

December 14, 2022

Office of the Regulator of Oil and Gas Operations

PO Box 1320
Yellowknife NT, X1A 2L9

By Email: orogo@gov.nt.ca

RE: Abandonment of the Cameron 2B-09 Well (ACW-2021-SOG-2B-09-WID 2071)

ELM Inc, acting on behalf of Alvarez & Marsal Canada Inc in their capacity as the receiver for Strategic Oil and Gas Ltd requests a variation to the well approval for the Cameron 2B-07 well.

The current abandonment program utilizes swabbing to remove the inhibited fluids from the wellbore. Swabbing is typically a slow and inefficient process, with fluid recovery per swab pull decreasing with depth, and issues related to fluids freezing as they are not being pumped under pressure.

ELM proposes a new abandonment program where the well is logged, and if there is no isolations needed, a coil tubing unit can circulate the well over to fresh water. If isolations are needed, then the service rig can circulate the well over to fresh water before perforating and cementing. The new program also contains a procedure for a balanced plug cement squeeze (also called Braidenhead cement squeeze), should the feed rate into remedial perforations deem it the better option.

Our proposed program is the same as the previously approved F-73 program, except for the following changes.

1. Well data
2. Rename the “ground water perforation” section to “remedial perforation”
3. Step 19, depth for this specific well
4. Step 29, reduce the amount of fluid to be hauled to location as the well is already full
5. Step 34, depth for this specific well
6. Step 48, changed program to “during the feed rate in the previous step”. The F-73 program says during step 41, which is no longer correct as steps were added and that was never fixed on F-73 before being submitted.

Should you have any questions or require further information, please contact the undersigned at christopher@elminc.ca

Sincerely,

Christopher Gagnon, EIT

ELM Inc, acting as a consultant to Alvarez & Marsal Canada Inc



ELM
Environmental Liability Management

Routine Well Abandonment Program

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

STRATEGIC ET AL CAMERON 2B-09
302/B09 60-10N 117-30W

Elm Inc. Project Number: STRA050

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

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ROUTINE ABANDONMENT PROGRAM

BACKGROUND:

- Zonal abandoned vertical well
- Well, was perforated, acidized, swabbed, and abandoned
- Abandoned with permanent bridge plug and 10 meters of cement
- Well was not cleaned after swabbing. Contains mixture of oil and produced water (85% water cut)

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 2B-09
UNIQUE ID: 302/B09 60-10N 117-30W
SURFACE LOCATION: 60.135910 -117.515897
LICENSE #: 2071
STATUS: Zonal Abandoned
TOTAL DEPTH: 1520.2 mKB
ELEVATIONS: **GL:** 808.3 m **KB:** 812.6 m
BGWP: 600.0 mKB
PLUG BACK: 1450.0 mKb (Cement top on PBP)
H₂S DATA: None reported, assume worst case 2%
SCVF: None, last tested Sept 26, 2022
SITP: 48 kPa
SICP: 372 kPa
RESERVOIR PRESSURE: 6079.1 kPa, static gradient test March 9, 2010
MAX FLARE VOLUME: 1.5 x wellbore volume at 10 MPa = 2.8 e3m³

Significant flare volumes are not expected during this operation

LANDOWNER: Crown

DIRECTIONS: Refer to maps

COMPLETION:

Sulphur Point: 1467.5 – 1471.0 mKB (abandoned)

Sulphur Point: 1463.2 – 1466.2 mKB (abandoned)

Permanent Bridge Plug and 10 m Cement: 1450.0 – 1460.0 mKB

Bridge plug was pressure tested at 17 Mpa for 15 minutes

FORMATIONS:

<u>Formation</u>	<u>Depth (mKB)</u>
Wabamun	587.0
Jean Marie	764.0
Fort Simpson	770.0
Twin Falls	882.0
Hay River	1039.0
Beaverhill Lake	1374.0
Slave Point	1397.0

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F 4	1438.5
Watt Mountain	1446.0
Sulphur point Limestone	1452.0
Sulphur Point Dolomite	1461.5
Muskeg	1474.0
TOTAL DEPTH	1520.0

TUBULARS:

SURFACE CASING: 219.1 mm, 35.72 kg/m, J-55, ST&C. Casing landed at 391.0 mKB. Cemented with 39.0 T 0-1-0 Class G + 1.5% CaCl₂, **7 m³ cement Returns**

PRODUCTION CASING: 139.7mm, 20.83 kg/m, J-55, ST&C. Casing landed at 1520.0 mKB. Cemented with 27.0 T ThixLite + 0.4% LTR and 9.0 T Expandomix LWL + 0.15% CFL-3 + 0.3% LTR. **2 m³ cement returns.**
Cement bond log ran March 7, 2010. Reports say it looked good, no copy on hand.

