2018 Performance Presentation

Devon Canada Corporation
Jackfish SAGD Project

Commercial Scheme Approval No. 10097 (as amended)
October 2018

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Advisory

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Subsurface Operations

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Project Background

Section 3.1.1-1

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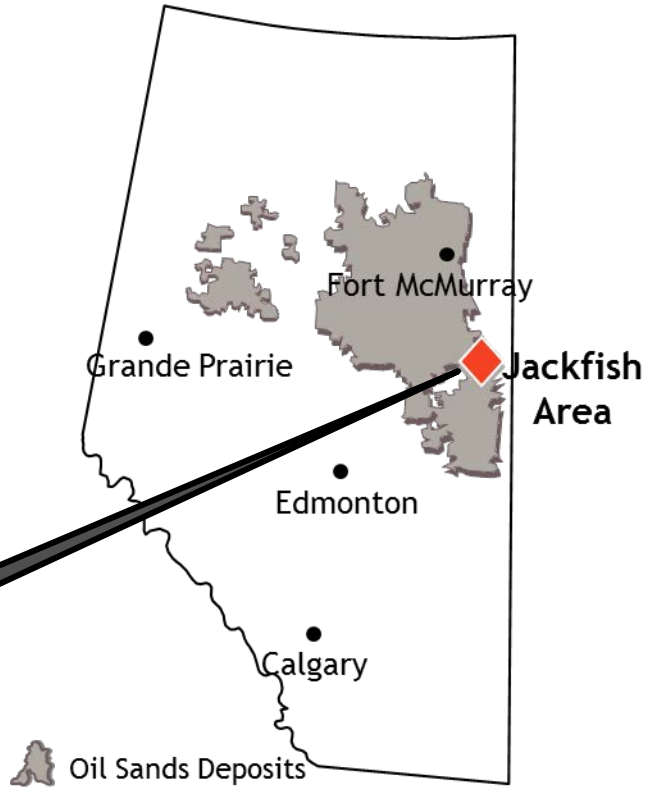
Brief Background of Scheme

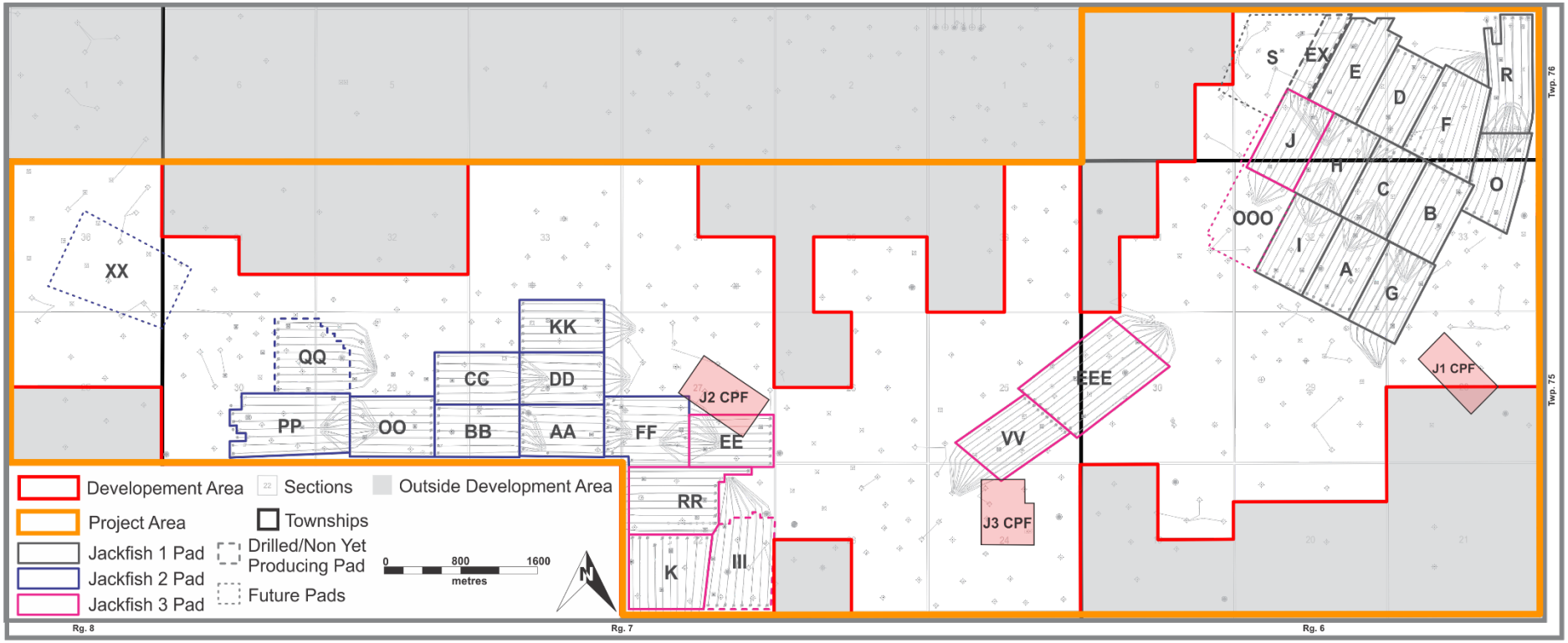
3.1.1-1

- Jackfish 1, 2, and 3 utilize steam-assisted gravity drainage (SAGD) to recover bitumen from the McMurray formation
- Located 150 km south of Fort McMurray
- Jackfish 1 scheme approval granted in August 2006; first steam was August 2007
- Jackfish 2 scheme approval granted in August 2008; first steam was May 2011
- Amalgamation of Jackfish approvals (including Jackfish 3) in November 2011; first steam was July 2014



Brief Background of Scheme

3.1.1-1



Brief Background of Scheme

3.1.1-1

Asset	Number of Operating Pads	Number of Operating Well Pairs	Upcoming Pads
Jackfish 1	11	78	EX
Jackfish 2	8	60	QQ
Jackfish 3	6	53	III
TOTAL	**25**	**191**	**-**

Geology

Section 3.1.1-2

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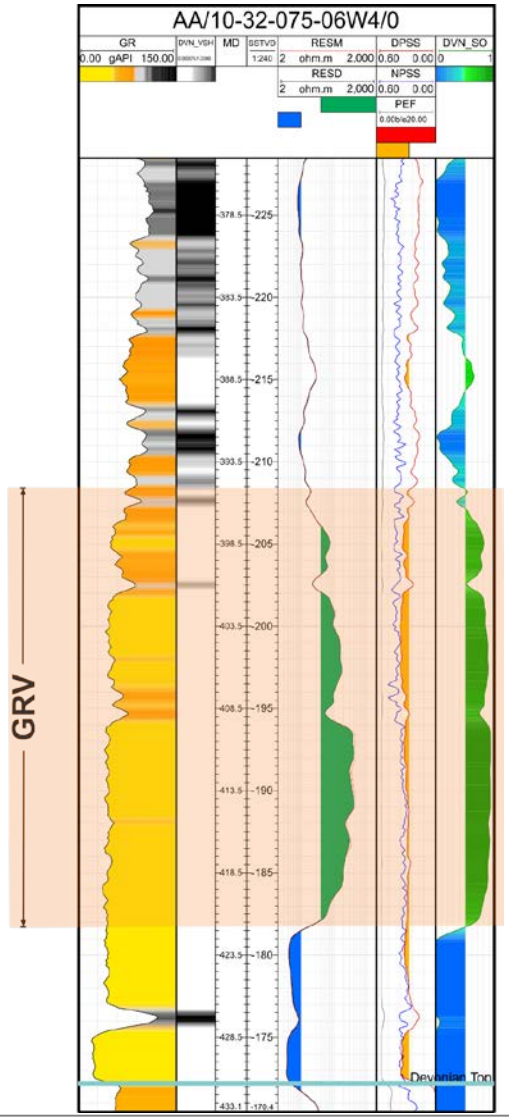
Geology

Jackfish Gross Rock Volume Pay Definition

3.1.1-2a

Gross Rock Volume (GRV)

- Characterizes the complete package accessible through SAGD
- Defined by:
  - S_o > 50%
  - V_{sh} < 40%
  - can contain up to 3m continuous non-reservoir
  - encompasses all brecciated intervals
- V_{sh} and S_o are standard petrophysical curves calculated from gamma ray, resistivity, and porosity logs, and correlated to image logs and core data



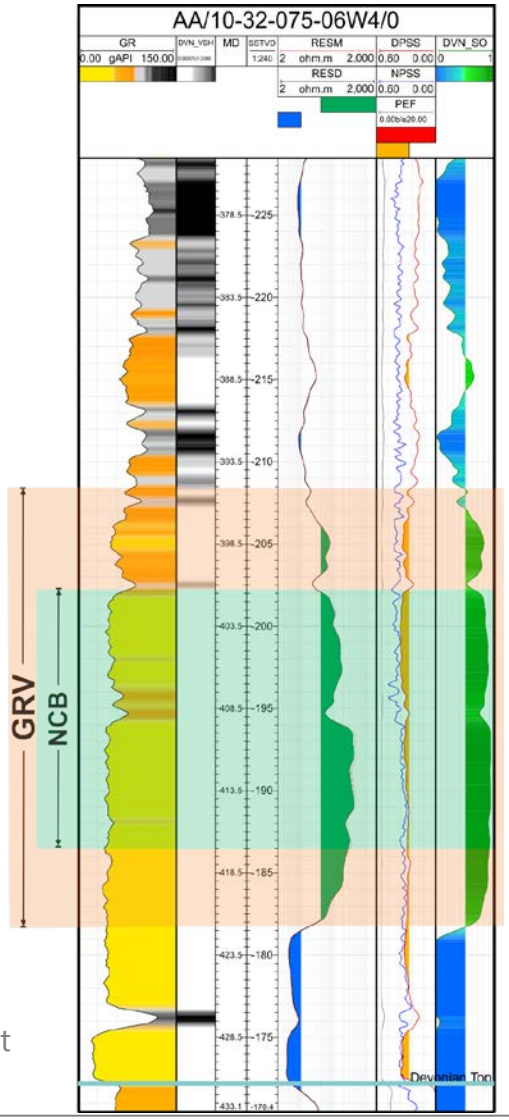
Geology

Jackfish Net Continuous Bitumen Pay Definition

3.1.1-2a

Net Continuous Bitumen (NCB)*

- More conservative definition used to define continuous bitumen pay, used for pad and well pair planning
- Defined by:
  - V_{sh} < 40%
  - can contain up to 1m continuous non-reservoir
  - excludes breccias that do not meet V_{sh} cutoff
  - base defined by producer (actual or estimated) elevation
- V_{sh} and S_o are standard petrophysical curves calculated from gamma ray, resistivity, and porosity logs, and correlated to image logs and core data



*Prior submissions defined net pay based on a net-to-gross ratio calculation, not a net continuous bitumen pay zone

Geology

Jackfish Volumetrics and Average Reservoir Properties

3.1.1-2b

	Area (Ha)	OBIP (10^6m^3)	Avg. GRV thickness(m)*	Avg. Oil Saturation (So)*	Avg. Porosity (%)*
Project Area	**7,668**	**367.3**	**22.1**	**67.2**	**32.9**
Development Area	**5,445**	**325.0**	**27.0**	**67.4**	**32.9**

*Prior submissions calculated OBIP and average parameters only within the net pay portion, not for the complete GRV interval

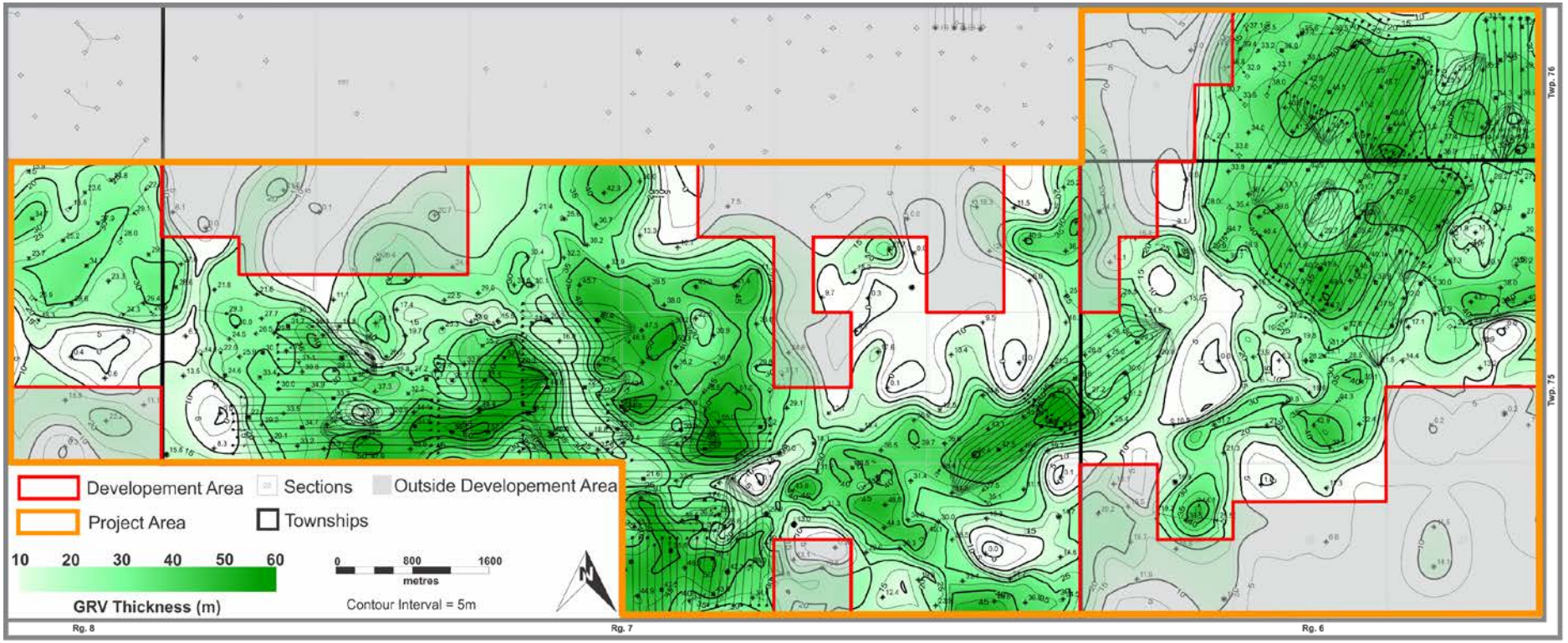
Property	Jackfish 1	Jackfish 2	Jackfish 3
OBIP *(10^6m^3)***	75.3	81.3	67.5
Avg. Reservoir Depth *(mTVD)* Avg. Reservoir Depth *(mASL)*	400 202	459 202	428 202
Avg. Original Reservoir Pressure *(kPa)*	2,700 @ scheme startup	2,700 @ scheme startup	2,700 @ scheme startup
Avg. Reservoir Temp. *(°C)*	12	12	12
Avg. Kh *(md)*	5,000	3,000	4,000
Avg. Kv *(md)*	2,000	1,200	1,500
Avg. Phi *(%)*	33	33	33
Avg. Bitumen Viscosity *(Cp)*	1,000,000+	1,000,000+	1,000,000+
Original Bottom Water Pressure *(kPa)*	2,300	2,300	2,300

**Total for all producing, drilled, and planned pads

Geology

Jackfish Gross Rock Volume Pay Thickness

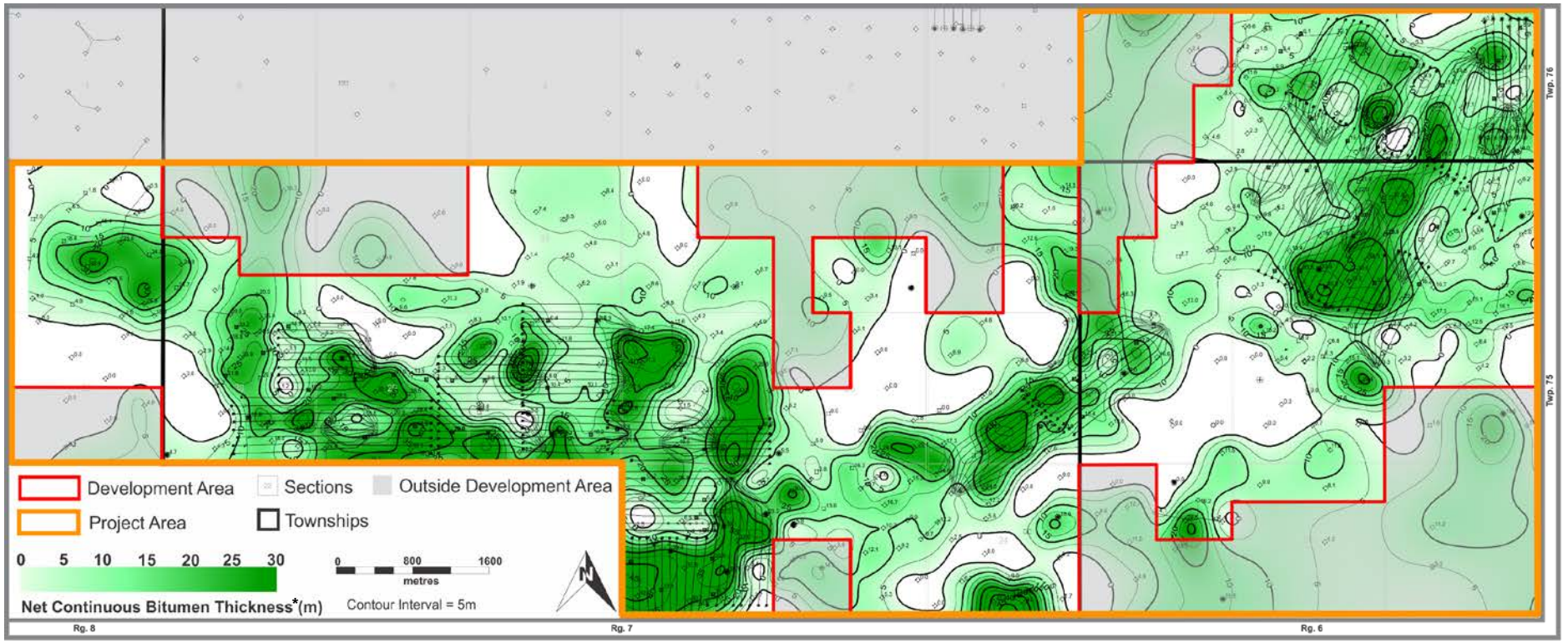
3.1.1-2c



Geology

Jackfish Net Continuous Bitumen Pay Isopach

3.1.1-2c

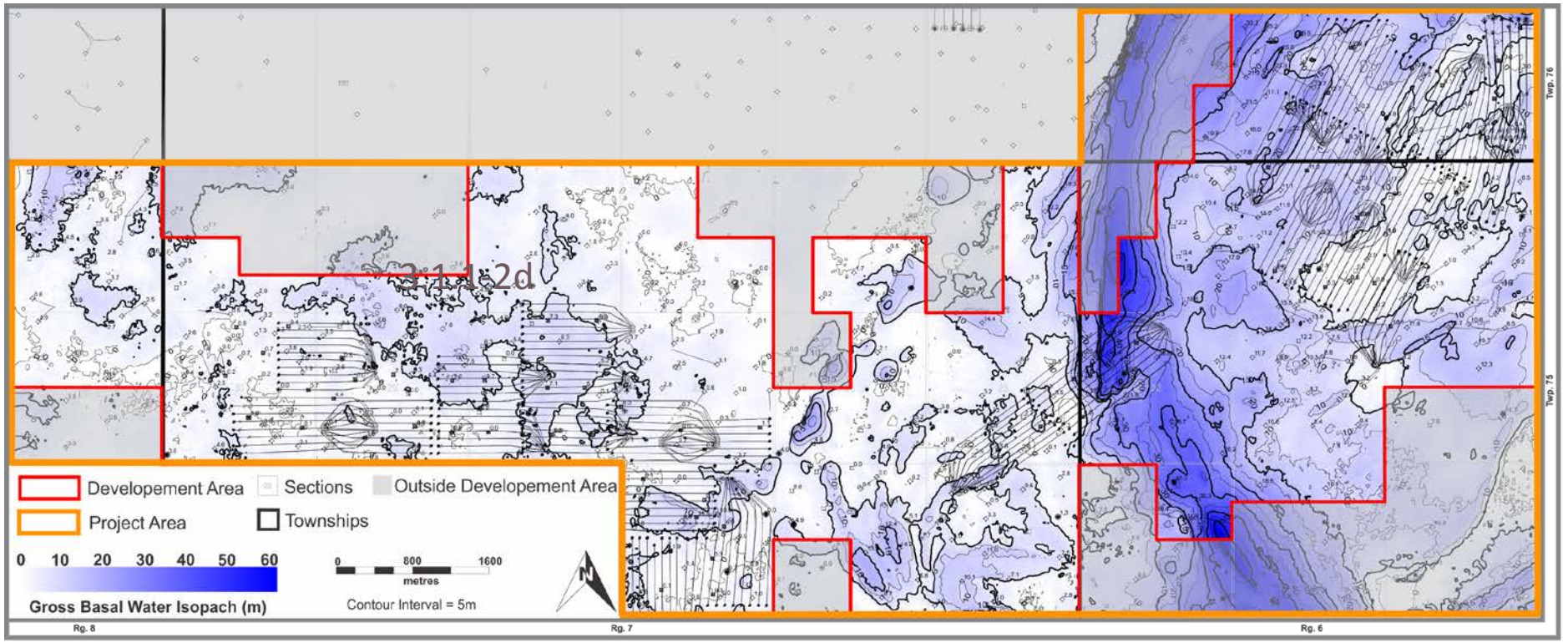


*Prior submissions defined net pay based on a net-to-gross ratio calculation, not a net continuous bitumen pay zone

Geology

Jackfish McMurray Water Contact to Paleozoic Isopach

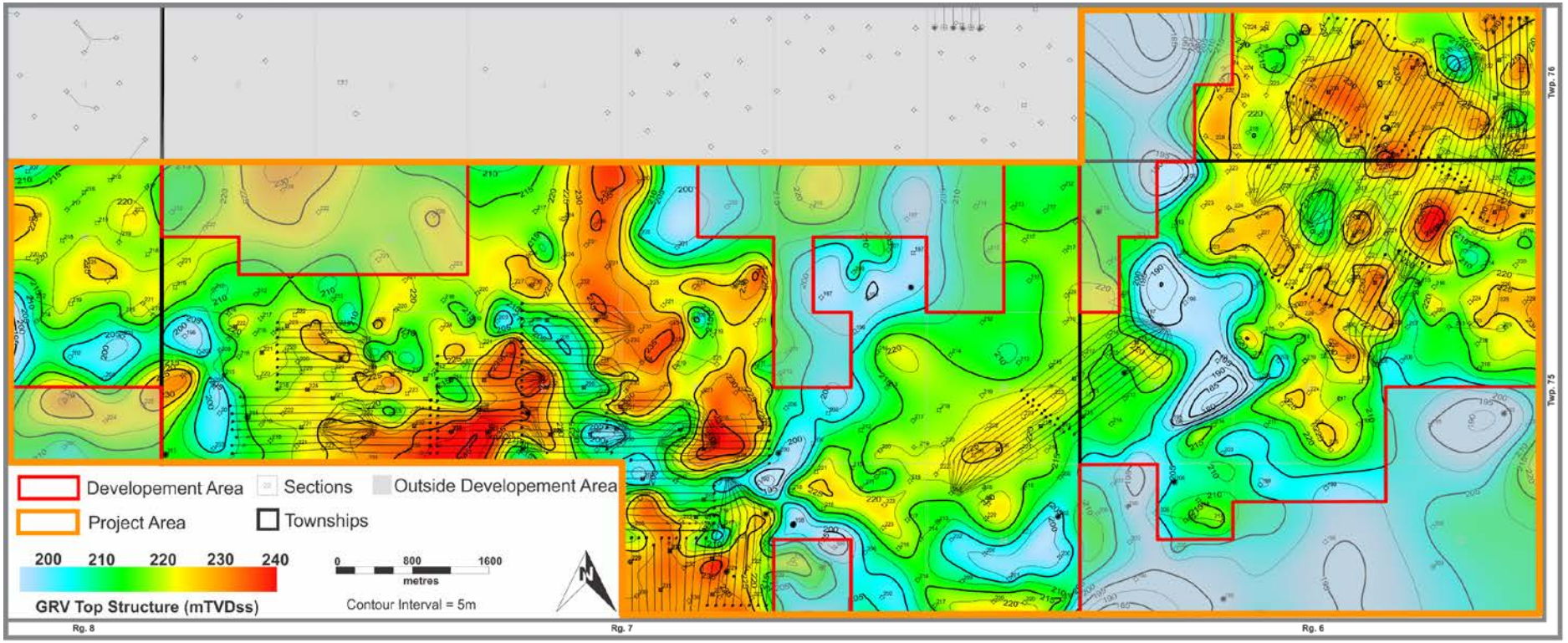
3.1.1-2c



Geology

Jackfish Top Structure of Gross Rock Volume

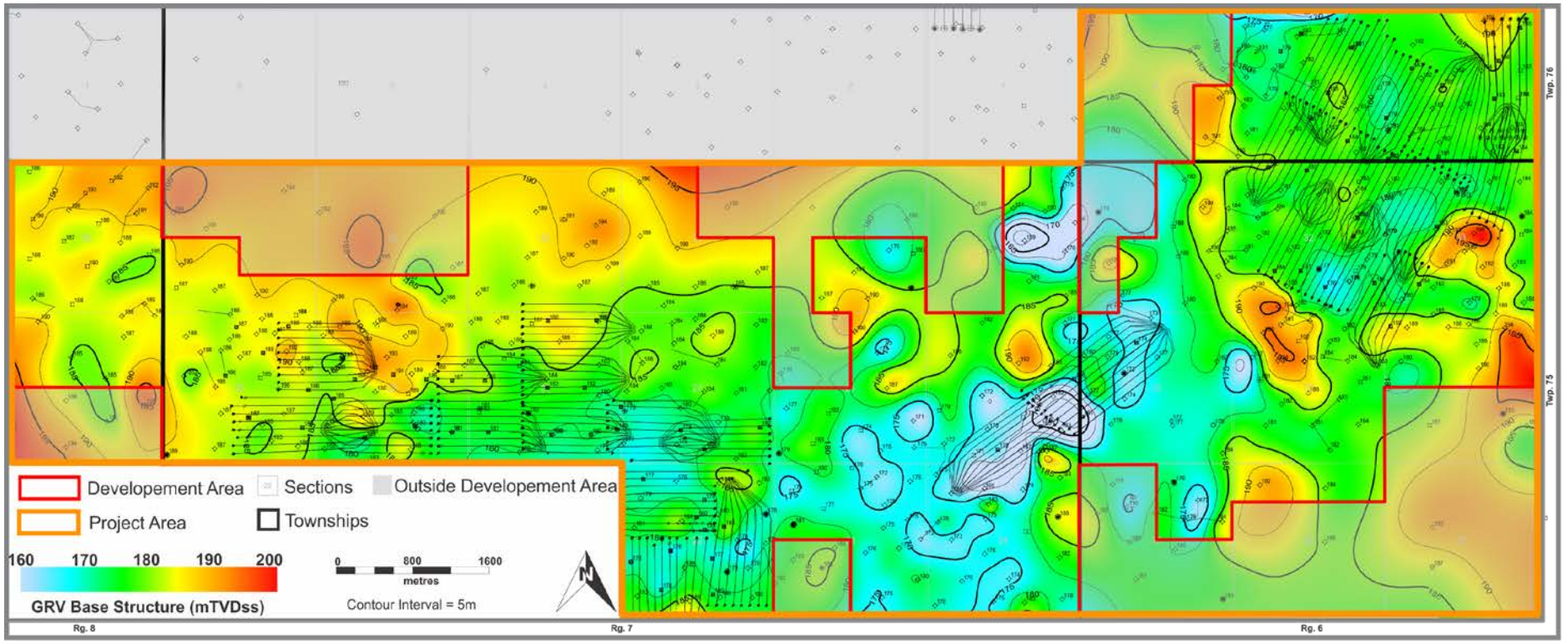
3.1.1-2d



Geology

Jackfish Base Structure of Gross Rock Volume

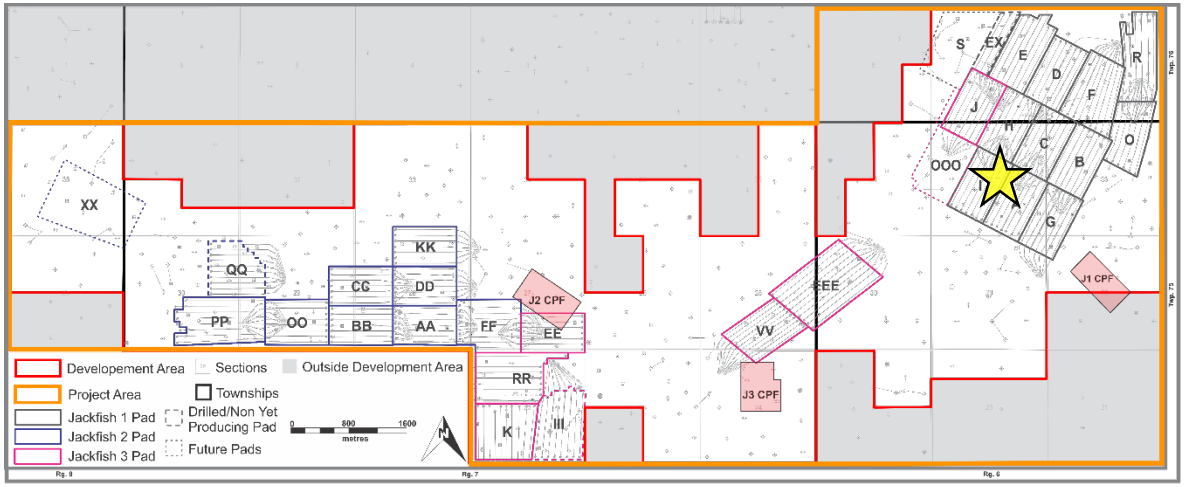
3.1.1-2d

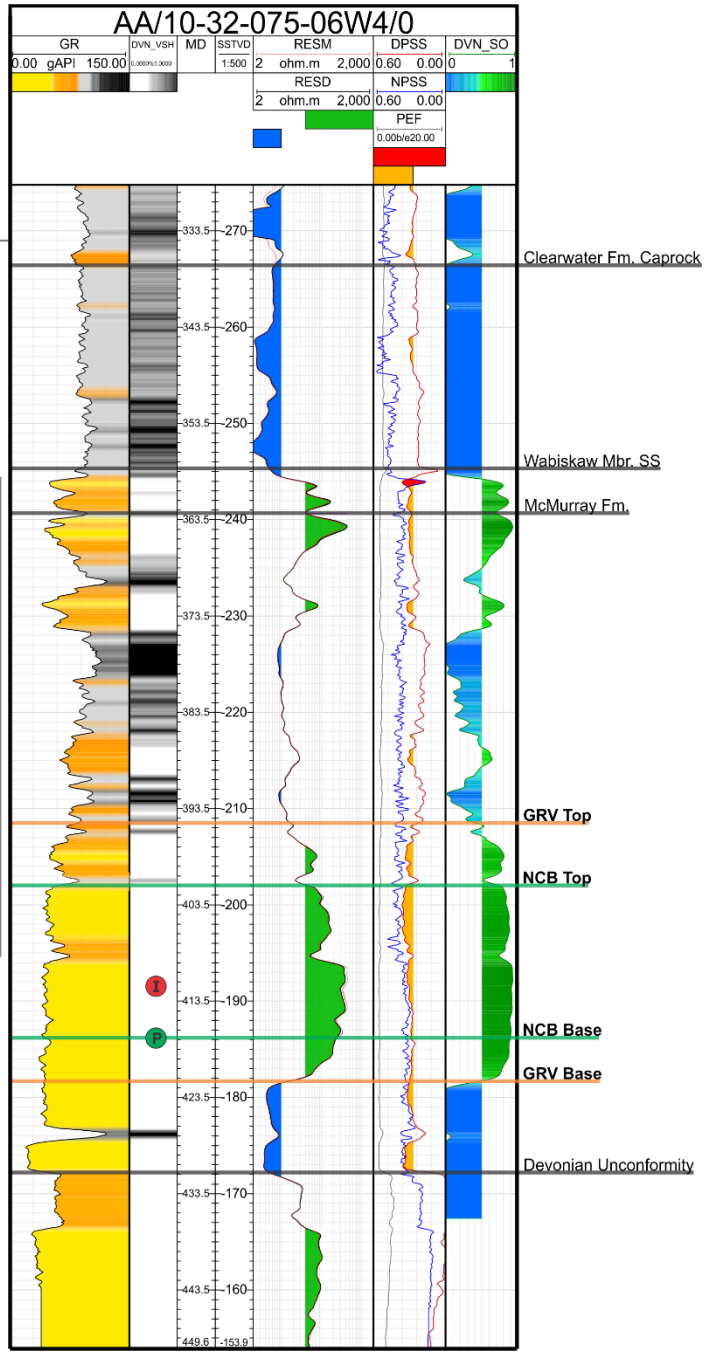


Geology

Jackfish 1 Representative Well Log

3.1.1-2e

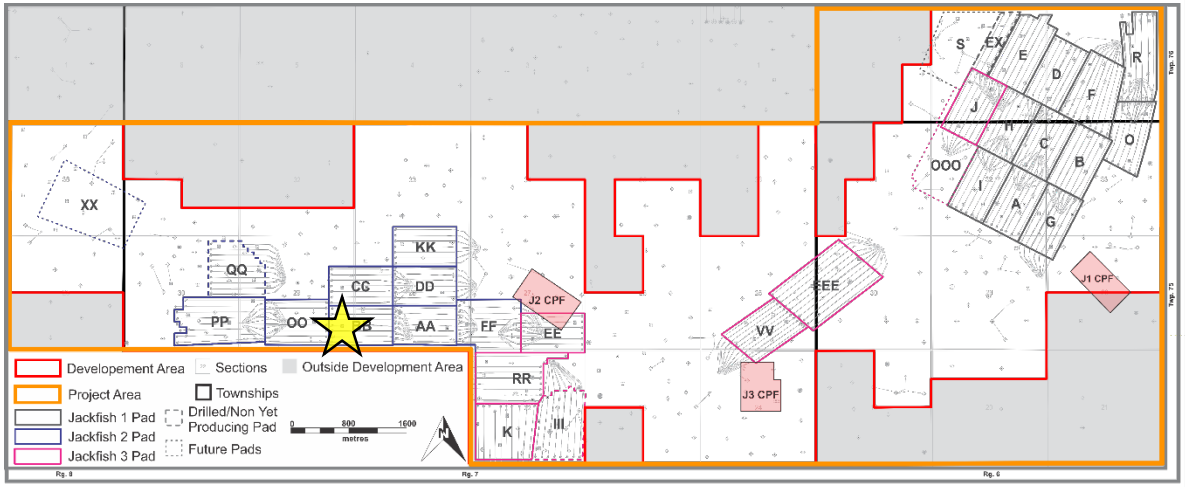


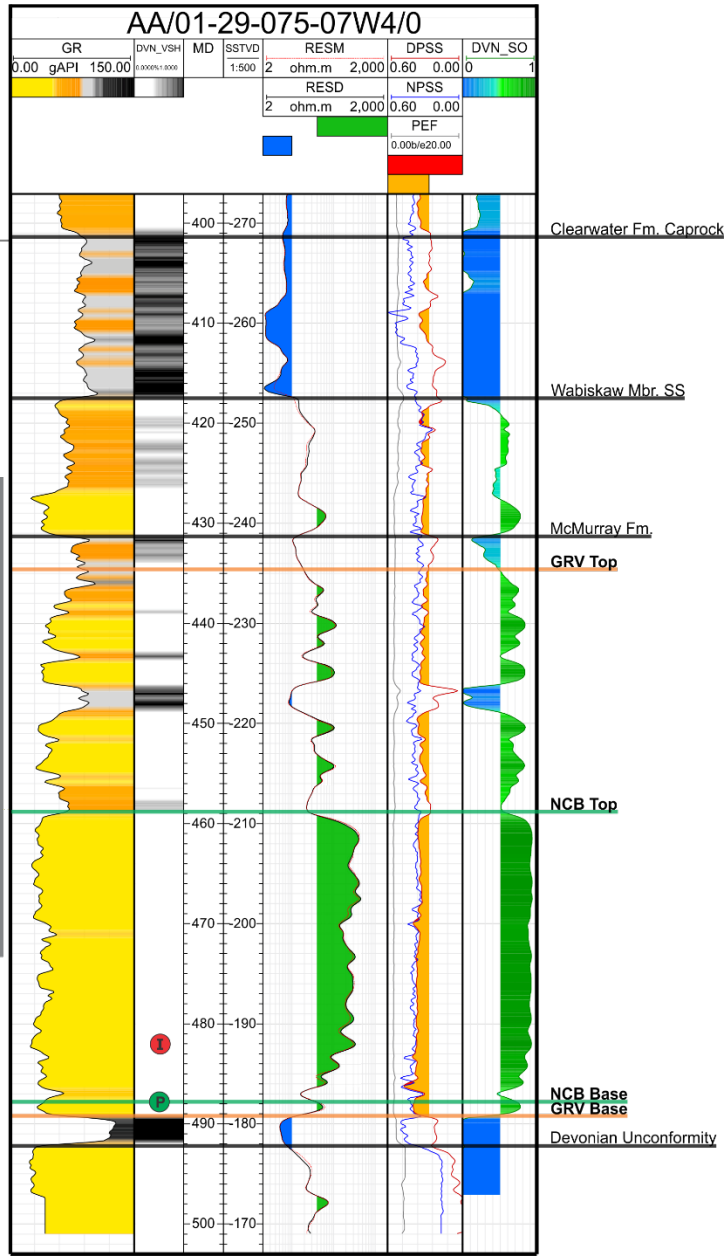


Geology

Jackfish 2 Representative Well Log

3.1.1-2e

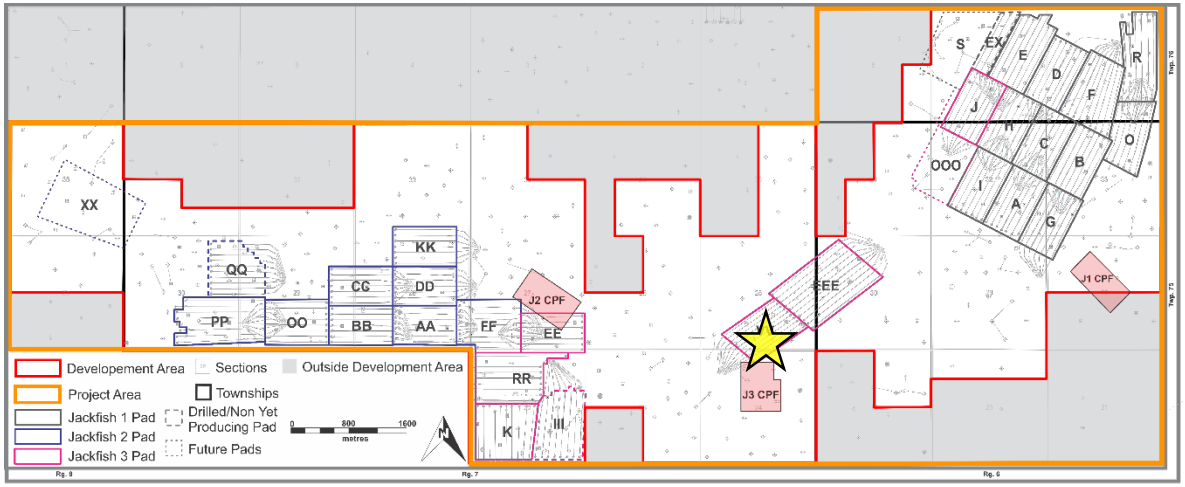


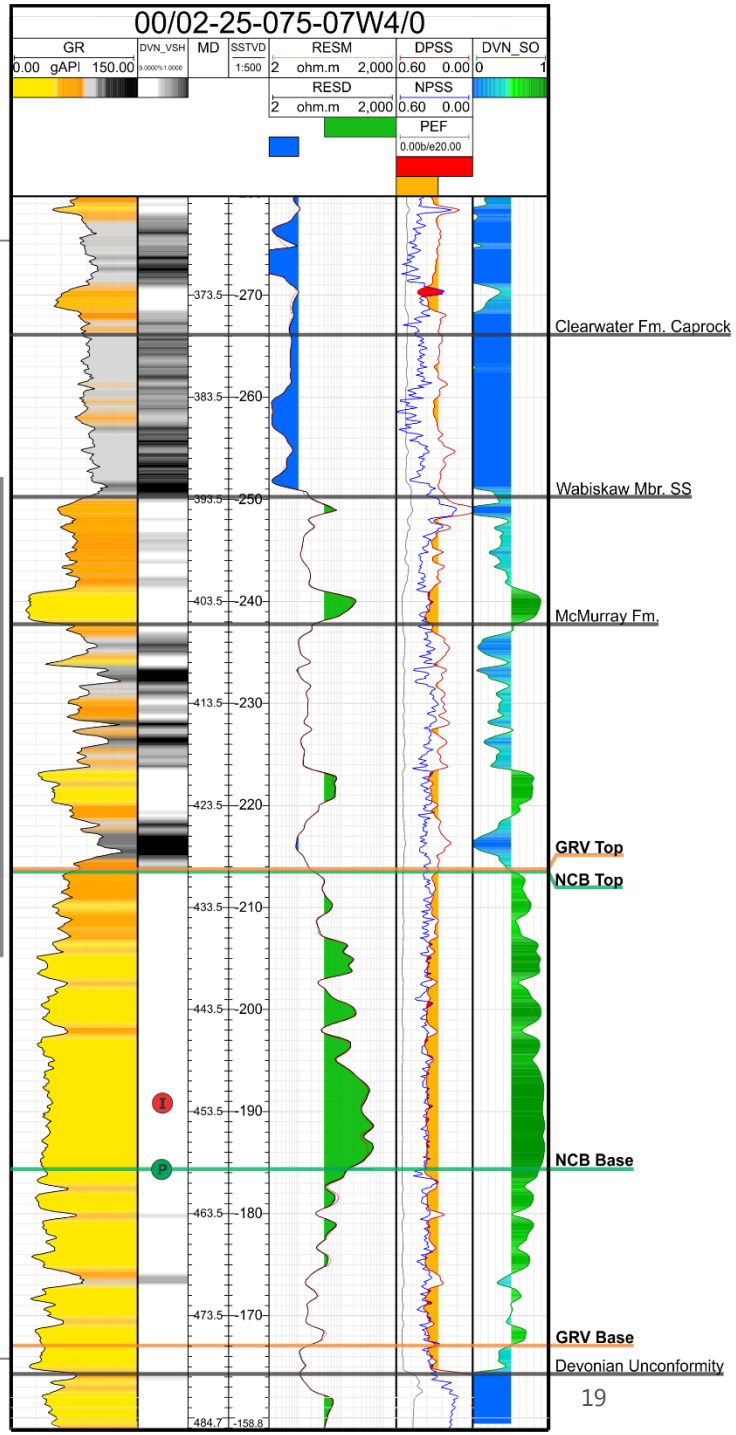


Geology

Jackfish 3 Representative Well Log

3.1.1-2e

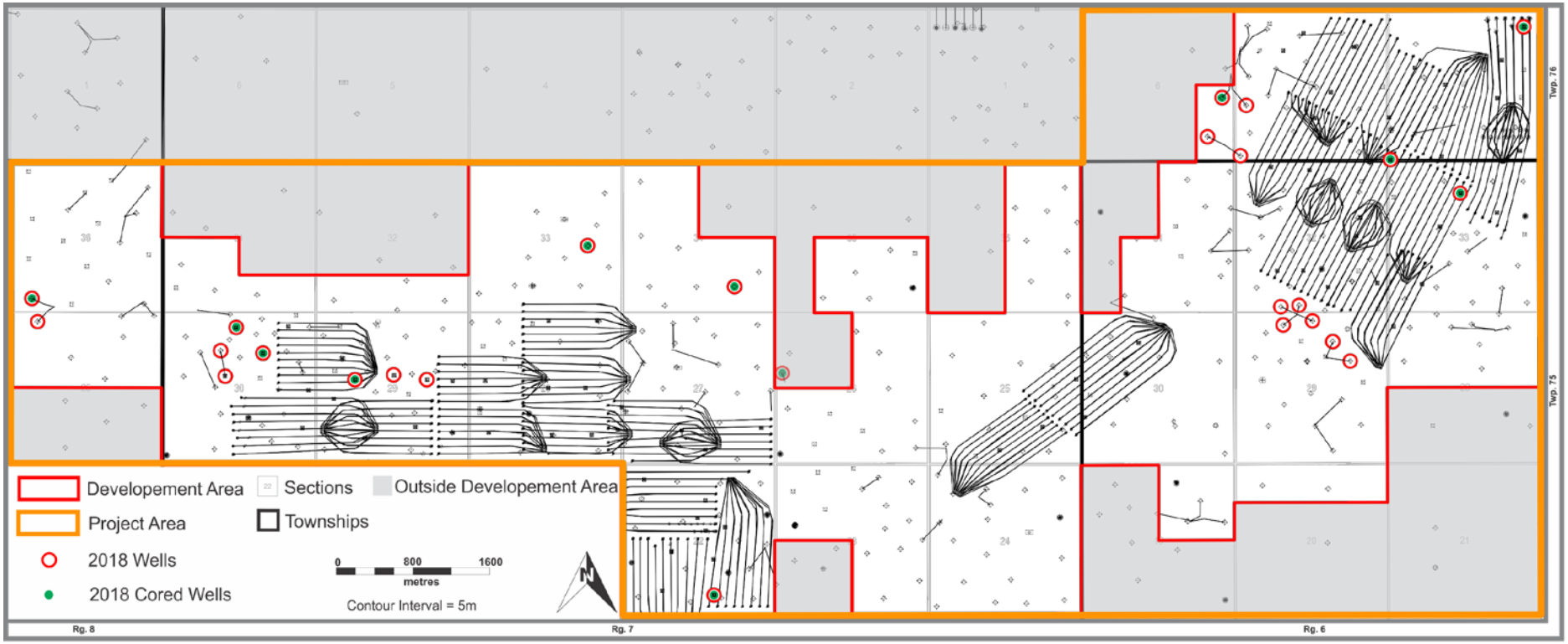




Geology

Jackfish 2018 Drilling Program and Cored Wells

3.1.1-2f



Project Area

2017-2018 Wells: 26 Total Well Count: 459
2017-2018 Core: 12 Total Core: 208

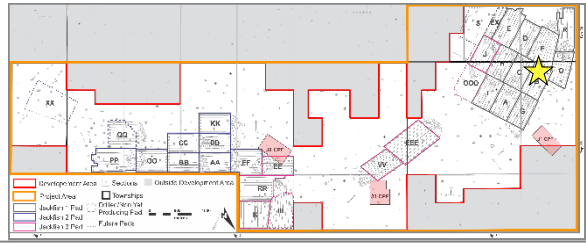
Special Core Analysis

No special core analysis conducted on core from the 2018 drilling program.

