



ELM
Environmental Liability Management

Routine Well Abandonment Program

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

STRATEGIC ET AL CAMERON B-38
300/B38 60-10N 117-30W

Elm Inc. Project Number: STRA050

Original Program: Ken Nikiforuk, Consultant for A&M
Developed by: Christopher Gagnon EIT
Reviewed by: Malcolm McKean P.Eng

December 19, 2022

ROUTINE ABANDONMENT PROGRAM

BACKGROUND (as currently approved):

- Zonal abandoned directional well
- Well produced from Sulphur Point formation
- Abandoned with permanent bridge plug and 15 meters of cement
- Second permanent plug and cement set just below surface
- Well filled with inhibited water

ABSTRACT (as currently approved):

- Move on and rig up service rig
- Rig in a rig assist snubbing unit
- Drill out the bridge plug
- Circulate well to fresh water
- Run bond log
- Perforate and cement squeeze if necessary
- Cut and cap well

CONTACTS:

Elm Inc. Calgary Office

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

Elm Inc. Field Staff		
To be determined	To be determined	To be determined

Client Contact

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

Regulator Contact

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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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:

Use the attached program with the following changes:

Step 5 (p. 3) Contact Calgary Office with the results of the bubble test

Step 30 (p. 5) Perform cement bond log from PBTD to surface. Ensure data is transferred for evaluation as communications allow. Evaluation results to be forwarded to Calgary Office and OROGO as soon as they are available.

Step 34 (p. 5) Correlate all perforating operations to the recently performed cement bond log. Pick up and RIH with 86 mm ERHSC perf guns loaded with 25-gram charges spaced at 17 spm and 60-degree phasing. Position and perforate 1.0 meters at a depth to be determined. POOH and inspect guns to ensure all shots fired.

Step 52 (p. 6) MIRU water jet cut and cap company. Cut and cap wellbore as per vendor procedure. Ensure pictures are taken.

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FINAL REPORTING

1. Prepare a final downhole diagram showing the final well configuration
2. 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.
3. 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.

STRATEGIC OIL & GAS LTD. c/o ALVAREZ & MARSAL CANADA INC

STRATEGIC ET AL CAMERON
B-38 60-10N 117-30W
Wellbore Abandonment

August 10, 2021

CONTACTS:

Engineering:	Ken Nikiforuk	Cell	403 804-2510
Field Consultant:	To be determined	Cell	
Production Foreman:	To be determined	Cell	
Construction:	To be determined	Cell	
Facilities :	Kurt Hewitt	Cell	780 830-8303
Director, A&M:	Duncan MacRae	403 538-7514	Cell [REDACTED]

ATTACHMENTS:

OBJECTIVES:

To perform operations to abandon this wellbore and cut and cap

SAFETY:

SOG Completions safety guidelines given in the "Employee Safety Manual", the "Contractor's HSE Pamphlet" and the "SOG Cameron Hills HSE Assurance plan" will be followed during all completion activities. Discuss the contents of the Contractor's HSE Pamphlet with the rig crew plus all service company personnel prior to the commencing work. Conduct a service rig safety inspection. Fill out the "Service Rig Safety Inspection" sheets; discuss and remedy all unsatisfactory comments and document when follow-up is completed on the daily reports. **Safety meetings are to be held with all on site personnel prior to each event. The wellsite supervisor must notify all personnel of potential hazards and ensure workers are aware of the responsibilities and duties in accordance with the SOG and OROGO regulations and that all workers comply with these regulations. A record of all safety meeting minutes and hazard assessments should be kept on site and submitted along with the daily reports to the Calgary Office at the end of the job. All service companies supplying materials will review Material Safety Data Sheets at the safety meetings and keep the MSDS papers posted on site.**

Contact the lead operator 48 hours prior to moving on to the lease. If this is an existing lease with production equipment, one of the operators should provide site-specific safety concerns and isolate the production equipment as required.

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UWI: 300B386010117300

OROGO Well ID: 2002

AFE: to be determined

WORKING INTEREST: 88%

ELEVATIONS: KB: 729.9 m
GL: 725.3 m

TD: 1652.0 mKB **TVD:** 1477.1 mKB **PBTD:** 6.0 mKB (BP and cement)

DEVIATION: Directional wellbore.

SURFACE CASING: 219.1 mm, 35.72 kg/m, J-55, ST&C. Landed @ 431.0 m KB. Cemented with 32.0 tonnes 0:1:0 'G' + 2.0% CaCl₂. 1.5 m³ of good cement returns to surface.

PRODUCTION CASING: 139.7 mm, 23.07 kg/m, J-55, LT&C. Landed at 1515.0 mKB. Cemented with 30.0 tonnes Thixlite + 1.0% SMS followed by 12.0 tonnes Expandomix LWL + 0.1% CFL-3 + 0.2% LTR. 1.5 m³ cement returns to surface.

