



ELM
Environmental Liability Management

Revised Well Abandonment Program

Strategic Oil and Gas Ltd. C/O Alvarez & Marsal Canada
Inc.

STRATEGIC ET AL CAMERON M-74
300/M74 60-10N 117-15W

Elm Inc. Project Number: STRA050

Developed by: Christopher Gagnon EIT
Reviewed by: Malcolm McKean P.Eng

February 6, 2023

ROUTINE ABANDONMENT PROGRAM**BACKGROUND:**

- Zonally abandoned vertical well
- Well completed in the Sulphur Point
- Zonally abandoned with a Permanent Bridge Plug and 8m of cement
- Repaired production casing failure with new casing and remedial cementing
- Top of cement retainer
- Below Cement Retainer to Permanent Bridge Plug, inhibited water

ABSTRACT:

- Move on wireline to run cement bond log
- If bond log shows acceptable cement isolation, coil tubing unit to circulate well to fresh water
- If bond log shows insufficient cement isolation, use service rig to circulate well to fresh water and conduct isolation squeezes
- Cut and cap the well

CONTACTS:**Elm Inc. Calgary Office**

Malcolm McKean P.Eng, Vice President Liability	██████████ – Cell	Malcolm@elminc.ca
Christopher Gagnon EIT, Operations Engineer	██████████ – Cell	Christopher@elminc.ca

Elm Inc. Field Staff

To be determined	To be determined	To be determined

Client Contact

Duncan MacRae – Director, A&M	██████████ - Cell	dmacrae@alvarzeandmarsal.com
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Regulator Contact

OROGO - Office	867-767-9097	orogo@gov.nt.ca
OROGO - 24-hour emergency line	1-867-445-8551	
NWT Spill Line	1-867-920-8130	

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WELL INFORMATION:

WELL NAME: STRATEGIC ET AL CAMERON M74
UNIQUE ID: 300/M74 60-10N 117-15W
SURFACE LOCATION: Lat: 60°03'58.8" Long: 117°29'56.8" (Decimal Degrees)
LICENSE #: 2063
STATUS: Zonally Abandoned
TOTAL DEPTH: 1473 mKB (1473 mKB TVD)
ELEVATIONS: **GL:** 777.9 m **KB:** 782.1 m
BGWP: 600.0 mKB
PLUG BACK: 367.3 mKB (cement on top of retainer)
H₂S DATA: No gas analysis, or reports during completion. Assume worst case of 2%
SCVF: None, last test February 6, 2023.
GAS MIGRATION: None.
SITP: 0 kPa
SICP: 0 kPa
RESERVOIR PRESSURE: 5469.30 kPa – Static Gradient – Feb 28, 2010
MAX FLARE VOLUME: 1.5 x wellbore volume at 10 MPa = 2.82 e3m3

Significant flare volumes are not expected during this operation

LANDOWNER: Crown

DIRECTIONS:

Refer to maps

COMPLETION:

Sulphur Point 1421.5 to 1425.0 mKB (Abandoned)
 Sulphur Point 1414.0 to 1419.0 mKB (Abandoned)
 Sulphur Point 1407.0 to 1408.0 mKB (Abandoned)
 WR Plug w/2m sand 1398.0 to 1400.0 mKB
 BP and Cement 1385.0 to 1393.0 mKB
 Remedial Perforations 390.0 to 391.0 mKB (Open)
 Casing Failure 198.8 mKB to 206.4 mKb

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FORMATIONS:

Formation	MD (m)
Wabamun	557.0
Fort Simpson	723.0
Twin Falls	835.0
Beaverhill Lake	1325.0
Slave Point	1348.0
F 4	1390.0
Watt Mountain	1396.0
Sulphur Point LST	1405.0
Sulphur Point DOL.	1416.0
Muskeg	1430.0
Total Depth	1460.0

TUBULARS:**SURFACE CASING:**

219.1 mm, 35.7 kg/m, J-55, ST&C. Casing landed @ 367.0 mKB. Cemented with 33.0 tonnes 0:1:0 'G' + 1.5% CaCl₂. 7.5 m³ of good cement returns to surface.

PRODUCTION CASING: 139.7 mm, 20.83 kg/m, J-55, ST&C. Landed at 1473.0 mKB. Cemented with 28.0 tonnes Thixlite + 0.4% LTR followed by 9.0 tonnes Expandomix LWL + 0.3% LTR + 0.15% CFL-3. "Full returns to surface throughout job no cement returns".