PRODUCTION STRING: NONE

Casing size and weight	Casing ID (mm)	Casing Drift (mm)	Casing Capacity (m3/m)	Top of Plugback	Casing Capacity to Plugback (m3)
219.1 mm 35.72 kg/m	205.66	202.49	0.033221	N/A	N/A
139.7mm 20.83 kg/m	127.3	124.13	0.012729	1450	18.45

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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 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

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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 wireline mast unit, mobile boiler, and pressure tank with flare.
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.

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Run radial cement bond log

6. Read and record shut in pressures. If necessary, rig in the pressure tank, stake circulating lines, pressure test each to 1400 kPa low and 21,000 kPa high, and bleed pressure through pressure tank and to flare stack.
7. Rig up the wireline unit with lubricator and bench tested valve for well control.
8. Run in with a gauge ring and casing collar locator to PBTD. Pull out with tools.
9. Run in radial bond tools and record a high-speed log on trip in to PBTD. Run a full radial bond log from PBTD to surface. Send completed logs to wireline company for analysis, and to OROGO and Calgary office.
10. Rig out the wireline unit and all services.
11. Calgary office will review the log and determine if operations are to proceed to the “Circulate with coil tubing” section or to “Remedial perforation” section.
WAIT ON ORDERS.

Circulate well with coil tubing

12. Mobilize and move in a coil tubing unit with Class III BOP system, mobile boiler, water truck, pressure tank with flare, and floc tank.
13. 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.
14. Rig in circulating lines to pressure tank and floc tank. Ensure lines are staked and the lines and manifold are pressure tested to 1400 kPa and 21,000 kPa for 10 minutes each.
15. Stump test the BOP stack. Test the ram preventors to 1400 kPa low and 21,000 kPa high for 10 minutes each. Test the annular preventor to 1400 kPa low and 7000 kPa high, 10 minutes each. Review and function test the accumulator system.
16. Bleed off trapped pressure in well to the pressure tank. If well does not bleed down, then contact Calgary office immediately.
17. Break down wellhead and install BOP stack. Pressure test the BOP stack connections to 1400 kPa and 21,000 kPa for 10 minutes each.
18. Rig in coil tubing injector.

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19. Run in with coil tubing and tag existing plug back at 1450 mKB. Pick up 0.25 meters.
20. Forward circulate well over to fresh water, over displace by 2 m³ to ensure well is clean. Direct returns through pressure tank and to floc tank.
21. Pull out of hole with coil tubing.
22. Close blind rams and pressure test well to 7000 kPa for 10 minutes. Bleed off pressure to the pressure tank. Open the blind rams.
23. Rig out the coil tubing injector.
24. Rig out the BOP system and reinstall the wellhead.
25. Rig out the coil tubing unit. Clean out the floc tank and transfer recovered fluids to the slop tank at the battery for transfer to Alberta disposal.
26. Ensure lease is cleaned of all garbage and debris. Demobilize all equipment.

Remedial Perforation

27. Mobilize and move in a double service rig with Class III BOP system, doghouse, pump and tank, mobile boiler, pressure tank with flare, work string with +/- 1500 meters of 73mm tubing, and air safety hand.
28. 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.
29. Transfer minimum 10 m³ of fresh water to rig tank.
 - NOTE: Formations are under pressured, fresh water will be adequate for well kills. Ensure 1.5 times hole volume is on location for well kill. Well is currently full.
30. Lay circulating lines from wellhead to pressure tank and to the rig tank. Stake lines and pressure test to 1.4 mPa low and 21 Mpa high for 10 minutes per test.
31. Bleed off any well pressure to the pressure tank and flare.
32. Stump test the BOP stack. Test the ram preventors to 1400 kPa low and 21,000 kPa high for 10 minutes each. Test the annular preventor to 1400 kPa low and

