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Staff Report

Applicant: Paramount Resources Ltd.	
Location: West of Fort Liard, NT	**File Number:** MV2020A0009 and MV2020L1-0006
Date Prepared: November 3, 2020	**Date of Board Meeting:** November 13, 2020
Subject: Type A Land Use Permit and Type B Water Licence Renewal Applications	

1. Purpose

The purpose of this Report is to present to the Mackenzie Valley Land and Water Board (MVLWB/the Board):

a) A new Land Use Permit (Permit) Application and Water Licence (Licence) Application submitted by Paramount Resources Ltd. (Paramount);
b) Seek confirmation on preliminary screening exemption;
c) Consider the Waste Management Plan;
d) Consider the Spill Contingency Plan; and
e) Consider the Engagement Plan.

2. Background

- November 14, 2013 – Issuance of Permit MV2013A0012 and Licence MV2013L1-0002;
- August 30, 2018 – Extension to term of Permit MV2013A0012 and Amendment to term of Licence MV2013L1-0002; and the Board issued direction on re-assessment of security;
- October 30, 2018 – Paramount submitted a security estimate using Directive 011 from the Alberta Energy Regulator;
- January 17, 2019 – Board directed Paramount to submit a security estimate using the RECLAIM model;
- March 1, 2019 – Paramount submitted security estimate using RECLAIM model;
- March 5, 2019 – Review of security estimate commenced;
- April 5, 2019 – Reviewer comments and recommendations on security estimate due and received;
- April 18, 2019 – Responses on security estimate due and received;
- July 23, 2020 – Applications to renew the Permit and Licence received;
- July 31, 2020 – Applications deemed incomplete;
- August 18, 2020 – Additional information received;
- August 28, 2020 – Applications deemed complete and review commenced;
- September 18, 2020 – Reviewer comments and recommendations due and received;
- September 22, 2020 – Request to extend response deadline received;

- October 2, 2020 – Responses due and received;
- October 8, 2020 – Board invoked 22(2)(b) requesting further study related to security;
- **November 13, 2020 – Applications presented to the Board for decision and Expiration of Permit MV2013A0012 and Licence MV2013L1-0002.**

3. Discussion

Background

The Fort Liard West oil and gas development (referred to as Fort Liard West, or the Project) is situated approximately 20 kilometers (km) northwest of the Hamlet of Fort Liard, Northwest Territories, between Fisherman Lake and Fort Liard River (Figure 1). Development in Fort Liard West contains oil and gas infrastructure and supporting facilities, including:

- five sites (K-29, O-80, M-25, F-25 and F-25A) containing nine natural gas and disposal wells (K-29, K-29A, 2K-29, 3K-29, O-80, M-25, 2M-25, F-25, and F-25A),
- a communication site,
- winter roads,
- an all-season road,
- ice bridges,
- pipelines and pipeline rights-of-way[1],
- quarries (D-05, K-03, G-01, L-04, M-05, C-66, O-10, F-25),
- campsites (D-05, L-18, K-29), and
- sumps (A-01 contains two pits, L-18, F-25).

The development was constructed by different proponents, including Paramount. Paramount has acquired portions of development through mergers and acquisitions. Currently, all of the aforementioned development in Fort Liard West is authorized under Type A Permit MV2013A0012 and Type B Licence MV2013L1-0002 which were issued to Paramount on November 14, 2013.

[1] As described in the Application, K-29, M-25 and F-25 are tied-in to a 37.2km pipeline that connects the K-29 site to the former Pointed Mountain plant site. The M-25 site is linked to the F-25 plant site via a 1.4 km pipeline and the F-25 plant is linked to the main pipeline via a 3.3 km pipeline.