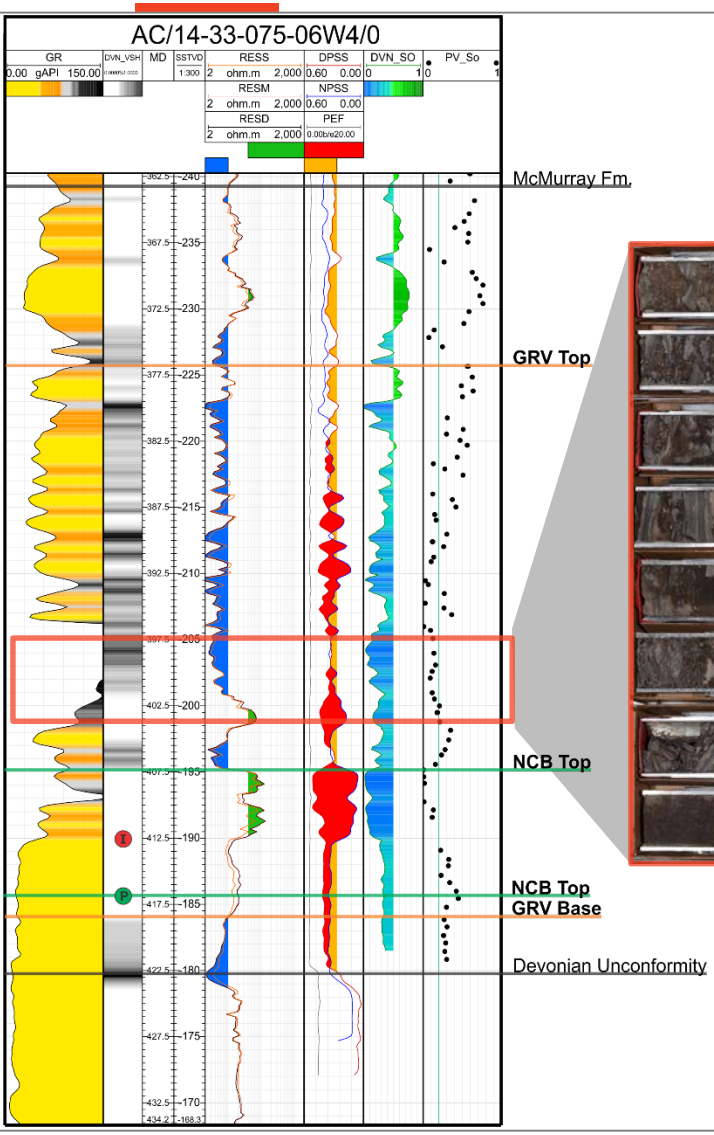
Geology

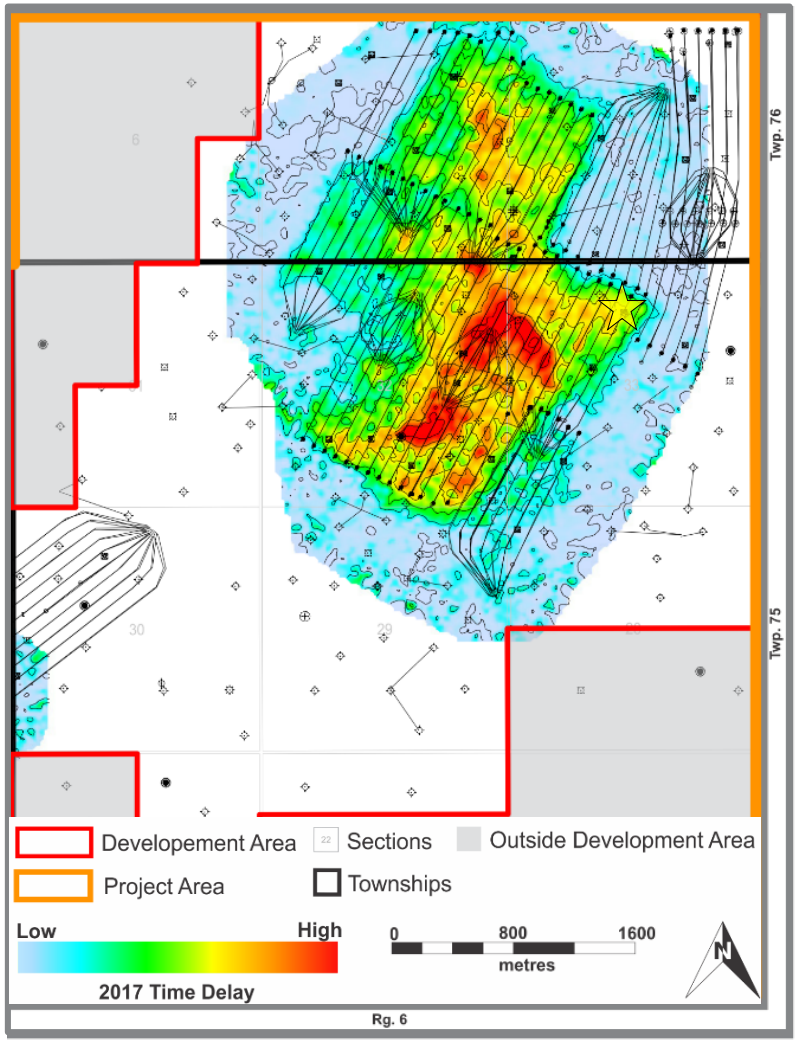
Jackfish 1 Pad B Steam Evaluation Core

3.1.1-2f



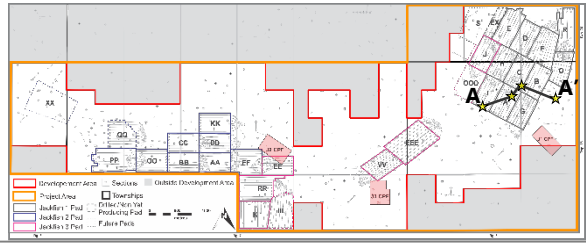
No new implications on ultimate recovery at this point in time



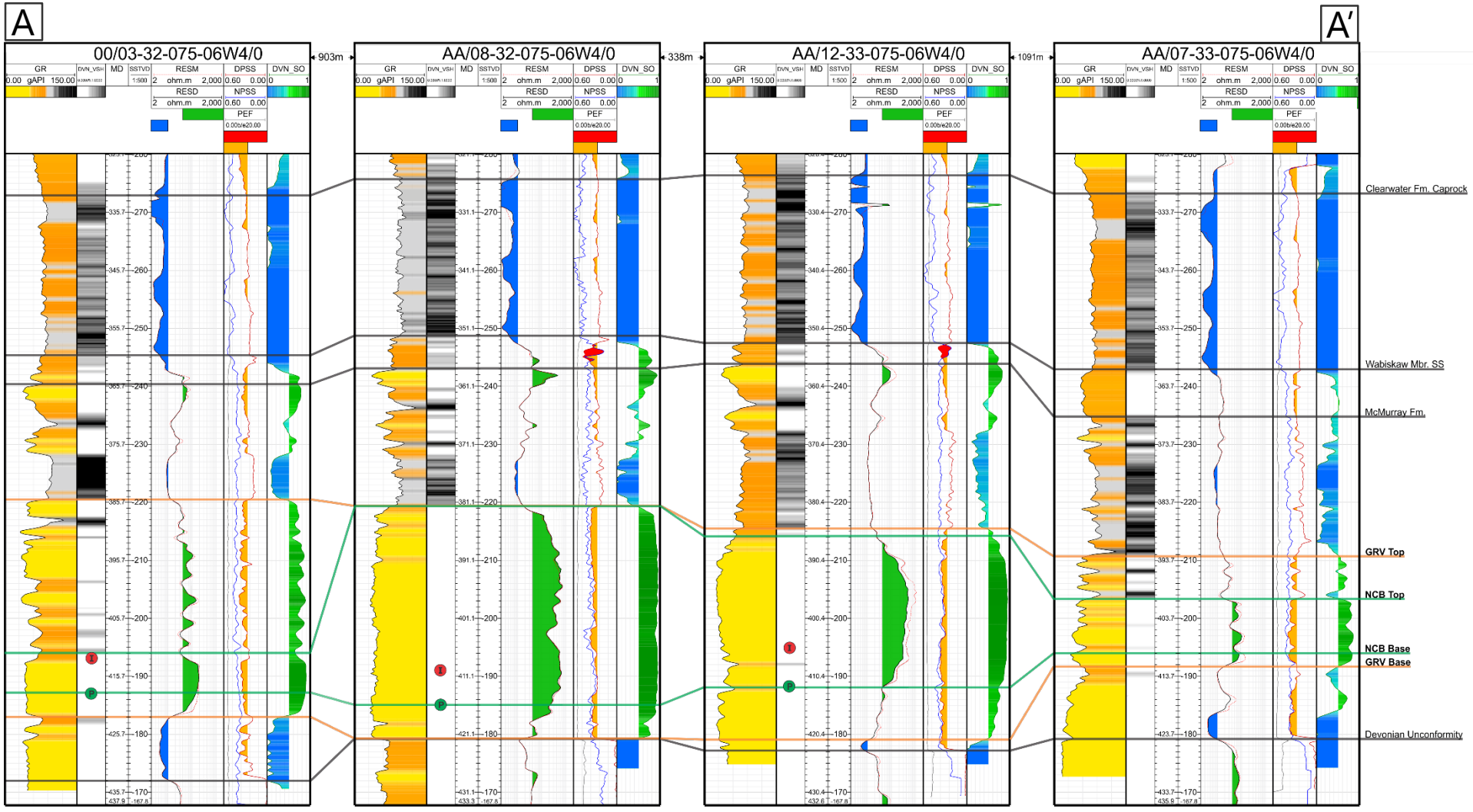


Geology

Jackfish 1 Representative Structural Cross-section

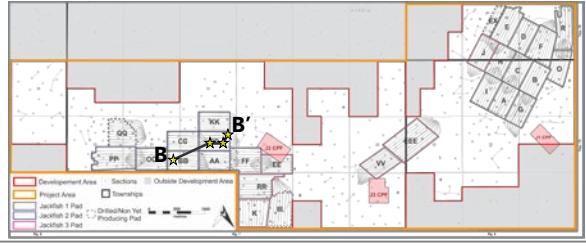


3.1.1-2i

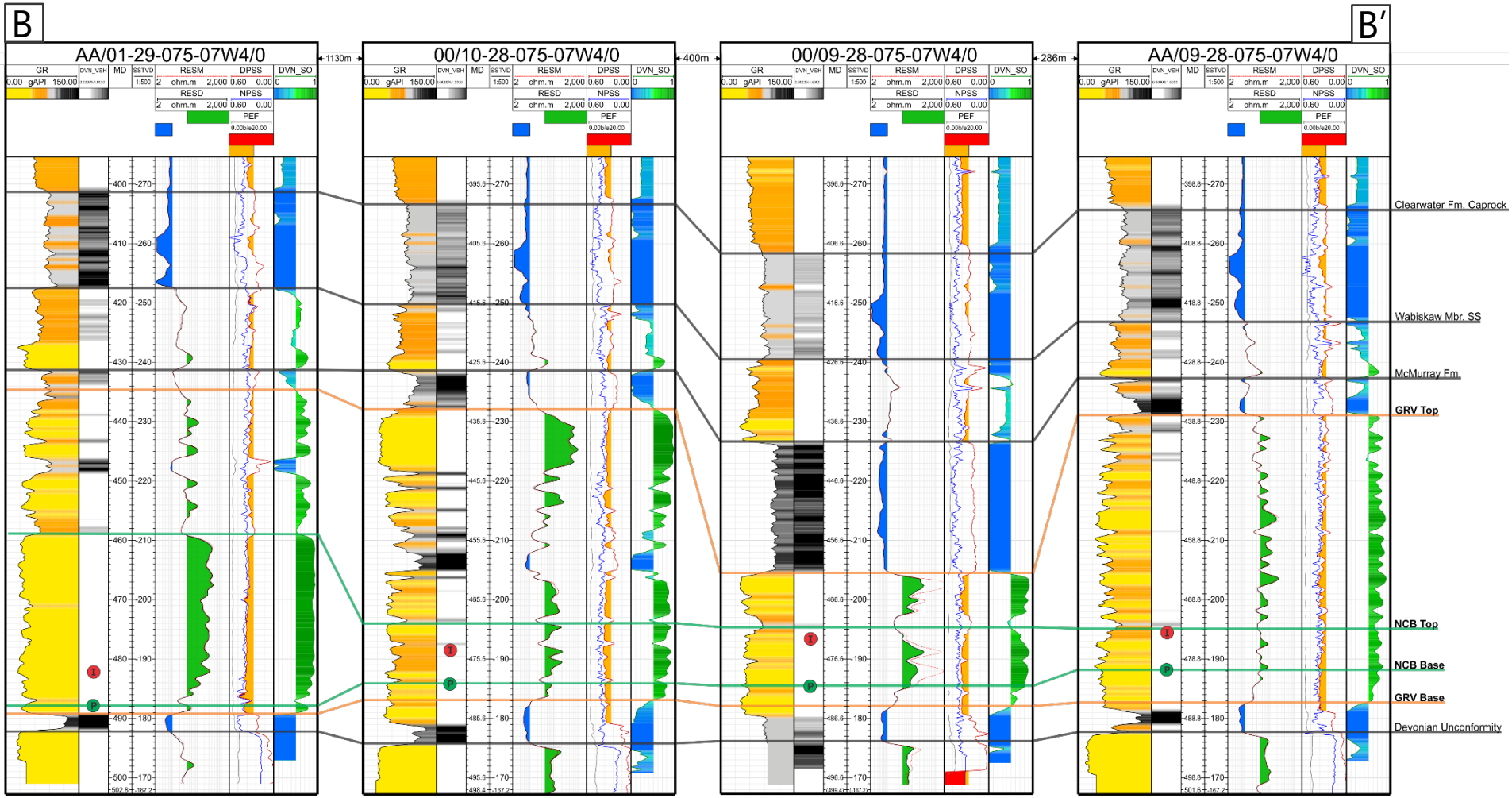


Geology

Jackfish 2 Representative Structural Cross-section

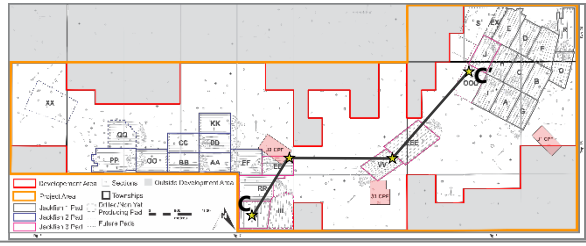


3.1.1-2i

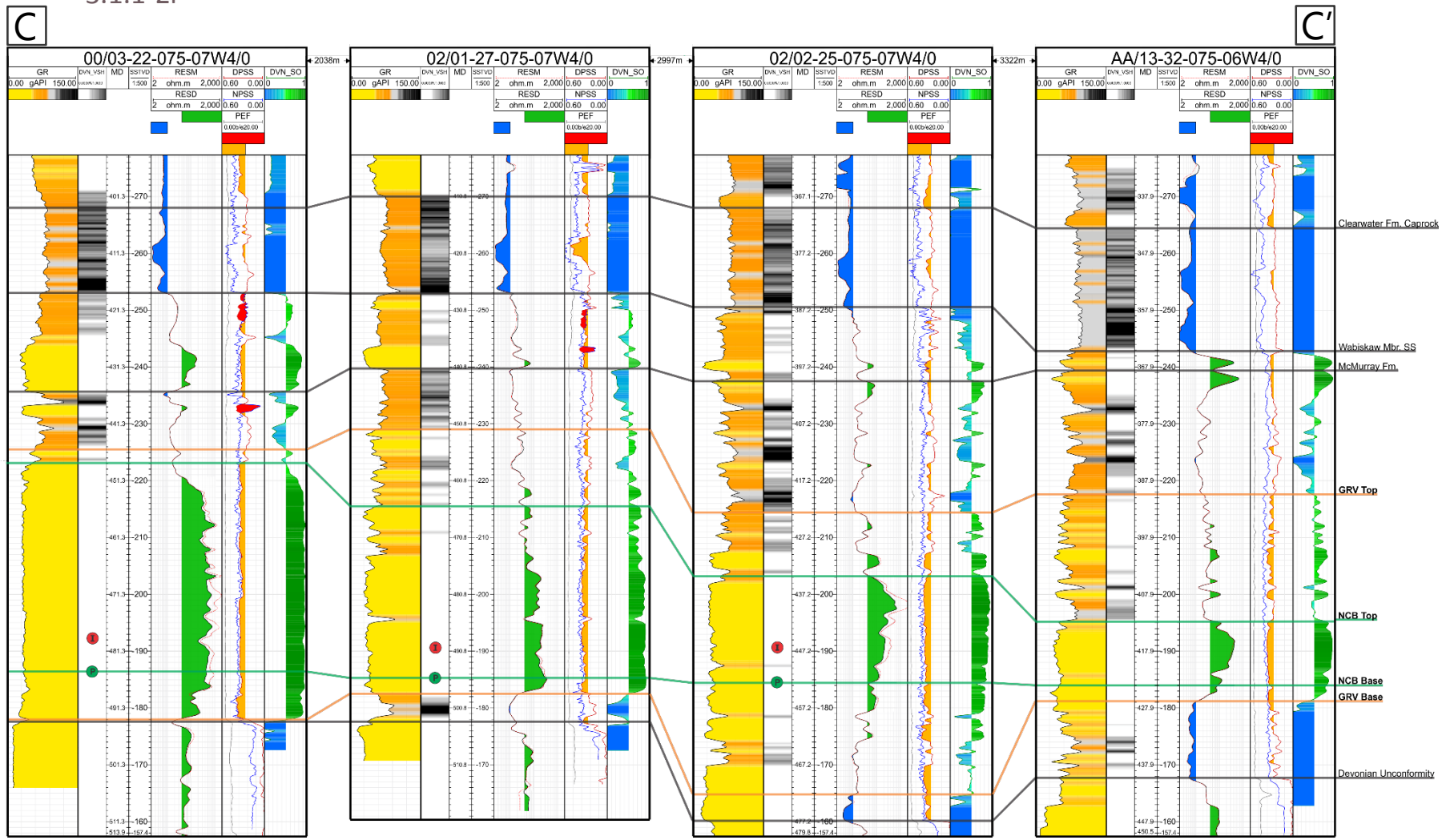


Geology

Jackfish 3 Representative Structural Cross-section



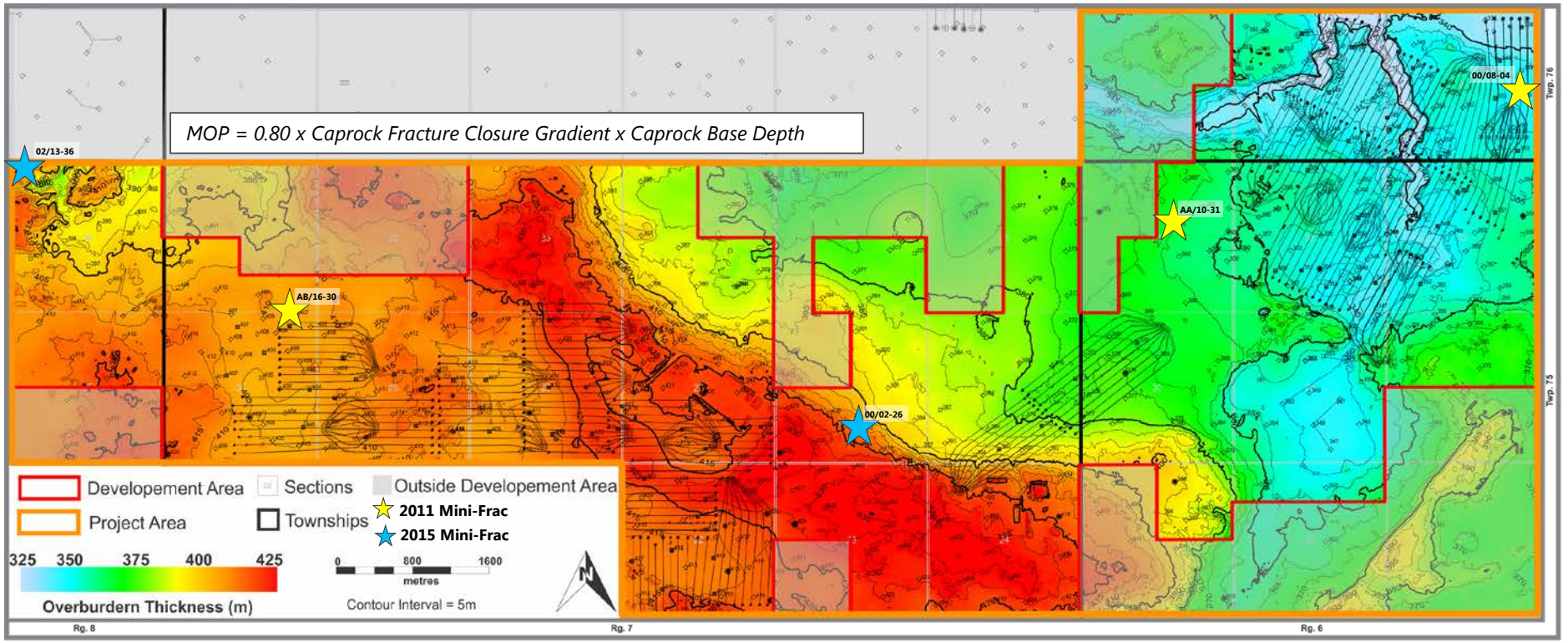
3.1.1-2i



Geology

Caprock Overburden Map and 2015 Mini Frac's

3.1.1-2m



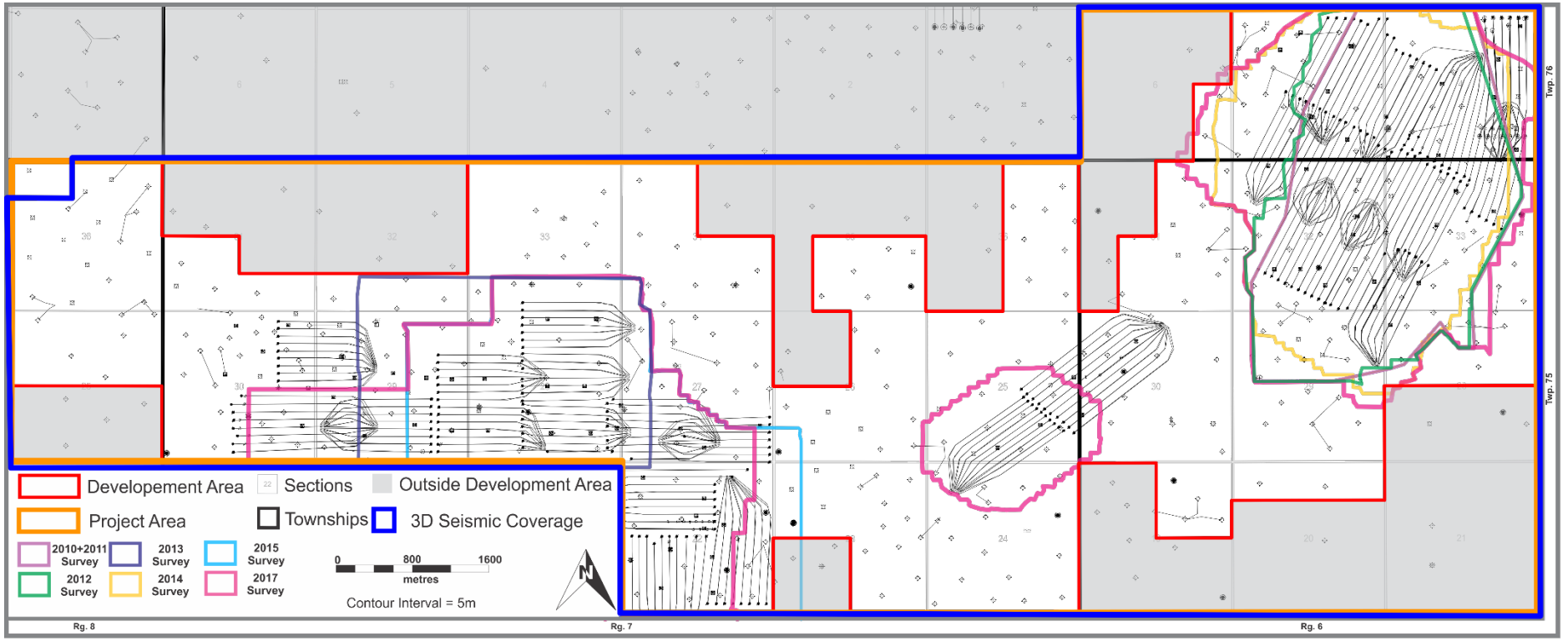
Interpretation complete on 2015 mini frac program:

- Lowest Wabiskaw shale fracture closure gradient of 14.1kPa/m at AA/10-31
- Fracture closure gradient of 18.6kPa/m from the 2011 mini frac program was utilized for the earlier MOP approval
- Category 2 Amendment to adjust the Jackfish MOP submitted in Q3 2016 and subsequently approved

Seismic

Historical Surveys

3.1.1-6a

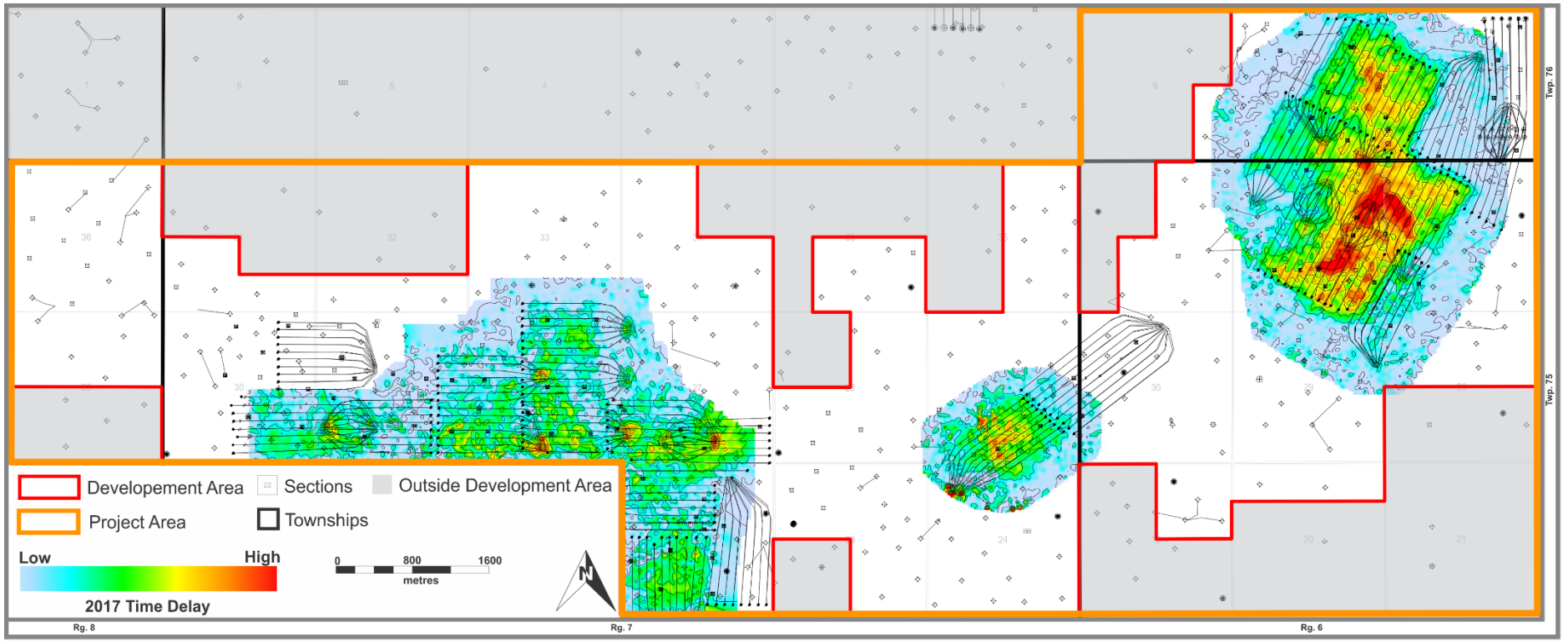


- No seismic was acquired in 2018
- Historically, seismic acquisition is extensive, totaling 21.7 km^2

Seismic

2017 4D Results

3.1.1-6a

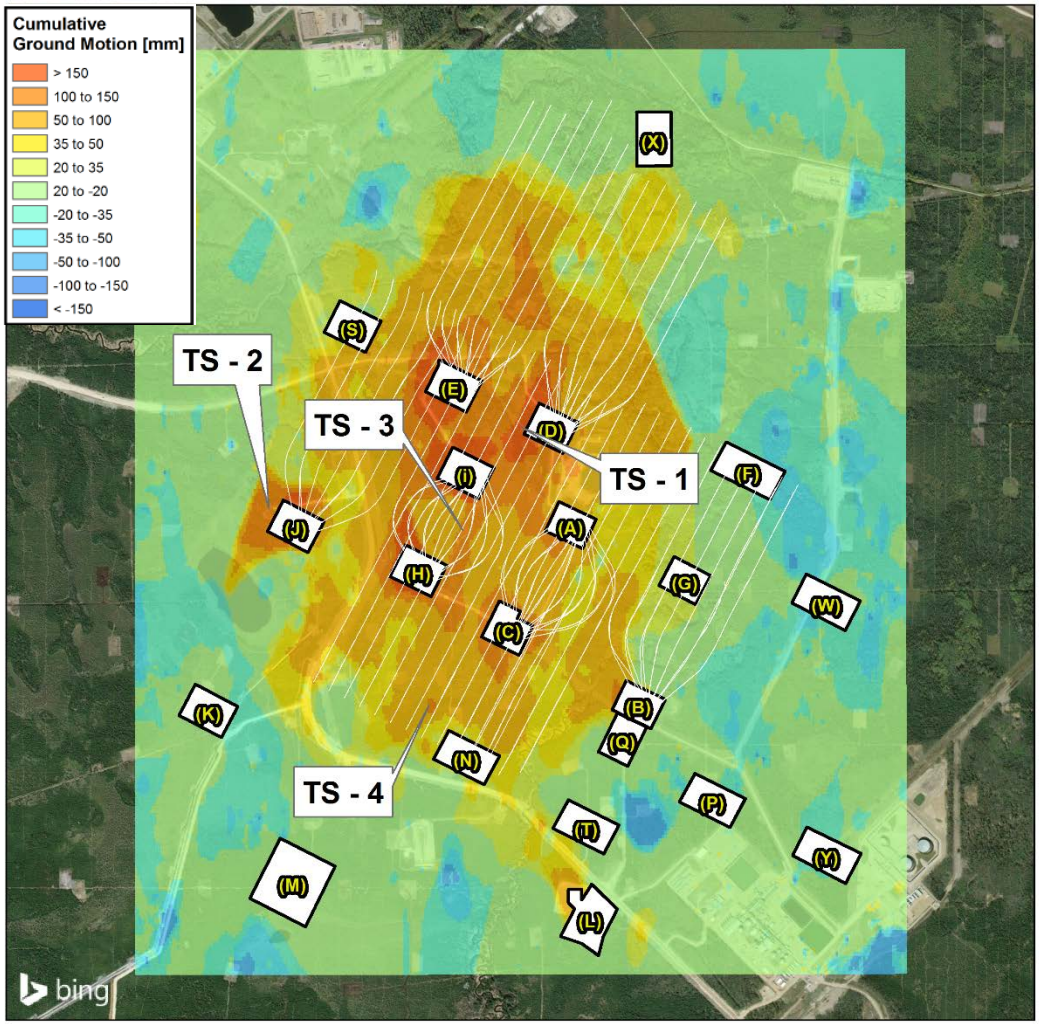


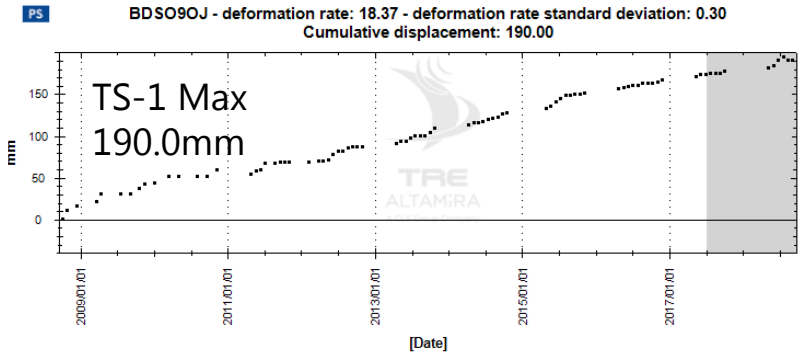
- Time delay is in direct relation to steam chamber development
- Colour gradient represents Paleozoic reflector time change from 2003 (baseline) to 2017

