



**Sunshine Oilsands Ltd.
BA Code A2TF**

阳光油砂

SUNSHINE OILSANDS LTD.

WEST ELLS SAGD

**Scheme No. 11764G
AER In Situ Performance Presentation
May 25, 2020**



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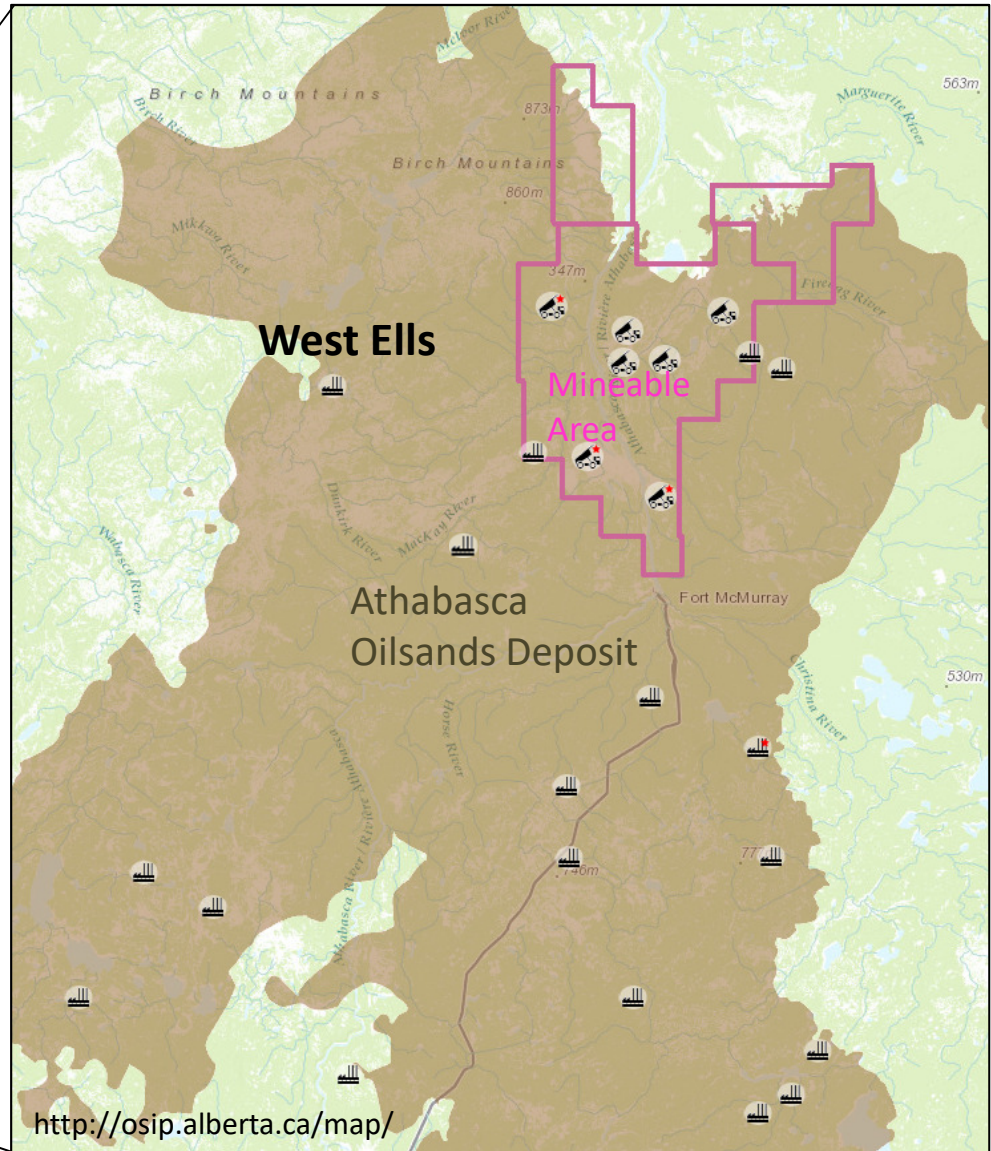
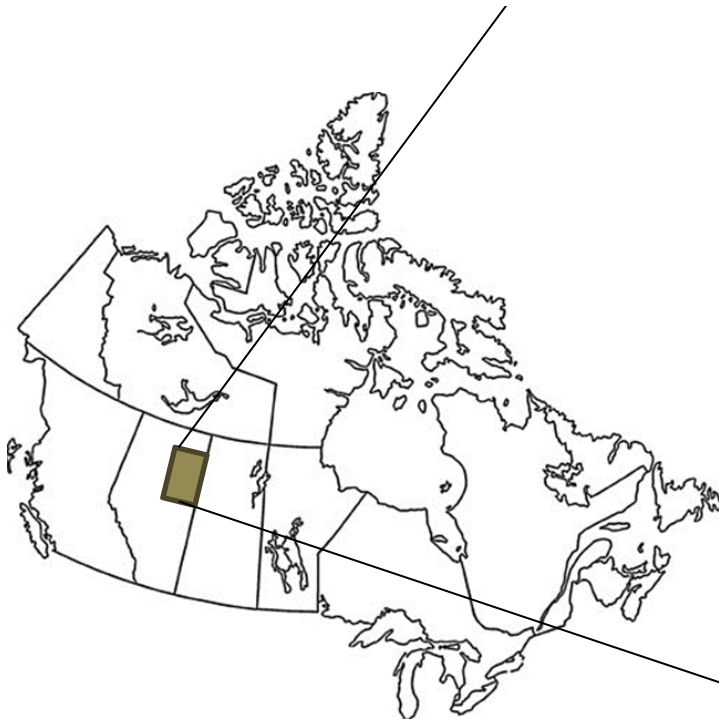
Introduction

Introduction



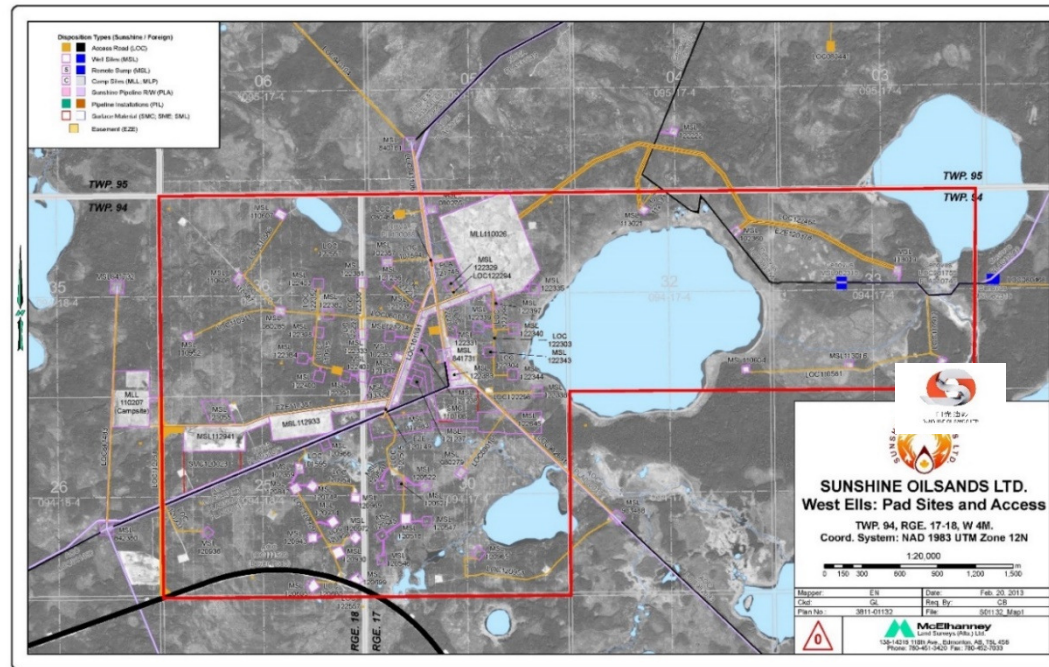
Location within the Athabasca Oilsands Deposit

West Ells SAGD Project
Located in the NW part of
the Athabasca Oilsands
Deposit, Alberta, Canada



West Eils SAGD

- Covering 9,856 contiguous gross hectares in the Athabasca Oil Sands Region
- Two phases of 5,000bbl/d
 - Phase 1 currently in Operation since September 2015 is supplied by Pad 2
 - Phase 2 will commence in the future and is supplied by Pad 3 which has already been drilled
 - MSL 112941 and MSL 112933 were cleared of vegetation with no soil disturbance, anticipated to serve as make-up pads as the project advances