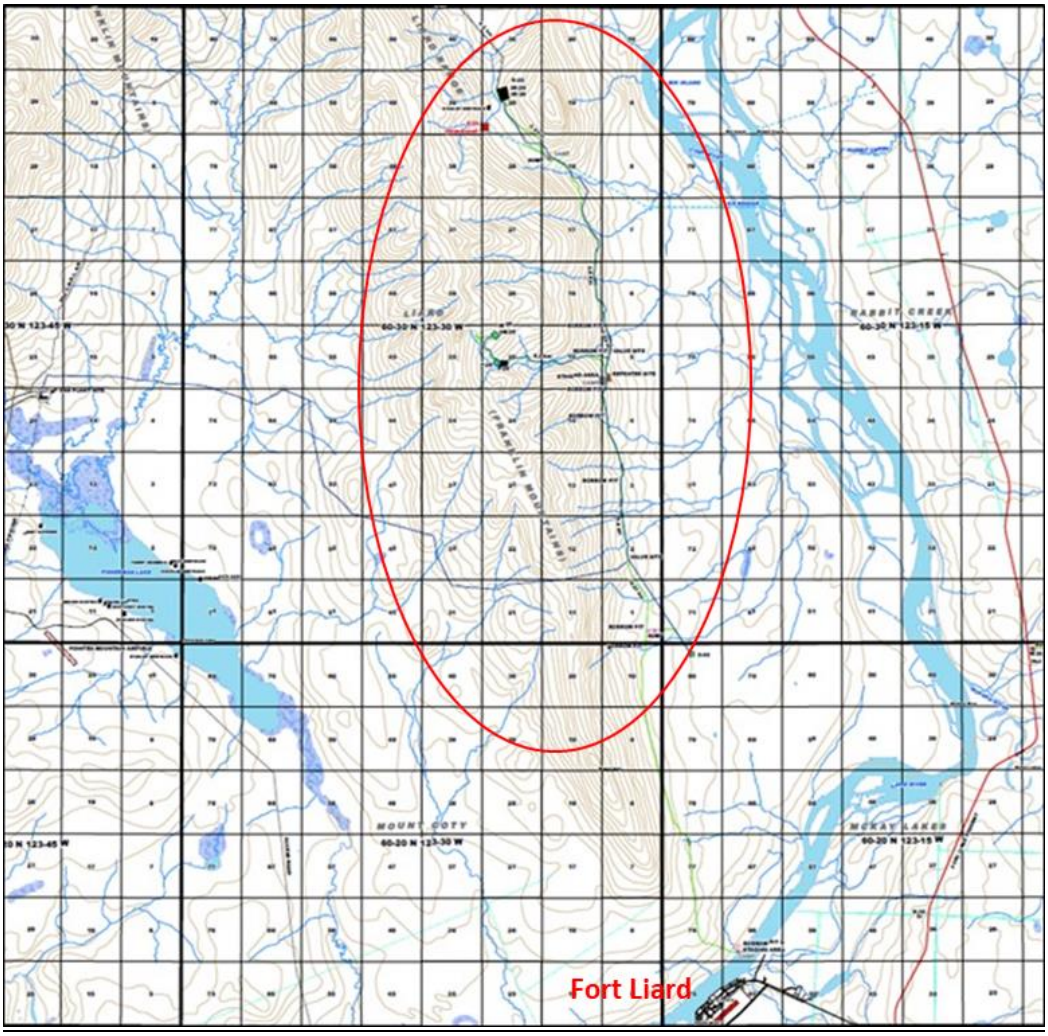


Figure 1: The Project in relation to Fort Liard

On August 30, 2018, the Board extended the term of Permit MV2013A0012 and amended the term of Licence MV2013L1-0002 to November 13, 2020. As part of these decisions, the Board directed Paramount to submit a revised security estimate by October 30, 2018. This stemmed from a recommendation during the review period from the Government of the Northwest Territories Department of Environment and Natural Resources (GNWT-ENR) that the Board initiate a review of the security currently held under the authorizations to ensure the amount appropriately represents the liability associated with the Project.

On October 30, 2018, Paramount submitted a security estimate utilizing Directive 011 from the Alberta Energy Regulator without supporting rationale. The security proposed by Paramount totaled $345,000.00.

On January 17, 2019, the Board determined they could not proceed with the regulatory process based on Paramount's October 30, 2019 submission. The Board directed Paramount to submit another security estimate using the current version of RECLAIM by February 28, 2019 and encouraged Paramount to work with the GNWT prior to submitting.

On March 1, 2019, Paramount submitted an updated security estimate using RECLAIM version 7.0. The submission was the subject of a public review which began on March 5, 2019 and concluded April 18, 2019. The GNWT submitted an updated security estimate as part of the review. Paramount's and the

GNWT submissions resulted in different estimations of liability costs which was not reconciled as part of the review. Because of this, Board staff felt it would be more efficient to address security as part of the renewal Application process. Security is discussed in more detail in the Public Review and Security sections below.

Authorization History

Previous authorizations associated with development in Fort Liard West include the following:

- Permit MV2000A0001 issued to Purcell Energy for the suspension and reactivation of well F-25A;
- Permit MV2000A0059 and Licence MV2000L1-0016 issued to Purcell Energy Ltd for construction of well site facilities for production and connection to the pipeline located at 60° 24' N, 123° 35' W;
- Permit MV2001P0097 issued to Paramount for the construction, maintenance, operation and reclamation of wellsite dehydration facilities and pipelines with associated rights-of-way;
- Licence MV2001L1-0011 issued to Paramount for ongoing operation and maintenance; and
- Permit MV2006P0021 and Licence MV2006L1-0005, renewals of Permit MV2001P0097 and Licence MV2001L1-0011, respectively, issued to Paramount to continue ongoing operations, quarrying, staging and maintenance of the well sites and transportation facilities.

The existing Permit MV2013A0012 and Licence MV2013L1-0002 were renewed from Permit MV2006P0021 and Licence MV2006L1-0005, respectively. The scope of the existing authorizations is as follows:

- Maintenance and operation of access roads, well sites, quarry sites, staging areas, gathering system and pipeline rights-of-way, a communication system, camps, pipelines, sumps, and related facilities; and
- Other related activities such as completion, evaluation, recompletion, suspension, reentry work of existing well sites[2].

Description of Applications

On July 23, 2020, Paramount submitted renewal applications for Fort Liard West (MV2020A0009 MV2020L1-0006) to replace the existing Permit MV2013A0012 and Licence MV2013L1-0002. Paramount Resources Ltd. proposed a start date of November 1, 2020 and a completion date of October 31, 2025, resulting in a term of 5 years.

Paramount described the activities as well re-entries, completions, suspensions, abandonments, production, reclamation, and remediation. Paramount indicated the Applications include all facilities and activities previously approved as part of Permit MV2013A0012 and Licence MV2013L1-0002. Paramount indicated exploratory oil and gas drilling was not part of the Application and that all project components were constructed. The well and battery sites K-29, O-80, M-25, and F-25A are suspended while F-25 has been abandoned. Production was excluded from the draft authorizations as oil and gas production requires a Type A application as per the Waters Regulations Schedule D, Item 3(b), which Paramount has not applied for.

[2] Re-activation and production were included as part of the scope of the Permit but not part of the scope of the Licence. The Decision Letter for the existing Licence indicated production would require a Type A Water Licence, which Paramount had not applied for at that time, and has not been applied for as part of the current Applications.

The applications were deemed incomplete on July 31, 2020. In the incomplete letter Board staff requested clarification on eligibility, the status of Project infrastructure, detail pertaining to the camp layout, clarification pertaining to waste management, clarification on fuel storage and spill response measures.

By August 18, 2020, Paramount submitted a response letter and revised application material. Board staff deemed the application complete on August 28, 2020 and distributed the Application for review.

Management Plans

A Waste Management Plan (WMP) and Spill Contingency Plan (SCP) were included with the Application. The plans were previously approved under the existing Permit and Licence. The Plans provide an overview of management practices for the Project area; however, issues on the plans applicability to current practices and Project detail were identified. Comments and recommendations pertaining to the content of the WMP and SCP were received during the public review. The adequacy of the plans is discussed further in the Public Review section below.

Engagement

An Engagement Record and Engagement Plan were included in the Application. Paramount noted they engaged with the following parties:

- Acho Dene Koe First Nation (ADKFN),
- Dehcho First Nations (DFN),
- Dene Tha First Nation (DTFN),
- DTFN-Department of Lands,
- Hamlet of Fort Liard (the Hamlet),
- Sambaa k'e First Nation (SKFN), and
- SKFN Development Corporation.

Paramount began engagement by contacted parties through electronic mail on April 3, 2020. Paramount contacted parties again on April 21, 2020 through electronic mail and phone calls.

Acho Dene Koe First Nation
ADKFN provided comments and recommendations on June 1, 2020. Paramount replied to ADKFN on June 19, 2020. Table 1 identifies the concerns, comments and recommendations expressed by ADKFN and Paramount's subsequent response.