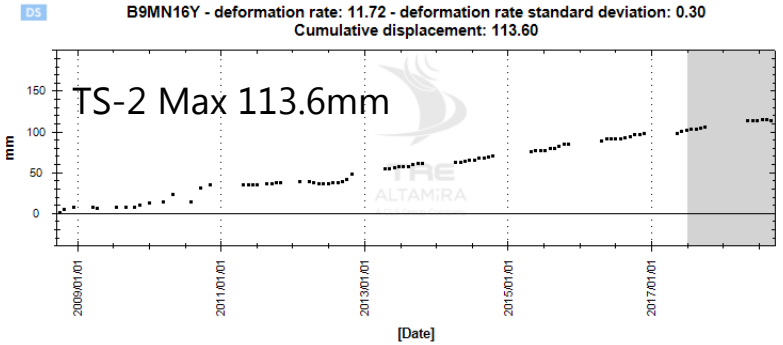
Jackfish 1

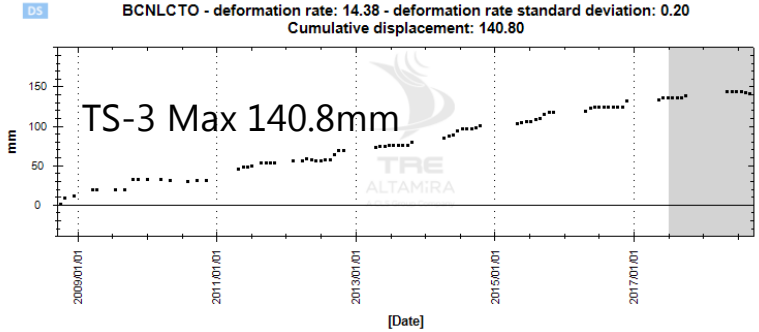
Accumulated Displacement 2008-2018

3.1.1-2k





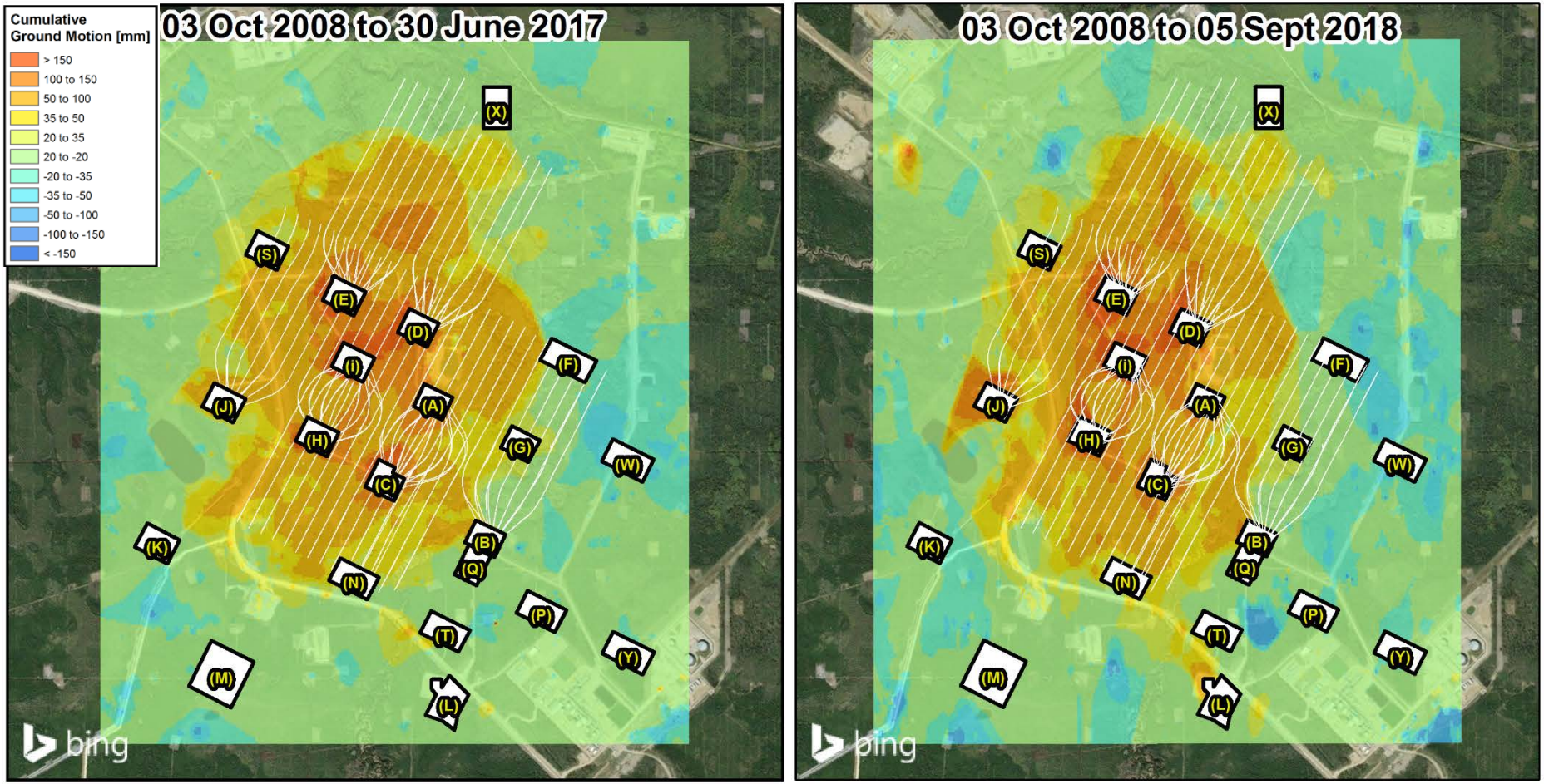




Jackfish 1

Comparing Accumulated Displacement 2017 to 2018

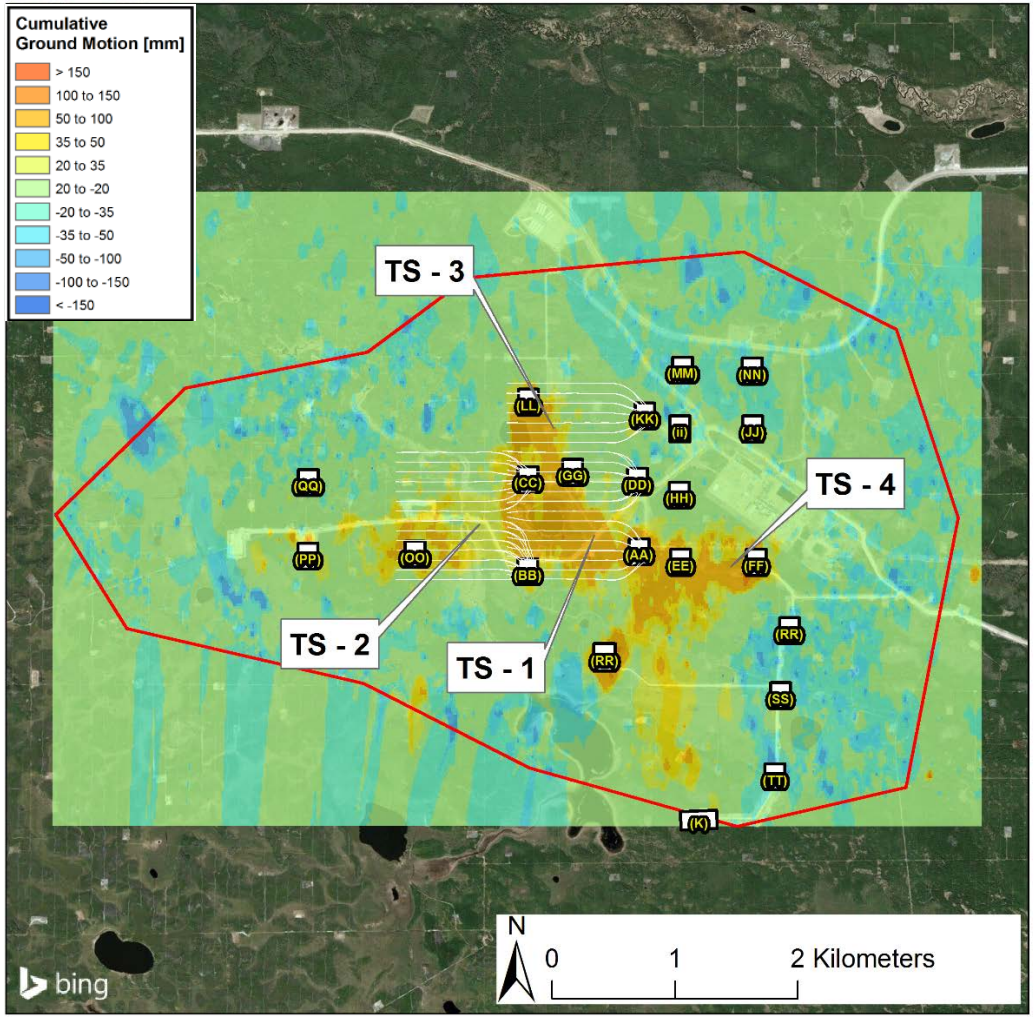
3.1.1-2k

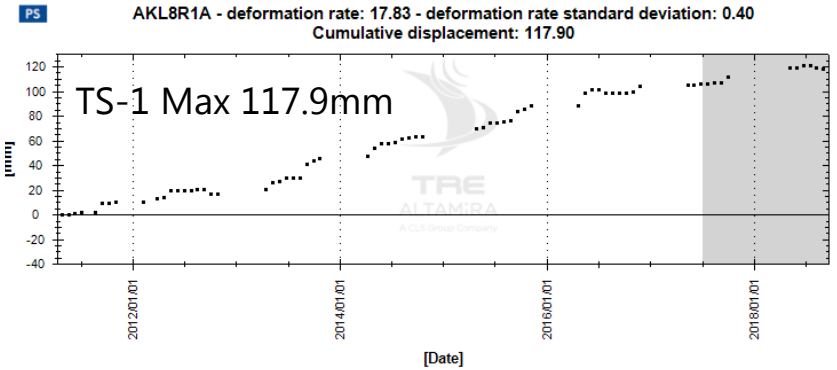


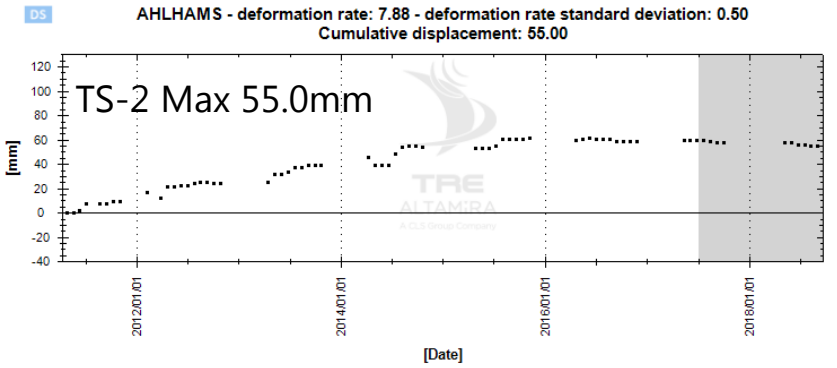
Jackfish 2

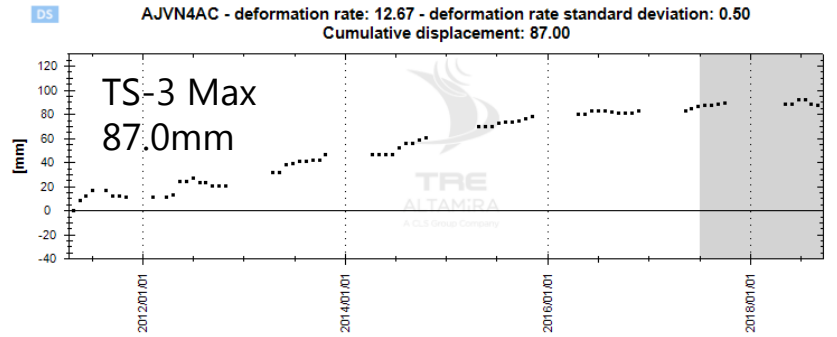
Accumulated Displacement 2011-2018

3.1.1-2k





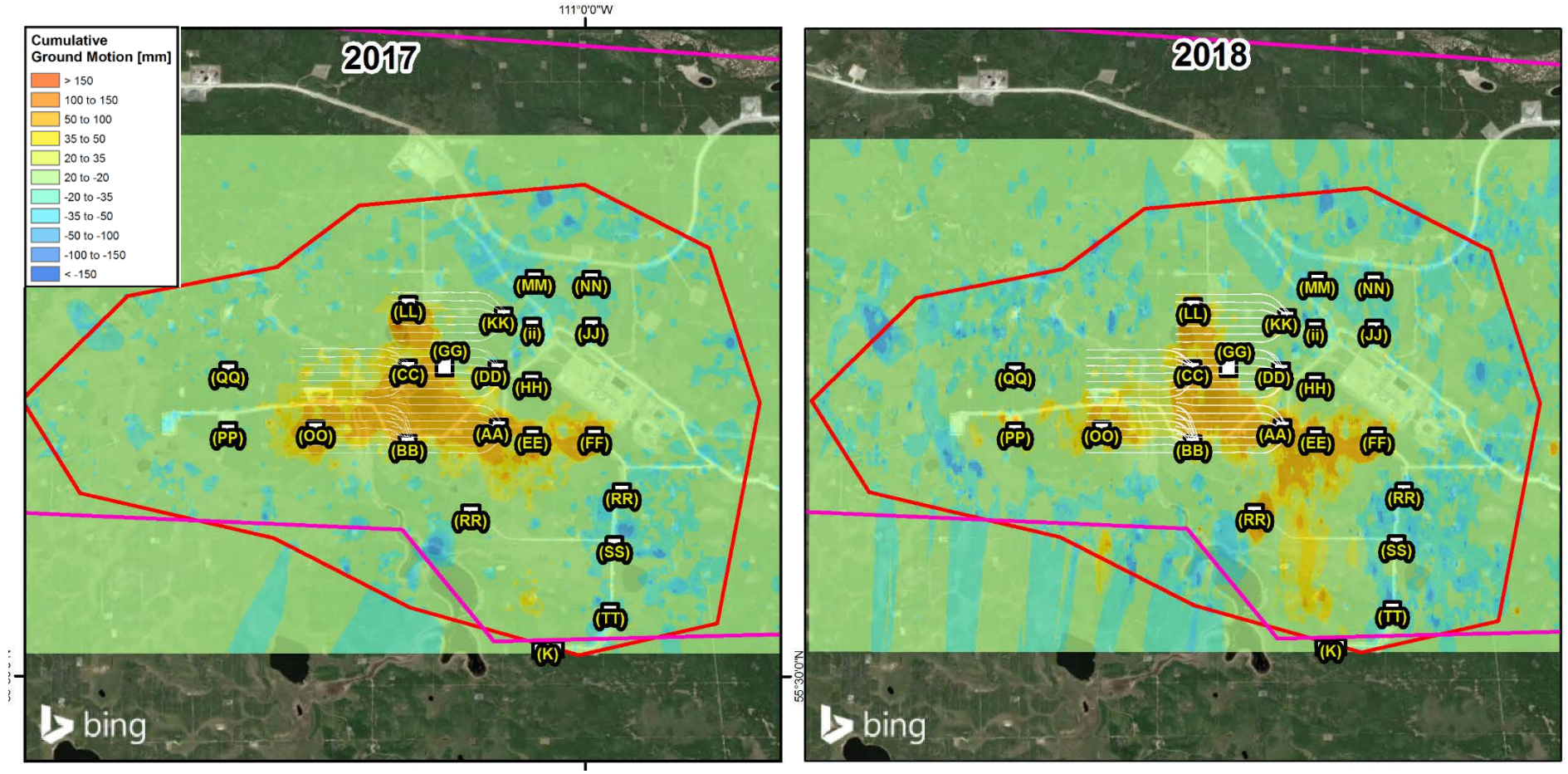




Jackfish 2

Comparing Accumulated Displacement 2017 to2018

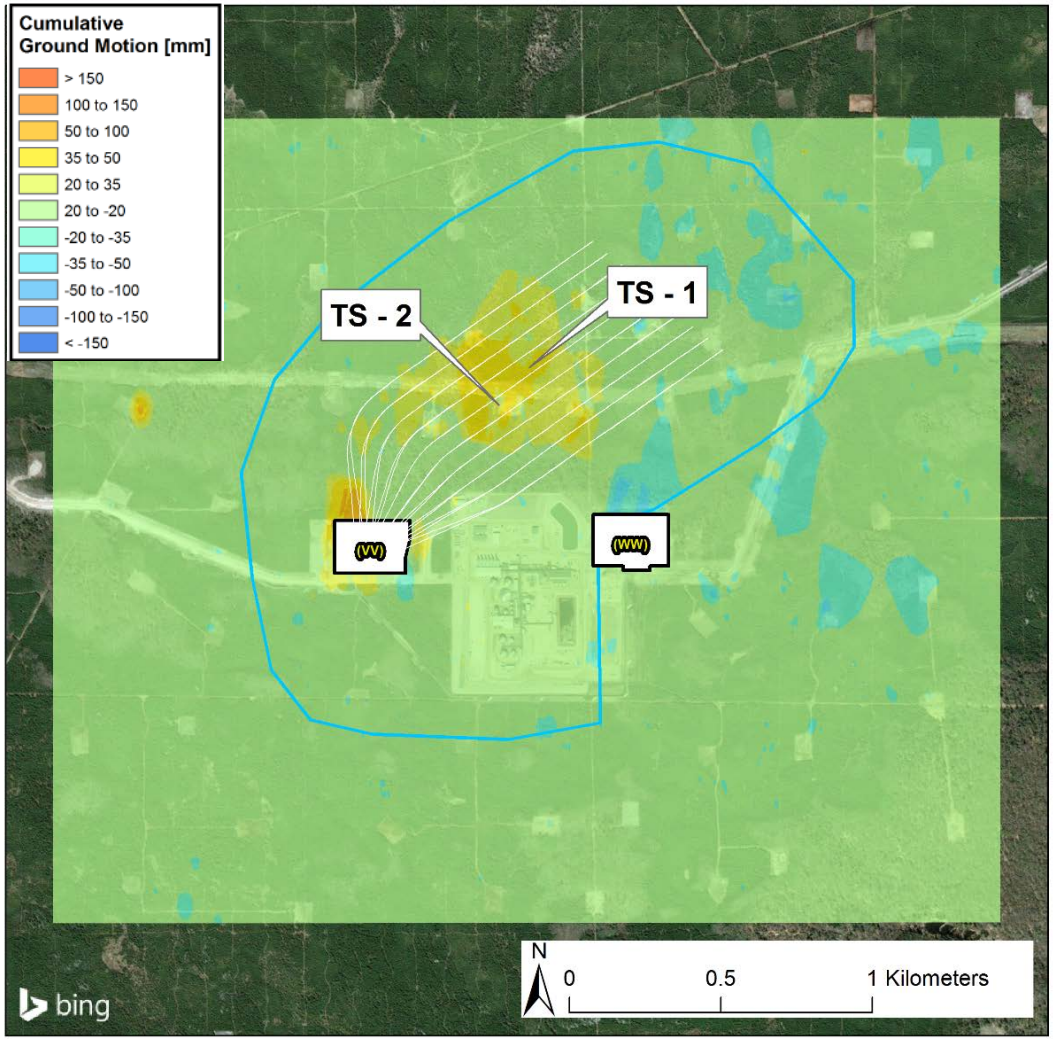
3.1.1-2k

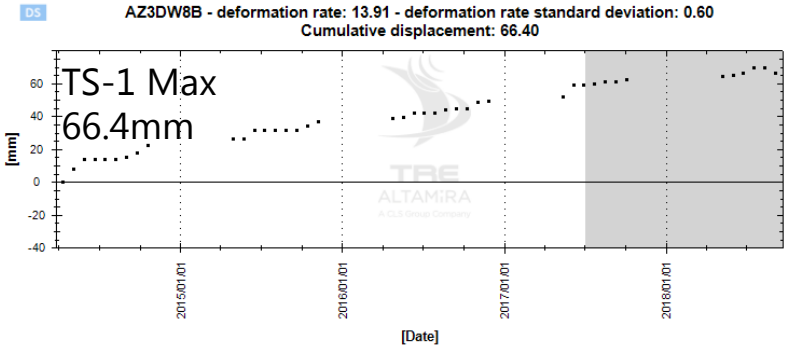


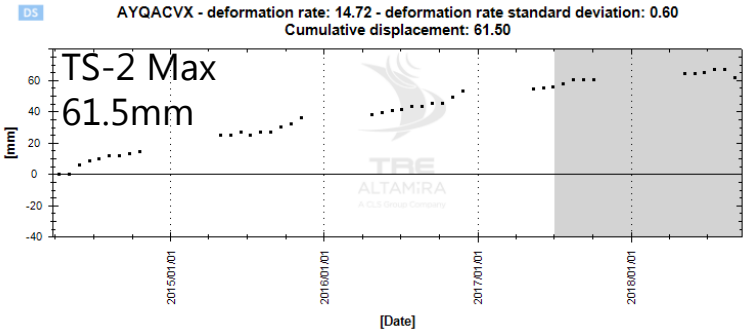
Jackfish 3

Accumulated Displacement 2014-2018

3.1.1-2k



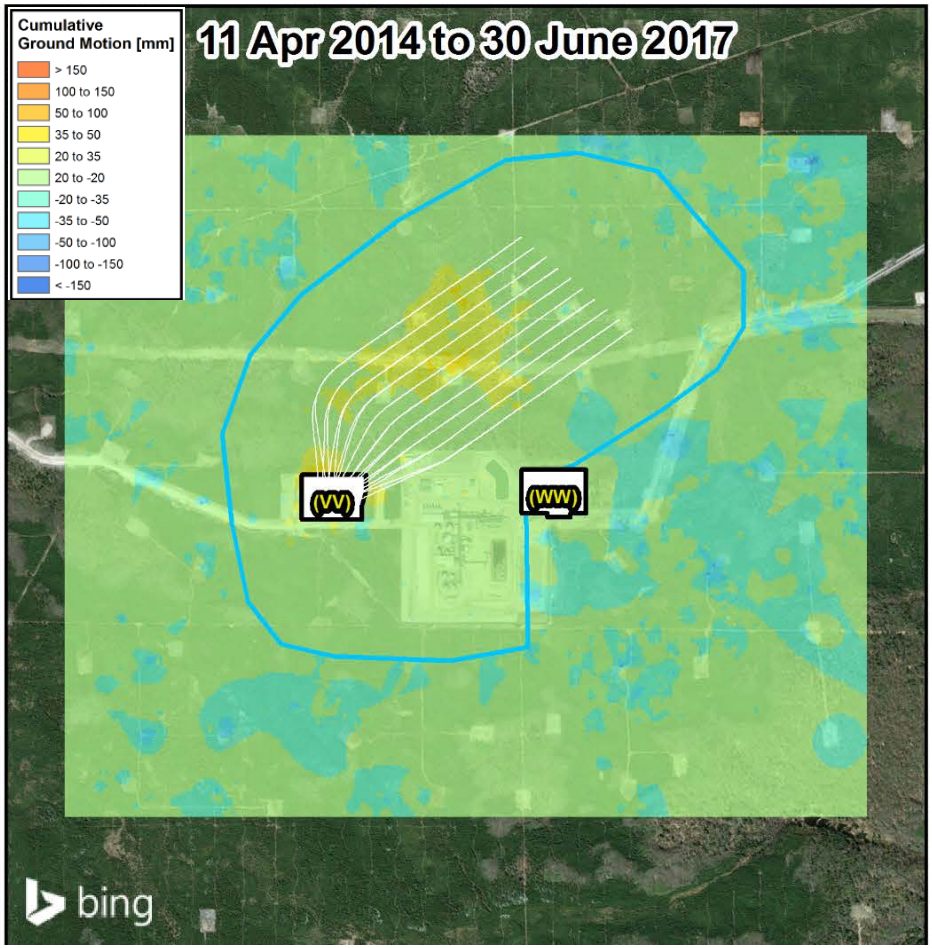


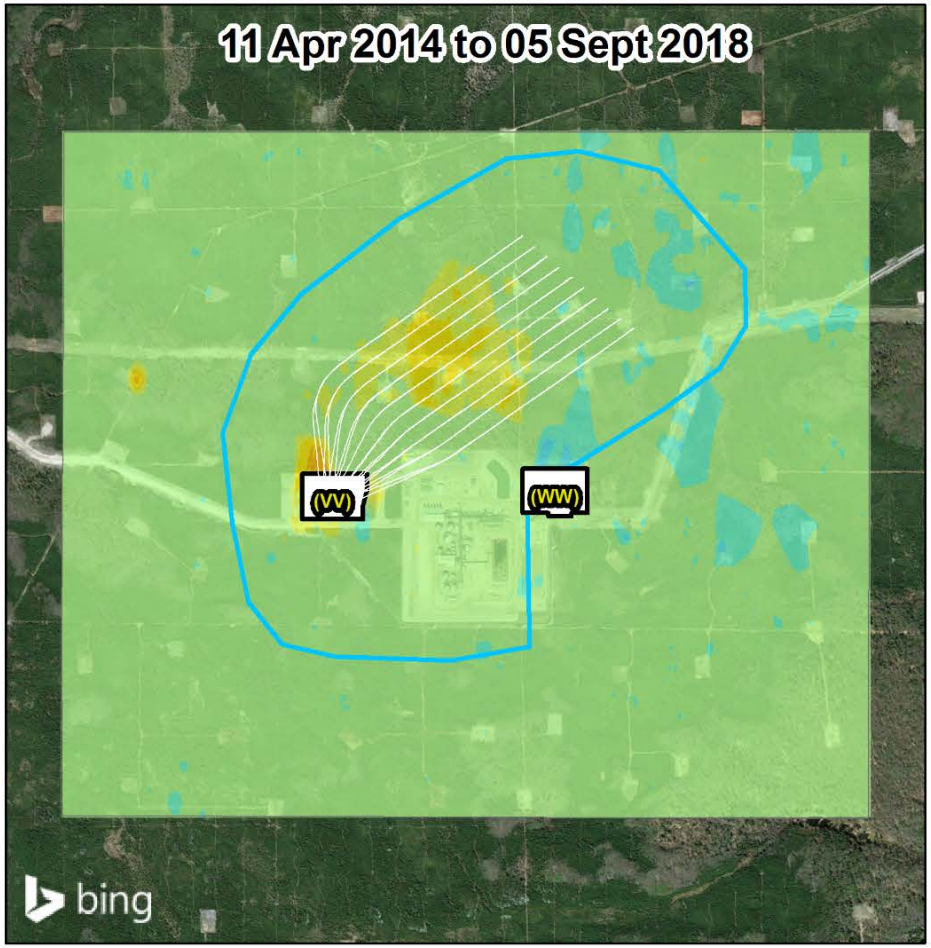


Jackfish 3

Comparing Accumulated Displacement 2017 to2018

3.1.1-2k





Drilling and Completions

Section 3.1.1-3

devon

Drilling and Completions

Overview

3.1.1-3a

Operating SAGD Horizontal Wells

- **Jackfish 1:** 78 well pairs on eleven pads (horizontal sections are 790 – 1,200m)
- **Jackfish 2:** 60 well pairs on eight pads (horizontal sections are 790 – 1,200m)
- **Jackfish 3:** 53 well pairs on six pads (horizontal sections are 720 – 1,200m)

Observation Wells

- 65 active SAGD observation wells (two to three wells per operating pad)
- 21 regional multi-zone monitoring wells equipped with piezometers

Service Wells

- Six Grand Rapids brackish source water wells
- Two McMurray brackish source water wells
- 14 water disposal wells (Class 1b)
  - 12 active wells
  - 1 inactive well (102/12-05-076-06W4)
  - 1 suspended well (102/03-22-075-06W4)

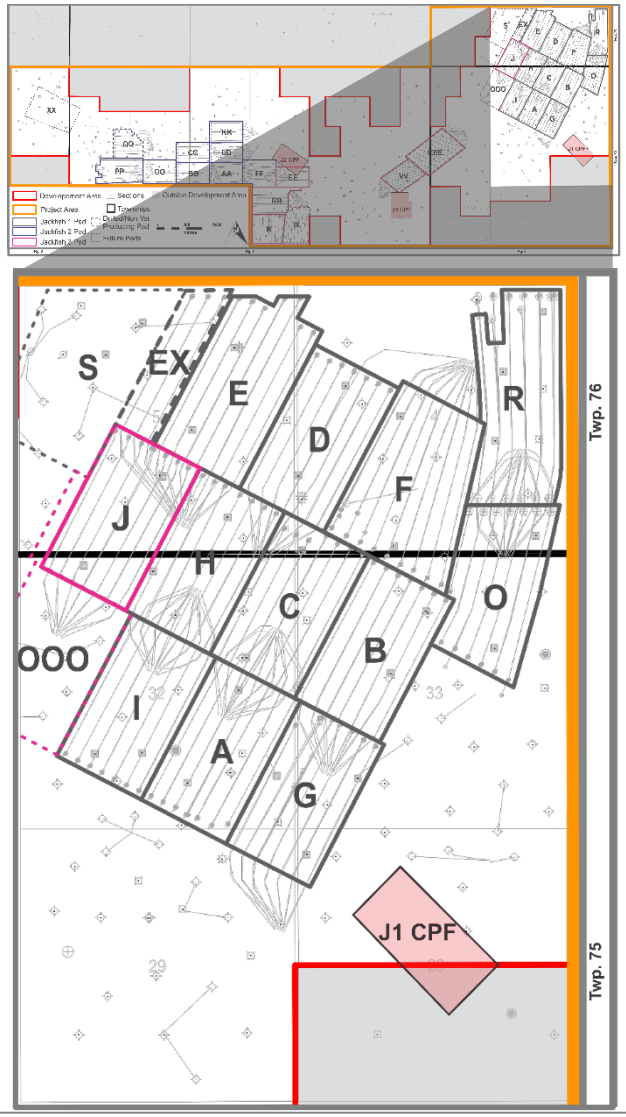
Drilling and Completions

Jackfish 1 Overview – SAGD Wells

3.1.1-3a

Existing Pads

- Pad A, B, C, D, E, G, H, I, O: Seven well pairs per pad
- Pad F: Ten well pairs
- Pad R: Six well pairs
  - Steam on three wellpairs Q2 2018
- Two observation wells per pad (heel and toe)



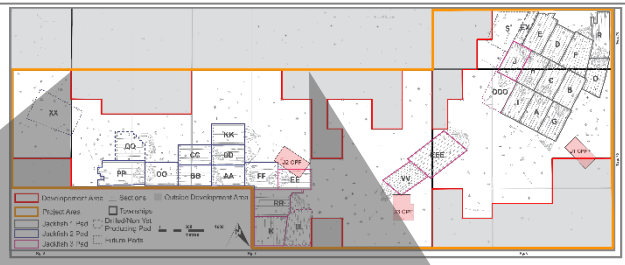
Drilling and Completions

Jackfish 2 Overview – SAGD Wells

3.1.1-3a

Existing Pads

- Pad AA, BB, CC, DD, and KK: Seven well pairs per pad
- Pad OO and PP: Eight well pairs per pad
- Pad FF: Nine well pairs
- Pad QQ: Ten well pairs, planned for steam Q4 2018
- Two observation wells per pad (heel and toe), three wells at Pad FF



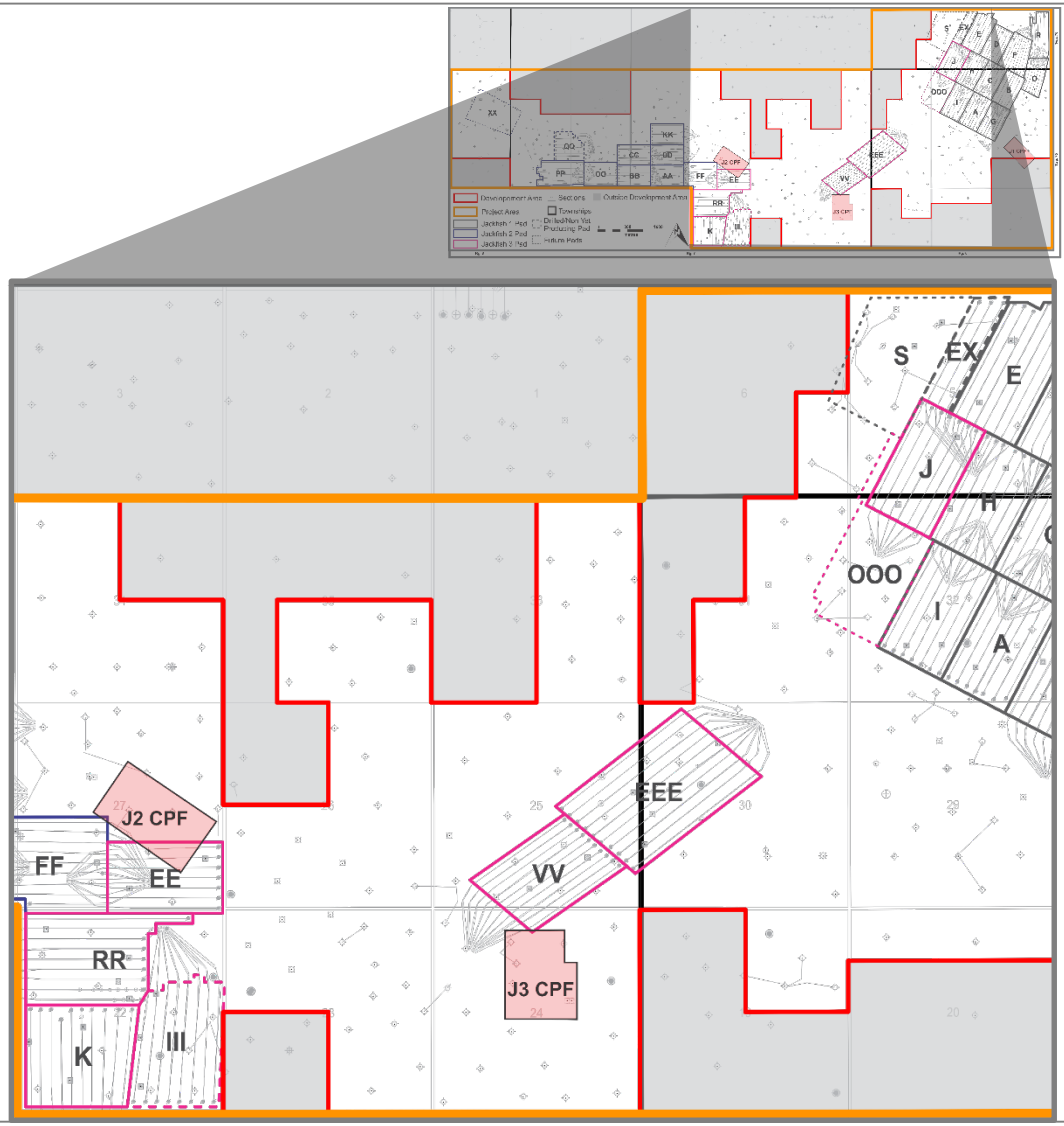
Drilling and Completions

Jackfish 3 Overview – SAGD Wells

3.1.1-3a

Existing Pads

- Pad J and EE: Seven well pairs per pad
- Pad VV and K: Ten well pairs per pad
- Pad RR: Nine well pairs
- Pad EEE: Ten well pairs, five operating
- Pad III: eight well pairs, planned for steam Q1 2019



Drilling and Completions

Inter-well Spacing

3.1.1-3a

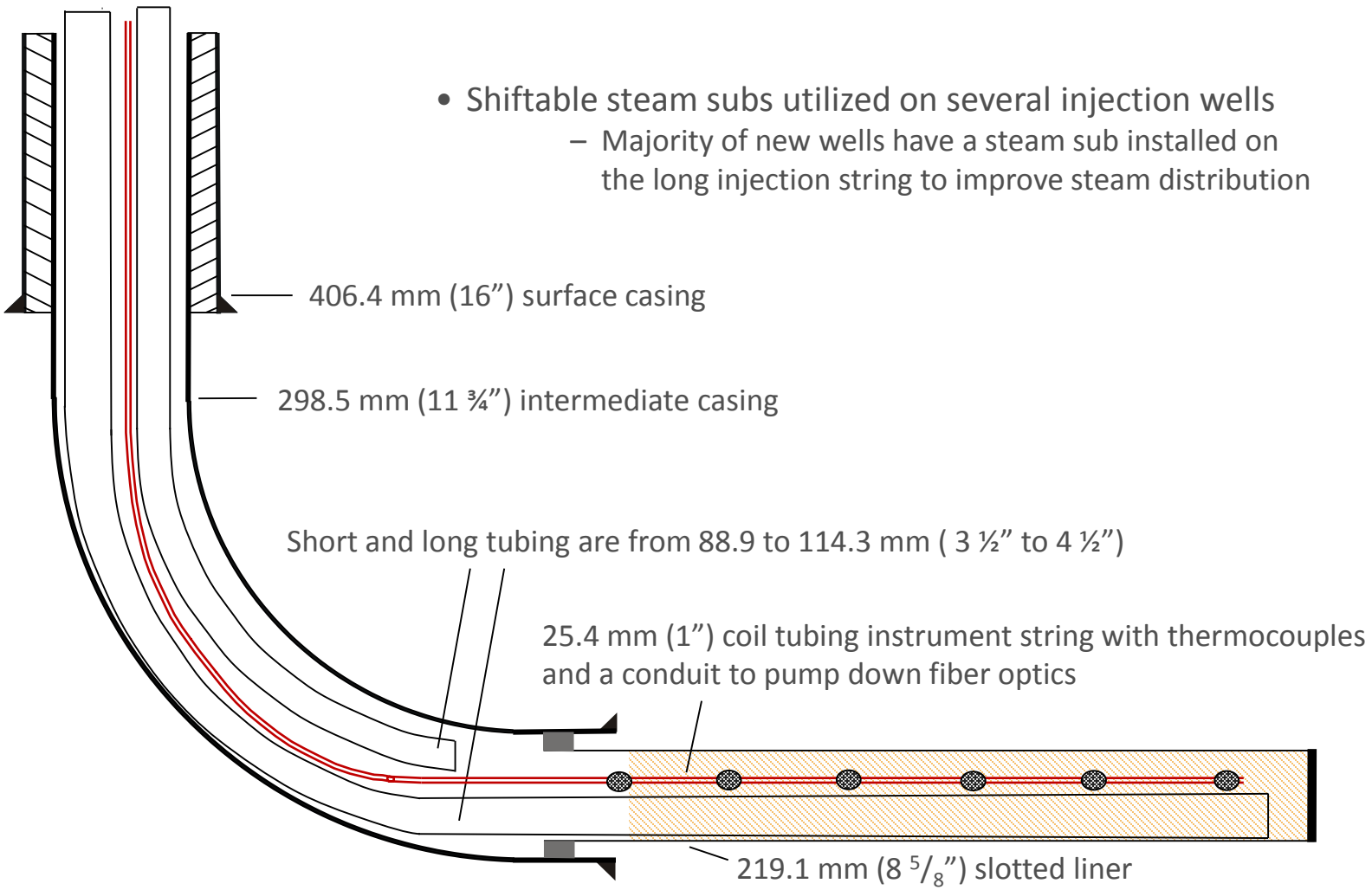
- Standard lateral inter-well spacing at Jackfish is 80m

- Currently drilled pads that differ from the standard are:
    - Pad VV: Spacing of 60m
    - Pad F: Spacing of 60m at the heels fanning to 90m at the toes
    - Pad O: Spacing of 75m at the heels fanning to 90m at the toes
    - Pad R: Spacing varies from 71 to 90m due to boundary restrictions
    - Pad III: Spacing of 80m at the heels fanning to 90m at the toes

Drilling and Completions

Typical Injection Well Schematic

3.1.1-3c

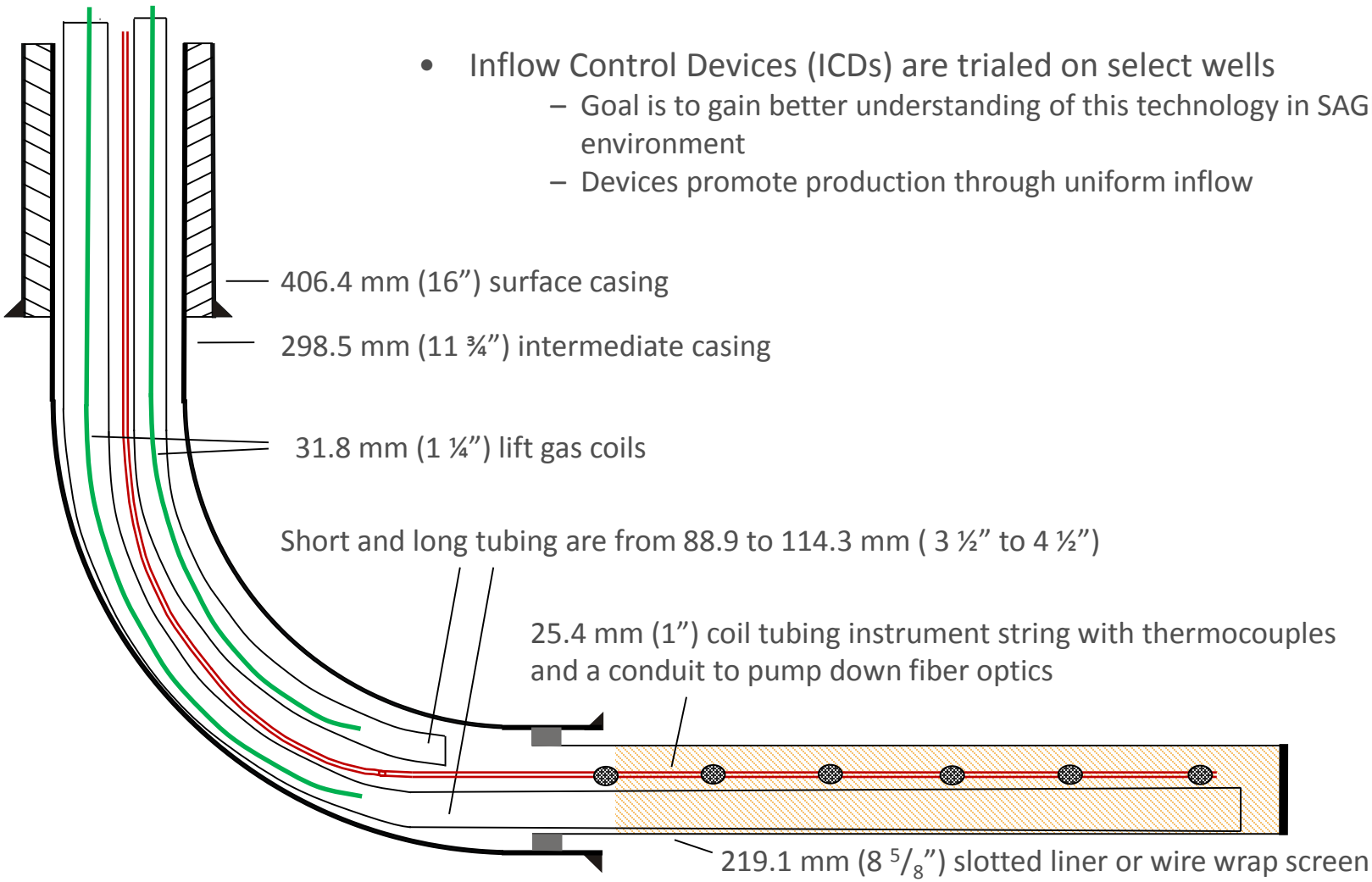


- Shiftable steam subs utilized on several injection wells
  - Majority of new wells have a steam sub installed on the long injection string to improve steam distribution

Drilling and Completions

Typical Gas Lift Production Well Schematic

3.1.1-3c

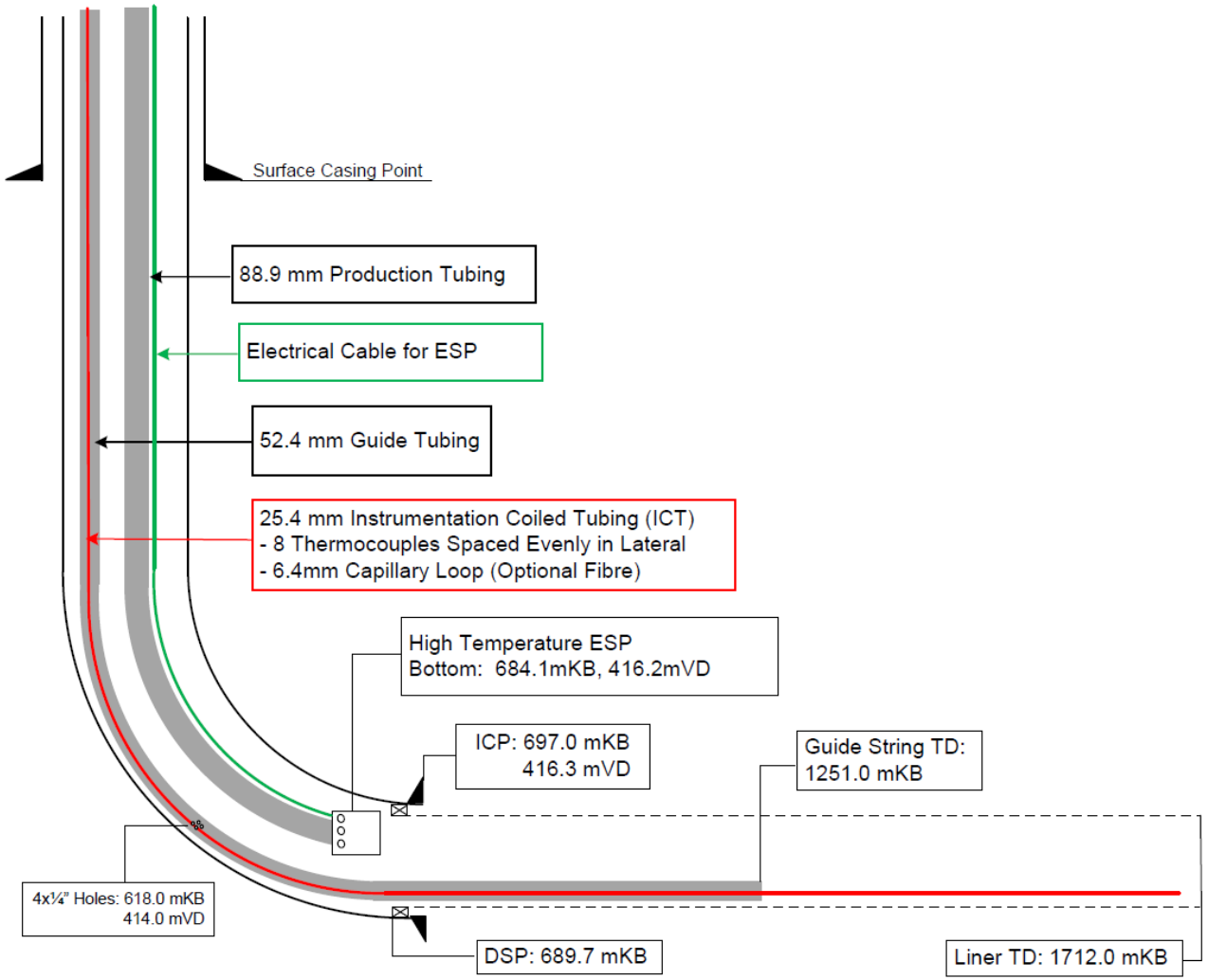


- Inflow Control Devices (ICDs) are trialed on select wells
  - Goal is to gain better understanding of this technology in SAGD environment
  - Devices promote production through uniform inflow

Drilling and Completions

Typical ESP Production Well Schematic

3.1.1-3c



Drilling and Completions

Inflow Control Devices (ICDs)

3.1.1-3c

- Tubing-deployed systems on wells CC1P, DD2P, DD7P, OO1P, OO8P
    - Installed successfully via service rig

- Liner-deployed systems on wells RR2P, RR6P, QQ(1,3,5,7,9)P, III3P, III5P
    - Installed successfully via drilling rig

- Key learnings to date:
    - Actual pressure drops in original ICDs different than design. Incorporated lab test data in recent deployments and pressure drop to date is within expected design range.
    - Observed well production improvements range from 0 to 100%, uplift sustainability is being evaluated
    - Able to operate wells at lower subcool with positive impact on temperature conformance

Drilling and Completions

Wire Wrapped Screens

3.1.1-3c

- Wire wrapped screens are the producer sand control standard for all future pads at Jackfish

- Expected benefits of wire wrapped screens:
  - Reduced liner pressure drop
  - Increased open flow area
  - Mechanical strength
  - Sand control

- First implementation at Jackfish 1 was at Pad F
  - Successful start-up in 2016

Well Integrity Summary

- There were no wellhead or intermediate casing failures at any of the Jackfish Thermal wells since the last Directive 054 update.
- As per Devon's Well Integrity Management System (WIMS), annual SCVF/GM surveys are conducted on injection and production wells
    - Also, annual wellhead preventative maintenance program is executed on all thermal wells
- Devon reports findings from these surveys to AER through its DDS system as per ID 2003-01.
    - Issues identified are managed accordingly through communication and approval with AER
- Devon implemented a Surface Casing Coating program as of December 2015.
    - Producers at Pads C, E and AA were inspected in 2018 – 5 corrosion issues were identified and repaired (external corrosion on surface casings)

Well Integrity Summary

- Devon is fully compliant with AER regarding reporting, repairing wells with wellbore integrity issues
- No suspended or abandoned thermal wells in Devon Jackfish Operations as of November 2018.
- Initiatives for 2019:
  - Evaluate impact of casing grade on intermediate casing failures
  - VIT pilot on Pad-MM (Monitor SCVF/GM in this pad to see impact of VIT on SCVF/GM)

Artificial Lift

Section 3.1.1-4

devon

Artificial Lift

3.1.1-4a, b

- Combination of Gas lift and ESP utilized for artificial lift at Jackfish District

- Gas lift continues to be an effective lift strategy for Jackfish operating conditions
  - Typical producer operating pressure above 1,800 kPag
  - Ability to handle over 1,000 m^3/day emulsion flow
  - No operating temperature limitation

- ESP use has expanded from single well (B3P) in 2015 to Full pad install (Pad O) in 2018
  - ESP Wells (B3P, F10P, O1P-O7P
    - R1-R6P (following circulation)
  - Plan to continue to deploy ESPs as deemed necessary

Instrumentation

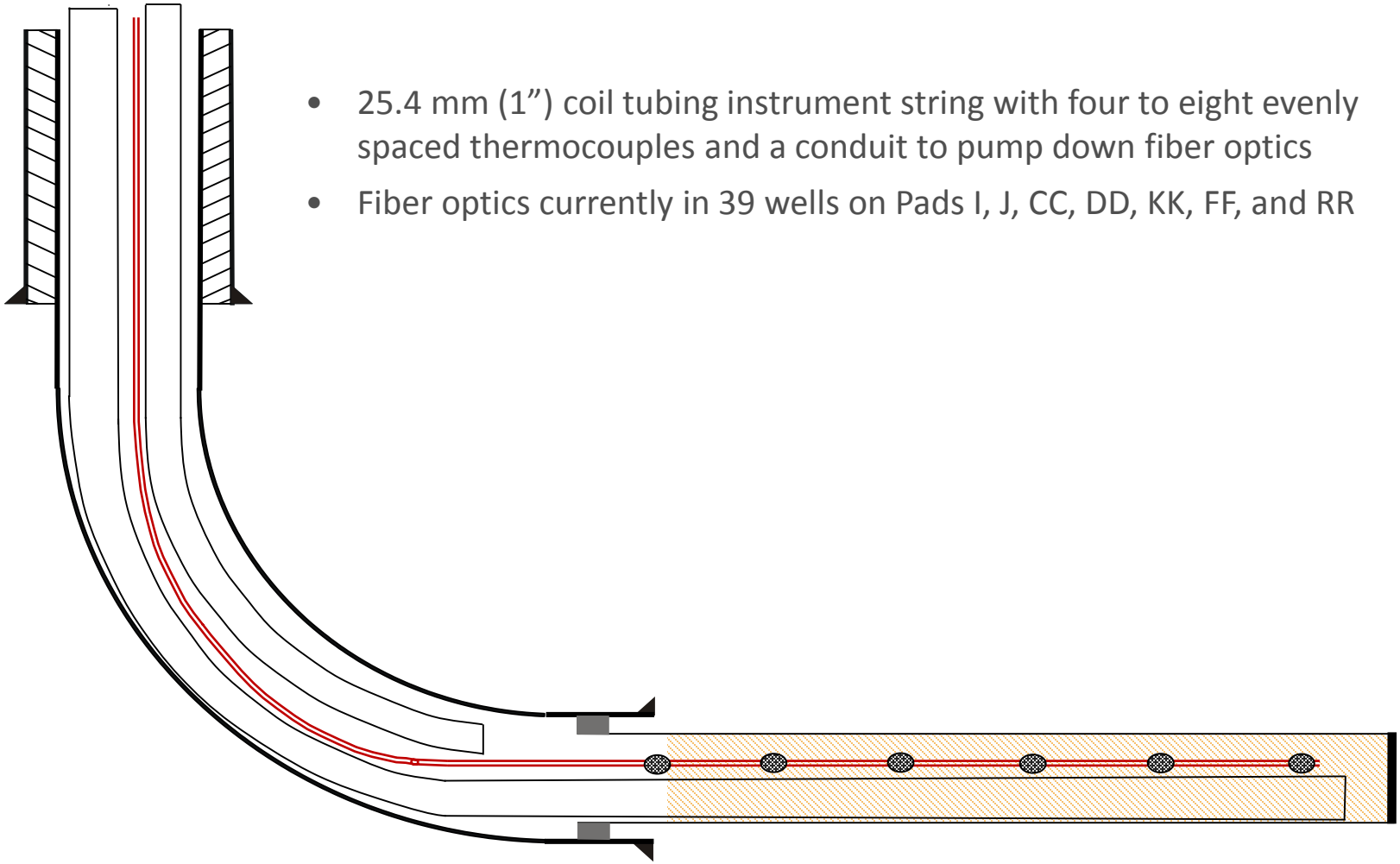
Section 3.1.1-5

devon

Instrumentation in Wells

SAGD Injection and Producer Wells

3.1.1-5b



- 25.4 mm (1”) coil tubing instrument string with four to eight evenly spaced thermocouples and a conduit to pump down fiber optics
- Fiber optics currently in 39 wells on Pads I, J, CC, DD, KK, FF, and RR

Instrumentation in Wells

Injector Downhole Pressure Monitoring

3.1.1-5b

As of September 2017 all injector wells use annulus gas pressure measurement (AGPM) with the exception of NCG injection wells.

For Typical Injector Wells:

- Utilizing our fuel gas source at the pad to inject a small amount of gas into the annulus space of the tubing and casing to create a bubble tube affect
  - BHP = surface pressure + methane hydrostatic

For NCG Injector Wells:

- Calculate downhole pressure based on surface steam injection pressures on short and long tubing strings
  - BHP = steam injection surface pressure – frictional losses
- Calculate downhole pressure based on surface annulus NCG gas injection pressure and accounting for frictional losses
  - BHP = NCG gas injection surface pressure – frictional losses
  - Conduct a NCG injection step rate test periodically to ensure accurate friction losses
- Using thermocouples / fiber optics temperature data to convert downhole live steam temperature from T_{sat} to P_{sat}

Instrumentation in Wells

Producer Downhole Pressure Monitoring

3.1.1-5b

As of September 2017 all gas lift producer wells use annulus gas pressure measurement (AGPM). ESP wells use a bubble tube or a downhole sensor.