West Eils SAGD 2019 Performance

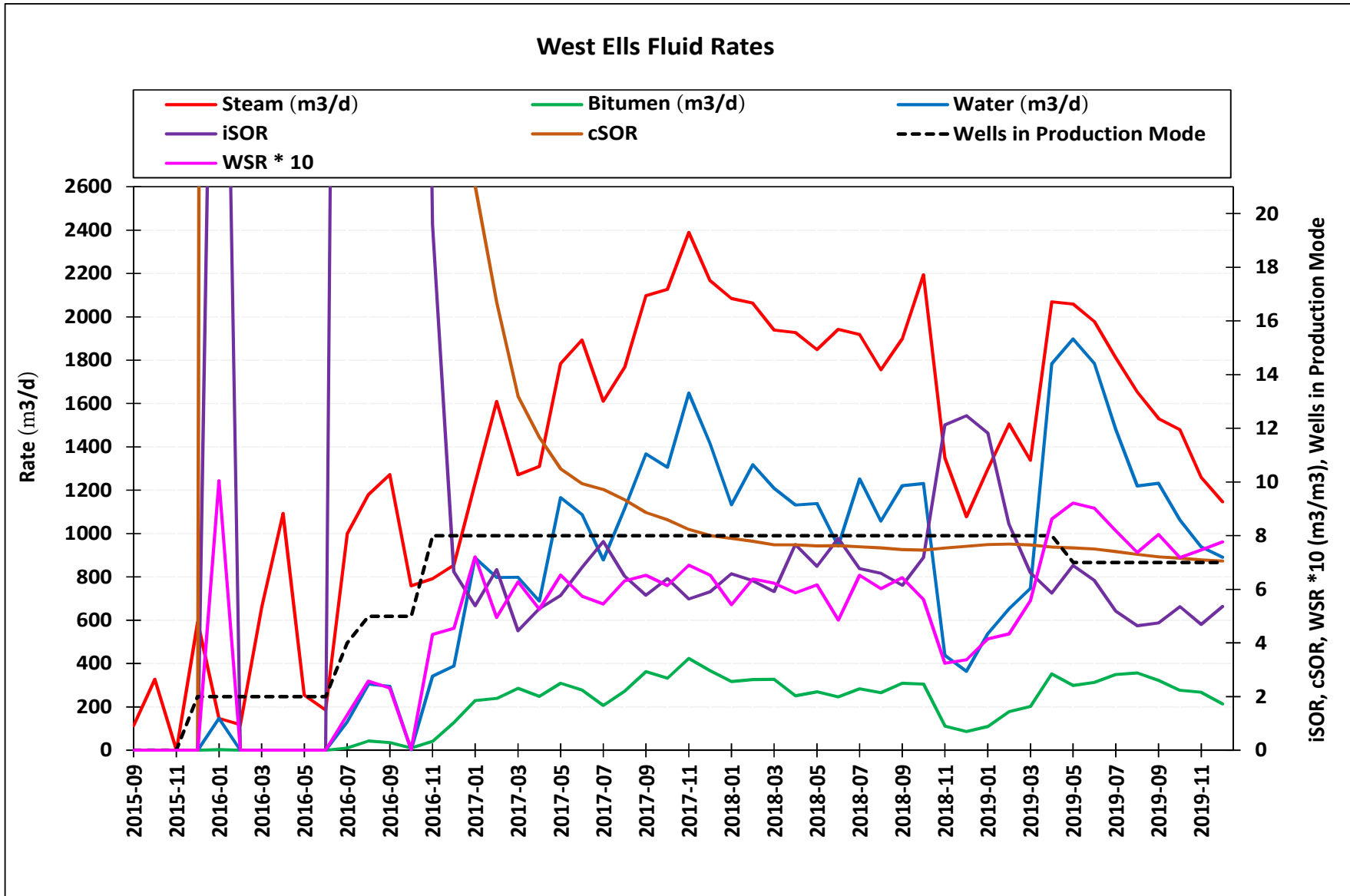


Subsurface

Subsurface

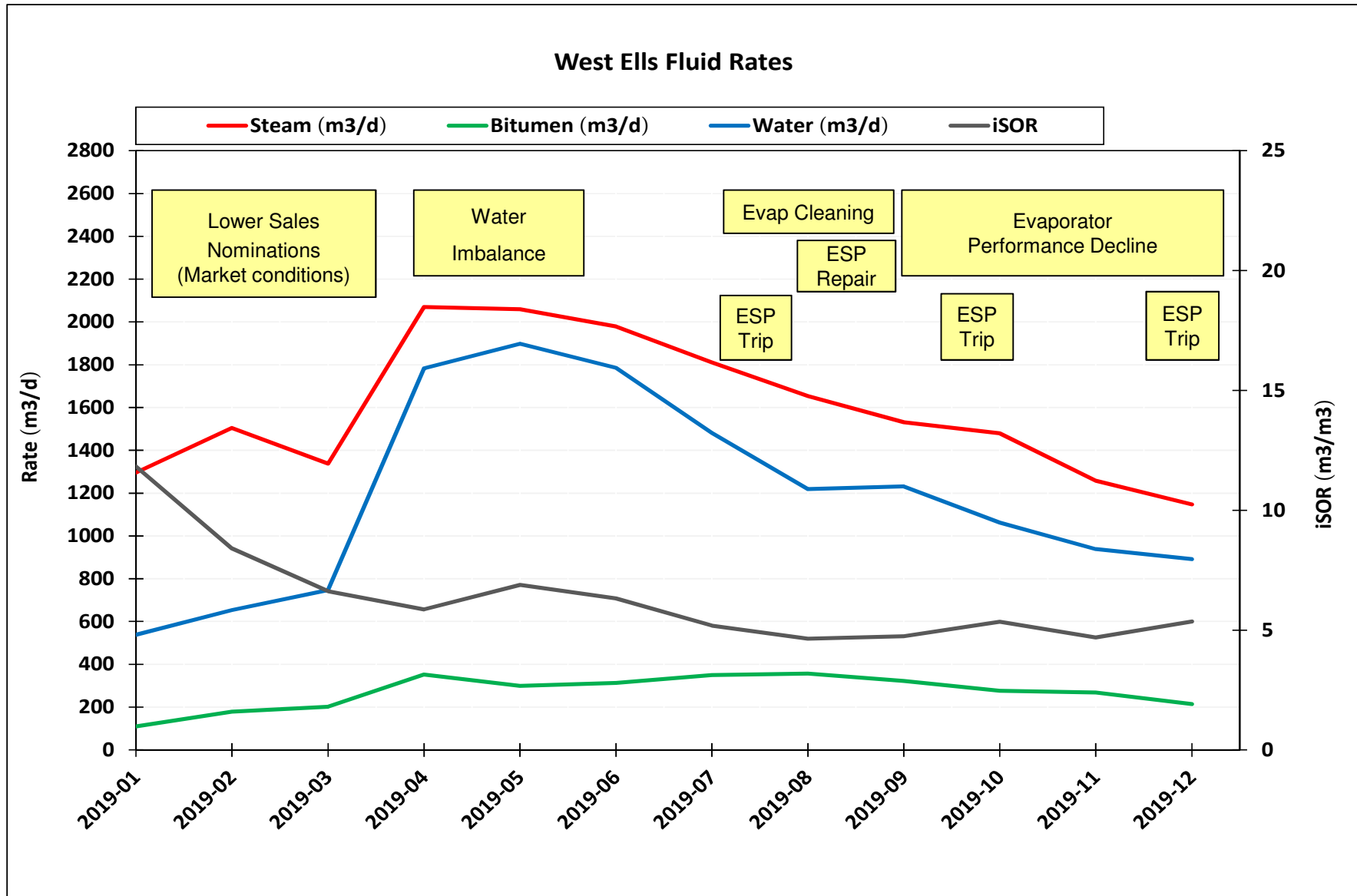


Production Curves



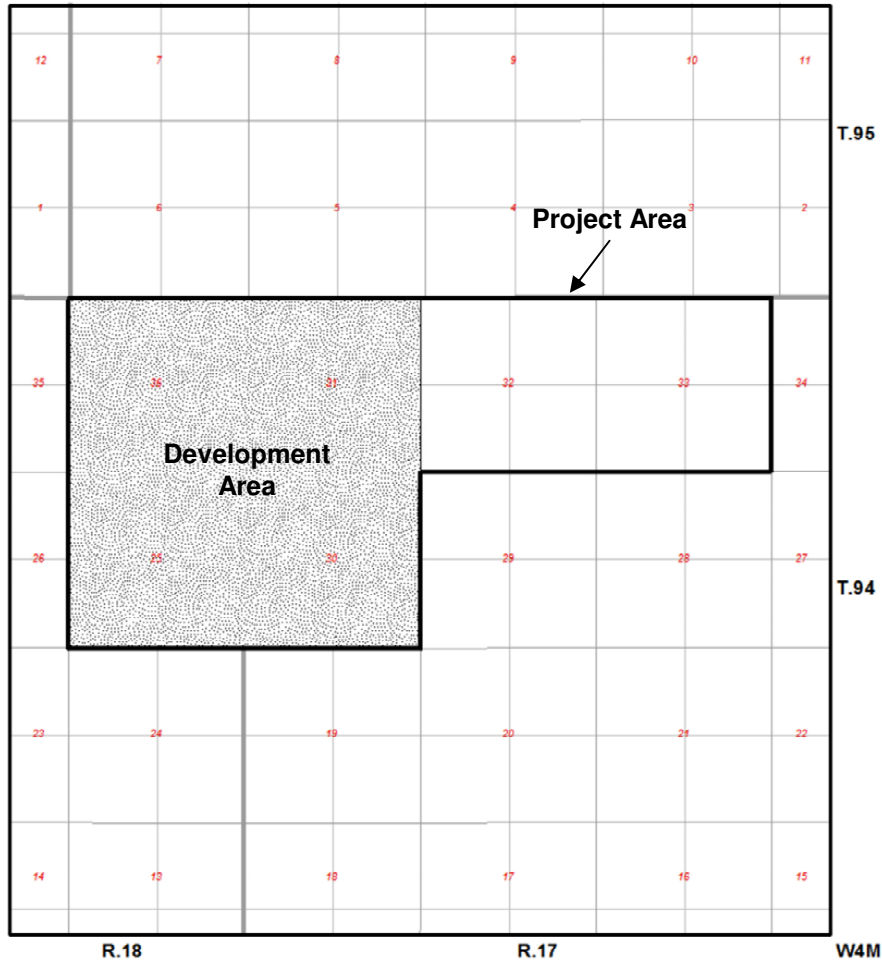


Annotation of Major Events





Development and Project Area



Area	Land Description
Development Area (4 sections)	T94 R17W4; Sec 30, 31 T94 R18W4; Sec 25, 36
Project Area (6 sections)	T94 R17W4; Sec 30, 31, 32, 33 T94 R18W4; Sec 25, 36

First Steam – September 2015

First Production – December 2015

ATHABASCA OIL SANDS AREA
APPENDIX A TO APPROVAL NO. 11764G

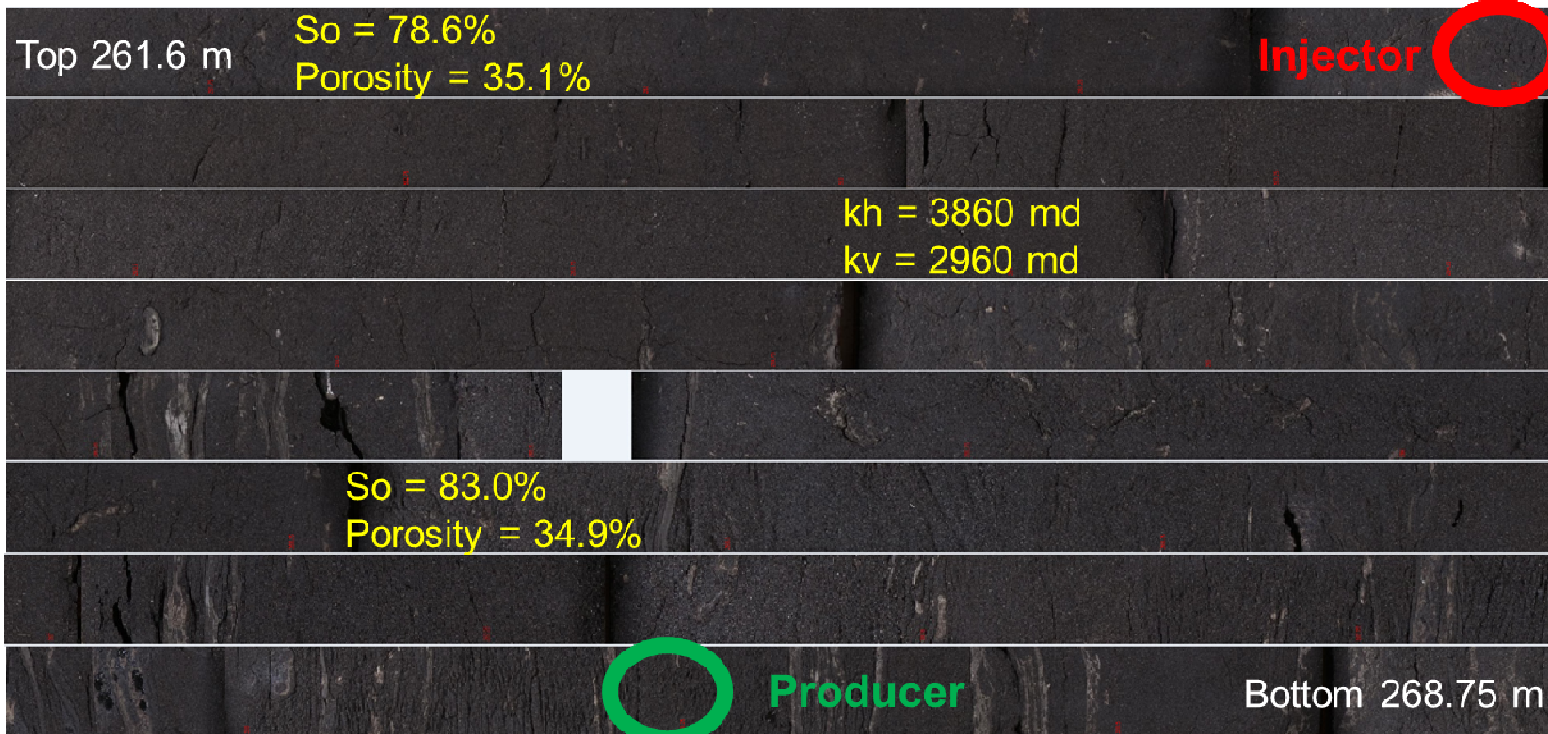
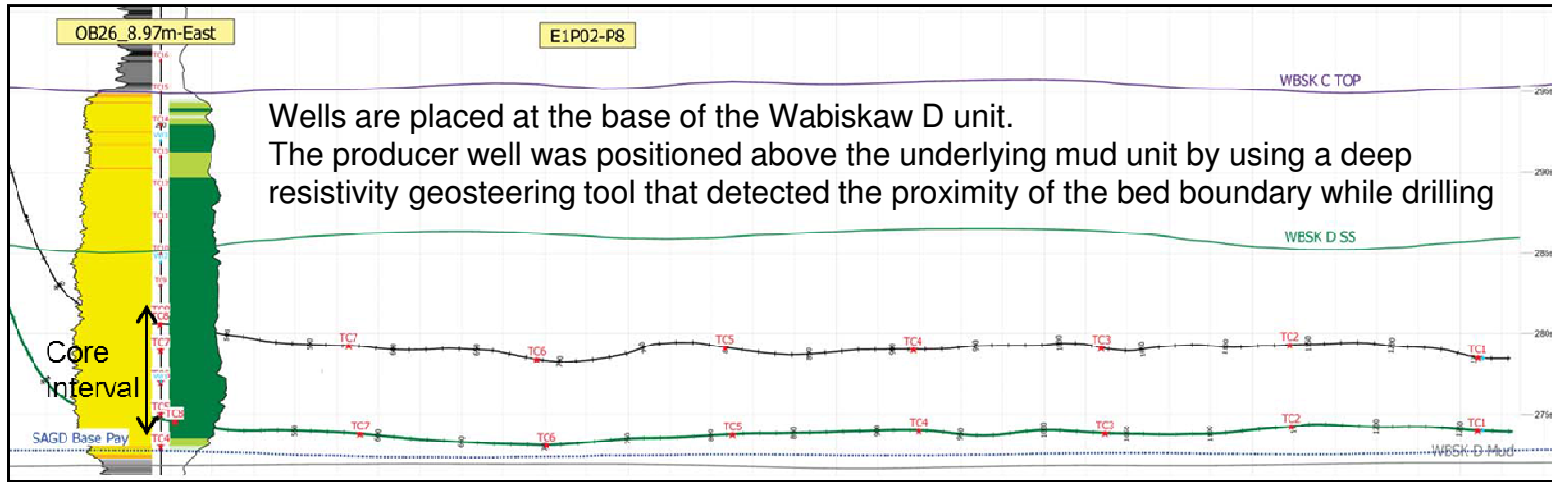
The AER does not warrant the accuracy or completeness of the information contained in this map and is not responsible for any errors or omissions in its content and accepts no liability for the use of this information.

Base Data Provided by Spatial Data Warehouse Ltd., 2003

Legend

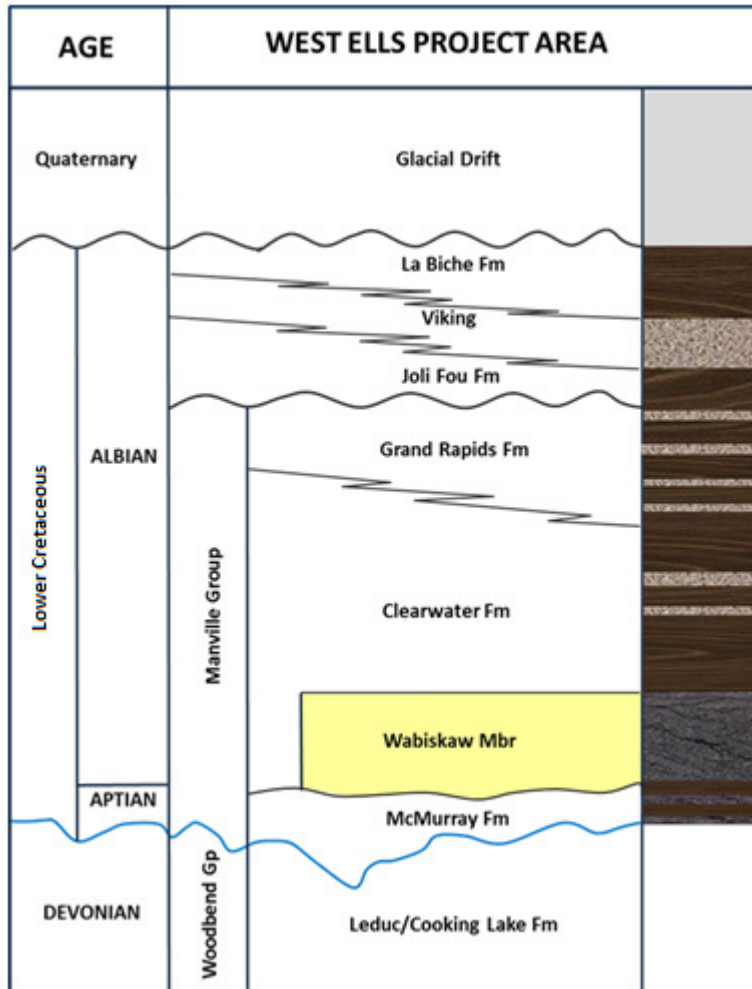
- Project Area
- Development Area

Typical SAGD Well Placement (e.g. Pair 8)

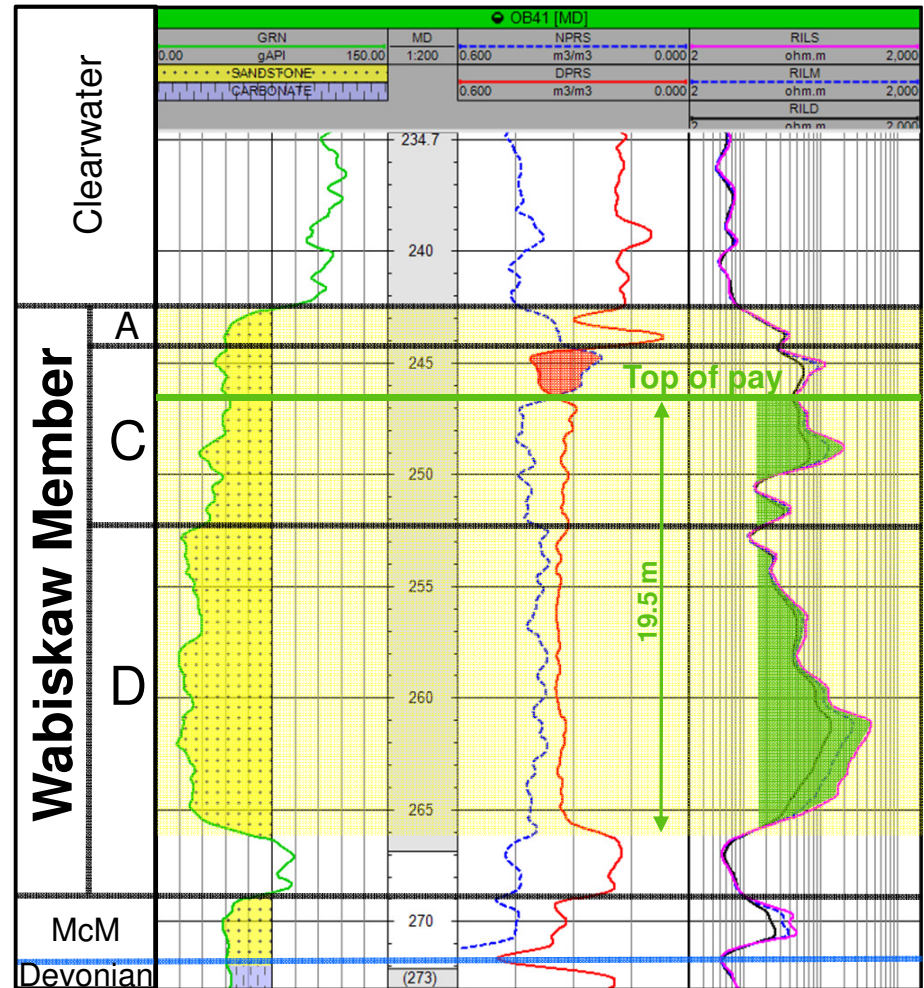


Stratigraphic Chart & Type Well

Stratigraphic chart

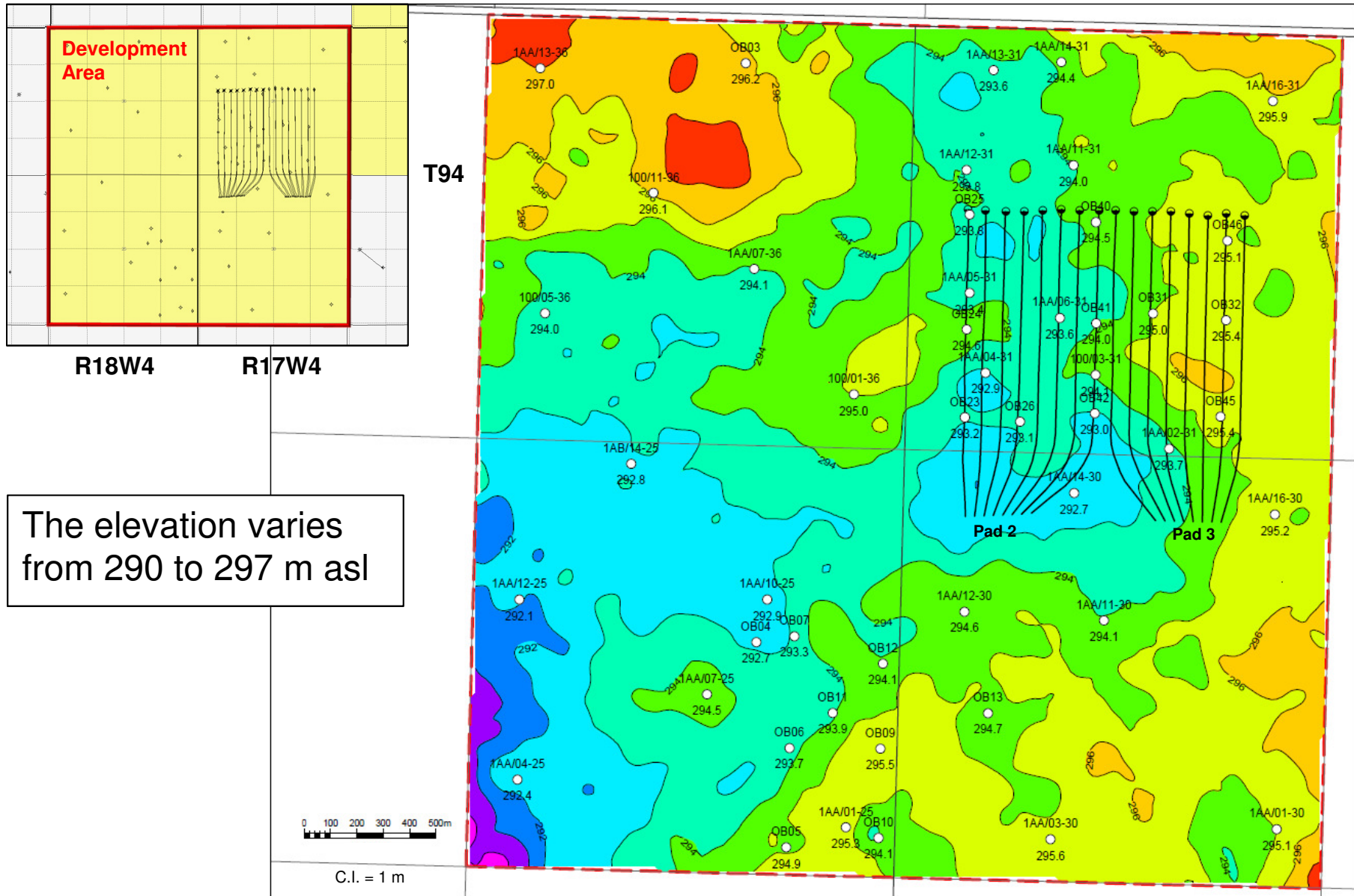


Type Well – OB41 (102/06-31-094-17W4)

