



Well Operations Report

Well Name: ARROWHEAD RIVER J-74
UWI: 300/J-74-60.40-122.45/00
License #: WID1987
Field: FT LIARD (5501)
Profile: Vertical
Zone: Chinkeh
Class: Level I

CNRL has performed the well abandonment operations within the last 30 days for this well as outlined in the approved program. Included in this document are the daily reports, and a wellbore schematic of the current state of the well. Additional documentation will follow in the summer once a gas migration test is complete with a change of well status form, and pictures of the cut and capped wellbore.

Please advise if any additional information is required

Thank you,

Canadian Natural Resources Limited

A handwritten signature in black ink, appearing to read "T. Bernhard".

Terran Bernhard, P.Eng.

Abandonment Engineer

Canadian Natural Resources Limited

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Downhole Schematic (Gov't Submission)

ANADARKO ARROWHEAD RIVER J-74

Current Event (UWI) 300/J-74-60.40-122.45/00	Surface Legal Location	License # NT001987	Field Name FT LIARD	Province N.W.T									
Well Profile Vertical	Fluid Type Deep Gas	Original KB Elevation (m) 517.00	KB-Ground Distance (m) 4.80	KB-Casing Flange Distance (m)									
Latitude (°)	Longitude (°)	Orig Spud Date 3/10/2003	Orig RR Date 3/17/2003	C&C Date 1/24/2023	GW Protected? Yes	BGWP (mKB) 604.80	Oilsand Area No						
Directions To Well Refer to surveys							H2S Classification Sweet						
Vertical - Original Hole, 2/17/2023 2:33:24 PM				SCVF & GM Tests (Last 2 Records)									
MD (mKB)	TVD (mKB)	Vertical schematic (actual)		Test Date	Test Type	Failed?							
-1.8				1/24/2023	Gas Migration	No							
0.0				1/24/2023	SCVF	No							
Openhole Information													
Section Des		Size (mm)		Top (mKB)		Bottom (mKB)							
Surface		311.2		4.80		240.00							
Main 1		200.0		240.00		824.00							
Casing Strings													
Csg Des		OD (mm)		Wt/Len (kg/m)		Grade							
Surface		219.1		35.716		J-55							
Production		139.7		20.834		J-55							
Cement Stages													
Description		Cementing Start Date		Top Depth (mKB)		Btm (mKB)							
Production Cement		6.80		824.00		1.00							
Comment 19.0 tonnes Thixmix II + 1.0% CaCl2 + 0.3% CFL-3. 1.0m3 cement returns													
Description		Cementing Start Date		Top Depth (mKB)		Btm (mKB)							
Surface Cement		6.80		240.00		0.50							
Comment 24.0 tonnes G + 3.0% CaCl2 + 4.0 bags cellophane. 0.5m3 cement returns													
Description		Cementing Start Date		Top Depth (mKB)		Btm (mKB)							
Thermal Cement Plug		1/7/2023		641.80		679.80							
Comment 38 Lineal meter (500L) Thermal Cement Plug Circulated On Bridge Plug													
Perforations													
Zone		Top (mKB)		Btm (mKB)		Current Status							
Chinkeh, Original Hole		690.90		690.91		Abandoned							
Chinkeh, Original Hole		695.50		697.00		Abandoned							
Chinkeh, Original Hole		698.00		700.00		Abandoned							
Other In Hole													
Des		Run Date		Pull Date		Top (mKB)							
BPV (for visual)		6/10/2003		1/6/2023		4.50							
3% KCl water		1/24/2023		1/7/2023		4.80							
Steel plate welded to centralizer						6.74							
Fresh Water		1/7/2023				10.00							
Cement Plug		1/7/2023				641.80							
HM2 10k Permanent Bridge Plug		1/7/2023				679.80							
Plug Back		3/19/2003				680.20							
Formation Tops													
Formation Name		Top (mKB)		Com									
Scatter		537.00		Porous									
Garbutt		590.00		Tight									
Base Ground Water		604.80		OROGO Default									
Chinkeh		689.00		Porous									
Debolt		699.50		Tight									
Shunda		717.00		Porous									



