ATHABASCA OIL CORPORATION

PROJECT UPDATE FOR AER

December 2015

ATHABASCA
OIL CORPORATION

HANGINGSTONE PROJECT
INTRODUCTION

- PROJECT DESCRIPTION AND STATUS
- SUBSURFACE
- FACILITIES
- COMPLIANCE
- FUTURE PLANS

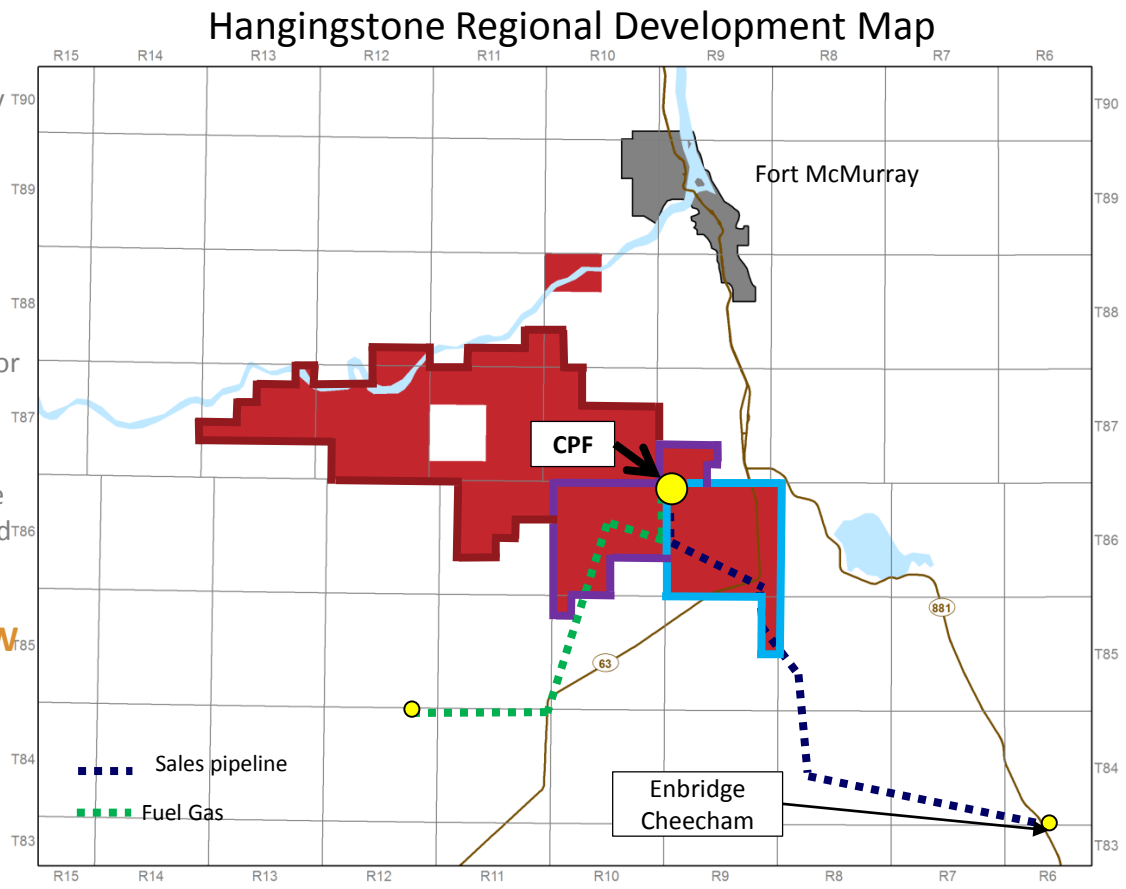
HANGINGSTONE PROJECT
AQUISITION AND DELINEATION HISTORY

AOC HANGINGSTONE

- Lands outlined ( ) acquired and delineated between July 2006 and February 2010
- Lands outlined ( ) acquired in October 2010 and delineated by March 2011 as Hangingstone Project 1 application submitted March 2011
- Initial development area selected for its proximity to infrastructure and to act as a central development node for the overall Hangingstone asset.
- Lands outlined ( ) acquired in October 2011 and delineated over the following two winters formulating the initial development for Hangingstone Expansion submitted in March 2013

ASSET STATISTIC AND DEVELOPMENT OVERVIEW

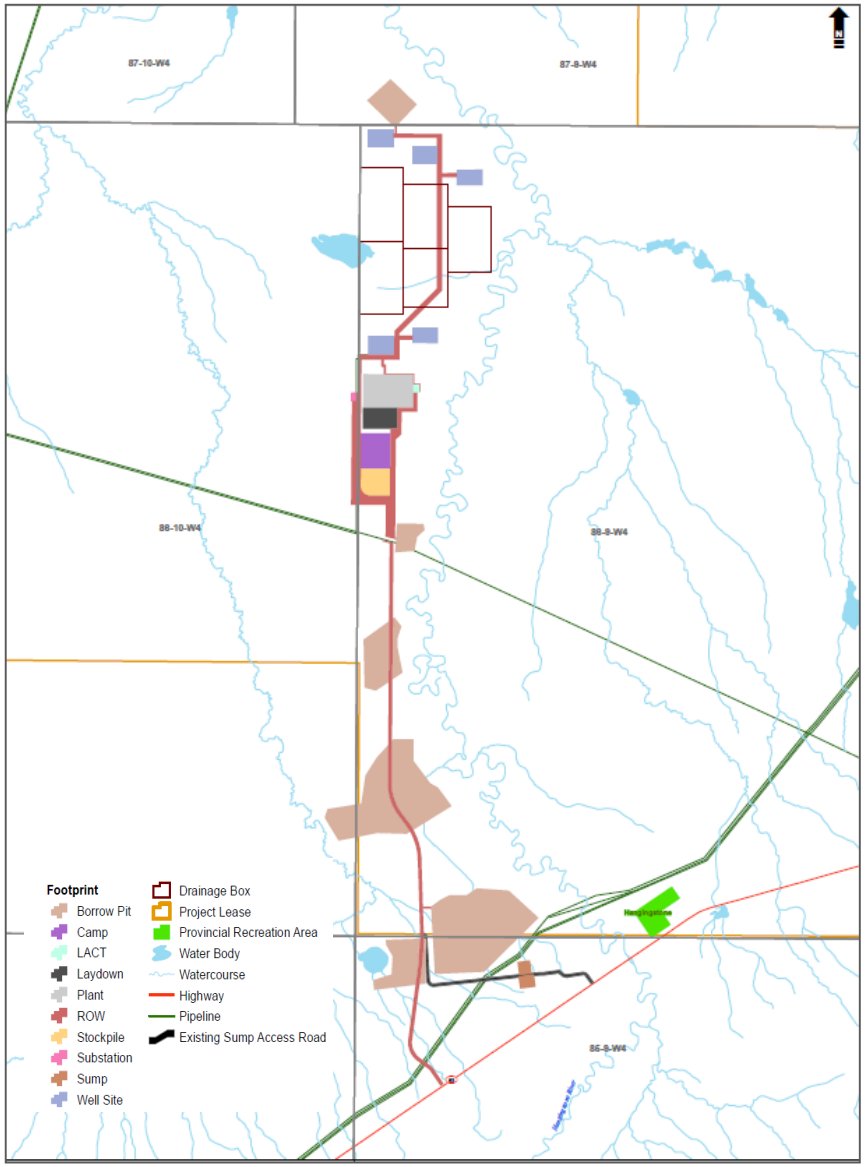
- 35.8 MMm^3 (225.6 MMbbl) 2P reserves; 124.2 MMm^3 (781.6 MMbbl) best estimate (2C) contingent resource
- Asset planned to be developed in multiple phases:



- Project 1 – 1,908 m^3/d (12,000 bbl/d) (March 2015 first steam)
- Project 2A – 1,272 m^3/d (8,000 bbl/d) (current EIA application)
- Phase 2B – 5,087 m^3/d (32,000 bbl/d) (current EIA application)
- Project 3 – 4,770 m^3/d (30,000 bbl/d) (current EIA application)

Oil sands reserves and resources as at 31 December 2014 per DeGolyer and MacNaughton

HANGINGSTONE PROJECT
DESCRIPTION



Project Details

- Located 20 km south of Fort McMurray, AB
- 5 production pads
- 25 horizontal well pairs (5 wellpairs per pad)
- CPF and associated facilities
- Offsite services and utilities

INFRASTRUCTURE

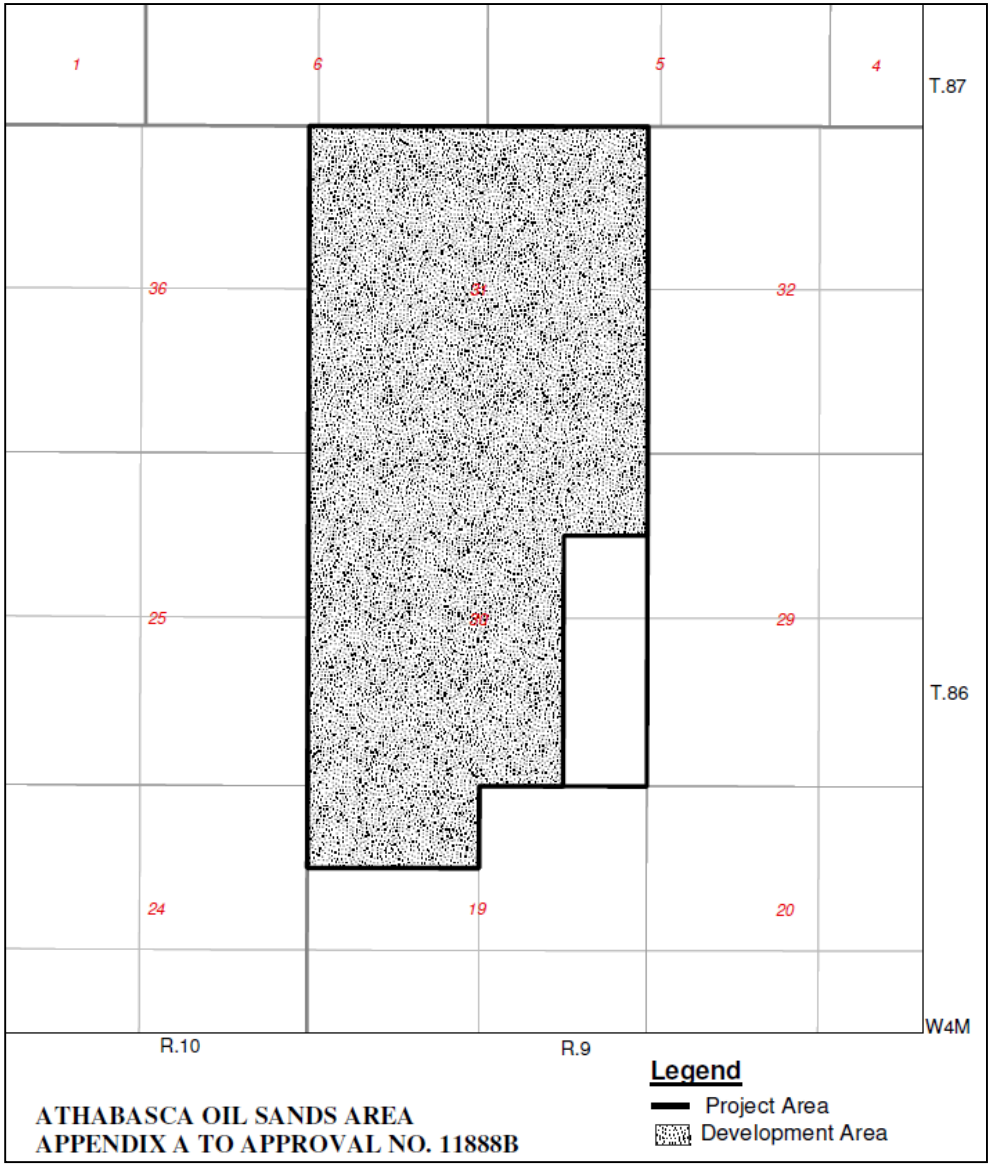
- Fuel gas from TCPL
- Dilbit export to Enbridge Cheecham Terminal
- Diluent from IPL

HANGINGSTONE PROJECT
STATUS

HS1 Project

- Construction completed Q4, 2014
- Commissioning completed Q1, 2015
- First steam (downhole) achieved March 23rd, 2015
- First oil produced July, 2015
- Selected to start 21 well pairs out of the 25 wells pairs to support production
- First SAGD conversion July 15th, 2015 (AD02)
- As of October 31st, 2015 there were 15 well pairs in SAGD mode, 6 in circulation and 4 well pairs were standing

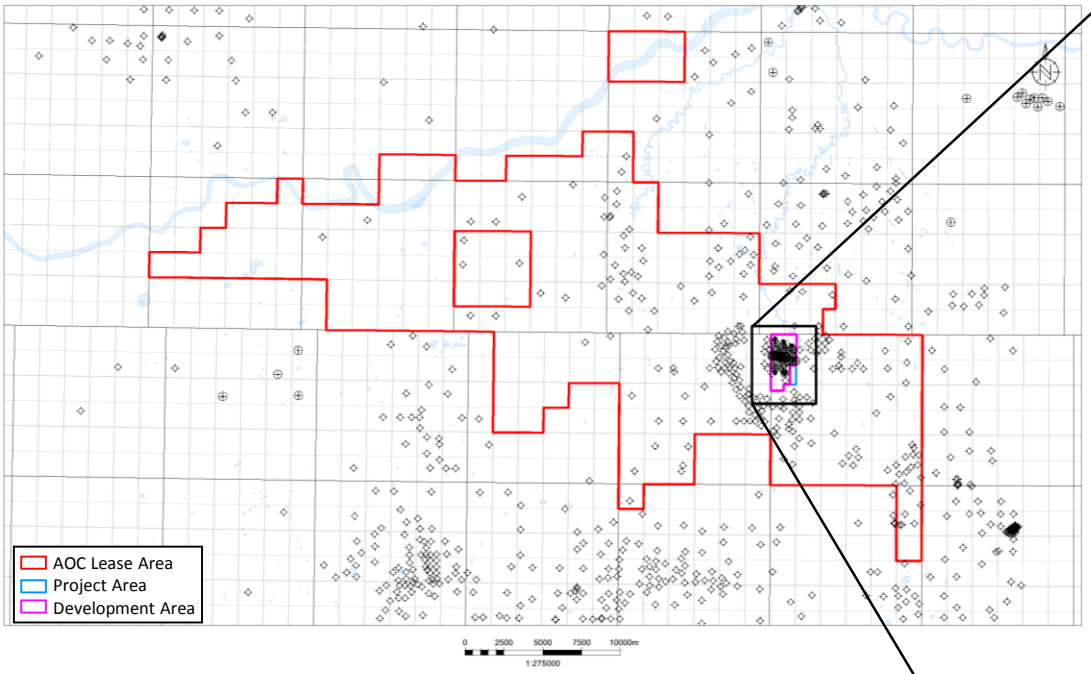
HANGINGSTONE PROJECT
SCHEME MAP



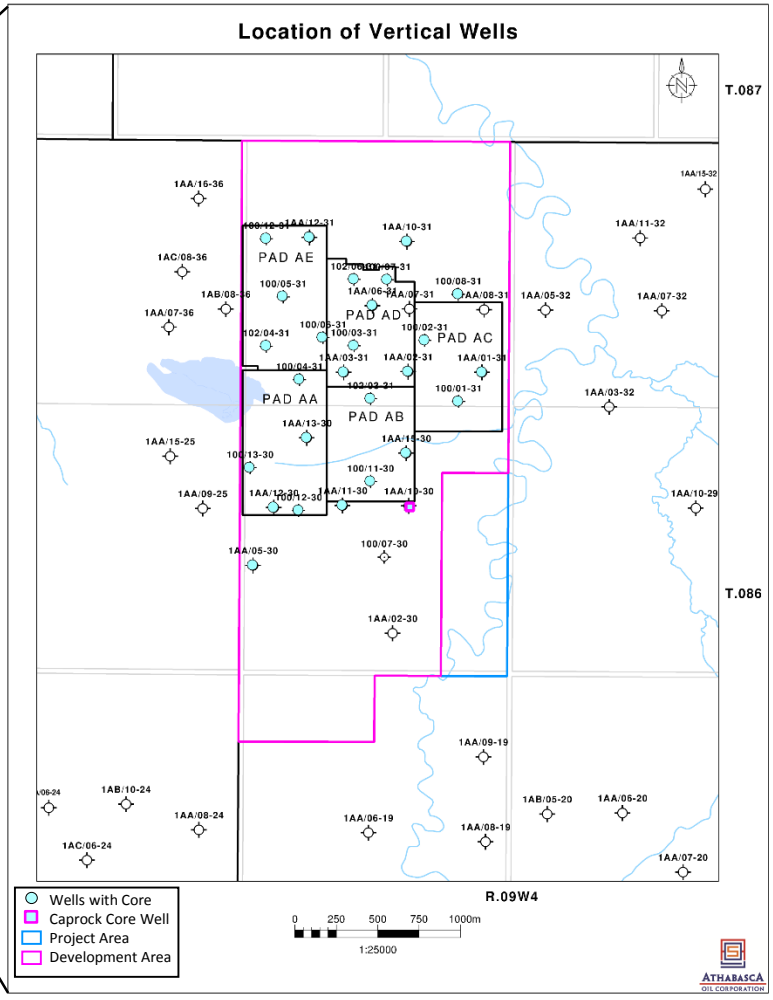
HANGINGSTONE PROJECT
SUBSURFACE

HANGINGSTONE PROJECT
SURFACE DATA OVERVIEW

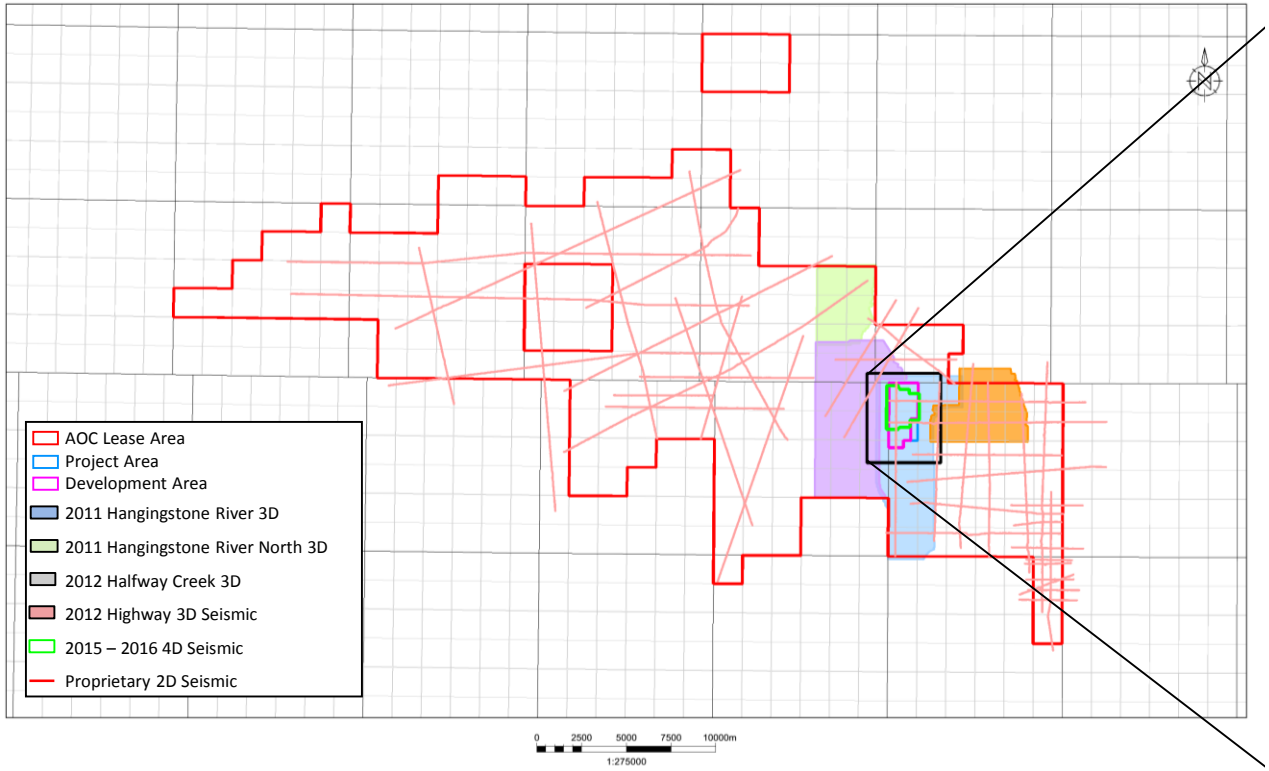
Hangingstone Lease

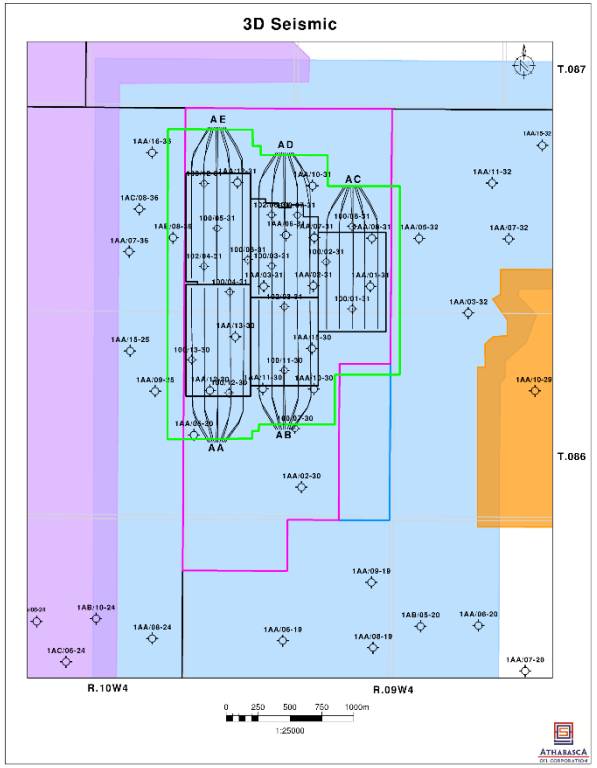


	Area (Km^2)	MCMR Cored Wells	Image Logs	Caprock Core
Development Area	5.1	26	31	1
Project Area	5.6	26	31	1



HANGINGSTONE PROJECT
SUBSURFACE DATA OVERVIEW



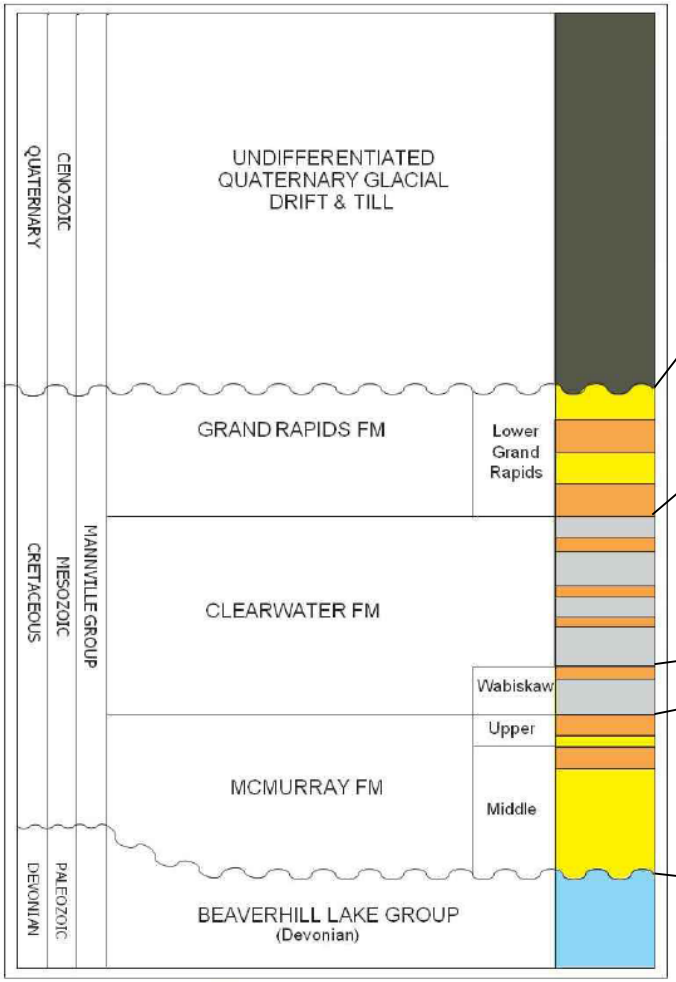


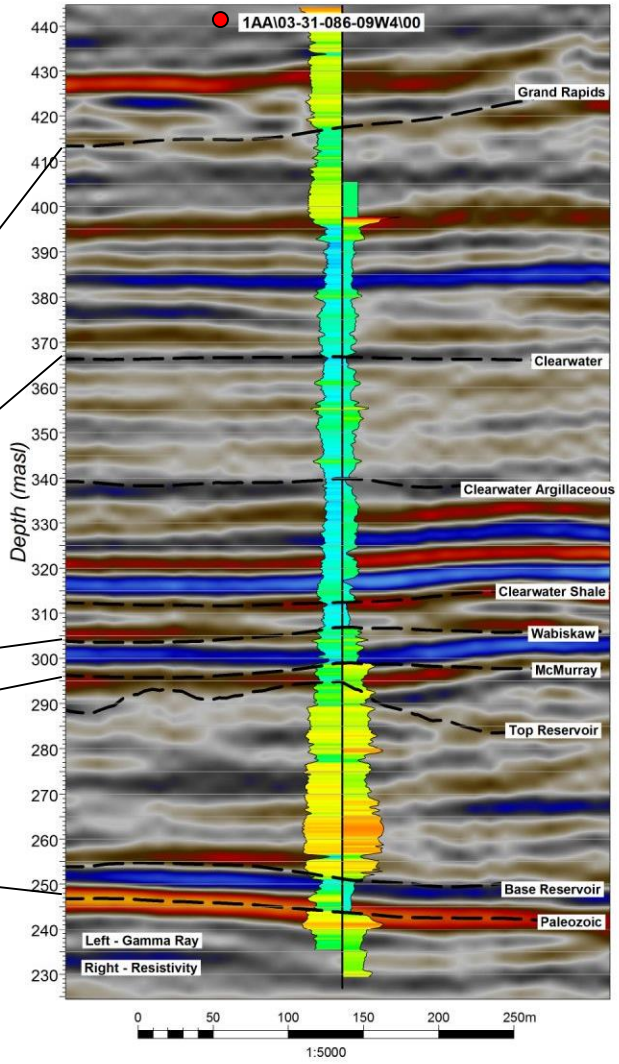
- 3D acquired in 2011 and 2012, merged in 2012.
- Total proprietary 2D ~ 450 km.
- Total 3D area ~98 km^2 (merged).
  - Covers development area.
- Total 4D area 3.72 km^2 (acquired Q1 2014)

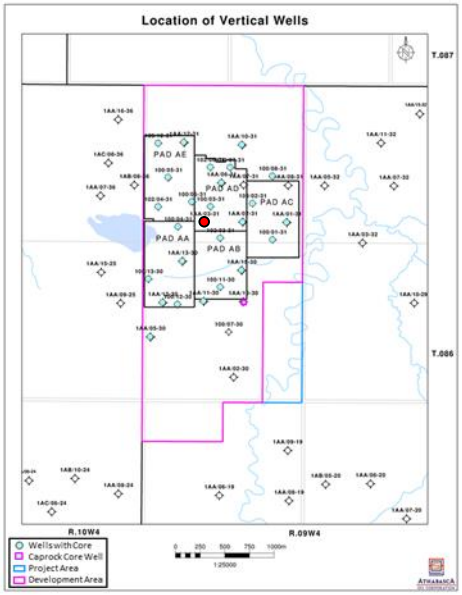
- 3D/4D PARAMETERS
  - Source line/source spacing: 60m/ 20m.
  - Receiver line/receiver spacing: 60(40)m/20m.

