



June 24, 2020

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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. 3:  
Application to Alter the Condition of a Well for the Abandonment of the  
Arrowhead River K-35 well (ACW-2019-016-CNRL-K-35-WID1991)**

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Dear Sir:

Canadian Natural Resources Limited (Canadian Natural) is responding to the Information Request email and attachments received June 12, 2020 from the Office of the Regulator of Oil and Gas Operations (OROGO) with the following information:

### **3.1 Production Potential of Open Hole Section**

**Request:** Please submit detailed geological evidence, interpretation and supporting information to confirm if any geological zone in the open hole section could be impacted (e.g. potential for production) if conventional and/or other stimulation techniques (e.g. hydraulic fracturing) were to be utilized for future oil and gas production within a 5 km radius of the well. Supporting information should include an assessment of offset wells, if any, that have produced from the geological formations in the open hole section of the well.

**Response:** To enhance the detailed review supplied with IR2 please find below a production map showing no production within a 5 km radius of well centre for either K-35 or I-75. The production area of investigation for both K-35 and I-75 includes the same list of wells for evaluation; N-65, F-56 and C-55. Please refer to Table 1 below for a summary of the geological assessment and stimulation / testing results by well and formation. The table clearly shows the Landry is the only formation with aerial extensive porosity, and that porosity streaks or stringers in other formations are localized near wellbore, and have no potential. For the K-35 well specifically the additional information confirms that there are no hydrocarbons or discrete zones within the wellbore, and there are no exploitable hydrocarbons within a 5 km radius, regardless of stimulation technique<sup>[1]</sup>. CNRL's proposed abandonment program is therefore in compliance with Section 56 of the OGDPR.

