Para et al Cameron E-52

Approval to Drill a Well Application

Cameron Hills - Winter 2011

Prepared by:
Brad Scott
January 2011

1 Authorization to Drill a Well Form (3 Copies)

2 Stick Diagram

3 Geological Prognosis

4 Wellsite Survey

5 Drilling Operations Plan

6 Drilling Fluids Program

7 Land Use Permit

8 Water License

PARA et al Cameron E-52

ADW WID Number

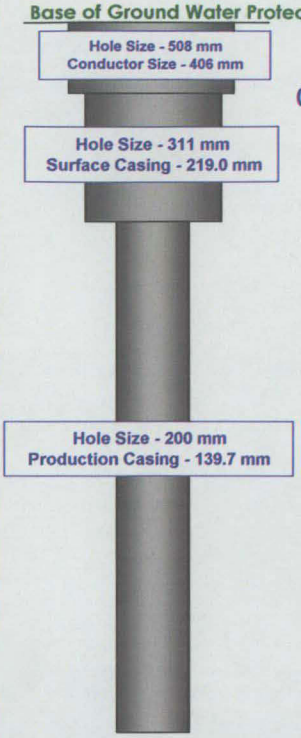
Surface Location - E-52 60' 10" 117' 15"

Sour

Oil - Vertical

TIGHT HOLE - YES

Diagram



Working Interest

Paramount Resources	88.0%	AFE Number	10N110008
Estimated Days	12	AFE Estimate	$1,692,520

Elevations / Depths

Ground Level	744.2 m	*Surveyed*
Kelly Bushing	748.8 m	
Total Depth	1421 m TVD	

Formation Tops

(MD) m KB	(TVD) m KB	FORMATION TOPS	DEPTH SUBSEA	EXPECTED PRESSURE	EMD	POTENTIAL PROBLEMS	FORMATION DIPS
	360	SURFACE CASING					
	542	WABAMUN	207			Complete Loss Circulation	
	685	FORT SIMPSON	64				
	794	TWIN FALLS	-45				
	1290	BEAVERHILL LAKE	-541				
	1315	SLAVE POINT	-566				
	1356	F4	-607				
	1363	WATT MOUNTAIN	-614				
	1371	SULPUR POINT LST	-622	9,800 kPa	729 kg/m³	H2S	
	1381	SULPUR POINT DOL	-632				
	1397	MUSKEG	-648				
	1421	TOTAL DEPTH					

* Primary zone ** Secondary Zone

(S-Sour Zone, AP-Abnormal Pressure, LC-Lost Circulation, WI-Water Injection, DP-Depleted)

Geological Evaluation

Samples	1275mKB to TD 5m intervals
NEB	1275mKB to TD 5m intervals
Gas Detection	Surface casing shoe to TD
Cores	**One** 18 m core in the **Suphur Point**
DST	Sulphur Pt. Dol. depending on logs
LOGGING	See Geological Prog

Additional Information

Prior to moving rig, notify Paramount production foreman: Doug Bardick Cell: (780) 622-8477 Office: (403) 398-8130 Fax: (780) 956-4457

H2S is expected in the Sulphur Point formation

Maximum H2S Concentration - 3.4%

Lost circulation is expected in the Wabamun formation Attempt to cure losses with LCM otherwise drill blind to approximately 720 m. Run 2 cement plugs Ensure LCM products are on location

Drilling Fluids

Surface	0 - 360 m	Gel/PHPA
Production	360 - 1200 m	Floc Water
	1200 - TD	Gel - Polymer

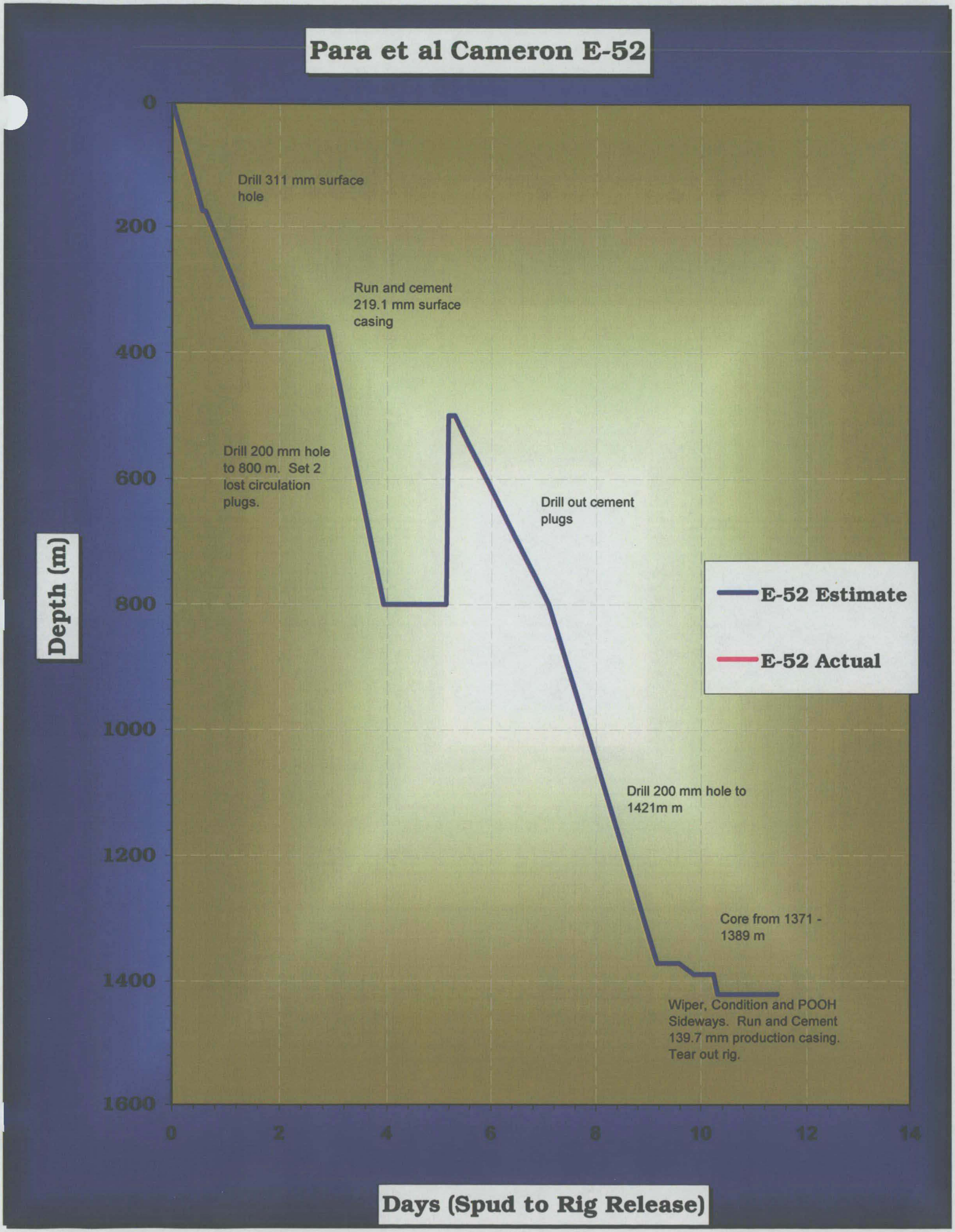
Casing

	Surface	Production
Casing Size	219.1 mm	139.7 mm
Casing Weight	35.7 kg/m	20.8 kg/m
Casing Grade	J-55	J-55
Coupling	ST&C	ST&C
Drift	202.5 mm	124.1 mm
Make Up Torque	3310 N-m	2330 N-m
Burst Pressure	20,340 kPa	29,440 kPa
Collapse	9,450 kPa	21,510 kPa
Joint Strength	108,500 daN	76,100 daN

Cement

Surface	Preflush	5.0 m³ water
	360 - 0	MaxxCem G + 0.90% FL-5 + 1.00% $CaCl_2$
Production	Preflush	4.0 m³ water
	Scavenger	3.0 m³ MaxxCem G + 0.90% FL-5 + 1.00% $CaCl_2$ at 1250 kg/m³
	1421 - 0	MaxxCem G + 0.90% FL-5 + 1.00% $CaCl_2$ at 1700 kg/m³

Date Prepared 9-Sep-10 Prepared by Brad Scott


Para et al Cameron E-52
Depth (m)
0
200
400
600
800
1000
1200
1400
1600
0
2
4
6
8
10
12
14
Days (Spud to Rig Release)
Drill 311 mm surface hole
Run and cement 219.1 mm surface casing
Drill 200 mm hole to 800 m. Set 2 lost circulation plugs.
Drill out cement plugs
Drill 200 mm hole to 1421m m
Core from 1371 - 1389 m
Wiper, Condition and POOH Sideways. Run and Cement 139.7 mm production casing. Tear out rig.
E-52 Estimate
E-52 Actual

Geological Prognosis

Para et al Cameron E-52 **Revised 23-Sep-10**

Purpose of the well is to evaluate for oil in the Sulphur Point Dolomite.

	K.B. est.	753.0	K.B. Act.	
	G.L. est.	748.0	G.L. Act.	

Location (NAD27) X 475949 Y 6653946 (NAD27)

	Prognosed			Actual		
Formation	**Drill Depth**	**Subsea**	**Isopach**	**Drill Depth**	**Subsea**	**Isopach**
Wabamun	546.5	206.5	142.5			
Fort Simpson	689.0	64.0	104.0			
Twin Falls	793.0	-45.0	501.0			
BhL	1294.0	-541.0	25.0			
Slave Point	1319.0	-566.0	41.6			
F4	1360.6	-607.0	7.1			
Watt Mountain	1367.7	-614.0	8.2			
Sulphur Point Lst.	1375.9	-622.0	9.8			
Sulphur Point Dol.	1385.7	-632.0	16.0			
Muskeg	1401.7	-648.0	20.3			
T.D.	1422.0					

Comments:

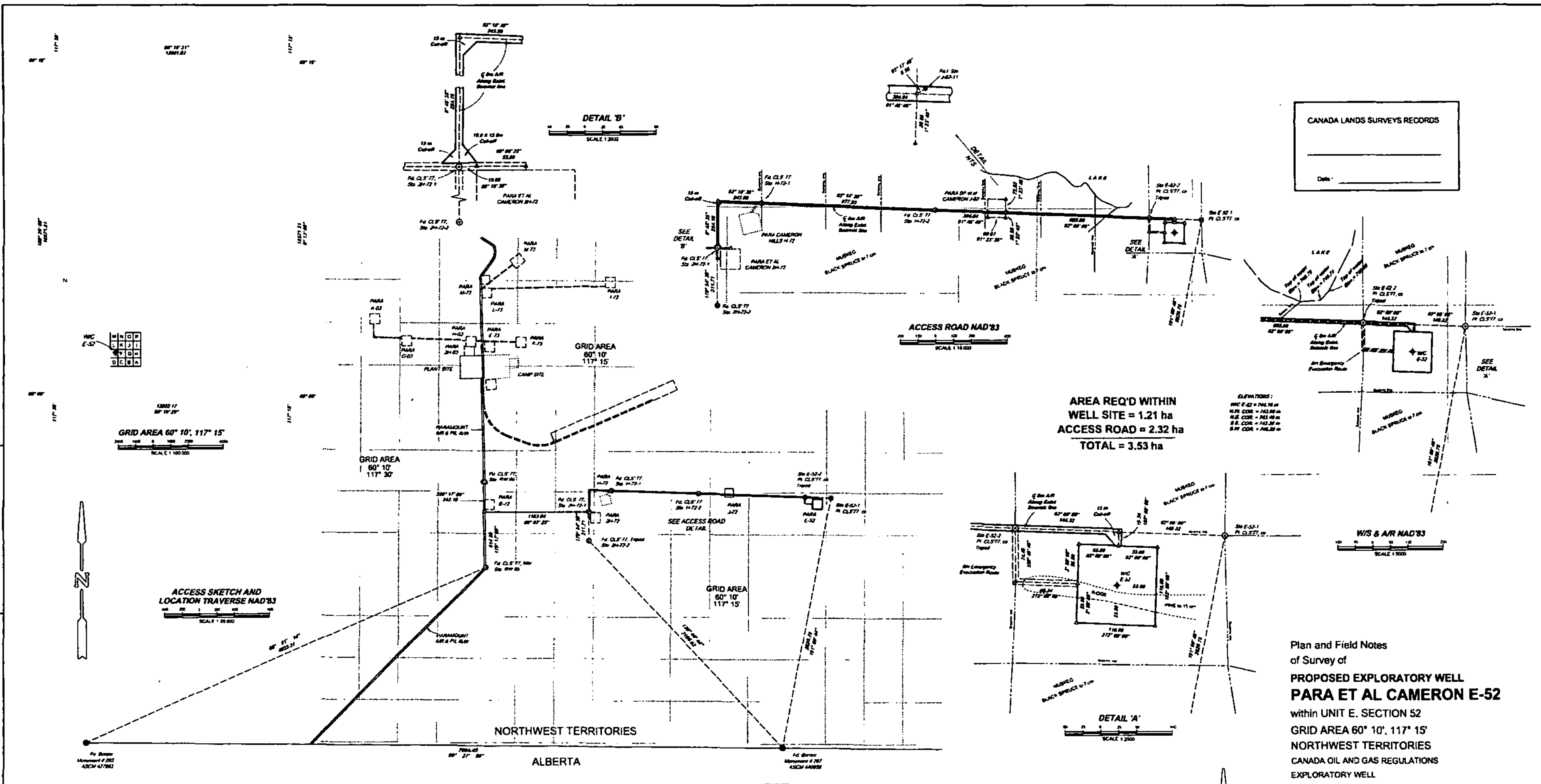
Samples:
To be determined once NEB issues drilling licence.

Gas Detection:
Must be run from Base Sfce Csg to T.D. and incorporated into the "strip log"

Logging Program:
These wells are usually logged in two runs but if there is enough overhole, one run may suffice
Single Run: **STI/SPeD/CNS/GR/MRT/HBC/CAL**
Log the MRT from TD to top of Slave Point(0-40). Log everything else TD to SC.
SPeD/CNS: LS scale TD to SC plus Dolomite scale TD to top of Slave Point.
Log High Res Density/Neutron/GR from TD to top of Slave Point.
Display high res on Lime and Dolomite on both 1:240 and 1:120 scale(a total of 4 high res playbacks).
Enhance STI on 1:120 scale over the same interval.
BCS/GR: BCS 300 TO 100 TD TO SC.
It may be necessary to drop back down to pick up missed interval with MRT/HBC.
If necessary to log in two separate runs use:
Run 1: STI/SPeD/CNS/GR
Run 2: MRT/HBC/CAL
RapidPost as soon as you are above the Slave Point and phone Llew to let him know that the logs are posted.

Coring and Testing:
One 18m core in the Sulphur Point
A DST in Sulphur Point Dol. possible if gas is suspected from logs

Prepared by L.L. Williams
August 24, 2010



AREA REQ'D WITHIN
WELL SITE = 1.21 ha
ACCESS ROAD = 2.32 ha
TOTAL = 3.53 ha

GEOGRAPHIC AND UTM COORDINATES - NAD '27				
STATION	LATITUDE (N)	LONGITUDE (W)	NORTHING	EASTING
GRID AREA 60° 10', 117° 15'				
N E	60° 10' 00.000"	117° 15' 00.000"	[illegible]	[illegible]
N W	60° 10' 00.000"	117° 30' 00.000"	[illegible]	[illegible]
S W	60° 00' 00.000"	117° 30' 00.000"	[illegible]	[illegible]
S E	60° 00' 00.000"	117° 15' 00.000"	[illegible]	[illegible]
UNIT E-52				
N E	[illegible]	[illegible]	[illegible]	[illegible]
N W	[illegible]	[illegible]	[illegible]	[illegible]
S W	[illegible]	[illegible]	[illegible]	[illegible]
S E	[illegible]	[illegible]	[illegible]	[illegible]
STA E-52-1	[illegible]	[illegible]	[illegible]	[illegible]
STA E-52-2	[illegible]	[illegible]	[illegible]	[illegible]
WC E-52	[illegible]	[illegible]	[illegible]	[illegible]

GEOGRAPHIC AND UTM COORDINATES - NAD '83 (Original)					
STATION	LATITUDE (N)	LONGITUDE (W)	NORTHING	EASTING	ELEVATION
BORDER MON. [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(ASCM [illegible]) PUBL FIXED					
BORDER MON. [illegible]					
(ASCM [illegible]) PUBL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(ASCM [illegible]) ADJ	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
E 52-1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
E 52-2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
WC E-52	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

FINAL COORDINATES WERE CALCULATED IN NAD'83 AND CONVERTED TO NAD'27 USING NATIONAL TRANSFORMATION VERSION 2 PROGRAM

LEGEND

Plan and Field Notes
of Survey of
PROPOSED EXPLORATORY WELL
PARA ET AL CAMERON E-52
within UNIT E, SECTION 52
GRID AREA 60° 10', 117° 15'
NORTHWEST TERRITORIES
CANADA OIL AND GAS REGULATIONS
EXPLORATORY WELL

CERTIFIED CORRECT
GREG BOGGS
CANADA LANDS SURVEYOR

Surveyed for
PARAMOUNT RESOURCES LTD.

SCALE= 1:5000		UNIVERSAL JOB No.	10-1083
DATE NOV 12, 2010		UNIVERSAL PLAN No.	101083W01
		REVISION No.	A

Para et al Cameron E-52

Drilling Operations Plan

Cameron Hills - Winter 2011

Prepared by:
Brad Scott
January 2011

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1.0 GENERAL INFORMATION

Prospect Name:	Cameron Hills
Well:	Para et al Cameron E-52
Field:	SDL 007
Rig:	Nabors #24
Contractor:	Nabors Drilling
Type of Work:	Development
Directional Information:	Vertical Well
Grid Area:	60° 10', 117° 15'
Surface Location (NAD27):	N. 6653945.94, E. 475949.17
Bottom Hole Loc. (NAD27):	N. 6653945.94, E. 475949.17
Ground Level:	744.16 m AMSL
Kelly Bushing:	748.76 m AMSL
Primary Target:	Sulphur Point Dolomite
Secondary Target:	Slave Point Limestone
Proposed TD:	1421 m MD
AFE Number:	10N110008
Total AFE:	$1,692,520

1.1 Basic Well Data

1.1.1 Geological Summary

Expected Pressures

As these are infill wells of a known field, the pressures are well known.
The virgin reservoir pressure of the Sulphur Point is approximately 9800 kPa (wells may encounter lower/depleted pressures). The shallowest expected top of the Sulphur Point to be drilled this winter is anticipated to be 1362 mKB in the H-72 well, with other wells encountering this formation at a deeper depth. This equates to a gradient of 7.2 kPa/m or an equivalent density of 733 kg/m^3. This is significantly less than that of pure fresh water.

Target Formations

Sulphur Point Formation (Primary Target – Oil)
(associated solution gas typically 2% H_2S – up to 3.4%)

In the Cameron Hills area, the Sulphur Point Formation comprises a dolomite member 0 to 22 m in thickness overlain by a generally tight limestone member that ranges from 0.4 to 23.5 m in thickness. The contact between the Sulphur Point and the underlying Muskeg evaporites is unconformable with significant intervals of the interlayered anhydrites and dolomites of the Muskeg removed. It would appear that the Muskeg surface was locally exposed prior to onset of the Sulphur Point carbonate deposition. Given the tight and/or severely brecciated nature of the Limestone member, the majority of oil and gas production has been derived from the Sulphur Point Dolomite. Reservoir development within the Sulphur Point is directly related to primary depositional facies. The peloidal and skeletal grainstones characteristic of the subtidal to intertidal facies generally host well developed moldic, interparticle and intercrystalline porosity. The moldic porosity, resulting from the dissolution of bioclasts, represents the most significant pore type in the skelatal grainstones, with intercrystalline porosity being critical for connectivity of the porosity network. Within the peloidal grainstones, interparticle porosity provides the excellent reservoir quality characteristic of this facies. Vertical communication in these sediments is limited to vertically-oriented, small-scale fractures.

The Sulphur Point was deposited in a peritidal environment, ranging from subtidal to supratidal and was regularly subjected to periods of subareal exposure. A detailed core study identified five stages of karsting in the rock record. Lateral continuity of units is very good in the Dolomite Member with two porous intervals being easily correlated in most wells in the Cameron Hills area. Exceptions exist where tectonics and karsting have combined to essentially remove the entire Sulphur Point carbonate interval. As in most carbonates, porosity and permeability are highly variable, both being closely associated with the diagenetic history of the area which in turn would seem to be closely linked to the tectonic history.

The best Sulphur Point oilwell, K-74, is located in an area between Pre-Devonian erosional remnants. The reservoir is especially porous and permeable because it is a "roof collapse breccia", a grainstone that has been enhanced through a phase of leaching by meteoric waters and then significantly fractured though collapse into an open cave system during a phase of karsting. This would imply that this portion of lower Sulphur Point dolomite reservoir was exposed to meteoric waters, leached and karsted as a result of being on a high, so this area would have moved up early. Wells that are off the trend of highs have good porosity developed within an identical portion of the Sulphur Point dolomite but permeability is poorer and oil inflow is lower. Examples are F-73, E-72, C-16 and F,K and O-19 The challenge is to find areas equivalent to the Oil Pilot within the fairway of pre-Devonian quartzite remnant highs and consequent tectonic highs. To date, the best exploration model has been to drill the flanks of Slave Point highs to get above the long oil-water transition zone and avoid gas. The 2011 winter drilling program is designed to accomplish this, the locations being situated on the flanks of highs or between highs as determined from the 3D seismic control.

Slave Point Formation
(Secondary Target – gas - up to 3.4% H_2S)

The Slave Point Formation is a secondary objective in the Cameron Hills area. It rests conformably on the Middle Devonian-aged Fort Vermilion evaporites and is capped by the argillaceous limestones of the Waterways Formation of the Beaverhill Lake Group. The Slave Point limestone in the Cameron Hills area was deposited in a back-barrier intertidal to subtidal setting. Shallow platform and lagoonal carbonates with restricted biota such as calcispheres, brachiopods, ostracods, gastropods, and crinoids predominate with cycles of colonization characterized by amphipora and bulbous stromatoporoid floatstones. In the Cameron Hills area the Slave Point Formation is approximately 31 meters thick and does not typically exhibit any of the grainstone shoal members at the top of the sequence which are often recognized in other regions of northwestern Alberta
Reservoir development within the Slave Point is directly related to primary depositional facies, and is generally restricted to higher energy grainstone shoals and stromatoporoid floatstone facies which are characteristic of the colonization subcycles. The main porosity type is interparticle porosity with fractures enhancing permeability in regions of intense structural movement.

1.1.2 Samples Requirement

Bagged samples: every 5m from 1275 m KB to TD. May be every 10 m through some intervals when drilling rate is high or cuttings return to surface is low. Limited to no returns may be encountered in the Wabamun formation from ~550 – 720 m KB.

1.1.3 Coring

An 18 m fullhole conventional core is planned to be cut from the Sulphur Point formation from ~1371 – 1389 m KB.

1.1.4 Logging

These wells are usually logged in two runs but if there is enough overhole, one run may suffice
Single Run: **STI/SPeD/CNS/GR/MRT/HBC/CAL**
Log the MRT from TD to top of Slave Point(0-40). Log everything else TD to SC.
SPeD/CNS: LS scale TD to SC plus Dolomite scale TD to top of Slave Point.
Log High Res Density/Neutron/GR from TD to top of Slave Point.
Display high res on Lime and Dolomite on both 1:240 and 1:120 scale(a total of 4 high res playbacks).
Enhance STI on 1:120 scale over the same interval.
BCS/GR: BCS 300 TO 100 TD TO SC.
It may be necessary to drop back down to pick up missed interval with MRT/HBC.
If necessary to log in two separate runs use:
Run 1: STI/SPeD/CNS/GR
Run 2: MRT/HBC/CAL

1.1.5 DST

A DST in the Sulphur Point Dolomite is possible if gas is suspected from logs

1.1.6 Production Test

Production testing will be done with a service rig. Separate AACW application will follow for the completion and testing program.

1.1.7 Well Objectives

1.1.7.1 Drill, evaluate and test to a depth of 1421 m MD in the 2011 winter season.

1.1.7.2 Maintain Paramount Resources Ltd. HSE standards throughout the life of the project. Build and establish an HSE culture with project team members (Paramount, contractors).

1.1.7.3 The wellbore will be temporarily suspended until the service rig will be able to move in and flow test and/or complete the well for production.

1.1.7.4 Maintain wellbore within the defined bottom hole target area.

1.1.7.5 Provide a borehole in a condition which will allow the Sulphur Point Dolomite to be completed and tested, with the Slave Point Limestone as a contingency.

