



ENERGY CORPORATION

Sawn Lake Single SAGD Wellpair Demonstration Project

Peace River Oil Sands Region

Scheme Approval 11341A

Alberta Energy Regulator (AER)

Annual D54 Performance Presentation

Craig Pichach, VP Operations, October 22 2015

Cautionary Statement



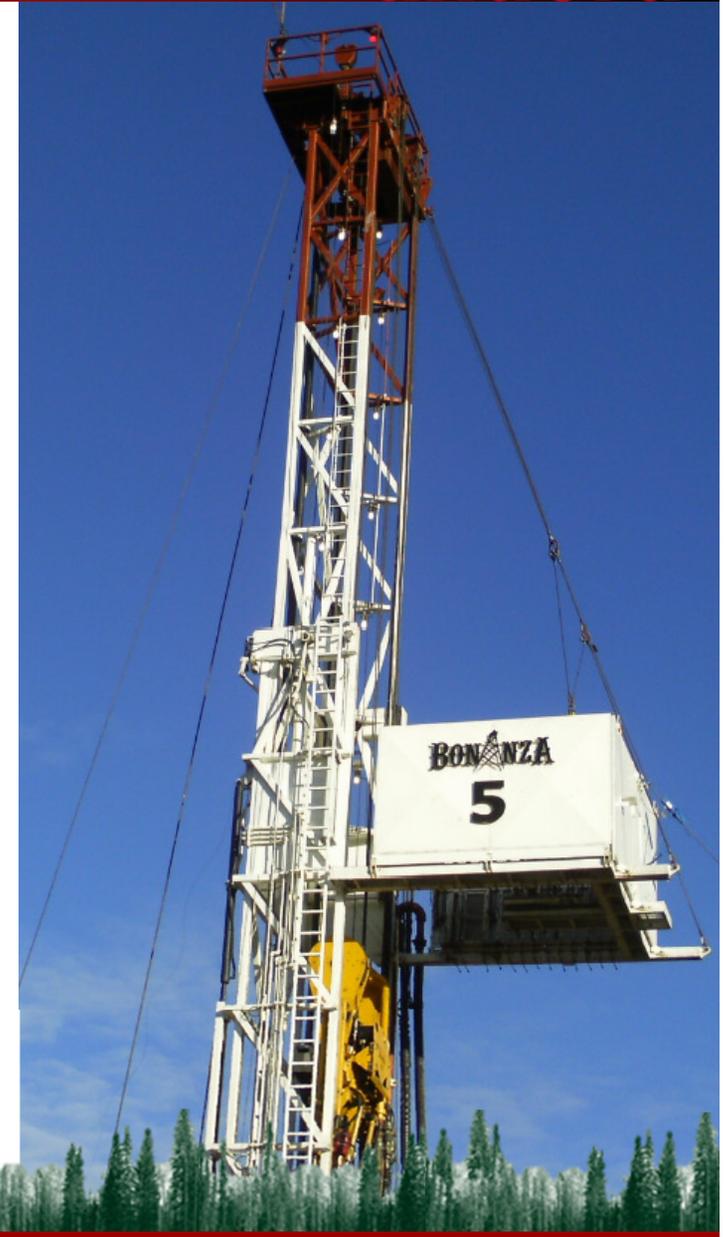
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- **3 Drilling and Completions**
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Agenda (Surface Operations)



■ 6 Facilities

- Subsection 3.1.2 (1) Facilities
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■ 7 Measurement and Reporting

- Subsection 3.1.2 (3) Measurement and Reporting

■ 8 Water Source and Disposal

- Subsection 3.1.2 (4) Water Production, Injection and Use

■ 9 Environmental

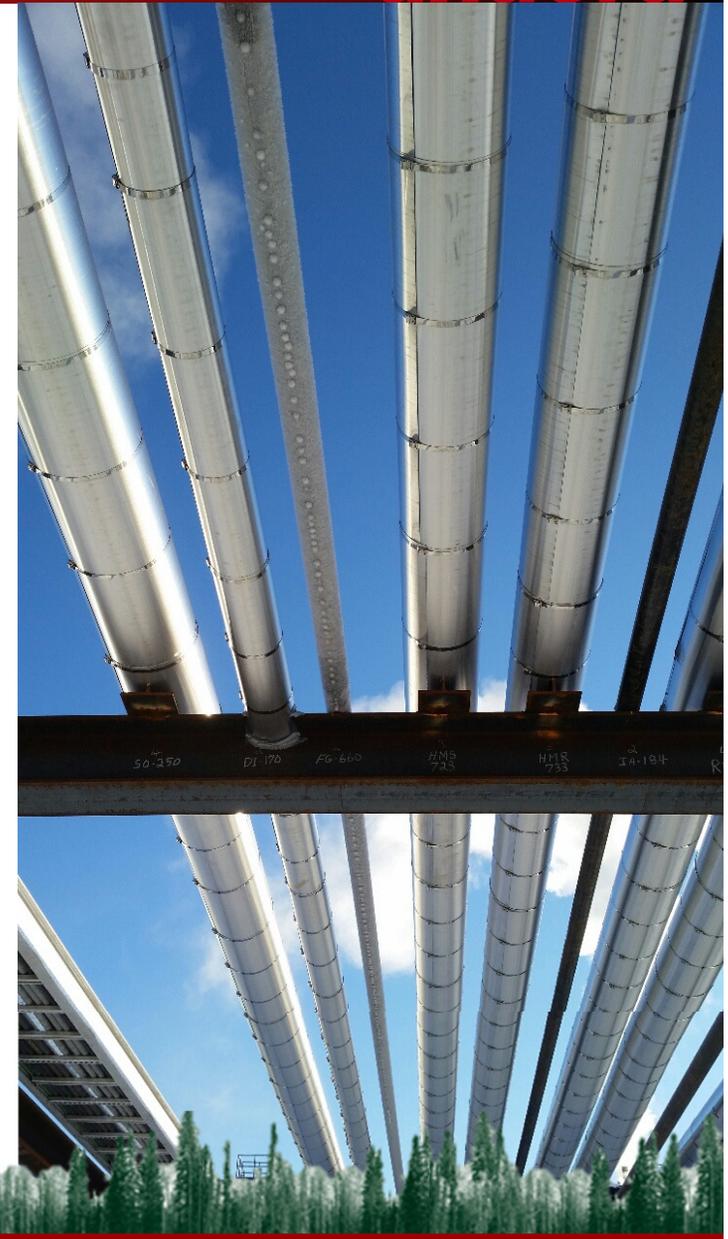
- Subsection 3.1.2 (5) Sulphur Production
- Subsection 3.1.2 (6) Environmental Issues

■ 10 Compliance Statement

- Subsection 3.1.2 (7/8) Compliance

■ 11 Future Plans - Facilities

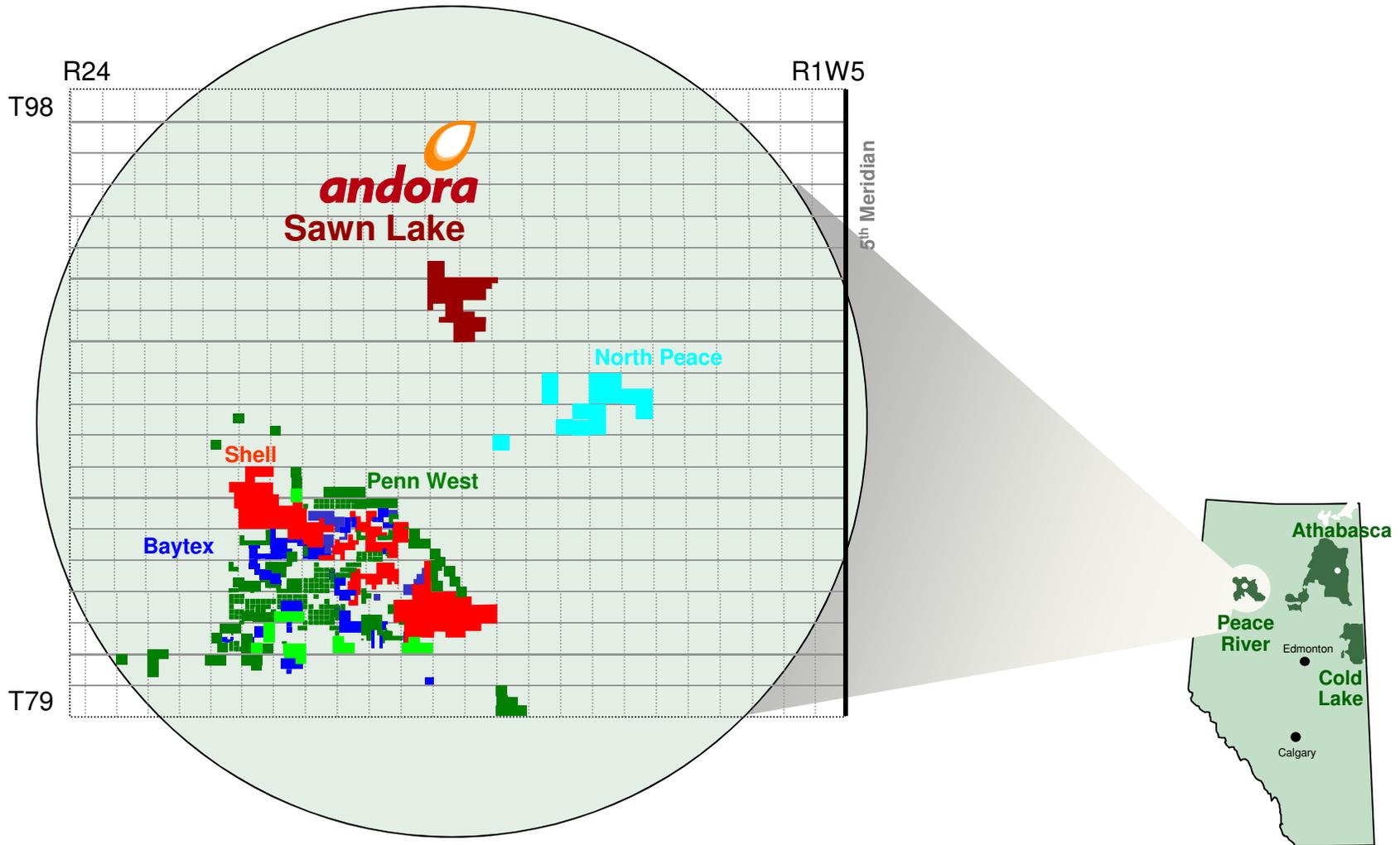
- Subsection 3.1.2 (9) Future Plans



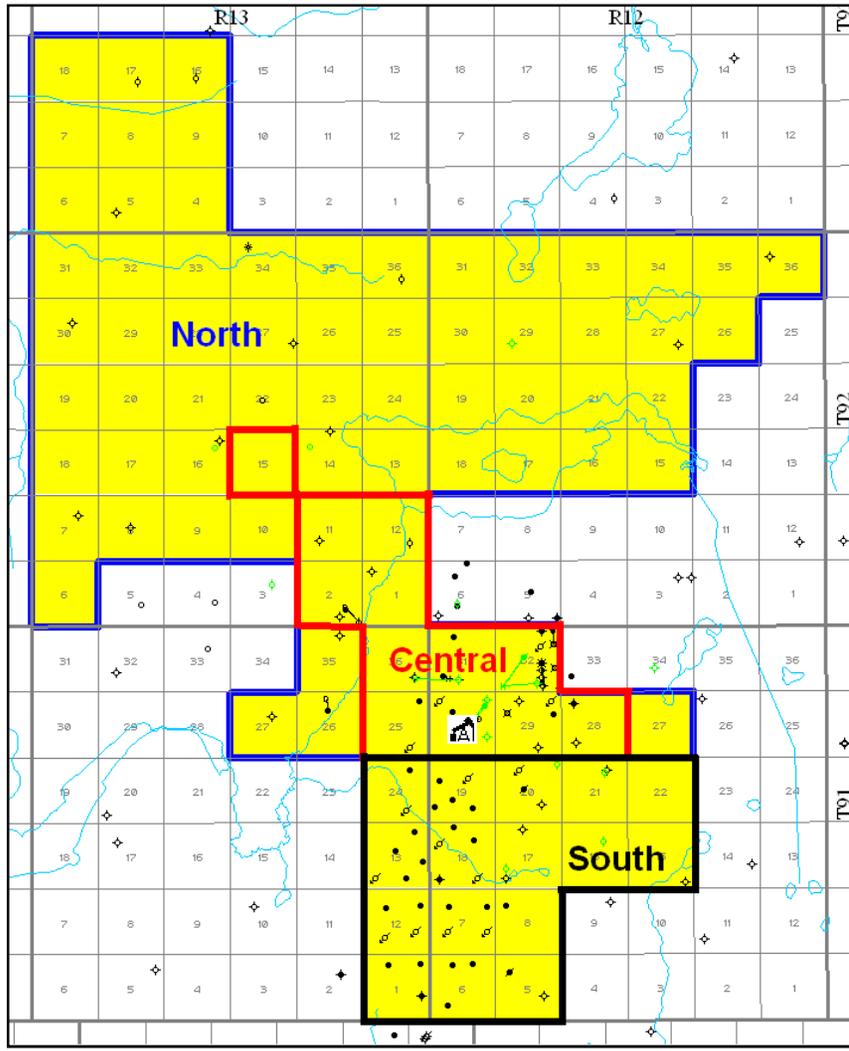
Introduction and Overview



Sawn Lake Location Map



Sawn Lake – Land (Andora)



Andora - Working Interest in 88 sections

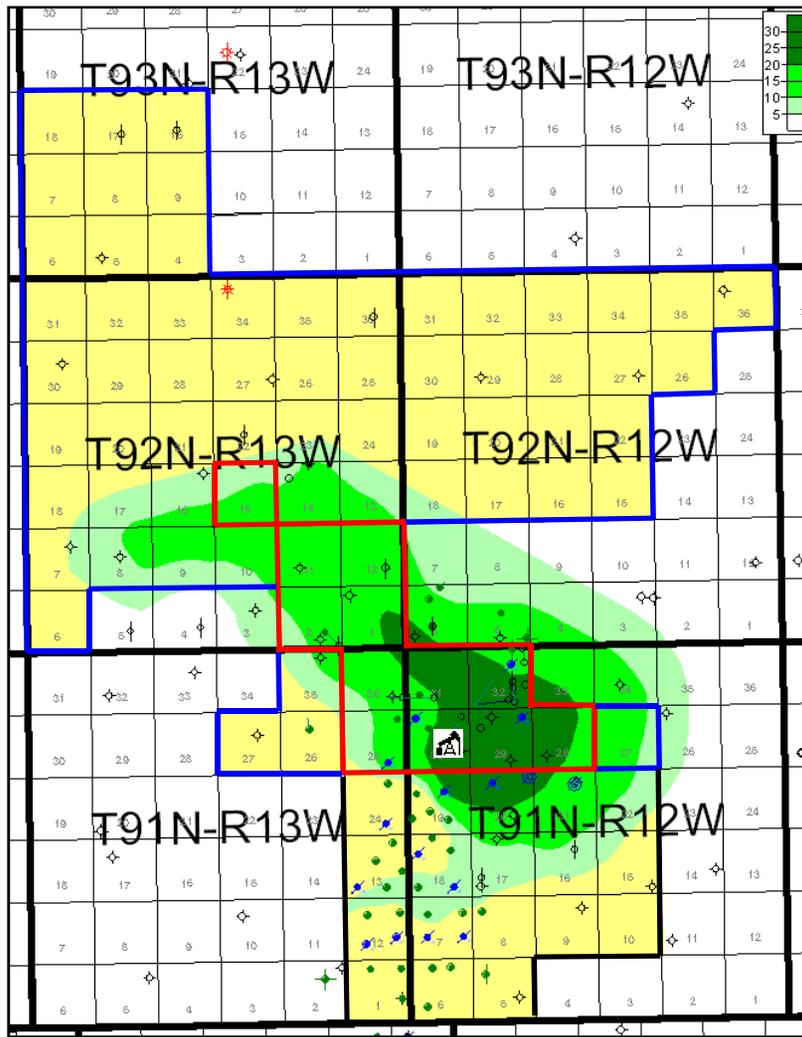
- Sawn Lake North
 - 10% of 51 sections (non-operated)
 - 100% of 9 sections
- Sawn Lake Central
 - 50% of 12 sections
 - Designated Operator; Approved Commercial SAGD Site
- Sawn Lake South
 - 100% of 16 sections

(Gross 100%)	SAGD Contingent Resource Estimate (MMbbl)		
	High	Best	Low
Sawn Lake	428.5	366.9	333.2

 **SAGD Project Location**



Sawn Lake Single WP Pilot Overview



AER Scheme Approval: 11341A

One (1) SAGD wellpair

Pilot Facility at 7-30-91-12W5

Target formation is the Bluesky

Traditional SAGD recovery process

Andora Energy is Operator.

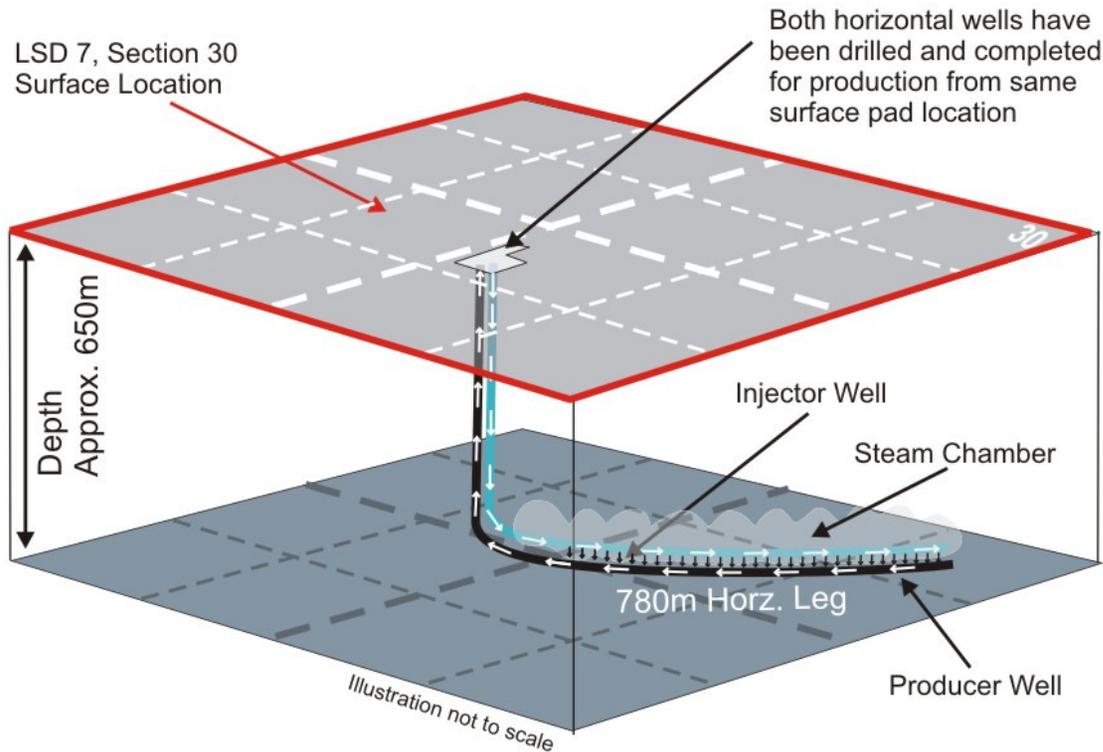
Dark Green Area >20m pay

Green 15-20m pay

Light Green <15m pay



Single SAGD Wellpair Project Overview



Using Steam Assisted Gravity Drainage (SAGD) to recover bitumen from the Bluesky formation.



Sawn Lake Project Background



- Andora has working interests in 88 sections of Oil Sands Leases - all in primary term
- Andora's Focus - Operated Leases 740307A365, 7403070363 & 7408030779
- 2005 – 2007 Resource Evaluation and Asset Consolidation
 - > 100 Legacy wells, Sawn Lake Slave Point Exploration & Development
 - 3 Andora (Signet) Horizontal Wells
 - 9 Andora (Signet) Vertical Wells
 - ~ 200km 2D seismic
 - Andora Acquired 18km² 3D Seismic over SAGD Project Location
- 2008 – 2009 Application to ERCB for SAGD Demonstration in Sawn Lake
- August 2009, ERCB Commercial Scheme Approval for SAGD demonstration project in South Sawn Lake
- 2009 – 2010 build all season access road and pipeline right of way into 15-21 site (disposal well, source water well)

Demonstration Project Applications



Single Wellpair SAGD Demonstration Project Application Timeline

- 2008 Sawn Lake SAGD Demonstration Project Application to the ERCB
- 2008 Sawn Lake SAGD Demonstration Project Supplemental Information Request #1
- 2008 Sawn Lake SAGD Demonstration Project Supplemental Information Request #2
- 2012 Sawn Lake SAGD Demonstration Project D78 Project Amendment (7-30 Application)
- 2013 Sawn Lake SAGD Demonstration Project D78 Project Amendment Supplemental Information Request
- 2013 Sawn Lake Measurement, Accounting and Reporting Plan (MARP)

Future Applications (Not Implemented)

- 2014 D78 Category 2 - 2U/2L SAGD Wellpair; Approved
- 2015 D78 Category 1 – Produced Water Boiler (PWB) Trial.; Approved

Future Applications / Approvals



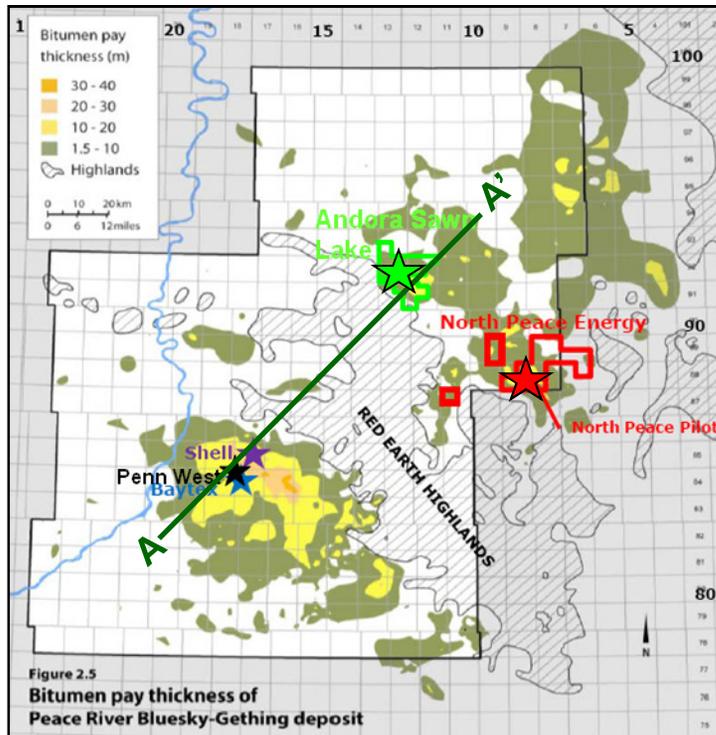
Single Wellpair SAGD Demonstration Project Approvals and Licences

- AER Approval 11341A (7-30) – 2013
- AER Approval of MARP (2013)
- AER Approval for Disposal Well (D51) – 1775897; well W0420620
- AER Approval for Class II Disposal Well (D65) – 12169
- Approved Fuel Gas P/L Licence 55565
- Approved Source Well P/L Licence 55566
- Approved Disposal Well P/L Licence 55567
- Approved 1U/16-30-91-12W5 (Injector) Licence 0457964
- Approved 1L/16-30-91-12W5 (Producer) Licence 0457960
- Approved F46733 Bitumen Battery Facility Licence
- EPEA Approval 00247729-00-01
- Approved Plan 1076969MS-2013-10-08
- Water Act Approval Licence 00361158-00-00

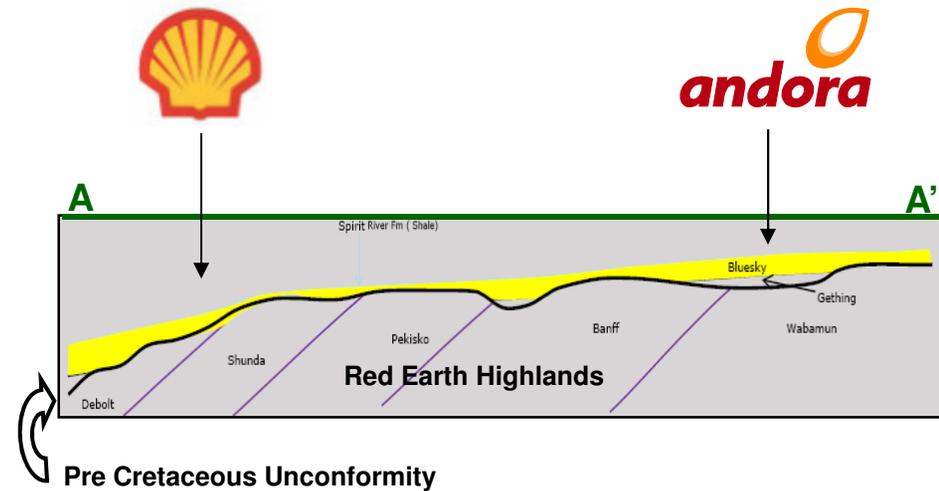
Subsurface – Geology and Geophysics



Sawn Lake – Geological Setting



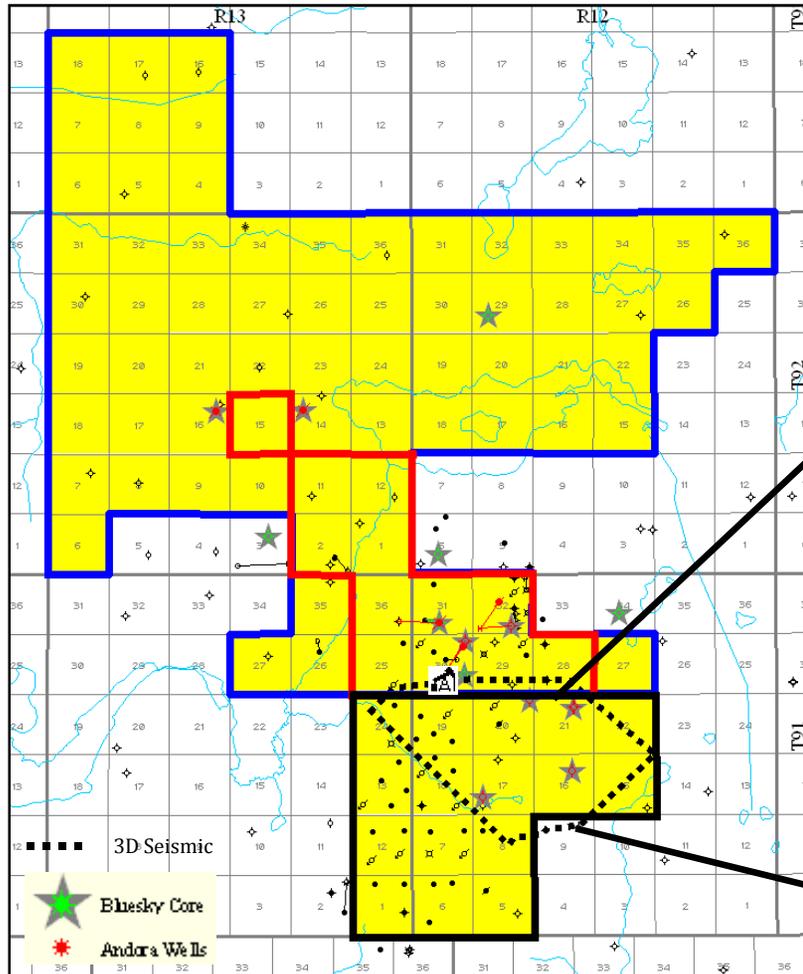
Peace River Region – Oil Sands Geological Schematic Cross Section



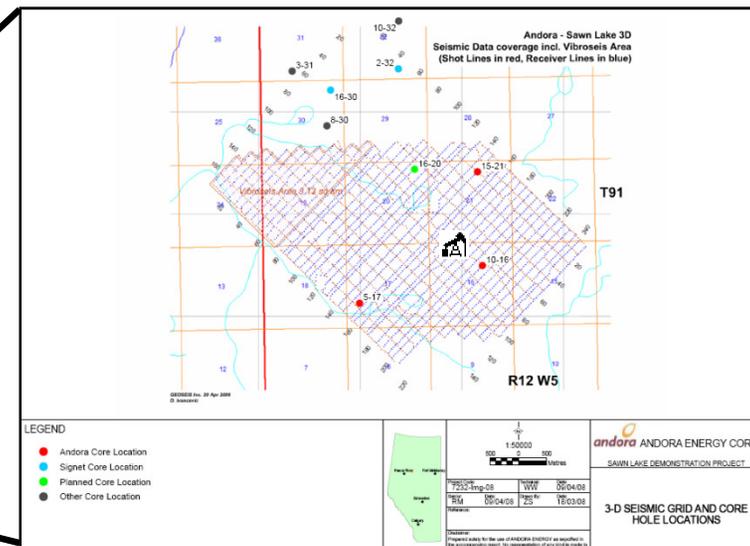
Peace River Region – Oil Sands Deposits & Major Projects



