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# Heavy Oil

## Controlled Document

Quest CCS Project

### **Well Technical Specifications Quest SCL Radway 7-11-59-20 Quest SCL Thorhild 5-35-59-21**


<b>Project</b>	Quest CCS Project
<b>Document Title</b>	Well Technical Specifications – Quest SCL Radway 7-11-59-20, Thorhild 5-35-59-21
<b>Document Number</b>	07-3-ZW-7770-0002
<b>Document Revision</b>	Rev 02
<b>Document Status</b>	Approved
<b>Document Type</b>	ZW7770-Other Functional Design Specification
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<b>Owner / Author</b>	Mark Hodder / Raul Caldera
<b>Issue Date</b>	2011-08-11
<b>Expiry Date</b>	None
<b>ECCN</b>	EAR 99
<b>Security Classification</b>	
<b>Disclosure</b>	None

*Revision History shown on next page*

**Revision History**

REVISION STATUS			APPROVAL		
Rev.	Date	Description	Originator	Reviewer	Approver
01	2011-08-11	Issued for approval	Mark Hodder	Vincent Hugonet	Janis Gayle
02	2011-08-29	Final	Mark Hodder Raul Caldera	Vincent Hugonet	Janis Gayle
<ul style="list-style-type: none"> <li>All signed originals will be retained by the UA Document Control Center and an electronic copy will be stored in Livelink</li> </ul>					

**Signatures for this revision**

Date	Role	Name	Signature or electronic reference (email)
	Originator	Mark Hodder Raul Caldera	
	Reviewer	Vincent Hugonet	
	Approver	Janis Gayle	

**Summary**

Well Technical Specifications for the well Quest SCL Radway 7-11-59-20W4 and Thorhild 5-35-59-21.

**Keywords**

Well Technical Specifications, Radway 7-11-59-20W4, Thorhild 5-35-59-21.


**PCAP Authorities**

Date	Role	Name	Signature or electronic reference
	C&WI TA-2	John Coblens	
	WE TA-2	Janis Gayle	

Well Technical Specifications –  
Quest SCL Radway 7-11-59-20,  
Thorhild 5-35-59-21

02

Heavy Oil



**Quest SCL Radway 7-11-59-20**

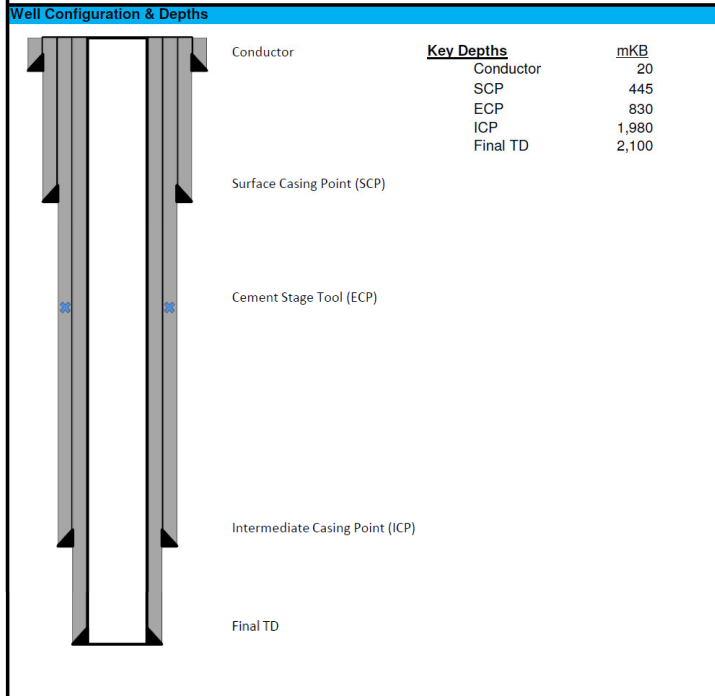
Drilling Engineer: Mark Hodder

Drilling Superintendent: Don Sorkilmo

Drilling Engineering Team Lead: Janis Gayle

Date: August 5, 2011

Spud Date: June 1, 2012



General Information	
Well Name	Quest SCL Radway 7-11-59-20
Network Number	
License Number	
UWI	
Surface LSD	07-11-059-20 W4M
Ground Level [mASL]	635.67
KB Height [m]	5.85
Bottom Hole LSD	07-11-059-20 W4M
Rig Name	
phone:	
fax:	
email:	

