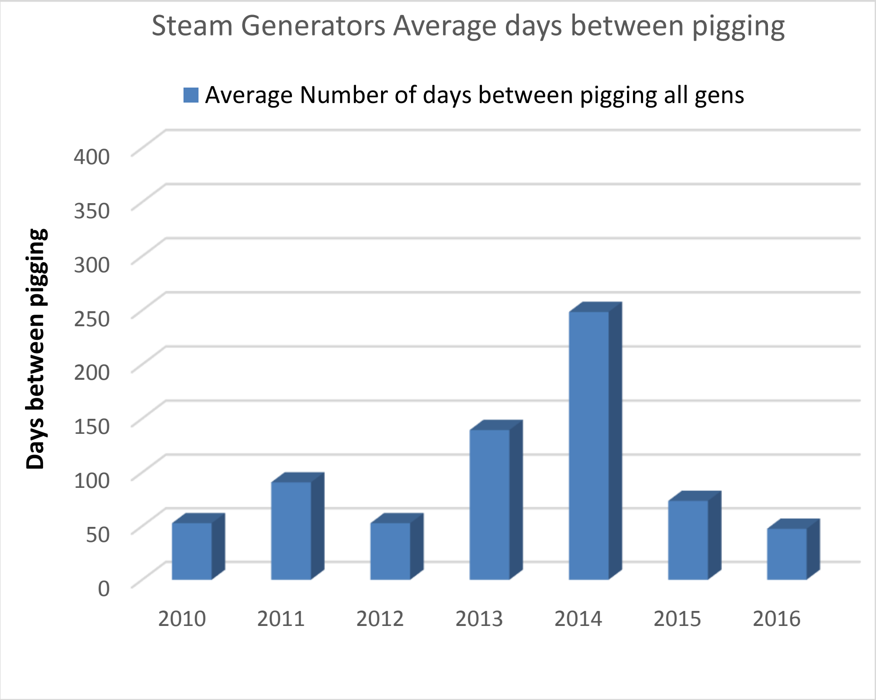


- Phase 2 steam generators started commissioning on April - May 2015.
- Train 1 and 2 (steam generators 1-12) were started in 2015.
- Steam interconnect between Phase 2 and Phase 1 was commissioned in 2015, so any excess of steam from Phase 2 steam generators can be directed to Phase 1 well pads.

OTSG Pigging Frequency

Surmont 1 number of pigging events on steam generators and days between pigging.



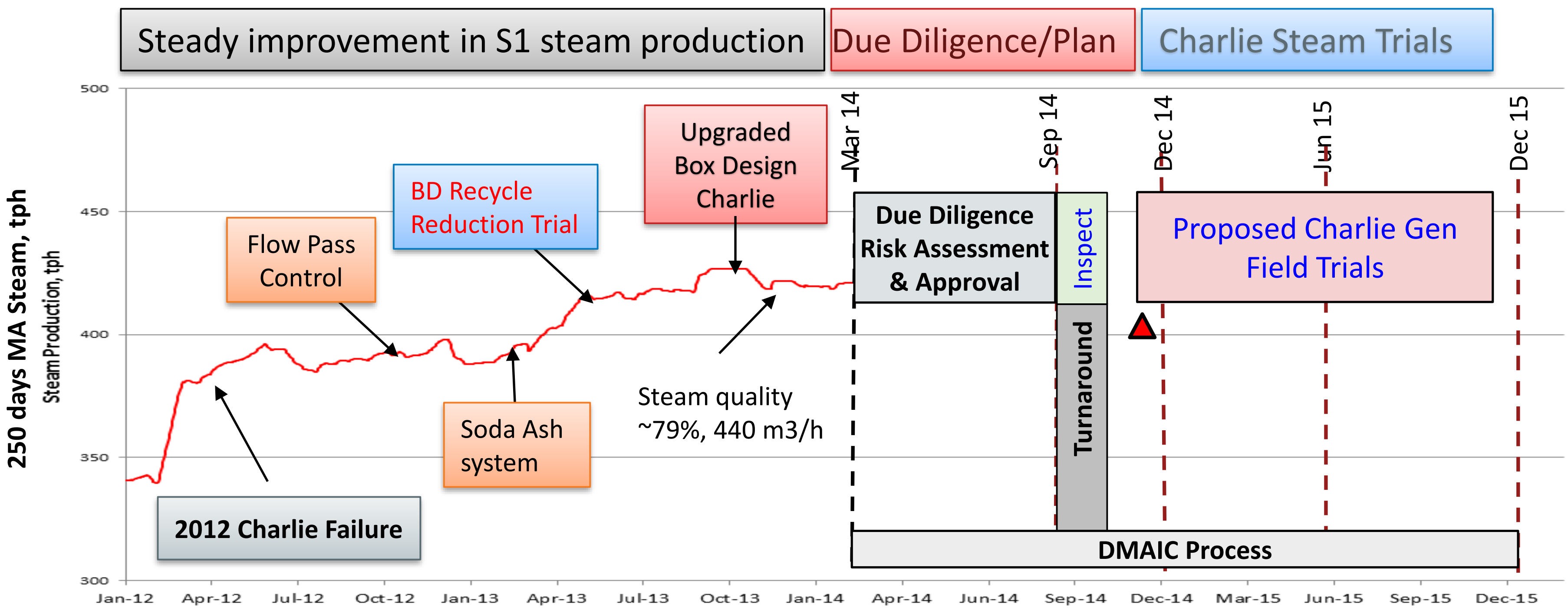


- Number of pigging events increased during 2015 due to water quality challenges at the end of 2014 and throughout 2015.
- Well stimulation during October 2015 impacted water quality and pigging frequency.
- Surmont 2 generators were not pigged since being started in 2015.

S1 Steam Quality Improvement Trial Background

- **2009-13 Background**
  - 2009 & 2012 – OTSG failures, RCA
  - 2012-2013 – CFD & New box design
  - 2013 – BD Reduction trial
  - 2012-2013 – SG & WT improvement

- **2014 Due Diligence & Trial Plan**
  - 2014 – Due diligence and trial Plan
  - 2014 TA – Preparing OTSGs for trial
  - 2014 – Approval for trials on Charlie



Phase 1 Steam Quality Improvement Trial 2015 Goal

2015 OS Goal: Safely & successfully delivered 85% SQ trial at Phase 1 Charlie gen Q4, 2015

Base - 100%		Step 1 - 105%			Step 2 - 107%			Step 3 - 110%	
Steam Quality	80%	80%	Pigging & SP	80%	83%	Pigging & SP	83%	85%	Pigging & SP
BFW rate m3/hr	140	147		147	148		148	148 - 151	
Steam Output m3/hr	112	117		117	122		122	125 - 128	
Time Line	15-Oct 17-Nov	25-Nov-2014 11-Jan-2015		14-Jan 28-Apr	06-May-2015 29-July-2015		01-Aug 10-Aug	Aug 10, 2015 Oct 18, 2015	

Risk mitigation strategy:

- Conduct trials on Charlie OTSG with upgraded box design, material and redundant TCs.
- Conduct trials in three incremental steps, inspect OTSG to ensure no deterioration.

Phase 1 Steam Quality Improvement Trial Results Key Learnings & Path forward

- Conducted Step 3 trial for 10 continuous weeks on Charlie OTSG:
  - Achieved Target steam quality ~ 85% and steam output of ~ 126 m3/h.
  - No increase in the fouling rate observed with ~110% burner firing vs. base case.
- Enablers to generate ~85% SQ and 110% steam output:
  - OTSG retrofitted with a new box - upgraded design and upgraded materials.
  - On-spec BFW quality (Target KPIs: Hardness < 0.2 ppm & Turbidity < 2.5 NTU).
  - No significant excursions in WTP and/or Front-end.
  - Upsized FD fan motor 400 HP (to supply more combustion air for >107% firing).
  - Continuous monitoring of ΔT rise on bottom rows of shock tubes and low finned tubes.
  - BFW temp over ~150 ^{0}C (Higher BFW temp → more steam output).
  - Timely pigging/smart pigging of OTSGs using the pigging predictive tool.

➨ Operation of Delta steam gen at 83% SQ at 107% firing is able to achieve:

- Target steam quality ~ 83% and steam output of ~ 123 m3/h (7% incremental).
- Upsized FD fan motor is required for 110% firing to achieve 85% SQ.

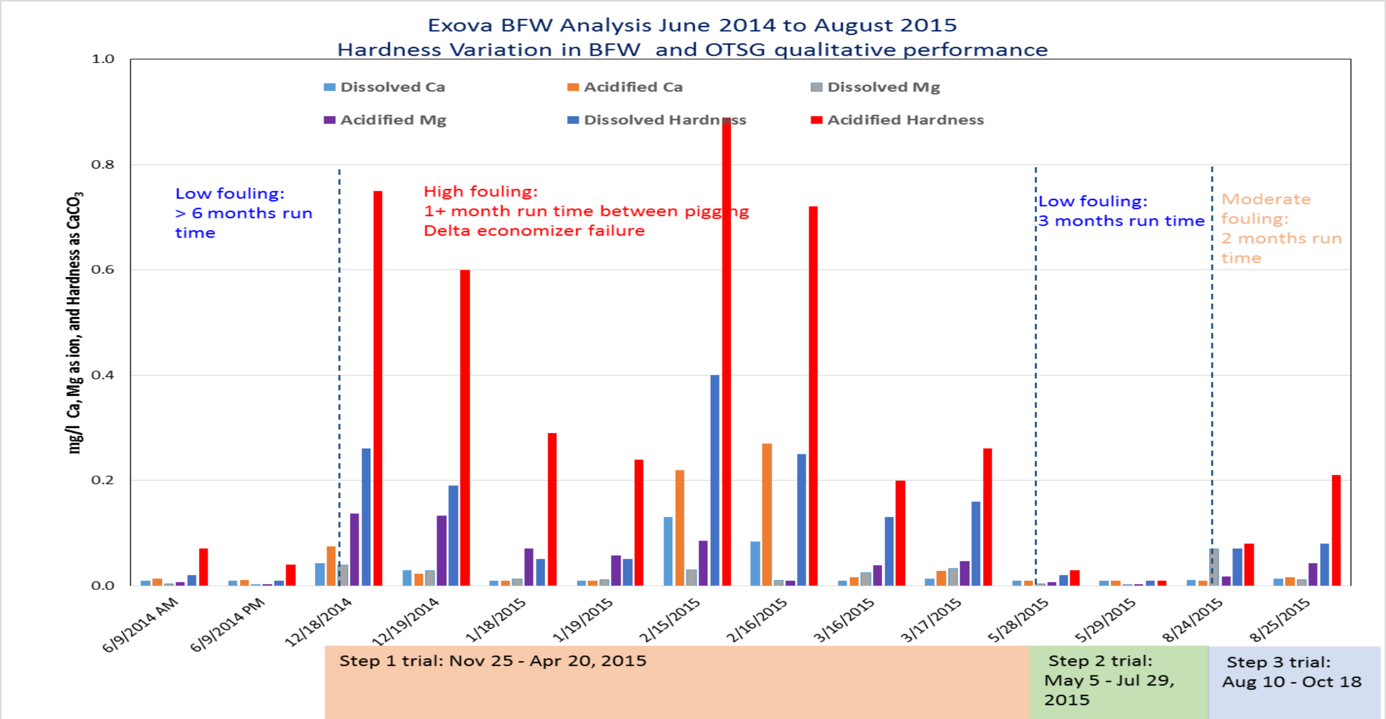
Phase 1 Fouling Lessons Learned Transferred to Phase 2

- Transition to hardness measurement via Inductively Coupled Plasma Mass Spectrometry (ICP-MS).
- Conducted on a minimum once per day frequency, in addition to the current practice of measuring dissolved hardness via the Hach titration methodology (once per six hours).
- Hach methodology used to detect short term process upsets that may otherwise be missed by ICP-MS.

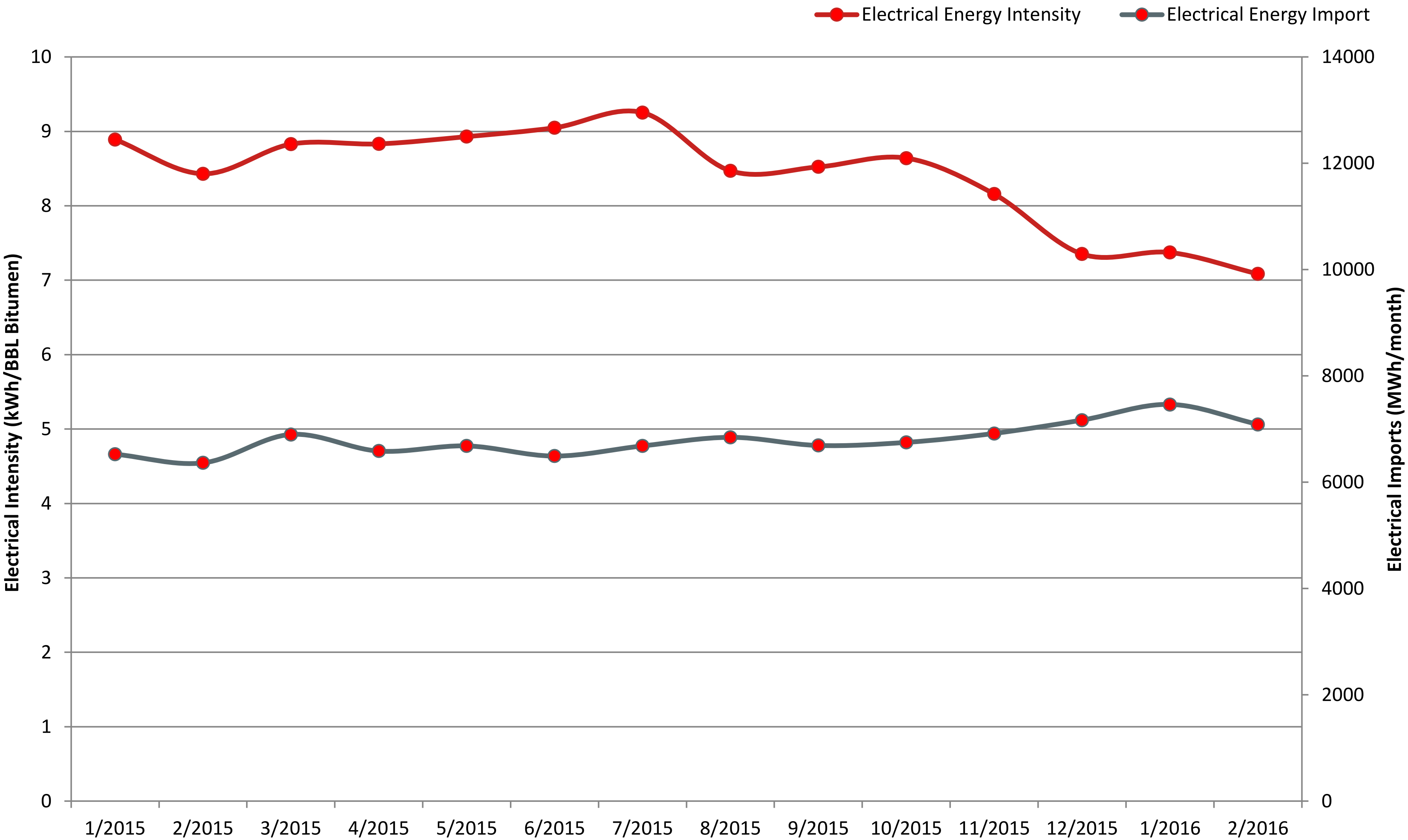
- Measure dissolved and total hardness via ICP-MS to determine the quantity of particulate hardness present and consider this parameter in determining the fouling potential of BFW.
- Use total hardness instead of dissolved as the primary metric for BFW quality in terms of fouling potential.

Phase 1 Fouling Lessons Learned Transferred to Phase 2

- Based on analytical data, the dissolved hardness measurements recorded through ICP-MS correlated well with those measured on site using the Hach titration method.
- Total hardness measurements by ICP-MS, and in particular the differential between total and dissolved hardness, was found to correlate relatively well with the distinct operation modes / high and low fouling periods observed during 2014 and 2015.
- Individual cation (Ca and Mg) total and dissolved concentrations along with the total and dissolved hardness concentrations aligning with a qualitative indication of the OTSG fouling rates observed during each period of the steam quality trial on Steam gen Charlie.
- Large difference seen between total and dissolved hardness measurements is due primarily to magnesium, present as fine particulate material.



Facility Performance: Electricity Consumption Surmont 1



Electricity consumption at S1 is constant while production has climbed.

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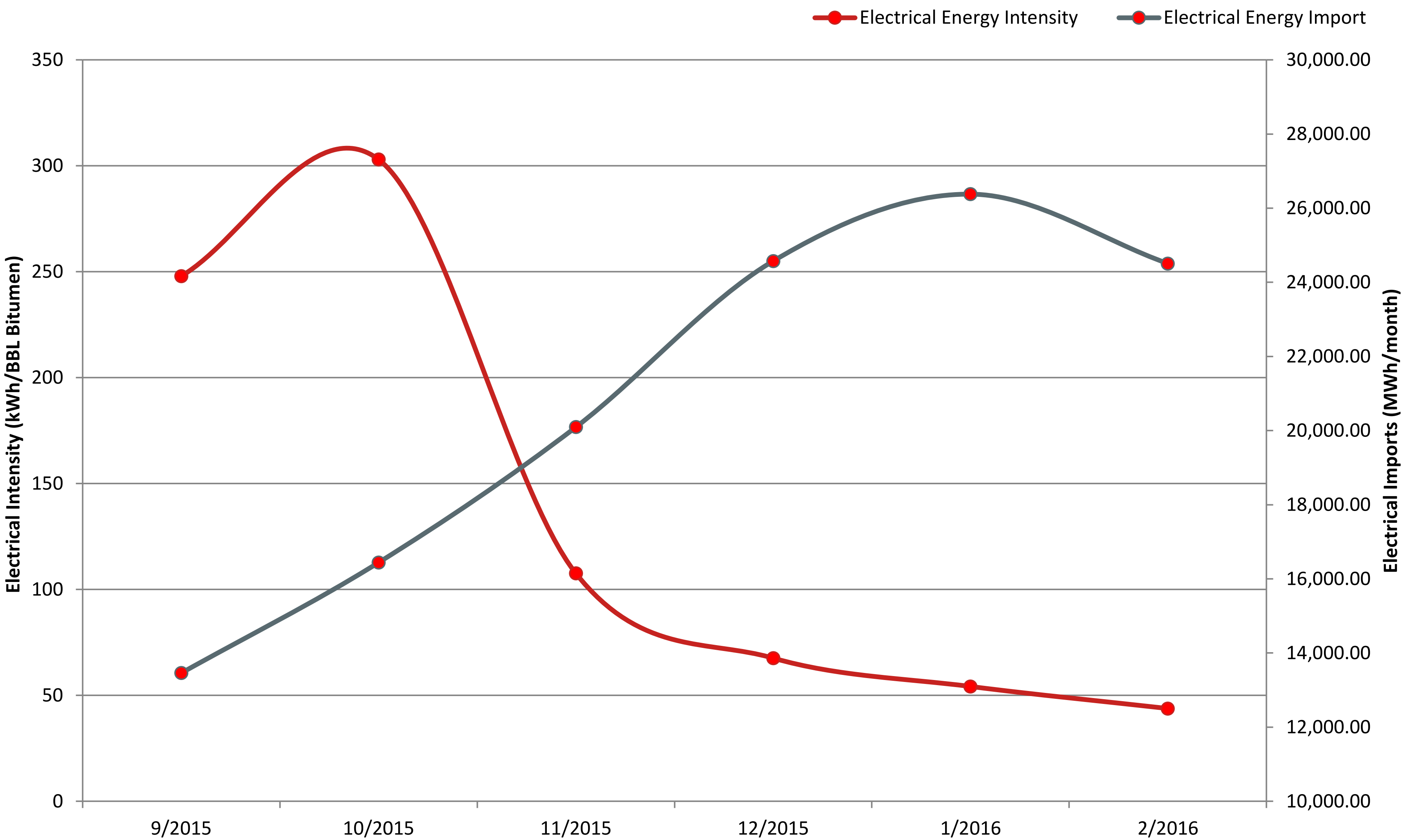
Facility Performance: Electricity Consumption Surmont 2

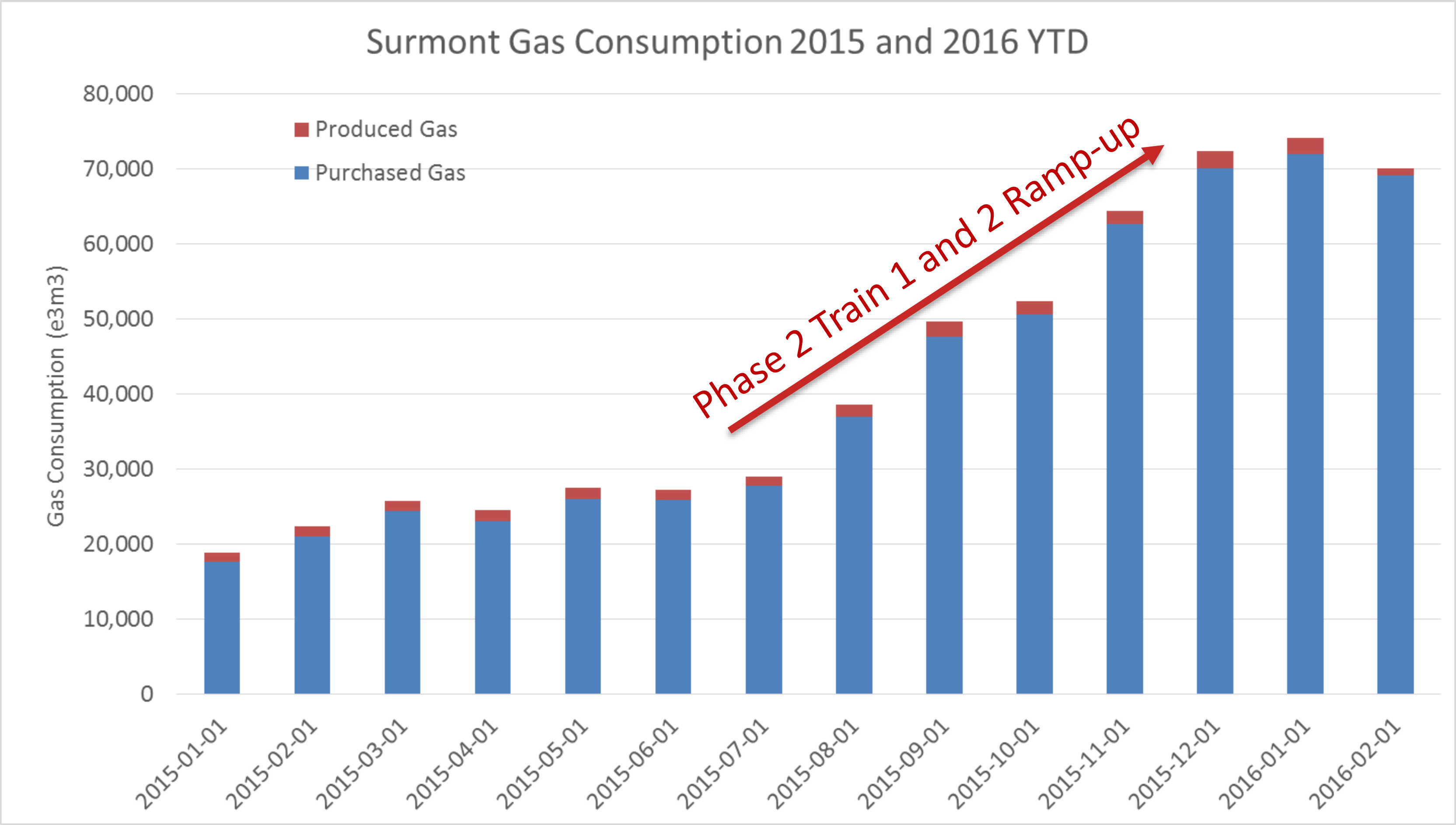


Electricity consumption at S2 is climbing as is production – system not at steady state