Sawn Lake – Core & 3D Seismic Data



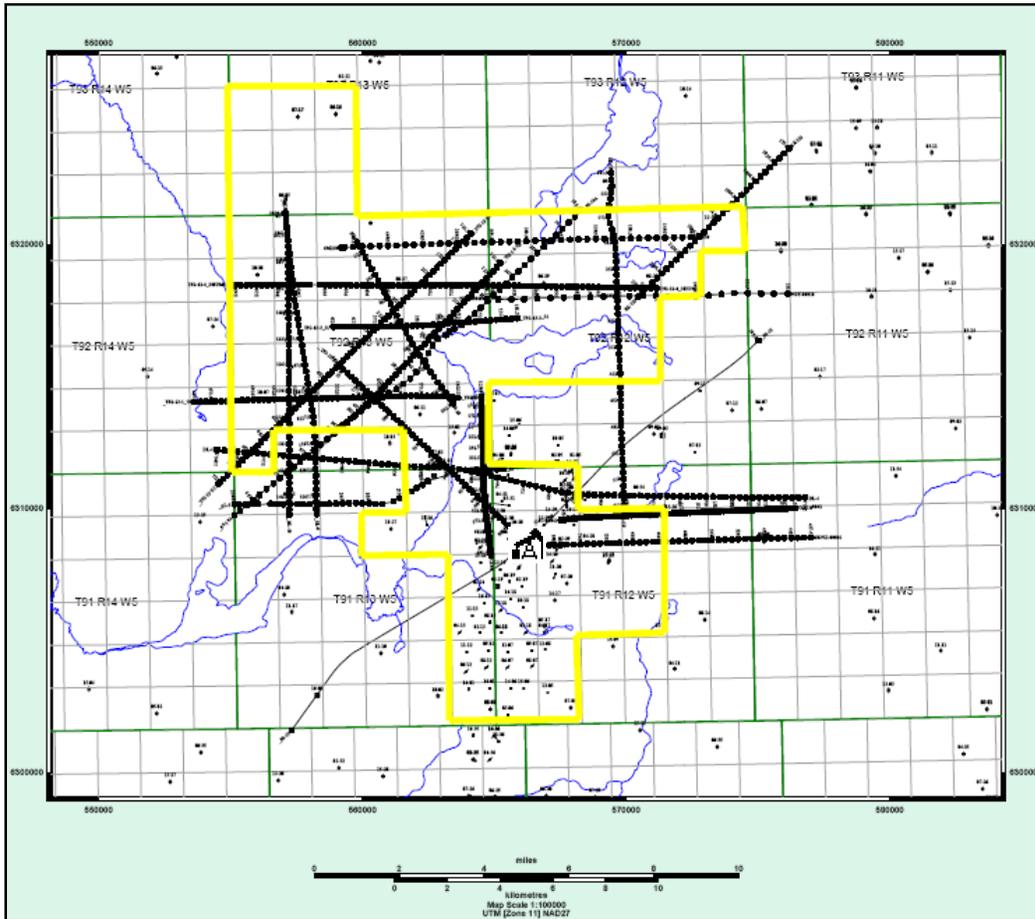
- Average of 2.8 wells per section on South & Central
- 18km² of 3D Seismic coverage over SAGD Demonstration
- 14 Bluesky Core



 SAGD Project Location



Sawn Lake – 2D Seismic Data

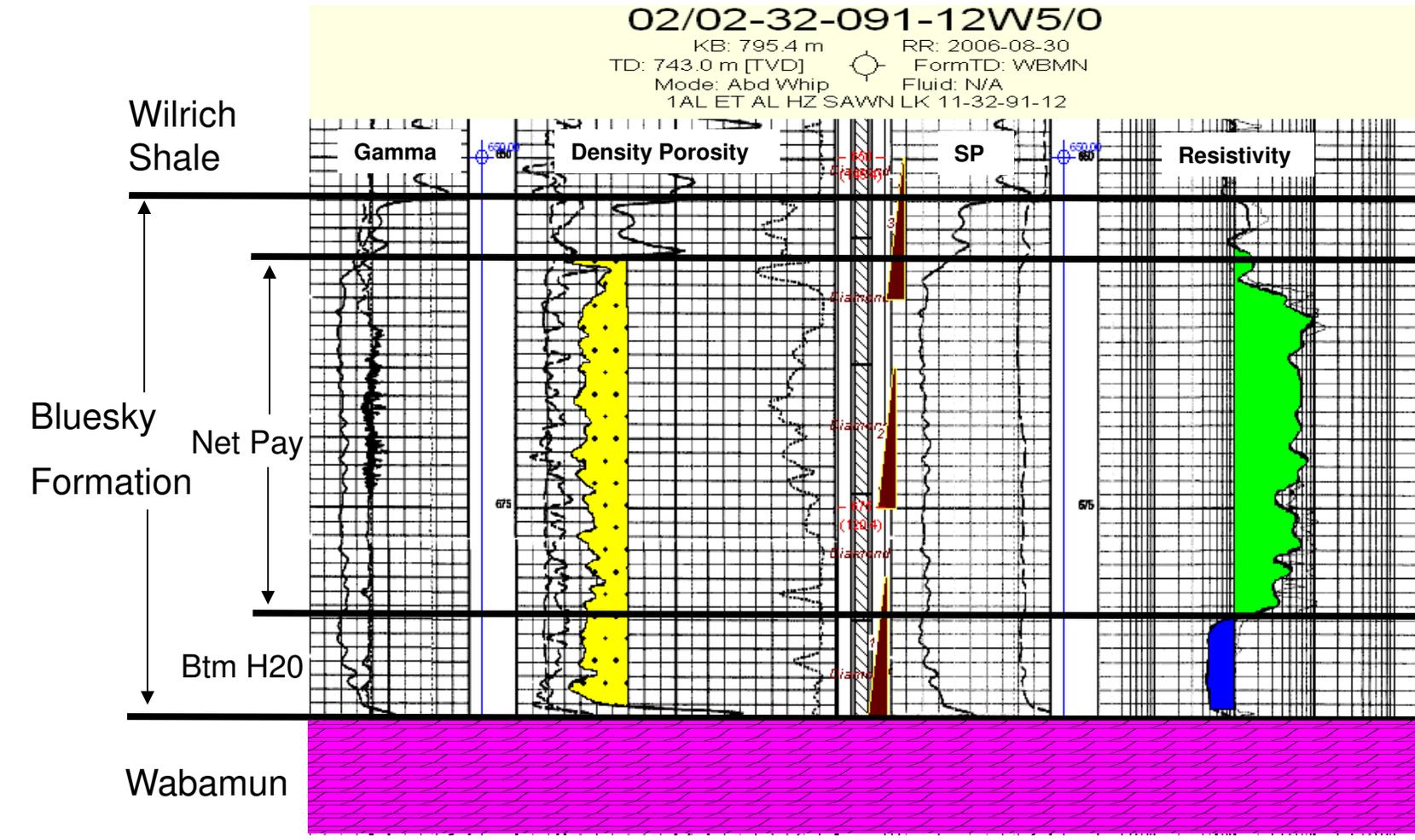


➤ +200 km 2D seismic data

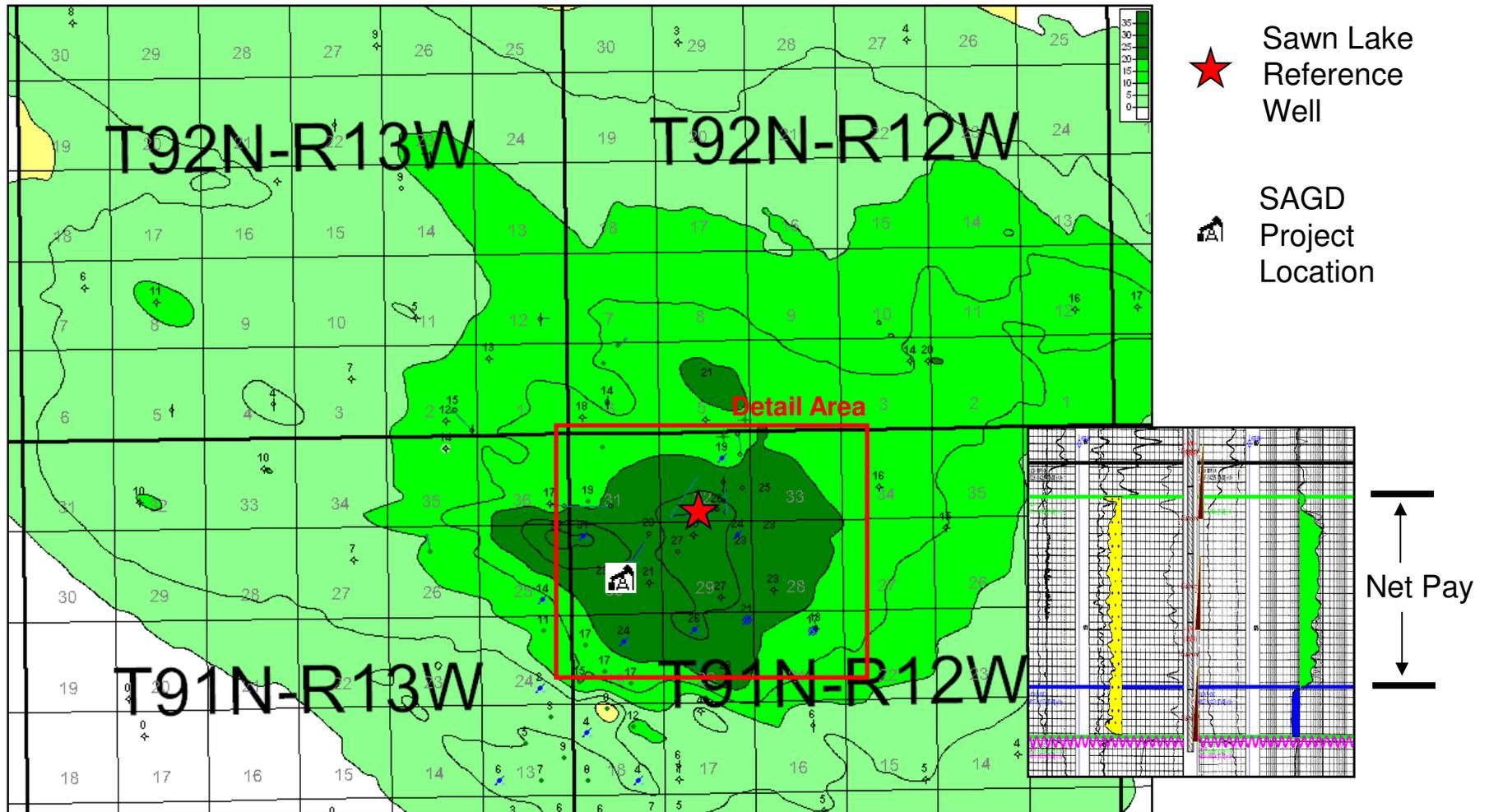
▲ SAGD Project Location



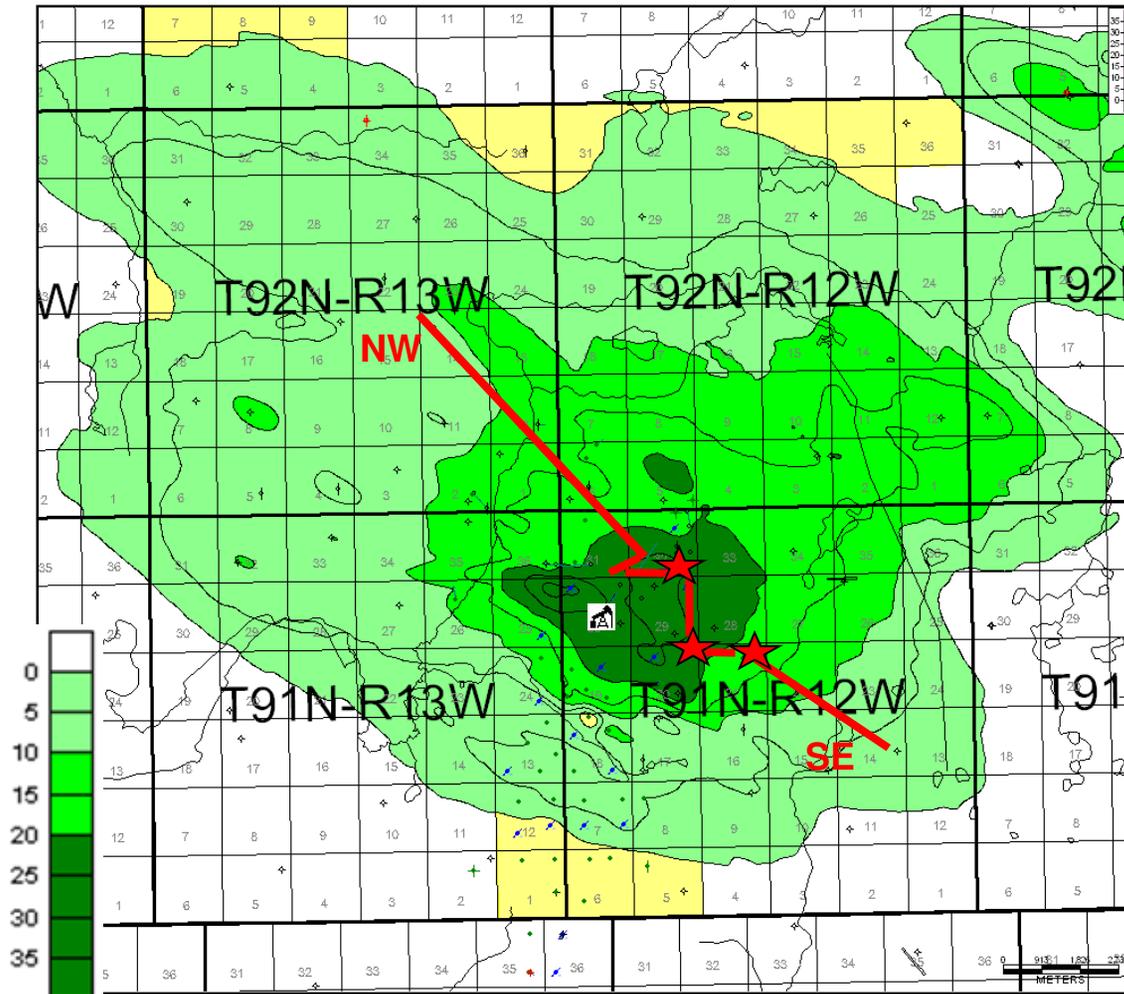
Sawn Lake – Type Well



Sawn Lake - Bluesky Net Pay



Sawn Lake - Regional Cross Section

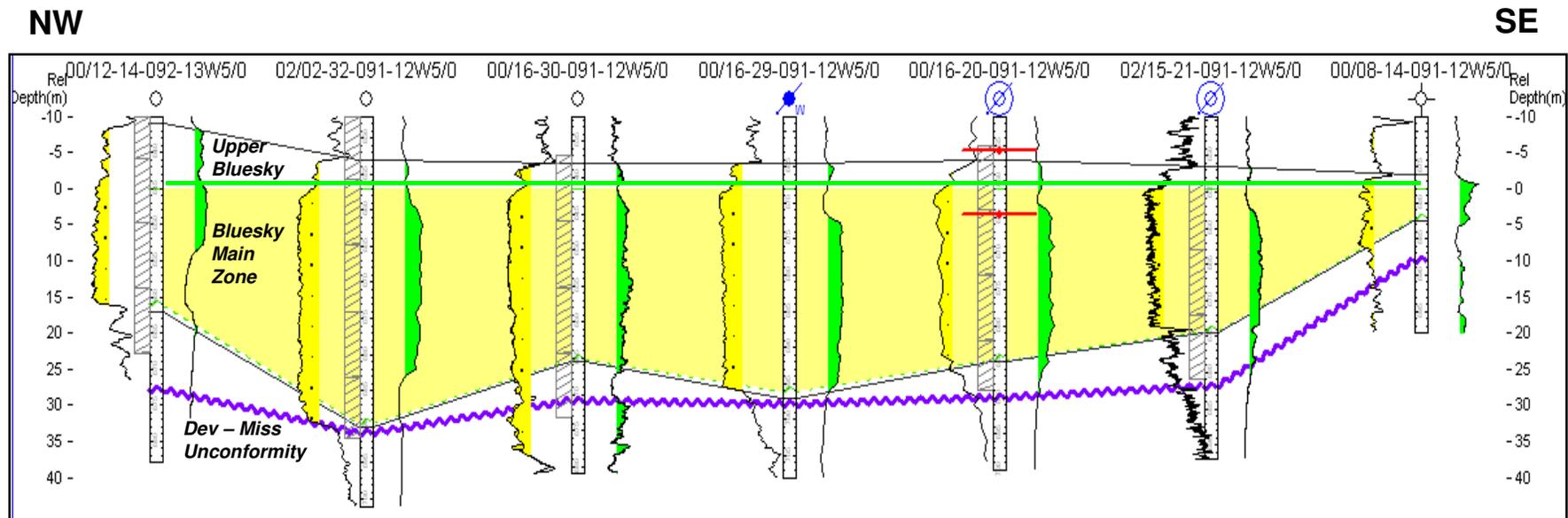


➤ Regional Cross Section
NW – SE through the
“Tide Dominated Delta”

 SAGD Demonstration
Site



Sawn Lake – Regional Cross Section NW-SE

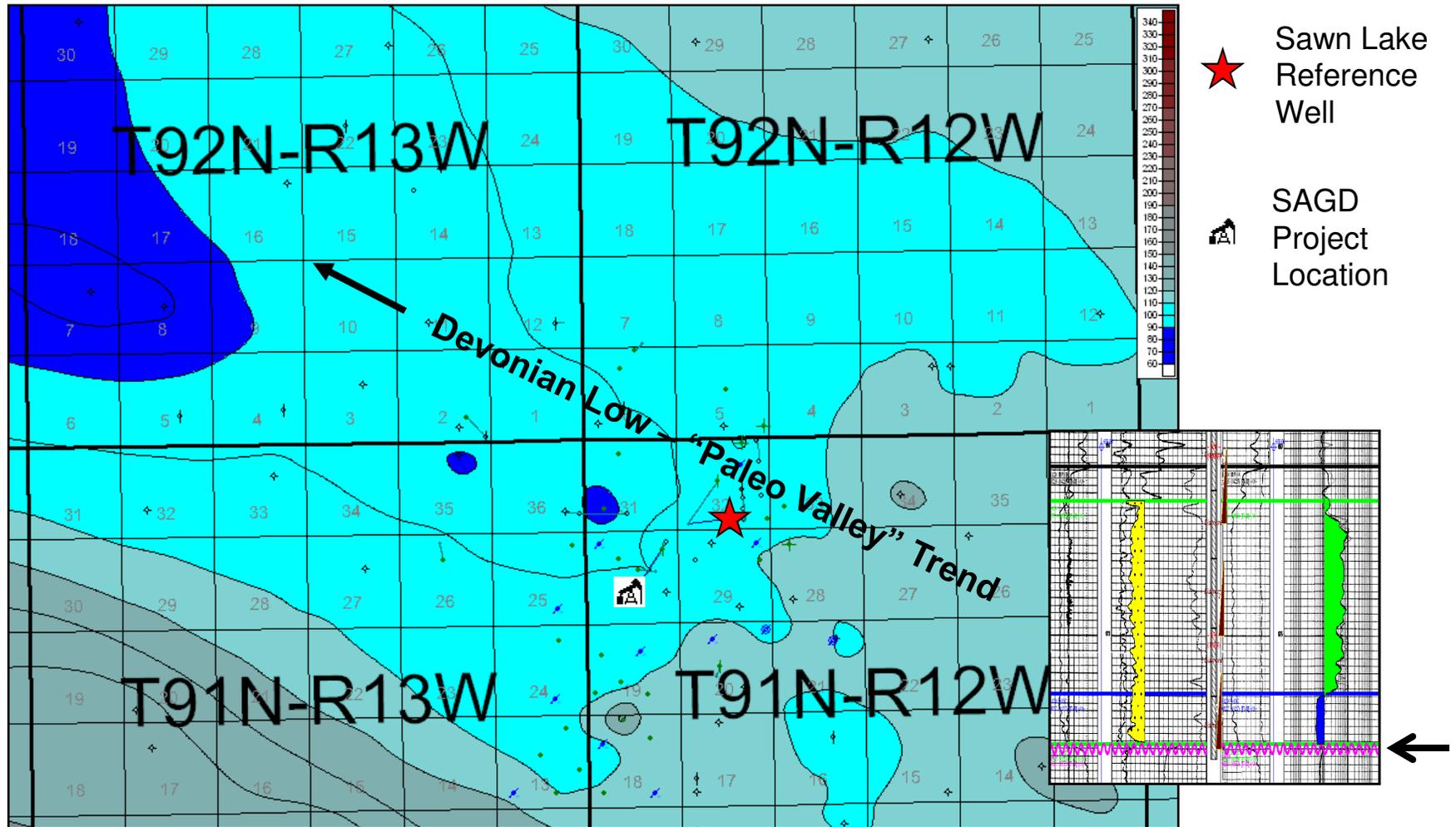


← 15 Kms →

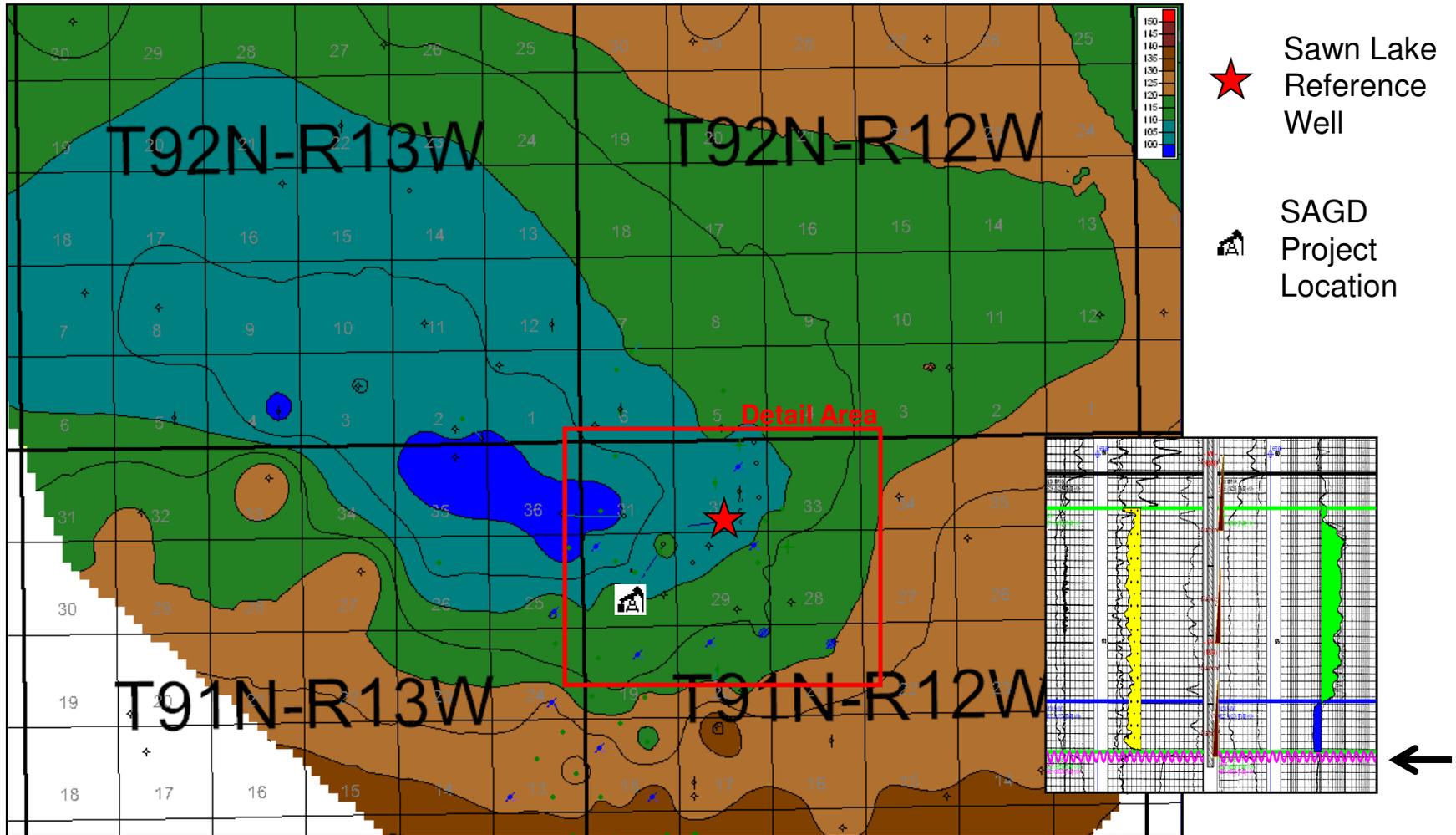
- Thick continuous Oil Sands Reservoir within the “Paleo Valley”



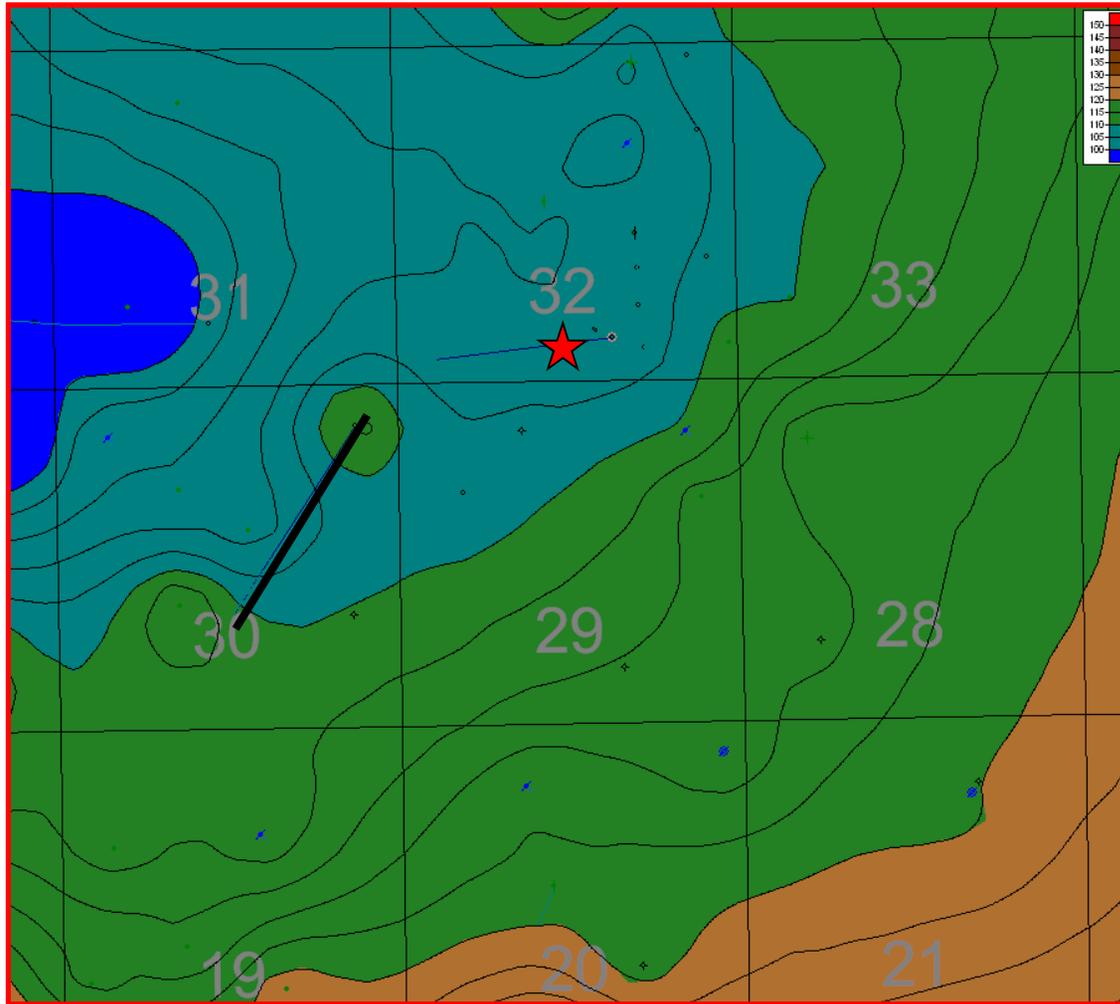
Sawn Lake – Devonian Structure



Sawn Lake – Base Bluesky Structure

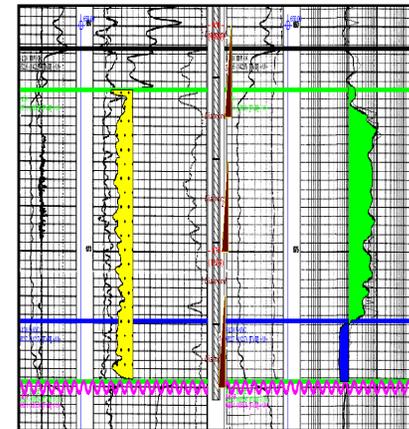


Sawn Lake – Base Bluesky Structure (Detail)