Surface Section	
Hole Size:	406.4mm (16")
Bit Type:	406.4mm Insert Bit Tricone
Risks:	Lost circulation in shallow hole, mud rings, and sloughing / tight hole.
BOP:	Class 1A Diverter
Mud:	Dispersed Water / Gel Chem
Density	1020-1100 kg/m3
Viscosity	45 - 60 s/L
Fluid Loss	< 10mL / 30min
pH	8.5 - 9.5
YP / PV	5.0 - 10.0 Pa / ALAP
Surveys:	Once per 30m to section TD
Logging:	Borehole caliper log and CBL
Sampling:	Vial/Bag/Isotube each 5m from surface to final TD
Casing:	339.7mm x 107.15kg/m L80LRP LTC R3 SMLS
Cement:	Class G cement to surface
LOT/FIT:	None
P-Test:	21 MPa
H2S	None

Intermediate Section	
Hole Size:	311.1mm (12-1/4")
Bit Type:	311.1mm PDC
Risks:	Potential for significant lost circulation in Nisku Potential for high pressure in Winnipegosis Potential hydrocarbons from 2nd White Specks to final TD, sloughing / tight hole, and chert pebbles in Viking and Manville.
BOP:	Class IV
Mud:	OBM / Invert
Density	1050-1080 kg/m3
Viscosity	40 - 50 s/L
H2S	< 15mL / 30min
YP / PV	2.0 - 2.5 Pa / ALAP
ES	> 800 Volts
O/W	90 : 10
Lime	10kg/m3; 15kg/m3 prior to Nisku
Surveys:	Once per 100m from SCP to section TD
Logging:	Open Hole and Cased Hole programs Mud gas detector from SCP to final TD
Sampling:	Vial/Bag/Isotube each 5m from surface to final TD
Casing:	244.5mm x 59.53kg/m L80LRP LTC R3 SMLS
Cement:	Class G cement to surface; 2-stage to protect Nisku
LOT/FIT:	LOT
P-Test:	21 MPa
H2S	Potential in Viking, Nisku, and Ireton (up to 3.5%)
Coring:	Lotsberg and Winnipegosis

Contact Information			
Drilling Engineer	Mark Hodder	403-691-4772 (office)	403-554-1130 (cell)
Drilling Superintendent	Don Sorkilmo	403-691-3243 (office)	403-669-6463 (cell)
Well Delivery Manager	Anton Vos	403-691-2700 (office)	
Civil Earthworks Superintendent	Calvin Leithead	403-691-4331 (office)	

Formation Name	Geological Prognosis		Risks			Pore Pressures		Mud Weights	
	Top [mASL]	Top [mKB]	H2S	LC	Hi-P	Pressure [kPa]	EMD	KMD	
Lea Park	437.58	203.94				1,513	475	694	
Colorado	316.58	324.94				2,415	537	693	
2nd White Specks	183.08	458.44				3,411	657	792	
Base Fish Scales	112.58	528.94				3,937	688	810	
Viking	58.28	583.24	X			4,342	727	845	
Joli Fou	33.08	608.44				4,530	747	863	
Mannville	23.58	617.94			X	4,604	822	716	
Glauconite SS	-113.42	754.94				5,745	740	830	
Ostracod Zone	-149.62	791.14				6,046	776	866	
Ellerslie	-152.52	794.04				6,070	750	837	
Calmar	-183.42	824.94				6,328	767	852	
Nisku	-199.42	840.94	X	X		6,461	734	814	
Ireton	-255.72	897.24	X			6,283	804	671	
Duvernay	-416.02	1057.54				7,737	690	753	
Cooking Lake	-501.12	1142.64				8,520	708	766	
Beaverhill Lake	-584.92	1226.44				9,291	744	800	
Moberly	-630.87	1272.39				9,714	742	796	
Christina	-692.82	1334.34				10,284	762	814	
Calmut	-793.42	1374.94				10,657	776	827	
Firebag	-757.92	1399.44				10,883	771	821	
Slave Point	-797.42	1438.94				11,246	789	838	
Watt Mountain	-812.02	1453.54				11,381	788	836	
Prairie Evaporite	-830.82	1472.34				11,554	738	783	
Winnipegosis	-953.77	1595.29			X	15,206	962	1,007	
Contact Rapids	-969.07	1610.59				15,385	934	976	
Ernestina Lake	-1037.92	1679.44				16,191	974	1,016	
Top U. Lotsberg	-1053.42	1694.94				16,372	909	948	
Top L. Lotsberg	-1193.92	1835.44				18,016	983	1,021	
Basal Red Beds	-1227.42	1868.94				18,024	961	999	
Upper Marine Silt	-1269.42	1910.94				18,532	981	1,018	
Middle Cambrian Shale	-1284.42	1925.94				18,713	968	1,005	
Lower Marine Sand	-1328.42	1969.94				19,246	963	999	
Basal Cambrian Sand	-1394.72	2036.24				20,048	982	1,016	