For Gas Lift Producer Wells:

- Using annulus gas pressure measurement with periodic blanket gas purges to verify pressures
- Option to use concentric open-ended lift gas (LG) coiled tubing to calculate down hole pressure
  - BHP = LG surface pressure – frictional losses + static head
  - Frictional losses are correlated/calculated by performing numerous gas lift step rate tests

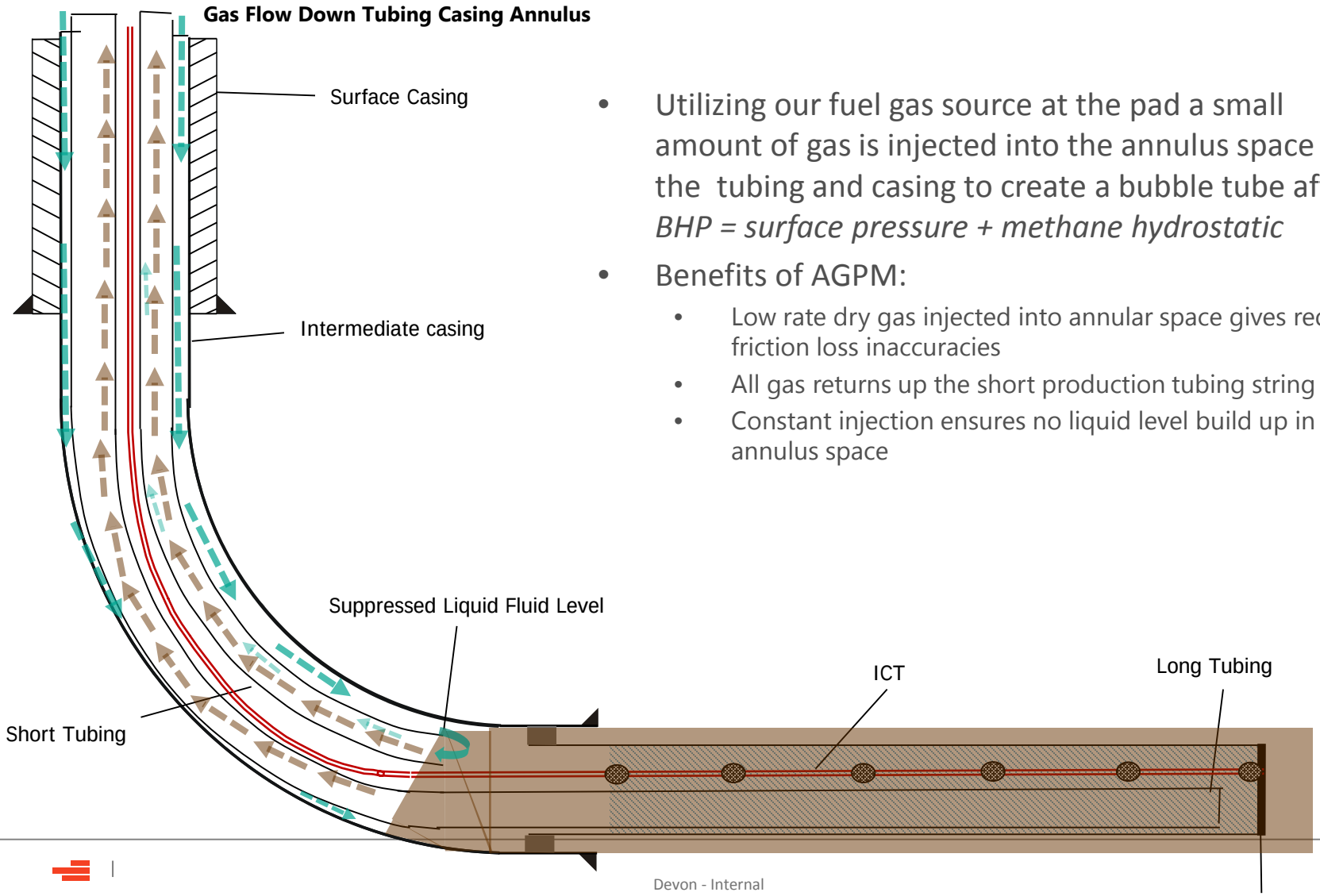
For ESP Producer Wells:

- Use guide string that is installed in well for instrument coil as a bubble tube, gas discharge is above the ESP
- B3P and F10P have sensors in the ESP assembly

Instrumentation in Wells

Annulus Gas Pressure Measurement (AGPM) Update

3.1.1-5b

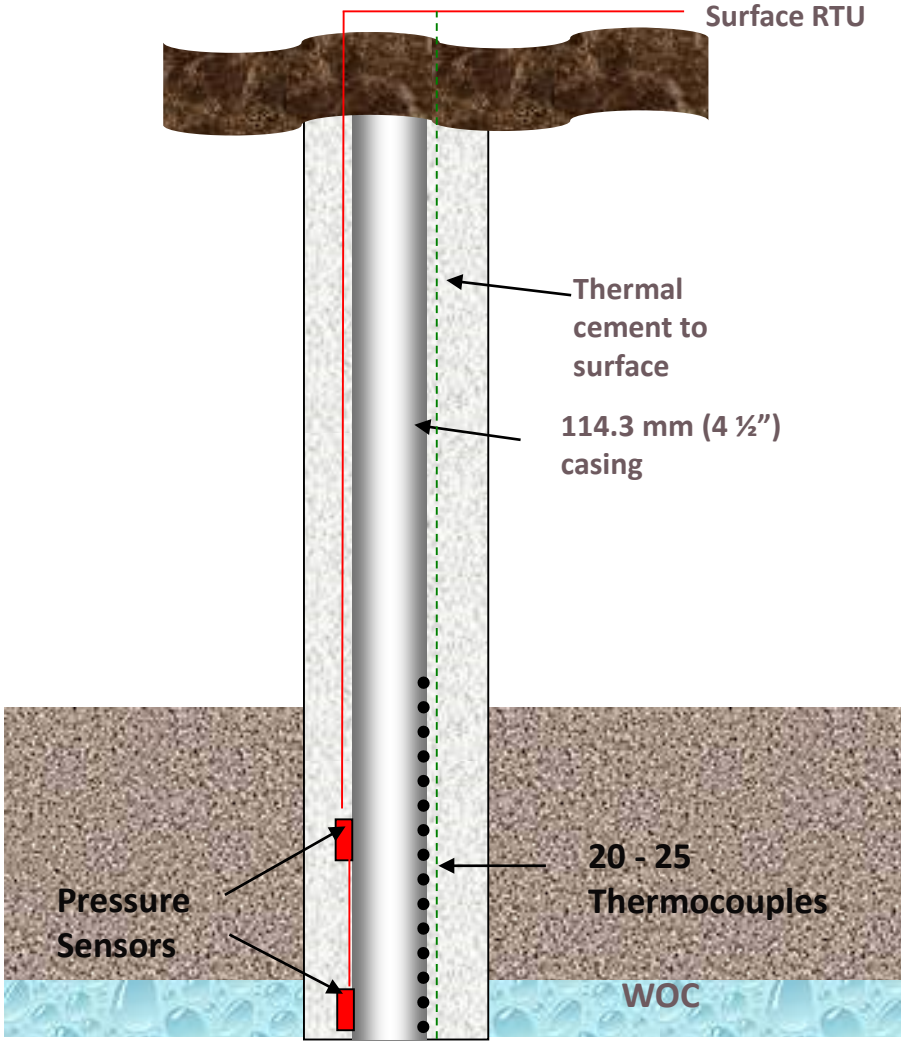


- Utilizing our fuel gas source at the pad a small amount of gas is injected into the annulus space of the tubing and casing to create a bubble tube affect, *BHP = surface pressure + methane hydrostatic*
- Benefits of AGPM:
  - Low rate dry gas injected into annular space gives reduced friction loss inaccuracies
  - All gas returns up the short production tubing string
  - Constant injection ensures no liquid level build up in the annulus space

Instrumentation in Wells

SAGD Observation Wells

3.1.1-5b



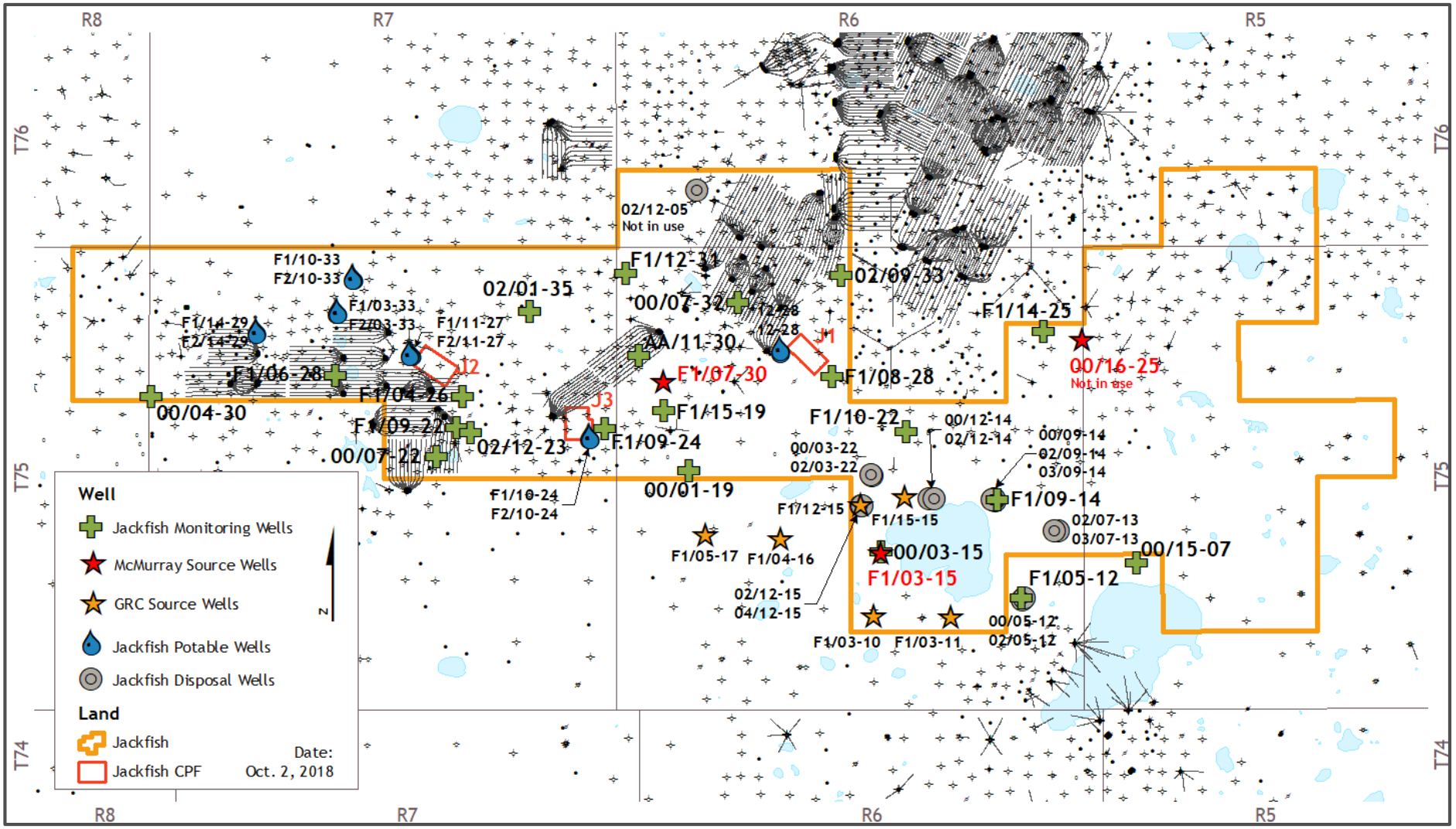
Jackfish 1, 2, and 3 SAGD observation wells contain:

- 20 points thermocouples (25 points in more recently drilled wells), spaced above, below, and within pay interval
- Two to four pressure sensors spaced above, below, and within pay interval

Instrumentation in Wells

Regional Monitoring Well Locations

3.1.1-5b



Instrumentation in Wells

Regional Multi-zone Monitoring Wells

3.1.1-5b

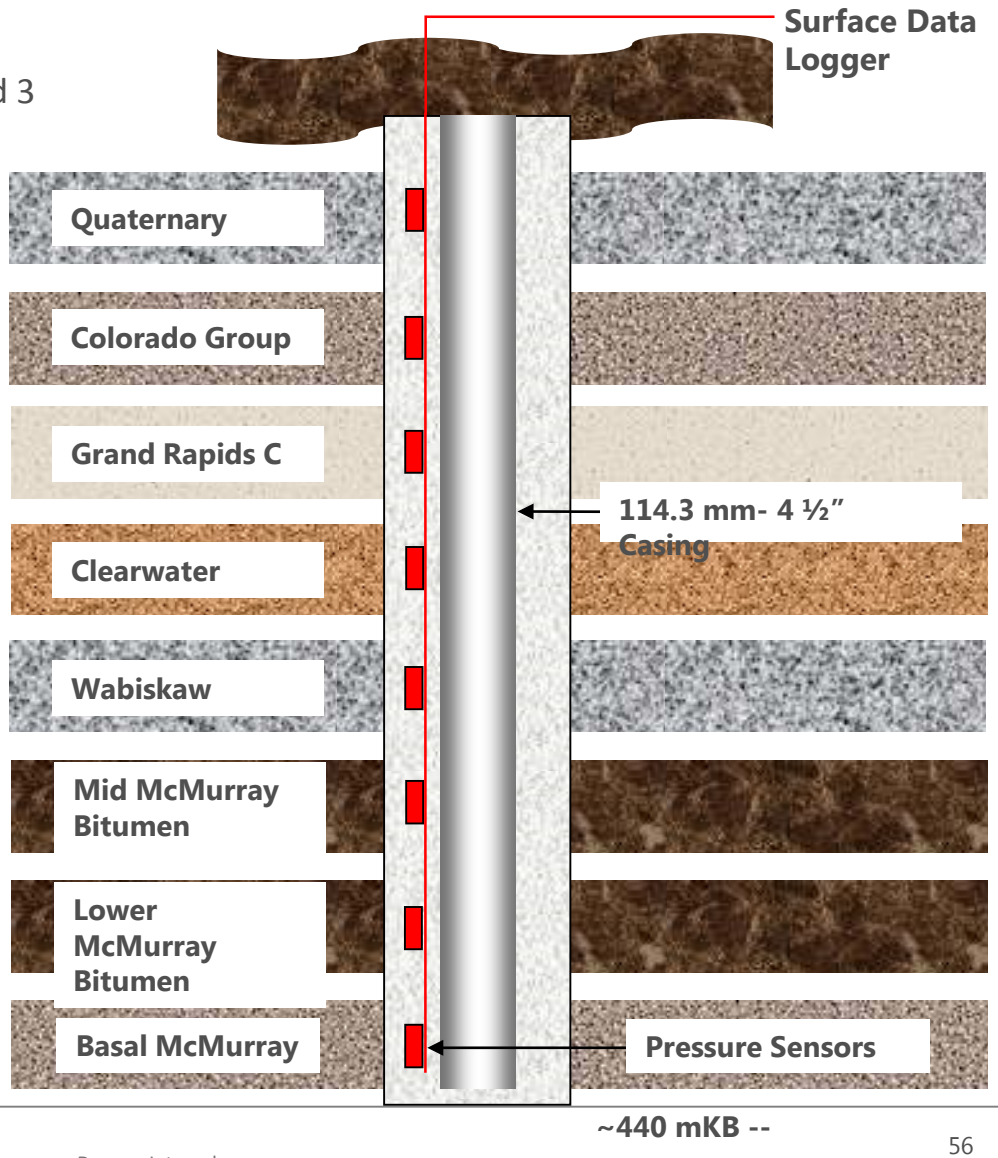
Monitoring wells cover areas of Jackfish 1, 2, and 3

Twenty-one wells

- 00/07-32-75-6W4 (5 piezometers)
- F1/08-28-75-6W4 (4 piezometers)
- F1/09-14-75-6W4 (4 piezometers)
- F1/12-31-75-6W4 (4 piezometers)
- F1/10-22-75-6W4 (5 piezometers)
- F1/04-26-75-7W4 (5 piezometers)
- F1/06-28-75-7W4 (5 piezometers)
- F1/15-19-75-6W4 (5 piezometers)
- F1/09-24-75-7W4 (5 piezometers)
- F1/14-25-75-6W4 (5 piezometers)
- F1/05-12-75-6W4 (5 piezometers)
- F1/09-22-75-7W4 (4 piezometers)
- 02/12-23-75-7W4 (4 piezometers) *
- 02/01-35-75-7W4 (3 piezometers)
- 00/15-07-75-5W4 (4 piezometers)
- 00/07-22-75-7W4 (2 piezometers)
- 00/03-15-75-6W4 (3 piezometers) **
- 02/09-33-75-6W4 (4 piezometers)
- 00/04-30-75-7W4 (3 piezometers)
- 00/01-19-75-6W4 (3 piezometers) **
- AA/11-30-75-6W4 (5 piezometers)

* Perf with a Level Logger

** Perf for water sampling



Instrumentation in Wells

Regional Multi-Zone Monitoring Wells

3.1.1-5b

UWI	Rig Release	Quaternary	Colorado Group	Grand Rapids	Clearwater	Wabiskaw	McMurray Bitumen	Basal McMurray Water
00/07-32-075-06W4	2004/03/11			X		X	X	X
F1/08-28-075-06W4	2006/03/11			X	X	X		X
F1/09-14-075-06W4	2006/03/12			X	X	X		X
F1/12-31-075-06W4	2007/01/24			X	X	X		X
F1/10-22-075-06W4	2007/01/29		X	X	X	X		X
F1/04-26-075-07W4	2007/02/19			X	X	X	X	X
F1/06-28-075-07W4	2007/02/26			X	X	X	X	X
F1/15-19-075-06W4	2007/03/05		X	X	X	X		X
F1/09-24-075-07W4	2008/02/27		X	X	X	X		X
F1/14-25-075-06W4	2008/03/03		X	X	X	X		X
F1/05-12-075-06W4	2008/03/06			X	X	X		X
F1/09-22-075-07W4*	2008/03/07	X		X	X	X		
02/12-23-075-07W4	2012/03/05	X						
02/01-35-075-07W4	2012/03/06	X						
00/15-07-075-05W4	2012/03/09			X	X			X
02/09-33-075-06W4	2013/01/10	X		X	X			X
00/03-15-075-06W4	2013/01/18	X		X	X			
AA/11-30-075-06W4	2013/01/18							X
00/01-19-075-06W4	2013/02/17	X		X	X			
00/04-30-075-07W4	2013/03/03	X		X	X			
00/07-22-075-07W4	2013/03/13			X	X			

Scheme Performance

Section 3.1.1 - 7

devon

Scheme Performance Prediction

Jackfish

3.1.1-7a

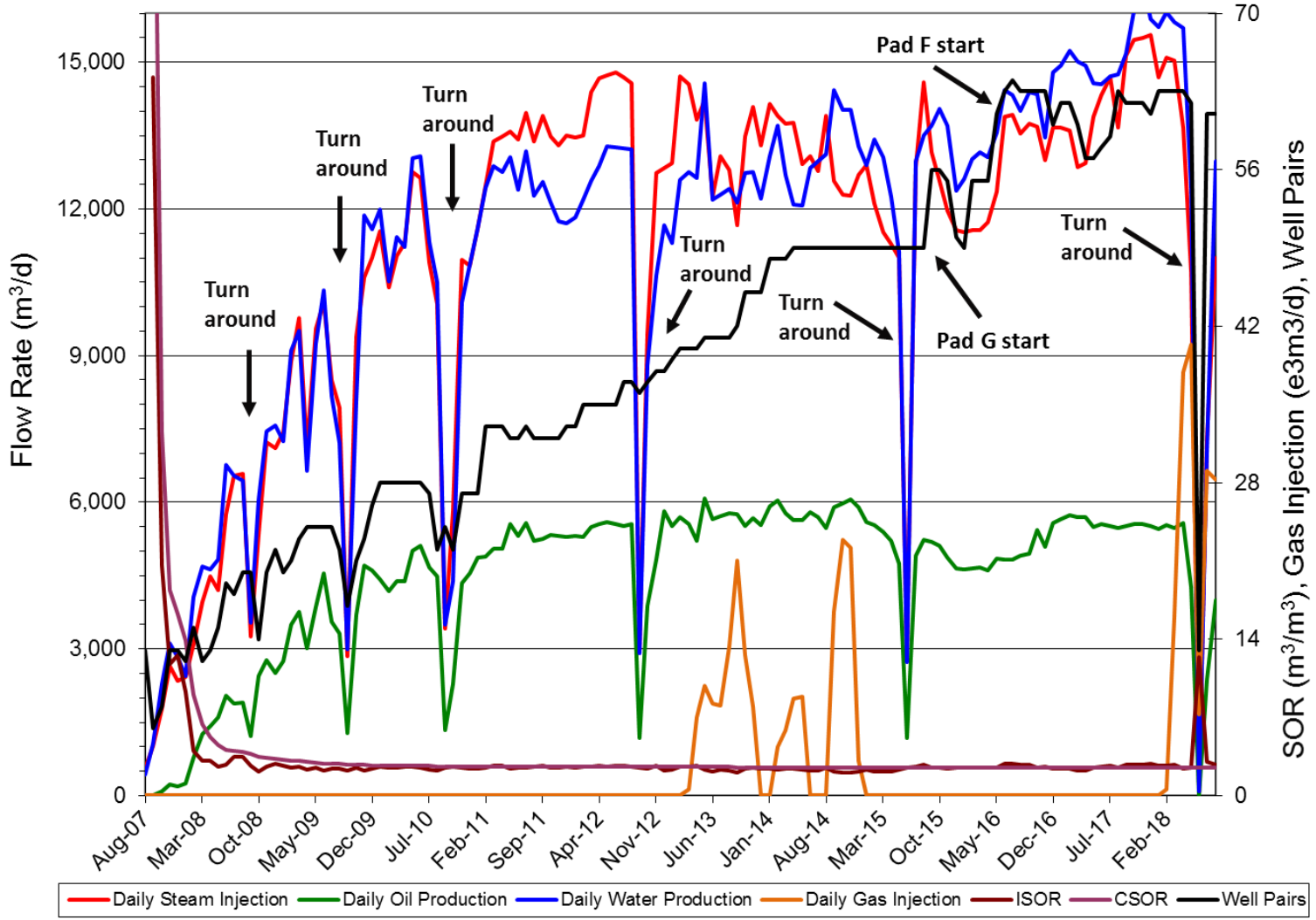
- Well pad performance forecasts generated using Jackfish and industry analogues; validated with numerical simulation and analytical methods

- Facility service factors based on historical data, future plans, and quantified risks

Scheme Performance

Jackfish 1 Project Life Plot

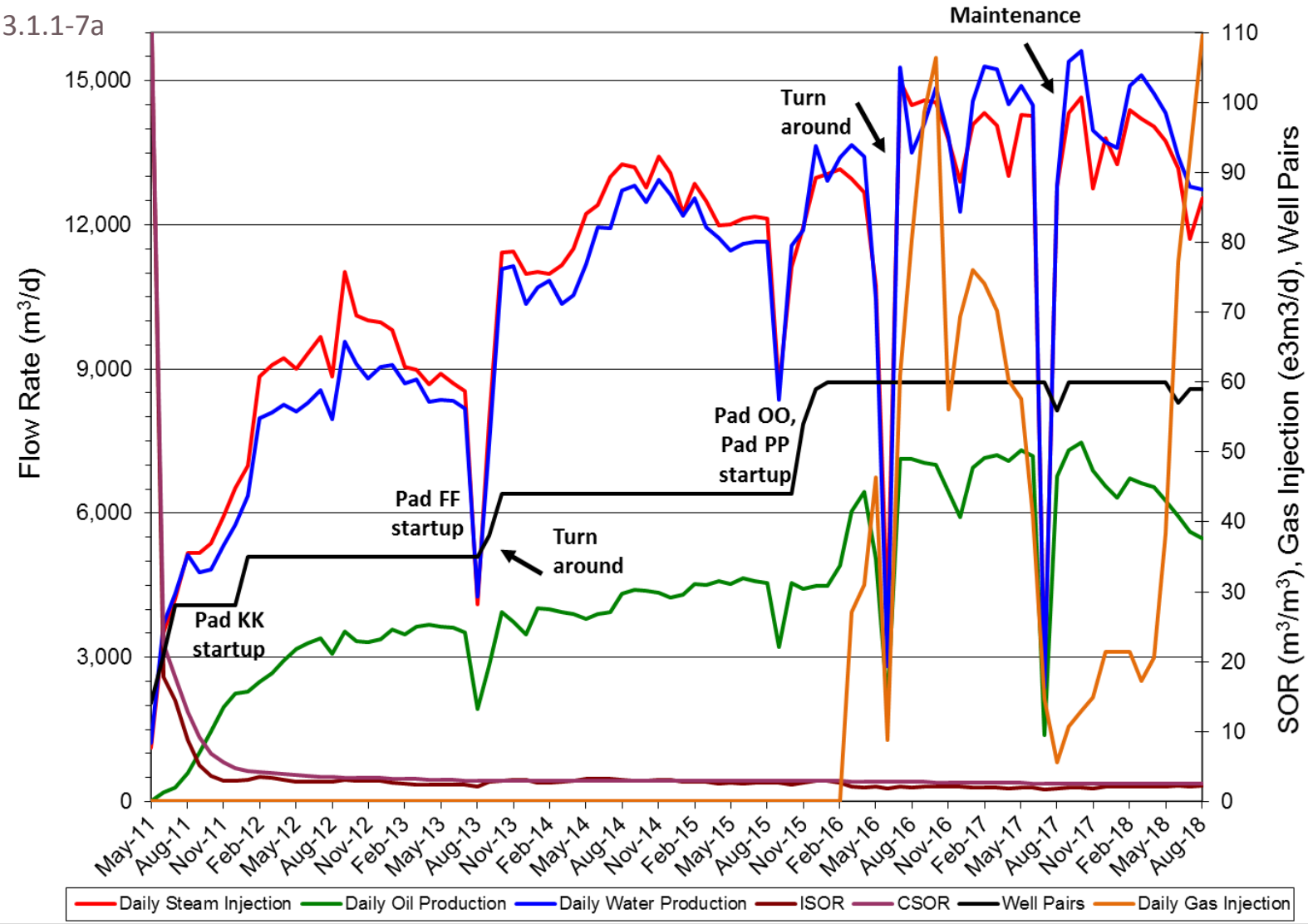
3.1.1-7a



Scheme Performance

Jackfish 2 Project Life Plot

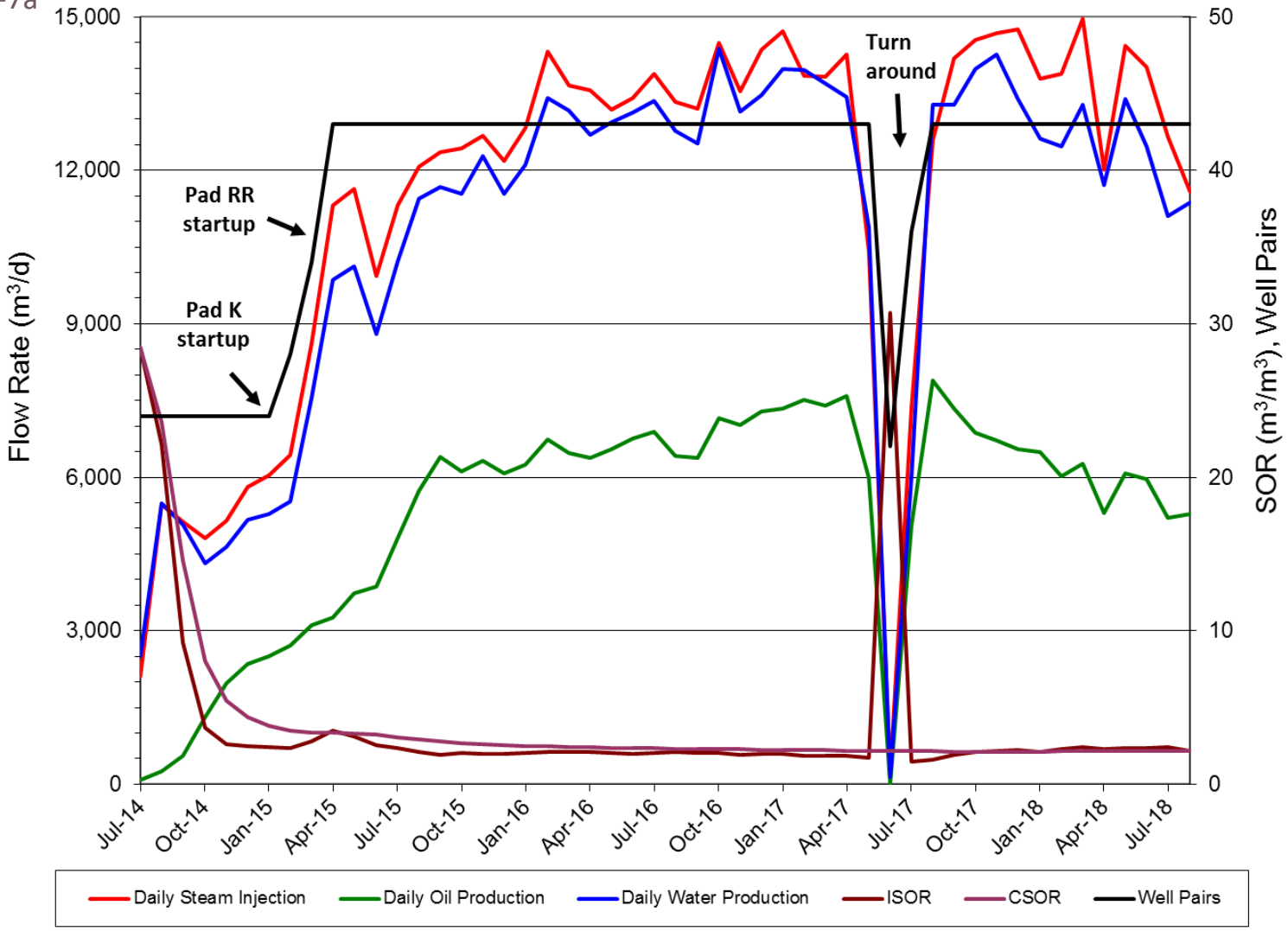
3.1.1-7a



Scheme Performance

Jackfish 3 Project Life Plot

3.1.1-7a

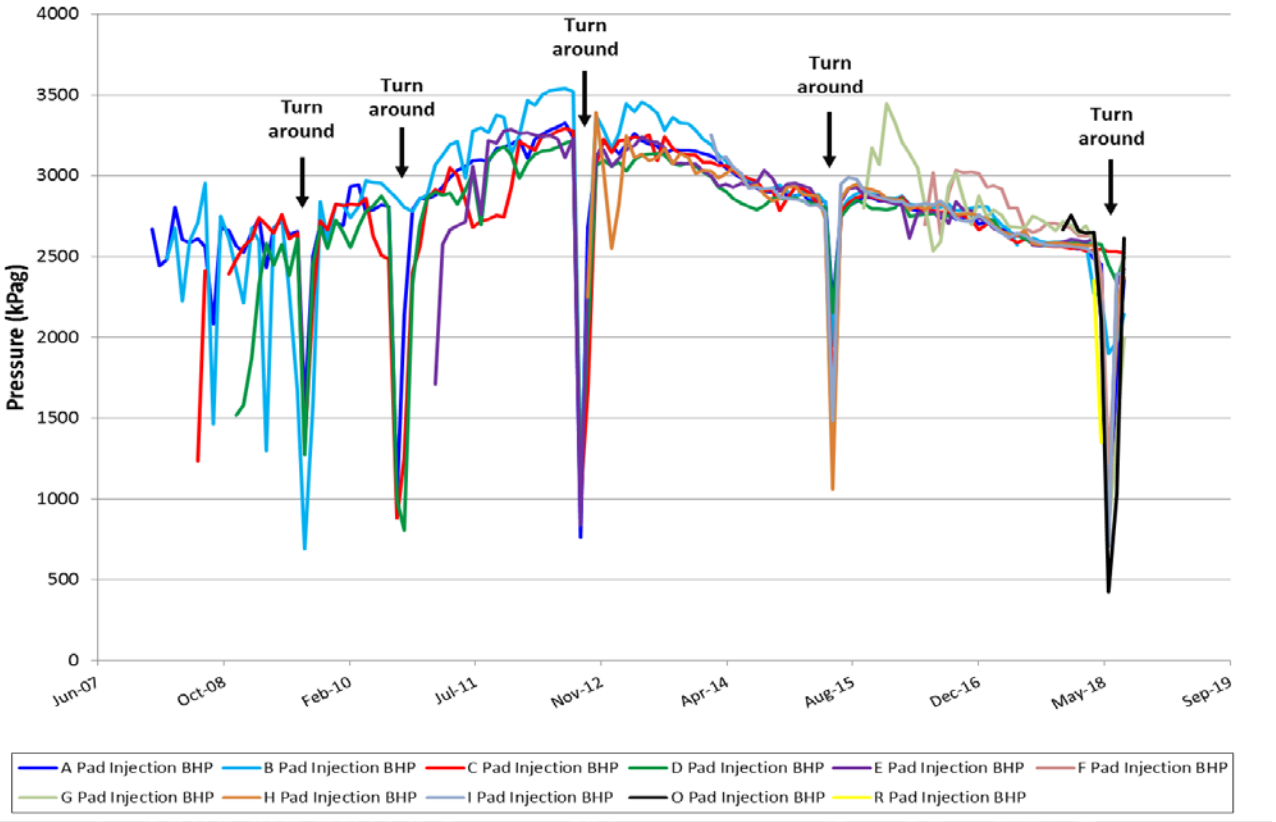


Scheme Performance

Jackfish 1 Bottom Hole Injector Pressures

3.1.1-7b

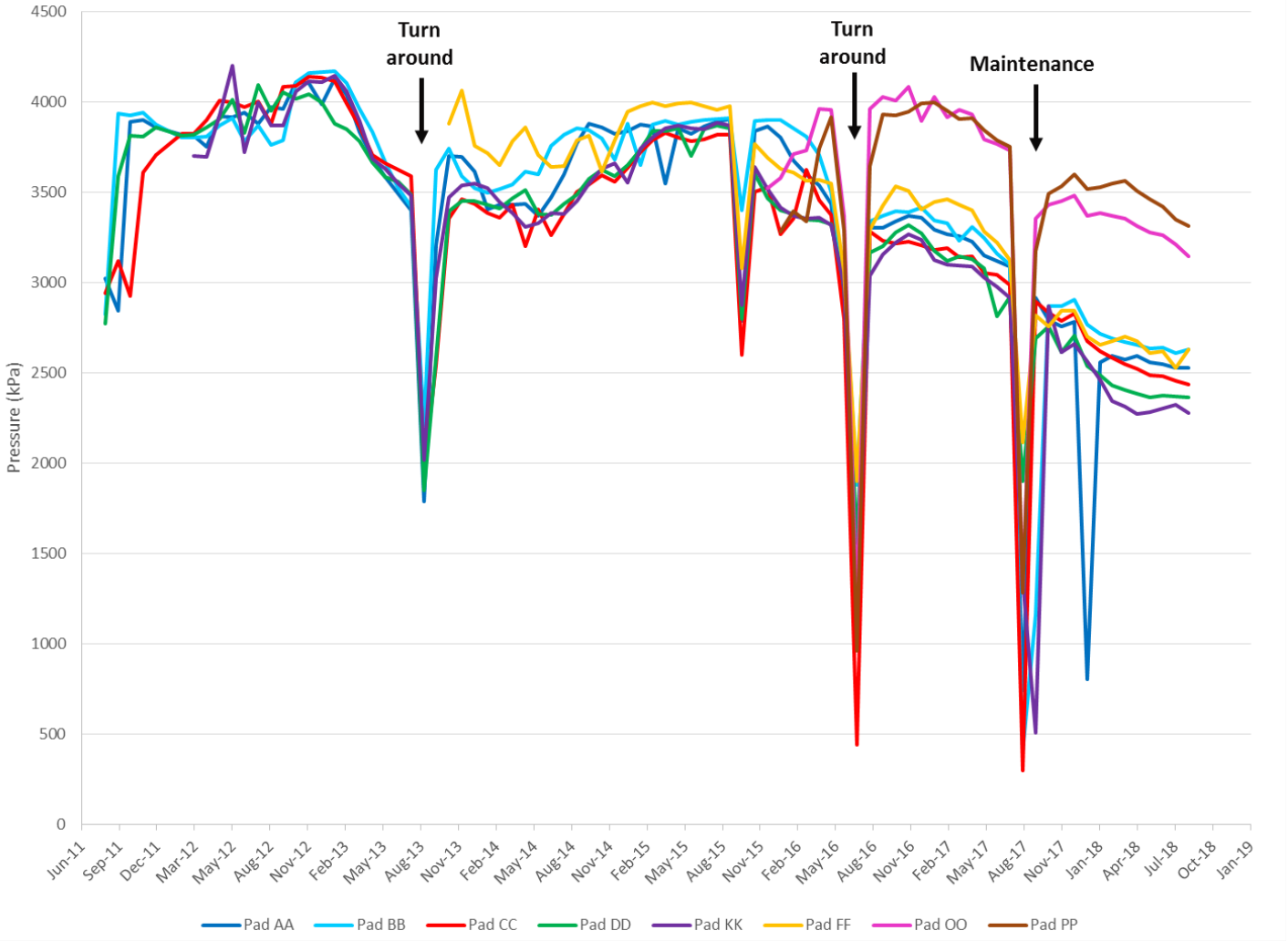
- Devon manages injection pressures to maximize producing rates, manage leak-off and increase overall reservoir recovery. A reduction in operating pressure was implemented in 2013 and continued into 2018.



Scheme Performance

Jackfish 2 Bottom Hole Injector Pressures

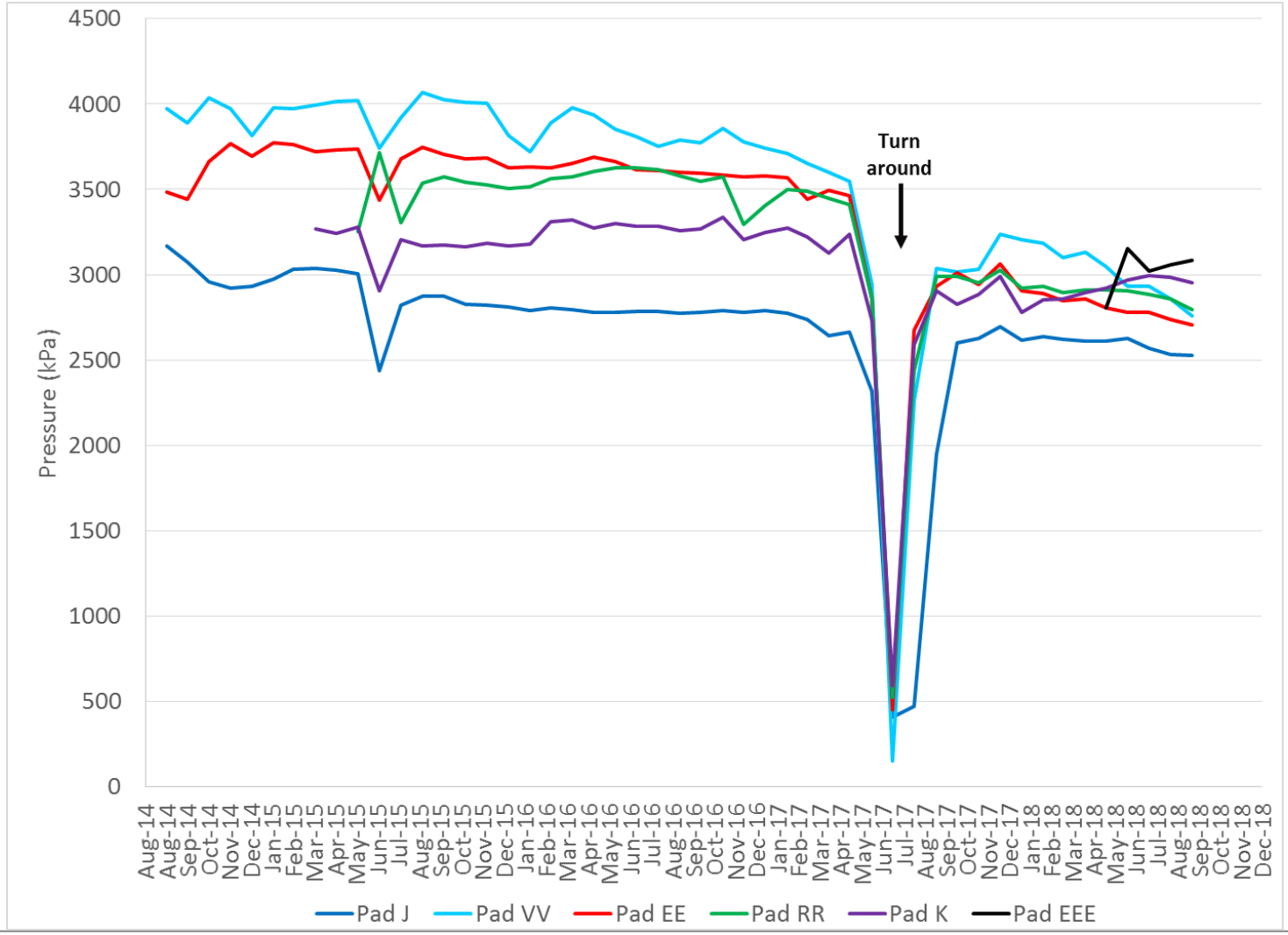
3.1.1-7b



Scheme Performance

Jackfish 3 Bottom Hole Injector Pressures

3.1.1-7b



2018 Scheme Performance

Jackfish 1 Pad Recoveries

3.1.1-7c

Pad	Area (m^2)	Avg. GRV Pay (m)	Net GRV Pay S_o (%)	Net GRV Pay Porosity (%)	OBIP (10^6m^3)	Ult Rec (10^6m^3)	Cum Prod [1] (10^6m^3)	RF (%) to Date [1]
A	529,788	42	80	33	6.0	4.6	4.4	73
B	532,736	44	75	34	5.9	3.5	2.4	41
C	530,374	42	78	34	6.0	2.9	2.7	45
D	531,192	46	79	34	6.6	2.8	2.4	36
E	603,919	43	74	34	6.4	3.2	2.2	34
F	675,933	37	77	34	6.6	3.8	0.8	12
G	525,388	34	80	34	4.8	1.9	0.4	8
H	530,352	34	70	33	4.2	1.6	1.5	36
I	530,093	36	76	34	4.8	2.2	1.0	21
O	509,016	30	75	34	3.9	1.8	NA	NA
R	587,459	36	75	34	5.3	1.8	NA	NA

[1] Effective August 31/2018

2018 Scheme Performance

Jackfish 2 Pad Recoveries

3.1.1-7c

Pad	Area (m^2)	Avg. GRV Pay (m)	Net GRV Pay S_o (%)	Net GRV Pay Porosity (%)	OBIP (10^6m^3)	Ult Rec (10^6m^3)	Cum Prod [1] (10^6m^3)	RF (%) to Date [1]
AA	501,959	32	78	34	4.3	2.4	1.5	35
BB	505,867	46	77	34	6.0	4.3	3.4	57
CC	506,800	38	74	34	4.8	1.6	0.7	17
DD	506,799	39	76	34	5.1	1.9	0.9	18
FF	653,895	32	76	34	5.4	2.6	1.4	26
KK	506,801	31	77	34	4.1	1.2	0.9	22
OO	573,574	40	82	34	6.4	4.0	1.1	17
PP	802,652	31	81	35	7.0	4.0	1.8	26

[1] Effective August 31/2018

2018 Scheme Performance

Jackfish 3 Pad Recoveries

3.1.1-7c

Pad	Area (m^2)	Avg. GRV Pay (m)	Net GRV Pay S_o (%)	Net GRV Pay Porosity (%)	OBIP (10^6m^3)	Ult Rec (10^6m^3)	Cum Prod [1] (10^6m^3)	RF (%) to Date [1]
J	530,754	38	71	34	4.9	2.3	0.8	16
K	671,303	46	84	34	8.8	5.4	2.6	30
EE	506,800	47	76	33	6.1	3.8	1.7	28
RR	724,014	34	80	34	6.7	2.4	1.4	21
VV	558,761	44	75	34	6.2	3.3	1.5	24
EEE	1,00,1409	33	75	34	8.4	3.6	NA	NA

[1] Effective August 31/2018

Jackfish 2 - Pad DD Highlights

Low Performer

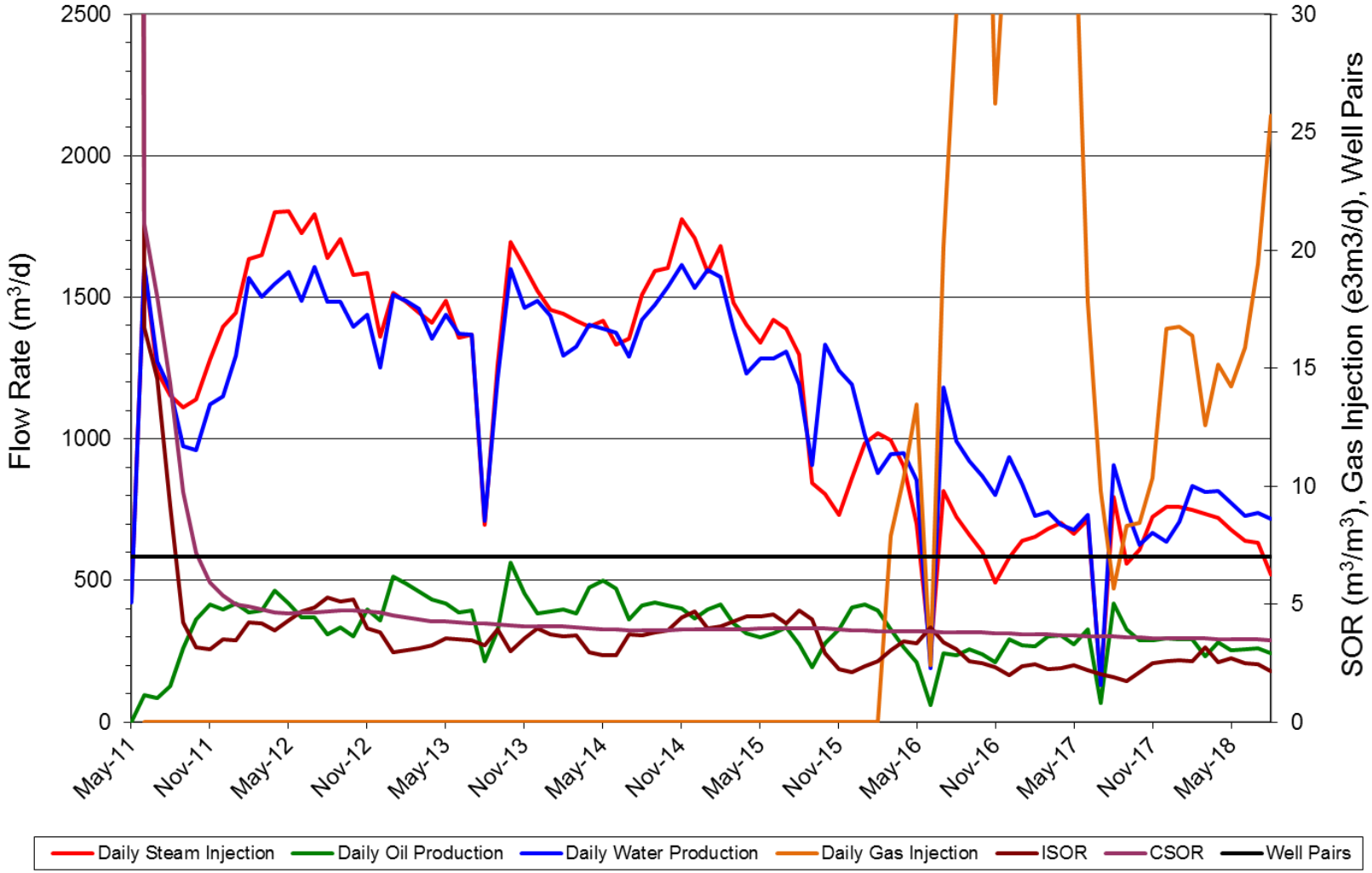
3.1.1-7c

- First steam occurred in June 2011
- NCG injection commenced as of March 2016 on wells DD1, DD3, DD5, and DD6
- Heterogeneous reservoir with low mid-heel ceiling of ~5m pay thickness
    - Limited vertical steam chamber growth
    - Regions of poor temperature conformance
- Inflow Control Device installed in September 2013 (DD2)
- Inflow Control Device installed in November 2014 (DD7
- Potential fluid interaction with Pad AA due to chamber growth on DD1-DD3 wells

Pad DD Performance

Jackfish 2 Pad DD Life Plot

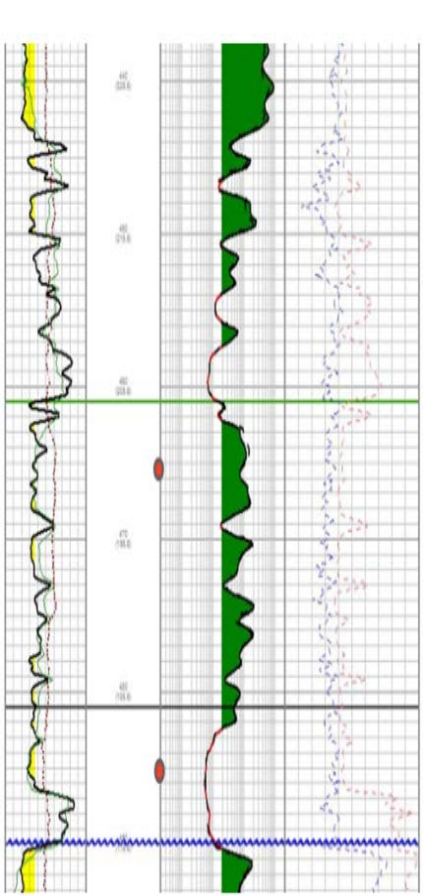
3.1.1-7c



Pad DD Toe Observation Well Temp

(10.5m from DD3 well pair)

