



ABANDONMENT PROGRAM R1
OROGO LEVEL II WELLBORE
PARAMOUNT ET AL LIARD 3K-29
WID # N1999
POTENTIAL H₂S: 0.5%

PROCEDURE APPROVAL & DISTRIBUTION

DATE: August 12, 2022
WELL NAME: PARAMOUNT ET AL LIARD 3K-29
SURFACE LOCATION: L-29-6030-12330
Latitude: 60° 24' 50.701"
Longitude: 123° 35' 11.872"
BOTTOM LOCATION: Latitude: 60° 27' 46.610"
Longitude: 123° 34' 15.528"
UWID: 303/K-29-6030-12330/1
WID: 1999
OPERATIONS AREA: 60° 30' N, 123° 30' W **PROVINCE:** NWT
OBJECTIVE: Abandon wellbore in accordance with OROGO guidelines.
PARAMOUNT WI (%): **88.00%**
AFE No: TBD
AMOUNT: TBD
PRL Supplier Coding: PR-210-9231-xxx (Abandonment program)

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 CANADA LTD. POLICIES ON:

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

DISTRIBUTION:

FIELD:

CALGARY: Richard Bean/Well Files

PREPARED BY:

Steven Ong, Rotational E.I.T.
Milo Christie, Completions Superintendent

DATE: August 12, 2022

REVIEWED AND APPROVED BY:

Richard Bean, Superintendent, ARO
Tim Wood, Manager, ARO & Wellsite Construction

DATE: August 19, 2022

DATE: August 25, 2022

ABANDONMENT PROGRAM

OBJECTIVE

Suspended Level II wellbore. Abandon production zones and ensure porous intervals and BGW are isolated to abandon the well as per approved ACW and OROGO guidelines. Cut and cap well.

REPORTING

- All rig calls and Daily Reports are to be directed to Richard Bean (Superintendent, ARO)
 - Office: (403) 303-1929
 - Cell: (403) 793-4586
 - E-mail: Richard.Bean@paramountres.com

PROGRAM SUMMARY

- Move in class III coiled tubing unit. Rig in and mill out permanent bridge plug at 50m
- Continue in hole with coil tubing to cement top at 2682 mKB.
- Rig off coil, rig up class III free standing service rig. Move in and rig in wire line.
- Place tubing in tension, perform wireline conveyed casing cut.
- Circulate well over to clean fresh water.
- Pull and lay down 127.0mm L-80 Hydril 513.
- Rig in wire line and run in to set permanent 177.8mm bridge plug above cut casing at (+/- 2675 mKB)
- Fill casing with fresh water and pressure test casing and bridge plug to 7 MPa x 10 min.
- Conduct a cement bond log from bridge plug set depth to surface.
- Pick up 73mm work string or coiled tubing (TBD) and run open ended to top of bridge plug.
- Rig in cementing equipment and circulate down with 1m³ thermal cement and place on BP.
- Pull and lay down all but 600m x 73mm tubing
- Pick up wire line. Run in and perforate for zonal isolation intervals. (To be confirmed)
- Establish feed rate and run/test retainer to prep for cement squeeze.
- Squeeze or circulate cement to surface (Cement program TBD once feed rate or circulation is established)
- Lay down remaining tubing, remove BOP and install wellhead.
- Confirm no SCVF or GM present
- Move equipment off location.
- Cut and cap well at surface

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 (see attached Form), 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.

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.

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.

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.

WELL HISTORY:

Well was directionally drilled by Chevron early 2004 to a measured depth of 3700m with a TVD of 2642 mKB,. During suspension activity in 2008, slickline tools were lost in hole while running a gauge ring. Fishing attempts were made to recover the tool string before an acid treatment was pumped to dissolve scale recovered during wireline operations. Minimal rates were able to be established during the acid treatment and the ability to inject fluid below 28 MPa was lost during acid displacement. Another attempt was made to fish and recover tools, after acid treatment, that was also unsuccessful. A permanent bridge plug was set above the lost tool string at 2690 mKB, the casing successfully pressure tested to 7 MPa, and the bridge plug capped with 8 meters of thermal cement. Wellbore fluid was then treated with a weighted corrosion inhibitor and a second permanent bridge plug was set at 50mKB.