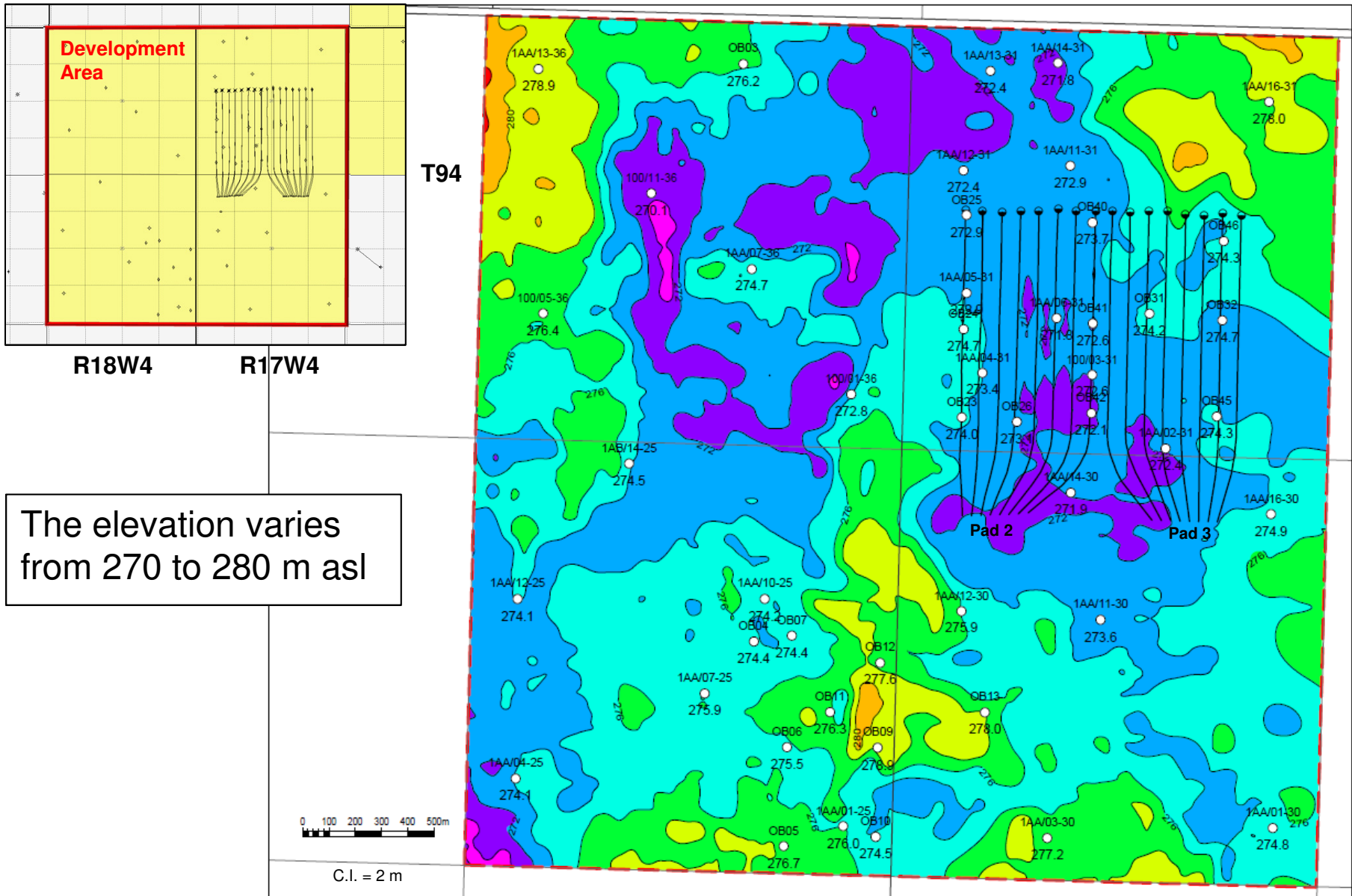


The SAGD wells are located at the base of the Wabiskaw D sand unit

Top of Bitumen Pay Structure Map

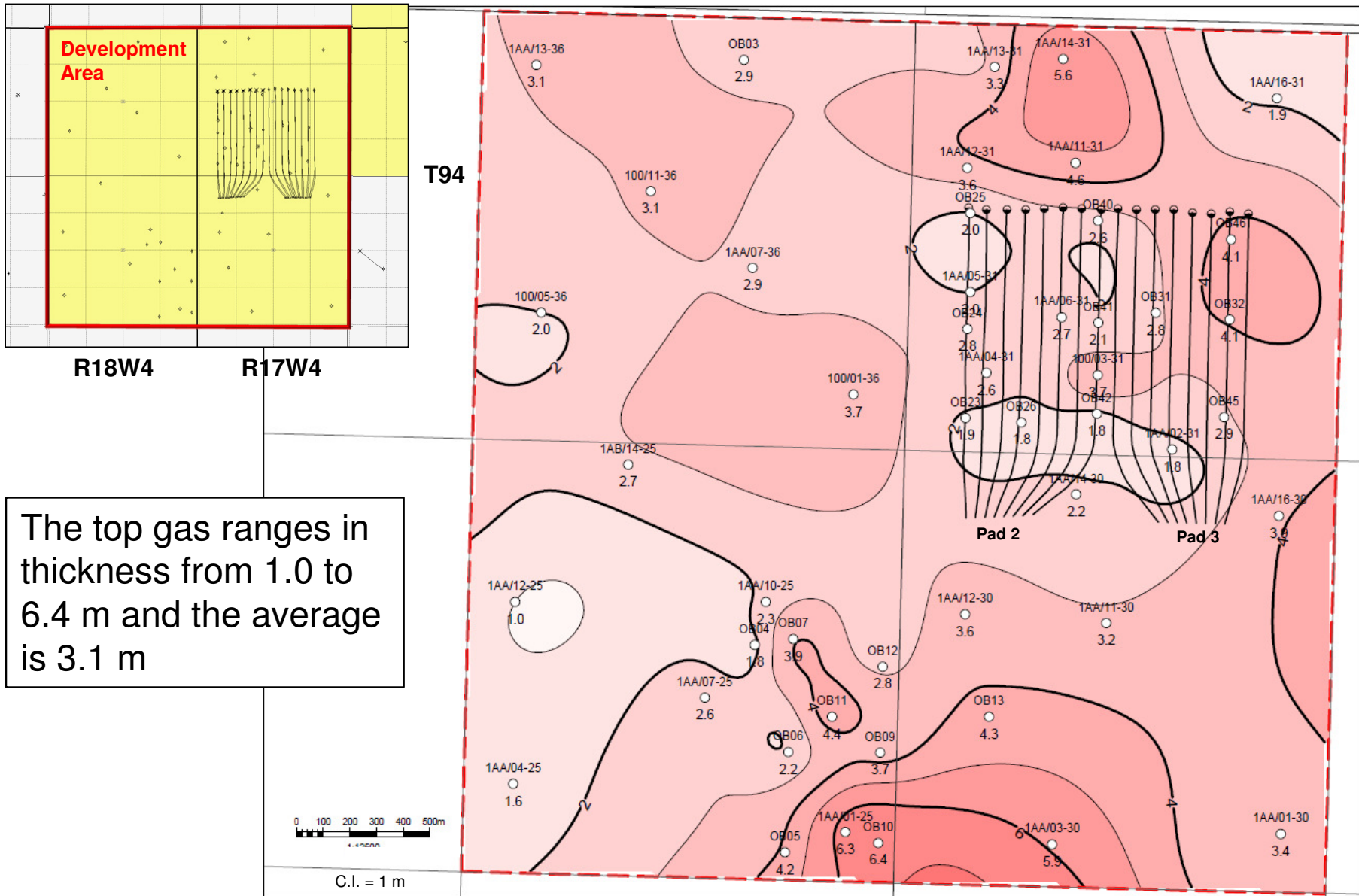


Base of Bitumen Pay Structure Map





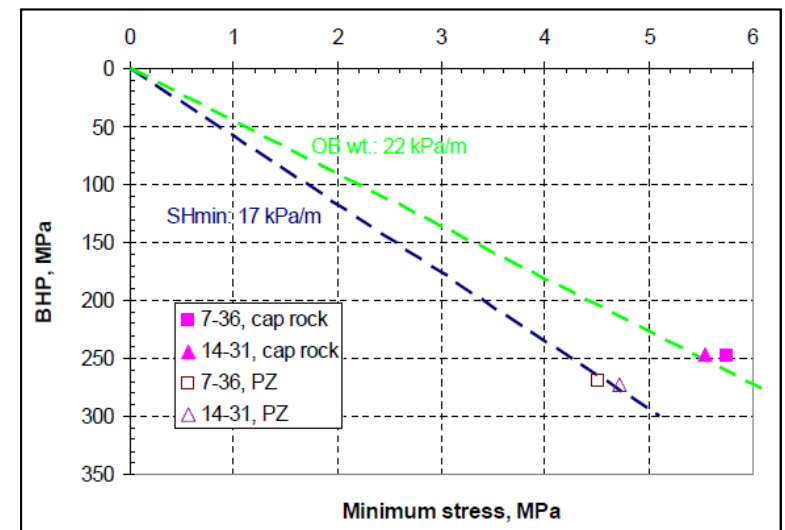
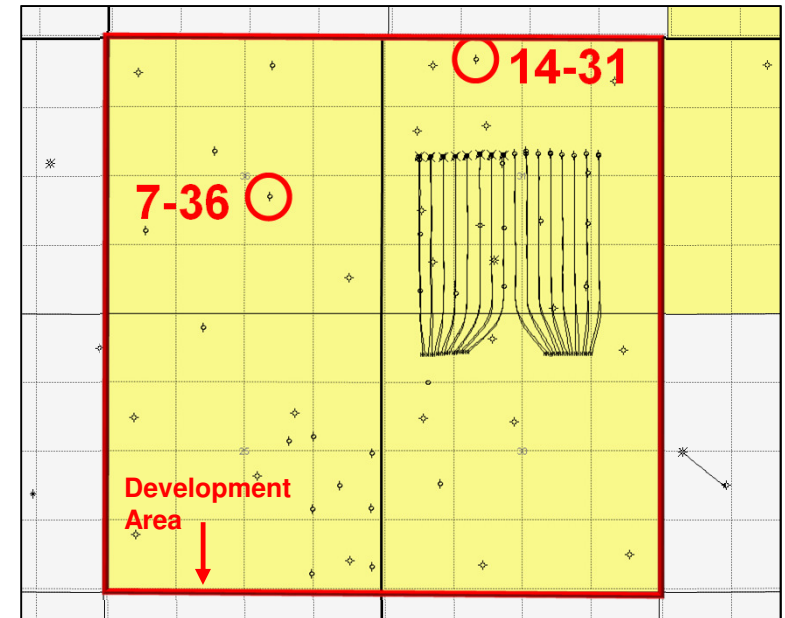
Wabiskaw C Top Gas Isopach Map



Geomechanical Anomalies--Cap Rock Integrity

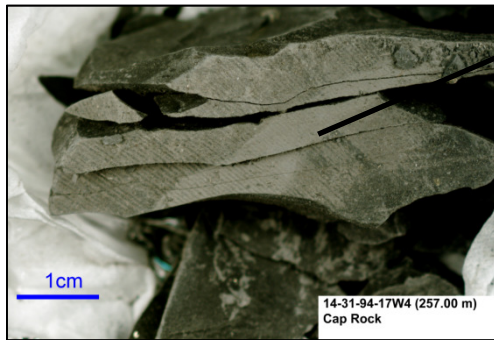
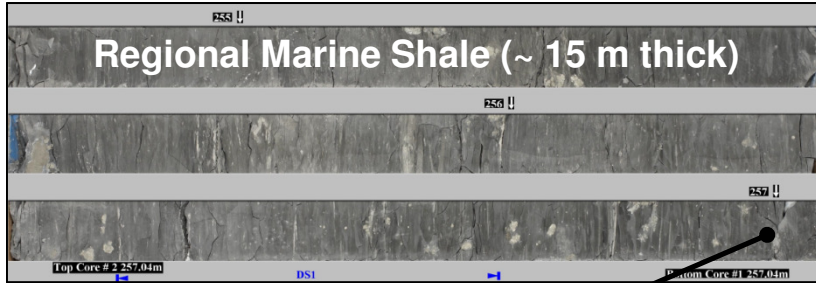
- No geomechanical anomalies reported in 2019 as the injection pressure was below MOP*. The injection pressure was between 2000-2450 kPa throughout the year
- Mini-frac tests were performed at:
 - 1AA/14-31-094-17W4/0
 - 1AA/07-36-094-18W4/0
- Caprock average minimum stress gradient = **22** kPa/m (Wabiskaw Shale Member)

* The maximum operating pressure (MOP) of **4400** kPag was granted on March 10, 2016