3.1.1-7c



Jackfish 3 - Pad EE Highlights

Medium Performer

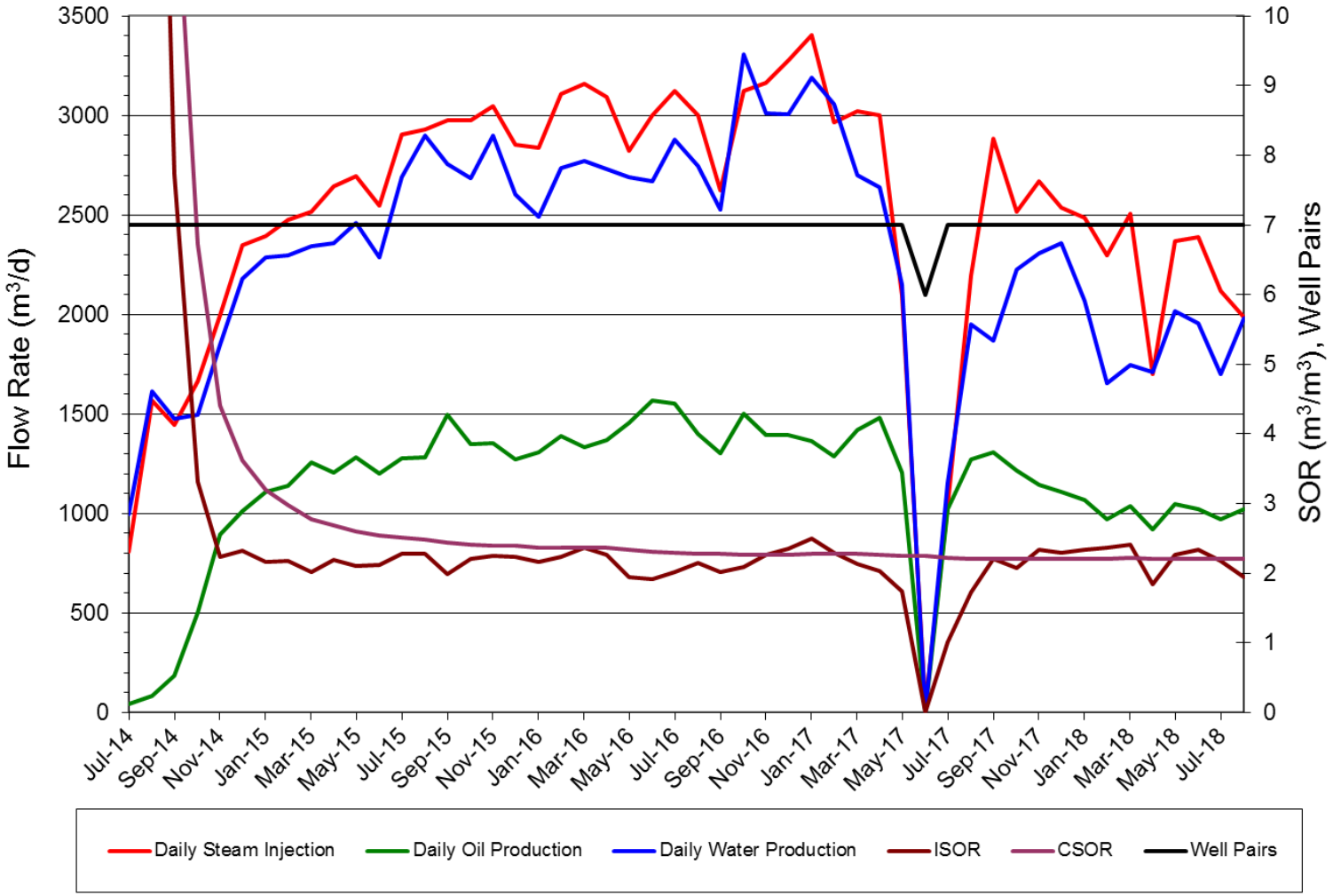
3.1.1-7c

- First steam occurred in July 2014
- Seven well pairs in operation
- Production currently in plateau phase
- Wells EE1 – EE5 have clean sand with uniform ceiling
- Wells EE6 – EE7 have low ceiling at toe of wells
- Steam subs opened on EE1 – EE5 in 2015 to increase steam injection rates
- Pad SOR historical average between 2.0 – 2.5
- EE exhibiting signs of transition into decline

Pad EE Performance

Jackfish 3 Pad EE Life Plot

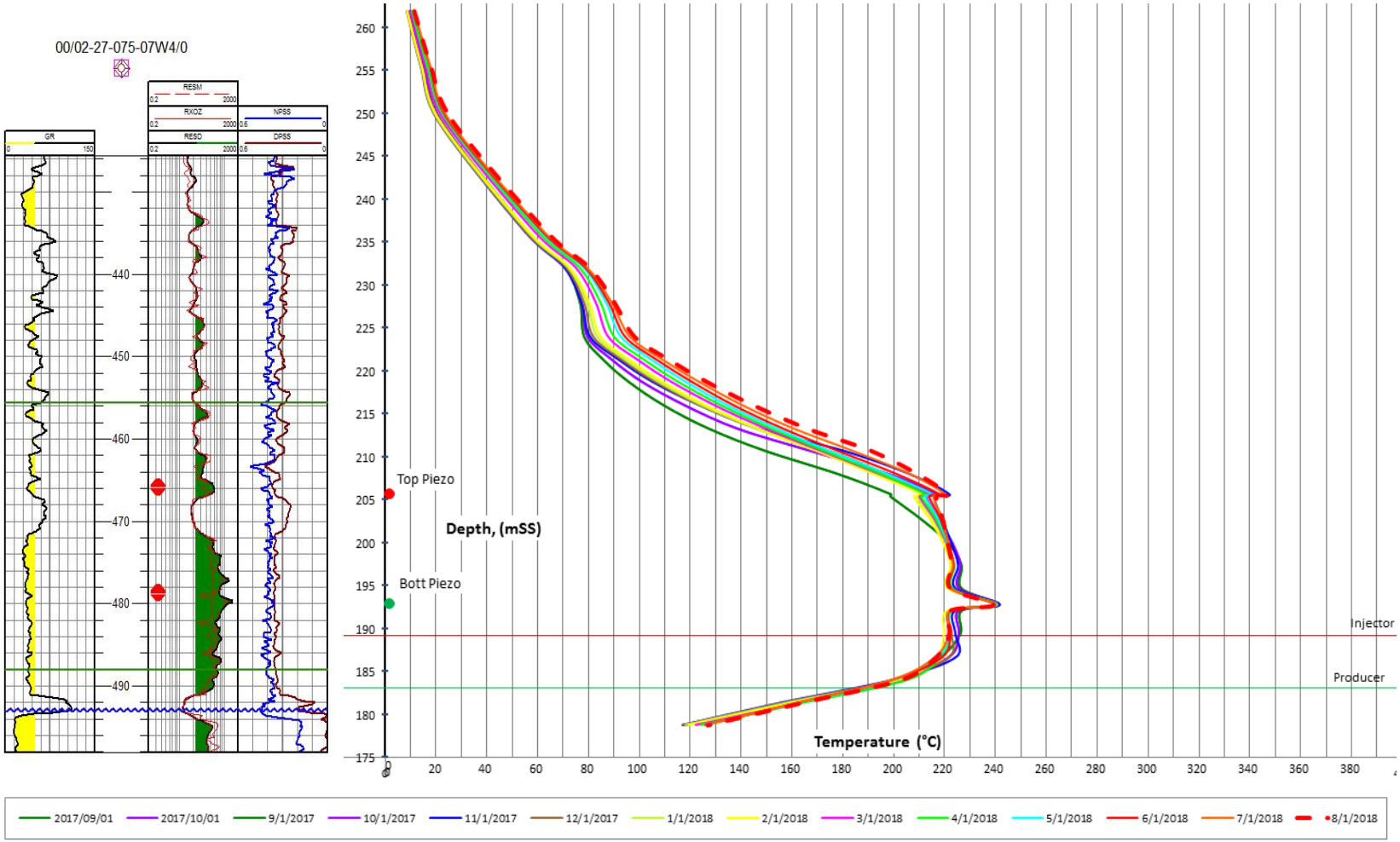
3.1.1-7c



Pad EE Heel Observation Well Temp

(4.8m from EE5 well pair)

3.1.1-7c



Jackfish 3 - Pad K Highlights

High Performer

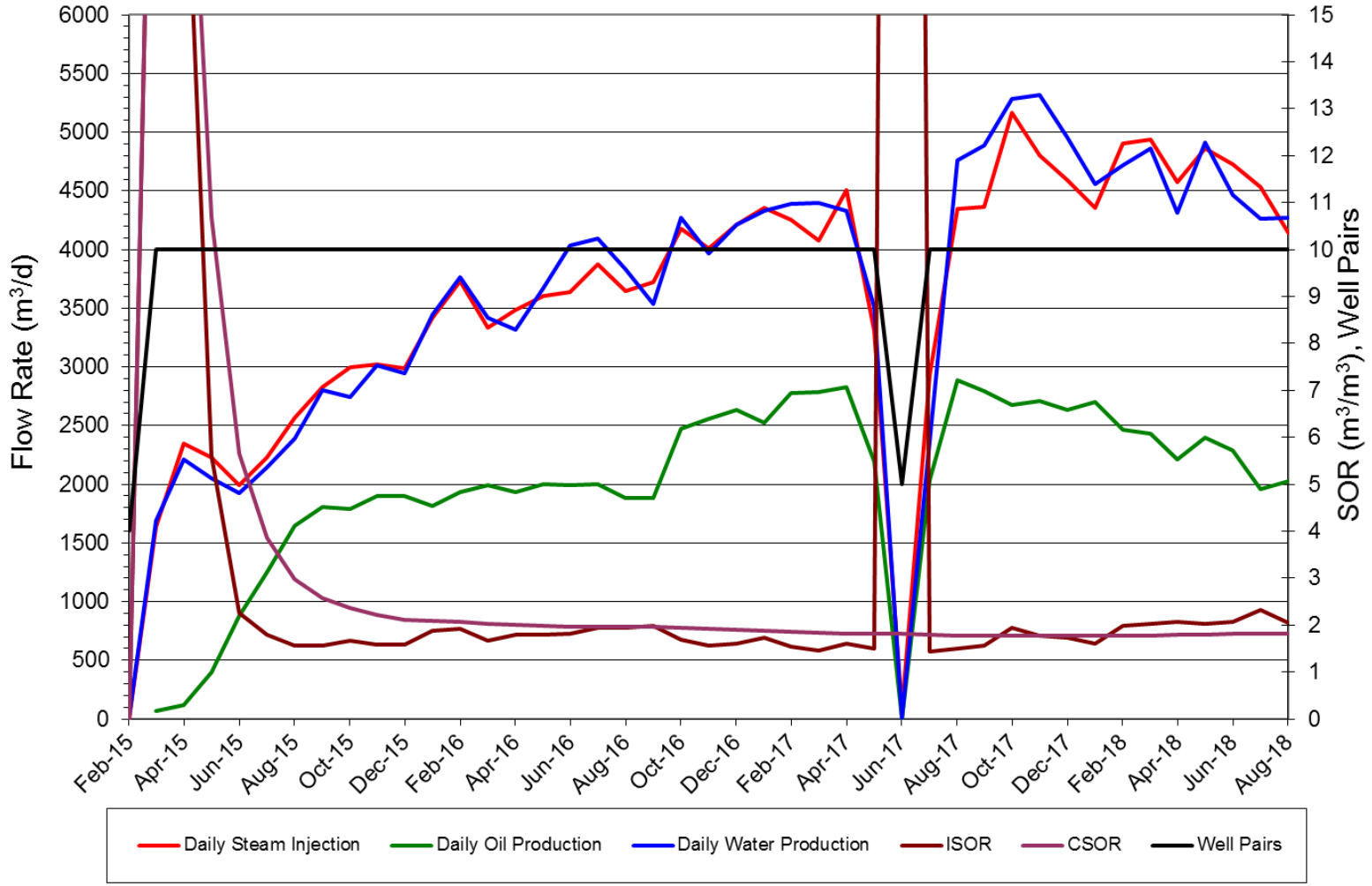
3.1.1-7c

- First steam occurred in February 2015
- Ten well pairs are in operation
- Best performing pad at Jackfish 3
- Clean sand throughout all ten well pairs
- Historical SOR < 2
- Pad K starting to exhibit signs of potential decline

Pad K Performance

Jackfish 3 Pad K Life Plot

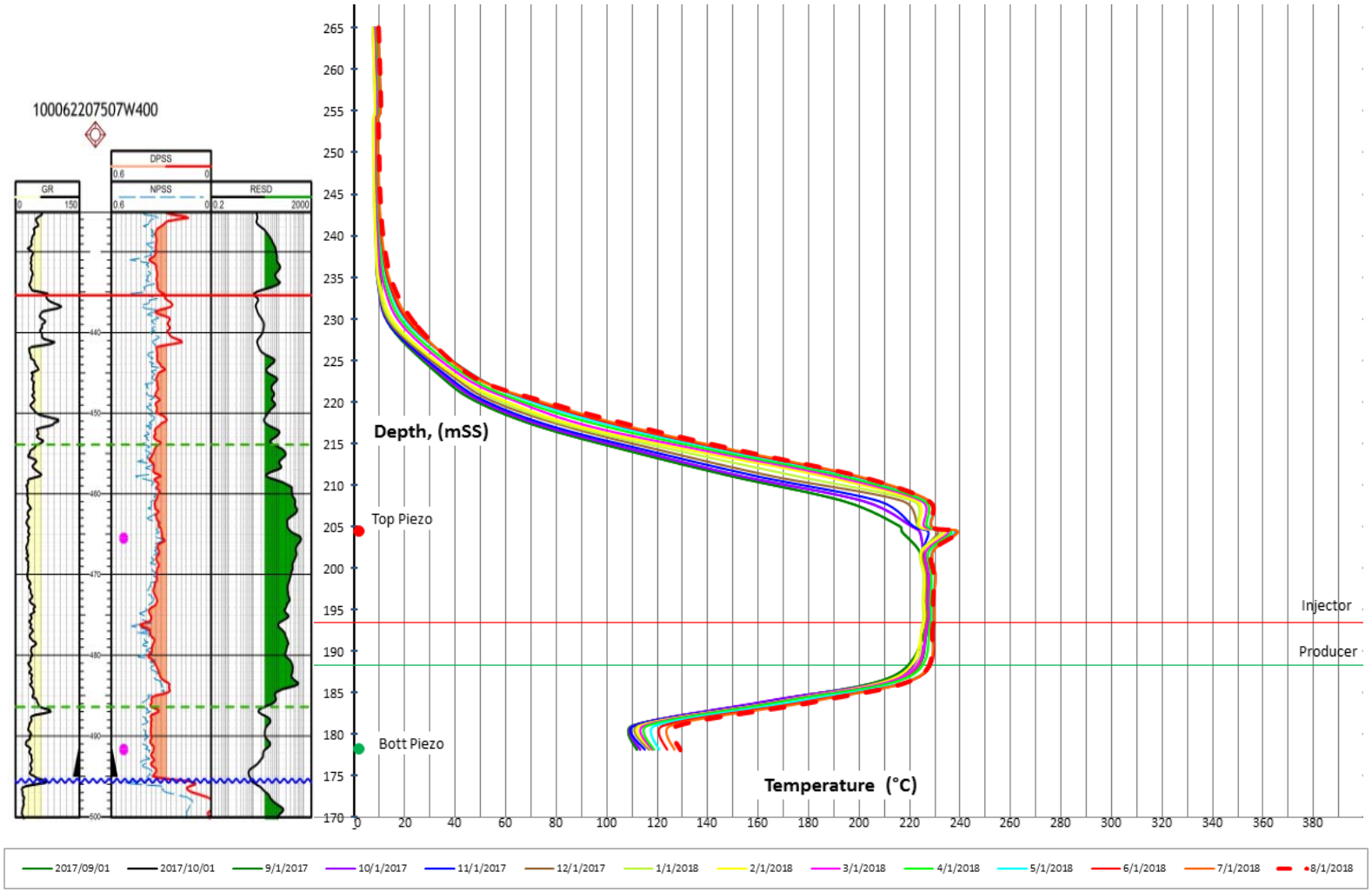
3.1.1-7c



Pad K Toe Observation Well Temp

(9.5m from K5 well pair)

3.1.1-7c



Five Year Outlook

Jackfish Pad Abandonments

3.1.1-7c

- No anticipated pad abandonments at Jackfish within the next five years

Wellhead Steam Quality

3.1.1-7d

	Pressure (kPag)	Temperature (°C)	Quality (%)
Plant Gate	9,600	311	100%
JF1 Wellhead	2,500-3,700*	226-246	97%
JF2 Wellhead	2,500-4,400*	226-256	97%
JF3 Wellhead	2,500-4,400*	226-256	97%

* Maximum injection pressure for each facility in line with MOP

- Losses in steam quality occur as steam is transported to the pads
- Utilize condensate traps at each pad to maximize wellhead steam quality

NCG Co-Injection

3.1.1-7e, g

- Overview
  - NCG source is fuel gas, primarily composed of methane
  - 6 Pads online: B, C, D, DD, KK & FF

- Learnings to date:
  - NCG injection rates within expected range (1 – 4 mole%, per pad)
  - NCG successful in maintaining chamber pressure with reduced steam
  - No negative impact to resource recovery observed in late life NCG co-injection
  - Improved SOR observed

- Go Forward Plan
  - 10 new Pads planned to be available for co-injection by end of 2019
  - Continuing to monitor and evaluate NCG performance

Steam Additive Update

3.1.1-7e, g

- Overview
  - Additive (water-oil mutual solvent) is co-injected with steam
  - First stage of the testing will evaluate the impact of the product in the CPF
  - Additive co-injection was implemented as follows:
    - OO3 well pair initiated on May 13, 2018
    - OO5 well pair initiated on June 4, 2018
    - Injecting ~11.0-18.0 e3m3/month gas equivalent

- Learnings to date
  - No noticeable impact to fluid treatment and separation in the CPF

- Go-Forward Plan
  - Continue to evaluate well performance and potential impact on CPF

Jackfish Performance

Key Learnings

3.1.1-7f

- District SOR improvements tied to pressure reduction and optimization
- Maintained focus on pressure balance with the aquifer is beneficial
- Successful use of NCG enables steam transfer to higher quality pads

Future Plans

Section 3.1.1-8

devon

Future Plans

Well Operations, Drilling, and Trials

3.1.1-8a, b

Jackfish 1

- Pad EX – SAGD completions planned Q1 2019

Jackfish 2

- Pad MM – SAGD drilling planned Q3 2018
- Pad TT – SAGD drilling planned Q2 2019
- Pad XX – SAGD drilling planned Q3 2019

Jackfish 3

- Pad OOO SAGD drilling planned Q2 2019

Future Plans

Jackfish District Steam Strategy

3.1.1-8c

Jackfish 1

- Utilizing steam capacity while managing SOR through steam allocation, execution of NCG co-injection, and continuing to balanced chamber pressures with aquifer

Jackfish 2

- Utilizing steam capacity while managing SOR through steam allocation, pressure management, and leveraging NCG co-injection across asset

Jackfish 3

- Utilizing steam capacity while managing SOR through steam allocation, pressure management, and leveraging NCG co-injection across asset

Surface Operations

devon

Facilities

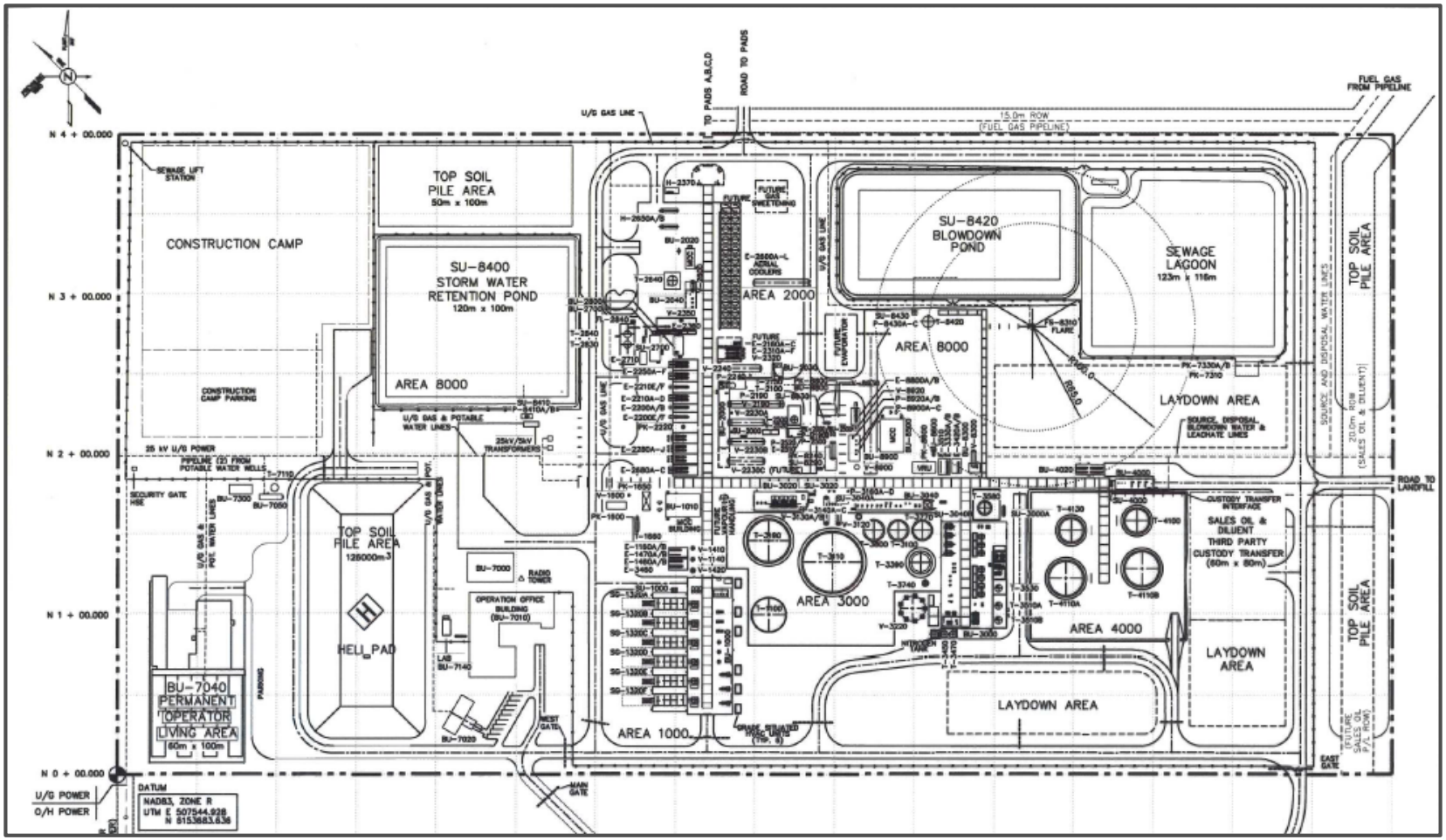
Section 3.1.2-1

devon

Facilities

Plot Plan – Jackfish 1

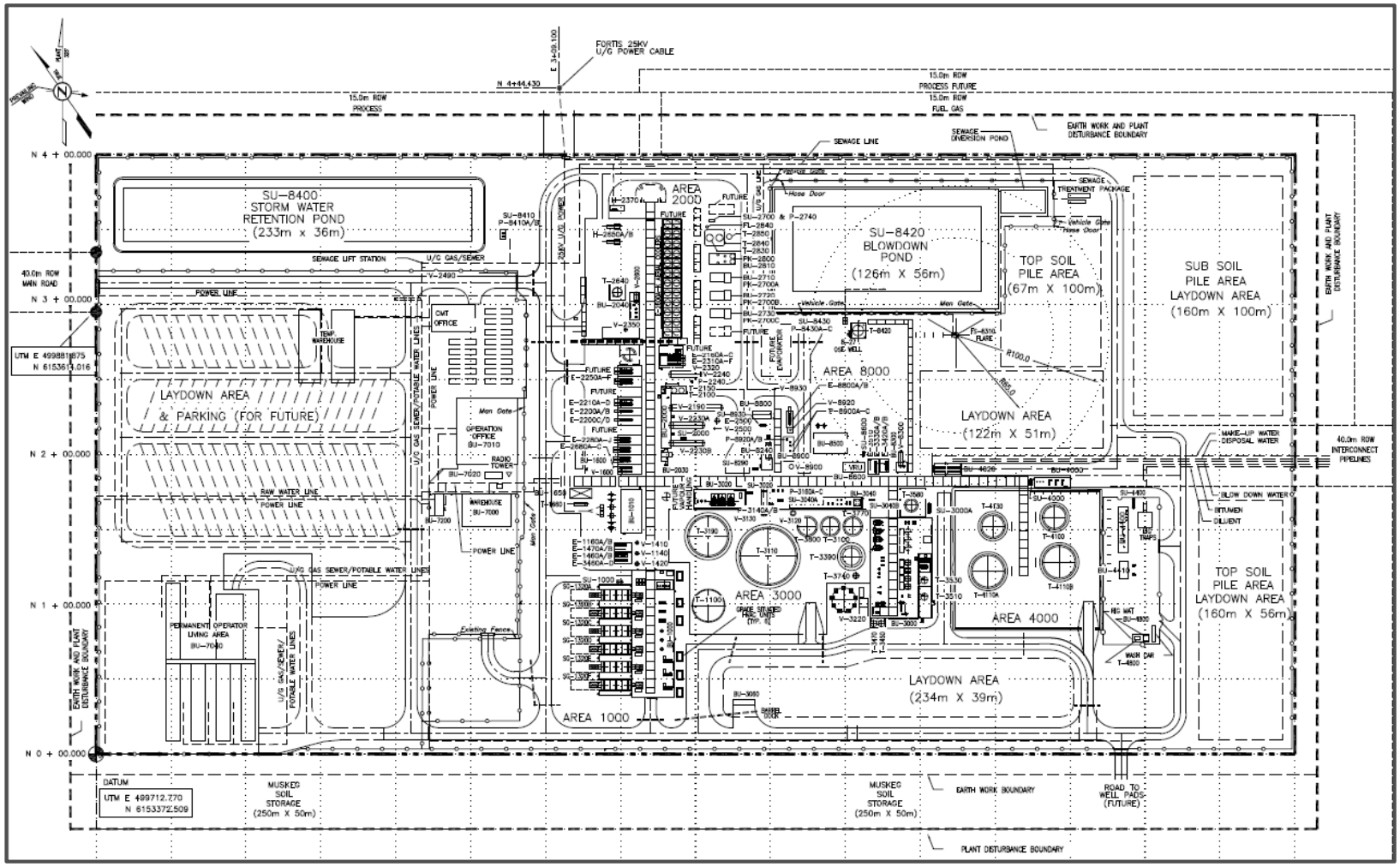
3.1.2-1a



Facilities

Plot Plan – Jackfish 2

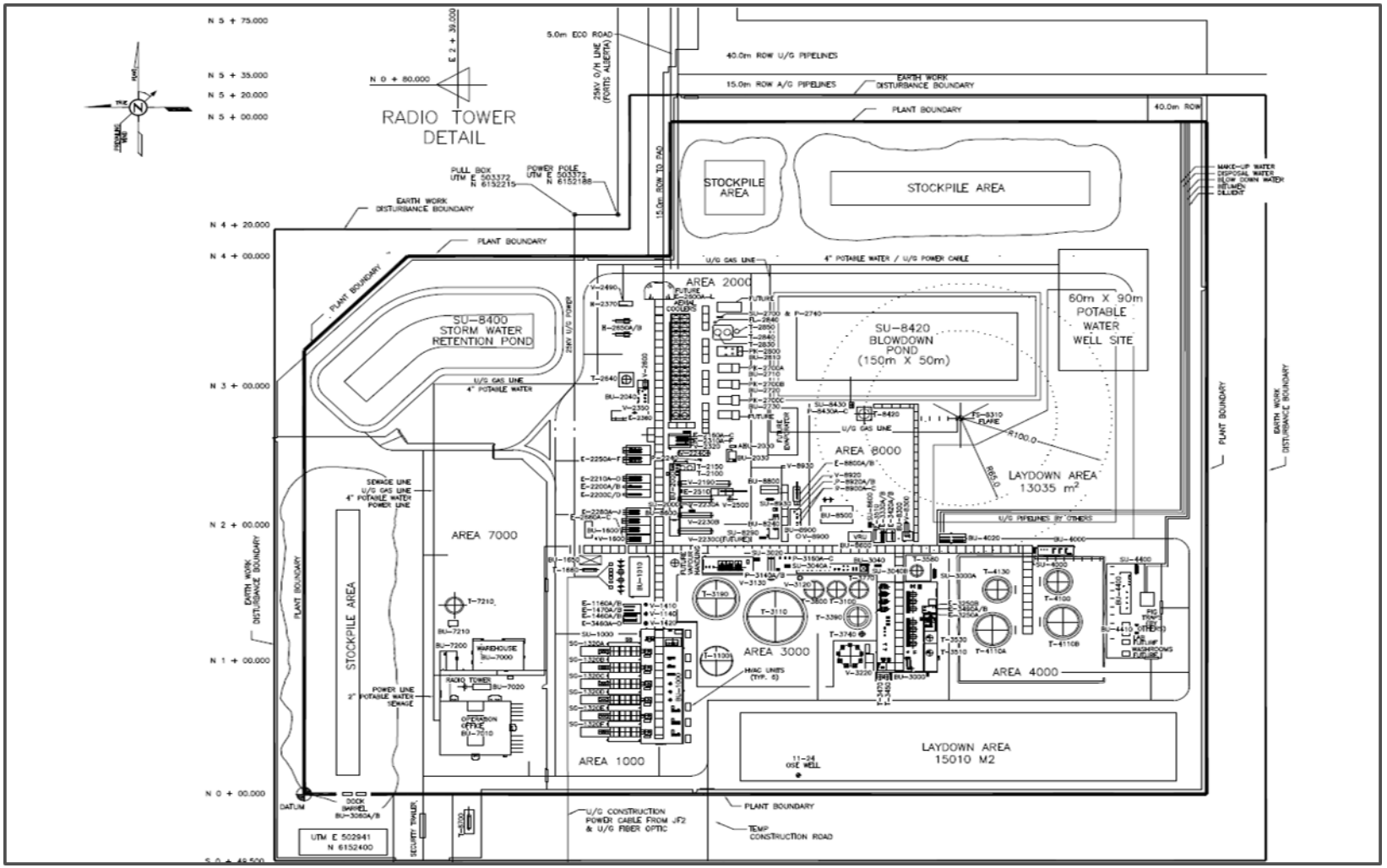
3.1.2-1a



Facilities

Plot Plan – Jackfish 3

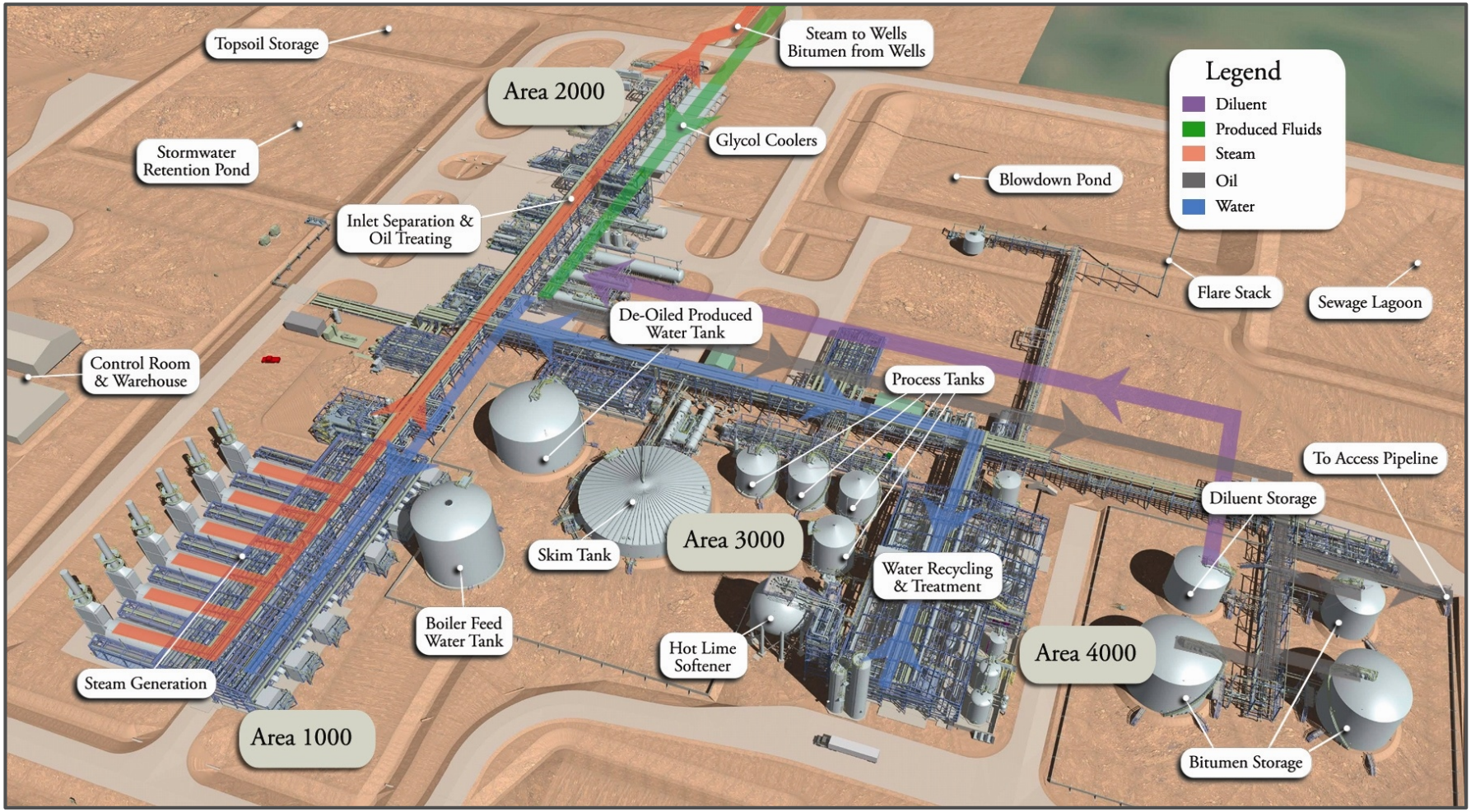
3.1.2-1a



Facilities

Plant Schematic

3.1.2-1b



Facilities Performance

Section 3.1.2-2

devon

Facilities Performance

3.1.2-2a-c

Turnarounds/Outages

- Jackfish 1 maintenance turnaround completed June 2018

Bitumen Treatment

- Stable operation production rates at J2/J3

Water Treatment

- Utilized brackish water wells with TDS ranging from 4,000-22,000 ppm for all make up water requirements
- Addition of 4th LSF at Jackfish 2, and Jackfish 3

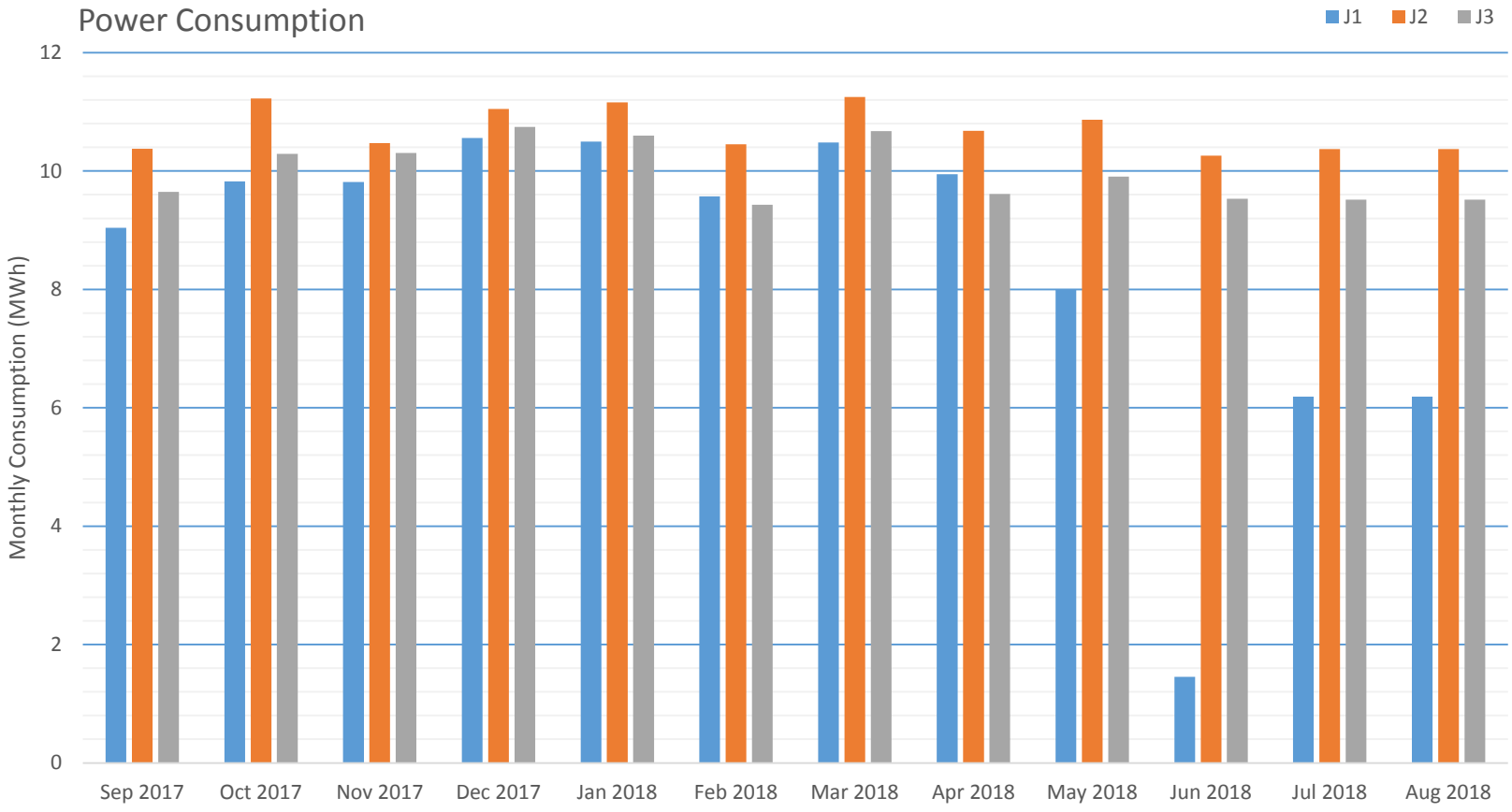
Steam Generation

- 80% overall steam quality targeted to decrease blowdown disposal volumes and increase steam generation

Facilities Performance

Power Consumption

3.1.2-2d

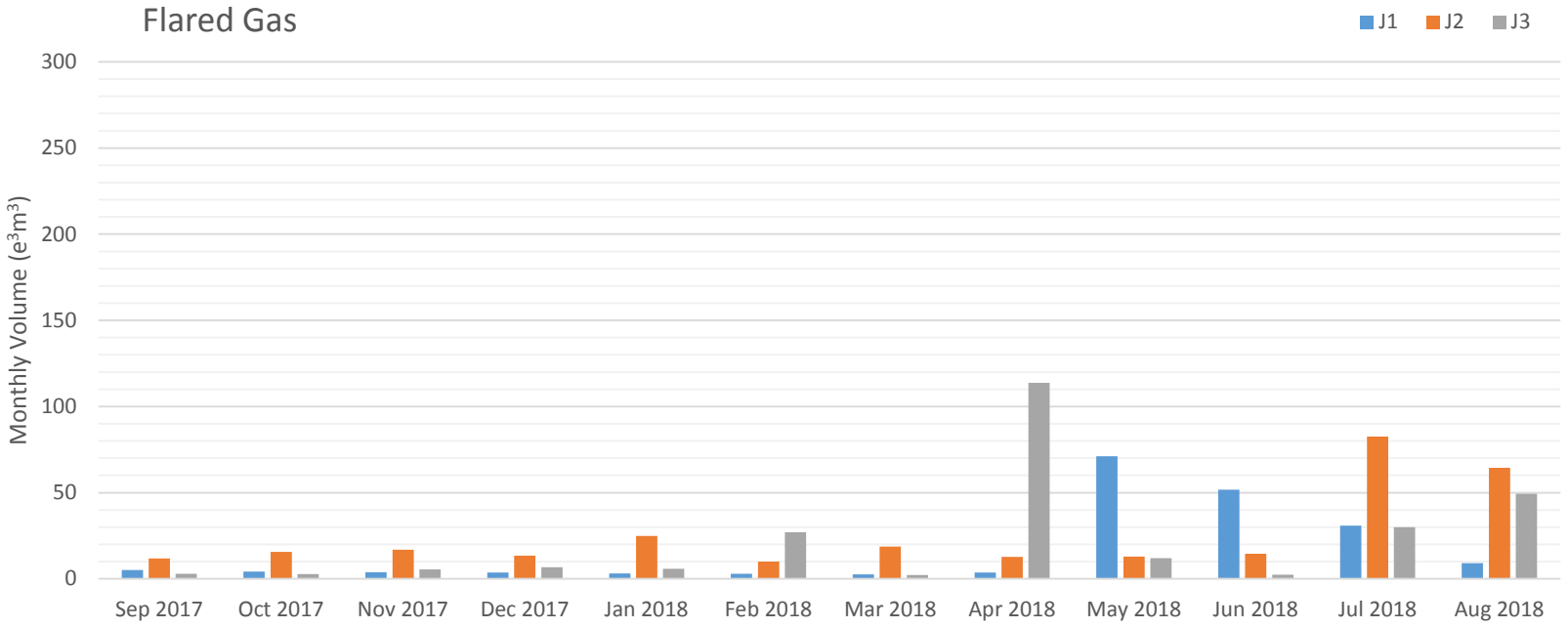


- Power consumption was low in May-July 2018 for planned maintenance turnaround

Facilities Performance

Flared Gas Volume

3.1.2-2e



Flare volumes include produced gas only. Volumes are aligned with MARP reporting requirements for Jackfish.

