



April 27, 2020

Janpeter Lennie-Misgeld
Senior Advisor, Legislation and Policy
Office of the Regulator of Oil and Gas Operations
4th Floor, 5201-50 Avenue
Yellowknife, NT
X1A 3S9

**RE: Information Request No.1:
Application to Alter the Condition of a Well for the Abandonment of the
Arrowhead River I-75 well (ACW-2019-012-CNRL-I-75-WID1981)**

Dear Sir:

Canadian Natural Resources Limited (Canadian Natural) is responding to the Information Request letter dated March 27, 2020 from the Office of the Regulator of Oil and Gas Operations (OROGO) with the following information:

1.1 Detailed Operations Program

Request: Please submit an updated abandonment program that provides sufficient detail to determine how CNRL proposes to:

- 1) Safely conduct pressure testing of pumping surface lines as stated in Step 17;
- 2) Kill the well as stated in Step 25;
- 3) Ensure that the internal surface of the casing is free of debris and/or scaling if a scraper run is NOT completed before installing the bridge plug as stated in Step 26; and
- 4) Prepare, introduce and circulate the cement when placing the required 30 metres of circulated cement as stated in Step 34.

Response: CNRL has updated the abandonment program with more concise; or additional verbiage to enhance or clarify the procedures / intentions of the program steps in question above.

1.2 Isolation of Porous Zones

Request: Please submit an updated abandonment program that provides sufficient operational and geological detail to determine how CNRL will ensure isolation all porous zones in the open hole section of the well.

Canadian Natural Resources Limited

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Response: There are no perforated intervals in the open hole section of the wellbore. CNRL's geology team notes that interpretation of porosity from strip logs is subjective and that the open hole section is a fractured network. CNRL contends that there are no discrete pressure zones which require isolation in the open hole section.

1.3 Flaring and Venting

Request: Please provide an explanation how the well abandonment operations will be conducted without the need to flare or vent or provide an updated abandonment program that includes procedures for safely flaring or venting the well along with estimates of the rate, quantity and period of flaring or venting that may be required.

Response: As per the "Additional Terms" (below) of Operations Authorization NWT-OL-2014-001 CNRL anticipates and intends to utilize flaring as part of well abandonment operations. The wording surrounding well kill / control operations has been enhanced in the abandonment program for additional clarity.

7. Pursuant to section 67 of the *Oil and Gas Drilling and Production Regulations*, Canadian Natural Resources Limited is approved to conduct controlled flaring utilizing separator packages and/or flare stacks as part of well kill operations at a maximum daily flow rate of 30 x 103m³/day and maximum daily duration of 4.0 hours per day. CNRL is also approved to conduct controlled venting of sweet gas as part of well kill operations at a maximum daily flow rate of 900 m³/day and maximum daily duration of 4.0 hours per day. CNRL shall include the volume and composition of any amount of flared and/or vented gas in its daily report to OROGO. Flaring and/or venting of any volume, daily volume rate and/or duration greater than the approved maximum daily flow shall be reported to OROGO as an incident under section 75 of the *Oil and Gas Drilling and Production Regulations*.

If you have any questions, please contact the undersigned at Ryan.N.Munro@cnrl.com; or at (403) 386-6538.

Yours truly,
CANADIAN NATURAL RESOURCES LIMITED

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Manager, Abandonment Engineering

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