POROUS ZONES DEPTHS MD (mKB)

Intervals separated by not more than 10m are within ()

Formation	Porous Zones MD (mKB)
Exshaw	1654.0 – 1656.0
Nahanni	2918.0m – 3220.5m MD 3236.9m – 3251.2m MD 3264.0m – 3268.6m MD 3283.0m – 3284.0m MD 3296.0m – 3454.5m MD 3468.5m – 3470.0m MD 3491.3m – 3517.0m MD 3534.5m – 3624.5m MD 3642.2m – 3683.0m MD

No data found on salinity of the groundwater. Therefore, protection must extend to 600m below surface.

- BGWP @ 600 mKB (default)

PARAMOUNT ET AL LIARD 2K-29 ABANDONMENT

WELL DATA AND WELLBORE CONFIGURATION

Surface Location:	Latitude: 60° 24' 50.701" Longitude: 123° 35' 11.872"
Bottomhole Location:	Latitude: 60° 27' 46.610" Longitude: 123° 34' 15.528"
Profile:	Directional
BGWP:	600m GL (Default)
SCVF:	No
OPERATING LICENCE#	TBD
LAND USE PERMIT#	TBD
WATER LICENCE #	TBD
OROGO OA#	TBD
OROGO ACW#	TBD
Spud Date:	January 12, 2004
Rig Release Date:	February 23, 2004
KB:	417.30 m
GL:	409.90 m
KB-GL:	7.40 m
Casing Shoe:	3875 mMD
TD/PBTD:	3700 mMD
TVD:	2642 mTVD

SURFACE HOLE: 311 mm to 778 mMD
Directionally drilled from a KOP of 225 mKB to an inclination of 290 at the casing shoe.

SURFACE CASING: 244.5 mm, 59.53 kg/m, K-55, LT&C casing set at 775 mKB. Cemented with 32 t 1:1:2 'G' + 0.5% CFR + 1% FWCA-H followed by 18.5 t ThixMix + 0/36% CFL-3 + 0.1% LTR.
Cement to surface **Returns not reported.**

MAIN HOLE: 222 mm to 2912 mKB. Drilled directionally with an inclination of approximately 29° from the surface casing shoe at a constant inclination to a second KOP at about 2650 mMD to an inclination of approximately 68° at the casing shoe.

PROD. CASING: 177.8 mm, 38.69 kg/m MN-80 Hydril SLX. Casing set at 2912 mKB. Cemented with? Cement top unknown. Cementing details unknown.

PROD. TUBING: 127 mm, L-80 Hydril 513 tubing: 26.78 kg/m. From surface to 725 mKB and 22.32 kg/m from 725 mKB to the packer at 2880 mKB.

OPEN HOLE: 156 mm to 3700 mMD (2642 mTVD). Drilled directionally from the casing shoe to an inclination of approximately 89° at TD.
Open Hole Section: Nahanni: 2912 mMD - 3700 mMD

CORES: NONE
DST's: NONE

WELLHEAD: 35 MPa

PERFORATIONS: NONE

Formation Tops
geoSCOUT Ref Elev(m): +417.2

Formation	TVD (m)	Elev (m)	MD
Mexshaw	1252.1	-834.9	1351.0
Dbesa_rvL	1624	-1206.8	1774.0
Dmuskwa	2341.7	-1924.5	2581.5
Dnahanni	2572.7	-2155.5	2898.0
/FAULT/	2641.1	-2223.9	3660.9
Dmuskwa	2641.1	-2223.9	3661.0

TUBING/CASING DATA:

	Surface Casing	Production Casing	Production Tubing
Size O.D. (mm)	244.5	177.8	127.0
Weight (kg/m)	59.5	38.7	26.78 – 22.32
Grade	K-55	MN-80	L-80
Connection	LT&C	Hydril SLX	Hydril 513
Drift I.D. (mm)	220.45	156.24	105.44 – 108.79
I.D. (mm)	224.41	159.41	108.61 – 111.96
Capacity (m³/m)	0.0396	0.0200	0.0093 – 0.0098
Collapse (MPa)	17.72	37.30	72.33 – 49.99
Burst (MPa)	27.23	49.92	69.91 – 57.16
Joint Yield (1000 daN)			188,000 – 156,000
Depth (mKB)	775	2912	2926

RESERVOIR DATA:

Formation	Nahanni	
Perforations (mKB)	2912 – 3700	
Reservoir Pressure	21,792 kPa	Gradient 2005
Shut-in Tubing Pressures	12,776 kPa	Gradient 2005
Estimated BH Temp.	155°C	Gradient 2005
Kill Fluid density (kg/m³)	1000 (Fresh Water)	Hydrostatic = 25,918 kPa @ 2642m
Estimated H₂S %	0.50	
Estimated CO₂ %	20	