Bond log ran February 4, 2023, Cement top at +/- 370 mKB.

Remedial Cement:

Remedial perms at 390.0 to 391.0 mKB. Cemented with 9.4 tonnes Mag G 1900. No dies or cement returns to surface.

Replaced Following Casing:

RIH with string shot and fired string shot at 171.3 mKB and 171 mKB.

POOH casing.

Replaced casing with 1 – Pup Joint = 3.12m, 13 joints new CSG = 175.11m, 1 – Pup Joint = 3.19m, 1 Joint CSG = 13.53m. (pg. 9, dated March 03, 2015) – New CSG, 139.7mm, 20.83 kg/m.

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PRODUCTION STRING: Well, is empty.

Casing size and weight	Casing ID (mm)	Casing Drift (mm)	Casing Capacity (m3/m)	Top of Plugback (mKB)	Casing Capacity to Plugback (m3)
219.1 mm 35.7 kg/m	205.66	202.49	0.033221	N/A	N/A
139.7mm 20.83kg/m	127.30	124.13	0.012729	367.3	4.68

DOCUMENTATION & REPORTING:

Daily operation reports are to be emailed prior to 7:00 am the next day following operations. They are to be sent to the ELM Inc office via ElmDownholeOffice@elminc.ca

Daily reports are to include a detailed description of the day's events along with all third party services that were utilized and their respective billing charges. These billing charges are to be added and represented by a daily operational cost. These total daily operational costs are to be reflected in a to-date accumulative cost. Along with the daily report the email must include a brief description of the work that was done that day, as well as a 24 hour forecast for the work to be done the following day.

Any incident or injury is to be reported immediately, after appropriate first- and/or medical-aid has been administered to the Elm Inc. office staff in Calgary. After the situation has been placed under control and all affected parties have been aided or corrected, an incident investigation is to take place and attempt to gather all necessary information via written witness statements and summarized in an incident investigation form. Elm Inc. Calgary office staff will then inform the appropriate client representatives of what has taken place.

After the abandonment has been completed, the well site supervisor is to provide the office staff in Calgary with all third-party purchase orders and field tickets/service reports, material transfers, waste manifests along with all appropriate field safety documents. This needs to be completed immediately following the job.

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 worker comply with regulations. All service companies supplying materials will review Safety Data Sheets at this meeting for all products supplied and maintain

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these Safety Data Sheets available for worker's examination on location in compliance with WHIMIS regulations. All Safety meetings will be recorded on the daily reports.

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.

All applicable regulations, including, but not limited to the NWT Office of the Regulator of Oil and Gas Operations (OROGO) and Occupational Health and Safety regulations, are to be strictly adhered to. Written instructions must be posted in the 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 the daily report. The name of the individual contacted, and the subject matter of approval or notification should be recorded on the same.

REGULATORY:

OROGO regulations require that the Well Approval as signed by the regulator must be posted in a clearly visible location on the work site. The well approval, its additional terms, and this well abandonment program must be precisely followed. Any deviations from the program must be approved by OROGO and clearly documented on the morning report. Include the time, name of person approving changes, and the important points of the phone conversation.

ABANDONMENT PROGRAM:

Pre-Operations Notifications:

1. Notify the Area Foreman 48 hours before operations to begin.

Mobilize and Inspections:

2. Mobilize to location and inspect access. Ensure that access is clear to allow two-way traffic in and out of the site.
3. Mobilize and move in a service rig with Class III BOP system, doghouse, pump and tank, mobile boiler, pressure tank with flare, work string with +/- 390 meters of 73 mm tubing, and air safety hand.

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4. Hold and record a safety and procedure meeting with all personnel on location. Perform a walk around inspection to ensure no hazards on the site. Document meeting topics and prepare a site-specific ERP.
5. Disassemble the SCVF piping and ensure that it is not blocked. Re assemble the piping and install a bottle and hose type tester. Watch tester and ensure there are no bubbles in 10 minutes. Document test on daily report and on the “Surface Casing Vent Flow” form. If using a non-freezing liquid (example windshield washer fluid) for the test, document the liquid used and the density.