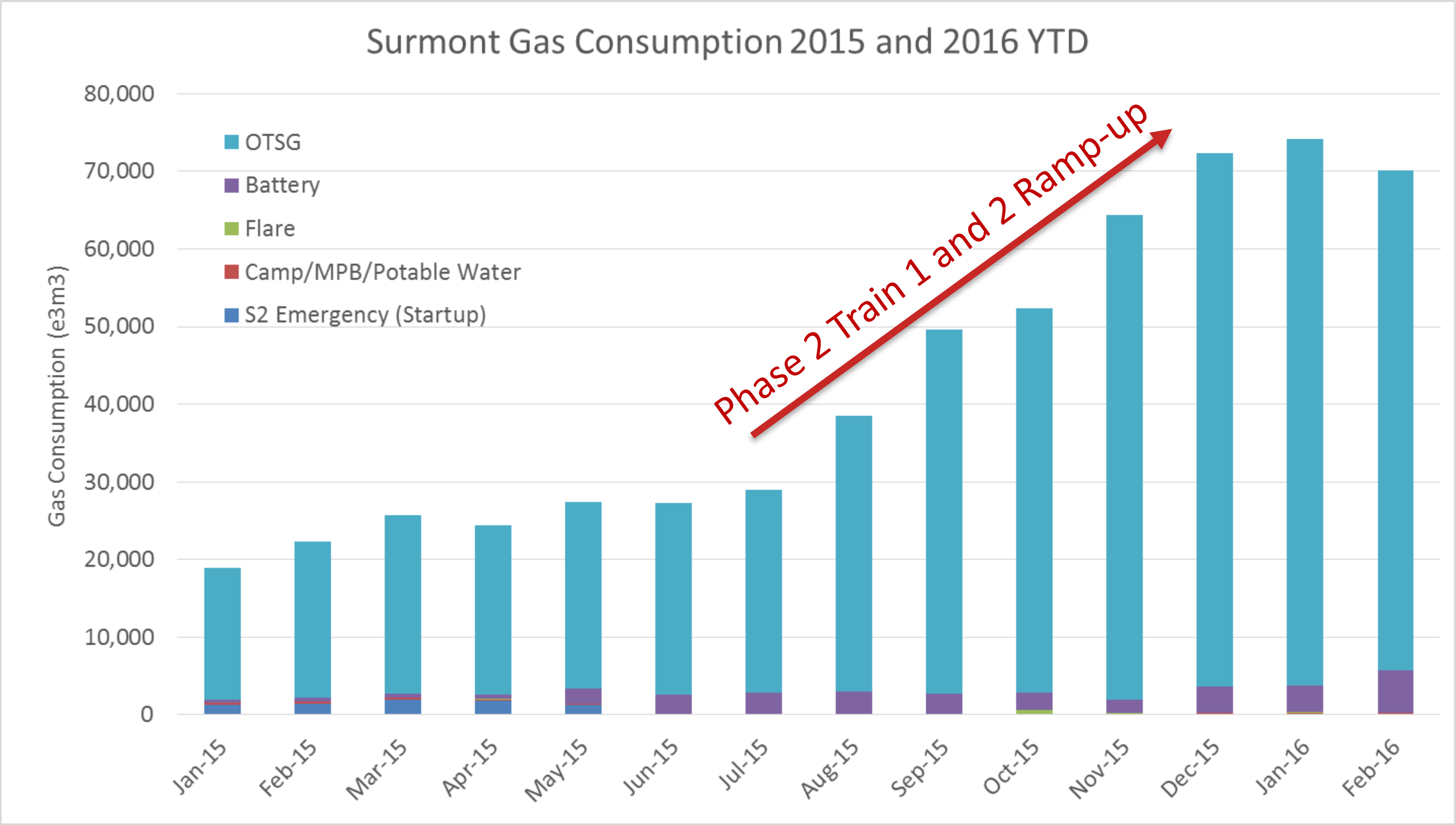
Facility Performance: Gas Usage

	2007	2008	2009	2010	2011	2012	2013	2014	2015 Phase 1 Phase2	to 2016-04	Units
Total Gas Imports (TCPL)	42,999	160,095	183,933	223,447	228,344	250,412	254,883	241,276	433,640	297,462	10^3m^3
Solution Gas	2,534	5,273	10,052	12,703	13,869	15,193	17,005	14,246	18,749	9,284	10^3m^3
Total Gas Flared	4,640.6 -includes TCPL to flare stack	6,438.7 -includes TCPL to flare stack	3,962.0	705.0	624.8	217.6	117.3	277.3	S1-194.9 S2-280.8 475.7	84.1	10^3m^3
Solution Gas Recovery			60.6	94.5	95.5	98.6	99.3	98.1	97.5	99.1	%

Facility Performance: Gas Consumption



Facility Performance: Gas Consumption by Location



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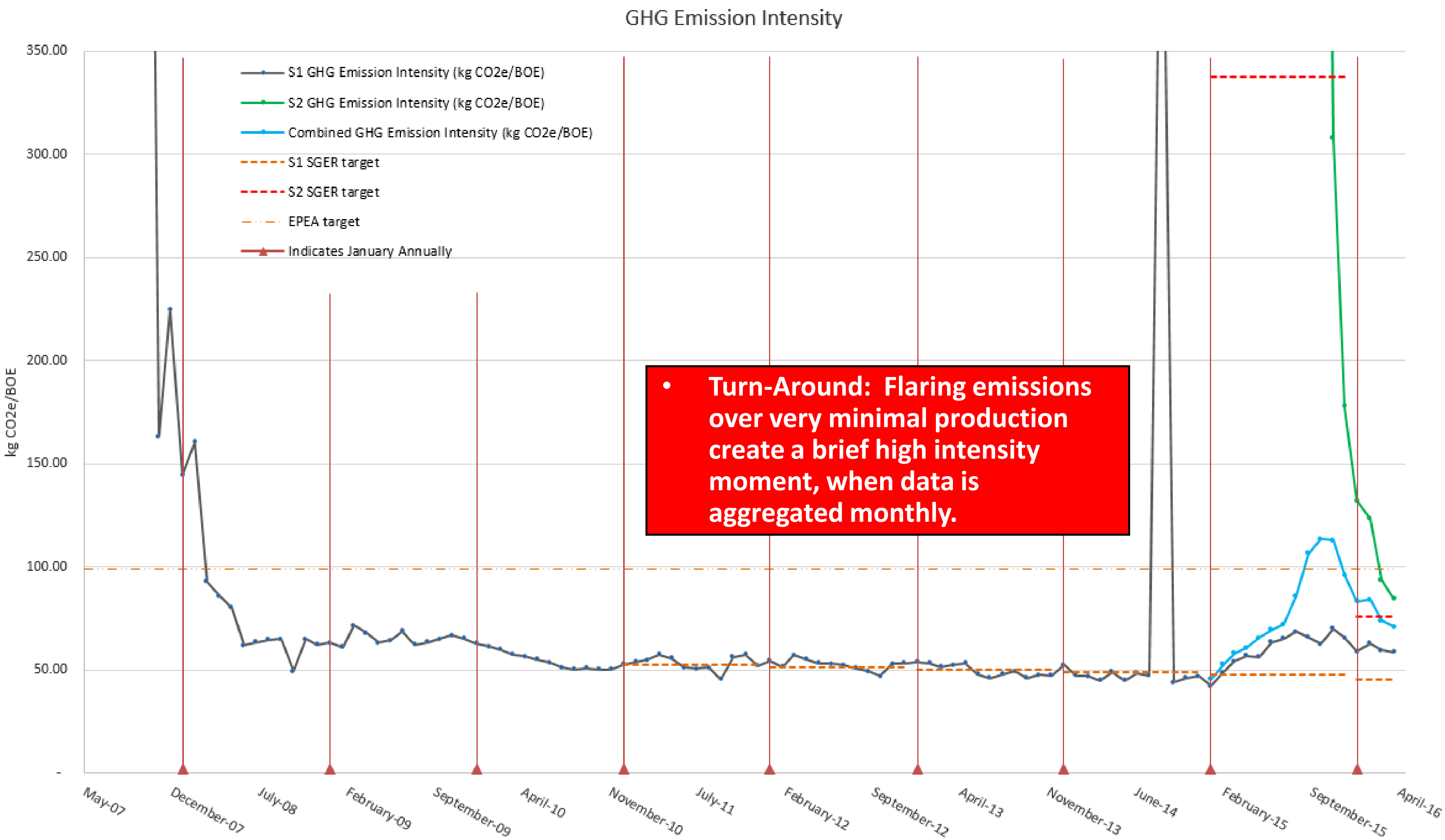
Facility Performance: Greenhouse Gas



- **Turn-Around: Flaring emissions over very minimal production create a brief high intensity moment, when data is aggregated monthly.**

- **Exceeded Specified Gas Emitters Regulation intensity reduction target of 10% for 2015 at S1, and of 10% direct fee on total emissions at S2.**
- **162kt CO2e overage, $2.4M payment was issued by Mar 31st 2016. 2015 absolute CO2e emitted is 905kt.**

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Measurement and Reporting

Subsection 3.1.2 (3)

MARP and Well Testing

- One-Surmont MARP approved by AER in 2015.
  - AER site-visit to Phase 2 in October 2015.

- Phase 1 Pad 103 and seven Phase 2 Well Pads started in 2015.

- Intensive efforts to resolve challenges with:
  - Test separator performance
  - Calibration of water-cut meters during circulation phase
  - Data handling across multiple software systems

Well Allocated Oil Production

Well Allocation Oil Production = Estimated Monthly Well Oil Production x Oil Proration Factor

Where:

Estimated Production	= Accepted well test / duration of test * on-stream hours
Oil Proration Factor	= Actual battery production / estimated battery production
Actual Battery Production	= Dispositions + Tank Inventory – Receipts + Shrinkage + External Shipments + (Load Oil to Wells inventories)

Where:

Dispositions	= Sales Oil shipped to Enbridge + Diluent send to Surmont Pilot
Tank Inventory	= Sales Oil tanks volume changes + Diluent tank volume changes + Slop tank oil inventory + Skim tank oil inventory
Receipts	= Sales Oil received from Surmont Pilot + Diluent received from Enbridge
Shrinkage	= Shrinkage adjustment
External Shipment	= Oil from slop trucked out to external facility

- **Surmont design allows for the production and sale of the 2 different blends: Synbit and Dilbit. Current Operation only blends Synbit**

Well Allocated Water Production

Well Allocation Water Production = Estimated Monthly Well Water Production x Water Proration Factor

Where:

Estimated Water Production	= Accepted well test / duration of test * on -stream hours
Water Proration Factor	= Produced water (PW) volume / estimated water production
PW Volume	= Dispositions + PW_{tanks} – Receipts + Load Water (LW) Inventory

Where:

Dispositions:	Battery PW Disposition to Injection Facility + Pilot Plant + Other
PW_{tanks} :	Battery PW Inventory, including net water content in oil storage tanks
Receipts:	PW received from other sources, including Injection Facility
LW Inventory:	Battery LW Inventory

Well Allocated Gas Production

Well Allocation Gas Production = Well Allocated Oil Production x Calculated Gas-Oil Ratio

Where:

Calculated Gas-Oil Ratio (GOR)	= Gas Production / Battery Bitumen Production
Gas Production	= Dispositions – Receipts

Where:

Dispositions	= Metered Flared Gas + Metered Steam Gen Fuel Gas + Utilities Fuel Gas + Purge Gas
Receipts	= Fuel Gas Receipts from TCPL

Well Allocated Steam Injection

Estimated Volume of Injected Steam = Sum of Injected Steam to Wells x Steam Proration Factor

Where:

Steam Proration Factor = Steam Produced / Steam Measured

Steam Produced: Total Steam Meter to Well Pads – Steam Condensate Dropped Out – Steam Recovered at Pipeline

Steam Measured: Steam Injection to Heel and Toe String of each well

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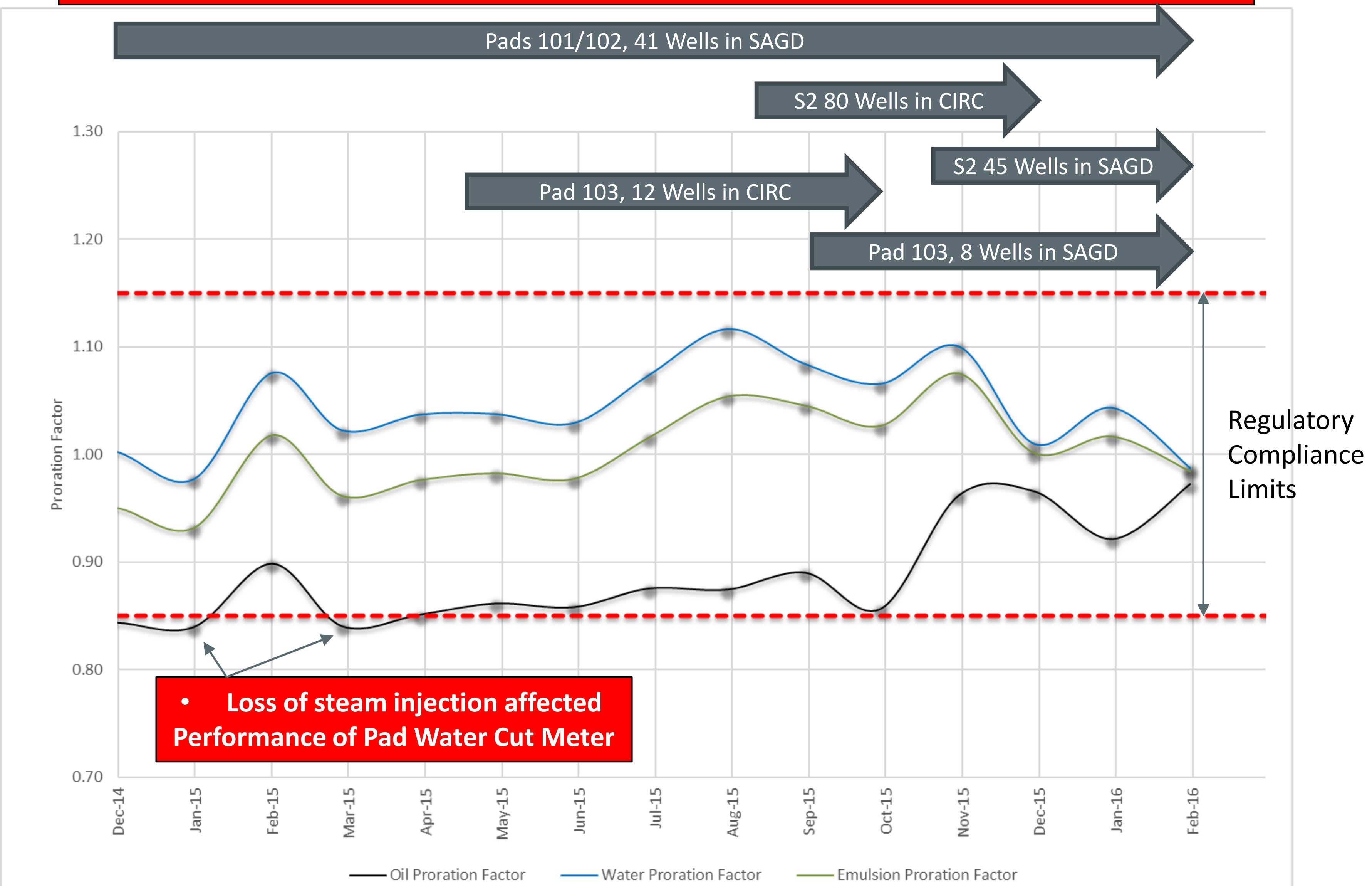
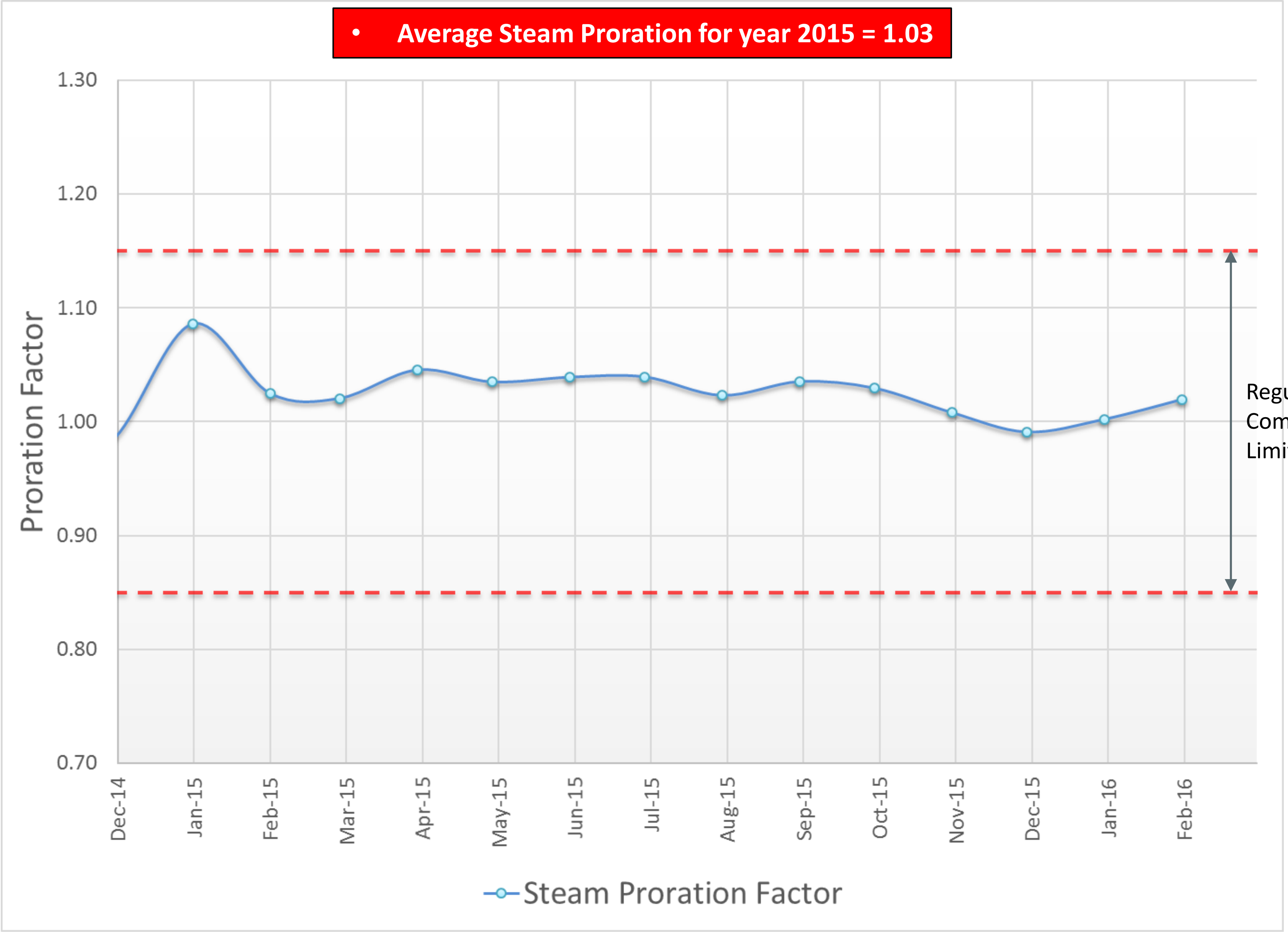
Production Proration Factors

- **Produced Oil and Water Regulatory Compliance Maintained through Start-Up of S2 Well Pads**



Injection Proration Factor

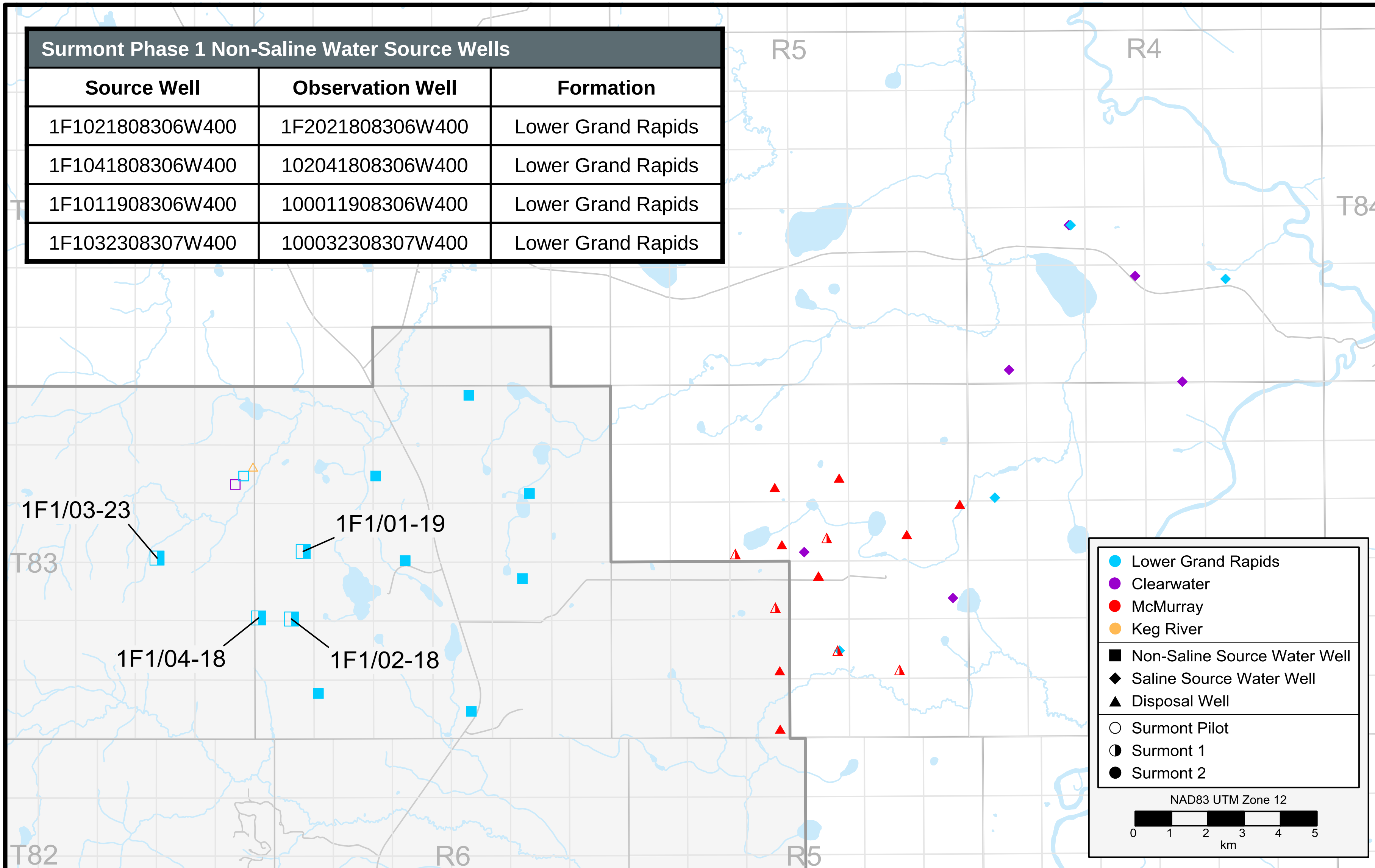


Water Production, Injection, and Uses

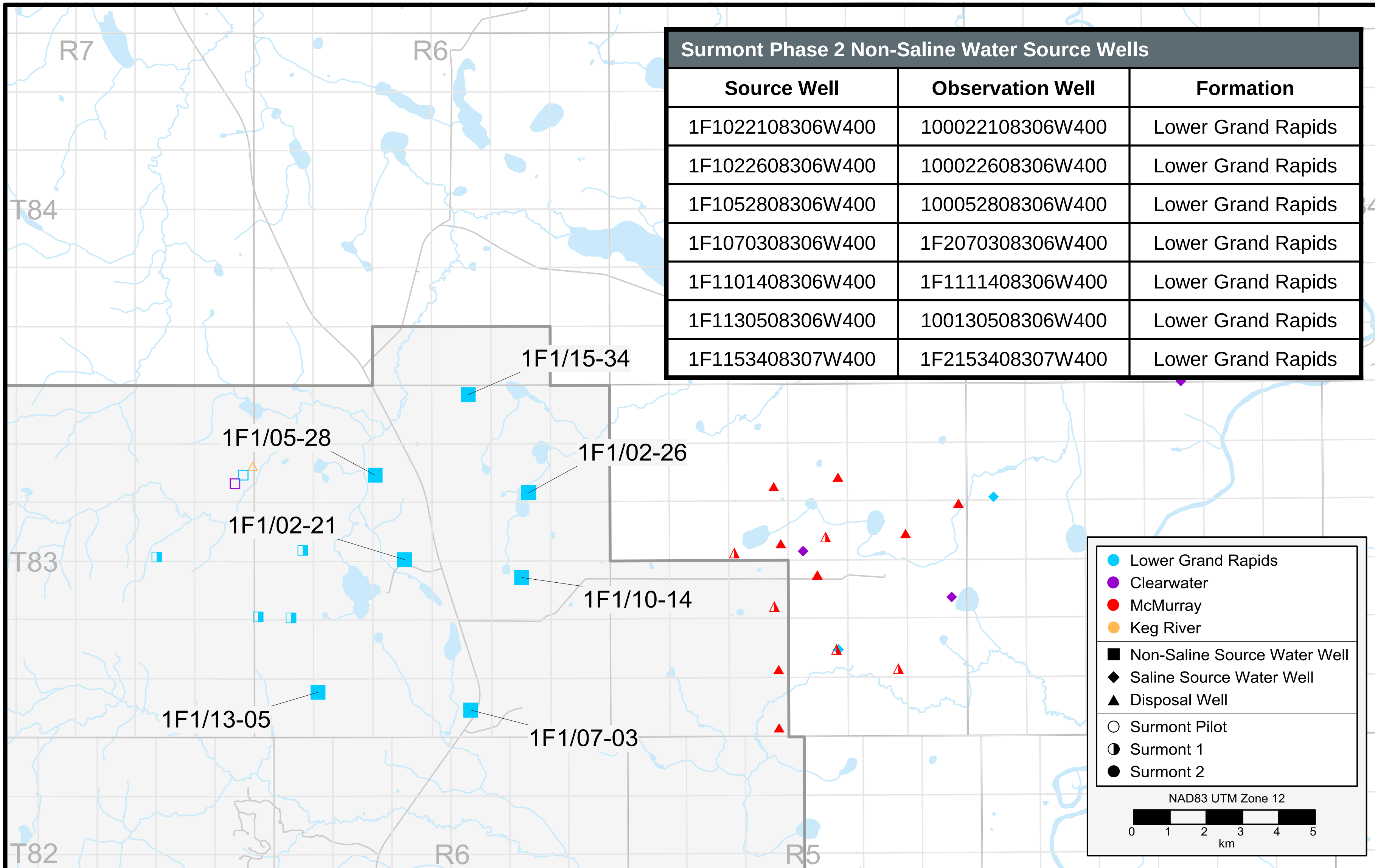
Subsection 3.1.2 (4)