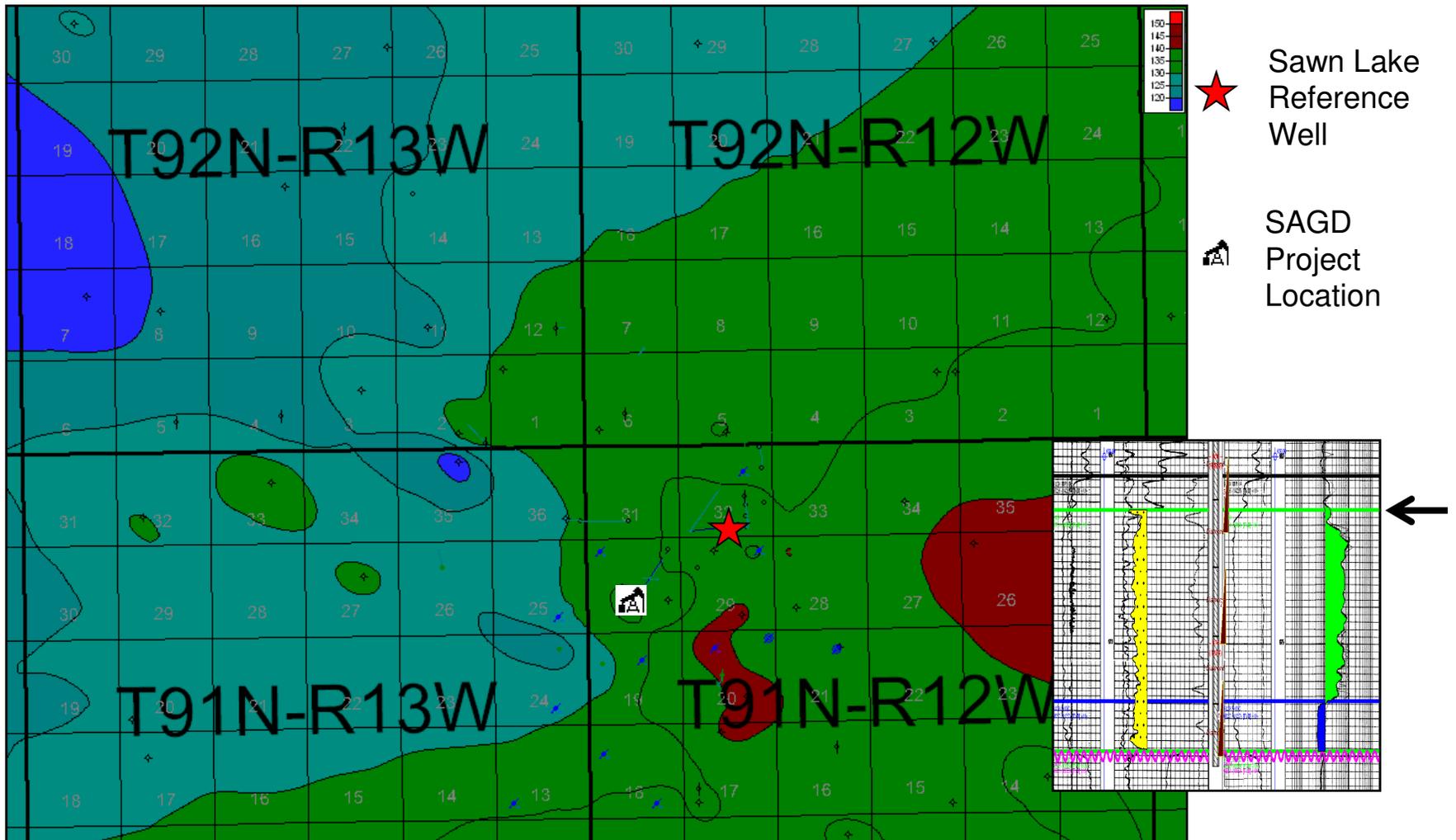


— 16-30 SAGD Well Pair Path

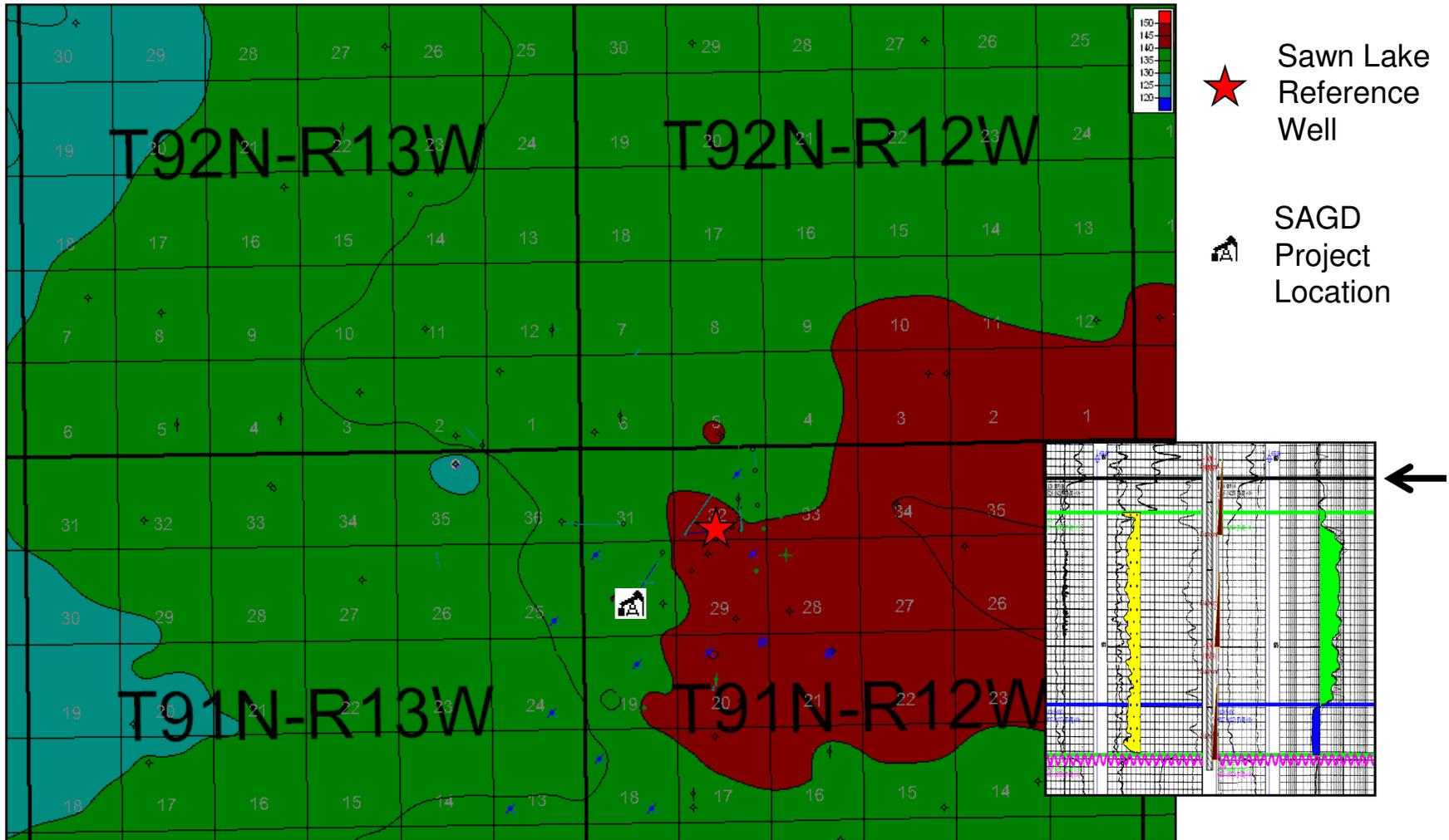
★ Sawn Lake Reference Well



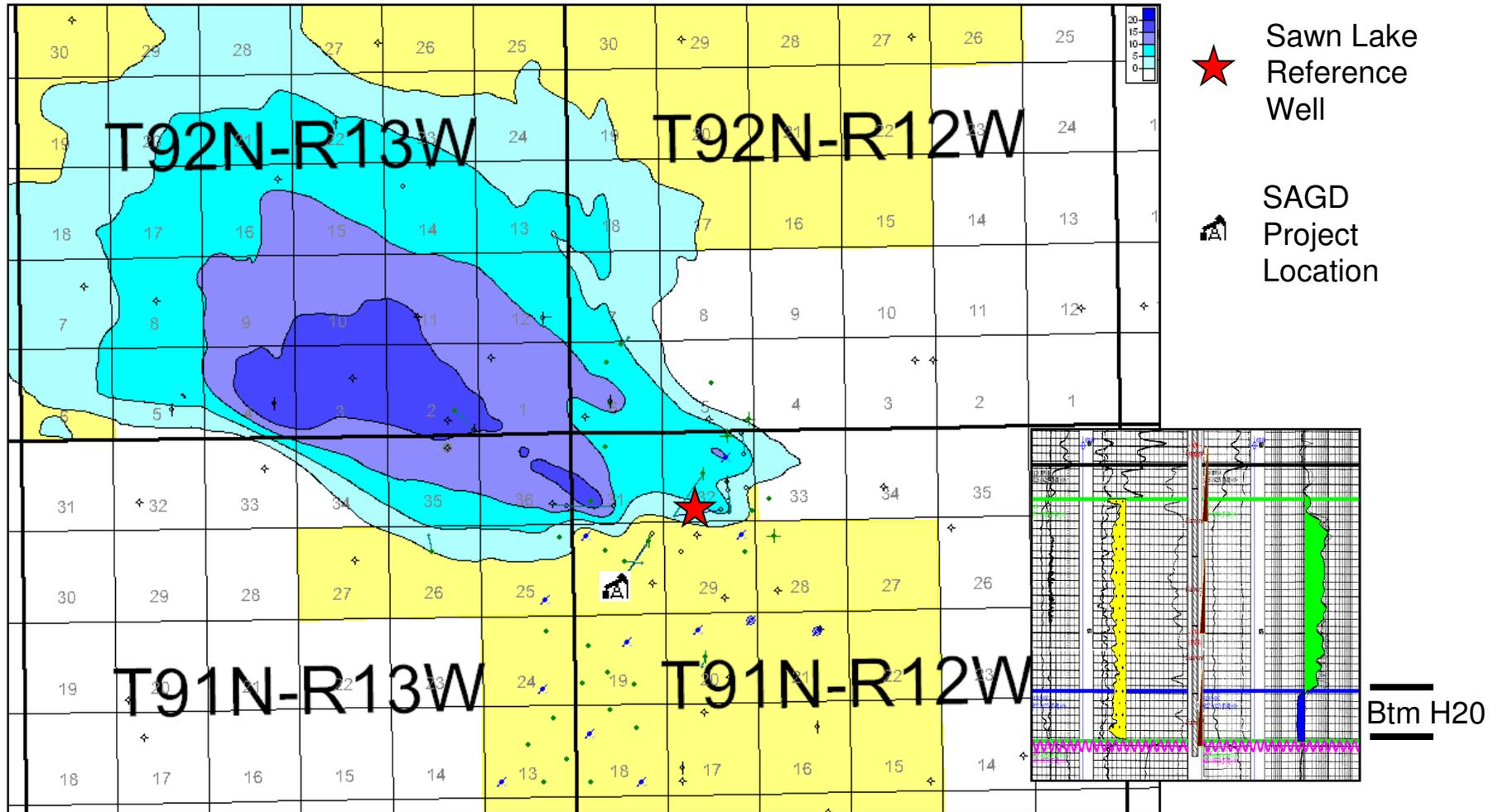
Sawn Lake – Top Bluesky Pay Structure



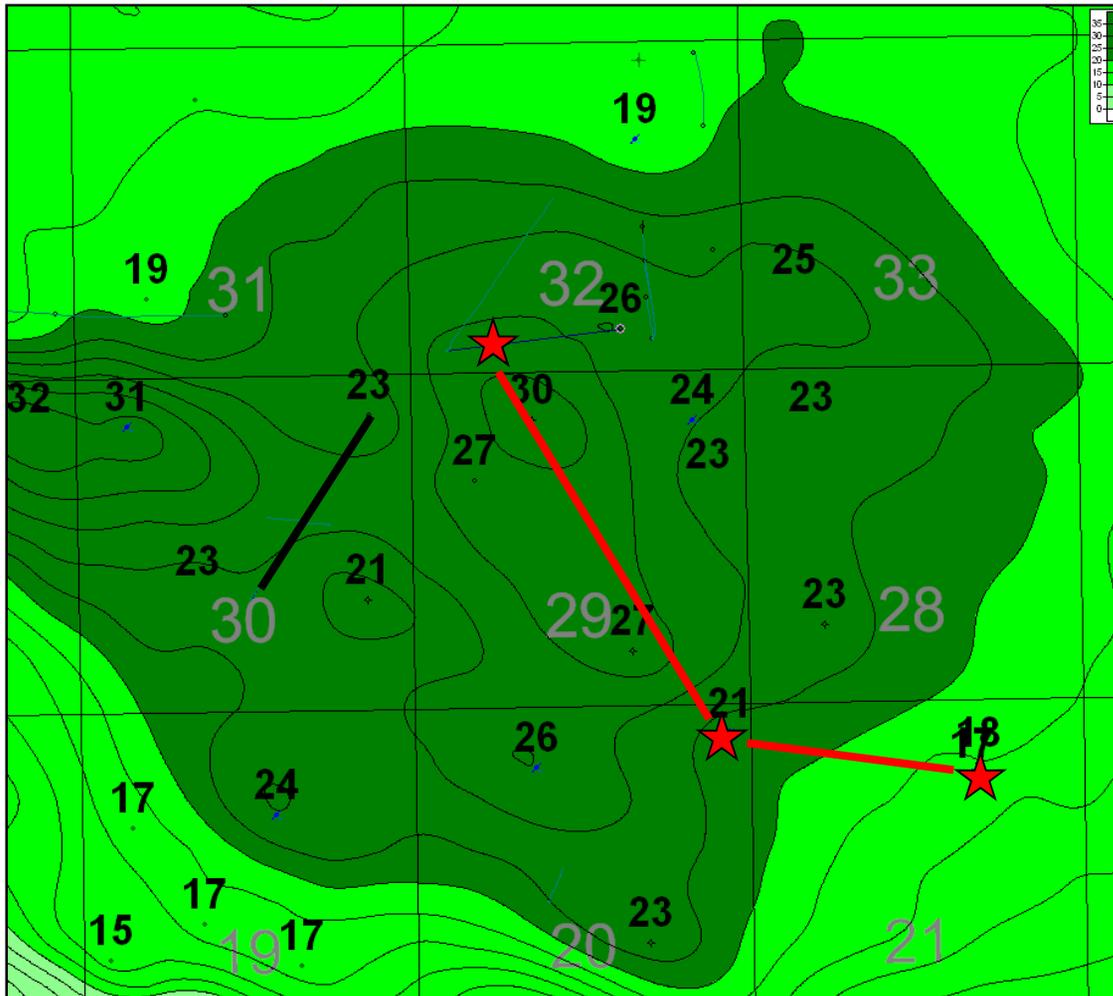
Sawn Lake – Top Bluesky Structure



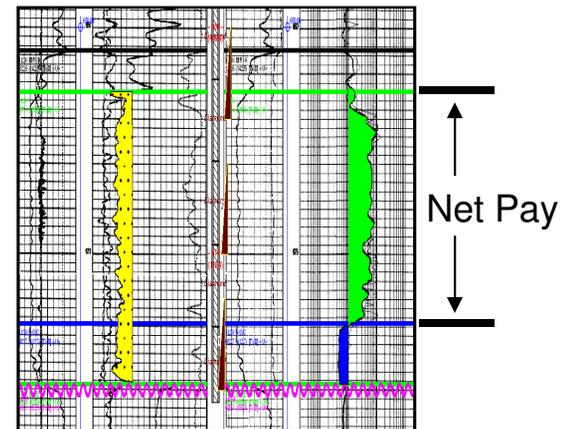
Sawn Lake – Bottom Water



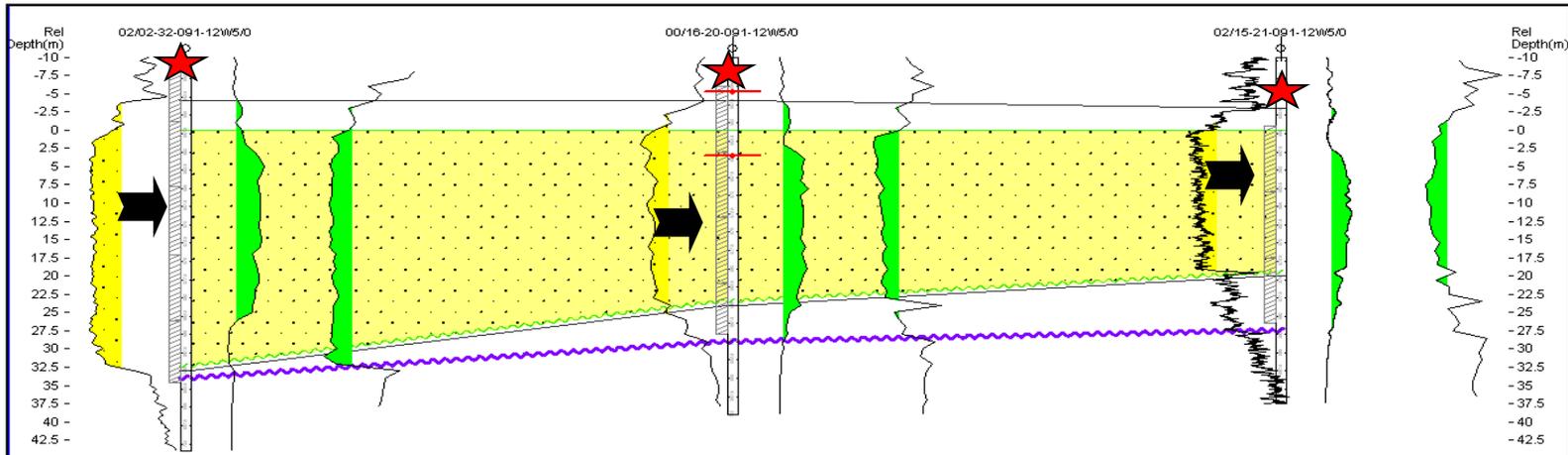
Sawn Lake - Bluesky Net Pay



- Proposed SAGD Well Pair Path
- ★ — Sawn Lake SAGD Project Cross Section



Sawn Lake – SAGD Test Key Zones

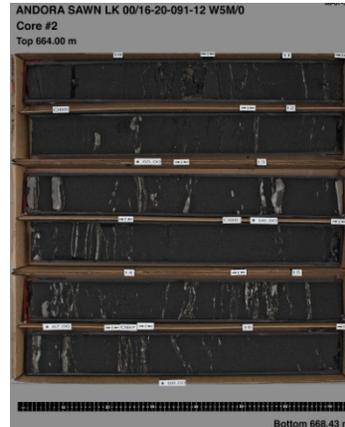


Thick Clean Heavily Oil Saturated



* Dominant Zone Type

Dispersed Shale Inter-beds



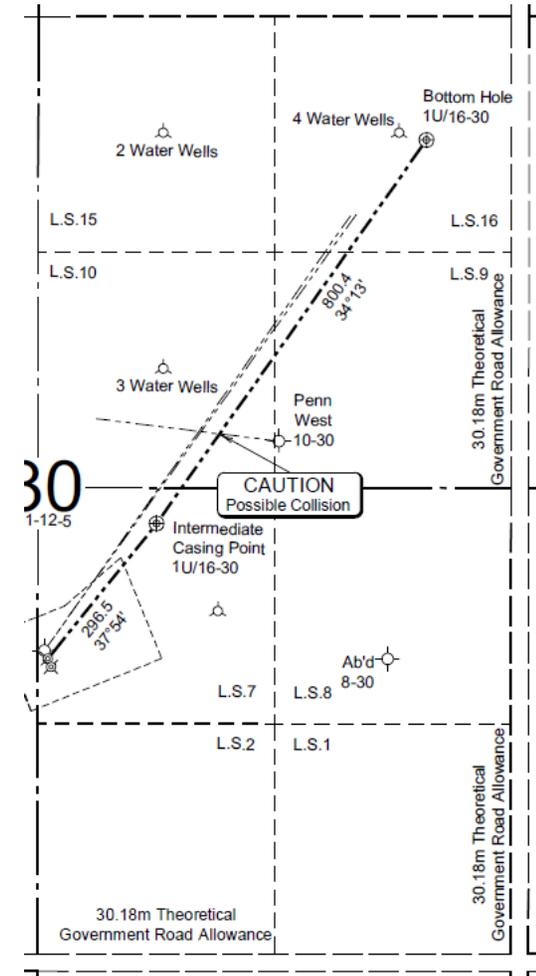
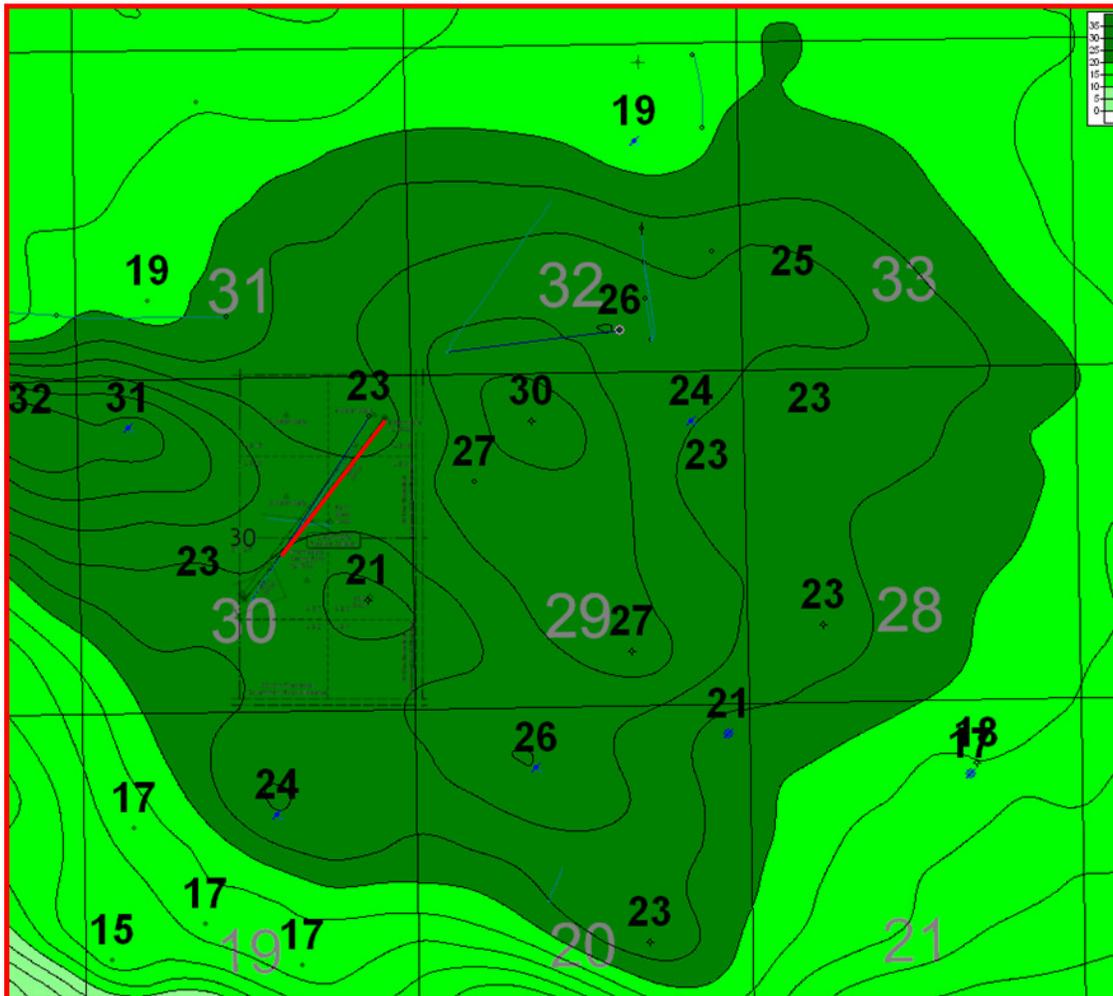
Top Lean Zone



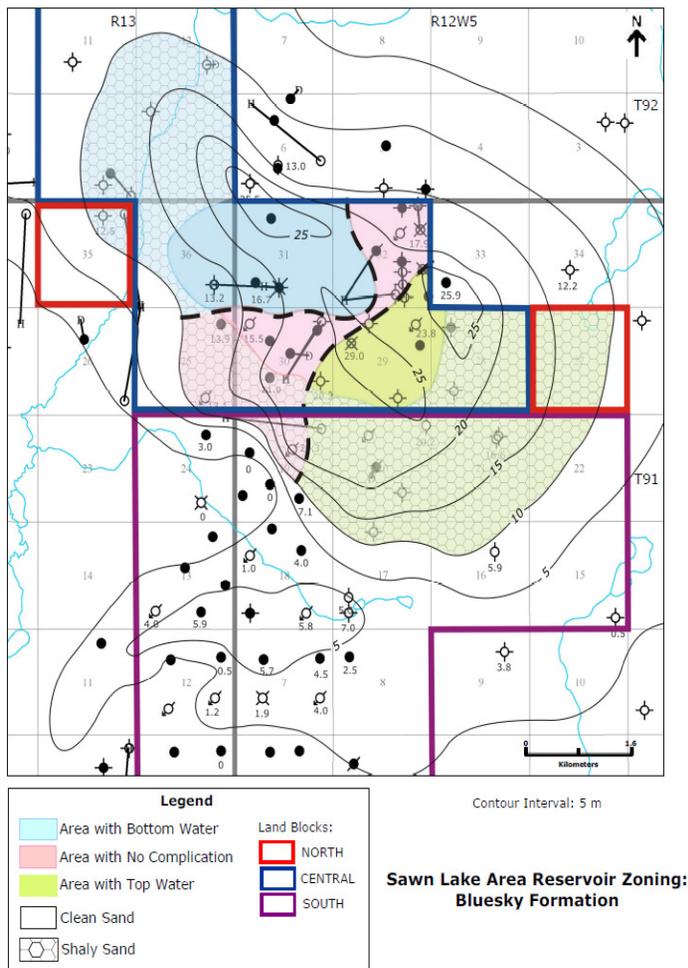
* Thin & aerally constrained Zone Type



1U/1L Wellpair



Sawn Lake - Bluesky Net Pay



- Sawn Lake Field
 - 39 contiguous sections with > 10 meters of pay and excess of 2 Billion Gross Barrels of Bitumen in Place
 - 6.5 sections with > 20 meters of pay and ~ 0.5 Billion Gross Barrels of Bitumen in Place, ~ 30% Porosity, ~70% Oil Saturation
 - Areas with no complication, bottom water, top lean zones identified; strategy is Low Pressure SAGD (LP SAGD) operating with steam chamber pressure close to base reservoir pressure
 - Base Reservoir Pressure identified as ~3200kPag at ~650m TVD.
 - Pilot Placed at 7-30-91-12W5 drilled to BH 16-30-91-12W5 (no complications)

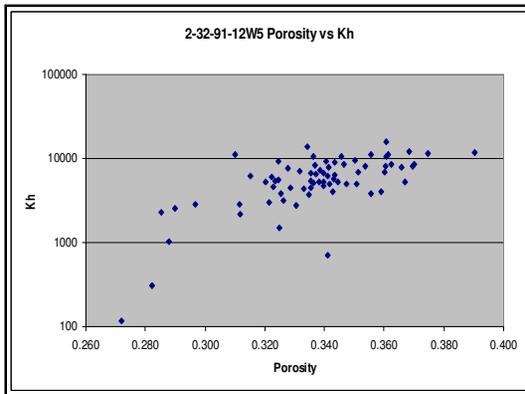
80145



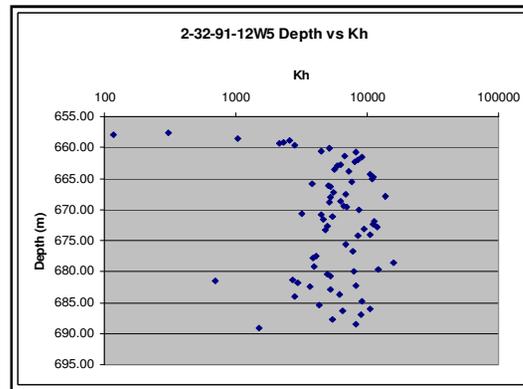
Sawn Lake – 2-32-91-12W5 Core



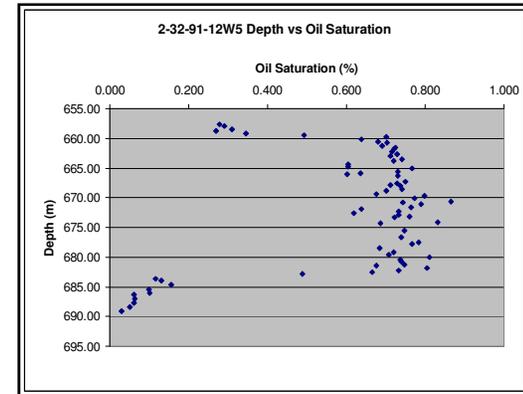
➤ 2-32-91-12W5



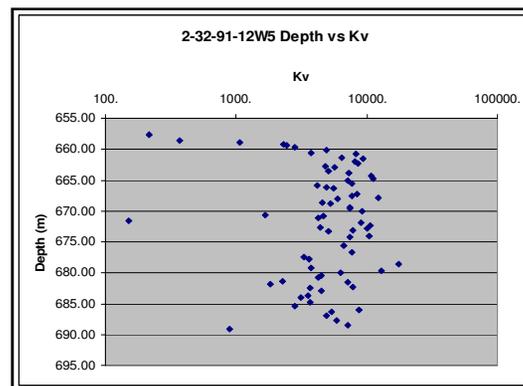
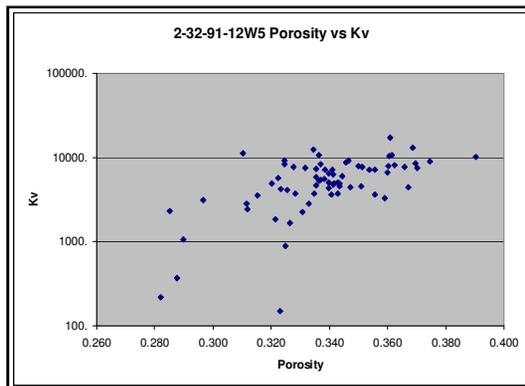
Porosity vs. Permeability



Depth vs. Permeability



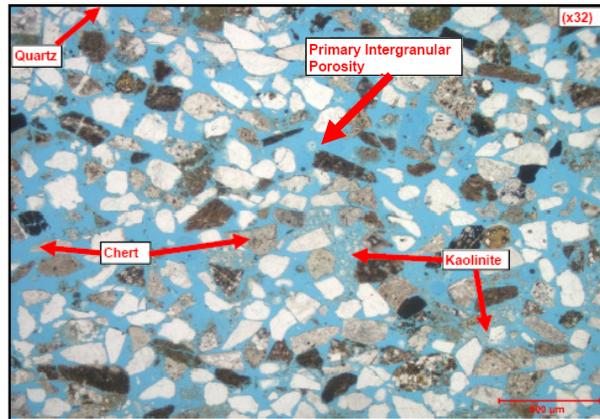
Depth vs. Oil Saturation



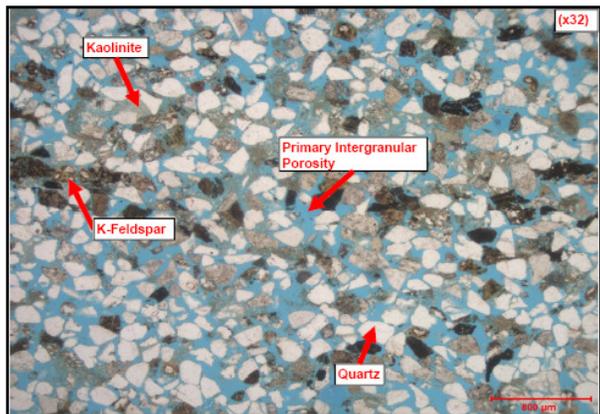
Sawn Lake – Petrography



➤ 2-32-91-12W5 (677.75 m)