Rig up service rig

6. Read and record shut in pressures.
7. Transfer 25 m³ of fresh water to the rig tank.
 - NOTE: Reservoir is under pressured and can be controlled with fresh water
8. Lay circulating lines from wellhead to pressure tank and to the rig tank. Stake lines and pressure test to 1400 kPa low and 21,000 kPa high for 10 minutes per test.
9. Pressure test the casing “as is” to 7000 kPa for 10 minutes.
10. Stump test the BOP stack. Test the ram preventors to 1400 kPa low and 21,000 kPa high for 10 minutes each test. annular preventor to 1400 kPa low and 7000 kPa high, 10 minutes each. Review and function test the accumulator system.
11. Remove the wellhead top section. Install tubing hanger with pup joint and stabbing valve
12. Strip the BOP stack onto the wellhead. Pressure test the connections to 1400 kPa low and 21,000 kPa high for 10 minutes each.

Abandon Remedial Perforations

13. Make up and run-in hole with permanent bridge plug and setting tool.
14. Set plug at 380 mKB. Use setting procedure provided by the tool company.
 - NOTE: A permanent bridge plug must not be set within 5 meters of a casing collar. Collars are located at 385 mKb and 374.5 mKB

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15. Pull out of hole with activated setting tool.
16. Run in hole with test packer. Set packer at 378 mKB and pressure test plug to 7 Mpa for 10 minutes.
17. Pull out of hole with packer and stand tubing.
18. Run in hole open ended. Land tubing just off top of bridge plug.
19. Mix 200L of class G cement in barrel. Circulate cement down tubing using attached procedure. (200 L of cement gives a 15.7m long cement plug).
20. Pull out of hole with tubing.

Remedial Perforation

21. Run in hole with a 1-meter perforating gun. Gun loading to be determined based on availability. Correlate gun based on previous bond log. Perforate 363 – 364 mKB.
 - NOTE: Due to the proximity to cement top, be prepared to reel in the excess wire if the gun is propelled up hole.
22. Close blind rams. Pump down the casing and evaluate feed rate into the perforations. Attempt to establish circulation to surface. Contact Calgary office to confirm cementing plan. Keep wireline on site for next steps

Remedial Cementing – Cement Retainer

23. Run in hole with cement retainer on setting tool and CCL.
24. Correlate to previous perforation log and set at 357 mKB.
 - NOTE: log. A cement retainer must not be placed within 5 meters of a casing collar. Casing collars are at 362.0 and 349.3 mKb.
25. Release wireline.
26. Run in hole with test packer and set at 350 mKB. Pressure test cement retainer to 7 Mpa for 10 minutes.
27. Pull out of hole with tubing and stand in derrick.
28. Run in with stinger. Sting into retainer and confirm feed rates and pressures for cementing company to prepare a treatment program.

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29. Pull into neutral and pressure test tubing to 5 Mpa above the pressure established during the feed rate in previous step. Do not exceed 21 Mpa.
30. Move on remedial cementing crew and vacuum truck.
31. Hold and record a safety and procedure meeting with all personnel on location. Perform a walk around inspection to ensure no hazards on the site. Document meeting topics and modify site specific ERP if necessary.
32. Mix cement as per cementing program.
33. Pump cement down tubing and through retainer. Squeeze cement into formation / circulate to surface as per cementing program.
 - NOTE: if circulating cement to surface, do not shut-in surface casing vent until minimum 0.5 m³ of cement has returned to surface.
34. Squeeze cement to final pressure as per cementing program. If cement was circulated to surface, shut in the vent for the squeeze.
35. Sting out of retainer and balance remaining cement on the retainer.
36. Slowly pull out 2 joints of tubing and tie in circulating equipment. Reverse circulate excess cement out of well, leaving at least 15 lineal meters of cement on top of the retainer. Circulate minimum 2 tubing volumes of fresh water and continue circulating with fresh water until returns are clean. Direct returns to vacuum truck and mix with sugar in truck to prevent cement from setting up.
37. Calgary will advise if there is another zone to perforate and squeeze, or if there are no further operations pending. Pull out of hole and stand tubing if there is further work. Otherwise proceed to “rig out” section

Rig Out

38. Circulate well over to fresh water
39. Pull tubing and lay down, stopping with 5 joints left for a final circulation to fresh water. Pull out last 5 joints but do not top up to prevent wellhead from freezing solid.
40. Remove BOP stack and re install wellhead.
41. Rig out the service rig. Clean the rig tank and send the fluid to the next well for re use, or to the slop tank at the battery to be taken to disposal.
42. Ensure all garbage and debris has been removed from location.