Surmont Phase 1 Non-Saline Water Source Wells

Surmont Phase 1 Non-Saline Water Source Wells		
Source Well	**Observation Well**	**Formation**
1F1021808306W400	1F2021808306W400	Lower Grand Rapids
1F1041808306W400	102041808306W400	Lower Grand Rapids
1F1011908306W400	100011908306W400	Lower Grand Rapids
1F1032308307W400	100032308307W400	Lower Grand Rapids



Surmont Phase 2 Non-Saline Water Source Wells



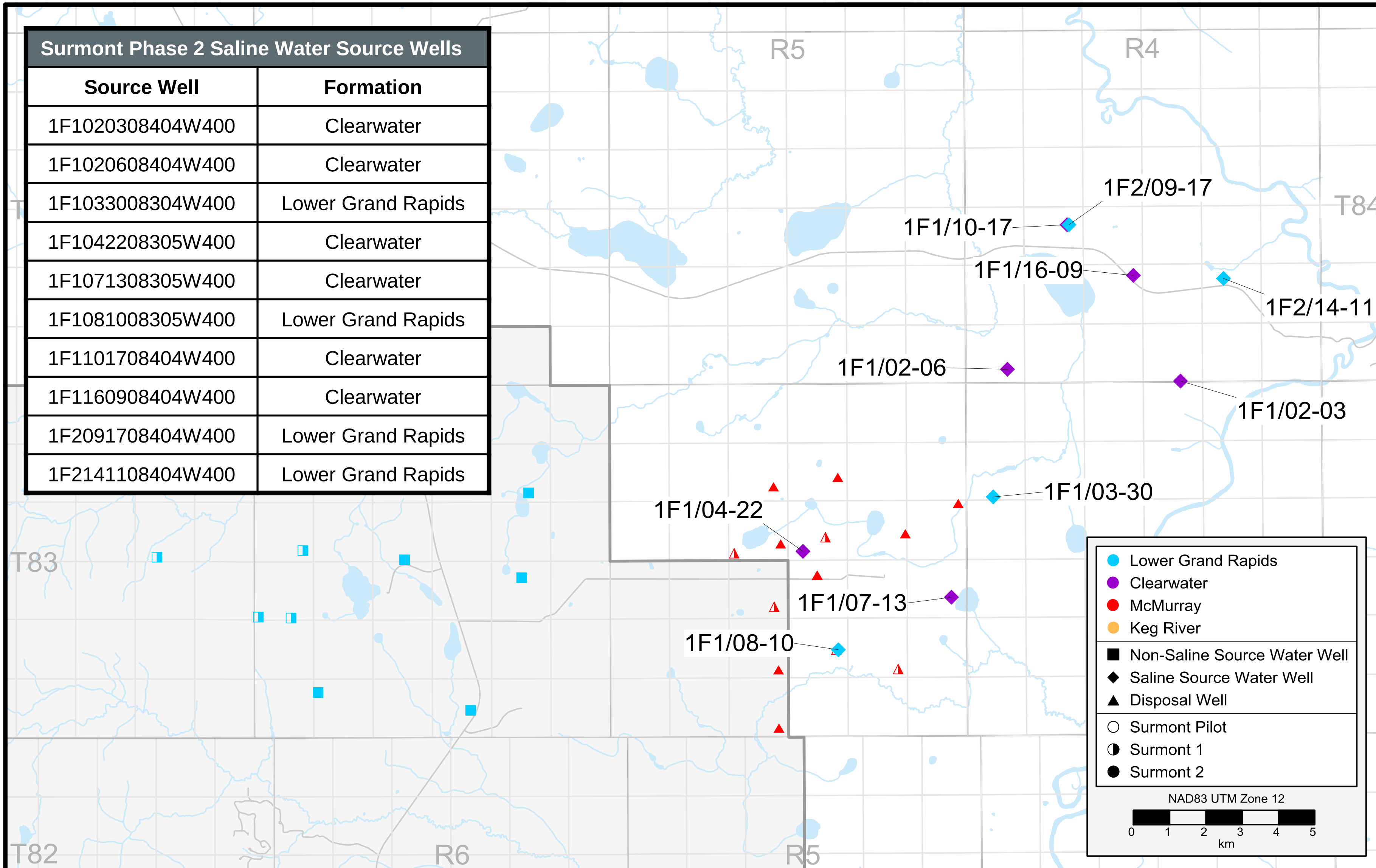
Surmont Phase 2 Non-Saline Water Source Wells

Source Well	Observation Well	Formation
1F1022108306W400	100022108306W400	Lower Grand Rapids
1F1022608306W400	100022608306W400	Lower Grand Rapids
1F1052808306W400	100052808306W400	Lower Grand Rapids
1F1070308306W400	1F2070308306W400	Lower Grand Rapids
1F1101408306W400	1F1111408306W400	Lower Grand Rapids
1F1130508306W400	100130508306W400	Lower Grand Rapids
1F1153408307W400	1F2153408307W400	Lower Grand Rapids

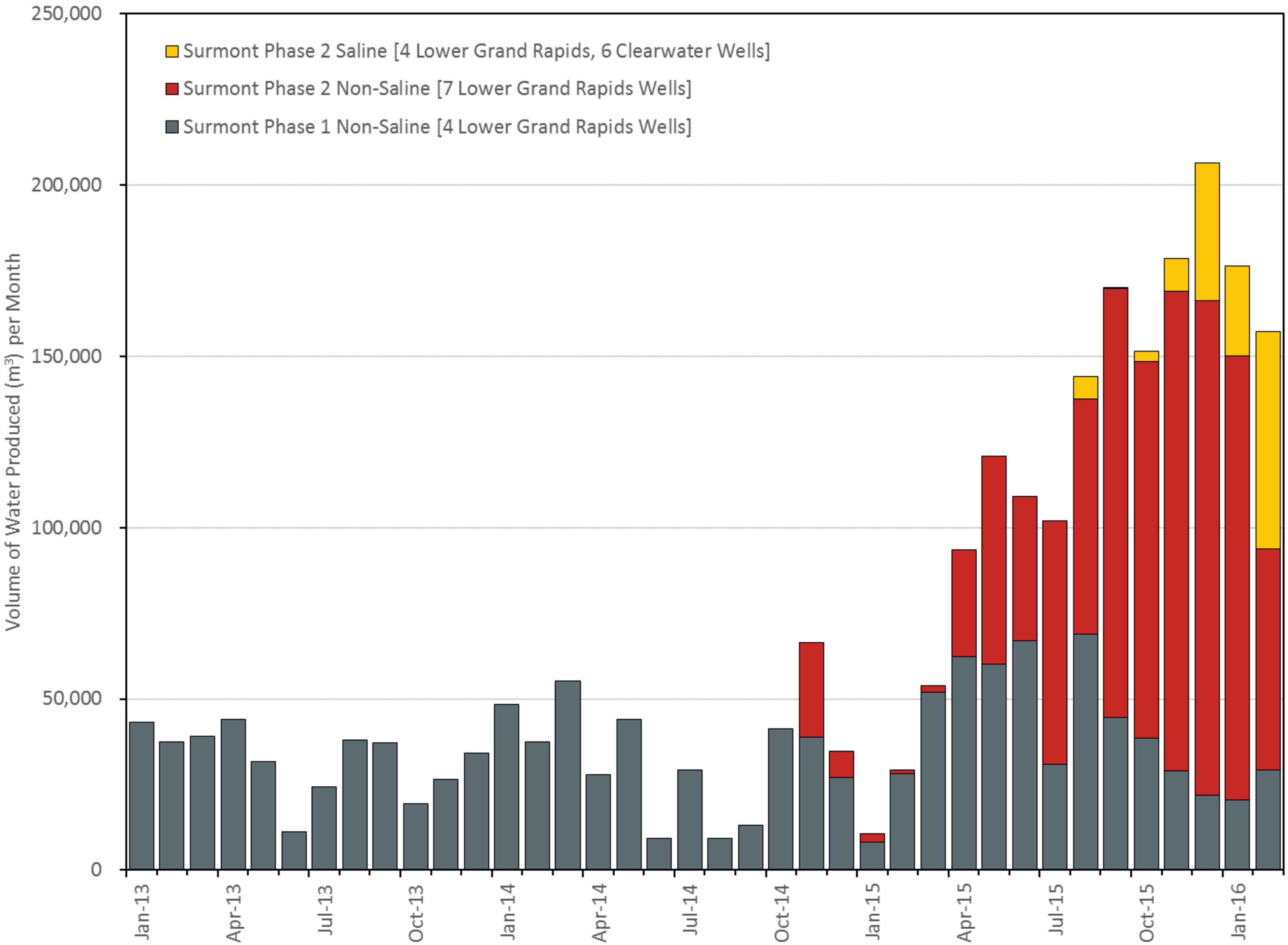
Surmont Phase 2 Saline Water Source Wells

Surmont Phase 2 Saline Water Source Wells

Source Well	Formation
1F1020308404W400	Clearwater
1F1020608404W400	Clearwater
1F1033008304W400	Lower Grand Rapids
1F1042208305W400	Clearwater
1F1071308305W400	Clearwater
1F1081008305W400	Lower Grand Rapids
1F1101708404W400	Clearwater
1F1160908404W400	Clearwater
1F2091708404W400	Lower Grand Rapids
1F2141108404W400	Lower Grand Rapids



Surmont Non-Saline and Saline Water Source Wells Production Volumes



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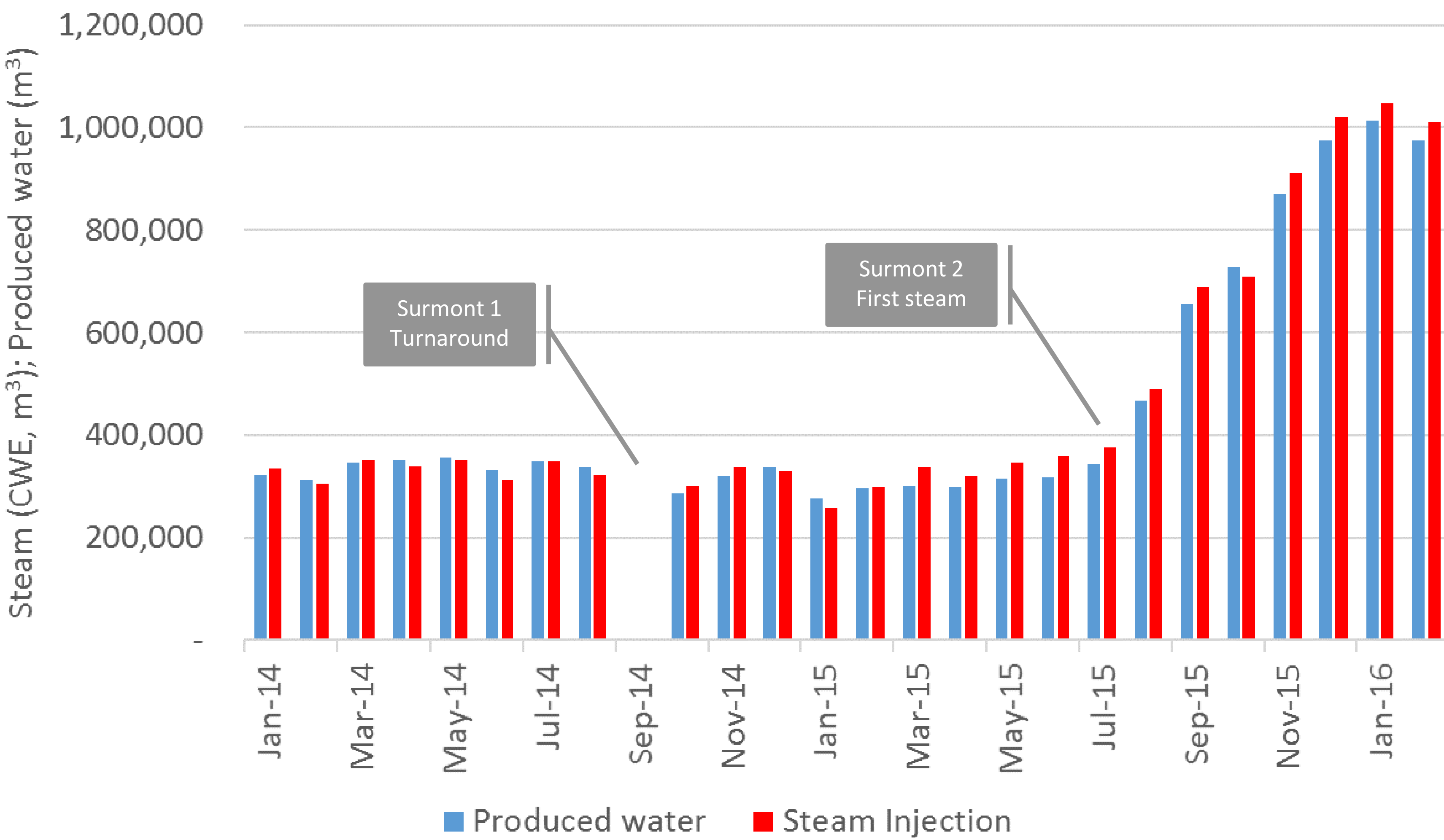
Water Production and Steam Injection Volumes



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Water Recycle Rate (*Bulletin 2006-11*)

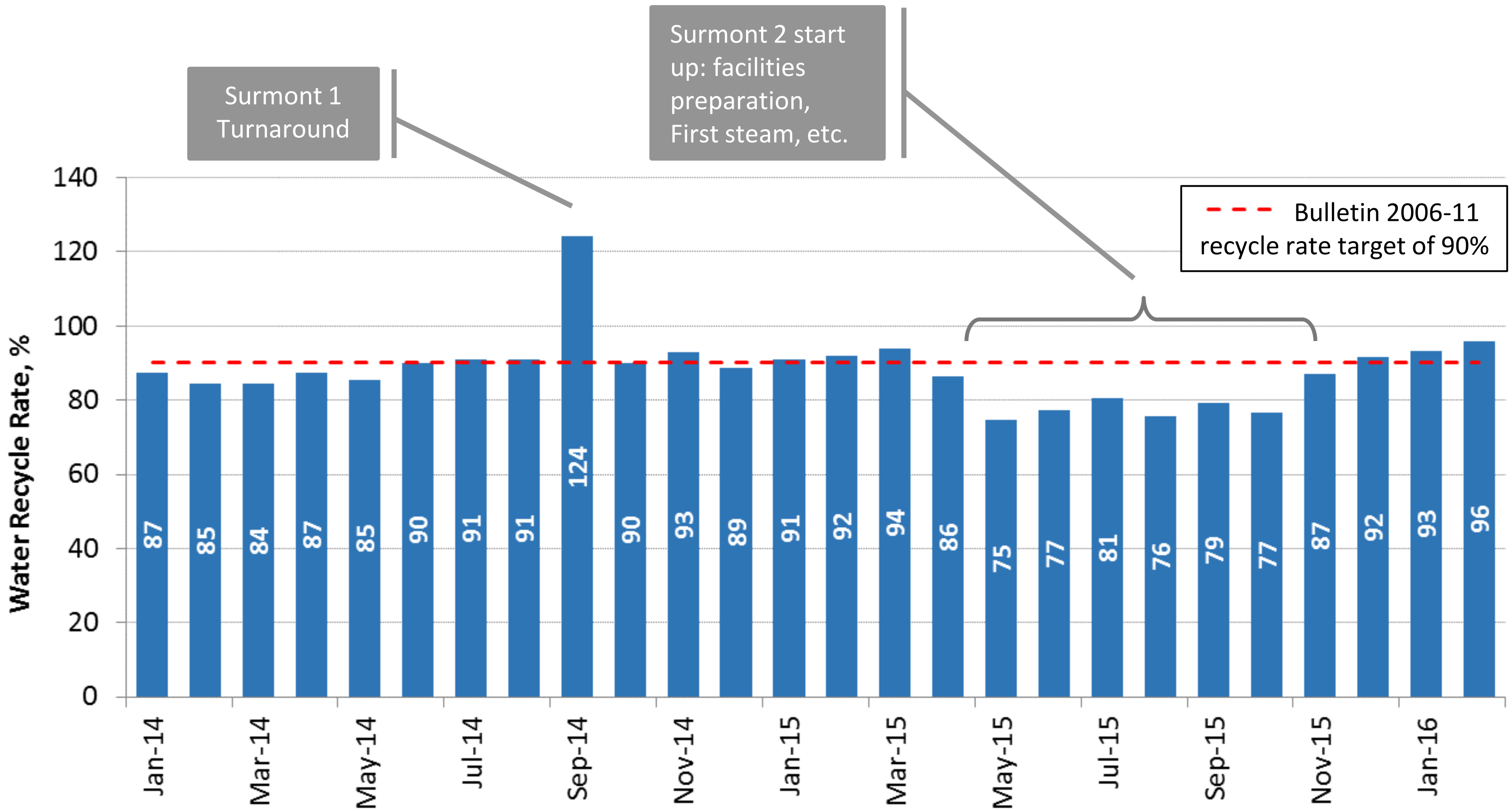
Continuous optimization and improvements:

- Steam quality trials;
- Water and energy balances;

Challenges

- Surmont 2 commissioning and startup

Year	WRR, %
2012	81.9
2013	87.1
2014	88.2
2015	83.9



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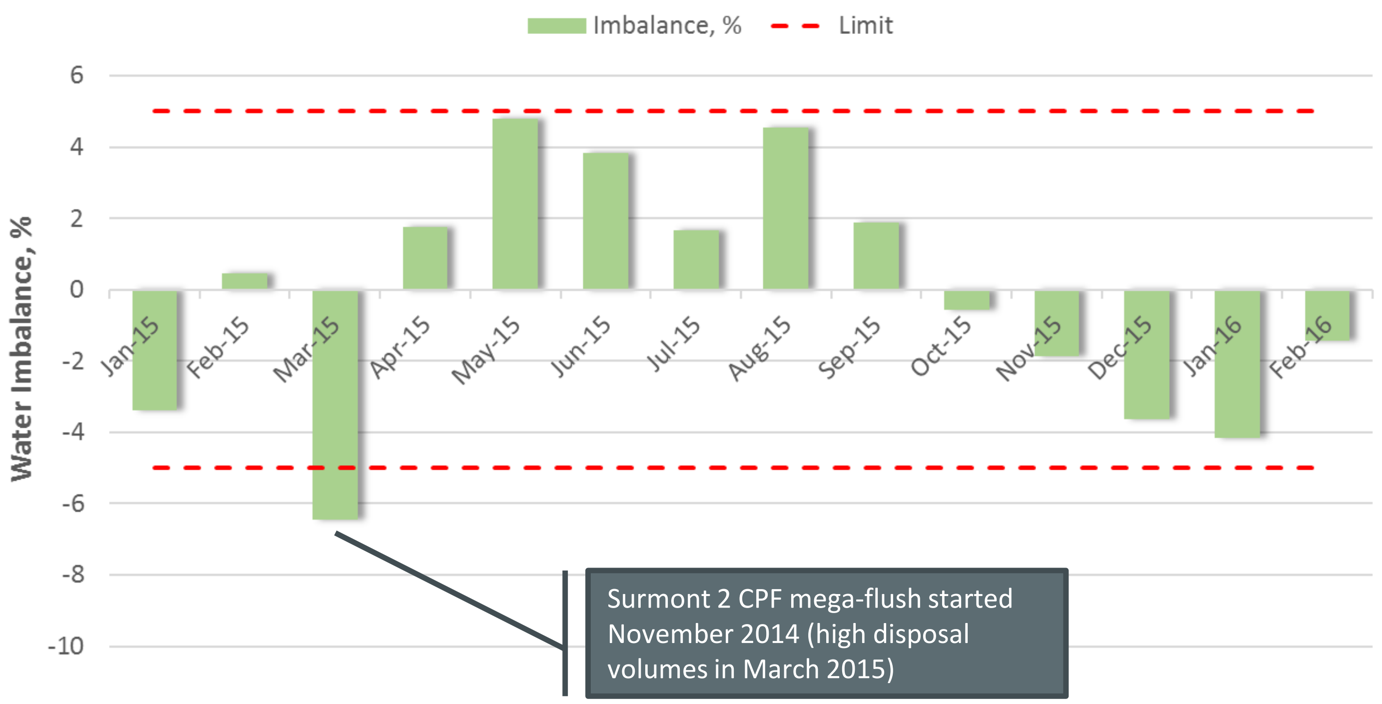
Directive 81: Injection Facility Water Imbalance

- Surmont in compliance with *D-81* Injection Facility Water Imbalance since June 2014.
- Challenging to keep metering imbalance within 5% when performing large maintenance/repair projects (Sept 2014).
- Maintained compliance during Surmont 2 ramp up.