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Daily Service Report (Gov't Submissions)

ANADARKO ARROWHEAD RIVER J-74

Job: Abandonment
Report #: 1.0

1/5/2023 10:30 to 1/5/2023 13:00

Current Event (UWI) 300/J-74-60.40-122.45/00		Surface Legal Location	License # NT001987	Field Name FT LIARD	Province N.W.T
WI (%) 100.00	Objective				Plug Back Depth (mKB)
Job Start Date 1/5/2023	Ground Elevation (m) 512.20	Tubing Head Elevation (m)	KB-TH (m)	Casing Pressure (kPa)	Tubing Pressure (kPa) 7,000
Job End Date 1/24/2023	Original KB Elevation (m) 517.00	Casing Flange Elevation (m)	KB-Casing Flange Distance (m)	Road Condition Rough	Set Depth (MD) (mKB) -14 Weather Sunny Temperature (°C)

Daily Activities

Morning Ops @ 7am

Spot rig and equipment

Daily Operations Summary

Moved wellhead crew to location. tried to pull BPV stuck in tbg hanger. Checked scv no LEL'S or H2S. SITP 7000kPa. SICP 16kPa. Rig out wellhead crew.

Time Log

Start Time	Dur (hr)	Comments
10:30	0.25	Held safety meeting with wellhead crew filled out JSA and identified any hazards on location or well.
10:45	2.25	Rigged up on wellhead with lubricator to pull BPV. Screwed into bpv and equalize pressure SITP below valve 7000kPa. Tired to pull bpv stuck in tbg hanger. Notified Calgary. Back tools out and removed lubricator. Poured penetration oil and methanol on top of bpv secured well.

Perforations Summary

Date	Zone	Top (mKB)	Btm (mKB)	Type	Comments
3/20/2003 00:00	Chinkeh, Original Hole	690.90	690.91	Perforated	
3/20/2003 00:00	Chinkeh, Original Hole	695.50	697.00	Perforated	
3/20/2003 00:00	Chinkeh, Original Hole	698.00	700.00	Perforated	

Daily Fluids Summary

Daily Fluids Summary				Operational Supervisors	
Fluid	To well (m³)	From well (m³)	Left to recover (m³)	Contact	Title
				Roy Craft	Wellsite Supervisor
				Dale Duffy	Superintendent
				Jeffrey Willick	Abandonment Ops Mgr.
				Contractor	Rig Number
				Rig Manager	



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Daily Service Report (Gov't Submissions)

ANADARKO ARROWHEAD RIVER J-74

Job: Abandonment
Report #: 2.0

1/6/2023 07:00 to 1/6/2023 18:30

Current Event (UWI) 300/J-74-60.40-122.45/00		Surface Legal Location	License # NT001987	Field Name FT LIARD	Province N.W.T
WI (%) 100.00	Objective				Plug Back Depth (mKB)
Job Start Date 1/5/2023	Ground Elevation (m) 512.20	Tubing Head Elevation (m)	KB-TH (m)	Casing Pressure (kPa) 0	Tubing Pressure (kPa) 7,000
Job End Date 1/24/2023	Original KB Elevation (m) 517.00	Casing Flange Elevation (m)	KB-Casing Flange Distance (m)	Road Condition Rough	Set Depth (MD) (mKB) -17

Daily Activities

Morning Ops @ 7am
SR: POOH Production Tubing
Daily Operations Summary Spotted 400 bbl tank, testers, tubing catwalk and boiler. Spotted and rigged up PD 829 service rig and support equipment. Pulled BPV, Flush 3m3 Fresh Water (Well On Vac). PT BOPs, Install BOPs, Rig In Work Floor And Handling Equipment. Complete SCVF bubble test (Good), GM as per regulations (Good).