1.1.7.6 Conduct operations within the authorized plan and within planned cost.

1.1.7.7 Build relations with Northern communities and industry while meeting all requirements of our benefit agreements.

1.2 Drilling Hazards

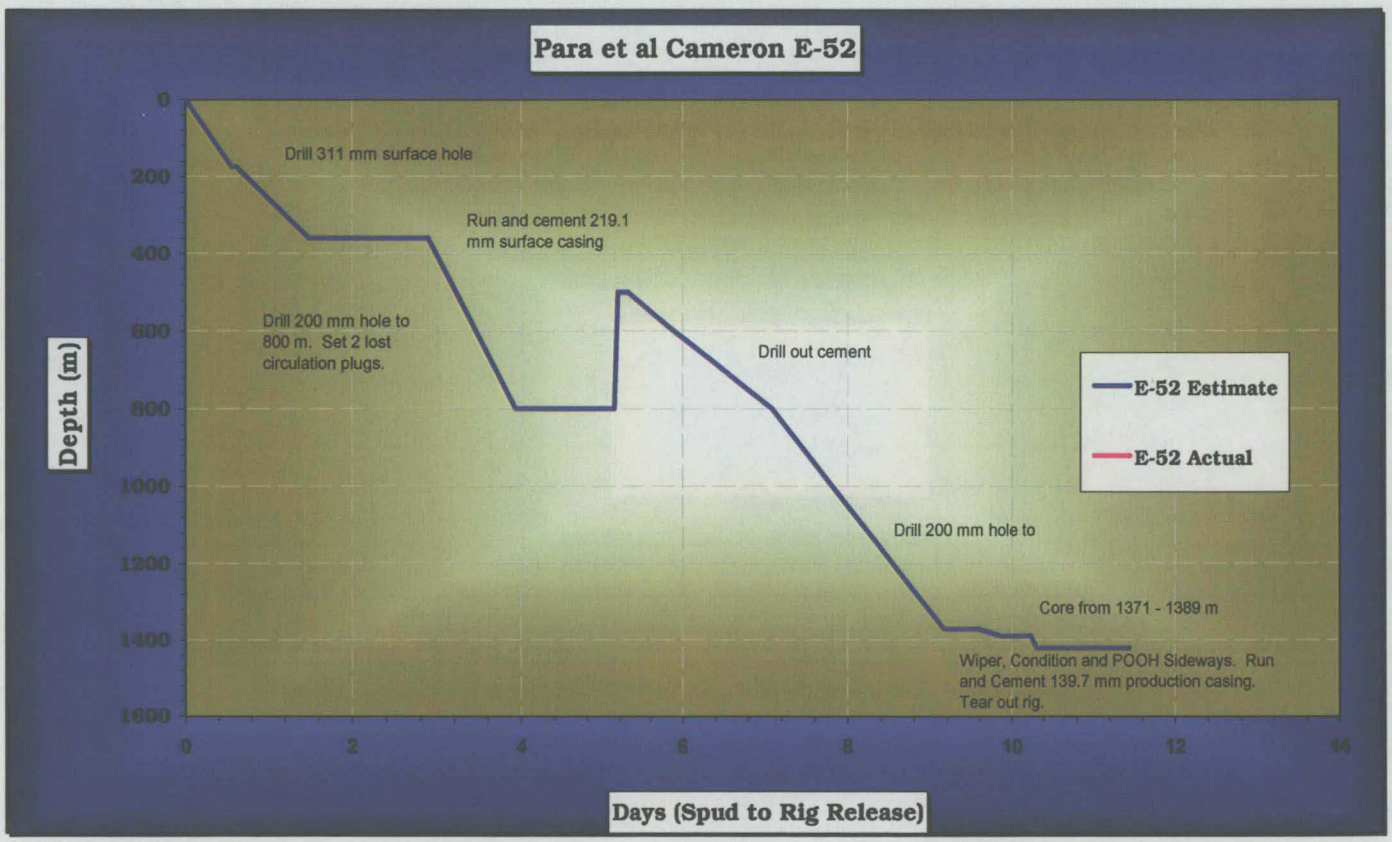
1.2.1 Lost Circulation

While drilling the Wabamun formation (~500 – 715 m MD) in the Cameron Hills field it is very likely to encounter total loss of circulation. Should this occur, the well will be drilled blind until it is determined that the entire Wabamun formation has been penetrated. Once this has been achieved 2 – 3 lost circulation cement plugs will be run to seal of the formation and regain returns.

1.2.2 Pore Pressure

The proposed Para et al Cameron E-52 well is being drilled in a known field with the shallowest expected depth of the Sulphur point resulting in a gradient of 7.2 kPa/m (EMD 733 kg/m^3). Therefore this well is considered to be subnormally pressured.

1.3 Drilling Time Curve



1.4 Directional Profile

The well is planned to be Vertical.

2.0 CONDUCTOR (0 – 20 m MD)

2.1 Overview

Once approval has been received from the Chief Conservation Officer and prior to setting the conductor, a 1.5 m (5') diameter cellar will be dug to a minimum depth of 1 m (3.2"). A rathole rig will be used to drill 508 mm (20") hole to +/- 20 m below the base of the cellar in order to set a 406.4 mm (16") conductor pipe. Ensure that the conductor is set in a vertical position. The conductor will be cemented by the rathole drilling company with cement as per the cement provider's slurry design.

A detailed conductor and rathole plan will be developed with Shadow Rathole and approved by Paramount's superintendent prior to commencement of this operation.

3.0 311.2 mm SURFACE HOLE SECTION (219.1 mm CASING)

- The 311.2 mm (12 ¼") surface section will be drilled to +/- 360 m using an insert roller cone bit.
- A 219.1 mm surface casing string will be run and cemented to surface.
- Hydraulics optimization will be critical to continually clean the bit and the hole while reducing erosion.

3.1 Objectives

- Casing drill 311.2 mm (12 ¼") hole to the required depth.
- Minimize the amount of hole erosion.
- Cement 219.1 mm (8 5/8") casing full length (maintain cement returns at surface).
- Minimize unscheduled event time.
- Minimize the volume of drilling fluid waste produced.

3.1.1 Potential Problems

Drilling Fluid Losses

Minor drilling fluid losses are possible throughout this section. Ensure good mud properties are being maintained and build volume as necessary.

Sand/Gravel/Boulders

Gravel and/or Boulders have been encountered in some offsetting wells in the Cameron Hills field. Ensure good mud properties are being maintained (ie: Viscosity and Yield Point) and the hole is being cleaned properly. Control drill as necessary to avoid getting packed off and stuck. Work the drill string and wiper trip as necessary to get the wellbore in good condition prior to drilling ahead to TD.

3.1.2 Notes

- The Authority to Drill a Well (ADW) and the NWT Water License MUST be posted in the Paramount Resources Ltd. onsite office complex prior to spud.
- A copy of the Canada Oil and Gas Drilling and Production Regulations and the Oil and Gas Occupational Safety and Health Regulations must be on location and available to all personnel at the drill site.
- Notify NEB 24 hours prior to moving the rig to location (Rick Turner/Lori Croal/Saadat Javeed).
- All reporting of serious incidents prior to spud are made to WCB. Duty officer Yellowknife 1-800-661-0792. After spud, all work falls under Canada Oil and Gas Occupational Safety and Health Regulations.
- Notify NEB of spud within 24 hours (Rick Turner/Lori Croal/Saadat Javeed and dailyreports@neb-one.gc.ca).
- Daily Status Reports are to be e-mailed by 0830 hours to Rick Turner/Lori Croal/Saadat Javeed and dailyreports@neb-one.gc.ca.
- Weekly INAC water usage, waste water and spill report are to be submitted to the INAC Engineer.
- Enough weight material must be on location prior to spud in order to increase the density of the entire active mud system by 200 kg/m^3 or to a minimum density of 1325 kg/m^3.
- Ensure all Pason pit volume totalizer/flow monitoring equipment as well as data recording equipment are operational as of spud.
- Ensure the rig is leveled and centered over the cellar. Ensure the cellar is clear of any junk prior to drilling. The Paramount Drilling Supervisor is to fill out a pre-spud checklist for the rig and location, is then required to formally accept the rig and a copy sent to Paramount Drilling Superintendent. This acceptance will be recorded in the tour sheet and drilling report.
- Record the Kelly Bushing (KB) elevation, Ground Elevation (GL) and KB to GL on the first Daily Drilling report.
- Caliper all the drilling BHA components prior to running in the hole. All the equipment must be accurately measured, with details of lengths, ODs, IDs and fishing neck dimensions.

3.2 Interval Mud Information

Solids Control
The shale shakers should be dressed with 84 mesh shaker screens and screened up as possible following spud. Solids can be generated that will exceed the capacity of the shakers. Control drilling may be necessary to enable the management of the solids. As a guideline, do not drill with a ROP that results in an annular cuttings load greater than 5% of volume.

Drilling Fluid
A Gel-Polymer (Shure Shale PHPA) mud system is used for shale inhibition. Additions of drilling detergent may be required to aid in minimizing mud ring development. Ensuring high low shear viscosity and high yield point will assist in good hole cleaning.

3.3 Drill 311.2 mm Hole Section

1. Pick up and rack back +/- 350 m of 114.3 mm drill pipe and 3 stands of 114.3 mm HWDP prior to spud of well.
2. Pick up the following BHA to drill out the conductor shoe and the Surface hole with the Gel-polymer mud:
    - 311.2 mm insert bit with open jets
    - Bit Sub
    - 2 - 8" drill collars
    - Bell sub
    - 1 – 6 ¼" drill collar
    - Teledrift
    - 4 – 6 ¼" drill collars
    - Set of hydromechanical Jars
    - 9 – 6 ¼" drill collars
    - XO to NC50 connection
    - 6 joints of 114.3 mm HWDP
3. Hold pre-job safety meeting to review JSA that has been made up for this task.
4. Monitor cutting load and volumes at shale shakers. Ensure cuttings are effectively managed at surface and drilling is smooth at controlled ROP, the pump rate can be increased with the objective to increase ROP and reduce circulating time while drilling.
5. Work the drill string prior to making a connection. Avoid extensive circulating with the bit stationary. Keep pipe moving to avoid creating washouts and ledges.

6. Monitor torque closely while drilling to detect indications of hole squeezing, poor hole cleaning or string vibration. These parameters should increase linearly with depth. If progressive increase in rotary torque and pump pressure is detected, plan to increase pump rate, pump viscous mud sweeps to better clean the hole or conduct a wiper trip.

7. If very slow drilling is observed with a drop in torque, expect that bit balling is a likely cause. Pick the string off bottom and increase pump rate while pumping nut plug sweeps with drilling detergent to break up the mud while rotating the string at 80 – 100 rpm, if possible.

8. Drastic increase in pressure and torque will likely be a sign of either severe hole sloughing, or more likely mud ring development. Again some treatment with detergent might be beneficial.

9. Drill 311.2 mm hole to a depth range of +/- **360** m. Ensure the bottom hole formation will have enough integrity to provide an adequate casing seat.

10. Once at TD, conduct a wiper trip(s) as required (strap and tally the drill pipe) to surface and circulate hole clean prior to POOH to run casing. Increase the viscosity and yield point as per the mud program.

Casing Details

Size (mm)	Wt. (kg/m)	Grade	Thread Type	Interval (m RT)		Length (m)	I.D. (mm)	Drift (mm)	Coupling OD (mm)
				From	To				
219.1	35.7	J-55	ST&C	360	0	360	205.7	202.5	244.5
				Collapse (kPa)	Burst (kPa)	Strength (daN)		Torque (N-m)	
						Joint	Body	Optimum	Maximum
				9,439	20,326	108,531	169,469	3308	4135

3.3.1 Cement 219.1 mm Casing

Cement Slurry/Blend

Pre-flush:	5 m^3 Water
Blend:	MaxxCem G + 0.9% FL-5 + 1.00% $CaCl_2$
Density (planned):	1800 kg/m^3
% Excess:	50%
Thickening Time:	Testing
Compressive Strength:	Testing

A detailed cementing procedure will be developed with BJ Services at the rig and approved by the Paramount Superintendent prior to the casing cementing operations according to the following guidelines:

Goals

- Cement casing in full length, bringing cement returns to surface.
- Attain high quality cement at the casing shoe to ensure an adequate casing seat for drilling the next hole section.
- Minimize WOC time.

Cement Contingency Requirements

As a result of extreme hole erosion or lost circulation during the cement job, cement returns to surface may not be achieved. If cement returns are inadequate a top job should be performed with a 1" string.

Slurry Design

All slurry designs will be batch tested with actual cement samples, mix water and chemicals planned for use during the job. The batch tests should be presented to the Paramount onsite Drilling Supervisor at least 48 hours before the job is pumped. All properties are to be confirmed through lab tests using rig samples before the job is pumped.

Cementing Operational Guidelines

1. Ensure that final batch tests have been received from BJ Services confirming pump times and slurry properties.
2. Obtain a dry cement sample as well as slurry samples.
3. Hold a safety meeting while circulating the casing
4. Set the casing in the slips and make up BJ Services cement head with casing wiper plug.
5. There should be enough cement on location to permit pumping +100% excess for the primary job plus the top slurry.
6. Have the casing landed out prior to cementing. The casing can be reciprocated, if required, during the cement job. If this requires excessive time to change out casing elevators plan to leave the casing in the slips and cement without reciprocation.
7. Pump pre-flush and cement slurry as per the detailed cementing program. .
8. Monitor returns during the job. At the first indication of cement spacer at surface, cease mixing cement and drop the plug and begin displacement. As possible, leave the final cement from the mix tub and lines to be pumped above the displacement plug. Do not pump out lines.
9. Displace the casing with the calculated casing volume of drilling mud to the upper float collar. Over displace a maximum of ½ the shoe track joint volume. Be prepared to shut in at the cement head and hold pressure in the event the floats have washed out due to extensive circulation.
10. Note: More cement should be pumped if channeling is suspected.

3.3.2 Wellhead Operation Sequence

1. WOC time should be the time it takes to reach 75% of the maximum expected compressive strength of the cement.
2. Cut the 16" conductor about 0.95 m (38") below the bottom of the matting and rough cut the 219.1 mm casing above the final cut point such that the top of the casing bowl will be ~1 m above ground

level. **NOTE: Measure the wellhead and BOP equipment and review stack up heights prior to cutting the conductor pipe.**
3. Pull the 219.1 mm cut off joint out of the hole.
4. Weld on the casing bowl as per GE's recommended procedures.
5. Begin nipple up of the BOP's with a 228.6 mm 21,000 kPa BOP stack configuration.

General 219.1 mm Casing Running Guidelines:

1. All casing should be drifted and strapped while on the rack.
2. All threads must be washed and inspected.
3. Ensure applied thread make up compound is rated for low temperature service.
4. All connections in the shoetrack shall be threadlocked.
5. Centralizer placement should be evaluated prior to running the casing, depending on hole conditions. All centralizers should be placed over the couplings except for the shoe track joints, where they should be placed over a stop collar. The initial centralization program is as follows:
   - 1 bow spring centralizer 3 m above the float shoe, on a stop ring and 1 centralizer 3 m below the float collar, on a stop ring.
   - 1 bow spring centralizer per joint on each of the next 5 joints
   - 1 bow spring every 3rd casing joint to surface

3.4 BOP Pressure Testing

a. Pressure test BOP's using a test plug.
b. Pressure test all BOP equipment to a maximum potential surface pressure based on maximum anticipated bottom hole pressure. The low pressure test will be to 1500 kPa and the high pressure test will be to 14,000 kPa.
c. The test pressures shall be maintained for 5 minutes with no pressure drop or 15 minutes with a pressure drop of less than 5%.
d. Document all pressure test information on the Paramount drilling report and CAODC tour report.
e. Note: BOPs will be pressure tested once every 15 drilling days to comply with COGDPR section 37.
f. Unseat the test plug and pressure test the casing to 16261 kPa (80% of burst).
g. Install the wear bushing.
h. Note: Casing will be pressure tested once every 1000 rotating hours or more frequently where casing wear is detected.

4.0 200 mm PRODUCTION HOLE SECTION (139.7 mm CASING)

4.1 Objectives

- Directionally Drill 200 mm hole to the required vertical depth.
- Drill the Wabamun and run cement plugs as required to cure lost circulation
- Cement the 139.7 mm casing as required.
- Minimize unscheduled event time.
- Optimize bit life and ROP.

4.1.1 Potential Problems

Extreme Loss of Circulation

Drilling the Wabamun formation in the Cameron Hills field is highly likely to result in complete loss of circulation. The Wabamun formation interval is approximately from 500 – 720 m MD. Should total losses be experienced, the section will be drilled blind with floc water. Once it is confirmed that the entire interval has been penetrated, spotting 2 or 3 lost circulation cement plugs will typically cure the losses and drilling can proceed normally.

H_2S

Producing zones will contain up to 3.4% H_2S. A four channel rig rat system will be installed on the drilling rig to monitor for the presence of H_2S. Also, monitor for a sudden drop in pH as it is a likely indicator of H_2S in the mud. Test with a Hach test – treat excess sulphides in mud with Aquatreat H_2S scavenger as per the approved mud program.

Differential Sticking

As the zones of interest are under pressured, it is possible that the drill string may become stuck if the drilling fluid density is too high and the drill string remains stationary for extended periods of time. Maintain the drilling fluid density as low as the hole conditions will allow and minimize the amount of time the drill string remains stationary while making connections.

4.1.2 Notes

- Consult Paramount Superintendent for clarification on any issues.
- The Authority to Drill a Well (ADW) for the well and the NWT Water License MUST be posted in the Paramount office complex.

- A copy of the Canada Oil and Gas Drilling and Production Regulations and the Oil and Gas Occupational Safety and Health Regulations must be on location and available to all personnel at the drill site.
- All reporting of serious incidents as per Canada Oil and Gas Occupational Safety and Health Regulations.
- Daily Status Reports are to be e-mailed by 0800 hours to dailyreports@neb-one.gc.ca.
- Weekly INAC water usage, waste water and spill report are to be submitted to the INAC Engineer.
- Sufficient LCM should be on location to treat 1.5 times the volume of the active drilling fluid system.
- Enough weight material must be on location prior to spud in order to increase the density of the entire active mud system by 200 kg/m^3 or to a minimum density of 1325 kg/m^3.
- There must be adequate mud material to mix two complete surface volumes.
- Caliper and document all BHA components prior to running in the hole. All the equipment must be accurately measured, with details of lengths, OD's, ID's and fishing neck dimensions.
- Recover maximum volume of mud practical from the previous hole section and circulate through the centrifuge at low circulation rate with maximum centrifuge bowl RPM to strip out low gravity solids as much as possible.

4.2 Interval Mud Information

Solids Control

The chemical additions and dilution will be significantly less if the solids control equipment is operated properly. Control drilling may be necessary to enable the management of the solids. Ensure that the centrifuges are configured such that they can be run in barite recovery mode if weighted mud above 1200 kg/m^3 is required. At mud weights less than 1200 kg/m^3, run both centrifuges to reduce low gravity solids. Screen up the shakers such that a very minor degree of fluid carryover is observed.

Drilling Fluid

The mud system in this hole section will be floc water to a depth of ~1200 m at which point it will be switched over to a water based Gel PHPA Polymer system. The mud density will be maintained as per the pore pressure requirements. Below normal pore pressures are expected through the Slave Point and Sulphur Point formations.

If the mud system is working effectively, the drill cuttings on the shaker should appear as discrete cuttings which are not sticky and have a dry texture on the inside. If cuttings dispersion and mud ring material is observed at the shaker, the effectiveness of the mud is not up to expectation.

4.2.1 Hydraulics

Hydraulics will be very important to the success of this hole section. Good mud rheology will be required for adequate hole cleaning. In the event of hole cleaning problems, mud rheology should be addressed prior to increasing pump rates.

4.3 Drill 200 mm Hole Section

1. This section will be drilled conventionally to 1421 mMD.
2. Install wear bushing as per the GE installation guidelines.
3. Drill out cement, 219.1 mm shoe track, 311.2 mm rat hole with the following BHA:

    - 200 mm PDC bit
    - Bit Sub
    - 1 – 6 ¼" drill collar
    - Teledrift
    - 13 – 6 ¼" drill collars
    - Set of hydromechanical Jars
    - XO to NC50 connection
    - 6 joints of 114.3 mm HWDP

    Prior to initiating drill out, treat the mud with bicarbonate of soda and citric acid to sequester calcium and ensure the mud PH does not exceed 10.5.

4. Utilize low RPM and moderately low WOB until the BHA has cleared the casing shoe.
5. Slowly adjust drilling parameters to determine optimum settings.
6. If deviation becomes an issue, discuss corrective action with Drilling Superintendent.
7. Work pipe as required on connections.
8. Maximum anticipated mud density in this hole section is 1150 kg/m^3. Try to maintain the mud density as low the hole will allow with appropriate safety factor.
9. Drill through the Wabamun formation blind (if losses occur) and set lost circulation cement plugs as required.
10. Drill out cement plugs and continue drilling to TD of 1421 m MD.
11. Perform a wiper trip as the hole dictates. Wiper trip back to the previous casing shoe, or up to 500 m from current depth, whichever is less.
12. Monitor for pore pressure indicators as zones of interest are approached. Control drill into target zones and flow check the well after penetration. Adjust mud density accordingly.
13. Once at TD, conduct wiper trips as necessary and circulate prior to POOH to log
14. POOH and log as per geological prognosis.
15. RIH and conduct wiper trips as necessary and circulate prior to POOH to run casing. Increase the viscosity and yield point as per the mud program.
16. Strap out of the hole. Lay down BHA.

4.3.1 Logging Operations

These wells are usually logged in two runs but if there is enough overhole, one run may suffice
Single Run: **STI/SPeD/CNS/GR/MRT/HBC/CAL**
Log the MRT from TD to top of Slave Point(0-40). Log everything else TD to SC.
SPeD/CNS: LS scale TD to SC plus Dolomite scale TD to top of Slave Point.
Log High Res Density/Neutron/GR from TD to top of Slave Point.
Display high res on Lime and Dolomite on both 1:240 and 1:120 scale(a total of 4 high res playbacks).
Enhance STI on 1:120 scale over the same interval.
BCS/GR: BCS 300 TO 100 TD TO SC.
It may be necessary to drop back down to pick up missed interval with MRT/HBC.
If necessary to log in two separate runs use:
Run 1: STI/SPeD/CNS/GR
Run 2: MRT/HBC/CAL

4.4 Run 139.7 mm casing

Casing Details

Size (mm)	Wt. (kg/m)	Grade	Thread Type	Interval (m RT)		Length (m)	I.D. (mm)	Drift (mm)	Coupling OD (mm)
				From	To				
139.7	20.8	J-55	ST&C	1421	0	1421	127.3	124.13	153.67
				Collapse (kPa)	Burst (kPa)	Strength (daN)		Torque (N-m)	
						Joint	Body	Optimum	Maximum
				21,497	29,420	76,506	98,746	2332	2915

Casing Running Order
The 139.7 mm casing will be run as follows:

- Float Shoe (Import Tool)
- 1 Joint of Casing
- Float Collar (Import Tool)
- Casing to Surface

General Casing Running Guidelines:

1. Circulate the wellbore clean and prepare to POOH. POOH and lay down BHA components.
2. All casing should be drifted and strapped on the racks.
3. All threads must be washed and inspected.
4. A safety meeting should be held prior to rigging up casing handling tools.
5. Ensure the entire shoe track is thread locked.
6. Ensure a 139.7 mm circulating swedge is available on the rig floor.

7. Centralizer placement shall be evaluated prior to running the casing. Adequate centralization will reduce the risk of differential sticking the casing off bottom. Ensure the casing centralization program provides good stand off across any porous zones.
8. Before continuing to run casing, ensure proper operation of the float equipment as follows:

   - Make up the shoe track and one additional joint of casing.
   - Fill the casing and then hoist up 1 joint above the rotary table.
   - Lower the casing and set it in the slips.
   - Observe that the fluid level has dropped in the casing and that the fluid is staying at that level. If this is not observed, contact the Paramount Drilling Superintendent prior to resuming running casing.

9. Fill every joint on the way in hole. Break circulation at 500 m.
10. A surge/swab evaluation should be made to determine a safe running speed.
11. Minimize the time the pipe is stationary.
12. Stage circulation up to the planned cementing rate, 1.0 m^3/min, while monitoring for losses. Reciprocate as the hole allows. Treat the mud as required while reciprocating and rotating the casing.
13. Casing should be strapped and run so that it lands <2 m off bottom.

4.4.1 Cement 139.7 mm casing

Cement Slurry/Blend

Pre-flush:	4 m^3 Water
Scavenger:	3 m^3 MaxxCem G + 0.90% FL-5 + 1.00% $CaCl_2$ at 1250 kg/m^3
Blend:	MaxxCem G + 0.90% FL-5 + 1.00% $CaCl_2$
Density (planned):	1700 kg/m^3
% Excess:	30% in open hole over Caliper
Thickening Time:	Testing
Compressive Strength:	Testing

A detailed cementing procedure will be developed at the rig and approved by the Paramount Drilling Superintendent prior to cementing operations according to the following guidelines:

Goals

- Cement the casing to surface.
- Attain high quality cement throughout the length of the casing.
- Attain high quality cement at the casing shoe to ensure an adequate casing seat for drilling the next hole section.
- Minimize WOC time.