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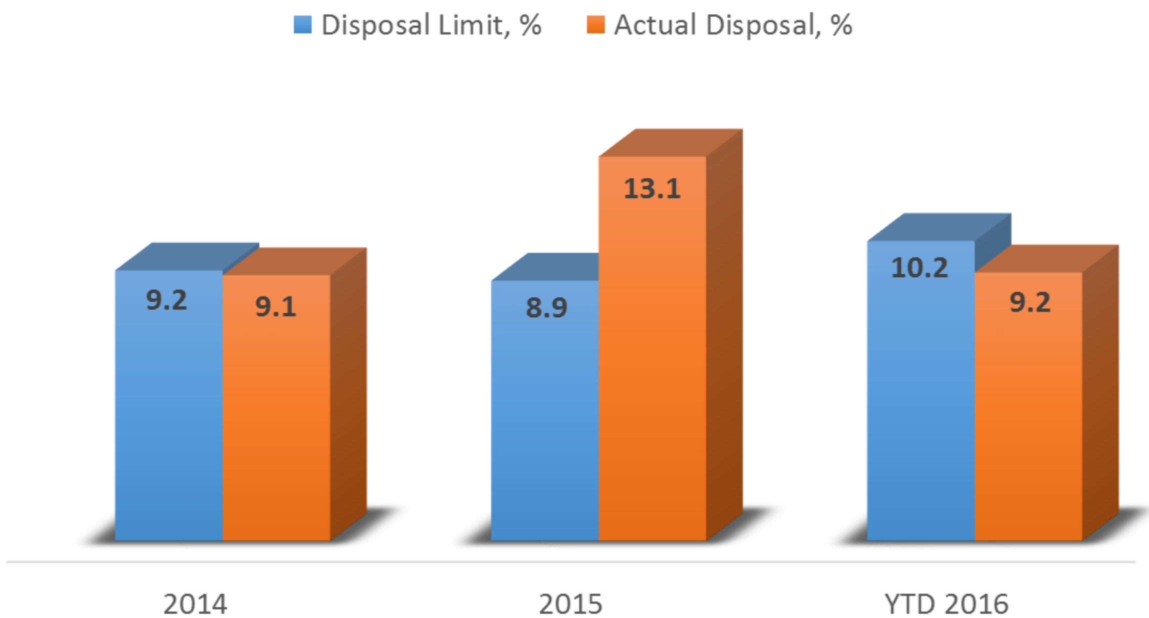
Directive 81: Annual Disposal performance



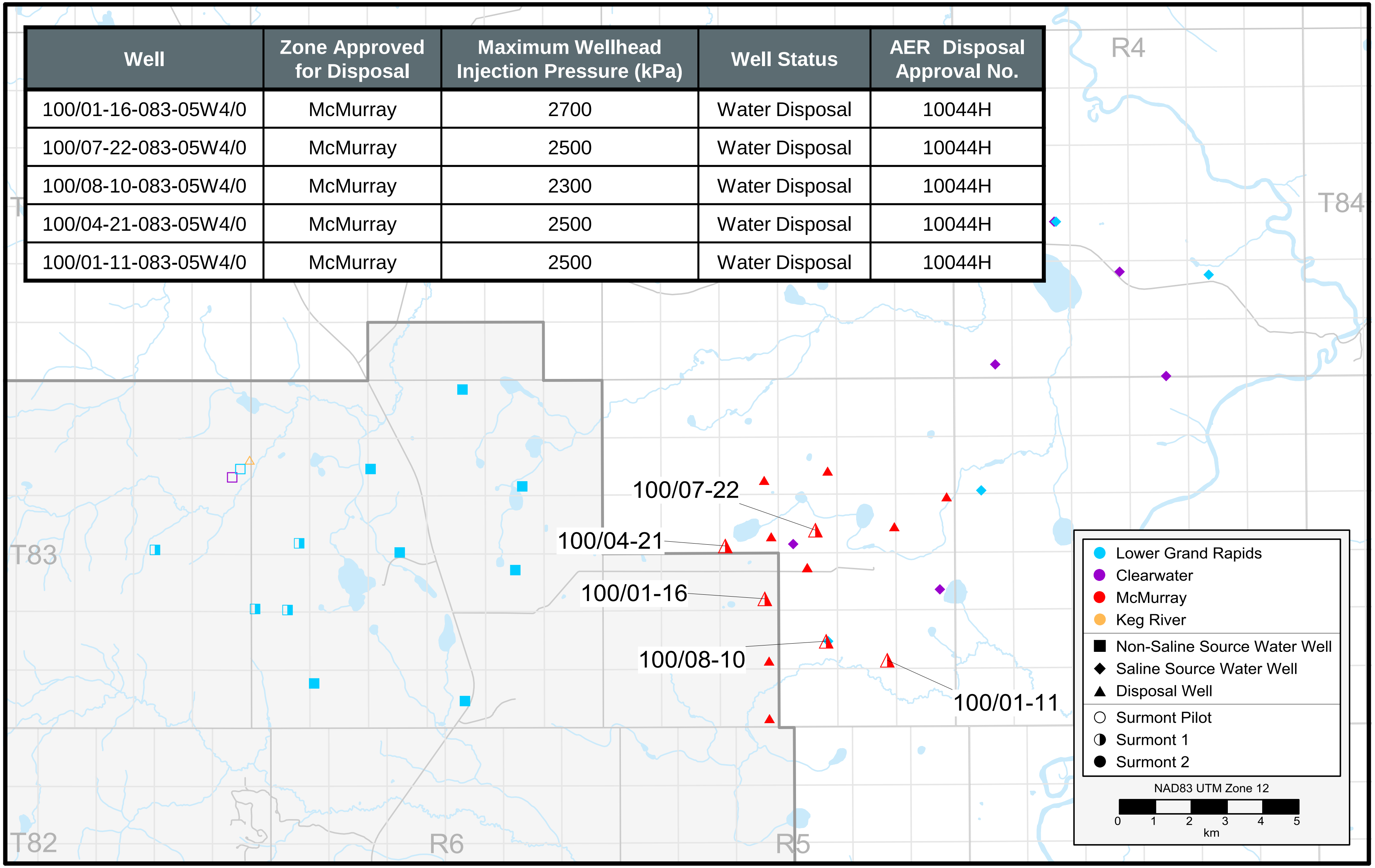
- Surmont achieved *Directive 81* disposal limit compliance in 2014 (9.1% actual vs. 9.2 % disposal limit) after completing reduced blowdown recycle rate trials in 2013:
  - Average boiler blowdown recycle rate at Surmont 1 in 2014 was 53 - 58%

- Excess disposal in 2015 due to:
  - Surmont 2 ramp-up (Testing 12 out of 18 OTSGs)
  - Performed Surmont 2 CPF mega-flush
  - Significant repair work on Surmont 1 OTSG-D
  - Well caustic work causing significant water plant upset

- Saline water and blowdown evaporators at Surmont 2 will enable D-81 compliance in 2016.

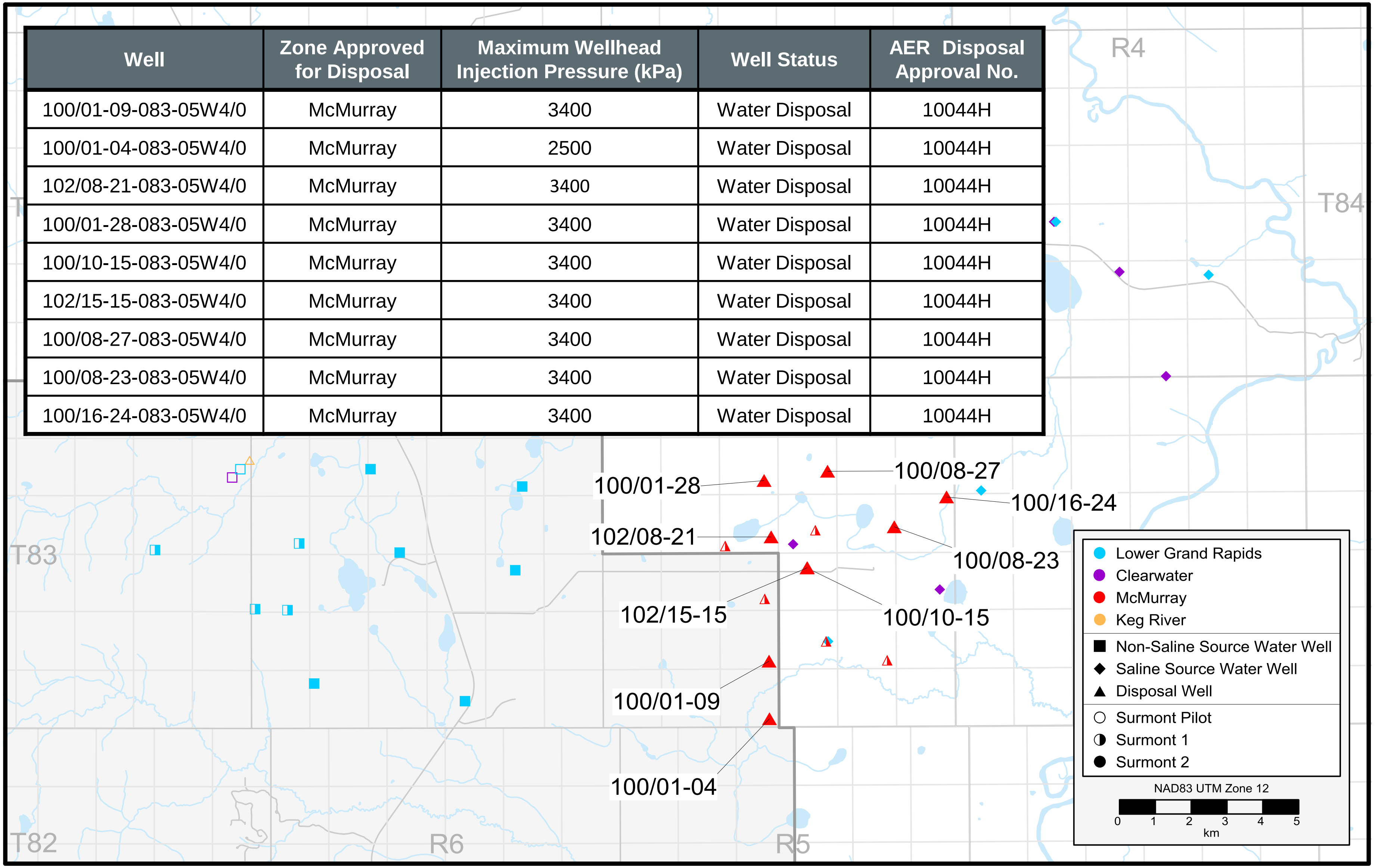
Surmont Phase 1 Water Disposal Wells

Well	Zone Approved for Disposal	Maximum Wellhead Injection Pressure (kPa)	Well Status	AER Disposal Approval No.
100/01-16-083-05W4/0	McMurray	2700	Water Disposal	10044H
100/07-22-083-05W4/0	McMurray	2500	Water Disposal	10044H
100/08-10-083-05W4/0	McMurray	2300	Water Disposal	10044H
100/04-21-083-05W4/0	McMurray	2500	Water Disposal	10044H
100/01-11-083-05W4/0	McMurray	2500	Water Disposal	10044H

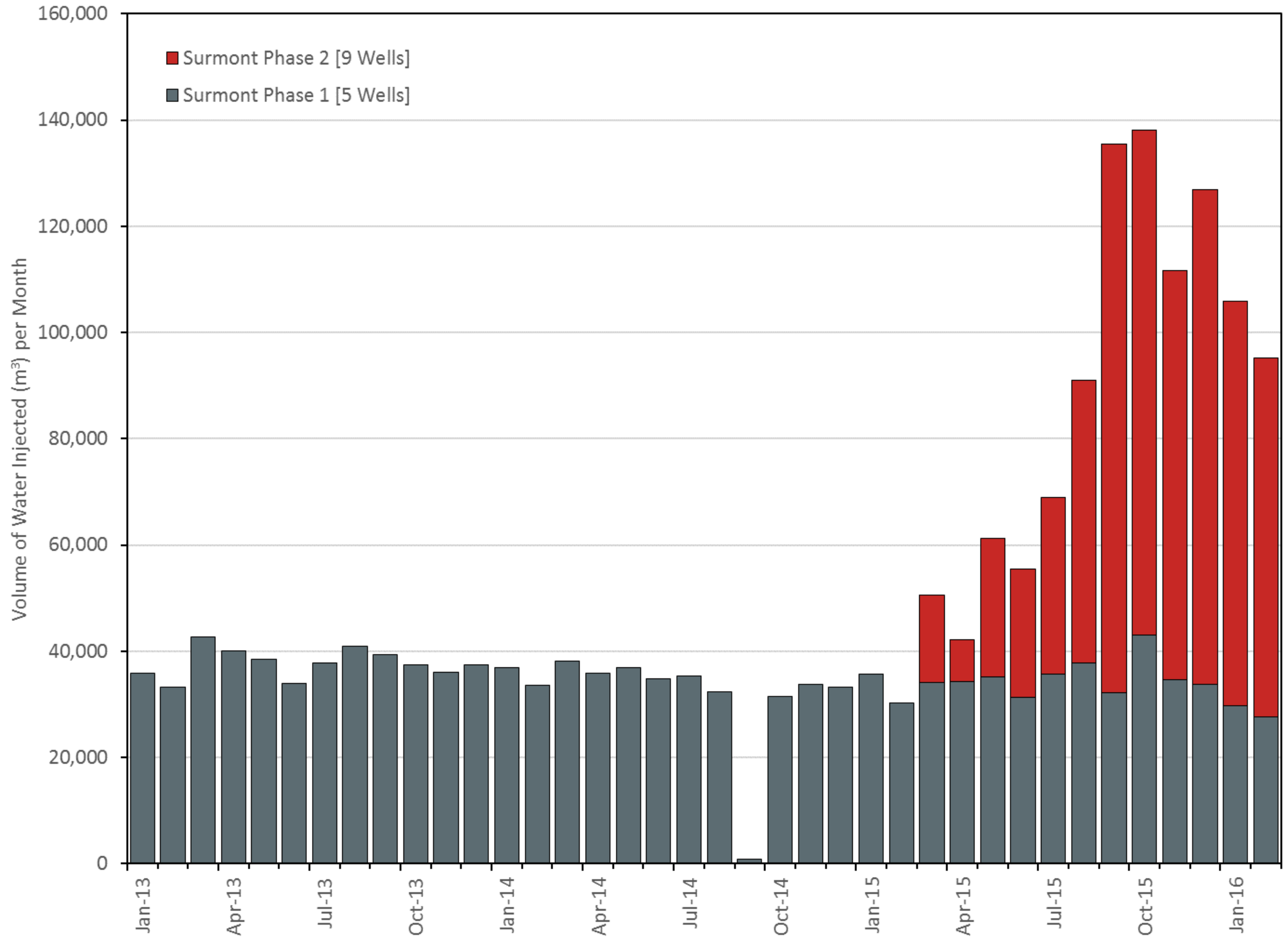


Surmont Phase 2 Water Disposal Wells

Well	Zone Approved for Disposal	Maximum Wellhead Injection Pressure (kPa)	Well Status	AER Disposal Approval No.
100/01-09-083-05W4/0	McMurray	3400	Water Disposal	10044H
100/01-04-083-05W4/0	McMurray	2500	Water Disposal	10044H
102/08-21-083-05W4/0	McMurray	3400	Water Disposal	10044H
100/01-28-083-05W4/0	McMurray	3400	Water Disposal	10044H
100/10-15-083-05W4/0	McMurray	3400	Water Disposal	10044H
102/15-15-083-05W4/0	McMurray	3400	Water Disposal	10044H
100/08-27-083-05W4/0	McMurray	3400	Water Disposal	10044H
100/08-23-083-05W4/0	McMurray	3400	Water Disposal	10044H
100/16-24-083-05W4/0	McMurray	3400	Water Disposal	10044H



Surmont Water Disposal Wells Injection Rates (McMurray)



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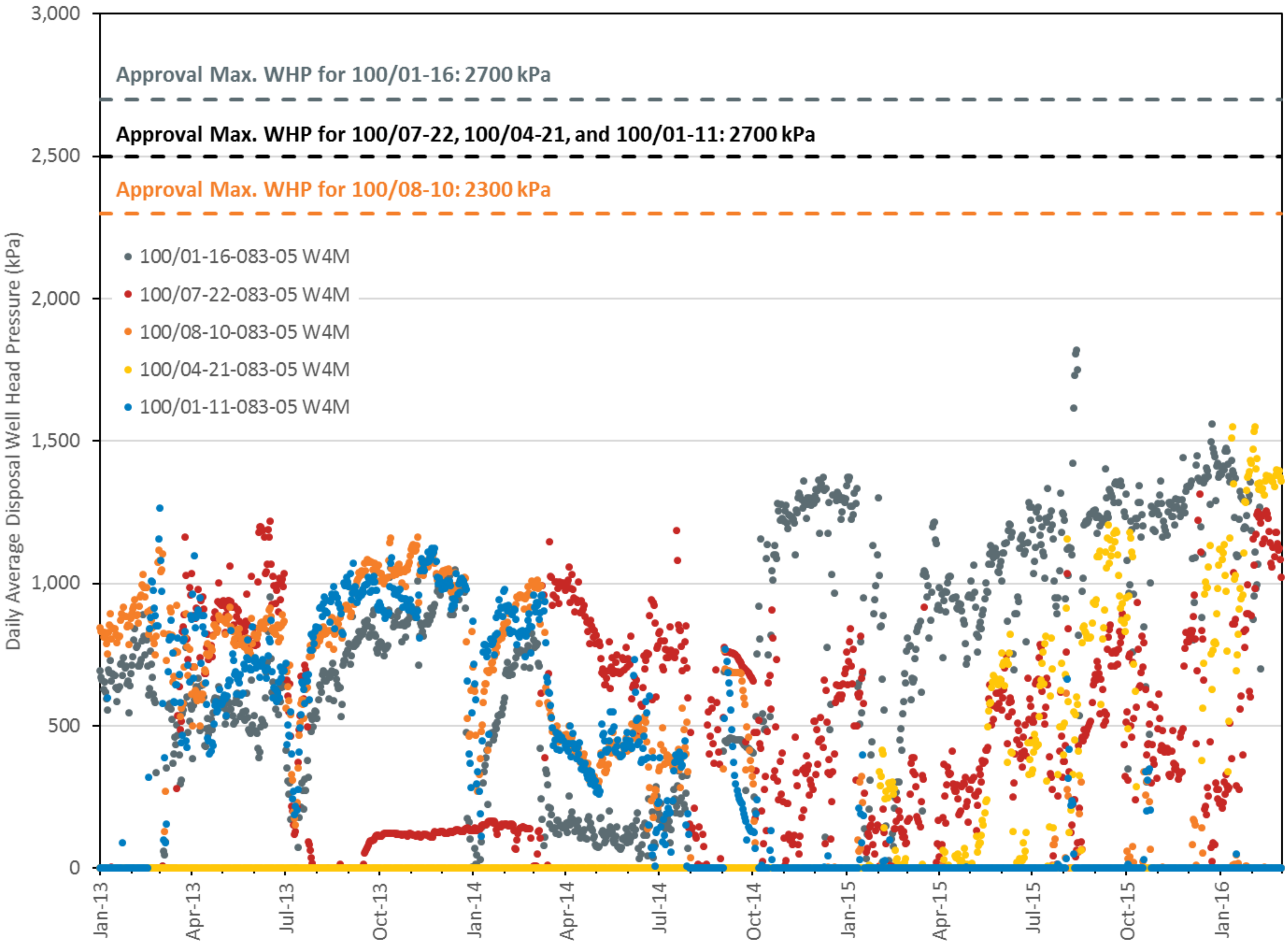
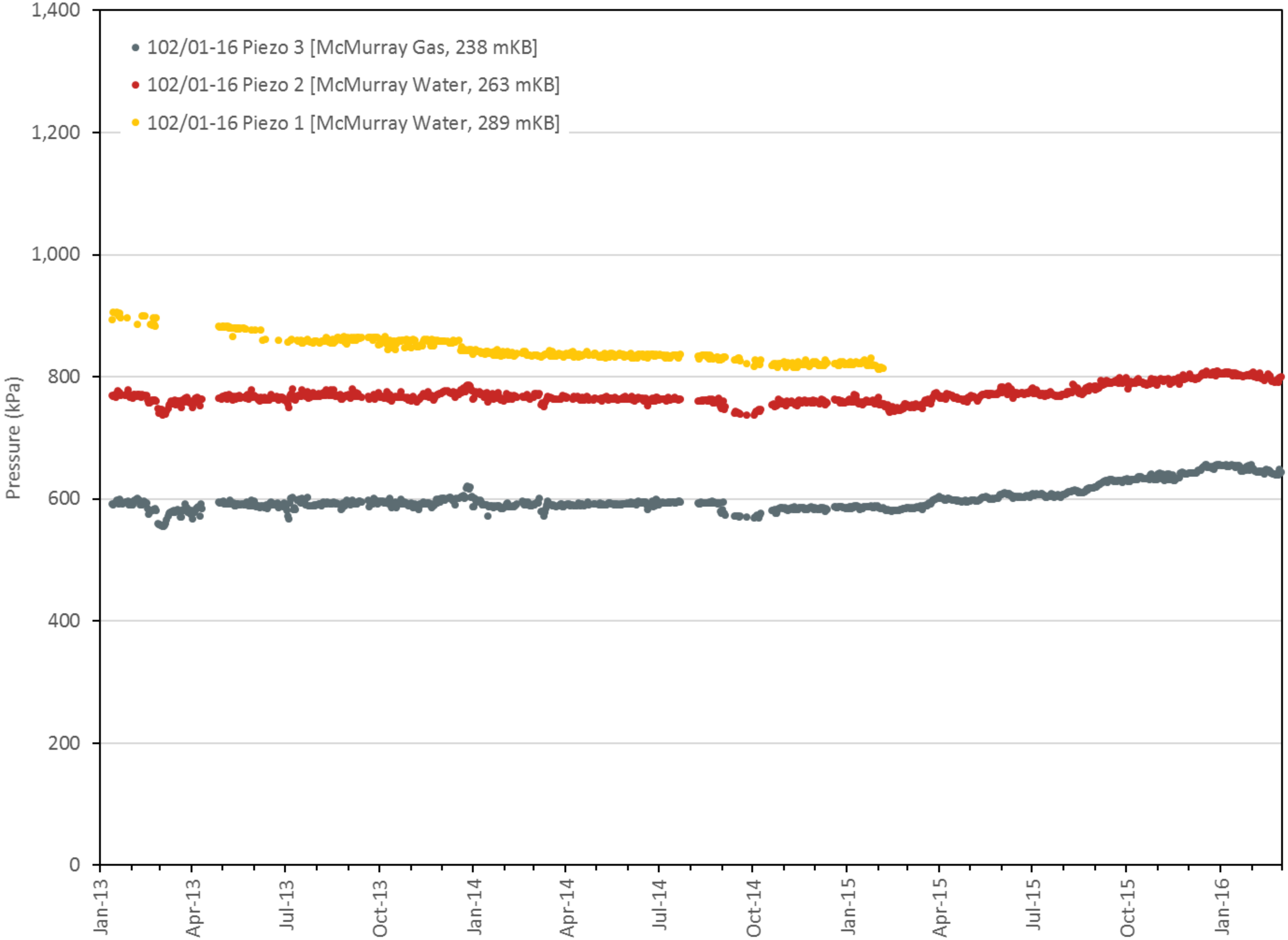
Surmont Phase 1 Water Disposal Wells Well Head Pressure (McMurray)

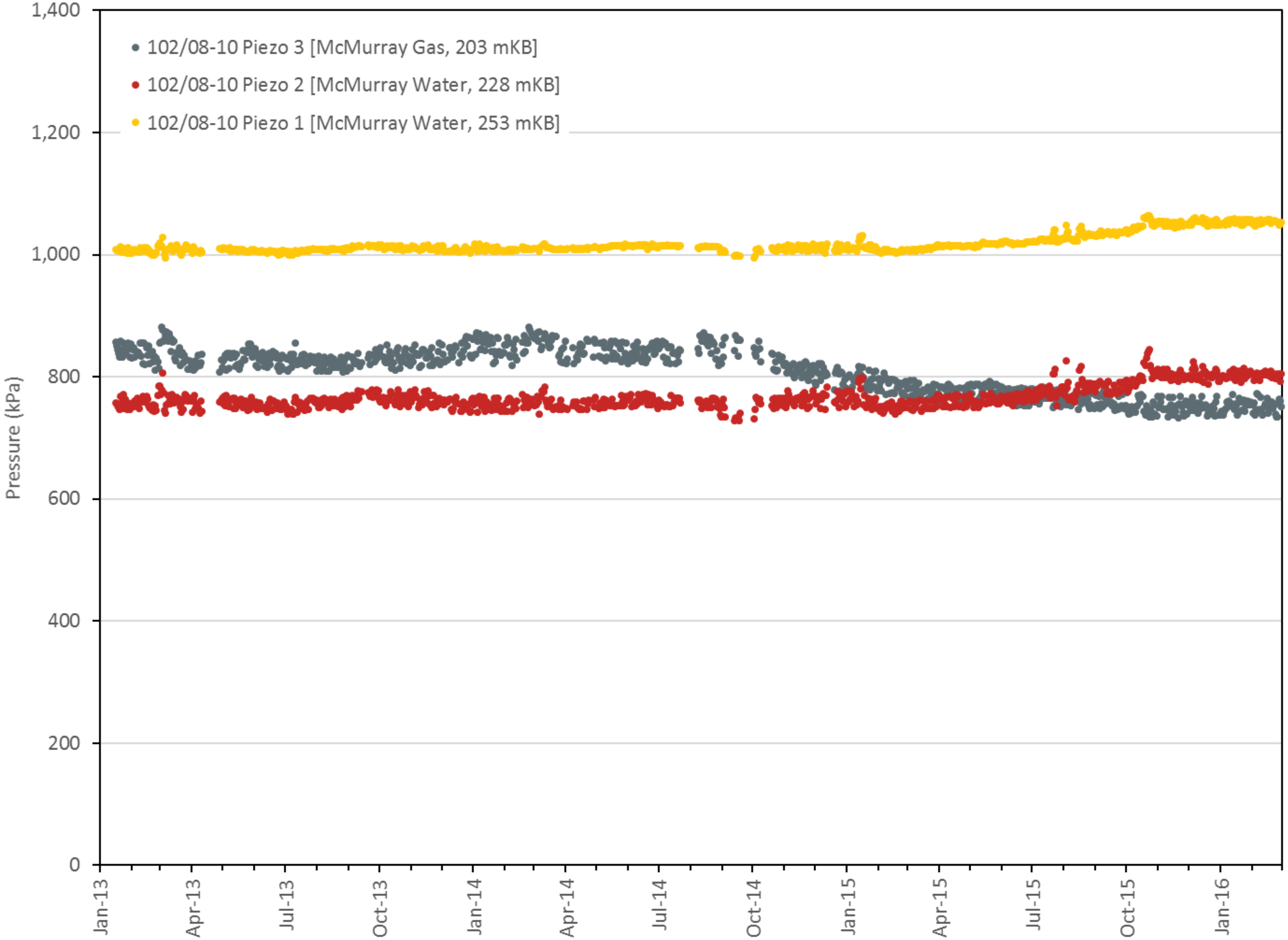


Surmont Phase 2 Water Disposal Wells Well Head Pressure (McMurray)

Water Disposal Well 100/01-16-083-05 W4M Observation Well Pressure (McMurray)



Water Disposal Well 100/08-10-083-05 W4M Observation Well Pressure (McMurray)