Time Log

Start Time	Dur (hr)	Com
07:00		***2 Days Of Charges Added Under Daily Costs For Rig Travel Jan 4 & 5 2023***
07:00	1.00	07:00 - 08:00 Hrs - Complete a detailed job kickoff Safety MTG with PWS Service Rig Crew, Skyline, United safety and Poor Boy Trucking. Review CNRL, PWS, United, Skyline and Poor Boy, Policy's & Procedures, Review Transportation of injured worker Plan. Fire & Explosion Plan and Medics Location, Ensure OROGO, OHS, CNRL and specific companies Policies are followed. Review CNRL 4-Pillars/KPI's, Review site specific Job details/JSA's and work program, Talk about working in the cold weather and importance of taking breaks and watching out for each other.
08:00	4.50	08:00 - 12:30 Hrs - Bed truck spotted 400 bbl tank and boiler. Spot rig matting and equipment with picker, Back in and spot PWS 829 service rig on jacks. Rigged up the following equipment: PWS Service rig 829 with pump, tank and doghouse and Skyline testers P-tank to all OROGO, OH&S & CNRL and specific companies rules & regulations. Completed site supervisor walk around (Good). Complete SCVF bubble test and no bubbles, SICP= 0 kPa SITP= 7000 kPa. H2S = 0%. Complete GM test as per CNRL regulations. (Good).
12:30	2.00	12:30 - 14:30 Hrs - Hold pre-job safety meeting with Stream Flo, tied in boiler line and heated wellhead for 30 mins, move in and spot picker and lubricator.
14:30	1.00	14:30 - 15:30 Hrs - Heat pump lines and manifold. Rig in pump line. Pressure test line to wellhead @ 7 Mpa, open master valve and flush 3m3 fresh water. Rig out pump line. Check well (Slight Vac).
15:30	2.00	15:30 - 17:30 Hrs - Back in and spot 5 ton to well. Tie pump line into test stump, pressure test pipe rams, blind rams, annular, working spool and stabbing valve (1.4 Mpa low - 21 Mpa High), all tests good 10 mins each. Break down and remove wellhead, install strip on pup c/w stabbing valve, pickup and strip on BOPs. Secure BOPs to wellhead.
17:30	1.00	17:30 - 18:30 Hrs - Rig in working floor, handrails, tongs and pipe handling equipment. Rig up catwalk to floor. Shut cap and secure well. Winterize equipment. SDFN.

Perforations Summary

Date	Zone	Top (mKB)	Btm (mKB)	Type	Com
3/20/2003 00:00	Chinkeh, Original Hole	690.90	690.91	Perforated	
3/20/2003 00:00	Chinkeh, Original Hole	695.50	697.00	Perforated	
3/20/2003 00:00	Chinkeh, Original Hole	698.00	700.00	Perforated	

Daily Fluids Summary

Daily Fluids Summary				Operational Supervisors	
Fluid	To well (m³)	From well (m³)	Left to recover (m³)	Contact	Title
Fresh Water	3.00	0.00	3.00	Dale Duffy	Superintendent
				Jeffrey Willick	Abandonment Ops Mgr.
				Mike Hamer	Wellsite Supervisor
				Contractor Precision Well Servicing	Rig Number 829
				Rig Manager Anthony Klimm	



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Daily Service Report (Gov't Submissions)

ANADARKO ARROWHEAD RIVER J-74

Job: Abandonment
Report #: 3.0

1/7/2023 07:00 to 1/7/2023 19:00

Current Event (UWI) 300/J-74-60.40-122.45/00		Surface Legal Location		License # NT001987		Field Name FT LIARD		Province N.W.T
WI (%) 100.00	Objective						Plug Back Depth (mKB)	
Job Start Date 1/5/2023		Ground Elevation (m) 512.20	Tubing Head Elevation (m)	KB-TH (m)		Casing Pressure (kPa) 0	Tubing Pressure (kPa) 0	Set Depth (MD) (mKB)
Job End Date 1/24/2023		Original KB Elevation (m) 517.00	Casing Flange Elevation (m)	KB-Casing Flange Distance (m)		Road Condition Rough	Weather Cloudy	Temperature (°C) -21

Daily Activities

Morning Ops @ 7am
SR: POOH Setting Tool
Daily Operations Summary
Change Over To 73mm Handling Equipment, PT Pipe Rams, Unset Packer, POOH 73 mm Production Tubing, Complete Pipe Swap. RIH HM2 Bridge Plug, Set With CE @ 680 mkb, Top @ 679.80 mkb - Bottom @ 680.20 mkb, PT (Start 7180 kpa - Finish 7102 kpa), Circulate Well To Fresh, Batch Mix And Circulate 500L Thermal 40 Blend Cement +1.5% CaCl2 (38 Lineal meters), Pulled 5 Joints And Backwash Tubing, Pull 1 Tubing. Winterize All Equipment.