Slurry Design

All slurry designs will be batch tested with actual cement samples, mix water and chemicals planned for use during the job. The batch tests should be furnished to the drilling supervisor at least 48 hours before the job is pumped. All properties are to be confirmed through lab tests using rig samples before the job is pumped.

Cementing Operational Guidelines

1. Ensure that final batch tests have been received from BJ Services confirming pump times and slurry properties.
2. Obtain a dry sample as well as slurry samples.
3. Hold a safety meeting prior to pressure testing cement lines and starting the cement job.
4. Make up the BJ Services cement head with bottom wiper plug.
5. There should be enough cement on location to permit pumping 75% excess cement.
6. Have the casing landed out prior to cementing. The casing can be reciprocated, if required, during the cement job.
7. Pump pre-flush, scavenger and cement slurry as per the detailed cementing program.
8. Cement volumes are to be calculated using the caliper log plus an additional 30% excess.
9. Displace the casing with the calculated casing volume of drilling mud to the float collar. Over displace a maximum of ½ the shoe track volume. Be prepared to shut in at the cement head and hold pressure in the event the floats have washed out due to extensive circulation.

4.4.2 Wellhead Operations Sequence

1. Drain the BOP stack.
2. Install the casing slips and seals as per GE installation guidelines.
3. Pressure test the seals.
4. Test the seals to 80% of the collapse of the 139.7 mm casing, for 15 minutes.
5. Install Wellhead

4.5 Drilling Waste Management

Waste management will be performed in accordance to Paramount's Waste Management Plan.
Sumps will no longer be used by Paramount for drilling waste disposal. Paramount is planning to dispose of all drilling waste by trucking it to a CCS Landfill facility in Northern Alberta. Drill cuttings will be temporarily stored in a high walled shale bin on location until they are frozen. A front end loader will load sealed end dumps with cuttings they will then be trucked south to CCS's land fill.

Waste drilling fluid will be shipped South in the spring for disposal at CCS's disposal site in Northern Alberta.

MARQUIS ALLIANCE
ENERGY GROUP INC

DRILLING FLUIDS PROPOSAL
POLYMER

PARAMOUNT RESOURCES Ltd.

PARA Cameron E-72 (SL E-72 60'10" 117' 15")
E-72

Prepared For:	***BRAD SCOTT***
Sales Representative:	***JOHN HINDMAN***
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Prepared On:	***Wednesday, October 13, 2010***
Products & Distribution:	***High Level, AB***

Should you have any queries please contact the following:

PERSONNEL	***FUNCTION***	***PHONE***
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High Level, AB	Trucker Warehouse	250-774-7663

Drilling Fluids Program

PARA Cameron E-72 (SL E-72 60'10" 117' 15") — **Vertical** — **POLYMER**

PARA Cameron E-72 (SL E-72 60'10" 117' 15") — **Vertical**

FORMATION	EMD (kg/m³)	[H2S] (%)	DEPTH mMD	DEPTH mTVD	HOLE SIZE
GL: 748.0 m KB: 762.6 m Sandstone Shale Carbonate Evaporite	As per Paramount	As per Paramount			311 mm
219.1mm Surface Csg			360	360	
					200 mm
WABAMUN			546	546	
FORT SIMPSON			689	689	
TWIN FALLS			798	798	
MUD UP			1200	1200	
					200 mm
BEAVERHILL LAKE			1294	1294	
SLAVE POINT			1319	1319	
P4			1360	1360	
WATT MOUNTAIN			1367	1367	
SULPHUR POINT LST *	727	3.40	1375	1375	
Core: One 18m in Sulphur Point					
SULPHUR POINT DOL			1385	1385	
MUSKEG			1401	1401	
TD (18.0m Into Muskeg)			1421	1421	

MUD SYSTEMS

SHURE SHALE PHPA

INTERVAL: 0 - 360

	Min	Max
Density (kg/m³):	1060	1080
Viscosity (sec/L):	45	75
pH:	8	9
Fluid Loss (cc's/30 min):	No control	
MBT (kg/m³):	Mix no Gel as the MBT increases naturally to 100+	

FLOC WATER PHPA

INTERVAL: 360 - 1200

	Min	Max
Density (kg/m³):	1000	1020
Viscosity (sec/L):	28	30
pH:	Neutral	
Fluid Loss (cc's/30 min):	10	14
Calcium Ion (mg/L):	250	300
PHPA (kg/m³):	0.5 Hyperdrill 247	1

Maintain a clear water system until mud up depth or first sign of tight hole or pressure.

Mud up at indicated depth or sooner if hole conditions dictate.

POLYMER

INTERVAL: 1200 - 1421

	Min	Max
Density (kg/m³):	1080	1150
Viscosity (sec/L):	65	70
For trips or higher if bridges occur	90	100
For logging:	~140	
pH:	9.5	10
if H2S is encountered	10.5	11
Fluid Loss: (cc's/30 min):	6	8
P.V. (mPa):	15	30
Yield Point (Pa)	15	30
Gels 10 sec (Pa):	3	6
Gels 10 min (Pa):	5	12
MBT (kg/m³):	80	100

Primary Zone *
Secondary Zone**

OFFSET INFORMATION

Sand/gravel were reported on offset wells (30 - 120 m). Be prepared for losses if encountered. Offsets reported gravel at 30 - 50 m, rocks at 60 - 80 m and sand from 90 - 120 m.

Loss of circulation is possible if rocks or gravel are encountered. Ensure to have an adequate supply of LCM be on location prior to spudding.

Sand and gravel was reported on offset wells from 30 to 120m. If encountered, increase the viscosity to 80 - 150 sec/L OR as required to clean the hole. Use MF VIS or Gel depending hole circumstances, (do not add Gel to viscosity if mud rings are an issue). Gel can be used nearer TD to clean well.

Mud rings and plugged flow lines were reported on offset wells.

Mud rings were reported on offset wells. Mud rings are possible especially if viscosity is increased. Recommended to spud with premix and adding 5 - 7 L/m³ Shure Shale and 1 kg/m³ excess Hyperdrill 247 for the prevention of mud rings. If required, additions of SAPP and Drilling Detergent are to be on location to treat mud rings and/or bit balling if required.

Foaming issues were reported on offset wells (230 - 250m).

Mud up if losses are encountered.

Coal seams may be encountered under the shoe and in the upper hole.

If coal is encountered control drill and thoroughly work these sections with the drill string. Attention should be paid to trip speeds through these sections. Coal gas and sloughing may also be associated with coal bearing formations.

Sloughing shale may be present in the upper zones.

Maintain the Calcium level with Calcium Nitrate.

Lost circulation is likely in the Wabamun. Attempt to cure losses with LCM otherwise drill blind to approximately 720m. Should LCM not heal losses, 2 cement plugs are to be run. Ensure LCM products are on location.

If losses are severe to complete, **Marquis Alliance recommends the use of FracAttack for the expected losses. Refer to the attached FracAttack procedure for details.**

Minor reaming and cleaning to bottom possible on most trips.

Seepage Losses may be encountered throughout the drilling of this well.

Seepage Losses if encountered can be controlled with additions of Calcium Carbonate "0" and "325". If persistent, increase the Calcium Carbonate content to >30 kg/m³. Additions of Ultra Seal XP at 15 kg/m³ may also be considered. Losses could be due to high annular pressures and can be controlled with a reduction in pump rates.

Sloughing Shale may be encountered and an increase in Density may be required to control formation pressures. A minimum Yield Point of 6 Pa will be required to suspend weight material.

Pressure Data: Refer to stick for pressure information provided by Paramount. No pressures are expected in the formations to be drilled. Caution is advised.
For pressure and kicks, increase density as required with additions of Calcium Carbonate &/or Barite. A minimum yield point of 6 Pa will be required to suspend weight material.

H_2S Data: **Paramount noted H_2S is expected in the Sulphur Point formation . Maximum H2S concentration up to 3.4%.**

H_2S - If a sudden drop in pH is encountered, immediately increase pH to 10.5 - 11.0 with Caustic Soda as required. Check for sulphides using a Hach Sulphide Test Kit and/or a GGT.
If excessive sulphides are detected, treat the active system with 2.0 L/m³ of Aquatreat H_2S. maintain the pH between 10.5 - 11.0 and continue to monitor. 2.0 L/m³ Aquatreat H2S will scavenge approx 500 ppm of H_2S.

Anhydrite may be encountered in the Sulphur Point formation (see offset M-74). Increase pH at 10.5-11.0 with Caustic Soda.

COMMENTS / RECOMMENDATIONS

Prior to spudding, check make up water and treat out excess calcium.
1) Fill tanks 1/2 - 3/4 full of water and start circulating system.

2) While circulating drip feed 1 pail of detergent into system to aid in mud ring prevention.

3) Add 10 pails of Shure Shale (5-7 L/m³) and 2 sacks Hyperdrill AF247 (1 kg/m³) and MF VIS for a 45 s/L viscosity.

4) Raise viscosity as required to clean hole, if rocks, boulders and gravel are encountered increase viscosity as hole dictates and ensure good hole cleaning prior to drilling ahead to prevent stuck pipe.

5) Mix 2 - 3 pails of Defoamer at 230 - 250m, if required.

6) If mud rings are encountered mix detergent into suction and mix 2 via cups of TKPP at drill pipe on connections to break down prior to surfacing. If problem persists mix 1/2 ek TKPP through hopper and continue to mix at drill pipe.

7) For seepage losses mix Sawdust through hopper as required.

8) Increase viscosity to 65 - 70 sec/L, prior to wiper trip with MF VIS and 5-10 sacks of Gel. Once on btm drilling the last few meters, increase viscosity to 80 - 100 sec/L for casing operations with MF VIS and another 10 sacks of Gel.

9) Ensure prior to pulling out for casing the system gets 20 L/m of fresh water as the natural clay is sucking the water out of the system while in the hole during casing operations.

10) Once casing is landed and hole cleaned, lower viscosity to 50 - 55 sec/L and a YP of 5 - 7.5 Pa.

DRILL OUT

1) While W.O.C. clean all mud and solids from all tanks. Fill tanks with water.
2) While circulating all tanks drill out cement. Do not treat out cement as it will assist in flocculation.

3) Raise and maintain Calcium ion at a minimum of 250 - 300 mg/L with additions of Calcium Nitrate. Daily additions of Calcium Nitrate will be required to maintain Calcium ion at a minimum of 250 mg/L.
After through loss zones
4) Floc system with additions of Alkapam 1103D. Mix 1 vis-cup into a chemical barrel full of water. Add below shaker at 1.5 - 2 L/20 m of new hole drilled.

5) Mix 1 - 2 sacks of Hyperdrill 247 every 12-18 hours in order to generate and maintain the PHPA level. Discontinue 200 m from mud up point if mudding up on the fly.
6) Discontinue all Alkapam and Calcium Nitrate additions 100m prior to mud up.

Refer to attached FracAttack for losses prevention.

MUD UP

1) While W.O.C, clean all mud and solids from all tanks. Fill tanks with water and reduce Calcium Content to < 100 mg/L with 3-6 sacks of Soda Ash.

2) Raise and maintain pH at 9 - 10 with additions of Caustic Soda. Increase to 10.5 - 11.0 if H_2S is encountered.

3) Raise and maintain Viscosity at 65 - 70 sec/L with additions of MF VIS:MF PAC in a 1:2 ratio.

4) Lower and maintain Fluid Loss < 8 cc's/30min with additions of MF PAC and Lignite at a 1:2 ratio.

5) To minimize waste water run in water from the water section while drilling ahead. Lower excess Calcium with small additions of Soda Ash. **No more than a total of 10 sacks of Soda Ash are to be mixed.**

6) Run a minimum of 8-10 LPM water at all times while drilling ahead.

7) 4 - 6 hours prior to TD start to increase viscosity to 60 - 100 sec/L with additions of Gel and/or MF VIS as required.

If mud rings occur, add 1-2 vis cups of Detergent down pipe on connections. SAPP may also be used; 1 vis cup down the drill pipe on each connection. If gravel, rocks and boulders are encountered increase viscosity as required with additions of Gel.

Contingency LCM Ensure an adequate supply of LCM is on location.
May include: Calcium Carbonate, Cellophane, Ultra Seal, Sawdust, Prime Seal, Magma Fiber.

FOR LOGGING:
1) Increase Viscosity to 80 - 100 sec/L and the yield point to 17 Pa with additions of Gel. The viscosity range is dependent on the condition of the hole while drilling and tripping.
2) Circulate to condition mud and hole and a wiper trip to casing shoe is also recommended prior to POOH to log.

FOR CEMENTING CASING: If hole conditions allow.
1) While circulating landed casing, bypass all compartments except the suction tank and lower the Viscosity to 40 - 45 sec/L and the Yield Point to 5 - 7 Pa with additions of water and 1 - 2 sacks of Desco.

OFFSETS INFORMATION

7. Paramount Cameron M-74 60 10" 117 15" 1473 m 29 days 2010

Surface to 378m: Spudded on January 17, 2010, Spud 311mm surface hole with PHPA and Polymer Mud system. Drilled ahead and encountered gravel at 25-40m, rocks at 60-80m and sand from 90-120m. Experienced foaming issue at 250m, and treat with Defoamer then drill ahead. Increase in MBT content naturally to 100 kg/m³ and with pH at 8.5 the system has not been affected with mud rings. Mixed detergent and TKPP as required to break down building natural clay. Increased viscosity to 65s/L for wiper trip. Ran a wiper trip without issues and increase viscosity to 100s/L prior to run casing. Ran and cemented 244.5mm casing with no problems and 5m³ of good cement returns.
Top Main to 951m: Drilled out float, cement and shoe. Drilled 200mm upper main hole with Flocculated Clear Water system. Drilled to 559m, Lost circulation at 559m then drill blind to 630m and regain circulation. Lose a total of 180m³ during section. Drill ahead to 1019m with 8 deviation problem. Drill ahead to 1026m and pull out of hole to pick up directional tools. Lose 25m³ at 550m while pulling out and 25m3 at 20m from bottom on the way back. Reduce pump rate from 110 strokes to 70 strokes and regain circulation, mix L.C.M and rebuild volume back to 50m3. Drill ahead to 1069m, encountered total losses. Rebuild volume with water and pull out to run Frac Attack pill. Mix 12m³ of Frac Attack L.C.M pill with 9.6m3 of water, 160 Frac Attack and 30 sacks of Barite. Only 10m³ are to be pumped, Pump 2.5m³ from pill at 700m then pull 150m above pill and circulate. Run in to 625m and pump another 2.5m³. Pull 150m above pill and circulate. Run in to 475m and pump 2.5m3 of pill then pull back 200m above pill and apply 100 Psi for 30 minutes. Run in with bit and drill out Frac Attack. Wash down to 950m and lost circulation. Pump a 3.5m³ Frac Attack pill at 550m, and squeeze it with 200 psi for 30 minutes, Drilled out pill and lose circulation. Cleaned up hole down to 750m then pull out to run cement plugs. Run 2 cement plugs across the thief zone and pull out. Wait on cement then run in and drill out cement plugs. Lose 12m3 at 557m then well stabilizes. Ran in to 960m, lost circulation, then pull out to run cement plugs. RIH and washed through bridges at 460m and 552m. Circulated at 732m and condition mud for cement plugs. Pumped first plug at 732m, pull out to 466m. Circulate bottoms up and pump 2nd cement plug. Pulled out and pick up directional tools. RIH to casing shoe. Last down 18 singles. Reamed cement from 405m to 481m. Reamed cement from 481m-595m for 7 hrs. Pulled out 8 stands. Washed to 595m, circulated and conditioned mud and pulled out. Run in to 672m washed through bridges at 405m and 600m. Circulated and conditioned mud and set cement plug from 664m-475m. Pulled out to 400m, Circulated and conditioned mud. Ran in and tag top of plug at 494m, Circulated bottoms up then set cement plug #2 from 403m to 303m. Pull out 9 stands. Ran in hole lay down DP and wait on cement. Tag cement at 402m. Circulate down to good cement at 467m (Frac Attack and other LCM evident at shaker). Kick-off plug and drill a 200mm new hole from 467m-676m at midnight with minimal losses (seepage), Continued drilling 200mm hole from 576-589m. Encountered total losses at 589m. Pumped two viscous LCM sweeps to aid in cleaning bit. Drilled ahead blind without returns to 681m. Run a wiper trip to 375m then run back in while reaming from 411m to 424m. At 425m above bit depth circulate with full returns, but below this point circulation drops off. Reamed from 411 to 425m until LCM and cuttings star coming over shakers (approx 2m). Reamed down to 590m. Run in hole to 681m and continue drilling ahead with partial around 10% returns at reduced pump strokes (90spm). Continued drilling to 731m then run wiper trip, and pulled out of hole for cement plugs. Total mud lost for the last 24 hrs is 600m³. RIH with 300m of fiberglass string. Kelly-up and try to wash through bridge without success. Pulled out and laid down stinger. Mud-up fluid in tanks to 70sll viscosity, pick up and run in with button bit. Kelly-up and reamed at 450m with large amounts of LCM back at shakers. Blended thick fluid with water from hole and maintained viscosity around 40-45 sec/L. Cleaned-up hole and continued in to 455m. Reamed and cleaned hole from 455-731m. Pulled out and reamed at 430-453m. Continued to pull out, picked up 300m of fiberglass cementing tubing. Ran back in hole to 453m, and washed from 463-602m. Unable to get past 602m, pulled out and laid down fiberglass pipe. Picked up and run in with bit to ream and cleaned up bridges at 455-600m with mudded up system. Cleaned well lifting LCM and drill cuttings (4-5 loader buckets). Encounter total losses at 600m then reamed to 625m. Switched over to water from mud and reduce pump strokes to 80spm to reduce water consumption, Reamed to 700m and regained circulation and continued reaming to 731m with mud. Conditioned and pulled out. Picked up and run in with stinger to 731m. Washed bridges at 613, 628, 656m then set cement plug 1. Pulled out to 499m, circulate and run in hole. Tagged plug at 604m, circulated and pumped 2nd cement plug. Pulled on top of the plug, circulated and waited on cement, Circulated while waiting on cement. Tagged plug at 535m, Pulled out, pick up BHA and run in hole, Reamed cement from 535m to 742m. Drilled ahead from 742-951m. Started mixing to increase funnel viscosity with (Millzan / Kelzan to 32 sec/L) to aid in hole cleaning. Temporarily stuck at 931m, worked pipe free then conditioned mud to 30s/l viscosity. Continue drilling ahead while mixing Millzan to increase YP at 3pa and increase gel strengths as well.
Main to 1473m: Drilled 200mm lower main hole with Polymer Mud system from 951-1254m with no reported problems on connections. Mudded up with Drispac R, Stardrill, and Lignite to reduce water loss and increase pH. Drilled 200mm main hole from 1254m to TD at 1473m. Mud is cleaning well. Drilled 25m into anhydrite, causing pH to drop, mixed Caustic Soda to maintain proper pH. Mixed Millzan and Kelzan slowly over several circulations to increase funnel viscosity to 50 sec/L, prior to wiper trip. Experienced Anhydrite in Sulphur Point. Increased pH to 10.5-11. Mud Weight is low, filter cake very thin, lubricous, pliable and hard to compress. Pulled out to shoe then run in hole, Kelly-up, washed and reamed tight hole from 1434-1473m. Muskeg River formation unloaded and washed out. Continued to condition mud for 16 YP and 57s/l viscosity. Circulated twice the bottoms up, and hoist for logs. Logged well to 1456.3m. 17m of fill reported. Rig out loggers. RIH with bit, Tri-cone and reamed tight hole from 902-910m, RIH, reamed and washed from 1431-1473m (TD). Increased viscosity to 86 sec/L then pulled out. Continued logging well, 13m fill reported. Laid down loggers. RIH for clean out. Washed and reamed from 1431-1436m. Washed to bottom from 1451m. Circulate clean hole for 2 full circulations. Pull out of hole to run casing. Picked up and run 139.7mm casing and losing fluid while running in. Broke circulation at752m at reduced strokes (69 spm). Ran in to 1453m. Washed to 1473m, washed down 1 1/2 joints casing. Circulated to condition for cement, decreased viscosity to 45-50 sec/L. Cemented casing with 0.5m³ of cement return. Set slips and rig out.

Surface Hole: 0 - 360 — SHURE SHALE PHPA

Gel	15 sacks	
Sawdust	100 sacks	
Drilling Detergent	3 pails	
MF VIS	4 sacks	
Shure Shale	11 sacks	
Hyperdrill AF247RD	7 sacks	
Caustic Soda	3 sacks	
Defoamer XL	7 pails	$ 8,201.61

Top Hole: 360 - 1200 — FLOC WATER PHPA

Calcium Nitrate	30 sacks	
Alkapam A 1103	7 sacks	
Hyperdrill AF247RD	2 sacks	$ 3,264.18

FracAttack - $5,000.00 per pallet

FracAttack Pills	3 pallets

Main: 1200 - 1421 — POLYMER

MF VIS	13 sacks
MF PAC	14 sacks
MF STAR	16 sacks
Gel	36 sacks
Caustic Soda	8 sacks
Soda Ash	12 sacks
Lignite	4 sacks
Desco CF	5 sacks

			$ 12,132.99

TOTAL ESTIMATED MATERIAL COST W/O CONTINGENCY: $ 23,598.78

3rd Party Estimated Expenses
Based on 12 days drilling

Pallets	$20.00	8 each	$160.00
Pallets Returned	-$8.00	8 each	-$48.00
Shrink Wraping	$20.00	8 each	$160.00
Van Rental	$70.00	14 per day	$980.00
Trucking	$1,500.00	1 per well	$1,500.00
Engineering	$475.00	12 days	$5,700.00

($950.00/1 rig - $475.00/2 rigs)

TOTAL ESTIMATED 3rd Party Expenses: $ 8,137.82

TOTAL ESTIMATED MATERIALS: $ 32,000.78

* Product subject to a 20% restocking charge.
TERMS: Net 30 Days From Invoice Date.
TAXES: All Applicable Taxes Will Be Added.

Contingency Materials: Severe lost circulation, abnormal pressures or unexpected hole problems will increase the estimated usage and costs substantially. Should these problems be encountered, contingency materials may be required.

Offset Summaries

Surface
-E-72: Gravel from 32 – 45 m
-J-04: Mud rings and plugged flow line throughout surface, Casing bridged off at 75 m. Reaming
-A-03: Tight hole / reaming
-L-28: Gravel from 65 – 80 m. Sand from 120 – 128 m. Clean/unball bit. Bit balling continued to 429 m.
-L-73: Sand and gravel at 95 m, Rocks and gravel at 105 m. Sand 200 – 213 m, 245-278m, Cleaned plugged flow line. Mud rings at 309m 338 & 370m.
-L-40: Gravel sloughing in at 65m, Worked mud rings.
-M-74: Gravel at 25-40m, Rocks and Boulders at 50-70m, Encountered Sand at 105m, Foaming at 240m controlled with defoamer, Dehydration while running casing and on breaking circulation prior to cement job.

Top/Main
-E-72: Minor losses 447-730m, At 1193m tripped for plugged jet and balled up bit at 1193m. Hole was tight 1000 & 850m. Partial losses continued, Trip bit for a plugged jet.
-J-04: Minor losses started at 598m, Major losses reported by 729m. Mixed LCM. Ran 4 cement plugs. Drilled ahead and losses continued with LCM additions, Plugged jets. Drilled ahead blind with LCM from 1099 – 1093m. Drilled ahead to 1399m with 50% losses.
-A-03: Started to lose circ at 553m, Plumped 3 cement plugs. Had plugged jets. Drill ahead with some tight hole at 1400m.
-L-29: Lost circ at 588 m. Lost 96.4 m³ from 588-735m. Ran cement plugs. Some tight hole form 1430-1390m.
-L-73: Losses began at 569m with total loss circ at 613m. Drilled ahead blind to 739m with no LCM. Ran 3 cement plugs. Some reaming from 1357-1450m while TIH.
-L-40: While logging, hit a bridge at 786m. Tight spots encountered 770-795m.
-M-74: Plugged back to shoe, Cement wasn't bonding with LCM in hole (Frac Attack). Drilled sidetrack with CaNo4 until 600m. Then lost total circ. Pumped LCM sweep. Sawdust. Reamed LCM/Cuttings bridges from 455m-731m after mudding up. Losses while RIH w/production casing from surface to 755m. No losses once past Wabamun formation.

THE WASTE FROM THIS WELL WILL BE DISPOSED OF USING THE LAND METHOD.
ALWAYS KEEP VOLUMES TO A MINIMUM AND UTILIZE SUMP WATER FOR DILUTION ON MAIN HOLE.
ALL PRODUCTS PASS THE MICROTOX AND CAN BE DISPOSED OF USING THE LAND METHOD.