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43. Proceed to “Wellhead Cut and Cap” section.

Wellhead Cut and Cap

44. Move in waterjet cut and cap crew and equipment.
45. Hold and record a safety and procedure meeting with all personnel on location. Perform a walk around inspection to ensure no hazards on the site. Document meeting topics and prepare a site-specific ERP.
46. Install a bottle and hose type tester on the vent assembly. Watch tester and ensure there are no bubbles in 10 minutes. Document test on daily report and on the “Surface Casing Vent Flow” form. If using a non-freezing liquid (example windshield washer fluid) for the test, document the liquid used and the density.
47. Rig in the waterjet cut and cap crew. Cut and cap the well 1.5 meters below ground level following the waterjet company procedures. Take pictures of the well before the cut, with the wellhead removed, the cut surface, and the vented cap before and during instillation.
48. Backfill open excavation. Photograph the backfill.
49. Install abandoned well sign 1 meter north of the well. Sign is to meet the requirements as outlined in the attachment.
50. Release all services. Field operations are complete.

Final Reporting

51. Prepare a final downhole diagram showing the final well configuration
52. Ensure that all tickets and costs are recorded on the morning reports. If a vendor has not submitted their tickets, then put in an estimated cost.
53. Tickets are to be coded with the well name, AFE number, date, and field supervisor’s signature. Ensure vendors electronically send all invoices to

ELM Inc
#1000, 205 – 5th Ave SW
Calgary AB T2P 2V7
AP@Elminc.ca

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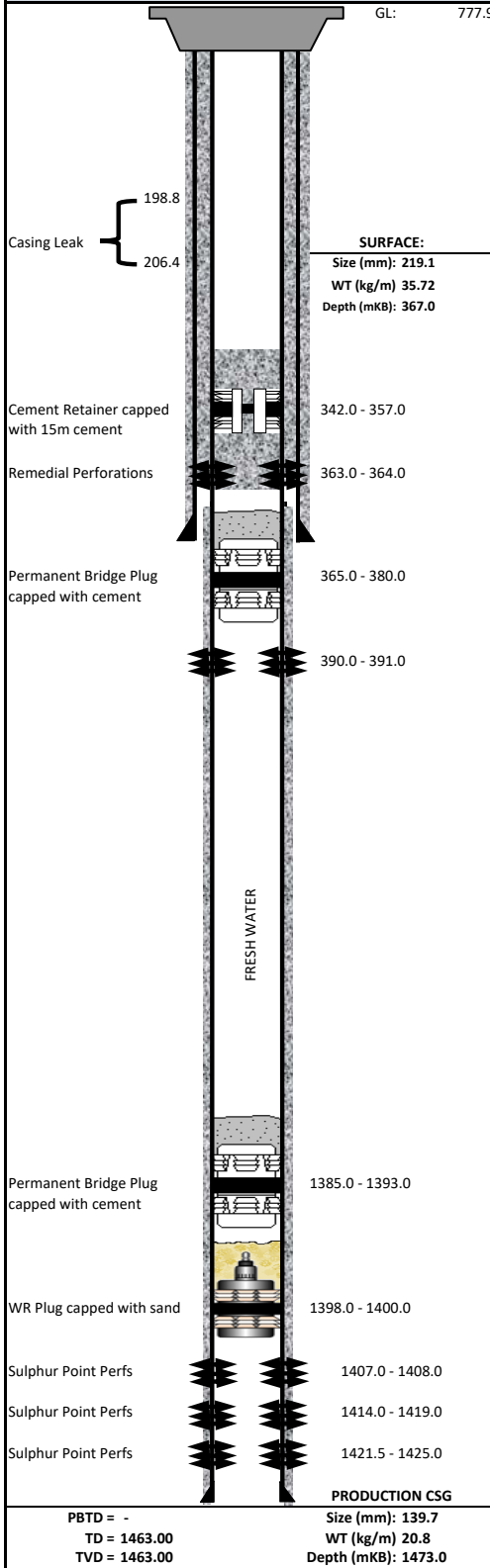
Elm Inc. Terms of Service:

1. The price estimate for this well is presented as a most probable cost based on similar repair operations and is to be used for AFE purposes only. This estimate is only as good as the information provided to Elm. Elm will co-ordinate and supervise the entire operation, pay all third party services and submit a final invoice based on actual costs incurred for equipment and services. Depending on the complexity of the abandonment, location and age of the well, Elm recommends adding 10-25% contingency to the estimates attached.
2. This estimate does not contain any lease clean up costs other than back filling around the wellhead after it has been cut off. If requested Elm's Reclamation Division will perform a site assessment that will be used to determine a cost estimate for surface reclamation. A preferential price to do the site assessment will be given if done in conjunction with the downhole abandonment.
3. Elm does not accept any liability for the well, lease, facility and or property it is working on. Elm acts as an independent consultant, providing mainly consulting and supervision services, with some specialized equipment included.
4. Elm will accept liability for the proper placement of bridge plugs and / or cement plugs that we set, however we do not accept liability for any unforeseen or unmentioned down hole problems. This would include failure of the casing to pressure test, collapsed casing, stuck pipe, tubing or rods, scale and or wax build up, surface casing vent flows, gas migration etc.
5. Elm does accept the responsibility of Prime Contractor for sites that have an agreement assigning the Prime Contractor Status.
6. The cost estimate included services and third party costs as listed, if other services are required they will be billed as per our cost schedule. The client will be informed of any costs to be incurred outside of this summary prior to the work being done. These services usually include: disposal costs, stuck and towing or cat work for access, rental and / or trucking of work strings, trucking of tubing, rods, and / or well heads, sour service, required safety equipment and extra charges associated working in hot or cold temperatures.

Elm's objective is to offer the safest and most efficient abandonment while saving the operator both time and money. We feel that by working with you on this project, we can achieve our goals and maintain the high level of professionalism that is reflected in the end product.



PROPOSED WELL DIAGRAM



GENERAL DETAILS						REV #	1.0
WELL NAME: Strategic et al Cameron M-75		FIELD: Cameron Hills					
UWI: 300/M-74 60-10N 117-15W		LICENSE: 2063					
SURFACE:		LATITUDE: 60°03'58.8"		LONGITUDE: 117°29'56.8"			
COMPANY: Strategic Oil And Gas Ltd		DRAWN BY: C. Gagnon		DATE: 06 Feb 2023			
DEVIATION: Vertical		WELL STATUS: Abandoned					
ELEVATIONS & DEPTHS							
KB (mKB)	GL (m)	KB-SCF (m)	KB-GR (m)	BGWP (mKB)	PBTD (mKB)	TD (mKB)	TVD (mKB)
782.1	777.9		4.20	600.00		1463	1463
CASING STRINGS							
STRING	SIZE (mm)	WEIGHT (kg/m)	GRADE	CPLG	DRIFT I.D. (mm)	SHOE DEPTH (mKB)	
Surface:	219.1	35.72	J-55			367	
Intermediate:							
Production:	139.7	20.8	J-55			1473	
Liner:							
Open Hole:							
CEMENTING							
STRING	DETAIL			Returns (m ³)	Log Cmt Top (mKB)	Calc'd Top (mKB)	
Surface:	33 T 0-1-0 Class G + 1.5% CaCl ₂			7.5 m ³			
Intermediate:	28 T Thixlite + 0.4% LTR 9 T Expandomix LWL + 0.3% LTR + 0.3% LTR + 0.15% CFL-3			No Returns	370 Logged Feb 4, 2023		
COMPLETION DATA							
ITEM	DEPTH (mKB)		STATUS				
Casing Split (3MPa to open, 36 LPM @ 7 MPa)	198.8 - 206.4		Backside cemented off				
Cement Retainer Capped with 15m cement Perforations	342.0 - 357.0 363.0 - 364.0		Cement Squeezed				
Permanent Bridge Plug capped with 15m cement Perforations	365.0 - 380.0 390.0 - 391.0		Abandoned				
Permanent Bridge Plug capped with 8m cement	1385.0 - 1393.0						
Retrievable Bridge plug capped with 2m sand	1398.0 - 1400.0						
Sulphur Point Perforations	1407.0 - 1408.0		Abandoned				
Sulphur Point Perforations	1414.0 - 1419.0		Abandoned				
Sulphur Point Perforations	1421.5 - 1425.0		Abandoned				
LANDOWNER	LANDOWNER #		OCCUPANT			OCCUPANT #	
DIRECTIONS:						Sign Off	
REMARKS:							