March 28, 2023

Pauline de Jong
Regulator
Office of the Regulator of Oil and Gas Operations
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Yellowknife, NT
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RE: Information Request No. 2 - Variation 6 - ACW-2019-010-CNRL-A-77-WID1964
Information Request 2 - ACW-2019-009-CNRL-K-77-WID1862

Dear Pauline de Jong:

CRNL received Information Request No. 2 from OROGO on March 21, 2023 regarding CNRL's extension request submitted on March 15th, 2023. Most of the requests in OROGO's document request CNRL to provide an updated program for review. CNRL is unable to provide an updated well abandonment program at this time and is requesting more time to review the proposed technologies before submitting a revised program. Once a plan is in place, a detailed updated program with the specific steps for implementing the technology will be submitted to OROGO. CNRL is requesting until September 15, 2023 to submit this program as this will allow sufficient time to review the new technologies. By September 15th, CNRL will also have a firm understanding on whether or not the vent flows still exist. If they have not died out, then CNRL will submit a revised program outlining the steps that will be taken for the next remedial attempt including intervention intervals.

After further review of the wells, CNRL is requesting this extension to **March 31, 2025** to allow for time to perform two separate, post repair inspection and monitoring reports prior to seeking approval to cut and cap the well.

CNRL has answered the questions below to the best of our ability at this time. Please see below for the requested information for both A-77 and K-77:

2.1 Timing of Operations

- If the SCVF on both wells die out as they are currently on trend to do, CNRL will perform GM testing and further SCVF testing during frost free conditions this summer (between July and September). The wells will then be cut and capped prior to the Q1 2024 deadline once access can be opened back up with winter roads.
- If the SCVF on both wells doesn't die out, CNRL will plan to move back to these locations in Q1

of 2024 to perform the remedial attempts. These wells will be cut and capped by March 31, 2024 if the SCVFs die out after performing these remedial attempts.

2.2 Site Access

- CNRL has determined that if the SCVF does not die out on these wells, a further remedial attempt(s) will be performed as winter operations in Q1, 2024. This will be accessed by winter road, similarly to this past year's winter operation. Previously CNRL mentioned potential summer operations, but after reviewing this option, CNRL has opted for winter operations. Winter operations will allow for a rig if required during any of the remedial attempts and provides more flexibility in the services used.

2.3 Equipment

- Detailed programs for the proposed Biosqueeze and Interwell interventions are not currently available. They will be developed based on well specific data.

2.4 Contingency Plan for SCVF Repair and Well Abandonment

- If the proposed new technologies are unsuccessful at repairing the SCVF, CNRL will move in the required services in Q1, 2024 to perform additional remedial attempts on the wellbores based on no signs of success following the proposed remedial operation.
- Additionally conventional remedial attempts with a service rig (perf and squeeze) should be covered by the existing abandonment programs.

2.5 Bio Squeeze Technology – Potential Impacts/Limitations

- Currently there are no long term durability tests on this product since it is new and hasn't been run for a long period of time. The supplier has indicated that the chemical makeup of the finished product is the same as limestone and poses little risk of long term degradation.
- The perforations will be isolated with a BP and the cement plug will be planned to be dump bailed with the wireline unit that will be at the location during the remedial attempt. CNRL believes this is a very low risk variance, as the producing zones in these wells are already downhole abandoned with a BP and cement plug that was circulated in place.
- Intervals will be selected once additional review of the technology is completed. The projected source in both wells is the Muskwa formation, so this would be the first and deepest interval for both wells.

2.6 Interwell Technology – Potential Impacts

- The company who has developed this technology is avialble to host a virtual technical

presentation on the technology to answer any questions as they have done with other regulators.

- The thermite reaction is designed to only affect the near wellbore to the tool setting depth. A very specific amount of thermite and fuel are loaded into the tool, preventing the reaction from lasting longer than intended. Setting a BP below the interval and spotting 3 meters of sand on the BP, contains the reaction to the intended interval. The reaction happens quickly and cools quickly as well. All tests that the company has done were tagged in the intended location.
- Re-entry past the selected interval would not be possible due to the hardness content of the finished plug. Depth selection for this technology is especially important as it is a destructive technology.
- CNRL's interval would be as deep as possible limiting the risk of needing to later get past the Interval. The specific interval will be selected once additional review of the technology is performed. The projected source in both wells is the Muskwa formation, so this would be the first and deepest interval for both wells.

2.7 Monitoring SCVF

- CNRL will send OROGO SCVF monitoring reports from the Vent-Nanny installed on A-77 and K-77 on the 1st and 3rd Monday of each month once the vent assemblies thaw. This monitoring will be installed until Mid-July 2023 to determine the success of the existing remedial attempts. Vent assemblies will be installed again prior to performing any additional remedial attempts in Q1, 2024 if required.
- Two separate post-repair inspections will be performed prior to cutting and cap the wells.

Please advise if any additional information is required, below are the 2 wells:

300/K-77-60.50-122.30/00 (WID1862)
300/A-77-60.50-122.30/00 (WID1964)

Thank you,
Canadian Natural Resources Limited

Terran Bernhard, P.Eng.
Abandonment Engineer