



October 31, 2018

Re: Application 1913895
Application for Class 1b disposal into Cardium zone
LANDS: SE25-069-06W6
SURFACE LOCATION: 07-25-069-06W6

Dear Brent Conrad,

Dragos Energy Corp. (Dragos) is pleased to provide the following response to Inception Exploration Ltd.'s (Inception) Statement of Concern (SOC) dated October 22, 2018 concerning the proposed well recompletion for disposal into the Cardium formation at 07-25-069-06W6 (Project).

1. ***"Inception Exploration Ltd. notes that the Cardium zone Dragos Energy is planning to dispose water into is in a reservoir that has been actively disposed into by another area operator. Inception Exploration Ltd. drilled 2 wells through it in September 2017 at nearby locations and found it to be at a significantly and concerning high pressure. As Inception Exploration Ltd. owns the mineral rights below the Cardium in the area and has substantial plans to be drilling in the area, Inception Exploration Ltd. is very concerned about the already over-pressured Cardium reservoir that Dragos is proposing to conduct additional disposal into, thereby creating an even greater barrier to being able to safely drill through the Cardium to access Inception Exploration Ltd.'s minerals. Most notably, Inception plans to drill over 8 wells off of the adjacent 12-19-69-5W6 pad site which is located within 1100m of the 7-25-69-6W6 proposed disposal well. In addition, it would put at risk drilling over 8 sections of Inception's P&NG rights from any reasonable surface location in the near area. Also, the loss of projected Crown Royalties over these 8 sections of land would be in excess of \$100 million if the P&NG reserves can not be accessed.***

Dragos owns the P&G rights within Section 25-069-06W6 covering the Cardium formation. Dragos is aware of the pressures associated with the Cardium formation and believes that incremental disposal will not cause an environmental or safety hazard in the area.

Dragos is proposing the following mitigation concerning the Cardium formation pressure:

- Dragos is proposing to convert its existing wellbore at 100/16-24-069-06W6/02 (16-24 well) 0.78 km away into a Cardium monitoring well. The 16-24 well is currently completed into the Dunvegan formation. These perforations would be abandoned in accordance with Directive 020 and re-completed up-hole into the Cardium formation. The 16-24 well would be used to monitor pressures for the proposed disposal scheme within the Cardium formation. The 16-24 well is located between Dragos's proposed Project and Inception's 12-19-69-5W6 pad site, therefore Dragos is confident that any increase in pressure would be seen at the 16-24 well.
- Dragos proposes creating an agreement with Inception to share pressure monitoring data with Inception during any subsequent well planning or drilling within our area of influence to satisfy any technical requirements.
- Dragos also proposes in the same agreement with Inception that should the monitoring data show a heightened reservoir pressure at 16-24 well that Dragos would shut in the disposal well at 07-25-069-06W6M (if provided with a request) for a specific period to allow the reservoir pressure decrease while Inception drilled through the Cardium formation.
- Dragos proposes within the agreement that should reservoir pressures not stabilize to a self determined pressure that Dragos and inception agree to, Dragos would compensate Inception financially for the differential in cost of using a heavier drilling mud/mud system if it was substantiated to be required to drill through the Cardium formation in our area of influence.

2. ***The table below outlines the pressures Inception encountered last year.***

Well Name	Surface	Licence Number	EMD (kg/m3)	Depth (m) Est Cardium	FM Pressure (kpa)
INCEPTION EXP HZ ELM 1-20-69-5	12-19-69-5W6	0483816	1950	810	15,500
INCEPTION EXP HZ ELM 3-36-69-6	12-19-69-5W6	0483817	1935	805	15,300

Dragos hired a 3rd party consultant (CG Engineering Ltd.) to conduct a search of area offsets with pressure data in the Cardium zone. Please see appendix A for a summary of the results and raw data.

3. As ongoing disposal has been continuing in this reservoir, the current Cardium pressures would now be higher and additional nearby disposal would only accelerate and exacerbate the issue. Clearly, reservoir pressures with a gradient exceeding 20 kPa/m and continuing to increase is a safety concern. As the pressures are increasing and are already significantly high, there would be the possibility of not having hydraulic isolation in the Cardium zone.

The Alberta Energy Regulator (AER) has robust regulations associated with disposal scheme applications consisting of *Directive 065: Resource applications for Oil and Gas Reservoirs* and *Directive 051: Injection and Disposal Wells – Well Classifications, Completions, Logging, and Testing* that Dragos must meet in their applications. The AER's rigorous review process determines the parameters of the disposal scheme based on science to determine the Maximum Wellhead Injection Pressure, Hydraulic Isolation, and Reservoir Containment.