Geomechanics--Caprock and Oil Sand from 14-31-94-17W4 Location

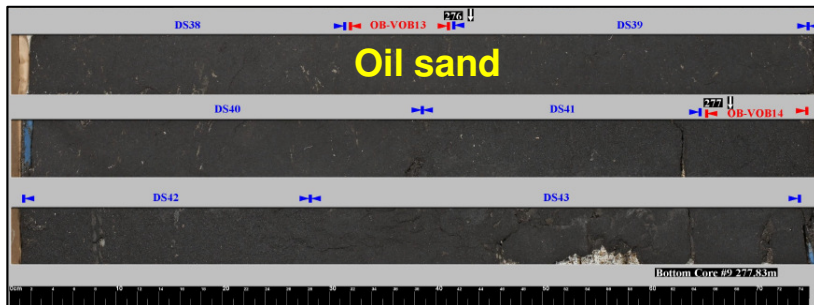
Caprock - Wabiskaw Shale Member



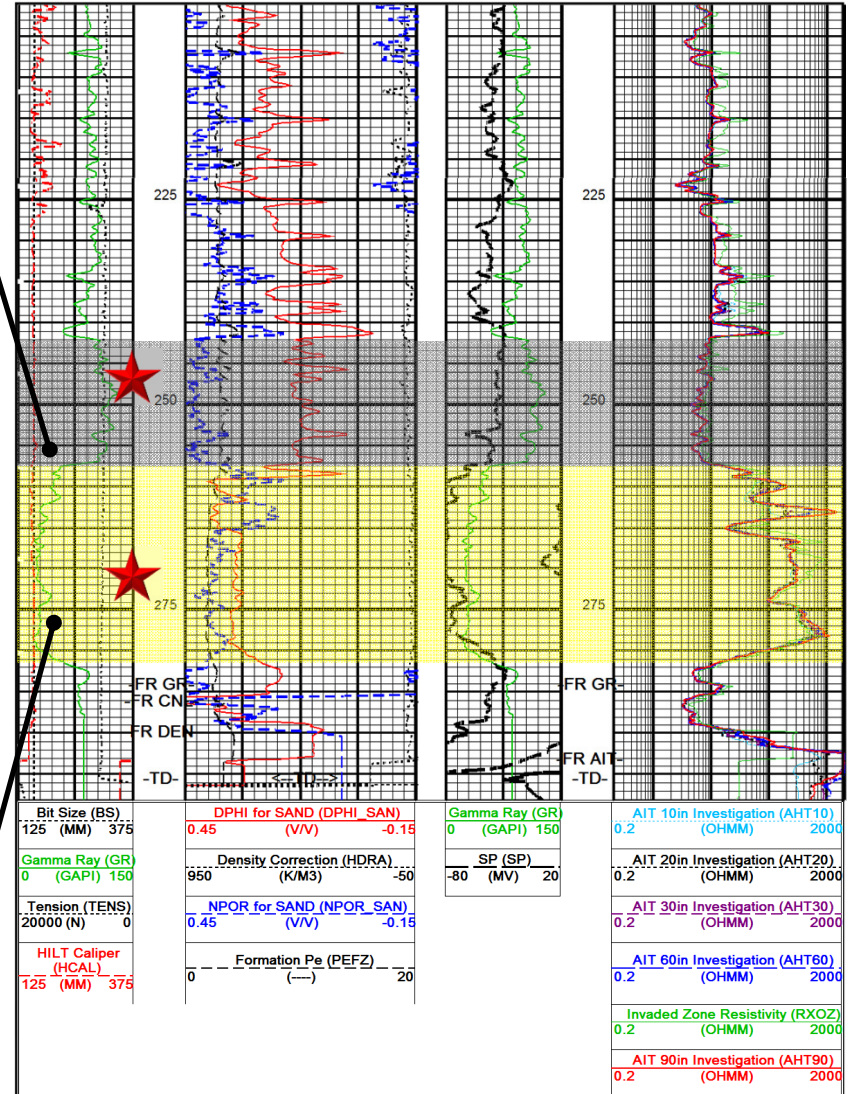
Caprock mini-frac

Oil sand mini-frac

Oil sand - Wabiskaw Sand



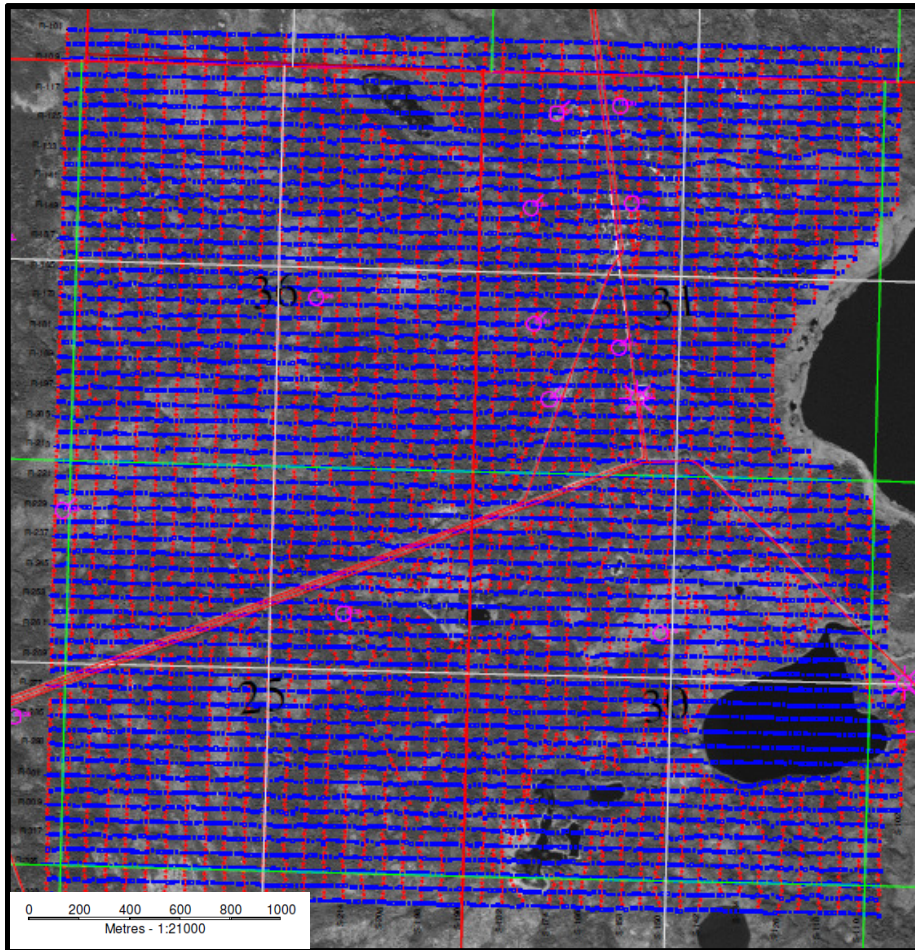
1AA/14-31-094-17W4/0 Well Log



3D Seismic Survey and Acquisition Parameters

- No new seismic data acquired in this reporting period

Survey Layout



Acquisition Parameters

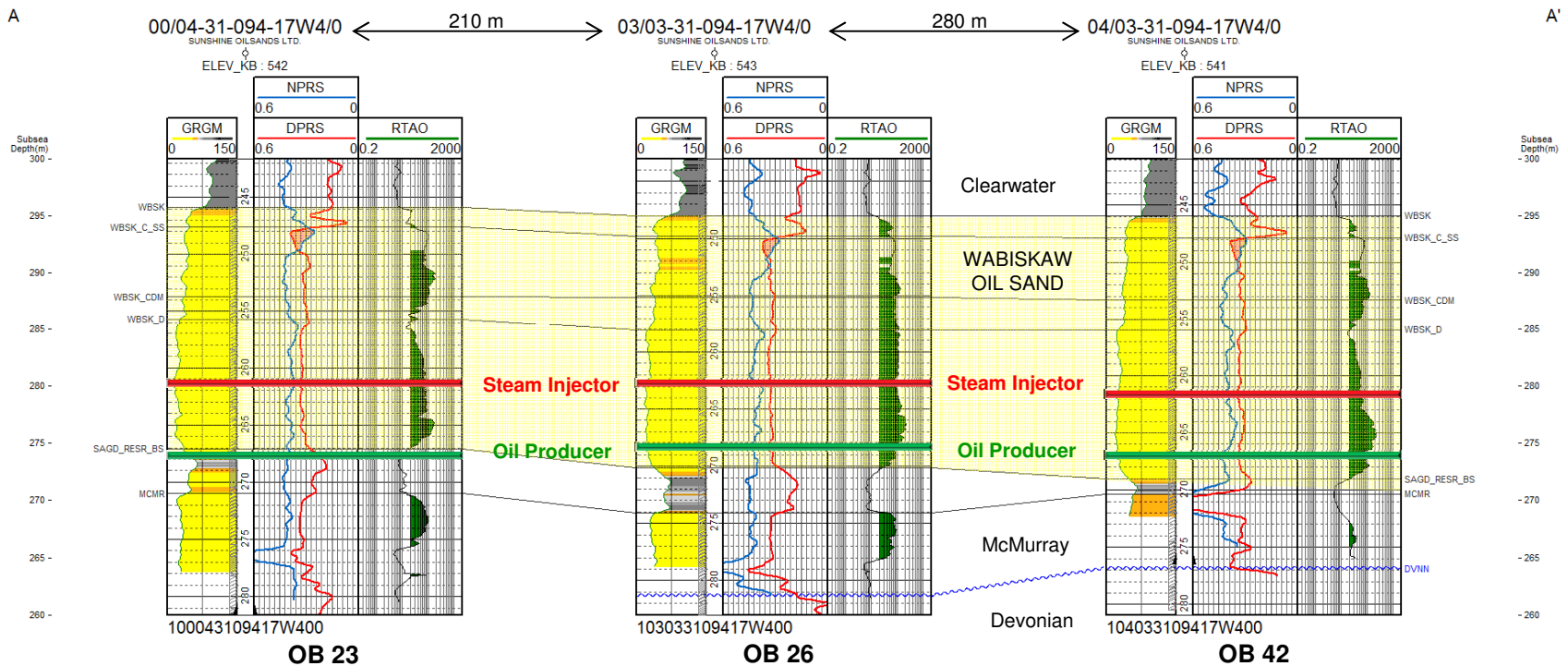
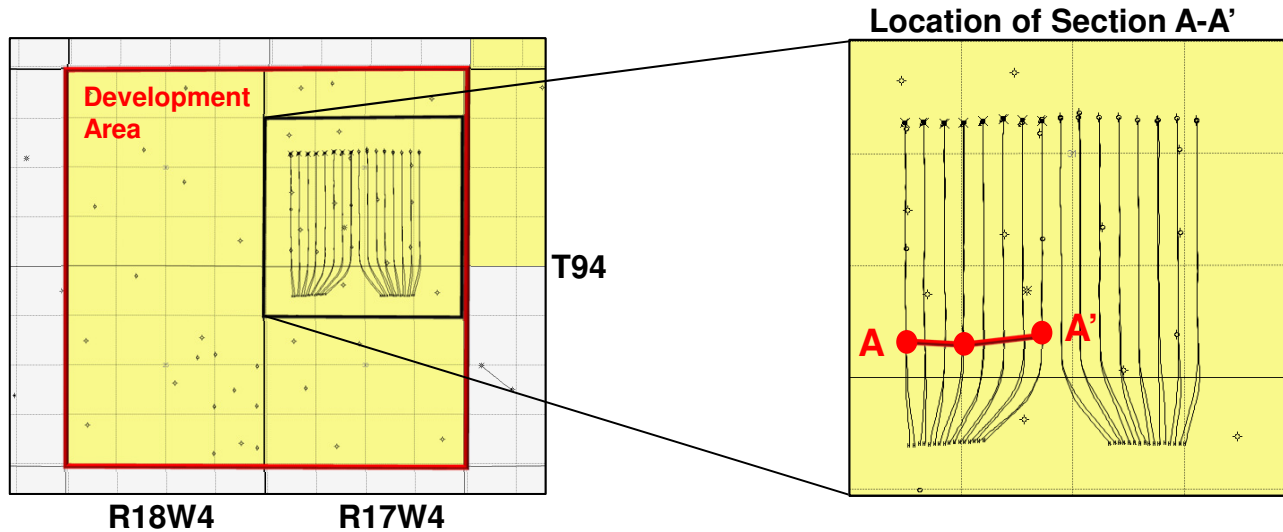
Area 10.7 (km ²)			
Source Information		Receiver Information	
Source interval (m)	20	Receiver interval (m)	20
Source line interval (m)	80	Receiver line interval (m)	60
Line orientation	N-S	Line orientation	W-E
Total km of line	167.1	Total km of line	194.9
Number of source points	7078	Number of receiver points	9681
Source depth (m)	6		
Source type	Dynamite		



4-D Seismic

- As measured on the observation wells, the width of the steam chamber is narrow and less than 10 m from the SAGD well pair. Therefore, Sunshine did not plan a 4D seismic acquisition survey in 2019 because it is difficult to image a small steam chamber in the seismic data
- While there are no plans in 2020 to conduct a 4D seismic survey, Sunshine will consider a 4D seismic survey when it is appropriate and provides an advantage for resource recovery

Cross-Section A-A' of the Active Development Area



West Ellis SAGD 2019 Performance



Average Reservoir Properties for Development Area

Property	Value
Bitumen saturation (%)	71
Porosity (%)	33
Grain size	Fine to medium
Net pay (m)	15.2
Horizontal perm. (D)	2.4
Vertical perm. (D)	1.7
Reservoir pressure (kpa)	600
Reservoir temperature (°C)	9
Reservoir depth (m TVD)	265
Bitumen viscosity (cp)	> 1 million
Well length (m)	800
Well spacing (m)	70



