



## ABANDONMENT PROGRAM

### OROGO LEVEL I WELLBORE

PARAMOUNT et al LIARD M-25

WID: 1867

POTENTIAL H<sub>2</sub>S: 0.5%

POTENTIAL CO<sub>2</sub>: 20%

## PROCEDURE APPROVAL & DISTRIBUTION

DATE: October 12, 2022  
WELL NAME: PARAMOUNT et al LIARD M-25  
UWID: 300/M-25-6030-12330/4  
OPERATIONS AREA: Liard West PROVINCE: NWT  
OBJECTIVE: Abandon wellbore in accordance with OROGO guidelines.  
PARAMOUNT WI (%): 88%  
Cost Center:  
AMOUNT:

### REGULATORY APPROVALS:

REQUIRED: YES

TYPE: OROGO Operations Authorization and ACW.

AUTHORIZATION RECEIVED by: DATE:

PROCEDURE COMPLIES WITH CONDITIONS OF AUTHORIZATION: YES  NO

TYPE OF WORKOVER: (Abandonment):

### PROCEDURE COMPLIES WITH PARAMOUNT RESOURCES LTD. POLICIES ON:

- 1) Paramount Well Control Manual
- 2) AER Servicing **BOP Class III** well.

DISTRIBUTION: FIELD CALGARY: Well Files

PREPARED BY: Dinah Asamoah-Barnieh DATE: October 12, 2022

REVIEWED & APPROVED BY:  DATE: October 19, 2022  
Tim Wood Manager (ARO/Construction)

## ABANDONMENT PROGRAM

### OBJECTIVE

Abandon Level 1 wellbore in accordance with ACW and OROGO guidelines. Cut and cap wellbore.

### SAFETY

A safety meeting is to be held with all service company personnel prior to each job. Wellsite supervisor must notify Contractors of known hazards of which Contractor(s) may be unaware. Wellsite supervisor must ensure that workers are aware of their responsibilities and duties under OH&S regulations and that workers comply with regulations. All service companies supplying materials will review Material Safety Data Sheets at this meeting for all products supplied and maintain these Material Safety Data Sheets available for worker's examination on location in compliance with WHIMIS regulations. All safety meetings will be recorded on the Paramount daily report and on the daily tour sheet.

Whenever possible, plan and conduct all workover procedures in a manner which will avoid the mixing of air & hydrocarbons in the well bore and connected surface piping. If mixing does occur, purge prior to pressurizing or exposing mixture to any other possible source of ignition.

Rig anchor locations if required will be approved by Paramount Wellsite Supervisor prior to installation.

### REGULATIONS

All applicable regulations, including, but not limited to the specific approved OROGO ACW approval, OROGO Well Suspension and Abandonment Guidelines, Oil and Gas Occupational Safety and Health Regulations (NWT) and Occupational Health and Safety (OHS) Regulations (NWT) are to be strictly adhered to. Written instructions must be posted in doghouse or other conspicuous area prior to the wellsite supervisor leaving the lease. Wellsite supervisor must designate, in writing a competent person to carry out principal contractor's responsibilities. All verbal notifications and approvals from government regulatory agencies will be recorded on Paramount's daily report tour sheet. The name of the individual contacted and the subject matter of approval or notification should be recorded on same.

Paramount shall provide all staff and contractors for this program with the OROGO 24-hour incident reporting phone number (867-445-8551) prior to commencing any work or activity.

Paramount shall submit to OROGO an updated operator contact list for this program prior to any work or activity by email at [orogo@gov.nt.ca](mailto:orogo@gov.nt.ca).

Paramount shall submit to OROGO certificates and inspection documents for any service rig, well control and associated equipment (including boilers) at least 10 days prior to the rig commencing work by e mail at [orogo@gov.nt.ca](mailto:orogo@gov.nt.ca).

Paramount shall submit to OROGO all reports required under the Oil and Gas Drilling and Production Regulations in a timely manner to OROGO by email at [orogo@gov.nt.ca](mailto:orogo@gov.nt.ca).

Paramount shall submit to OROGO, completed Change of Well Status form 30 days after the service rig release date or when the abandonment operation has been finished.

### WORK ORDERS/FIELD TICKETS



Delivery and field tickets for all work, services performed, or materials purchased must be signed by a Company wellsite supervisor. Record the AFE number and well location on all purchase and work tickets.

### **MATERIAL TRANSFERS**

All materials shipped to this location that are not used must be transferred to an appropriate warehouse point. Transfers of any tubular materials must include complete tally. Company wellsite supervisor will complete such transfers and forward both copies to Calgary office for approval and further handling.



# PARAMOUNT et al LIARD M-25 ABANDONMENT PROGRAM

## WELL DATA AND WELLBORE CONFIGURATION

### WELL DATA:

**Surface Location:** LAT: 60.41416 deg N, LONG: 123.58830 deg W  
**Bottomhole Location:** LAT: 60.42743 deg N, LONG: 123.59429 deg W  
**UWI:** 300/M-25-6030-12330/1  
**Profile:** Vertical  
**BGWP:** 600m GL (Default)  
**WID#:** N1867  
**Spud Date:** September 29, 1999  
**Rig Release Date:** December 21, 2000  
**KB:** 917.8m  
**GL:** 910.6m  
**KB-GL:** 7.2m  
**PBTD Original:** 3770.0m KB  
**TD:** 3382.3m KB

**CONDUCTOR:** Size: 508.0 mm set @ 11.0 m

**SURFACE:** 444.5 mm to 852 mKB  
**Drilled directionally from a kick off point at 300 mKB to an inclination of 26° at 852 mKB.** 339.7 mm, 101.19 kg/m, K-55, BT&C set at 849 mKB. Cemented with 80 t 'G' cement + 0.8% S-1 + 1.0% prehydrated gel followed by 15 t 'G' cement. 10.0 m<sup>3</sup> cement returns to surface.