4. The reservoir Dragos is proposing to dispose into already has had over 12,500,000 bbls of water disposed into it and it is reaching the maximum limit it can safely hold.

The Cardium formation is finite, whether the formation has reached its maximum limit is under the jurisdiction and authority of the AER. Until the AER has been determined that the Cardium formation has reached its disposal limit and place a moratorium on Cardium formation disposal, Dragos is determined to make application to use its mineral rights to dispose into the Cardium formation.

Dragos is also aware that Inception has recently submitted and received a D065 disposal scheme approval (application 1908436/Approval 12365D) to dispose into the Cardium formation at 100/16-26-69-5W6M. Dragos questions why Inception has an issue with Dragos using the Cardium formation for disposal, yet it plans on using this same formation itself for disposal.

5. For absolute clarity, Inception Exploration Ltd. objects to Dragos Energy's proposed disposal into the Cardium formation.

Dragos understands your concerns but believes that with proper mitigation measures and operating procedures, and strong communication between our companies that Cardium formation disposal can be done safely without effecting oil & gas production. If Inception is still not satisfied with Dragos's proposed mitigations, Dragos would like to offer the AER's Alternative Dispute Resolution process as a possible option to resolve your concerns.

Sincerely,
Dragos Energy Corporation

Per:
Clint Jensen
VP Operations

Appendix A



Re: Application 1913895
Application for Class 1b disposal into Cardium zone
LANDS: SE25-069-06W6
SURFACE LOCATION: 07-25-069-06W6

This letter is in support to Dragos Energy Corp. (Dragos) response to Inception Exploration Ltd.'s (Inception) Statement of Concern (SOC) dated October 22, 2018 concerning the proposed well recompletion for disposal into the Cardium formation at 07-25-069-06W6 (Project).

CG Engineering conducted a search of area offsets with pressure data in the Cardium zone. Below is a table that summarizes the results.

Operator	Unique Well Identifier	Mid Point Pressure (kPa)	Run Depth Pressure (kPa)	Survey Date	Shut In Period (h)	Base Formation	Top Formation	Run Depth (m)
Envolve Energy Services	00/04-07-070-05W6/3	5669.59	5703.78	2012-12-17	334	DOE CK	DOE CK	1112
Envolve Energy Services	00/04-07-070-05W6/3	0	5098.11	2012-12-17	333	DOE CK	DOE CK	1112
Envolve Energy Services	00/04-07-070-05W6/3	8953.79	8458.63	2014-06-18	40	CARD SD	CARD SD	722
Envolve Energy Services	00/04-07-070-05W6/3	18130.29	18001.8	2016-10-28	381	CARD SD	CARD SD	761
Envolve Energy Services	00/04-07-070-05W6/3	16616.79	16488.31	2016-10-28	381	CARD SD	CARD SD	761
Envolve Energy Services	00/04-07-070-05W6/3	16325.81	16263.18	2017-08-27	386	CARD SD	CARD SD	766
Envolve Energy Services	00/04-07-070-05W6/3	16328.63	16263.39	2017-08-27	386	CARD SD	CARD SD	766
Blackbird Energy Inc.	00/06-14-070-07W6/0	8325.74	8134.04	2016-11-23	22	CARD	COLO	823
Envolve Energy Services	00/15-07-070-05W6/4	15230.94	15113.33	2016-10-27	334	CARD SD	CARD	745
Envolve Energy Services	00/15-07-070-05W6/4	15162.5	15051.55	2016-10-28	376	CARD SD	CARD	745
Envolve Energy Services	00/15-07-070-05W6/4	15169.16	15051.55	2016-10-28	24	CARD SD	CARD	745
Envolve Energy Services	00/15-07-070-05W6/4	15956.73	7580.01	2018-07-23	553	CARD SD	CARD	0
Aqua Terra Water Management	00/16-32-069-05W6/3	10523.22	10260.73	2017-08-21	509	KPAU	CARD SD	761.9
Aqua Terra Water Management	00/16-32-069-05W6/3	10260.73	10260.73	2017-08-21	509	KPAU	CARD SD	770
Secure Energy Services	F1/10-13-070-06W6/0	8565.4	8585.28	2012-07-23	65	CARD SD	CARD SD	760
Secure Energy Services	F1/10-13-070-06W6/0	8564.95	8584.83	2012-07-23	64	CARD SD	CARD SD	760
Secure Energy Services	F1/10-13-070-06W6/0	9174.1	9041.09	2016-10-13	1006	CARD SD	CARD SD	714.24

Inception has claimed in their SOC that they have encountered pressures of 15,500 kPa (INCEPTION EXP HZ ELM 1-20-69-5) and 15,300 kPa (INCEPTION EXP HZ ELM 3-36-69-6) citing equivalent mud densities of 1950 kg/m³ and 1935 kg/m³ respectively.