Main Section	
Hole Size:	215.9mm (8-1/2")
Bit Type:	215.9mm PDC
Risks:	No H2S expected below UMS (Devonian)
BOP:	Class IV
Mud:	OBM / Invert
Density	1050-1080 kg/m3
Viscosity	40 - 50 s/L
H2S	< 15mL / 30min
YP / PV	4.0 - 5.0 Pa / ALAP
ES	> 800 Volts
O/W	90 : 10
Lime	10kg/m3
Surveys:	Survey at final TD
Logging:	Open Hole and Cased Hole programs Mud gas detector from SCP to final TD
Sampling:	Vial/Bag/Isotube each 5m from surface to final TD
Casing:	177.8mm x 38.69kg/m L80 LTC R3 SMLS 177.8mm x 33.81kg/m 25Cr-125 Vam R3 SMLS
Cement:	Class G cement to surface
LOT/FIT:	LOT
P-Test:	21 MPa

Well Technical Specifications =

Quest SCL Radway 7-11-59-20,  
Thorhild 5-35-59-21

Heavy Oil

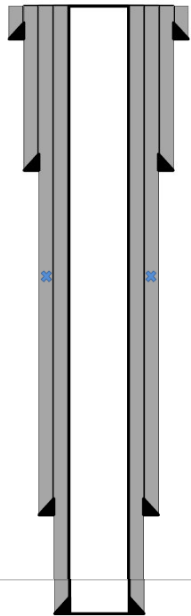


**Quest SCL THORH 5-35-59-21**

Date: August 5, 2011  
 Spud Date: July 15, 2012

Drilling Engineer: Mark Hodder  
 Drilling Superintendent: Don Sorkilmo  
 Drilling Engineering Team Lead: Janis Gayle

**Well Configuration & Depths**



Conductor	Key Depths	mKB
	Conductor	20
	SCP	445
	ECP	835
	ICP	1,985
	Final TD	2,100

Surface Casing Point (SCP)

Cement Stage Tool (ECP)

Intermediate Casing Point (ICP)

Final TD

**General Information**

Well Name: Quest SCL THORH 5-35-59-21  
 Network Number:  
 License Number:  
 UWI:  
 Surface LSD: 05-35-059-21 W4M  
 Ground Level [mASL]: 641.71  
 KB Height [m]: 5.85  
 Bottom Hole LSD: 05-35-059-21 W4M  
 Rig Name:  
 phone:  
 fax:  
 email:

**Surface Section**

Hole Size: 406.4mm (16")  
 Bit Type: 406.4mm Insert Bit Tricone  
 Risks: Lost circulation in shallow hole, mud rings, and sloughing / tight hole.  
 BOP: Class 1A Diverter  
 Mud: Dispersed Water / Gel Chem  
 Density: 1020-1100 kg/m3  
 Viscosity: 45 - 60 s/L  
 Fluid Loss: < 10mL / 30min  
 pH: 8.5 - 9.5  
 YP / PV: 5.0 - 10.0 Pa / ALAP  
 Surveys: Once per 30m to section TD  
 Logging: Borehole caliper log and CBL  
 Sampling: Vial/Bag/Isotube each 5m from surface to final TD  
 Casing: 339.7mm x 107.15kg/m L80IRP LTC R3 SMLS  
 Cement: Class G cement to surface  
 LOT/FIT: None  
 P-Test: 21 MPa  
 H2S: None