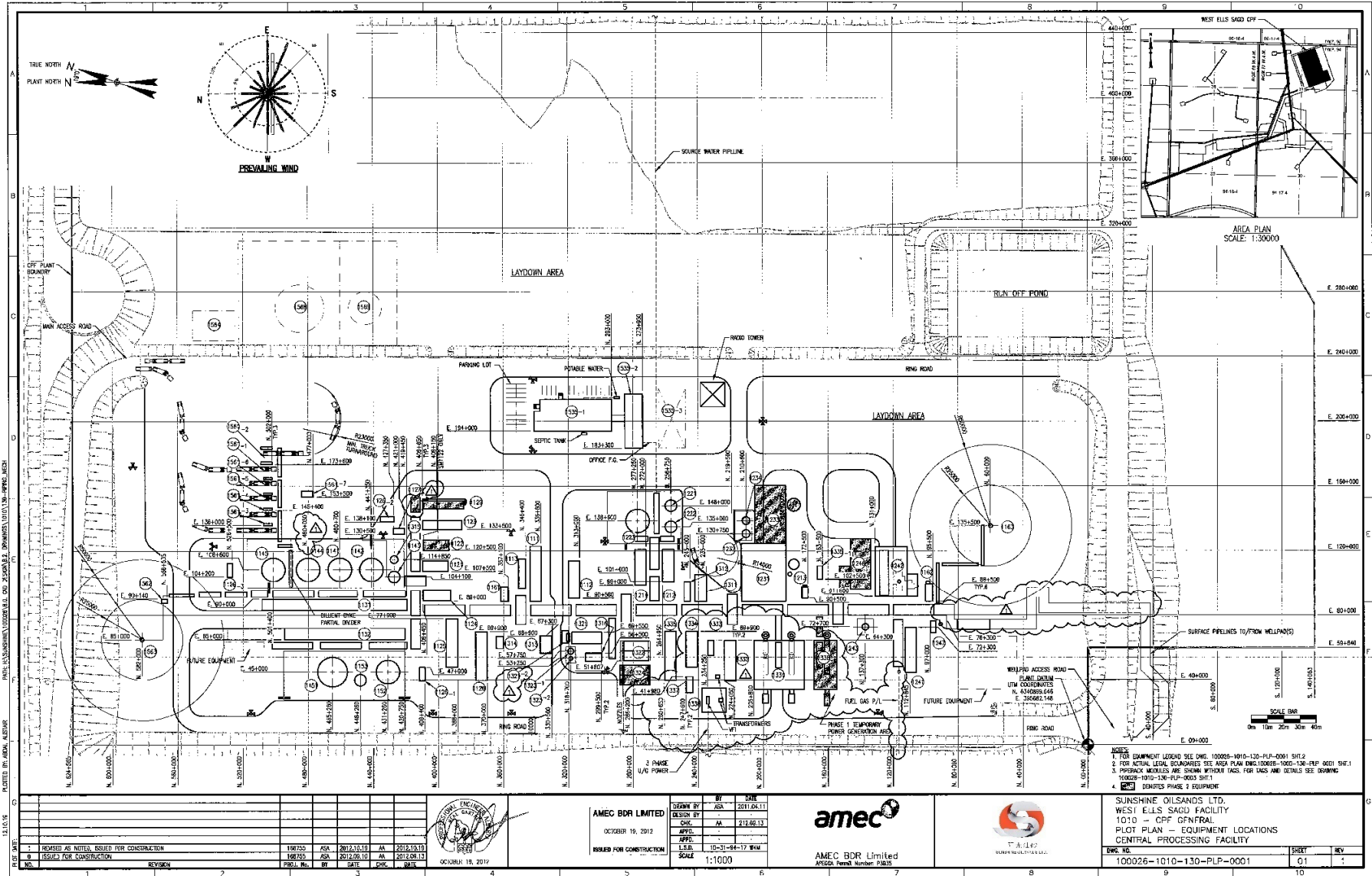
Surface

Surface



CPF Plot Plan

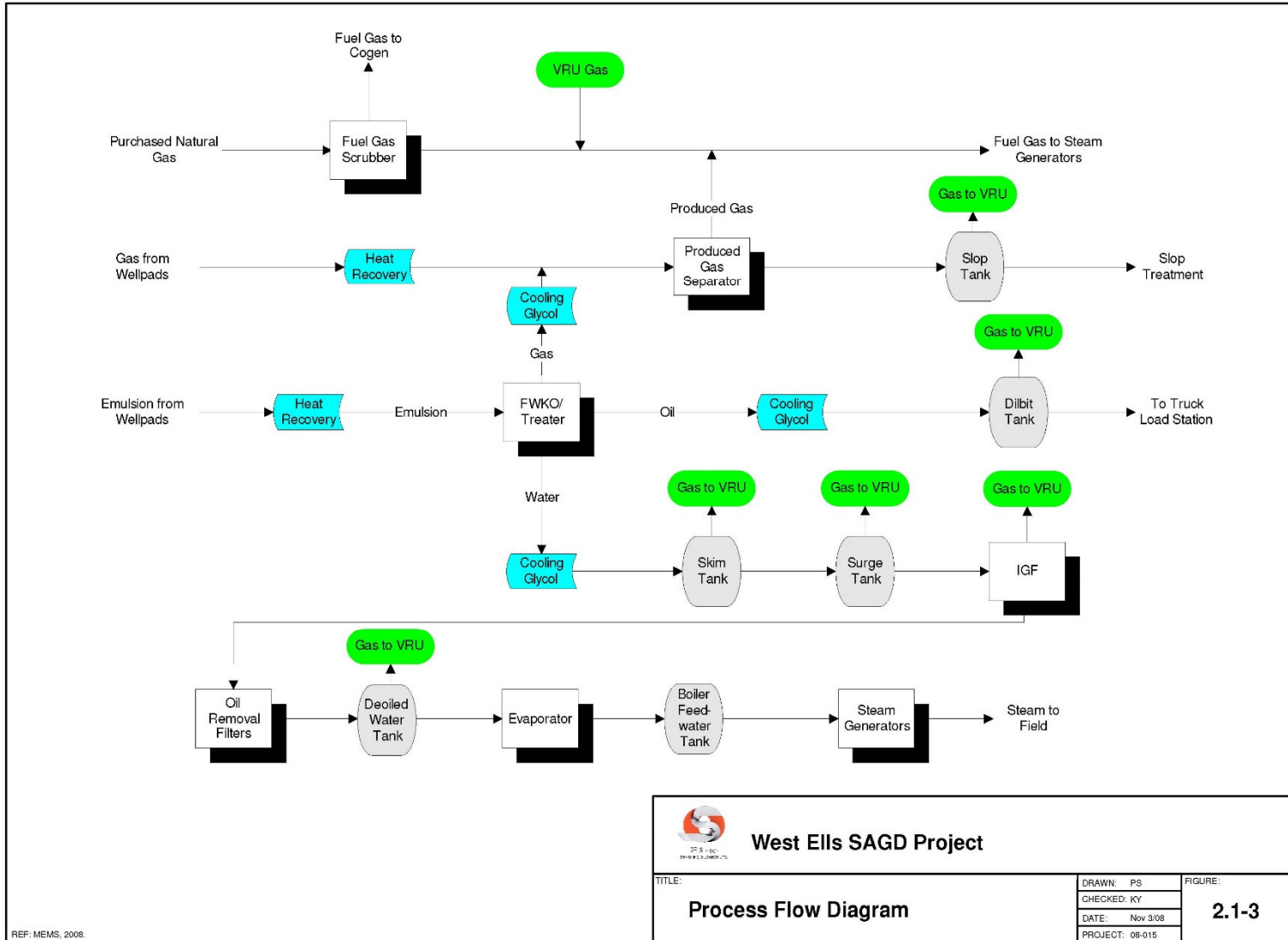
- No major facility modifications during this reporting period




DRAWN BY: JACOB ALBERT CHECKED BY: JACOB ALBERT DATE: 11.16.14				AMEC BDR LIMITED OCTOBER 19, 2012 ISSUED FOR CONSTRUCTION		DRAWN BY: JACOB ALBERT DESIGN BY: CHC CHECKED BY: AA APPROVED BY: L.S.B. SCALE: 1:1000		 AMEC BDR Limited ARSQA Permit Number: P435		 SUNSHINE OILSANDS LTD. WEST ELLIS SAGD FACILITY 1010 - OFF GENERAL PLOT PLAN - EQUIPMENT LOCATIONS CENTRAL PROCESSING FACILITY		DWG. NO.: 100026-1010-130-PLP-0001 SHEET: 01 REV:	
REVISION AS NOTED, ISSUED FOR CONSTRUCTION 100730 ASA 2012.12.19 AA 2012.10.19		REVISION AS NOTED, ISSUED FOR CONSTRUCTION 100730 ASA 2012.12.19 AA 2012.10.19		REVISION AS NOTED, ISSUED FOR CONSTRUCTION 100730 ASA 2012.12.19 AA 2012.10.19		REVISION AS NOTED, ISSUED FOR CONSTRUCTION 100730 ASA 2012.12.19 AA 2012.10.19		REVISION AS NOTED, ISSUED FOR CONSTRUCTION 100730 ASA 2012.12.19 AA 2012.10.19		REVISION AS NOTED, ISSUED FOR CONSTRUCTION 100730 ASA 2012.12.19 AA 2012.10.19		REVISION AS NOTED, ISSUED FOR CONSTRUCTION 100730 ASA 2012.12.19 AA 2012.10.19	



CPF Process Flow Simplified



REF: MEMS, 2008.

 West Ellys SAGD Project		
TITLE: Process Flow Diagram	DRAWN: PS	FIGURE: 2.1-3
	CHECKED: KY	
	DATE: Nov 3/08	
	PROJECT: 09-015	