Only two Envolve wells show pressures of 15-16 MPa in the Cardium zone, this is due to the ongoing disposal at these locations. The most relevant Cardium pressure data in the nearby area, is from Aqua Terra Water Management at 16-32-69-5W6. This test done in August of 2017 shows a Cardium pressure of 10,500 kPa. This data appears to be the initial reservoir pressure measured during the completion into the Cardium zone, prior to any disposal activity. There are two other wells that also show reservoir pressures below 10 MPa taken with the past two years by Blackbird Energy Inc. & Secure Energy Services.

Furthermore an accurate reservoir pressure cannot be measured from EMD (equivalent mud density) as there is no way to tell how much overkill is being exerted on the formation. The 15,500 kPa EMD while drilling through the Cardium only shows that the reservoir pressure is somewhere below that number.



For further information or clarification regarding the contents of this letter. Please contact the undersigned.

Sincerely,

A handwritten signature in black ink, appearing to read 'Shawn Cody'.

Shawn Cody, P. Eng
587-538-0286
scody@cgeng.ca
CG Engineering Ltd.

Suite 320, 407 – 2nd Ave SW
Calgary, AB
T2P 2Y3

Well Pressure - 00/04-07-070-05W6/3

Well Header

Name	ENVOLVE ENERGY GOLDCK 4-7-70-5	Current Status	WATER DISPOSAL
Province	AB	Current Status Date	Sep 2, 2015
Field Name	ELMWORTH	On Production	
Pool Name	CARDIUM SD UND	Licensee Name	ENVOLVE ENERGY SERVICES CORP.
		GL Elevation	654.60 m

Well Pressure Header

Reservoir Gradient		Base Formation	CARD SD
Well Datum		Base Depth	779.50 m
Pool Datum			

Pressure Data

Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
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AOF Deliverability Data

Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOF
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Remarks

Sequence No.	Observation Type	Observation Number	Remarks
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Well Pressure Header

Reservoir Gradient	0.00 kPa	Base Formation	DOE CK
Well Datum	0.00 m	Base Depth	1114.50 m
Pool Datum	0.00 m		

Pressure Data

Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
1	Dec 17, 2012	BH_STATIC_GRAD	4515.00 kPa	1112.00 m	5703.78 kPa	0.00 °C	9.77 kPa	334.00 h	0.00 kPa

AOF Deliverability Data

Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOF
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Remarks

Sequence No.	Observation Type	Observation Number	Remarks
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Well Pressure Header

Reservoir Gradient	0.00 kPa	Base Formation	DOE CK
Well Datum	0.00 m	Base Depth	1114.50 m
Pool Datum	0.00 m		

Pressure Data

Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
2	Dec 17, 2012	BH_BUILDUP	4515.00 kPa	1112.00 m	5098.11 kPa	0.00 °C	0.00 kPa	333.00 h	0.00 kPa

AOF Deliverability Data

Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOF
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Remarks

Sequence No.	Observation Type	Observation Number	Remarks
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Well Pressure Header

Reservoir Gradient	0.00 kPa	Base Formation	CARD SD
Well Datum	0.00 m	Base Depth	779.50 m
Pool Datum	0.00 m		

Pressure Data

Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
1	Jun 18, 2014	BH_STATIC_GRAD	1329.00 kPa	722.00 m	8458.63 kPa	0.00 °C	9.91 kPa	40.00 h	0.00 kPa

AOF Deliverability Data

Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOF
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Remarks

Sequence No.	Observation Type	Observation Number	Remarks
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Well Pressure Header

Reservoir Gradient	0.00 kPa	Base Formation	CARD SD
Well Datum	0.00 m	Base Depth	779.50 m
Pool Datum	0.00 m		

Pressure Data

Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
2	Oct 28, 2016	BH_STATIC_GRAD	93.00 kPa	761.00 m	18001.80 kPa	0.00 °C	12.48 kPa	381.00 h	0.00 kPa

AOF Deliverability Data

Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOF
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Remarks

Sequence No.	Observation Type	Observation Number	Remarks
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Well Pressure Header

Reservoir Gradient	0.00 kPa	Base Formation	CARD SD
Well Datum	0.00 m	Base Depth	779.50 m
Pool Datum	0.00 m		

Pressure Data									
Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
3	Oct 28, 2016	BH_FALLOFF	93.00 kPa	761.00 m	16488.31 kPa	0.00 °C	0.00 kPa	381.00 h	0.00 kPa

AOF Deliverability Data									
Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOF	