The addition of the following mean additional analysis may be needed.
Additives
Drilling Detergent in excess of 5.4 L/m³
Soap in excess of .025 kg/m³
Nitrogen in excess of 600 kg ≈ Envirotec in excess of 3100 kg.
Lubricants (hydrocarbons), Surfactants
Biocides, Clumicides, Shale control inhibitors
Corrosion Inhibitors, Defoamers, Emulsifiers

PROGRAM PREPARED FOR:	ATTENTION	AFE #	MARQUIS ALLIANCE REPRESENTATIVE:	Prepared By:	WAREHOUSE / TRUCKING:	DATE PREPARED:
PARAMOUNT RESOURCES Ltd. Calgary, AB	BRAD SCOTT PHONE: email:	TBD	JOHN HINDMAN PHONE: (403) 264-1588, CELL(403) 990-3344 email: jhindman@marquisalliance.com	Valentin Variam Phone: (403) 264-1588	Formula Powell High Level Phone: 250-774-7663	October 13, 2010

Drilling Fluids Program

PARA Cameron E-72 (SL E-72 60'10" 117' 15")

Vertical

POLYMER

FORMATION	EMD (kg/m³)	[H_2S] (%)	DEPTH mMD	DEPTH mTVD	HOLE SIZE	MUD SYSTEMS	OFFSET INFORMATION	COMMENTS / RECOMMENDATIONS
GL: 748.0 m KB: 752.6 m Sandstone Shale Carbonate Evaporite	As per Paramount	As per Paramount			311 mm	**SHURE SHALE PHPA** **INTERVAL: 0 - 360** **Density (kg/m³):** Min 1060 Max 1080 **Viscosity (sec/L):** 45 75 **pH:** 8 9 **Fluid Loss (cc's/30 min):** No control **MBT (kg/m³):** Mix no Gel as the MBT increases naturally to 100+	Sand/gravel were reported on offset wells (30 - 120 m). Be prepared for losses if encountered. Offsets reported gravel at 30 - 50 m, rocks at 60 - 80 m and sand from 90 - 120 m. Loss of circulation is possible if rocks or gravel are encountered. Ensure to have an adequate supply of LCM be on location prior to spudding. Sand and gravel was reported on offset wells from 30 to 120m. If encountered, increase the viscosity to 80 - 150 sec/L OR as required to clean the hole. Use MF VIS or Gel depending hole circumstances. (do not add Gel to viscosity if mud rings are an issue). Gel can be used nearer TD to clean well. Mud rings and plugged flow lines were reported on offset wells. Mud rings were reported on offset wells. Mud rings are possible especially if viscosity is increased. Recommended to spud with premix and adding 5 - 7 L/m³ Shure Shale and 1 kg/m³ excess Hyperdrill 247 for the prevention of mud rings. If required, additions of SAPP and Drilling Detergent are to be on location to treat mud rings and/or bit balling if required. Foaming issues were reported on offset wells (230 - 250m). Mud up if losses are encountered.	Prior to spudding, check make up water and treat out excess calcium. 1) Fill tanks 1/2 - 3/4 full of water and start circulating system. 2) While circulating drip feed 1 pail of detergent into system to aid in mud ring prevention. 3) Add 10 pails of Shure Shale (5-7 L/m³) and 2 sacks Hyperdrill AF247 (1 kg/m³) and MF VIS for a 45 s/L viscosity. 4) Raise viscosity as required to clean hole, if rocks, boulders and gravel are encountered increase viscosity as hole dictates and ensure good hole cleaning prior to drilling ahead to prevent stuck pipe. 5) Mix 2 - 3 pails of Defoamer at 230 - 250m, if required. 6) If mud rings are encountered mix detergent into suction and mix 2 vis cups of TKPP at drill pipe on connections to break down prior to surfacing. If problem persists mix 1/2 sk TKPP through hopper and continue to mix at drill pipe. 7) For seepage losses mix Sawdust through hopper as required. 8) Increase viscosity to 65 - 70 sec/L prior to wiper trip with MF VIS and 5-10 sacks of Gel. Once on btm drilling the last few meters, increase viscosity to 80 - 100 sec/L for casing operations with MF VIS and another 10 sacks of Gel. 9) Ensure prior to pulling out for casing the system gets 20 L/m of fresh water as the natural clay is sucking the water out of the system while in the hole during casing operations. 10) Once casing is landed and hole cleaned, lower viscosity to 50 - 55 sec/L and a YP of 5 - 7.5 Pa.
219.1mm Surface Csg			360	360				
WABAMUN			546	546	200 mm	**FLOC WATER PHPA** **INTERVAL: 360 - 1200** **Density (kg/m³):** Min 1000 Max 1020 **Viscosity (sec/L):** 28 30 **pH:** Neutral **Fluid Loss (cc's/30 min):** 10 14 **Calcium Ion (mg/L):** 250 300 **PHPA (kg/m³):** 0.5 1 Hyperdrill 247 **Maintain a clear water system until mud up depth or first sign of tight hole or pressure.** **Mud up at indicated depth or sooner if hole conditions dictate.**	**Coal** seams may be encountered under the shoe and in the upper hole. If coal is encountered control drill and thoroughly work these sections with the drill string. Attention should be paid to trip speeds through these sections. Coal gas and sloughing may also be associated with coal bearing formations. **Sloughing shale** may be present in the upper zones. Maintain the Calcium level with Calcium Nitrate. **Lost circulation is likely in the Wabamun. Attempt to cure losses with LCM otherwise drill blind to approximately 720m. Should LCM not heal losses, 2 cement plugs are to be run. Ensure LCM products are on location.** If losses are severe to complete, **Marquis Alliance recommends the use of FracAttack for the expected losses. Refer to the attached FracAttack procedure for details.** Minor reaming and cleaning to bottom possible on most trips. **Seepage Losses** may be encountered throughout the drilling of this well. **Seepage Losses** if encountered can be controlled with additions of Calcium Carbonate "0" and "325". If persistent, increase the Calcium Carbonate content to >30 kg/m³. Additions of Ultra Seal XP at 15 kg/m³ may also be considered. Losses could be due to high annular pressures and can be controlled with a reduction in pump rates. **Sloughing Shale** may be encountered and an increase in Density may be required to control formation pressures. A minimum Yield Point of 6 Pa will be required to suspend weight material. **Pressure Data:** Refer to stick for pressure information provided by Paramount. No pressures are expected in the formations to be drilled. Caution is advised. **For pressure and kicks,** increase density as required with additions of Calcium Carbonate &/or Barite. A minimum yield point of 6 Pa will be required to suspend weight material. **H_2S Data: Paramount noted H_2S is expected in the Sulphur Point formation . Maximum H2S concentration up to 3.4%.** **H_2S - If a sudden drop in pH is encountered, immediately increase pH to 10.5 - 11.0 with Caustic Soda as required. Check for sulphides using a Hach Sulphide Test Kit and/or a GGT. If excessive sulphides are detected, treat the active system with 2.0 L/m³ of Aquatreat H_2S, maintain the pH between 10.5 - 11.0 and continue to monitor. 2.0 L/m³ Aquatreat H2S will scavenge approx 500 ppm of H_2S.** **Anhydrite** may be encountered in the Sulphur Point formation (see offset M-74). Increase pH at 10.5-11.0 with Caustic Soda.	**DRILL OUT** 1) While W.O.C. clean all mud and solids from all tanks. Fill tanks with water. 2) While circulating all tanks drill out cement. Do not treat out cement as it will assist in flocculation. 3) Raise and maintain Calcium Ion at a minimum of 250 - 300 mg/L with additions of Calcium Nitrate. Daily additions of Calcium Nitrate will be required to maintain Calcium Ion at a minimum of 250 mg/L. After through loss zones 4) Floc system with additions of Alkapam 1103D. Mix 1 vis-cup into a chemical barrel full of water. Add below shaker at 1.5 - 2 L/20 m of new hole drilled. 5) Mix 1 - 2 sacks of Hyperdrill 247 every 12-18 hours in order to generate and maintain the PHPA level. Discontinue 200 m from mud up point if mudding up on the fly. 6) Discontinue all Alkapam and Calcium Nitrate additions 100m prior to mud up. **Refer to attached FracAttack for losses prevention.**
FORT SIMPSON			689	689				
TWIN FALLS			798	798				
MUD UP			1200	1200	200 mm	**POLYMER** **INTERVAL: 1200 - 1421** **Density (kg/m³):** Min 1080 Max 1150 **Viscosity (sec/L):** 65 70 For trips or higher if bridges occur 90 100 For logging: ~140 **pH:** 9.5 10 if H2S is encountered 10.5 11 **Fluid Loss: (cc's/30 min):** 6 8 **P.V. (mPa):** 15 30 **Yield Point (Pa)** 15 30 **Gels 10 sec (Pa):** 3 6 **Gels 10 min (Pa):** 5 12 **MBT (kg/m³):** 80 100 Primary Zone * Secondary Zone**		**MUD UP** 1) While W.O.C. clean all mud and solids from all tanks. Fill tanks with water and reduce Calcium Content to < 100 mg/L with 3-6 sacks of Soda Ash. 2) Raise and maintain pH at 9 - 10 with additions of Caustic Soda. Increase to 10.5 - 11.0 if H_2S is encountered. 3) Raise and maintain Viscosity at 65 - 70 sec/L with additions of MF VIS:MF PAC in a 1:2 ratio. 4) Lower and maintain Fluid Loss < 8 cc's/30min with additions of MF PAC and Lignite at a 1:2 ratio. 5) To minimize waste water run in water from the water section while drilling ahead. Lower excess Calcium with small additions of Soda Ash. **No more than a total of 10 sacks of Soda Ash are to be mixed.** 6) Run a minimum of 8-10 LPM water at all times while drilling ahead. 7) 4 - 6 hours prior to TD start to increase viscosity to 80 - 100 sec/L with additions of Gel and/or MF VIS as required. If mud rings occur, add 1-2 vis cups of Detergent down pipe on connections. SAPP may also be used; 1 vis cup down the drill pipe on each connection. If gravel, rocks and boulders are encountered increase viscosity as required with additions of Gel. Contingency LCM Ensure an adequate supply of LCM is on location. May include: Calcium Carbonate, Cellophane, Ultra Seal, Sawdust, Prima Seal, Magma Fiber. **FOR LOGGING:** 1) Increase Viscosity to 80 - 100 sec/L and the yield point to 17 Pa with additions of Gel. The viscosity range is dependent on the condition of the hole while drilling and tripping. 2) Circulate to condition mud and hole and a wiper trip to casing shoe is also recommended prior to POOH to log. **FOR CEMENTING CASING: If hole conditions allow.** 1) While circulating landed casing, bypass all compartments except the suction tank and lower the Viscosity to 40 - 45 sec/L and the Yield Point to 5 - 7 Pa with additions of water and 1 - 2 sacks of Desco.
BEAVERHILL LAKE			1294	1294				
SLAVE POINT			1319	1319				
F4			1360	1360				
WATT MOUNTAIN			1367	1367				
SULPHUR POINT LST *	727	3.40	1375	1375				
Core: One 18m in Sulphur Point								
SULPHUR POINT DOL			1385	1385				
MUSKEG			1401	1401				
TD 139.7mm Main Casing			1421	1421				

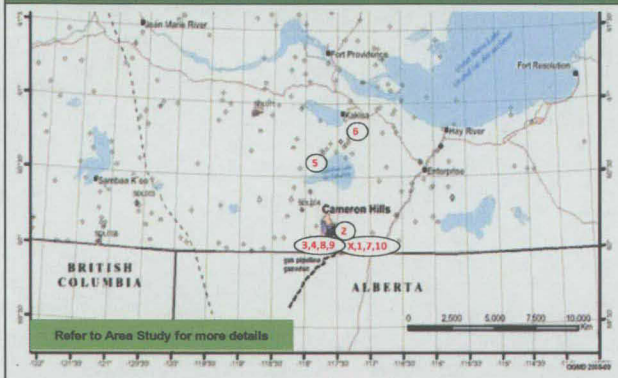
PROGRAM PREPARED FOR:	ATTENTION:	AFE #	MARQUIS ALLIANCE REPRESENTATIVE:
PARAMOUNT RESOURCES Ltd. Calgary, AB	BRAD SCOTT PHONE: email:	TBD	JOHN HINDMAN PHONE: (403) 264-1588, CELL(403) 990-3344 email: jhindman@marquisalliance.com

MARQUIS ALLIANCE ENERGY GROUP INC

PARA Cameron E-72 (SL E-72 60'10" 117' 15")

Vertical

OFFSETS INFORMATION



7. Paramount Cameron M-74 60 10" 117 15" 1473 m 29 days 2010

Surface to 378m: Spudded on January 17, 2010. Spud 311mm surface hole with PHPA and Polymer Mud system. Drilled ahead and encountered gravel at 25-40m, rocks at 60-80m and sand from 90-120m. Experienced foaming issue at 250m, and treat with Defoamer then drill ahead. Increase in MBT content naturally to 100 kg/m³ and with pH at 8.5 the system has not been affected with mud rings. Mixed detergent and TKPP as required to break down building natural clay. Increased viscosity to 65s/L for wiper trip. Ran a wiper trip without issues and increase viscosity to 100s/L prior to run casing. Ran and cemented 244.5mm casing with no problems and 5m³ of good cement returns.

Top Main to 951m: Drilled out float, cement and shoe. Drilled 200mm upper main hole with Flocculated Clear Water system. Drilled to 559m. Lost circulation at 559m then drill blind to 630m and regain circulation. Lose a total of 180m³ during section. Drill ahead to 1019m with 8 deviation problem. Drill ahead to 1026m and pull out of hole to pick up directional tools. Lose 25m³ at 550m while pulling out and 25m3 at 20m from bottom on the way back. Reduce pump rate from 110 strokes to 70 strokes and regain circulation, mix LC.M and rebuild volume back to 50m3. Drill ahead to 1089m, encountered total losses. Rebuild volume with water and pull out to run Frac Attack pill. Mix 12m³ of Frac Attack L.C.M pill with 9.6m3 of water, 160 Frac Attack and 30 sacks of Barite. Only 10m³ are to be pumped. Pump 2.5m³ from pill at 700m then pull 150m above pill and circulate. Run in to 625m and pump another 2.5m³. Pull 150m above pill and circulate. Run in to 475m and pump 2.5m3 of pill then pull back 200m above pill and apply 100 Psi for 30 minutes. Run in with bit and drill out Frac Attack. Wash down to 950m and lost circulation. Pump a 3.5m³ Frac Attack pill at 550m, and squeeze it with 200 psi for 30 minutes. Drilled out pill and lose circulation. Cleaned up hole down to 750m then pull out to run cement plugs. Run 2 cement plugs across the thief zone and pull out. Wait on cement then run in and drill out cement plugs. Lose 12m3 at 557m then well stabilizes. Ran in to 980m, lost circulation, then pull out to run cement plugs. RIH and washed through bridges at 480m and 552m. Circulated at 732m and condition mud for cement plugs. Pumped first plug at 732m, pull out to 466m. Circulate bottoms up and pump 2nd cement plug. Pulled out and pick up directional tools. RIH to casing shoe. Laid down 18 singles. Reamed cement from 405m to 481m. Reamed cement from 481m-595m for 7 hrs. Pulled out 8 stands. 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Reamed from 411 to 425m until LCM and cuttings star coming over shakers (approx 2m). Reamed down to 590m. Run in hole to 681m and continue drilling ahead with partial around 10% returns at reduced pump strokes (90spm). Continued drilling to 731m then run wiper trip, and pulled out of hole for cement plugs. Total mud lost for the last 24 hrs is 600m³. RIH with 300m of fiberglass string. Kelly-up and try to wash through bridge without success. Pulled out and laid down stinger. Mud-up fluid in tanks to 70s/l viscosity, pick up and run in with button bit. Kelly-up and reamed at 450m with large amounts of LCM back at shakers. Blended thick fluid with water from hole and maintained viscosity around 40-45 sec/L. Cleaned-up hole and continued in to 455m. Reamed and cleaned hole from 455-731m. Pulled out and reamed at 430-453m. Continued to pull out, picked up 300m of fiberglass cementing tubing. Ran back in hole to 453m, and washed from 463-602m. Unable to get past 602m, pulled out and laid down fiberglass pipe. Picked up and run in with bit to ream and cleaned up bridges at 455-600m with mudded up system. Cleaned well lifting LCM and drill cuttings (4-5 loader buckets). Encounter total losses at 600m then reamed to 625m. Switched over to water from mud and reduce pump strokes to 80spm to reduce water consumption. Reamed to 700m and regained circulation and continued reaming to 731m with mud. Conditioned and pulled out. Picked up and run in with stinger to 731m. Washed bridges at 613, 628, 656m then set cement plug 1. Pulled out to 499m, circulate and run in hole. Tagged plug at 604m, circulated and pumped 2nd cement plug. Pulled on top of the plug, circulated and waited on cement. Circulated while waiting on cement. Tagged plug at 535m. Pulled out, pick up BHA and run in hole. Reamed cement from 535m to 742m. Drilled ahead from 742-951m. Started mixing to increase funnel viscosity with (Millzan / Kelzan to 32 sec/L) to aid in hole cleaning. Temporarily stuck at 931m, worked pipe free then conditioned mud to 30s/l viscosity. Continue drilling ahead while mixing Millzan to increase YP at 3pa and increase gel strengths as well.

Main to 1473m: Drilled 200mm lower main hole with Polymer Mud system from 951-1254m with no reported problems on connections. Mudded up with Drispac R, Stardrill, and Lignite to reduce water loss and increase pH. Drilled 200mm main hole from 1254m to TD at 1473m. Mud is cleaning well. Drilled 25m into anhydrite, causing pH to drop, mixed Caustic Soda to maintain proper pH. Mixed Millzan and Kelzan slowly over several circulations to increase funnel viscosity to 50 sec/L prior to wiper trip. Experienced Anhydrite in Sulphur Point. Increased pH to 10.5-11. Mud Weight is low, filter cake very thin, lubricous, pliable and hard to compress. Pulled out to shoe then run in hole. Kelly-up, washed and reamed tight hole from 1434-1473m. Muskeg River formation unloaded and washed out. Continued to condition mud for 16 YP and 57s/l viscosity. Circulated twice the bottoms up, and hoist for logs. Logged well to 1456.3m. 17m of fill reported. Rig out loggers. RIH with bit, Tri-cone and reamed tight hole from 902-910m. RIH, reamed and washed from 1431-1473m (TD). Increased viscosity to 86 sec/L then pulled out. Continued logging well, 13m fill reported. Laid down loggers. RIH for clean out. Washed and reamed from 1431-1436m. Washed to bottom from 1451m. Circulate clean hole for 2 full circulations. Pull out of hole to run casing. Picked up and run 139.7mm casing and losing fluid while running in. Broke circulation at752m at reduced strokes (69 spm). Ran in to 1453m. Washed to 1473m, washed down 1 1/2 joints casing. Circulated to condition for cement, decreased viscosity to 45-50 sec/L. Cemented casing with 0.5m³ of cement return. Set slips and rig out.

Surface Hole: 0 - 360	**SHURE SHALE PHPA**	
Gel	15 sacks	
Sawdust	100 sacks	
Drilling Detergent	3 pails	
MF VIS	4 sacks	
Shure Shale	11 sacks	
Hyperdrill AF247RD	7 sacks	
Caustic Soda	3 sacks	
Defoamer XL	7 pails	$ 8,201.61
Top Hole: 360 - 1200	**FLOC WATER PHPA**	
Calcium Nitrate	30 sacks	
Alkapam A 1103	7 sacks	
Hyperdrill AF247RD	2 sacks	$ 3,264.18
FracAttack - $5,000.00 per pallet		
FracAttack Pills	3 pallets	
Main: 1200 - 1421	**POLYMER**	
MF VIS	13 sacks	
MF PAC	14 sacks	
MF STAR	16 sacks	
Gel	36 sacks	
Caustic Soda	8 sacks	
Soda Ash	12 sacks	
Lignite	4 sacks	
Desco CF	5 sacks	$ 12,132.99
TOTAL ESTIMATED MATERIAL COST W/O CONTINGENCY:		$ 23,598.78
3rd Party Estimated Expenses		
Based on 12 days drilling		
Pallets	$20.00	8 each $160.00
Pallets Returned	-$8.00	6 each -$48.00
Shrink Wraping	$20.00	8 each $160.00
Van Rental	$70.00	14 per day $980.00
Trucking	$1,500.00	1 per well $1,500.00
Engineering	$475.00	12 days $5,700.00
($950.00/1 rig - $475.00/2 rigs)		
TOTAL ESTIMATED 3rd Party Expenses:		$ 8,452.00
TOTAL ESTIMATED MATERIALS:		$ 32,050.78

*** Product subject to a 20% restocking charge.**
TERMS: Net 30 Days From Invoice Date.
TAXES: All Applicable Taxes Will Be Added.

Contingency Materials: Severe lost circulation, abnormal pressures or unexpected hole problems will increase the estimated usage and costs substantially. Should these problems be encountered, contingency materials may be required.

Offset Summaries

Surface:
- E-72: Gravel from 32 – 45 m
- J-04: Mud rings and plugged flow line throughout surface. Casing bridged off at 75 m. Reaming
- A-03: Tight hole / reaming
- L-28: Gravel from 65 – 80 m. Sand from 120 – 128 m. Clean/unball bit. Bit balling continued to 429 m.
- L-73: Sand and gravel at 95 m. Rocks and gravel at 105 m. Sand 200 – 213 m, 245-278m. Cleaned plugged flow line. Mud rings at 309m 338 & 370m.
- L-40: Gravel sloughing in at 65m. Worked mud rings.
- M-74: Gravel at 25-40m. Rocks and Boulders at 50-70m. Encountered Sand at 105m. Foaming at 240m controlled with defoamer. Dehydration while running casing and on breaking circulation prior to cement job.

Top/Main
- E-72: Minor losses 447-730m. At 1193m tripped for plugged jet and balled up bit at 1193m. Hole was tight 1000 & 850m. Partial losses continued. Trip bit for a plugged jet.
- J-04: Minor losses started at 598m. Major losses reported by 729m. Mixed LCM. Ran 4 cement plugs. Drilled ahead and losses continued with LCM additions. Plugged jets. Drilled ahead blind with LCM from 1069 – 1093m. Drilled ahead to 1399m with 50% losses.
- A-03: Started to lose circ at 553m. Plumped 3 cement plugs. Had plugged jets. Drill ahead with some tight hole at 1406m.
- L-29: Lost circ at 588 m. Lost 96.4 m³ from 588-735m. Ran cement plugs. Some tight hole form 1430-1390m.
- L-73: Losses began at 569m with total loss circ at 613m. Drilled ahead blind to 739m with no LCM. Ran 3 cement plugs. Some reaming from 1357-1450m while TIH.
- L-40: While logging, hit a bridge at 766m. Tight spots encountered 770-795m.
- M-74: Plugged back to shoe. Cement wasn't bonding with LCM in hole (Frac Attack). Drilled sidetrack with CaNo4 until 600m. Then lost total circ. Pumped LCM sweep, Sawdust. Reamed LCM/Cuttings bridges from 455m-731m after mudding up. Losses while RIH w/production casing from surface to 755m. No losses once past Wabamun formation.