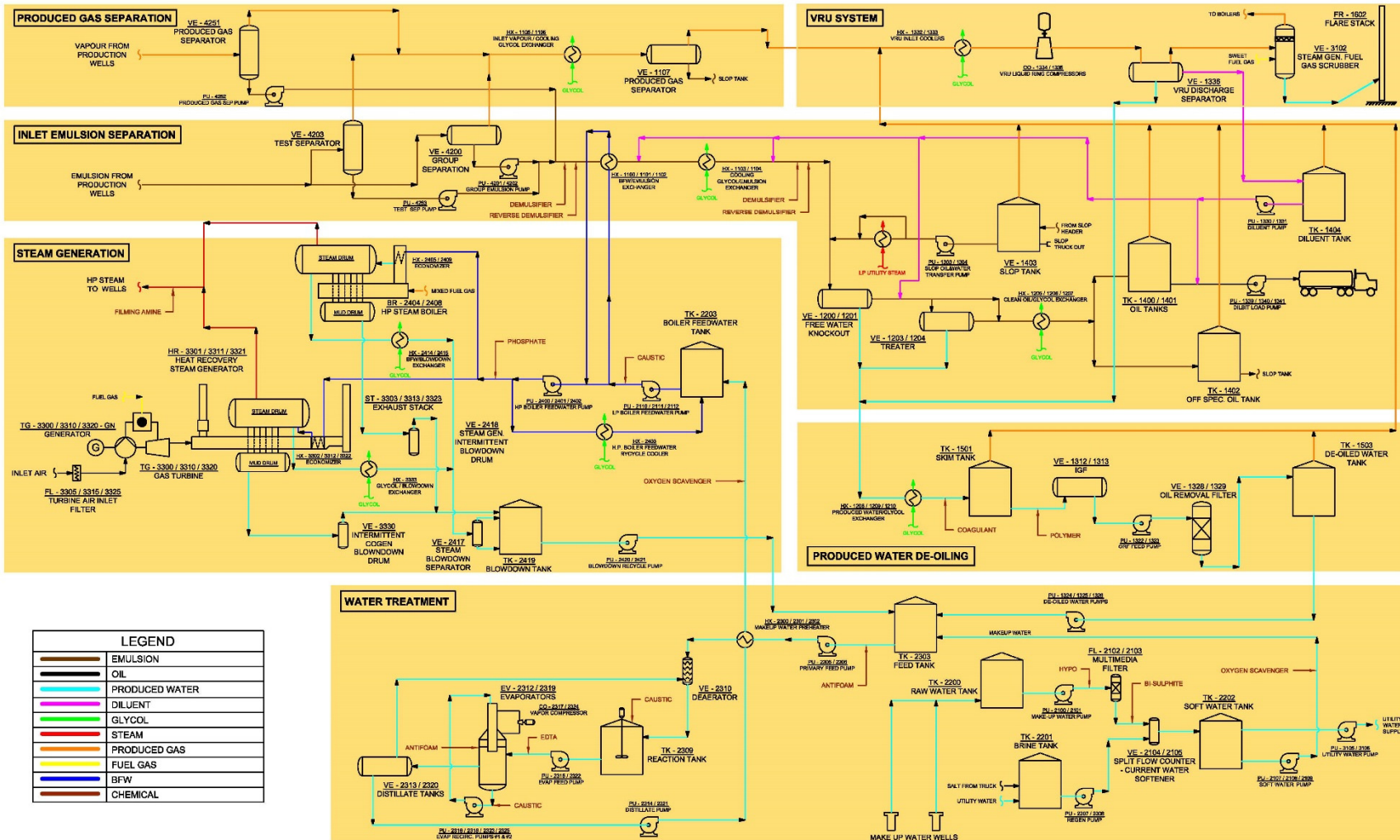


CPF Process flow

- No modifications during this reporting period

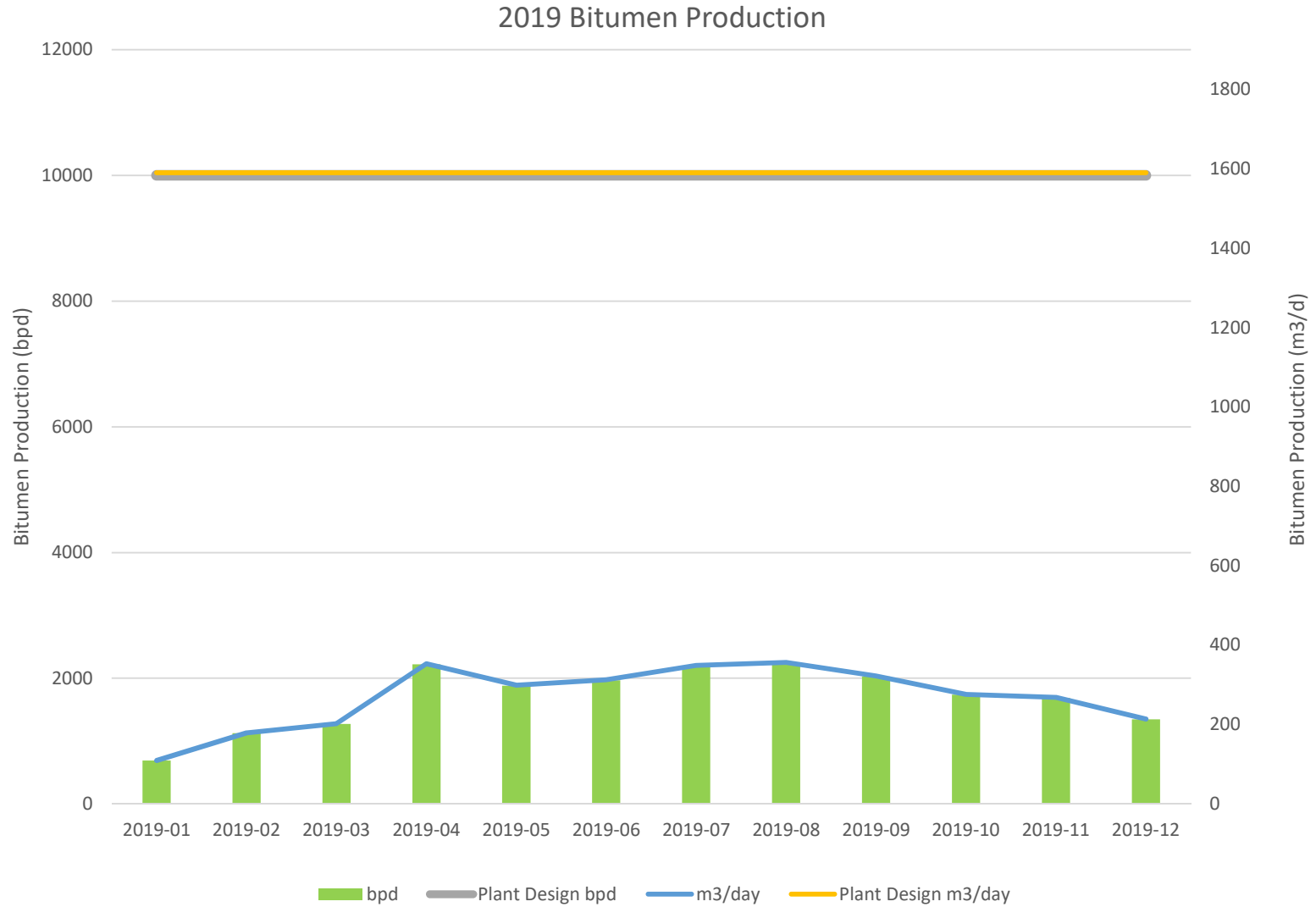


SUNSHINE WEST ELLS 10,000 BOPD SAGD FACILITY FLOW DIAGRAM DRAFT



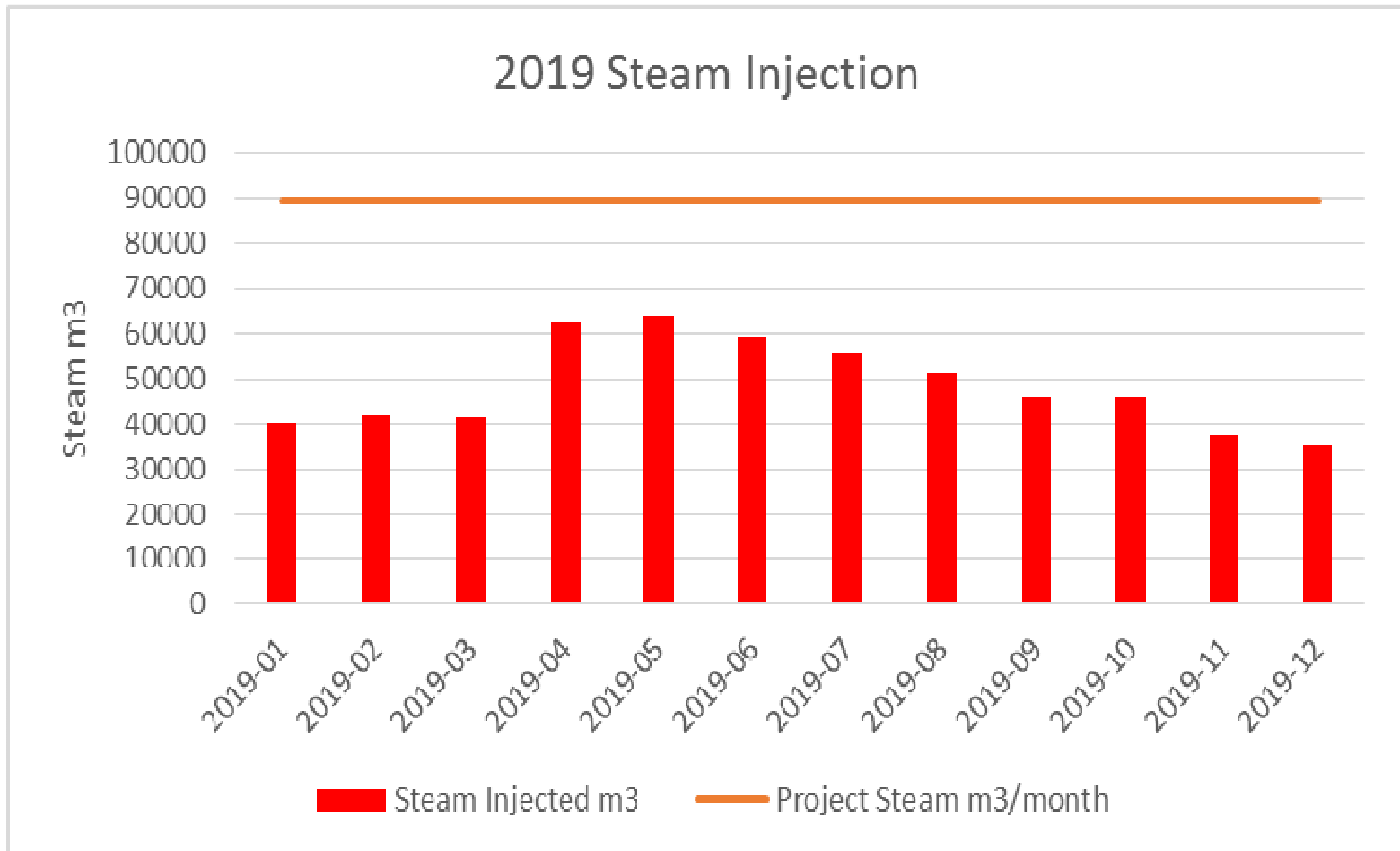


Bitumen Production





Steam Injection



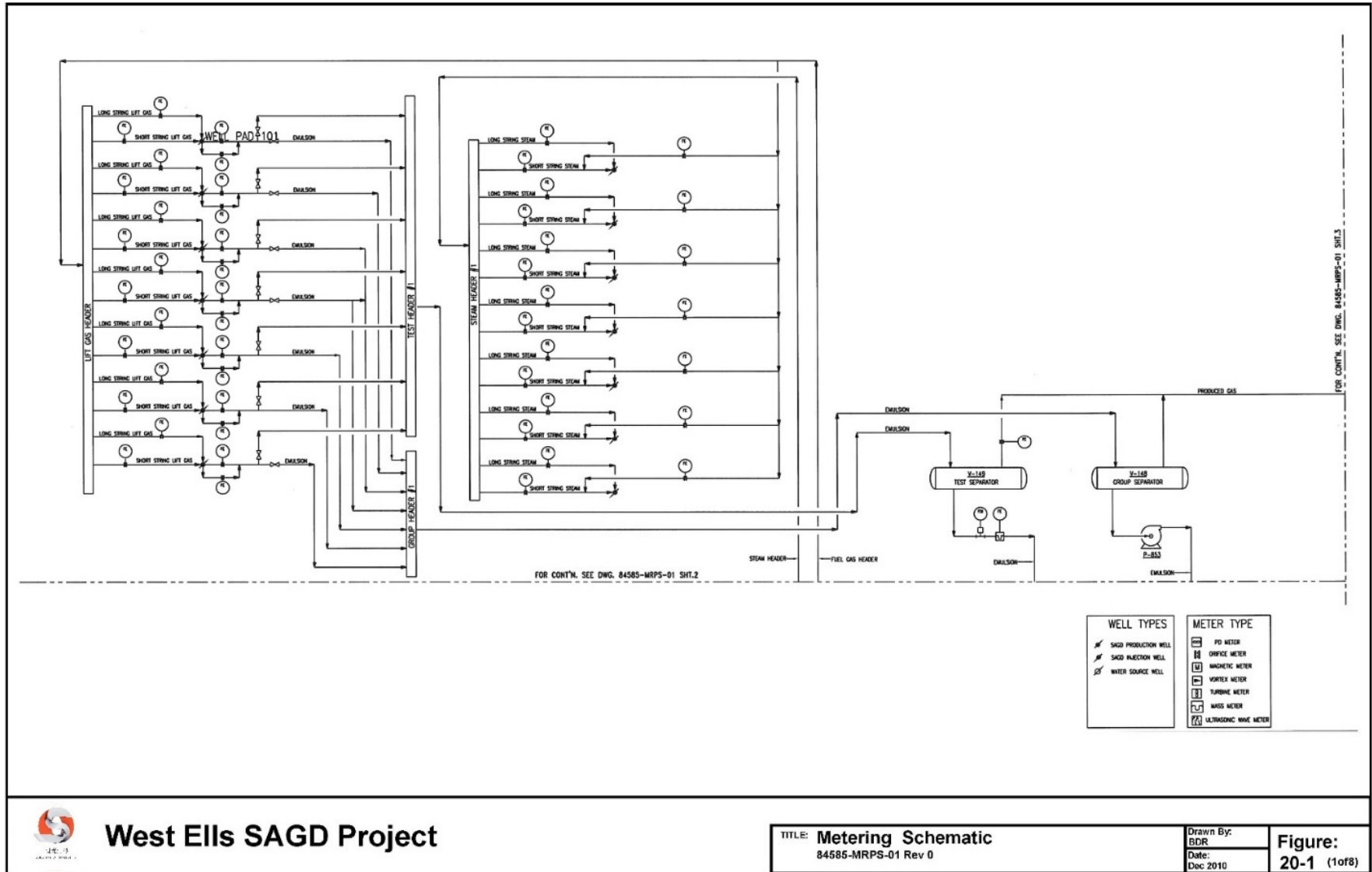


MARP

Measurement, Accounting and Reporting Plan (MARP)

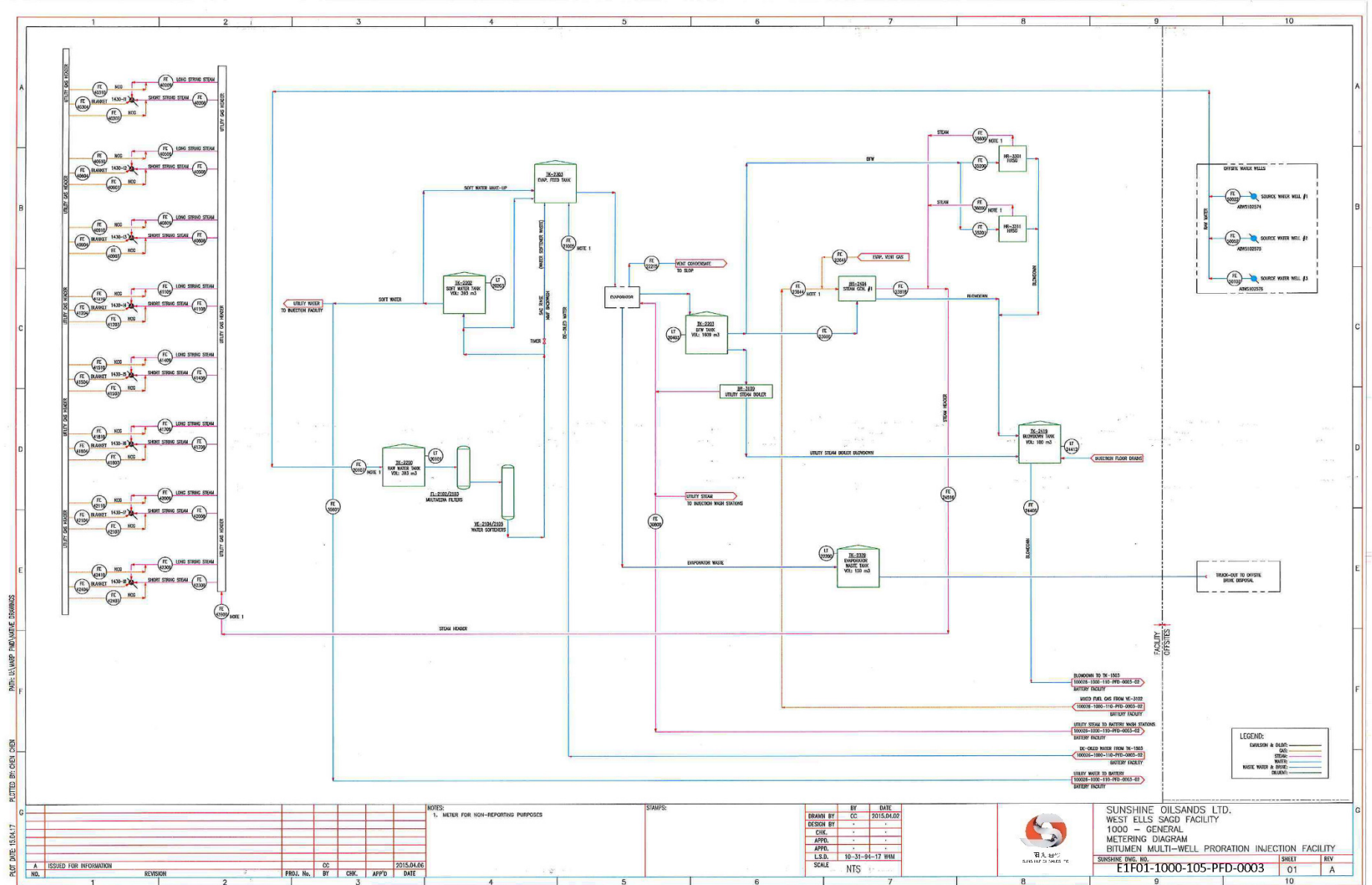
- Reporting codes associated with West Ells
 - ABBT0123666
 - ABIF0123667
 - ABWS0139258, ABWS0139259, ABWS0139260
- MARP approved August 2012
- MARP updated in 2015
- MARP Meter list revised in 2018
- No further changes or alterations made during the 2019 reporting period

Metering Schematic – Well Pads





Metering Schematic – Injection Facility



NOTES:
1. METER FOR NON-REPORTING PURPOSES

STAMPS:

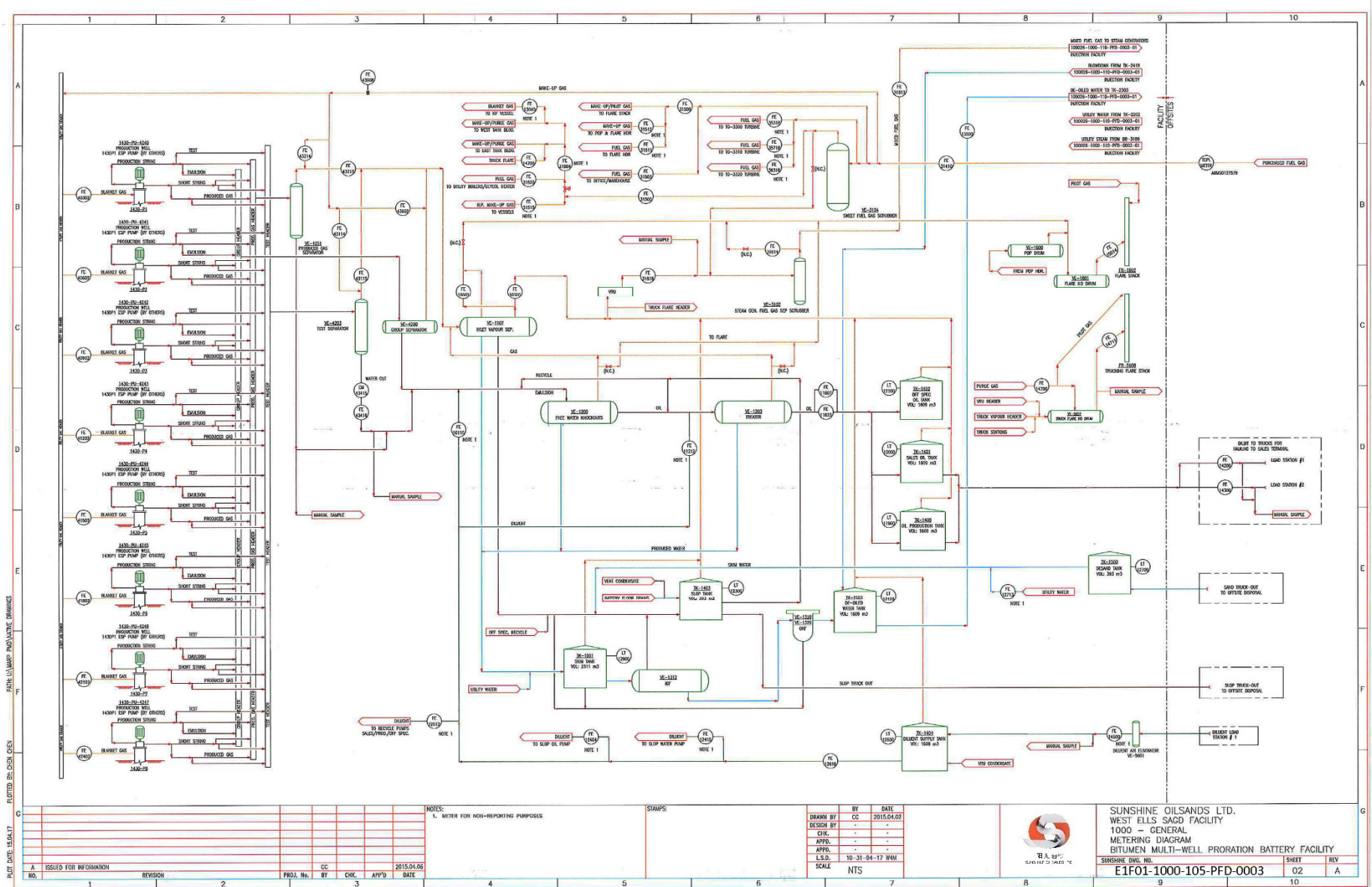
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CC	CC	2015.04.02
DESIGN BY		
CHK		
APPD.		
U.S.N.	10-31-94-17 WEM	
SCALE	NTS	



SUNSHINE OILSANDS LTD.
WEST ELLS SAGD FACILITY
1000 – GENERAL
METERING DIAGRAM
BITUMEN MULTI-WELL PRORATION INJECTION FACILITY
SUNSHINE DWG. NO. E1F01-1000-105-PFD-0003
SHEET 01 REV A



Metering Schematic - Battery



NO.	ISSUED FOR INFORMATION	REVISION	PROJ. No.	CC	BY	CHK.	APP'D	DATE
1								2015.04.02

NOTES:
1. REFER FOR NON-REPORTING PURPOSES

STAMPS:

BY	DATE
DRAWN BY	02 2015.04.02
DESIGN BY	-
CHK.	-
APP'D.	-
APP'D.	-
L.S.D.	10-31-04-17 WWT
SCALE	NTS



SUNSHINE OILSANDS LTD.
WEST ELLS SAGD FACILITY
1000 - GENERAL
METERING DIAGRAM
BITUMEN MULTI-WELL PRORATION BATTERY FACILITY
SUNSHINE OILSANDS, INC.
E1F01-1000-105-PFD-0003

SHEET	REV
02	A



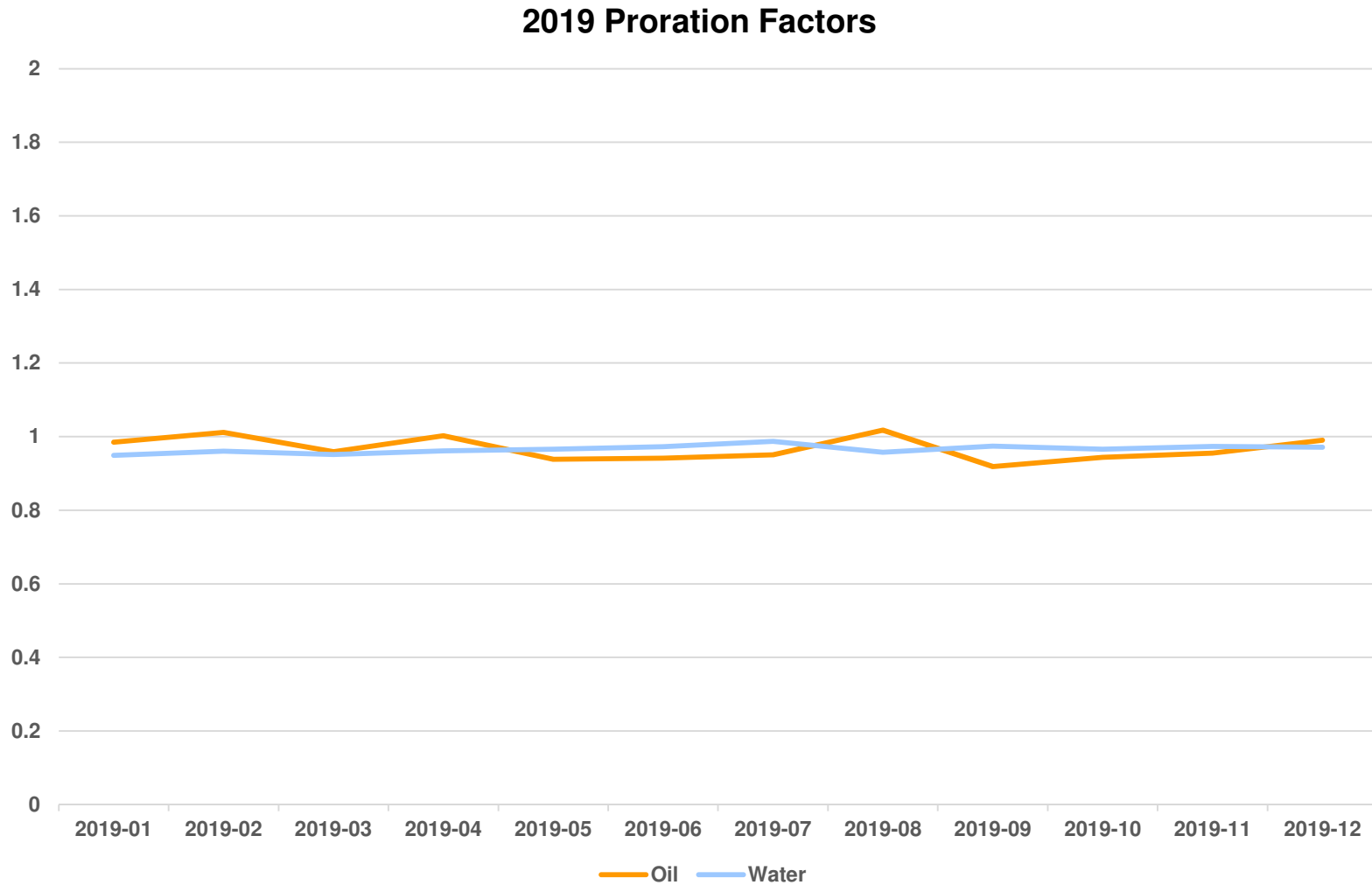
Measurement Methodology

- No changes or alteration made to measurement methodology in reporting period
- Daily oil rate of each well is calculated by multiplying the most current well emulsion rate with the manual oil cut
 - Emulsion rate is the test flow rate from the test separator and oil cut is measured manually by taking a sample of the flow
 - Due to the slugging nature of the wells and high water flow during initial production, the test separator is not fully commissioned
 - There is only one separator on the well pad and well tests generally last for 8 to 15 hours depending on the fluid rate from the well (includes time to purge the test pipeline and test vessel)
 - To properly conduct a well test, with 8 wells on a pad, only one well can be tested every 4 - 5 days
- With the total production from the pad, individual well volumes are prorated against the overall production volume
- The same philosophy and process is applied to produced water and gas
- Currently, the meters on the test separator are being verified every time by comparing the results with the manual oil cut and water