CAPACITIES:

Capacity of 177.8 mm 38.69 kg/m casing (0.0200m³/m x 2912m): 58.2 m³
Capacity of 127.0 mm 26.8 kg/m tubing (0.0093m³/m x 725m): 6.7 m³
Capacity of 127.0 mm 22.3 kg/m tubing (0.0093m³/m x 2155m): 20.0 m³

SCVF:

No Active History

DOWNHOLE DIAGRAM

Paramount et al Liard 3K-29

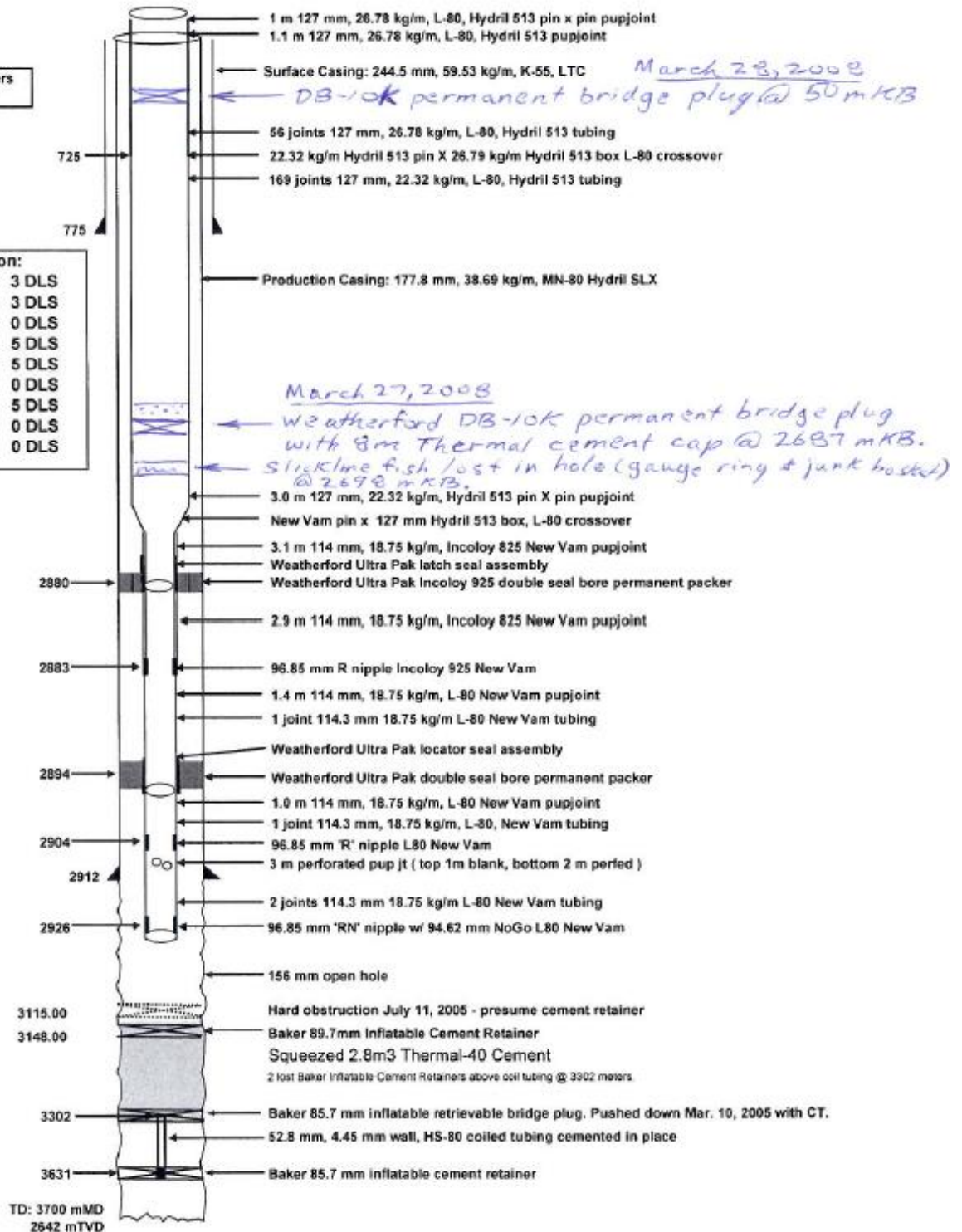
Location: K-29 60° 30' N, 123° 30' W WID#: 1999