➤ 16-20-91-12W5 (673.5 m)



➤ XRD Analysis

	2-32-91-12W5	16-20-91-12W5
Depth Interval (m)	677.5	673.5
Mineral	Whole Rock Weight %	
Quartz	91	80
K-Feldspar	1	2
Plagioclase	0	0
Anhydrite	0	0
Calcite	0	0
Dolomite	Trace	3
Halite	0	0
Siderite	0	0
Pyrite	Trace	Trace
Total Clay	8	15
Total	100	100

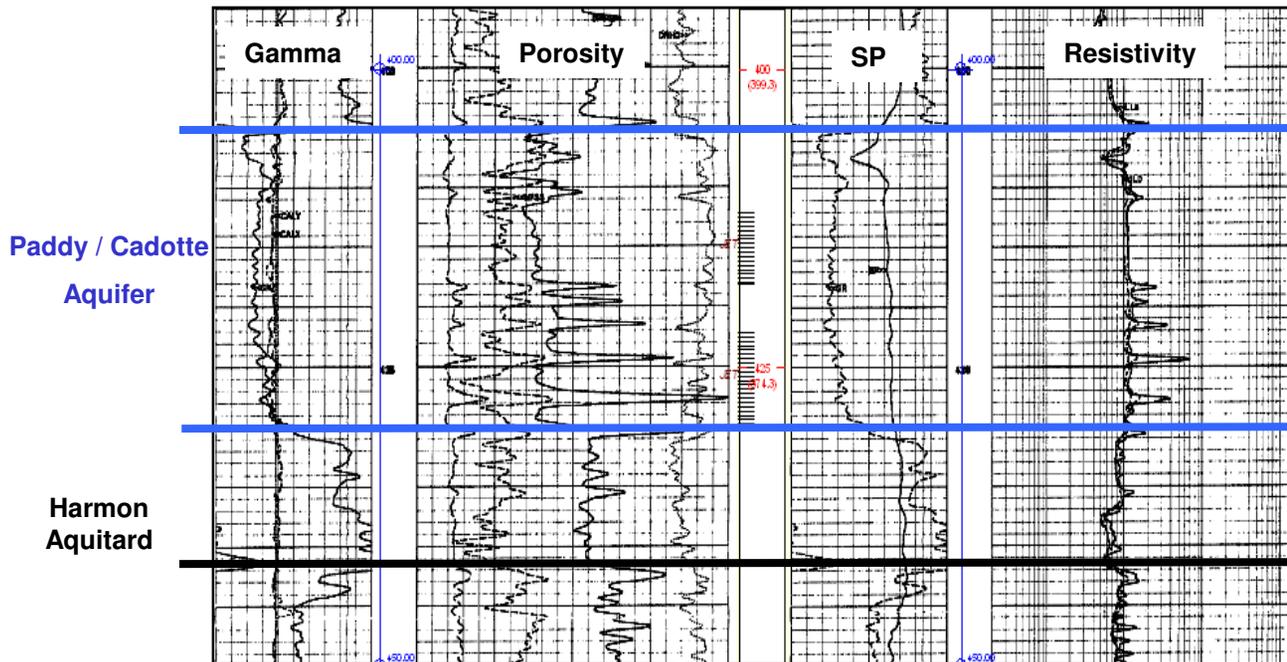
Clay Mineral	Relative Clay %	
Smectite	0	0
Illite / Smectite	0	0
Illite / Mica	14	14
Kaolinite	86	86
Chlorite	0	0
Total	100	100



Sawn Lake – Surface Operations



Water Source Well 00/16-20-91-12W5



- Paddy / Cadotte Aquifer, 420 mKb
- Fresh Water, ~ 3600 ppm



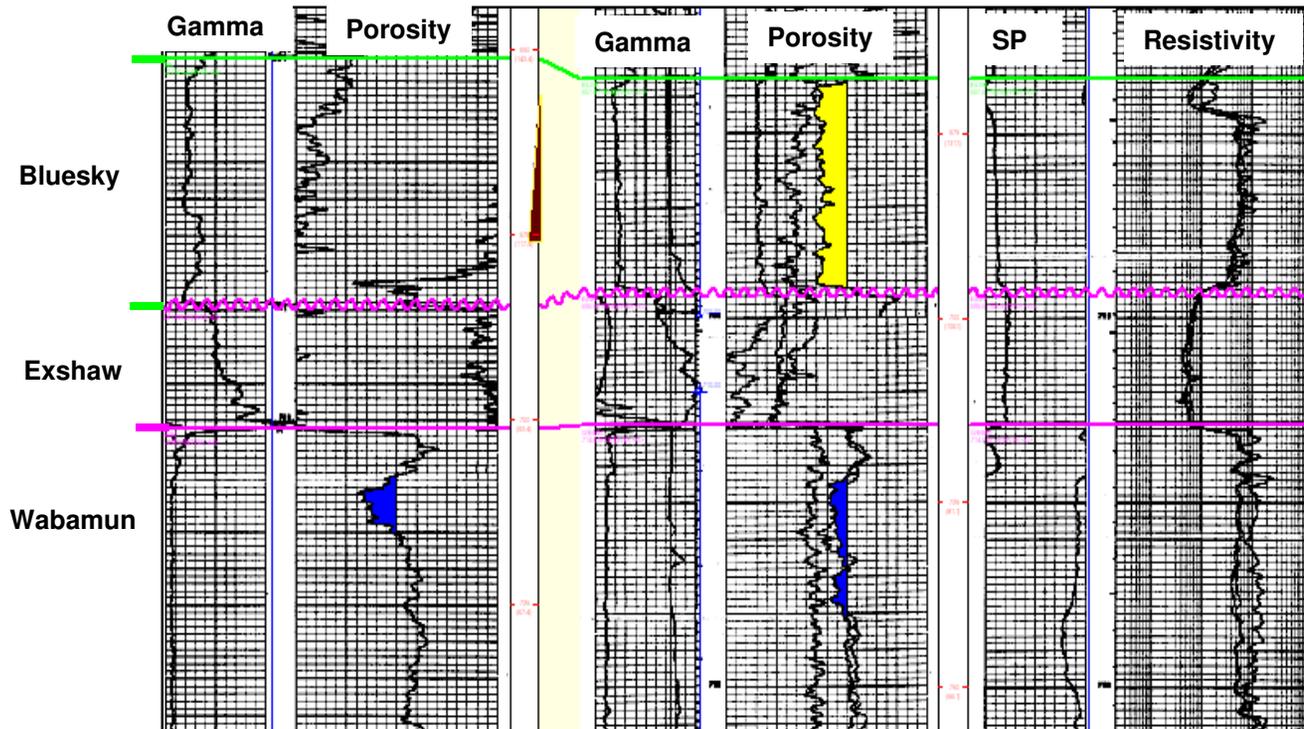
Sawn Lake – Surface Operations



➤ Water Disposal Well 15-21-91-12W5

00/15-21-91-12W5

00/16-29-91-12W5



- Disposal Well located on facility site
- Disposing to the Wabamun

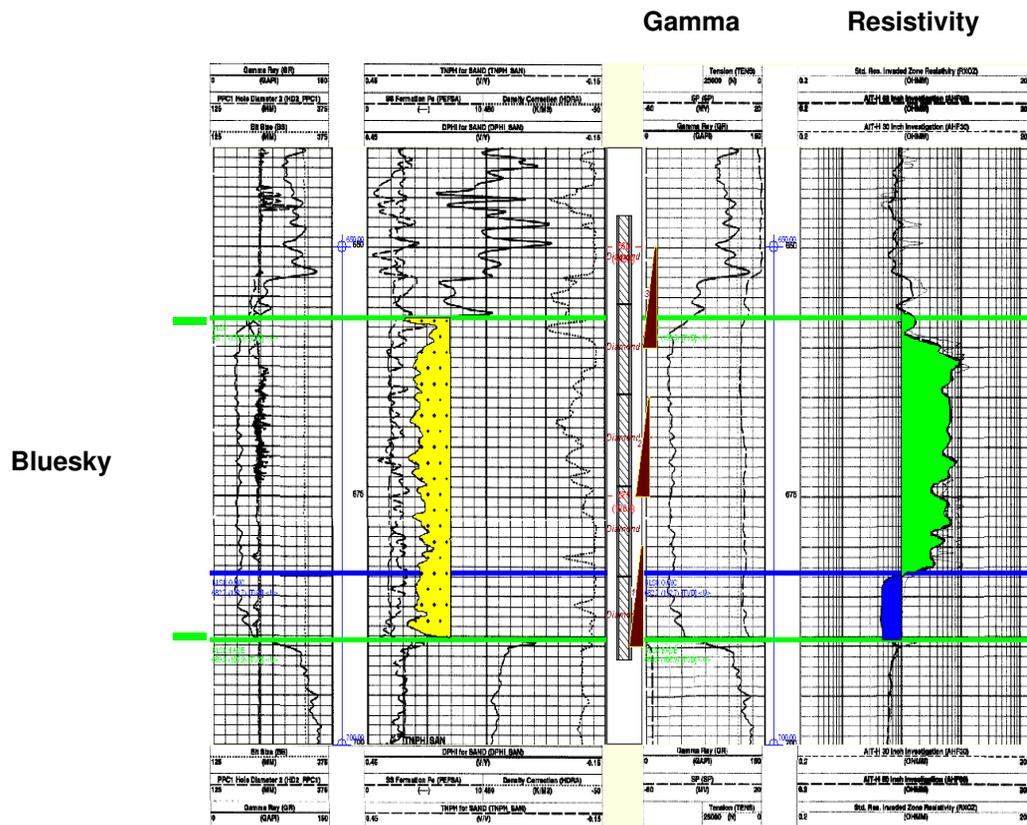


Sawn Lake – Surface Operations



➤ Future Potential Saline Source – Bluesky

02/02-32-091-12W5/0



▪ Potential source water is the Bluesky.

▪ Measured/laboratory samples in T091 and T092 R13 suggest the TDS is 14,906 and 23,352 mg/L, respectively.

▪ A DST sample in T091 R13 suggests a TDS of 19,786 mg/L.

▪ Would require water treatment plant capable of handling saline water (such as PWB).



Sawn Lake – Surface Operations

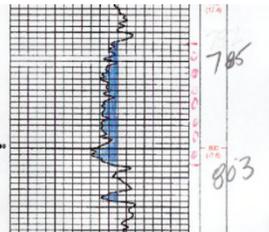


➤ Future Potential Saline Source – Lower Wabamun Zones

00/15-21-91-12W5

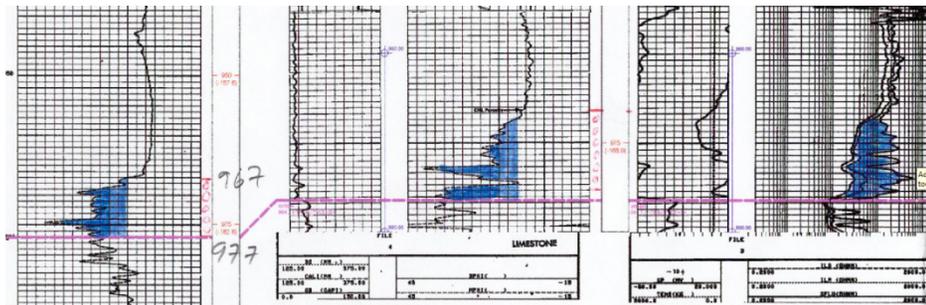
00/16-29-91-12W5

Gamma



Gamma

Resistivity



Wabamun

Winterburn

▪ Lower Wabamun Zones; Middle zone (785m-803m at 15-21) and Lower Zone Wabamun lower zone (967m-977m at 15-21)

▪ Overall conceptual model Wabamun is saline (buried deep beneath sediment and therefore is not getting recharge from a fresh water source anywhere in close proximity)

▪ Based on the assumption that it is quite saline and using the remaining DST data (with outliers culled), the salinity range in the Wabamun is expected to be between 55,000 and 70,000 mg/L TDS.

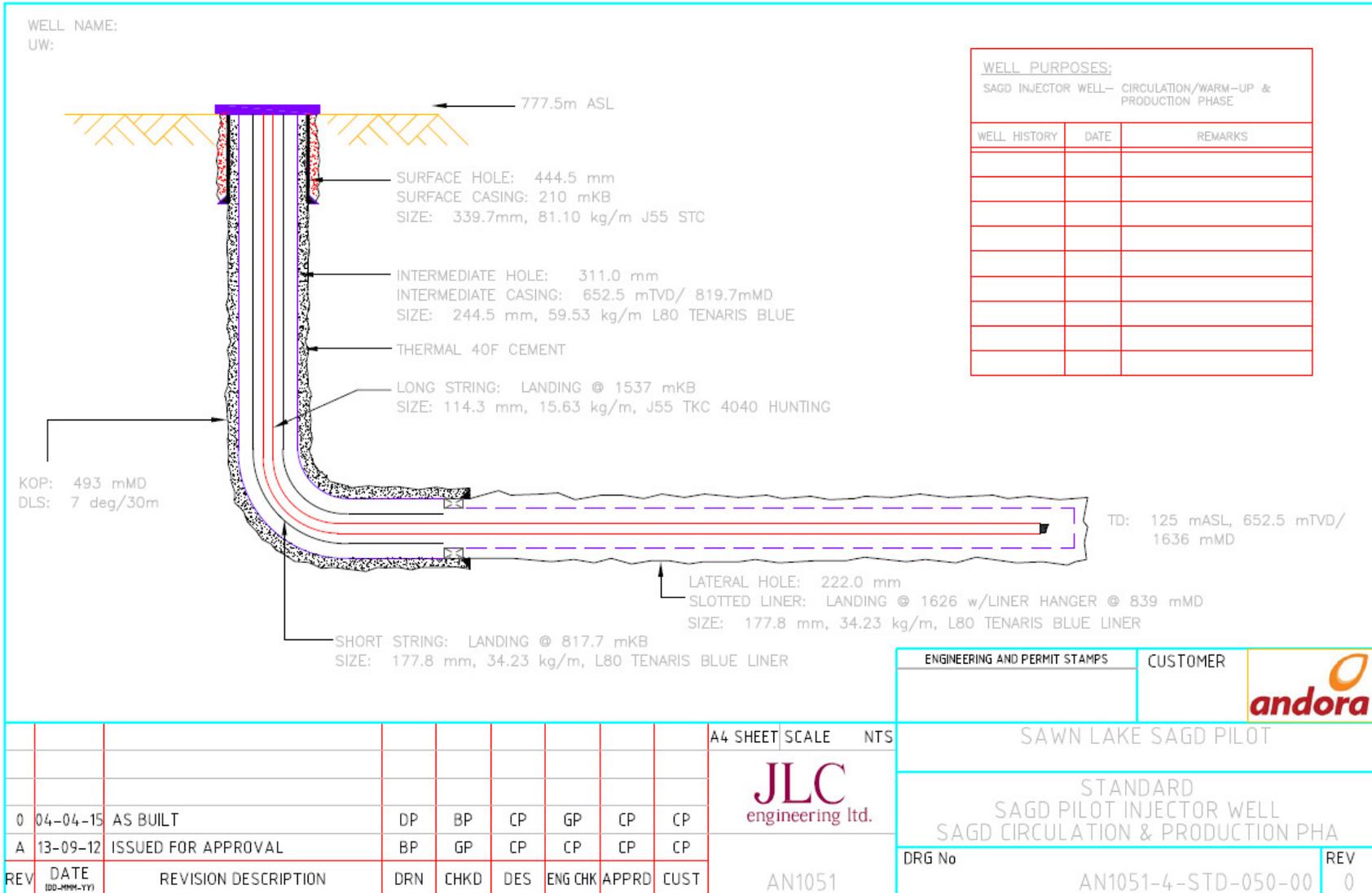
▪ Some outlier DST data ranged from 1,000 mg/L to 22,000 mg/L.

▪ Future effort on mapping the middle and lower zones.

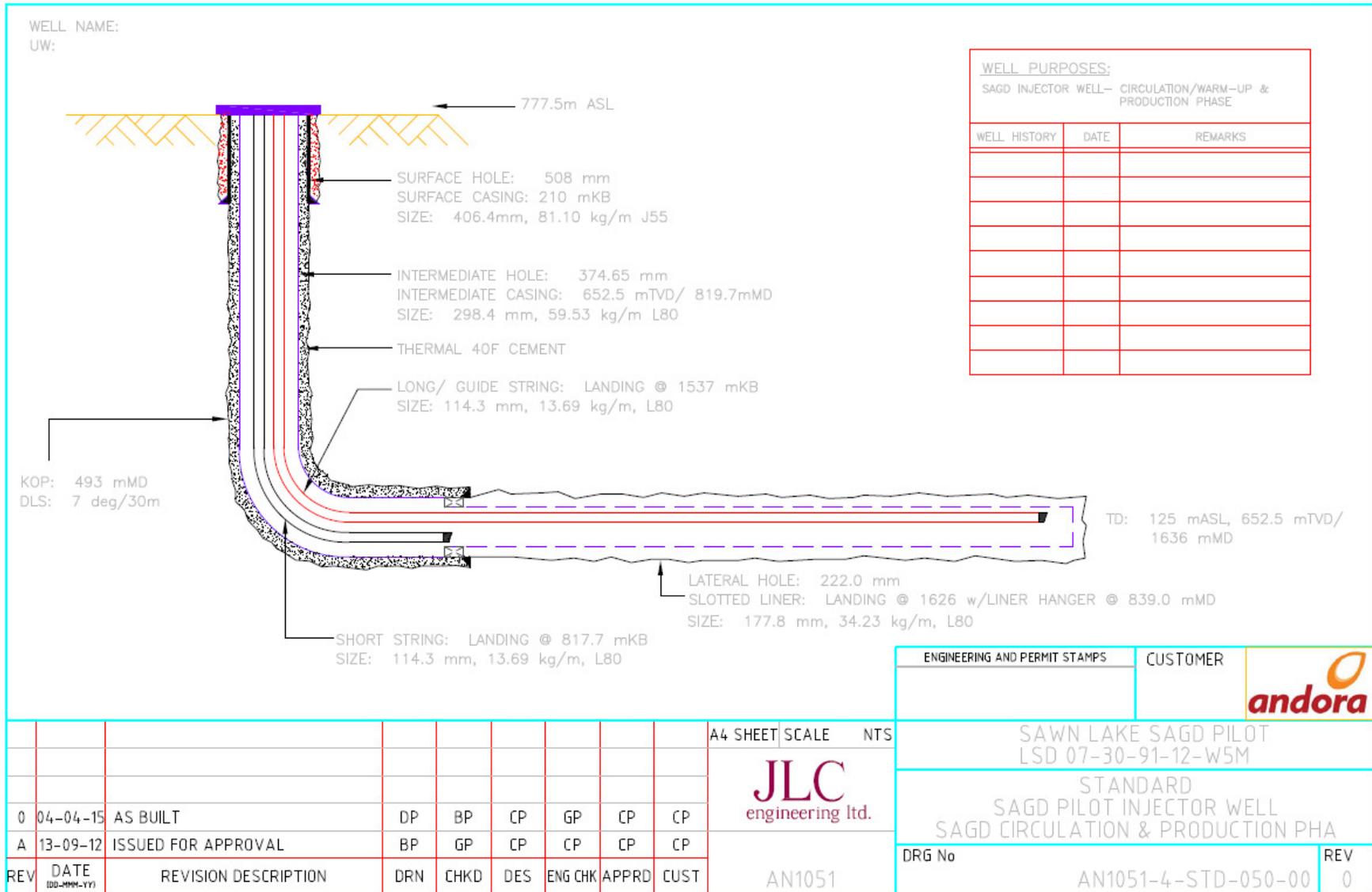
▪ Usage would require require water treatment plant capable of handling saline water (such as PWB).



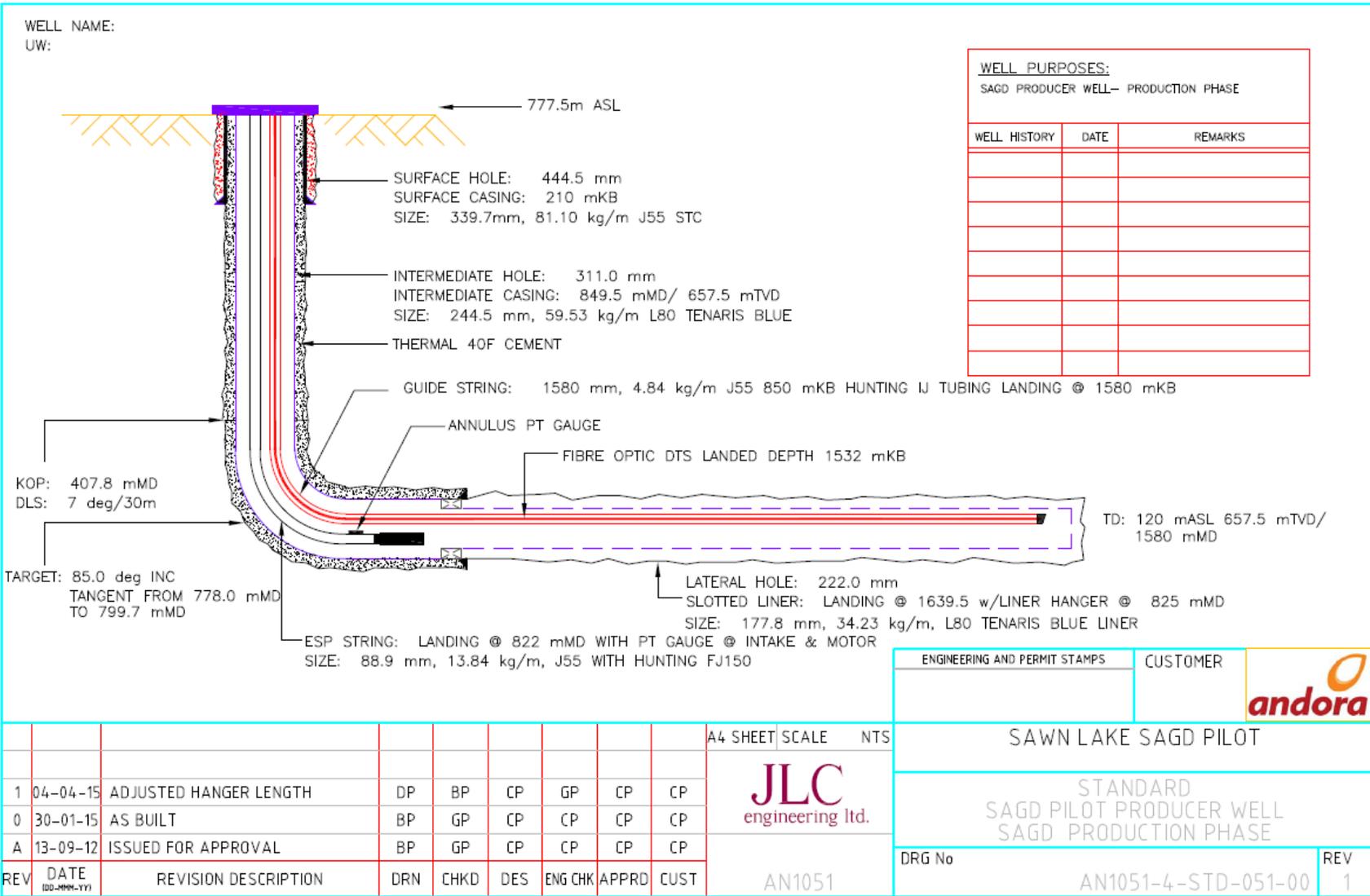
Drilling and Completions - Injector



Drilling and Completions – Producer (Circ)



Drilling and Completions - Producer (SAGD)

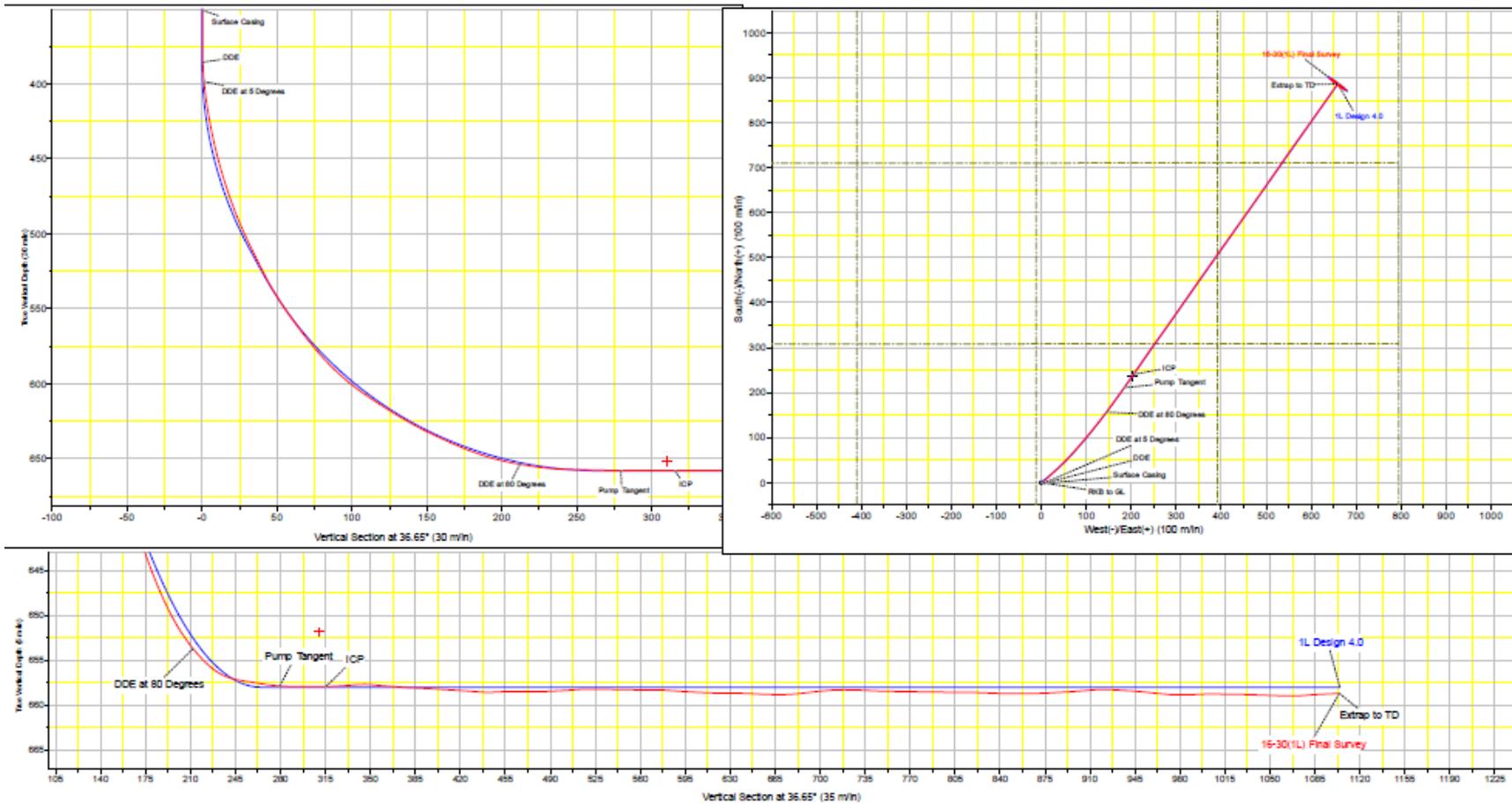


Drilling and Completions – Well Survey



HALLIBURTON

Project: Sawn Lake (Nad 83)
 Site: 30-91-12W5M
 Well: Andora 1L Sawn Lake 7-30/16-30-91-12W5M
 16-30(1L) Final Survey



Injector

- Blanket gas for downhole pressure measurement

Producer

- Fiberoptic DTS temperature profile
- X2 P/T Gauge on ESP Suction (heel)
- P/T Gauge on ESP Motor
- X 1 Pressure gauge at Toe
- Casing Gas pressure at surface

Discussion

- Toe Pressure gauge reading lower (~400kPa+) than heel pressure gauges; and has trended down below base reservoir pressure; believed to have failed.
- DTS fiberoptic temperatures were trending with surface temperatures; surface compensation corrected
- Primary subcool on heel pressure, temperature and DTS Avg/High at heel pressure.

Artificial Lift



- Artificial Lift provided by Electric Submersible Pump (ESP) due to depth (650m TVD) with low base reservoir pressure (3200kPag)
- First ESP lasted from Sept 2015 to May 2015; (9 months); motor failure due to manufacturing fault. Pump showed no sign of sand, well integrity good. Some sign of up-thrust damage from low start up rates (on edge of pump curve).
- New ESP downsized to avoid future upthrust potential.