Table 1: Correspondence between ADKFN and Paramount

ADKFN Concerns, Comments and Recommendations (June 1, 2020)	Paramount Response (June 19, 2020)
Require additional time to review applications.	Encouraged ADKFN to contact the MVLWB to request an extension.
Expressed they would not be in favor of the Applications being exempt from preliminary screening.	Noted that the Project areas were subject to previous screenings and assessment processes and would indicate ADKFN's non-support in the Applications' Engagement Record.
Expressed concern on the effectiveness of the conditions of the existing authorization and provided their comments and recommendations.	Stated the MVLWB review processes review the effectiveness of Licence and Permit conditions.
Expressed they did not want to be referred to as a stakeholder.	Altered the term stakeholder to affected party in the revised Engagement Plan.
Requested capacity for Traditional Knowledge and land use activities.	Stated they would not provide capacity for Traditional Knowledge and land use activities as the projects do not involve altering the footprint or activities.
Requested ADK Holdings Ltd. be added to the distribution list.	Added ADK Holdings Ltd. to the Engagement Plan.
Requested an openness to face to face and community meetings.	Stated community meetings are included in the Engagement Plan under reclamation and remediation planning.

Dehcho First Nations
On April 22 and April 29, representatives of DFN requested the engagement material be provided again. Paramount responded by resending the material via email.

Dene Tha First Nation
DTFN responded to Paramount on April 23, 2020 and indicated they had reviewed the material and did not have any concerns.

Hamlet of Fort Liard
On April 22, 2020, the Hamlet notified Paramount the material would be a part of the next Council meeting. No further correspondence between the Hamlet and Paramount were identified.

Sambaa k'e First Nation
On May 28, 2020, SKFN requested a meeting with Paramount. On June 5, 2020, SKFN and Paramount held a meeting by video conference where they discussed the area and Paramount's Liard Projects, which encompasses Liard West, East and South, and two other projects near the Hamlet of Fort Liard: Celibeta and Pointed Mountain. Following the meeting, on June 9, 2020, Planit North, on behalf of SKFN, emailed Paramount with four requests. The requests and Paramount's subsequent response, on June 19, 2020, is provided in Table 2 below.

Table 2: Correspondence between SKFN and Paramount

SKFN Concerns, Comments and Recommendations (June 9, 2020)	Paramount Response (June 19, 2020)
Update and expand representatives' contact information and use the name Sambaa k'e First Nation	Indicated they would update the contacts for SKFN.
Requested meetings twice annually in person or via tele/video conference.	Recommended meetings on an as needed basis due to some years having low amount of activity.
Requested exploring opportunities to have representatives visit sites during field activities, at least once per field season.	Encouraged SKFN to pursue site visit options with the GNWT and the Office of the Regulator of Oil and Gas Operations (OROGO).
Requested a representative attend helicopter inspections of the Celibeta site.	Encouraged SKFN to pursue site visit options with the GNWT and OROGO.

Eligibility

As per section 18 of the Mackenzie Valley Land Use Regulations (MVLUR), eligibility must be determined before the Board can issue a permit. As part of their Application, Paramount indicated they hold Production Licences 09 and 11 and Significant Discovery Licence 099 with the GNWT Department of Industry, Tourism and Investment (GNWT-ITI) Mineral and Petroleum Resources Division. Paramount is eligible for a permit under subsection 18(a)(i) of the MVLUR:

18) A person is eligible for a permit who
(a) Where the proposed land-use operation is in the exercise of a right to search for, win or exploit minerals or natural resources,
(i) holds the right

Paramount included existing quarries in their Application and indicated they hold one active quarry permit with the GNWT in Fort Liard West (2018QP0003) which is valid until January 10, 2021. Paramount clarified that if they require quarry material after the expiry date then they would apply for a new quarry permit and provide the information to the MVLWB. Board staff have included this information in the Decision Letter.

Type of Area

This Project is in a non-federal area.

Fees

The required fees were included with the Application (attached):
- $150 Permit Application Fee,
- $30 Licence Application Fee, and
- Anticipated water use fees for the Licence.

Term

Paramount has applied for a Permit term of five years. Paramount indicated the Project contains oil and gas infrastructure but are not producing; well and battery sites K-29, O-80, M-25, and F-25A have been suspended while F-25 has been abandoned. Compliance requirements for oil and gas wells which have been suspended or abandoned are outlined in OROGO *Well Suspension and Abandonment Guidelines and*

Interpretation Notes (2017)[3]. Based on the timelines for suspended and abandoned wells described in the OROGO (2017), the requested term of five years is appropriate.

Board staff note that permits can be granted for a period of five years, plus a two-year extension (for a total of seven years). Section 26(2) of the *Waters Act*/subsection 72(2) of the MVRMA allows for licences to be issued for a term not exceeding 25 years. A decision is required on the terms.

4. Comments

Triggers

The activities as described trigger a Type A permit as per paragraph 4(a) of the MVLUR:

(4) No person shall, without a Type A permit, carry on any activity that involves
(a) on land outside the boundaries of a local government,
(ii) the use of a vehicle or machine of a weight equal to or exceeding 10 t, other than on a road or on a community landfill, quarry site or airport,
(iii) the use of a single container for the storage of petroleum fuel that has a capacity equal to or exceeding 4 000L,
(iv) the use of a self-propelled motorized machine for moving earth or clearing land.
(v) the leveling, grading, clearing, cutting or snowploughing of a line, trail or right-of- way, other than a road or existing trail to a building, that exceeds 1.5 m in width or 4 ha in area, for the purpose other than the grooming of recreational trails; or
(b) On land within or outside the boundaries of a local government,
(ii) The use of a campsite outside a territorial park for a duration of or exceeding 400 person-days,
(iii) The establishment of a petroleum fuel storage facility with a capacity equal to or exceeding 80 000 L, or
(iv) The use of a stationary motorized machine, other than a power saw, for hydraulic prospecting, moving earth or clearing land.

The Project triggers a Type B Water Licence for water use as per Schedule D, item 2(1) of the Waters Regulations for the construction of an ice road / ice bridge which constitutes a water course crossing, dust control, and fluid make-up.

Inspection Reports

Board staff have reviewed the recent Inspection Reports on the public registry. An Inspection on July 29, 2020 noted an unacceptable condition at wellsite M-25: the doors were left open and not secured, while vents were dislodged and fell from the roof of the site building. The Inspector requested the material be cleared prior to December 1, 2021. Board staff note that inspections on July 25, 2018 and July 13, 2015 also identified that the roof vents fell from site buildings. Inspection reports have not identified other unacceptable conditions for which Paramount has not addressed.

5. Public Review

Two public reviews are summarized in this section. The first public review pertained to the re-assessment of security which occurred from March 5 to April 18, 2019. The second public review pertains to the renewal applications submitted on August 18, 2020, which occurred from August 28 to October 2, 2020.