Measurement & Reporting

Proration of Oil and Water





Water Disposal

- There are no approved disposal facilities or wells associated with the West Ells Project
- All water is trucked off site to approved waste management facilities in the form of Evaporator Blowdown water
- The Directive 81 disposal limit for 2019 was 7.75%
 - $((\text{Fresh In} \times D_f + \text{Produced In} \times D_p) / (\text{Fresh In} + \text{Produced In})) \times 100$
- West Ells has had an average disposal rate of 2.36% for 2019
 - $((\text{Total Disposal}) / (\text{Fresh In} + \text{Produced In})) \times 100$
- West Ells was compliant with disposal limits for the entirety of 2019



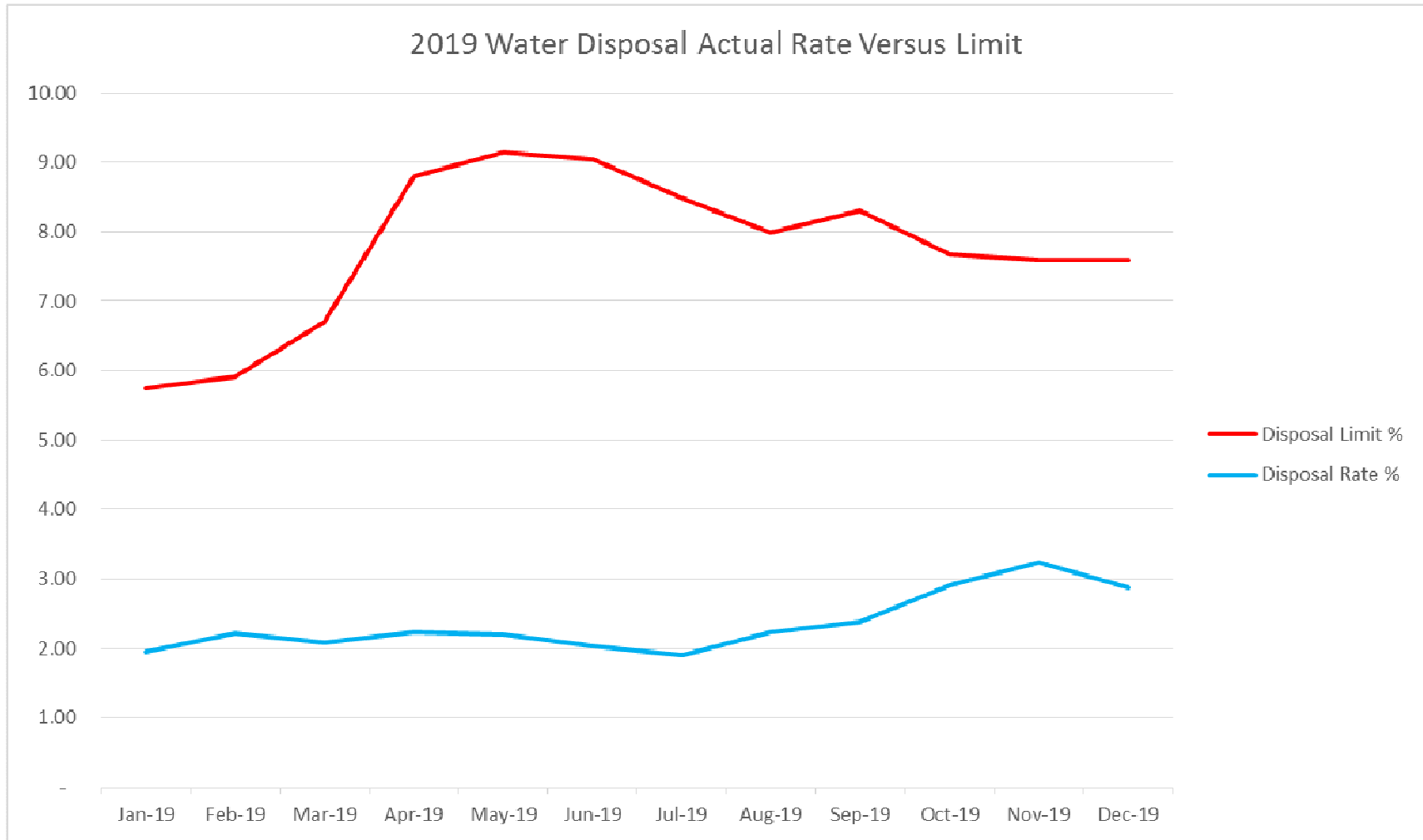
Water Disposal And Recycle Rates

Directive 081 Monthly Balances

	January 2019	February 2019	March 2019	April 2019	May 2019	June 2019
Fresh Water In (m3)	25,977.40	25,812.10	20,631.00	11,034.50	8,152.90	8,513.60
Produced Water In (m3)	16,690.90	18,296.10	23,139.40	53,516.10	58,831.50	53,554.00
Disposal Total (m3)	835.50	980.50	910.10	1,445.20	1,472.00	1,267.80
Disposal Factor, Fresh Water	0.03	0.03	0.03	0.03	0.03	0.03
Disposal Factor, Produced Water	0.1	0.1	0.1	0.1	0.1	0.1
Disposal Limit %	5.74	5.90	6.70	8.80	9.15	9.04
Disposal Rate %	1.96	2.22	2.08	2.24	2.20	2.04
	July 2019	August 2019	September 2019	October 2019	November 2019	December 2019
Fresh Water In (m3)	12,729.10	15,308.00	11,835.00	16,354.30	14,692.80	14,479.50
Produced Water In (m3)	45,927.40	37,803.70	36,955.50	32,931.70	28,155.80	27,616.50
Disposal Total (m3)	1,116.00	1,186.20	1,164.00	1,432.50	1,389.00	1,212.40
Disposal Factor, Fresh Water	0.03	0.03	0.03	0.03	0.03	0.03
Disposal Factor, Produced Water	0.10	0.10	0.10	0.10	0.10	0.10
Disposal Limit %	8.48	7.98	8.30	7.68	7.60	7.59
Disposal Rate %	1.90	2.23	2.39	2.91	3.24	2.88