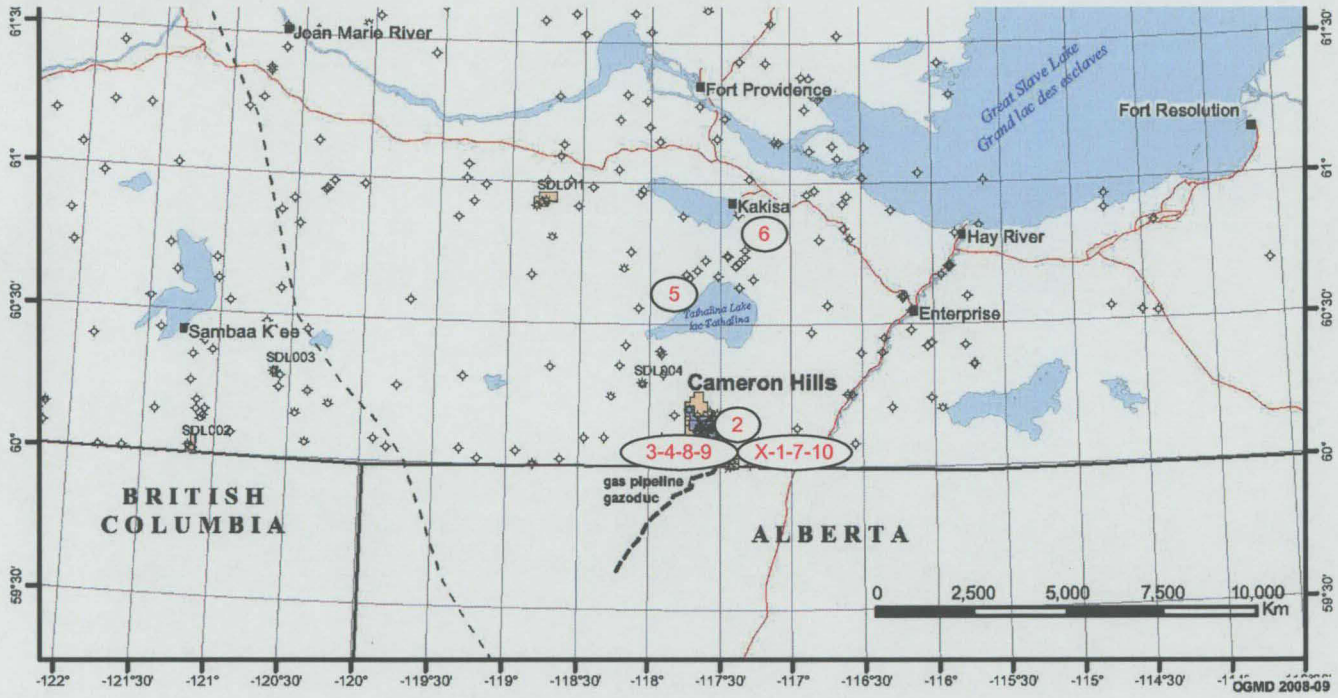
THE WASTE FROM THIS WELL WILL BE DISPOSED OF USING THE LSWD METHOD.
ALWAYS KEEP VOLUMES TO A MINIMUM AND UTILIZE SUMP WATER FOR DILUTION ON MAIN HOLE.
ALL PRODUCTS PASS THE MICROTOX AND CAN BE DISPOSED OF USING THE LSWD METHOD.

The addition of the following mean additional analysis may be needed.
Additives
Drilling Detergent in excess of 0.4 L/m³
Sapp in excess of .025 kg/m³
Nitrogen in excess of 400 kg = Envirofloc in excess of 3190 kg.
Lubricants (hydrocarbons), Surfactants
Biocides, Chemcides, Shale control inhibitors
Corrosion inhibitors, Defoamers, Emulsifiers

Prepared By:	WAREHOUSE / TRUCKING	DATE PREPARED
Valentin Varlam	**Formula Powell**	**October 13, 2010**
Phone: (403) 264-1588	**High Level**	
	Phone: 250-774-7663	

MARQUIS ALLIANCE

AREA STUDY



X Well: Para et al Cameron H-72 (60° 10' 117° 15') 1410 m
Para et al Cameron E-72 (60° 10' 117° 15') 1421 m
Para et al Cameron HZ 2H-03 (60° 10' 117° 15') 2358 m

**May contain confidential Records – confirm well type / date prior to releasing information.*

	WELL NAME	LSD	TOTAL DEPTH	YEAR	
1	Paramount Cameron	E-72	1408	Mar-04-2007	60° 10' 117° 15'
2	Paramount Cameron	J-04	1449	Feb-16-2007	60° 331.3" 117° 3047.8"
3	Paramount Cameron	A-03	1515	Feb-21-2007	60° 10' 117° 30'
4	Paramount Cameron	L-29	1450	Mar-04-2007	60° 10' 117° 30'
5	Paramount Cameron	L-73	1450	Mar-01-2007	60° 38.3' 117° 54'
6	Paramount Cameron	L-40	1453	Jan-26-2007	60° 935.5"" 117° 3715.9"
7	Paramount Cameron	M-74	1473	Feb-14-2010	60° 10' 117° 15'
8	Paramount Cameron	2B-09	1520	Mar-05-2010	60° 10' 117° 30'
9	Paramount Cameron	H-06	1468	Feb-03-2010	60° 10' 117° 30'
10	Paramount Cameron	F-77	1417	Feb-14-2010	60° 10' 117° 15'

MARQUIS ALLIANCE

AREA STUDY

Offsets Summary

Surface:

- E-72: Gravel from 32 – 45 m
- J-04: Mud rings and plugged flow line throughout surface. Casing bridged off at 75 m. Reaming
- A-03: Tight hole / reaming
- L-28: Gravel from 65 – 80 m. Sand from 120 – 128 m. Clean/unball bit. Bit balling continued to 429 m.
- L-73: Sand and gravel at 95 m. Rocks and gravel at 105 m. Sand 200 – 213 m, 245-278 m. Cleaned plugged flow line. Mud rings at 309m 338 & 370 m.
- L-40: Gravel sloughing in at 65 m. Worked mud rings.
- M-74: Gravel at 25-40m. Rocks and Boulders at 50-70m. Encountered Sand at 105m. Foaming at 240m controlled wtih defoamer. Dehydration while running casing and on breaking circulation prior to cement job.
- H-06: encountered gravel at 30-40m, rocks at 60-80m and sand from 90-120m. Drilled to 141m when conductor pipe starts leaking. Ran two cement plugs.
- F-77: Encountered gravel at 30-40m, rocks at 60-80m and sand from 90-120m.
- 2B-09: Encountered gravel and sand stringers reducing ROP at 105m. Encountered hard pack sand and gravel from 105-131m.

Top/Main

- E-72: Minor losses 447-730 m. At 1193 m tripped for plugged jet and balled up bit at 1193 m. Hole was tight 1000 & 850 m. Partial losses continued. Trip bit for a plugged jet.
- J-04: Minor losses started at 598 m. Major losses reported by 729 m. Mixed LCM. Ran 4 cement plugs. Drilled ahead and losses continued with LCM additions. Plugged jets. Drilled ahead blind with LCM from 1069 – 1093 m. Drilled ahead to 1399 m with 50% losses.
- A-03: Started to lose circ at 553 m. Plumped 3 cement plugs. Had plugged jets. Drill ahead with some tight hole at 1406 m.
- L-29: Lost circ at 588 m. Lost 96.4 m^3 from 588-735 m. Ran cement plugs. Some tight hole form 1430-1390m.
- L-73: Losses began at 569m with total loss circ at 613m. Drilled ahead blind to 739m with no LCM. Ran 3 cement plugs. Some reaming from 1357-1450m while TIH.
- L-40: While logging, hit a bridge at 766m. Tight spots encountered 770-795m.
- M-74: Plugged back to shoe. Cement wasn't bonding with LCM in hole (Frac Attack). Drilled sidetrack with CaNo4 until 600m. Then lost total circ. Pumped LCM sweep, Sawdust. Reamed LCM/Cuttings bridges from 455m-731m after mudding up. Losses while RIH w/production casing from surface to 755m. No losses once past Wabamun formation.
- H-06: Drilled ahead to 560m and lost total circulation. Drilled blind to 752m while feeding the well with water. Set two cement plugs with open end. At 1088m experienced bit balling once back on bottom.
- 2B-09: At 779m experienced tight connections. Encountered tight hole at 966m. Higher than anticipated shale and clays requires extra Shure Shale and Hyperdrill 247 additions.

MARQUIS ALLIANCE

AREA STUDY

Well Name & LSD	Depth	Days	Mud System				Density
1. Para et al Cameron	1408	8	0-435m		311mm	219.1mm	
E-72 (60° 10' 117° 15')			435-~1193 m	Floc Water	200mm		
(Feb-24-2007 to Mar-04-2007)			~1193-1408m	Gel Chem	200mm	139.7mm	1140 kg/m³
Operator							

Spud 311mm hole. Drill to 34 m. Cond mud, mixed gel. Drilled ahead encountering gravel from 32 – 45 m. Drill ahead to 185 m. Circ and trip for bit. Drill ahead to 430 m. Circ hole clean. Wiper trip. Drill to 435 m. Conc & cond hole. POOH to run 219.1mm csg.

Drill out 311mm hole. Drill and survey from 447-730 m with very minor losses. Lost 0.26 m³ in 13 min's on a survey at 645 m. Drill ahead to 1193 m. Circ & try to get the bit clean up. Trip for a plugged jet and balled up bit at 1193 m. There was a ¾" rock in one jet of the bit. The hole was tight at 1000 and 850 m. Continued to had partial losses while running deviation survery (at 887 m-0.62 m³ over 18 min, at 990 m-0.22 m³ over 18 min, at 1094 m-0.21 m³ over 23 min. Trip the bit for a plugged jet. RIH with new bit. Drill ahead to 1408 m. Cond mud & circ up sample. Wiper trip back to 1000 m. Cond mud and do a 2nd wiper trip while waiting on loggers. Circ & cond mud. POOH to log. RIH, cond mud & circ. Run 139.7mm csg.

2. Para et al Cameron	1449	24	0-430m	Gel Slurry	311mm	219.1mm	
J-04 (60° 331.3" 117° 3047.8")			430-~1100m	Floc Water	200mm		
(Jan-24-2007 to Feb-16-2007)			1100-1449m	Gel Chem	200mm	139.7mm	1100 kg/m³
Operator							

Spud 311 mm hole. Drill ahead to 29 m. Mud ring and plugged flow line reported. Drill ahead from 330-388 with mud ring and having to unplug flow line. Wiper trip for mud ring and ream mud ring from 302-386 m. Drill ahead to 397 m, working mud ring. Drill to 430 m TD. Circ & cond. Work pipe. Wiper trip #2 to 250 m. Ream from 280-295 m. Circ & cond. Work pipe. Cond hole. Hoist bit. Run 219.1mm casing. Casing bridged off at 75 m. Circ & rotate to 81 m (rocks). Lay down csg & rig out power tongs. Wiper tirp # 3 with bit to 75 m. Remove & unplug flow line. Ream form 75-103 m. Fish trip in. Circ & cond (work pipe, clean plugged lfow line). Wiper trip #4, circ & cond mud. Hoist bit to run csg #2. Rig to & run 219.1mm csg #2 (bridged off at 81 m, circ & work csg, no progress). Lay down csg #2. Trip in with MX1 bit. Ream from 56-205 m. Hoist bit. Run 219.1mm csg.

Drill 200mm hole. Small losses started at 598 m. Drill to 729 m. Major losses reported. Mixed LCM slugs. Hoist bit to run cement plug. Trip in open ended and pick up 27 jts of DP (total losses 105 m³). Run cement plug #1 from 729-549 m with no returns. Drill out cement plug at 593 m. Mix LCM plug and displace into hole. Drill ahead from 618 m with LCM. Run cement plug #2 (tagged at 572 m). Drill out cement. Drill ahead to 758 m. Cond mud & circ. Run plug # 3, some returns. Pump cement plug #4 at 616 m. Drill out cement from 573-700 m. At 700 m lost 8 m³ of mud. Finish drill out cement plug to 758 m. No losses on flow check. Drill ahead. At 846 m, lost 8 m³ in 15 min. Drill ahead to 884 m. Mixed LCM, pump and displace. Circ under shakers 50% of the time). Drill to 914 m. Bit balling up. Mixed sawdust and plug jets. No mud returns. POOH for plugged jets, no mud returns. Unplug jets. Drill ahead to 947 m. 15 m³ mud loss. Mix LCM and cleaned shaker tank. Drill ahead to 991 m, adding sawdust as drilling ahead. Drill blind with LCM slugs form 1069-1072 m. Pumped away all fluid. Filled tanks with fresh water and mixed gel/sawdust. Drill ahead blind with slugs from 1072-1076 m, lost 30 m³. Mix slugs and drill blind from 1076-1093 m. Trip out to 700 m. Build volume, mix LCM, regain 100% circ. Trip in to 95 m, mix LCM. Build volume, mix mud. Trip out due to plugged jets. RIH. Drill ahead from 1122-1283 m with loss circ. Drill from 128-1399 m with 50% losses. Tripped out, made up core barrels and RIH. Cut core. Drill ahead to 1449 m. Log hole. Run 139.7mm csg.

3. Para et al Cameron	1589	11	0-436m	Gel	311mm	219.1mm	
A-03 (60° 10' 117° 30')			436-~975 m	Floc Water	200mm		
(Feb-10-2007 to Feb-21-2007)			~975-1589m	Gel Caustic	200mm	139.7mm	1220 kg/m³
Operator							

Spud 311mm hole. Drill to 270 m, circ hole clean. Trip for bit. Hole was tight from 260-150 m on the way out and from 13 – 23 on the way in. Drill ahead to 430 m, Cond mud & circ. Wiper trip. Tight form 220 – 250 m. Ream 270 – 280 m on trip in. Drill to 436 m. Cond mud & circ. Run 219.1mm casing.

Drill 200mm hole ahead to 626 m. Started to lose circ at 553 m. Loss circ averaged 4.2 m³/hr through the Wabamun until 730 m, the Fort Simpson shale. POOH to run plugs and run back in open ended. Circ and wait on cementers. Pumped cement plug #1. Plug tagged at 604 m. Cement plug #2. Plug tagged at 510 m. Run cement plug #3. Tag cement at 525 m. Drill out cement. Drill ahead 1250 m. Circ, try to unplug jet while drilling. Trip bit for plugged jet. There was a survey barrel feather stuck in the jet. Run back in and the jets were plugged again. Couldn't get them unplugged so had to trip out again. Drill to 1380 m with partial plugged jets. The pressure got too high and had to trip for jets. RIH and drill ahead to 1589 m. Circ sample and wiper trip back to 1200 m. Had some tight hole at 1406 m. RIH and cond mud. POOH to log. Run logs with no problems reported. Ran 139.7mm csg.

4. Para et al Cameron	1515	10	0-435.5 m	Gel Slurry	311mm	219.1mm	
L-29 (60° 10' 117° 30')			436-~1200 m	Floc Water	200mm		
(Jan-28-2007 to Feb-07-2007)			~1200-1515 m	Gel Chem	200mm	139.7mm	1140 kg/m³
Operator							

Spud 311mm hole. Encountered gravel from 65-80 m. Had some sand from 120-128 m. Trip out to clean/unball bit. Drill ahead to 354 m having trouble with bit wanting to ball up. Drill ahead to 429 m. Conc mud & circ. POOH. Circ mud ring. Drill to 435.5 m. Run 219.1mm csg.

Drill out and ahead a 200mm hole. Drill to 588 m, lost circulation, waited for water. Drill ahead to 735 m. Lost a total of 96.4 m³ by the pason to drill form 588-735 m. There was total loss on the first 2 singles then got partial returns. Drill to 739 m. Circ sample and POOH. RI opened ended for loss circulation cement plugs. Ran a 192 m plug (at 585 m). Lost 43 m of cement out of the hole to the loss circ zone on this plug. Pumped plug #2 (536 m). Lost 49 m of hole volume from this plug to the loss circ zone. Drill out cement from 536-664 m and 664-739 m. Drill ahead to 1515 m. Circ sample. Wiper trip. Some tight hole from 1430-1390 m. Cic & cond hole. Wiper trop. POOH to log. Log. Circ & cond hole. Ran 139.7mm casing.

MARQUIS ALLIANCE

AREA STUDY

Well Name & LSD	Depth	Days	Mud System				Density
5. Para et al Cameron	1450		0-436m	Gel Slurry	311mm	219.1mm	
L-73 (60° 38.3' 117° 54')			436-900m	Floc	200mm		
(Feb-18-2007 to Mar-01-2007)			900-1450m	Gel Chem	200mm	139.7mm	1190 kg/m³
Operator							

Surface to 436m: Spud 311mm hole. Drill ahead hitting sand and gravel at 95 m. Hit rocks and gravel at 105 m. Drill ahead with sand reported from 200 – 213 m. Clean plugged flow line. Sand reported from 245-278 m. Drill ahead. Circ and work pipe for mud rings at 309 m, 338 m, 370 m. Drill ahead to 425 m, circ and work pipe. Wiper trip to surface. TIH to 400 m. Kelly up and wash to btm at 425 m (plugged flow line). Circ & work pipe. Drill ahead to 436 m TD. Circ cond (work pipe). Hoist bit to run 219.1mm csg.

Main to 1450m: Drill ahead 200mm hole to 569 m. Losses began. Had total loss circ at 613 m. Drill blind to 739 m (no LCM mixed). Hoist bit to run loss circ cement plugs. Run cement plug #1. Circ btms up, still losing fluid in annular. RIH to tag plug (571 m) and run plug #2 (tagged at 559 m). Run cement plug #3. Tag cement at 476 m. Drill out cement plugs. Finish drilling out loss circ cement plug from 628-739 m. Flow checked and losing 1 m³/hr. Mudded up at 900 m. Drilled ahead to 1255 m. Bit keeps balling. Drill ahead to 1450m TD. Circ up sample and conditioned mud to shoe. Trip in and ream from 1357-1450 m TD. Circ and conditioned mud. Hoist to log. Finish logging. Ran 139.7mm casing.

6. Para et al Cameron	1453	11	0-425m	Gel Slurry	311mm	219.1mm	
L-40 (60° 935.5''' 117° 3715.9")			425-~1000 m	Floc Water	200mm		1140 kg/m³
(Jan15-2006 to Jan-26-2006)			~1000-1453m	Gel Chem	200mm	139.7mm	
Operator							

Surface to 425m: Drill mouse hole in gravel at 65 m sloughing in. Increased vis to 200 sec/L. Spudded 311mm hole and drilled ahead to 354m. POOH for mud ring. Worked mud ring at 20m. At 100m, unplugged flow line. Reamed mud ring at 160 & 260m. Circulated to bottom. Drilled ahead to 410m. Circulated hole clean, wiper tripped, washed to bottom. Drilled ahead to 425m. Conditioned mud & circulated. Ran 219.1mm casing.

Main to 1453m: Drilled 200 mm hole ahead to 1453m, POOH to lay down directional tools. Ran back in and reamed to bottom at 1421m. Circulated and conditioned, vis was 65 sec/L. Increased to 75 sec/L. POOH to log. RIH with logging tools. Hit a bridge at 766m. Tagged bridge at 768m and reamed. Rest of the hole was good. Circulated and conditioned mud. Pulled out to log. Some tight spot for 25m from 770-795m, worked tools. Ran 139.7mm casing.

MARQUIS ALLIANCE

AREA STUDY

Well Name & LSD	Depth	Days	Mud System				Density
7. Para et al Cameron	1473	29	0-378m	PHPA Clay Free	311mm	244.5mm	1050 kg/m³
M-74 (60° 10" 117° 15")			378-951m	Floc Water	200mm		1010 kg/m³
(Jan17-2010 to Feb-14-2010) MA			951-1473m	PHPA Shure Shale	200mm	139.7mm	1050 kg/m³

Surface to 378m: Spudded on January 17, 2010. Spud 311mm surface hole with PHPA and Polymer Mud system. Drilled ahead with gravel at 25-40m, rocks at 60-80m and sand from 90-120m. Experienced foaming issue at 250m, and treat with Defoamer then drill ahead. Increase in MBT content naturally to 100kg /m³ and with pH at 8.5 the system has not been affected with mud rings. Mixed detergent and TKPP as required to break down building natural clay. Increased viscosity to 65s/L for wiper trip. Ran a wiper trip without issues and increase viscosity to 100s/L prior to run casing. Ran and cemented 244.5mm casing with no problems and 5m³ of good cement returns.

Top Main to 951m: Drilled out float, cement and shoe. Drilled 200mm upper main hole with Flocculated Clear Water system. Drilled to 559m. Lost circulation at 559m then drill blind to 630m and regain circulation. Lose a total of 180m³ during section. Drill ahead to 1019m with 8° deviation problem. Drill ahead to 1026m and pull out of hole to pick up directional tools. Lose 25m³ at 550m while pulling out and 25m3 at 20m from bottom on the way back. Reduce pump rate from 110 strokes to 70 strokes and regain circulation, mix L.C.M and rebuild volume back to 50m3. Drill ahead to 1089m, total losses. Rebuild volume with water and pull out to run Frac Attack pill. Mix 12m³ of Frac Attack L.C.M pill with 9.6m3 of water, 160 Frac Attack and 30 sacks of Barite. Only 10m³ are to be pumped. Pump 2.5m³ from pill at 700m then pull 150m above pill and circulate. Run in to 625m and pump another 2.5m3. Pull 150m above pill and circulate. Run in to 475m and pump 2.5m3 of pill then pull back 200m above pill and apply 100 Psi for 30 minutes. Run in with bit and drill out Frac Attack. Wash down to 950m and lose circulation. Pump a 3.5m3 Frac Attack pill at 550m, and squeeze it with 200 psi for 30 minutes. Drill out pill and lose circulation. Clean up hole down to 750m then pull out to run cement plugs. Run 2 cement plugs across the thief zone and pull out. Wait on cement then run in and drill out cement plugs. Lose 12m3 at 557m then well stabilizes. Run in to 980m, lose circulation, then pull out to run cement plugs.

Jan 31 2010: Run in hole washed through bridges at 480m and 552m. Circulated at 732m and condition mud for cement plugs. Pumped first plug at 732m, pull out to 466m. Circulate bottoms up and pump 2nd cement plug. Pull out and pick up directional tools. Run in hole casing shoe. Lay down 18 singles. Reamed cement from 405m to 481m. Reamed cement from 481m-595m for 7 hrs. Pulled out 8 stands. Washed to 595m, circulated and conditioned mud and pulled out. Run in to 672m washing through bridges at 405m and 600m. Circulated and conditioned mud and set cement plug from 664m-475m. Pulled out to 400m. Circulated and condition mud. Ran in and tag top of plug at 494m. Circulated bottoms up then set cement plug #2 from 403m to 303m. Pull out 9 stands. Ran in hole lay down DP and wait on cement. Tag cement at 402m. Circulate down to good cement at 467m (Frac Attack and other LCM evident at shaker). Kick-off plug and drill a 200mm new hole from 467m-576m at midnight with minimal losses (seepage). Continued drilling 200mm hole from 576m to 589m. Encounter total losses at 589m. Pumped two viscous LCM sweeps to aid in cleaning bit. Drilled ahead blind without returns to 681m. Run a wiper trip to 375m then run back in while reaming from 411m to 424m. At 425m above bit depth circulate with full returns, but bellow this point circulation drops off. Reamed from 411 to 425m until LCM and cuttings star coming over shakers (approx 2m°). Reamed down to 590m. Run in hole to 681m and continue drilling ahead with partial around 10% returns at reduced pump strokes (90spm). Continued drilling to 731m then run wiper trip, and pulled out of hole for cement plugs. Total mud lost for the last 24 hrs is 600m³. RIH with 300m of fiberglass string. Kelly-up and try to wash through bridge without success. Pulled out and laid down stinger. Mud-up fluid in tanks to 70s/l viscosity, pick up and run in with button bit. Kelly-up and reamed at 450m with large amounts of LCM back at shakers. Blended thick fluid with water from hole and maintained viscosity around 40-45 sec/L. Cleaned-up hole and continued in to 455m. Reamed and cleaned hole from 455-731m. Pulled out and reamed at 430-453m. Continued to pull out, picked up 300m of fiberglass cementing tubing. Ran back in hole to 453m, and washed from 463-602m. Unable to get past 602m, pulled out and laid down fiberglass pipe. Picked up and run in with bit to ream and cleaned up bridges at 455-600m with mudded up system. Cleaned well lifting LCM and drill cuttings (4-5 loader buckets). Encounter total losses at 600m then reamed to 625m. Switched over to water from mud and reduce pump strokes to 80spm to reduce water consumption. Reamed to 700m and regained circulation and continued reaming to 731m with mud. Conditioned and pulled out. Picked up and run in with stinger to 731m. Washed bridges at 613, 628, 656m then set cement plug 1. Pulled out to 499m, circulate and run in hole. Tagged plug at 604m, circulated and pumped 2nd cement plug. Pulled on top of the plug, circulated and waited on cement. Circulated while waiting on cement. Tagged plug at 535m. Pulled out, pick up BHA and run in hole. Reamed cement from 535m to 742m. Drilled ahead from 742-951m. Started mixing to increase funnel viscosity with (Millzan / Kelzan to 32 sec/L) to aid in hole cleaning. Temporarily stuck at 931m, worked pipe free then conditioned mud to 30s/l viscosity. Continue drilling ahead while mixing Millzan to increase YP at 3pa and increase gel strengths as well.

Main to 1473m: Drilled 200mm lower main hole with Polymer Mud system from 951-1254m with no reported problems on connections. Mudded up with Drispac R, Stardrill, and Lignite to reduce water loss and increase pH. Drilled 200mm main hole from 1254m to TD at 1473m. Mud is cleaning well. Drilled 25m into anhydrite, causing pH to drop, mixed Caustic Soda to maintain proper pH. Mixed Millzan and Kelzan slowly over several circulations to increase funnel viscosity to 50 sec/L prior to wiper trip. Experienced Anhydrite in Sulphur Point. Increased pH to 10.5-11. Mud Weight is low, filter cake very thin, lubricous, pliable and hard to compress. Pulled out to shoe then run in hole. Kelly-up, washed and reamed tight hole from 1434-1473m. Muskeg River formation unloaded and washed out. Continued to condition mud for 16 YP and 57s/l viscosity. Circulated twice the bottoms up, and hoist for logs. Logged well to 1456.3m. 17m of fill reported. Rig out loggers. RIH with bit, Tri-cone and reamed tight hole from 902-910m. RIH, reamed and washed from 1431-1473m (TD). Increased viscosity to 86 sec/L then pulled out. Continued logging well, 13m fill reported. Laid down loggers. RIH for clean out. Washed and reamed from 1431-1436m. Washed to bottom from 1451m. Circulate clean hole for 2 full circulations. Pull out of hole to run casing. Pick up and run 139.7mm casing and losing fluid while running in. Broke circulation at752m at reduced strokes (69 spm). Ran in to 1453m. Washed to 1473m, washed down 1 1/2 joints casing. Circulated to condition for cement, decreased viscosity to 45-50 sec/L. Cemented casing with 0.5m³ of cement return. Set slips and rig out.