**PRODUCTION:** 311 mm to 3446 m MD  
**Drilled directionally from the surface casing shoe to an inclination of approximately 31° at casing point.** 244.5 mm, L-80, BT&C 69.9 kg/m casing from surface to 1551 mKB and 64.94 kg/m from 1551 - 3438 mKB. Cemented 75 t 'G' cement + 0.5% D-65 + 0.2% D-46 + 2.0% D-20 + 0.2% D-167 + 0.5% D-28 followed by 35t 'G' + 0.6% D-167 + 0.5% D-28 + 0.35% D-66 + 0.2% D-46.  
**Logged cement top at 960 m.**

**TUBING:** 177.8 mm 43.16 kg/m L-80 Hydril 563 tubing

**OPENHOLE:** 216 mm to 3770 mMD (3374 mTVD). **Drilled directionally from the casing shoe to an inclination of approximately 39° at TD.**

#1: Nahanni: 3450 - 3452 mKB  
Cut: 2.0 m  
Rec: 1.5 m fractured Dolomite

#2: Nahanni: 3452.0 - 3456.8 mKB



Cut: 4.8 m  
Rec: 4.8 m fractured Dolomit

DST's: None

## **PROGRAM SUMMARY**

- MIRU service rig and associated equipment.
- Read and record SICP, SITP
- Check for SCVF & H2S
- Stump test & Function test Class III BOPs.
- Kill well with clean fresh water
- Remove wellhead and Install Class III BOPs (11" 5000lbs BOP required). Pressure Test BOPs 1400kpa low and 35000kPa high.
- Makeup milling assembly on Coil Tubing and run-in hole to mill out existing Weatherford permanent bridge plugs set @ 75m KB. Circulate hole clean. POOH w/ milling assembly
- Run in hole with an inside cutter on 73mm workstring and cut off 177.8mm tubing @ approximately 3288 mKB above the existing RWK permanent bridge plug @ 3290m KB. Circulate to fresh water. POOH w/ cutter
- Pull and lay down 177.8mm tubing string.
- RIH 244.5mm permanent bridge plug and set above cut tubing @ 3288m KB. Pressure test Bridge Plug 7MPa x 10min. Spot 4m<sup>3</sup> cement w/ 73mm tubing (cap Bridge Plug with 30m cement) on top of Bridge Plug. Pull out of hole. RIH and tag cement top. A minimum of 1,800 daN is required. Record set down weight and depth on tour sheet and Daily Report. Pull out of the hole.
- Based on existing logs interpretation, perform remedial squeezes as required for hydraulic isolation.
- Ensure no SCVF exist
- Rig Out
- Cut & Cap wellbore



**Open Hole Section:**                      **Muskwa:** 3438 mMD - 3770 mMD  
 Estimated BHP:                                23000 kPa (Jan 2008 - Estimated)  
 Estimated H<sub>2</sub>S Content:                    0.0% (August 2021 – Well Inspection Report)  
 Estimated CO<sub>2</sub> Content:                 20% (August 2004 - Estimated)  
 Estimated Temperature:                    160° C (August 2004 - Estimated)

**Formation Tops**  
**geoSCOUT Ref Elev(m):                +918.0**

Formation	TVD (m)	Elev (m)	MD (m)	Formation	TVD (m)	Elev (m)	MD (m)
Mbesa_r_U	954.3	-36.3	1001.9	Dnahanni	3094.7	-2176.7	3415.2
Mexshaw	1887.8	-969.8	2053.9	/FAULT/	3377.3	-2459.3	3762.9
Dbesa_rvL	2315.1	-1397.1	2534.0	Dmuskwa	3377.3	-2459.3	3763.0
Dmuskwa	2885.0	-1967.0	3171.2				

**Current Well Operation Summary:**

On March 19, 2008, Paramount Resources Ltd. moved Concord Well Servicing rig # 101 onto Paramount et al Liard M-25 to suspend the well. Service rig operations were completed on March 25, 2008. A chronological summary of the suspension operations follows:

<b>19/3/2008:</b>	Moved on and rigged up service rig.
<b>20/3/2008:</b>	Finish rigging up service rig. Bleed casing and tubing to test vessel. Monitor casing and tubing while waiting on equipment.
<b>21/3/2008:</b>	Removed the wellhead and installed the BOP's. While pressure testing BOP's the landing pup-joint collapsed. Wait on replacement pup-joint.
<b>22/3/2008:</b>	Installed new landing joint and finished pressure testing BOP's. Unset the tubing hanger and pulled out of the hole with 213 joints of the <b>114 mm inside production tubing</b> .
<b>23/3/2008:</b>	Finished pulling the inner production tubing string. Install cross over for wireline lubricator.



<b>24/3/2008:</b>	Rig in electric wireline unit. Found problem with wireliner's BOP's. Wait on replacement BOP's. Install and test replacement BOP's. Attempted to run in the hole with a 152.8 mm gauge ring. Got stuck in casing at surface. Pulled out of rope socket. Removed lubricator and retrieved gauge ring with rig winch. Ran 144.8 mm gauge ring to 3340 mKB.
<b>25/3/2008:</b>	<b>Ran and set a bridge plug at 3290 mKB.</b> Filled hole with inhibited fresh water. Pressure tested the bridge plug to 6000 kPa. Dump bailed 8 linear meters of cement onto the bridge plug. <b>Set a second bridge plug at 75 mKB.</b> Removed the BOP's and installed the wellhead. Rigged out the service rig.

**Capacities:**

Capacity of 339.7 mm 101.19 kg/m casing:	0.07810m <sup>3</sup> /m (Surface Casing)
Capacity of 244.5 mm 69.9 kg/m casing:	0.03819m <sup>3</sup> /m (Production Casing)
Capacity of 244.5 mm 64.94 kg/m casing:	0.03884m <sup>3</sup> /m (Production Casing)
Capacity of 177.8mm 43.16kg/m Tubing	0.0194m <sup>3</sup> /m
Annular Capacity (Surface - Production Casing):	0.03926m <sup>3</sup> /m
Annular Capacity (Production Casing – Tubing):	0.01944m <sup>3</sup> /m
Volume Tubing 177.8mm 43.16kg/m Tubing:	66.60m <sup>3</sup>
Volume (Production Casing – Tubing)	66.83m <sup>3</sup>
Open Hole Volume	12.16m <sup>3</sup>
<b>Total Volume (Internal)</b>	<b>145.59m<sup>3</sup></b>
Volume Production casing (Assume no tubing):	133.53m <sup>3</sup>
Annular Volume (Surface - Production Casing):	33.33m <sup>3</sup>
Annular Volume (Production Casing shoe to Surface Casing shoe):	100.56m <sup>3</sup>