Time Log

Start Time	Dur (hr)	Com
07:00	0.50	07:00 - 07:30 Hrs - Complete a detailed Safety MTG with PWS (Service Rig Crew), Skyline and United safety. Review CNRL, PWS, Skyline, United Safety Policy's & Procedures, Review Transportation of injured worker Plan. Fire & Explosion Plan, Medic Locations, Ensure OROGO, OHS, CNRL, Policies are followed. Review CNRL 4-Pillars/KPI's, Review site specific Job details/JSA's, Talk about working in the cold weather and importance of taking breaks and watching out for each other. Sweep lease and wellhead area for LEls and H2S, lease clear.
07:30	1.00	07:30 - 08:30 Hrs - Change over Pipe rams and all handling equipment from 60.3 mm to 73 mm, Tie in pump line to BOPs, Pressure test pipe rams to 1.4 Mpa low - 14 Mpa High for 10 mins each. Good test on BOPs. Bleed off and blow down pump line.
08:30	3.50	08:30 - 12:00 Hrs - Function test ram saver, crown saver, air horn, air kills and all safety devices. Remove leg screws, pull up on tubing hanger and unset packer (1/4 turn right and straight pull), allow elements to relax for 10 mins. POOH to catwalk as follows: 1X73 mm J-55 tubing, 2X73 mm J-55 pups, 70X73 mm J-55 Tubing, 1X73 mm J-55 pup, 1XHowco On-Off, 1XHowco PLS Packer, 1X73mm - 60.3 mm XO, 1X60.3 mm pup, Baker R-Nipple, wireline guide. Change over equipment and prep to RIH.
12:00	4.00	12:00 - 16:30 Hrs - Hold PJSM with Poor Boy Trucking, spot picker and complete tubing swap, remove thread protectors and talley work string. Hold PJSM with Dans Oilfield. MU and RIH with HM2 10K permanent bridge plug, 70 joints off catwalk. Pick casing collar @ 672 mkb, meter in and land BP with CE @ 680 mkb. Top @ 679.80 mkb, Bottom @ 680.20 mkb. Tie in pumping equipment and line, fill tubing pressuring up to 10,500 Kpa setting plug. Tie into casing, fill with 2m3 fresh water and pressure test BP/Casing to 7000 kpa for 10 mins (start 7180 kpa - finish 7102 kpa). Bleed off pressure, Pull up 2 meters, circulate well over to fresh water pumping 9 m3.
16:00	2.50	16:30 - 18:30 Hrs - Hold PJSM with Charger Cementers. Rig in cementers, batch mix 500L Thermal 40 Blend @ 1800 kg/m3, preflush with 300L fresh water, pressure test surface lines to 15 Mpa, pump 500L cement and displace plug with 1.7 m3 fresh water. Rig out cementers. TOC is 641.80, pull and lay out 5 tubing to catwalk. Tie in rig pump and line, backwash tubing with 3.5 m3 fresh water. Rig out pump lines. Pull 1 joint to catwalk.
18:30	0.50	18:30 - 19:00 Hrs - Shut cap and secure well, drain pump lines and pump. Winterize and fuel up all equipment. SDFN.