Bottom Hole Diagram (as of *March 28/08*)

KB: 417.3 m
GL: 409.9 m

Note: All depths in meters measured depth (mKB)

Wellbore Deviation:		
300 mKB	6.0 deg	3 DLS
510 mKB	22.0 deg	3 DLS
740 mKB	28.4 deg	0 DLS
2700mKB	33.1 deg	5 DLS
2900mKB	65.3 deg	5 DLS
2951mKB	71.0 deg	0 DLS
3100mKB	82.8 deg	5 DLS
3300mKB	89.1 deg	0 DLS
3722mKB	89.1 deg	0 DLS



GENERAL REQUIREMENTS

- **Daily reports shall be e-mailed to the Operator's office 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#, G/L number and accurate identification of the well location along with the Wellsite Supervisor's signature indicating acceptance to the same.

PARAMOUNT ET AL LIARD 3K-29 ABANDONMENT

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
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. **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.
6. **Ensure all PRL and vendor COVID 19 protocols are reviewed, understood and followed by all personnel. PRL COVID protocols and information are available in Comply Works**
7. Obtain safe work permit from operations to turn over responsibility of well to the well site supervisor. The well site supervisor will then permit all other services.
8. Complete lease access and well handover process. Complete lease inspection, program review and obtain well access permit with the production operator. Note the condition of the lease, record any clean-up operations required to address any spills and record any other noteworthy findings on the first morning report. Discuss the transportation arrangements for the tanks and fluid with respect to other activity in the surrounding field area.
9. Prepare location for Service Rig & support equipment.
10. 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.
11. 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
12. 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 Weatherford DB 10K permanent bridge plug set at 50.0 mKB. Monitor for well pressure once plug integrity is breached and bleed off gas as required.
13. 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**
14. Continue to circulate in hole to the top of thermal cement at 2682m KB.

15. Pull to surface and rig off coiled tubing unit.
16. MIRU service rig complete with a 35 MPa Class III BOP stack. 127.0 mm rams, kill spool, rig pump, clean tank, and related auxiliary equipment to OROGO, OH&S and PRL regulations and guidelines. Ensure Corporate Policies and Procedures are followed prior to commencing operations (see attached). Space out equipment in accordance with AER and OH&S requirements.
 - Ensure all necessary safety equipment is strategically positioned, on site and tested to ensure proper operating condition prior to commencing with the workover operations.
 - All personnel must be familiar with the operation of all emergency equipment. Safety and BOP drills are to be conducted on a regular basis and recorded on the "Daily Completion / Workover Report"
 - Conduct a complete inspection of the service rig per requirements of AER Directive 37 and PRL guideline policy. Identify and remediate any deficiencies prior to initiating completion operations
 - Conduct an operational and safety meeting prior to installing BOPs onto the wellhead and pressure testing.
17. If necessary, install temporary rig anchors and conduct pull tests on each anchor to 20000 lbs. Install escape line anchor and pull test to 3000 lbs. Ensure PRL ground disturbance procedures are followed.
18. Haul in approximately 60 m³ of fresh water.
19. Conduct daily pre-job safety meeting and equipment inspection.
20. Tie in circulating lines with a return line tied into 'P' tank. Properly stake surface lines and pressure test lines and manifold to 1,400kPa (low) and 35,000kPa (high) and hold each for ten (10) minutes.
21. Ensure the well is dead. Install the working spool and BOPs onto the BOP test stump. If required warm up the BOP stack with steam. Function test the blind rams and pipe rams on the test stump. Close the blind rams and pressure test the working spool, the blind rams and BOP flange to 1.4 and 35MPa for 10 minutes each. Install a ported tubing pup and stabbing valve through the BOPs on the BOP test stump. Pressure test the pipe rams and stabbing valve to 1.4MPa and 35MPa for 10 minutes each.
22. Conduct an accumulator function test. Recharge the accumulator, shut off the pump and record the accumulator pressure. Close each ram and record the start and end pressures and the time to close each ram. Recharge the accumulator and record the time for the accumulator to recharge to the original pressure. Ensure that hand wheels are available and are the correct type and size for all the BOP rams. Record the number of turns to close each ram manually.
23. Remove wellhead top section and confirm hanger lift threads, nipple up service rig BOPs. Install 127.0mm pup joint in tubing hanger. Close pipe rams and pressure test BOP ring seal to 1.4 MPa low and 35 MPa high for 10 min. each.
24. Pull tubing into tension, the value recommended by e-line conveyed casing cutter vendor, set slips and land tubing.
25. MIRU E-line unit with lubricator and BOPs. Purge and pressure test the lubricator to 1400kPa (low) and 14MPa (high) with Nitrogen gas. Purge the lubricator each time before running in the hole with tools. Hang the wireline sheave in the derrick.
26. Run in with casing cutter for 127.0mm and tag top of existing cement cap at 2682.0 mKB, above permanent bridge plug at 2690.0 mKB. Anchor casing cutter and conduct cut at +/- 2675 mKB. Pull to surface.
27. Pick up on casing and confirm cut was successful. Rig in pump equipment and reverse circulate well with fresh water.