MARQUIS ALLIANCE

AREA STUDY

Well Name & LSD	Depth	Days	Mud System				Density
8. Para et al Cameron	1520	13	0-391m	PHPA Clay Free	311mm	219.1mm	1140 kg/m³
2B-09 (60° 10" 117° 30")			391-950 m	Amine/Floc Water	200mm		1030 kg/m³
(Feb 21-2010 to Mar-5-2010) MA			950-1520m	Shure Shale Polymer	200mm	139.7mm	1090 kg/m³

Surface to 391m: Spudded on February 21, 22010. Spudded a 311mm surface hole with Clay Free PHPA mud system. Drill to 105m. Encountered gravel and sand stringers reducing ROP. Drill ahead from 105m to 131m and encountered hard pack sand and gravel. Add Soda Ash and Gel to reduce Calcium and increase viscosity. Continue drilling ahead to 295m. Drilled ahead from 295-391.4m, STD, circulate condition mud and pull out of hole. Ran back in and reamed from 105-123m. Run to bottom, circulate out mud ring. Conditioned mud for 75s/l viscosity and hoist for wiper trip, run in, circulate bottom's up while waiting on tong truck. Pull out of hole and run a 219mm surface casing. Cement casing with good returns to surface.

Top Main to 950m: Drilled out float cement and shoe and drill a 200mm upper main hole from 391m with Marquis Alliance Amine Floc Water system. Drilled ahead to 779m, experienced tight connections, and sweep hole with high viscosity LCM pill without noticeable change in hole conditions. Mixed to increase funnel viscosity around (32-33 sec/L) to aid in hole cleaning. Continued drilling ahead to 950m, shut in system and start mudding up with Kelxan, Pac R, Stardrill, Shure Shale and Lignite for the bottom section.

Main to 1520m: Continued drilling a 200mm lower main hole with Shure Shale Polymer mud. Encountered tight hole at 966m. Mixed Detergent to reduce stickiness at shakers. Continued drilling ahead with positive results after mudding up. Drilled ahead to 1311m, fluid starts foaming, shut centrifuge down for several circulations. Dumped 12m³ of mud and diluted with 12m³ of fresh water. Higher than anticipated shale and clays requires extra Shure Shale and Hyperdrill 247 additions. Shut down centrifuge to reduce foaming and stop Shure Shale additions. Increased concentration of Hyperdrill 247 and dilute system with 15% fresh water, which helps reduce the foaming. Continued drilling ahead to 1510m while conditioning mud for a wiper trip. Increase viscosity to 75 sec/L and pump out 4 singles then wash back to bottom with 1m fill. Conditioned mud and pulled up to shoe. Ran back in and ream to bottom. Circulated and pulled out for wiper trip #2 to 1030m. Ran wire line logs to 1511m. Ran in conditioned mud then pulled out sideways. Picked up 139.7mm casing and run to bottom, circulate the last joint and condition mud for a 60s/l viscosity with Desco and fresh water. Reduce viscosity to 50 sec/l and cemented 139.7mm casing with good returns to surface.

9. Para et al Cameron	1468	20	0-378m	Shure Shale PHPA	311mm	244.5mm	1120 kg/m³
H-06 (60° 10" 117° 30")			378-1100 m	Floc Water	200mm		1000 kg/m³
(Jan-15-2010 to Feb-3-2010) MA			1100-1468m	Gel Chem	200mm	139.7mm	1110 kg/m³

Surface to 378m: Spudded on January 16, 2010. Spudded surface hole with Shure Shale PHPA mud system. Drilled ahead and encountered gravel at 30-40m, rocks at 60-80m and sand from 90-120m. Drill ahead to 141m when conductor pipe starts leaking. Ran two cement plugs and drill out cement then treat contamination with sodium bicarbonate. Continued drilling ahead to 240m and system starts foaming. Treat with Defoamer and drill ahead with an increase in MBT naturally to 128kg/m³ with 8.5pH, no signs of mud rings. Mixed Detergent and TKPP as required when shaker is sticky to break down building natural clay. Drill to 378m, STD, and increase viscosity to 65s/l for wiper trip. Trip and hit bridges on the way back in, so warrant another wiper trip with good results. Increase viscosity to 100s/l for casing run. Ran and cemented 244.5mm casing without problems and 5m³ of good cement returns.

Top Main to 1100m: Drilled out float cement and shoe and drill a 200mm upper main hole with Flocculated Clear Water mud. Drilled ahead to 560m and lost total circulation. Drilled blind to 752m while feeding the well with water. POOH and set two cement plugs with open end. While circulate casing after first plugs is set, lost 15m³. Pulled out and set plug #2, then pull to 365m and circulate without any losses. Trip out and pick up BHA then ran in and tagged cement plug at 550m. Drilled out cement plugs to 752m with Flocculated Water and continue drilling from 752-1124m, shut in system and mud up. Required a lot of treatment for calcium as the mud system has gained calcium from cement plugs.

Main to 1468m: Mudded up with Gel while continuing to treat out Calcium. Drilled a 200mm lower main hole with Polymer Mud to 1143m and wiper tripped to 500m, on trip in clean out bridge at 1088m.Experience bit balling once back on bottom, drill ahead to 1189m and pull bit for two plugged jets. Clean up bit and run in with the same bit. MBT is 128kg/m³ due to natural clays. Run centrifuge to help strip system down and turn mud system to a P.H.P.A / Shure Shale to reduce bit balling. Cuttings still sticky on and off, treating with detergent and TKPP as required. Jets on bit 2B are plugged again, so run in with bit 3 (tri cone) and drill to 1448m and wiper trip without problems. Drilled to TD at 1468m and POOH. Ran log then laid down sideways. Ran 139.7mm casing and cemented without issues. Mixed fresh water at 40 L/min and Desco CF to thin-out mud to 53 sec/L (5 pa YP) prior to cement.

10. Para et al Cameron	1417	9	0-379m	Shure Shale PHPA	311mm	219.1mm	1060 kg/m³
F-77 (60° 10" 117° 15")			379-1000 m	Floc Water	200mm		1000 kg/m³
(Feb-06-2010 to Feb-14-2010) MA			1000-1417m	Gel Chemical	200mm	139.7mm	1100 kg/m³

Surface to 379m: Spudded on February 6, 2010. Drilled a 311mm surface hole with PHPA Shure Shale mud system and drilled ahead through gravel at 30-40m, rocks at 60-80m and sand from 90-120m. MBT is naturally up to 57 kg/m³. Mixed detergent and TKPP as required when shakers are sticky to break down building natural clay. Also, mixed 2-3 pails of Defoamer at 230-240m to control foaming problem. Drilled to 379m, STD, and increased viscosity to 58s/L for wiper trip. Washed bridge at 190m on the way in with 3-4m fill. Increased viscosity to 80s/L and run 219mm surface casing to bottom then lower viscosity to 50-55 s/l and yield point to 5-7.5pa. Cemented casing with good cement return to surface.

Top Main to 1000m: Drilled out float cement and shoe and drilled a 200mm upper main hole with Flocculated Clear Water. Drilled to Fort Simpson formation without any reported problem. The transition between the Wabamun and Fort Simpson was slightly sticky on two connections. Worked connections and continued drilling. Pumped sweep with no extra cuttings at shakers. Drilled down to 1000m, shut in system and started mudding up without treating out calcium as it is needed for inhibition in main hole section.

Main to 1417m: Drilled 200mm lower main hole while mudding up with 2-3 sacks of Kelzan to achieve 36-38 s/l viscosity and 3-4 yield point. Let pH drop naturally to 8-8.5 and mix 8-10 Shure Shale into suction to achieve 800-1000 mg/l Cl content at the same time to inhibit formations while mudding up. Also, lowered fluid loss to 6-8 with Ultrapac and Lignite at 1:2 ratio and mixed Hyperdrill 247RD to increase polymer content to 0.5-1 kg/m³ for shale and clay encapsulation. Drilled ahead with above properties to 1417m, TD. Ran a wiper trip with the drilling mud properties then increased viscosity to over 70s/L for logging and running casing. Ran a 139.7mm casing, and prior to cement lower viscosity to 40-50 s/l and 5-8 yield point with water and Desco in isolated suction containing 5-6m³ of drilling fluid.

Mackenzie Valley Land and Water Board
7th Floor - 4910 50th Avenue
P.O. Box 2130
YELLOWKNIFE NT X1A 2P6
Phone (867) 669-0506
FAX (867) 873-6610

FILE NUMBER: MV2010A0051

Date: December 23, 2010

To: Mr. Terence Hughes

Organization: Paramount Resources Ltd.

Fax: Sent Via email

Copied To: Scott Stewart, A/District Manager, South Mackenzie District, INAC
Distribution List

From: Amanda for Willard Hagen, Chair

Number of pages including cover 14

Remarks:

Issuance – Type A Land Use Permit

If you have any questions please contact our office at (867) 669-0506 or email permits@mvlwb.com.

Thanks,

☒ Enclosures

☐ As requested

☐ For your information

☒ For your comment

☐ For your approval

Delivered by	Date
☐ Courier	
☐ Hand Delivered	
☒ Email/Fax	Dec. 23, 2010
Sent by	AG

Mackenzie Valley Land and Water Board
7th Floor - 4910 50th Avenue • P.O. Box 2130
YELLOWKNIFE, NT X1A 2P6
Phone (867) 669-0506 • FAX (867) 873-6610

December 22, 2010 File: MV2010A0051

Mr. Terence Hughes
Paramount Resources Ltd.
4700 Bankers Hall West, 888 3rd St. SW
CALGARY AB T2P 5C5 Fax: (403) 262-7992

Dear Mr. Hughes:

Issuance of Type A Land Use Permit
Oil and Gas Exploration, Cameron Hills, NT

Attached is Land Use Permit MV2010A0051 granted by the Mackenzie Valley Land and Water Board (MVLWB) in accordance with the *Mackenzie Valley Resource Management Act*. The MVLWB has approved this Permit for a period of 5 years commencing December 22, 2010 and expiring December 21, 2015.

Please read all conditions carefully making particular note of Land Use Permit condition 54 regarding the posting of a security deposit. Pursuant to section 32 of the Mackenzie Valley Land Use Regulations, this deposit, **payable to the Receiver General for Canada** in the amount of $40,000, shall be posted with Indian and Northern Affairs Canada, #16 Yellowknife Airport, Yellowknife, NT, X1A 3T2. Attention: Charlene Coe. Please copy to the MVLWB office prior to the start of your operation.

A copy of all related correspondence and documents has been filed on the Public Registry at the office of the MVLWB. Please be advised that this letter, its attached procedures, inspection reports, and related correspondence is part of the Public Registry and is intended to keep all interested parties informed of the manner in which the Permit's requirements are being met. All Public Registry material will be considered if an amendment to the Permit is requested.

.../2

The full cooperation of Paramount Resources Ltd. is anticipated and appreciated. If you have any questions or concerns, please telephone (867) 669-0506 or email permits@mvlwb.com.

Yours sincerely,

Willard Hagen
Chair

Copied to: Scott Stewart, A/District Manager, South Mackenzie District, INAC
Distribution List;
Shannon Hayden, Regulatory Officer, MVLWB

Attachments

Land Use Permit

Permit Class	Permit No	Amendment No
A	MV2010A0051	

Subject to the Mackenzie Valley Land Use Regulations and the terms and conditions in this Permit, authority is hereby granted to:

Paramount Resources Ltd.

Permittee

to proceed with the land use operation described in the application of:

Signature	Date
Mr. Terence Hughes	October 26, 2010
Type of Land Use Operation	
Oil and Gas Exploration	
Location	
Well Site E-52, Cameron Hills, NT	

This Permit may be assigned, extended, discontinued, suspended, or cancelled pursuant to the Mackenzie Valley Land Use Regulations.

Dated at Yellowknife this 22nd day of December, 2010

Signature Chair

Signature Witness

Commencement Date
December 22, 2010

Expiry Date
December 21, 2015

ATTENTION

It is a condition of this Permit that the Permittee comply with the provisions of the *Mackenzie Valley Resource Management Act* and Regulations and the terms and conditions set out herein. A failure to comply may result in suspension or cancellation of this Permit.

Conditions Annexed to and Forming Part of Land Use Permit # MV2010A0051

Part A: Scope of Permit

1. This Permit entitles Paramount Resources Ltd. to conduct of the following activities:

    a) construction including access road, well site, and pipeline right-of-way, if necessary;
    b) drilling, testing, maintenance, and production activities;
    c) completion/re-completion; and
    d) abandonment and reclamation

    of well site E-52 located at 60°1'26.18" N and 117°25'53.52" W.

2. The Permit is issued subject to the conditions contained herein with respect to the use of land for the activities and area identified in Part A, item 1 of this Permit.

3. Compliance with the terms and conditions of this Permit does not absolve the Permittee from the responsibility for compliance with the requirements of all applicable federal, territorial, and municipal legislation.

Part B: Definitions

"Act" means the *Mackenzie Valley Resource Management Act.*

"Board" means the Mackenzie Valley Land and Water Board established under Part 4 of the *Mackenzie Valley Resource Management Act.*

"Drill Cuttings" means the solid materials, fragments of rock and other materials brought to the surface during the drilling process.

"Drill Waste" means all materials or chemicals, solid or liquid, associated with the drilling of boreholes and includes borehole cuttings.

"Greywater" means all liquid Wastes from showers, baths, sinks, kitchens, and domestic washing facilities but does not include Toilet Wastes.

"Inspector" means an Inspector designated by the Minister under the *Mackenzie Valley Resource Management Act.*

"Permeability" means the capacity to transmit water through a medium.

"Sewage" means all toilet wastes and Greywater.

"Sewage Disposal Facilities" means Sump(s) and/or Sewage collection tank(s) designed to hold Sewage.

"Sump" means a man-made pit, or natural hollow or cavity in the earth's surface used for the purpose of depositing waste material therein.

Part C: Conditions Applying to All Activities

26(1)(*a*) Location and area

1. The Permittee shall not conduct this land use operation on any lands not designated in the accepted application. — PLANS

2. The Permittee shall use an existing campsite. — CAMP LOCATION

3. The Permittee shall, accompanied by an Inspector, conduct a joint inspection of the well site, remote Sump(s), and campsite(s) prior to any clearing or other use of the site takes place. — INSPECT LOCATIONS

26(1)(*b*) Time

4. The Permittee shall advise an Inspector at least ten days prior to the completion of the land use operation of: — REPORTS BEFORE REMOVAL

   a) The plan for removal or storage of equipment and materials; and
   b) When final clean-up and restoration of the land used will be completed.

5. The Permittee's Field Supervisor shall contact an Inspector at (867) 874-6995 at least 48 hours prior to the commencement of this land use operation and shall provide in writing the following information: — IDENTIFY AGENT

   a) Name(s) of the person(s) in charge of the field operation to whom notices, orders, and reports may be served;
   b) Alternates; and
   c) All methods for contacting the above person(s).

6. The Permittee shall submit a progress report to the Board and the Inspector every 7 days during this land use operation. — PROGRESS

7. The Permittee shall, prior to spring break-up, complete all clean-up, camp closures, snow fill removals, ice bridge removals, brush and timber disposals, erosion control activities, and all other restoration required by the conditions of this permit or as ordered by an Inspector. — RESTORATION

8. The Permittee shall not conduct any overland movement of equipment and vehicles after 0800 hours local time on March 31 unless otherwise authorized in writing by an Inspector. — SHUT-DOWN DATE

9. The Board, for the purpose of this operation, designates March 31 as spring break-up, or as otherwise approved by an Inspector. — SPRING BREAK-UP

10. The Board and/or Inspector reserve the right to impose closure of any area to the Permittee in periods when dangers to natural resources are severe. — CLOSURE

26(1)(c) Type and size of equipment

11. The Permittee shall not use any equipment except of the type, size, and number that is listed in the accepted application. — ONLY APPROVED EQUIPMENT

26(1)(d) Methods and techniques

12. The Licensee shall construct winter snow roads in accordance of the methodology and guidelines identified in the *Environmental Guidelines for the Construction and Maintenance and Closure of Winter Roads in the Northwest Territories for the Department of Transportation, Government of the Northwest Territories*, 1993, and any subsequent revisions. — SNOW ROADS/ ICE ROADS

13. The Permittee shall not clear areas larger than identified in the accepted application. Where possible, the Permittee will utilize existing components to minimize additional clearing. — MINIMIZE AREA CLEARED

14. The Permittee shall remove or cut off and seal all drill casings at ground level immediately upon abandonment. — REMOVAL AND SEALING OF DRILL CASINGS

26(1)(e) Type, location, capacity, and operation of all facilities

15. The Permittee shall remove all temporary construction buildings and equipment prior to spring break-up of each year. — REMOVAL OF TEMPORARY STRUCTURES

16. The Permittee shall restrict its activities to designated right-of-ways, approved extra workspaces, existing roads and appropriate detours. — RESTRICTION OF CONSTRUCTION TRAFFIC

17. The Permittee shall ensure that the land use area is kept clean at all times. — CLEAN WORK AREA

18. The Permittee shall place rig matting under all heat lines and stationary heat generating equipment. — RIG MATTING

19. The Permittee shall avoid disturbance to the organic layer and degradation of permafrost by constructing a snow pad for the well site. — SNOW PAD

26(1)(f) Control or prevention of ponding of water, flooding, erosion, slides, and subsidence of land

20. The land use operation shall not cause obstruction to any natural drainage. — NATURAL DRAINAGE

21. The Permittee shall install erosion control structures as the land use operation progresses. — PROGRESS-IVE EROSION CONTROL

22.	The Permittee shall construct dykes and diversion ditches as authorized in writing by an Inspector.	DYKES/ DIVERSION
23.	The Permittee shall not use any material other than snow in the construction of snow fills.	SNOW FILLS
24.	The Permittee shall prepare the site in such a manner as to prevent rutting of the ground surface.	PREVENTION OF RUTTING
25.	The Permittee shall suspend overland travel of equipment or vehicles at the first sign of rutting.	SUSPEND OVERLAND TRAVEL
26.	The Permittee shall not move any equipment or vehicles unless the ground surface is in a state capable of fully supporting the equipment or vehicles without rutting or gouging.	VEHICLE MOVEMENT FREEZE-UP
27.	The Permittee shall initiate a pre-construction permafrost assessment by conducting active layer surveys and boreholes investigations if the well is to be tied-in and a trench excavated. A report of the results shall be submitted to the Board immediately upon completion.	PERMAFROST ASSESSMENT
28.	All areas affected by construction or removal activities shall be stabilized and landscaped to pre-construction profiles or as approved by an Inspector.	PRE-CONSTRUCTION PROFILES
	26(1)(g) Use, storage, handling, and ultimate disposal of any chemical or toxic material	
29.	The Permittee shall not use chemicals in connection with the land use operation that were not identified in the accepted application.	APPROVAL OF CHEMICALS
30.	The Permittee shall remove all Drill Waste containing poisonous, toxic, or persistent chemical additives to an approved disposal facility, or as approved in writing by an Inspector.	DRILL WASTE DISPOSAL
31.	The Permittee shall deposit all non-toxic Drill Cuttings into a permitted and licenced Sump.	DRILL WASTE
32.	The Permittee shall remove all Drill Waste from ice surfaces.	DRILL WASTE DISPOSAL
33.	The Permittee shall not allow any Drill Waste to spread to the surrounding lands.	DRILL WASTE CONTAINMENT
34.	The Permittee shall supply to the Board and the Inspector, prior to rig removal, a list of mud components used during the drilling operation.	MUD COMPONENTS
35.	The Permittee shall dispose of all combustible waste petroleum products by incineration or removal.	WASTE PETROLEUM DISPOSAL

36. The Permittee shall report spills immediately to the 24-hour Spill Report Line, (867) 920-8130, in accordance with instructions contained in the "NT-NU Spill Report" form N.W.T 17/52/0593. — REPORT CHEMICAL AND PETRO-LEUM SPILLS

37. The Permittee shall report spills to potentially affected communities. — REPORT SPILLS

38. The Permittee shall not construct any Sumps under this land use permit. — NO SUMP

26(1)(*h*) Wildlife and fish habitat

39. The Permittee shall minimize damage to wildlife and fish habitat in conducting this land use operation. — HABITAT DAMAGE

40. The Permittee shall use food handling and garbage disposal procedures that do not attract wildlife. — WILDLIFE/ HUMAN CONFLICT

41. The Water intake hose used on the Water pumps shall be equipped with a screen with a mesh size and screen design sufficient to ensure no entrainment or impingement of fish as outlined in Fisheries and Oceans Canada's "Freshwater Intake End-of-Pipe Fish Screen Guidelines" (1995) or subsequent approved additions. — PREVENT ENTRAINMENT

26(1)(*i*) Storage, handling, and disposal of refuse or Sewage

42. The Permittee shall dispose of all Sewage and Greywater as proposed in the accepted application. — SEWAGE DISPOSAL

43. The Permittee shall remove all non-combustible garbage and debris, including plastics, from the land use area to a disposal site as specified in the accepted application. — REMOVE GARBAGE

44. The Permittee shall use a forced-air, fuel-fired incinerator to burn all combustible garbage except plastics. — INCINERATORS

45. The Permittee shall keep all garbage and debris in a covered metal container of sufficient size on site until disposal. — GARBAGE CONTAINER

46. The Permittee shall remove all scrap metal, discarded machinery, parts, barrels, kegs, plastics, and building materials as specified in the accepted application. — REMOVE WASTE MATERIAL

26(1)(*j*) Protection of historical, archaeological, and burial sites

47. The Permittee shall not operate any vehicle within 100 metres of a known or suspected archaeological site unless otherwise approved by the Inspector. — OPERATE VEHICLE

48. The Permittee shall not knowingly remove, disturb, or displace any archaeological specimen or site. DISTURBANCE OF SITE

49. The Permittee shall immediately cease any activity which disturbs an archaeological, historical, and/or burial site and contact the Mackenzie Valley Land and Water Board at (867) 669-0506 should an archaeological site or specimen be encountered or disturbed by any land use activity. CONTACTS

50. The Permittee shall ensure that all persons working under authority of the Permit are aware of these conditions concerning land use activities around archaeological sites. NOTIFICATION TO EMPLOYEES

26(1)(*k*) Objects and places of recreational, scenic, and ecological value.

Intentionally left blank

26(1)(*l*) Security deposit

51. The Permittee shall deposit, with the Minister, a security deposit in the amount of $40,000 pursuant to section 32 of the Mackenzie Valley Land Use Regulations. SECURITY DEPOSIT

52. The Permittee shall be liable for any costs of damage over and above the amount of the security deposit. LIABILITY FOR DAMAGE

53. The security deposit must be posted prior to the commencement of the land use operation. SECURITY DEPOSIT TIMING

26(1)(*m*) Fuel storage

54. The Permittee shall not place any fuel storage containers within 100 metres of the normal high water mark of any water body, unless otherwise authorized in writing by an Inspector. FUEL BY STREAM

55. The Permittee shall not allow petroleum products to spread to surrounding lands or into water bodies. FUEL CONTAINMENT

56. The Permittee shall construct an impermeable dyke around each stationary fuel container or group of stationary fuel containers, including those which contain hydrocarbons and associated water, where any one container has a capacity exceeding 4,000 litres. DYKE FUEL CONTAINERS

57. The volume of the dyked area shall be 10 percent greater than the capacity of the largest fuel container placed therein. CAPACITY

58. A certified double-walled tank will be deemed to satisfy requirements of an impermeable dyke. DOUBLE-WALLED TANK

59. The Permittee shall ensure that adequate contingency plans and spill kits are in place, prior to commencement of operations, to respond to any potential spills. SPILL RESPONSE

26(1)(*n*) Methods and techniques for debris and brush removal

60. The Permittee shall dispose of all debris and brush by running heavy machinery over the trees and brush until they are crushed to lie flat on the ground. WELL SITE BRUSH DISPOSAL

61. The Permittee shall dispose of all debris and brush cleared from right-of-ways and access roads by: RIGHT-OF-WAY AND ACCESS ROAD BRUSH DISPOSAL

a) Windrowing the debris and brush to the side of the line or clearing; and
b) Making breaks in the windrow of at least 10 meters wide at intervals of not more than 60 meters;

62. The Permittee shall dispose of all debris and brush cleared from trails and lines by: TRAILS AND LINES BRUSH DISPOSAL

a) Pushing or felling the material into the adjacent forest; and
b) Cutting the branches from the stems and cutting the stems into lengths so that all parts of the trees felled lie flat on the ground surface.