Perforations Summary

Date	Zone	Top (mKB)	Btm (mKB)	Type	Com
3/20/2003 00:00	Chinkeh, Original Hole	690.90	690.91	Perforated	
3/20/2003 00:00	Chinkeh, Original Hole	695.50	697.00	Perforated	
3/20/2003 00:00	Chinkeh, Original Hole	698.00	700.00	Perforated	

Daily Fluids Summary

Daily Fluids Summary				Operational Supervisors	
Fluid	To well (m³)	From well (m³)	Left to recover (m³)	Contact	Title
Fresh Water	26.00	0.00	29.00	Dale Duffy	Superintendent
Other				Jeffrey Willick	Abandonment Ops Mgr.
				Mike Hamer	Wellsite Supervisor
				Contractor Precision Well Servicing	Rig Number 829
				Rig Manager Anthony Klimm	



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Daily Service Report (Gov't Submissions)

ANADARKO ARROWHEAD RIVER J-74

Job: Abandonment
Report #: 4.0

1/8/2023 07:00 to 1/8/2023 15:00

Current Event (UWI) 300/J-74-60.40-122.45/00		Surface Legal Location	License # NT001987	Field Name FT LIARD	Province N.W.T
WI (%) 100.00	Objective				Plug Back Depth (mKB)
Job Start Date 1/5/2023	Ground Elevation (m) 512.20	Tubing Head Elevation (m)	KB-TH (m)	Casing Pressure (kPa) 0	Tubing Pressure (kPa) 0
Job End Date 1/24/2023	Original KB Elevation (m) 517.00	Casing Flange Elevation (m)	KB-Casing Flange Distance (m)	Road Condition Rough	Set Depth (MD) (mKB) Temperature (°C) -20

Daily Activities

Morning Ops @ 7am

C&C: Well Ready For Cut And Cap

Daily Operations Summary

POOH With 49X73 mm Tubing To Catwalk, Tie In Pumping Equipment And Fill Hole (600L), POOH Remaining 15X73 mm Tubing To Catwalk, Remove BOPs, Install And Secure Wellhead, Rig Out Service Rig, Testers, Boiler, Air hand And All Other Services, Load 400 bbls, Catwalks, Rig Matting And Handling Equipment. Prep To Move.

Time Log

Start Time	Dur (hr)	Com
07:00	0.50	07:00 - 07:30 Hrs - Complete a detailed Safety MTG with PWS (Service Rig Crew), Skyline and United safety. Review CNRL, PWS, Skyline, United Safety Policy's & Procedures, Review Transportation of injured worker Plan. Fire & Explosion Plan, Medic Locations, Ensure OROGO, OHS, CNRL, Policies are followed. Review CNRL 4-Pillars/KPI's, Review site specific Job details/JSA's, Talk about working in the cold weather and importance of taking breaks and watching out for each other. Sweep lease and wellhead area for LEls and H2S, lease clear.
07:30	2.50	07:30 - 10:00 Hrs - Function test ram saver, crown saver, air horn, air kills and all safety devices. POOH to catwalk with 49X73 mm tubing, install pumping equipment, fill hole with 600L fresh water, rig out pumping equipment. POOH to catwalk with remaining 14X73 mm tubing. Break off CCL.
10:00	5.00	10:00 - 15:00 Hrs - Rig out stairs, tubing catwalk and working floor. Remove rig BOPs with PoorBoy picker, winterize and install wellhead c/w chain and lock. Complete visual inspection of mast lowering equipment. Lower mast, take rig off jacks, rig out service rig, boiler, testers and all support equipment. Break apart pump lines and load rig tank. Complete tubing cleanup, load 400 bbl on bed truck, Hook up to doghouse. Complete wellhead cleanup. Prep equipment for rig move.

Perforations Summary

Date	Zone	Top (mKB)	Btm (mKB)	Type	Com
3/20/2003 00:00	Chinkeh, Original Hole	690.90	690.91	Perforated	
3/20/2003 00:00	Chinkeh, Original Hole	695.50	697.00	Perforated	
3/20/2003 00:00	Chinkeh, Original Hole	698.00	700.00	Perforated	

Daily Fluids Summary

Fluid	To well (m³)	From well (m³)	Left to recover (m³)	Operational Supervisors	
				Contact	Title
Fresh Water	1.00	0.00	30.00	Dale Duffy	Superintendent
Other	0.00	0.00		Jeffrey Willick	Abandonment Ops Mgr.
				Mike Hamer	Wellsite Supervisor
				Contractor Precision Well Servicing	Rig Number 829
				Rig Manager Anthony Klimm	