Scheme Performance



Operations Update



May 19, 2014

First Sustained OTSG firing

May 21, 2014

Commenced steam injection on injector and producer (First Steam) at 25-30tpd/wellpair

May 23, 2014

Offloading of liquids in producer and injector

May 23 – Aug 29 2014

SAGD Circulation

Aug 29, 2014

Plant Shut down / Cool down

Sept 9 – 11 2014

Service Rig for ESP and fiberoptic install

Sept 12 2014

Plant Start Up on SAGD mode

Performance Data (Month Cal. Day Avg)



To Sept 30 2015



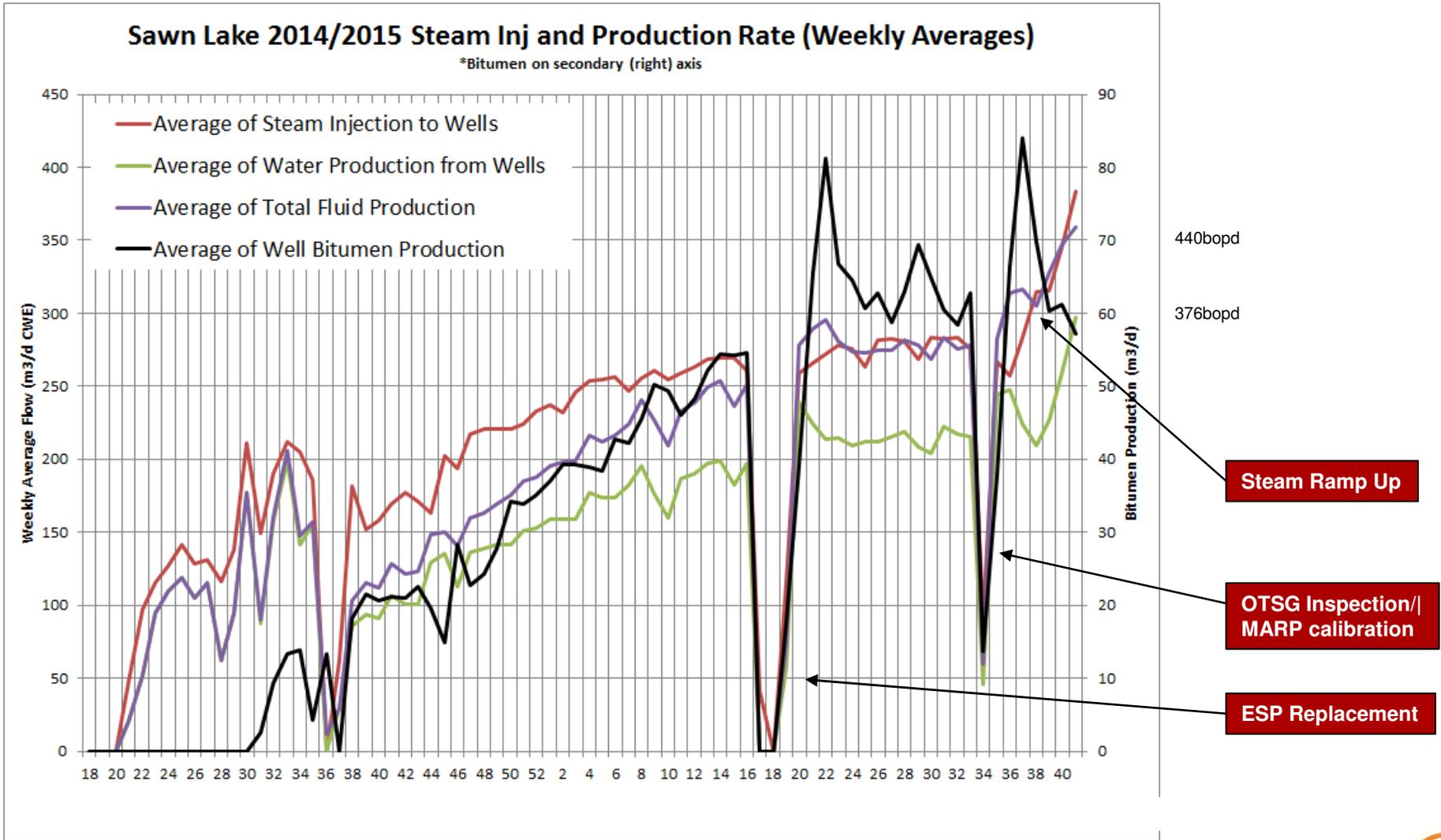
**OTSG Inspection/
MARP calibration**

ESP Replacement

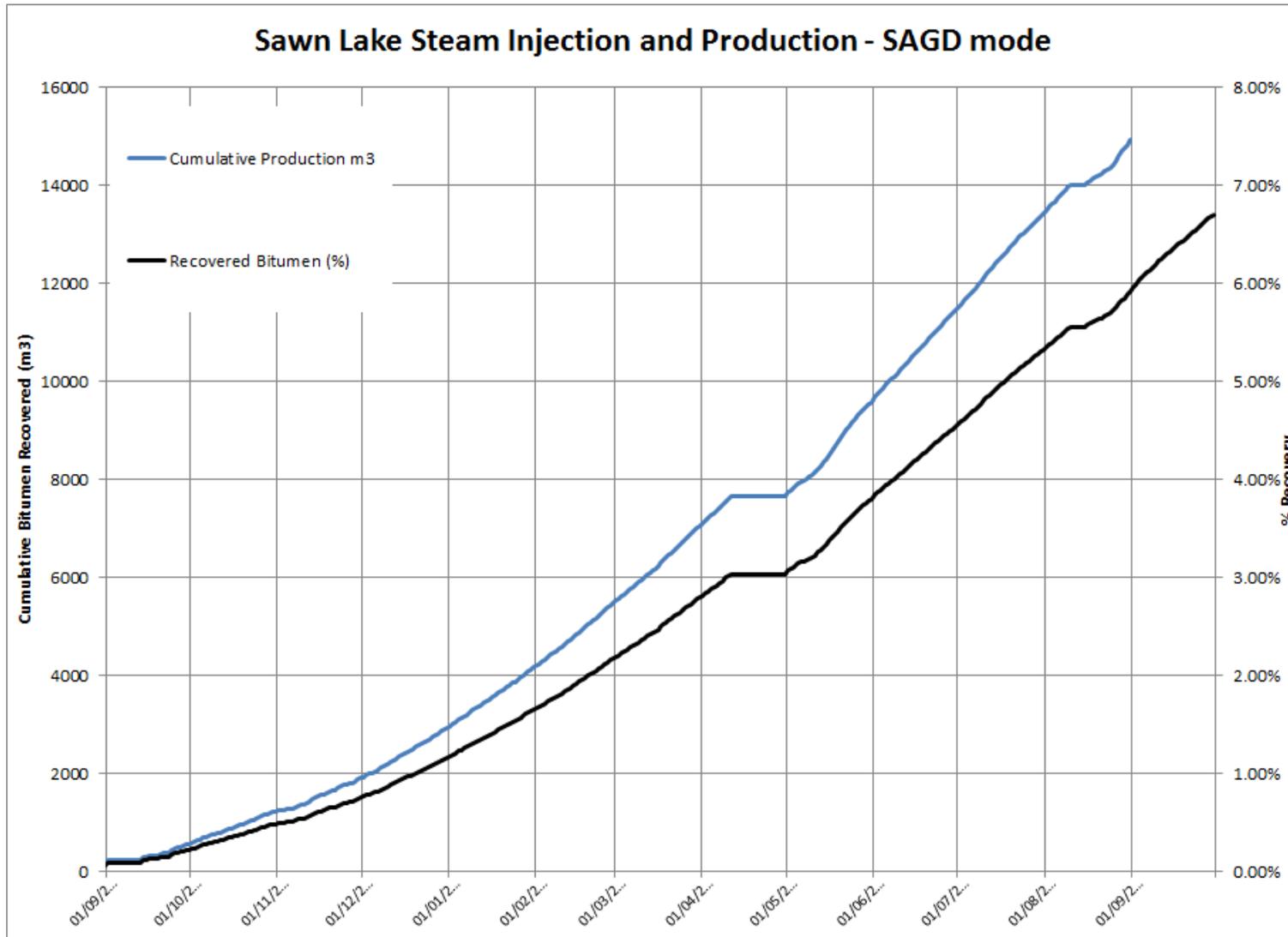
**ESP Install/
SAGD Mode**



Performance Data (Weekly Averages) - SAGD

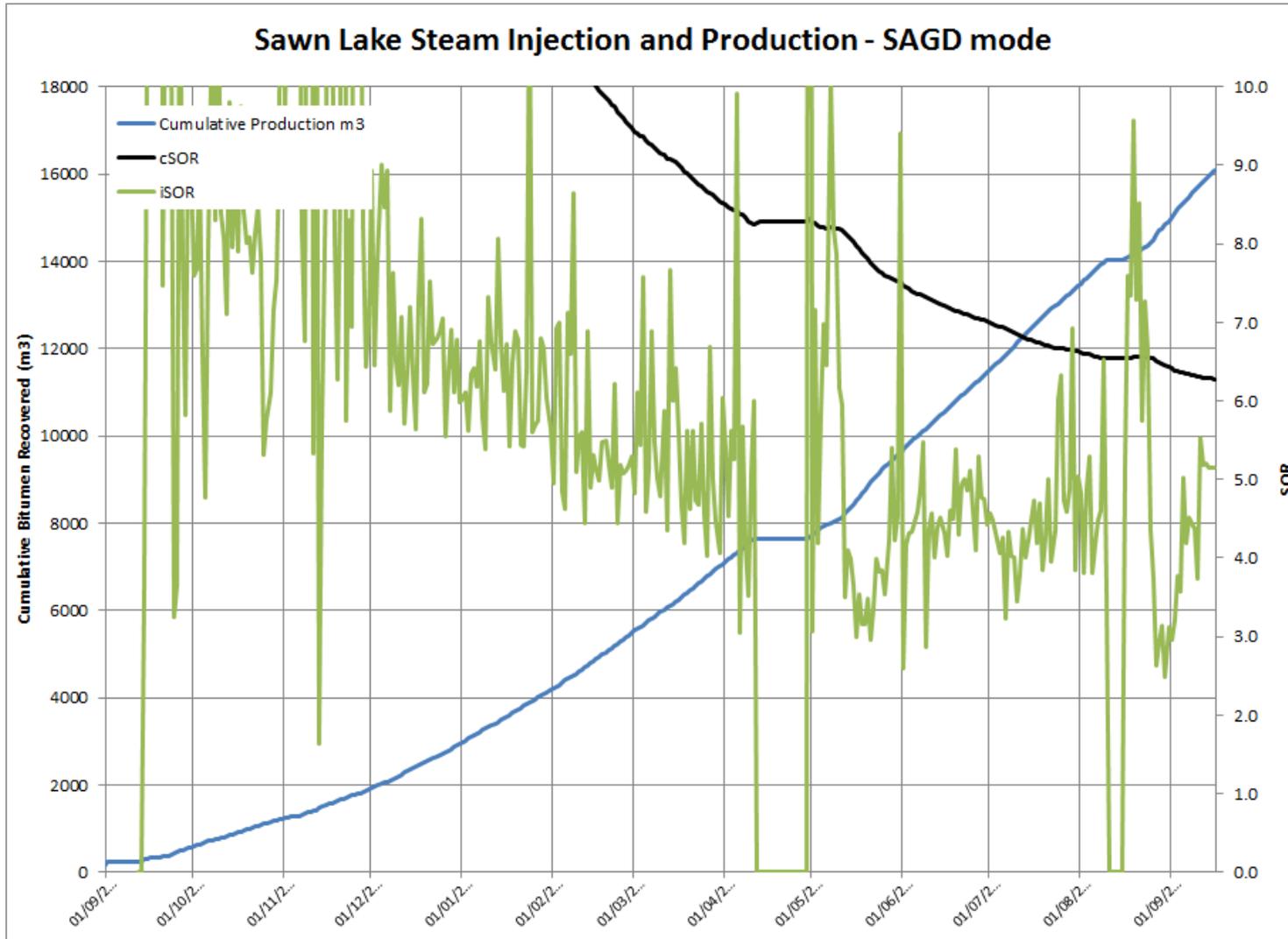


Performance Data (Recovery) - SAGD

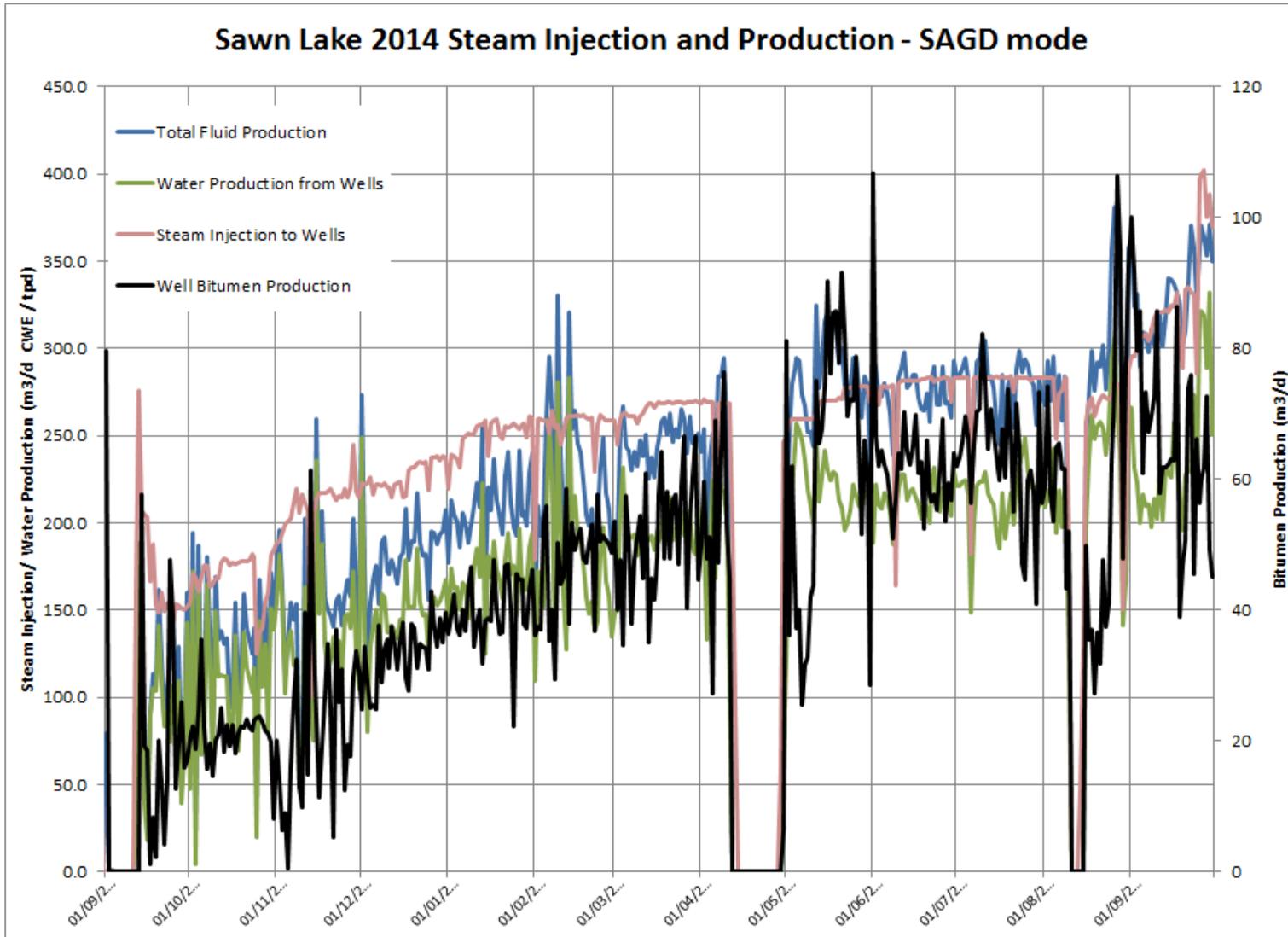


Simulated Ultimate Recovery expected to be ~60% (LP-SAGD).

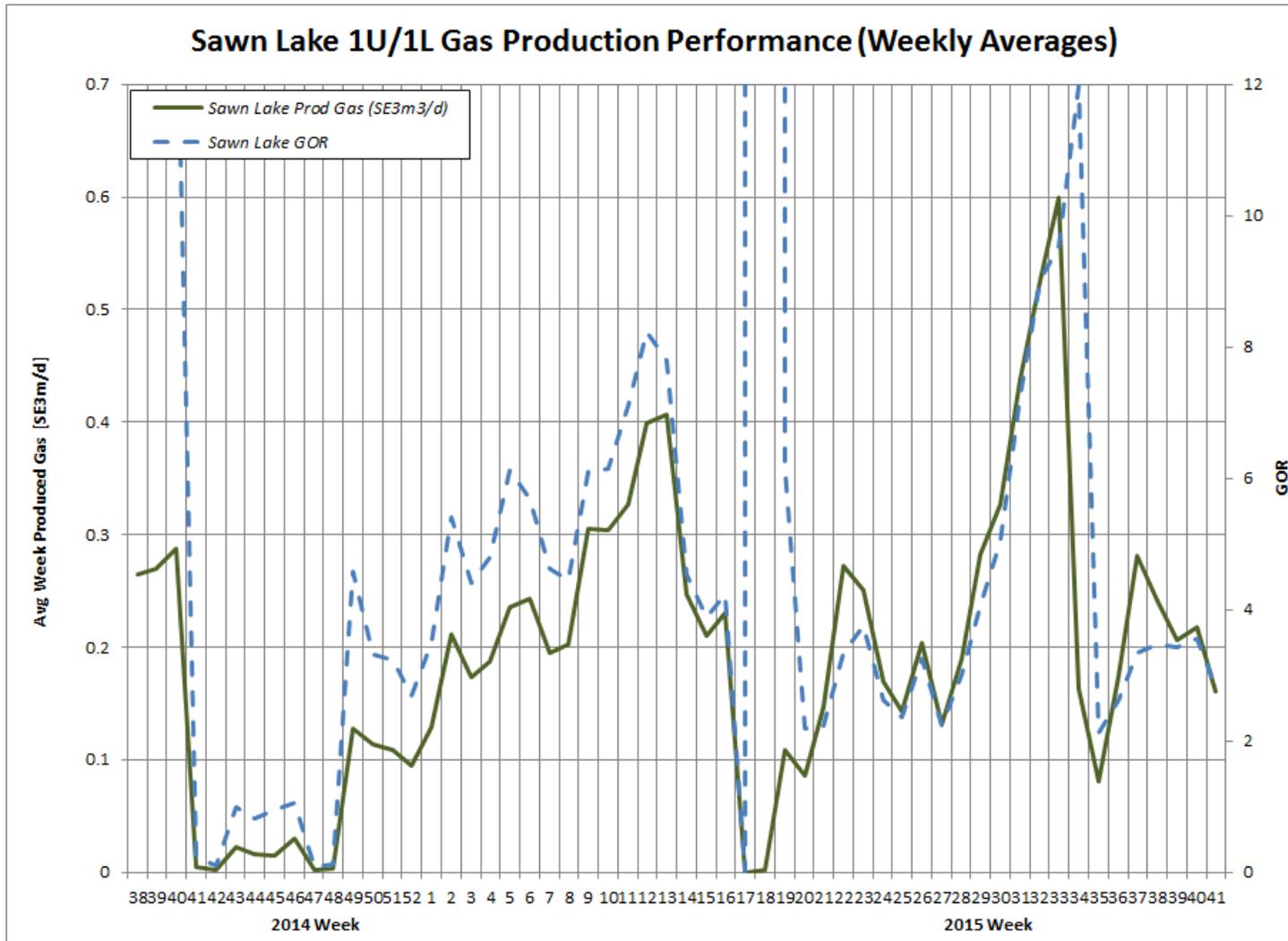
Performance Data (cSOR / iSOR) - SAGD



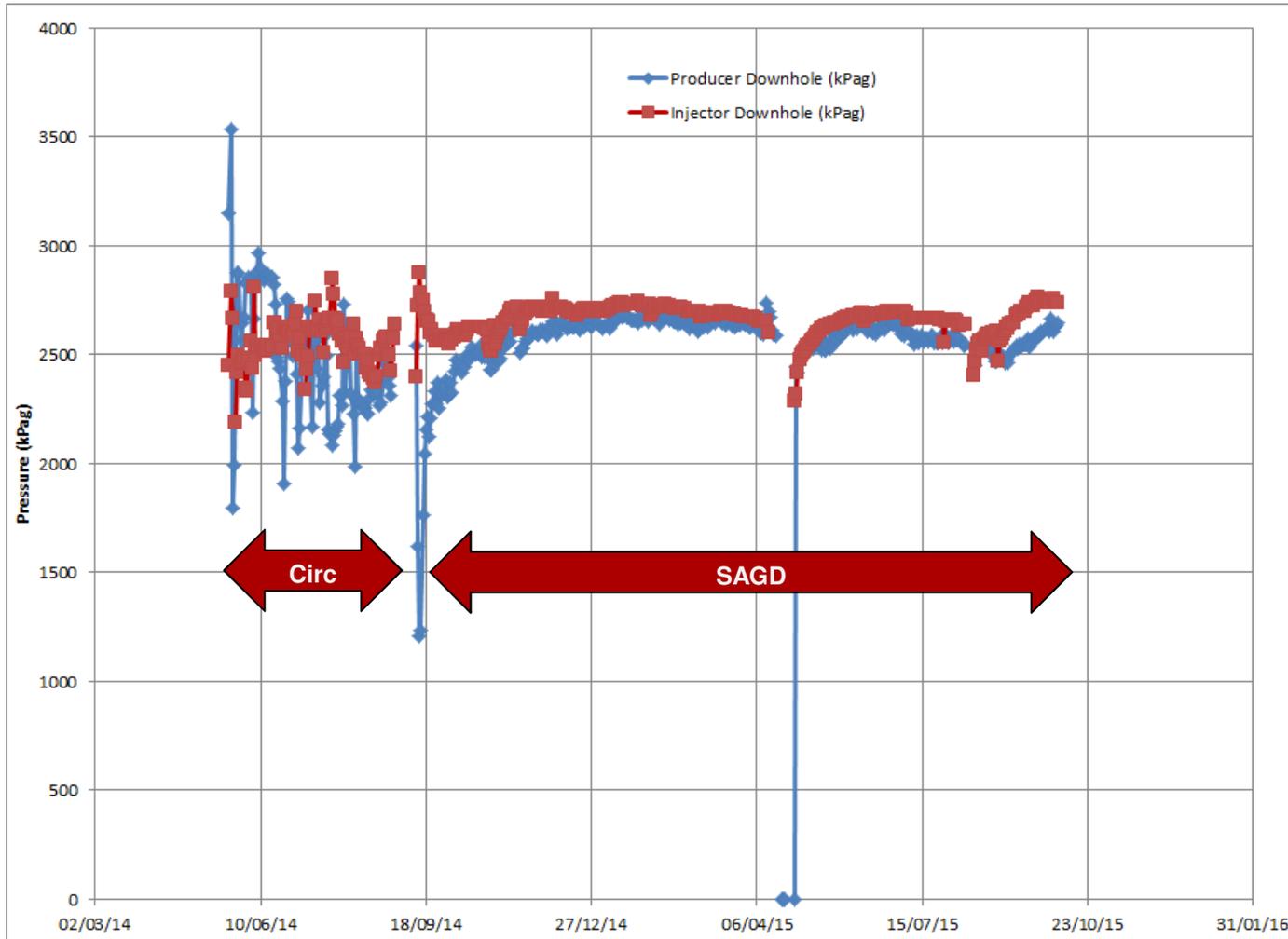
Performance Data (Daily) - SAGD



Performance Data (Gas; Weekly Averages) - SAGD



Downhole Pressures



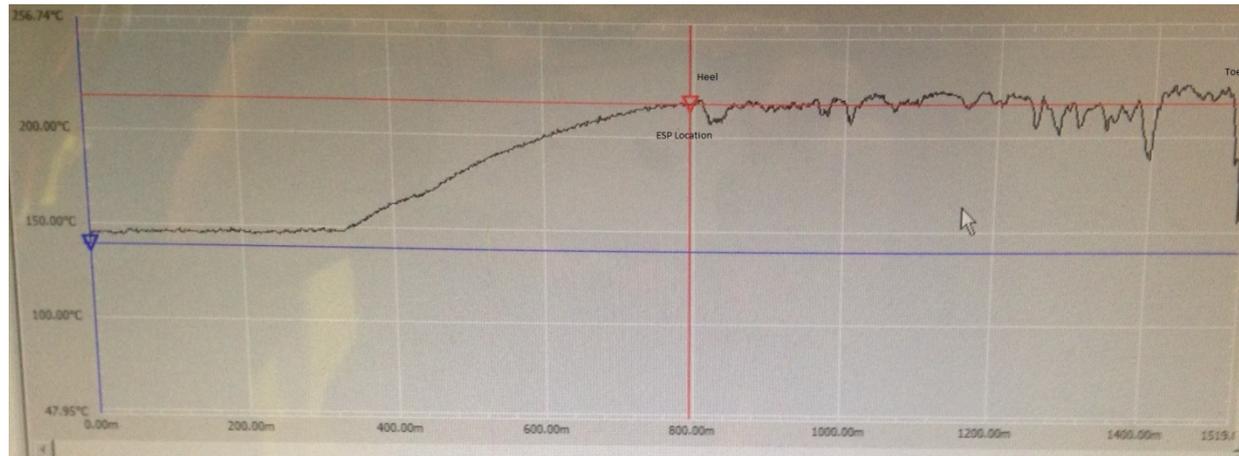
Circulation mode slugging due to tests to confirm steam throughout well.

SAGD mode declines in injection pressure @ const steam rate believed to be due to steam chamber volume expansion and condensation surface area increase (caprock).

Increases in steam injection pressure due to increased steam injection.

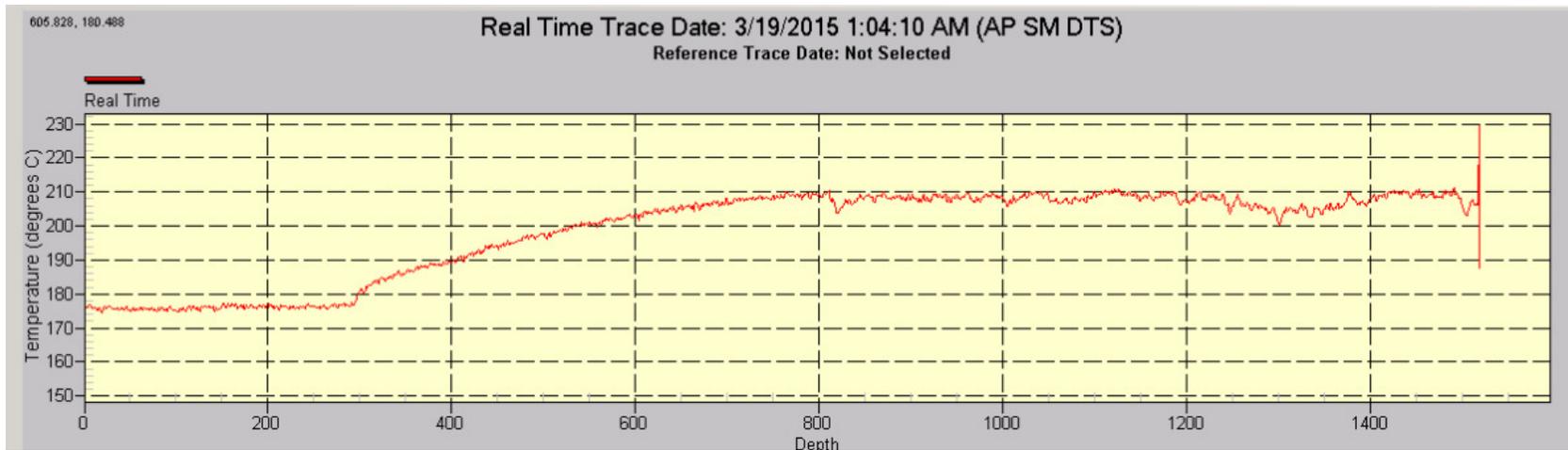


Conformance



September 2014

March 2015



Sproule (Andora) Expectations Dec31-2014



- Exceeding Sproule “LOW” case [121 bopd @ SOR 8 for 2015; 242 bopd @ SOR 5.7 for 2016 & 2017]
- Exceeding Sproule “BEST” case [173 bopd @ SOR 5.6 for 2015; 345 bopd @ SOR 4 for 2016 & 2017]
- Aiming to exceed “HIGH” case of [224 bopd @ SOR 4.3 for 2015; 449 bopd @ SOR 3.1 for 2016 & 2017]
- Can inject more steam than predicted by Sproule [>380 tpd actual vs. 208 tpd Sproule] which could mean more production.