TUBULAR DATA:

	<u>Casing</u>	<u>Tubing</u>
Size (mm)	139.7	73.0
Weight (kg/m)	23.07	9.67
Grade	J-55	J-55
Connections	LT&C	EUE
Drift I.D. (mm)	122.56	59.61
Collapse (kPa)	27860	52950
Burst (kPa)	30160	50060
Capacity (m ³ /m)	0.012416	0.003019

PERFORATIONS:

Keg River	1609.5 to 1613.0 mKB (abandoned)
BP and cement	1595.0 to 1605.0 mKB
Sulphur Point	1522.5 to 1525.5 mKB (abandoned)
Sulphur Point	1517.5 to 1519.0 mKB (abandoned)
BP and cement	1500.0 to 1510.0 mKB
BP and cement	6.0 to 21.0 mKB

H2S: unknown (assume 2%)

RESERVOIR PRESSURE: 7300 kPa from static gradient dated Mar 2, 2006 – 5.3 kPa/m

MAX FLARE VOLUME: 1.5 times wellbore volume at 10 MPa = 2.8 e3m³

Note that any significant flare volume in this operation is unexpected

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1. Contact the on shift Area Foreman – to be determined - 48 hours prior to moving rig to location.
2. Hold and record a safety and procedural meeting with all personnel on location. Review and confirm safety certificates of all workers. Job hazard analysis is to be performed on all critical tasks. Complete a site specific ERP form and review it at the safety meeting if required.
3. A sweep of the wellsite shall be performed to confirm the presence or absence of LEL and H2S.
4. Read and record SICP.
5. Conduct a 10 minute bubble test on the surface casing vent using the procedure found in OROGO's Well Suspension and Abandonment Guidelines section 4B. Ensure that the wellhead and SCV piping is not in a frozen state. Check and monitor LEL and H2S levels at wellhead and investigate for evidence of gas migration at surface. Report the results on the daily report and the AER form "Surface Casing Vent Flow FAC-38". Ensure that the vent stays open and clear of obstructions throughout all operations and note any subsequent flows on the daily report. **Contact Ken Nikiforuk with the results of the bubble test.**
6. MIRU service rig complete with pump, tank and Class III BOP's. Rig up all equipment to SOG and OROGO requirements. RU P-tank, safety services and an air trailer. Conduct a walk around lease inspection and hazard assessment. Ensure all necessary safety equipment is strategically positioned on site and tested to ensure proper operating condition prior to commencing the zonal abandonment operations. Document all controls initiated to mitigate identified hazards.
7. The reservoir is underpressured (less than 10 kPa/m) so fresh water will suffice to kill the well. Ensure there is at least 1.5 times hole volume on location prior to commencing kill operations.
8. Pressure test the casing to 7000 kPa for ten minutes.
9. Bleed off casing to P-tank.
10. Install the working spool and BOP's 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 1400 kPa and 21 MPa for 10 minutes each. Install a ported tubing pup and stabbing valve through the BOP's on the BOP test stump. Pressure test the pipe rams and stabbing valve to 1400 kPa and 21 MPa for 10 minutes each. Pressure test the annular preventer to low of 1400 kPa and high of 7000 kPa.
11. Conduct an accumulator function test as per the attached procedure from the WSBOP manual.
12. Install a 73.0 mm landing pup with an open stabbing valve. Strip the BOP's over the landing pup and nipple up the stack. Close the pipe rams on the landing pup and pressure test the BOP connection to the wellhead for 1400 kPa and 21 MPa for 10 minutes each.

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13. BOP drills will be performed at the start of wellbore operations and then weekly if required and are to be recorded on the daily reports. BOP equipment will be function tested at least once daily and any equipment found defective will be made serviceable before operations are resumed.
14. MIRU rig assist snubbing unit.
15. It is unexpected but the pressure underneath the shallow bridge plug and cement could be as high as 7300 kPa (static gradient dated March 2, 2006). As per the OROGO safety bulletin dated April 23, 2021 (attached), a hazard analysis and risk assessment shall be performed as outlined on page two of the bulletin. This risk assessment and hazard analysis shall be forwarded to orogo@gov.nt.ca no less than an hour before drilling operations commence.
16. Pick up and RIH with 4.75" rock bit c/w bit sub and one 3.5" drill collar on 73.0 mm tubing. Tag PBTD (6.0 mKB).
17. Use fresh water as a circulating fluid.
18. Drill out the bridge plug and cement.
19. Run in to +/- 50 mKB.
20. Pull and lay down the 73.0 mm tubing and drilling BHA.
21. A summary of the milling operations must be submitted to orogo@gov.nt.ca within an hour of the completion of milling operations.
22. Rig out and release snubbing unit.
23. Pick up and RIH with drilling BHA on 73.0 mm tubing.
24. Tag the new PBTD at 1500.0 mKB..
25. Circulate 1.5 times hole volume using fresh water (hole volume is 18.6 m3) to ensure wellbore is clean.
26. Pressure test the existing BP and cement to 7000 kPa for fifteen minutes.
27. Pull and stand the 73.0 mm tubing.
28. MIRU electric line truck. Conduct walk around lease inspection and hazard assessment. Document all controls initiated to mitigate identified hazards. Hold and record safety meeting with all personnel on location.
29. The cement bond log dated March 21, 2014 shows good cement from 505 mKB to inside the surface casing (431.0 mKB)

