



September 13, 2019

Pauline de Jong
Chief Conservation Officer
Office of the Regulator of Oil and Gas Operations
4th Floor, 5201-50 Avenue
Yellowknife, NT
X1A 3S9

**RE: Information Request No.7:
Canadian Natural Resources Ltd. Application for an
Operations Authorization for Well Abandonments (OA-2018-005)**

Dear Madam:

Canadian Natural Resources Limited (Canadian Natural) is responding to the Information Request letter dated August 20, 2019 from the Office of the Regulator of Oil and Gas Operations (OROGO) with the following information:

7.1 Waste Management

Request

OROGO requires that CNRL provide the following information to ensure compliance with section 9(h), (i), (j) and (k) of the OGDPR:

- Identify waste streams and handling procedures associated with use, disposal or release to the environment of well bore fluids, drill wastes and/or flared gas as a by-product of the planned well bore abandonment operations;
- Details on how CNRL plans to monitor compliance with the plan for measuring performance objectives; and
- Updated concordance table identifying where the requested information under Section 9 (h), (i), (j) and (k) of the OGDPR is located.

Canadian Natural is providing the requested information (Attachment 7.1)

Canadian Natural Resources Limited

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7.2 Decommissioning and Abandonment Activities Request

OROGO requires that CNRL provide the following information to ensure compliance with Section 6 of the OGDPR:

- Detailed information on methodologies and logistics for the planned well bore abandonments; and
- Details on how operations will be conducted, in a 12 week period, to ensure operational safety and protection of the environment. This should include, but not be limited to :
 - Number of service rigs;
 - Detailed logistics; and
 - Contingencies should there be a delay in one of the well abandonment programs.

Canadian Natural is submitting Attachment # 7.2 for your review

If you have any questions, please contact the undersigned at arly.castillo@cnrl.com or at (403) 514-7637.

Yours truly,
CANADIAN NATURAL RESOURCES LIMITED

A handwritten signature in purple ink that reads "Arly Castillo".

Arly Castillo
Regulatory Coordinator



Table 1 – Waste Streams and Handling/Disposal Procedures Associated with Well Abandonment Operations

Wellbore Waste Stream	Description	Handling and Storage Methods	Handling/Disposal
Wellbore Fluids	All well fluids that are introduced or recovered from the wellbore as a result of abandonment operations.	All fluids will be contained within appropriate storage equipment including transportable storage tanks, rig tanks, pressure vessels and transportation trucks.	<p>All fluids will be contained using surface equipment, and there will be no planned discharge of waste streams to the environment.</p> <p>When possible, well fluids will be reused as primary kill fluid for project wells.</p> <p>All other fluids will be trucked and disposed of within approved OROGO facilities or licensed facilities within British Columbia.</p>
Fresh Water	All fresh water supplied to location for use as workover fluid	Fluids will be contained in above ground storage tanks. Unless specifically managed as a fresh water tank, all fluids will be considered potentially contaminated.	<p>Potentially contaminated fresh water will be disposed of as per Disposal description above.</p> <p>If applicable, managed fresh water tanks may be considered for release to the environment. Canadian Natural will use the Criteria for the Surface Discharge of Collected Surface Run-on/Runoff Waters from Directive 55 (Alberta) for the appropriate release of fresh water.</p>
Associated Gas	Gas Flared or Vented as a result of wellbore abandonment operations.	Due to the lack of pipeline infrastructure, recovery of associated gas will not be possible.	<p>Gas will be flared or vented in accordance to Directive 60 (Alberta) requirements, or specifically consulted with OROGO for unique situations.</p> <p>Flared or vented volumes will be documented and available on request of OROGO.</p>