HANGINGSTONE PROJECT
STRATIGRAPHY AND REFERENCE WELL

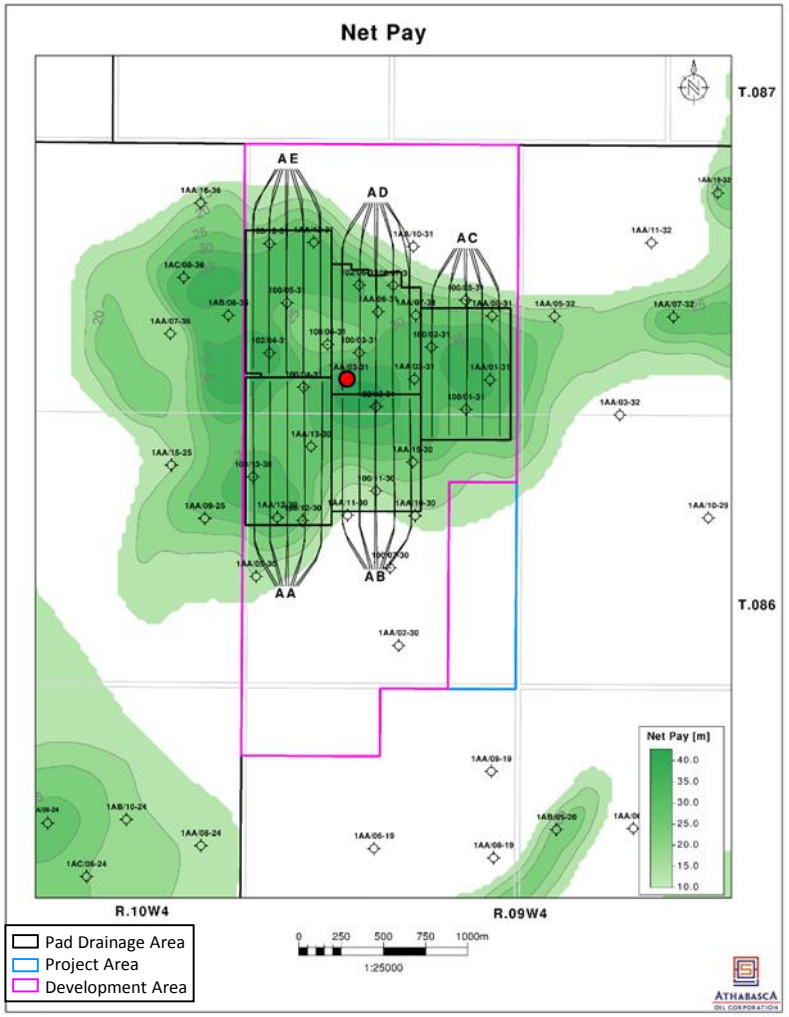
MIDDLE MCMURRAY TARGET RESERVOIR

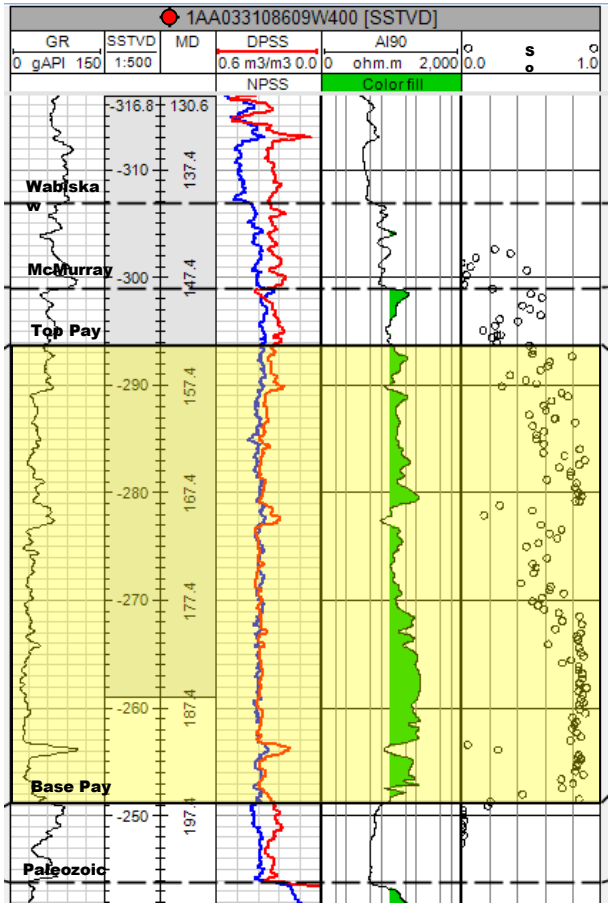






HANGINGSTONE PROJECT
DEFINITION OF NET PAY AND MAP



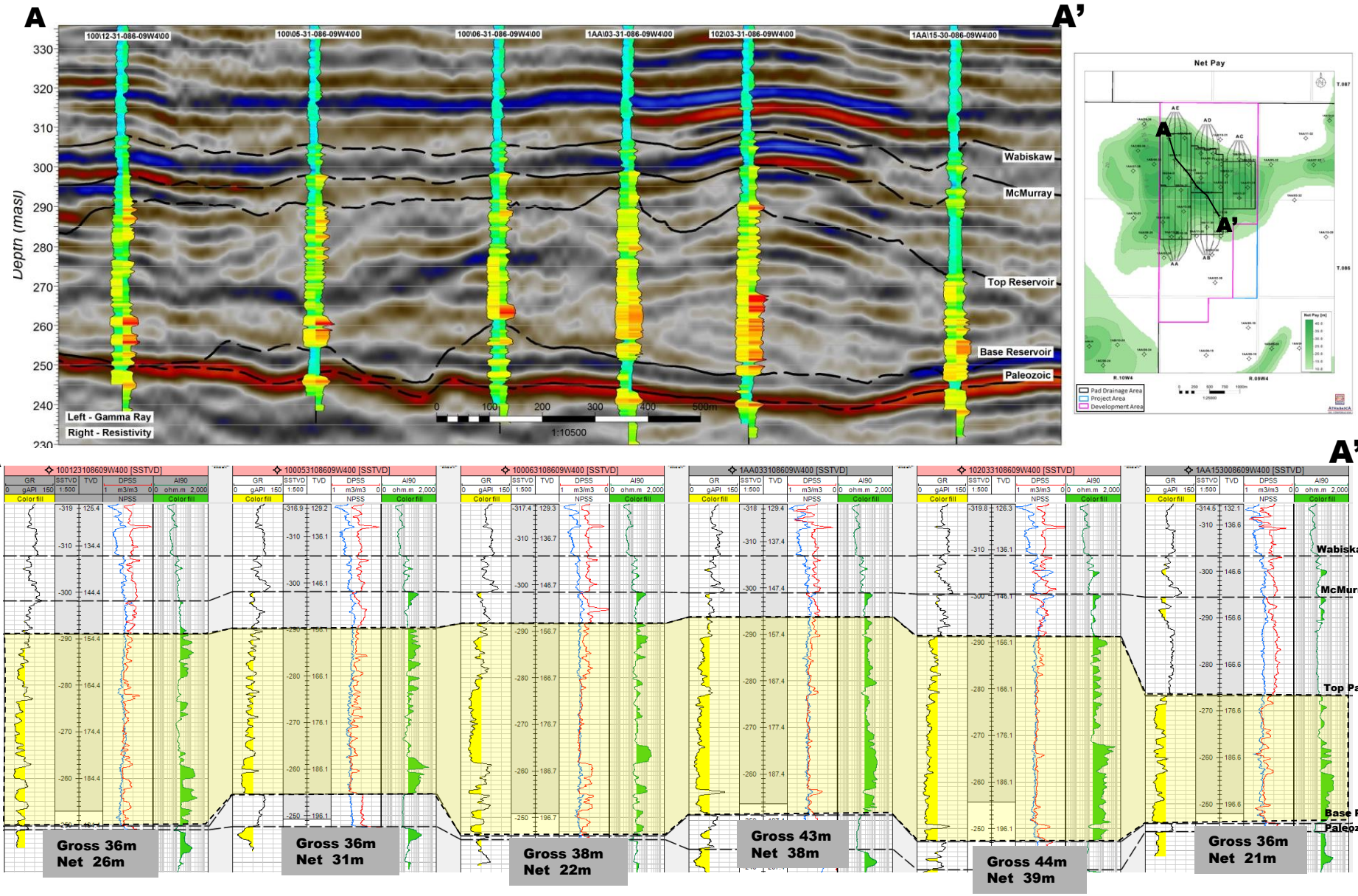


MIDDLE MCMURRAY GROSS PAY DEFINITION

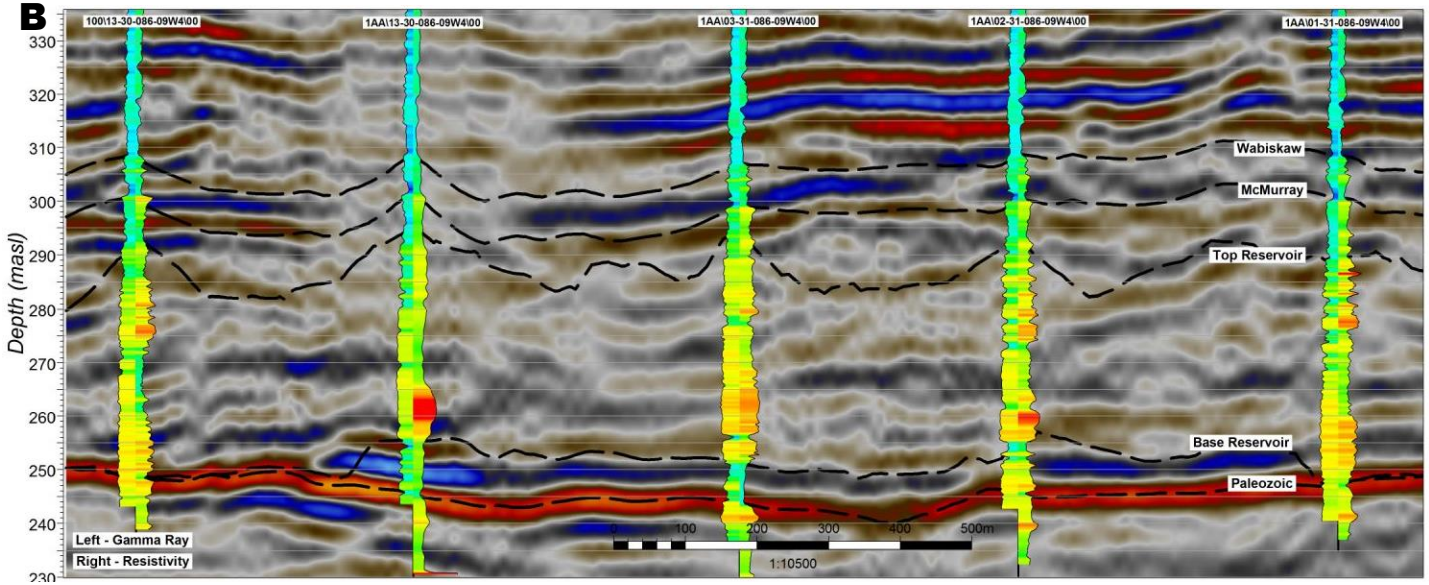
GR < 70 API
Density > 27%
Resistivity >18 ohm
Water Saturation < 50%
Includes < 1 m thick mud.

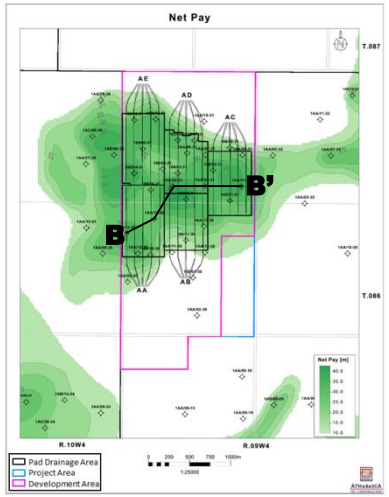
Net Pay thickness typically excludes mud.

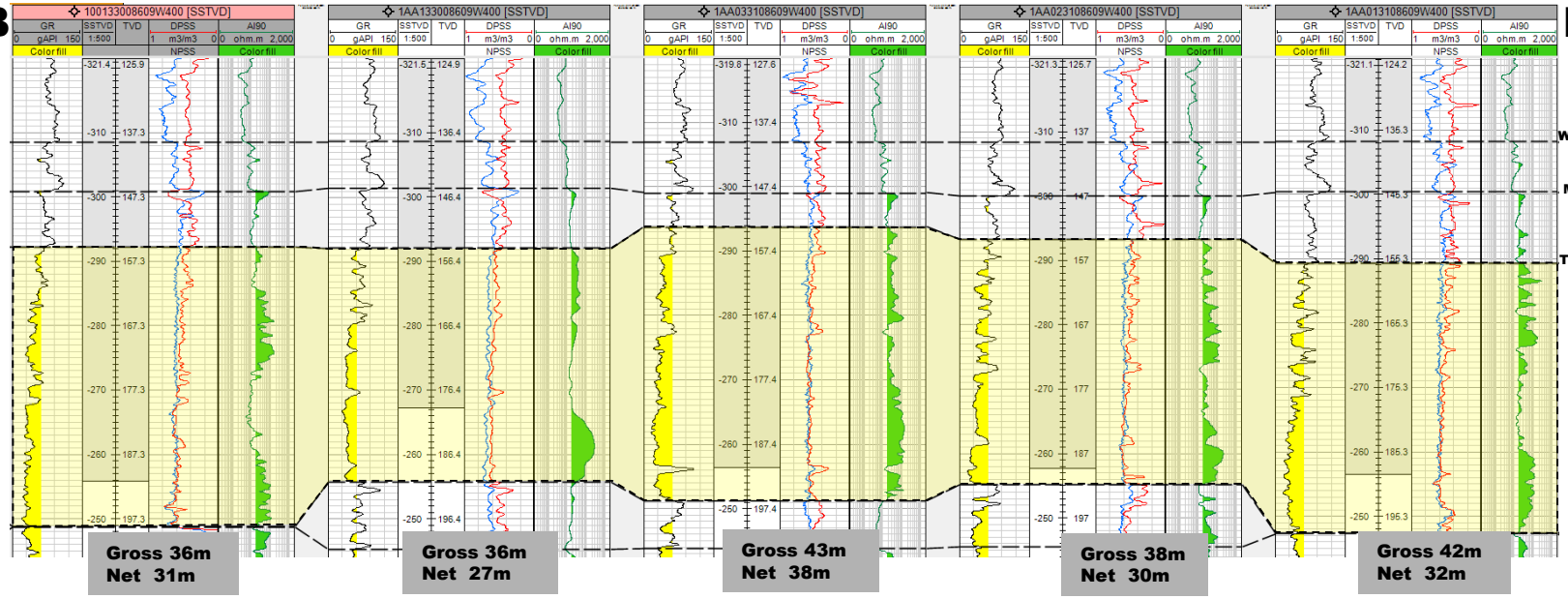
HANGINGSTONE PROJECT
STRUCTURAL CROSS SECTION NW-SE ACROSS HS1 AREA



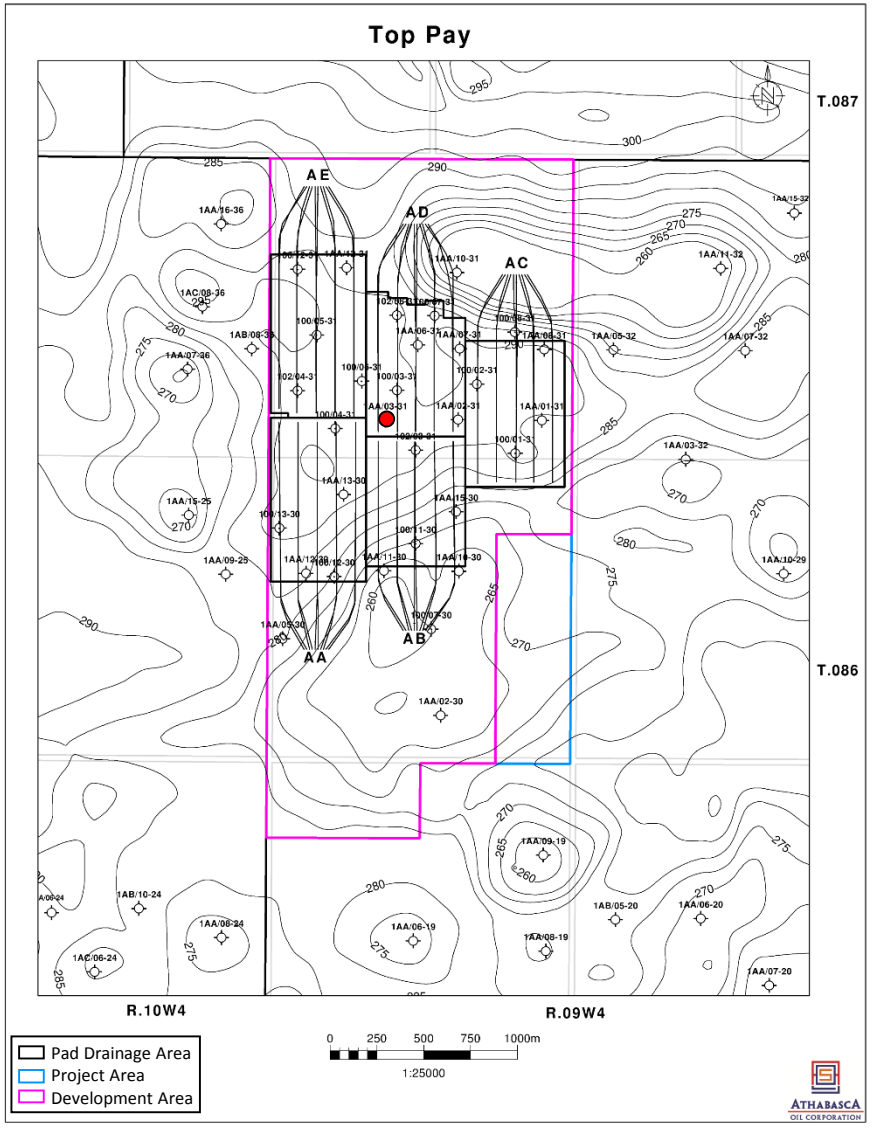
HANGINGSTONE PROJECT
STRUCTURAL CROSS SECTION W-E ACROSS HS1 AREA



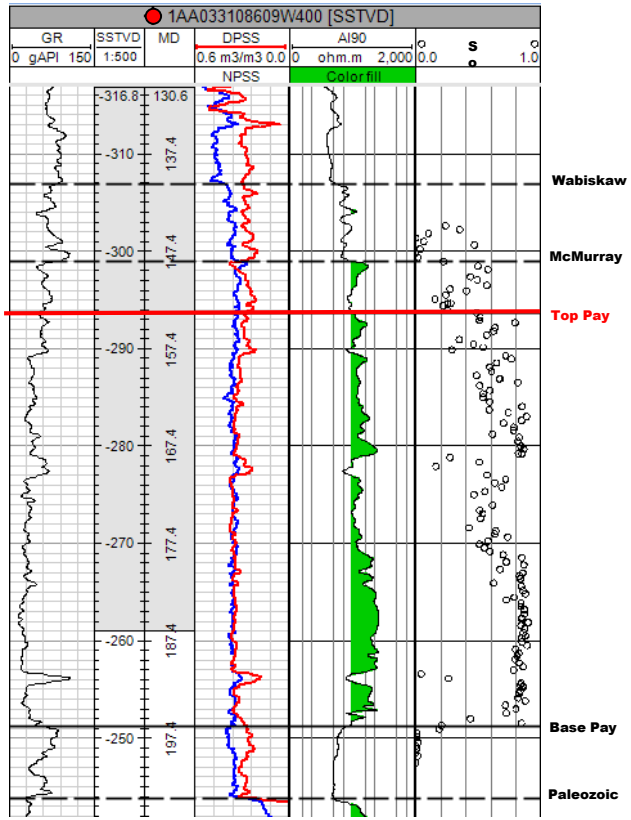




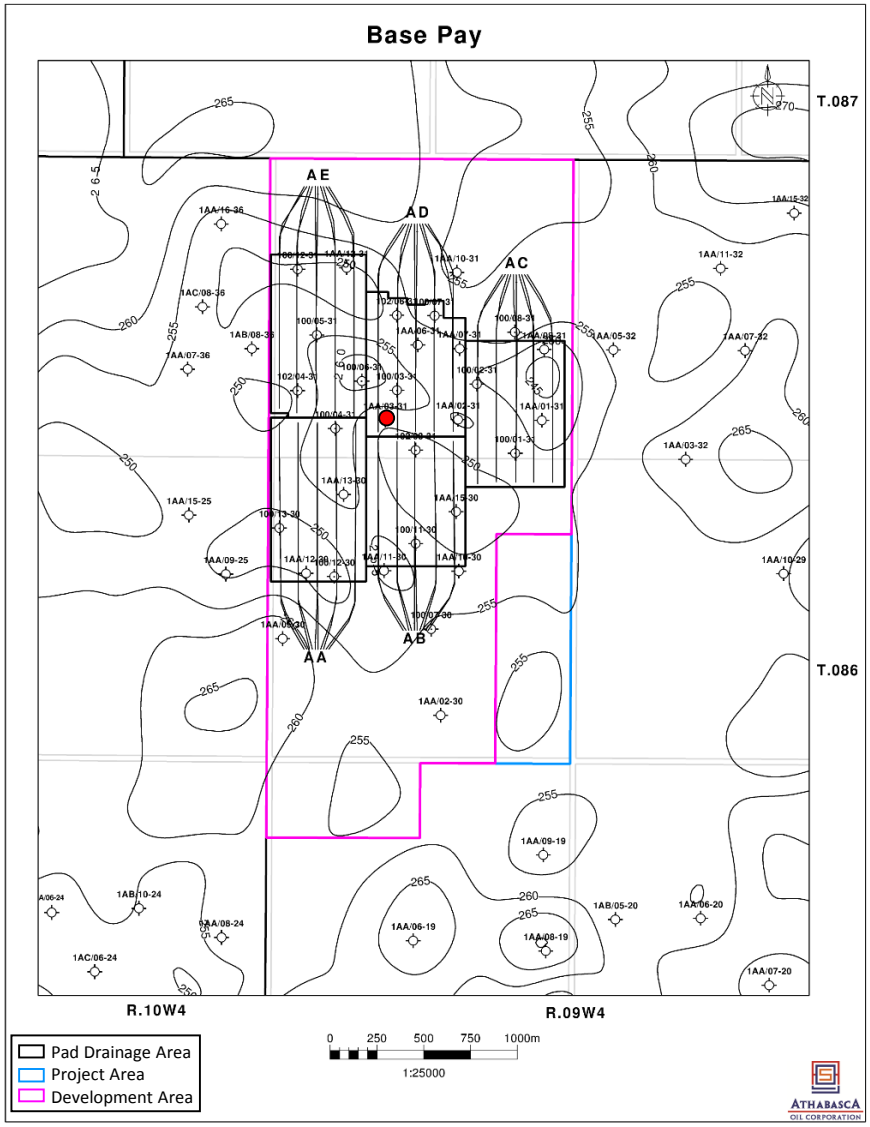
HANGINGSTONE PROJECT
STRUCTURE MAP OF TOP OF BITUMEN PAY



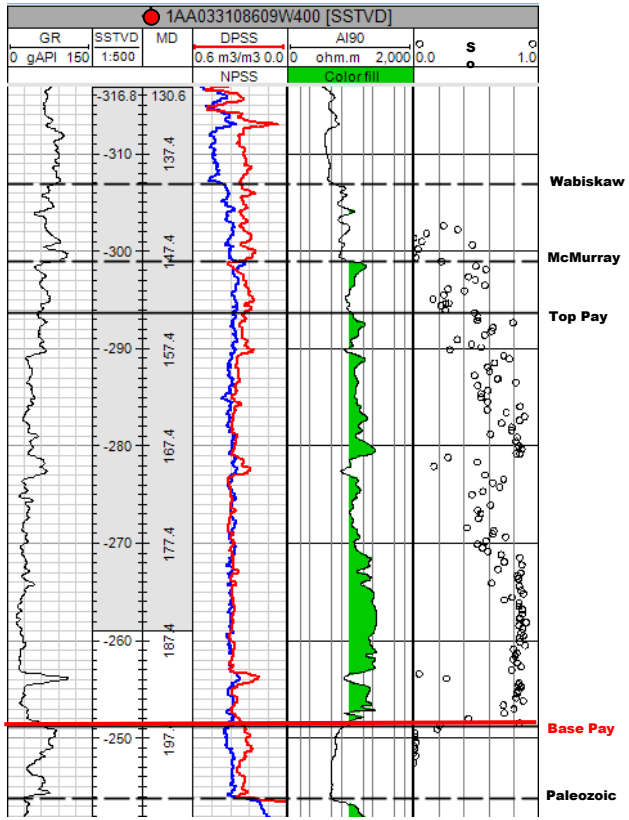
Range of elevation from 260 to 295 masl, highest over drainage pads.



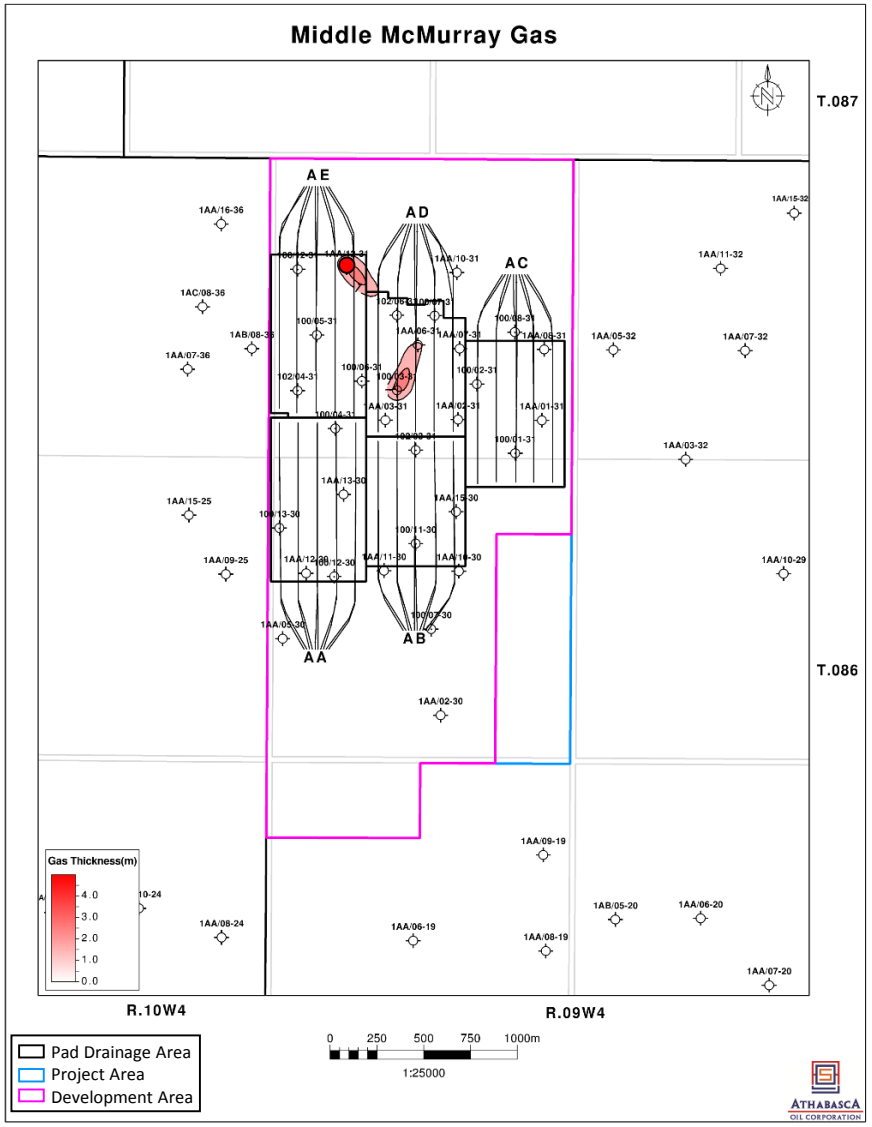
HANGINGSTONE PROJECT
STRUCTURE MAP OF BASE OF BITUMEN PAY



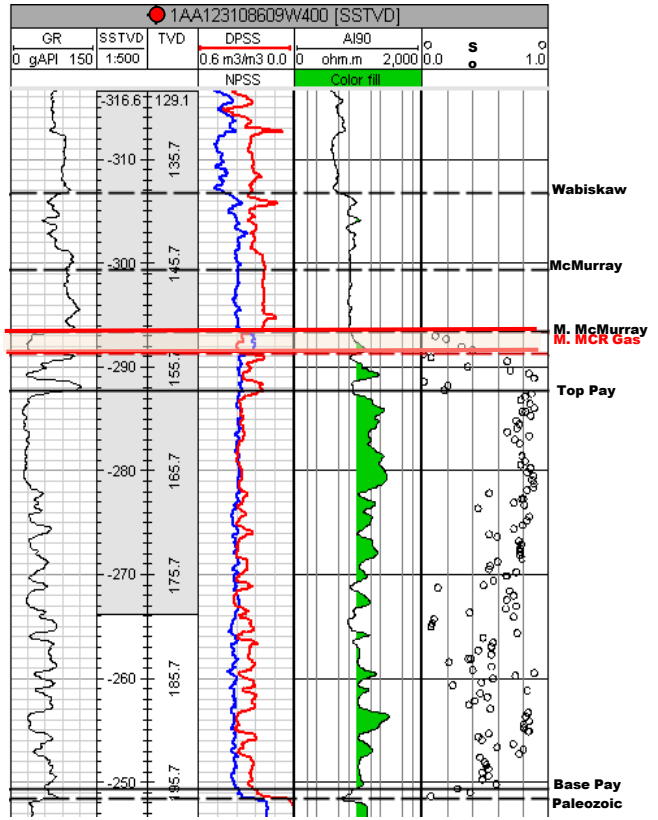
Range of elevation from 245 to 260 masl, low over drainage pads.