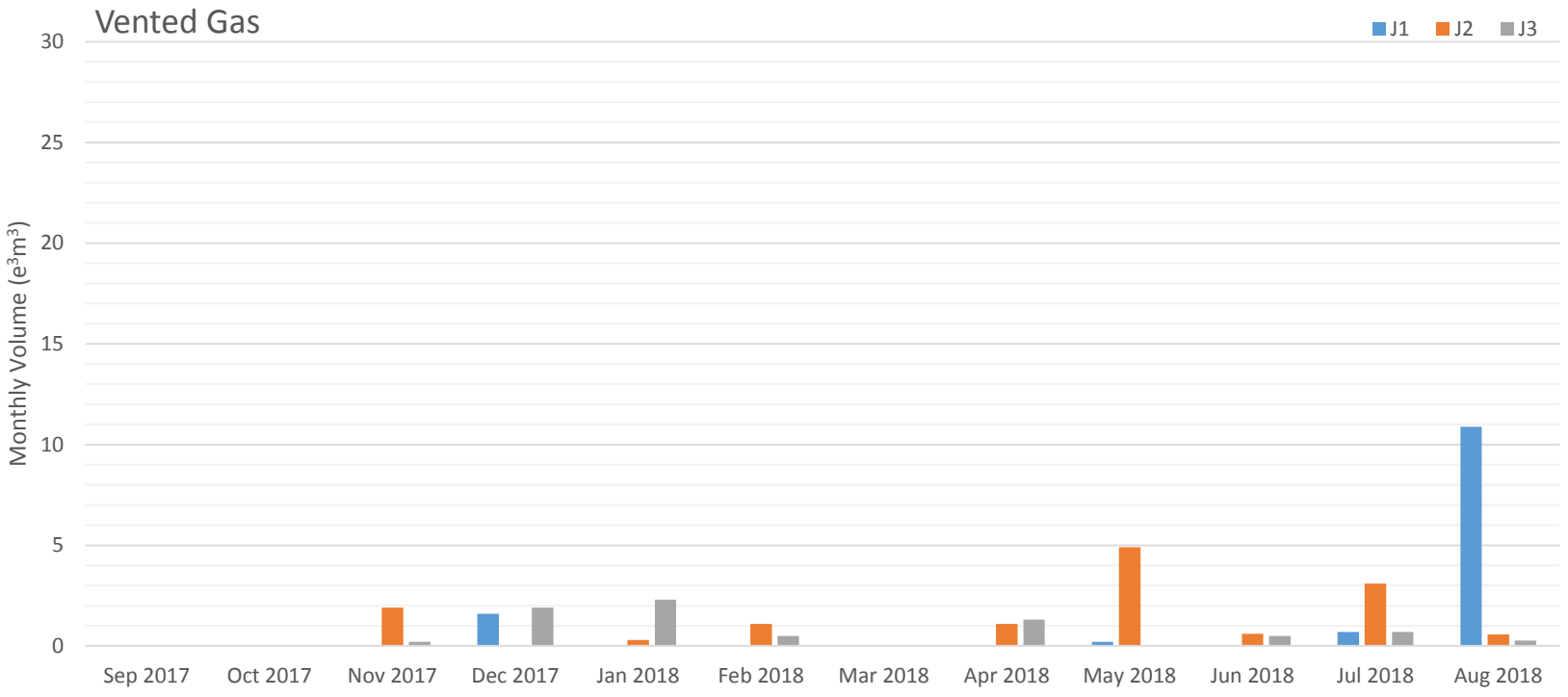
- J1: May/June – Maintenance Turnaround
- J2: July/August – Process upsets
- J3: April – Gas boot compressor maintenance

Devon notified the AER of all events as per *Directive 60*

Facilities Performance

Vented Gas Volume

3.1.2-2e



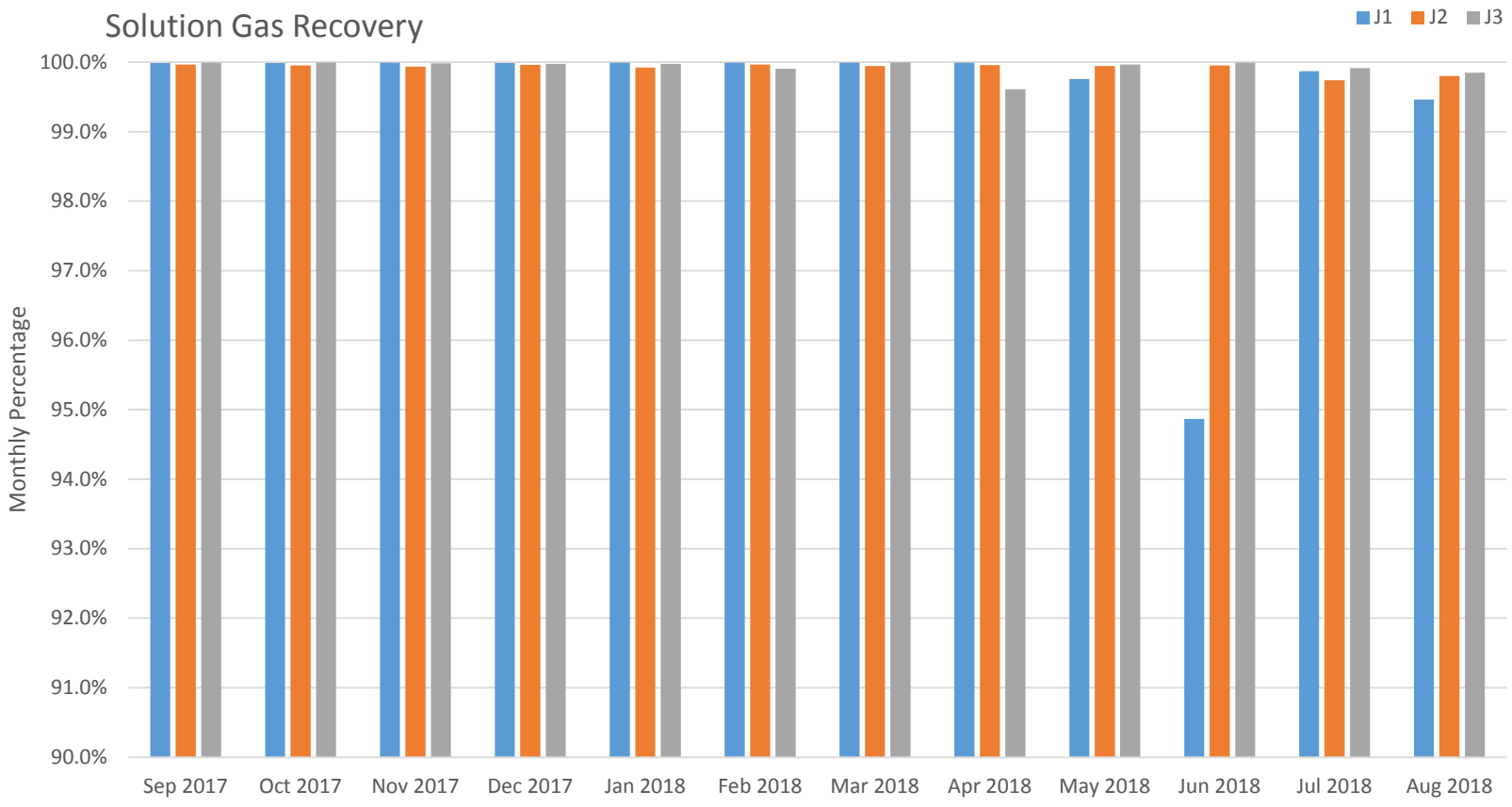
- J1: August – Plant trip, process upset
- J2: May/July – VRU Trips

Devon notified the AER of all events as per *Directive 60*

Facilities Performance

Solution Gas Recovery

3.1.2-2e

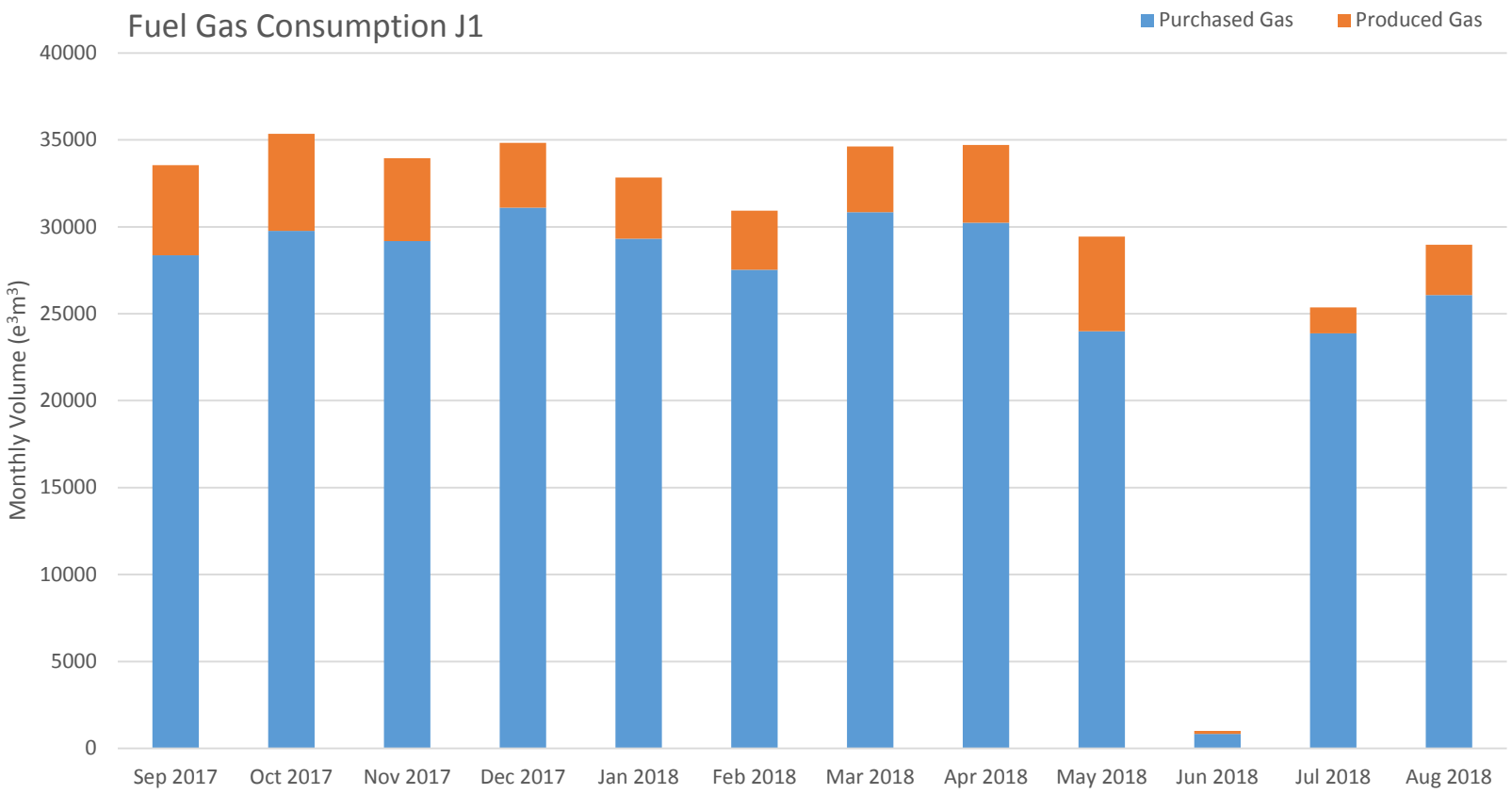


- J1: June – Lower gas recovery due to turnaround gas flaring events

Facilities Performance

Fuel Gas Consumption

3.1.2-2e

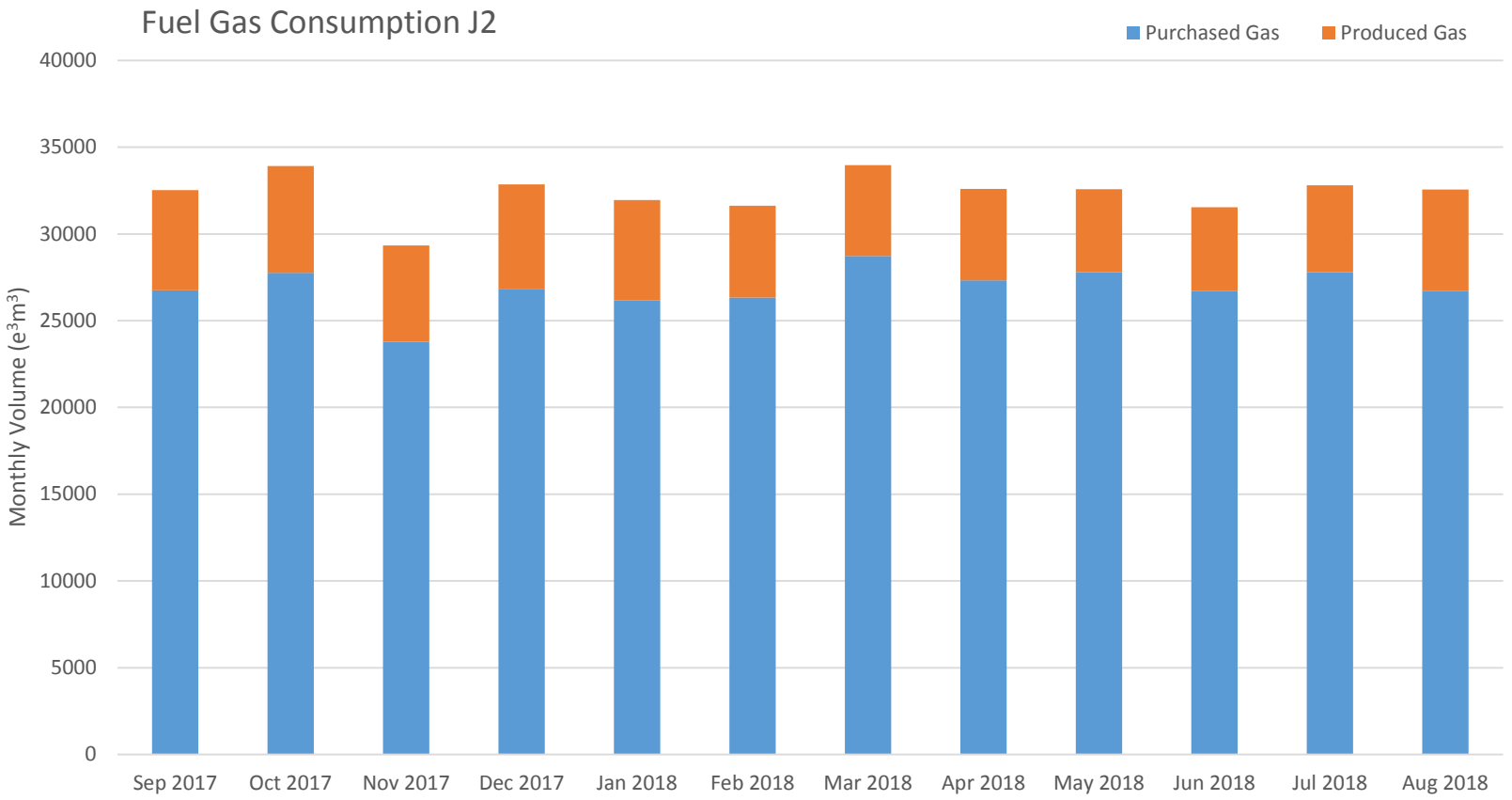


- J1: May/June – Volumes lower due to planned maintenance turnaround

Facilities Performance

Fuel Gas Consumption

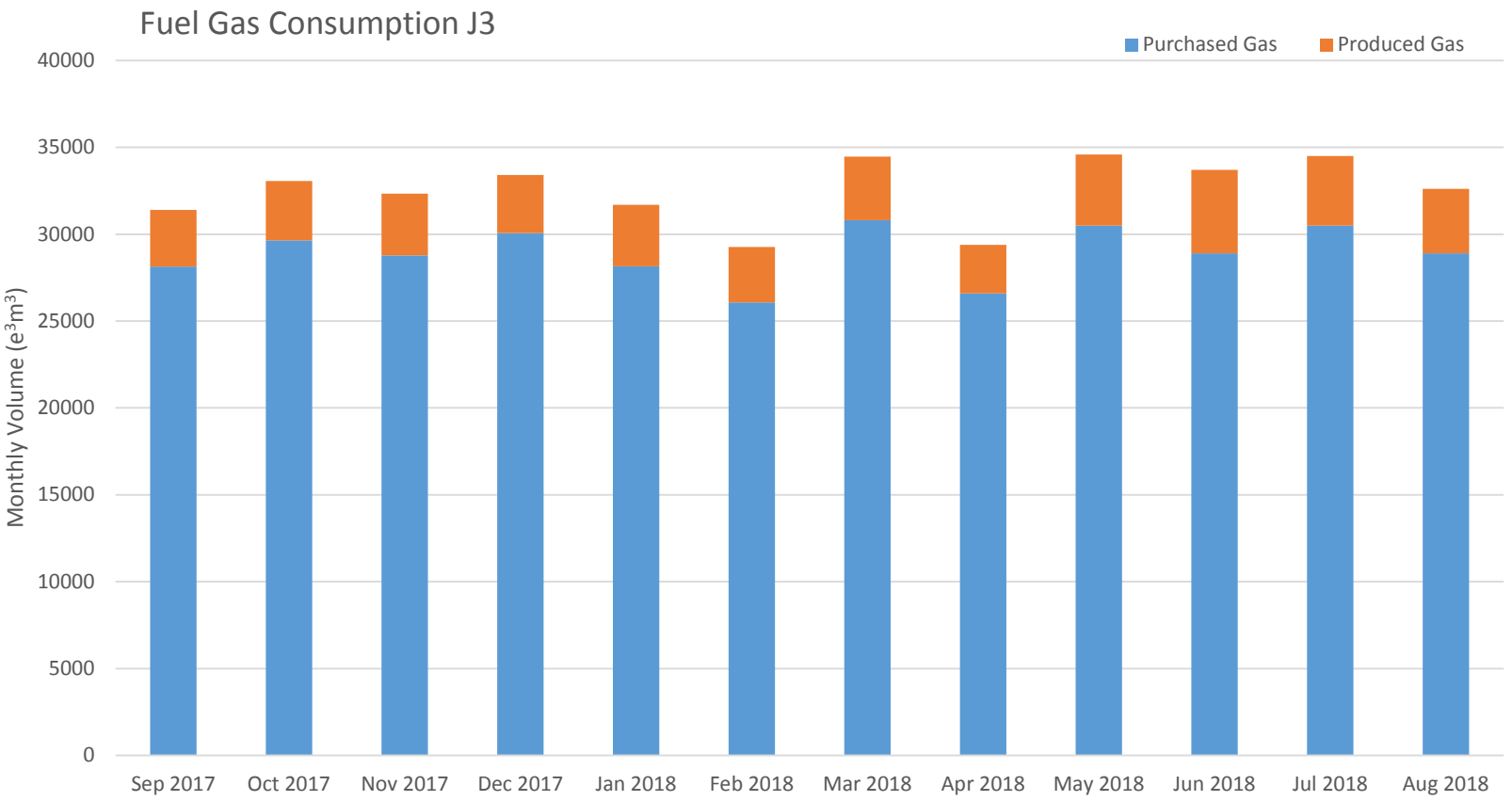
3.1.2-2e



Facilities Performance

Fuel Gas Consumption

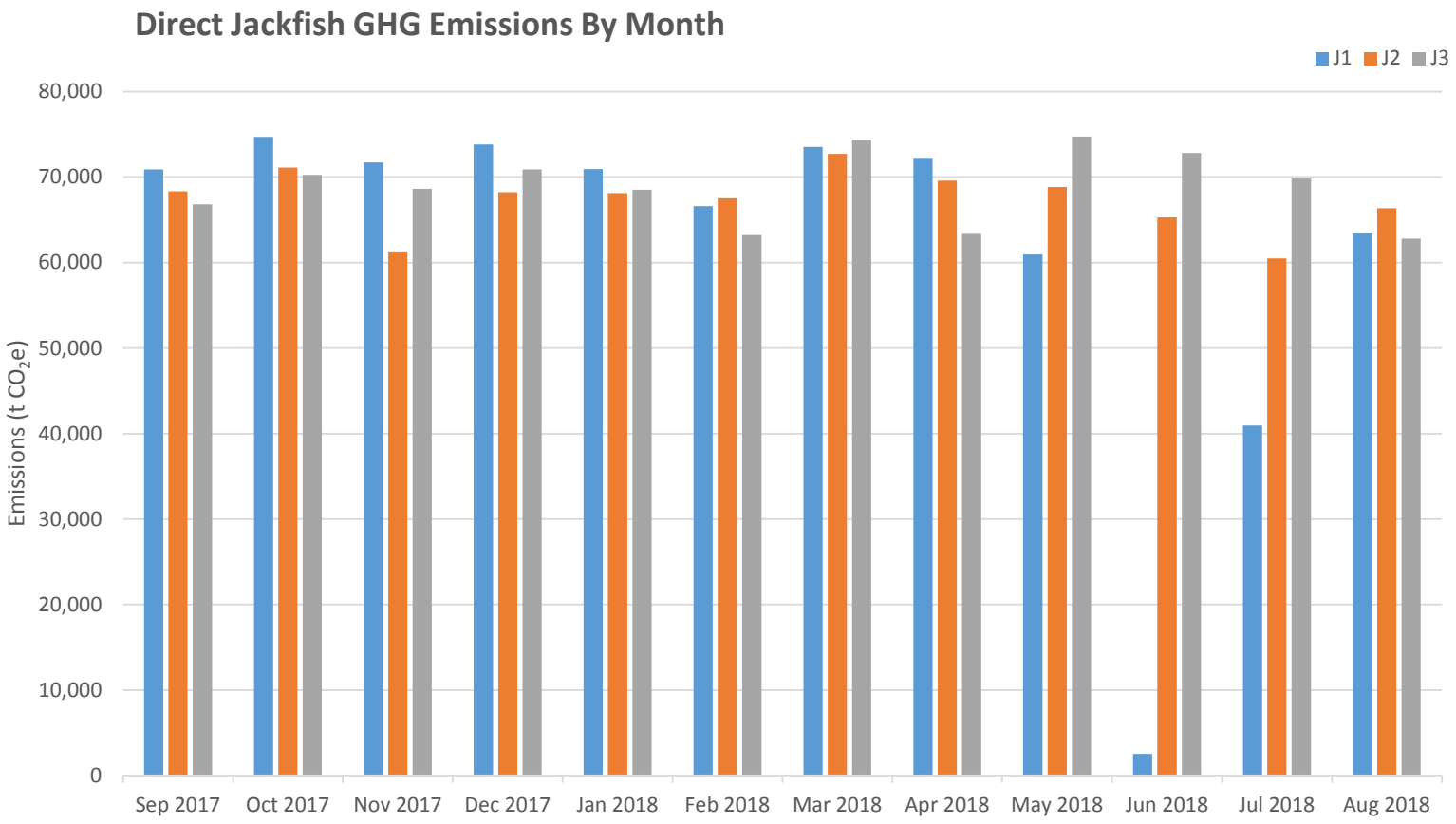
3.1.2-2e



Facilities Performance

Greenhouse Gas Emissions (GHG)

3.1.2-2f



- J1: June/July – Volumes lower due to planned maintenance turnaround

Measurement and Reporting

Section 3.1.2-3

devon

Measurement and Reporting

Production and Injection Volumes

3.1.2-3a, c

Well Bitumen / Water Production

- The total battery production is allocated to each SAGD producing well based on individual well tests
- Battery Bitumen Production = Dispositions – Receipts + ΔInventory + Blending Shrinkage
- Battery Water Production = Inlet Produced Water + ΔInventory + Truck Out – Truck in – Desand Water to Treater and FWKO
- Individual well test:
    - Each pad equipped with test separator along with coriolis meter and watercut analyzer on liquid leg
    - Vortex meter for gas measurement / water vapor calculation
    - Tested water volume includes the calculated water vapor (from $P_{sat}/P_{measured}$)
    - Typical well test duration is nine hours

Measurement and Reporting

Production and Injection Volumes

3.1.2-3a, c

Well Gas Production

- Well estimated test gas production = GOR x test bitumen production
- Battery Gas Production = Fuel + Fuel to IF + Flare – TCPL Purchase – Receipt Gas – Diluent Flash
- Battery gas is allocated to each well based on well test

Steam Injection

- Total steam to field measured downstream of HP separators minus the steam condensate
  - Alternate steam determination in place at J2 and J3
- Vortex meters at each wellhead are used to allocate the total steam

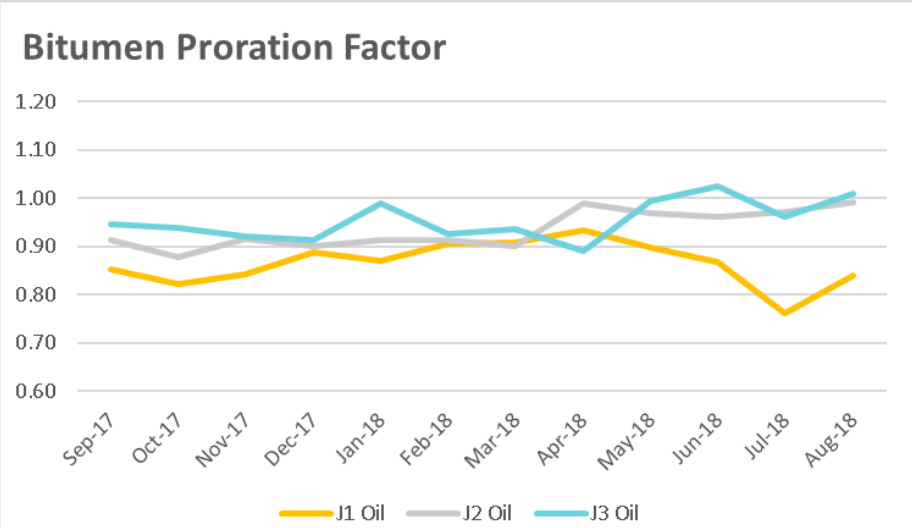
Measurement and Reporting

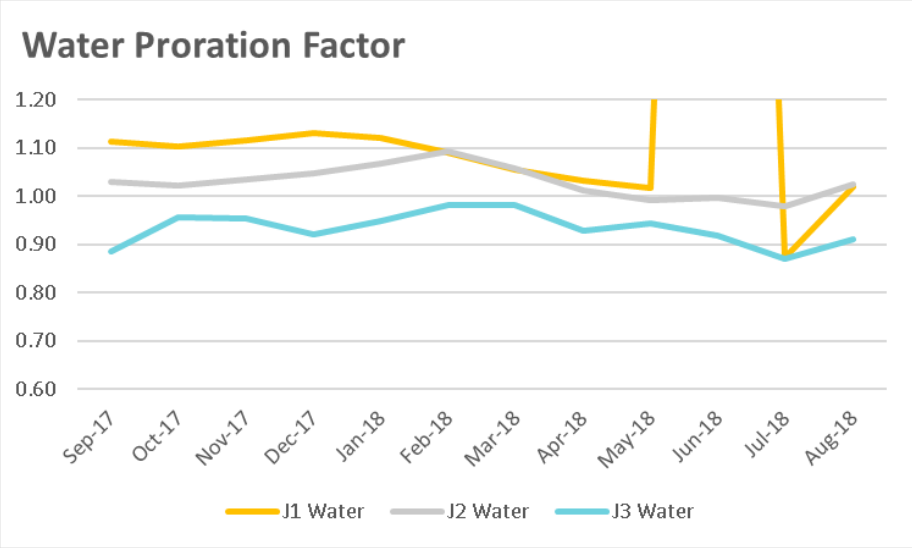
Proration Factors

3.1.2-3a, b

Bitumen / Water Proration Factor

- Typically within AER target tolerances on an ongoing basis
- Jackfish 1 extended facility outage June / July 2018
- Jackfish 1 bitumen proration being monitored by Devon





Measurement and Reporting

New Measurement Technology - Update

3.1.2-3d

Plant Gate Steam Metering with Bypass

- Replacement meters (dual path ultrasonic) installed in Q3-2018 – in service Q4-2018

Water Production, Injection, and Uses

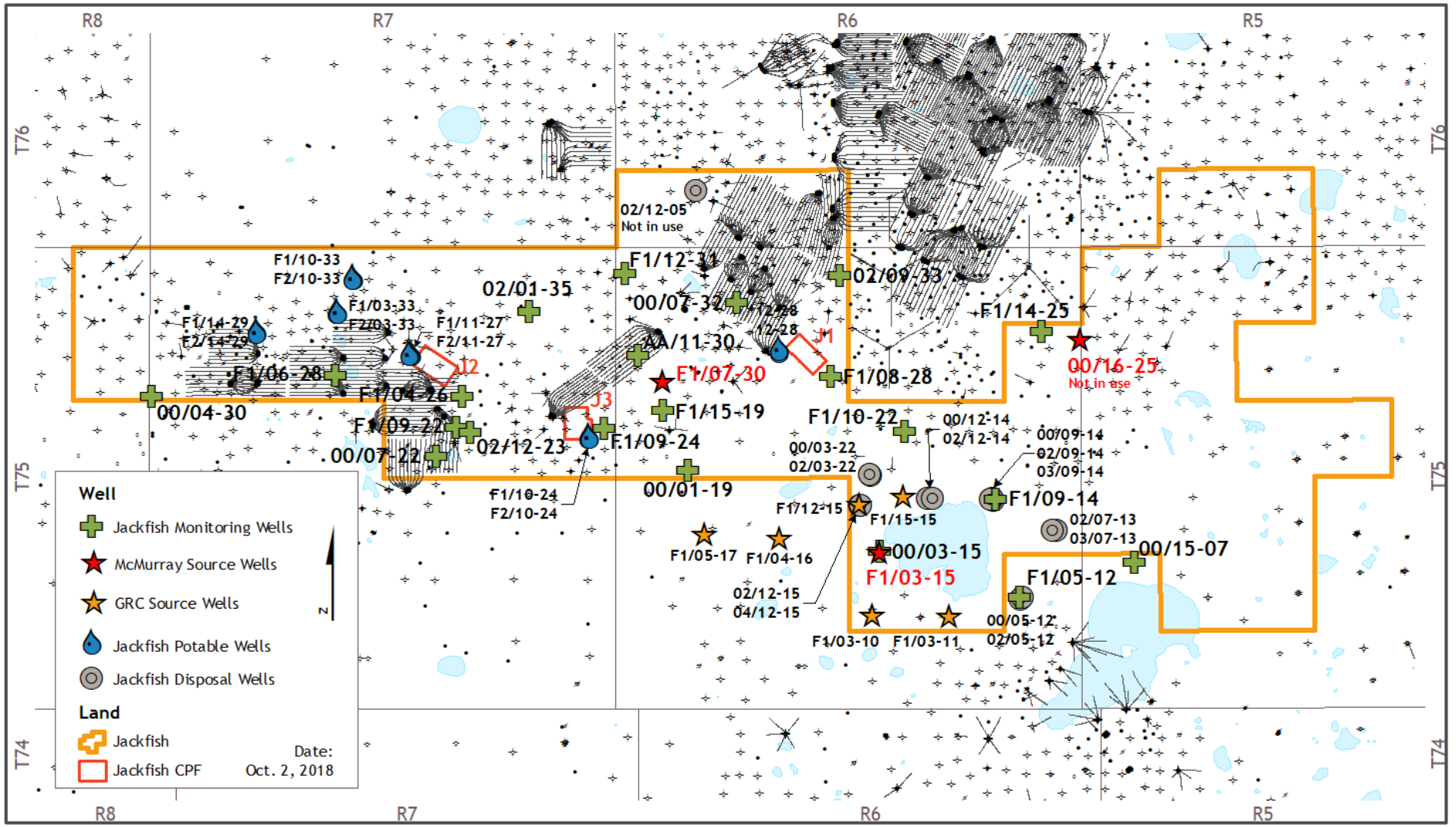
Section 3.1.2-4

devon

Water Disposal and Source Water

Well Locations

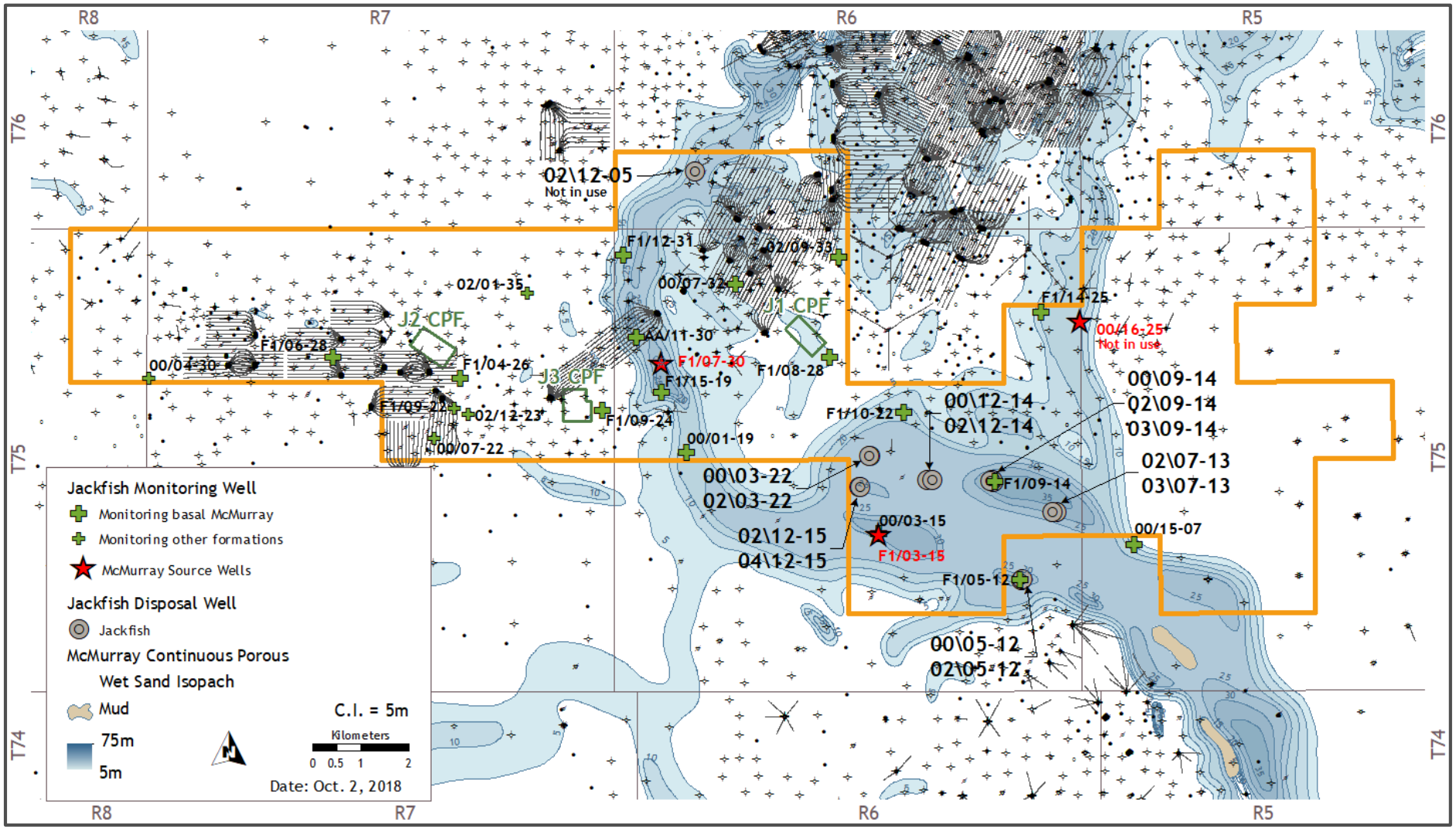
3.1.2-4a



Water Disposal Geology

Basal McMurray Aquifer

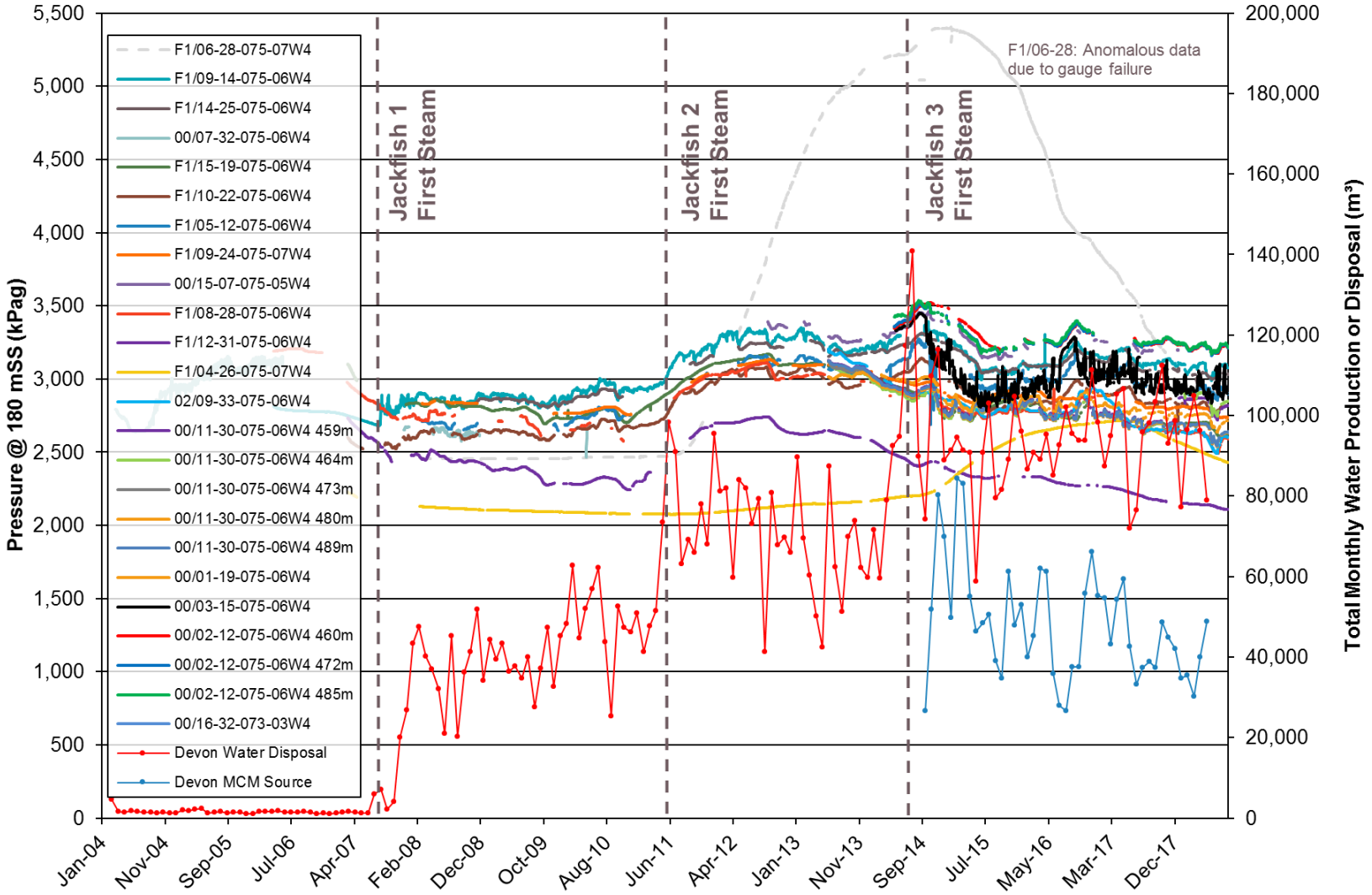
3.1.2-4a



Water Disposal Operations

Basal McMurray Pressure in 75-6W4, 75-7W4

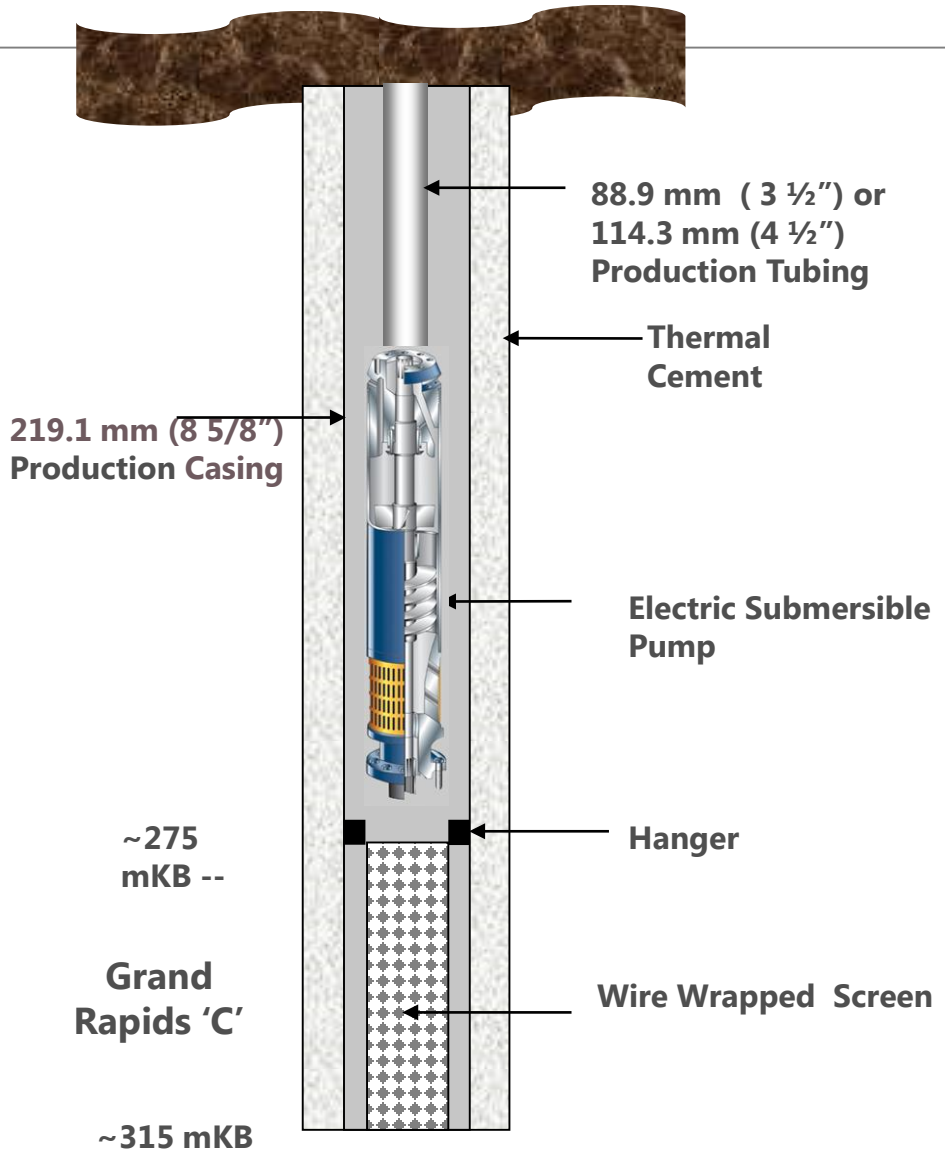
3.1.2-4a



Water Usage - Brackish

3.1.2-4a

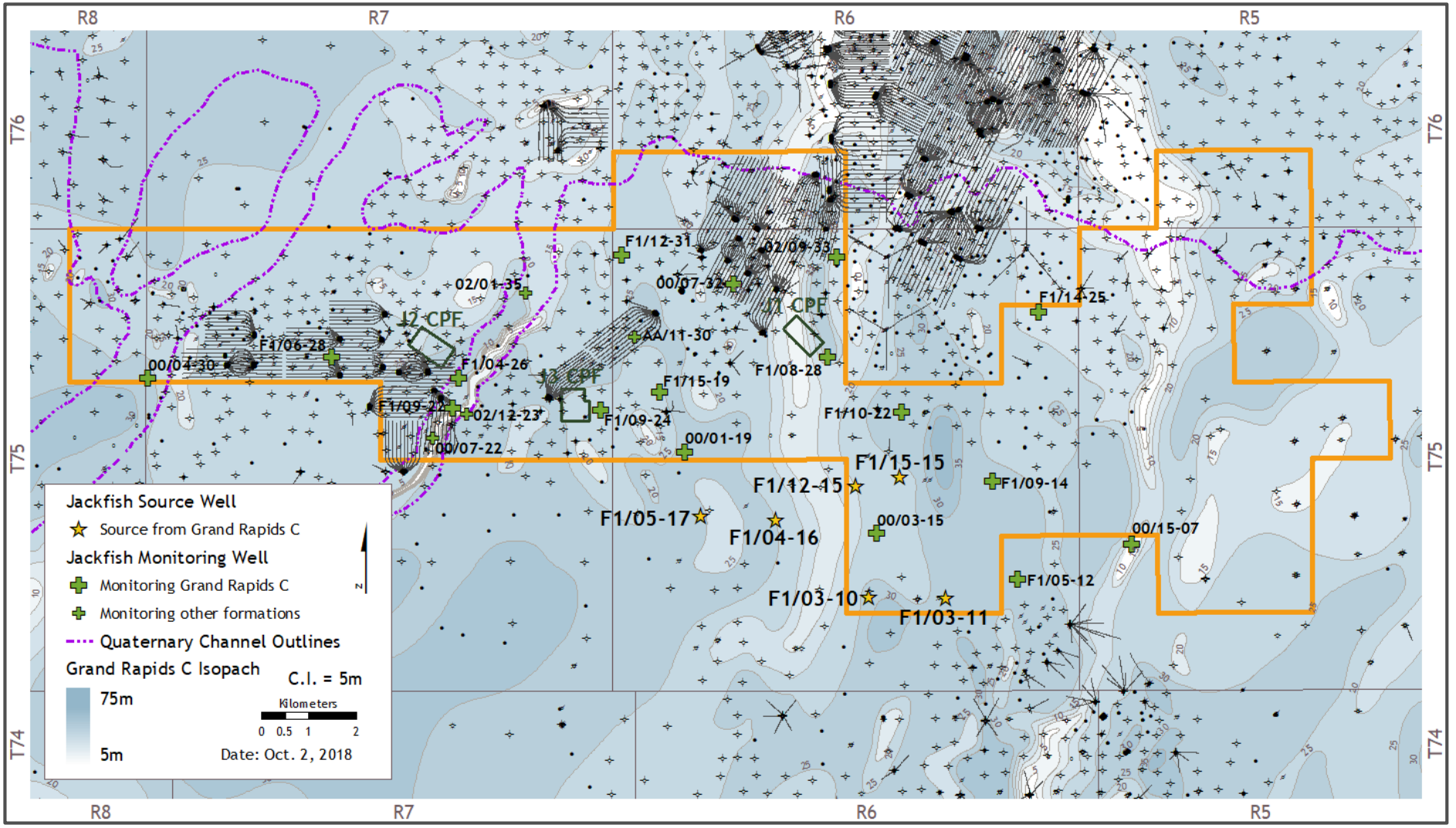
- Brackish source water produced from the Grand Rapids 'C' and McMurray zones
- Available for Jackfish 1, Jackfish 2, and Jackfish 3
- Two McMurray Wells:
  - F1/07-30-075-06W4
  - F1/03-15-075-06W4
- Six Grand Rapid Wells:
  - F1/12-15-075-06W4
  - F1/15-15-075-06W4
  - F1/03-10-075-06W4
  - F1/03-11-075-06W4
  - F1/04-16-075-06W4
  - F1/05-17-075-06W4



Source Water Geology

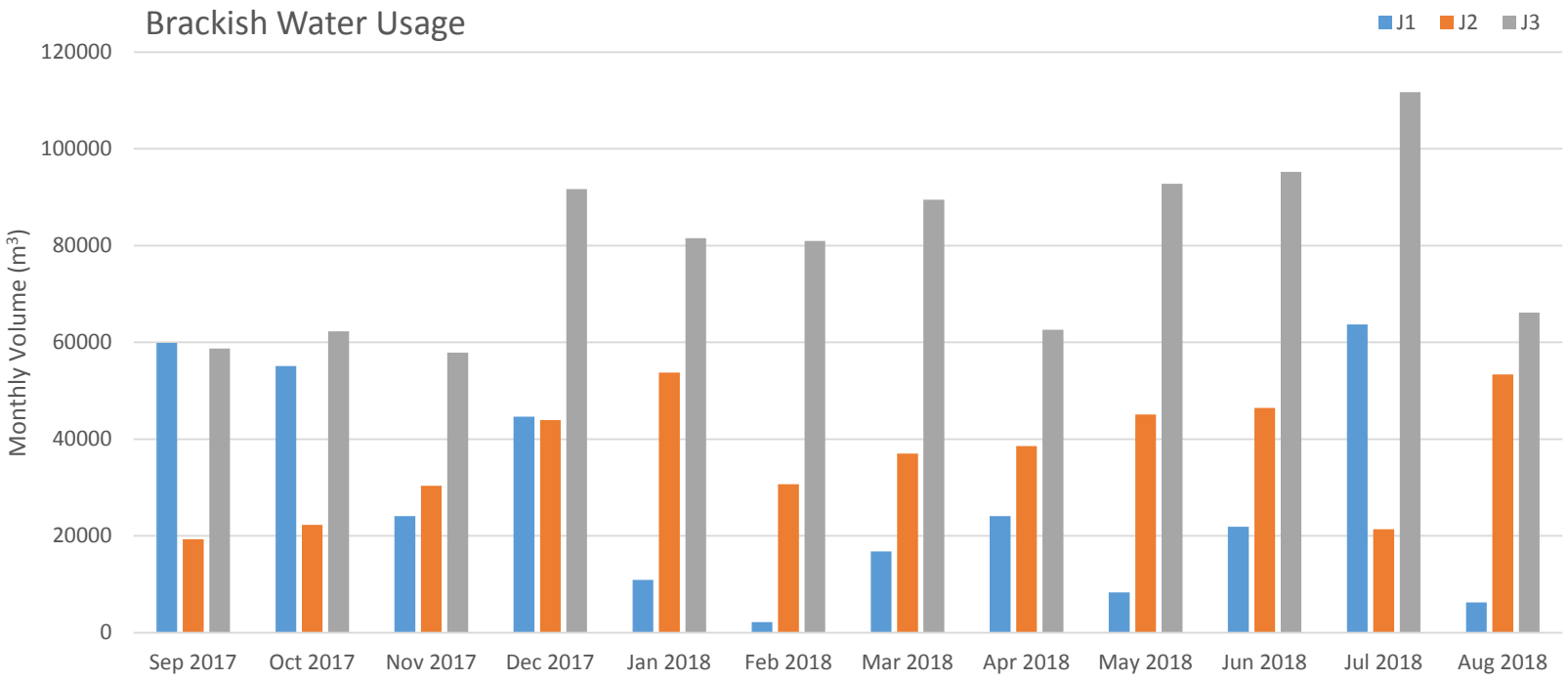
Grand Rapids C Aquifer

3.1.2-4a



Water Usage - Brackish

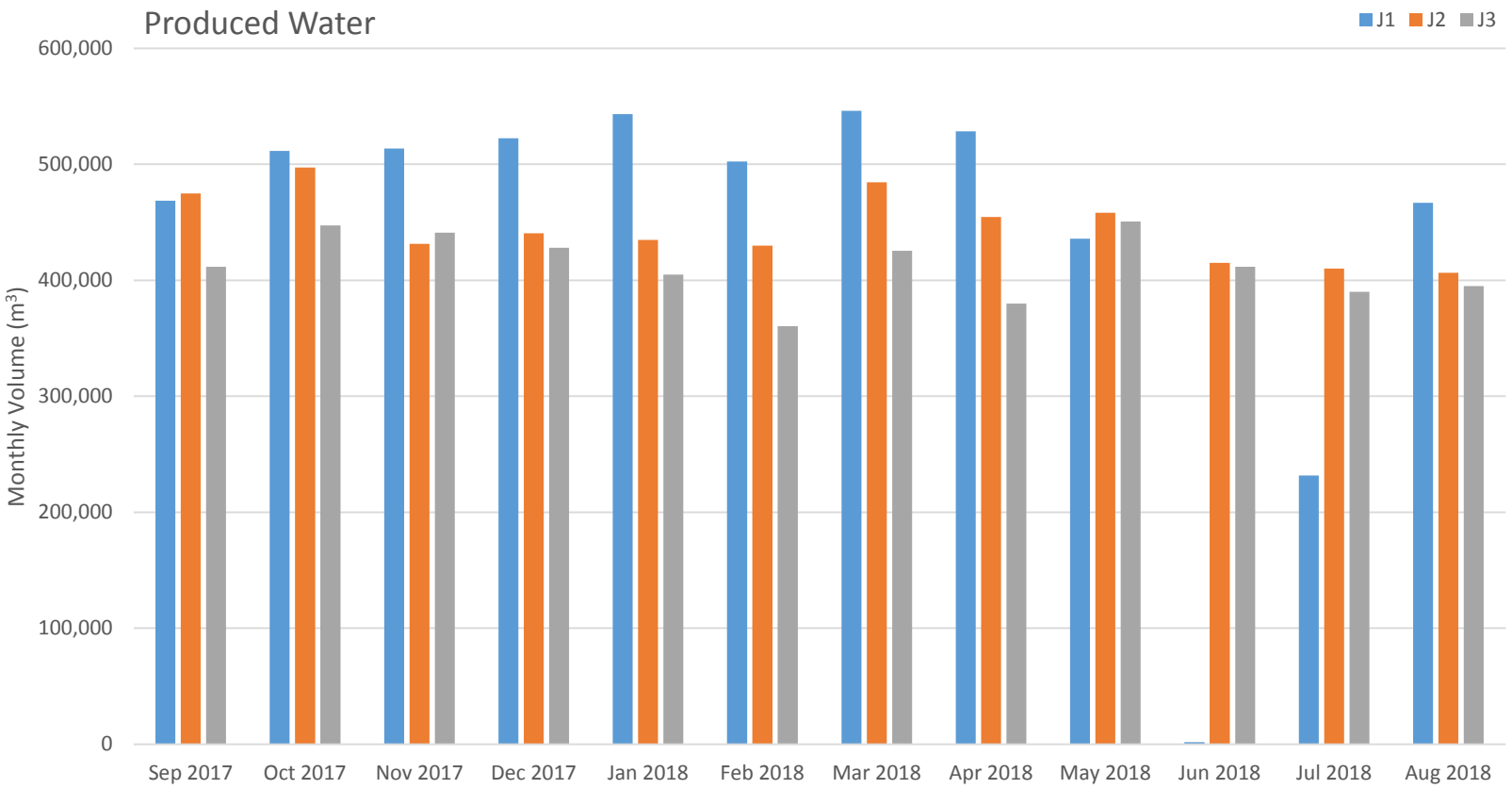
3.1.2-4b



- Brackish water production from the Grand Rapids 'C' commenced on July 12/2007 and McMurray commenced on October 2/2014
- Brackish water quality analyzed 1-2 times per year