Waste Disposal

Waste Description	Disposal Weight (Tonnes)	Disposal Method
Dangerous Oilfield Waste	3179	
Hydrocarbon/Emulsion Sludge	586	Oilfield Waste Processing Facility
Crude Oil/Condensate Emulsions	185	Oilfield Waste Processing Facility
Various	2403	Landfill
Non-Dangerous Oilfield Waste	29867	
Lime Sludge	862	Landfill
Various	23143	Landfill
Well Fluids	5862	Cavern

Waste Recycling

Waste Description	Disposal Weight (Tonnes)	Disposal Method
Oil	38	Used Oil Recycler
Empty Containers	6	Recycling Facility
Fluorescent Light Tubes	0.5	Recycling Facility
Batteries	6	Recycling Facility

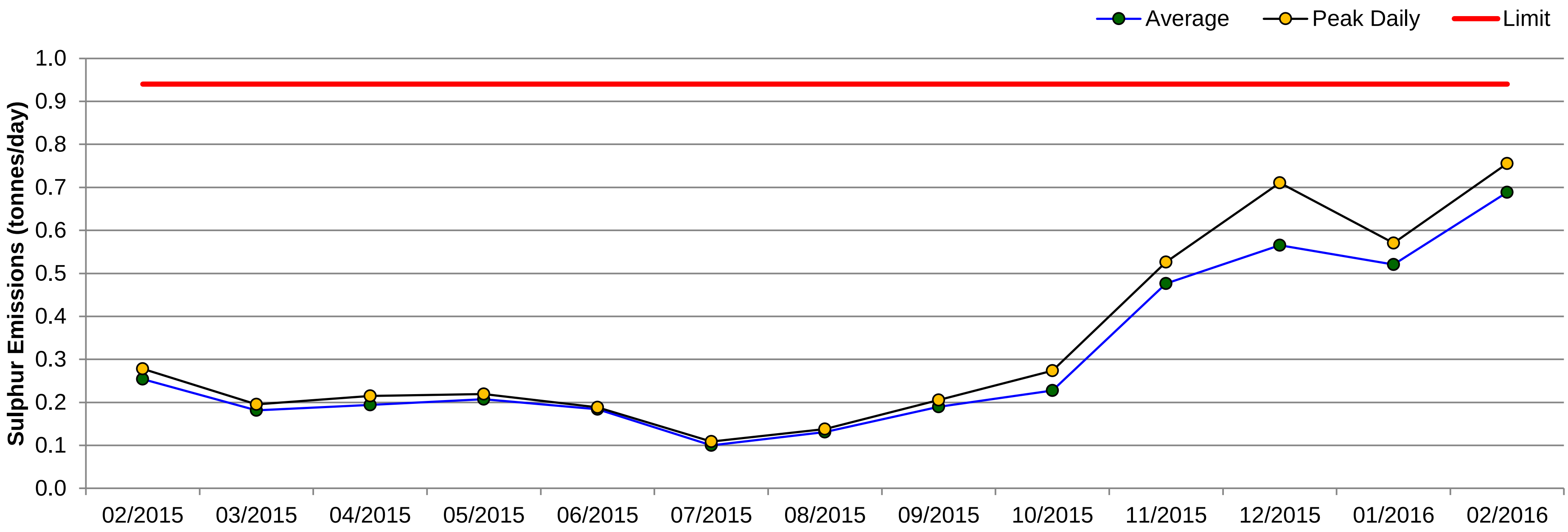
Typical Water Analysis

Parameter	Non-Saline Makeup Water (mg/L)	Saline Makeup Water (mg/L)	Produced Water (mg/L)	Disposal Water (mg/L)
pH	8.5	8.2	7.5	11.8
Total Dissolved Solids (TDS)	1,400	8,000	1,800	23,000
Chloride	200	2,800	650	9,500
Hardness as $CaCO_3$	<0.5	225	10	5
Alkalinity as $CaCO_3$	900	350	250	2,700
Silica	8	7	190	225
Total Boron	6	3.3	40	260
Total Organic Carbon	15	4	500	2,150
Oil Content	<1	<1	65	30

Sulphur Production

Subsection 3.1.2 (5)

Daily Sulphur Emissions



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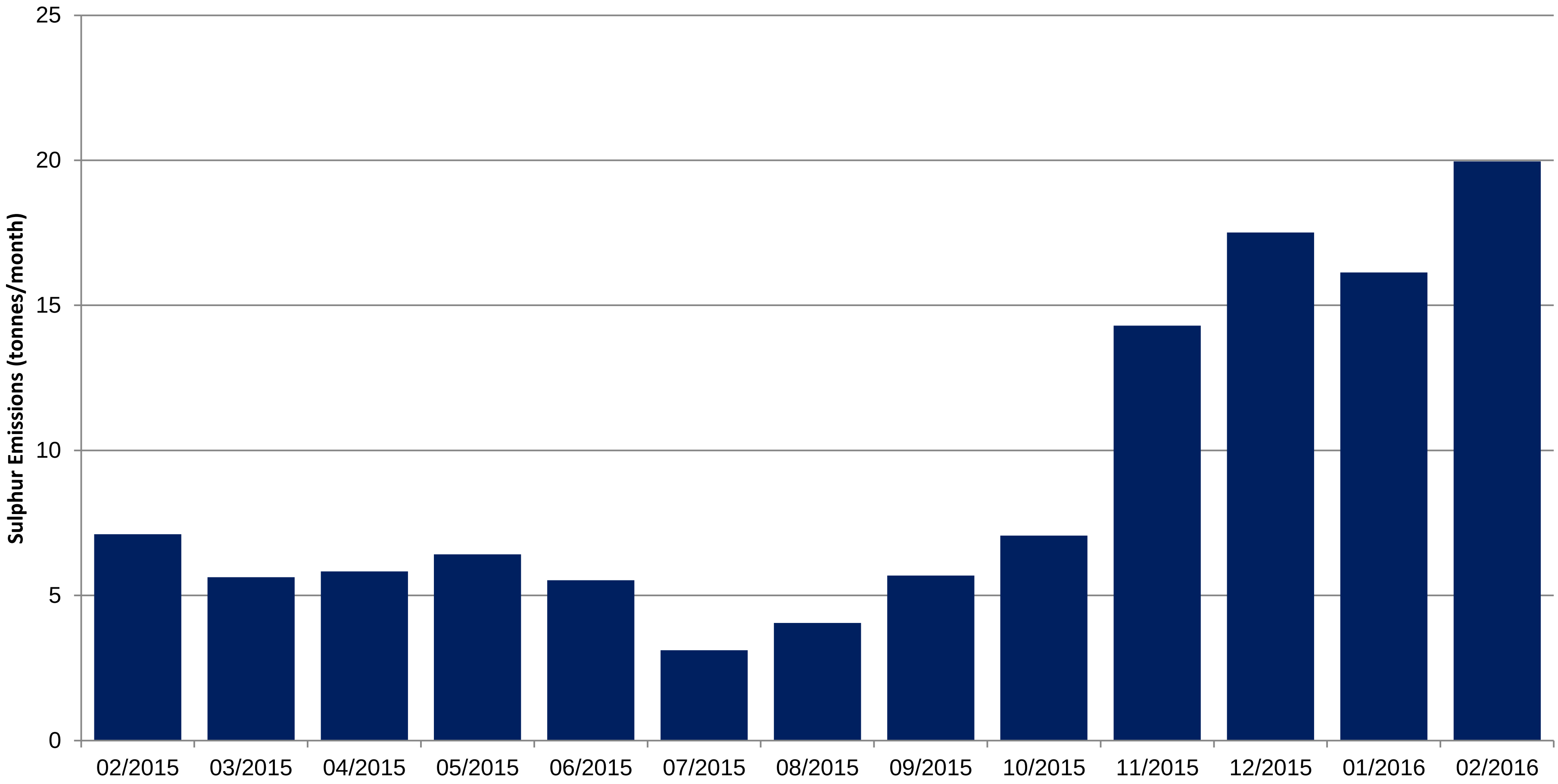
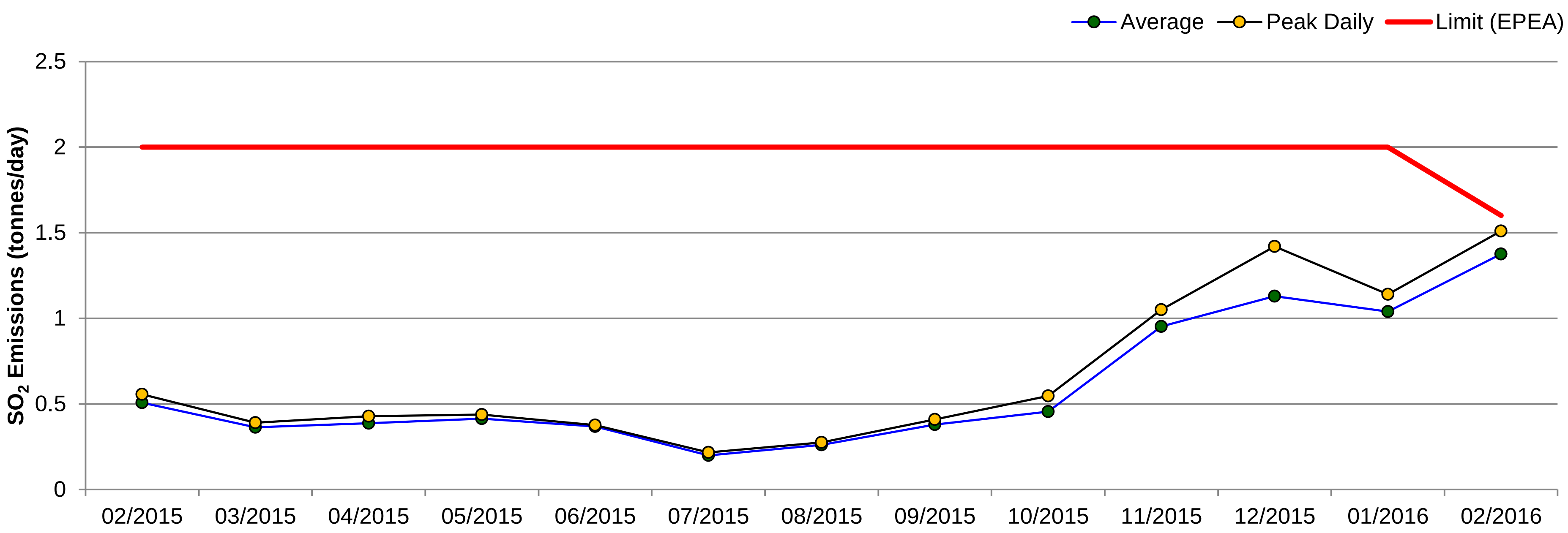
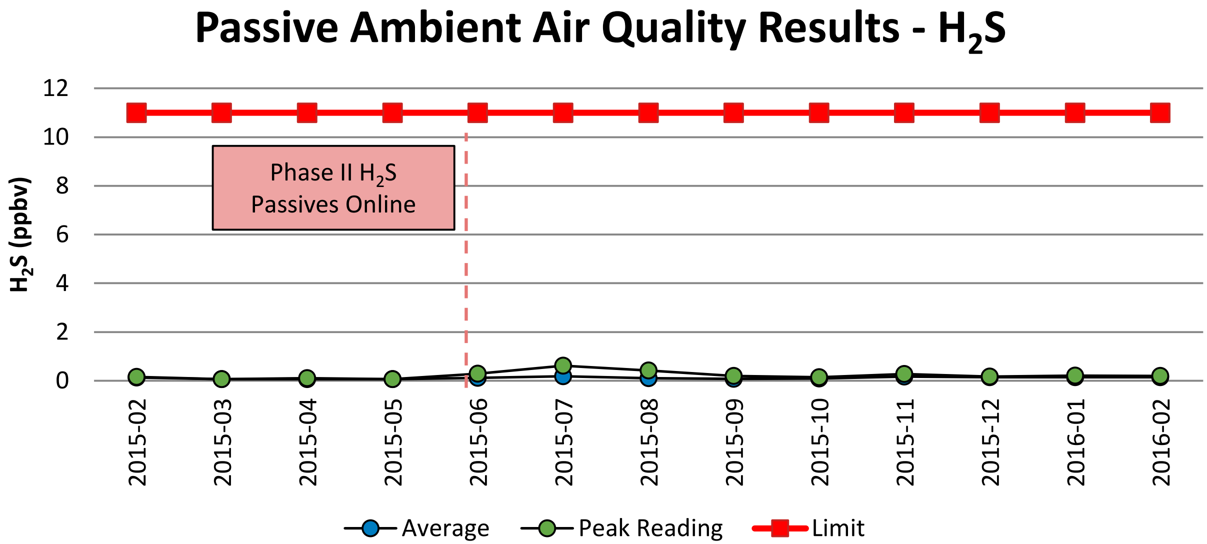
Monthly Sulphur Emissions

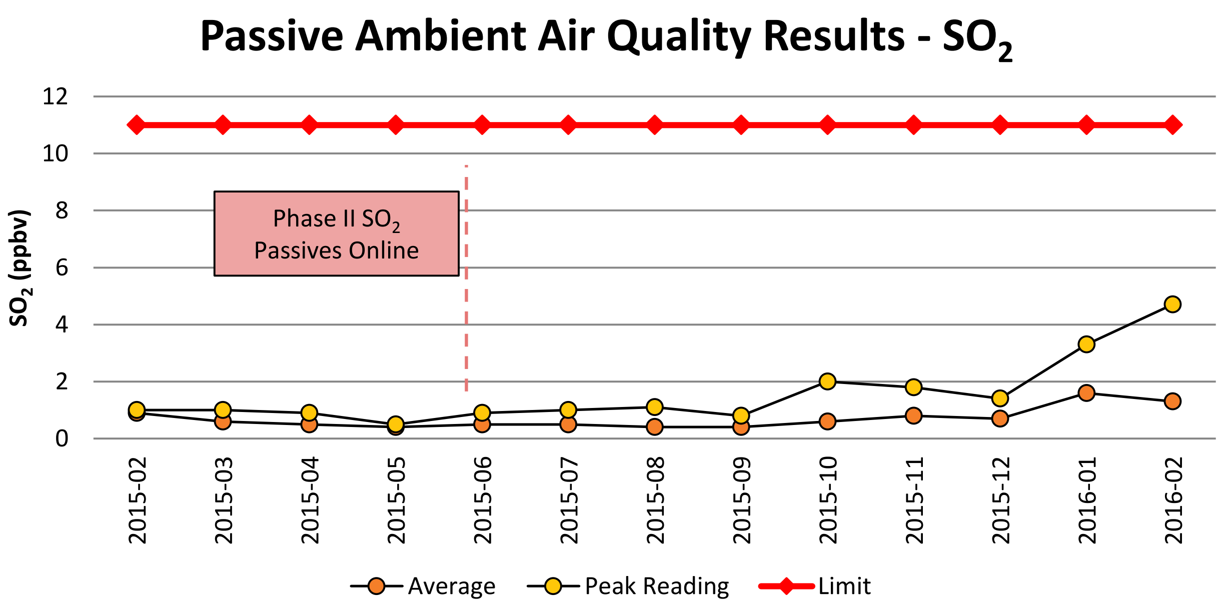


Daily SO_2 Emissions



Ambient Air Quality Monitoring





Continuous ambient air monitoring - all Alberta Ambient Air Quality Objectives were met in 2015

NOx Passives added to Surmont Facility January 2016

Environmental Compliance

Subsection 3.1.2 (6)

Environmental Compliance

Environmental Approval Contraventions

- Reference # 295104 – February 26, 2015
  - The sample membrane of one Sulphur dioxide passive sample was lost at or before installation making the sample invalid. Thus only three samples were counted instead of the required four.
- Reference # 298932 – May 29, 2015
  - The results of the manual stack surveys showed that the glycol trim heaters were exceeding oxides of Nitrogen limit (2.2 kg/hr). Vendor came out to adjust burner settings to reduce emissions.
- Reference # 308062 – February 7, 2016
  - Failure to submit Certificate of Completion for the Phase 2 Storm water pond within 60 days of construction completion.
  - Certificate submitted March 31, 2016.

Environmental Monitoring

- Groundwater Monitoring Program
  - 2015 results within historical/background concentrations
- Integrated Wetlands Monitoring Program
  - 2015 results within historical/background concentrations
- Reclamation Programs
  - No final reclamation in 2015
- Wildlife Monitoring Program
  - Monitoring of above-ground pipeline completed in 2015
  - January 2016 Monitoring program expanded to include Surmont Phase 2
  - Monitoring avian productivity and survivorship (MAPS)
- Provided funding to AEMERA and provided technical input through COSIA monitoring working group and JOSM Biodiversity Component Biodiversity Committee in 2015.
- In 2015, CPC was required to contribute to CEMA, WBEA and ABMI.

- **Groundwater and Integrated Wetland Monitoring Programs extended to Surmont 2**

Compliance Confirmation and Non Compliances

Subsection 3.1.2 (7) + (8)

Compliance Confirmation and Non Compliances

ConocoPhillips Canada is in regulatory compliance for 2015 with the exception of the following:

- A minor overpressure event at Pad 263-1 and Pad 265-2:
  - Caused by challenges with the bubble tube used to measure bottom hole pressure.
- Surmont Phase 1 Pond Primary Liner Leak:
  - Self Disclosed that there is a breach in the primary liner at Phase 1.
  - Corrective action plan has been developed and is being executed.
- Surmont Phase 2 Storm Water Pond Certificate of Completion:
  - Certificate of Completion was not submitted within 60 days of completion.

Future Plans

Subsection 3.1.2 (9)

Future Plans – Surmont

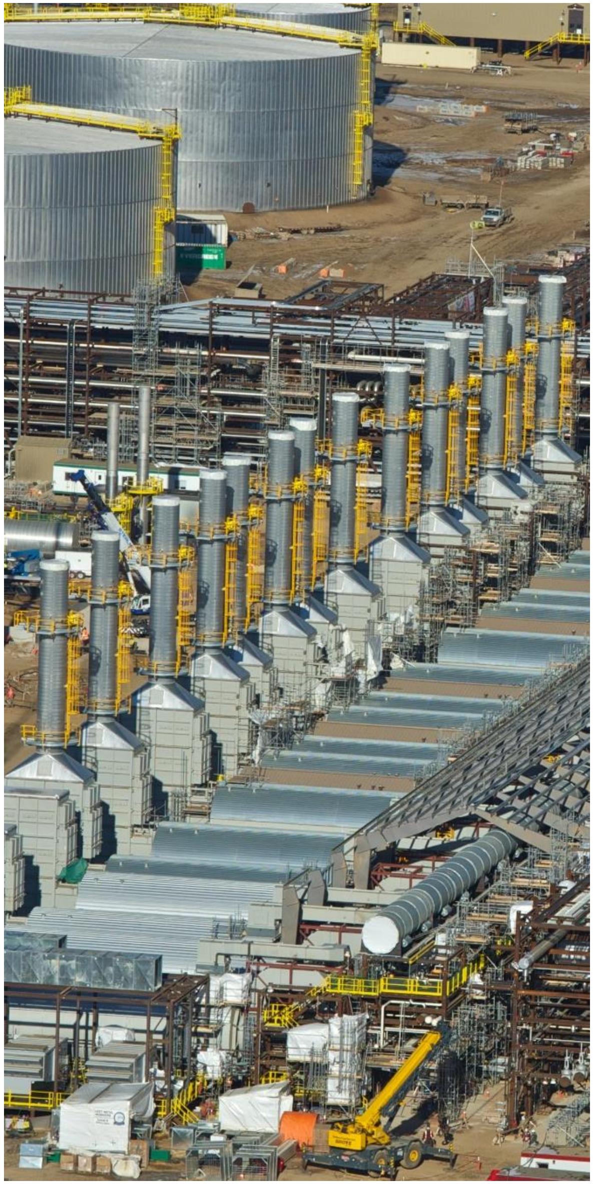
Phase 1

- Exploration of a heat integration project to improve facility efficiency and uplift steam production. Critical tie-ins planned to be executed during June Shutdown. Project still under evaluation.
- Full Implementation of alternative WLS coagulant program based on 2016 trial results.

Phase 2

- Execution of alternative WLS coagulant program pending success at Phase 1.
- Completion of detailed engineering to manage PSV lift challenges in steam plant.
- Kick off of detailed engineering for treater desand installations – pending
- Train 1 steam plant Condensate Induced Water Hammer Mitigation project – detailed engineering to begin 2Q, 2016.

S2 Ramp-up

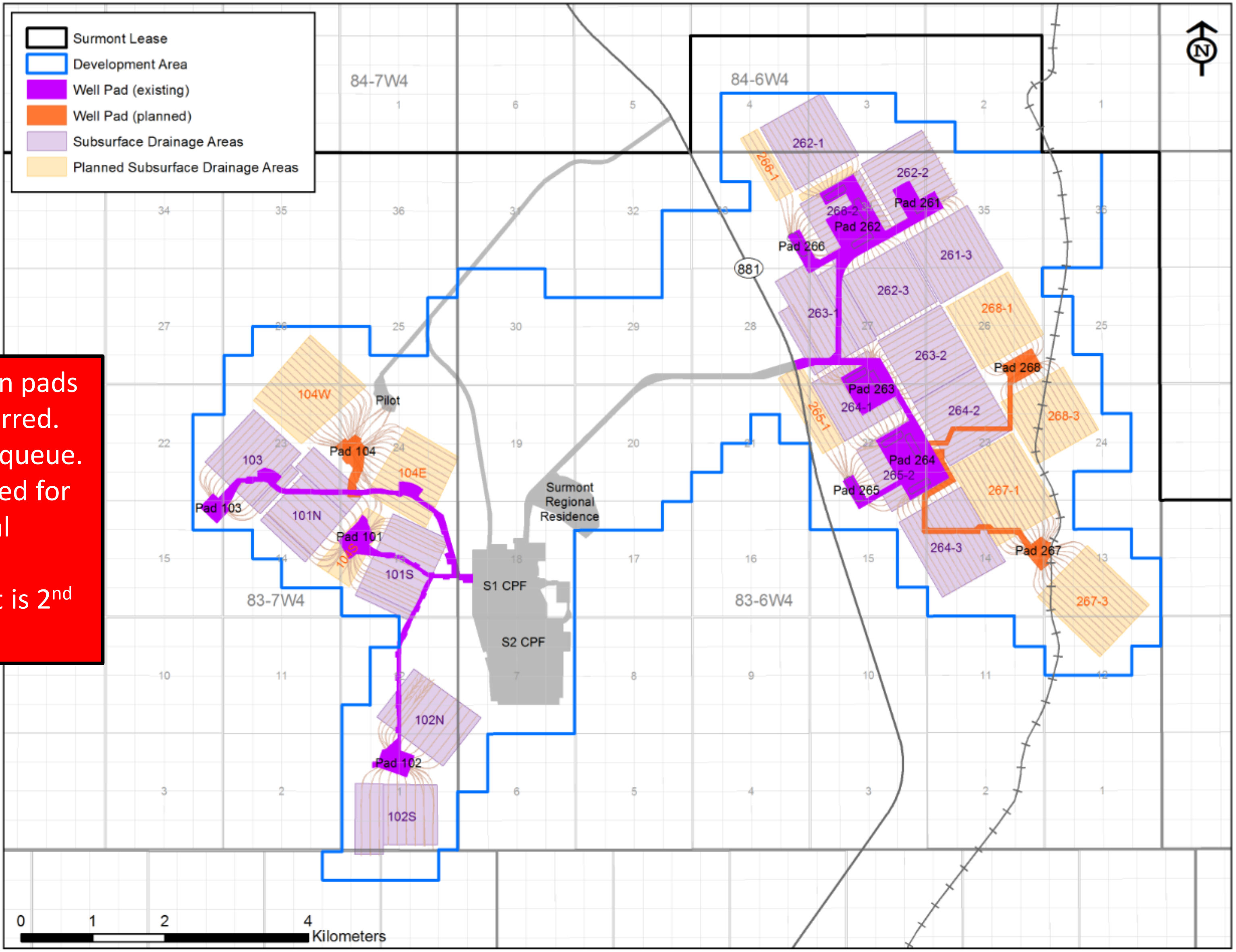


Activity Name	Finish
Train 1 - Prepare and Test Steam Gen #1 (OTSG)	15-July-2015
Train 1 - Prepare and Test Steam Gen #2 (OTSG)	15-July-2015
Train 1 - Prepare and Test Steam Gen #3 (OTSG)	15-July-2015
Train 1 - Prepare and Test Steam Gen #4 (OTSG)	15-July-2015
Train 1 - Prepare and Test Steam Gen #5 (OTSG)	9- Aug -2015
Train 1 - Prepare and Test Steam Gen #6 (OTSG)	16-Aug -2015
Train 2 - Prepare and Test Steam Gen #7 (OTSG)	16-Oct-15 A
Train 2 - Prepare and Test Steam Gen #9 (OTSG)	21-Oct-15 A
Train 2- Prepare and Test Steam Gen #11 (OTSG)	09-Nov-15 A
Train 2 - Prepare and Test Steam Gen #12 (OTSG)	30-Oct-15 A
Train 2 - Prepare and Test Steam Gen #10 (OTSG)	02-Nov-15 A
Train 2 - Prepare and Test Steam Gen #8 (OTSG)	07-Nov-15 A

Upcoming Commissioning:
- **Gen 13 – 2/25/2016**
- **Gen 14 – 3/04/2016**
- **Gen 15 – 3/12/2016**
- **Gen 16 – 3/20/2016**
- **Gen 17 – 04/15/2016**
- **Gen 18 – 4/22/2016**

Future Pad Developments

- Outboard wells on pads 265 and 266 deferred.
- 267 is first in the queue.
- 268 being reviewed for impact of regional bottom water.
- 104 development is 2nd in the queue.