[1] – Includes hydraulic fracturing with proppant

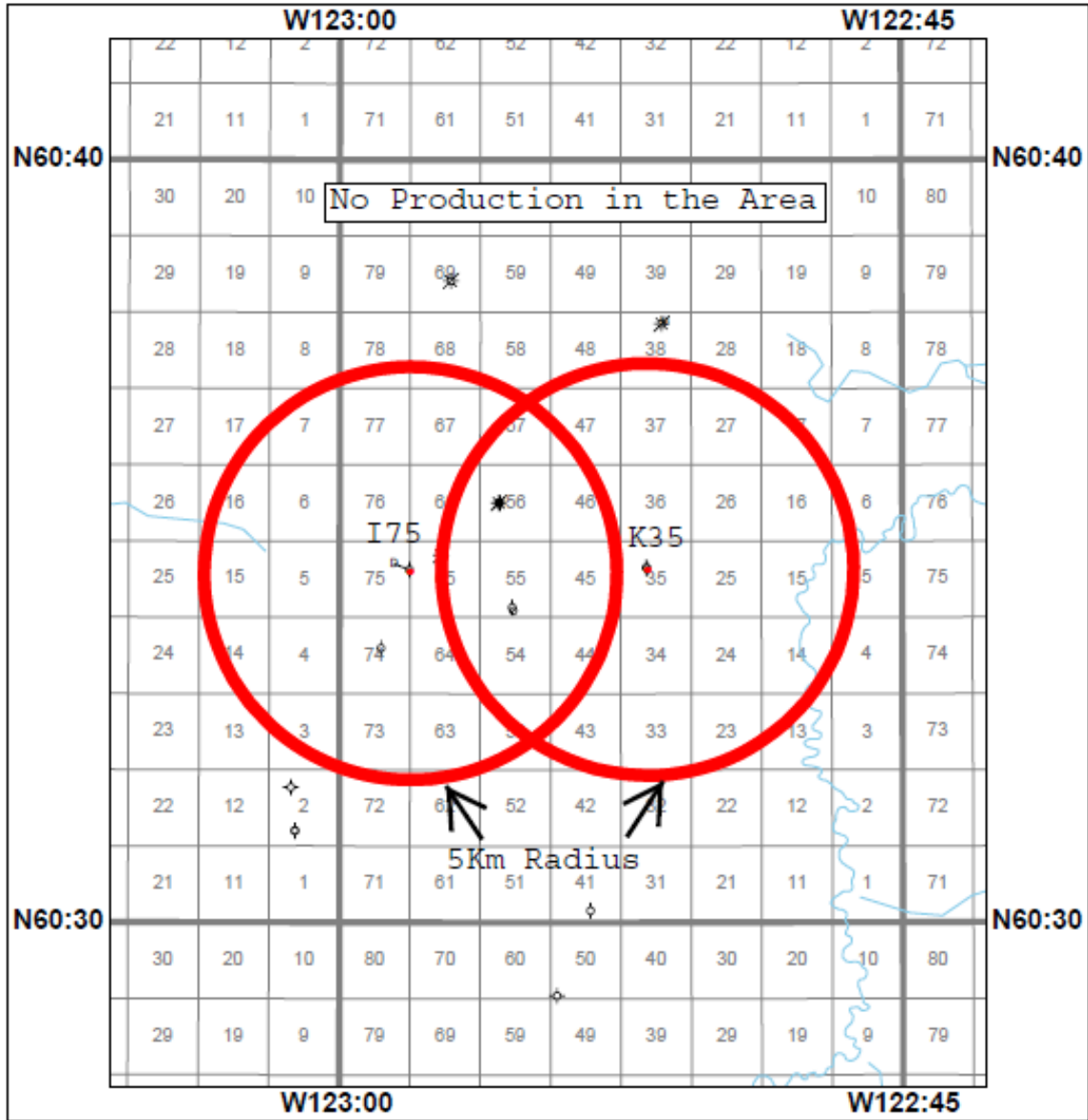
**Canadian Natural Resources Limited**

Suite 2100, 855 - 2nd Street SW, Calgary, Alberta, T2P 4J8 T 403.517.6700 F 403.514.7677 www.cnrl.com

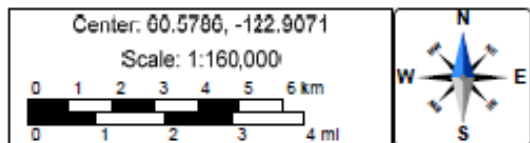
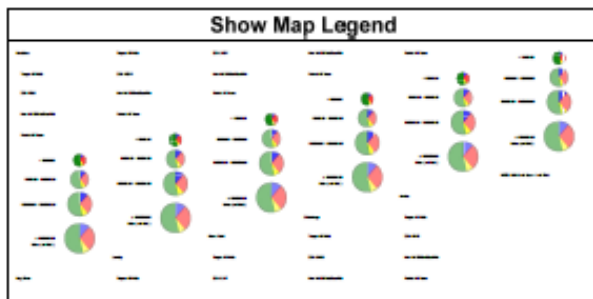


# Canadian Natural

Figure 1. Production map



Map Title Datum: NAD27 Projection: Stereographic DLB Version AB: ATS 2.6, BC: PRB 2.0, SK: STS 2.5, MB: MLI07



Map Title
Description
Les Gray, June 17, 2020
U:\Accumap Files\NWT\accumap

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**Table 1. Summary of geological assessment and stimulation / testing results by formation**

	I-75	N-65	F-56	C-55	K-35
<b>UWI</b>	300/I-75-60.40-122.45	300/N-65-60.40.122.45	300/F-56-60.40-122.45	300/C-55-60.40-122.45	300/K-35-60.40-122.45
<b>License</b>	NT001981	NT001833	NT001978	NT001979	NT001991
<b>Licensee</b>	CNRL	Paramount	CNRL	CNRL	CNRL
<b>Completion Typ</b>	Openhole	Cased / Perforated	Cased / Perforated	Openhole	Openhole
<b>FORMATIONS</b>					
<b>Slave Point</b>	Tight	Porous Streaks Acid Wash Acid Squeeze Flow Test 32 - 165 e3m3/d High water production High depletion PTA boundary = 25-45 m Localized No Commercial Potential	Porous Streak No Potential	Tight	Tight
<b>Watt Mountain</b>	Tight	Anomaly/fault	Tight	Anomaly/fault	Tight
<b>Sulphur Point</b>	Porous Stringers Weak gas show Nil Reservoir No Potential	Porous Streak Acid Wash Acid Squeeze Swab Test Water production Gassy Fluid No Potential	Porous Streaks Perforated 37 metres Acid Wash Acid Squeeze Swab / Flow Test Trace Gas, TSTM No potential	Tight	Tight
<b>Keg River</b>	Tight	Tight	Tight	Tight	Tight
<b>Headless</b>	Tight	Porous Streaks Acid Wash Acid Squeeze Acid Fracture Swab / Flow Test Trace Gas, TSTM Water production No Potential	Tight	Tight	Tight
<b>Landry</b>	Porous No Stimulation Flow Test 125 e3m3/d 70% drawdown Depleting No Commercial Potential	Porous No Test	Porous Acid Wash Acid Squeeze Swab / Flow Test <5 e3m3/d 99% drawdown Depleting No Potential	Porous Acid Wash Acid Squeeze Swab Test No Hydrocarbons 100% water Water Inj. Test >1000 m3/d No Production Potential	Porous Acid Wash Unable to Squeeze Swab / Flow Test No gas, No inflow 100% drawdown No potential
<b>Arnica</b>	NA	Tight	Tight	Tight	Tight

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

Yours truly,  
**CANADIAN NATURAL RESOURCES LIMITED**

Ryan Munro, P.Eng.  
Manager, Abandonment Engineering

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