**SCVF**

None (August 20, 2021 Well Inspection Report: Evidence of SCVF – **No**)

**Kill Fluid**

Estimated reservoir pressure (2008 program) – 23000kPa  
TVD: 3377m  
Minimum kill fluid density required ~ **694 kg/m<sup>3</sup>**  
Kill fluid: **Water @ 1000kg/m<sup>3</sup>**



**Tubing/Casing Data:**

	Surface Casing	Production. Casing	Tubing*
Size O.D. (mm)	339.7	244.5	177.8
Weight (kg/m)	101.19	69.9 / 64.94	43.16
Grade	K-55	L-80	L-80
Connection	BT&C	BT&C	
Drift I.D. (mm)	311.38	222.63	160.81
I.D. (mm)	315.34	226.59	163.98
Capacity (m <sup>3</sup> /m)	0.07810	0.03819	0.0194
Collapse (MPa)	13.44	12.0	13.65
Burst (MPa)	23.79	17.65	18.75
Tension (daN)	578,300	-	-
Annular Volume (m <sup>3</sup> /m)			
Depth (mKB)	849	3438	3426

\*used H-40 Grade

**Reservoir Data:**

Formation	Muskwa
Perforations	Open Hole 3438 mMD - 3770 mMD
Reservoir Pressure	N/A
Shut-in Tubing Pressure	N/A
Pipeline Pressure @ Tie-in	N/A
Reservoir Temperature	160 deg C (est.)
H <sub>2</sub> S %	0.0% (Well Inspection report – 2021)
Expected Gas Rate	N/A
Expected Condensate Rate	N/A
Expected Water Rate	N/A





## **GENERAL REQUIREMENTS**

- **Daily reports shall be completed in Wellview by 7:00am each day.**
- Before commencing operations, the Wellsite Supervisor will complete a list of nearest available emergency services. This list along with a detailed and accurate description of directions to the location is to be posted in a conspicuous and accessible location known to all personnel.
- Emergency contact list should be completed, posted and available to all on site.
- Ensure that all personnel receive a Paramount orientation, are briefed on the wellsite hazards, safety and first aid equipment locations, escape routes and muster points upon their arrival to the lease. All personnel must be signed in after receiving their briefing and all personnel must sign out when departing the work site.
- Safety and well plan meeting to be held with all service company personnel prior to each job and meetings must be recorded on the Paramount's daily report and on the daily tour sheet.
- All applicable regulations, including, but not limited to the specific approved OROGO ACW approval, OROGO Well Suspension and Abandonment Guidelines, Oil and Gas Occupational Safety and Health Regulations (NWT) and Occupational Health and Safety (OHS) Regulations (NWT) are to be strictly adhered to. Written instructions must be posted in doghouse or other commonly visited area prior to Wellsite Supervisor leaving lease.
- The Wellsite Supervisor is responsible for assessing all worker's competency and ability to perform work.
- All service companies supplying materials will provide Material Safety Data Sheets for all products supplied and maintain these Material Safety Data Sheets available for worker's examination on location in compliance with WHIMIS regulations.
- The Wellsite Supervisor will ensure that dangerous goods shipped or received are classified, packaged, marked, labelled and documented in compliance with the Transportation of Dangerous Goods Regulations. If required, placards must be attached to vehicles transporting dangerous goods. All shipping documents must be forwarded to the Calgary office for filing.
- All operations carried out on behalf of the Operator shall be conducted in a safe and efficient manner in compliance with the Operator's safety regulations and all applicable acts and regulations.
- The Operator expects that all operations conducted will be designed to protect and maintain the quality and integrity of the environment and comply with all environmental acts and regulations.
- BOP equipment will be tested at least once daily, and any equipment found defective should be made serviceable before operations are resumed. Blowout prevention and man-down drills are to be performed weekly and are to be recorded on both the morning reports and tour reports.
- Whenever possible, plan and conduct all completion / workover procedures in a manner which will avoid the mixing of air & hydrocarbons in the wellbore and connected surface piping. If mixing does occur, purge prior to pressurizing or exposing mixture to any other possible source of ignition.
- During the absence of the Wellsite Supervisor, a qualified and competent alternate shall be designated, in writing, to carry out the principal Contractor's responsibilities. Written instructions must be posted in a conspicuous and accessible location known to all personnel prior to the Wellsite Supervisor leaving the location.



- All verbal notifications and approvals received on location from any regulatory agency must be documented and recorded on both morning reports and tour reports and should include a contact name from the agency, phone number and details of the subject matter.
- All field tickets and other supporting documentation submitted for materials purchased and/or services rendered require a correct AFE number and accurate identification of the well location along with the Wellsite Supervisor's signature indicating acceptance to the same.



## PARAMOUNT et al LIARD M-25 ABANDONMENT PROGRAM

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### **ABANDONMENT PROGRAM**

1. Submit certificates and inspection documents for any service rig, well control and associated equipment (including boilers) at least 10 days prior to the rig commencing work by e mail at [orogo@gov.nt.ca](mailto:orogo@gov.nt.ca)
2. **The Wellsite Supervisor is responsible to** notify (or verify notification has been completed) the OROGO, a **minimum of 24 hrs prior** to any well servicing abandonment operation.
3. **The Wellsite Supervisor is responsible to** notify (or verify notification has been completed) the OROGO, a **minimum of 24 hours prior to** any planned flaring operation. When a permit is applicable for sour gas flaring, a copy of such permit must be on site during any flaring operation and requirements of such permit must be strictly adhered to
4. **The Wellsite Supervisor is responsible to** verify notifications have been completed to all applicable residents, industrial operators, trappers & guiders within the categorized radius and/or within the emergency planning zone (EPZ) if applicable **a minimum of 24 hours prior** to any flaring operation.
5. Paramount shall provide all staff and contractors for this program with the OROGO 24-hour incident reporting phone number (867-445-8551) prior to commencing any work or activity.

