



NWT OFFICE OF THE REGULATOR OF OIL AND GAS OPERATIONS

Office of the Regulator of Oil and Gas Operations

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Terran Bernhard  
Program Engineer  
Canadian Natural Resources Ltd.  
Suite 2100, 8800 – 2 ST SW  
CALGARY AB T2P 4J8

March 21, 2023

Dear Terran Bernhard:

**Information Request No.2: ACW-2019-010-CNRL-A-77-WID1964 variation 6**

On March 15, 2023, the Office of the Regulator of Oil and Gas Operations (OROGO) received a request from Canadian Natural Resources Ltd. (CNRL) to vary ACW-2019-010-CNRL-A-77-WID1964 variation 5 for the abandonment of the Emile Lake K-77 well (WID1964). CNRL is requesting a change to the Well Abandonment Program and an extension to the deadline for abandoning the well to March 31, 2024.

In order to review CNRL's application, OROGO requires additional information, as set out in the attached Information Request No.2.

Please send your written responses and any associated correspondence to me by email at [oro.go@gov.nt.ca](mailto:oro.go@gov.nt.ca) or through OROGO's secure file transfer site.

Please submit your response on or before 4:00 p.m. on March 27, 2023. If you are unable to respond within this timeframe or have any questions, please contact me at (867)767-9097 or by email at [oro.go@gov.nt.ca](mailto:oro.go@gov.nt.ca).

Sincerely,

Pauline de Jong  
Regulator

c. James Ireland, CNRL  
Wade Hartzell, CNRL  
Dale Duffy, CNRL

**Canadian Natural Resources Ltd. (CNRL)**

**Request for Variation 6 (ACW-2019-010-CNRL-A-77-WID1964)**

**Information Request No. 2**

**2.1 Timing of Operations**

**Preamble:**

CNRL's request for variation, received on March 15, 2023, does not include a schedule for its proposed operations to repair the surface casing vent flow (SCVF) on the Emile Lake A-77 well and complete the abandonment of the well.

CNRL's current Operations Authorization and Well Approval for the abandonment of the Emile Lake A-77 well are based on winter operations and may not be appropriate for operations during other seasons.

**Request:**

Please submit an updated Well Abandonment Program that specifies when the proposed SCVF repair operations will occur and when the well will be abandoned in accordance with OROGO's *Well Suspension and Abandonment Guidelines and Interpretation Notes*.

**2.2 Site Access**

**Preamble:**

CNRL's request for variation, received on March 15, 2023, does not describe how the wellsite will be accessed to carry out the proposed SCVF repair operations or complete the abandonment of the well.

CNRL's current Operations Authorization and Well Approval for the abandonment of the Emile Lake A-77 well are based on winter operations and reflect site access by winter road. This may not be appropriate for the SCVF repair operations CNRL is proposing.

**Request:**

Please submit an updated Well Abandonment Program that specifies how CNRL will access the wellsite to carry out the proposed SCVF repair operations and complete the well abandonment in accordance with OROGO's *Well Suspension and Abandonment Guidelines and Interpretation Notes*.

## **2.3 Equipment**

### **Preamble:**

CNRL's request for variation, received on March 15, 2023, does not describe the equipment to be used for the proposed SCVF repair operations or complete the abandonment of the well.

CNRL's current Operations Authorization and Well Approval for the abandonment of the Emile Lake A-77 well are based on service rig operations. This may not be appropriate for the SCVF repair operations CNRL is proposing.

### **Request:**

Please submit an updated Well Abandonment Program that specifies the equipment CNRL will use to carry out the proposed SCVF repair operations and complete the well abandonment in accordance with OROGO's *Well Suspension and Abandonment Guidelines and Interpretation Notes*.

The equipment description must include confirmation of the type, class and rating of well servicing and well control equipment to be used during the operations, as required under section 6.1 of the *Application Guidelines and Interpretation Notes – Well Suspensions and Abandonments*.

## **2.4 Contingency Plan for SCVF Repair and Well Abandonment**

### **Preamble:**

CNRL's request for variation, received on March 15, 2023, does not address the possibility that neither proposed SCVF repair operation will be successful and that the Emile Lake A-77 well will need to be repaired and abandoned using a service rig.

CNRL's request for variation includes a request for a one-year extension to the abandonment deadline for the Emile Lake A-77 well, currently March 31, 2023. If this extension is granted, CNRL will have only one winter season (January to March 2024) in which to complete the repair and abandonment of the well if the proposed SCVF repair operations are not successful.

### **Request:**

Please submit an updated Well Abandonment Program that includes a contingency plan for completing the SCVF repair and well abandonment using a service rig before March 31, 2024. The contingency plan must include information on wellsite access and proposed equipment.

## **2.5 Bio Squeeze Technology – Potential Impacts/Limitations**

### **Preamble:**

CNRL's request for variation, received on March 15, 2023, proposes Bio Squeeze as an option for repairing the SCVF in the Emile Lake A-77 well. Bio Squeeze involves injecting microbes through perforations in the casing into the space between the casing and the cement which is allowing the SCVF to occur.

OROGO has discussed this option with its consultant and has some concerns about the potential impacts of this option, as follows:

- CNRL has not submitted the results of long-term durability testing conducted by the supplier;
- Bio Squeeze requires a cement cap to cover the open perforations in the casing; and
- Geological background information and interpretation were not provided to justify target intervals for using this product and prove isolation of thermogenic formations.

### **Request:**

Please submit an updated Well Abandonment Program that includes:

- The results of long-term durability testing of this product by the supplier (if available);
- A description of how a cement plug will be installed to effectively cover the perforations; and
- Geological information to justify target intervals for using this product and prove isolation of thermogenic formations.

## **2.6 Interwell Technology – Potential Impacts**

### **Preamble:**

CNRL's request for variation, received on March 15, 2023, proposes Interwell's RockSolid Barrier as an option for repairing the SCVF in the Emile Lake A-77 well. This technology involves creating a chemical reaction in the wellbore that melts the casing, fusing it into a basalt (rock) barrier that blocks the SCVF.

OROGO has discussed this option with its consultant and has some concerns about the potential impacts of this option, as follows:

- The mechanism for controlling the reaction to contain it to the area of interest and not melt other barriers in the wellbore is not clear;

- Should this product fail to repair the SCVF, it would prohibit future re-entry of the wellbore below that depth for additional repair operations; and
- Geological background information and interpretation were not provided to justify target intervals for using this product and prove isolation of thermogenic formations.

**Request:**

Please submit an updated Well Abandonment Program that includes:

- Information on the mechanism for controlling the reaction so that it is contained to the area of interest;
- A description of how re-entry into the wellbore will be achieved should this product fail to repair the SCVF; and
- Geological information to justify target intervals for using this product and prove isolation of thermogenic formations.

## **2.7 Monitoring of SCVF**

**Preamble:**

CNRL's request for variation, received on March 15, 2023, does not include a schedule for reporting to OROGO on the results of current SCVF monitoring on the Emile Lake A-77 well once the vent assemblies have thawed out in the spring.

CNRL's request for variation also does not include any monitoring of the SCVF after the proposed operations to repair the SCVF, even though the two repair methods proposed are not commonly used in Canada.

**Request:**

Please submit an updated Well Abandonment Program that includes a schedule for:

- Reporting on the results of current SCVF monitoring to OROGO on a weekly basis; and
- At least two separate, post-repair inspection and monitoring reports prior to seeking approval to cut and cap the well.