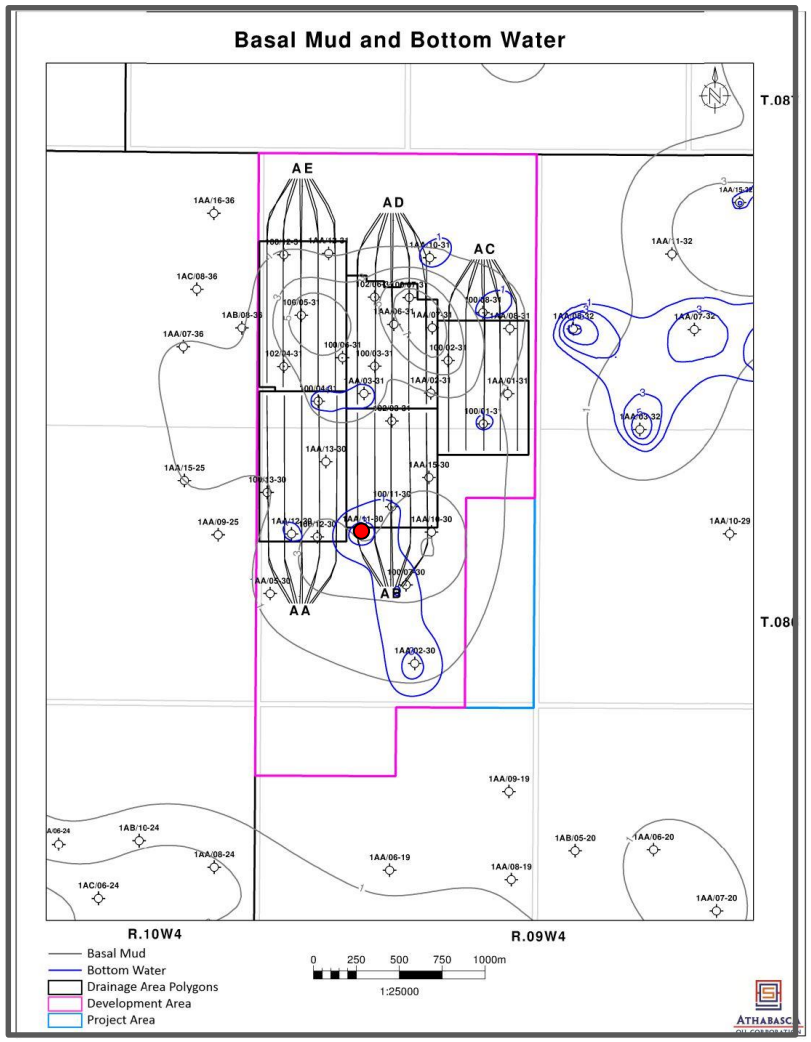
HANGINGSTONE PROJECT
ISOPACH MAP OF MIDDLE MCMURRAY FM GAS



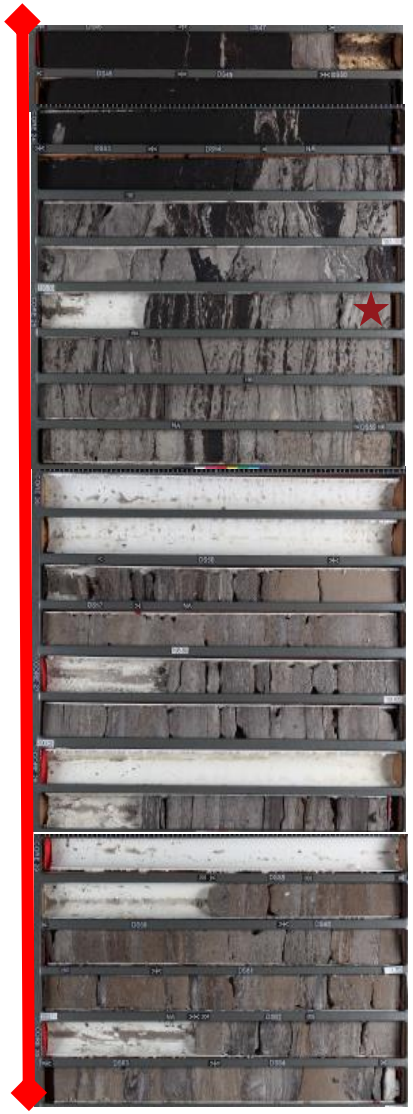
Middle McMurray gas has minimal thickness and limited distribution within the Development Area.



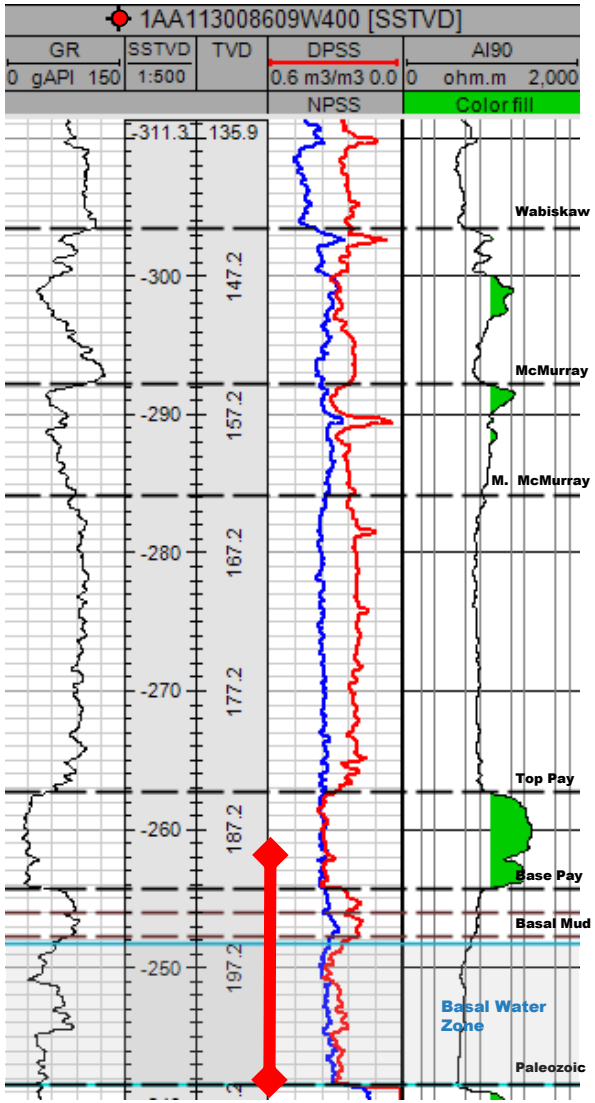
HANGINGSTONE PROJECT
ISOPACH MAP OF MIDDLE MCMURRAY BOTTOM WATER



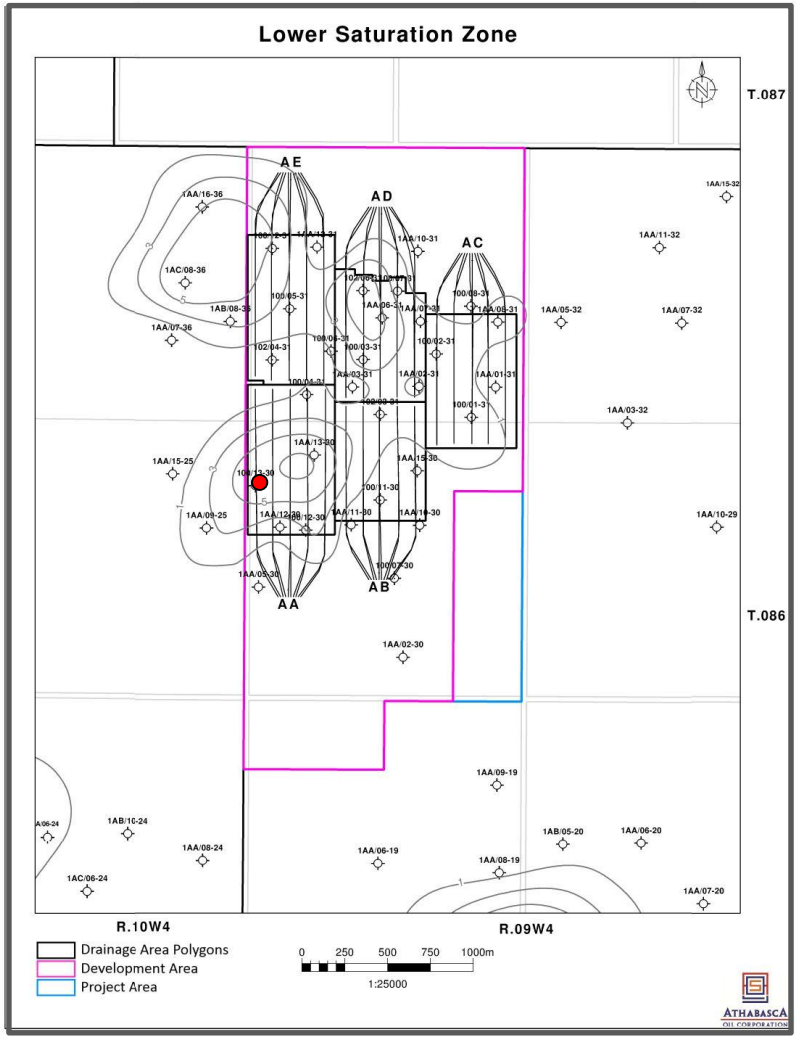
The permeability measured from core within the muddy interval between the bottom water and the bitumen reservoir through interval 193.80 to 193.85 m MD is 4.30 millidarcy (kV) and 71.0 millidarcy (kMax). Denoted on photo by .

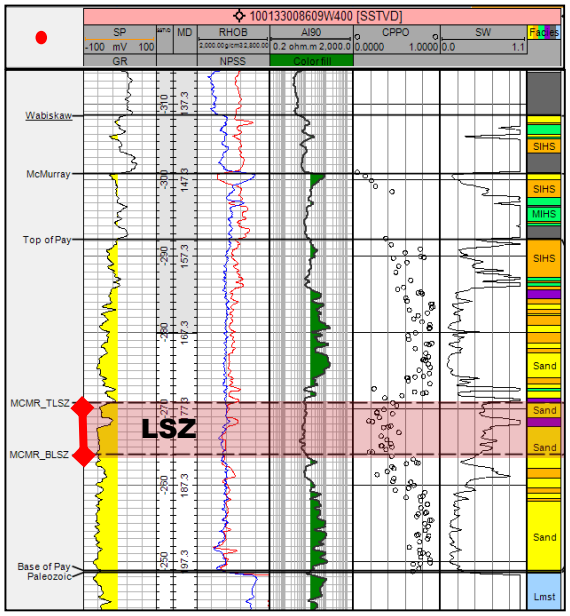


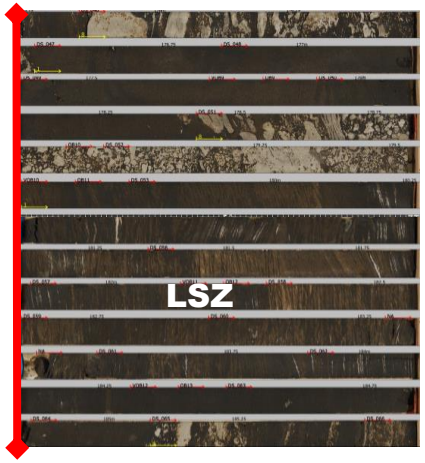
Interbedded mud and water saturated sand

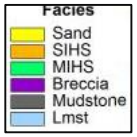


HANGINGSTONE PROJECT
ISOPACH MAP OF MIDDLE MCMURRAY LOW BITUMEN SATURATION







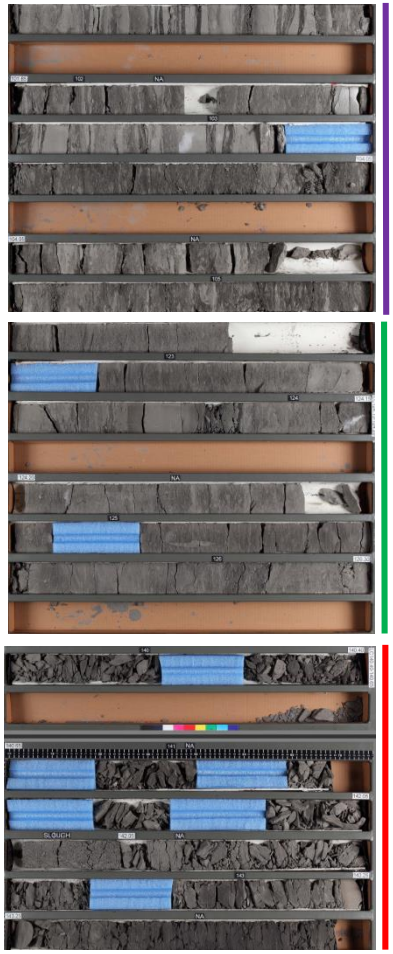


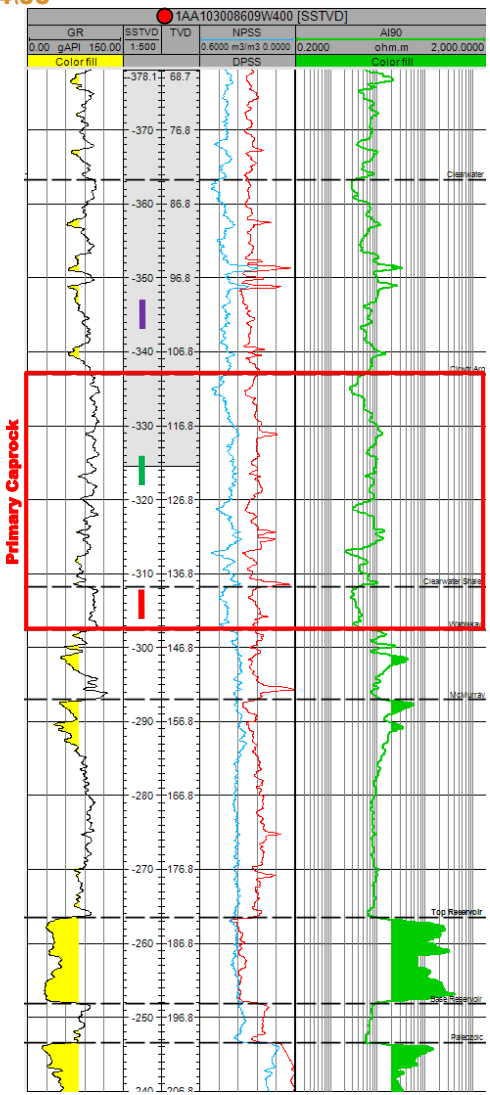
LOW BITUMEN SATURATION ZONE (LSZ)

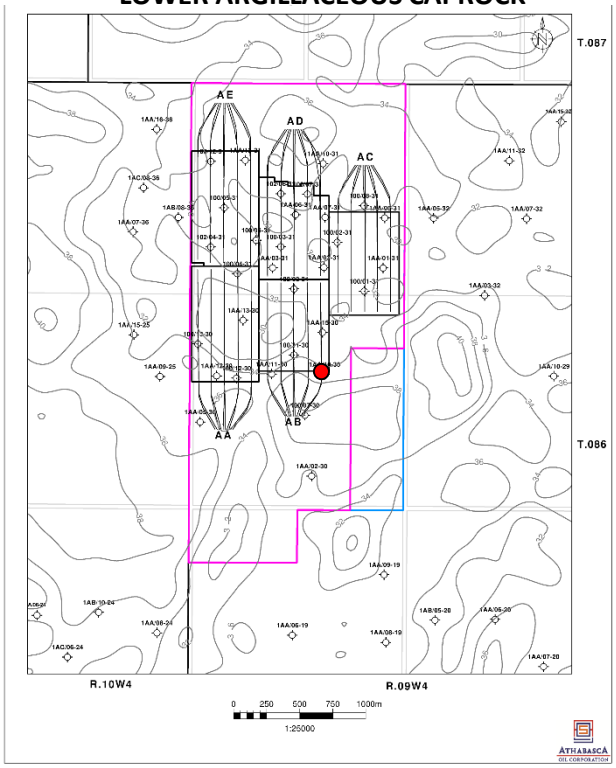
- GR<60 API, density porosity >0.27 and resistivity <18 ohms and core water saturation >50%.
- Core So= 0.36 and porosity = 0.37, thus the LSZ will still contribute to the overall bitumen production.

HANGINGSTONE PROJECT
CAPROCK DESCRIPTION – CORE AND IMAGE DATA

Caprock Core 1AA\10-30-86-9W4\00



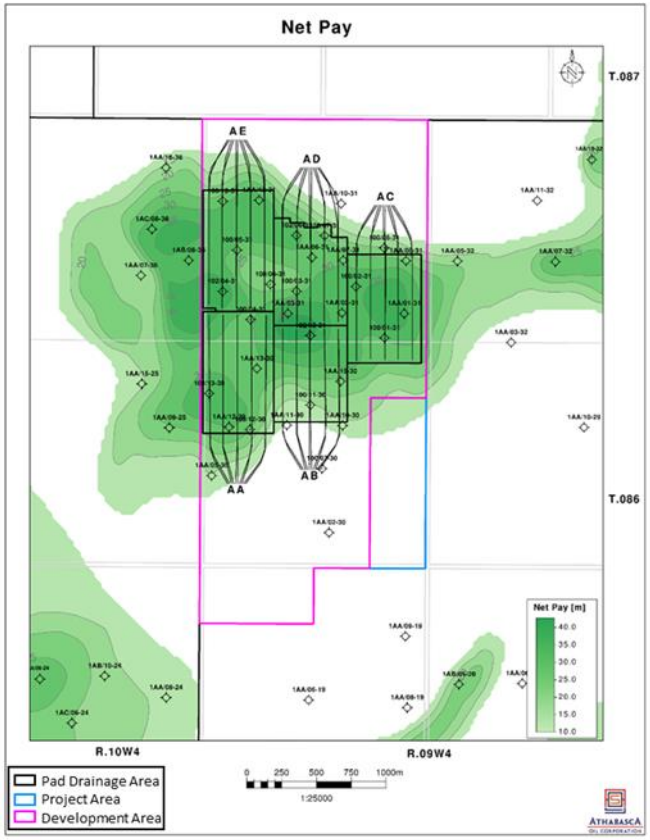




Caprock is defined as the unit between the top of the Clearwater Formation and Wabiskaw.

- Two main units within the caprock; lower argillaceous and upper silty mud.
- Primary caprock is the lower argillaceous unit which ranges from the top of the Clearwater Argillaceous to the top of Wabiskaw.
- Composed primarily of shales and siltstones

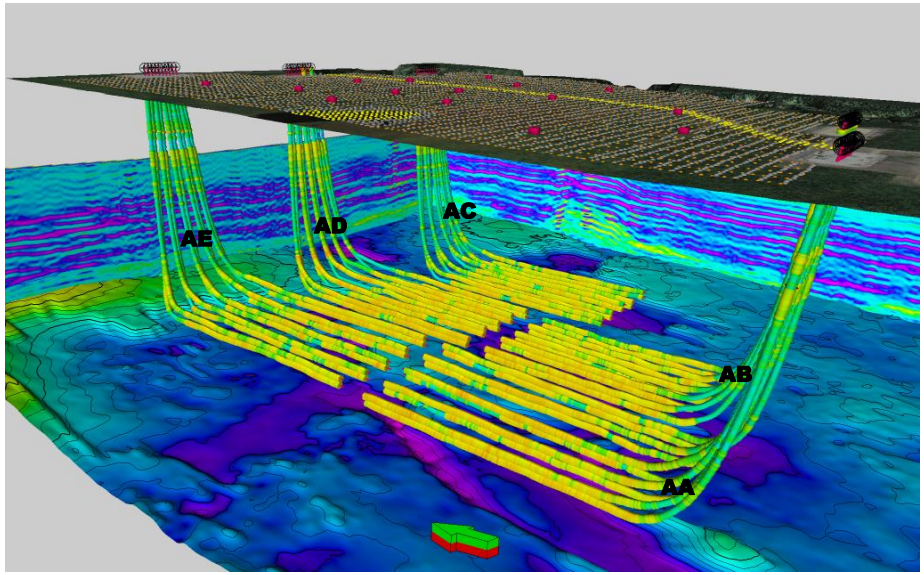
HANGINGSTONE PROJECT
OBIP AND RESERVOIR PROPERTIES



	Avg Porosity	Avg So	OBIP
	(Vol Frac)	(Vol Frac)	(mln m^3)
Drainage Areas	0.35	0.75	12.5
Development Area	0.35	0.75	14.2
Project Area	0.35	0.75	14.3

Depth Typical Producer	Pres Initial @ 190mTVD	Tres Initial	Reservoir Kh, avg	Reservoir Kv, avg	Bitumen Viscosity @ Tres Initial
(m TVD/masl)	(kPaa)	(°C)	(mD)	(mD)	(cP)
191/258	600	8	4,000	3,200	>1 mln

HANGINGSTONE PROJECT
SAGD DRILLING SUMMARY



Pad	Average Net Pay thickness above producer	Average Effective Lateral Length in producer (GR<60 API)	Average Percent Reservoir along producer lateral	Average Interwell Distance
	(m)	(m)	(%)	(m)
AA	24.8	715	86	100
AB	20.6	613	97	100
AC	26.0	674	94	100
AD	25.6	614	96	100
AE	24.2	746	93	100

- Duration: Aug 2013-Apr 2014
  - 2 Precision Drilling slant rigs utilized
  - Approximately 2.5 months per pad per rig
- 25 well pairs 650-850m long laterals
- Typically 8 5/8” liners
  AA-I4 and AB-I4 injector have 7” liners.
- AE01 and AE05 have tapered injector liners
- Thermal cement used and radial cement bond logs all showed good to excellent cement bond and integrity.
- All well pairs were drilled successfully (within range limits of planned well paths and within targeted vertical separations).
- Excellent reservoir percentage for the pads.

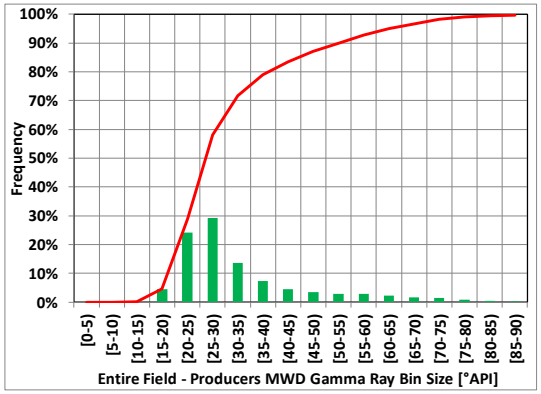
HANGINGSTONE PROJECT
SAGD DRILLING SUMMARY – LWD TOOLS

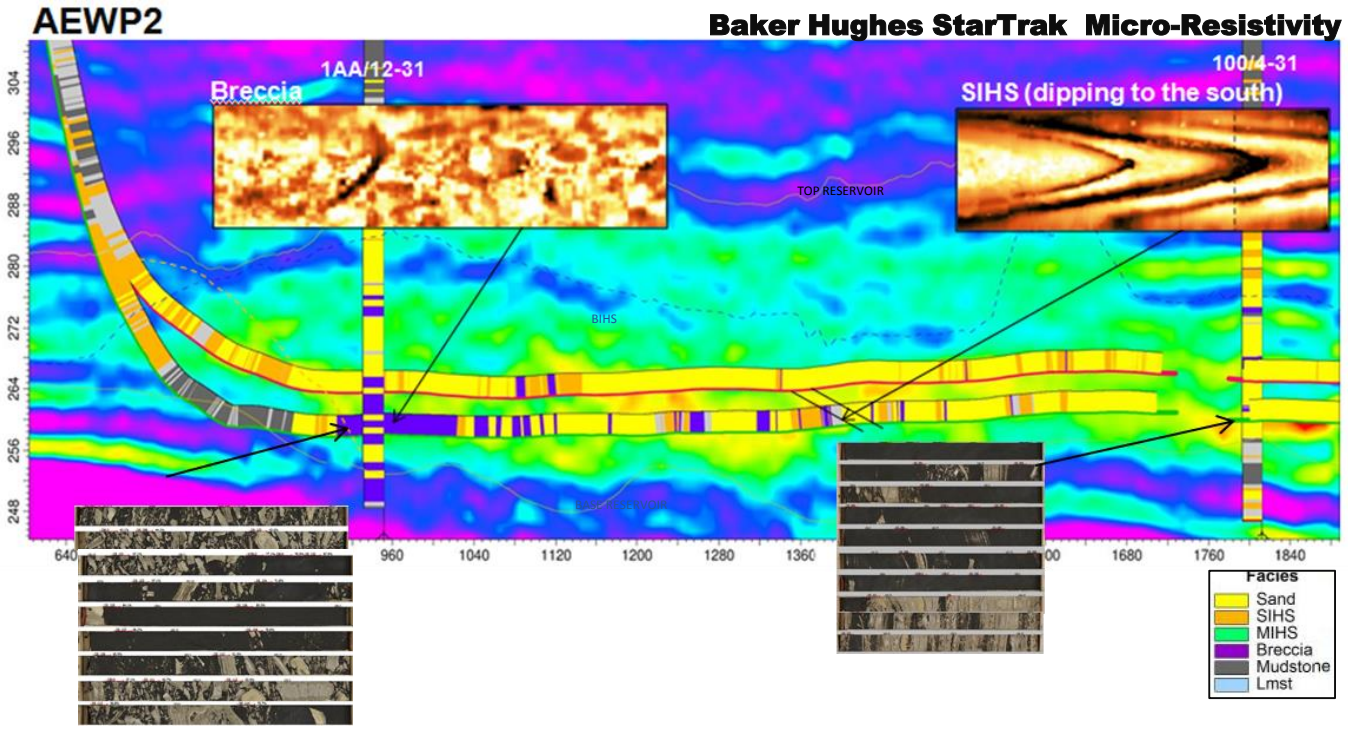
LWD Tools

- Gamma Ray on every well; producer well elevation changes were made based on Gamma Ray (GR>60 API). Overall, Gamma Ray response correlated well with density model.

- Microresistivity image logs were run on 7 producers (AEP1-5, ABP4 and ACP4). Images were used to identify facies type. Image data and gamma ray data from laterals and vertical wells were used to create facies logs along all the laterals.

- Deep azmiuthal resistivity log was run on 4 producers (AAP2, ACP1, ADP1 and 3). Able to confirm areas of varying saturation; was not used for elevation changes.