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30. Perform cement bond log from PBTD to surface. Ensure data is transferred for evaluation communications allow. Evaluation results to be forwarded to Ken Nikiforuk and OROGO as soon as they are available.
31. Rig out electric line truck.
32. Depending on the results of the cement bond log evaluation, the decision will be made to go forward with cut and cap operations (proceed to step 50) or to perform remedial cementing operations (proceed to step 33).
33. MIRU electric line truck.
34. Correlate all perforating operations to the recently performed cement bond log. Pick up and RIH with 101.6 mm ERHSC perf guns loaded with 39 gram charges spaced at 17 spm and 60 degree phasing. Position and perforate 1.0 meters at a depth to be determined. POOH and inspect guns to ensure all shots fired.
35. Rig out electric line.
36. Pick up and RIH with 139.7 mm cement retainer on 73.0 mm tubing.
37. Set cement retainer at a depth to be determined.
38. Sting out of retainer and pressure test to 7000 kPa for fifteen minutes.
39. Sting back in to retainer and establish feed rate.
40. Based on the feed rate, the cement blend and volumes will be determined.
41. Sting out of retainer.
42. MIRU cement pumper. Rig up all equipment to SOG and OROGO requirements. RU P-tank, safety services and an air trailer. Conduct a walk around lease inspection and hazard assessment. Document all controls initiated to mitigate identified hazards.
43. Establish circulation between tubing and casing.
44. Batch mix a to be determined volume of a to be determined cement blend.
45. Circulate a to be determined volume of cement down the tubing and sting back in to retainer.
46. Squeeze a to be determined volume of cement into the formation and sting out of retainer.
47. Slowly pull and lay down two joints of the 73.0 mm tubing while rotating and ensure 15 lineal meters of cement has been circulated on top of the cement retainer.

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48. Reverse circulate fresh water at least two tubing volumes or until returns are clean.
49. Pull and lay down tubing. Prior to pulling the last joint out of the hole, circulate over to fresh water.
50. Ensure the well is dead, remove BOP's and install wellhead. Ensure that bull plugs and needle valves are installed where required and the wellhead valves have been chained and locked.
51. Rig out service rig. Ensure lease is clean and free of debris.
52. MIRU NuWave Industries and cut and cap wellbore as per attached procedure. Ensure pictures are taken.
53. Install abandoned well sign as per attached OROGO specifications.
54. All facilities must be removed while ice road access exists. This can occur either before or after service rig operations have taken place but shall be done during the same winter season.
55. A complete LEL and H2S sweep shall be performed in all areas of the lease including the high line, separator building, tank, flare stack etc.
56. All vessels, tanks and high line shall be drained and purged with air prior to dismantling operations. Any recovered fluid or solids shall be trucked to an approved disposal facility
57. All surface equipment shall be dismantled and taken to the laydown yard at H-03 facility. Further processing shall occur at the H-03 laydown yard. Any reuseable equipment shall be separated. Unusable equipment shall be shredded and shipped to an approved salvage / disposal facility.
58. All piles are to be jet cutted at a depth one meter.
59. The pipeline has been previously discontinued and has already been pigged and purged.
60. The pipeline shall be jet cutted at a to be determined depth. This depth will be past the transition point where the pipeline goes horizontal.
61. A pipeline cap detailing location, size and date of capping shall be installed.
62. Ensure lease is clean and free of debris.

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Upon completion of field work the Wellsite Supervisor shall complete the following:

- Prepare a complete set of downhole and wellhead diagrams showing all serial numbers, pressure ratings, sizes, setting depths, etc.
- A complete lease clean-up shall be conducted. All garbage shall be picked up from the lease, all surplus material shall be transferred to proper storage locations and all rental equipment shall be returned.
- Ensure a sign has been installed.
- Ensure that all field-generated PO.'s MT's etc. are filled out vendor's name and address, a brief description of the work performed and a rough estimate of the final expected costs involved.

MORNING REPORTS: All morning reports are to be e-mailed to the following:

Ken Nikiforuk at kanikiforuk@icloud.com

Kurt Hewitt at kurtw.hewitt@gmail.com

Duncan MacRae at dmacrae@alvarezandmarsal.com

OROGO at orogo@gov.nt.ca

FIELD TICKETS/INVOICES:

Field tickets are to be completed in detail with the **Well Location, AFE Number, Codes** and details of the service work. **Tickets are to be signed by the on site representative. These tickets and all invoices must be made out to Strategic Oil & Gas Ltd. c/o Alvarez & Marsal Canada Inc**

Invoices are to be mailed to:

STRATEGIC OIL & GAS LTD. C/O ALVAREZ & MARSAL CANADA INC

#1110, 250 – 6th Avenue SW

Calgary, AB

T2P 3H7

ATTENTION: KEN NIKIFORUK

Prepared By: Ken Nikiforuk
Operations Consultant: _____ Date _____

Approved By: Duncan MacRae
Director, Alvarez & Marsal: _____ Date _____