### **ABANDONMENT PROGRAM TO ABANDON 300/M-25-6030-12330/4 WELLBORE**

6. Move in class III coiled tubing unit. Rig in equipment and injector to tubing c/w 101.6mm bit on motor, hydraulic disconnect and cross over. Pressure test all surface equipment to 3.0 MPa low and 35 MPa high.
7. In accordance with OROGO-SB-1 (sent with program files) conduct and record an on-site risk assessment and hazard analysis associate with shallow plug milling. **No less than 1 hour prior to running in hole to commence this operation** submit to OROGO the above JSA and Hazard Analysis at [orogo@gov.nt.ca](mailto:orogo@gov.nt.ca)
8. Record well pressures and bleed off any tubing pressure to test vessel. Establish circulation with fresh water through coiled tubing. Run in and mill out 10K permanent bridge plug set at 75.0 mKB. Monitor for well pressure once plug integrity is breached and bleed off gas as required.
9. Once bridge plug releases, chase down 15 meters to ensure it is free. **Send summary of operations related to the milling of plug in accordance with OROGO-SB-1 within one hour of completion to [orogo@gov.nt.ca](mailto:orogo@gov.nt.ca)**
10. Continue to circulate in hole to the top of thermal cement at 3282m KB.
11. Pull to surface and rig off coiled tubing unit.



12. Move in and rig up Service Rig, P tank, safety trailer and related auxiliary equipment to AER, OH&S and PRL regulations and guidelines. Ensure OROGO Guidelines, Corporate Policies and Procedures are followed prior to commencing operations.
13. Conduct daily pre-job safety meeting and equipment inspection. Identify daily potential hazards and discuss at safety meetings.
14. Haul in approximately 150m<sup>3</sup> of fresh water
15. Tie in circulating lines with return line tied into 'P' tank. Properly stake surface lines and pressure test lines and manifold to 1.4 MPa (low) and 35MPa (high) and hold each for 10 minutes.
16. Check SCVF and presence of H<sub>2</sub>S
17. Record casing pressure SICP, SITP
18. Stump test Class III 11" BOP, accumulator hose and function test each element of the BOP to 1.4 MPa low and 35 MPa high. Stump test the annular preventer to 1.4 MPa low and 10 MPa high. Remove wellhead. Nipple Up Class III BOPs. Pressure test pipe rams and ring grooves to 1.4MPa low 35MPa high for 10min
19. Run in hole with an inside cutter on 73mm workstring and cut off 177.8mm tubing @ approximately 3288 mKB above the existing RWK permanent bridge plug @ 3290m KB. Circulate to fresh water. POOH. Record in Tour Sheet and on Daily Report "Well completely circulated to fresh non-saline water". Pull and lay down 177.8mm tubing string.
20. MIRU Wireline Unit. Pressure test lubricator 7MPa x 10min.
21. RIH 244.5mm permanent bridge plug and set above cut tubing @ 3288m KB. Pressure test Bridge Plug 7MPa x 10min. POOH. Move on cementing unit. Spot 4m<sup>3</sup> cement (cap Bridge Plug with 30m cement - using 73mm tubing) on top of Bridge Plug. Pull out of hole. RIH and tag cement top. A minimum of 1,800 daN is required. Record set down weight and depth on tour sheet and Daily Report. Pull out of the hole
22. Based on existing logs interpretation, perform remedial squeezes as required for hydraulic isolation If unable to establish circulation, acidize perforations and attempt to establish feed-rate. If successful, ensure 30m linear cement on top of retainer. If no success, RIH w/ 244.5mm Permanent Bridge Plug, pressure test 7MPa for 10min. POOH and cap with 30m linear cement.
23. Remove BOPs. Install wellhead. Rig out.
24. Cut and cap wellbore as per the attached procedure in the Appendix.



## CORPORATE CONTACTS

Paramount Resources Ltd.  
1000, 700 - 9<sup>th</sup> Avenue, SW  
Calgary, AB  
T2P 3V4

### IWT (Calgary):

	<u>Business</u>	<u>Residence</u>	<u>Cellular</u>	<u>Fax</u>
Tim Wood Manager – ARO & Construction E-mail: <a href="mailto:tim.wood@paramountres.com">tim.wood@paramountres.com</a>	(403) 290-2919		(403) 803-8410	(403) 261-1349
Richard Bean Superintendent E-mail: <a href="mailto:richard.bean@paramountres.com">richard.bean@paramountres.com</a>	(403) 290-3640		(403) 793-4586	(403) 261-1349
Dinah Asamoah-Barnieh Completions Engineer E-mail: <a href="mailto:dinah.asamoah-barnieh@paramountres.com">dinah.asamoah-barnieh@paramountres.com</a>	(403) 290-6266		(780) 904-2638	(403) 261-1349

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### PRODUCTION (District Office):

	<u>Business</u>	<u>Residence</u>	<u>Cellular</u>	<u>Fax</u>
<u>Production Foreman, Well Services</u> Martin Doll <a href="mailto:martin.doll@paramountres.com">martin.doll@paramountres.com</a>	(780) 683-8037		780-926-7192	

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## CORPORATE POLICY & PROCEDURES