Canadian Natural

Amended Concordance Table

OGDPR Environmental Protection Plan	Canadian Natural Environmental Protection Plan & Amended Waste Stream Table
(h) a description of equipment and procedures for the treatment, handling and disposal of waste material;	9(h): Waste Management Plan, Section 3
(i) a description of all discharge streams and limits for any discharge into the natural environment including any waste material;	9(i): Waste Management Plan, Section 4 and 5; and well abandonment operations waste listed above.
(j) a description of the system for monitoring compliance with the discharge limits identified in paragraph (i), including the sampling and analytical program to determine if those discharges are within the specified limits; and	9(j): Waste Management Plan, Section 5.5
(k) a description of the arrangements for monitoring compliance with the plan and for measuring performance in relation to its objectives.	9(k): Attachment A: Corporate Statement on Environmental Protection



7.2 Decommissioning and Abandonment Activities

As stated in information request No. 7, Section 7.2, OROGO is requiring additional information specific to:

- Detailed information on methodologies and logistics for the planned well bore abandonments; and
- Details on how operations will be conducted, in a 12 week period, to ensure operational safety and protection of the environment. This should include, but not be limited to:
 - number of service rigs;
 - detailed logistics; and
 - contingencies should there be a delay in one of the well abandonment programs

As the 'Application for Approval to Alter the Condition of a Well' has yet to be submitted and approved, CNRL has only been able to consider a high level approach to the execution of the proposed operations within the Operations Application (OA). As specific well programs are developed, CNRL will build on the existing considerations to ensure appropriate resources are secured and execution scheduled to meet the approved timelines within the OA.

Methodologies and Logistics

Upon initial review of well details, CNRL intends to abandon the project wells through the installation of downhole barriers as described within the Well Suspension and Abandonment Guidelines and Interpretation Notes. If, during specific well abandonment design, alternative abandonment approaches are identified CNRL will propose variances as described in the Guidelines.

Due to the remote nature of the wells, consideration will be given to non-winter heli-portable operations to initiate some of the downhole preparation for service rig operations. In addition, if during the detailed well design or development of detailed logistics, it is apparent that a single season abandonment campaign has risk of non-completion, or there are synergies identified with other operators in the area the project may be split across multiple years prior to the deadline described in the OA.

It is expected all operations will be based out of a camp. The location of the camp will be subject to the detailed logistics planning and may be located in-field or staged out of Fort Liard. Final camp location will be considered for most efficient crew operations, with consideration for minimizing crew travel during winter conditions. Movement of crews by Helicopter will also be considered during the detailed logistics planning.

Operations Execution

As described above, it is expected that the majority of the work will require service rig operations. Due to the configurations and requirements for the wells, consideration will be given to multiple operations simultaneously where rigless operations are conducted to prepare wells for rig operations, as well as complete logging/intervention without service rigs on hole. CNRL has had significant success with project based work, whereas multiple services work as a team in stages rather than working on single wells at a time.



It is expected that operations will be conducted on a 24-hour schedule, with 2-3 crews per operational unit depending on required travel times and crew schedules. Primary equipment anticipated for the size of the project will consist of:

- 1-2 service rigs
- 1 wireline/slickline unit
- 1 cement unit
- Supporting services as required

Development of execution planning will be coordinated with abandonment operations in NE British Columbia, where CNRL has a significant presence. Ideally, the deadlines considered in the OA allow for coordination for a Northern British Columbia project whereas CNRL will have active services that could be mobilized efficiently in the event well conditions or weather result in execution not progressing as initially designed. Coordination with other operators active in the area, if possible, will also provide contingencies for additional services/personnel if required.

Operational safety and protection of the environment will begin with initial well design and continue into vendor and crew selection. Given the short duration and remote nature, vendors and crews will be selected to ensure adequate safety procedures, equipment and crew experience.

In the event there are wells within the program where a Surface Casing Vent Flow remediation is required and are either unsuccessful within the program or time is required to allow for dissipation of gas, CNRL will request extensions to existing OA deadlines as applicable. Additionally, if significant unexpected well issues or delays due to weather are encountered, CNRL will request appropriate extensions the deadlines described in the OA. Due to the remote nature of the wells and high cost for access and crew mobilization, CNRL will make every reasonable effort to complete all well abandonments within the original scope.