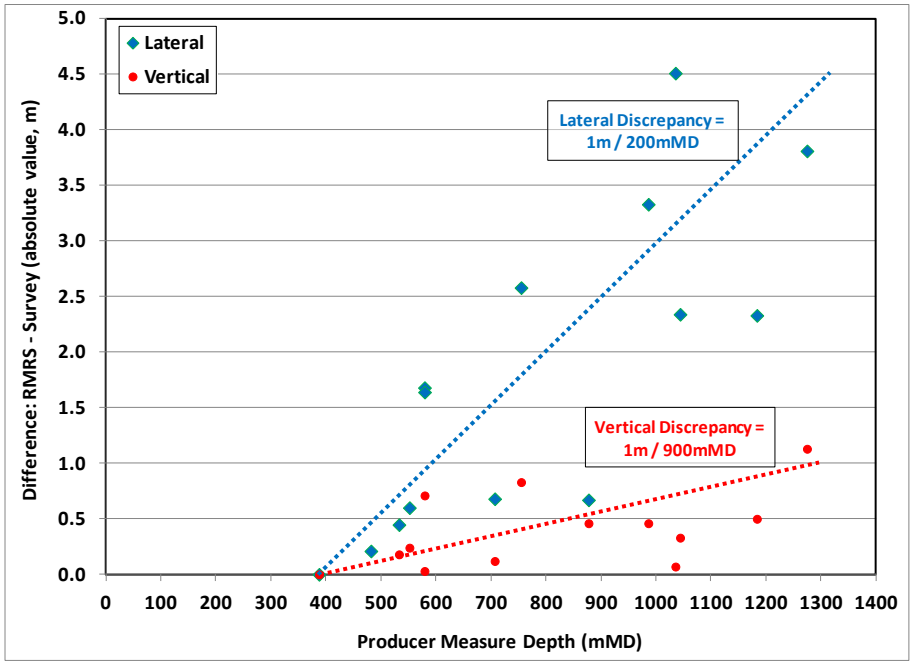
HANGINGSTONE PROJECT
SAGD DRILLING SUMMARY – RANGING TOOLS

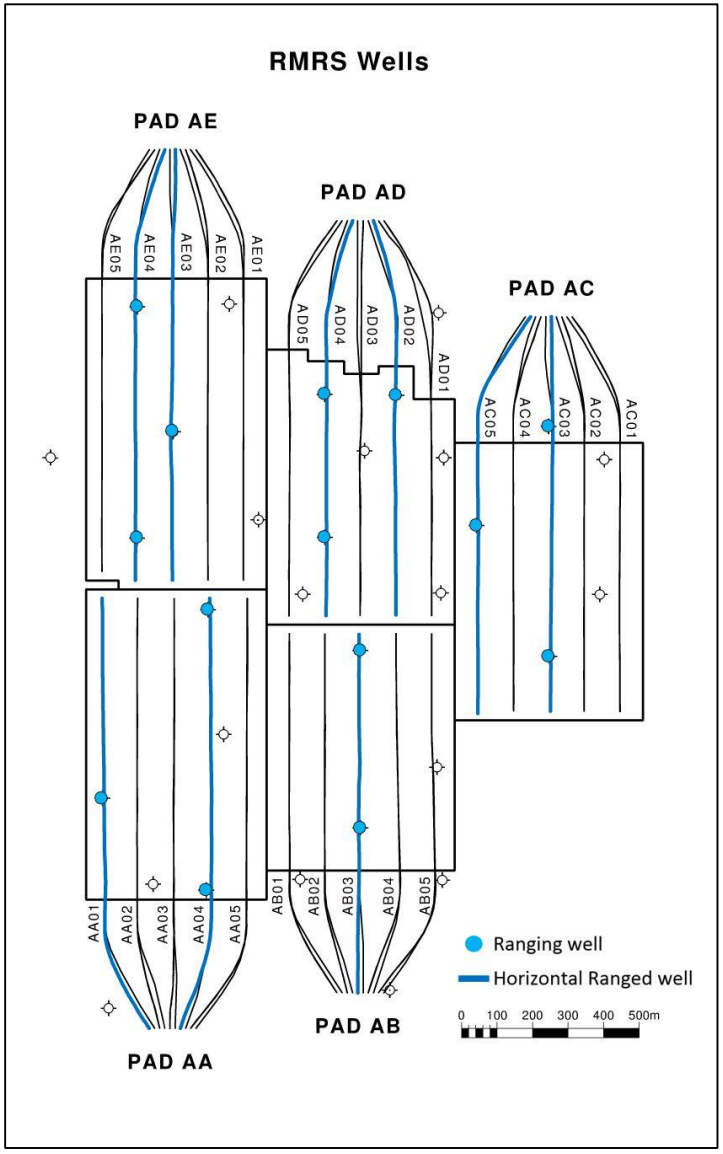
ROTATING MAGNETIC RANGING SYSTEM (RMRS)

This was used to confirm the MWD survey elevation, depth, and lateral positioning

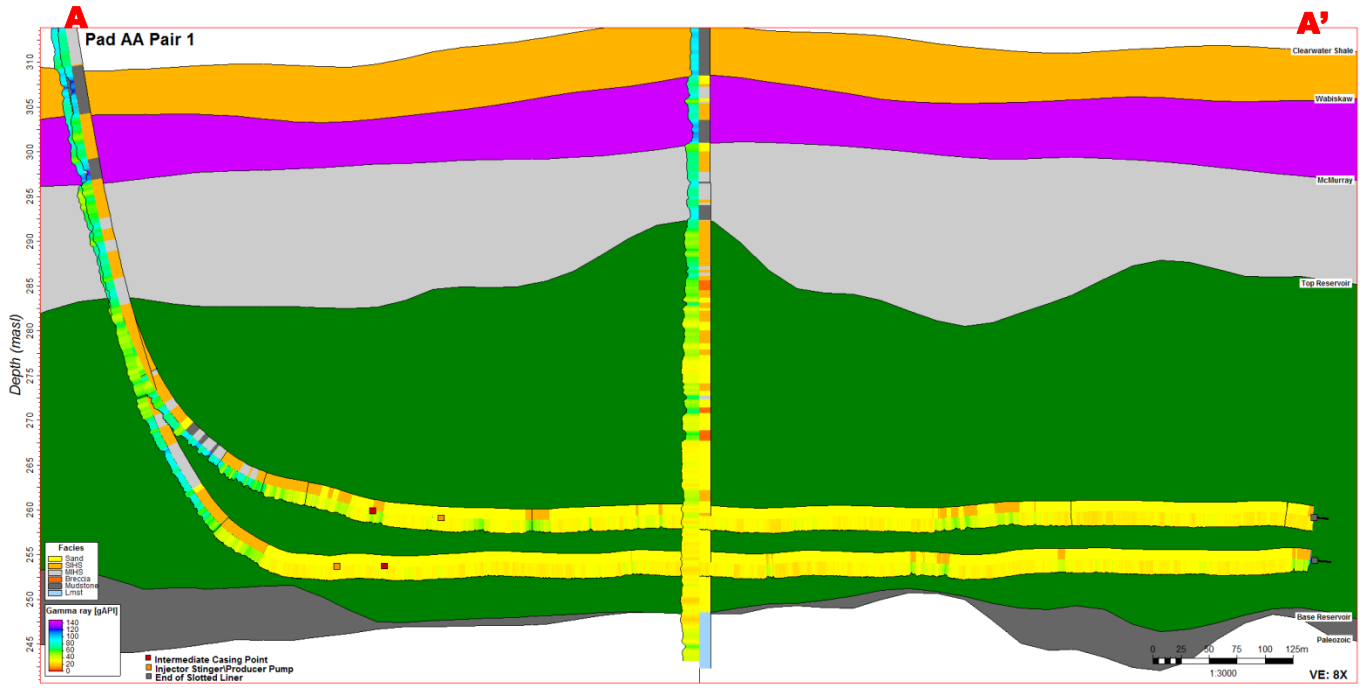
MAGNETIC GUIDANCE TOOL (MGT) was used for optimizing placement of the injector above the producer. Target was 5.0 to 5.5m vertical separation; actual field average is 5.3m.

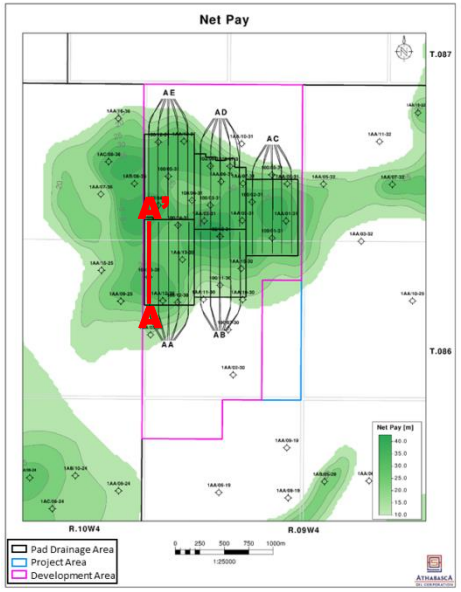
COMPARISONS OF LOCATIONS OF PRODUCER LATERALS
RMRS vs MWD SURVEY

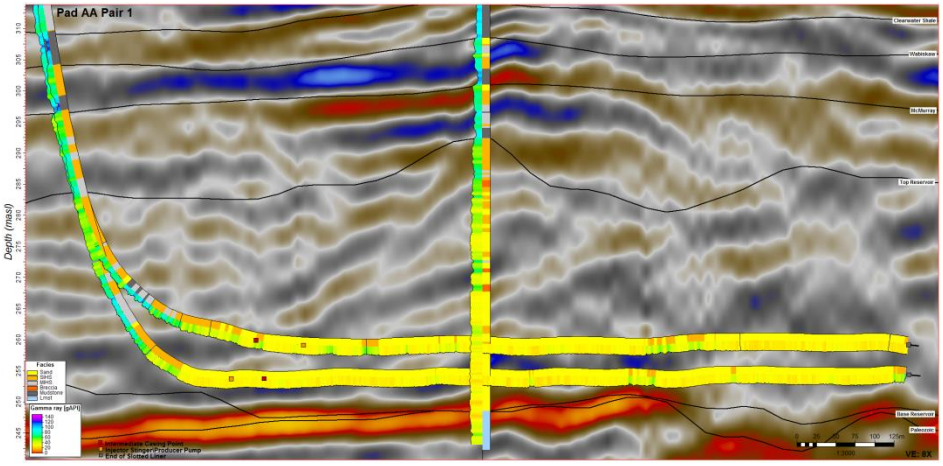




HANGINGSTONE PROJECT
SAGD DRILLING RESULTS – PAD AA WP1

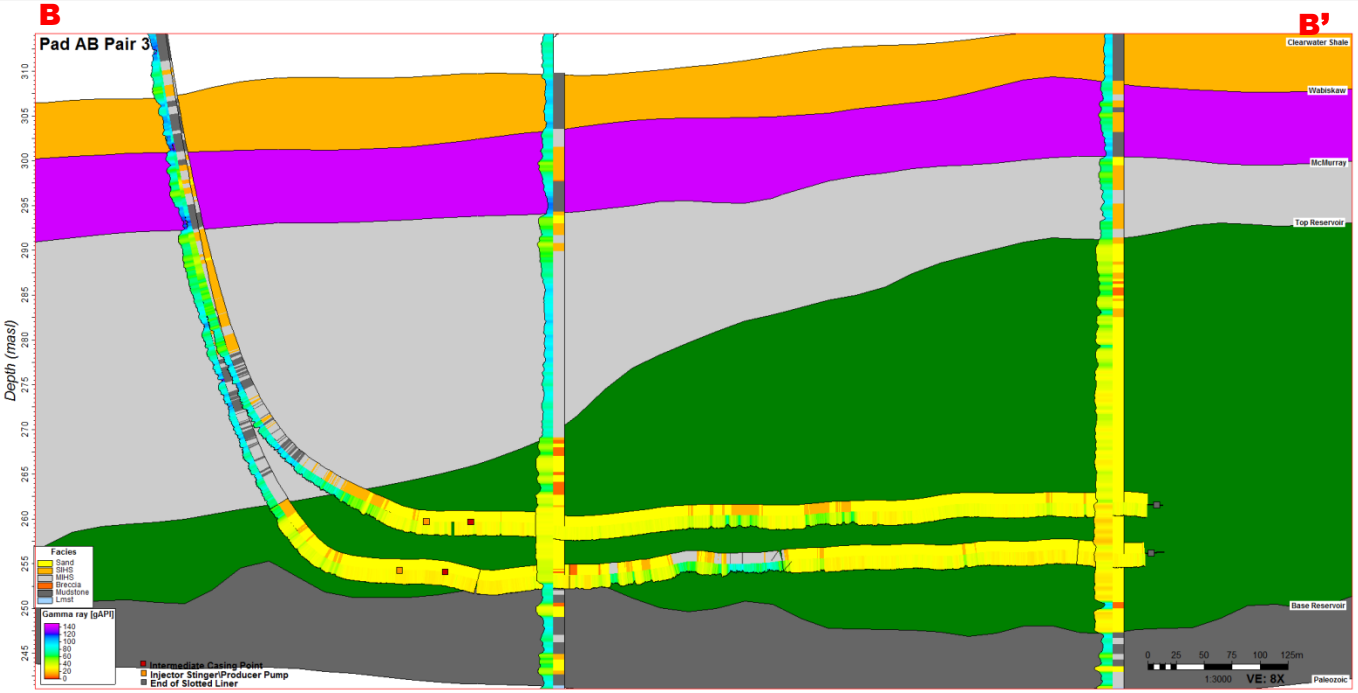


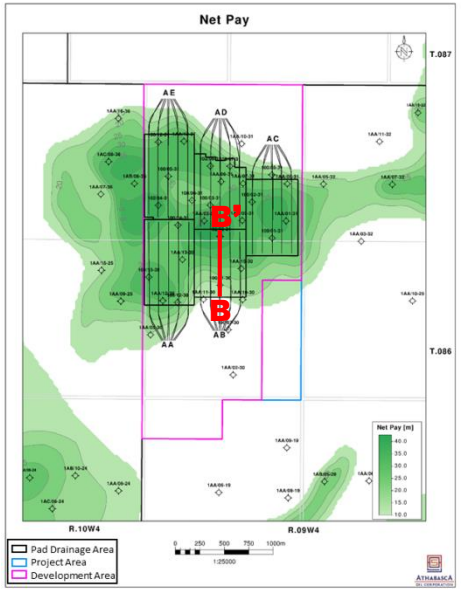


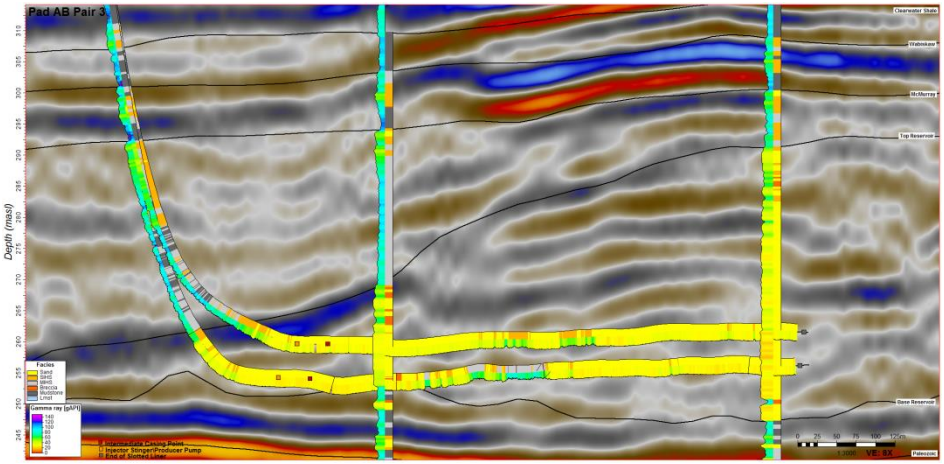


- Total lateral length 846 mMD.
- Average injector-producer separation: 5.3m
- Well is placed low in reservoir in bitumen rich sand with 100% reservoir along wellbore (mean net pay thickness above producer 27m).

HANGINGSTONE PROJECT
SAGD DRILLING RESULTS – PAD AB WP3

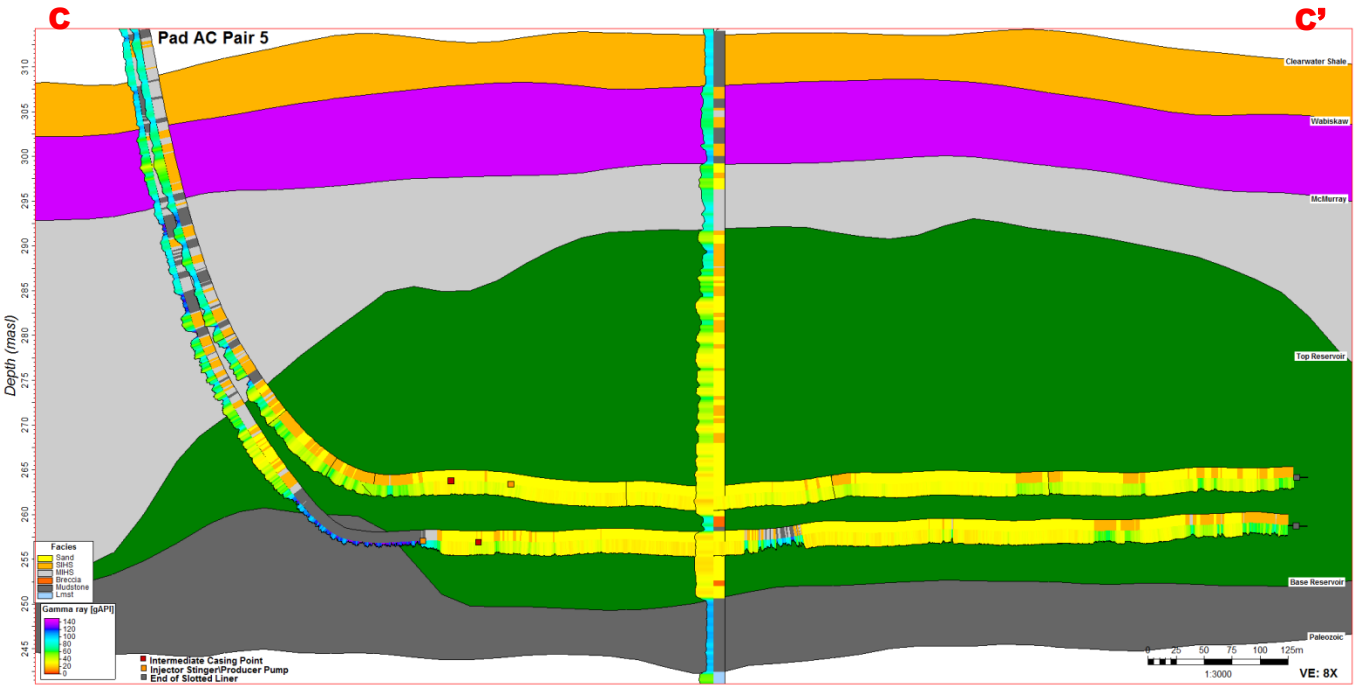


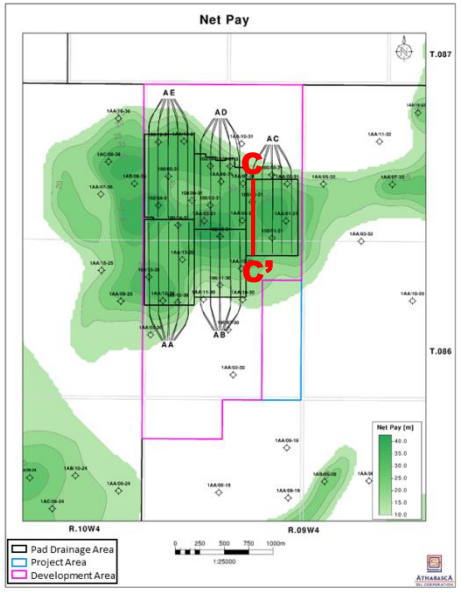


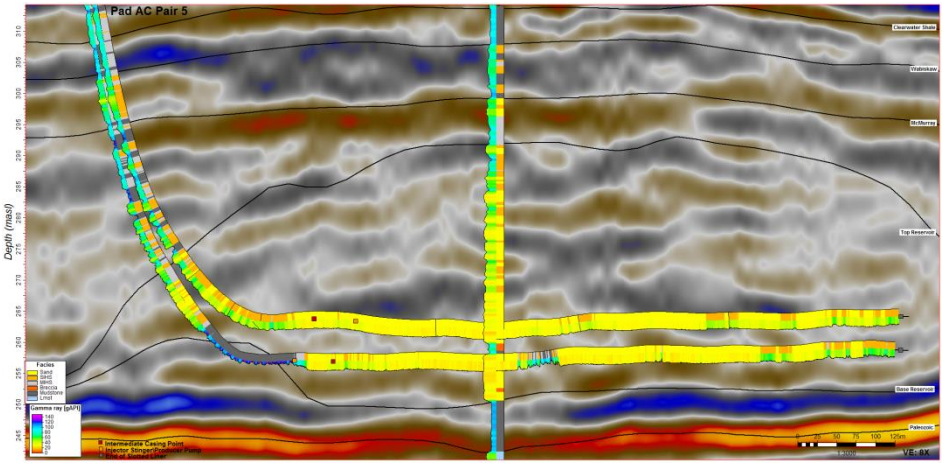


- Total lateral length 643 mMD.
- Average injector-producer separation: 5.4m
- Well is placed low in reservoir in bitumen rich sand with 91% reservoir along wellbore (mean net pay thickness above producer 20m).

HANGINGSTONE PROJECT
SAGD DRILLING RESULTS – PAD AC WP5

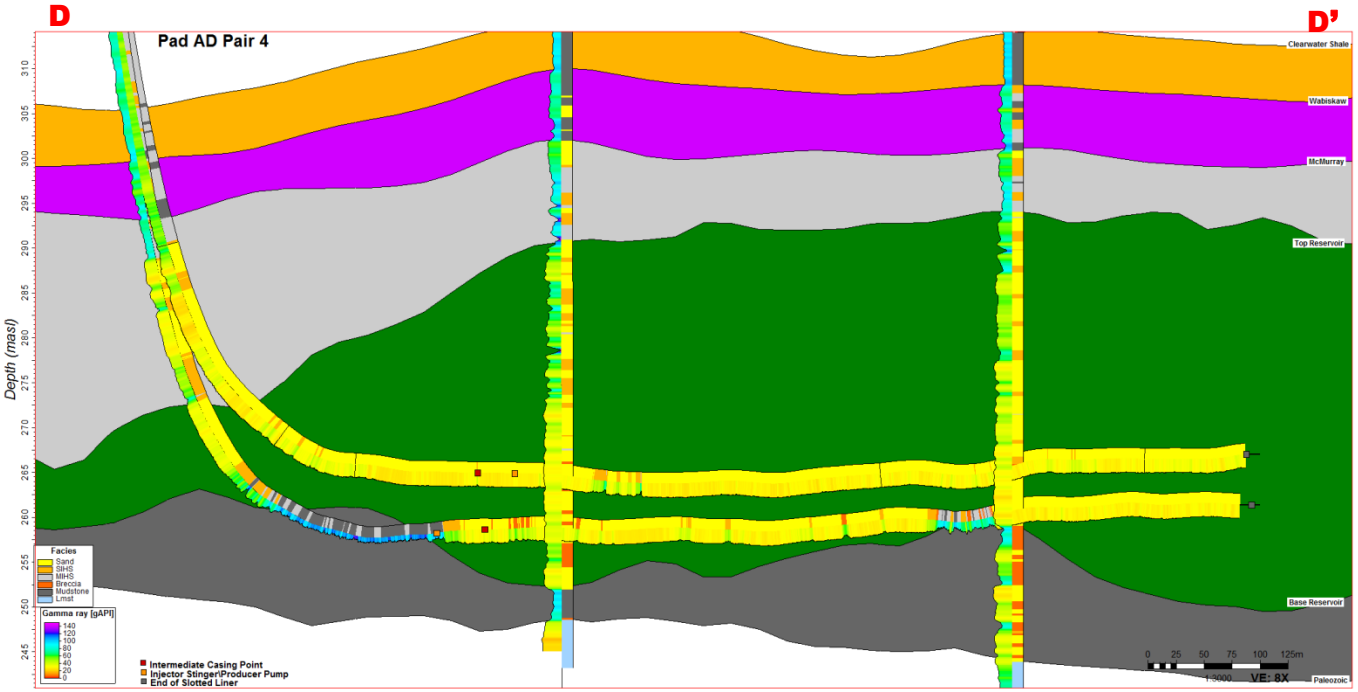


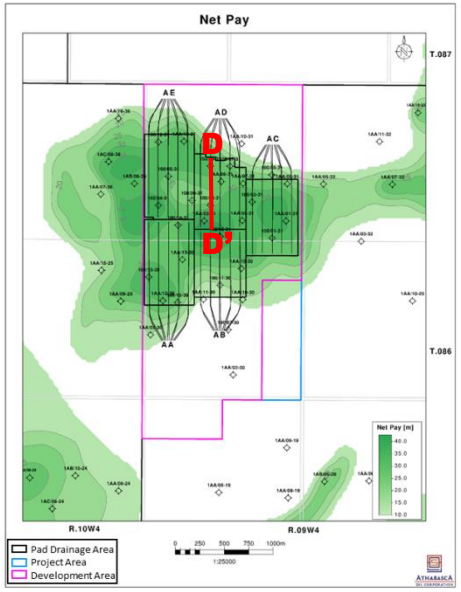


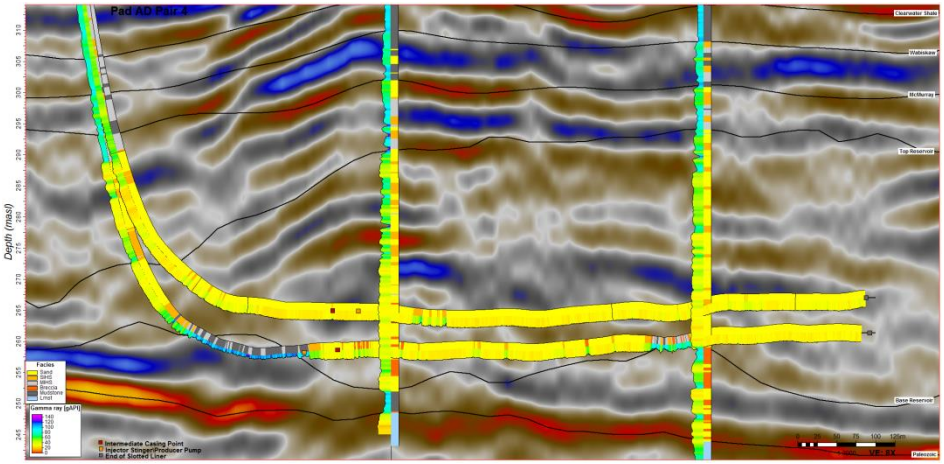


- Total lateral length 749 mMD.
- Average injector-producer separation: 5.4m
- Well is placed low in reservoir in bitumen rich sand with 93% reservoir along wellbore (mean net pay thickness above producer 26m).