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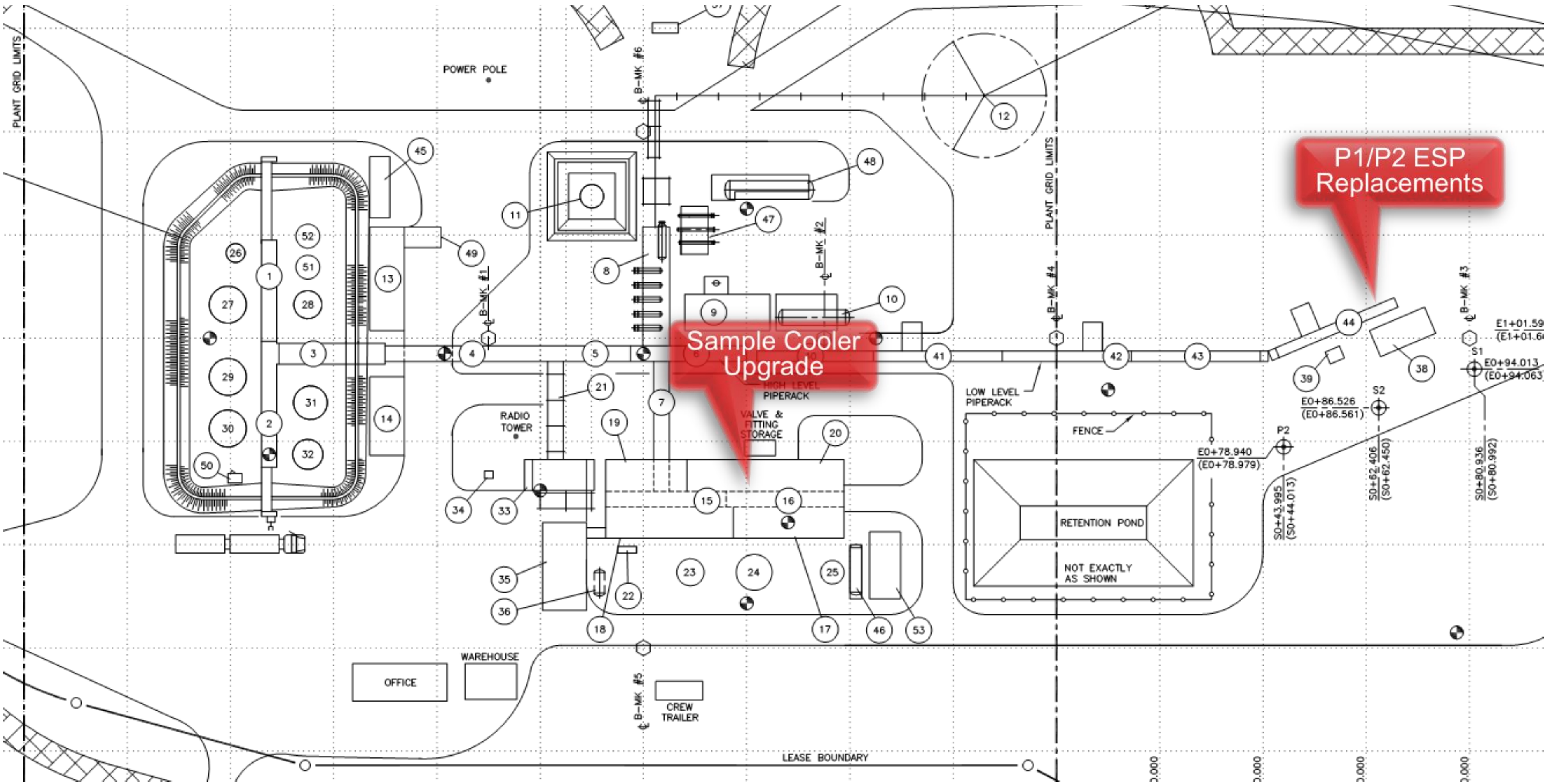
Surface Operations and Compliance
Pilot Project Approval 9460

Facilities

Subsection 3.1.2 (1)

Site Survey Plan & Facility Modifications



No significant facility modifications completed in 2015.

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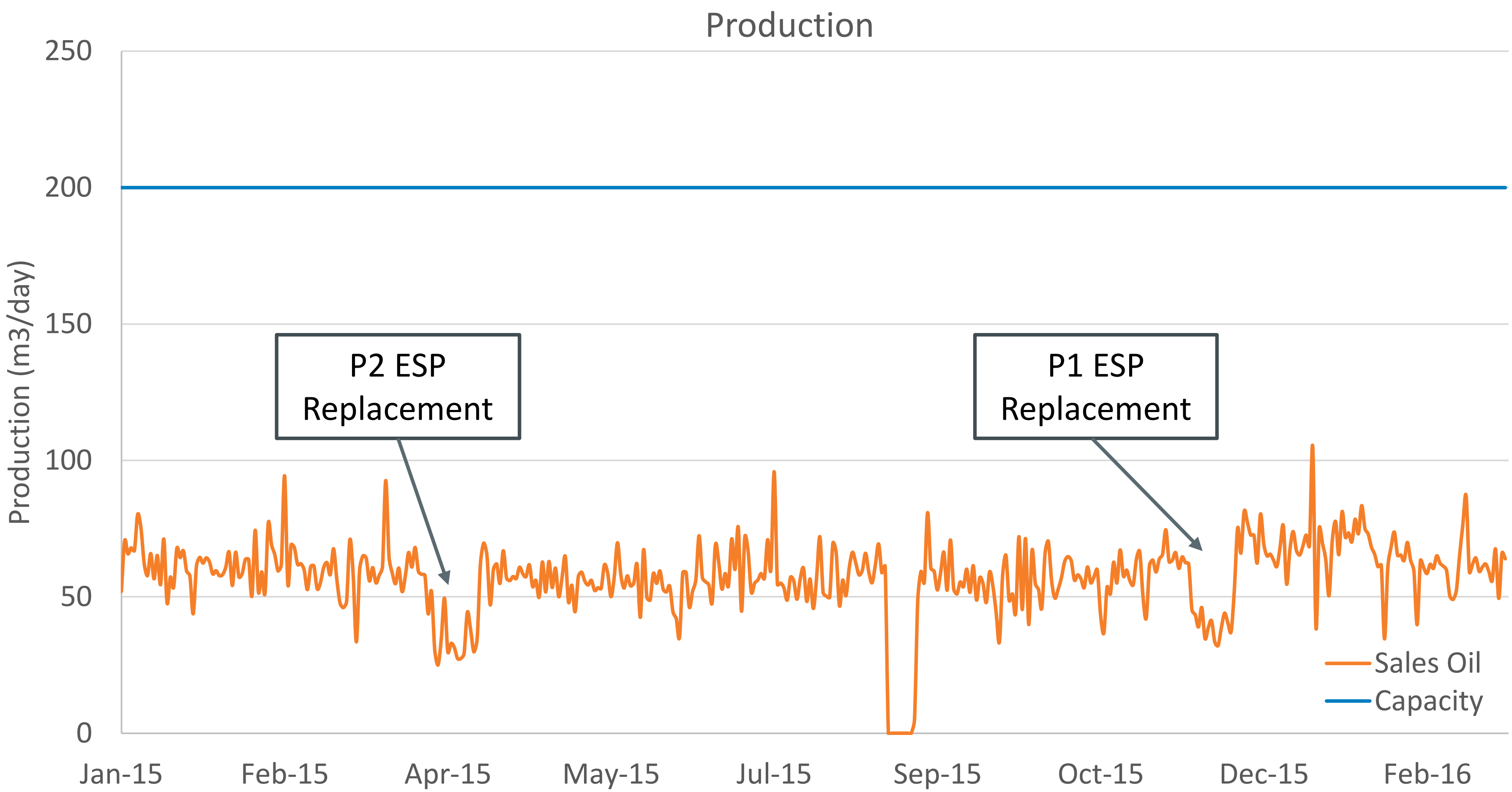
Facility Performance

Subsection 3.1.2 (2)

Pilot Plant Performance Bitumen Production



Average Production 2014 = ~356 bbls/day   Average Production in 2015 = ~352 bbls/day

Deviation from capacity due to:

- Thief zone interaction limiting production
- P2 ESP unable to decrease to subcool target
- P3 pump failed shutting in production from this well in 2014

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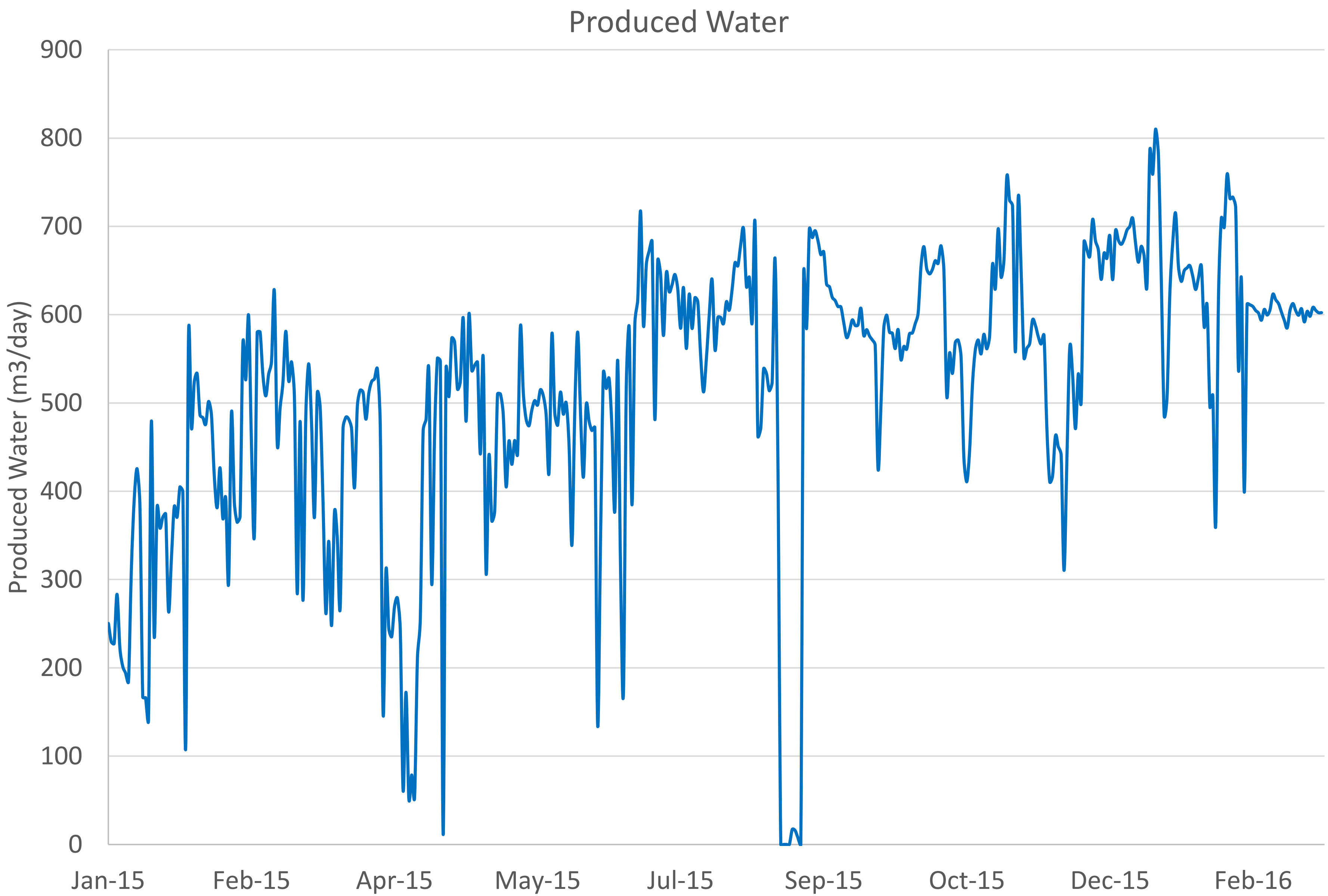
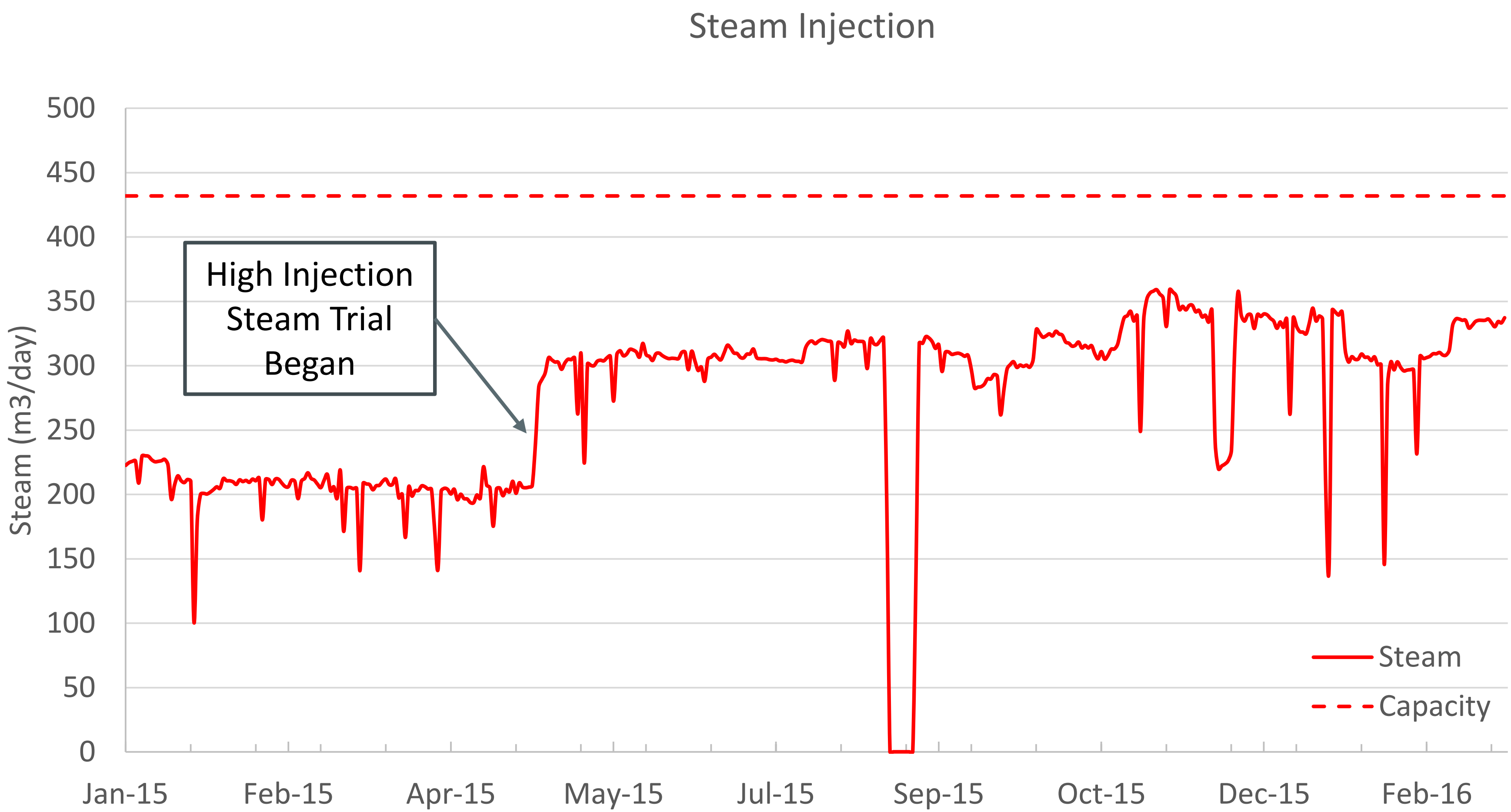
Pilot Plant Performance Produced Water



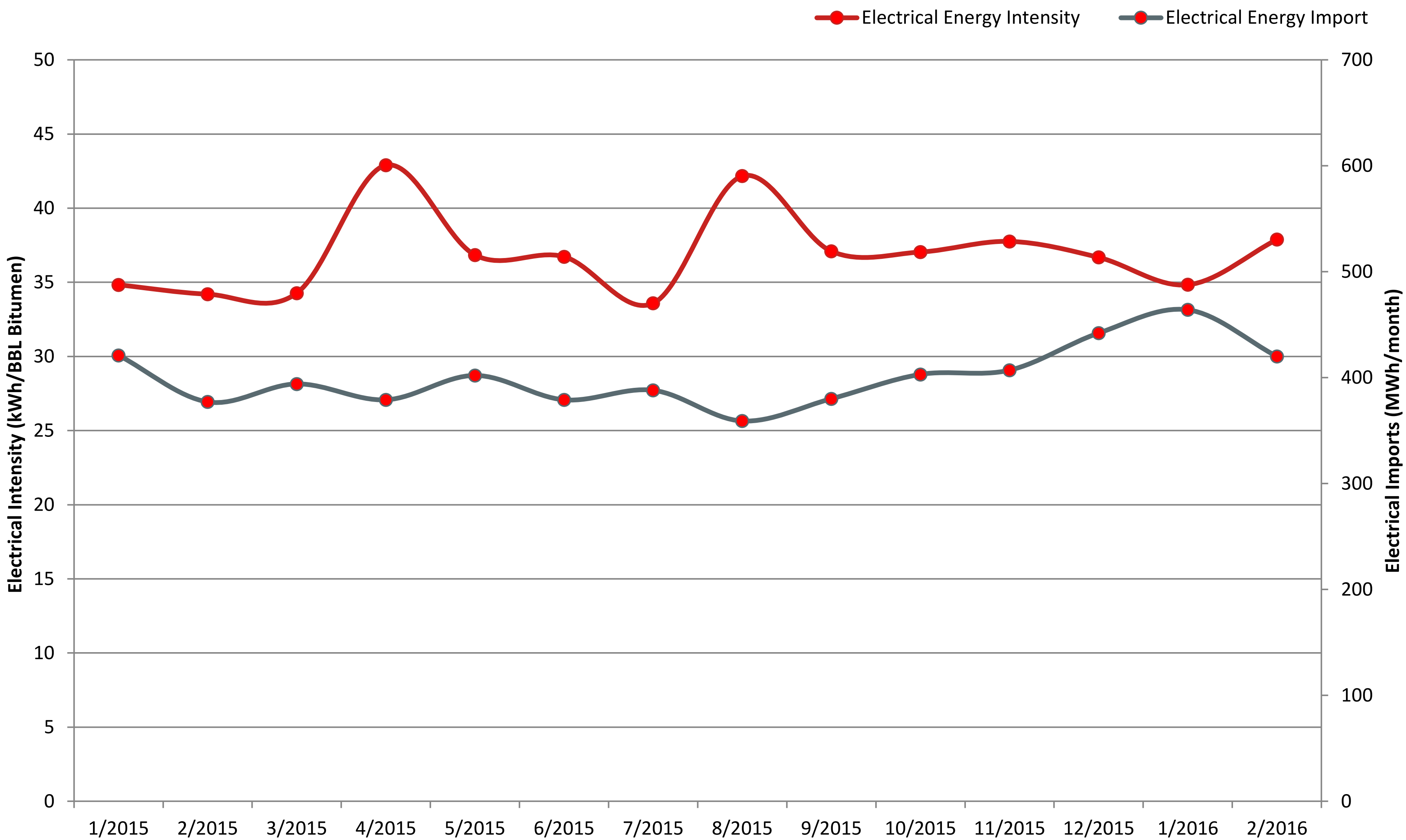
Pilot Plant Performance Steam Generation



Deviation from capacity due to:

- HP BFW output limitations
- Reservoir strategy prior to high injection steam trial
- Steam quality sampling

Facility Performance: Electricity Consumption Surmont Pilot

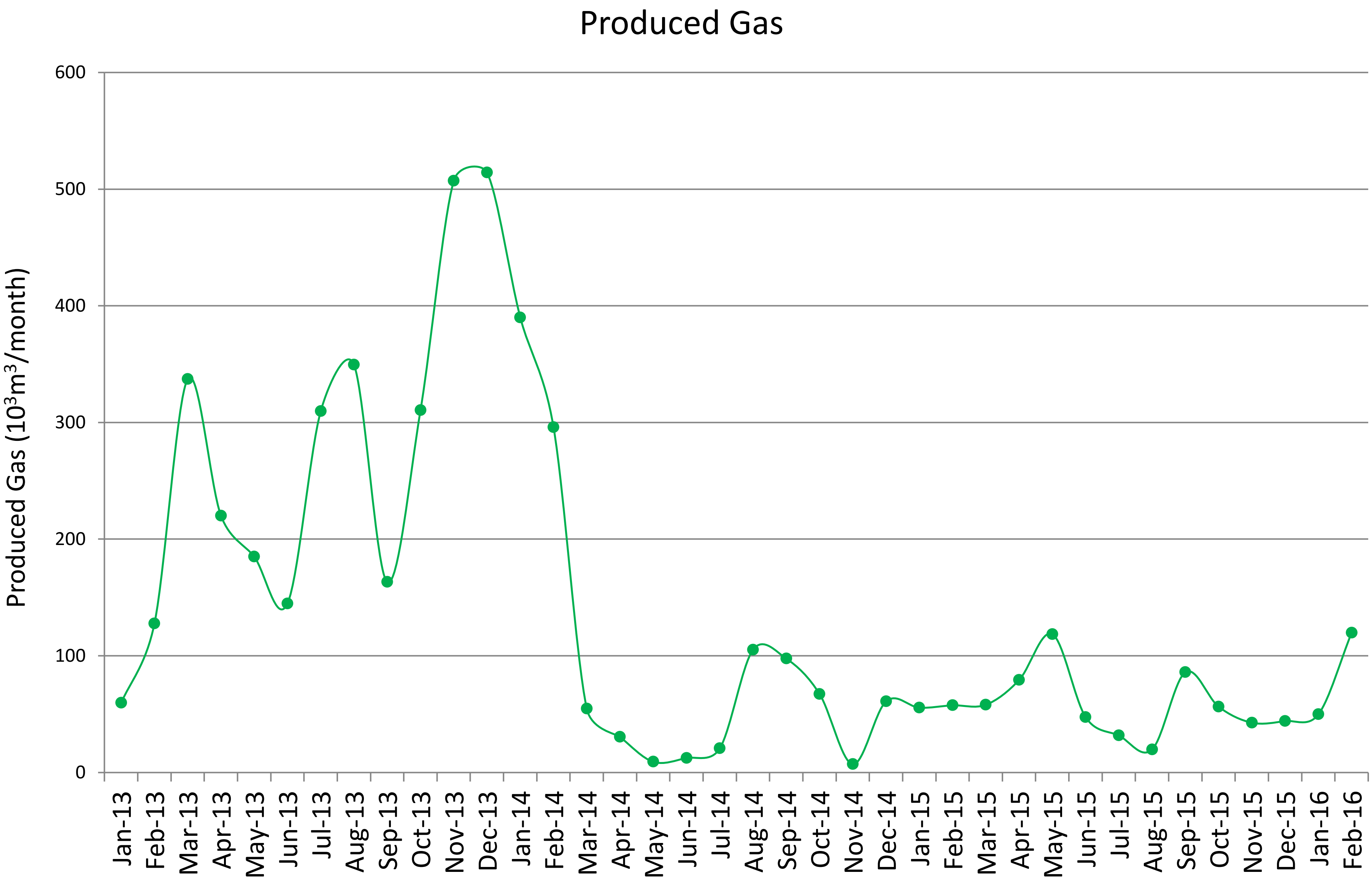


Electricity consumption and intensity at pilot is constant.