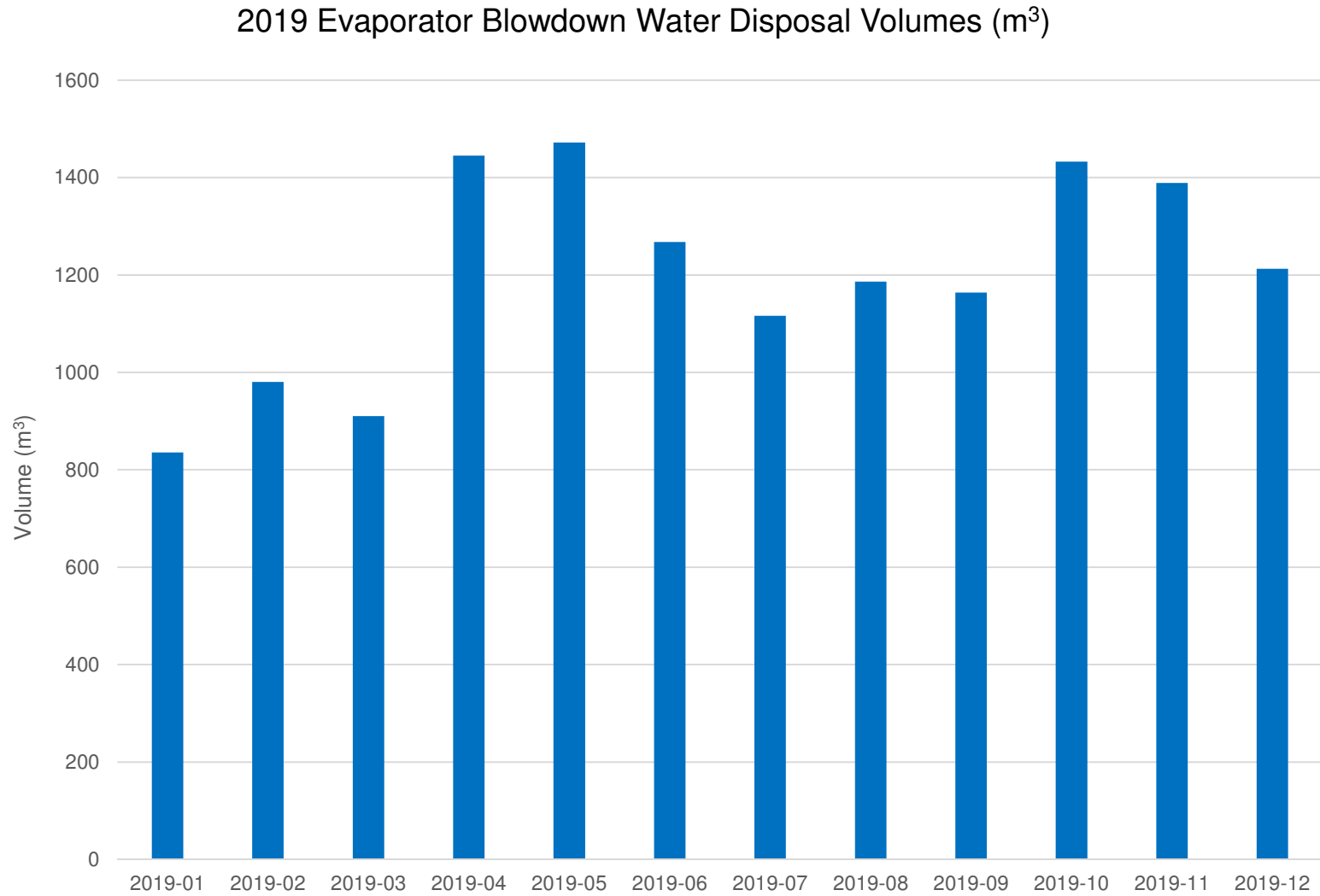


Water Disposal Rate





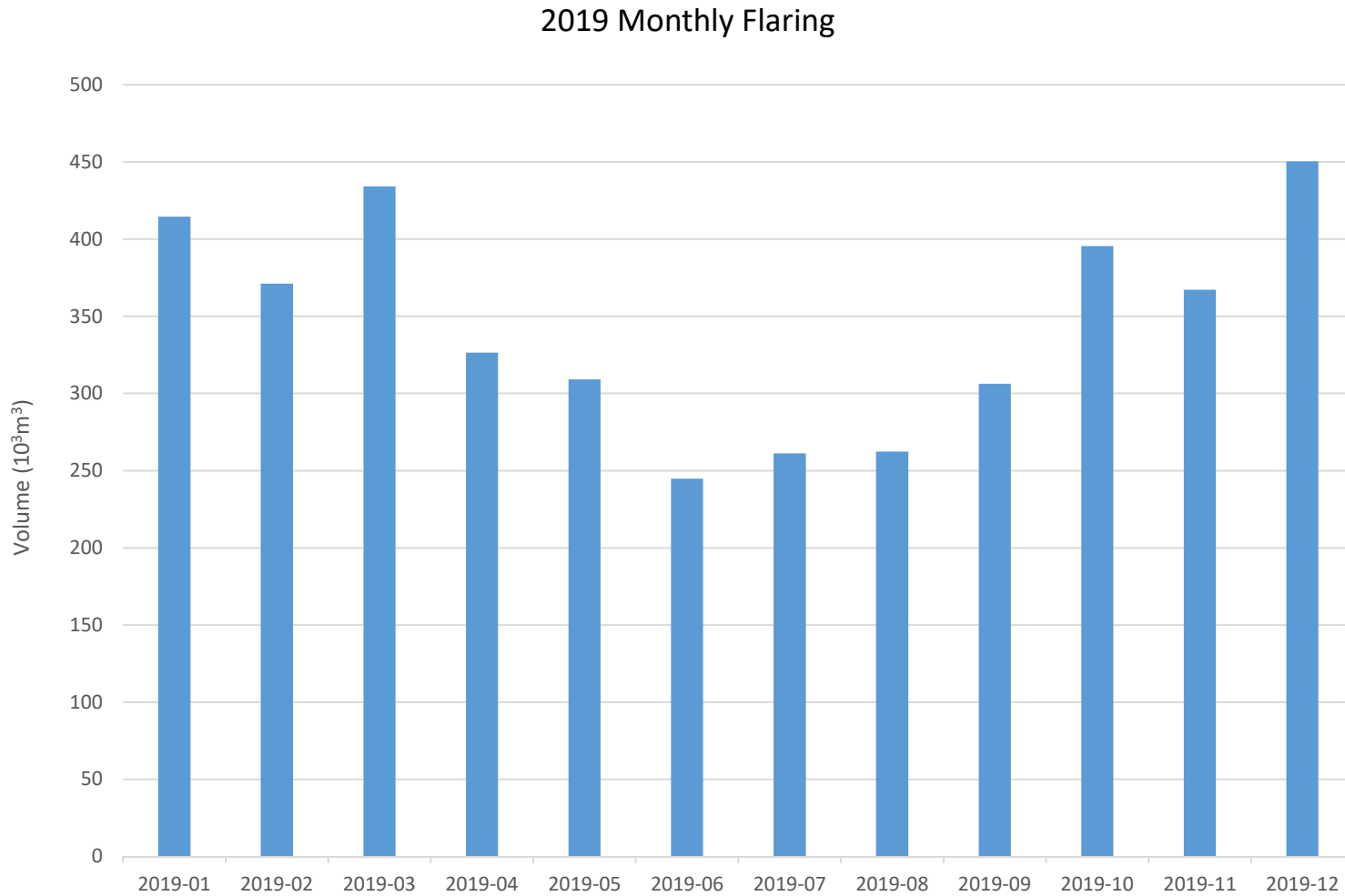
Waste Water Disposal





Flaring & Venting

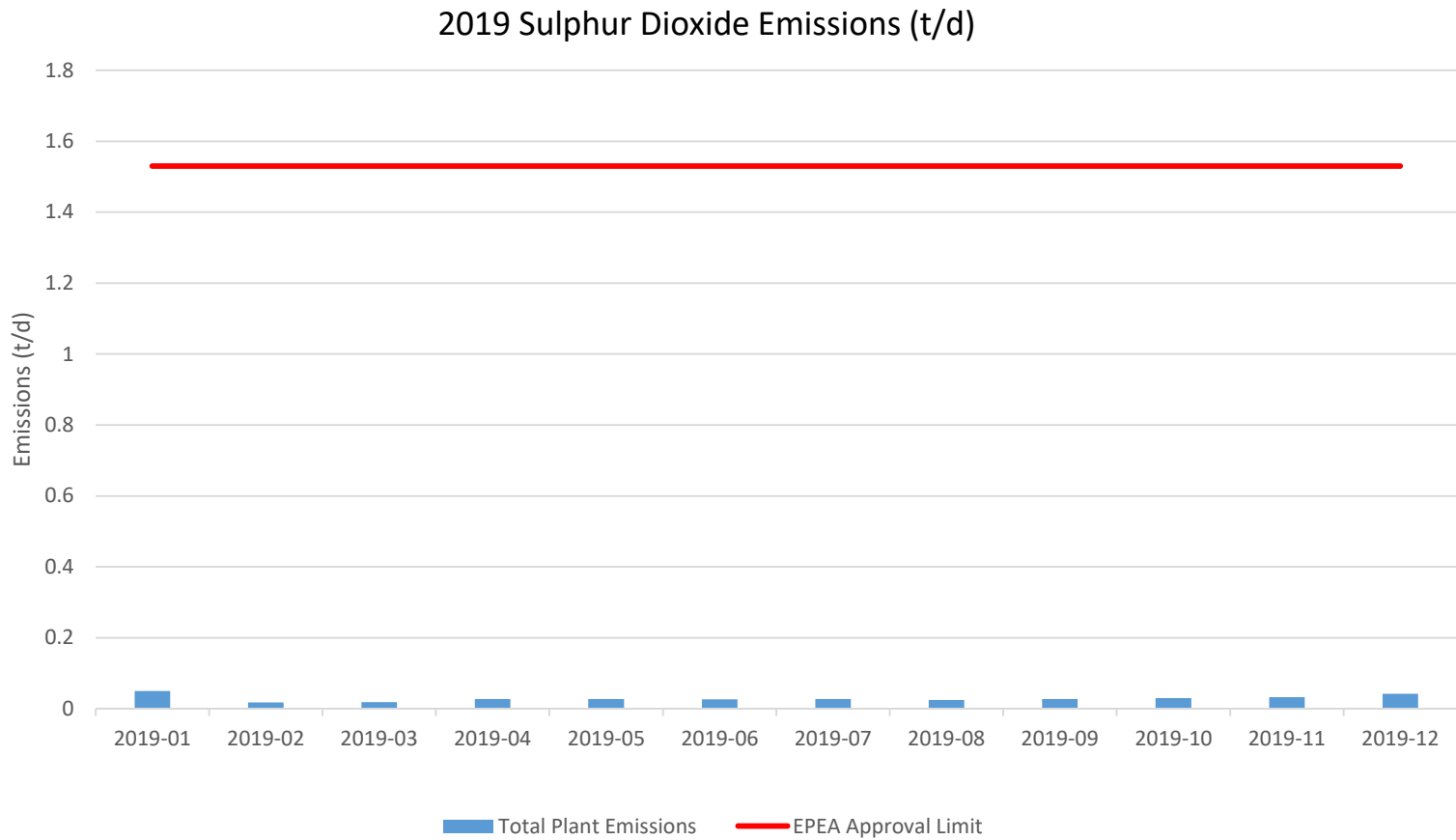
- There were no reportable flaring events in 2019
- There was no venting in 2019





Sulphur Production

- There are no sulphur recovery facilities at West Ells



- Total Plant SO₂ = Flared SO₂ + Steam Generator SO₂ + Co-Generation Units SO₂



Compliance – Monitoring Programs

Ambient Air Quality Monitoring

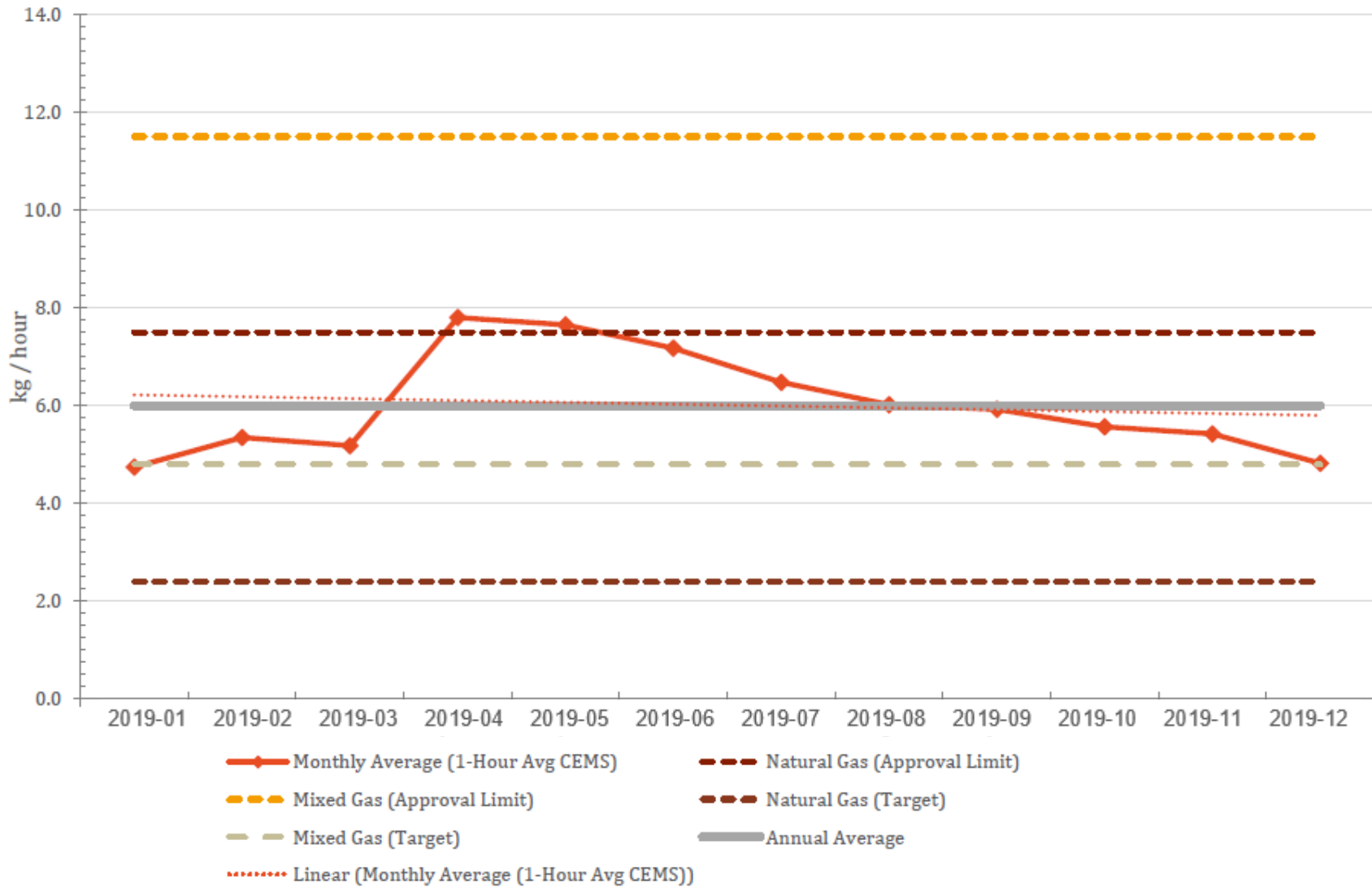
- There are four (4) passive monitoring stations that monitor SO₂ and H₂S

Passive Ambient Monitoring 2019		
Month	Peak SO ₂ (ppbv)	Peak H ₂ S (ppbv)
January	0.5	0.59
February	0.6	0.35
March	0.7	0.39
April	1.0	0.45
May	1.0	0.17
June	1.0	0.48
July	0.6	0.42
August	0.6	1.08
September	4.6	0.87
October	0.5	1.58
November	0.7	1.40
December	0.9	1.33



Compliance – Monitoring Programs

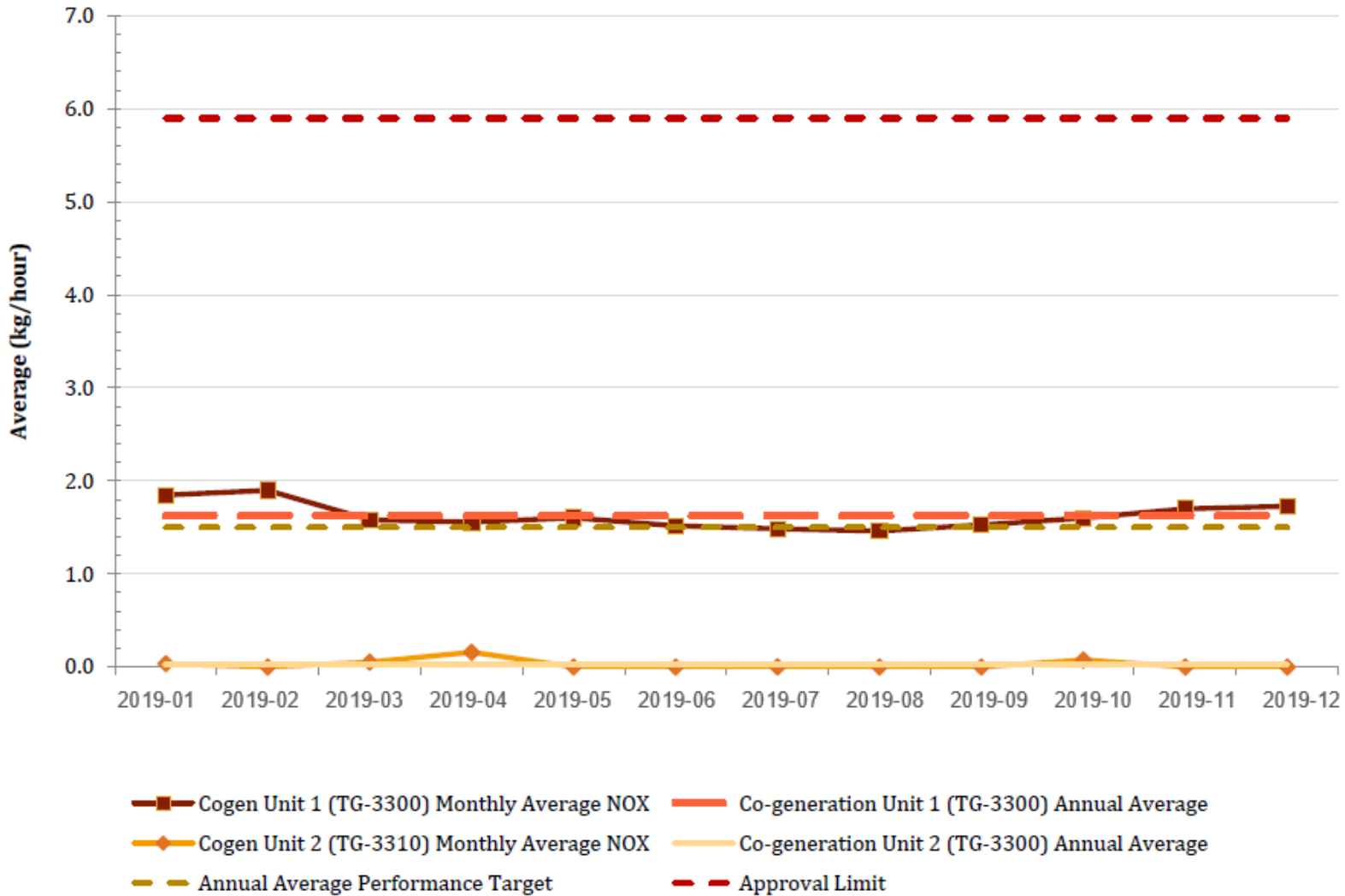
2019 Comparison of 85 MW Power Boiler hourly mass NO_x emissions to performance targets and Approval limits





Compliance – Monitoring Programs

2019 Comparison of Co-generation Units hourly mass NO_x emissions to performance targets and Approval limits





Compliance – Monitoring Programs

Industrial Runoff Monitoring

- Industrial runoff is monitored and tested prior to release and reported annually
- Releases from the Central Processing Facility (CPF) Storm Pond are analyzed by accredited lab
- Industrial runoff parameters meet the limits established in EPEA Approval Schedule V, Section 5

Industrial Runoff Monitoring 2019			
Discharge Point	Average pH	Average Cl	Volume (m3)
Storm Pond	7.7	8.5	10,650.0
Pad Ditch	7.4	18.4	2,250.0

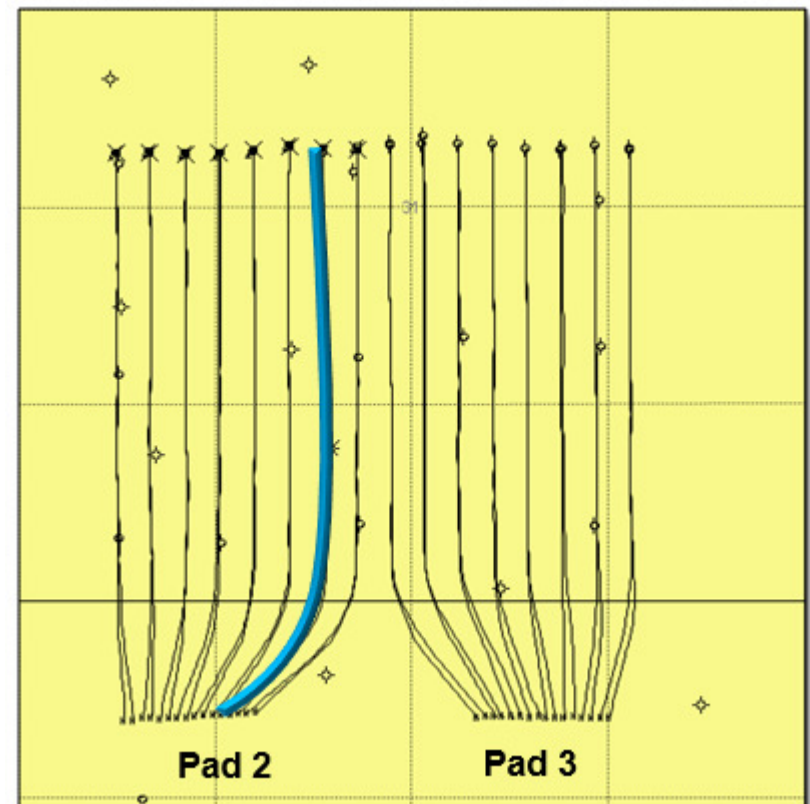


Historical & Upcoming Activity

Summary of Suspension Activity

On May 1, 2019, Producer and Injector wells, P11/I11 (Pad 2), were suspended

- P11 online March 12, 2018 after completion of ESP repair
- P11 ESP trip May 17, 2018 after a trial of speeding up the pump
 - Unable to turn on pump and backflush the pump through tubing
- Production ceased May 18, 2018
- Suspension is temporary as it is not economic to fix the well at this time
- The suspension impacts production from well pairs 10 and 12
- 226,723 m³ remaining reserves





Regulatory and Operational Changes

In this reporting year there were:

- No material regulatory or operational changes
- No events that materially affected scheme performance, energy or material balances
- No technological innovations or pilots conducted



Lessons, Success and Failures

- In 2019, West Ells achieved the most stable operation for steam injection and production
- There were no major failures/incidents reported at site
- Emulsion flow reduction could cause process upset which could be solved by following:
 - Reduce the frequency of well testing
 - Adjust water dump rate at FWKO
 - Conduct more bottle tests to ensure that OIW in the de-oiled system is within spec
- Diluent injection rate should be monitored/adjusted carefully based on the trending of oil cut
- Maintaining clear communication was key between Calgary and Site teams. *A simple request can be answered in different ways*



Compliance History – Approval Contraventions

- The following list summarizes non-compliance events and one reportable spill in this reporting period

Date	CIC #	Description	Remediation
29-Mar	0351380	Failed to submit January CEMS data and February passive air monitoring data	Data has been submitted.
29-Mar	0351382	Water level no longer monitored in Observation Wells	Manual water level reading occur weekly
1-May	0352681	Failed to submit March passive air monitoring data	Data has been submitted
30-Jun	0356947	Failed to submit June passive air monitoring data	Data has been submitted
2-Jul	0355501	Failed to submit May passive air monitoring and CEMS data	Data has been submitted
16-Oct	0360099	Failure to submit August passive air monitoring data	Data has been submitted
18-Oct	0360178	Did not provide a minimum of two weeks notice prior to Relative Accuracy Test Audit (RATA)	Internal process has been updated
31-Oct	0360643	Failure to submit September passive air monitoring data	Data has been submitted
11-Dec	0361936	After a successful chemical cleaning of the evaporator, the chemical reaction during the chemical cleaning process caused the evaporator to trip on high pressure and the water seal on the suction side of the evaporator compressor failed, releasing approximately 4.0 m3 of evaporator fluid	Final soil scraping and confirmatory samples to be taken once the area thaws



Future Plans

- The current COVID – 19 pandemic and extreme low oil price has forced the temporary suspension of production at West Ells. This will have significant impacts on scheme performance for the remainder of the year
- No new initiatives planned
 - Continue to fully demonstrate the reservoir productivity before advancing to Phase II (10,000 bpd production)



Contact

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