**Intermediate Section**

Hole Size: 311.1mm (12-1/4")  
 Bit Type: 311.1mm PDC  
 Risks: Potential for significant lost circulation in Nisku  
 Potential for high pressure in Winnipegosis  
 Potential hydrocarbons from 2nd White Specks to final TD, sloughing / tight hole, and chert pebbles in Viking and Manville.  
 BOP: Class IV  
 Mud: OBM / Invert  
 Density: 1050-1080 kg/m3  
 Viscosity: 40 - 50 s/L  
 HTHP: < 15mL / 30min  
 YP / PV: 2.0 - 2.5 Pa / ALAP  
 ES: > 800 Volts  
 O/W: 90 : 10  
 Lime: 10kg/m3; 15kg/m3 prior to Nisku  
 Surveys: Once per 100m from SCP to section TD  
 Logging: Open Hole and Cased Hole programs  
 Mud gas detector from SCP to final TD  
 Sampling: Vial/Bag/Isotube each 5m from surface to final TD  
 Casing: 244.5mm x 59.53kg/m L80IRP LTC R3 SMLS  
 Cement: Class G cement to surface; 2-stage to protect Nisku  
 LOT/FIT: LOT  
 P-Test: 21 MPa  
 H2S: Potential in Viking, Nisku, and Ireton (up to 3.5%)  
 Coring: Lotsberg and Winnipegosis

**Main Section**

Hole Size: 215.9mm (8-1/2")  
 Bit Type: 215.9mm PDC  
 Risks: No H2S expected below UMS (Devonian)  
 BOP: Class IV  
 Mud: OBM / Invert  
 Density: 1050-1080 kg/m3  
 Viscosity: 40 - 50 s/L  
 HTHP: < 15mL / 30min  
 YP / PV: 4.0 - 5.0 Pa / ALAP  
 ES: > 800 Volts  
 O/W: 90 : 10  
 Lime: 10kg/m3  
 Surveys: Survey at final TD  
 Logging: Open Hole and Cased Hole programs  
 Mud gas detector from SCP to final TD  
 Samples: Vial/Bag/Isotube each 5m from surface to final TD  
 Casing: 177.8mm x 38.69kg/m L80 LTC R3 SMLS  
 177.8mm x 33.81kg/m 25Cr-125 Vam R3 SMLS  
 Cement: Class G cement to surface  
 LOT/FIT: LOT  
 P-Test: 21 MPa

**Contact Information**

Drilling Engineer: Mark Hodder 403-691-4772 (office)  
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 Drilling Superintendent: Don Sorkilmo 403-691-3243 (office)  
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**Geological Prognosis**


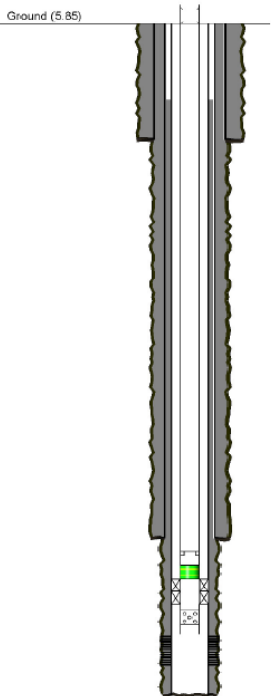
Formation Name	Top [mASL]	Top [mKB]	Risks			Pore Pressures		Mud Weights	
			H2S	LC	Hi-P	Pressure [kPa]	EMD	KMD	
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Colorado	316.58	330.98				2,415	530	684	
2nd White Specks	183.08	464.48				3,411	650	783	
Base Fish Scales	112.58	534.98				3,937	681	802	
Viking	58.28	589.28	X			4,342	720	836	
Joli Fou	33.08	614.48				4,530	740	854	
Mannville	23.58	623.98			X	4,604	617	710	
Glauconite SS	-113.42	760.98				5,745	735	824	
Ostracod Zone	-149.62	797.10				6,046	770	860	
Ellerslie	-152.52	800.08				6,070	745	831	
Calmar	-183.42	830.98				6,328	762	846	
Nisku	-199.42	846.98	X	X		6,461	729	808	
Ireton	-255.72	903.28	X			6,263	600	667	
Duvernay	-416.02	1063.58				7,737	687	749	
Cooking Lake	-501.12	1148.68				8,520	705	763	
Beaverhill Lake	-584.92	1232.48				9,291	741	797	
Moberly	-630.87	1278.43				9,714	739	792	
Christina	-692.82	1340.38				10,284	759	811	
Calmut	-733.42	1380.98				10,657	773	824	
Firebag	-757.92	1405.48				10,883	768	817	
Slave Point	-797.42	1444.98				11,246	785	834	
Watt Mountain	-812.02	1459.58				11,381	785	833	
Prairie Evaporite	-830.82	1478.38				11,554	735	780	
Winnipegosis	-953.77	1601.33			X	15,206	959	1,003	
Contact Rapids	-969.07	1616.63				15,385	930	973	
Ernestina Lake	-1037.92	1685.48				16,191	970	1,012	
Top U. Lotsberg	-1053.42	1700.98				16,372	906	945	
Top L. Lotsberg	-1193.92	1841.48				18,016	979	1,018	
Basal Red Beds	-1227.42	1874.98				18,024	958	996	
Upper Marine Silt	-1269.42	1916.98				18,532	978	1,015	
Middle Cambrian Shale	-1284.42	1931.98				18,713	965	1,002	
Lower Marine Sand	-1328.42	1975.98				19,246	961	996	
Basal Cambrian Sand	-1394.72	2042.28				20,048	979	1,013	