HANGINGSTONE PROJECT
SAGD DRILLING RESULTS – PAD AD WP4

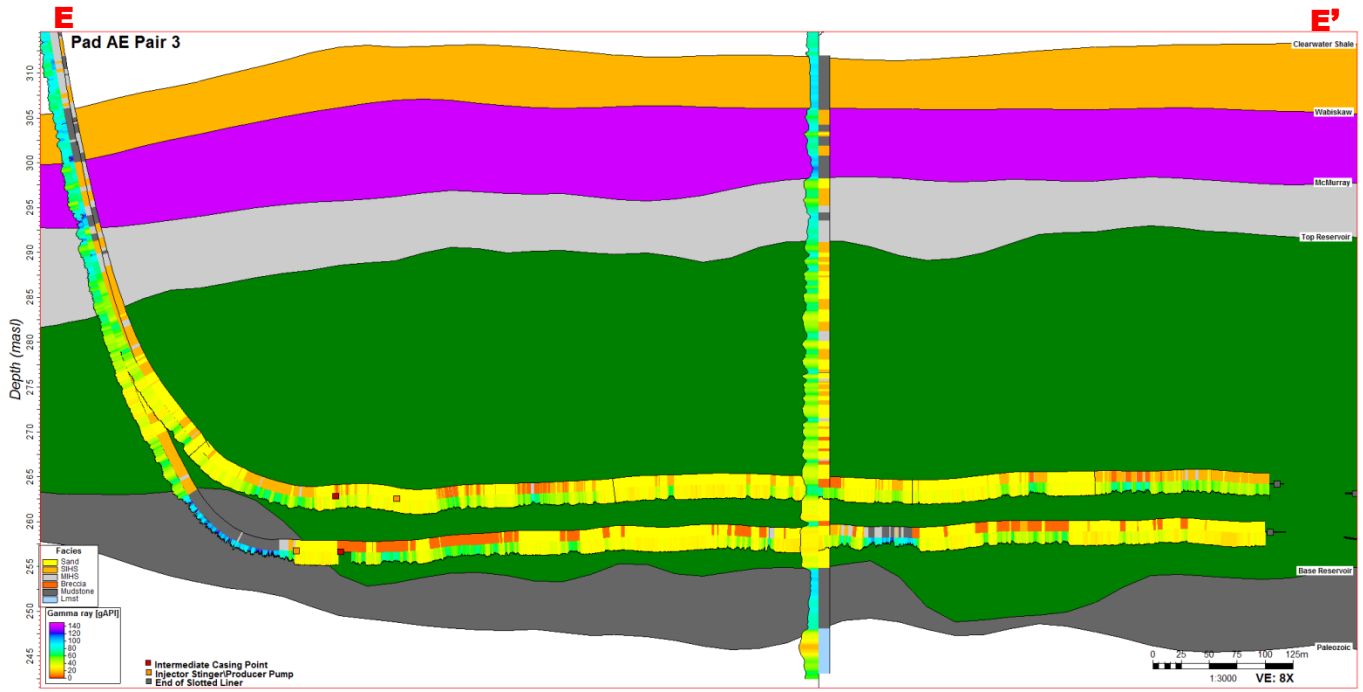


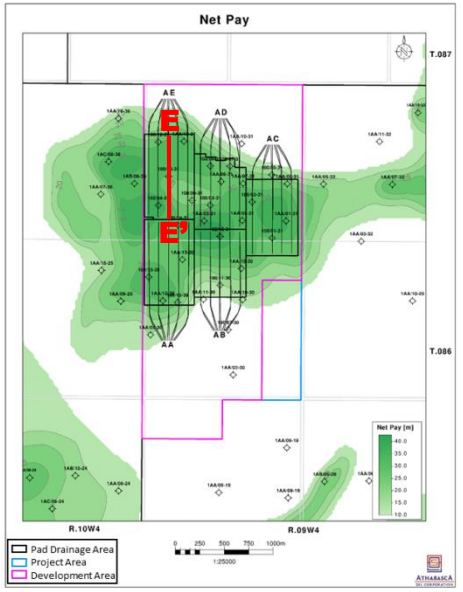


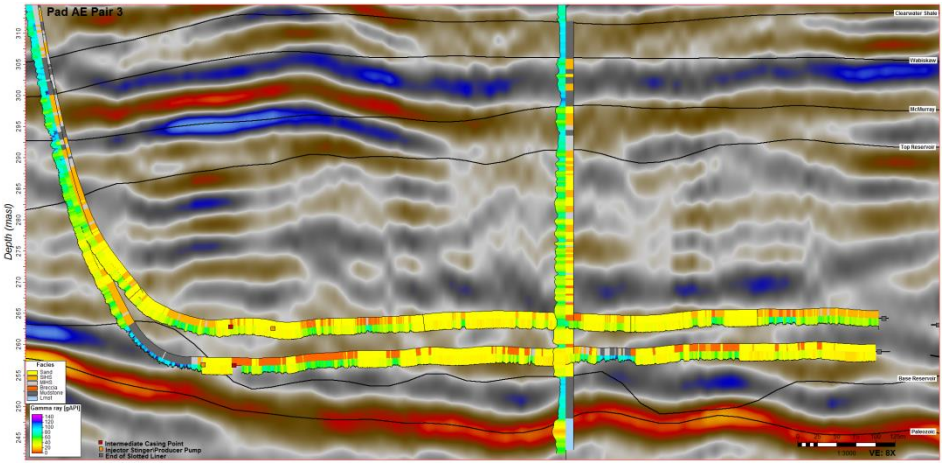


- Total lateral length 693 mMD.
- Average injector-producer separation: 5.3m
- Well is placed low in reservoir in bitumen rich sand with 94% reservoir along wellbore
  (mean net pay thickness above producer 25m).

HANGINGSTONE PROJECT
SAGD DRILLING RESULTS – PAD AE WP3



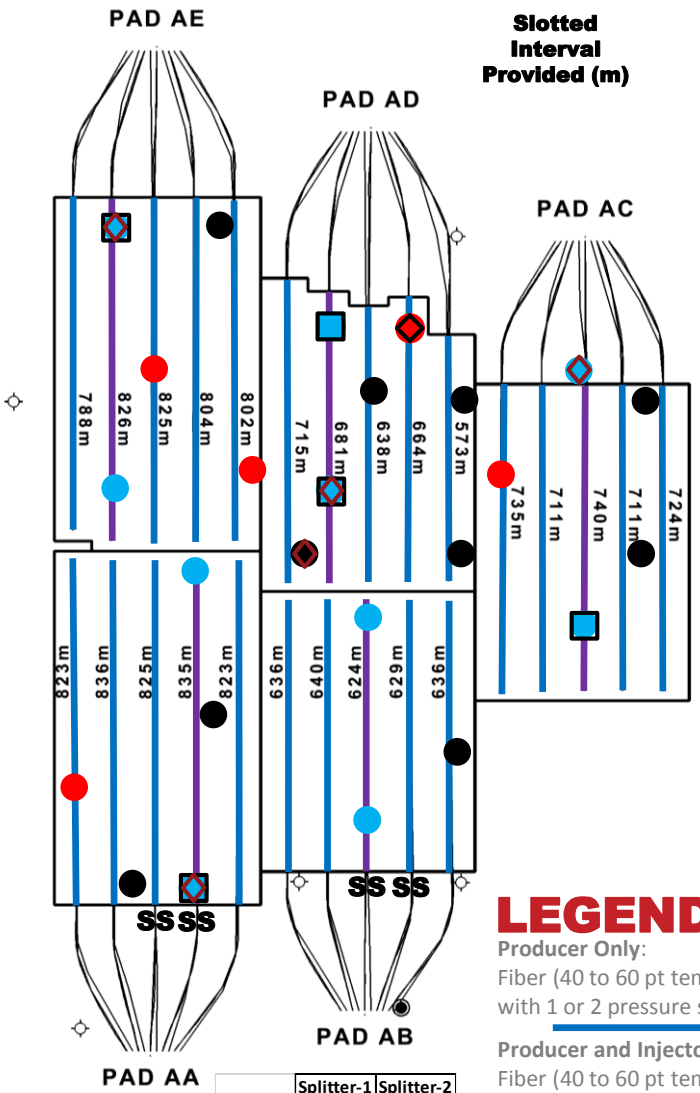




- Total lateral length 845 mMD.
- Average injector-producer separation: 5.2m
- Well is placed low in reservoir in bitumen rich sand with 89%* reservoir along wellbore
(mean net pay thickness above producer 25m).

* Percent reservoir is based on GR<60 API;
image log confirm GR>60°API is dominantly breccia.

HANGINGSTONE PROJECT
INSTRUMENTATION IN SAGD AND OBSERVATION WELLS



Well	Splitter-1 MD (m)	Splitter-2 MD (m)
AAI03	701	1103
AAI04	903	1105
ABI03	741	896
ABI04	757	958

OBSERVATION WELLS

- All equipment functioning (no failures to date)
- Thermocouples or piezometers below pay on many observation wells
- Instrumentation used during circulation and SAGD mode to monitor reservoir pressure build-up and heat propagation
- Results used to extrapolate reservoir pressure build-up and forecast water retention (source water demand)
- Observation well instrumentation agrees with wellbore instrumentation

SAGD WELLS

- Both DTS and FBG have accurate temperature monitoring and are adequate for temperature management along the wellbore
- DTS used during initial wellbore warm-up to develop initial well heating strategy to ensure casing integrity (finer resolution, ~1m)
- Injector instrumentation has demonstrated that blanket gas is an accurate means of measuring BHP and BHT
- Injector instrumentation used during circulation for temperature fall-offs, as a means to compare against producer response
- Producer bottom hole pressure sensor used to determine wellbore subcool
- Steam splitters were left closed during circulation and opened for SAGD. No issues opening of splitters

LEGEND

Producer Only:
Fiber (40 to 60 pt temp FBG, or DTS) with 1 or 2 pressure sensors

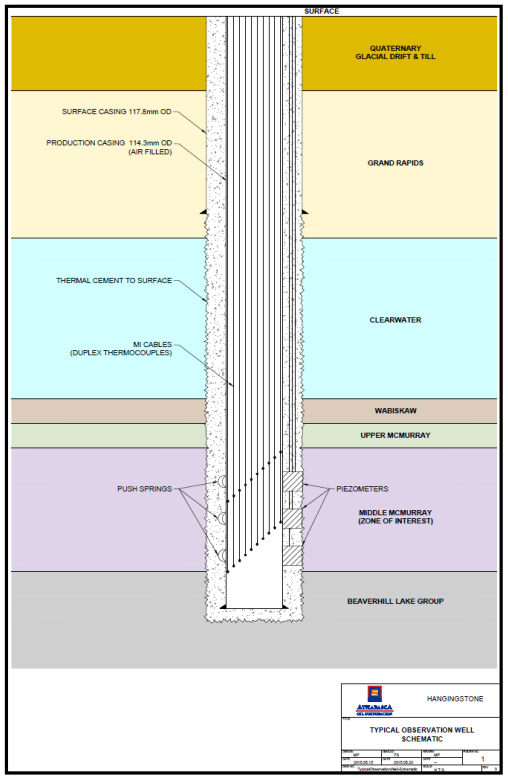
Producer and Injector:
Fiber (40 to 60 pt temp FBG, or DTS) each with 1 or 2 pressure sensors

SS = Steam Splitters
4 injectors, each with 2 ports
AA3 and AB3 have slimbore 7” liner

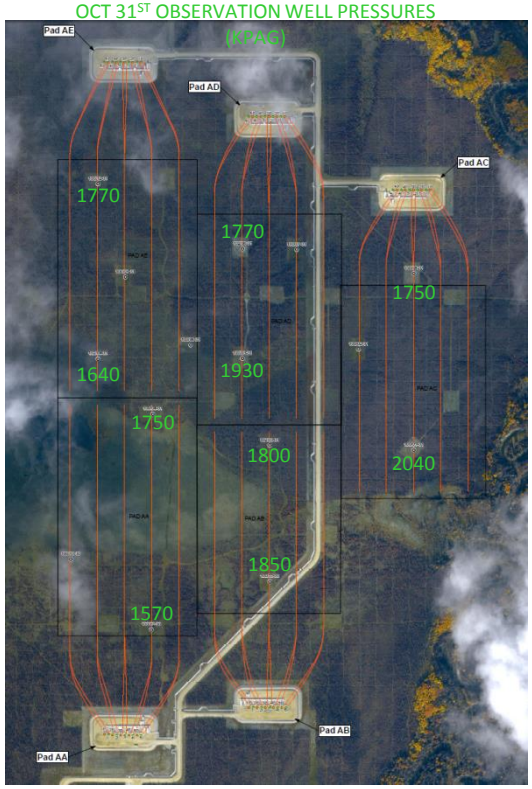
- 10 Vertical delineation well
- 5 Obs wells with 10 to 20 TCs
- 10 Obs wells with 10 to 20 TCs and 3-6 piezometers
- Obs well also monitoring above pay (U.McM, Wab, and CLW caprock)
- 5 Obs well with Well Reservoir Saturation Logging (RMT)

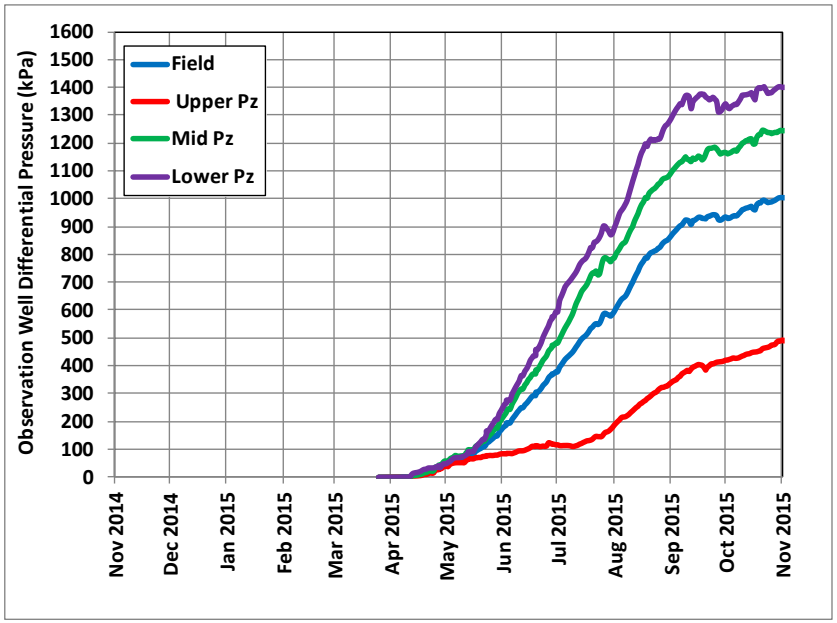
HANGINGSTONE PROJECT
SUBSURFACE- RESERVOIR PRESSURE BUILD-UP

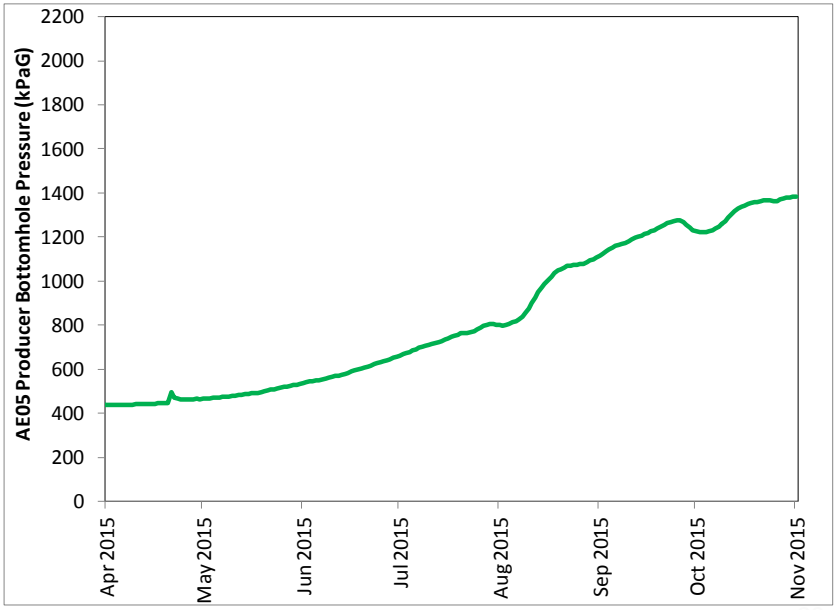
- Reservoir pressure building across entire field
- Pressure response is stronger at wellbore depth; slower pressure response at top of reservoir
- Pressure movement was quickest through LSZ
- Pressure response observed through all facies types: sands, breccias and IHS
- Offline SAGD well-pairs used in conjunction with vertical observation wells for pressure monitoring



OCT 31ST OBSERVATION WELL PRESSURES (KPAG)

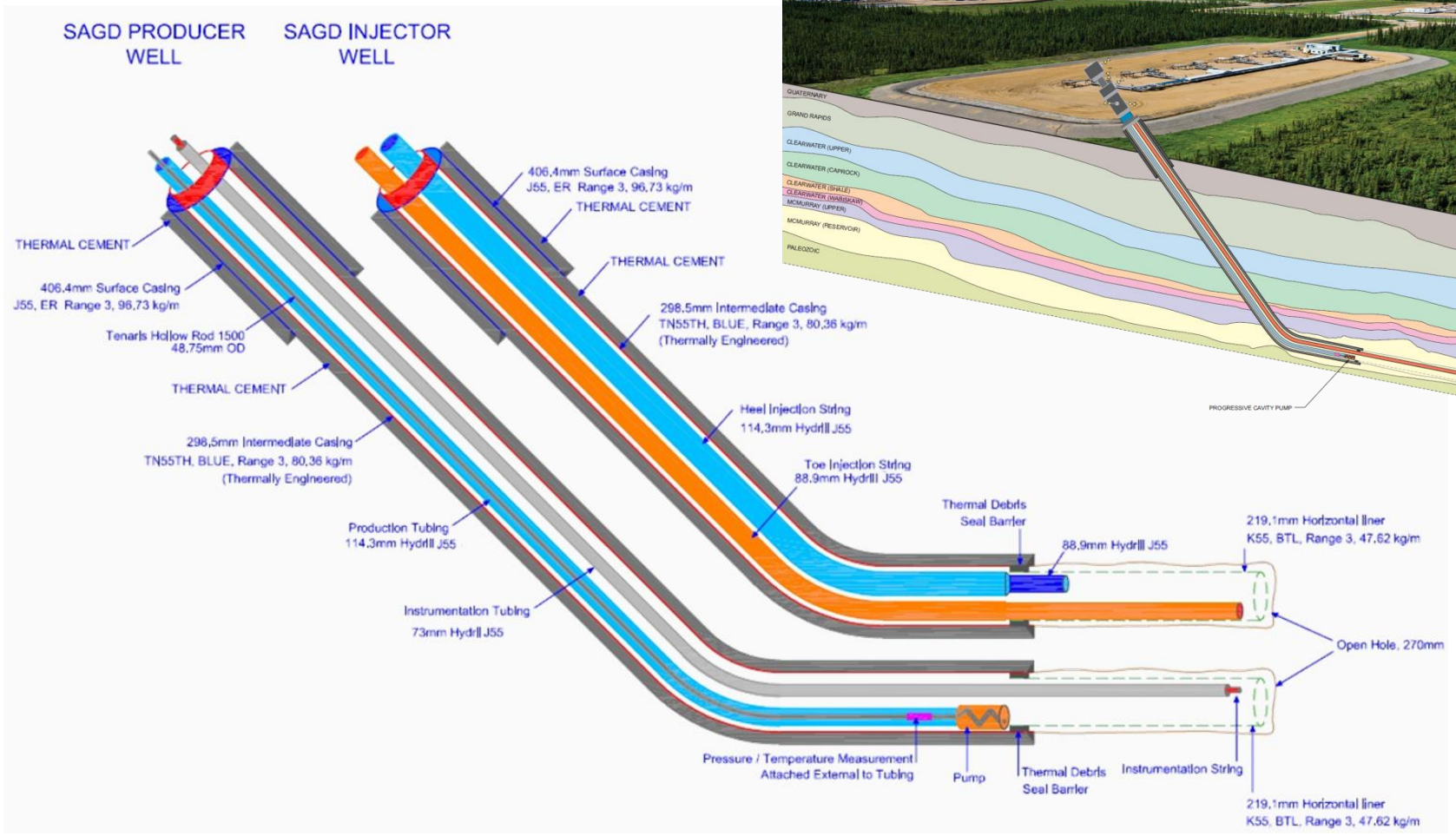






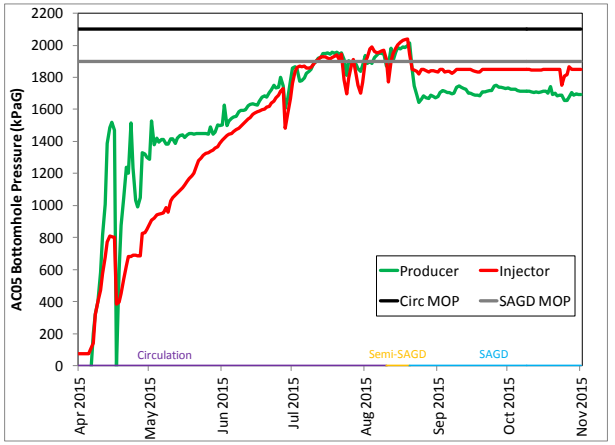
HANGINGSTONE PROJECT
COMPLETION SCHEMATIC FOR TYPICAL SAGD WELL PAIR

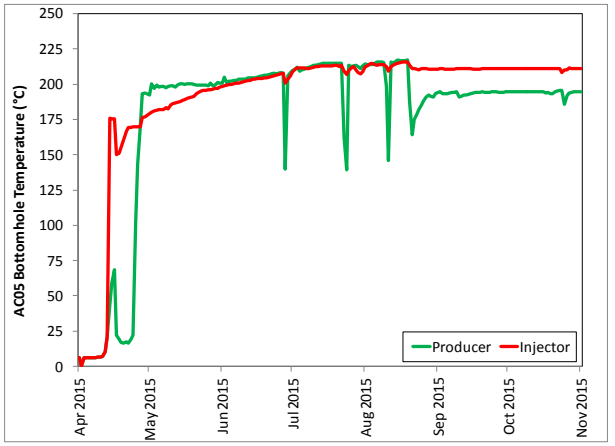
- Mechanical lift required to bring fluids to surface.
- All-metal PCP's utilized in all 25 producers, with the option to trial ESP's at a future date.
- Hollorod™ sucker rods utilized in all 25 producers.

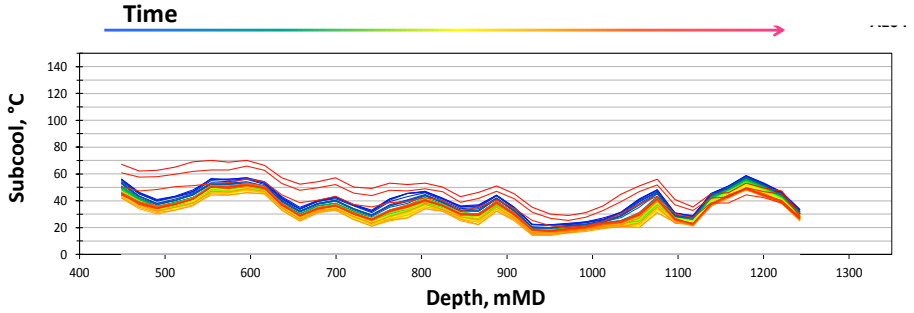


OPERATING STRATEGY

- **CIRCULATION**
  - Initiate wellbore warm-up strategy
  - Achieve steam-to-toe conditions, with returns to surface
  - Build reservoir pressure during circulation period
  - After hydraulic communication, expect dP <100kPa
  - Perform temperature fall-offs to assess conversion readiness
- **SEMI-SAGD**
  - Reverse dP, direction so that fluids flow towards producer
    Producer BHP < Injector BHP
  - Injector returns are closed, producer returns are open
- **SAGD**
  - Continue to build pressure towards SAGD MOP, post conversion as required
  - Operate injector with a 50 kPa standoff from MOP
  - Manage subcool (by minimum subcool measurement)
  - Increase pump rate and injection rate as subcool permits
  - Monitor differential pressure between producer-injector



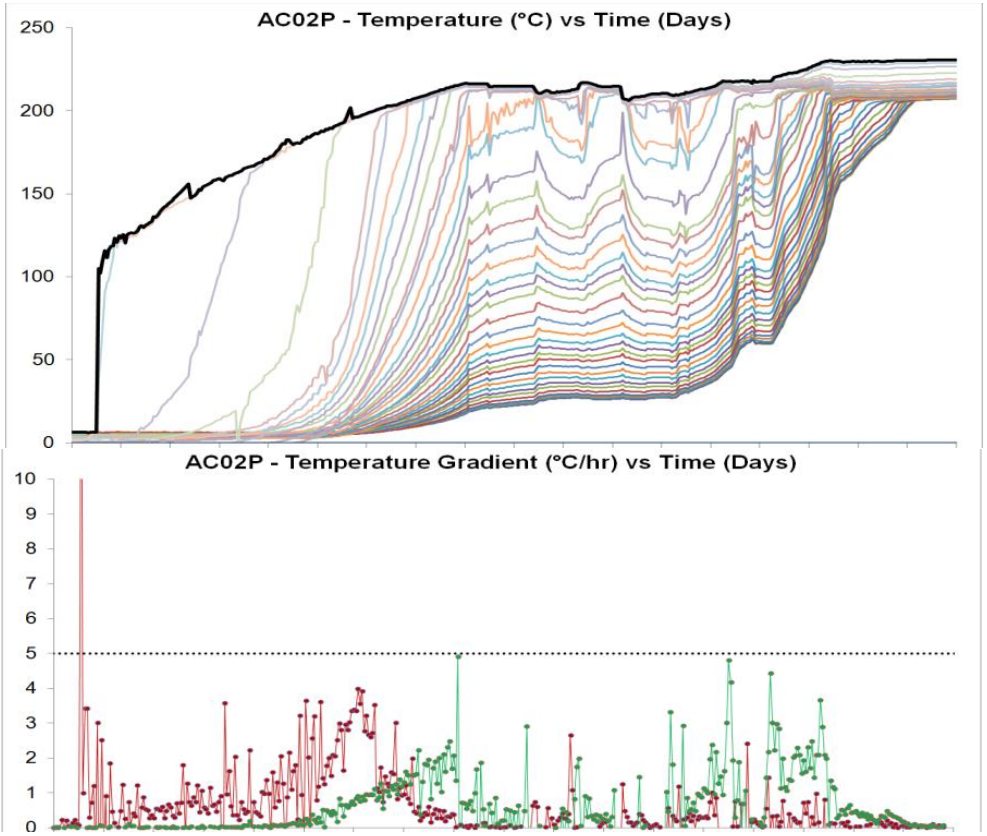




HANGINGSTONE PROJECT
SUBSURFACE - INITIAL WELL BORE WARM UP

- Temperature fiber strings used to monitor rate of temperature change
- Temperature strings have measurements throughout wellbore and up riser section to surface
- Target maximum temperature gradient of <5°C/hr
- Temperature gradient was to protect casing and cement integrity
- Typically 5 days for steam conditions at heel and additional 7 days for steam to toe
- About 7 days saved in using annulus gas to initially lift wellbore liquids to surface
- Successful execution of initial wellbore warm-up strategy across field

AC02P Warm Up



HANGINGSTONE PROJECT
SUBSURFACE – CONVERSIONS TO SAGD

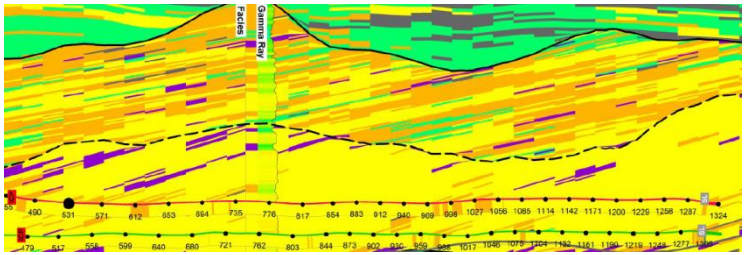
ASSESSMENT CRITERIA

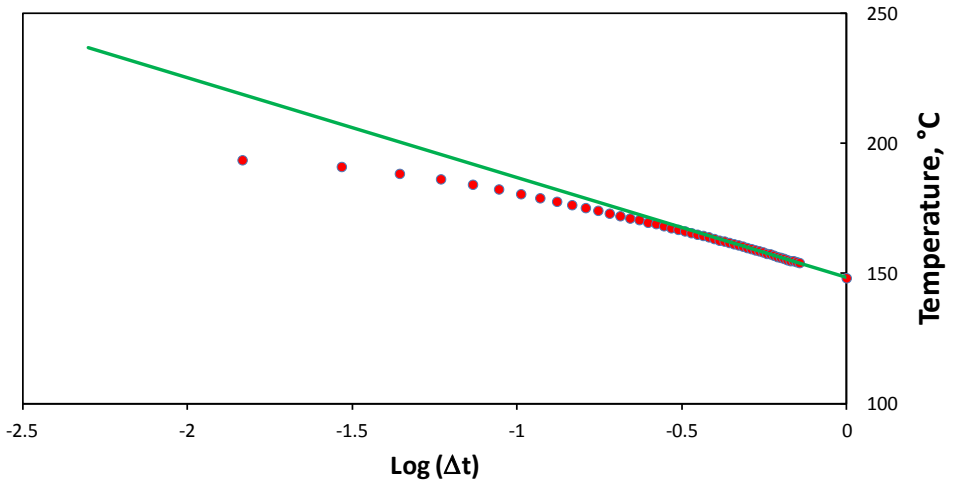
Field Data and Tests

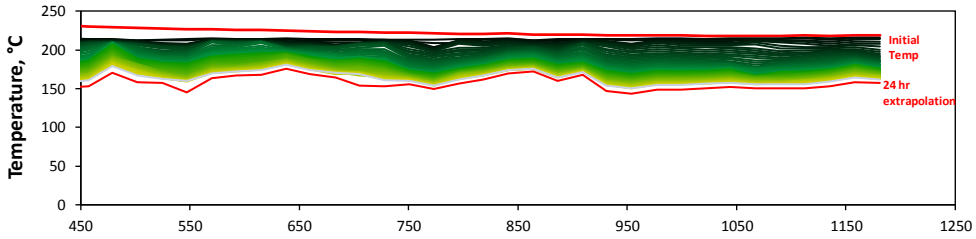
- 24 hr temperature fall-off profile determined by semi-log extrapolation of temperature transient
- Target temperature >135°C for >90% wellbore
- Hydraulic communication
  Injector-Producer pressure interference test
- Semi-SAGD response
  Oil rates, pressure communication.