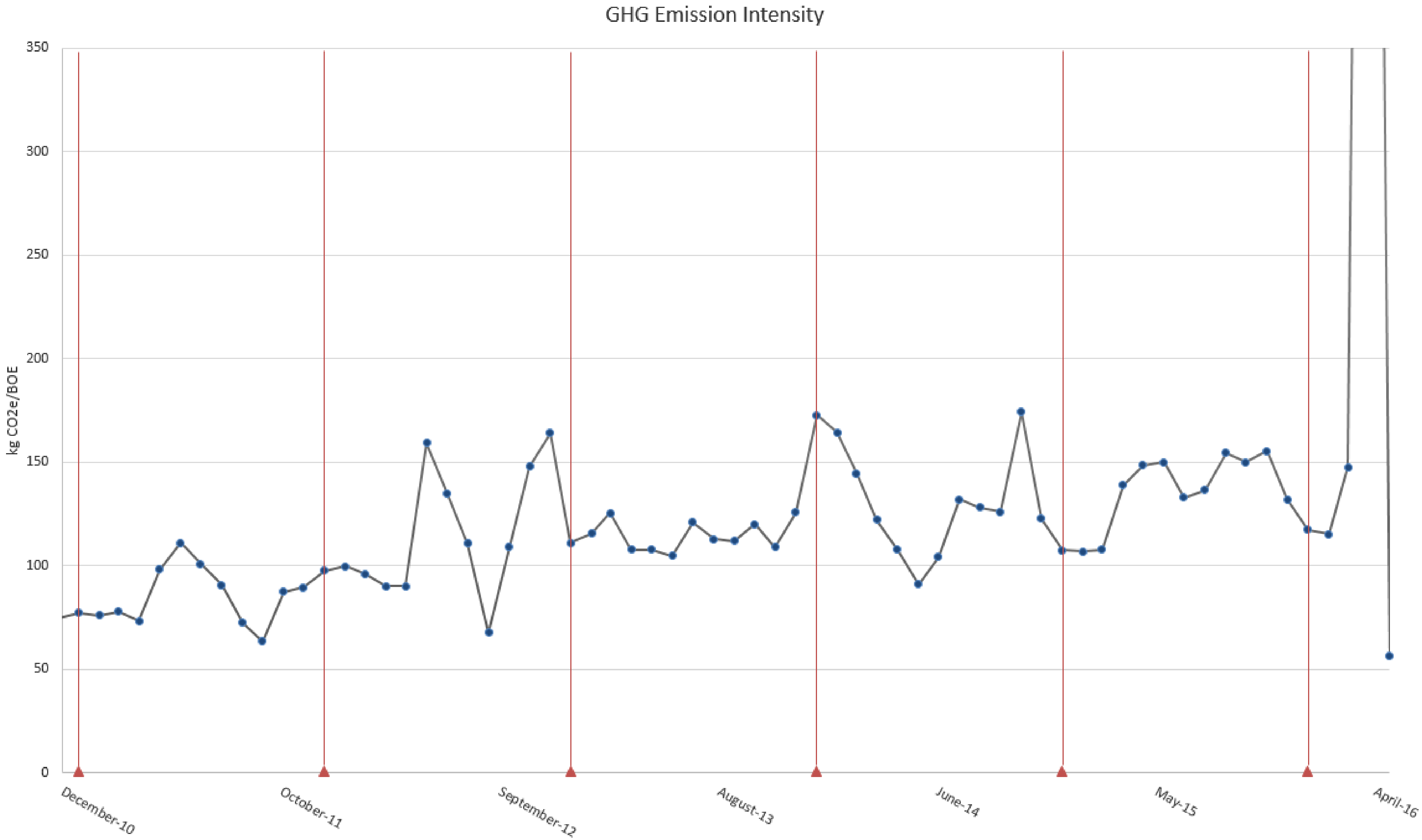
Pilot Plant Performance: Gas Usage

	2011	2012	2013	2014	2015	to 2016-04
Total Gas Imports (TCPL) (10^3m^3)	12,334	9,728	11,828	10,351	8,876	2,405
Solution Gas (10^3m^3)	1,347	2,962	3,229	1,152	555	428
Total Gas Flared (10^3m^3)	2.8	2.5	85.4	31.7	6.2	194.0
Solution Gas Recovery (%)	99.8	99.9	97.4	97.2	98.9	54.7

Pilot Plant Performance Produced Gas



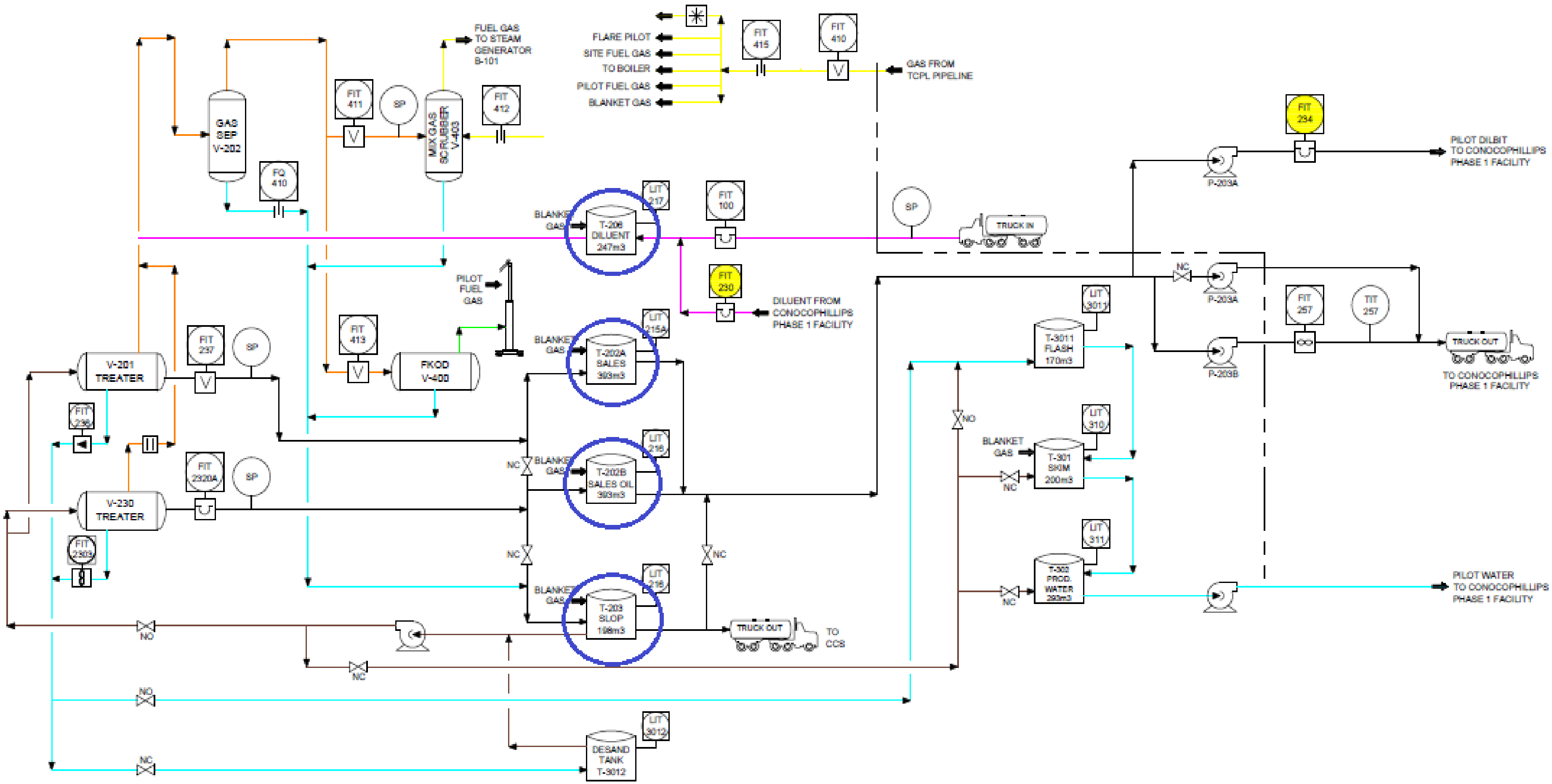
Pilot Plant Performance: Greenhouse Gas



Measurement and Reporting

Subsection 3.1.2 (3)

Bitumen Measurement and Reporting



Battery Actual Bitumen Production = [Closing Inventories – Opening Inventories (Oil portion of Sales and Slop)]/Shrinkage Factor – Diluent Received + [Closing Inventories – Opening Inventories (Diluent)] + [Closing – Opening (Injected Fluids into Producers)] + Sales Shipped to S1 and Trucked

Battery Estimated Bitumen Production = Well bitumen production is calculated from well tests (pro-rated battery)

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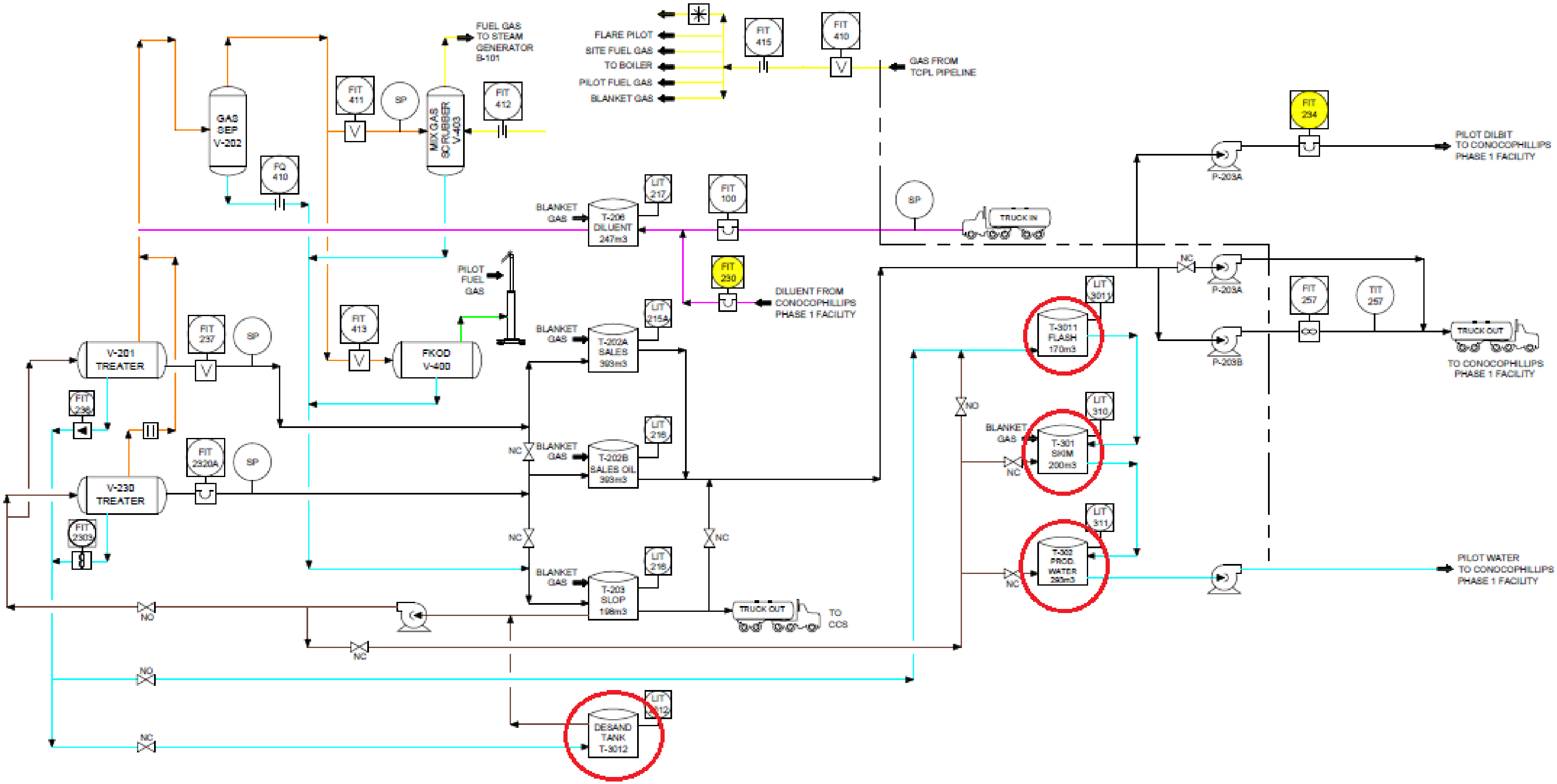
Produced Water Measurement and Reporting



Water Production = [Closing inventories – Opening Inventories (Water portion of Sales, Slop, Flash, Skim and Produced Water)] – Water Content of Received Diluent or Oil + [Closing – Opening (Injected Fluids into Producers)] + Produced Water + Produced Water Truck Tickets + Water Content of Sales Oil

Battery Estimated Water Production = Well water production is calculated from well tests (pro-rated battery)

Measurement and Reporting Methods

Production Gas

- Total battery gas production estimated from inlet of FKOD, Scrubber and P3 usage.
- Well gas production calculated from well oil production and GOR.
- GOR = battery gas production / battery bitumen production.
- Gas proration factor = total battery gas production / well test gas production.

Steam

- Steam injection metered individually at each well and allocated using the group steam injection meter.

Well Testing

- One well on test at a time.
- Target a minimum of two tests per well per month (24 hours in length).
- All well pairs tests regularly tested to meet minimum monthly target.

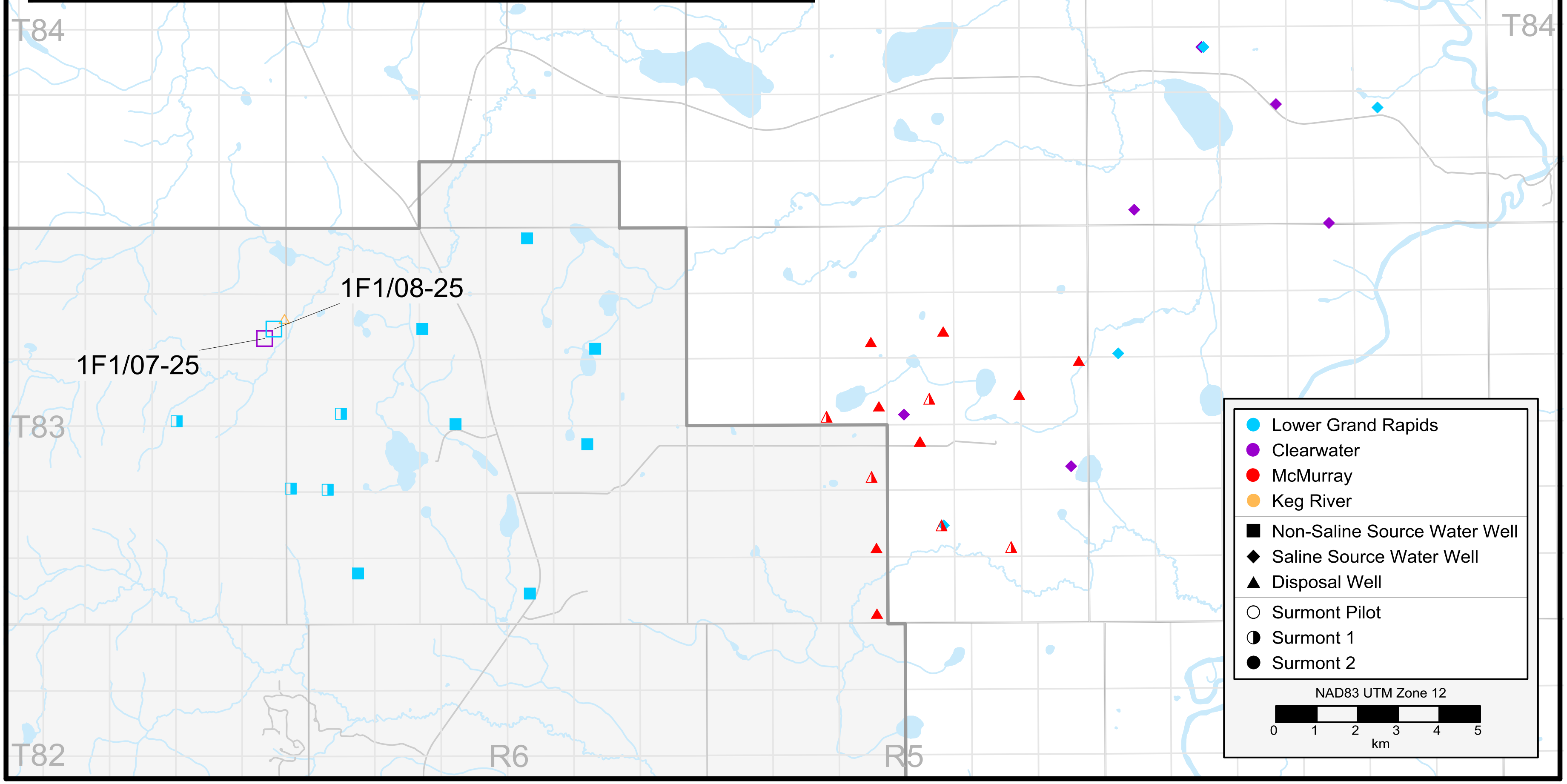
- **No modifications in accounting formula**

Water Production, Injection, and Uses

Subsection 3.1.2 (4)

Surmont Pilot Non-Saline Water Source Wells

Surmont Pilot Non-Saline Water Source Wells		
Source Well	**Observation Well**	**Formation**
1F1082508307W400	1AJ082508307W400	Lower Grand Rapids
1F1072508307W400	100072508307W400	Clearwater



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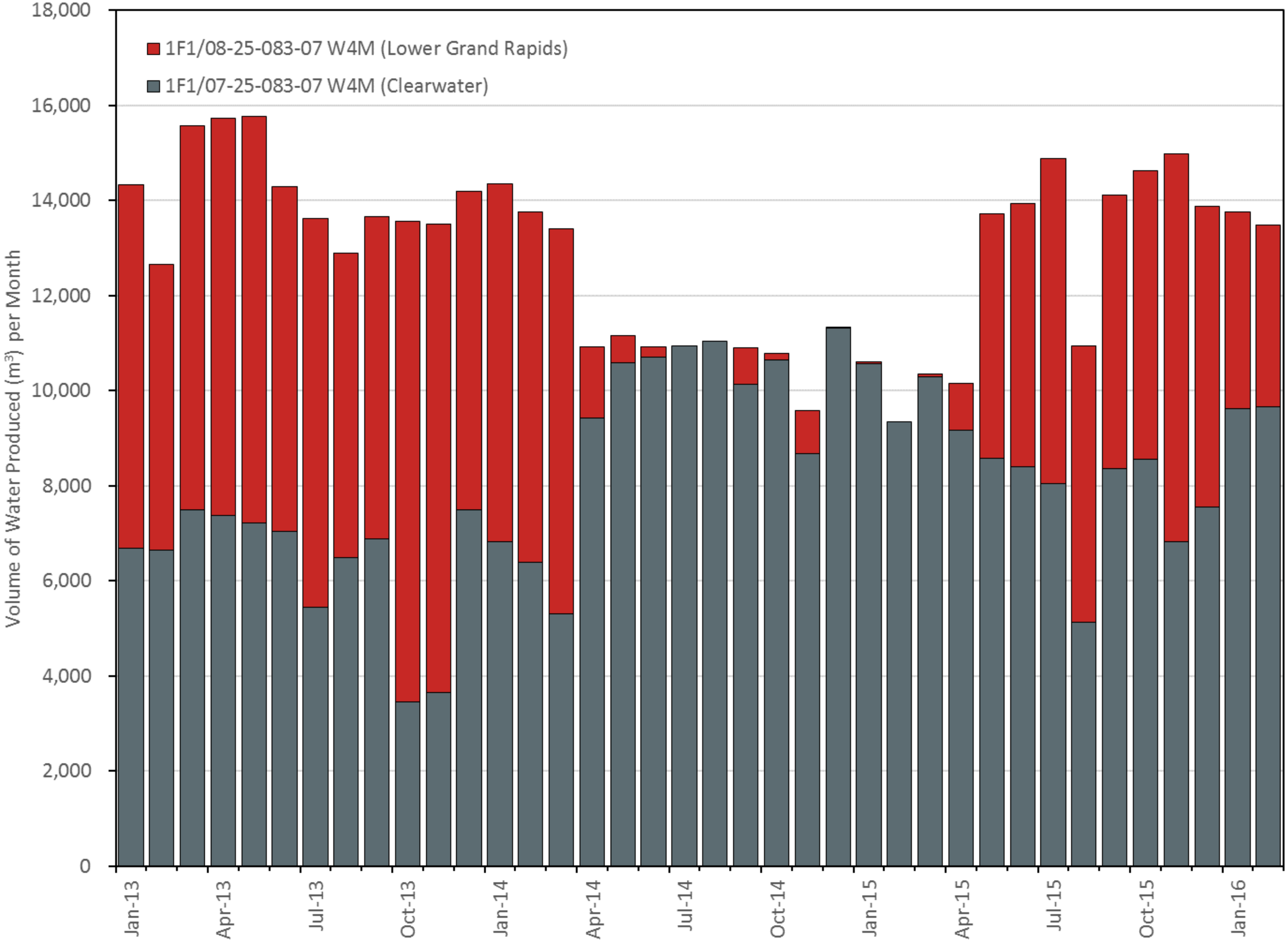
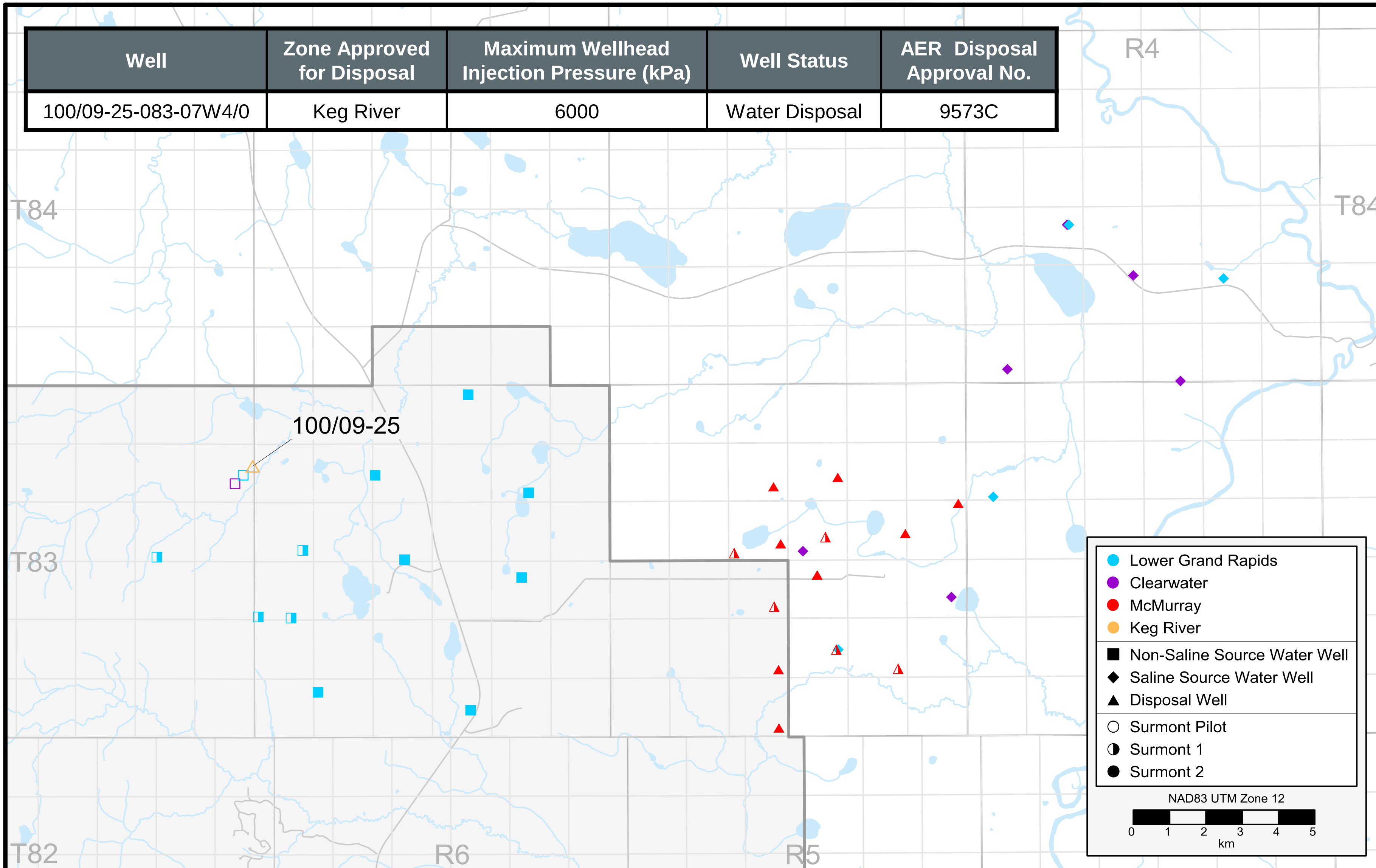
Pilot Water Source Wells Production Volumes