[3] OROGO *Well Suspension and Abandonment Guidelines and Interpretation Notes (January 25, 2017)*

Board staff understand there are links between the two reviews and so are presented chronologically. Review Summary and Attachments for both reviews are attached.

Public Review of the Security Re-assessment (March 5 to April 18, 2019)

Security was re-assessed as part of a public review process in March and April 2019. In the public review for the renewal Applications, Board staff communicated that evidence gained as part of the review for the re-assessment of security would also be used to establish security for the applications Paramount applied for. The security re-assessment was based on RECLAIM estimates Paramount submitted on March 1, 2019. By April 5, 2019, comments and recommendations on the RECLAIM estimates were received from four reviewers:

- Landmark Resource Management on behalf of ADKFN;
- GNWT-ENR;
- GNWT-Lands; and
- OROGO.

Paramount responded by April 18, 2019.

Main Issues Raised During the Security Re-assessment Review

- ADKFN raised the following issues as part of the review:
    - Socioeconomics (comment ID-1) - ADKFN discussed business and employment opportunities as a result of the Project. Paramount responded by indicating they have provided socio-economic opportunities to ADKFN and envision continuing to do so. Regarding ADKFN's request, Board staff note that a recent decision made by the Board where the Board indicated that it is not within the Board's jurisdiction to require agreements related to funding to be in place, and the Boards' Engagement Guidelines do not require Applicants to report extensively on engagement efforts related to socio-economic issues.[4]

    - Funding (comment ID-2) - ADKFN stated the estimate did not include funding for engagement processes. Paramount noted they included funds under indirect project costs which they feel are sufficient for engagement. Paramount further stated they have committed to ongoing engagement throughout the life of the project via the approved Engagement Plan. Board staff note that cost for engagement is a required as per the MVLWB/INAC/GNWT *Guidelines for Closure and Reclamation Cost Estimates for Mines*[5] which can be used to inform closure cost estimates for projects that are not mining, milling or advanced mineral exploration projects (e.g. oil and gas projects).

    - Traditional Knowledge (comment ID-3) - ADKFN requested they be included on the selection of seed, vegetation and propagation through the use of Traditional Knowledge (TK) and expertise. Paramount did not directly address the request but committed to using native species. Board staff note that one of the Minister's modification to measures from EA99-0061-86 was to

[4] See MV2019X0007 – Giant Mine Remediation Project – Reasons for Decision
[5] See MVLWB/INAC/GNWT *Guidelines for Closure and Reclamation Cost Estimates for Mines (2017)*

incorporate Traditional Knowledge into the Project and include re-vegetation planning as part of Closure and Reclamation. Board staff note these are included in draft Licence conditions.

- Post-Closure Monitoring and Maintenance (comment ID-4) - ADKFN indicated they felt there was an insufficient amount of time and cost allotted for Post-Closure Monitoring and Maintenance. Board staff note Paramount's estimate is similar to the GNWTs estimate, which was also a one year in duration.

- GNWT-ENR submitted a RECLAIM estimate as part of their review. The RECLAIM estimate submitted by GNWT-ENR and the responses from Paramount are discussed in detail below. As context for the discussion, Board staff note that the Board previously encouraged Paramount to work with the GNWT to reduce the amount of assumptions made in their estimate (January 17, 2019 direction). As part of the review, GNWT-ENR stated Paramount had not engaged with them prior to submitting their estimate.
  - RECLAIM Assumptions (comment ID-1 and 2) – GNWT-ENR indicated that the applications for the existing authorizations had insufficient information to inform an accurate RECLAIM estimate and further indicated that Paramount's RECLAIM estimate lacked supporting information. GNWT-ENR clarified that Paramount had not communicated with them prior to their submission. GNWT-ENR recommended Paramount submit supporting information and rationale for their estimate to clarify any significant discrepancies.

    Paramount responded stating they established their estimate using information on the MVLWB public registry, information contained in current and former applications, the commitments Paramount made (or inherited) under Environmental Assessment processes, and information from inspections conducted by the GNWT and Crown Indigenous Relations and Northern Affairs Canada (CIRNAC). Paramount indicated they disagreed with the GNWT's estimate and encouraged the GNWT to submit a revised estimate based on their responses. Board staff note that Paramount provided the following information in response to GNWT-ENR's comment ID-5.

    > *For Liard West, there are no camps at D-05 or L-18 and the camp at K-29 is part of the production equipment. GNWT ENR assumes monthly monitoring will be required, this is not done at present for the fields and is not a standard reclamation practice. No justification is provided in their estimate as to why monthly monitoring would be needed.*

  - Access Roads (comment ID-3) – The GNWT indicated they did not include the reclamation of access roads and encouraged Paramount to contact the local rights holders to confirm if they would like the roads reclaimed or left in place. Paramount did not commit to contacting local rights holders, but, rather, mentioned that if local stakeholders express an interest in being assigned or purchasing portions of the Project that Paramount would be open to those discussions.

  - Pipeline (comment ID-3 and 4) – The GNWT indicated they did not include cost for the removal of pipelines because of uncertainty as to whether the pipeline is part of the MVLWB authorizations or reclamation requirements or under other jurisdictions, such as the National Energy Board (NEB, now the Canada Energy Regulator) or OROGO. The GNWT recommended the

MVLWB and/or Paramount confirm which jurisdiction should hold the appropriate security for the pipeline and, if applicable, include it as part of an updated RECLAIM estimate. Paramount responded by stating the pipeline, and associated surface equipment, is the responsibility of the (OROGO), having formerly been the responsibility of the NEB, while the pipeline right of way is the responsibility of the MVLWB. Board staff note that OROGO, as part of their review (comment ID-1), indicated they hold Proof of Financial Responsibility (PFR) which may be used to pay claims made under section 63 of the *Oil and Gas Operations Act* (OGOA) for actual loss or damages from or for cost associated with clean-up of debris, spills or discharges, emissions or escape of oil and gas.[6] Board staff note that section 63 of OGOA does not address cost associated with well abandonment, remediation or reclamation, and OROGO has previously clarified that PFR does not cover such costs.[7]

- Security Estimates (comment ID-5 and 7) – The GNWT commented that Paramount suggested a security amount of $698,904.00 for the Permit and $3,593.00 for the Licence. The GNWT submitted security estimates using the Oil and Gas RECLAIM Model and indicated they used information from Paramount's applications for the existing authorizations. The GNWT stated they were required to make assumptions as insufficient information was provided in Paramount's application. The GNWT's security estimate totaled $2,162,651.00 for Liard West; $1,142,288.00 and $1,020,363.00 for land and water, respectively. Paramount responded by indicating they disagreed with the estimate provided by the GNWT and noted OROGO also holds security related to Paramount's activities. Paramount stated that the GNWT's estimate could result in Paramount posting overlapping security for aspects of the project, namely abandonment of wells and decommissioning of production facilities. Paramount further indicated the GNWT's estimate contained the following errors: sites D-05 and L-08 do not containing camps and the camp at site K-29 is part of production equipment. Paramount noted the GNWT's estimate assumes monthly monitoring (presumably closure monitoring) without providing justification.