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- 7000 kPa high, 10 minutes each. Review and function test the accumulator system.
33. Break down the wellhead, if necessary install a landing pup and stabbing valve, then install the BOP stack. Pressure test the connections to 1.4 mPa low and 21 Mpa high for 10 minutes per test.
 34. Pick up tubing off trailer and run-in hole open ended. Find PBTD at +/- 1450 mKb, then pull up 1 meter.
 35. Forward circulate well over to fresh water, over displace by 2 m³ to ensure that well is all fresh water.
 36. Pull out of hole with tubing. Stand enough tubing for next operations, lay down remaining tubing.
 37. Close in blind rams. Pressure test the well to 7 Mpa for 10 minutes. Bleed off pressure and open the blind rams.
 38. Move on wireline unit.
 39. 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.
 40. Rig in wireline lubricator and full opening valve for well control.
 41. Run in hole with a 1 meter, 86mm ERHSC perforating gun loaded with 25-gram charges at 17 shots per meter and 60-degree phasing. Correlate gun based on previous bond log. Perforating depth to be determined by Calgary office. Pull out spent guns and inspect to ensure all shots have fired.
 42. 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. Options will be “Option 1 – Cement Retainer” or “Option 2 – Balanced Plug”.
 - NOTE: If a feed rate is not established Calgary will have to confirm further operational plans with OROGO, with potential for further up hole isolations.
 43. Rig out the wireline unit.

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Remedial Cementing Option 1 – Cement Retainer

44. Pick up a cement retainer for 139.7mm casing and setting tool.
45. Run in hole with retainer on 73 mm tubing and set as per Calgary's direction.
 - NOTE: Check Calgary's order against the collar log from the bond log. A cement retainer must not be placed within 5 meters of a casing collar. If required, contact Calgary to adjust retainer depth.
46. Sting out of cement retainer and pressure test down casing to 7 Mpa for 10 minutes.
47. Sting into retainer and confirm feed rates and pressures for cementing company to prepare a treatment program.
48. 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.
49. Move on remedial cementing crew and vacuum truck.
50. 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.
51. Mix cement as per cementing program.
52. 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.
53. Squeeze cement to final pressure as per cementing program. If cement was circulated to surface, shut in the vent for the squeeze.
54. Sting out of retainer and balance remaining cement on the retainer.
55. 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.

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56. 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.
57. Depending on the log analysis and the previous cementing operations, Calgary may order another zone to be perforated. If so, return to the “Remedial Perforation” section and contact OROGO for permission to proceed.
58. Remove BOP stack and re install wellhead.
59. Rig out the service rig. Clean the rig tank and take to slop tank at battery or to next location to use as kill fluid.
60. Ensure location is cleaned of all garbage and debris.
61. Proceed to “Wellhead cut and cap” section.

Remedial Cementing Option 2 – Balanced Plug

62. Run in hole with tubing open ended and land 16 meters below the perforations.
63. Move on remedial cementing crew and vacuum truck.
64. 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.
65. Mix cement as per cementing program.
 - NOTE: Minimum cement plug volume is 1 m³
66. Pump cement down tubing and balance in well as per cementing program.
67. Slowly pull tubing above estimated cement top and reverse circulate 2 tubing volumes of fresh water to clean up tubing.
68. Squeeze cement into formation as per cementing program. Final squeeze pressure must exceed 7 Mpa.
69. Once cement has flat lined, close in well with pressure and rig off cementers. Clean up equipment into vacuum truck and mix sugar in truck to prevent cement from setting up.
70. After cement has set up (overnight at minimum) run in with tubing and probe cement plug. Apply 1800 decanewtons to confirm top of plug.

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71. Pressure test plug and casing to 7 MPA for 10 minutes.
72. 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.
73. Depending on the log analysis and the previous cementing operations, Calgary may order another zone to be perforated. If so, return to the “Remedial Perforation” section and contact OROGO for permission to proceed.
74. Remove BOP stack and re install wellhead.
75. Rig out the service rig. Clean the rig tank and take to slop tank at battery or to next location to use as kill fluid.
76. Ensure location is cleaned of all garbage and debris.
77. Proceed to “Wellhead cut and cap” section.

Wellhead Cut and Cap

78. Move in waterjet cut and cap crew and equipment.
79. 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.
80. 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.
81. 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.
82. Backfill open excavation. Photograph the backfill.
83. Install abandoned well sign 1 meter north of the well. Sign is to meet the requirements as outlined in the attachment.
84. Release all services. Field operations are complete.

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Final Reporting

85. Prepare a final downhole diagram showing the final well configuration
86. 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.
87. 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.