Well Technical Specifications

Quest SCL Radway 7-11-59-20,  
 Thorhild 5-35-59-21

Heavy Oil

## COMPLETION SCHEMATIC (Radway 7-11 and Thorhild 5-35)

	<b>Well:</b> Quest SCL Radway 7-11-59-20 <b>Date:</b> August 25, 2011 <b>Spud date:</b> TBD	<b>Completion Engineer:</b> Raul Caldera _____ <b>C&amp;WI Superintendent:</b> Jeremy Friesen _____ <b>C&amp;WI Team Lead:</b> John Coblens _____																																																																															
 <p style="font-size: small;">Ground (5.85)</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #f2f2f2;"> <th colspan="3">Casing Information</th> </tr> <tr style="background-color: #f2f2f2;"> <th style="text-align: left;">Depth (mKB)</th> <th style="text-align: left;">Item</th> <th style="text-align: left;">Description</th> </tr> </thead> <tbody> <tr> <td>20</td> <td>Conductor</td> <td>TBD</td> </tr> <tr> <td>445</td> <td>Surface casing</td> <td>339.7 mm x 107.15 Kg/m L80IRP LTC R3 SMLS</td> </tr> <tr> <td>1980</td> <td>Intermediate casing</td> <td>244.5 mm x 59.53 Kg/m L80IRP LTC R3 SMLS</td> </tr> <tr> <td>Surface to TBD</td> <td>Production Casing</td> <td>177.8mm x 38.69 kg/m L80 LTC R3 SMLS</td> </tr> <tr> <td>TBD to Final TD - 2101</td> <td>Production Casing</td> <td>177.8mm x 33.81Kg/m 25Cr-125 Vam R3 SMLS</td> </tr> <tr style="background-color: #f2f2f2;"> <th colspan="3">Completions Information</th> </tr> <tr style="background-color: #f2f2f2;"> <th style="text-align: left;">Depth (mKB)</th> <th style="text-align: left;">Item</th> <th style="text-align: left;">Description</th> </tr> <tr> <td>TBD</td> <td>Tubing Hanger</td> <td>177.8mm x 38.69 kg/m</td> </tr> <tr> <td>TBD</td> <td>Tubing X_O</td> <td>177.8mm x 38.69 kg/m x 88.9 mm</td> </tr> <tr> <td>TBD @ 2000</td> <td>Tubing</td> <td>88.9 mm</td> </tr> <tr> <td>TBD</td> <td>IPC-X Nipple</td> <td>88.9 mm Metallic coated OTIS</td> </tr> <tr> <td>TBD</td> <td>Anchor On-off tool</td> <td>88.9mm Baker H.</td> </tr> <tr> <td>TBD @ 2040</td> <td>Mech.Packer</td> <td>177.8mm, 600-292 Hornet Packer</td> </tr> <tr> <td>TBD</td> <td>IPC Pup joint</td> <td>88.9mm Metallic coated</td> </tr> <tr> <td>TBD</td> <td>IPC-X Nipple</td> <td>88.9mm x 71.45mm</td> </tr> <tr> <td>TBD</td> <td>IPC Pup joint</td> <td>88.9 mm Metallic coated</td> </tr> <tr> <td>TBD</td> <td>IPC-XN Nipple</td> <td>88.9mm x 71.45mm "X" Profile c/w 67.72mm NO-GO MC</td> </tr> <tr> <td>TBD</td> <td>WRGN</td> <td>Wireline Re-entry Guide</td> </tr> <tr style="background-color: #f2f2f2;"> <th colspan="3">Perforations</th> </tr> <tr> <td>Depth Interval :</td> <td>TBD</td> <td></td> </tr> <tr> <td>Depth Interval :</td> <td>TBD</td> <td></td> </tr> <tr> <td>H2S:</td> <td>TBD</td> <td></td> </tr> <tr style="background-color: #f2f2f2;"> <th colspan="3">Additional Information</th> </tr> <tr> <td colspan="3" style="height: 40px;"></td> </tr> </tbody> </table>			Casing Information			Depth (mKB)	Item	Description	20	Conductor	TBD	445	Surface casing	339.7 mm x 107.15 Kg/m L80IRP LTC R3 SMLS	1980	Intermediate casing	244.5 mm x 59.53 Kg/m L80IRP LTC R3 SMLS	Surface to TBD	Production Casing	177.8mm x 38.69 kg/m L80 LTC R3 SMLS	TBD to Final TD - 2101	Production Casing	177.8mm x 33.81Kg/m 25Cr-125 Vam R3 SMLS	Completions Information			Depth (mKB)	Item	Description	TBD	Tubing Hanger	177.8mm x 38.69 kg/m	TBD	Tubing X_O	177.8mm x 38.69 kg/m x 88.9 mm	TBD @ 2000	Tubing	88.9 mm	TBD	IPC-X Nipple	88.9 mm Metallic coated OTIS	TBD	Anchor On-off tool	88.9mm Baker H.	TBD @ 2040	Mech.Packer	177.8mm, 600-292 Hornet Packer	TBD	IPC Pup joint	88.9mm Metallic coated	TBD	IPC-X Nipple	88.9mm x 71.45mm	TBD	IPC Pup joint	88.9 mm Metallic coated	TBD	IPC-XN Nipple	88.9mm x 71.45mm "X" Profile c/w 67.72mm NO-GO MC	TBD	WRGN	Wireline Re-entry Guide	Perforations			Depth Interval :	TBD		Depth Interval :	TBD		H2S:	TBD		Additional Information					