  Board staff note that one of the discrepancies between the security estimates is whether oil and gas infrastructure is responsibility of the GNWT or OROGO. OROGO previously clarified that the PFR does not address costs associated with well abandonment, remediation or reclamation.[8] Security is discussed further through the public review of the Applications and Security sections (below).

- The GNWT-Lands Inspector submitted one comment indicating they had no comments or recommendations.
- OROGO submitted one comment with a variety of information.
  - Abandonment of Wells and Facilities - OROGO indicated Paramount's RECLAIM estimate does not account for costs associated with the abandonment of wells and facilities. Additionally, they provided the status of the wells included in Land Use Permit MV2013A0012:
    i. K-29 (WID1861) - abandoned

[6] OROGO's security is termed Proof of Financial Responsibility under the *Oil and Gas Operations Act* (OGOA)
[7] See correspondence from OROGO dated October 14, 2018
[8] See correspondence from OROGO dated October 14, 2018

ii. F-25 (WID1587) - abandoned
iii. 0-80 (WID1866) - suspended
iv. M-25 (WID1867) - suspended
v. F-25A (WID1621) - suspended
vi. K-29A (WID2030) - suspended
vii. 2K-29 (WID1989) - suspended
viii. 3K-29 (WID1999) - suspended
ix. 2M-25 (WID2008) - suspended

- Permit Scope Uncertainty - OROGO expressed uncertainly whether wells K-29A, 2K-29, 3K-29 and 2M-25 were included in the scope of the Permit MV2013A0012. Board staff note the aforementioned wells are located at well sites K-29 and M-25, and, therefore, are included in the scope of Permit MV2013A0012.
- Description of Proof of Financial Responsibility - OROGO provided a description on the purpose of the Proof of Financial Responsibility (PFR) held by OROGO under section 64(1) of the Oil and Gas Operations Act (OGOA) in association with an Operations Authorization. OROGO stated the following:

  > *Section 64(3) of OGOA indicates that the Regulator may use PFR to pay out claims made under section 63 of OGOA. Section 63 refers to claims for actual loss or damages from or for costs associated with the clean-up of debris, spills or the authorized discharge, emission or escape of oil or gas. Section 61 of OGOA defines:*
  >
  > - *"Actual loss or damage" as including loss of income, including future income and the loss of hunting, fishing and gathering opportunities by Aboriginal peoples;*
  > - *"Debris" as an installation or structure that has been abandoned without authorization or any material that has broken away or been jettisoned or displaced in the course of an approved work or activity; and*
  > - *"Spills" as a discharge, emission or escape of petroleum*.

  In their response, Paramount clarified that the wells in question were included in the application for MV2013A0012. Paramount stated their understanding that the security held by OROGO was a result of section 10 of OGOA, and that OROGO holds security based upon the matters it regulates and those in which it provides Operations Authorizations; which, in the case of the Fort Liard Projects, are oil and gas operations, including the abandonment of wells and the decommissioning of facilities. Paramount indicated they felt that if OROGO holds security only for the ability to pay for actual loss or damages for costs associated with the clean-up of debris, spills or unauthorized discharges, emission or escape of oil or gas, that OROGO holds excessive security for the suspended project areas. Paramount requested OROGO clarify the security it holds to inform the appropriate level of security with each regulator to ensure Paramount is not required to submit overlapping security. Board staff note that information provided to OROGO for the purposes of the OGOA is held confidential under section 91 of the *Petroleum Resources Act* (PRA) unless a company provides consent to release the information.

- Paramount submitted a letter, summarized as follows:
    - Posting of Security – Paramount referenced section 32 of the MVLUR indicating that security is to be determined by several factors related to the costs associated with the land-use operation. Paramount requested the Board take the following information into consideration when establishing security:
        i. Paramount is a publicly traded Canadian company that has been in business over 40 years. As a publicly traded company Paramount reports quarterly on results and financials.
        ii. Paramount has operated in the Northwest Territories (NWT) for over 20 years, and during that timeframe has posted security for operations at Fort Liard East, Fort Liard West, Fort Liard South and Cameron Hills. Paramount has never defaulted or failed to provide security when requested.
        iii. During its operations in the NWT, Paramount has received the return of all or a portion of its security based on successfully closing and reclaiming Project components.
        iv. Paramount has a large security posted with OROGO related to the Fort Liard Projects.
        v. The scope of permits and licences are limited. The probability of environmental damage is low. No new footprint is considered in either project area.

    - RECLAIM model - Paramount indicated they are uncomfortable with the RECLAIM model for the following reasons:
        i. They assume responsibility for using a model they did not have input in designing, with limited knowledge on how it and of those who designed it;
        ii. They are of the understanding RECLAIM was developed for the mining industry and don't feel it's appropriate for oil and gas operations; and
        iii. They are of the understanding that abandonment and reclamation activities are not regulated by the MVLWB.

      Paramount requested the Board provide background on why RELCAIM is used for the oil and industry in the Reasons for Decision.

    - Coordination of Security Requirements - Paramount stated their view that the GNWT's estimate is project-based and not limited to the jurisdiction of MVLWB. Oil and gas projects are subject to regulation by both the MVLWB and OROGO with both requiring security. Paramount expressed this as inefficient as applicants are required to complete security estimates with both regulators which increases administration and transaction costs and the probability that proponents will post security for Project components twice.

    - Security Estimate Submitted by the GNWT-ENR - Paramount indicated they were of the opinion the GNWT's estimate contained errors regarding the scale and scope of project, which amount to the difference between their security estimates. Paramount indicated they felt they clarified the errors in detail in their responses to the GNWT's review comments and recommendations.

Board Staff Analysis of the GNWT's and Paramount's Positions on Security

The security estimates submitted by Paramount and the GNWT resulted in different estimations of liability costs. Based on the evidence collected as part of the review, the different estimations are attributed to the following:

1) Whether reclamation of portions of oil and gas infrastructure, namely wells and site buildings, are the responsibility of the GNWT or OROGO. Paramount excluded portions of the Project from their cost estimate which resulted in different costs under line items 'Wells and Facilities' and 'Buildings and Equipment'.
2) Detail regarding the scale and scope of development which resulted in the GNWT and Paramount inputting different values into the RECLAIM model.