16-30-091-12W5 Pilot Well Forecasts

Low Estimate Contingent Resources

Year	Bitumen Rate bbl/d	Water Rate bbl/d	Steam 100% Quality bbl/d	SOR	CSOR
2015	121	918	966	8.0	8.0
2016	242	1,311	1,380	5.7	6.5
2017	242	1,311	1,380	5.7	6.2
2018	242	1,382	1,455	6.0	6.1
2019	242	1,453	1,529	6.3	6.2
2020	242	1,524	1,604	6.6	6.3
2021	242	1,594	1,678	6.9	6.4
2022	173	1,194	1,257	7.3	6.5
2023	124	893	940	7.6	6.5
2024	89	667	702	7.9	6.6
2025	64	497	523	8.2	6.6
2026	46	370	390	8.5	6.7
2027	33	275	290	8.8	6.7
2028	-	-	-	-	-
2029	-	-	-	-	-
2030	-	-	-	-	-
Total [Mbbbl]	767	4,890	5,148	CSOR	6.71

Best Estimate Contingent Resources

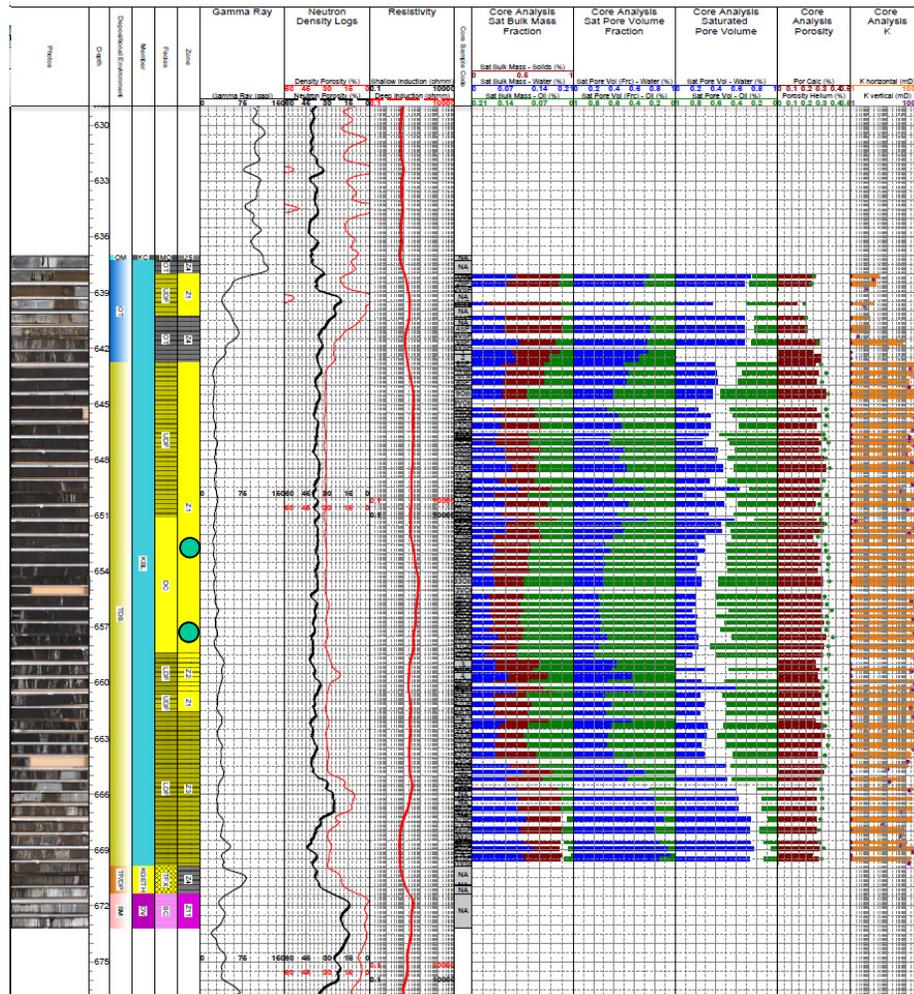
Year	Bitumen Rate bbl/d	Water Rate bbl/d	Steam 100% Quality bbl/d	SOR	CSOR
2015	173	918	966	5.6	5.6
2016	345	1,311	1,380	4.0	4.5
2017	345	1,311	1,380	4.0	4.3
2018	345	1,382	1,455	4.2	4.3
2019	345	1,453	1,529	4.4	4.3
2020	345	1,524	1,604	4.6	4.4
2021	345	1,594	1,678	4.9	4.5
2022	247	1,194	1,257	5.1	4.5
2023	178	893	940	5.3	4.6
2024	127	667	702	5.5	4.6
2025	91	497	523	5.7	4.6
2026	66	370	390	5.9	4.7
2027	47	275	290	6.2	4.7
2028	-	-	-	-	-
2029	-	-	-	-	-
2030	-	-	-	-	-
Total [Mbbbl]	1,095	4,890	5,148	CSOR	4.70

High Estimate Contingent Resources

Year	Bitumen Rate bbl/d	Water Rate bbl/d	Steam 100% Quality bbl/d	SOR	CSOR
2015	224	918	966	4.3	4.3
2016	449	1,311	1,380	3.1	3.5
2017	449	1,311	1,380	3.1	3.3
2018	449	1,382	1,455	3.2	3.3
2019	449	1,453	1,529	3.4	3.3
2020	449	1,524	1,604	3.6	3.4
2021	449	1,594	1,678	3.7	3.4
2022	322	1,194	1,257	3.9	3.5
2023	231	893	940	4.1	3.5
2024	166	667	702	4.2	3.5
2025	119	497	523	4.4	3.6
2026	85	370	390	4.6	3.6
2027	61	275	290	4.7	3.6
2028	-	-	-	-	-
2029	-	-	-	-	-
2030	-	-	-	-	-
Total [Mbbbl]	1,424	4,890	5,148	CSOR	3.62



Sawn Lake – 1U/1L Wellpair



1U/1L wellpair

- Production stagnation prior to caprock evidence of penetration to lean zone above Z1.
- Steam injection at 400tpd with injector pressure at 2750kPag further indication of low base reservoir pressure ~2300kPag and good permeability's.
- Further trialing to determine if steam is productive.



Sawn Lake Analyticals



SAWN LAKE ANALYTICALS

Bitumen

Last Analysis September 2015 – 1021kg/m³ density; 7.0API ; generally 7.8API.
Sawn Lake bitumen is consistent with a McMurray formation bitumen 7-8API

Produced Gas

Typical SAGD casing gas; small production;
54% methane, 40% CO₂, 2% Hydrogen, 1.4% H₂S
remainder C₂+ hydrocarbons.

Produced Water

TDS: 2100mg/L by evaporation, 352mg/L calculated
P-Alkalinity 0ppm, M Alkalinity 287ppm, Total Alkalinity 287mg/L
Total Hardness: 5mg/L as CaCO₃
Silica: 125-141mg/L

Non-Saline Make Up Water

TDS: 3530mg/L by evaporation
P-alkalinity 0ppm, M Alkalinity 1648mg/L, Total 1648mg/L
Total Hardness: 49mg/L
Silica: 3-8mg/L



OIL ANALYSIS

441 - 1			52136-2015-6657
CONTAINER IDENTITY	METER ID	WELL LICENSE NUMBER	LABORATORY FILE NUMBER
	Andora Energy Corporation		1
	OPERATOR		PAGE
07-30-091-12W6	Andora Sawn Lake 7-30 Battery		
LOCATION (UWI)	WELL NAME	KB ELEV (m)	GR ELEV (m)
Sawn Lake		Core Lab - GP	
FIELD OR AREA	POOL OR ZONE	SAMPLER	
TEST TYPE AND NO.		TEST RECOVERY	
Sales Bitumen			
POINT OF SAMPLE		SAMPLE POINT ID	
PUMPING	FLOWING	GAS LIFT	SWAB
WATER	m ³ /d	OIL	m ³ /d
		GAS	m ³ /d
TEST INTERVAL or PERFS (meters)			
SEPARATOR	RESERVOIR	OTHER	
Pressures, kPa (gauge)		Temperatures, °C	
at 13:26 hrs			
2015 09 10	2015 09 14	2015 09 18	ML
DATE SAMPLED (Y/M/D)	DATE RECEIVED (Y/M/D)	DATE ANALYZED (Y/M/D)	ANALYST
			AMT AND TYPE CUSHION
			MUD RESISTIVITY

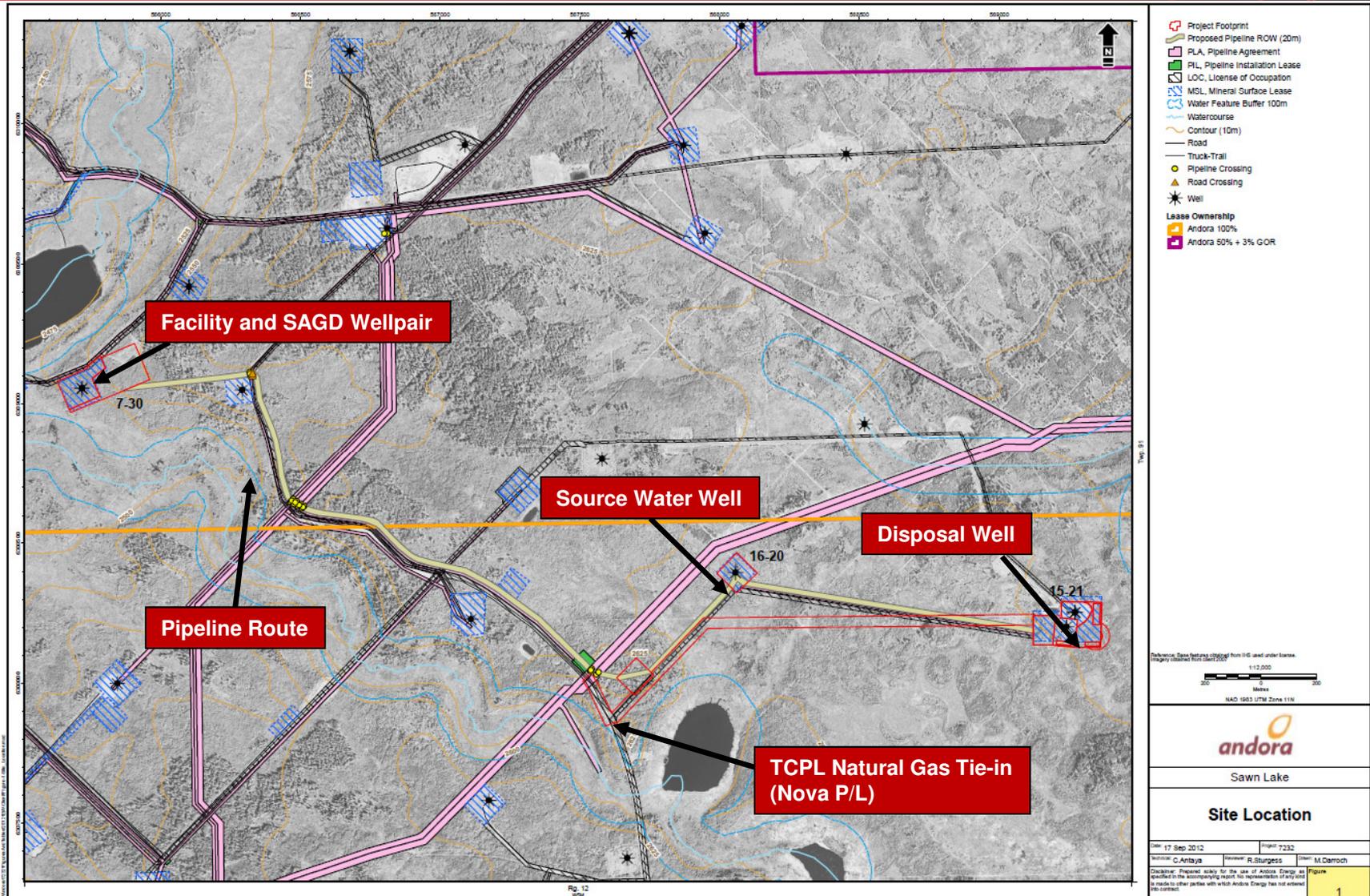
SAMPLE PROPERTIES				FRACTION	TEMP	
APPEARANCE OF CLEAN OIL				DISTILLED	°C	kPa
Dark Brown	WATER	BS	TOTAL BS & W			
ABSOLUTE DENSITY		API GRAVITY @15.6°C				
kg/m ³ @15°C						
AS RECEIVED	AFTER CLEANING	AS RECEIVED	AFTER CLEANING			
	1,021.0		7.0			
SULPHUR	SALT	WAX CONTENT	POUR POINT °C			
49.9						
grams/kg	kg/m ³	wt. %	A.S.T.M.			
				DISTILLATION SUMMARY		
				204 °C NAPHTHA	274 °C KEROSENE	



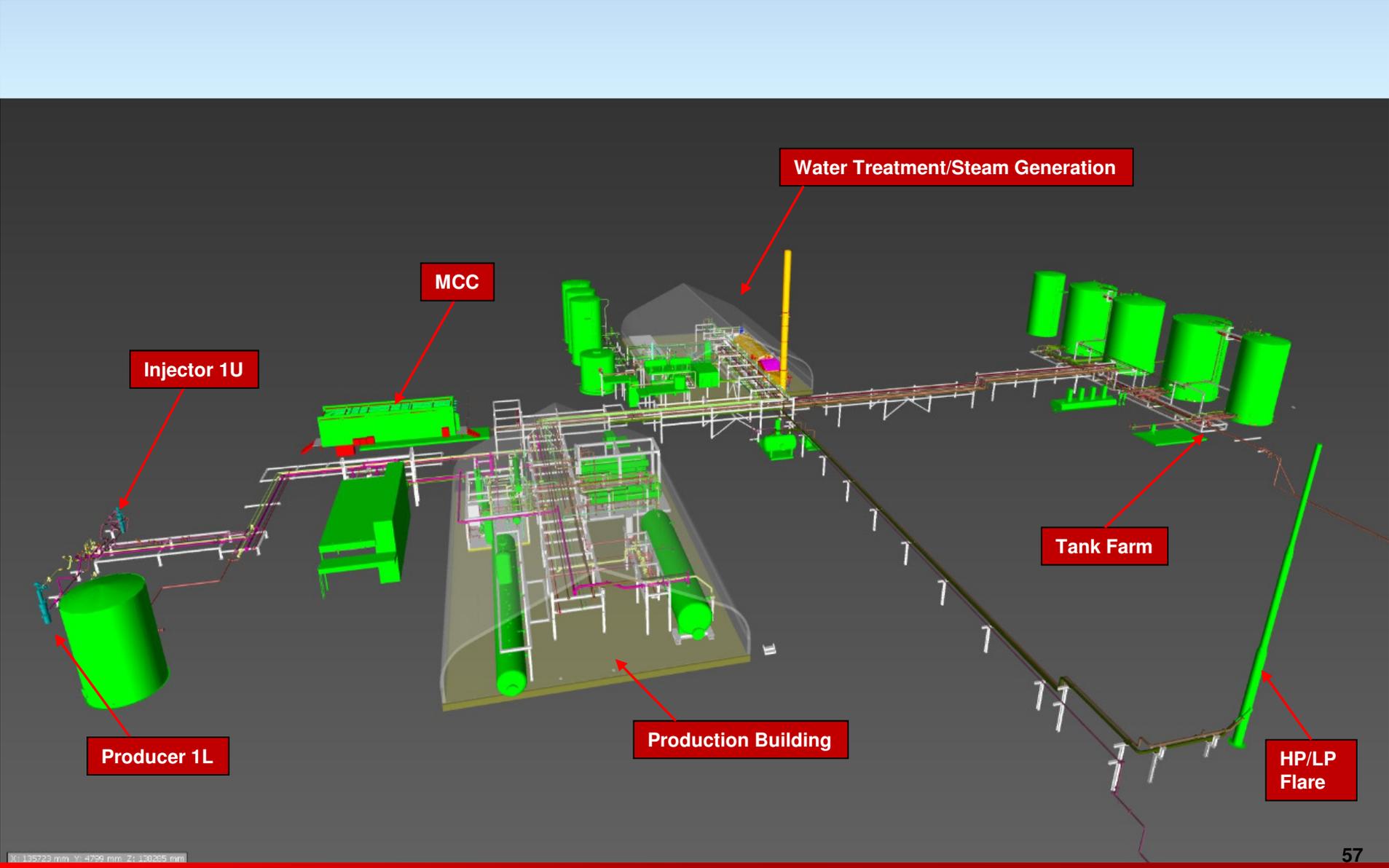
Surface and Facilities



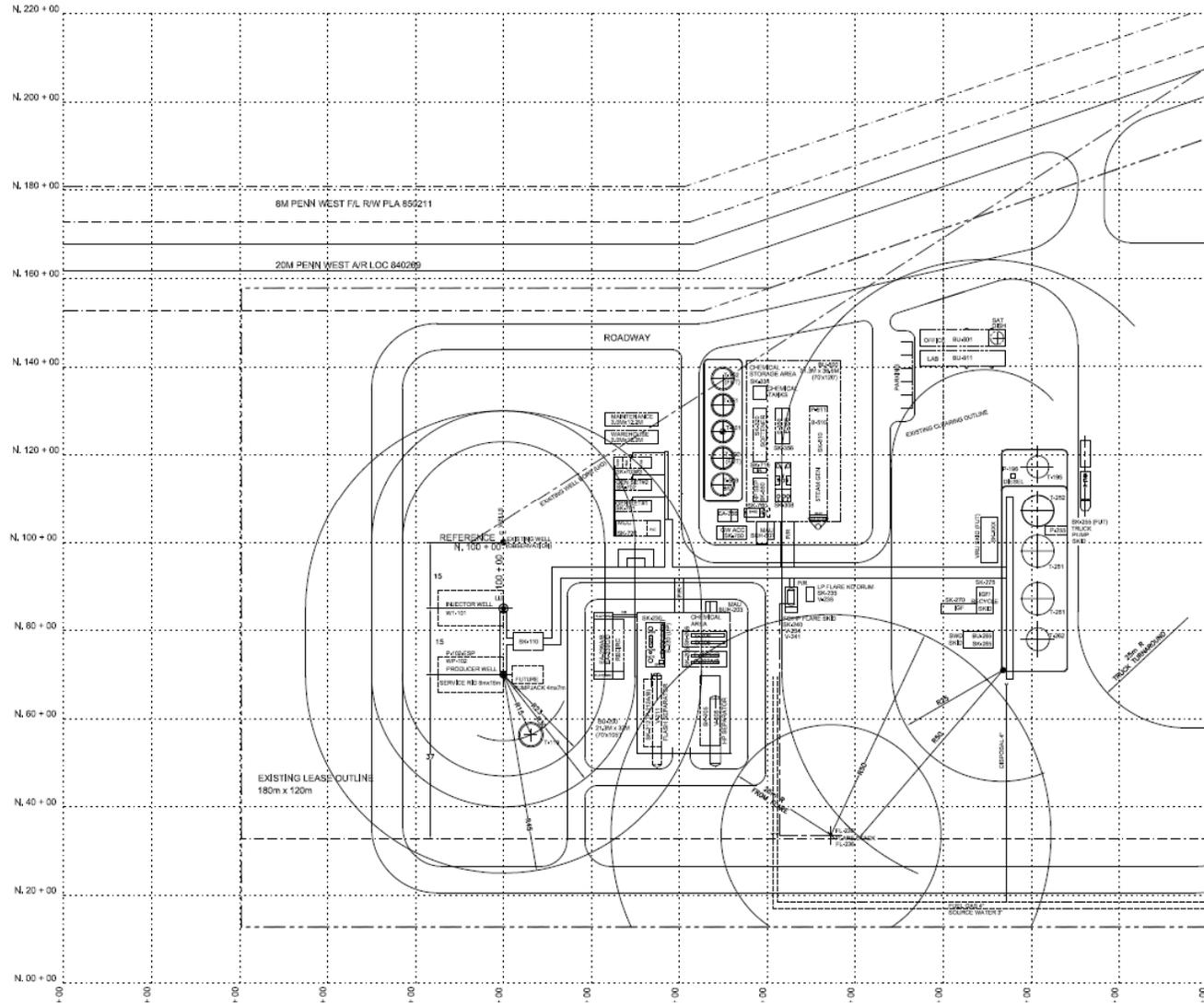
Project Overview– Facility, Wells, Pipeline



Sawn Lake SAGD Facility

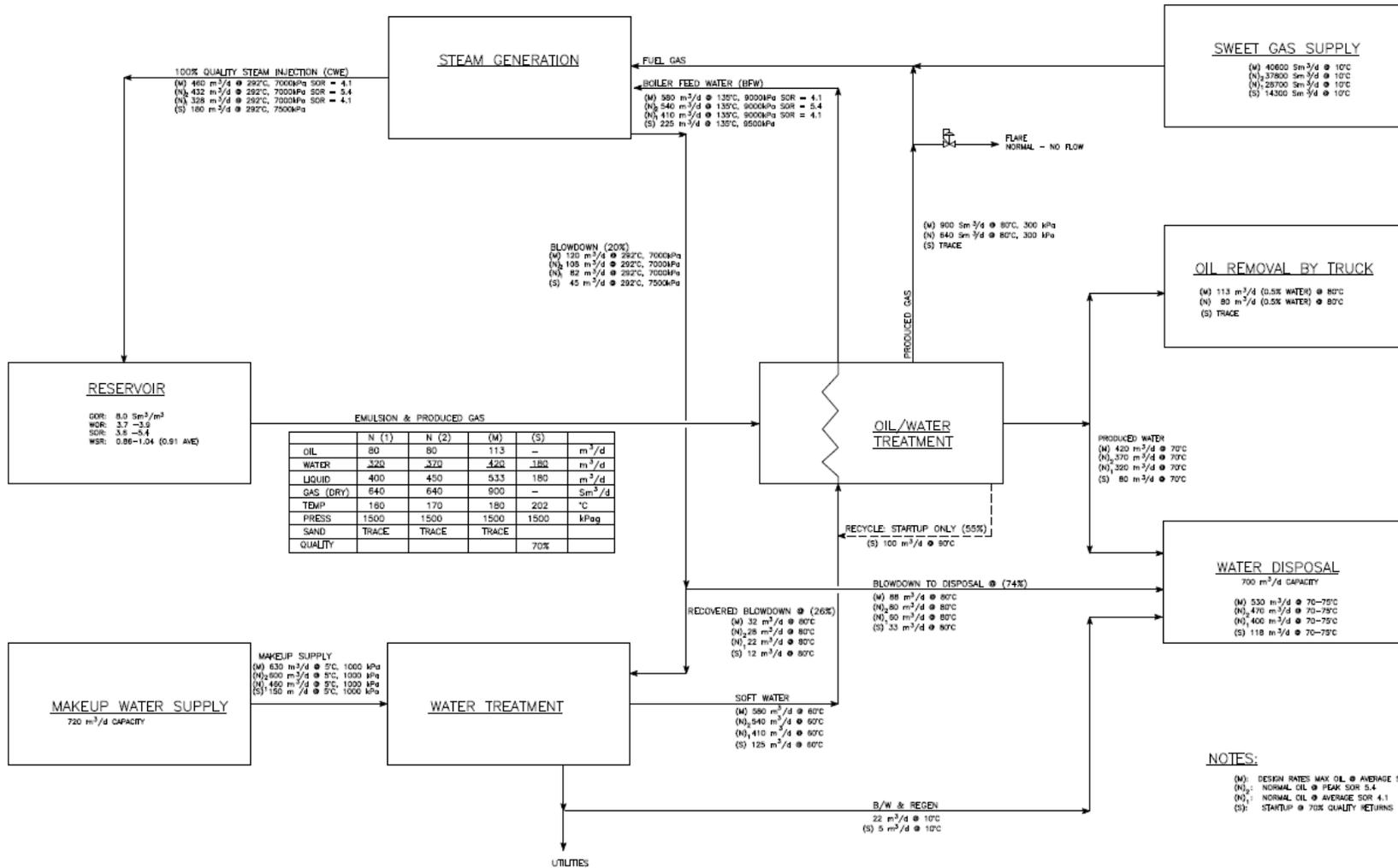


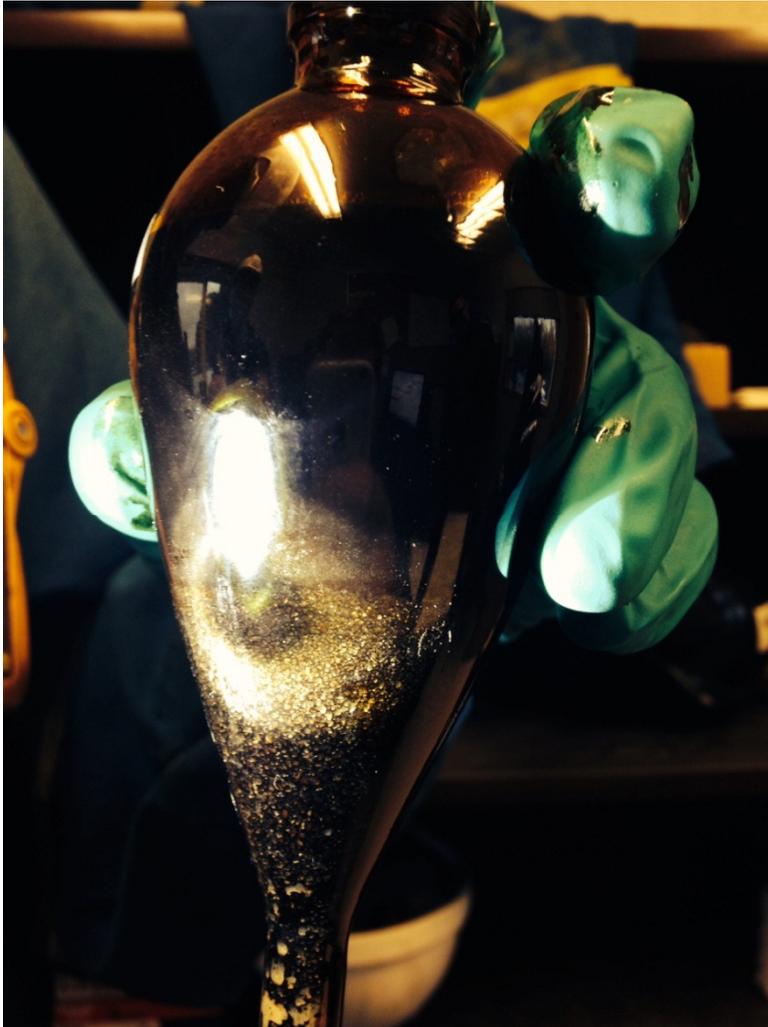
Project Overview— Facility Plot Plan



EQUIPMENT LIST	
BU200	PRODUCTION BLDG (AREA 200)
SK420	INLET SHD (UPPER & LOWER)
V002	CG SEPARATOR
E-004	EMULSION HEATER
SP214	STEAM TRAP E-004
E-231	PRODUCED VAPOR COOLER
V231	PRODUCED GAS SEPARATOR
V232	PRODUCED GAS SEPARATOR (PUT)
E-233	FG LIQUIDS PUMP
W179	INSTRUMENT AIR RECEIVER
BUH303	PRODUCT EN BLDG MAU
V303	HT SEPARATOR
SK-205	PIPING SHD
SK-206	E-206/208 EXCHANGER SHD
E-209	BTUMEN COOLER
E-208	PW TRIM COOLER
SK427	PW/BPW SHD
E-207A/B	PW/BPW EXCHANGERS
E-207C/D	PW/BPW EXCHANGERS (PUT)
V211	FLASH SEPARATOR
SK412	FLASH SHD (PUT)
N210A/B	BTUMEN TRANSFER PUMPS (PUT)
EA-230A/B	O/S PROD BLDG (AREA 200)
EA-230C/D	PV CONDENSER AERIAL COOLER
EA-230D	PV CONDENSER HEATING COILS
SK425	FLARE (AREA 240)
V-026	LP FLARE KD DRUM
SK-240	FG/HP FLARE SHD
V-024	HP FLARE KD DRUM
V-021	HP FG SEPARATOR
N-02	VARSOULMETHANOL PUMP
T-243	VARSOULMETHANOL PUMP
V-027	FLARE LIQUIDS PUMP
FV-026	HP FLARE
FV-028	LP FLARE
FV-029	LP FLARE
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FV-426	LP FLARE
FV-427	LP FLARE

Block Flow Diagram





Equipment

- Oil/Water Separation facility built upon AOSTRA/Devon/Suncor Dover project equipment; equipment refurbishment went well. Vessels have passed inspections. Some issues with gasket leaks, have been eliminated through use of modern gaskets.
- New OTSG has passed 1 year run time inspection; no issues.

Emulsion Treating

- Facility on circulation/SAGD start up was unable to meet water content requirement. Following ramp up good success with chemical treatment and high temperature separator. Meeting Tervita/Pembina sales spec 0.5%BS&W and Shell Peace River complex sales spec of 0.35% BS&W. Also exporting to Murphy 1-26. Early start up issues with HTS resulted in excess produced water trucking especially on start up steam circulation required trucking to Custom Treating stations (Gibsons Valleyview, NewAlta Peace River, Secure Judy Creek).
- Plains Midstream Nipisi terminal has been unable to blend (too heavy at 7-8API). Currently exporting to Shell Peace River Complex, Murphy 1-26, Tervita High Prairie.
- Able to meet spec with single High Temperature Separator (HTS) train. Flash Treater in building, not yet hooked up.
- Decision made to proceed with Recycle pumps; should allow for off-spec bitumen from off-spec tank to be recycled through the high temp separator to be brought on-spec.

Facility Performance



Steam Requirements / Plant Pressure Rating

- If 400tpd steam per well is productive than OTSG undersized for x 2 wellpairs; need additional 30-50MMBTU/hr steam generator for 1U/1L. 2U/2L will need to be revisited for additional steam requirements following start up steam circulation if steam injection is shown to be productive. Less than 3000kPag bottom hole pressures, plant could be designed for #600ANSI

Road / Geomembrane Trial

- Issues with truck turn around required improvement project with geomembrane/gravel appears to be a success; trouble free since road improvement project.

ESP Sizing/Scaling

- No sand generation; liner slot size strategy seems to have been successful
- During ESP replacement silica scaling on the production tubing at liquid/steam interface.
- New wells should have a start up ESP as opposed to full-rate ESP to avoid up-thrust damage or use 6 month run-time for first ESP.

Power Generators

- Gensets (x 3 270kW gensets) have issues with respect to switchgear / load shedding causing plant trips. Continuing to work on issues.

Natural Gas

Hydrate issues at nat gas let down; methanol injection commenced.