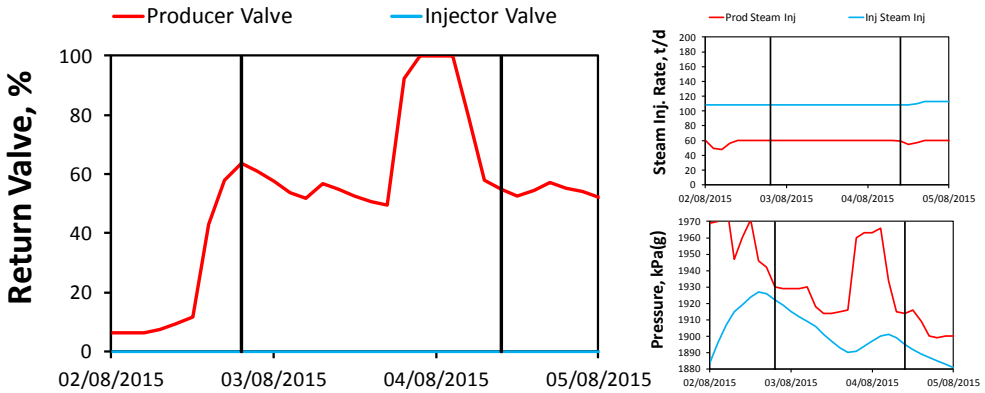
Predicted Performance

- Heat transfer to reservoir
  Energy/mass transferred
- Simulator response
  Predicted oil ramp-up
- Fall-off temperature profile used to determine initial steam-splits, and are consistent with lateral temperature during SAGD







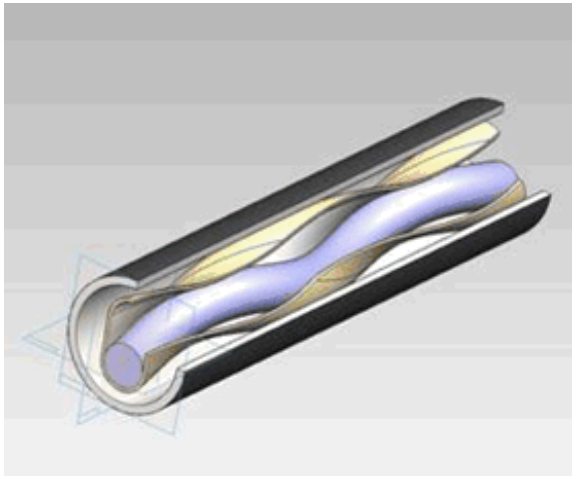


HANGINGSTONE PROJECT
SUBSURFACE – CIRCULATION LEARNINGS

- Instrumentation crucial in monitoring steam-to-toe and rate of temperature change
- Success in steaming through stator of PCP and connecting rotor to stator after circulation
- AOC did not target bullheading (no returns to surface) as part of circulation strategy. However, bullheading did occur on some well pairs.
  - There was no discernable impact from bullheading on heat conformance along wellbore
  - Bullheading expedited circulation due to greater transfer of energy to reservoir
  - Bullheading aided with building pressure to target operating pressure
  - Bullheading reduced as reservoir pressure increased throughout circulation
  - Bullheading required greater volume of source water to manage water material balance
  - Localized bitumen saturation and facies had strong correlation with bullheading (higher S_w more leak-off). Typically producers in richer oil sands and did not have bullheading
- Bitumen returns to surface were observed after reservoir operating pressure reached and bitumen mobilized (~3 to 4 months post first steam)
- Conversion criteria from circulation to SAGD mode was validated post-conversion by successful ramp-up of oil production and steam injection

HANGINGSTONE PROJECT
ARTIFICIAL LIFT – PROGRESSIVE CAVITY PUMPS (PCPs)

- PCP rotors and stators both installed during initial well completion
- Rotors landed just above metal stators to allow steaming through stator during circulation mode
- To convert to SAGD mode a 10m polish rod is installed on the top of the HolloRod™ rod string to place the rotor into the stator
- SAGD conversion completed in approximately 8 hours of rig time
- Quick conversion reduces cost and well pairs stay hot
- All 15 conversions to date have gone as per plan

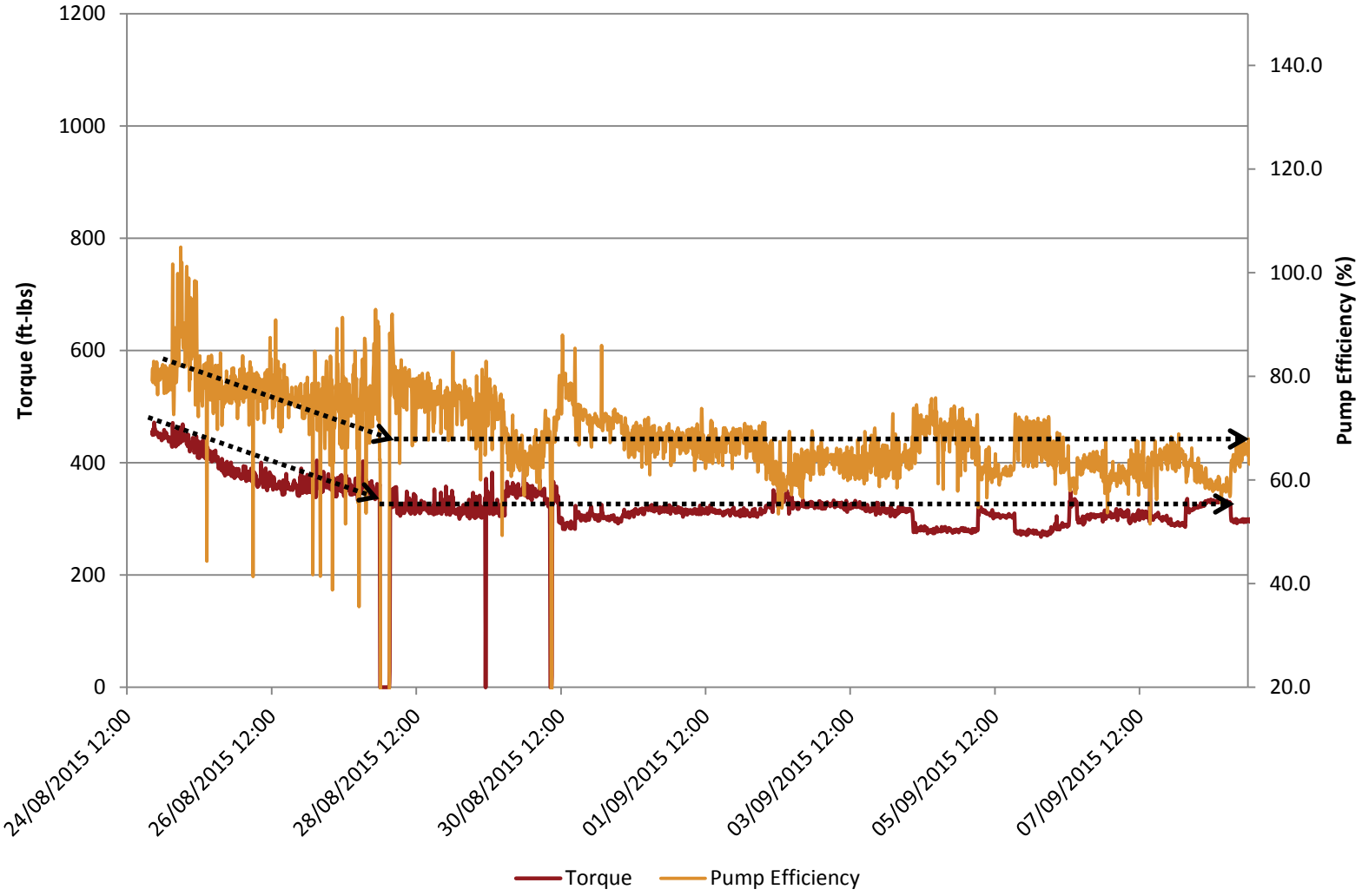


HANGINGSTONE PROJECT
ARTIFICIAL LIFT – PROGRESSIVE CAVITY PUMPS (PCPs)

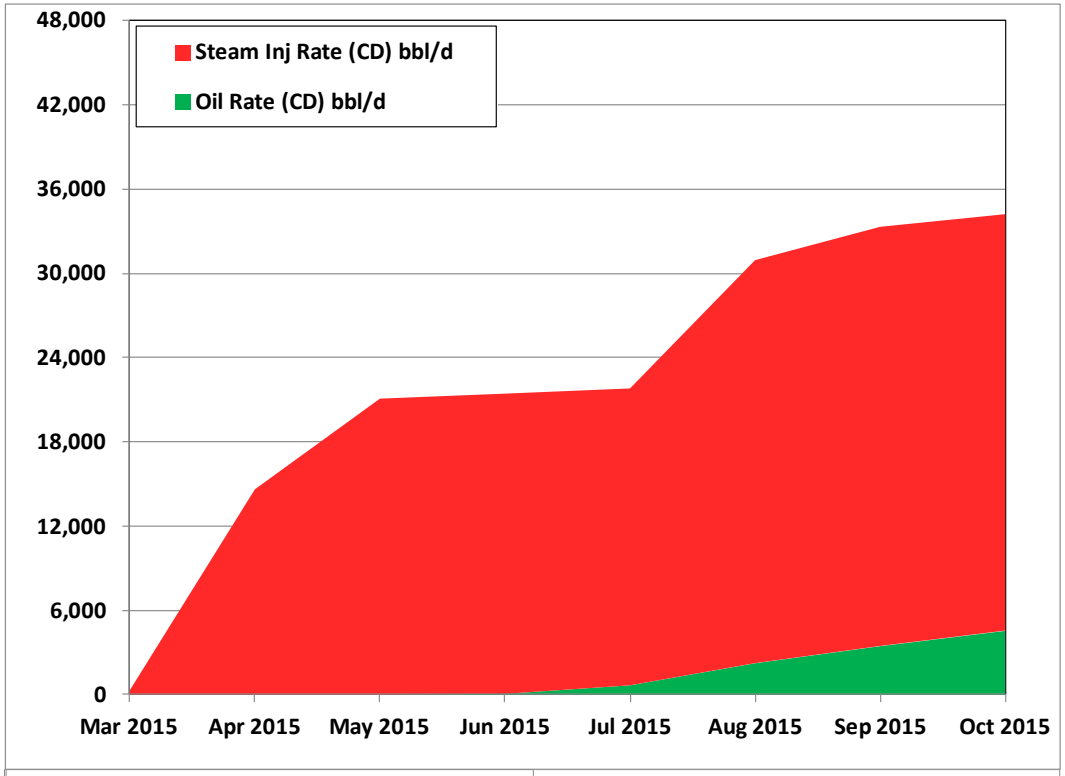
- All metal PCP's have performed as expected
- Efficiencies range from 30% to 60% after initial break-in
- Only one PCP has required replacement due to a rapid loss of efficiency caused by solids being cleaned up
- Only one failed rod string.
    - Investigation into cause of failure is in progress

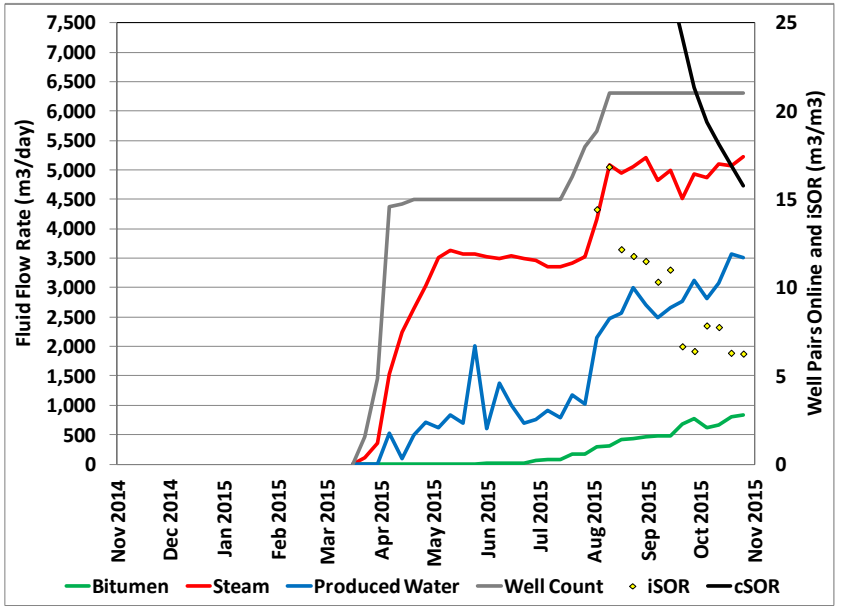
HANGINGSTONE PROJECT
ARTIFICIAL LIFT – PCP BREAK-IN TORQUE

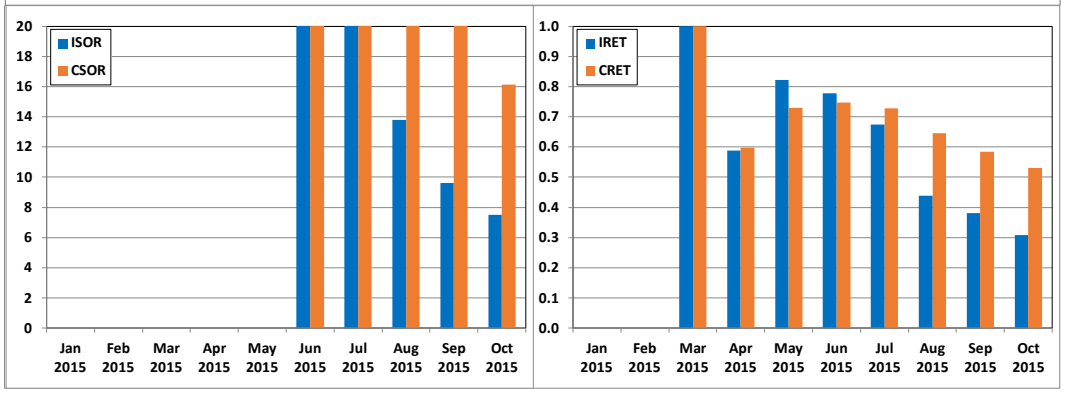
- Once converted to SAGD mode, all-metal PCP's have demonstrated a significant break-in phase
  - After break-in phase, performance stabilizes



HANGINGSTONE PROJECT
SCHEME PERFORMANCE – FIELD HISTORY

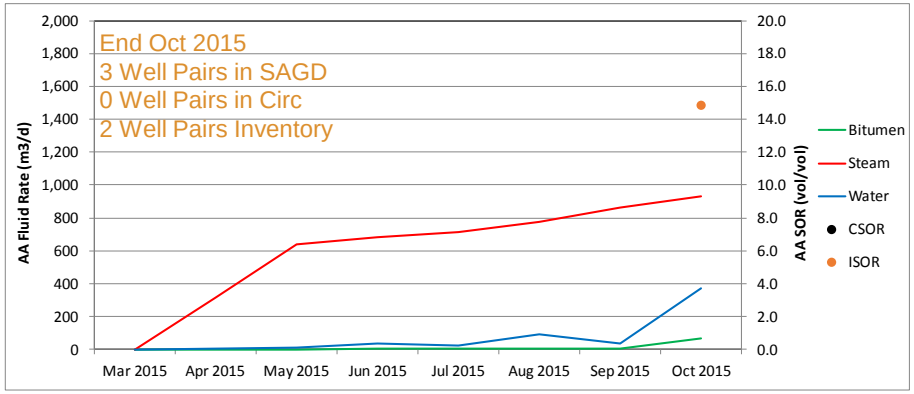


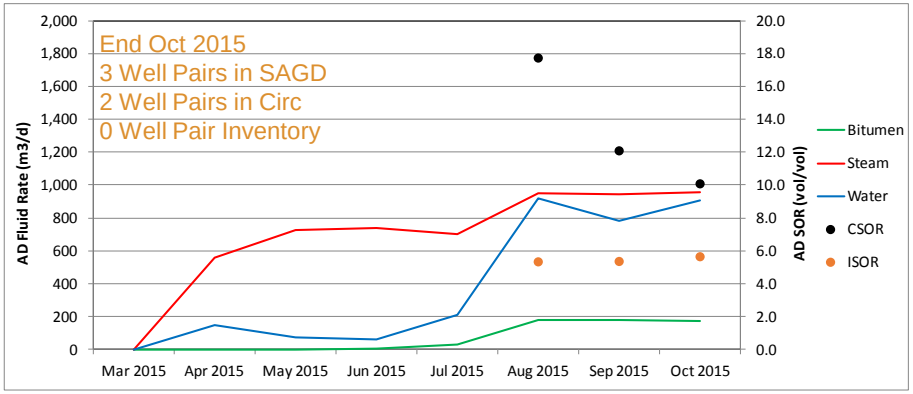


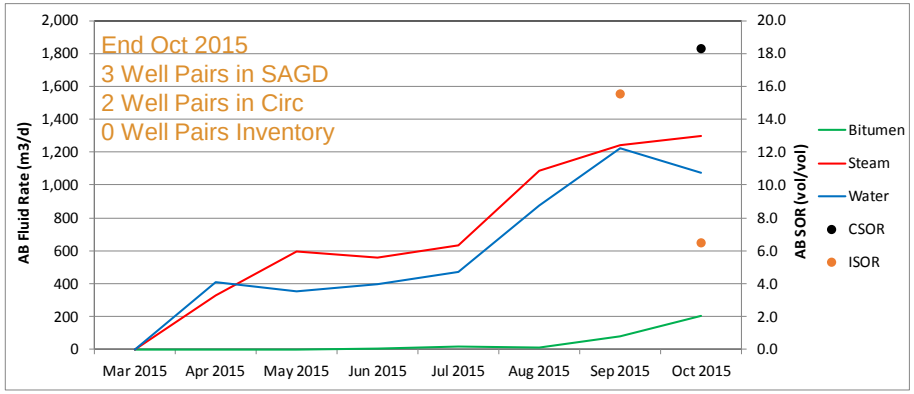


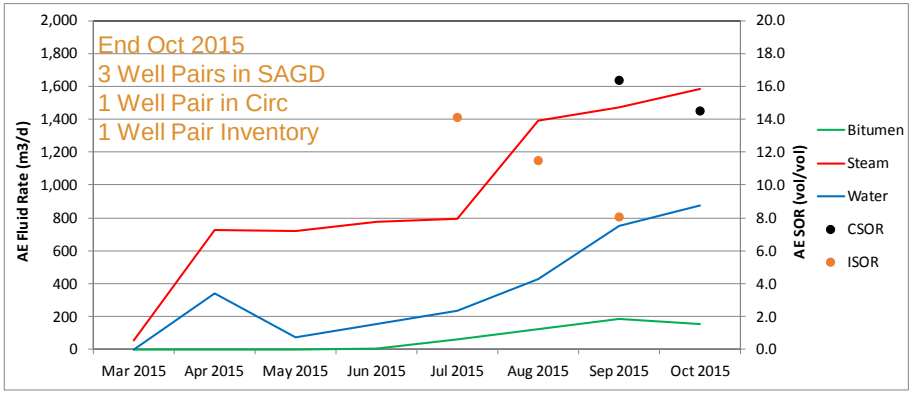
- Steam rate building towards CPF design 42,000 bbl
- Oil rate ramping-up in towards design 12,000 bbl/d
- 21 well pairs online; 15 in SAGD and 6 in circulation
- SOR declining towards CPF design of 3.5; displayed values include all steam for circulation
- SOR decline will continue as reservoir reaches target operating pressure and well pairs convert into SAGD
- Water retention continues to decline, reducing the daily withdrawal rate from the source water well

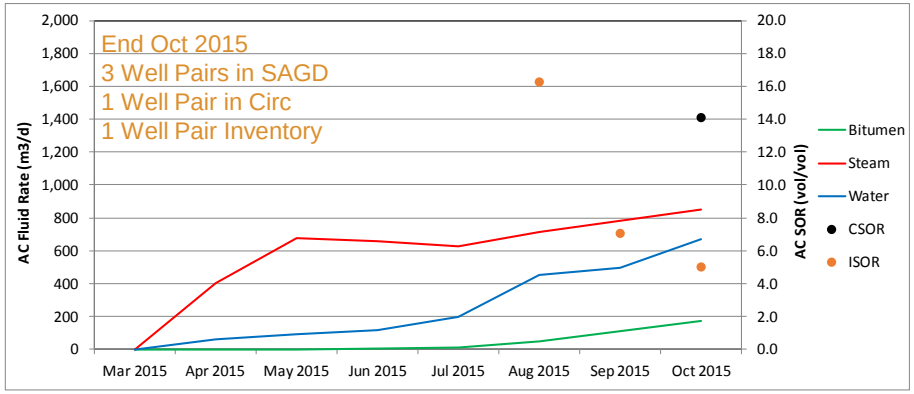
HANGINGSTONE PROJECT
SCHEME PERFORMANCE – PAD HISTORY











ALL PADS IN EARLY-TIME PRODUCTION RAMP-UP

- Oil production and steam injection are increasing across field
- ISOR decreasing as well pairs are converted into SAGD mode and progress through ramp-up
- Anticipate 6 more well pairs converted to SAGD by year end

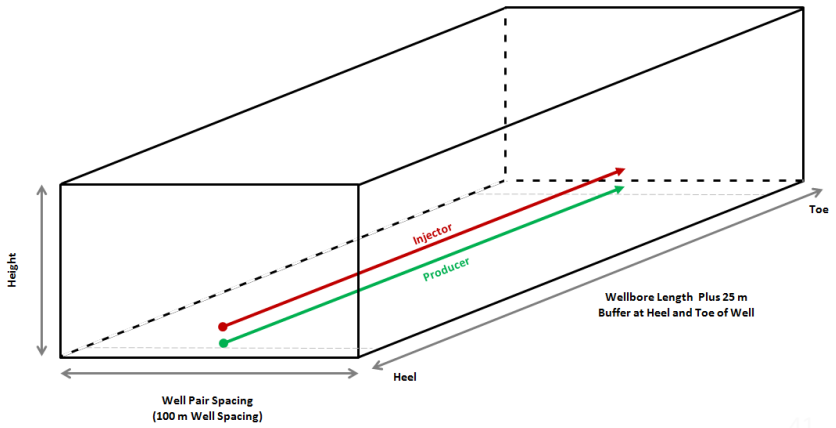
EARLY-TIME RESULTS CONFIRM:

- Excellent reservoir injectivity at all pads
- Highly productive reservoir at all pads
- Well pair separation of 5.0 to 5.5 m ideal for circulation and SAGD
- Properly designed slotted liner and artificial lift system

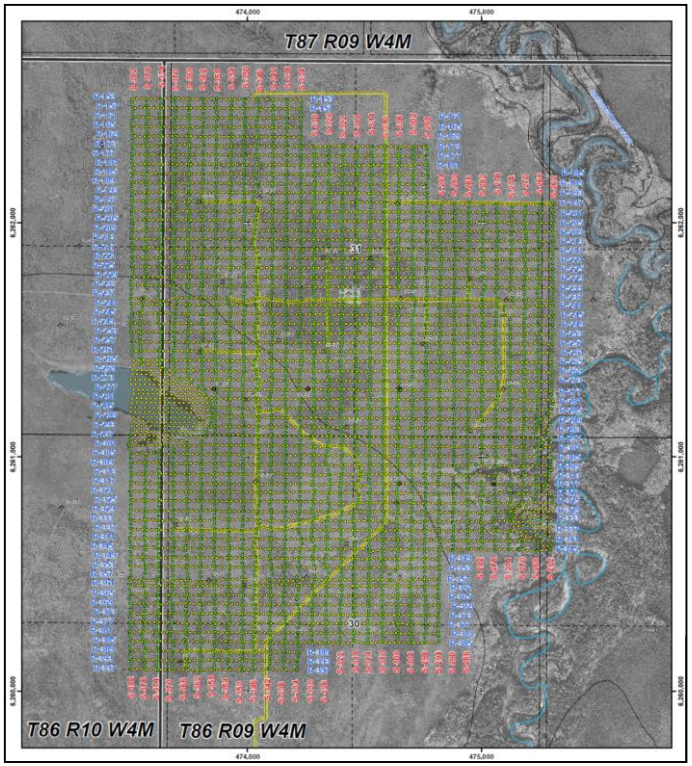
HANGINGSTONE PROJECT
SCHEME PERFORMANCE – PAD RECOVERIES

Pad	Well Pairs	Average Lateral Length	OBIP	Predicted RF	Current RF	Current RF
		(m)	(mln m^3)	(%)	(%)	(thousand m^3)
AA	5	850	2.75	50	0.1	2.0
AB	5	640	1.98	50	0.5	9.6
AC	5	750	2.67	50	0.5	10.2
AD	5	670	2.40	50	0.9	16.9
AE	5	830	2.65	50	0.8	15.9
TOTAL	25		12.45	50	0.4	54.6

OBIP and RBIP values are based on actual producer well placement and reservoir height above producer.