The review also identified other factors which would significantly influence security:

1) Whether reclamation of the access roads should be included.
2) Whether reclamation of pipelines and pipeline rights-of-way should be included.
3) That Fort Liard West contains nine wells (K-29, K-29A, 2K-29, 3K-29, O-80, M-25, 2M-25, F-25, and F-25A) at five sites (K-29, O-80, M-25, F-25 and F-25A), amounting to four additional wells not included in the GNWT's estimate.

On January 17, 2019, the Board encouraged Paramount to work with the GNWT prior to submitting their revised security estimate. As part of the 2019 review, the GNWT stated Paramount had not engaged with them prior to submitting. Board staff note the lack engagement as it appears to be a significant factor in the discrepancies between the estimates.

Public Review of the Renewal Applications August 28 to October 2, 2020

The Applications were distributed for review on August 28, 2020. By September 18, 2020, comments and recommendations on the Applications were received from four reviewers and Board staff:

- Shared Value Solutions on behalf of ADKFN;
- GNWT-ENR;
- GNWT-Lands; and
- OROGO.

On September 22, 2020, Paramount requested an extension to the response deadline to October 2, 2020. By October 2, 2020, Paramount responded to reviewer comments and recommendations.

Main Issues Raised during the Review of the Renewal Applications

- ADKFN raised the following issues as part of the review:
    - Erosion and Sediment Control Plan (comment ID-1) - ADKFN commented that the Application lacked an Erosion and Sedimentation Management Plan and a Closure and Reclamation Plan, and recommended they be required for the authorizations. Paramount responded indicating they value the Project and do not foresee closing the Project within the term of the licence and permit. Paramount indicated a recent inspection by the GNWT did not identify any concerns with erosion and sediment control. Board staff have included an Erosion and Sedimentation Management Plan,

a Closure and Reclamation Plan and Post-Closure and Reclamation Monitoring and Maintenance Plan in draft Licence conditions.

- Licence Conditions (comment ID-2) - ADKFN indicated the draft water licence conditions provided as part of the review did not contain recommended conditions ADKFN provided to Paramount regarding constructing ice and snow bridges in watercourses that are frozen to bottom and conducting winter fish habitat assessments on rivers where snow and ice fill bridges will be constructed. Paramount responded by indicating no new access or crossings are considered, that the road is built, and creating new crossings would result in new disturbance.

  Based on the Application material, Liard West has one ice bridge / ice road over the Liard River connecting the all-season road to the Hamlet of Fort Liard. Consequently, Board staff are under the presumption this comment applies to Liard East and is not discussed further in the context of Liard West.

- Aquatic Effects Monitoring (comment ID-3) - ADKFN expressed concern that Part G of the water licence was intentionally left blank and requested the MVLWB explain the absence of an Aquatic Effects Monitoring Program (AEMP). Board staff have included background and rationale in the Reasons for Decision; namely, that AEMPs are generally required for undertakings that require a Type A water licence and those which deposit waste directly to the receiving environment. The Application is for a Type B licence and does not involve the direct deposition of waste to the receiving environment. Board staff also note that ADKFN will have further opportunity to provide evidence during the review of the Erosion and Sedimentation Management Plan.

- Work Schedule (comment ID-4) - ADKFN requested more information pertaining to the expected work and a minimum notice of 90 days prior to the commencement of any new activities. ADKFN also requested a schedule for all work expected to occur during the term of the authorizations, as well as opportunities for ADKFN members to participate in monitoring activities. Paramount clarified that activity is related to economic conditions and, given current conditions, limit activity other than monitoring and maintenance will occur. Paramount committed to notifying ADKFN if reactivation or abandonment activities were to occur. Board staff consider ADKFN's request to be notified prior to the commencement of new work, along with Paramount's commitment to notifying stakeholders prior to certain activities occurring, to be appropriate. Board staff note that production is not included in the scope of the authorizations and would require an application for a Type A licence and associated engagement. Board staff recommend that the Board require Paramount to update their Engagement Plan to include notifying affected parties 60 days prior to site activities occurring.

- Merger of Liard West and East Projects (comment ID-5) - ADKFN recommended Liard West and East be merged into a single Project. Paramount responded by indicating they are of the opinion Liard West and East are separate projects based on the differences in their likely outcomes; Liard West potentially producing in the future with Liard East being closed and reclaimed. Board staff note that progressive reclamation, as described by the MVLWB/AANDC *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories (2013)*, allows for the closure and reclamation of certain project components while other components remain active, and, therefore, the differences between the Projects should not be a limiting factor for not merging Fort Liard West and East.

- Community Investment Plan (comment ID-6) - ADKFN indicated that they and Paramount are parties to a Community Investment Plan ("CIP") for the Liard West project area and that Paramount has not fulfilled their obligations under the CIP. ADKFN requested the Applications not be approved until Paramount is in compliance with their obligations. Paramount responded by citing a ruling that community investment plans are a matter of private, contractual law and that government could not enforce private agreements. Board staff note that a recent decision[9] made by the Board dictates that it is not within the Board's jurisdiction to require agreements related to funding, and the Board's Engagement Guidelines do not require Applicants to report extensively on engagement efforts related to socio-economic issues.

- GNWT-ENR
  - Security (comments ID-1, 2, and 3) – GNWT-ENR provided multiple comments pertaining to security. The GNWT noted a decision on security had not been made by the Board, that Paramount had not engaged with the GNWT, and that the information provided as part of the renewal Applications did not provide detail to rationalize Paramount's perceived inaccuracies with the GNWT's estimate.

    GNWT-ENR clarified that they and OROGO require security for different liabilities, and do not consider their estimate to result in overlapping costs. The GNWT further explained the purpose of their security requirements in relation to OROGO's PFR:

    i. PFR is not related to reclamation-related security that the Ministers of ENR and Lands hold under water licences and land use permits, respectively;
    ii. The GNWT cannot access OROGO funds in the case of solvency, and PFR does not apply to reclamation outside of the wells and pipelines (e.g. sumps and battery sites);
    iii. The security OROGO collects can only be paid to persons suffering "actual loss or damage" from a spill or debris or to the GNWT if it reasonably incurs "costs or expenses taking any action or measure in relation to the spill… or remedial action in relation to debris", as defined in OGOA.
    iv. The PFR is based on a future hypothetical scenario that may never materialize (e.g. a spill), which is unlike reclamation amounts that are based on the estimated actual costs of restoring lands to their original state. The GNWT indicated that because of this, they and OROGO do not consider their requirements to result of overlapping security. The GNWT elaborated by indicating previous applicants have also unsuccessfully made a similar overlapping security argument to the LWB's. The GNWT referenced the May 2014 S13L1-007 Reasons for Decision (p. 15).