Remarks									
Sequence No.	Observation Type	Observation Number		Remarks					

Well Pressure Header			
Reservoir Gradient	0.00 kPa	Base Formation	CARD SD
Well Datum	0.00 m	Base Depth	779.50 m
Pool Datum	0.00 m		

Pressure Data									
Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
4	Aug 27, 2017	BH_STATIC_GRAD	93.00 kPa	766.00 m	16263.18 kPa	0.00 °C	8.37 kPa	386.00 h	0.00 kPa

AOF Deliverability Data									
Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOF	

Remarks									
Sequence No.	Observation Type	Observation Number		Remarks					

Well Pressure Header			
Reservoir Gradient	0.00 kPa	Base Formation	CARD SD
Well Datum	0.00 m	Base Depth	779.50 m
Pool Datum	0.00 m		

Pressure Data									
Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
5	Aug 27, 2017	BH_FALLOFF	93.00 kPa	766.00 m	16263.39 kPa	0.00 °C	0.00 kPa	386.00 h	0.00 kPa

AOF Deliverability Data									
Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOF	

Remarks									
Sequence No.	Observation Type	Observation Number		Remarks					

Well Pressure - 00/06-14-070-07W6/0

Well Header

Name	BLACKBIRD HZ DISP ELM 6-14-70-7	Current Status	WATER DISPOSAL
Province	AB	Current Status Date	Jan 1, 2017
Field Name	ELMWORTH	On Production	
Pool Name	CARDIUM SD UND	Licensee Name	BLACKBIRD ENERGY INC.
		GL Elevation	665.60 m

Well Pressure Header

Reservoir Gradient	0.00 kPa	Base Formation	CARD
Well Datum	0.00 m	Base Depth	1387.00 m
Pool Datum	0.00 m		

Pressure Data

Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
1	Nov 23, 2016	BH_STATIC_GRAD	531.00 kPa	823.00 m	8134.04 kPa	0.00 °C	5.05 kPa	22.00 h	0.00 kPa

AOF Deliverability Data

Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOF
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Remarks

Sequence No.	Observation Type	Observation Number	Remarks
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Well Pressure - 00/15-07-070-05W6/4

Well Header

Name	ENVOLVE GOLDCK 15-7-70-5	Current Status	WATER DISPOSAL
Province	AB	Current Status Date	Jan 1, 2006
Field Name	ELMWORTH	On Production	
Pool Name	CARDIUM SD UND	Licensee Name	ENVOLVE ENERGY SERVICES CORP.
		GL Elevation	649.70 m

Well Pressure Header

Reservoir Gradient		Base Formation	CARD SD
Well Datum		Base Depth	771.00 m
Pool Datum			

Pressure Data

Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
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AOF Deliverability Data

Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOF
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Remarks

Sequence No.	Observation Type	Observation Number	Remarks
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Well Pressure Header

Reservoir Gradient	0.00 kPa	Base Formation	CARD SD
Well Datum	0.00 m	Base Depth	771.00 m
Pool Datum	0.00 m		

Pressure Data

Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
1	Oct 27, 2016	BH_FALLOFF	93.00 kPa	745.00 m	15113.33 kPa	0.00 °C	0.00 kPa	334.00 h	0.00 kPa

AOF Deliverability Data

Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOF
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Remarks

Sequence No.	Observation Type	Observation Number	Remarks
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Well Pressure Header

Reservoir Gradient	0.00 kPa	Base Formation	CARD SD
Well Datum	0.00 m	Base Depth	771.00 m
Pool Datum	0.00 m		

Pressure Data

Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
2	Oct 28, 2016	BH_STATIC_GRAD	93.00 kPa	745.00 m	15051.55 kPa	0.00 °C	9.50 kPa	376.00 h	0.00 kPa

AOF Deliverability Data

Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOF
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Remarks

Sequence No.	Observation Type	Observation Number	Remarks
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Well Pressure Header

Reservoir Gradient	0.00 kPa	Base Formation	CARD SD
Well Datum	0.00 m	Base Depth	771.00 m
Pool Datum	0.00 m		

Pressure Data

Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
3	Oct 28, 2016	BH_FALLOFF	93.00 kPa	745.00 m	15051.55 kPa	0.00 °C	0.00 kPa	24.00 h	0.00 kPa

AOF Deliverability Data

Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOF
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Remarks

Sequence No.	Observation Type	Observation Number	Remarks
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Well Pressure Header

Reservoir Gradient	0.00 kPa	Base Formation	CARD SD
Well Datum	0.00 m	Base Depth	771.00 m
Pool Datum	0.00 m		