Produced Water Volume

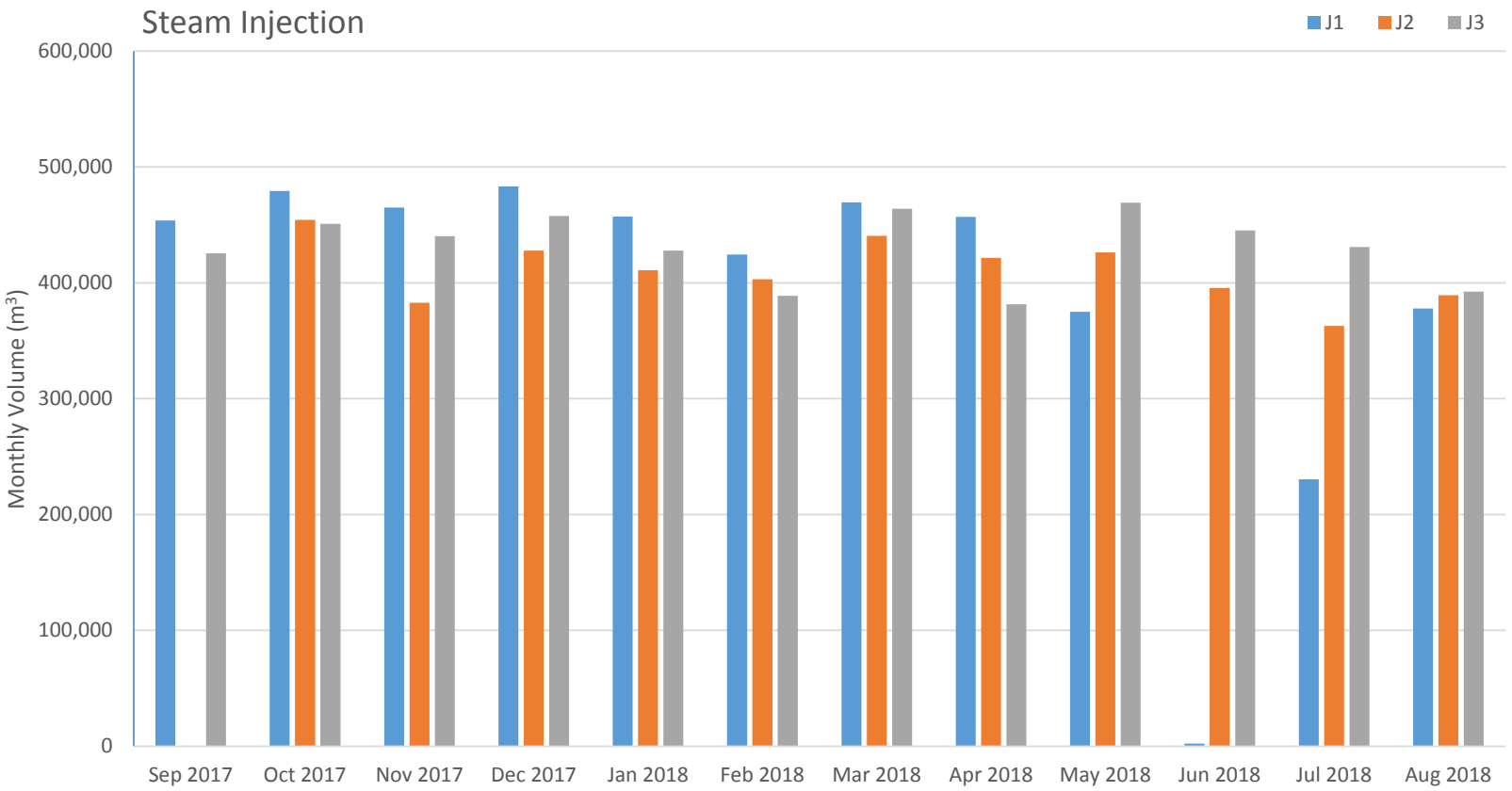
3.1.2-4c



- J1 produced water was low in June/July 2018 due to a planned maintenance turnaround

Steam Injection Volume

3.1.2-4d

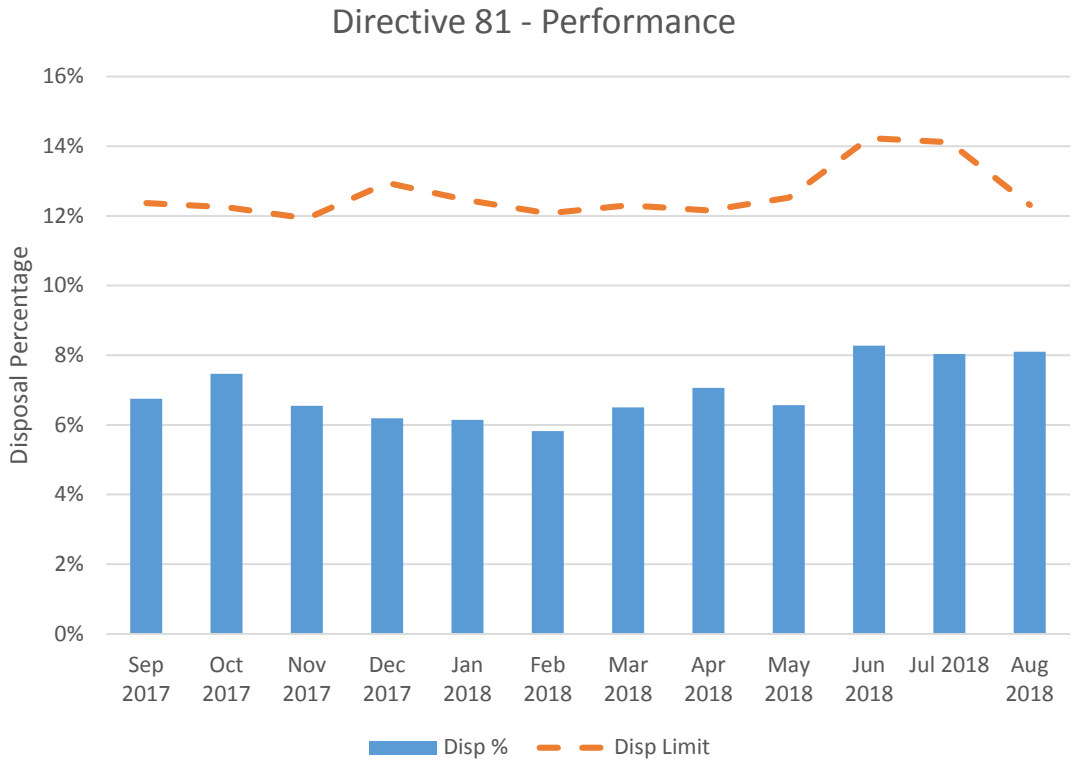


- J1 steam injection was low in June/July 2018 due to a planned maintenance turnaround

Produced Water Recycle

3.1.2-4e

- Only brackish water is used for required makeup volumes
- Jackfish disposal limit = 12 - 15%



$$Disposal\ Limit = \frac{(Brackish\ Water\ X\ D_b) + (Produced\ Water\ X\ D_p)}{(Brackish\ Water + Produced\ Water)}\ X\ 100\%$$

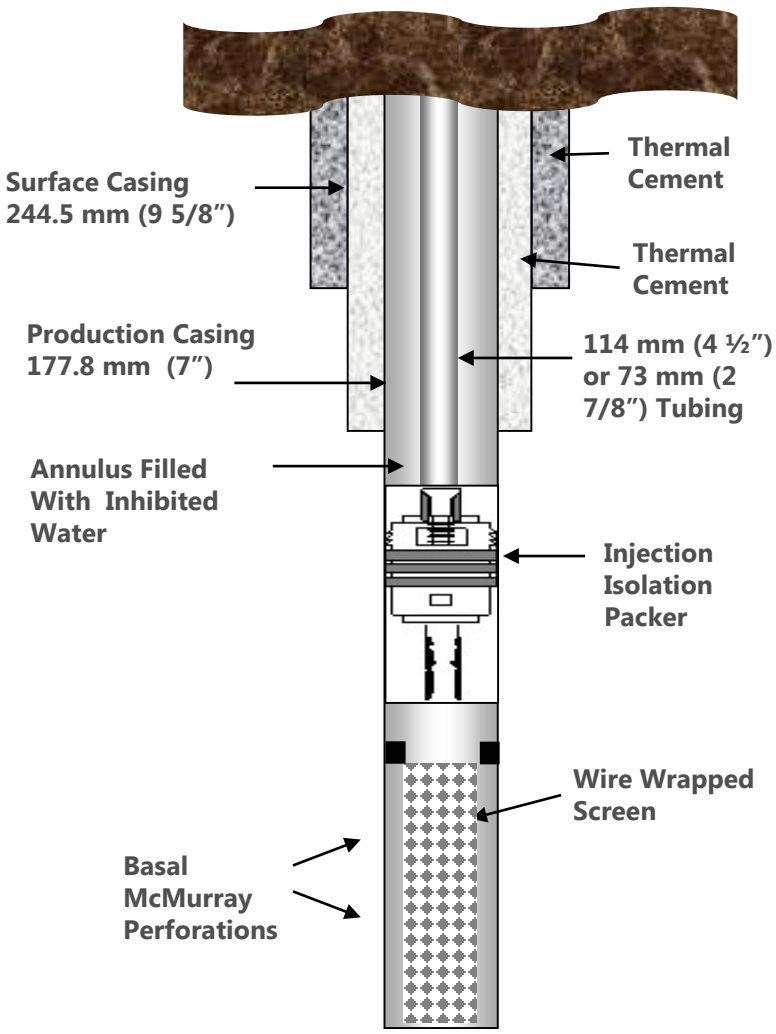
Water Disposal – Approval No. 10790

Class 1b

3.1.2-4g

Disposal System is shared between Jackfish 1, 2, and 3

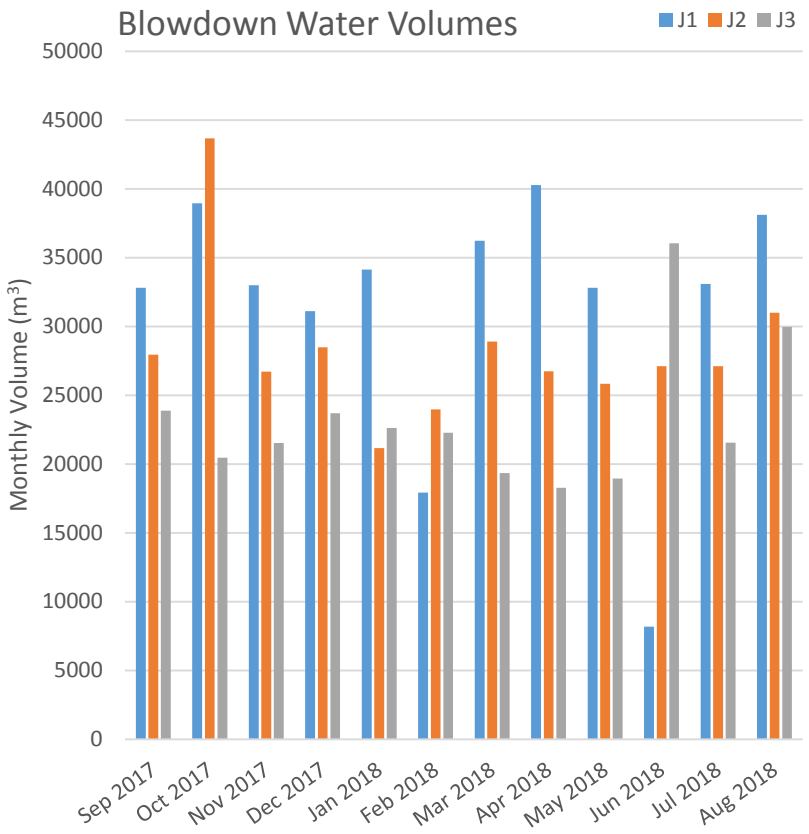
- Two disposal streams:
  - Blowdown and regen waste
- Fourteen Class 1b disposal wells in total:
  - Twelve active (see list below)
  - One inactive (102/12-05-076-06W4)
  - One suspended (102/03-22-075-06W4)
- Approved MWIP of 6,000 kPa (July 2009)
- Jackfish 1 disposal wells:
  - 00, 02, and 03/09-14-075-06W4 (blowdown)
  - 00 and 02/12-14-075-06W4 (regen)
- Jackfish 2 disposal wells:
  - 02 and 03/07-13-075-06W4 (blowdown)
  - 02 and 04/12-15-075-06W4 (regen)
- Jackfish 3 disposal wells:
  - 00 and 02/05-12-075-06W4 (blowdown)
  - 00/03-22-075-06W4 (regen)