63. The Permittee shall not clear any vegetation not identified in the accepted application unless authorized in writing by the Inspector. NO CLEARING

26(1)(*o*) Restoration of the lands

64. The Permittee shall, prior to submitting a final plan, provide the Board with a phase I environmental site assessment and a detailed site assessment. DETERMINATION OF RECLAMATION

65. The Permittee shall establish vegetation on all areas stripped of vegetation during this land use operation to a minimum of 70 percent ground cover. REVEGETATE STRIPPED AREA

66. Where seeding is done, the Permittee will use certified Canada #1 seed and the appropriate seed certificates will be made available to the Inspector. REPLANT DESIGNATED AREAS

67. Prior to the expiry date of this Permit, the Permittee shall save the organic soil stripped from the excavation area and place the organic soil over the disturbed area. SAVE AND PLACE ORGANIC SOIL

68. Spoil material excavated from trenches shall be saved by stockpiling it separately from the organic soil. SAVE SPOIL MATERIAL

69. Spoil material excavated from trenches will be backfilled by compacting and the last lifts will be crowned over the disturbed area prior to re-establishing vegetation. SPOIL MATERIAL BACKFILLED

70. The Permittee shall limit surface disturbances, such as grading and vegetation clearing, to the location as described in the accepted application, unless otherwise authorized in writing by an Inspector. MINIMIZE CLEARING

71. The Permittee shall endeavour to carry out Progressive Reclamation of areas which are abandoned prior to closure of operations. PROGRESSIVE RECLAMATION

72. Prior to the expiry date of this Permit, the Permittee shall complete all clean-up and restoration of the lands used. CLEAN-UP

26(1)(*p*) Display of permits and permit numbers

73. The Permittee shall display a copy of this Permit in each campsite established to carry out this land use operation. DISPLAY PERMIT

74. The Permittee shall use existing lines or roads to the extent identified in the accepted application. EXISTING LINES ROADS

75. The Permittee shall keep on hand, at all times during this land use operation, a copy of the Permit. COPY OF PERMIT

26(1)(q) Matters not inconsistent with the regulations

76. The Permittee shall ensure that all persons working under the authority of this Permit are aware of and will adhere to the conditions as stated in this Permit. NOTIFICATION TO ALL EMPLOYEES/ CONTRACTORS

77. The Permittee shall, while preparing access routes, make every effort to avoid covering or destroying traps or snares that may be found along these routes. TRAPS PROTECTION

78. The Permittee shall restore any trails used by trappers or hunters along access routes by slashing any and all trees that may fall across these paths or trails and by removing any other obstructions, such as snow piles or debris, that may be pushed across the trails. TRAILS RESTORATION

79. The Permittee shall display the permit number on all vehicles and equipment. DISPLAY PERMIT NUMBER

80. The Permittee shall adhere to the Operating Guidelines for Permafrost as described in Appendix II of EA03-005. OPERATING IN PERMAFROST

81. The Permittee shall adhere to the mitigative measures for minimizing disturbances resulting from the construction of the satellite and well sites as described in the Developers Assessment Report for EA03-005 on pages 64 and 65. CONSTRUCTION PRINCIPLES

82. The Permittee shall adhere to the mitigation measures for minimizing disturbances for routing as described in the Developers Assessment Report for EA03-005 on pages 65 and 66. — ROUTING PRINCIPLES

83. The Permittee shall construct pipeline crossings using the methods described in the Developers Assessment Report for EA03-005 on pages 66 and 67. — PIPELINE CROSSINGS

84. The Permittee shall adhere to the mitigative measures for minimizing the construction of gathering flowlines and water disposal pipelines using the methods described in the Developers Assessment Report for EA03-005 on pages 70-73. — CONSTRUCTION PRINCIPLES FOR FLOWLINES AND WATER DISPOSAL PIPELINES

85. The Permittee shall adhere to the mitigative measures for construction and operation of temporary campsites as described in the Developers Assessment Report for EA03-005 on pages 75-76. — TEMPORARY CAMPS

86. The Permittee shall adhere to the mitigative measures for the minimizing of ground disturbances as described in the Developers Assessment Report for EA03-005 on pages 83 and 84. — GROUND DISTURBANCE

87. The Permittee shall construct corduroy roads and fords for ATV traffic to the satisfaction of the Inspector. — CORDUROY ROADS FOR ATV TRAFFIC

88. The Permittee shall locate at least 50 percent of all proposed and planned developments in the Cameron Hills Significant Discovery License, as described in the Developer's Assessment Report from EA03-005, on areas currently disturbed (as of July 5, 2005). — DEVELOPMENT LOCATIONS

89. In order to prevent significant environmental impacts to boreal caribou, the Permittee shall not disturb an area greater than 1.8 km per km^2 in the areas encompassed by Ecodistrict 250 and 251 in the Northwest Territories.[1] — LINEAR DISTURBANCE

[1]As described in *Terrestrial Ecozone, Ecoregions and Ecodistricts of the Northwest Territories, Canada.* Ecological Stratification Working Group. 1995. National Ecological Framework for Canada. Agricultural and Environment Canada, State of the Environment Directorate, Ecozone Analysis Branch, Ottawa/Hull. Report and national map at 1:7,500,000 scale.

December 10, 2010 **Various**

Distribution List by Fax **Cameron Hills Area – Dehcho**

First Nations/ Aborginal Organizations

President Paul Herrington	Hay River Métis Government Council		hrmc@northwestel.net
President Albert Lafferty	Fort Providence Métis Council #57		867-699-4319
Chief Joachim Bonnetrouge	Deh Gah Got'ie Dene Council		867-699-3134
	West Point First Nation		**MAIL ONLY**
Chief Roy Fabian	K'atlodeeche First Nation		landsnresources@katlodeeche.com
Chief Lloyd Chicot	Ka'a'gee Tu First Nation	21	867-825-2002
Mandell Pinder, Barrister & Solicitors	Legal Counsel - Ka'a'gee Tu First Nation		604-681-0959
Grand Chief Sam Gargan	Dehcho First Nations	35	867-695-2038
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Priscilla Canadien	Fort Providence Resource Mgmt Board	27	867-699-3133
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Chief James Ahnassay	Dene Tha' First Nation		780-321-3886
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Mayor Tina Gargan	Hamlet of Fort Providence	18	867-699-3360
Mayor Allan Flamand	Enterprise Settlement Corporation		sao_enterprise@airware.ca

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If there are any errors in this distribution list, please contact our office.

Mackenzie Valley Land and Water Board
7th Floor - 4910 50th Avenue
P.O. Box 2130
YELLOWKNIFE NT X1A 2P6
Phone (867) 669-0506
FAX (867) 873-6610

FILE NUMBER: MV2010L1-0013

Date: December 23, 2010

To: Mr. Terence Hughes

Organization: Paramount Resources Ltd.

Fax: Sent Via email

Copied To: Scott Stewart, A/District Manager, South Mackenzie District, INAC
Robert Jenkins, Water Resources Division, INAC
Distribution List

From: Amanda for Willard Hagen, Chair

Number of pages including cover 32

Remarks:

Issuance – Type B Water Licence

If you have any questions please contact our office at (867) 669-0506 or email permits@mvlwb.com.

Thanks,

☒ Enclosures

☐ As requested

☐ For your information

☐ For your comment

☐ For your approval

Delivered by **Date**

☐ Courier

☐ Hand Delivered

☒ Email/Fax Dec. 23, 2010

Sent by AG

Mackenzie Valley Land and Water Board
7th Floor - 4910 50th Avenue • P.O. Box 2130
YELLOWKNIFE, NT X1A 2P6
Phone (867) 669-0506 • FAX (867) 873-6610

December 22, 2010 File: MV2010L1-0013

Mr. Terence Hughes
Paramount Resources Ltd.
4700 Bankers Hall West, 888 3rd St. SW
CALGARY AB T2P 5C5 Fax: (403) 262-7992

Dear Mr. Hughes:

Issuance of Type B Water Licence
Oil and Gas Exploration, Cameron Hills, NT

Attached is Water Licence MV2010L1-0013 granted by the Mackenzie Valley Land and Water Board (MVLWB or the Board) in accordance with the *Northwest Territories Waters Act*. A copy of this Licence has been filed on the Public Registry at the MVLWB office. Water Licence MV2010L1-0013 has been approved for a period of 5 years commencing December 22, 2010 and expiring December 21, 2015. Prior to bringing the well online for production, a type A Water Licence must be obtained.

Please read all the conditions carefully and note that in accordance with Water Licence condition B.4, a security deposit in the amount of $25,000 shall be posted with the Minister and copied to the Board prior to the start of the operation pursuant to section 17 of the *Northwest Territories Waters Act*. Submit payment of the security, made out to the **Receiver General for Canada** to: Indian and Northern Affairs Canada, Box 1500, Yellowknife, NT, X1A 2R3 Attention: Charlene Coe. Please copy to the MVLWB office prior to the start of your operation.

Also attached is a copy of the "General Procedures for the Administration of Licences in the Northwest Territories". Please review these carefully and address any questions to the Board's office. A Reasons for Decision document for these most recent applications from Paramount will be issued in the coming weeks.

.../2

This letter, with attached procedures, all inspection reports, and correspondence related thereto, is part of the Public Registry and is intended to keep all interested parties informed of the manner in which the Licence's requirements are being met. All Public Registry material will be considered if an amendment to the Licence is requested.

Your full cooperation is anticipated and appreciated. If you have any questions or concerns, please telephone (867) 669-0506 or email permits@mvlwb.com.

Yours sincerely,

Willard Hagen
Chair

Copied to: Robert Jenkins, Water Resources Division, INAC
Scott Stewart, A/District Manager, South Mackenzie District, INAC
Shannon Hayden, Regulatory Officer, MVLWB;
Distribution List

Attachment

Pursuant to the *Mackenzie Valley Resource Management Act* and Regulations, the Mackenzie Valley Land and Water Board, hereinafter referred to as the Board, hereby grants to:

Paramount Resources Ltd.
(Licensee)

of 4700 Bankers Hall West, 888 3rd St. SW, Calgary AB T2P 5C5
(mailing address)

hereinafter called the Licensee, the right to alter, divert or otherwise use water subject to the restrictions and conditions contained in the *Northwest Territories Waters Act* and Regulations made thereunder and subject to and in accordance with the conditions specified in this Licence.

Licence number:	MV2010L1-0013
Licence type:	B
Water management area:	Northwest Territories 01
Location:	60.023939 N and 117.431533 W
Purpose:	Use of water and disposal of waste
Description:	Oil and Gas exploration, development and associated activities
Quantity of water **not to be exceeded**:	Water Source 1 - 463,279.3m^3 annually Water Source 2 - <100m^3 annually Water Source 3 - no maximum Water Source 4 - 22,811.0m^3 annually
Effective date of licence:	December 22, 2010
Expiry date of licence:	December 21, 2015

This Licence issued and recorded at Yellowknife includes and is subject to the annexed conditions and schedules.

Mackenzie Valley Land and Water Board

Chair **Witness**

Part A: Scope and Definitions

Scope

This Licence entitles Paramount Resources Ltd. to use Water and dispose of Waste for industrial undertakings in oil and gas exploration and development:

a) located at 60°1'26.18" N and 117°25'53.52" W; and

b) including the activities and infrastructure, identified below, related to well site E-52:
   i. Construction of access roads, well site, and pipeline right-of-way, if necessary;
   ii. Drilling, testing, and maintenance activities;
   iii. Well completion/re-completion; and
   iv. Reclamation activities

Definitions

In this Licence: MV2010L1-0013

"Act" means the *Northwest Territories Waters Act.*

"Analyst" means an Analyst designated by the Minister under subsection 35(1) of the Act.

"Artesian Aquifer" means a Water-bearing rock stratum which, when encountered during drilling operations, produces a pressurized flow of groundwater that reaches an elevation above the Water table or above the ground surface.

"Board" means the Mackenzie Valley Land and Water Board established under Part 4 of the *Mackenzie Valley Resource Management Act.*

"Drill Cuttings" means the solid materials, fragments of rock and other materials brought to the surface during the drilling process.

"Drilling Fluids" means any liquid mixture of clay, Water or chemical additives pumped downhole.

"Drilling Muds" means Drilling Fluids that use hydrocarbons, saline solutions, or natural solutions such as water as a carrier fluid.

"Drilling Waste" means all materials or chemicals, solid or liquid, associated with the drilling process, including Drill Cuttings.

"EA03-005" means, for the purposes of this Licence, the totality of the Mackenzie Valley Environmental Impact Review Board (MVEIRB) Public Registry as established under Part 5 of the *Mackenzie Valley Resource Management Act* for this Licence application. This includes everything that was submitted by Paramount Resources Ltd. to the MVEIRB, the scope of which is consistent with the Water Licence Application.

"Engineer" means a professional Engineer registered to practice in the Northwest Territories in accordance with the *Engineering and Geoscience Professions Act*, S.N.W.T. 2006, c.16.

"Hydrocarbon-Based Drilling Muds" means Drilling Fluids that use hydrocarbons as a carrier fluid.

"Greywater" means all liquid Wastes from showers, baths, sinks, kitchens and domestic washing facilities but does not include toilet Wastes.

"Inspector" means an Inspector designated by the Minister under subsection 35(1) of the Act.

"Licensee" means the holder of this Licence.

"Minister" means the Minister of Indian Affairs and Northern Development.

"Modification(s)" means an alteration to a physical work that introduces a new structure or eliminates an existing structure but does not alter the purpose or function of the work and does not include an expansion.

"Progressive Reclamation" means those activities conducted during the operating period to modify and reclaim the land and Water to the satisfaction of the Board.

"Project" means the activities to be carried out at Cameron Hills, NT by Paramount Resources Ltd. as defined in Water License application, MV2010L1-0013.

"Regulations" means Regulations proclaimed pursuant to section 33 of the *Northwest Territories* Waters *Act*.

"Salt-Based Drilling Muds" means Drilling Fluids that use saline solutions as a carrier fluid.

"Sewage" means all toilet Wastes and Greywater.

"Sump(s)" means a man-made pit, trench, hollow or cavity on the earth's surface for the purpose of storing Water and/or Waste.

"Waste(s)" means Waste as defined by section 2 of the Act.

"Waste Disposal Facilities" means all facilities designated for the disposal of Waste.

"Wastewater" means Waste as defined by section 2 of the Act.

"Waterbody(ies)" means any area that in a normal year has water flowing or standing above ground to the extent that evidence of an ordinary high water mark is established. Wetlands contiguous to the Waterbody are considered part of the Waterbody.

"Watercourse" means any flowing body of Water.

"Water(s)" means any Waters as defined by section 2 of the Act.

"Water Use" means the use of Water as defined by section 2 of the *Northwest Territories Waters Act* and shall include freshwater from all sources.

"Water Use Fee" means a fee for the use of Water as defined by section 33 of the Act.

Part B: General Conditions

B.1 This Licence is issued subject to the conditions contained herein with respect to the taking of Water and the depositing of Waste of any type in any Waters or in any place under any conditions where such Waste or any other Waste that results from the deposits of such Waste may enter any Waters. Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the *Northwest Territories Waters Act*, or other statutes imposing more stringent conditions relating to the quantity or type of Waste that may be so deposited or under which any such Waste may be so deposited, this Licence shall be deemed, upon promulgation of such Regulations, to be automatically amended to conform to such Regulations.

B.2 Compliance with the terms and conditions of this Licence does not pardon the Licensee from the responsibility for compliance with the requirements of all applicable federal, territorial, and municipal legislation.

B.3 The Water Use Fee shall be paid annually on June 30 in conjunction with the Annual Report in accordance with the Regulations.

B.4 The Licensee, pursuant to subsection 17(1) of the Act and section 12 of the Regulations, shall post within thirty days of licence issuance, and maintain, a security deposit in the amount of $25,000.00 in a form acceptable to the Minister.

B.5 The security deposit shall be maintained until such time as it is fully or in part refunded by the Minister pursuant to section 17 of the Act.

B.6 The Licensee shall file an Annual Report with the Board not later than June 30 which shall contain the information as set out in Schedule 1, item 1, included in this Licence for the one year period ending May 31 of the year being reported.

B.7 The Licensee shall comply with the Schedules annexed to this Licence, and with any amendments to the Schedules as may be made from time to time, pursuant to the conditions of this Licence and as approved by the Board.

B.8 The attached Schedules and any compliance dates specified in this Licence may be amended at the discretion of the Board.

B.9 Meters, devices, or other such methods used for measuring the volumes of Water used and Waste discharged shall be installed, operated, and maintained by the Licensee to the satisfaction of an Inspector.

B.10 The Licensee shall adhere to mitigative measures 8 and 10 as outlined in Schedule 1, item 2, included in this Licence and as approved by the Responsible Ministers for the Paramount Resources Ltd.'s Cameron Hills Extension Project - EA03-005 and the Water-related developers commitments, as outlined in Schedule 1, item 3, included in this Licence and as described in the Mackenzie Valley Environmental Impact Review Board's "Report of Environmental Assessment and Reasons for Decision on the Paramount Resources Ltd.'s Cameron Hills Extension Project".

B.11 The Licensee shall ensure a copy of this Licence is maintained at the site of operation at all times.

Part C: Conditions Applying to Water Use

C.1 The Licensee shall obtain all Water for all oil and gas undertakings and associated activities from:

a) Water Sources 1 through 4 as indentified in Part C, item 2;
b) Watercourses, as approved by the Board, in accordance with Part C, item 3 of this Licence;
c) the Water well located at the H-03 Central Battery; or
d) as otherwise approved by the Board.

C.2 Total Annual Water Use from Water Sources 1 through 4 shall not exceed the 10% allowable allocation by Water Source as defined in the "DFO Protocol for Winter Water Withdrawal from Ice-covered Waterbodies in the Northwest Territories and Nunavut". The maximum allowable volume for each Water Source are indicated in the table below.

Source	Location	Maximum Annual Allowable Volume (m^3)
Water Source 1	60.0212 N and -117.6685 W	463,279.3
Water Source 2	60.1413 N and -117.5721 W	<100
Water Source 3	60.0460 N and -117.5369 W	No Maximum
Water Source 4	60.2282 N and -117.6336 W	22,811.0

C.3 The quantity of Water used for any purpose from Watercourses shall not exceed 10% of instantaneous flow. The Licensee shall submit to the Board, for approval, at least 30 days prior to the planned Water usage the methods used in determining instantaneous flow rates and the methods used to ensure Water withdrawal does not exceed 10% of this flow.

C.4 The Licensee shall document and report the volumes and location of all Water Sources used and include in the annual Water usage reporting of the Annual Report.

C.5 The Water intake hose used on the Water pumps shall be equipped with a screen with a mesh size and screen design sufficient to ensure no entrainment or impingement of fish, as outlined in Fisheries and Oceans Canada's "Freshwater Intake End-of-Pipe Fish Screen Guideline" (1995) or subsequent approved editions.

Part D: Conditions Applying to Waste Disposal

D.1 a) The Licensee shall submit to the Board for approval an updated Waste Management Plan no later than June 30, 2011. This plan shall incorporate the conditions found in Part D, items 5 through 17 and shall contain the information as set out in Schedule 2, item 1, included in this Licence.
b) Details for Waste sampling and monitoring shall be included in the Site-Wide Monitoring Plan identified in Part F, item 1.

D.2 If not approved by the Board, the Management Plan referred to in Part D, item 1 shall be revised and resubmitted for approval within three months of receiving notification of the Board's decision.

D.3 The Licensee shall review the Waste Management Plan annually and modify the plan as necessary, or at the direction of the Board, to reflect changes in operation and technology. Any proposed changes shall be submitted to the Board for approval.

D.4 a) The Licensee shall provide to the Board for approval a Biotreatment construction and operation plan at least 3 months prior to the construction or use of any proposed onsite Biotreatment technology. The Plan shall include, but not be limited to, the information as set out in Schedule 2, item 2, included in this Licence.
b) Details for soil and leachate sampling and monitoring shall be included in the Site-Wide Monitoring Plan identified in Part F, item 1.

D.5 If during operations, an uncontrolled flow of liquids at surface is encountered, including that produced from an Artesian Aquifer, the Licensee shall notify an Inspector and then the Board immediately. The Licensee shall collect and sample water from the flowing source at the point of discharge from the well as directed by the Inspector.

D.6 Any fluids generated to surface shall be contained and shall not be disposed of without the approval of the Inspector.

D.7 Waste, including Wastewater, shall not be discharged or decanted to any Waterbody, Watercourse or to the ground surface within 100 metres of the normal high water mark of any Waterbody or Watercourse.

D.8 Prior to the discharge or decant of Waters or Waste the Licensee shall:

a) Obtain a representative sample of the Water or Waste using the best methods available and describe in detail the prevailing conditions and how the sample was obtained;

b) Conduct the analysis in accordance with Part D, items 11 and 12;
c) Locate all discharge areas to the satisfaction of the Inspector; and
d) Indicate in writing to the Inspector and the Board;
   i. The results of the sampling and analysis;
   ii. The location of decant;
   iii. The volume of decant;
   iv. The method of decant;
   v. The direction of flow;
   vi. The location of fresh Waterbodies where the decanted effluent may go, if applicable; and
   vii. The ability of all discharge areas to absorb the decanted Waste under different conditions.

D.9 The Licensee may commence decanting upon receipt of the Inspector's approval.

D.10 Discharge and decant Waters of Sewage directed to land shall meet the following effluent quality criteria:

Parameter	**Maximum Criteria Limits**
pH	6-9
Total Suspended Solids	300 mg/L
BOD_5	360 mg/L
Faecal Coliforms	1×10^6 CFU/100ml
Oil and Grease	5 mg/L and Non-visible

D.11 All analyses shall be conducted in accordance with methods prescribed in the current edition of "Standard Methods for the Examination of Water and Wastewater" or by such other methods as may be approved by the Analyst.

D.12 The Licensee shall store Drilling Waste in on-site tanks, and recycle clear fluids prior to disposing of non-toxic Drilling Waste solids into a Sump.

D.13 The Licensee shall deposit all non-toxic Drilling Waste and casing cement in previously permitted and licenced or future permitted and licenced Sumps.

D.14 Hydrocarbon- or Salt-Based Drilling Muds are to be disposed of at an approved off-site Waste Disposal Facility.

D.15 The Licensee shall not construct any new Sumps at this well site.

D.16 The Licensee shall ensure that any unauthorized Wastes do not enter any Waters.

D.17 The Licensee shall collect all Waste from hydrostatically tested flowlines and dispose of as approved of by the Inspector.

Part E: Conditions Applying to Sediment and Erosion Control

E.1 a) The Licensee shall submit to the Board for approval a Sediment and Erosion Control Plan no later than June 30, 2011. This plan shall describe measures taken to prevent and remediate erosion that could lead to the deposit of sediment into Water. This plan shall incorporate the conditions found in Part E, items 4 through 8, consider applicable DFO operational protocols, and include, but not be limited to, the information as set out in Schedule 3, item 1, included in this Licence.

b) Details for sediment and erosion sampling and monitoring shall be included in the Site-Wide Monitoring Plan identified in Part F, item 1.

E.2 If not approved by the Board, the Sediment and Erosion Control Plan referred to in Part E, item 1 shall be revised and resubmitted for approval within three months of receiving notification of the Board's decision.

E.3 The Licensee shall review the Sediment and Erosion Control Plan annually and modify the plan as necessary, or at the direction of the Board, to reflect changes in operation and technology. Any proposed changes shall be submitted to the Board for approval.

E.4 The Licensee shall not construct any water crossings at this well site.

E.5 The Licensee shall minimize the disturbance of riparian vegetation within the immediate boundary of any Watercourse crossing to the extent practicable.

E.6 All areas affected by construction or removal activities shall be stabilized and landscaped to pre-construction profiles or as approved by an Inspector.

E.7 The Licensee shall not deposit any vegetation, soils, or other materials cleared from the site in any Waterbody. All materials shall be disposed of above the ordinary high Water mark to the satisfaction of an Inspector.

E.8 The Licensee shall construct winter snow roads in accordance with the methodology and guidelines identified in the *Environmental Guidelines for the Construction and Maintenance and Closure of Winter Roads in the Northwest Territories for the Department of Transportation, Government of the Northwest Territories*, 1993, and any subsequent revisions.

Part F: Conditions Applying to Monitoring

F.1 The Licensee shall submit to the Board for approval by June 30, 2011 a plan for a Site-Wide Monitoring Program that meets the following objectives and satisfies Schedule 4, item 1.

a) Describe the procedures used to assess the efficacy of impact mitigation measures that are used to minimize the effects of the Project on Water;
b) Assess the efficacy of impact mitigation measures that are used to minimize the effects of the Project on Water;
c) Identify the need for additional impact mitigation measures to reduce or eliminate Project-related effects on Water; and
d) Identify additional impact mitigation measures to reduce or eliminate Project-related effects on Water.