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Daily Service Report (Gov't Submissions)

ANADARKO ARROWHEAD RIVER J-74

Job: Abandonment
Report #: 5.0

1/24/2023 12:30 to 1/24/2023 17:00

Current Event (UWI) 300/J-74-60.40-122.45/00		Surface Legal Location	License # NT001987	Field Name FT LIARD	Province N.W.T
WI (%) 100.00	Objective				Plug Back Depth (mKB)
Job Start Date 1/5/2023	Ground Elevation (m) 512.20	Tubing Head Elevation (m)	KB-TH (m)	Casing Pressure (kPa) 0	Tubing Pressure (kPa)
Job End Date 1/24/2023	Original KB Elevation (m) 517.00	Casing Flange Elevation (m)	KB-Casing Flange Distance (m)	Road Condition Rough	Set Depth (MD) (mKB) -15 Weather Clear Temperature (°C)

Daily Activities

Morning Ops @ 7am

RR: Ready for Reclamation

Daily Operations Summary

Conduct SCV/ GM test, both good. Dig up 2.5 M around well & separate any dirty dirt from good dirt. Welder cut off wellhead. Weld vented plate between Surface & Production Casings. Weld on vented cap with ID #1987. Push in 5 M 73mm Jnt 1 M North of well centre. Back-fill hole with clean dirt. Make up sign with ID #, Company name, Date of Cut & Cap, Coordinates with NAD 83. Production casing cut 2 M below original ground level, Lease is ready for reclamation.

Time Log

Start Time	Dur (hr)	Com
12:30	0.50	Checked with GM tester no ppm's. Conduct Gas Migration test; Take 4 readings at 90° around casing, at a 2 meter radius and at a 6 m radius around well as per CNRL SCVF & GM Testing - Operational Procedures (July 2011). Recorded 0 ppm readings at all locations. SCVF/GM testing done as per CNRL SCVF & GM Testing – Operational Procedure: No issues. Ensure vent is clear. Bubble test SCV for 15 min (No Bubbles)
13:00	4.00	Travel to location Sweep work area with bump tested LEL monitor 0 - LEL's & 0 - PPM H2S. Conduct pre job safety meeting with services complete and review, Hazard Assessment, TIW and OROGO Regulations. Ensure all personnel have had CSO or PST Orientation. Review Beaver Enterprises & Nahanni Hazard Assessment. Dig down 2.5 M below GL & Separate any contaminated dirt from good dirt. Weld vented plate between Surface & Production Casings. Weld on 139.7mm vented cap with ID #1987. Push in 5 M 73mm Jnt 1 M North of well centre. Back-fill hole with clean dirt. Make up sign with ID #, Company name, Date of Cut & Cap, Coordinates with NAD 83. Spray paint Sign & post Orange. Well cut 2 M below original ground level Ensure pictures of operations are in attachments. No Grd Dist as confirm no under ground lines in this field. Lease has wellhead & dirty dirt pile off to the side. Well is Cut & Capped Jan 24 2023 Well is now ready for reclamation.

Perforations Summary

Date	Zone	Top (mKB)	Btm (mKB)	Type	Com
3/20/2003 00:00	Chinkeh, Original Hole	690.90	690.91	Perforated	
3/20/2003 00:00	Chinkeh, Original Hole	695.50	697.00	Perforated	
3/20/2003 00:00	Chinkeh, Original Hole	698.00	700.00	Perforated	

Daily Fluids Summary

Daily Fluids Summary				Operational Supervisors	
Fluid	To well (m³)	From well (m³)	Left to recover (m³)	Contact	Title
Fresh Water	0.00	0.00	30.00	Jeffrey Willick	Abandonment Ops Mgr.
Other	0.00	0.00		Dale Duffy	Superintendent
				Phil Millard	Wellsite Supervisor
				Contractor	Rig Number
				Rig Manager	