HANGINGSTONE PROJECT
4D SEISMIC



4D Seismic Strategy

- AOC has buried geophones over the five drainage areas to monitor steam growth and conformance using 4D seismic
  - Baseline was acquired in Q1 of 2014.
  - First monitor to be acquired Q1 of 2016.
- Buried geophones allow for year round shooting

ACQUISITION PARAMETERS

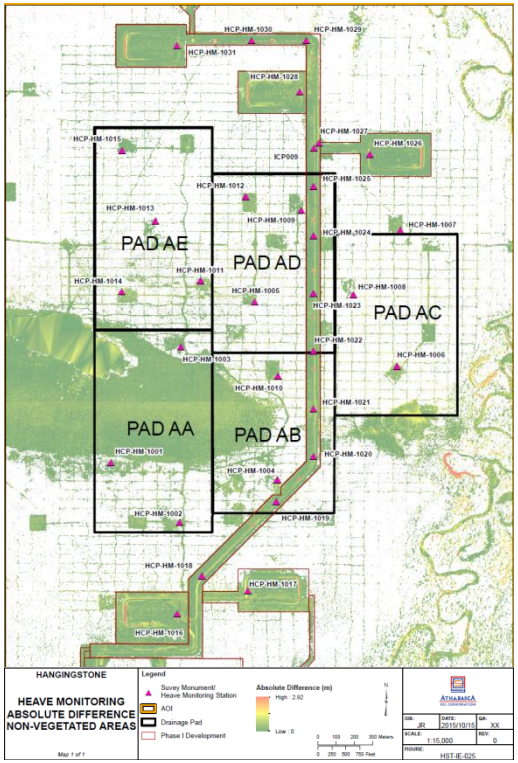
- Area: 3.72 km^2
- Source line interval: 60 m, source interval: 20 m
- Receiver line interval: 40 m, receiver interval: 20 m
- Buried receiver depth: 3 m
- Source depth: 6 m
- Source: dynamite

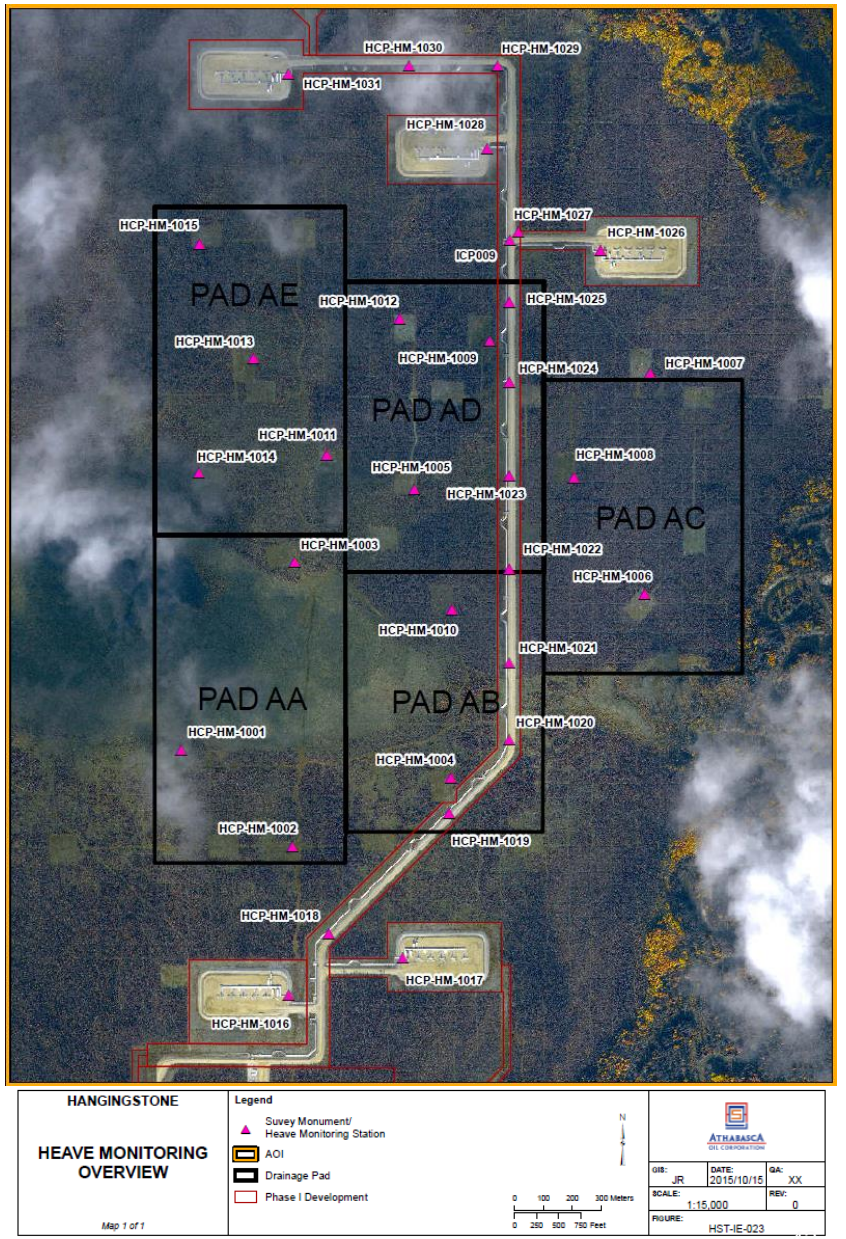
Area	2014				2015				2016				2017				2018			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Phase 1	B				S				M		M		M		M		M		M	

B Baseline S First Steam M Monitor

HANGINGSTONE PROJECT
SURFACE HEAVE MONITORING

- 31 permanent surface heave monuments (0.30 x 0.30 m plate)
  - Primary means for measuring heave across field
  - 15 monuments located at the observation wells and 16 along pipeline corridors and pads
  - Targeting minimum 1 time per annum for surveying
- Lidar baseline acquired in July 2014
- Lidar follow-up acquired June 2015 (8 points per m^2) and 4 band imagery (0.30 x 0.30 m) in September 2015
  - No heave measured; results support use of heave monuments





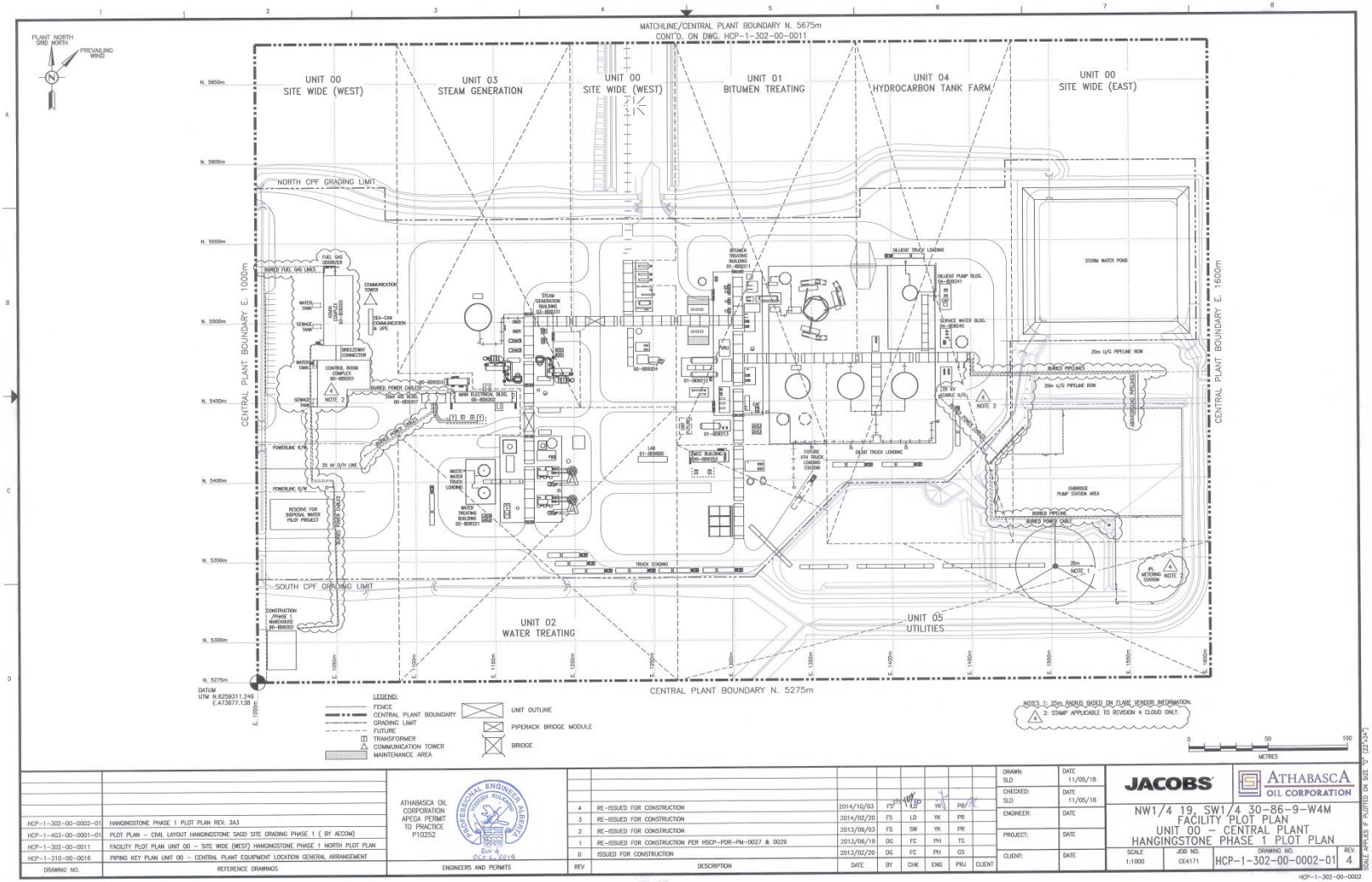
HANGINGSTONE PROJECT

SURFACE OPERATIONS

ATHABASCA OIL CORPORATION

HANGINGSTONE PROJECT

APPROVED PLOT PLAN - FROM D078 AMENDMENT APPLICATION 1757038



DRAWING NO.	REFERENCE DRAWINGS
HCP-1-302-00-0002-01	HANGINGSTONE PHASE 1 PLOT PLAN REV. 2A3
HCP-1-403-00-0001-01	PLOT PLAN – CIVIL LAYOUT HANGINGSTONE SAGD SITE GRADING PHASE 1 (BY ACCOM)
HCP-1-302-00-0011	FACILITY PLOT PLAN UNIT 00 – SITE WIDE (WEST) HANGINGSTONE PHASE 1 NORTH PLOT PLAN
HCP-1-310-00-0016	PIPING KEY PLAN UNIT 00 – CENTRAL PLANT EQUIPMENT LOCATION GENERAL ARRANGEMENT

ATHABASCA OIL CORPORATION
APEGA PERMIT TO PRACTICE
P10252
ENGINEERS AND PERMITS

REV	DESCRIPTION	DATE	BY	CHK	ENG	PRJ	CLIENT
4	RE-ISSUED FOR CONSTRUCTION	2014/10/03	FS	LD	YK	PR	
3	RE-ISSUED FOR CONSTRUCTION	2014/02/20	FS	LD	YK	PR	
2	RE-ISSUED FOR CONSTRUCTION	2013/09/03	FS	SW	YK	PR	
1	RE-ISSUED FOR CONSTRUCTION PER HSCP-PDR-PM-0027 & 0029	2013/06/19	DG	FC	PH	TS	
0	ISSUED FOR CONSTRUCTION	2013/02/20	DG	FC	PH	GS	

DRAWN: SLD — DATE 11/05/18
CHECKED: SLD — DATE 11/05/18
ENGINEER: — DATE
PROJECT: — DATE
CLIENT: — DATE

JACOBS
ATHABASCA OIL CORPORATION

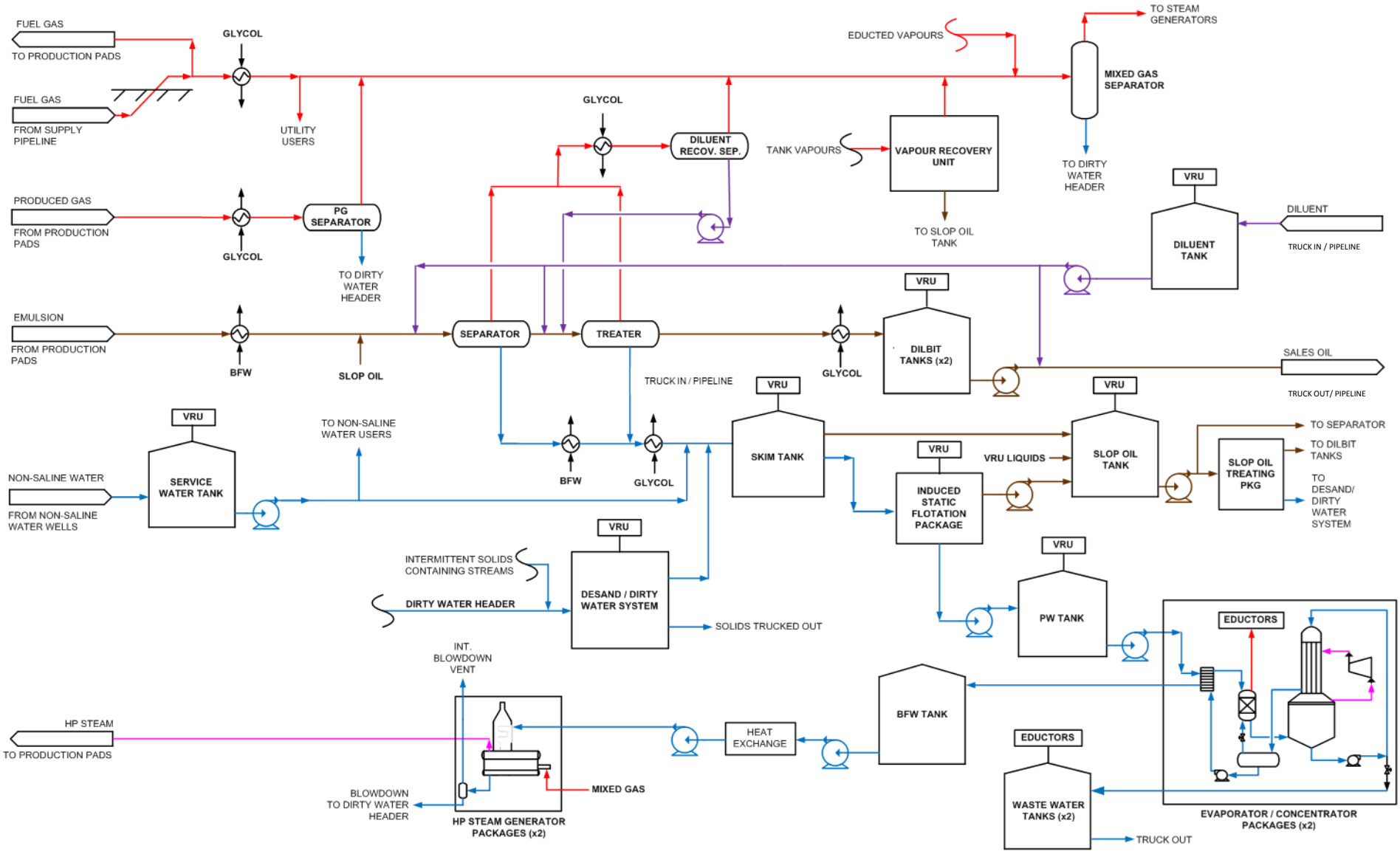
NW1/4 19, SW1/4 30-86-9-W4M
FACILITY PLOT PLAN
UNIT 00 – CENTRAL PLANT
HANGINGSTONE PHASE 1 PLOT PLAN

SCALE 1:1000 | JOB NO. CE4171 | DRAWING NO. HCP-1-302-00-0002-01 | REV. 4

SCALE APPLIES IF PLOTTED ON SIZE "D" (22"x34")

HCP-1-302-00-0002

HANGINGSTONE PROJECT
FACILITY SCHEMATIC



HANGINGSTONE PROJECT
FACILITY PERFORMANCE

FACILITY DESIGN

- **MATERIAL RATES**
  - Bitumen: 1,908 m^3/d
  - Steam: 6,677 m^3/d
  - Produced Water: 6,243 m^3/d
  - Diluent: 616 m^3/d
- **GAS USAGE**
  - Purchased: 475 10^3 m^3/d
  - Produced Gas: 7.12 10^3 m^3/d
  - Flared: 0.39 10^3 m^3/d (purge gas)
  - Vented: 0.12 10^3 m^3/d (truck loading)
- **GREENHOUSE GAS EMISSIONS**
  - CO_2E: 0.565 Mt/y (site-generated)
- **EXPECTED POWER CONSUMPTION**
  - 8.6 MW operating load
  - 6,278 MWh monthly import
- Values are annual averages.
- Solution gas is recovered and used as fuel in the steam generators.

HANGINGSTONE PROJECT
FACILITY PERFORMANCE

HANGINGSTONE PROJECT
FACILITY PERFORMANCE

SITE RELIABILITY >99%

UNIT 00- SITE WIDE

- There were no equipment failure experienced in this area which contributes to plant downtime & oil production. **OSF** is **100%**

UNIT 01- BITUMEN TREATING

- There were no equipment failure experienced in this area which contributes to plant downtime & oil production. **OSF** is **100%**

UNIT 02 – WATER TREATING:

- There were no equipment failure experienced in this area which contributes to plant downtime & oil production. **OSF** is **100%**

UNIT 03- STEAM GENERATION:

- There are 2 x 50 % steam generation unit. Steam demand for March 2015 to June 2015 was less than one boiler capacity.
- From July 2015 to October 2015, we operated both boilers to meet steam demand. OSF for Unit 03 is 99%

UNIT 04- HYDROCARBON TANK FARM:

- Continuous service rotating equipment in Unit 04 of Hangingstone Phase 1 are based on sparing philosophy of 2 x 100 % or 3 x 50% and intermittent service is 1 x 100 %,
- There were no equipment failure experienced in this area which contributes to plant downtime & oil production. OSF is 100%

UNIT 05 : UTILITIES

- Equipment in Unit 05 of Hangingstone Phase 1 are based on sparing philosophy of 2 x 100 % ,
- There were no equipment failure experienced in this area which contributes to plant downtime & oil production. OSF is 100%

HANGINGSTONE PROJECT
FACILITY PERFORMANCE

- Power Consumption YTD 40,934 MWh

Power Usage	
	MWh
Jan-15	737
Feb-15	1,283
Mar-15	3,195
Apr-15	3,866
May-15	3,822
Jun-15	4,908
Jul-15	5,324
Aug-15	5,989
Sep-15	6,326
10/26/2015	5,483

- DESIGN VALUE 6,278 MWH/ MONTH

HANGINGSTONE PROJECT
FACILITY PERFORMANCE

- Gas Usage YTD 60,955 e^3m^3
- Solution Gas recovery 100%

	Purchased Gas	Produced Gas	Diluent Flash	Gas Flared	Total Gas Usage
	e^3m^3	e^3m^3	e^3m^3	e^3m^3	e^3m^3
Jan-15	377	0	0		377
Feb-15	602	0	0		602
Mar-15	2,440	0	0		2,440
Apr-15	6,135	0	0		6,135
May-15	8,371	0	0		8,371
Jun-15	7,526	0	0		7,526
Jul-15	7,579	16.3	5.3	25.6	7,601
Aug-15	9,571	55.3	6.3		9,632
Sep-15	9,689	82.8	15.8		9,788
Oct-15	10,012	85.6	16.3		10,114

HANGINGSTONE PROJECT
FACILITY PERFORMANCE

- DIRECT GHG EMISSIONS – YTD 125.63 KT CO_2 EQUIVALENT
- ESTIMATED USING CAPP SHORT FORM METHODOLOGY
- SGER METHODOLOGY WILL BE USED FOR FORMAL SUBMISSION.

Direct GHG Emissions	
	kt CO2e
Jan-15	0.78
Feb-15	1.24
Mar-15	5.03
Apr-15	12.64
May-15	17.24
Jun-15	15.50
Jul-15	15.72
Aug-15	19.84
Sep-15	20.16
Oct-15	20.83

- DIRECT GHG EMISSIONS – LESS THAN DESIGN DUE TO RATES AS WELL AS HEAT INTEGRATION INCORPORATED DURING DESIGN PHASE

WASTE DISPOSAL

- Waste streams are slop oil and evaporator blowdown

		2015 (Volumes in m^3)										
	Facility Code	January	February	March	April	May	June	July	August	September	October	Totals
Evap Waste	AP WP 0000557		120.0		39.2			168.7	15.0		ND	**342.9**
	AB IF 0082399									62.5	ND	**62.5**
	AB WP 0000688		344.8	1261.5	541.7						ND	**2,148.0**
	AB WP 0134298				433.5	1403.1	1545.9	2308.4	2992.4	3529.4	ND	**12,212.7**
	SK IF 0005884									195.0	ND	**195.0**
											Total	**14,961.1**
Slop	AP WP 0000557	20.0									ND	**20.0**
	AB WP 0000688							94.5			ND	**94.5**
	AB WP 0133414							88.5	158.8	533.9	ND	**781.2**
											Total	**895.7**

- Slop oil volumes less than anticipated – currently 3% of bitumen production by volume
- Evaporator disposal averaging 2% of water to facility

HANGINGSTONE PROJECT
MEASUREMENT AND REPORTING

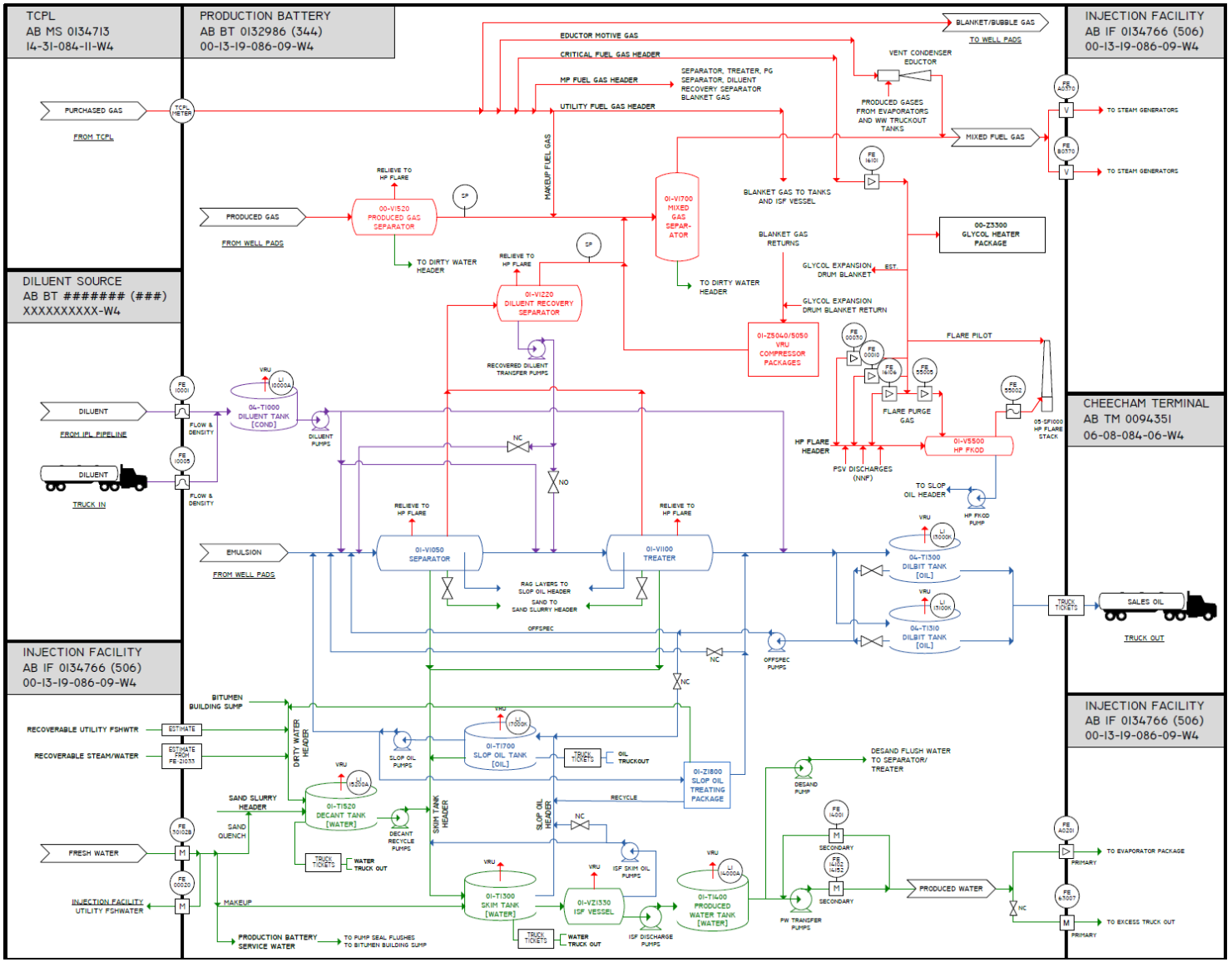
- Measurement, Accounting and Reporting Plan (MARP) approval received on October 5, 2012.

- MARP updated on February 11, 2013 to capture Directive 078 amendment application design changes and to align the MARP with the requirements of Directive 081.

- MARP updated March 2014 to reflect changed references; Energy Resources Conservation Board (ERCB) to Alberta Energy Regulator (AER).

- MARP updated February of 2015 to reflect diluent supply from pipeline

HANGINGSTONE PROJECT
MEASUREMENT SCHEMETICS - BATTERY



LEGEND

STREAMS
- WATER
- BITUMEN
- STEAM
- GAS
- DILUENT

WELL TYPES
- OIL WELL
- STEAM INJECTION WELL
- WATER SOURCE WELL

METER TYPES
- VORTEX METER
- ULTRASONIC METER
- CORIOLIS METER
- MAGNETIC METER
- V-CONE METER
- PETRINEX ACCOUNTING METER
- METER NOT REPORTING TO PETRINEX

TAGS

EQUIPMENT TAGS PRECEDED BY "HCP-"
INSTRUMENT TAGS PRECEDED BY "HCP-XX-" WHERE XX IS THE UNIT IDENTIFIER

ABBREVIATIONS

AE – ANALYZER
CBD – CONTINUOUS BLOWDOWN
FE – FLOW ELEMENT (ACCOUNTING METER)
H20 – WATER CUT
IBD – INTERMITTENT BLOWDOWN
LI – LEVEL METER (RADAR TYPE)
NC – NORMALLY CLOSED
NNF – NORMALLY NO FLOW
NO – NORMALLY OPEN
SP – SAMPLE POINT

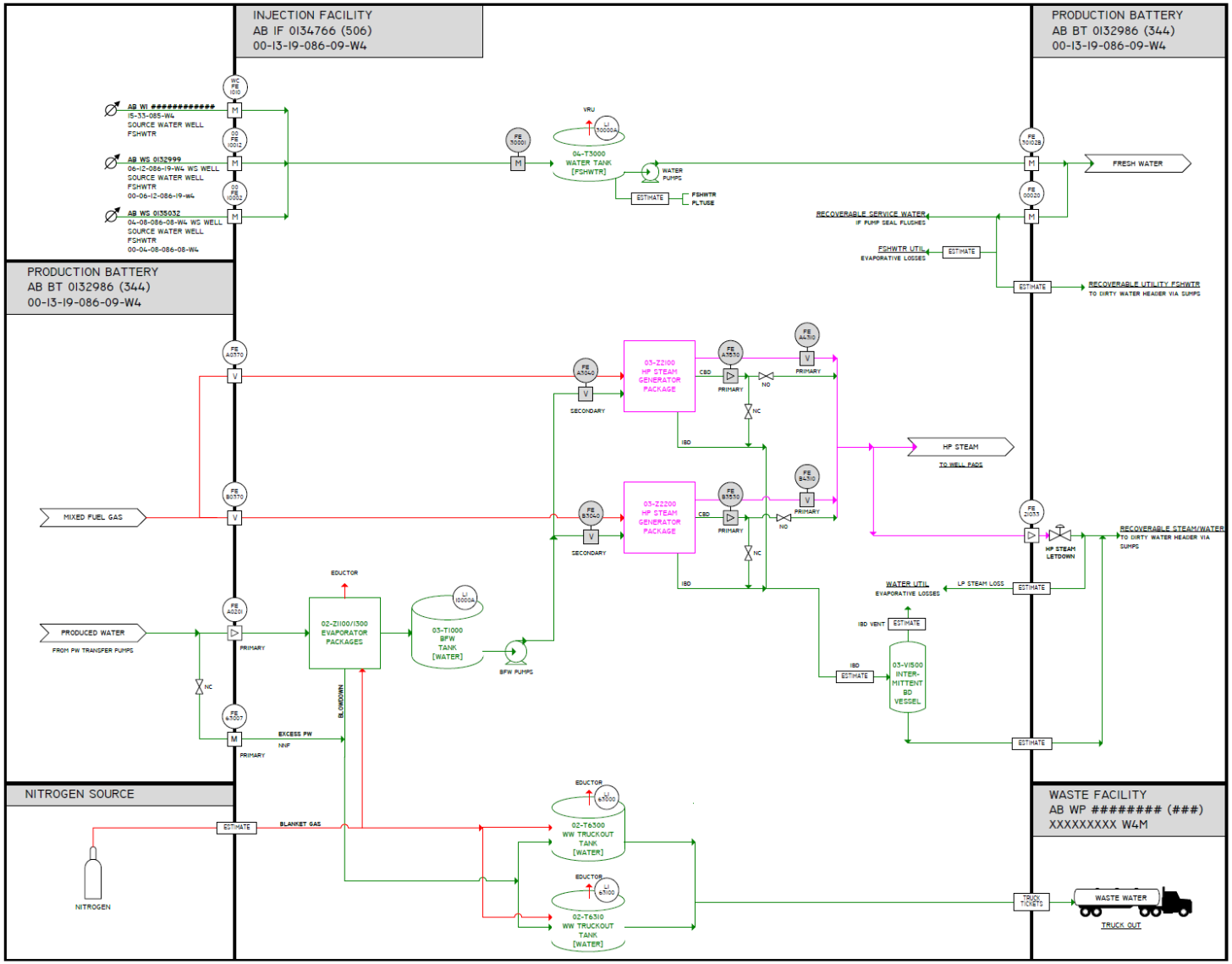
REV.	DESCRIPTION	DATE	BY
5	RE-IFA	24/02/15	SW
4	RE-IFA	18/03/14	YK
3	RE-IFA	06/02/14	YK
2	RE-IFA	01/02/13	SW
1	RE-IFA	05/06/12	SW
0	IFA	28/03/12	SW

ATHABASCA OIL CORPORATION

HANGINGSTONE PROJECT
MARP METERING SCHEMATIC

PRODUCTION BATTERY (PG 1 OF 3) | REV. 5

HANGINGSTONE PROJECT
MEASUREMENT SCHEMETICS – INJECTION FACILITY



LEGEND

STREAMS
WATER
BITUMEN
STEAM
GAS
DILUENT

WELL TYPES
OIL WELL
STEAM INJECTION WELL
WATER SOURCE WELL

METER TYPES
VORTEX METER
ULTRASONIC METER
CORIOLIS METER
MAGNETIC METER
V-CONE METER
PETRINEX ACCOUNTING METER
METER NOT REPORTING TO PETRINEX