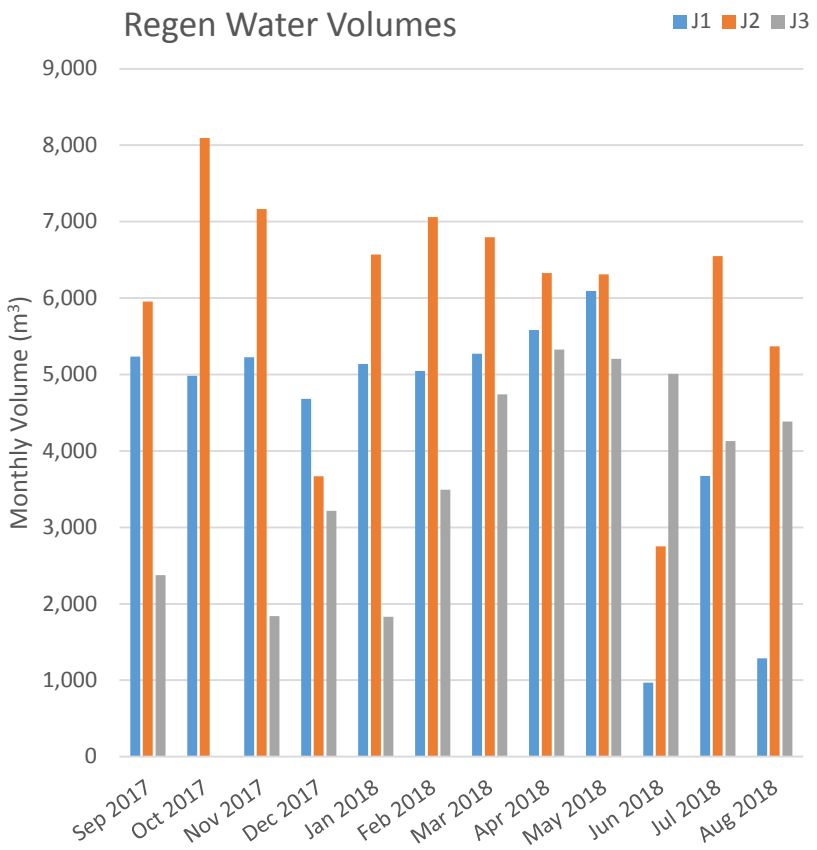


Water Disposal – Approval No. 10790

Volume Summary

3.1.2-4h

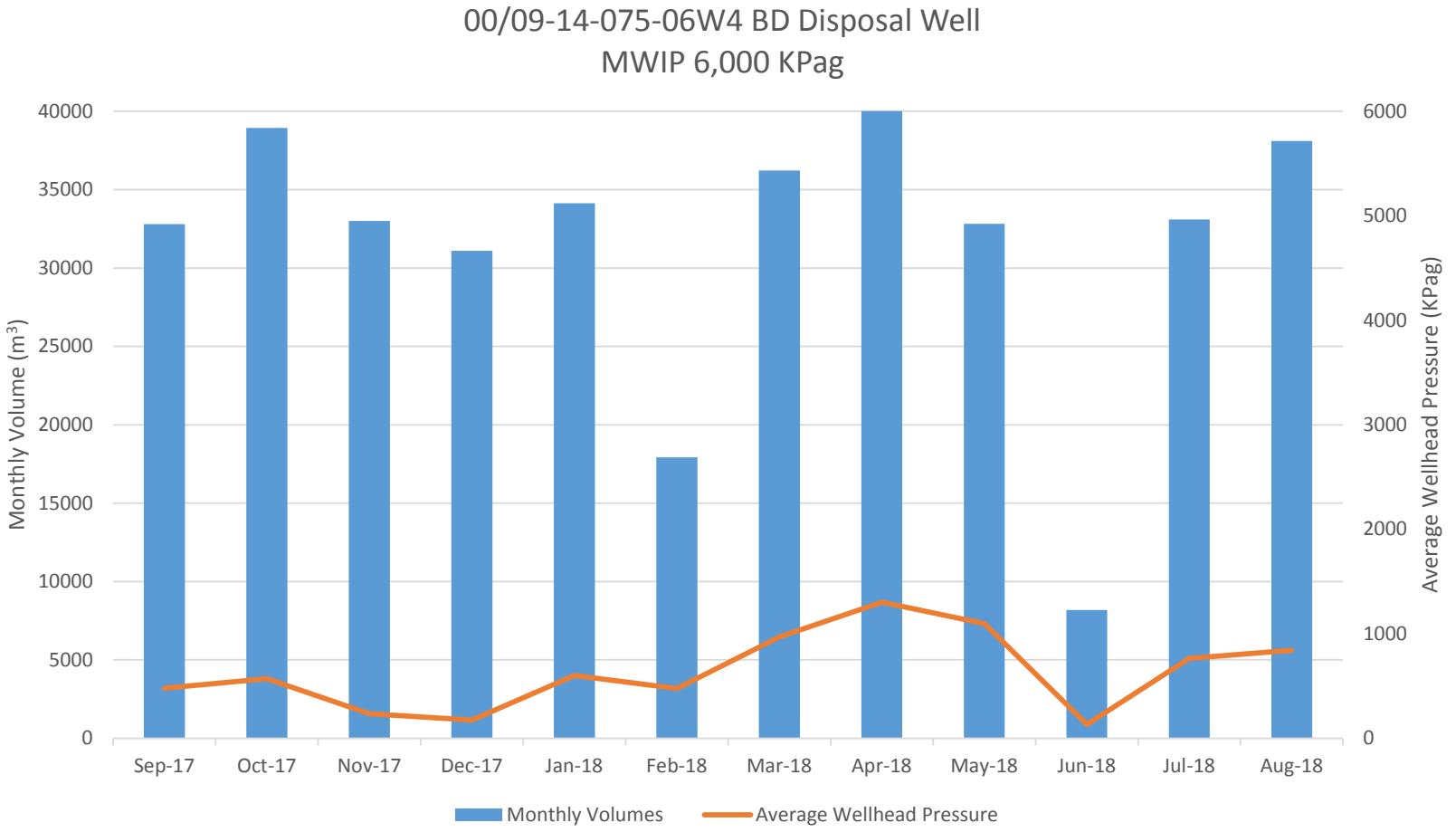




Water Disposal – Approval No. 10790

00/09-14-075-06W4

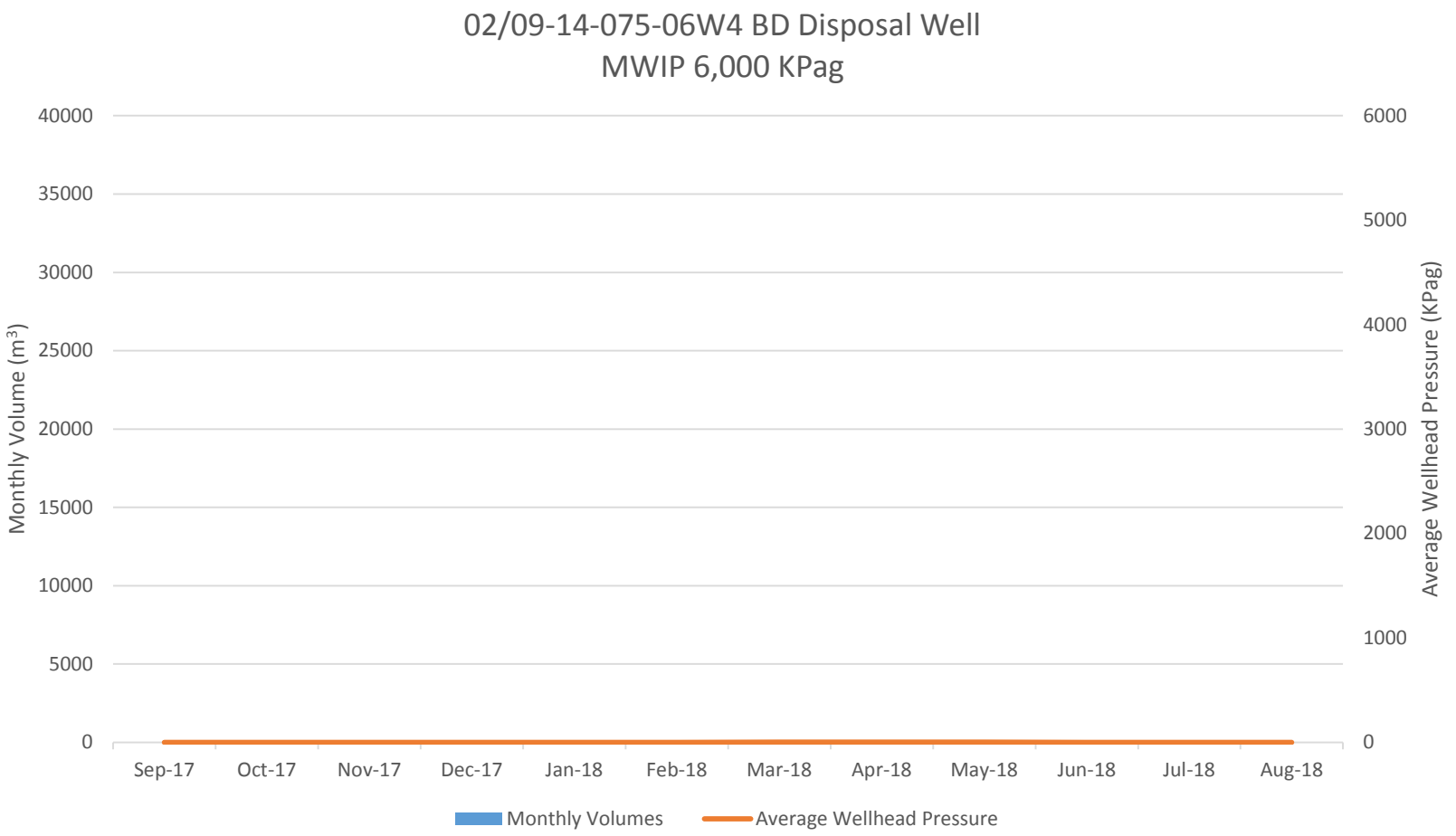
3.1.2-4h



Water Disposal – Approval No. 10790

02/09-14-075-06W4

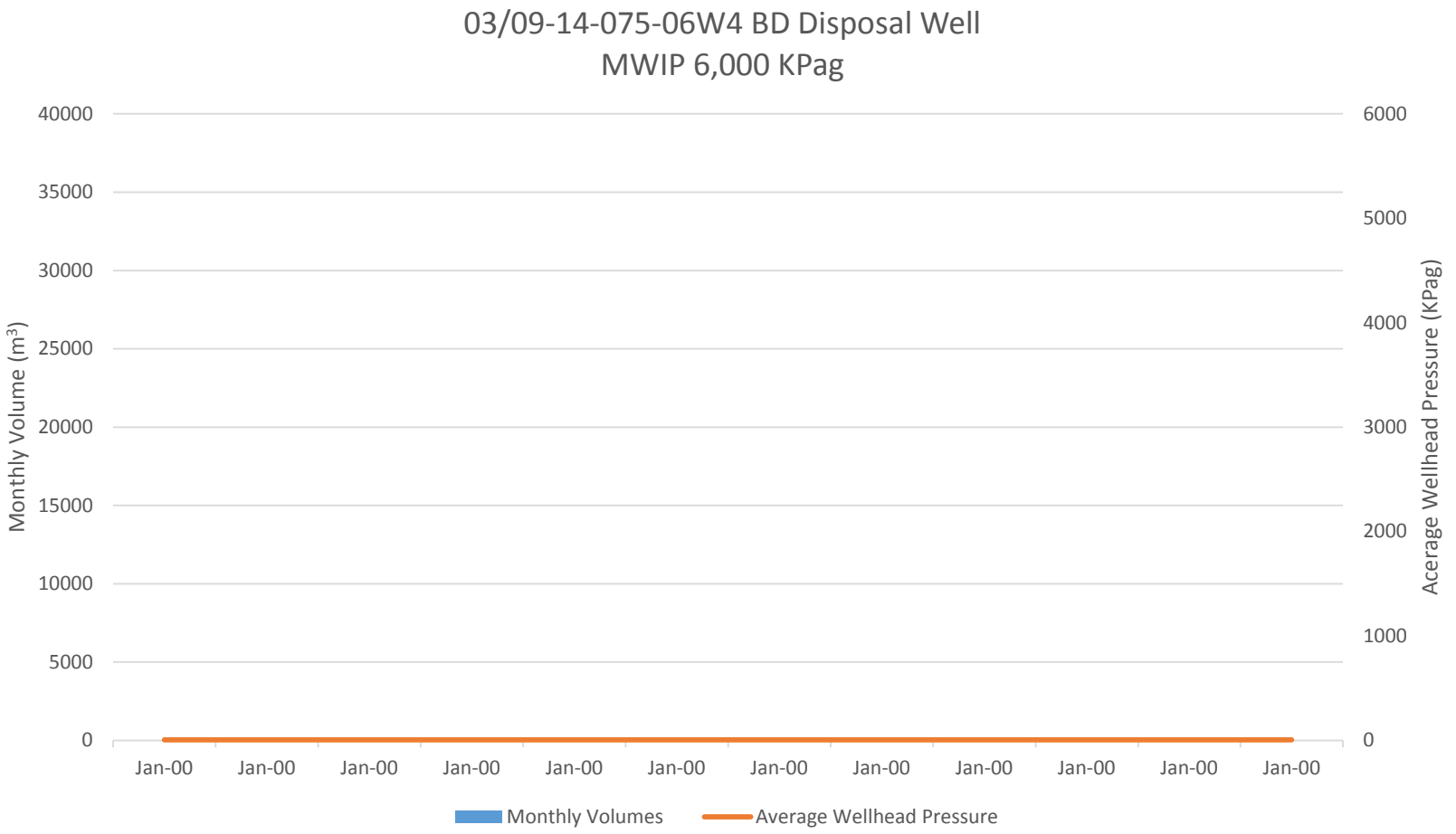
3.1.2-4h



Water Disposal – Approval No. 10790

03/09-14-075-06W4

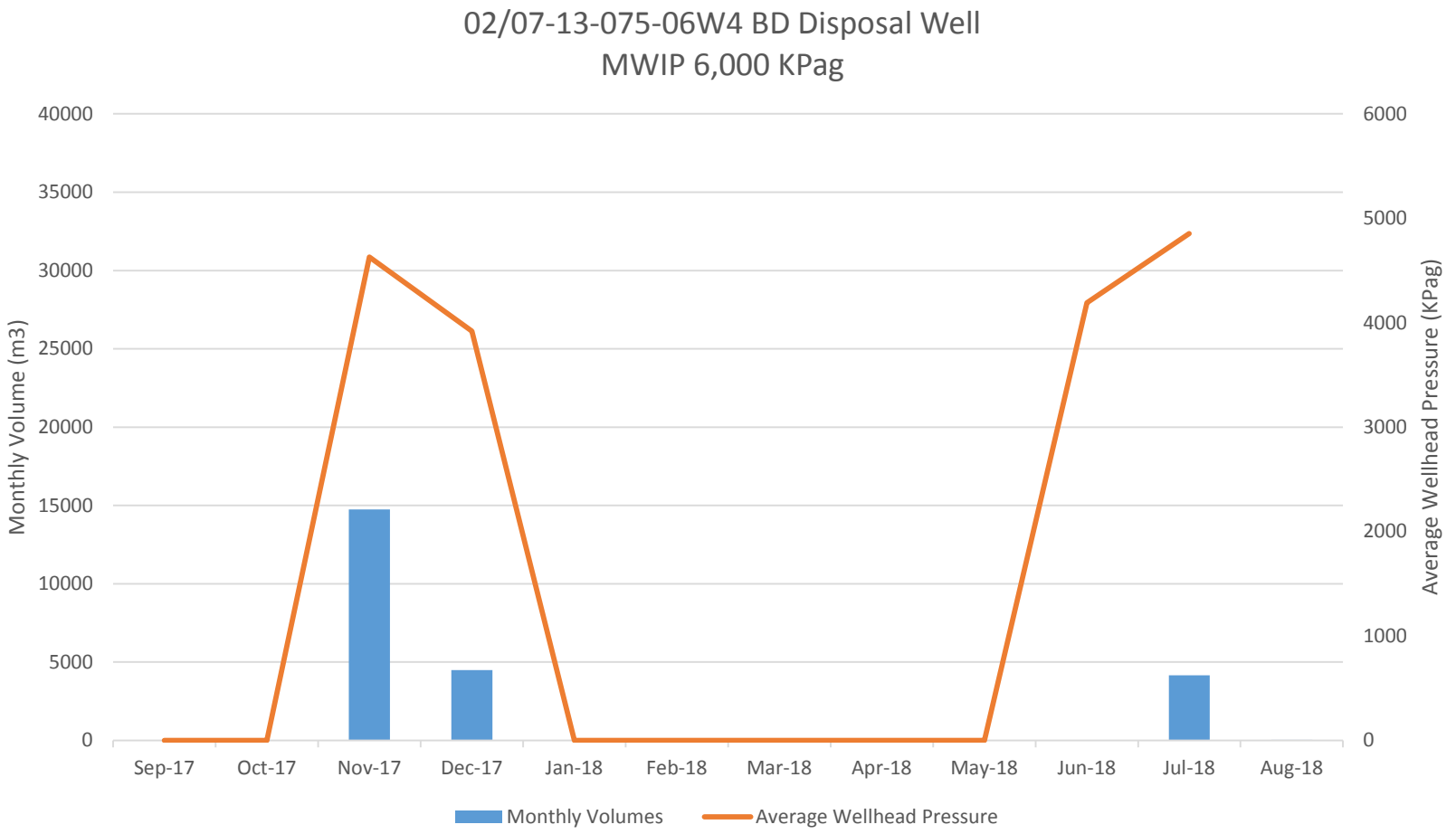
3.1.2-4h



Water Disposal – Approval No. 10790

02/07-13-075-06W4

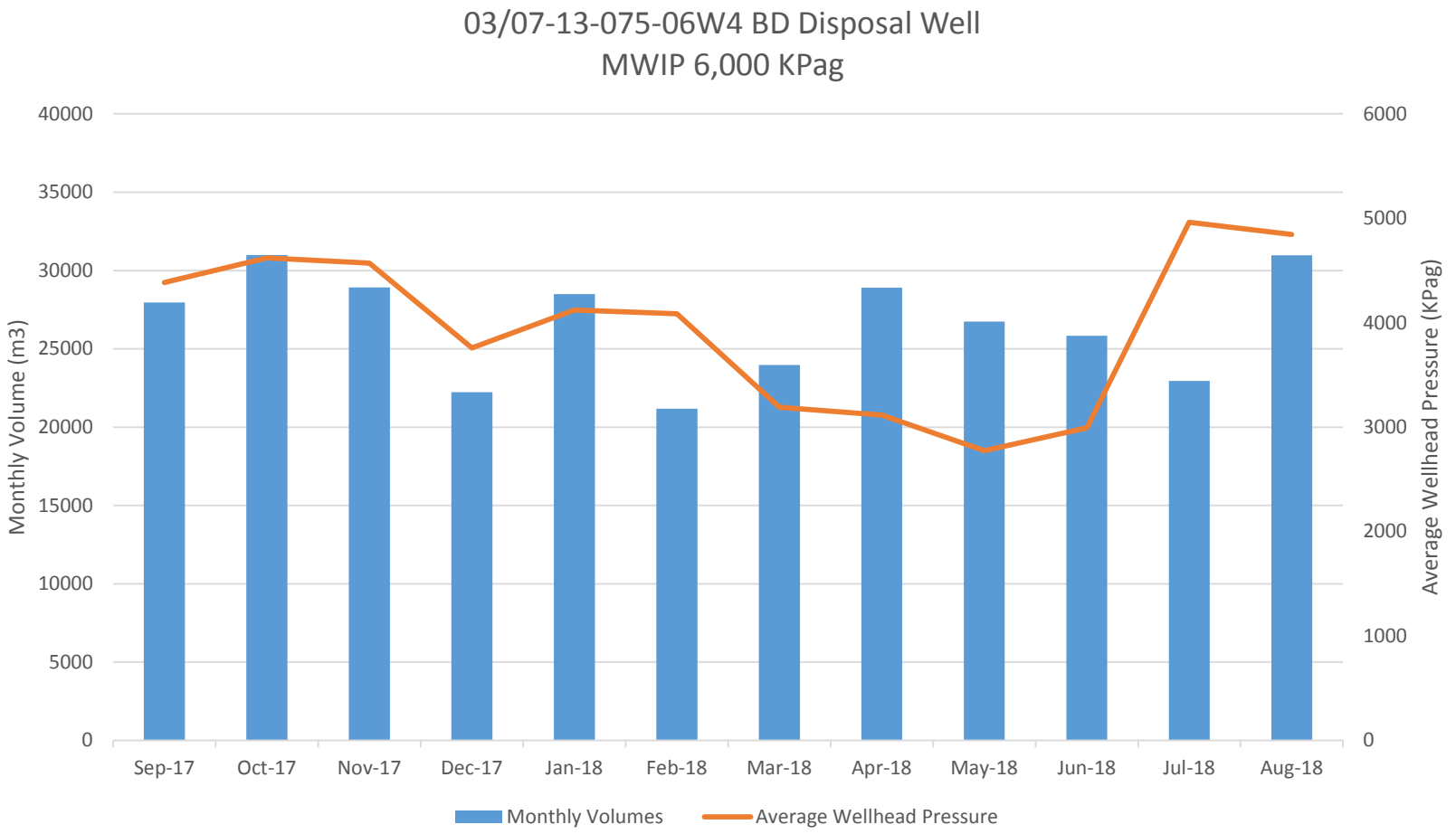
3.1.2-4h



Water Disposal – Approval No. 10790

03/07-13-075-06W4

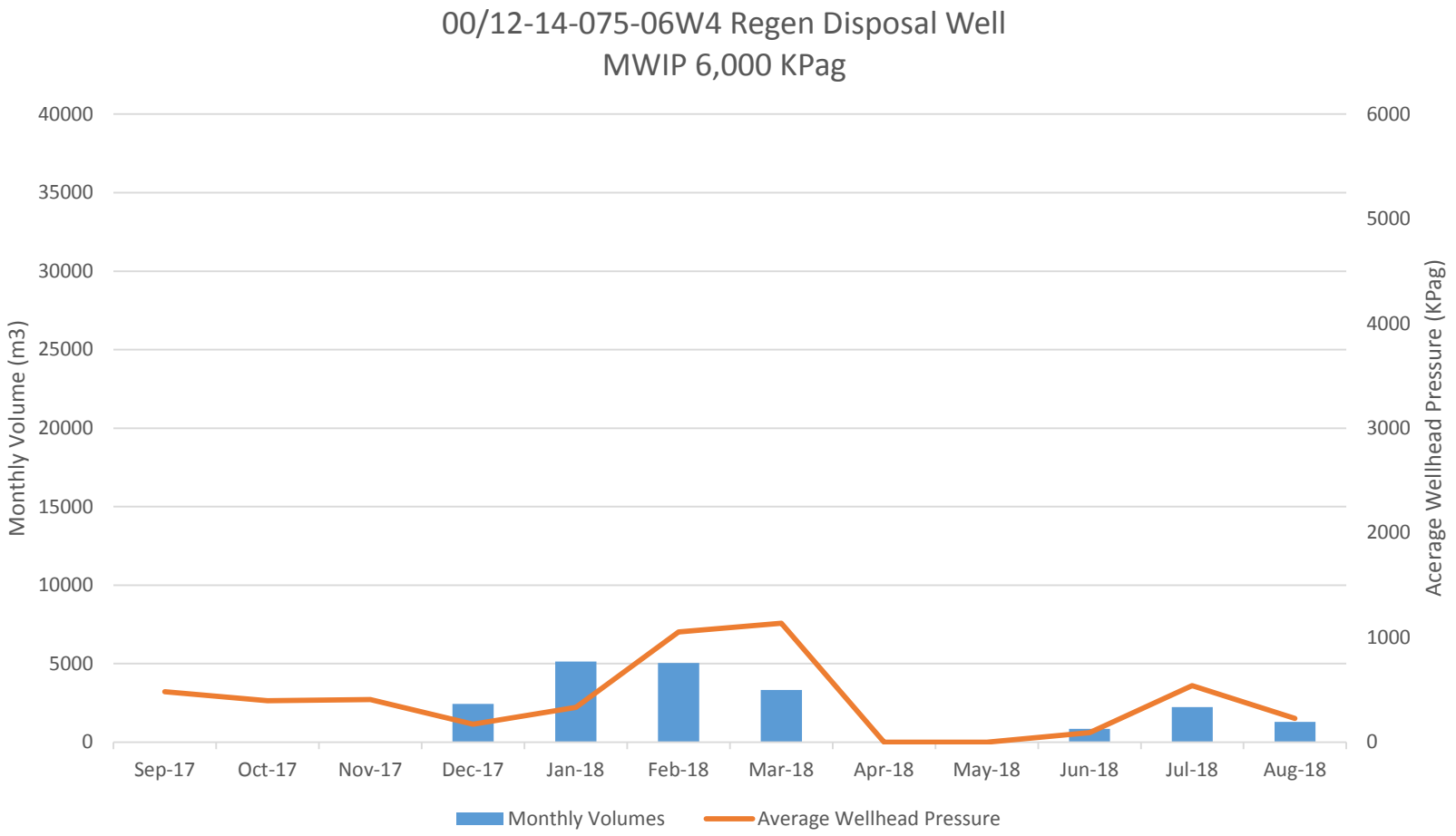
3.1.2-4h



Water Disposal – Approval No. 10790

00/12-14-075-06W4

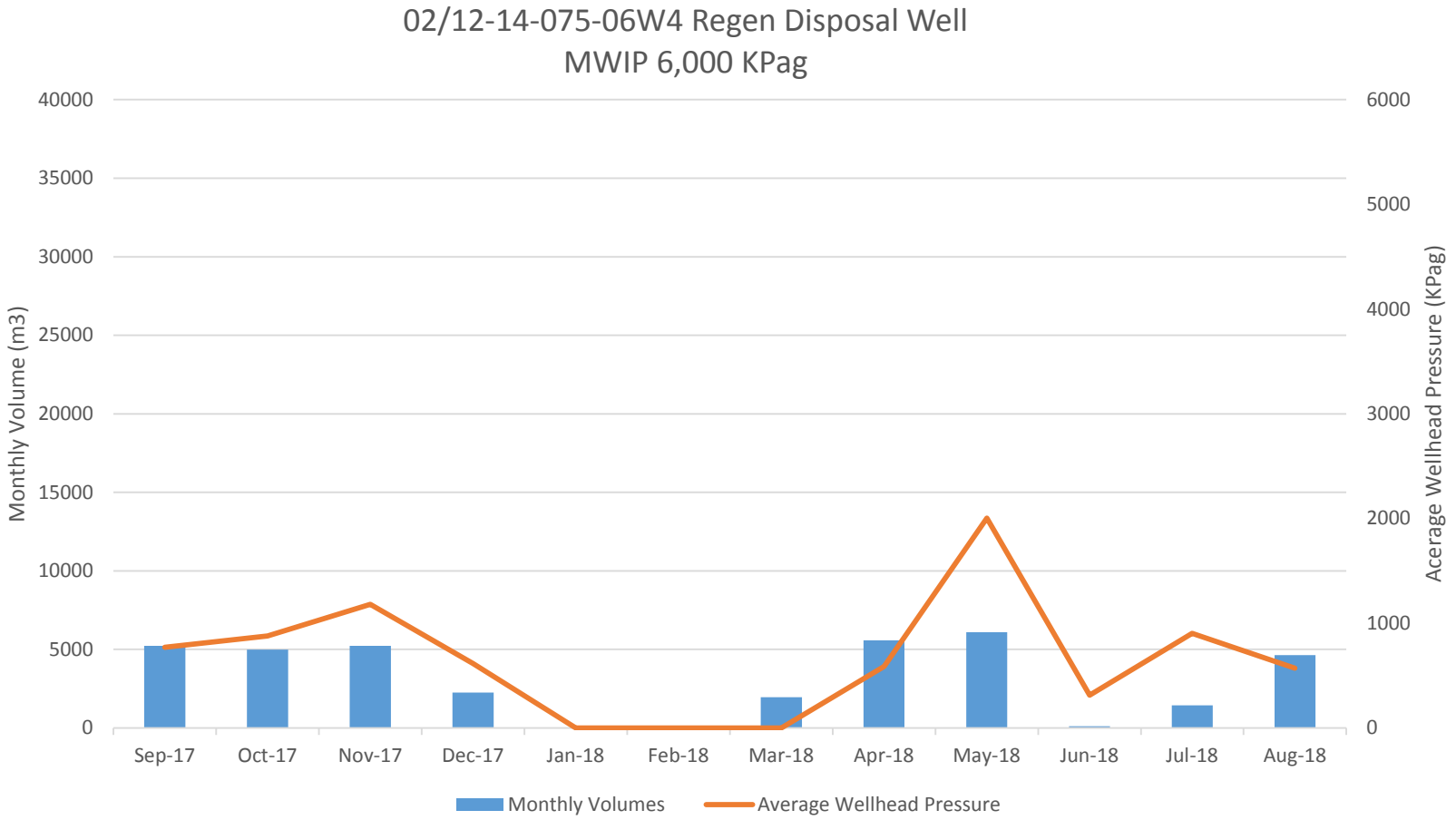
3.1.2-4h



Water Disposal – Approval No. 10790

02/12-14-075-06W4

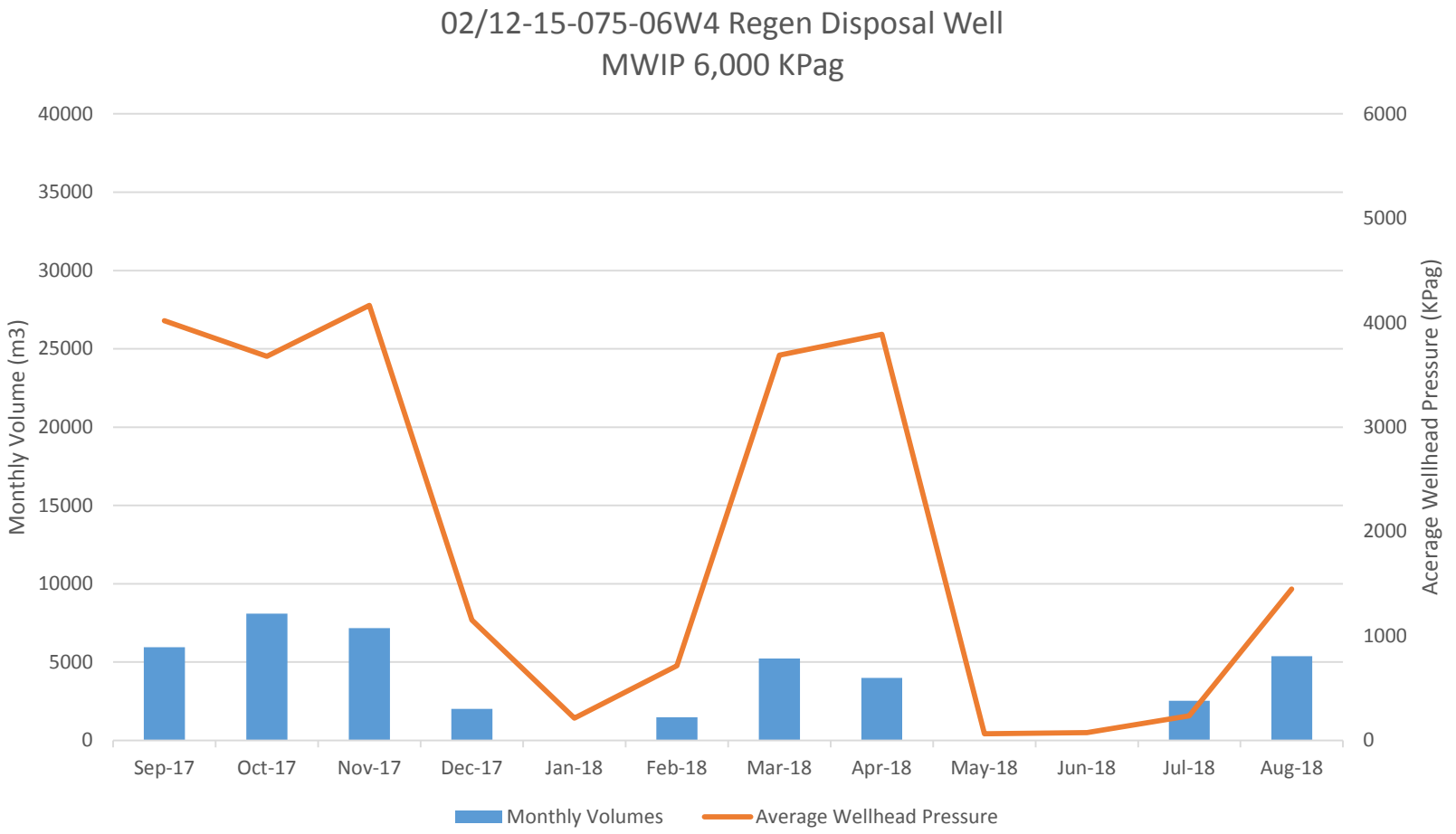
3.1.2-4h



Water Disposal – Approval No. 10790

02/12-15-075-06W4

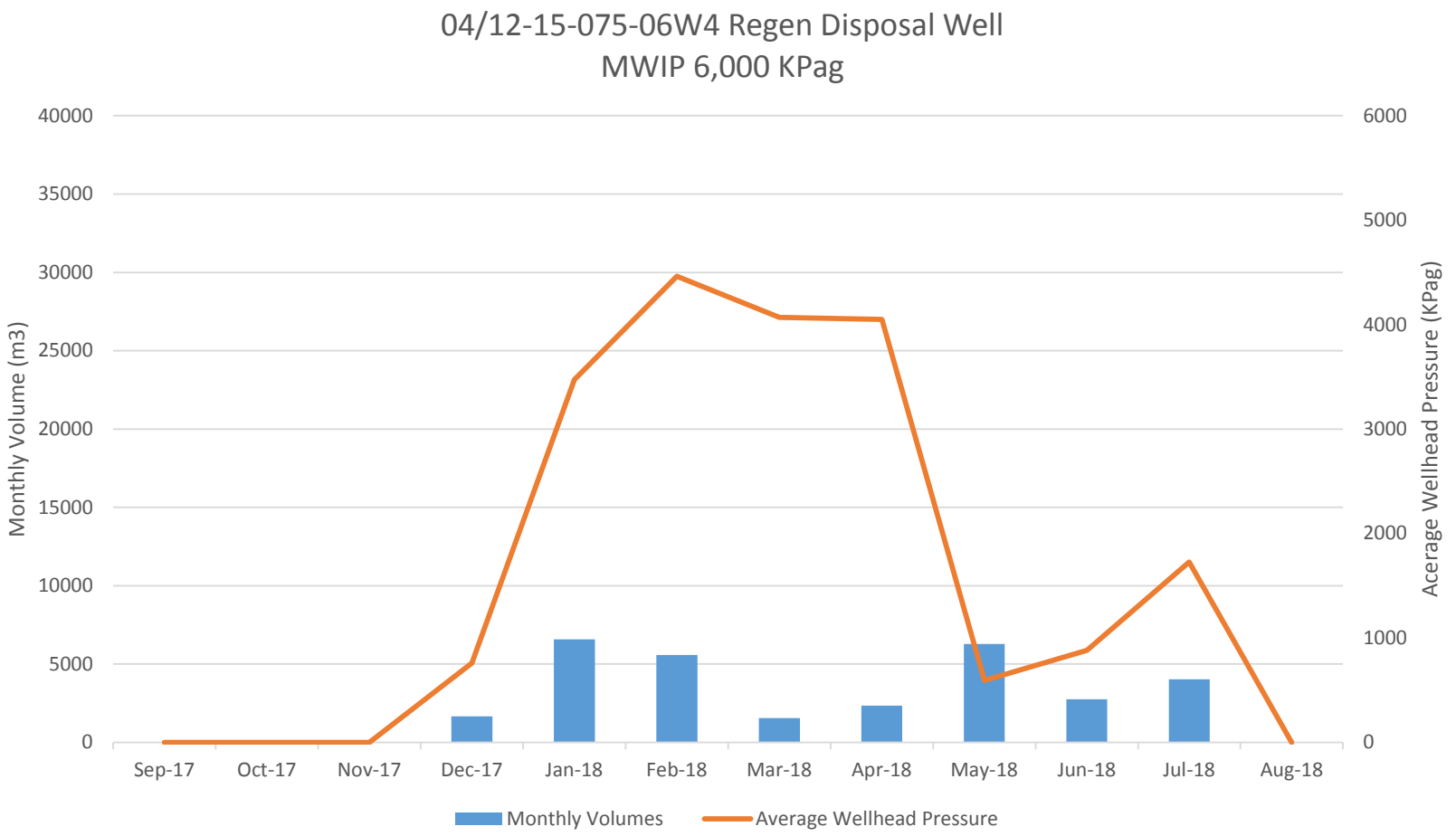
3.1.2-4h



Water Disposal – Approval No. 10790

04/12-15-075-06W4

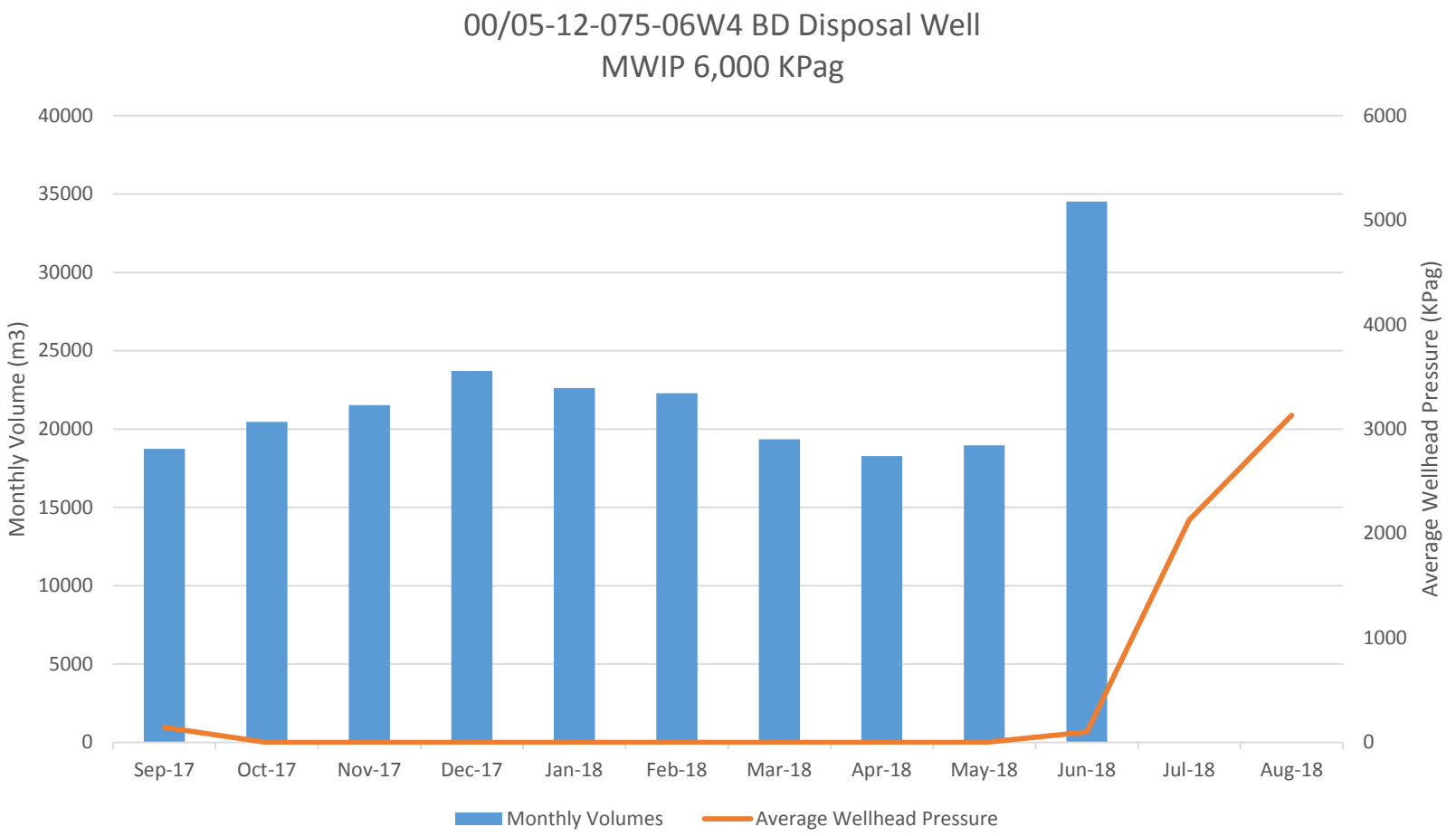
3.1.2-4h



Water Disposal – Approval No. 10790

00/05-12-075-06W4

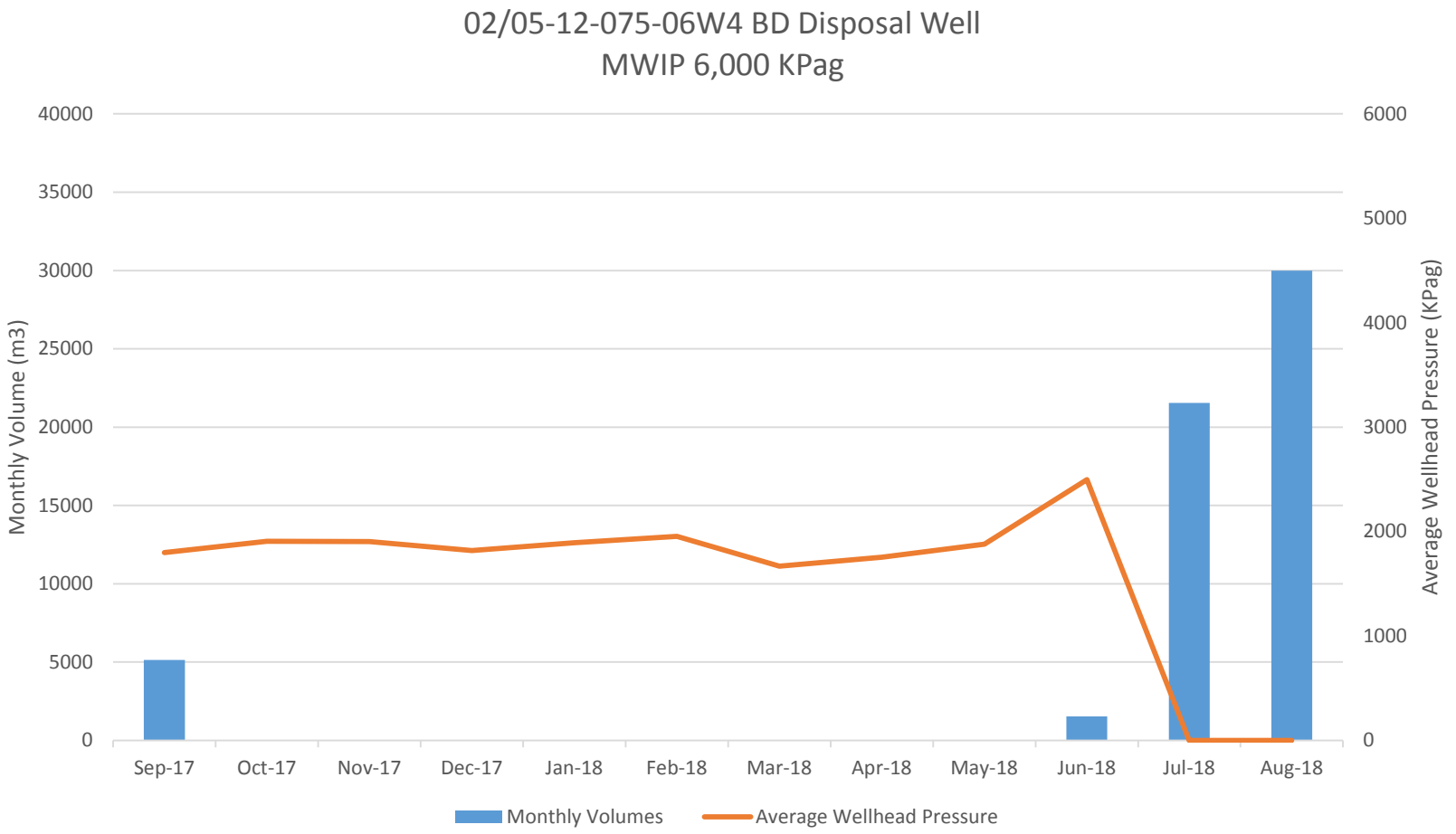
3.1.2-4h



Water Disposal – Approval No. 10790

02/05-12-075-06W4

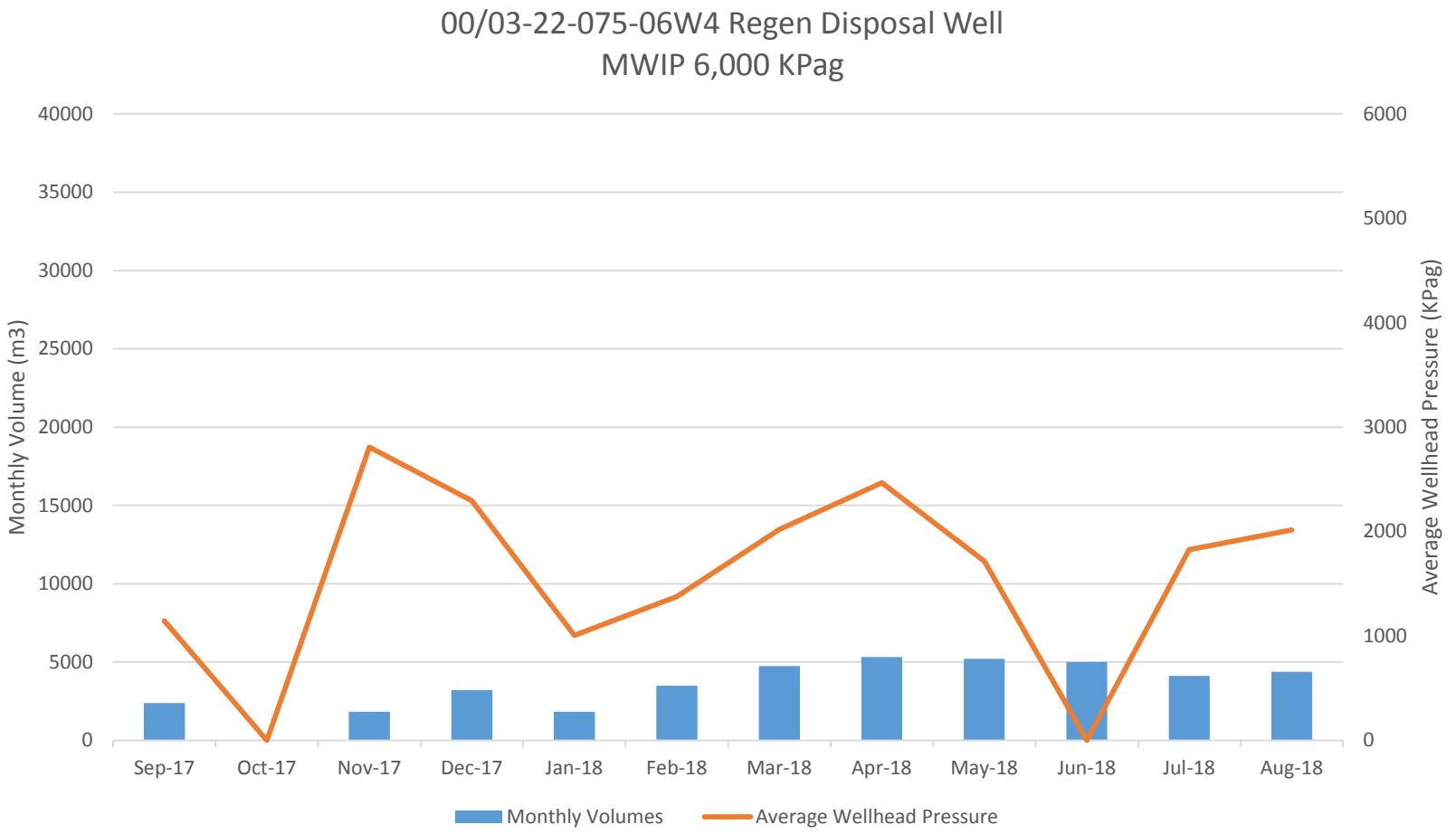
3.1.2-4h



Water Disposal – Approval No. 10790

00/03-22-075-06W4

3.1.2-4h



Off-site Water Disposal Volumes

3.1.2-4i

Disposal Facility	Volume Injected (m^3)
Tervita Lindbergh Cavern Facility	2,225
Cancen New Serepta	4,431
Tervita Ft. McMurray	2,634
CEIBA ATHABASCA	615
White Swan Atmore	3,568
White Swan Conklin	24,932
Cancen Morinville	1,326
Total	**39,731**

Sulphur Production and Air Emissions

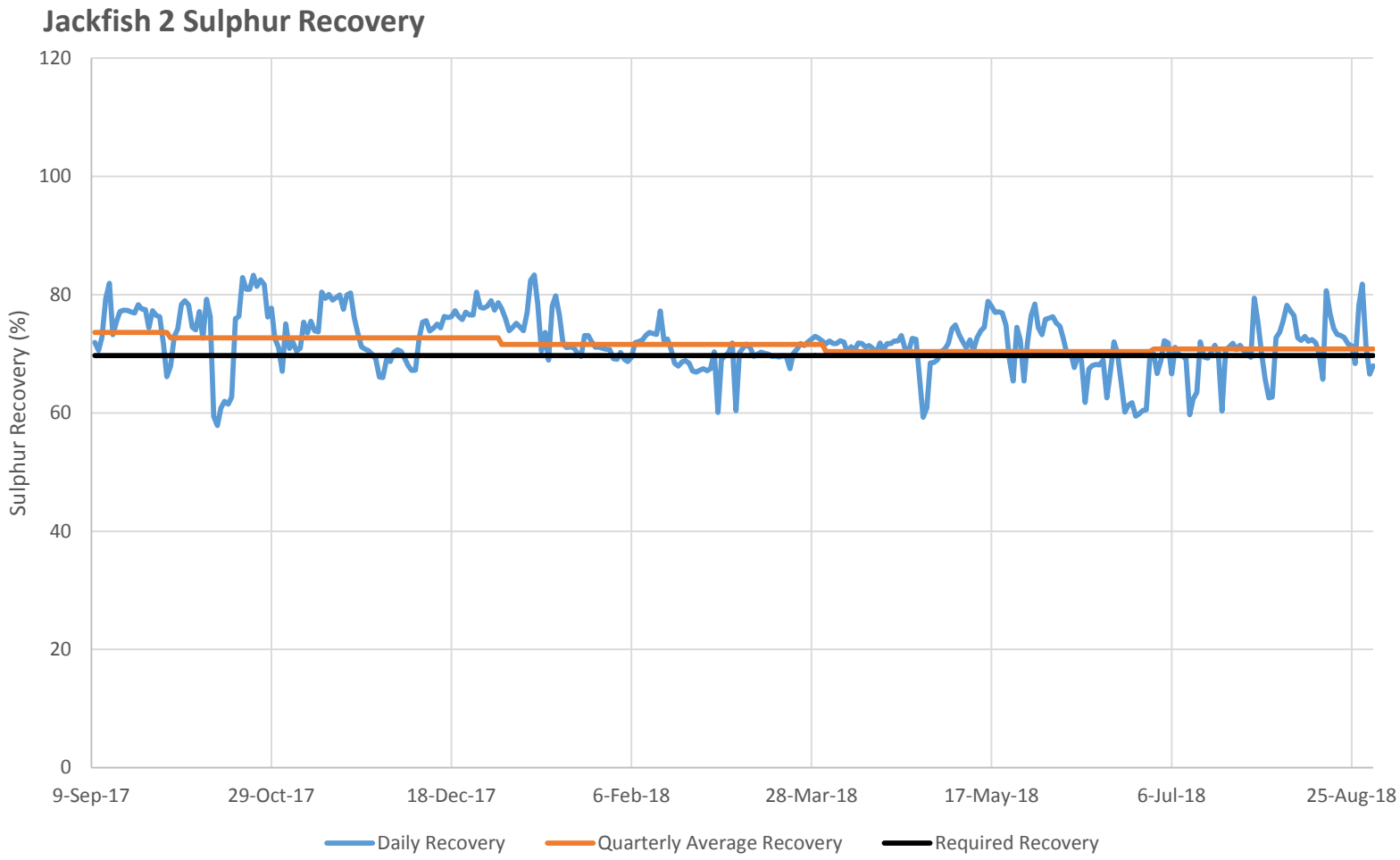
Section 3.1.2-5

devon

Sulphur Production

Operations with Sulphur Recovery

3.1.2-5a (i) and (ii)

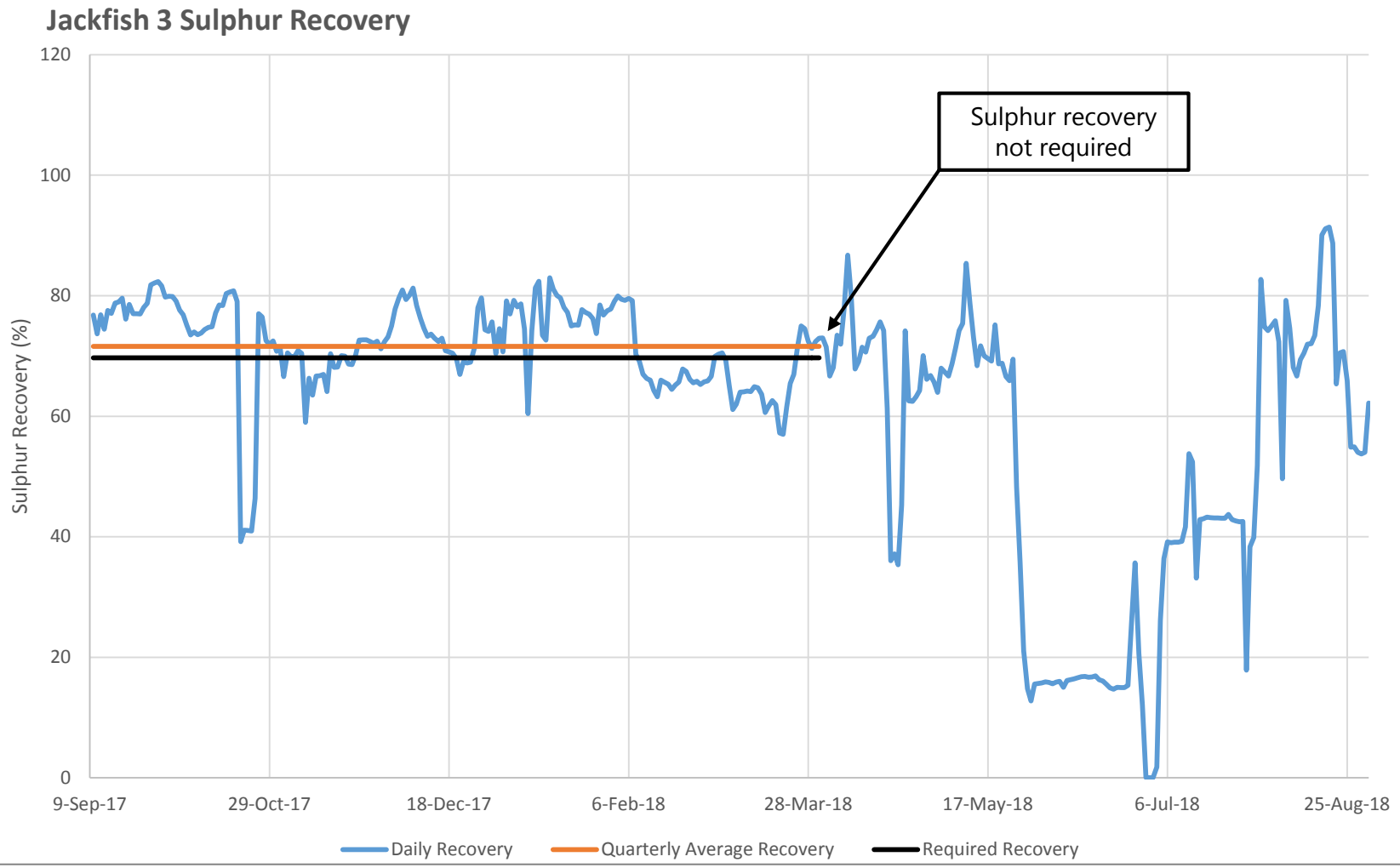


** Jackfish 1 - Sulphur recovery is not required as inlet Sulphur content is <1t/d.*

Sulphur Production

Operations with Sulphur Recovery

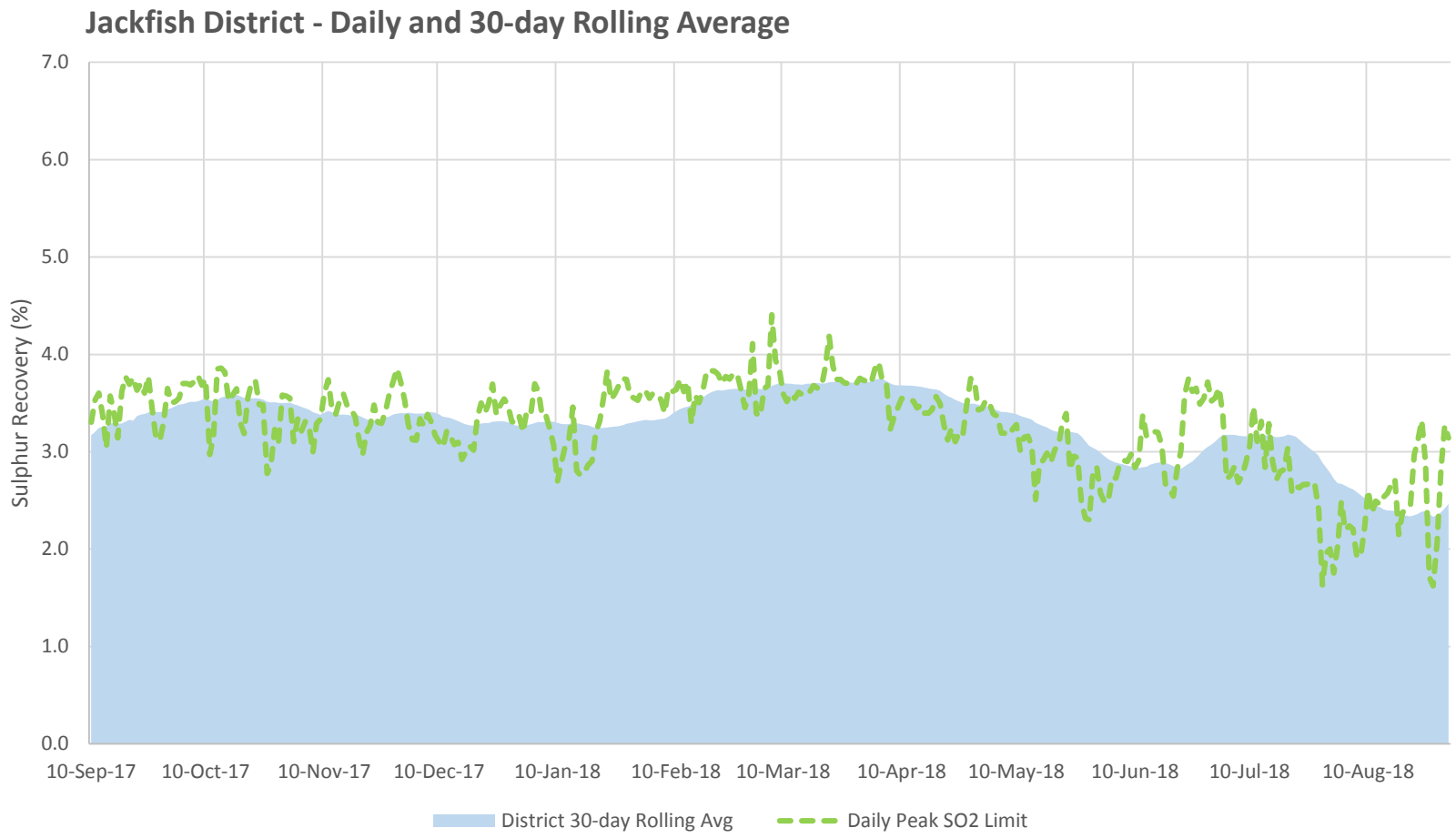
3.1.2-5a (i) and (ii)



Sulphur Production

Peak Daily and Rolling Averages – SO_2 Emissions

3.1.2-5c



Notes:

- *The ID 2001-03 waiver was used in March due to maintenance related process upsets.*
- *Emissions throughout year remained below allowable emissions limits permitted during maintenance outages.*
- *All reporting required under the EPEA approval has been completed.*

Ambient Air Quality Monitoring

3.1.2-5d

Passive air monitoring

- At minimum there are four passive stations located at each Jackfish site to monitor sulphur dioxide and hydrogen sulphide
- Monitored parameters: sulphur dioxide and hydrogen sulphide

Continuous ambient monitoring

- September 2018: Jackfish 1 and Jackfish 2/3 continuous monitoring stations joined the Wood Buffalo Environmental Associations (WBEA)'s integrated monitoring network. The monitoring stations are now operated by WBEA, on behalf of Devon.
- Monitored parameters: sulphur dioxide, hydrogen sulphide, nitrogen dioxide, total hydrocarbons, wind speed, and direction

All ambient air quality monitoring and reporting requirements were satisfactorily met in 2017-2018.

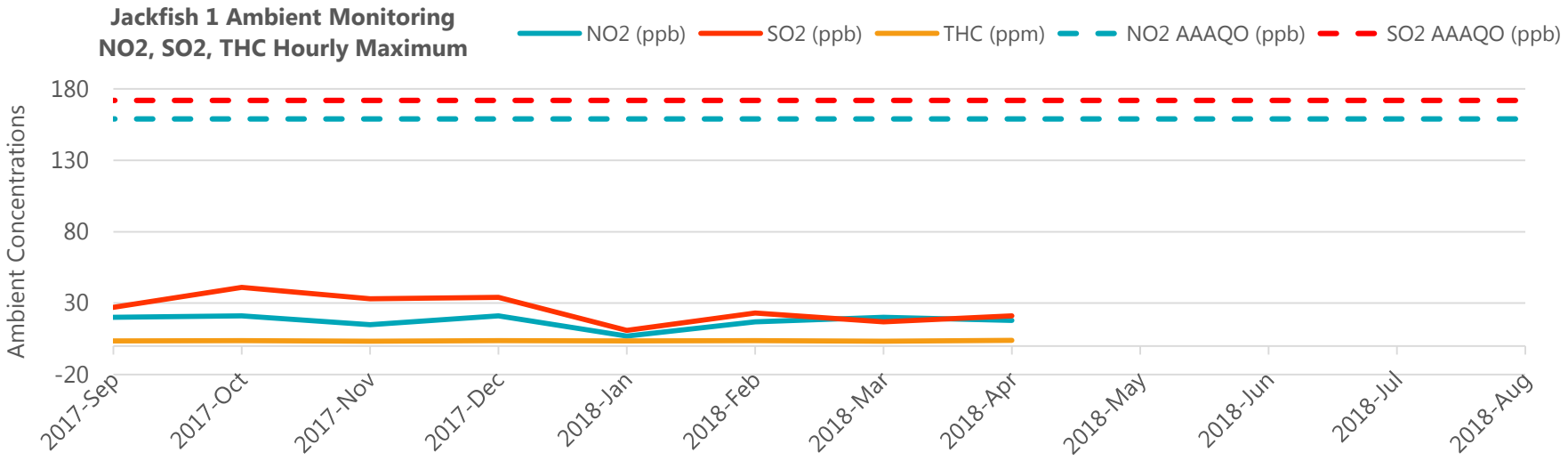
Ambient Air Quality Monitoring

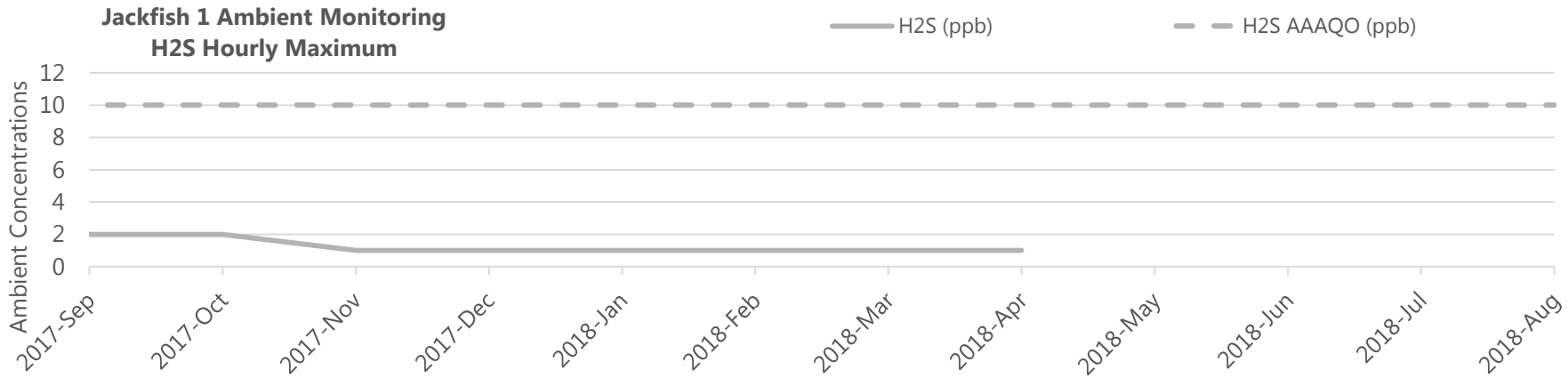
3.1.2-5d

Ambient Air Quality Monitoring

Jackfish 1 Results

3.1.2-5d

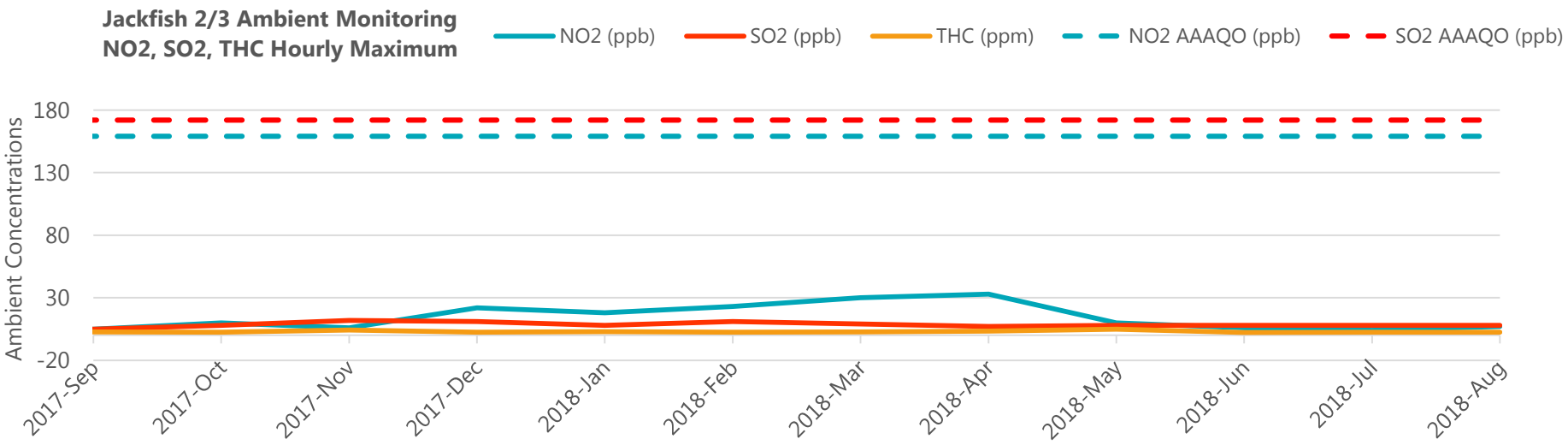


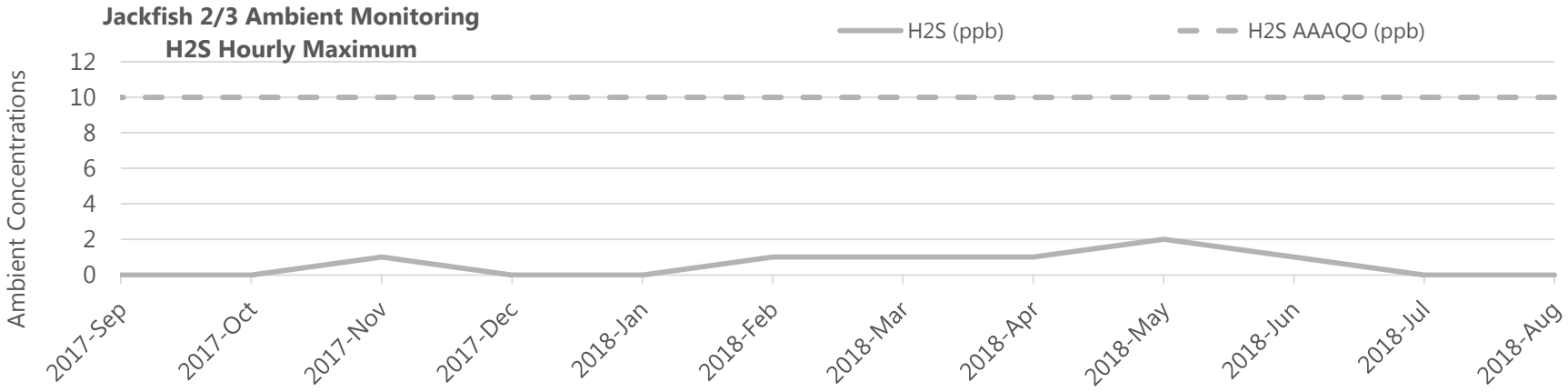


Ambient Air Quality Monitoring

Jackfish 2/3 Results

3.1.2-5d





Environmental Issues

Section 3.1.2-6

devon

Environmental Issues

EPEA Notifications

3.1.2-6a

- Jackfish 1 CPF Action Leakage Rate (ALR) exceedance
    - Voluntary self-disclosure exceedance was reported to the AER.
    - Devon repaired liner and ALR has since been maintained within allowable limits.

AER Regulatory Approval Summary

3.1.2-6b

D78 Amendments – September 2017 to August 2018

Amendment			Category
Jackfish Scheme Capacity Increase	October 10, 2017	10097NN	2
Jackfish Expansion Area	Under Review		3
Jackfish 2 Pad MM Proposal	November 20, 2017	10097OO	2
Jackfish 2 Pad TT Proposal	November 20, 2017	10097OO	2
Jackfish NCG Co-Injection	December 19, 2017	10097PP	2
Jackfish Sulphur Recovery Variance	January 11, 2018	10097QQ	2
Pad OO Steam Additive Pilot	April 6, 2018	10097RR	2
Jackfish 2 Pad MM – Additional Well Pair	July 30, 2018	10097SS	2
Pad OOO Proposal	Under Review		2
Pad S Proposal	Under Review		2

AER Regulatory Approval Summary

3.1.2-6b

D56 Facilities Licences

- Temporary waiver for D56 Sulphur Emission Limit:
  - Jackfish 3 CPF (F44113)
- Amendment to the continuous emission rates at:
  - Jackfish 3 CPF (F44113)

AER Regulatory Approval Summary

Jackfish Class II Landfill

3.1.2-6b

D58 Approval WM 105 E

Date Issued	Approval To:
Nov 17, 2017	• One time approval to accept OSE waste from the Jackfish East & West Project Areas
Nov 28, 2017	• One time approval to accept contaminated soil from the Devon NE Gas Project Area
Jun 21, 2018	• One time approval to accept contaminated soil from the Devon NE Gas Project Area • One time approval to accept contaminated soil from NE Gas Compressor Facility at 02-04-078-06 W4M • One time approval to accept contaminated soil from Devon Pike Yard at NW-09-075-06 W4M
Aug 22, 2018	• One time approval to accept contaminated soil from NE Gas lease at 08-29-076-06 W4M

AER Regulatory Approval Summary

Jackfish District

3.1.2-6b

EPEA Operating Approval No. 00224816-01-00

- EPEA renewal received July 2018

Water Diversion Licences

- No amendments

AER Regulatory Reporting Requirements

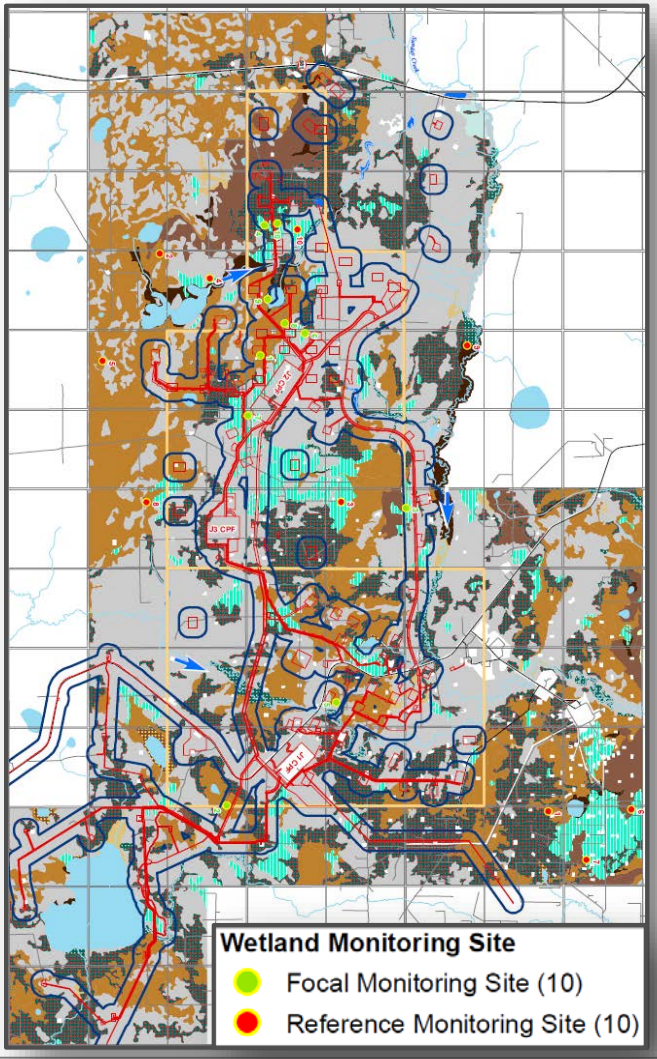
3.1.2-6c

- Industrial Wastewater and Industrial Runoff Report
- Groundwater Monitoring Report
- Wetland and Waterbody Monitoring Report
- Potable Water Monitoring Report
- Air Monitoring Report
- Soil Management Report
- Soil Monitoring Report
- Conservation and Reclamation Annual Report
- Project Level Conservation and Closure Plan
- Wildlife Mitigation and Monitoring Program
- Caribou Mitigation and Monitoring Program

Water Management

Jackfish 1, 2, and 3

3.1.2-6c



Groundwater

- Jackfish 1, 2, and 3 groundwater monitoring twice yearly at CPF, well pads, and tank farm as per EPEA approval
- No significant impacts observed to date
- Minor issues to date include:
  - Slightly elevated chlorides due to de-icing agents and dust suppressants
  - Trace hydrocarbons identified at a single well downgradient of Jackfish 2.

Wetlands

- Wetland monitoring sites were surveyed in Q2 and Q3 2018
- No significant impacts observed to date

Soil Monitoring and Soil Management

Jackfish 1, 2, and 3

3.1.2-6c

- District soil monitoring program for Jackfish 1, 2, and 3 was executed in August 2017
  - District soil monitoring report and soil management program proposal submitted to AER November 2017
  - Execution of the soil management program to occur Fall 2018

Environmental Monitoring and Progress

Wildlife Monitoring

3.1.2-6c

- As per EPEA approval condition, Devon's Jackfish Wildlife Monitoring Program was authorized in July 2012
- First comprehensive wildlife report was submitted July 2015
- Long term monitoring ongoing
- No significant project related impacts observed to date

Regional and Other Initiatives

3.1.2-6d

- Christina Lake Regional Water Management Agreement (CLRWMA)
- Canada's Oil Sands Innovation Alliance (COSIA)
- Alberta Biodiversity Monitoring Institute (ABMI)
- Regional Aquatics Monitoring Program (RAMP)
- Monitoring Avian Productivity and Survivorship (MAPS Program)
- Regional Industry Caribou Collaboration (RICC)
- Clean Air Strategic Alliance (CASA)
- Wood Buffalo Environmental Association (WBEA)
- Oil Sands Environmental Monitoring Program (OSM)

Other Environmental Initiatives

3.1.2-6d

Canada's Oil Sands Innovation Alliance (COSIA)

- Devon is an active participant of the Water, Land, and greenhouse gas (GHG) Environmental Priority Areas (EPAs) and the COSIA Monitoring Working Group

- Aspirations for each EPA have been developed and Devon is striving to:
  - GHG: Produce oil with lower GHG emissions than other sources of oil
  - Land: Be world leaders in land management, restoring the land and preserving biodiversity of plants and animals
  - Water: Be world leaders in water management, producing Canadian energy with no adverse impact on water

- Devon is either leading or participating in Joint Industry Projects in each of the EPAs

Other Environmental Initiatives

3.1.2-6d

Monitoring Avian Productivity and Survivorship (MAPS Program)

- Continued annual support (technical and financial) of the MAPS Program
- This program analyzes the influence of industry throughout NE Alberta on productivity and survivorship of migratory birds

Regional Industry Caribou Collaboration (RICC)

- Devon is leading a consortium of organizations in implementing a collaborative caribou conservation program for the Cold Lake Range, which includes the Jackfish and Pike areas
- This program focuses on:
  - Managing and reducing industry's footprint
  - Monitoring wildlife use of linear features
  - Identifying effective techniques to reduce wolf and bear movements throughout the caribou habitat

Regulatory Compliance

Section 3.1.2-7, -8

devon

Statement of Compliance

3.1.2-7

Devon Canada Corporation believes the Jackfish Project is in compliance with AER approvals and regulatory requirements. As of August 31/2018, Devon has no unaddressed non-compliant events.

Summary of Spill Releases

September 1/2017 – August 31/2018

3.1.2-8

The following list summarizes spills reported to the AER within the reporting period.

AER Spill Reporting		
Site	No. of Reportable Spills	Volume Released (m^3)
Jackfish 1	9	6.6
Jackfish 2	2	0.12
Jackfish 3	4	8.5

AER Summary of Noncompliance

September 1/2017 – August 31/2018

3.1.2-8

The following list summarizes non-compliant events within the reporting period. For all events corrective actions were identified and tracked to completion.

Date	Event	Corrective Actions
September 2017	Notice of Noncompliance (4) re: Failure to submit RASTER/LASS well logs.	Devon submitted required information.
December 2017	Notice of Noncompliance re: Failure to meet D-13 suspension requirements.	Well was recompleted and reactivated in Q1 2018.
June 2018	Notice of Noncompliance re: Failure to meet D-13 suspension requirements (19 wells in Jackfish area).	Devon submitted required information.
August 2018	Notice of Noncompliance re: D-50 Drilling Waste Management Disposal Form.	Devon submitted required information.

Future Plans

Section 3.1.2-9

devon

Future Plans (2018 – 2019)

Surface Operations

3.1.2-9a, b, c, d

Jackfish 1

- Soda ash injection into HLS is starting up to reduce regen waste disposal volumes
- CPF modifications in preparation for ESP conversion

Jackfish 2

- Plant maintenance turnaround planned for 2019
- Soda ash injection into HLS is starting up to reduce regen waste disposal volumes

Jackfish 3

- Soda ash injection into HLS is starting up to reduce regen waste disposal volumes

Thank you.