28. Pull and lay down 127.0mm L-80 Hydril 513 tubing.
29. Pick up wire line c/w pressure tested and purged lubricator. Run 177.8mm drift gauge ring to tag top of the cut 127.0mm casing. Pull out of hole. Make up and run in with 177.8 10K permanent bridge plug. Log onto depth and set plug as close to cut casing as possible. Pull and lay down wire line.
30. Fill well with fresh water and pressure test plug and casing to 7 MPa x 10 min.
31. Make and run cement bond logging tools, conduct high speed overview running in hole. Conduct cement bond log from bridge plug set depth to surface.
32. Pick up coiled tubing or run in with 73mm L-80 EUE work string (TBD) and tag top of bridge plug. Rig in cementing equipment. Mix and pump down tubing with 1.0m³ thermal cement. Balance cement onto bridge plug. Slowly pull tubing out of cement (1m³ cement = 50 linear m in casing) Land tubing above cement top and backwash tubing clean. Pull and lay down coiled tubing or jointed pipe as needed.

ZONAL ISOLATION PROCEDURE

Note* There is currently no cement detail available.

Porous Zones Depths MD (mKB)

Formation	Porous Zones MD (mKB)
Exshaw	1654.0 – 1656.0
Nahanni	2918.0m – 3220.5m MD 3236.9m – 3251.2m MD 3264.0m – 3268.6m MD 3283.0m – 3284.0m MD 3296.0m – 3454.5m MD 3468.5m – 3470.0m MD 3491.3m – 3517.0m MD 3534.5m – 3624.5m MD 3642.2m – 3683.0m MD

33. MIRU E-line unit with lubricator and BOPs. Purge and pressure test the lubricator to 1400kPa (low) and 14MPa (high) with nitrogen gas. Purge the lubricator each time before running in the hole with tools. Hang the wireline sheave in the derrick.
34. **Depending on where the cement top is confirmed, the following interval for perforating and cement squeezing may be required:**
 - Exshaw: 1653.0 – 1654.0 mKB
35. Makeup and RIH with 1.0m x 127mm ERHSC c/w 20gm SDP charges @ 20SPM & 60° phasing. Log onto depth and perforate the porous intervals as required.
36. POOH with perf assembly and inspect same for performance.
37. Pump down casing with fresh water and record feed rate or circulation results.
38. RIH on wireline with cement retainer for 177.8mm casing and set retainer ~2.0m above the perforations. Fill casing with fresh water and pressure test casing and retainer to 7.0MPa and hold for 10.0mins. Rig out and release wireline unit.

39. Pick up and RIH with stinger on tallied and drifted 73mm work string equipped with a PSN one joint from bottom, or on 38.1mm coiled tubing (Tubulars TBD). Sting into retainer and perform function and pressure tests.
40. Fill tubing with fresh water and attempt to break circulation to surface; otherwise perform a feed rate test. Note and record results of same. Contact Calgary Superintendent with results.
41. Move in and tie in cementers with single pumping unit, squeeze manifold and chart recorder. Conduct a pre-job treatment safety/orientation meeting with all personnel on location detailing the program, pressure limitations, personnel responsibilities, and safety precautions. Pressure test surface lines and equipment to 1,400kPa (low) and 14,000kPa (high) and hold each for 10 mins.
42. Fill tubing with fresh water and re-establish circulation/feed rate and check to ensure string is free of debris. Note and record same.
43. Pull stinger from retainer, mix, pump and circulate the prescribed cement design to tubing bottom. (Program TBD) Sting back into the retainer and perform remedial cement treatment. Catch and retain a minimum of 3 samples (beginning, middle & end of mixing) to monitor surface samples for “setting” conditions. Record and report same
44. Pull stinger from retainer, circulate a 15.0m balanced cement plug over the retainer and backwash string clean with fresh water. POOH sideways with 73 mm tubing and stinger.
45. Repeat above steps for any additional zonal isolation intervals identified.
46. POOH sideways with 73 mm tubing or coiled tubing and stinger.
47. Ensure the fluid level is down at least 3 m to prevent freezing and to facilitate the cut and cap.
48. Remove BOPs. Install wellhead. Rig out.
49. Cut and cap the casing strings with vented cap as per the attached procedure in the Appendix.