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ABBREVIATIONS
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H2O – WATER CUT
IBD – INTERMITTENT BLOWDOWN
LI – LEVEL METER (RADAR TYPE)
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REV.	DESCRIPTION	DATE	BY
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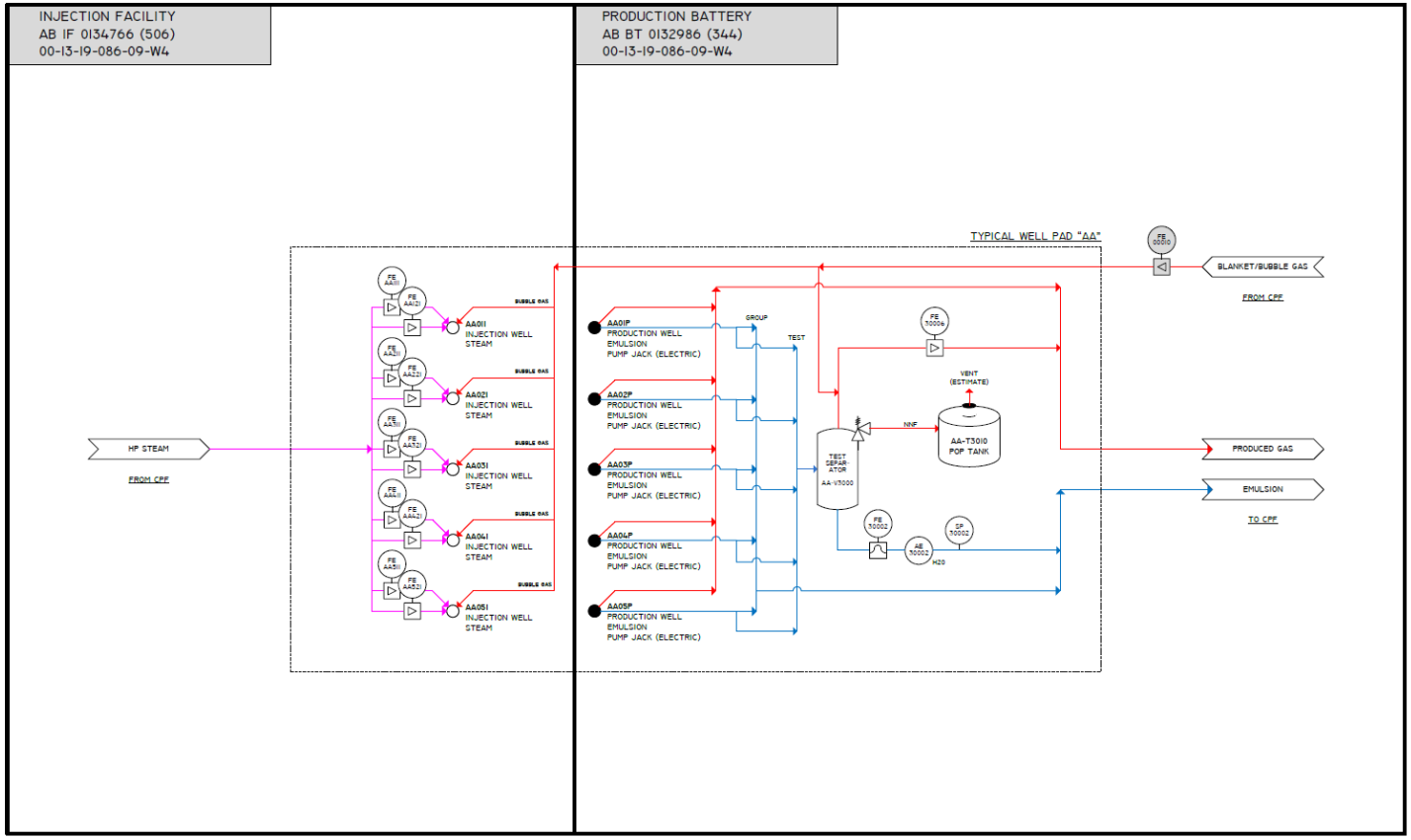
4	RE-IFA	18/03/14	YK
3	RE-IFA	06/02/14	YK
2	RE-IFA	01/02/13	SW
1	RE-IFA	05/06/12	SW
0	IFA	28/05/12	SW

ATHABASCA OIL CORPORATION

HANGINGSTONE PROJECT
MARP METERING SCHEMATIC

INJECTION FACILITY (PG 2 OF 3) | REV. 5

HANGINGSTONE PROJECT
MEASUREMENT SCHEMETICS – WELL PADS



LEGEND

STREAMS
WATER
BITUMEN
STEAM
GAS
DILUENT

WELL TYPES
OIL WELL
STEAM INJECTION WELL
WATER SOURCE WELL

METER TYPES
VORTEX METER
ULTRASONIC METER
CORIOLIS METER
MAGNETIC METER
V-CONE METER
PETRINEX ACCOUNTING METER
METER NOT REPORTING TO PETRINEX

TAGS
EQUIPMENT TAGS PRECEDED BY "HCP-"
INSTRUMENT TAGS PRECEDED BY "HCP-XX-" WHERE XX IS THE UNIT IDENTIFIER

ABBREVIATIONS
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CBD – CONTINUOUS BLOWDOWN
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REV.	DESCRIPTION	DATE	BY
5	RE-IFA	24/02/15	SW
4	RE-IFA	18/03/14	YK
3	RE-IFA	06/02/14	YK
2	RE-IFA	01/02/13	SW
1	RE-IFA	05/06/12	SW
0	IFA	28/03/12	SW

AOC WELL NAMES AND UNIQUE IDs

PAD AA		PAD AB		PAD AC		PAD AD		PAD AE	
AA01I	105/04-31-086-09W4/0	AB01I	106/03-31-086-09W4/0	AC01I	103/16-30-086-09W4/0	AD01I	100/02-30-086-09W4/0	AE01I	116/03-31-086-09W4/0
AA02I	106/04-31-086-09W4/0	AB02I	107/03-31-086-09W4/0	AC02I	100/16-30-086-09W4/0	AD02I	108/02-31-086-09W4/0	AE02I	114/04-31-086-09W4/0
AA03I	107/04-31-086-09W4/0	AB03I	108/03-31-086-09W4/0	AC03I	102/16-30-086-09W4/0	AD03I	118/03-31-086-09W4/0	AE03I	113/04-31-086-09W4/0
AA04I	108/04-31-086-09W4/0	AB04I	103/02-31-086-09W4/0	AC04I	102/15-30-086-09W4/0	AD04I	117/03-31-086-09W4/0	AE04I	112/04-31-086-09W4/0
AA05I	103/03-31-086-09W4/0	AB05I	104/02-31-086-09W4/0	AC05I	100/15-30-086-09W4/0	AD05I	105/03-31-086-09W4/0	AE05I	104/04-31-086-09W4/0
AA01P	103/04-31-086-09W4/0	AB01P	109/03-31-086-09W4/0	AC01P	106/16-30-086-09W4/0	AD01P	102/02-31-086-09W4/0	AE01P	104/03-31-086-09W4/0
AA02P	109/04-31-086-09W4/0	AB02P	110/03-31-086-09W4/0	AC02P	105/16-30-086-09W4/0	AD02P	107/02-31-086-09W4/0	AE02P	117/04-31-086-09W4/0
AA03P	110/04-31-086-09W4/0	AB03P	111/03-31-086-09W4/0	AC03P	104/16-30-086-09W4/0	AD03P	115/03-31-086-09W4/0	AE03P	118/04-31-086-09W4/0
AA04P	111/04-31-086-09W4/0	AB04P	105/02-31-086-09W4/0	AC04P	104/15-30-086-09W4/0	AD04P	114/03-31-086-09W4/0	AE04P	116/04-31-086-09W4/0
AA05P	112/03-31-086-09W4/0	AB05P	106/02-31-086-09W4/0	AC05P	103/15-30-086-09W4/0	AD05P	113/03-31-086-09W4/0	AE05P	115/04-31-086-09W4/0

ATHABASCA OIL CORPORATION

HANGINGSTONE PROJECT
MARP METERING SCHEMATIC

WELL PADS (PG 3 OF 3) | REV. 5

HANGINGSTONE PROJECT
MEASUREMENT METHODOLOGY

- **WELL PRODUCTION AND INJECTION VOLUMES**
  - Each well pad has a dedicated test separator with liquid flow meter and water cut analyzer to determine well bitumen and water production.
  - Wells will be individually put on test for one valid testing hour for every 20 hours of operation. Valid well test criteria per approved MARP.
  - Well gas production prorated from Battery Level GOR using a proration factor of 1. Battery Level GOR will be updated monthly.
  - Steam injection is metered at each individual wellhead. Primary and secondary steam production metering available at the central steam plant.
- **BATTERY SALES OIL**
  - Sales oil will be trucked from the Hangingstone Battery. Custody transfer metering will be done at the receiving facility.
- **MEASUREMENT TECHNOLOGY**
  - Well testing uses standard method of test separators with microwave water cut analyzers. New technologies such as multiphase flow meters may be evaluated later.

- **STEAM VOLUMES**

  - AOC utilizes Drum Boilers which generate 99.5% quality steam. A continuous blowdown (CBD) of approximately 2% is added to the steam of each boiler and is injected into the wells. A small portion of HP steam is letdown to provide LP steam for the facility. With the high quality BFW produced from the evaporators (<5ppm TDS), and the 2% CBD, only a small intermittent blowdown (IBD) is necessary, performed on a weekly basis. IBD flow is estimated at 0.02% of total water out of the facility using sound engineering practices.

  - The total steam leaving the steam plant is calculated by taking the measured stream at the outlet of the steam generator drum boilers plus the measured CBD flow from each boiler into the steam line less the measured HP steam which is let down into the LP steam system.

  - Secondary steam measurement is determined by taking the measured Boiler Feed Water Flow to each boiler less the estimated IBD, less the measured HP steam which let down to the LP steam header.

HANGINGSTONE PROJECT
MEASUREMENT METHODOLOGY

- **PRODUCED WATER VOLUMES**

  - Produced Water into the facility is calculated using the measured Water Disposition to the Injection Facility plus the Water Dispositions from the Plant plus and changes in Water Inventory less any Water Receipts.

  - Primary and secondary measurement is outlines as follows:

Water Disposition to Injection Facility
= Water to Evaporators (02-FE-A0201) + Excess PW (02-FE-63007)

Secondary Measurement
= PW Transfer Pumps Discharge (01-FE-14102 + 01-FE-14152)
– PW Transfer Pumps Minimum Flow (01-FE-14001)

Water Dispositions from Plant
= Water Carryover to Dilbit Sales (Tickets) + Water Carryover to Slop Oil Truckout (Tickets)
+ Water Trucked Out (Tickets)

Change in Water Inventory
= Closing Water Inventory – Opening Water Inventory

Water Inventory[3]
= Produced Water Tank 01-T1400 from 01-LI-14000A
+ Decant Tank 01-T1520 from 01-LI-15200A

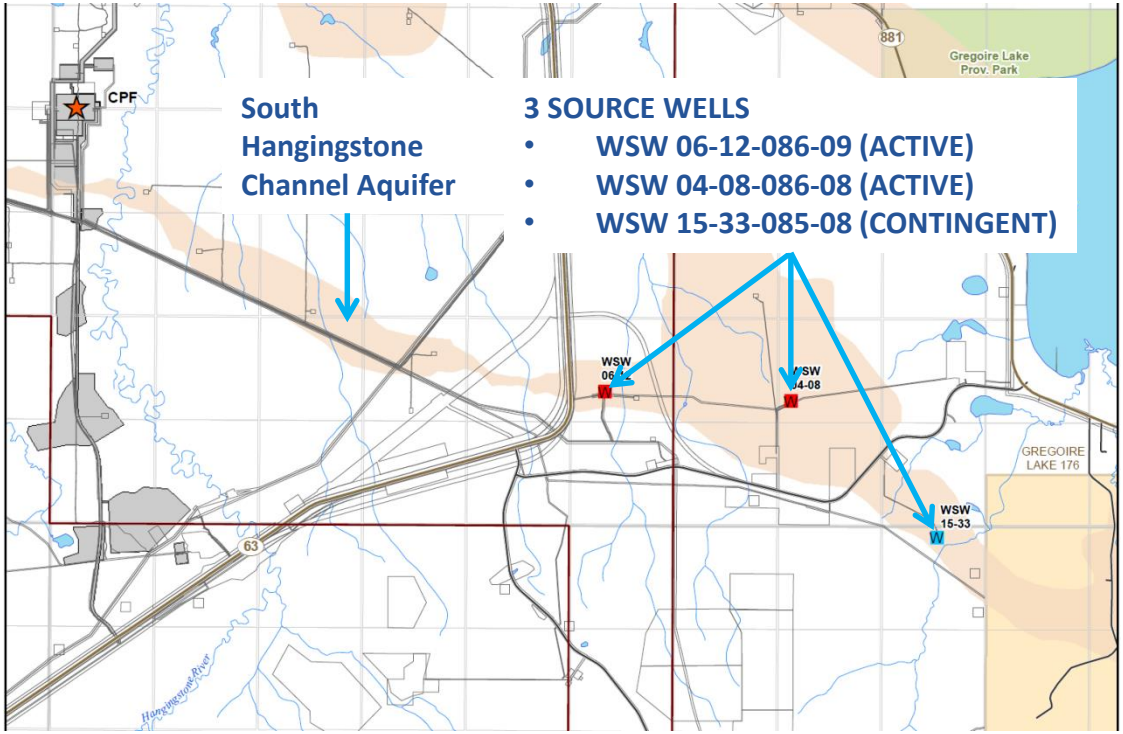
Total Water Receipts
= Fresh Water Receipts from Injection Facility + Water Receipts from Injection Facility
+ Fresh Water Carryover from Diluent Receipts (Tickets)

Fresh Water Receipts from Injection Facility
= Fresh Water from Injection Facility (04-FE-30102B – 01-FE-00020)
+ Recoverable Utility FSHWTR (Estimate)

Water Receipts from Injection Facility
= Recoverable Steam/Water (Estimate)

Estimates are expected to be <0.5% of the total battery water production.

HANGINGSTONE PROJECT
WATER PRODUCTION, INJECTION AND USES (TDL)



Well ID	Location	Formation	TDS (mg/L)	Maximum Rate of Diversion (m^3/d)
WSW153308508W400	15-33-085-08-W4	Quaternary	286	3,000
WSW061208609W400	06-12-086-09-W4	Quaternary	303	3,000
WSW040808608W400	04-08-086-08-W4	Quaternary	287	3,000

Wells are less than 150 m in depth and not licenced with the AER.
Well IDs are AOC internal identifiers, not UWIs.

FRESH WATER WELLS

- Water Diversion License 00316166-00-00 received on March 8, 2013 for 479,975 m^3 annually.
- February 13, 2015, Water License extended up to March 06, 2016
- July 15, 2015, TDL approval 00370472 for 90,000 m^3
- October 22, 2015, TDL approval 00374595 for 150,000 m^3
- December 7, 2015, application for Water License renewal

WATER USAGE

	Total Source Water Receipts	Produced Water	Steam Injected in Wells	Evap blow-down	Produced Water Recycle
	m^3	m^3	m^3	%	%
Jan-15	4,232	0	0	0	0
Feb-15	950	0	0	0	0
Mar-15	26,109	0	1,546	5.0	0
Apr-15	56,924	20,559	69,794	1.3	29%
May-15	87,921	18,452	103,972	1.2	18%
Jun-15	81,823	22,720	102,321	1.4	22%
Jul-15	76,361	35,001	107,559	2.2	33%
Aug-15	70,543	85,557	152,626	1.8	56%
Sep-15	64,837	98,540	159,052	2.3	62%
Oct-15	64,837	116,712	168,792	2.0	69%

WATER ANALYSES – PRODUCED WATER

RESULTS OF CHEMICAL ANALYSES OF WATER		
	UNITS	PRODUCED WATER PAD AE
Calculated Parameters		
Hardness (CaCO3)	mg/L	44
Total Dissolved Solids	mg/L	
Elements		
Dissolved Calcium (Ca)	mg/L	14.2
Dissolved Iron (Fe)	mg/L	3.14
Dissolved Magnesium (Mg)	mg/L	2.2
Dissolved Manganese (Mn)	mg/L	
Dissolved Potassium (K)	mg/L	24.3
Dissolved Sodium (Na)	mg/L	613.0
Anions		
Dissolved Chloride (Cl)	mg/L	793.4
Dissolved Sulphate (SO4)	mg/L	8
Physical Properties		
Conductivity	uS/cm	3150
pH	pH	7.82
Alkalinity (Total as CaCO3)	mg/L	271
Alkalinity (PP as CaCO3)	mg/L	
Bicarbonate (HCO3)	mg/L	330
Carbonate (CO3)	mg/L	<0.5
Hydroxide (OH)	mg/L	<0.5

WATER ANALYSES – SOURCE WATER

RESULTS OF CHEMICAL ANALYSES OF WATER		
	UNITS	**SERVICE TANK- 04-SC-30002**
Calculated Parameters		
Hardness (CaCO3)	mg/L	190
Total Dissolved Solids	mg/L	320
Elements		
Dissolved Calcium (Ca)	mg/L	56.1
Dissolved Iron (Fe)	mg/L	<0.01
Dissolved Magnesium (Mg)	mg/L	13.3
Dissolved Manganese (Mn)	mg/L	0.132
Dissolved Potassium (K)	mg/L	4.6
Dissolved Sodium (Na)	mg/L	48.4
Anions		
Dissolved Chloride (Cl)	mg/L	7.5
Dissolved Sulphate (SO4)	mg/L	27
Physical Properties		
Conductivity	uS/cm	580
pH	pH	7.86
Alkalinity (Total as CaCO3)	mg/L	270
Alkalinity (PP as CaCO3)	mg/L	<0.5
Bicarbonate (HCO3)	mg/L	330
Carbonate (CO3)	mg/L	<0.5
Hydroxide (OH)	mg/L	<0.5

WATER ANALYSES – EVAPORATOR BLOWDOWN

RESULTS OF CHEMICAL ANALYSES OF WATER		
	UNITS	EVAPORATOR 1 SUMP 2
Total Solids	%/WT	7.74
TDS	%/WT	7.19
TSS	%/WT	0.55
pH		11.72
Chlorides (HR)	ppm	28470
Oil Test	ppm	58.7

HANGINGSTONE PROJECT
FACILITY PERFORMANCE

SULPHUR PRODUCTION

Sulphur Production	
	tonne/month
Jan-15	0
Feb-15	0
Mar-15	0
Apr-15	0
May-15	0
Jun-15	0
Jul-15	0.02
Aug-15	0.07
Sep-15	0.10
Oct-15	0.11

- SULPHUR VALUES BASED ON ANALYTICAL RESULTS FROM PRODUCED GAS
- EPEA SO_2 LIMIT 0.24 TONNES/DAY

HANGINGSTONE PROJECT
REGULATORY APPROVALS AND AMENDMENTS

Date	Approval Summary
March 31, 2011	Filed Application
September 30, 2011	Project Update and SIR 1 submitted
March 6, 2012	Project Update and SIR 2 submitted
October 3, 2012	Order in Council 307/2012 and AER Commercial Approval 1188
October 5, 2012	MARP Approval (AER) 1949359
October 29, 2012	EPEA Approval 289664-00-00
November 6, 2012	Historical Resources Act Clearance 003119951
February 1, 2013	MARP Revision (AER) submitted
February 7, 2013	D78 Pad Shift Approval 00316166-00-00
March 20, 2013	Water Act License Approval 00316166-00-00
April 29, 2013	D78 Pad Shift Approval (AESRD) 289664-00-00
May 24, 2013	CPF Amendment Approval 11888B
May 31, 2013	Groundwater Management Program Approval

HANGINGSTONE PROJECT
REGULATORY APPROVALS AND AMENDMENTS

Date	Approval Summary
June 7, 2013	D56 Fuel Gas Pipeline (AER) License 55432
June 7, 2013	D56 Natural Gas Pipeline Reroute (AER) License 55219
June 20, 2013	D56 CPF Amendment (AER) License F45426
July 11, 2013	Caribou Monitoring and Mitigation Plan Approved
July 30, 2013	Water Act Amendment 00316166-00-01
September 9, 2013	D56 Pad AA License F46483
September 12, 2013	CPF Amendment Approval 289664-00-01
September 20, 2013	D56 Residue Fuel Gas Pipeline License 55432
October 30, 2013	D56 Pads AB (F46679), AC (F46680), AD (F46678), AE (F46681)
October 30, 2013	AHS-01 279S Substation License U2013-543
November 25, 2013	D56 Emulsion Pipeline (AER) License 55642
December 6, 2013	D56 Steam Pipeline #1 (AER) License 55708 D56 Steam Pipeline #2 (AER) License 55687
December 10, 2013	D56 Source Water Pipeline (AER) License 55714

HANGINGSTONE PROJECT
REGULATORY APPROVALS AND AMENDMENTS

Date	Approval Summary
February 6, 2014	MARP Revision (AER) submitted
May 6, 2014	CPF Amendment Approval (AER) 11888C
September 8, 2014	D51 Pad AD and AE Licenses
September 9, 2014	D51 Pad AC License
September 11, 2014	D51 Pad AA and AB Licenses
November 25, 2014	CPF Amendment Approval (AER) 11888D
February 2, 2015	Soil Monitoring Program Approval 00289664-00-01
February 26, 2015	MARP Revision (AER) submitted
June 3, 2015	Term Water License 00325409-00-00
July 25, 2015	Temporary MOP increase

HANGINGSTONE PROJECT

COMPLIANCE

ATHABASCA OIL CORPORATION

- The following table summarizes results of required monitoring programs

Air Monitoring	Results
Air Monitoring Program Proposal	AER Letter of Authority received August 2014
Continuous Emissions Monitoring System (CEMS) Monitoring Plan	AER Letter of Authority received January 2015
CEMS Certification Relative Accuracy Test Audit (RATA)	Completed May 2015
Glycol Heater Manual Stack Survey	Completed May 2015
Steam Gen A Cylinder Gas Audit (CGA)	Completed September 2015
Steam Gen A RATA	Completed October 2015
Steam Gen B Manual Stack Survey	Completed October 2015
CEMS and Air Monitoring Directive (AMD Quality assurance Plans Audit	Completed November 2015
Fugitive Emissions Monitoring Assessment	Completed October 2015
Industrial Air Monitoring Reporting (Monthly and Annual)	Ongoing

HANGINGSTONE PROJECT
COMPLIANCE – MONITORING PROGRAMS

Surface Water Monitoring	Results
Annual Industrial Wastewater and Industrial Runoff Report	Annual report submitted March 2015
Groundwater Monitoring	**Results**
Groundwater Monitoring Program Proposal	AER Letter of Authority received May 2014
2014 Baseline Groundwater Monitoring	Report submitted March 2015
2015 Semi-annual Operational Groundwater Monitoring	Spring and Fall groundwater sampling completed, Annual Report due March 2016
Water License #00316166-00-01 479,975m^3	Water Use Reporting completed May 2015 and November 2015 Annual Report Due February, 2015
Temporary Diversion License # 00370472 90,000m^3	Water Use Reporting completed Monthly Final report due before August, 2016
Temporary Diversion License # 00374595 150,000m^3	Water Use Report due before November 20, 2016

HANGINGSTONE PROJECT
COMPLIANCE – MONITORING PROGRAMS

Soil Monitoring	Results
Soil Monitoring Program Proposal	AER Letter of Authority received February 2015
Operational Soil Monitoring Program	Field Sampling completed August 2015
Operational Soil Monitoring Report	Report Due January 2016
Construction Monitoring	**Results**
Disturbance and Stockpile Report	Completed October 2015
Wildlife Monitoring	**Results**
Caribou Mitigation and Monitoring Plan	AER Letter of Authority received July 2013
Woodland Caribou Report	Report Due May 2016

HANGINGSTONE PROJECT
COMPLIANCE – REGIONAL INITIATIVES

- AOC is a funding member of:
  - Wood Buffalo Environmental Association
  - Joint Oil Sands Monitoring Program
  - Oil Sands Black Bear Partnership

HANGINGSTONE PROJECT
COMPLIANCE – RECLAMATION PROGRAMS

- Hangingstone OSE Assessment and Reclamation work is ongoing
- Reclamation Certificates have been received for OSE# 070032, OSE# 070034, OSE# 090002
- OSE# 080026 Reclamation Certificate application was completed in 2015 and is currently awaiting certification
- Borrow Pit 20 SMC# 120059 Interim Reclamation was completed in September 2015
- Reclamation of Main Access Road Realignment section planned for 2016

Borrow Pit 20 Interim Reclamation

Athabasca Oil Corporation Hangingstone Project is in compliance with AER approvals and regulatory requirements. As of November 30, 2015, AOC has no unaddressed non-compliant events.

HANGINGSTONE PROJECT
COMPLIANCE – SUMMARY OF NON-COMPLIANCE

- The following list summarizes non-compliance events. For all events corrective actions were identified and tracked to completion.

Event	Corrective Action
May 28, 2014 - AER notified of stream avulsion event along source water pipeline ROW.	March 2015 – culvert replacement and watercourse realignment work completed to control and protect against erosion and sedimentation.
August 5, 2014 - AESRD Bear Smart audit identified the camp electric fence was not working.	August 2014 – Weekly function tests completed on bear fence to ensure functioning properly.
August 7, 2014 - AER was notified of surface water diversion (TDL) limit exceedance.	August 2014 – TDL extension applied for and internal process developed to prevent future occurrence.
August 12, 2014 – AESRD issued order to remove fire hazard when burn pile had reignited without a burn permit in place.	August 2014 – Camera installed at burn pile to monitor activity in area.
August 20, 2014 – RMWB issued stop work order due to building permit discrepancies.	November 2014 – Established comprehensive list of all approvals required for project management.

HANGINGSTONE PROJECT
COMPLIANCE – SUMMARY OF NON-COMPLIANCE

Event	Corrective Action
May 29, 2015 – AER notified CEMS operational uptime did not meet 90% requirement for NO2 and flow for the month of April	June 2015 – Commissioning activities influenced CEMS operational uptime.
June 24, 2015 - AER notified of the wastewater tankfarm synthetic liner which was damaged during ladder installation.	June 2015 – Liner was repaired and site reviewed for other potential penetrating sources.
July 22, 2015 – AESRD notified of four deceased barn swallows discovered beneath dilbit load-out vent.	July 2015 – Screen vent covers were installed on tank load-out vents.
August 30, 2015 – AER notified of MOP exceedance on producer well AC03.	September 2015 - Management of change procedure developed to reduce steam injection rates as bottom hole pressure approached.
October 15, 2015 - AER notified of MOP exceedance on producer well AA02.	October 2015 – work permitting process improved for all well activities.

HANGINGSTONE PROJECT
COMPLIANCE – RELEASE REPORTING

No. of Reportable Spills	Volume Released (m^3)
7	31

No. of Reportable Flaring Events	Volume Flared (e^3m^3)
1	25.6

- All spills were cleaned up and have been remediated to eliminate any potential for adverse effect
- AOC tracks all release incidents within KMI the Corporate Compliance and Incident Tracking System

HANGINGSTONE PROJECT

FUTURE PLANS

ATHABASCA OIL CORPORATION

HANGINGSTONE PROJECT
FUTURE PLANS

- AOC filed an application for the Hangingstone Expansion Project in May 2013.
- The Expansion includes:
  - increase the bitumen recovery capacity from the existing approved 1,908 m^3/d (12,000 bpd) to 13,037 m3/d (82,000 bpd) to be developed in two phases:
    - HS2 will add an incremental 6,360 m^3/d (40,000 bpd) and
    - HS3 will add an incremental 4,770 m^3/d (30,000 bpd).
  - Extension of the production life from 10 to 40 years,
  - CPF expansion from 35 ha to 76 ha (all requires site clearing was conducted for HS1),
  - Field facilities and,
  - Offsite and utility services.

ATHABASCA OIL CORPORATION
SUITE 1200, 215-9TH AVENUE SW
CALGARY, AB T2P 1K3
P:403-237-8227
F:403-264-4640