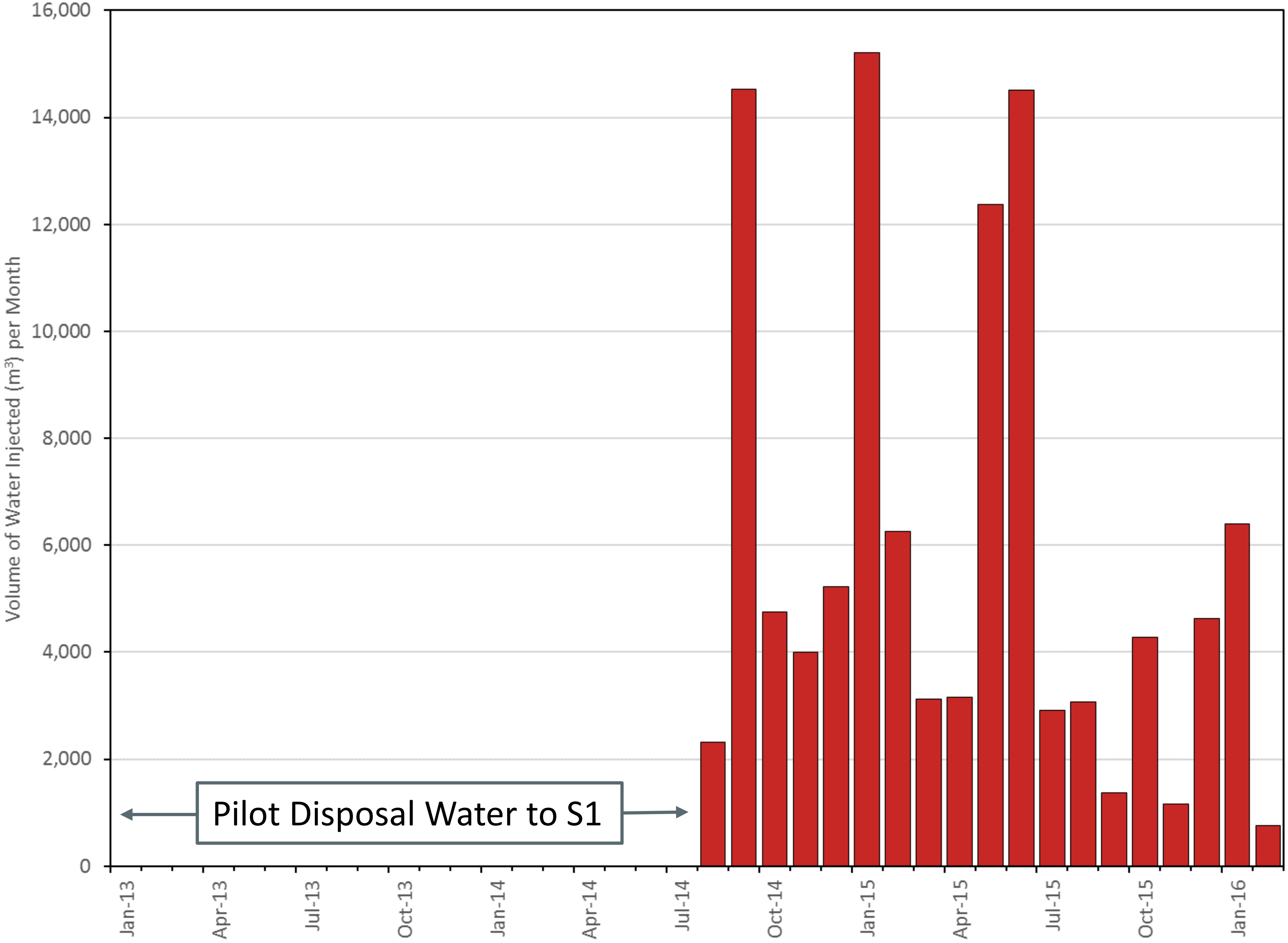


Surmont Pilot Water Disposal Well

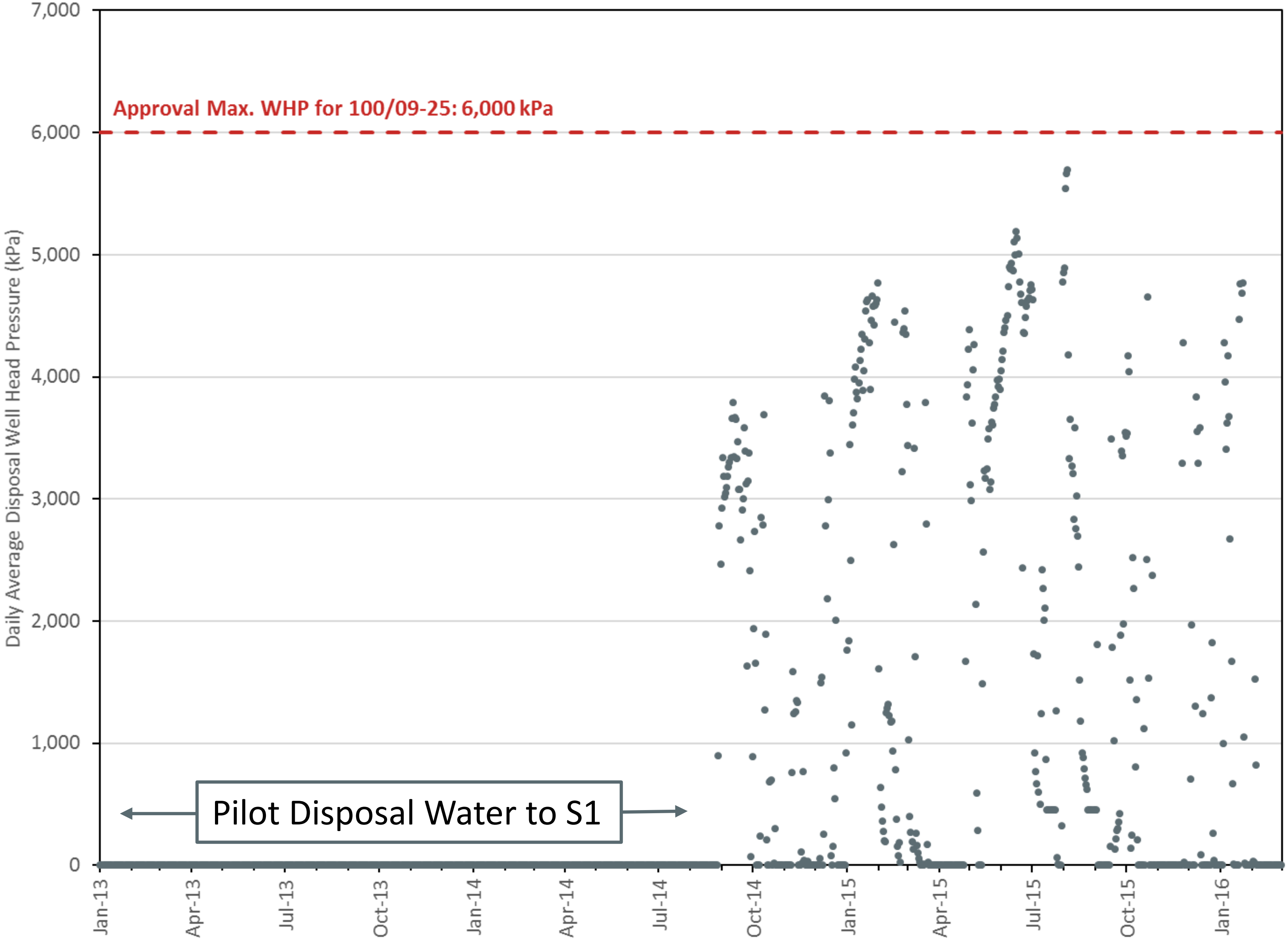
Well	Zone Approved for Disposal	Maximum Wellhead Injection Pressure (kPa)	Well Status	AER Disposal Approval No.
100/09-25-083-07W4/0	Keg River	6000	Water Disposal	9573C



Pilot Water Disposal Well 100/09-25-083-07 W4M Injection Rate (Keg River)



Pilot Water Disposal Well 100/09-25-083-07 W4M Well Head Pressure (Keg River)



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Waste Disposal & Recycling

Solid Waste

Waste Description	Disposal Weight (kg)	Disposal Method
Recycled Materials	1,750	Recycled
Dangerous Oilfield Waste	597	Landfill
Non-Dangerous Oilfield Waste	1,326	Landfill

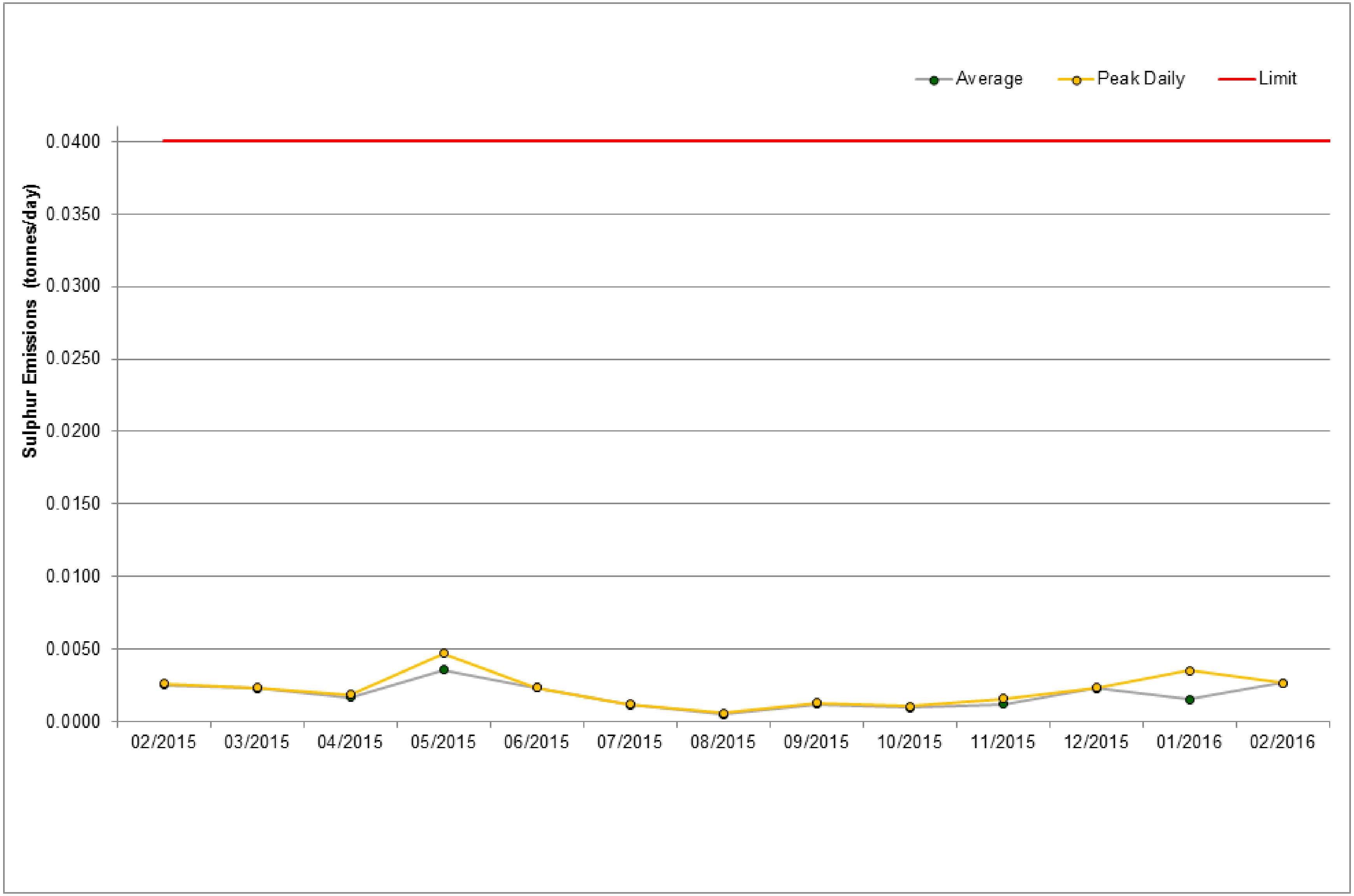
Fluid Waste

Waste Description	Disposal Volumes (m^3)	Disposal Method
Dangerous Oilfield Waste	284	Cavern
Non-Dangerous Oilfield Waste	149	Cavern

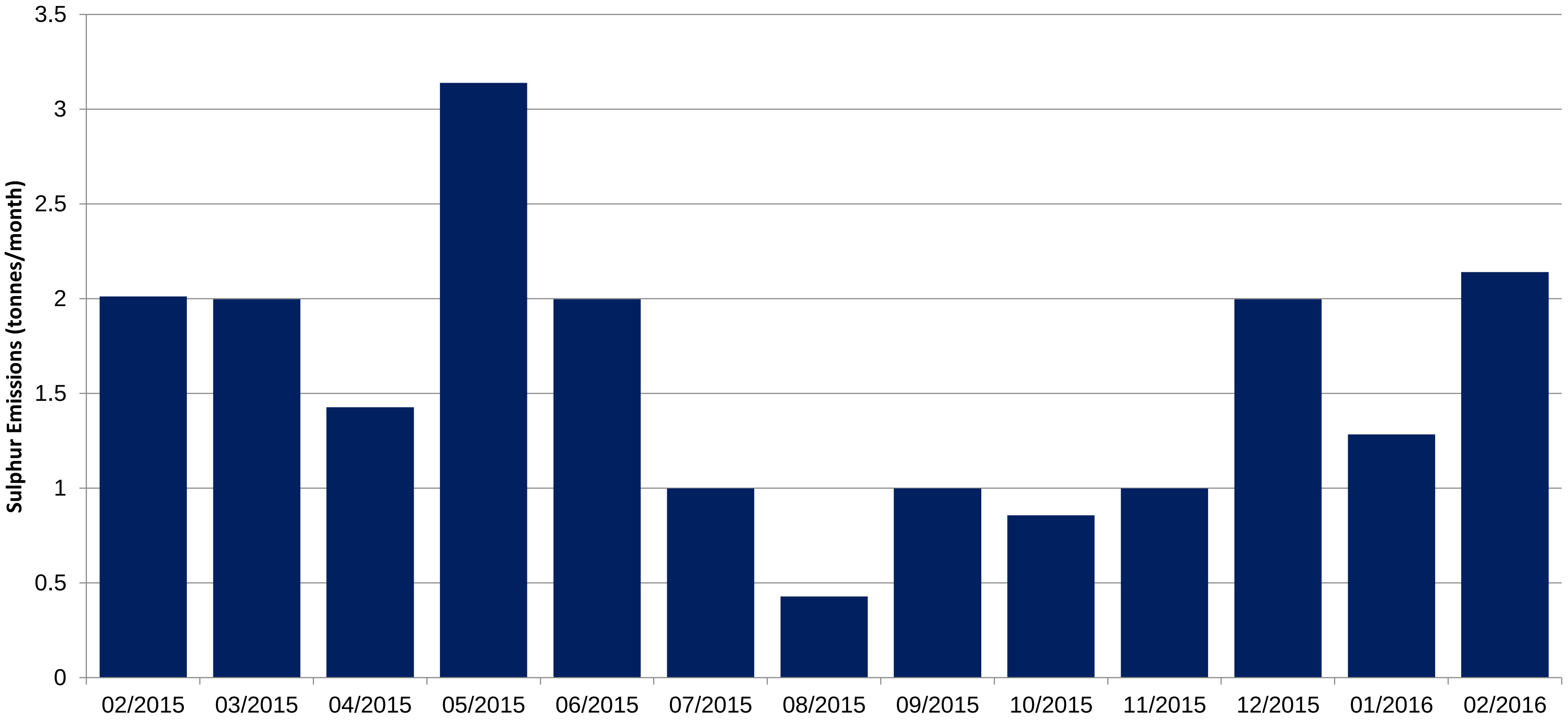
Sulphur Production

Subsection 3.1.2 (5)

Daily Sulphur Emissions



Monthly Sulphur Emissions



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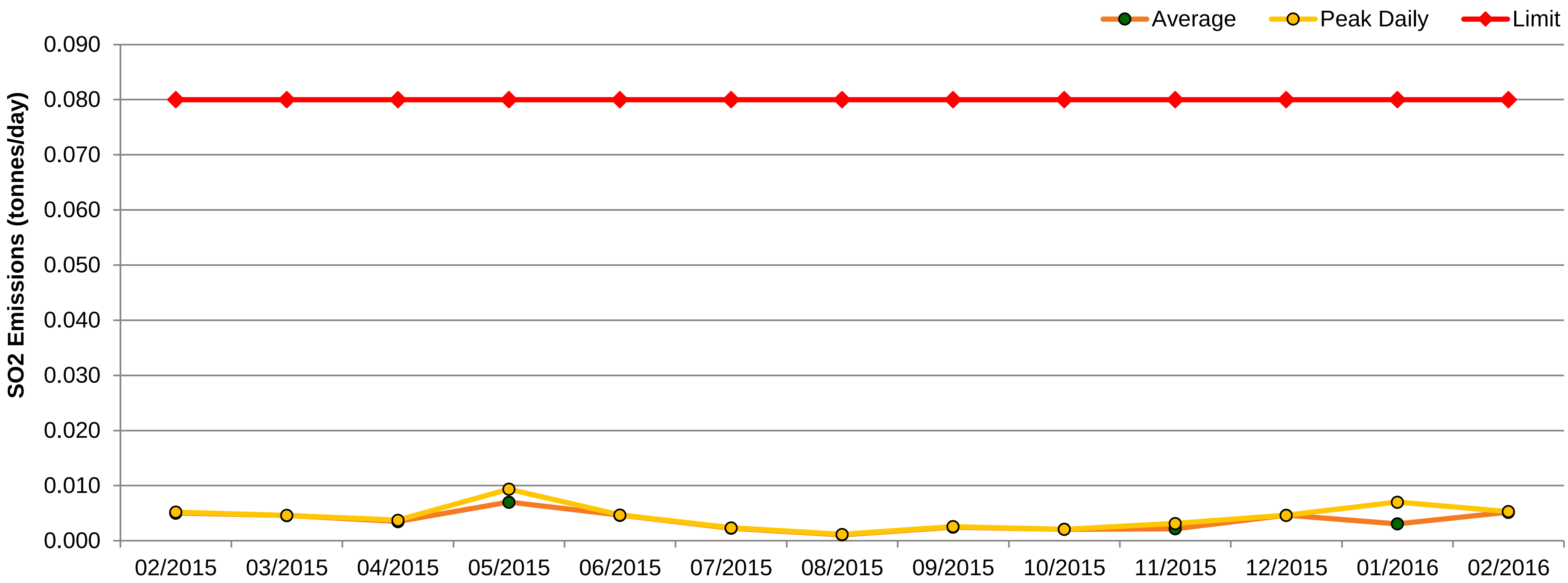
Daily SO_2 Emissions



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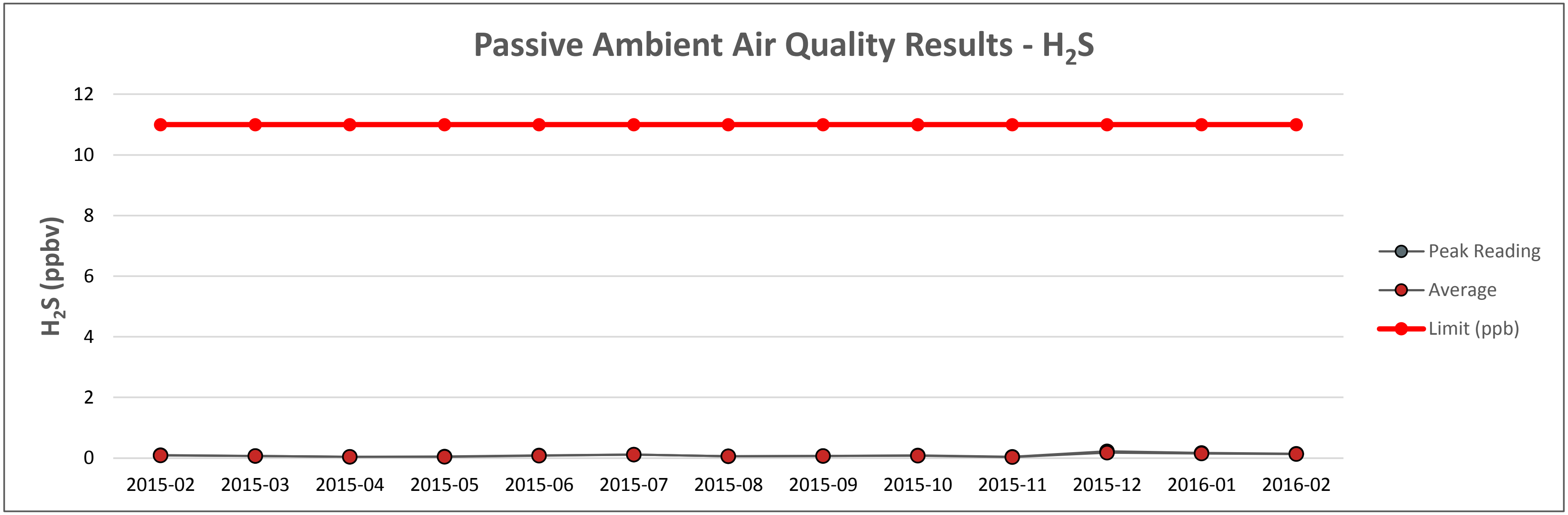
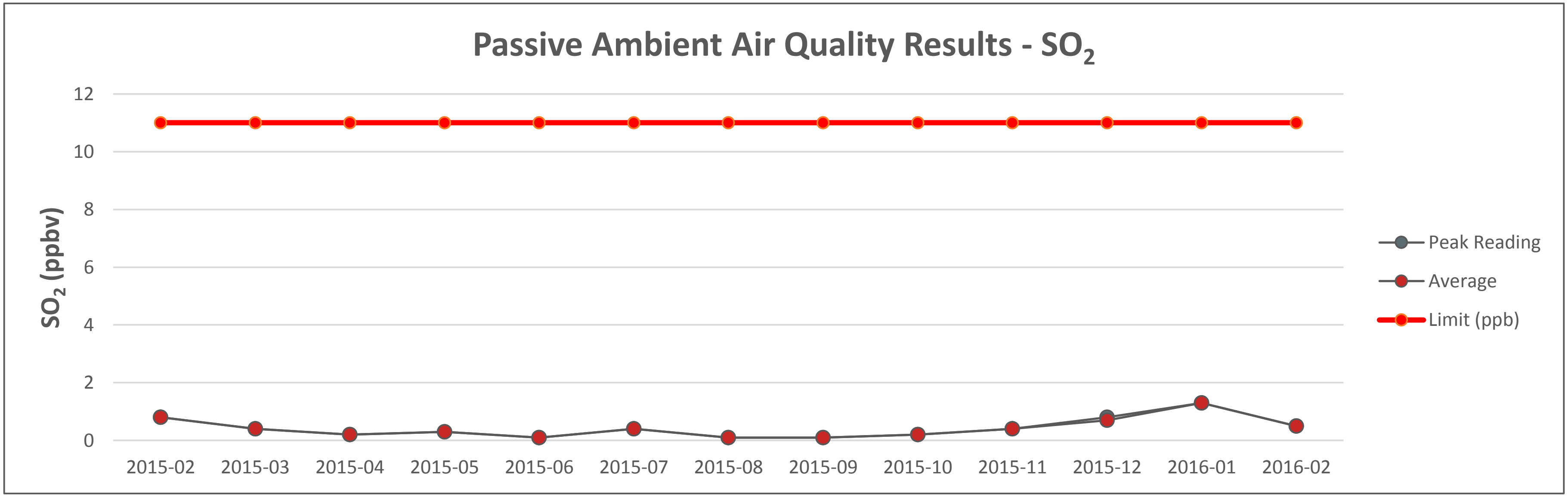
Ambient Air Quality Monitoring





Environmental Compliance

Subsection 3.1.2 (6)

Environmental Compliance

Groundwater Monitoring

- 2015 results within historical/background concentrations.

Soil Monitoring

- 2015 results within historical/background concentrations.

Reclamation Programs

- No reclamation in 2015.

Compliance Confirmation

Subsection 3.1.2 (7)

Compliance Confirmation

- ConocoPhillips Canada is in compliance in all areas of the regulations for all of 2015 with the exception of a flare event as detailed in Subsection 3.1.2 (8).

Non Compliance

Subsection 3.1.2 (8)

Non Compliance

Flaring Event

- One flaring event sustained over four hours within 24 hour period.
- Reported to Bonnyville field office and entered into DDS system.
- The event did not exceed the 30 10^3m^3 daily volume limit.

Future Plans

Subsection 3.1.2 (9)

Future Plans

- Thief zone pressure management.
- Reservoir blow down.
- Facility exit.
- Gas cap monitoring.