- All operations carried out on behalf of the Operator shall be conducted in a safe and efficient manner in compliance with the Operator's safety regulations and all applicable acts and regulations.
- The Operator expects that all operations conducted will be designed to protect and maintain the quality and integrity of the environment and comply with all environmental acts and regulations.
- All contractors on location must have as a minimum a valid H<sub>2</sub>S ticket (if necessary), WHMIS, and be fully covered by the NWT Worker's Compensation Board (WCB) where applicable, carry a minimum of \$2,000,000 liability insurance.
- Before commencing operations, the Wellsite Supervisor will complete a list of nearest available emergency services. This list along with a detailed and accurate description of directions to the location is to be posted in a conspicuous and accessible location known to all personnel.
- Any excavation or installation of anchors on location shall follow Paramount's Ground Disturbance Requirements:
  - a. Contact 1<sup>st</sup> Call (Review Paramount's Grey book)
  - b. Prior to excavation – obtain Ground Disturbance Permit
    - i. If pipeline in area, arrange for Hydrovac and hand expose lines within 5 meters of excavation.
- Prior to commencing operations, the Wellsite Supervisor shall:
  - Read and record SIP(s). Examine surface casing vent for blow or suction, record and report findings. Check and monitor LEL and H<sub>2</sub>S levels at wellhead and investigate for evidence of gas migration at surface.
  - Bleed off SISCVP. Shut in SCV, install chart recorder, monitor 24-hour build-ups, report same and complete AER's "Surface Casing Vent Flow/Gas Migration" form.
- Before commencing operations, the Wellsite Supervisor in conjunction with the Rig Manager will conduct an initial rig inspection using a CAODC or equivalent inspection form. A detailed rig inspection is to be completed weekly thereafter. Confirmation of these inspections is to be recorded on both the morning report and tour report.
- Have on-site a access to the AER Drilling/ Servicing Regulations - Directive 36, Workplace Health and Safety Regulations, NWT Oil and Gas Operations Act, NWT Drilling and Production Regulations, OROGO Well Suspension and Abandonment Guidelines.
- The Wellsite Supervisor and Rig Manager will conduct daily walk-around inspections and complete a daily rig inspection report in an effort to identify deficiencies regarding well control and safety related items.
- The Wellsite Supervisor must ensure that all pertinent data (tubulars, logs, tests etc.) are properly recorded on the tour sheets and that samples, where required are collected as required by well license. Also, the Wellsite Supervisor must ensure that trip sheets are properly completed and maintained.
- During cold weather operations, the Wellsite Supervisor must ensure that the blowdown line from the BOP stack to the choke manifold to the degasser is filled with a water/antifreeze solution.
- The Wellsite Supervisor must ensure that all personnel are advised and instructed not to trespass off the demised property.
- Safety meetings are to be held every day with wellsite personnel and recorded on both the morning reports and tour reports. Pre-job safety/orientation meetings are to be held prior to commencing new or non-routine work at which time the Wellsite Supervisor shall advise all personnel of known hazards, special pre-cautions and procedures. Hazard assessments must be conducted in accordance to Workplace Health and Safety Regulations and documented accordingly.



- BOP equipment will be function tested at least once daily and any equipment found defective should be made serviceable before operations are resumed. Blowout prevention drills are to be performed weekly and are to be recorded on both the morning reports and tour reports. **All appropriate Certifications for equipment used will be on-site and available for review.** Communicate this information with the contracted services.
- The Wellsite Supervisor will ensure that service companies supplying products and/or materials that require Material Safety Data Sheets review and advise wellsite personnel with the potential hazards associated and the appropriate emergency response to be undertaken when handling the same. As well, in compliance with WHMIS regulations, all MSDS are to be posted in a conspicuous and accessible place known to all personnel for their information and emergency reference. Site Specific Orientation to all personnel on-site must be given for all chemicals and materials used.
- The Wellsite Supervisor will ensure that dangerous goods shipped or received are classified, packaged, marked, labeled and documented in compliance with the Transportation of Dangerous Goods Regulations. If required, placards must be attached to vehicles transporting dangerous goods. All shipping documents must be forwarded to the Calgary office for filing.
- The Operator expects full compliance with all conditions detailed on the Land Use Permit and Water Permit, OA and ACW.
- During the absence of the Wellsite Supervisor, a qualified and competent alternate shall be designated, in writing, to carry out the principal Contractor's responsibilities. Written instructions must be posted in a conspicuous and accessible location known to all personnel prior to the Wellsite Supervisor leaving the location.
- All verbal notifications and approvals received on location from any regulatory agency must be documented and recorded on both morning reports and tour reports and should include a contact name from the agency, phone number and details of the subject matter.
- Daily reports shall be e-mailed (faxed) to the Operator's office by 07:00Hrs. every morning. Copy will be forwarded to Calgary. A daily operations report will be provided to the Wellsite Supervisor.
- All field tickets and other supporting documentation submitted for materials purchased and/or services rendered require a correct AFE# and accurate identification of the well location along with the Wellsite Supervisor's signature indicating acceptance to the same.
- All rental equipment must be accounted for and returned promptly upon conclusion of operations. Rental Sheets must be utilized.
- All surplus material and/or equipment must be accounted for and either returned for credit or material transferred to the appropriate warehouse point accordingly.
- All Accidents or Incidents shall be reported **immediately** to the Calgary Office - Attention: Richard Bean and /or Don Jones. Complete the Paramount Safe Incident Report and conduct the necessary investigations immediately. Fax copy to Calgary within 6 hours of incident.
- Upon conclusion of operations:
  - Fill out the following forms:  
**AER "Surface Casing Vent Flow/Gas Migration Data Sheet"**  
**Paramount's Suspended /Abandonment Action form**

Email / Fax a copy of the above completed form/s to the Calgary office.

  - Ensure that all garbage and debris has been removed from the location in accordance with AER Guide G-58 and that any environmental concern has been addressed. Contact the Construction foreman with any concerns.



- Ensure that all flange bolts are properly torqued in accordance with the manufacturer's specifications and that all valves are properly lubricated.
- Prepare a final wellbore diagram with all pertinent information recorded.
- Forward all paperwork including field logs and computer data files to the Calgary office including copies of all field logs. A paper and digital copy of all Paramount operation reports should be provided. All field tickets, Material Transfers, Incident Reports, well test reports, rig inspection reports and service reports shall be included with the operation report package.
- Notify the District Production Foreman of the well status.





## APPENDIX 1

### **SURFACE CASING VENT FLOWS:**

- If a SCVF issue exists, bleed off well and allow well to stand for a minimum of twenty-four (24) hours with the SCV left in the “open” position to allow well to stabilize prior to Noise-Temperature logging.
- Perform “bubble” test as per AEUB Directive 20 and complete the “Surface Casing Vent Flow / Gas Migration Data Sheet”.

### **NOISE-TEMPERATURE LOGGING:**

- When Noise-Temperature Logging, RIH with Noise-Temperature Logging Tools and, correlated to a cased-hole log provided, run the Temperature Log while running in hole to PBTD. Note and record results.
- Pull the Noise Log to surface and obtain readings every five (5) meters. Over “high” noise level intervals and possible origin(s) of the vent flow, reduce increments to one (1) meter readings. Note and record results of same.
- Upon conclusion of logging operations, forward copy of log to Calgary office for inspection prior to proceeding with the balance of the program.