Facility Performance - Gas



Gas Volumes E3m3

- Note – Most Produced Gas is recovered and consumed in the OTSG
- Tank vapors to LP Flare

	Purchased Gas	Produced Gas	Flared Gas
May-14	364.9	0.0	0
Jun-14	688.1	0.0	0
Jul-14	636.3	0.0	5.0
Aug-14	620.6	0.0	3.1
Sep-14	453.2	5.4	1.2
Oct-14	678.0	0.9	0.2
Nov-14	746.4	0.4	0.2
Dec-14	809.8	3.6	2.5
Jan-15	891.5	6.5	6.4
Feb-15	836.0	7.0	7.0
Mar-15	943.7	10.3	10.3
Apr-15	418.6	3.0	2.9
May-15	916.6	5.8	3.9
Jun-15	856.3	4.8	3.9
Jul-15	880.0	11.3	4.0
Aug-15	768.4	8.3	3.3
Sep-15	878.6	12.1	4.0



Facility Performance – Greenhouse Gas Emissions

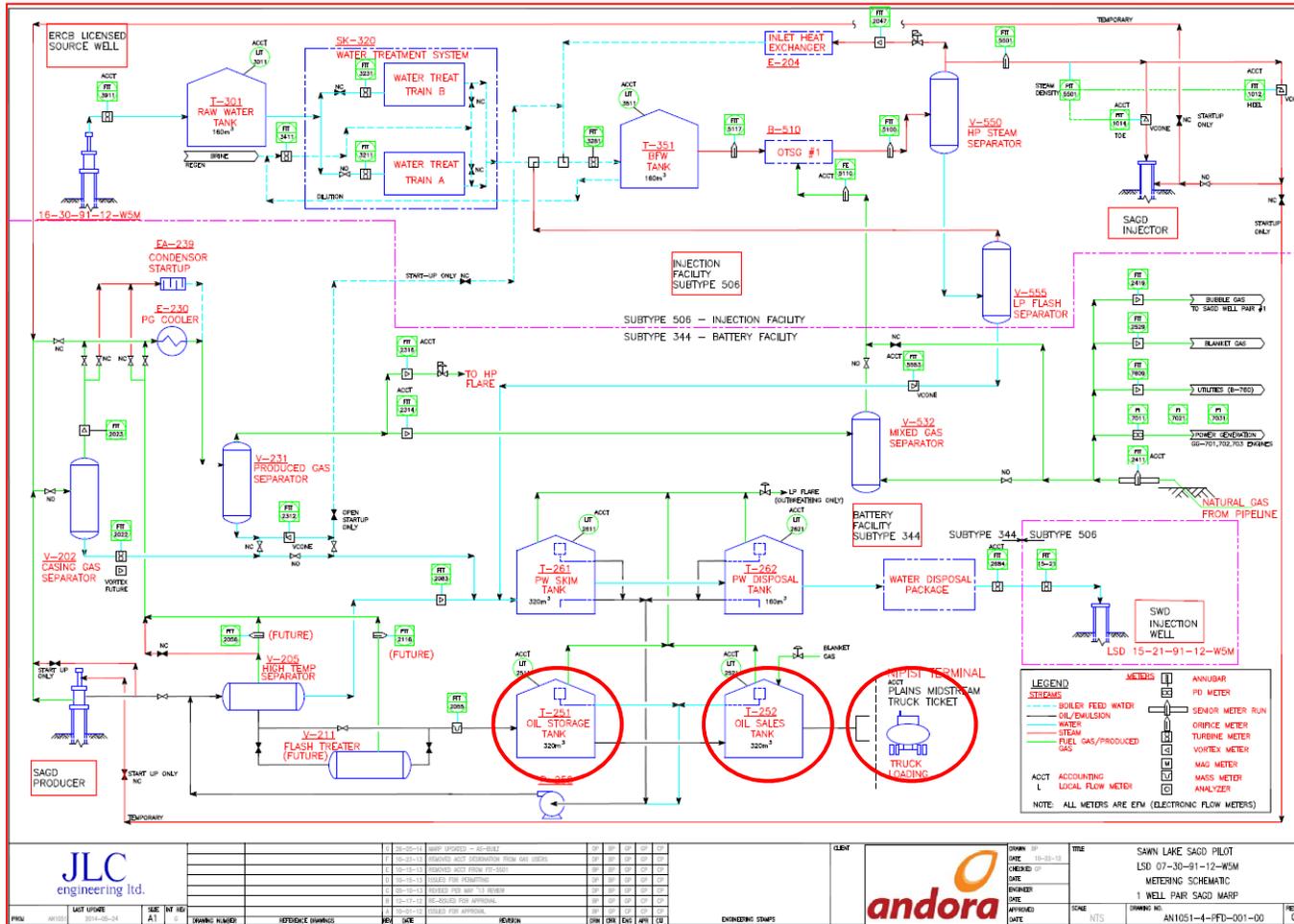


GREENHOUSE GAS EMISSIONS - SAWN LAKE (May 2014 to Sept 2015)			
	CO2 (tonnes)	N2O (tonnes)	CO2e (tonnes)
May-14	868.5	0.012	872.05
Jun-14	1637.7	0.023	1644.44
Jul-14	1514.4	0.021	1520.65
Aug-14	1477.0	0.020	1483.13
Sep-14	1088.0	0.015	1092.48
Oct-14	1615.3	0.022	1621.93
Nov-14	1777.1	0.025	1784.40
Dec-14	1933.6	0.027	1941.61
Jan-15	2133.1	0.030	2141.92
Feb-15	2002.0	0.028	2010.24
Mar-15	2264.0	0.031	2273.34
Apr-15	1001.4	0.014	1005.58
May-15	2191.6	0.030	2200.60
Jun-15	2046.3	0.028	2054.78
Jul-15	2114.1	0.029	2122.78
Aug-15	1843.2	0.026	1850.85
Sep-15	2112.3	0.029	2120.97

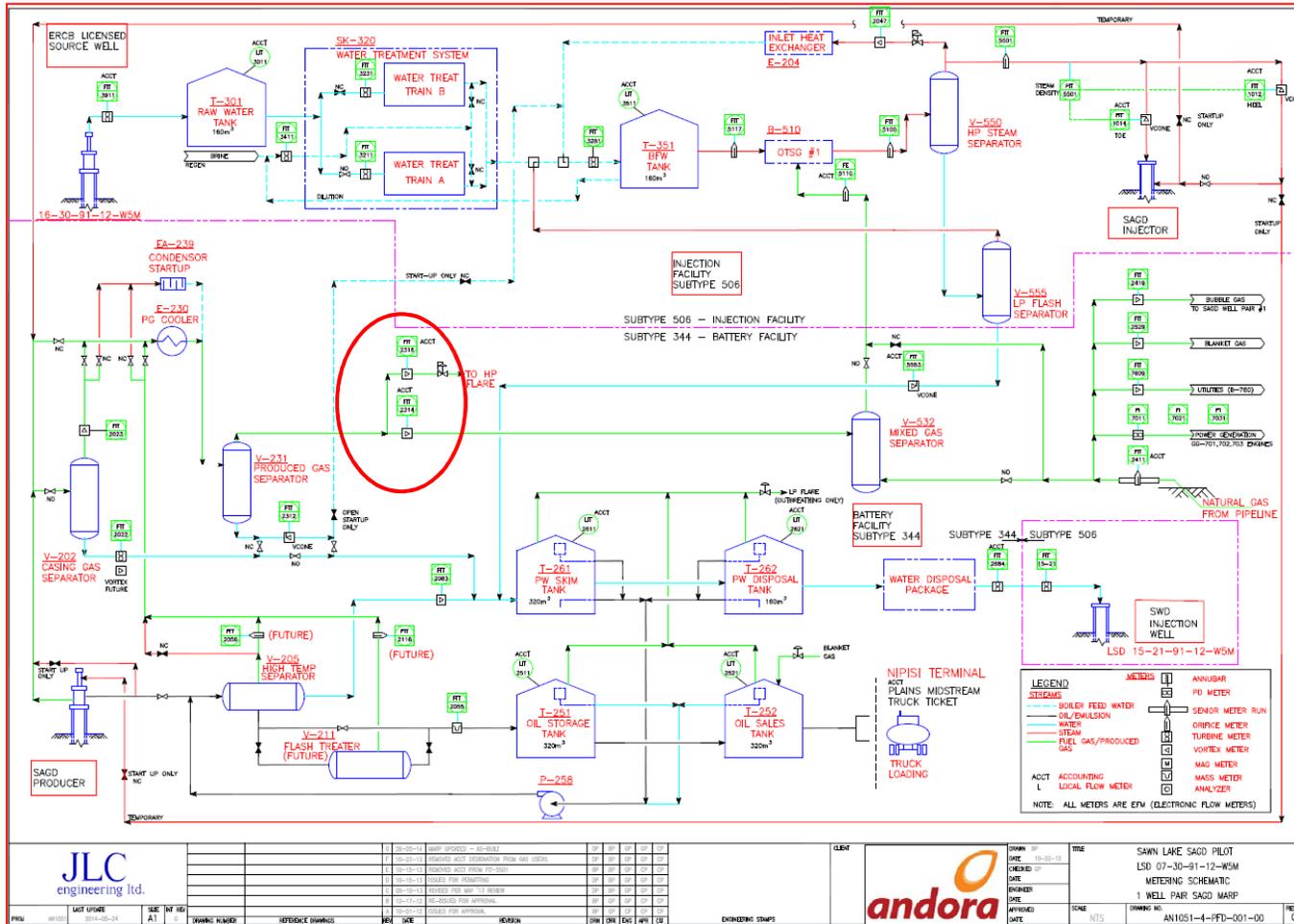


Measurement and Reporting

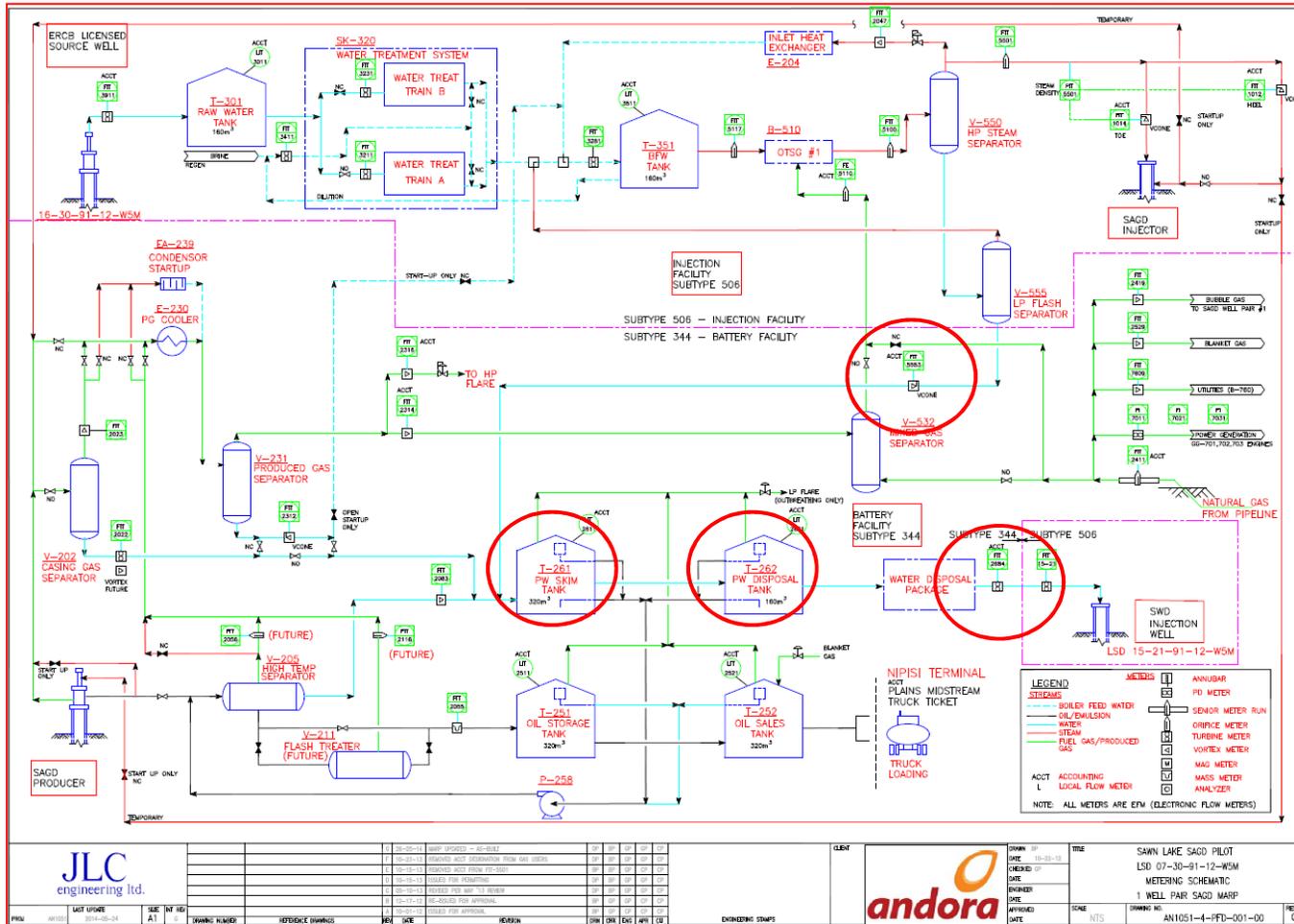




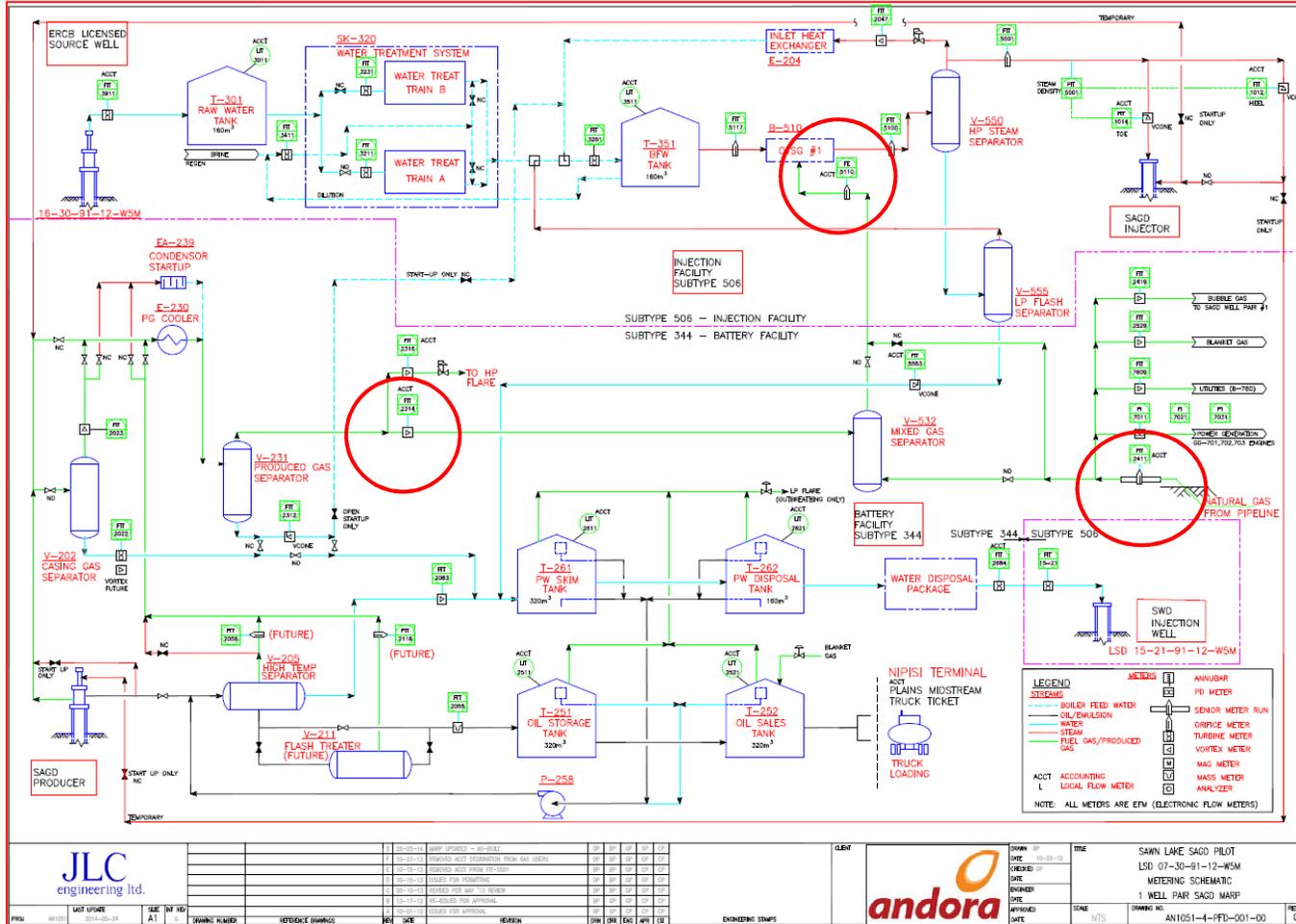
Bitumen Production = Truck receipts (Std Conditions)+ Daily delta LT-2511 (T-251) + Daily delta LT-2521 (T-252)
 Required adjustment on water cut on start up until chemical program produced on-spec bitumen.



Gas Production (Battery Facility) = FIT-2314+ FIT-2316 + Estimated solution gas vapors (See Section 6.4).
 Use of Hysys is permitted in CAPP guide “Estimation of Venting Volumes from Upstream Oil and Gas Facilities”. For initial operation of the plant Andora will report low pressure flaring of 2 Sm3 per m3 of bitumen produced.



Water Production = FIT-2684 (Disposal Meter) + Daily Delta LT-2611 (T-261) + Daily Delta LT-2621 (T-262) – FIT-5553 (Blowdown)
Note – Due to flashing across FIT-5553 / scaling; better calc blowdown Blowdown = FIT-3911 – FIT-1014 – FIT-1012



Pipeline Gas Into Battery Facility = FIT-2411
Fuel Gas Consumed by Battery Facility = FIT-2411+ FIT-2314 - FE-5110
Fuel Gas Disposition from Battery to Injector Facility (Consumed by Injector Facility) = FE-5110

Water Production and Usage



Source Water Well



Source Water Well

- Water Act Approval Licence 00361158-00-00
- Non Saline Source Water Well at 16-30-91-12W5
TDS: 3530mg/L by evaporation
P-alkalinity 0ppm, M Alkalinity 1648mg/L, Total 1648mg/L
Total Hardness: 49mg/L Silica: 3-8mg/L
- Water from the Paddy/Cadotte

Water Recycle

- Andora pilot uses less than 500,000m³ per year of make up water and does not recycle the produced water as per allowance in Directive 081, Section 5.

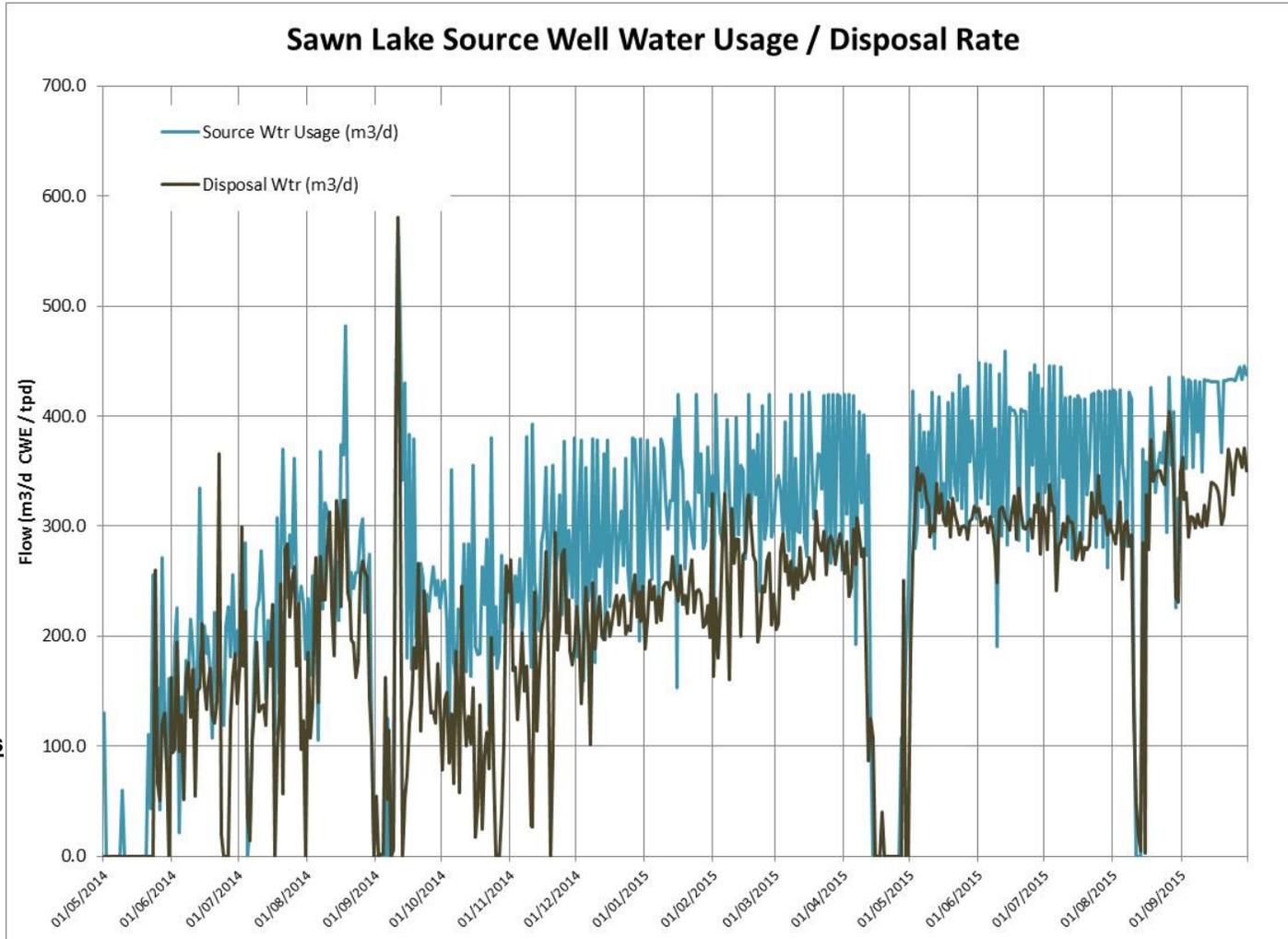
Produced Water Disposal Well

- AER Approval for Disposal Well (D51) – 1775897; well W0420620
- AER Approval for Class II Disposal Well (D65) – 12169
- Disposal into Upper Wabamum zone at 15-21-91-12W5
- Well remains near vacuum; injection pressure less than 500kPag

Other

- Tervita High Prairie – ABWP0093970
- Tervita Peace River – ABWP0090327
- Gibsons Mayerthorpe - ABWP0000556;
- NewAlta Peace River (11-07-082-W5M) – AB WP 0097804
- NewAlta Red Earth AB WP 0000663
- Secure Fox 11-36 - ABWL0730091

Sawn Lake Source / Disposal Rates



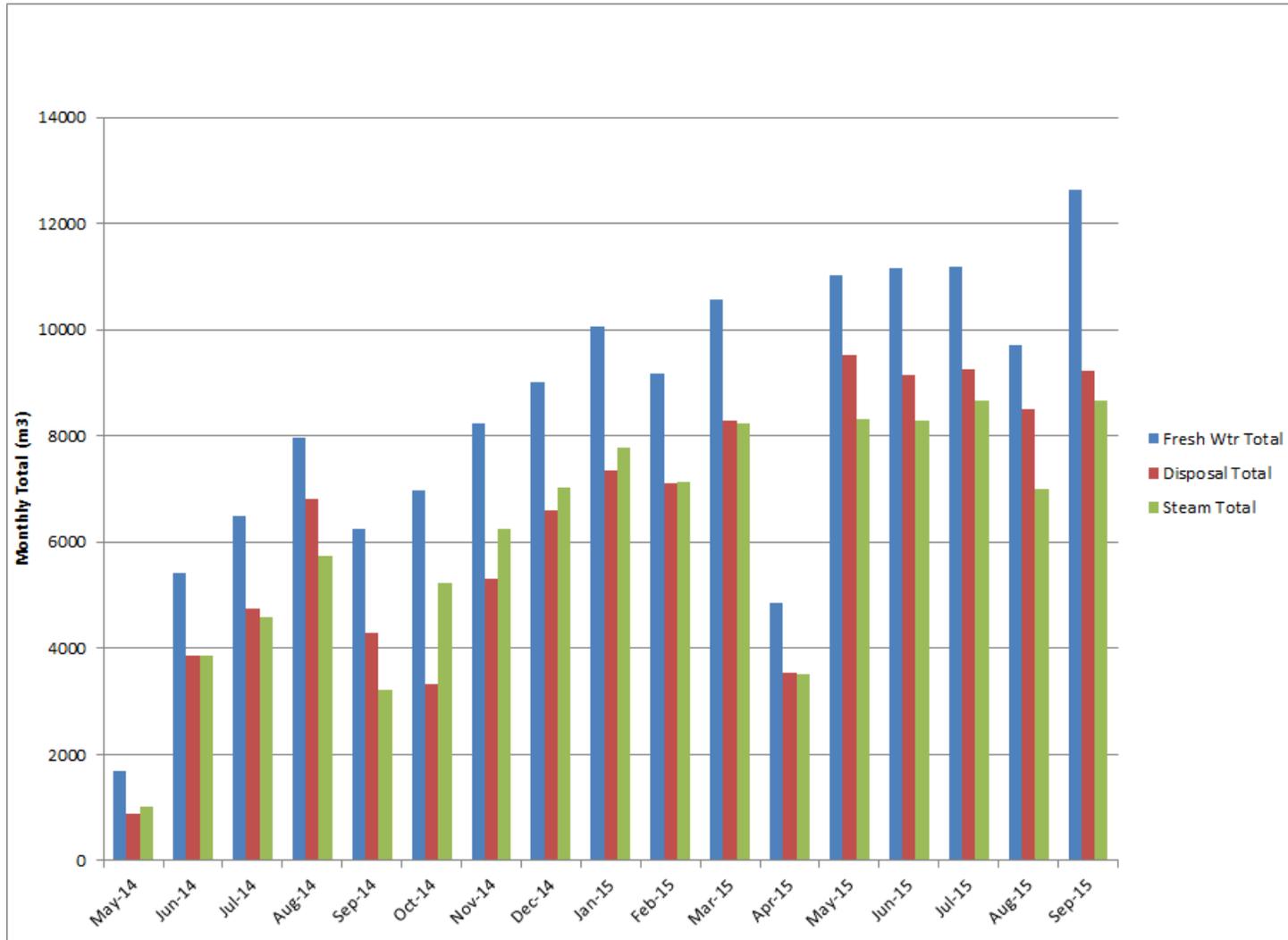
Regulatory Limits

Withdrawal
620m3

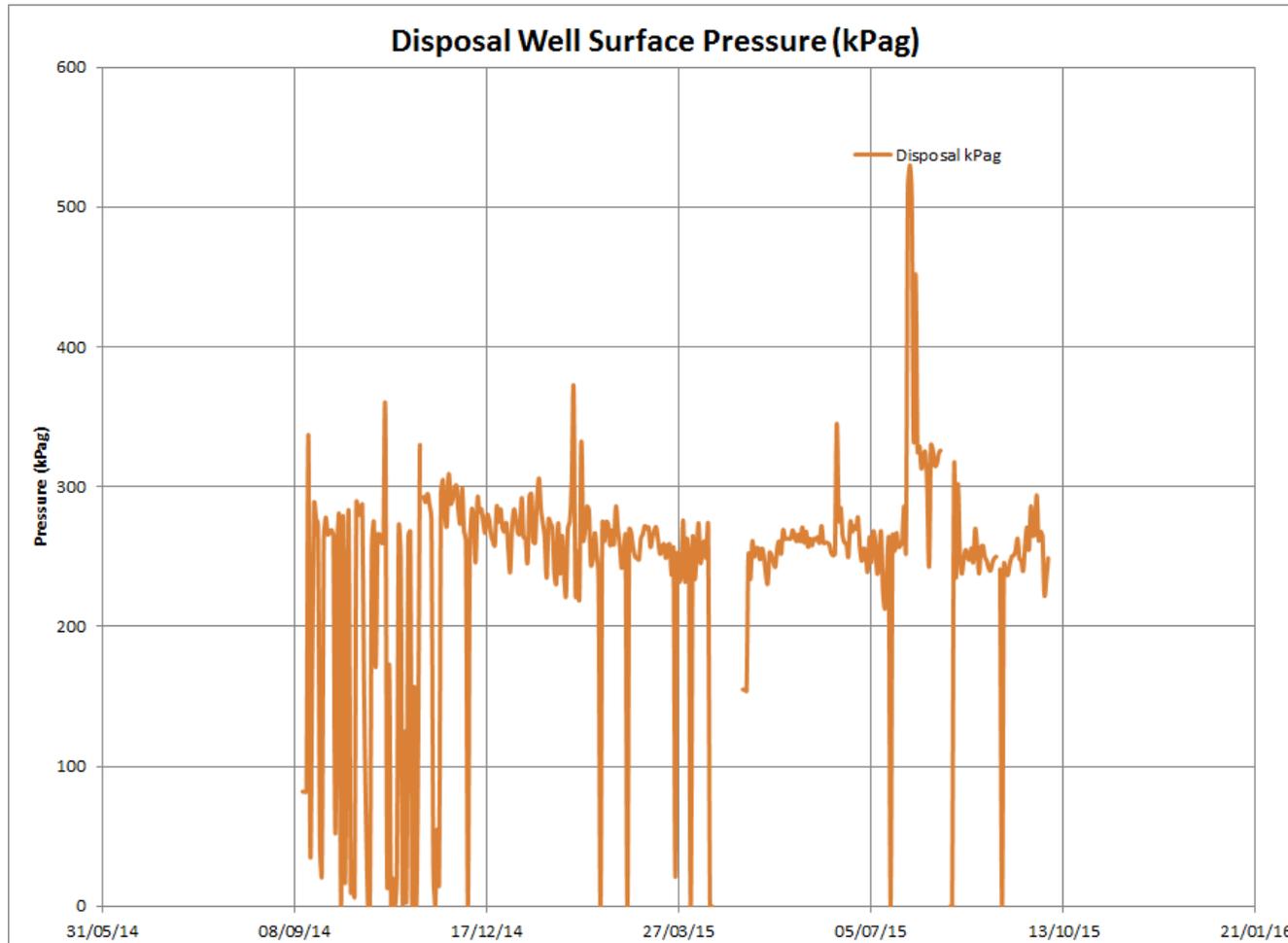
Disposal
700m3



Sawn Lake Monthly Water / Steam Totals



Disposal Well Pressure



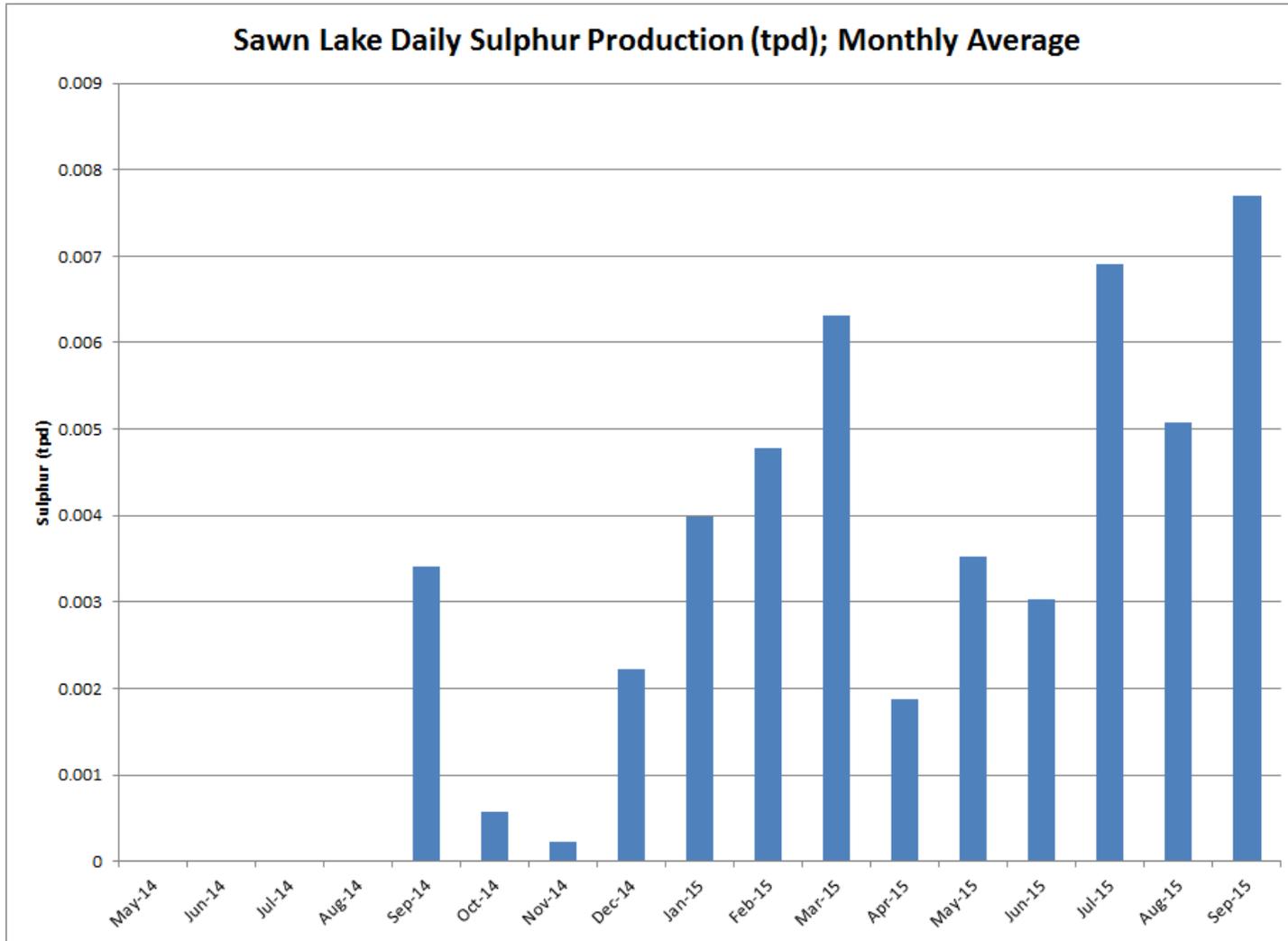
Disposal Well approved (D51) for Maximum Wellhead Injection Pressure of 7000kPag; no issues with wellhead injection pressures typically less than 500kPag.