Pressure Data

Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
4	Jul 23, 2018	AWS_FALLOFF	0.00 kPa	0.00 m	7580.01 kPa	0.00 °C	0.00 kPa	553.00 h	0.00 kPa

AOF Deliverability Data

Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOF
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Remarks

Sequence No.	Observation Type	Observation Number	Remarks
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Well Pressure - 00/16-32-069-05W6/3

Well Header

Name	FWOL GOLDCK 16-32-69-5	Current Status	WATER DISPOSAL
Province	AB	Current Status Date	Sep 6, 2017
Field Name	ELMWORTH	On Production	
Pool Name	CARDIUM SD UND	Licensee Name	AQUA TERRA WATER MANAGEMENT INC.
		GL Elevation	658.50 m

Well Pressure Header

Reservoir Gradient	0.00 kPa	Base Formation	KPAU
Well Datum	0.00 m	Base Depth	801.00 m
Pool Datum	0.00 m		

Pressure Data

Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
1	Aug 21, 2017	BH_STATIC_GRAD	93.00 kPa	761.90 m	10260.73 kPa	0.00 °C	0.00 kPa	509.00 h	0.00 kPa

AOF Deliverability Data

Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOFP
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Remarks

Sequence No.	Observation Type	Observation Number	Remarks
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Well Pressure Header

Reservoir Gradient	0.00 kPa	Base Formation	KPAU
Well Datum	0.00 m	Base Depth	801.00 m
Pool Datum	0.00 m		

Pressure Data

Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
2	Aug 21, 2017	BH_BUILDUP	93.00 kPa	770.00 m	10260.73 kPa	0.00 °C	0.00 kPa	509.00 h	0.00 kPa

AOF Deliverability Data

Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOFP
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Remarks

Sequence No.	Observation Type	Observation Number	Remarks
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Well Pressure - F1/10-13-070-06W6/0

Well Header

Name	SECURE ELM 10-13-70-6	Current Status	WATER SOURCE
Province	AB	Current Status Date	Sep 1, 2013
Field Name	ELMWORTH	On Production	Sep 1, 2013
Pool Name	TD UND	Licensee Name	SECURE ENERGY SERVICES INC.
		GL Elevation	657.70 m

Well Pressure Header

Reservoir Gradient	0.00 kPa	Base Formation	CARD SD
Well Datum	0.00 m	Base Depth	770.00 m
Pool Datum	0.00 m		

Pressure Data

Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
1	Jul 23, 2012	BH_STATIC_GRAD	1000.00 kPa	760.00 m	8585.28 kPa	0.00 °C	9.88 kPa	65.00 h	0.00 kPa

AOF Deliverability Data

Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOFP
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Remarks

Sequence No.	Observation Type	Observation Number	Remarks
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Well Pressure Header

Reservoir Gradient	0.00 kPa	Base Formation	CARD SD
Well Datum	0.00 m	Base Depth	770.00 m
Pool Datum	0.00 m		

Pressure Data

Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
2	Jul 23, 2012	BH_BUILDUP	1000.00 kPa	760.00 m	8584.83 kPa	0.00 °C	0.00 kPa	64.00 h	0.00 kPa

AOF Deliverability Data

Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOFP
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Remarks

Sequence No.	Observation Type	Observation Number	Remarks
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Well Pressure Header

Reservoir Gradient	0.00 kPa	Base Formation	CARD SD
Well Datum	0.00 m	Base Depth	770.00 m
Pool Datum	0.00 m		

Pressure Data

Obs No.	Test Date	Test Type	Well Head Pressure	Run Depth	Run Press	Run Temp	Gas Gradient	Shut In Time	Datum Depth Pressure
3	Oct 13, 2016	BH_BUILDUP	0.00 kPa	714.24 m	9041.09 kPa	0.00 °C	0.00 kPa	1006.00 h	0.00 kPa

AOF Deliverability Data

Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Reservoir	N-Val	Report AOF
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Remarks

Sequence No.	Observation Type	Observation Number	Remarks
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General Well Information - 00/16-32-069-05W6/3

Well Header

Name	FWOL GOLDCK 16-32-69-5	Lahee	NEW POOL WILDCAT IEW
Province	AB	Operator	AQUA TERRA WATER MANAGEMENT INC.
Field Name	ELMWORTH	Producing Formation	CARDIUM SD
Pool Name	CARDIUM SD UND	KB Elevation	666.60 m
Current Status	WATER DISPOSAL	Casing Flange Elevation	
Current Status Date	Sep 6, 2017	GL Elevation	658.50 m
On Production		Total Depth	3530.00 m
Licensee Name	AQUA TERRA WATER MANAGEMENT INC.	True Vertical Depth	3530.00 m
License Number	0095396	Formation at Total Depth	IRE
Profile Type	VERTICAL	Unit Name	
		Unit Code	