    Paramount responded by providing further information pertaining to perceived inaccuracies in the GNWT's estimate, such as the lack of oil batteries, facility equipment, estimates on volumes, buildings, depth of wells, monitoring and contamination.

    Security is discussed further in Section 6: Security below.

  - Wildlife Management and Monitoring Plan (comment ID-4) – The GNWT recommended Paramount submit a Wildlife Management and Monitoring Plan (WMMP) and encouraged Paramount to follow process and content guidelines they have established. Paramount responded

[9] See MV2019X0007 – Giant Mine Remediation Project – Reasons for Decision

by stating "noted". Board staff note that WMMPs are typically not included in permit and licence conditions and, therefore, have not been included in the draft authorizations.

- Nesting Birds (comment ID-5 and 6) – The GNWT indicated Paramount did not specify when potential vegetation clearing, ground disturbance or the removal of structures would occur, and if done during nesting seasons it would increase the risk of disturbance or destruction of birds and bird nests. The GNWT recommended Paramount adhere to the Government of Canada's guidelines pertaining to migratory birds and implement protective buffer zones according to the *Northern Land Use Guidelines – Northwest Territories Seismic Operations* or applicable Government of Canadas guidelines. The GNWT provided further recommendations, as follows:
    i. Conduct vegetation clearing and any new ground disturbance outside of nesting season for birds in the Project area (first week of April to third week of September), and
    ii. To contact the regional ENR office if disturbance or destruction of nest or eggs cannot be avoided and all other all mitigation options have been ruled out.

  Paramount responded by stating "noted". Board staff have included a draft condition related to vegetation clearing and any new ground disturbance outside of nesting seasons for birds in the Project area, for Board consideration.

- Wildlife (comment ID-7, 8, 10, 11, 12, 13, 14) – The GNWT submitted seven comments pertaining to wildlife disturbance, reporting sightings and kills, and species known to inhabit the area which are NWT-listed or pre-listed species.[10] The GNWT provided recommendations to reduce or eliminate impacts and disturbance and provided information on various reporting requirements. Paramount responded to the comments and recommendations by stating "noted". Board staff note that in an earlier comment, the GNWT recommended Paramount submit a WMMP; consequently, Board staff conclude that the information provided as part of these comments and recommendations could be included in the development of the WMMP as well.

- Wildlife Attractants (comment ID-9) – The GNWT recommended Paramount ensure waste management processes limit the attraction of wildlife. Paramount responded by stating "noted". Board staff recommend this information be required as part of an update to the WMP.

- GNWT-Lands submitted a letter indicating they had no concerns and confirmed Paramount does have the right to occupy the lands via leases 95 B/6-6, 95B/3-19, 95 B/11-3 and 95 B/12-3.

- OROGO submitted a letter as part of the review process. In their letter, OROGO described the scope of the draft authorization, indicated oil and gas works and activities are regulated by OROGO under OGOA, and that abandonment of wells requires approval under the Oil and Gas Drilling and Production Regulations (OGDPR). Paramount did not provide a response.

- Board staff provided comments and recommendations related to waste management practices, spill contingency measures and project details.

[10] NWT-listed species are those that are on the NWT List of Species at Risk, pre-listed species are those that have been assessed by the NWT Species at Risk Committee (SARC) but have not yet been added to the NWT List of Species at Risk.

- Waste Management Practices (comment ID-1, 9 and 18) – Board staff submitted three comments pertaining to waste management and applicability of the plan to current practices: whether past waste management strategies would be utilized or if all waste would be removed from the NWT; inclusion of maps with site features; and, identifying the locations in which waste would be stored.
    i. Comment ID-1: Paramount responded by uploading a revised WMP which removed a majority of historic waste practices that no longer apply; however, various bioremediation and thermal treatment techniques (e.g. thermal desorption), which were not applied for, or included in past authorizations, remained. Board staff recommend this information be removed from the WMP so it be current for the applications applied for.
    ii. Comment ID-9: Paramount provided an updated WMP with additional site figures; however, the site figures do not contain sufficient detail of the sites, such as the location of structures and operations in relation to local geographic features. Board staff recommend this be required as part of an update to the WMP.
    iii. Comment ID-18: Paramount indicated that at the time of the review they were not certain where waste would be stored but indicated waste could be generated at any well site or camp dependent on the activity. Board staff recommend Paramount's response be included as part of an update to the WMP.

- Authorizations and Conditions (comment ID-3) – Board staff requested input on draft Permit conditions. Paramount provided the following responses:
    i. Recommended removal of closure from the permit scope. Board staff have left closure in place.
    ii. PRIVATE PROPERTY SETBACK (Condition 2): Paramount indicated they were not aware of cabins within 100 meters, and that they would not want to preclude ADKFN members or other traditional land users from building cabins.
    iii. WIDTH RIGHT-OF-WAY (Condition 7): Paramount indicated project access is built and the condition is therefore not necessary. Board staff have kept the condition to ensure the rights-of-way remains at a maximum of 10 meters.
    iv. EQUIPMENT: WATERCOURSE BUFFER (Condition 35): Paramount indicated this condition would not allow maintenance and repairs of the existing road. Board staff have altered this condition to include the wording "except as identified in the Application" for Board decision. Of note, Board staff reviewed the recommended alteration with the Inspector who agreed it was appropriate.

  As described above, Board staff have updated the draft Permit conditions as a result of Paramount's responses, for Board consideration.

- Project Detail (comment ID-4, 5, 6 and 7) – Board staff submitted four comments and recommendations pertaining to project details. They included requests for clarification on the amount of camps anticipated to be in operation; how water will be removed from the source location, transported, and used at the camp; the location of a borrow pit; and, the amount of equipment which will be utilized. Paramount responded by indicating the following: at most one camp would be in operation; water would be removed following standards from the Department of Fisheries and Oceans, transported via trucks, and stored at camps in tanks; the borrow pit in question was C-66; and that equipment requirements are dependent on circumstances of the

work and that they anticipate one piece of abandonment and suspension equipment would be required.