### **CEMENT DUMPBAILING:**

On way in hole with loaded bailer, stop just above plug and make careful detailed note of line weight  
Dump cement on plug by breaking glass bottom by either method above  
DO Not stroke bailer repeatedly to insure glass is broken. Use only a single hard jar  
Pick up 1-2m off plug and wait ~5 minutes to let cement displace from bailer  
Pick up above estimated cement top and check line weight for indication of loss of cement  
If obvious weight/cement loss, pull out of the hole slowly for 1<sup>st</sup> ~20m so not to swab cement up hole  
If no weight loss, jar on bottom again and repeat steps above

Ensure to not inhibit wellbore fluid until after cement is dumped.

### **CEMENT-RETAINER CIRCULATIONS/SQUEEZES:**

- Ensure a representative sample of make-up water has been forwarded to cementers for compatibility testing.
- Set retainer two (2.0) meters above perms avoiding a casing collar and pressure test to 7.0 MPa.
- RIH with stinger, sting into and perform pressure and function tests.
- Perform feed rate test to perms with fresh produced water.
- Tie in single-pumping unit cementer with squeeze manifold and chart recorder.
- Pressure test surface lines to 1,400kPa (low) and 14,000kPa (high).
- Pull stinger from retainer, mix, pump and circulate prescribed cement design to tubing bottom.
- Sting back into retainer and perform cement circulation/squeeze.

### **NOTE:**

- Where circulation was not established and, after displacing the lead cement, monitor tubing to determine if plug is gravity feeding. If so and if cement setting times permit, allow well to gravity feed at a controlled rate of not more than 0.50 m<sup>3</sup>/min. as best possible with manifold valve or by pulling the stinger into the “neutral” position. When the well no longer gravity feeds, commence hesitation squeezes in 0.50 m<sup>3</sup> increments/stage unless breakdown is observed while pumping a stage at which time pumping should be stopped immediately ending that particular stage. Wait thirty (30) minutes or as appropriate,



depending on actual conditions between stages. Attempt to achieve a stabilized lock-up pressure to 7.0 MPa and hold for ten (10) minutes with chart recorder. Record and report same.

- Do not over displace cement squeeze.
- Be prepared to batch mix and pump an additional 1.50 m<sup>3</sup> – 3.00 m<sup>3</sup> cement, if necessary.
- Do not exceed a pump rate of 1.0 m<sup>3</sup>/min. or frac gradient (18.0 kPa/m) when feed rate testing or cementing.

Eg. Maximum allowable surface pump pressure when using 1030 kg/m<sup>3</sup> fluid @ a depth of 300 m:

$$\begin{aligned} &= \text{Frac pressure} - \text{Hydrostatic pressure} \\ &= (300 \text{ m} \times 18.0 \text{ kPa/m}) - (300 \text{ m} \times 1030 \text{ kg/m}^3 \times 0.00981) \\ &= 5,400 \text{ kPa} - 3,031 \text{ kPa} \\ &= 2,369 \text{ kPa} \end{aligned}$$

- Pull stinger from retainer, displace an eight (15.0) meter balanced cement plug over the retainer, raise string out of balanced cement plug, backwash string clean with fresh water and POOH with stinger.
- Shut in casing valves and WOC as prescribed.

#### **SUSPENSION & ABANDONMENT PLUGS:**

- Bridge plugs and cement retainers used for zonal suspension or abandonment and set in compliance with OROGO Well Suspension and Abandonment Guidelines, must be pressure tested to 7000 Kpa prior to capping with fifteen (15) meters of circulated cement for Level II wells and thirty (30) meters of circulated cement for Level I wells.

#### **PRL CUTTING & CAPPING PROCEDURES:**

- Move in 'B'-ticket welder, backhoe, unit and steamer, if required. If flowlines are present hydrovac may be required.
- Read and record SIP(s). Check and monitor LEL and H2S levels at wellhead and investigate for evidence of gas migration at surface. Examine surface casing vent for blow or suction. Record and report findings. If present, stop work and hold a safety meeting to review working procedures. If required, contact the Calgary office for further direction. Proceed with work only when conditions are able to be managed safely.

#### **NOTE:**

- When ambient temperatures are below freezing, tarp in wellhead and steam wellhead to ensure that wellhead and piping are not frozen.
- Remove all plugs and function test all wellhead valves to confirm there is no pressure built up in the wellhead or casing. Disassemble the SCV piping assembly and visually inspect that the vent is not plugged with cement or ice.
- Review corporate ground disturbance package and policies with all on-site personnel prior to commencing excavation around the wellhead. Hydrovac expose all underground facilities (casing, flowlines etc.) within five (5.0) meters of area to be excavated and excavate a 6.0m x 2.5m bell hole around the wellhead ensuring that walls of the bell hole are properly sloped for safe entry and egress and to prevent sloughing in. Check and monitor LEL and H2S levels and investigate for evidence of gas migration.
- While exercising caution, weld cut a small hole 30 cm below the surface casing bowl and investigate for trapped gas and fluids. Check and monitor LEL and H2S levels. With closed hooks and shackles, connect backhoe bucket to wellhead and pull into tension slightly more than the weight of the wellhead. Weld cut three (3) windows in the surface casing to access the innermost casing string ensuring that 50% of the circumferential metal remains to prevent possible collapse of the surface casing from the weight of the wellhead. While exercising caution, weld cut the innermost string.