Operational Dates

License Date	Mar 3, 1982
Spud Date	Mar 18, 1982
Final Drill Date	May 4, 1982
Rig Release Date	May 4, 1982
Confidential Release Date	

Directional Survey

Surface UTM	390116.15	6098604.44	UTM_Nad83_ZONE11
Surface UWI	00/16-32-069-05W6/0		
Bottom UTM	390116.15	6098604.44	UTM_Nad83_ZONE11
Surface M&B	N/S	322.90 m S	E/W 322.90 m W
Bottom M&B	N/S	322.90 m S	E/W 322.90 m W
Datum	Nad83		

Logs

Log Run	Source	Interval	Base Depth
CALIPER	ABERCB	457.00 m	- 2159.50 m
CALIPER	ABERCB	2800.00 m	- 3529.30 m
COLLAR LOG	ABERCB	1861.00 m	- 2000.00 m
CEMENT PLUG	ABERCB	3125.00 m	- 3391.00 m
CEMENT PLUG	ABERCB	2995.00 m	- 3102.00 m
CEMENT PLUG	ABERCB	2400.00 m	- 2488.00 m
CEMENT PLUG	ABERCB	2085.00 m	- 2139.00 m
DUAL INDUCTION	ABERCB	456.50 m	- 2159.50 m
DUAL INDUCTION	ABERCB	2158.00 m	- 3526.40 m
DIPMETER	ABERCB	2800.90 m	- 3527.40 m
GAMMA RAY CORR	ABERCB	1900.00 m	- 1960.00 m
MICROLOG	ABERCB	456.50 m	- 2159.50 m
MICROLOG	ABERCB	2158.00 m	- 3529.30 m
NEUTRON-DENSITY	ABERCB	456.00 m	- 2159.50 m
NEUTRON-DENSITY	ABERCB	2158.00 m	- 3527.90 m
SONIC-ACOUSTIC	ABERCB	456.50 m	- 2150.70 m
SONIC-ACOUSTIC	ABERCB	2158.00 m	- 3519.60 m
TEMPERATURE LOG	ABERCB	558.50 m	- 824.80 m

Completion

Completion Type	Source	Date	Sp	Interval	Formation Top
PACKER	ABERCB	Aug 5, 2018		774.00 m -	CARDIUM FM
JET PERFORATION	ABERCB	Aug 10, 2017	25.0	786.00 m - 788.00 m	CARDIUM SD
ACID SQUEEZE	ABERCB	Aug 11, 2017		786.00 m - 801.00 m	CARDIUM SD

JET PERFORATION	ABERCB	Aug 10, 2017	25.0	790.00 m	- 801.00 m	CARDIUM SD
BRIDGE PLUG	ABERCB	Aug 9, 2017		825.00 m	-	KASKAPAU FM
BRIDGE PLUG CAPPED W/CEMENT	ABERCB	Aug 8, 2017		1422.00 m	- 1462.90 m	BASE FISH SCALES MARKER
JET PERFORATION	ABERCB	Oct 6, 2006	17.0	1478.00 m	- 1487.00 m	CADOTTE MBR
FRACTURE	ABERCB	Oct 20, 2014		1478.00 m	- 1487.00 m	CADOTTE MBR
CEMENT SQ(PLUG)	ABERCB	Aug 8, 2017		1478.00 m	- 1487.00 m	CADOTTE MBR
BRIDGE PLUG CAPPED W/CEMENT	ABERCB	Dec 3, 2004		1952.00 m	- 1960.00 m	GETHING FM
JET PERFORATION	ABERCB	Nov 25, 2004	17.0	1972.00 m	- 1976.00 m	CADOMIN FM
FRACTURE	ABERCB	Nov 29, 2004		1972.00 m	- 1976.00 m	CADOMIN FM

Production Summary

	First 3 Months	Last 3 Months	Current Month	Average Daily Rate	Maximum Daily Rate	Cumulative
Gas						0.00 e³m³
Condensate						0.00 m³
Oil						0.00 m³
Water						0.00 m³

Casing

Type	Source	Shoe Depth	Size	Density
PRODUCTION	ABERCB	2160.00 m	244.50 mm	
SURFACE	ABERCB	456.40 m	339.70 mm	