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20	Conductor	TBD																																																																															
445	Surface casing	339.7 mm x 107.15 Kg/m L80IRP LTC R3 SMLS																																																																															
1980	Intermediate casing	244.5 mm x 59.53 Kg/m L80IRP LTC R3 SMLS																																																																															
Surface to TBD	Production Casing	177.8mm x 38.69 kg/m L80 LTC R3 SMLS																																																																															
TBD to Final TD - 2101	Production Casing	177.8mm x 33.81Kg/m 25Cr-125 Vam R3 SMLS																																																																															
Completions Information																																																																																	
Depth (mKB)	Item	Description																																																																															
TBD	Tubing Hanger	177.8mm x 38.69 kg/m																																																																															
TBD	Tubing X_O	177.8mm x 38.69 kg/m x 88.9 mm																																																																															
TBD @ 2000	Tubing	88.9 mm																																																																															
TBD	IPC-X Nipple	88.9 mm Metallic coated OTIS																																																																															
TBD	Anchor On-off tool	88.9mm Baker H.																																																																															
TBD @ 2040	Mech.Packer	177.8mm, 600-292 Hornet Packer																																																																															
TBD	IPC Pup joint	88.9mm Metallic coated																																																																															
TBD	IPC-X Nipple	88.9mm x 71.45mm																																																																															
TBD	IPC Pup joint	88.9 mm Metallic coated																																																																															
TBD	IPC-XN Nipple	88.9mm x 71.45mm "X" Profile c/w 67.72mm NO-GO MC																																																																															
TBD	WRGN	Wireline Re-entry Guide																																																																															
Perforations																																																																																	
Depth Interval :	TBD																																																																																
Depth Interval :	TBD																																																																																
H2S:	TBD																																																																																
Additional Information																																																																																	

Well Technical Specifications – Quest SCL Radway 7-11-59-20, Thorhild 5-35-59-21		02
Heavy Oil		