**NOTE:**

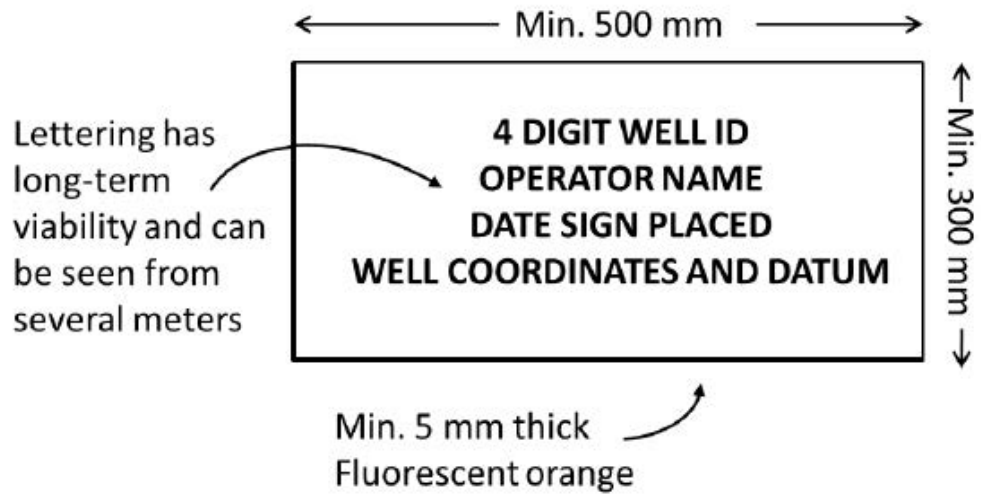
- Innermost string can be expected to suddenly drop once completely cut. Do not place pry bars, hands or fingers in the windows.
- Complete weld cut of the surface casing, lift and remove wellhead from bellhole with backhoe.
- Cut off the casing strings so that the top of the Protective Cap will be a minimum of 1.5 meters below the surveyed ground elevation. The surface casing and production casing are to be cut off at the same depth.
- Fabricate the Protective Cap and slip on collar using the surplus surface casing material.
- Dress the casing stubs. Using compatible metallurgical material, install and seal weld a 12.7 mm steel plate “donut” and vent assembly over the surface casing and production casing annulus, and a 12.7 mm steel plate and vent assembly over the inner most casing string. Required vent assemblies are as shown on the Capping Schematic.

**NOTE:**

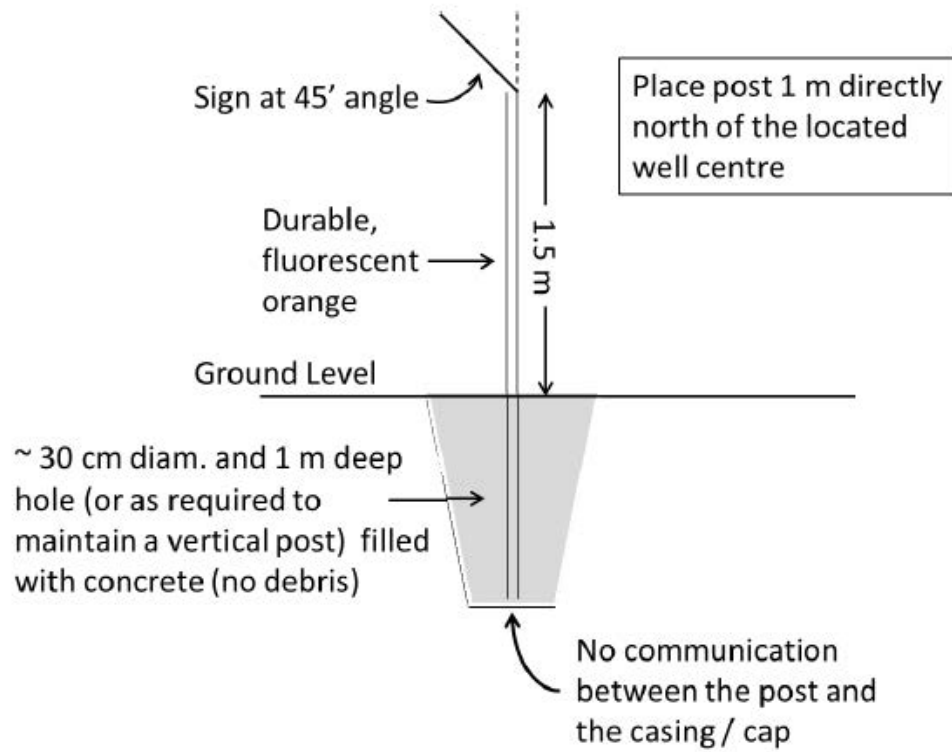
- All seal welds are to be pre & post-heated to 3000C.
- Install and tack weld the Protective Cap to the surface casing. Weld inscribe the LSD on top of the Protective Cap and document with a digital photograph.
- Fabricate and install durable post and sign as noted below. Backfill and compact the excavation, clean up lease and rig out and release all services.
- Complete material transfer(s) and forward equipment for servicing and/or storage.
- Note: OROGO guidelines state that field verified coordinates for the well center must be provided as part of the Well Operations report as follows:
  - The geodetic datum must be specified (NAD83 is recommended); and
  - Coordinates must be provided:
    - In decimal degrees to 4 decimal places or more, or
    - In degrees, minutes and seconds to 2 decimal places, if decimal coordinates are not possible.
- A field sketch of the area must also be submitted as part of the Well Operations Report.
- After surface abandonment is completed, all abandoned wells must be marked with a durable post and a sign as per below:



**Sign Requirements**



**Post Requirements**





# PARAMOUNT ET AL LIARD M-25

Location: 60° 30', 123° 30'

WID: 1867

Existing Bottom Hole Configuration (March 25, 2008)

Prepared By:

Dave Block

Date:

25-Mar-08

KB: 917.8 m  
GL: 910.6 m

Weatherford permanent  
bridge plug set at 75 mKB.

*BOT Surface Controlled Full Opening  
Sub Surface Safety Valve Incoloy 925*

**Wellbore Deviation:**

92 mKB	1.2 deg	1 DLS
503 mKB	14.6 deg	1 DLS
600 mKB	20.6 deg	2 DLS
1100 mKB	27.0 deg	1 DLS
1700 mKB	28.0 deg	1 DLS
2400 mKB	27.6 deg	1 DLS
3200 mKB	30.9 deg	1 DLS
3425 mKB	31.0 deg	1 DLS
3608 mKB	36.2 deg	5 DLS
3760 mKB	39.2 deg	1 DLS

444.5 mm hole drilled directionally from a kick off point at 300 mKB to an inclination of 26° at 852 mKB.