Formation Tops

Name	Measured Depth	True Vertical Depth	Subsea Elevation	Author	Quality	Comments
WAPIABI FM	596.00 m	596.00 m	70.60 m	GOVT	LOGS,GOOD	<N/A>
COLORADO GRP	632.60 m	632.60 m	34.00 m	CALC		<N/A>
BADHEART FM	731.00 m	731.00 m	-64.40 m	GOVT	LOGS,GOOD	<N/A>
MUSKIKI FM	737.60 m	737.60 m	-71.00 m	CALC		<N/A>
CARDIUM FM	767.50 m	767.50 m	-100.90 m	GOVT	LOGS,GOOD	<N/A>
CARDIUM SD	776.00 m	776.00 m	-109.40 m	GOVT	LOGS,GOOD	<N/A>
KASKAPAU FM	801.00 m	801.00 m	-134.40 m	GOVT	LOGS,GOOD	<N/A>
SECOND WHITE SPECKS	964.60 m	964.60 m	-298.00 m	CALC		<N/A>
DOE CREEK MBR	1118.00 m	1118.00 m	-451.40 m	GOVT	LOGS,GOOD	<N/A>
DUNVEGAN FM	1169.00 m	1169.00 m	-502.40 m	GOVT	LOGS,GOOD	<N/A>
SHAFTESBURY FM	1242.00 m	1242.00 m	-575.40 m	GOVT	LOGS,GOOD	<N/A>
BASE FISH SCALES MARKER	1361.00 m	1361.00 m	-694.40 m	GOVT	LOGS,GOOD	<N/A>
PADDY MBR	1464.00 m	1464.00 m	-797.40 m	GOVT	LOGS,GOOD	<N/A>
CADOTTE MBR	1476.00 m	1476.00 m	-809.40 m	GOVT	LOGS,GOOD	<N/A>
HARMON MBR	1502.00 m	1502.00 m	-835.40 m	GOVT	LOGS,GOOD	<N/A>
NOTIKWIN MBR	1523.60 m	1523.60 m	-857.00 m	CALC		<N/A>
SPIRIT RIVER FM	1525.50 m	1525.50 m	-858.90 m	GOVT	LOGS,GOOD	<N/A>
FALHER MBR	1564.60 m	1564.60 m	-898.00 m	CALC		<N/A>
FALHER C	1608.60 m	1608.60 m	-942.00 m	CALC		<N/A>
FALHER E	1658.00 m	1658.00 m	-991.40 m	CALC		<N/A>
WILRICH MBR	1691.60 m	1691.60 m	-1025.00 m	CALC		<N/A>
BLUESKY FM	1834.50 m	1834.50 m	-1167.90 m	GOVT	LOGS,GOOD	<N/A>
GETHING FM	1846.00 m	1846.00 m	-1179.40 m	GOVT	LOGS,GOOD	<N/A>
CADOMIN FM	1967.00 m	1967.00 m	-1300.40 m	GOVT	QUESTIONABL E	<N/A>
NIKANASSIN FM	1990.50 m	1990.50 m	-1323.90 m	GOVT	LOGS,GOOD	<N/A>
FERNIE GRP	2009.00 m	2009.00 m	-1342.40 m	GOVT	LOGS,GOOD	<N/A>

ROCK CREEK MBR	2032.00 m	2032.00 m	-1365.40 m	CALC		<N/A>
POKER CHIP SH	2040.00 m	2040.00 m	-1373.40 m	CALC		<N/A>
NORDEGG MBR	2066.00 m	2066.00 m	-1399.40 m	GOVT	LOGS,GOOD	<N/A>
CHARLIE LAKE FM	2088.00 m	2088.00 m	-1421.40 m	GOVT	LOGS,GOOD	<N/A>
HALFWAY FM	2128.60 m	2128.60 m	-1462.00 m	CALC		<N/A>
DOIG FM	2140.00 m	2140.00 m	-1473.40 m	GOVT	LOGS,GOOD	<N/A>
MONTNEY FM	2186.00 m	2186.00 m	-1519.40 m	GOVT	LOGS,GOOD	<N/A>
BELLOY FM	2380.00 m	2380.00 m	-1713.40 m	GOVT	LOGS,GOOD	<N/A>
TAYLOR FLAT FM	2419.60 m	2419.60 m	-1753.00 m	CALC		<N/A>
KISKATINAW FM	2422.00 m	2422.00 m	-1755.40 m	GOVT	LOGS,GOOD	<N/A>
GOLATA FM	2499.00 m	2499.00 m	-1832.40 m	GOVT	LOGS,GOOD	<N/A>
DEBOLT FM	2530.50 m	2530.50 m	-1863.90 m	GOVT	LOGS,GOOD	<N/A>
ELKTON MBR	2740.60 m	2740.60 m	-2074.00 m	CALC		<N/A>
SHUNDA FM	2755.50 m	2755.50 m	-2088.90 m	GOVT	LOGS,GOOD	<N/A>
PEKISKO FM	2864.00 m	2864.00 m	-2197.40 m	GOVT	LOGS,GOOD	<N/A>
BANFF FM	2918.00 m	2918.00 m	-2251.40 m	GOVT	LOGS,GOOD	<N/A>
EXSHAW FM	3133.00 m	3133.00 m	-2466.40 m	GOVT	LOGS,GOOD	<N/A>
WABAMUN GRP	3141.00 m	3141.00 m	-2474.40 m	GOVT	LOGS,GOOD	<N/A>
GRAMINIA FM	3343.00 m	3343.00 m	-2676.40 m	CALC		<N/A>
BLUERIDGE MBR	3351.00 m	3351.00 m	-2684.40 m	CALC		<N/A>
CALMAR FM	3375.00 m	3375.00 m	-2708.40 m	GOVT	LOGS,GOOD	<N/A>
NISKU FM	3377.00 m	3377.00 m	-2710.40 m	GOVT	LOGS,GOOD	<N/A>
IRETON SHALE	3490.60 m	3490.60 m	-2824.00 m	CALC		<N/A>
IRETON FM	3493.00 m	3493.00 m	-2826.40 m	GOVT	LOGS,GOOD	<N/A>