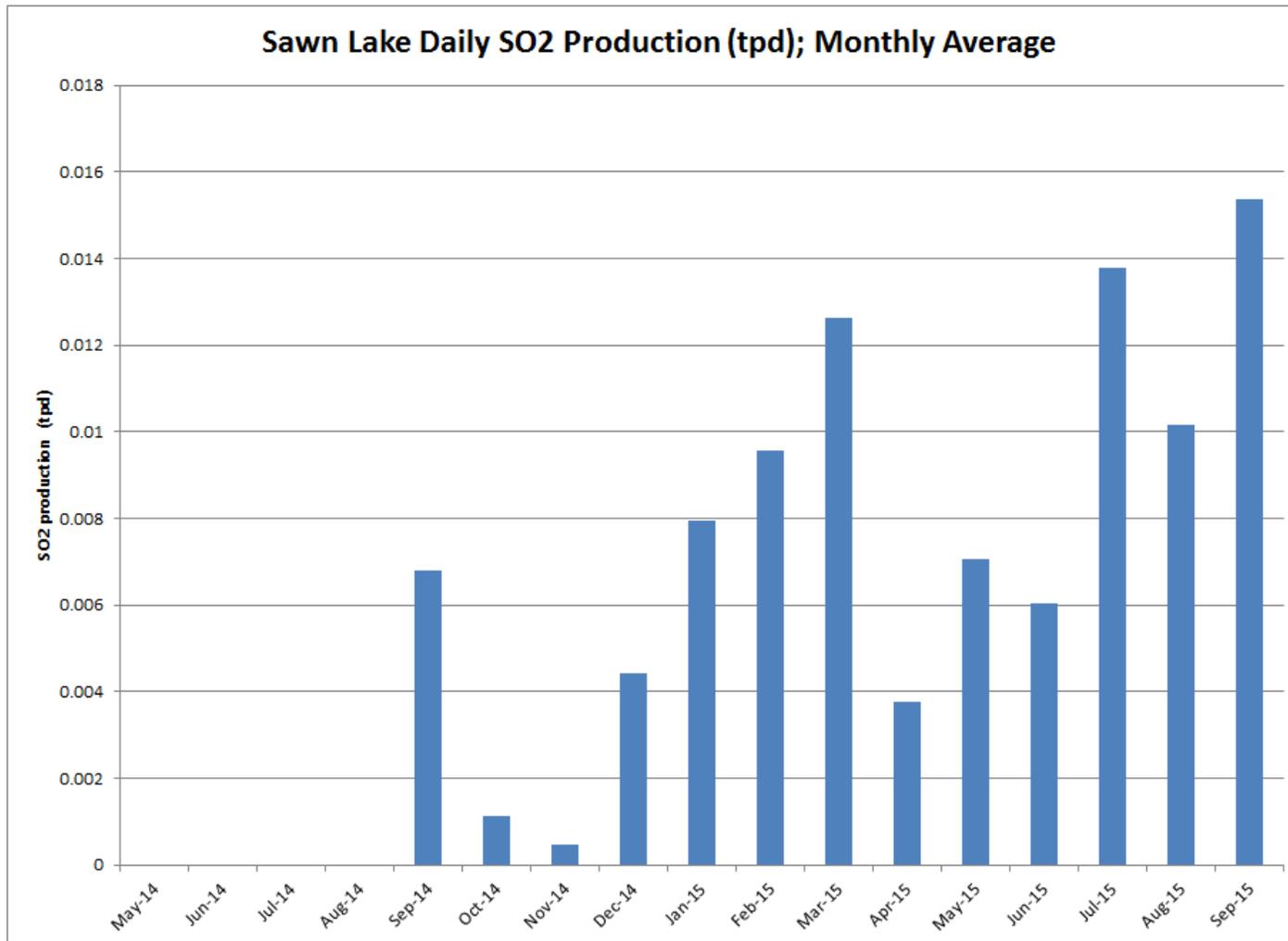
Sulphur Production and Environmental



Sulphur Production



SO2 Production



SO2
Emissions:
no
exceedances
of EPEA
Approval Limit.



Regulatory Summary



Emissions

- No exceedances on NO₂, SO₂, H₂S

Soil and Groundwater Monitoring

- Soil monitoring program on-going; samples taken 2015.

Spills and Clean Up

- October 5, 2015: Andora reported an onsite disposal (produced) water spill – 5m³. Area remediated and confirmed via third party; berm reinforced as requested.

Reclamation Programs

- No reclamation programs in 2014/2015

Ground Water Monitoring Program



- The groundwater monitoring program has been designed to monitor for potential impacts to groundwater quality due to operations at the central processing facility (CPF) and thermal-related effects to non-saline potential domestic use aquifers. The program was developed in consideration of the existing draft Alberta Environment and Sustainable Resource Development Groundwater Monitoring Directive (ESRD 2012).
- On March 9, 2015 a deficiency letter was received by Andora Energy from the AER noting that *“The thermal effects groundwater monitoring program must include groundwater monitoring wells completed within the deeper non-saline aquifers beneath the site. There are nearby water wells completed within sand and gravel aquifers at approximately 25 mbgl and 150 mbgl that must be protected. Confirm that Andora Energy will install groundwater monitoring wells within these aquifers and provide proposed locations and completion intervals on maps and cross-sections.”*
- Letter sent to AER April 2015 that nearby wellcores show no deeper intervals; May 28, 2015 AER noted that they wanted confirmation no Dunvegan or Wapiti at 7-30-91-12W5.
- September/October 2015 – Andora Drilled ground water test hole to 149.5m and drilled and completed 11 proposed shallow ground water wells at 7-30-91-12W5. Shallow Wells complete.
- Hole drilled; no apparent aquifers within the bedrock from cuttings return and drilling response; confirmed by geophysical logging; there are no apparent deep aquifers, just the shallow sand already noted above bedrock roughly around the 17-20m mark.
- Compiling and will submit information to the AER and document baseline measurements.

Compliance, Monitoring and Reclamation



Low Risk Noncompliance

- Inactive IWCP (core wells) suspended without downhole isolation per D13
- **Remedial Action:** Will bring 1 noncompliant inactive well into compliance per year; wells to be used as future in-field and/or observation wells.

Outside of the above to the best of our knowledge, the Andora Sawn Lake Single Wellpair SAGD Project is currently in compliance with all conditions of its approvals and associated regulatory requirements.

Future Plans



Regulatory



	2015				2016				2017				2018				2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
2U/2LWELLPAIR ADDITION TO EXISTING SITE [+400bopd to 800bopd]	<p>AER Approval</p>																							
PRODUCED WATER BOIL PILOT AND TRIAL	<p>AER submission</p> <p>AER approval</p>																							
ADD x2 WELLPAIR TO EXISTING SITE [+800bopd to 1600bopd]	<p>AER submission</p> <p>AER approval</p>																							
ADD x 4 WELLPAIRS AT NEW 8-30 LEASE [+1600bopd to 3200bopd]	<p>FEED</p> <p>AER submission</p> <p>Approval Period</p> <p>AER approval</p>																							



Patent

- Canadian patent issued (2015-06-16) for Produced Water Boiler (PWB) technology enabling steam generation from SAGD produced water meeting regulatory water recycle requirements on a per well pair scale enabling lower capital SAGD project expansions with mitigated capital requirements and risk.

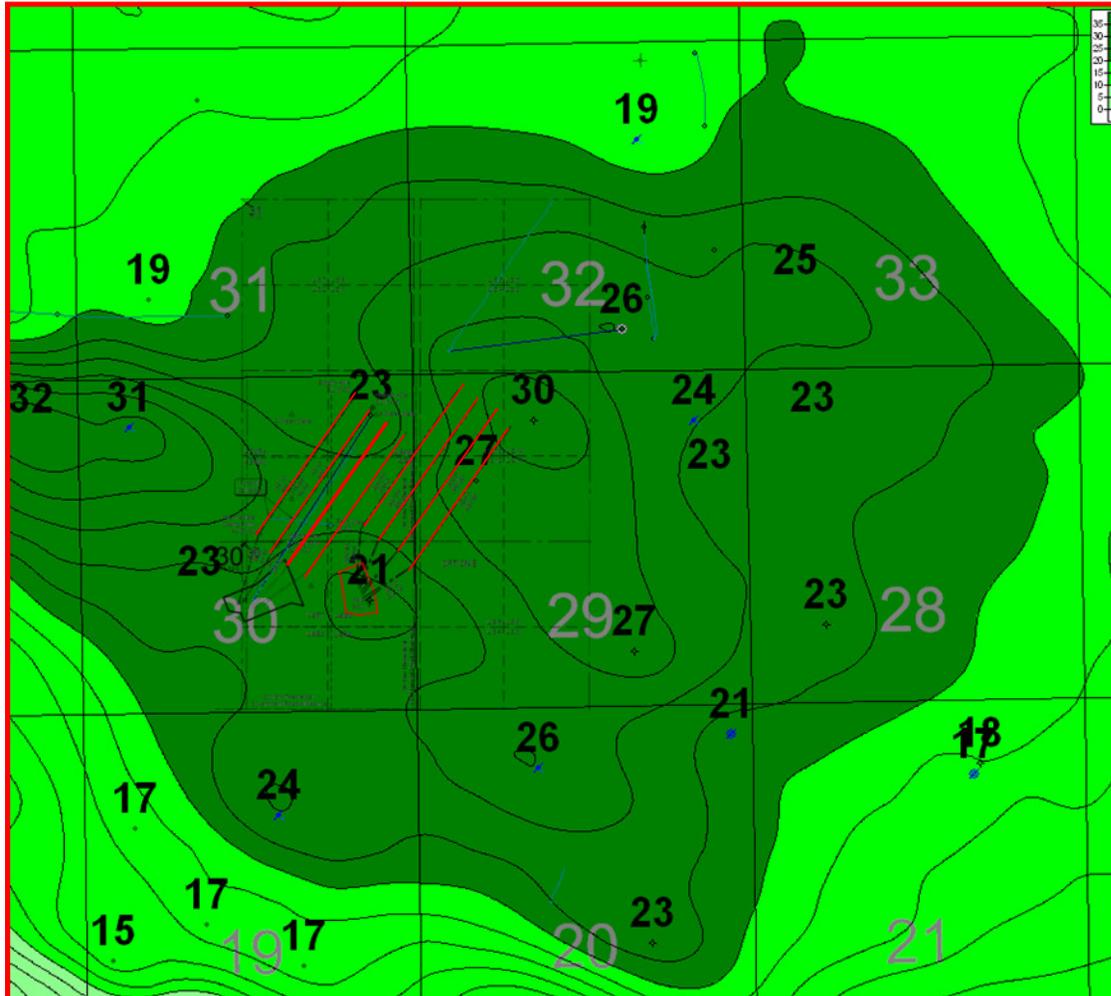
Background

- Economics of scale surrounding traditional SAGD water recycle technologies have generally required large capital investments to achieve adequate capital intensities. These large scale projects are inflexible once initiated and are susceptible to severe cost overruns

Application

- Produced Water Boiler (PWB) technology allows for low capital intensities at a smaller scale (1000bopd+, \$70MM+) Well pair scaled expansions allow for conversion of pilot facilities to commercial pods that meet regulatory requirements, enable modularization of facilities to reduce costs and optimise well pair placement
- Under development project agreement Andora could test Andora technology at Sawn Lake Demonstration Project
- Elimination of steam/emulsion transmission lines, heat efficiencies when coupled with High Temperature Separation, mitigation of OTSG tube rupture risks result in increased environmental and energy performance on a smaller footprint.

Conceptual Regulatory Application

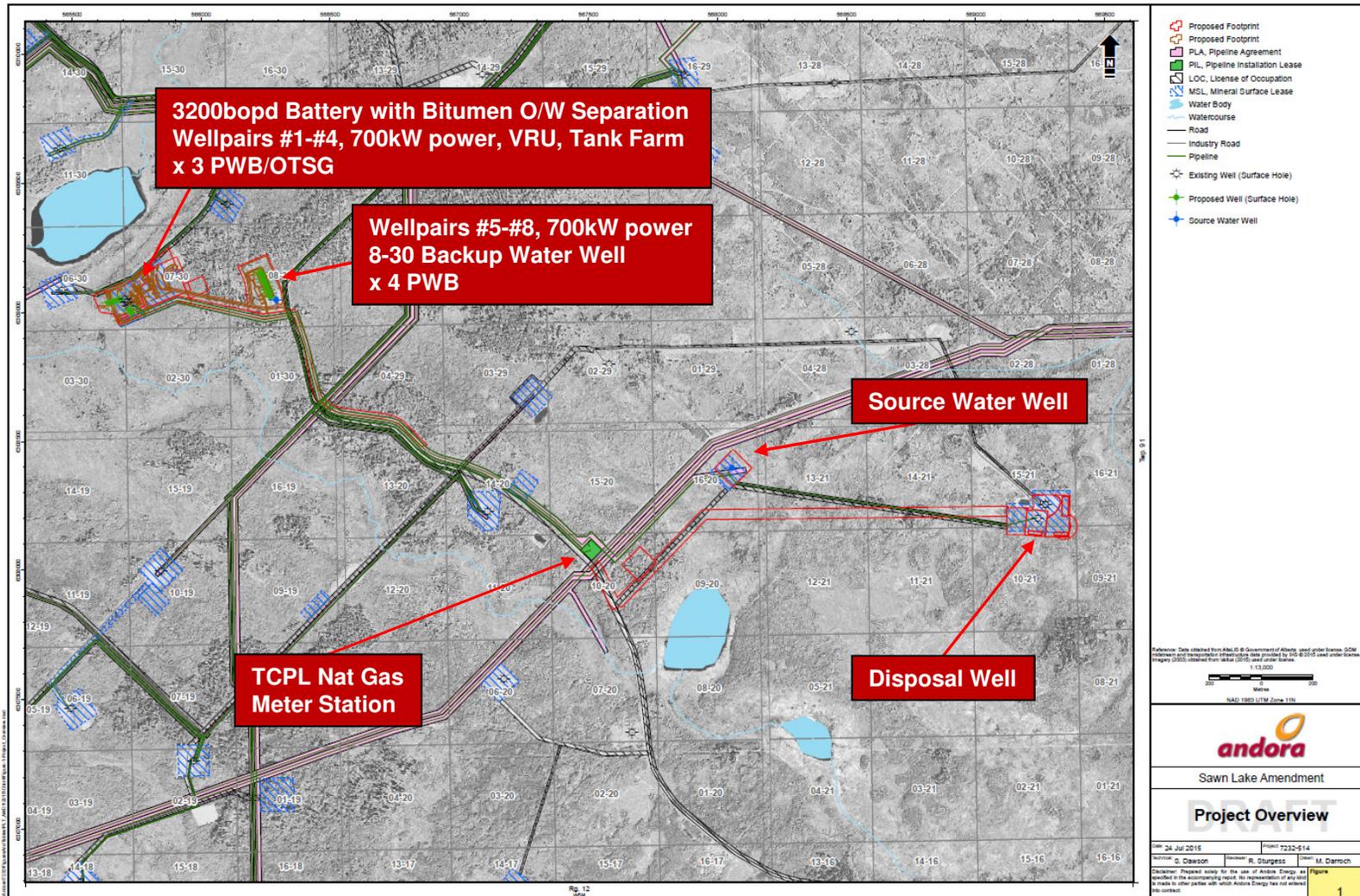


Application Includes:

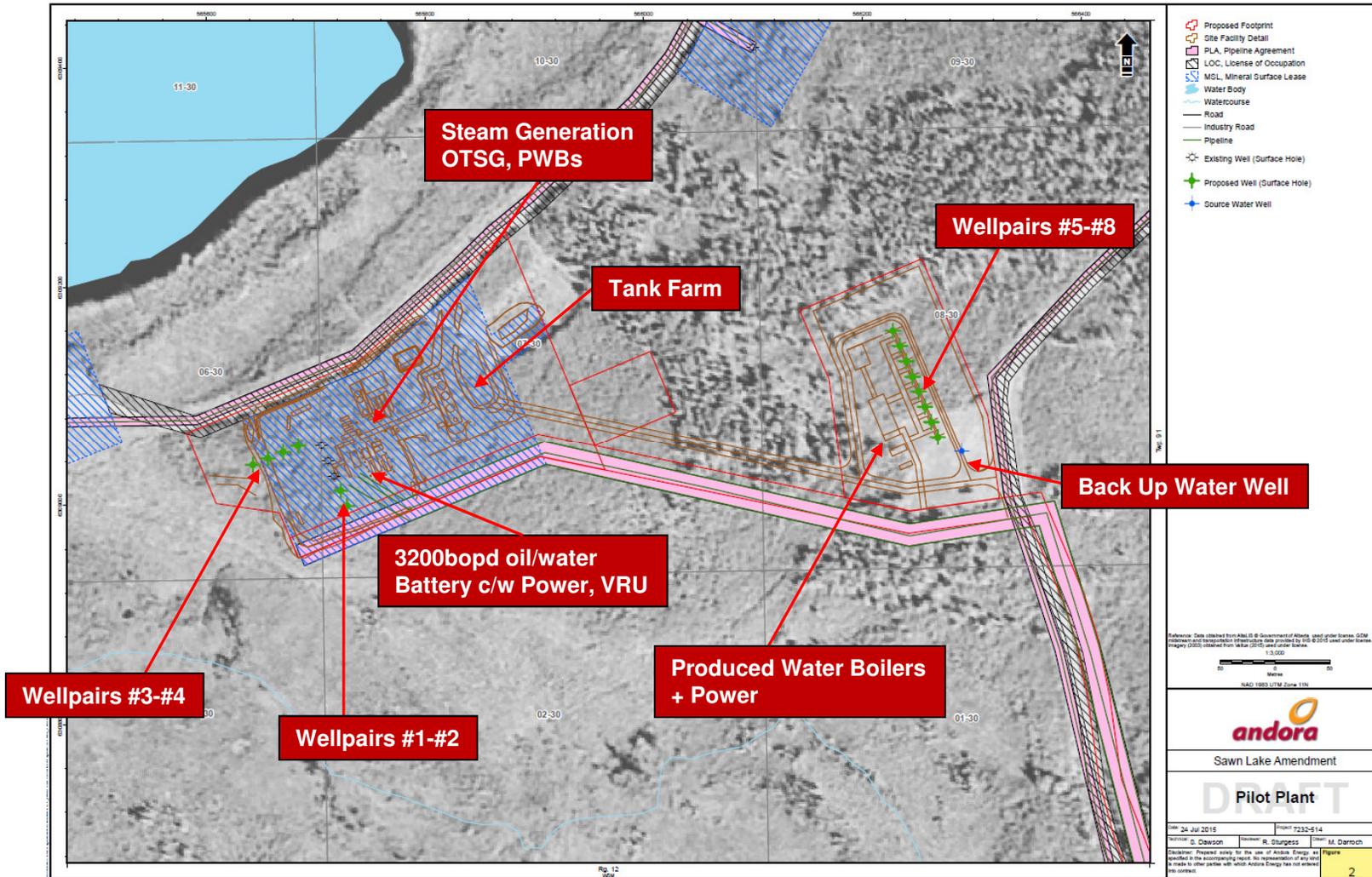
- Use of existing oil/water production facility (3200bopd), natural gas line, disposal well and in field well.
- Six (6) additional wellpairs for a total of eight (8) SAGD wellpairs
- Six (6) Produced Water Boilers (PWB), Vapor-Recovery-Unit (VRU)
- Additional back up source water well at 8-30-91-12W5.



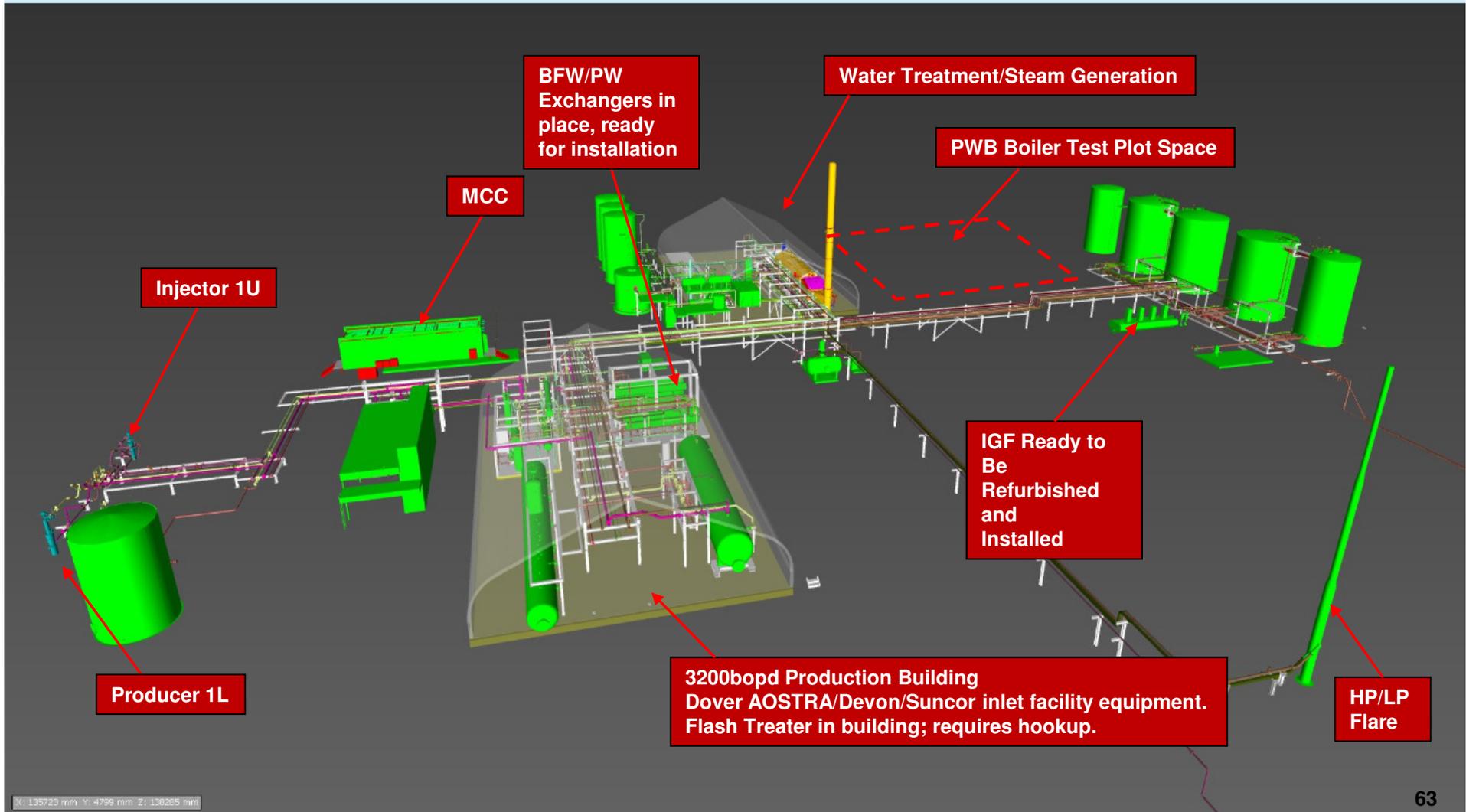
Conceptual Project Overview



Conceptual Battery Expansion



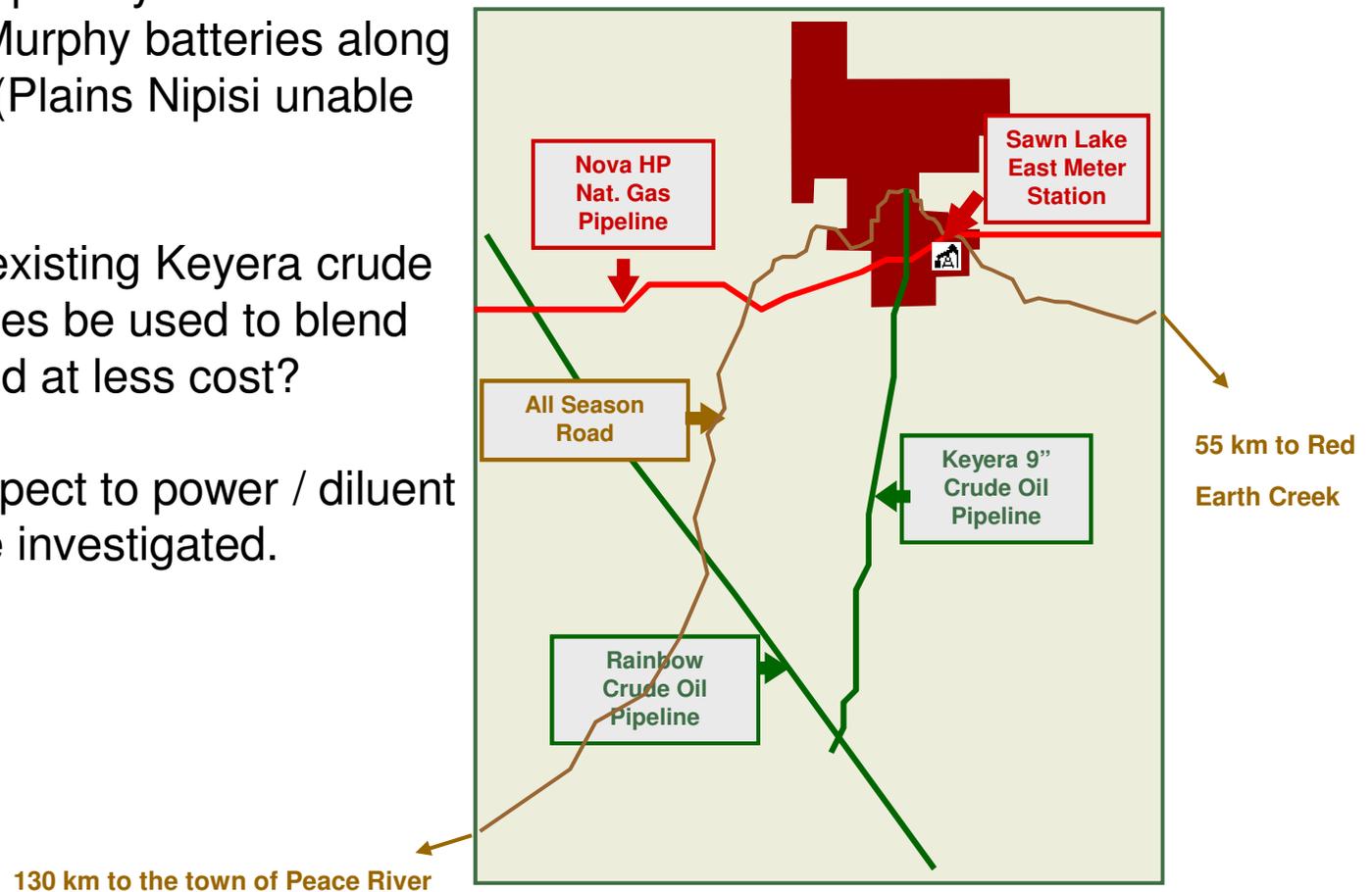
Pre-invested Emulsion Treating Equipment



Blending / Marketing



- Current plans to export by truck to Shell Peace River and Murphy batteries along Rainbow Pipeline (Plains Nipisi unable to blend)
- At 3200bopd can existing Keyera crude / Penn West facilities be used to blend closer to facility and at less cost?
- Synergies with respect to power / diluent / fuel gas still to be investigated.



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