339.7 mm, 101.19 kg/m, K-55, BT&C casing set at 849 mKB.

Cemented with 80 t 'G' + 0.8% S-1 + 1.0% prehydrated gel and 15 t 'G'. 10 m<sup>3</sup> cement returns to surface.

311 mm hole to 3466 mKB.

244.5 mm, L-80, BT&C 69.9 kg/m 0 - 1551 mKb & 64.94 kg/m 1551 - 3438 mKB.

Cemented with 75 t 'G' + 0.5% D-65 + 0.2% D-46 + 2.0% D-20 + 0.2% D-167 + 0.5% D-28 and 35.0 t 'G' + 0.35% D-66 + 0.2% D-46 + 0.6% D-167 + 0.5% D-28. Cement top logged at 960 mKB.

177.8 mm 43.16 kg/m L-80 Hydril 563 tubing

8 linear meters of high temperature cement  
Weatherford 'RWK' bridge plug

**NOTE:**  
Shoulder sub not latched into liner hanger. Liner hanger not part of tubing string.

- COT locator shoulder sub *Incoloy 925*
- COT 244.5 mm YRC liner hanger *Incoloy 925*
- 114.3 mm 20.09 kg/m CRA New VAM tubing joint
- Guiberson 244.5 mm Magnum HT perm packer *Incoloy 925*
- Guiberson 244.5 mm seal bore extension *Incoloy 925*
- 114.3 mm 20.09 kg/m L-80 New VAM tubing joint
- 96.85 mm 'XN' nipple w/94.61 mm NoGO *Incoloy 925*
- 114.3 mm 20.09 kg/m L-80 New VAM tubing joint
- Baker G-22 locator seal assembly L-80
- Baker DB permanent packer
- Partial 88.9 mm L-80 Hydril 533 tubing joint, jet cut off

215.9 mm open hole

Cement plug  
Owen HIP cement basket type plug

- Partial 88.9 mm L-80 Hydril 533 tubing joint
- 65.02 mm 'R' nipple *incoloy 925*
- 3 m x 88.9 mm L-80 Hydril 533 perforated pupjoint
- 2 joints 88.9 mm, 19.275 kg/m, L-80 Hydril 533 tubing
- 65.02 mm 'RN' nipple w/ 59.06 mm NoGo, *Impreglon 222 coated*
- Re-entry sub *Impreglon 222 coated*

215.9 mm open hole

Total Depth = 3770 mKB  
= 3383 mTVD



# PARAMOUNT ET AL LIARD M-25

Location: 60° 30', 123° 30'

WID: 1867

## Proposed Bottom Hole Configuration

Prepared By:

Dinah Asamoah-Barnieh

Date:

15-Aug-22

KB: 917.8 m  
GL: 910.6 m

Weatherford permanent bridge plug set at 75 mKB.

444.5 mm hole drilled directionally from a kick off point at 300 mKB to an inclination of 26° at 852 mKB.

339.7 mm, 101.19 kg/m, K-55, BT&C casing set at 849 mKB.

Cemented with 80 t 'G' + 0.8% S-1 + 1.0% prehydrated gel and 15 t 'G'. 10 m<sup>3</sup> cement returns to surface.

Cement Top ~ 960m KB

### Wellbore Deviation:

92 mKB	1.2 deg	1 DLS
503 mKB	14.6 deg	1 DLS
600 mKB	20.6 deg	2 DLS
1100 mKB	27.0 deg	1 DLS
1700 mKB	28.0 deg	1 DLS
2400 mKB	27.6 deg	1 DLS
3200 mKB	30.9 deg	1 DLS
3425 mKB	31.0 deg	1 DLS
3608 mKB	36.2 deg	5 DLS
3760 mKB	39.2 deg	1 DLS

311 mm hole to 3466 mKB.

244.5 mm, L-80, BT&C 69.9 kg/m 0 - 1551 mKb & 64.94 kg/m 1551 - 3438 mKB.

Cemented with 75 t 'G' + 0.5% D-65 + 0.2% D-46 + 2.0% D-20 + 0.2% D-167 + 0.5% D-28 and 35.0 t 'G' + 0.35% D-66 + 0.2% D-46 + 0.6% D-167 + 0.5% D-28. Cement top logged at 960 mKB.

Bridge Plug capped with 30m cement. Depth TBD

3290 ← 8 linear meters of high temperature cement  
Weatherford 'RWK' bridge plug

**NOTE:**  
Shoulder sub not latched into liner hanger. Liner hanger not part of tubing string.

3390 ← COT locator shoulder sub *Incoloy 925*  
3390 ← COT 244.5 mm YRC liner hanger *Incoloy 925*  
3396 ← 114.3 mm 20.09 kg/m CRA New VAM tubing joint  
3396 ← Guiberson 244.5 mm Magnum HT perm packer *Incoloy 925*  
3412 ← Guiberson 244.5 mm seal bore extension *Incoloy 925*  
3412 ← 114.3 mm 20.09 kg/m L-80 New VAM tubing joint  
3412 ← 96.85 mm 'XN' nipple w/94.61 mm NoGO *Incoloy 925*  
3412 ← 114.3 mm 20.09 kg/m L-80 New VAM tubing joint  
3420 ← Baker G-22 locator seal assembly L-80  
3420 ← Baker DB permanent packer  
3426 ← Partial 88.9 mm L-80 Hydril 533 tubing joint, jet cut off  
3438

← 215.9 mm open hole

3479 ← Cement plug  
3485 ← Owen HIP cement basket type plug

3569 ← Partial 88.9 mm L-80 Hydril 533 tubing joint  
3569 ← 65.02 mm 'R' nipple *incoloy 925*  
3569 ← 3 m x 88.9 mm L-80 Hydril 533 perforated pupjoint  
3569 ← 2 joints 88.9 mm, 19.275 kg/m, L-80 Hydril 533 tubing  
3597 ← 65.02 mm 'RN' nipple w/ 59.06 mm NoGo, *Impreglon 222 coated*  
3597 ← Re-entry sub *Impreglon 222 coated*

← 215.9 mm open hole

Total Depth = 3770 mKB  
= 3383 mTVD