Core Data

Core No.	Source	Type	Interval	Diameter	Cut/Recovered	Analyzed
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Pressure Tests

Obs No.	Test Date	Test Type	Well Head	Run Depth	Run Press	Run Temp	Gas Grad	Shut In Time	Datum Depth
3011	Aug 21, 2017	BH_STATIC_GRAD	93.00 kPa	761.90 m	10260.73	0.00 °C	0.00	509 h	0.00 m
3012	Aug 21, 2017	BH_BUILDUP	93.00 kPa	770.00 m	10260.73	0.00 °C	0.00	509 h	0.00 m

AOF Pressure Deliverability Tests

Obs No.	Test Date	Test Type	Flow Period	Flow Rate	Flow Press	Stab Rsvr	N-Val	Report AOF
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Operator	Unique Well Identifier	Mid Point Pressure (kPa)	Run Depth Pressure (kPa)	Survey Date	Shut In Period (h)	Base Formation	Top Formation	Run Depth (m)
Envolve Energy Services	00/04-07-070-05W6/3	5669.59	5703.78	2012-12-17	334	DOE CK	DOE CK	1112
Envolve Energy Services	00/04-07-070-05W6/3	0	5098.11	2012-12-17	333	DOE CK	DOE CK	1112
Envolve Energy Services	00/04-07-070-05W6/3	8953.79	8458.63	2014-06-18	40	CARD SD	CARD SD	722
Envolve Energy Services	00/04-07-070-05W6/3	18130.29	18001.8	2016-10-28	381	CARD SD	CARD SD	761
Envolve Energy Services	00/04-07-070-05W6/3	16616.79	16488.31	2016-10-28	381	CARD SD	CARD SD	761
Envolve Energy Services	00/04-07-070-05W6/3	16325.81	16263.18	2017-08-27	386	CARD SD	CARD SD	766
Envolve Energy Services	00/04-07-070-05W6/3	16328.63	16263.39	2017-08-27	386	CARD SD	CARD SD	766
Blackbird Energy Inc.	00/06-14-070-07W6/0	8325.74	8134.04	2016-11-23	22	CARD	COLO	823
Envolve Energy Services	00/15-07-070-05W6/4	15230.94	15113.33	2016-10-27	334	CARD SD	CARD	745
Envolve Energy Services	00/15-07-070-05W6/4	15162.5	15051.55	2016-10-28	376	CARD SD	CARD	745
Envolve Energy Services	00/15-07-070-05W6/4	15169.16	15051.55	2016-10-28	24	CARD SD	CARD	745
Envolve Energy Services	00/15-07-070-05W6/4	15956.73	7580.01	2018-07-23	553	CARD SD	CARD	0
Aqua Terra Water Management	00/16-32-069-05W6/3	10523.22	10260.73	2017-08-21	509	KPAU	CARD SD	761.9
Aqua Terra Water Management	00/16-32-069-05W6/3	10260.73	10260.73	2017-08-21	509	KPAU	CARD SD	770
Secure Energy Services	F1/10-13-070-06W6/0	8565.4	8585.28	2012-07-23	65	CARD SD	CARD SD	760
Secure Energy Services	F1/10-13-070-06W6/0	8564.95	8584.83	2012-07-23	64	CARD SD	CARD SD	760
Secure Energy Services	F1/10-13-070-06W6/0	9174.1	9041.09	2016-10-13	1006	CARD SD	CARD SD	714.24