F.2 If not approved by the Board, the Site-Wide Monitoring Program referred to in Part F, item 1 shall be revised and resubmitted for approval within three months of receiving notification of the Board's decision.

F.3 The Site-Wide Monitoring Program shall be implemented as and when approved by the Board.

F.4 The Licensee shall review annually and update, if necessary or at the direction of the Board, the plan for the Site-Wide Monitoring Program to reflect work planned for the upcoming year and submit the updated plan for approval. Only the updated sections require approval unless otherwise indicated by the Board.

F.5 The Licensee shall submit to the Board on an annual basis a report summarizing the results of monitoring completed, including but not limited to the information identified in Schedule 4, item 2, included in this Licence.

Part G: Conditions Applying to Modifications

G.1 The Licensee may, without written approval from the Board, carry out Modifications to the Water Supply and Waste Disposal Facilities provided that such Modifications are consistent with the terms of this Licence and the following requirements are met:

a) The Licensee has notified the Board in writing of such proposed Modifications at least 60 days prior to beginning the Modifications;
b) Such Modifications do not place the Licensee in contravention of either the Licence or the Act;
c) The Board has not, during the 60 days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than 60 days; and
d) The Board has not rejected the proposed Modifications.

G.2 Modifications for which all of the conditions referred to in Part G, item 1 have not been met may be carried out only with written approval from the Board.

G.3 The Licensee shall provide to the Board as-built plans and drawings of the Modifications referred to in this Licence within 90 days of completion of the Modifications.

Part H: Conditions Applying to Spill Contingency Planning

H.1 The Licensee shall, by June 30, 2011, submit to the Board for approval an updated Spill Contingency Plan in accordance with Indian and Northern Affairs Canada's 2007 "Guidelines for Spill Contingency Planning".

H.2 If not approved by the Board, the Contingency Plan referred to in Part H, item 1 shall be revised and resubmitted for approval within three months of receiving notification of the Board's decision.

H.3 The Licensee shall review the Contingency Plan annually and modify the plan as necessary, or at the direction of the Board, to reflect changes in operation and technology. Any proposed changes shall be submitted to the Board for approval.

H.4 If, during the period of this Licence, an unauthorized discharge of Waste occurs, or if such a discharge is foreseeable, the Licensee shall:

e) Employ the appropriate contingency plan;
f) Report the incident immediately via the 24-hour NWT Spill Report Line where substances and quantities satisfy Schedule 5, item 1. Currently the number is (867) 920-8130; and
g) Report in accordance with spill reporting protocols existing in the NWT.

H.5 Lost circulation of Drilling Muds shall be reported to the Inspector and the Board at the end of drilling.

Part I: Conditions Applying to Closure and Reclamation

I.1 a) The Licensee shall, six months prior to the closure of this well site, submit to the Board for approval, a Closure and Reclamation Plan in accordance with Schedule 6, item 1, included in this Licence.
b) Details for closure and reclamation sampling and monitoring shall be included in the Site-Wide Monitoring Plan identified in Part F, item 1.

I.2 The Licensee shall revise the plan referred to in Part I, item 1 if not approved. The revised plan shall be submitted to the Board for approval within three months of receiving notification of the Board's decision.

I.3 Notwithstanding the time schedule referred to in the Closure and Reclamation Plan, the Licensee shall endeavour to carry out Progressive Reclamation.

I.4 The Licensee shall complete the reclamation work within the time schedule specified in the plan or as subsequently revised and approved by the Board.

Mackenzie Valley Land and Water Board

Chair **Witness**

Schedule 1: General Conditions

1. The Annual Report referred to in Part B, item 6 shall include, but not be limited to, the following:
   a) An As-Built map identifying well site E-52 and associated infrastructure, a list of wells drilled during the year, as well as a summary of the operation to date;
   b) The monthly and annual quantities in cubic metres of fresh Water obtained from each source and an update of the expected amount of Water required from each source for the upcoming season;
   c) The volume of each Waste generated by source, the disposal location, and for those Wastes disposed of in multiple locations, the volume disposed of in each location;
   d) A list of all drill additives and products used with a comparison to the PSAC Mud List with an accompanying examination of associated toxicological information;
   e) Summary of construction, Modifications or maintenance work carried out on pipelines, right-of-ways, the Permanent Camp or Battery Facilities, including all associated structures;
   f) Identification of any new areas susceptible to erosion;
   g) Locations of encountered permafrost;
   h) A description and performance evaluation of each preventative and mitigative measure implemented to address erosion control issues and an assessment of any re-vegetation programs;
   i) Volume of treated soil removed from the Biotreatment Facility and analytical results for soil chemistry and particle size analysis, if applicable;
   j) Results of any leachate testing and analysis and how leachate is discharged or stored from the Biotreatment Facility, if applicable;
   k) Identification or update of all fuel storage locations and containment details;
   l) A list of any spills and unauthorized discharges;
   m) An update on commitments outlined in Schedule 1, item 3;
   n) A description of any new technologies being researched;
   o) Any updates or revisions to the approved Spill Contingency Plan;
   p) Any updates or revisions to the approved Waste Management Plan;
   q) A summary of any closure and reclamation work completed during the year and an outline of any work anticipated for the next year; and
   r) Any other details on Water Use or Waste disposal requested by the Board by November 1 of the year being reported.

2. Final Mitigation Measures 8 and 10 as Approved by the Responsible Ministers and the National Energy Board for the Paramount Resources Ltd. Cameron Hills Extension Project – EA03-005:

Measure 8

The Review Board recommends that Paramount modify its spill reporting procedures for the Paramount Cameron Hills developments to include notice of spill occurrences to potentially affected communities. Spills must be reported according to the Northwest Territories Spill Reporting Procedures.

Measure 10

The Review Board recommends that Paramount, in the case of an isolated water crossing, maintain downstream water flow at pre-in-stream work levels. All in-stream work must be completed as expediently as possible to mitigate disruption of fish movements.

3. Developer's Commitments from the Mackenzie Valley Environmental Impact Review Board's Report of Environmental Assessment and Reasons for Decision on the Paramount Cameron Hills Extension Project EA03-005:

DAR p.4	Pipelines crossing the Cameron River and its major tributary, above ground crossings are constructed by hanging the pipe from bridges. Secure crossings-leak detection.
DAR p.58	Paramount prefers to rely on natural encroachment to revegetate disturbed areas. When natural Encroachment is not progressing quickly or in especially erosion prone areas seeding will be undertaken. Only certified Canada #1 seed will be used. The seed mix will be Regreen sheet X wheatgrass 15%, Awned wheatgrass 25%, Fall rye 50%, Slender wheatgrass 10%.
DAR p.58	The local communities will be notified when the published Project updates so that anyone using the area will be aware of construction activities and to ensure appropriate avoidance or precautionary measures can be implemented.
DAR p.59	Paramount's operating guidelines for working in permafrost areas will be adhered to when areas of permafrost are encountered.
DAR p.60	Equipment operators will be careful to avoid gouging or otherwise disturbing banks or lake/stream bottoms.
DAR p.60	At no time shall any waste fluid, treated or otherwise, be discharged to surface waters.
DAR p.62	Water required for winter road construction will be obtained from the preferred water source Lake and/or the drilled water wells.
DAR p.63	Ice bridges as described in the DOT handbook (GNWT 1993) will be constructed over those drainages not frozen to the bottom at the time of access construction. This is expected to be relevant to the crossings of the Cameron River and its major tributaries.
DAR p.63	Special attention will be made to avoid introducing foreign material into the stream.
DAR p.63	Clean snow and ice will be used to construct the ice bridges to the extent feasible. Should any soil or other materials be accidentally introduced onto the ice of the watercourse, it will be removed before spring break-up so that no deleterious materials are allowed into the water. Depending on snow conditions, logs may be placed in the channel to facilitate ice bridge construction to ensure safe vehicle operation. If this method is used, all logs would be removed prior to spring break-up.
DAR p.63	The crossing will either be removed completely, or "V" notched to allow flow during break-up.
DAR p.63	No refuelling of vehicles will be allowed within 100m of any watercourse.
DAR p.63	If banks of a drainage are disturbed during construction, a pre-disturbance bank profile will be re-established which may include using rock riprap, organic cribbing, bundled logs, or other stabilization methods.

DAR p.66-67	Pipeline crossings will be done by one of the following methods: 1. Open Cut; 2. Aerial Crossing; 3. Horizontal Directional Drilling; or 4. Isolated. Details can be found on page 66-67.
DAR p.68	Mitigative measures for minimizing disturbance at water crossings include: 1-10. Details can be found on page 68.
DAR p.69	The flowlines will be hydrostatically tested using methanol.
DAR p.70	Paramount will install heavy-walled pipe where the Inspector identifies permafrost.
DAR p.74-75	Mitigative measures for minimizing disturbances associated with the use of proposed water sources include: 1-7. Details can be found on page 74-75.
DAR p.80	All snow/ice fill will be constructed using clean snow only; no dirt or other material that could adversely affect the watercourse will be used.
DAR p.80	All watercourses will be crossed at a 90-degree angle where the shoreline slope is shallow.
DAR p.81	Vibrators will be used on ice only where lakes are frozen to bottom otherwise they will be stacked on either side of the waterbody.
DAR p.84	Where the disturbance track expands to greater than 2m in width, a temporary log bridge may be placed over the crossing or gravel may be deposited to stabilize the ford.
DAR p.86	Mitigative measures for minimizing disturbances from waste handling include: 1-6. Details can be found on page 86.
DAR p.87	Mitigative measures for minimizing disturbances from Drilling Fluid include: 1-5. Details can be found on page 87.
DAR p.88	Sewage and greywater will be stored in camp sumps and treated with lime, as required.
DAR p.88	Combustible garbage will be burned in a diesel-fired incinerator.
DAR p.88	Non-combustible garbage will be contained in garbage bins and removed to an approved landfill.
DAR p.88	Garbage will be collected and stored properly.
DAR p.88	Sewage sumps will be treated with lime, backfilled and compacted.
DAR p.97	Sumpless drilling techniques will be used for drilling operations at Cameron Hills.
DAR p.193	Crossings of larger waterbodies will also use snow and ice bridges or existing bridges wherever feasible.
DAR p.193	Surface water hydrology is related to increased runoff potential in cleared areas as compared to forested areas. This effect will be minimized by leaving ground vegetation intact.
DAR p.193	Standard mitigation measures such as diversion ditches and berms, silt fence installation and revegetation will be implemented in areas of erosion potential.
DAR p.193	Water will be withdrawn from identified water source lakes to aid in the construction of snow/ice surface layer for wellsites and winter access roads, to provide make-up water for well Drilling Fluid, and for well control.
DAR p.193-194	Drilling Wastes will be stored in on-site tanks, and waste volume will be minimized by re-using clear fluids.

DAR p. 194	Drilling Waste solids will be disposed of by mix-bury-cover methods on-site or at remote pit locations to be determined by suitable soil and groundwater conditions.
DAR p. 194	Waterbody crossings will be located in areas with minimum topographic relief to minimize impacts to banks.
DAR p.194	Should flow be present at the time of crossing, an effective isolation method (dam/pump) or trenchless technique (horizontal directional drill) would be used.
DAR p.194	Waterbody bed material will be replaced in such a manner as to ensure that the substrate replaced onto the trench will not dam water.
DAR p.195	Water withdrawal during the operations phase will be limited to access road maintenance and potential amine make-up water if fuel sweetening is required.
DAR p.195	During open water conditions, large waterbodies, such as the Cameron River and larger tributaries, will be crossed via permanent bridges and small waterbodies will be forded.
DAR p.195	Bridge and plank installation will be used where appropriate and feasible to reduce sediment disturbance and bank deterioration.
DAR p.209	Camp sumps and Drilling Waste remote pits will be installed with low permeability sediments (silts and clays) to minimize potential for vertical migration of pit or sump fluids to any shallow aquifers.
DAR p.209	In the event of accidental surface contamination, Paramount will implement the spill response plan according to steps described on page 209.
DAR p.211	Paramount will take steps to mitigate potential impacts associated with pits including location, low permeability sediments or installation of a liner.
DAR p.211	Chemicals will be stored in accordance with legal and regulatory requirements.
DAR p.256	In order to mitigate impacts best management practices will be used for erosion and sediment control and site reclamation near the waterbody crossing and by the use of temporary or permanent bridge crossings.
DAR p.301	DFO guidelines will be followed to protect the potential fish habitat in water source lakes.
Transcripts Vol. 1 p.62:23-63:1	Paramount will commit to continue to submit on an annual basis water summary reports to the Mackenzie Valley Land and Water Board and also to DFO that summarizes water use per source location.

Schedule 2: Conditions Applying to Waste Disposal

1. The Waste Management Plan referred to in Part D, item 1 shall include, but not be limited to, the following:

   a) A definition of Waste management goals and objectives including environmental, social and regulatory factors;
   b) Identification and description of existing and proposed locations for Waste management activities including site physical, surface and subsurface characteristics, drainage patterns, substrate absorption rates, and geotechnical characteristics;
   c) Identification of all Waste types including a description of Waste characteristics, the source of generation, estimated volume/mass to be produced, and the potential environmental effects;
   d) Description of how Waste reduction techniques will be considered for each Waste type. That is, source reduction as the most preferred method, followed by reuse, recycle/recovery, treatment, and the least preferred method being disposal;
   e) A description and rationale for the method(s) that will be employed to manage each Waste type;
   f) A description of the activities and related infrastructure involved in each Waste type management;
   g) An engineering design report with any supporting engineered drawings that accounts for all life stages of applicable infrastructure, from construction, operation, to closure and reclamation. Where applicable, the infrastructure design report is to include details of construction specifications and QA/QC requirements, as well as monitoring requirements for each life stage of the infrastructure. The engineering design report for Waste infrastructure must include any pertinent information from studies that support the design and operation with reference to any supporting documents.;
   h) Details regarding the quality of effluent to be deposited; and
   i) A description of Sewage generation volumes.

2. The Biotreatment Construction and Operation Plan referred to in Part D, item 4 shall include, but not be limited to, the following:

   a) Details on the location of the Biotreatment facility;
   b) The expected amounts of contaminated soils and snow to be contained and treated;
   c) Sources and characteristics of the contaminated soils;
   d) A contingency plan in case volumes exceed expectations;
   e) Details for leachate management;
   f) Any planned usage of treated soils;
   g) Acceptable soils types;
   h) Details on treatment processes and soil manipulation processes (frequency and mode of tillage, frequency and extent of additives);
   i) Remediation standards; and
   j) Methods and frequency of inspection and maintenance details;

Schedule 3: Conditions Applying to Sediment and Erosion Control

1. The Sediment and Erosion Control Plan referred to in Part E, item 1 shall include, but not be limited to:

    a) A collection of all existing erosion prevention, control and mitigation designs plans;
    b) The criteria used to asses areas within the Project site that are sensitive to erosion and/or sedimentation;
    c) A theoretical discussion on preventative and mitigative measures employed and their related performance evaluations; and
    d) A discussion of sediment and erosion control contingency plans.

Schedule 4: Conditions Applying to Monitoring

1. The Site-Wide Monitoring Program referred to in Part F, item 1 shall include, but not be limited to:

    a) A summary of the potential impacts to Water from Project-related activities including, but not limited to:
        i. runoff from disturbed land surfaces,
        ii. contamination of Water due to decant or discharge of Wastewater,
        iii. erosion, including the degradation of permafrost, at Watercourse crossings, discharge points and other disturbed areas that could lead to the deposition of sediments into Water, and
        iv. spills.
    b) A summary of mitigation measures in place to prevent, reduce or manage the potential impacts to Water from Project-related activities;
    c) A map and attached table or detailed legend illustrating monitoring and sampling locations;
    d) A description, including a detailed rationale, of the type of monitoring required to achieve the objectives listed in Part F, item 1. This description shall include, but not be limited to, the type of work being carried out, the particular type of infrastructure being monitored, and the particular phase of the work or infrastructure being monitored (e.g. construction, operation, closure, etc);
    e) Description of monitoring protocols, methodologies, parameters and frequency specific to each monitoring type identified above in Schedule 4, item 1 c);
    f) A summary of baseline data including:
        i. baseline data collected to date;
        ii. identification of baseline data gaps; and
        iii. description of methods for filling in baseline data gaps or methods for approximating baseline conditions if necessary;
    g) Description of quality assurance and quality control measures followed for each monitoring type. This may include training provided to on-site staff carrying out specific types of monitoring;
    h) A description of the adaptive management strategy that will be employed to respond to the results of the Site Wide Monitoring Program;
    i) Link to Contingency Planning (for spills etc.); and
    j) Any other items as directed by the Board.

2. The Annual Monitoring Report shall include, but not be limited to, the following information:

   a) A summary of monitoring activities conducted under the Site-Wide Monitoring Program,
   b) Updated maps illustrating all sampling as carried out;
   c) Summaries of all data and information generated under the Site-Wide Monitoring Program in an electronic and printed format acceptable to the Board;
   d) An analysis and interpretation of the results;
   e) An evaluation of any identified environmental changes relative to baseline conditions that occurred as a result of the Project;
   f) An evaluation of the overall effectiveness of the Site-Wide Monitoring Program to date;
   g) Recommendations for refining the Site-Wide Monitoring Program to improve its effectiveness as required;
   h) Description of any adaptive management measures that will be undertaken to address monitoring results.

Schedule 5: Conditions Applying to Spill Contingency Planning

1. Spill amounts reportable to the NWT/NU 24-hour Spill Report Line (NWT/NU Spills Working Agreement, April 2008).

TDG Class	Substance	Reportable Quantities for NWT/NU 24-Hour Spill Reports
1.0 2.3 6.2 6.2 7.0 None	Explosives Compressed gas (toxic/corrosive) Infectious substances Sewage and wastewater (unless otherwise authorization) Radioactive materials Unknown substance	Any amount
2.1 2.2	Compressed gas (flammable) Compressed gas (non-corrosive, non-flammable)	Any amount of gas from containers with a capacity greater than 100 L
3.0	Flammable liquid	≥ 100 L
4.1 4.2 4.3	Flammable solid Substances liable to spontaneously combustible Water reactant substances	≥ 25 kg
5.1	Oxidizing substances	≥ 50 L or 50 kg
5.2 9.0	Organic peroxides Environmentally hazardous substances intended for disposal	≥ 1 L or 1 kg
6.1 8.0 9.0	Toxic substances Corrosive substances Miscellaneous Products, Substances or Organisms	≥ 5 L or 5 kg
9.0	PCB mixtures of 5 or more parts per million	≥ 0.5 L or 0.5 kg
None	Other contaminants, e.g., crude oil, drilling fluid, produced water, waste or spent chemicals, used or waste oil, vehicle fluids, wastewater, etc.	≥ 100 L or 100 kg
None 3.0 None	Sour natural gas (i.e., contains H_2S) Sweet natural gas Flammable liquid Vehicular fluid	Uncontrolled release or sustained flow of 10 minutes or more ≥ 20 L When released on a frozen water body used as a working surface
Report releases/potential releases of any size that: • are near or into an open water body; • are near or into a designated sensitive environment or sensitive habitat; • pose an imminent threat to human health or safety; or • pose an imminent threat to a listed species at risk or its critical habitat.		

Note: L = litre; kg = kilogram; PCB = polychlorinated biphenyls; ppm = parts per million.

Schedule 6: Conditions Applying to Closure and Reclamation

1. The Closure and Reclamation Plans referred to in Part I, item 1 shall include, but not be limited to, the following:

    a) Project description;
    b) Closure and end land use goals, objectives, and criteria;
    c) Community engagement associated to closure and reclamation planning;
    d) Identification of the Project environment including natural runoff Waters from the development site, the natural physiography, chemistry, biology and traditional environments and consideration of the impacts of any changes in these environments;
    e) Requirements for closure and reclamation including but not limited to:
        i) The restoration of natural drainage and the restoration of stream banks at the operation site(s);
        ii) The potential for groundwater contamination and any associated remediation plans;
        iii) The plans for re-vegetation of disturbed sites;
        iv) Identification of any facilities or areas which may have been affected by development such that potential pollution problems exist and any associated remediation plans;
    f) A phased approach and implementation schedule for closure and reclamation;
    g) Maps delineating all disturbed areas, borrow material locations, and site facilities; and
    h) A proposal identifying measures by which reclamation costs will be financed by the Licensee upon closure.

Annex A Schedule

Supplemental information to be submitted by Licensee as required through Licence Conditions

Licence Condition	Report Title/Require Action	Timeline for Submission
B.3	Water Use Fee	June 30 each year
B.4	Security Deposit	Within 30 days of Licence activities
B.6 (Schedule 1, item 1)	Annual Report	June 30 each year
C.3	Method for Determining Watercourse Instantaneous Flow Calculations	30 days prior to the use of Water from any Watercourse
D.1 (Schedule 2, item 1)	Waste Management Plan	June 30, 2011
D.3	Waste Management Plan Review	Annually
D.4 (Schedule 2, item 2)	Biotreatment Construction and Operation Plan	3 months prior to construction
D.5	Uncontrolled flow analysis	Immediately following the flow
D.8	Decant analysis and reporting	As soon as possible
E.1 (Schedule 3, item 1)	Sediment and Erosion Control Plan	June 30, 2011

E.3	Sediment and Erosion Control Plan Review	Annually
F.1 (Schedule 4, item 1)	Site-Wide Monitoring Program	June 30, 2011
F.4	Site-Wide Monitoring Program Review	Annually, if necessary
F.5 (Schedule 4, item 2)	Annual Site-Wide Monitoring Program Report	Annually
G.1	Notification of Modifications	60 days prior to beginning work
G.3	As-built plans and drawings of Modifications	Within 90 days of completion
H.1	Spill Contingency Plan	June 30, 2011
H.3	Spill Contingency Plan Review	Annually
H.5	Loss of circulation Drilling Muds	End of drilling
I.1 (Schedule 6, item 1)	Closure and Reclamation Plan	6 months prior to component closures

Mackenzie Valley Land and Water Board

Chair

Witness

General Procedures for the Administration of Licences Issued Under the *Northwest Territories Waters Act* in the Northwest Territories

1. At the time of issuance, a copy of the Licence is placed on the Public Registry in the office of the Mackenzie Valley Land and Water Board (MVLWB or the Board) in Yellowknife and is then available to the public.

2. To enforce the terms and conditions of the Licence, the Minister of Indian Affairs and Northern Development has appointed Inspectors in accordance with subsection 35(1) of the *Northwest Territories Waters Act.* The Inspectors coordinate their activities with staff of the MVLWB. The Inspector responsible for Licence MV2010L1-0013 is located in Fort Smith, NT.

3. To keep the MVLWB and members of the public informed of the Licensee's conformity to the Licence's conditions, the Inspectors prepare reports which detail observations on how each item in the Licence has been met. These reports are forwarded to the Licensee with a covering letter indicating what action, if any, should be taken. The Inspection Reports and Cover Letters are placed on the Public Registry, as are any responses received from the Licensee pertaining to the Inspection Reports. It is therefore of prime importance that you react in all areas of concern regarding all inspection reports so that these concerns may be clarified.

4. It is the responsibility of the Licensee to apply to the MVLWB for a new licence. The past performance of the Licensee, new documentation and information, and points raised during a public hearing, if required, will be used to determine the terms and conditions of any new licence. Please note that if the Licence expires and another has not been issued, then Water and Waste disposal must cease, or you, the Licensee, would be in contravention of the *Northwest Territories Waters Act.* It is suggested that an application for a new licence be made at least eight months in advance of the Licence's expiry date.

5. If, for some reason, Licence # MV2010L1-0013 requires amendment, a public hearing may be required. You are reminded that applications for amendments should be submitted as soon as possible to provide the MVLWB ample time to complete the amendment process. The process may take up to six months or more depending on the scope of the amendment requested.

.../2

6. Specific clauses of your Licence make reference to the Board, Analyst or Inspector. The contact person, address, phone, and fax number of each is:

Mackenzie Valley Land and Water Board:

Public Registry Clerk
Mackenzie Valley Land and Water Board
7th Floor - 4922 48 Street
P.O. Box 2130
YELLOWKNIFE NT XIA 2P6
Phone (867) 669-0506
Fax (867) 873-6610

Analyst:

Analyst
Water Laboratory
Indian and Northern Affairs Canada
P.O. Box 1500
4601- 52nd Avenue
YELLOWKNIFE NT XIA 2R3
Phone (867) 669-2780
Fax (867) 669-2718

Inspector:

Inspector
Indian and Northern Affairs Canada
136 Simpson Street
PO Box 658
FORT SMITH NT X0E 0P0
Phone (867) 872-2558
Fax (867) 872-3472

December 10, 2010 **Various**

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