Cut & Cap
Schematic.xlsx



Form 03-01 - Notice
of Worksite Supervi:

CORPORATE CONTACTS

Paramount Resources Ltd.
2800, 421 - 7th Avenue, SW
Calgary, AB
T2P 4K9

ARO (Calgary):

	<u>Business</u>	<u>Residence</u>	<u>Cellular</u>	<u>Fax</u>
Tim Wood Abandonment Manager E-mail: Tim.Wood@paramountres.com	(403) 290-2919		(403) 803-8410	(403) 261-1349
Richard Bean Abandonment Supt-Consult E-mail: Richard.Bean@paramountres.com	(403) 303-1929		(403) 793-4586	(403) 261-1349
Steven Ong Rotational Engineer-in-Training E-mail: Steven.Ong@paramountres.com	(403) 817-5089		(780) 286-9752	(403) 261-1349

PRODUCTION (District Office):

	<u>Business</u>	<u>Residence</u>	<u>Cellular</u>	<u>Fax</u>
Completions Sub-Surface Foremen				
Martin Doll /	(780) 683-8037		403 926-7192	
Kent Gillett	(780) 683-8037		403 350-2730	

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 H2S 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 rig anchors on location shall follow Paramount's Ground Disturbance Requirements:
 - a. Contact 1st 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 H₂S 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 (*OROGO does not have a form, so we fill it out on the AER 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 licence. 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 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 07:00 AM 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 District Field Office and 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 (*OROGO does not have these forms, fill out on the AER form*):
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 1st ~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 perfs avoiding a casing collar and pressure test to 7.0 MPa.
- RIH with stinger, sting into and perform pressure and function tests.
- Perform feedrate test to perfs with 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 m³/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 m³ 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 m³ – 3.00 m³ cement, if necessary.
- Do not exceed a pump rate of 1.0 m³/min. or frac gradient (18.0 kPa/m) when feed rate testing or cementing.

Eg. Maximum allowable surface pump pressure when using 1030 kg/m³ 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 (8.0) meter balanced cement plug over the retainer, raise string out of balanced cement plug, backwash string clean with inhibited 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.

CUTTING & CAPPING PROCEDURES:

- Move in 'B'-ticket welder, backhoe, hydrovac unit and steamer, if 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.
- Review the Capping Schematic in this Appendix. 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.

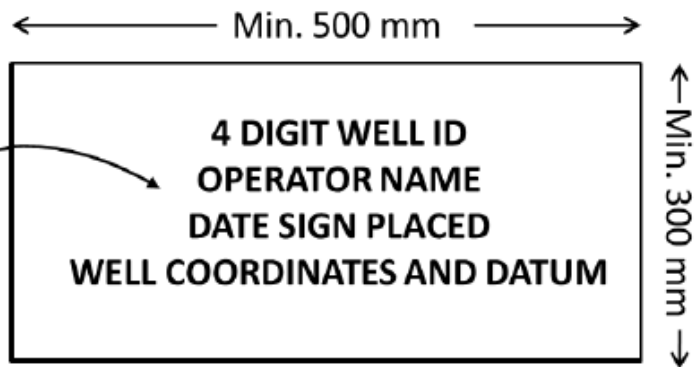
NOTE:

- All seal welds are to be pre & post-heated to 3000°C.

- Install and weld the Protective Cap to the surface casing as shown on the Capping Schematic. Weld inscribe the LSD on top of the Protective Cap and document with a digital photograph.
- 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

Lettering has long-term viability and can be seen from several meters



Min. 5 mm thick
Fluorescent orange

Post Requirements