- Spill Contingency Measures (comment ID- 9, 11, 12, 14, 15, 16, and 17) – Board staff submitted nine comments pertaining to spill contingency measures. Paramount responded by submitting an updated SCP which addressed some of the recommendations; particularly, Paramount clarified the amount of fuel stored on site (63,000 liters). However, certain recommendations were not addressed, as follows:
    i. Comment ID-9: the figure for K-29 is not legible, M-25 appears to be during drilling or servicing and may not be current, while F-25 does not contain descriptions of site features.
    ii. Comment ID-11: depiction of hydrocarbon fuel and methanol storage locations on site maps;
    iii. Comment ID-12: the location of spill response resources;
    iv. Comment ID-14: updates to response and control measures for wastewater and methanol;
    v. Comment ID-15: identifying how the public will be notified in the event of an emergency; and
    vi. Comment ID-16: inclusion of response measures for spills on/near water, snow and ice.

  Board staff note that useful information regarding procedures used for fuel transferring was included in the Application Form and that this information would be best suited for the SCP. Board staff recommend the fuel transferring procedures and the outstanding recommendations be included as part of an update to the SCP.

- ADKFN's Recommended Conditions (comment ID-19) – Board staff requested Paramount submit recommendations pertaining to conditions which were provided to Paramount by ADKFN. Paramount did not provide a response.

Preliminary Screening

Paramount indicated they were of the opinion the Applications should be exempt from preliminary screening as no changes to the scope of the undertaking were proposed. The Board previously determined the activities to be exempt from preliminary screening as per Schedule 1, Paragraph 2 of the Exemption List Regulations of the MVRMA which state:

A development, or a part thereof, for which a permit, licence or authorization is requested that

(a) was part of a development that fulfilled the requirements of the environmental assessment process established by the Mackenzie Valley Resource Management Act; and

(b) has not been modified since the development referred to in paragraph (a) fulfilled the requirements of the environmental assessment process established by the Mackenzie Valley Resource Management Act.

A portion of the Project was the subject of an Environmental Assessment that was completed in October 1999 (EA 99-0061-0086). Other activities and components of the Project underwent preliminary screening as part of the following authorizations: Permit MV2001P0097, Licence MV2001L1-0011, Permit MV2000A0001 and Permit MV2000A0059. This is described in detail in the Staff Report, dated October 22, 2013.

Draft Authorizations

The draft Permit and Licence (attached) contain recommended conditions based on the standard condition lists, measures from the Environmental Assessment Minister's modifications to measures, non-standard conditions from the existing Licence, the two public reviews, and Board staff recommendations.

6. Security

Legislative Requirements

The Board may require security as per section 32 of the MVLUR, which state:

32(1) The Board may require security to be posted in an amount not exceeding the aggregate of the costs of

(a) Abandonment of the land-use operation;
(b) Restoration of the site of the land-use operation; and
(c) Any measures that may be necessary after the abandonment of the land-use operation.

32(2) In setting the amount of security pursuant to subsection (1), the Board may consider

(a) The ability of the applicant or prospective assignee to pay the costs referred to in that subsection;
(b) The past performance of the applicant or prospective assignee in respect of any other permit;
(c) The prior posting of security by the applicant pursuant to other federal legislation in relation to the land-use operation; and
(d) The probability of environmental damage or significance of any environmental damage.

Current Security

A summary of security required and currently held under Permit MV2013A0012 and Licence MV2013L1-0002 is provided in Table 1 below.

Table 1: Current Security

Authorization	Condition	Amount
Permit MV2013A0012	Condition 59	$125,000.00
Licence MV2013L1-0002	Part B Condition 2	$0.00
Total		**$125,000.00**

Security Estimate Calculations

Table 2: Summary of Paramount's and the GNWT's Security Estimates

Table 2 compares Paramount's and the GNWT's 2019 security estimates. Based on the evidence available, Paramount's estimate does not include the pipeline, pipeline rights-of-way, nine wells (wellbores and wellheads), or installations and structures at the well sites.[11] The GNWT's estimate does not include the pipeline, pipeline rights-of-way, access roads, or four of the nine wells.

RECLAIM 7.0 Oil and Gas	**Paramount 2019**		**GNWT 2019**	
CAPITAL COSTS	**Land Liability**	**Water Liability**	**Land Liability**	**Water Liability**
Wells and Facilities	$0	$0	$637,000	$368,500
Buildings and Equipment	$2,040	$2,040	$180,190	$100,425
Chemicals and contaminated soil management	$392,700	$0	$0	$257,150
Surface and groundwater management	$0	$0	$0	$0
Interim care and maintenance	$0	$0	$0	$3,890
SUBTOTAL: Capital Costs	**$394,740**	**$2,040**	**$817,190**	**$729,965**
PERCENT OF SUBTOTAL	99%	1%	53%	47%
INDIRECT COSTS	**Land Liability**	**Water Liability**	**Land Liability**	**Water Liability**
Mobilization/ demobilization	$124,383	$643	$58,149	$51,943
Post-closure monitoring and maintenance	$65,661	$339	$38,135	$34,065
Engineering (3%)	$11,842	$61	$24,516	$21,899
Project management (3%)	$11,842	$61	$24,516	$21,899
Health and safety plans/ monitoring & QA/QC (1%)	$3,947	$20	$8,172	$7,300
Bonding/insurance (1%)	$3,947	$20	$8,172	$7,300
Contingency (20%)	$78,948	$408	$163,438	$145,993
Market price factor adjustment (0%)	$0	$0	$0	$0
SUBTOTAL: Indirect Costs	**$300,571**	**$1,553**	**$325,098**	**$290,398**
TOTAL COSTS	**$695,311**	**$3,593**	**$1,142,288**	**$1,020,363**
GRAND TOTAL COSTS	**$698,904**		**$2,162,651**	

Paramount submitted a security estimate of $698,904; $695,311 attributed to land liability and the remaining $3,593 attributed to water liability. Paramount indicated as part of the security re-assessment review in 2019 that they felt their estimate was high as a result of the rates utilized in the RECLAIM model. As noted above in Table 1, the GNWT currently holds a total of $125,000.00 for land and $0 for water.

[11] As indicated in Paramount's letter dated October 22, 2020

Paramount's estimate would result in a total increase of $573,904; $570,311 for land and $3,593 for water liability.

GNWT-ENR submitted a security estimate of $2,162,561; $1,142,288 attributed to land and $1,020,363 attributed to water. The cost difference between the security estimates is a result of two items in the RECLAIM model: 'Wells and Facilities' and 'Buildings and Equipment'. Also, of note, the GNWT's estimate more evenly splits liability between land and water, while Paramount attributes almost all to land liability.

As detailed in the Public Review section, the jurisdiction of the GNWT or OROGO with respect to surface infrastructure and perceived overlapping security was raised by Paramount. As part of the review of the Applications, the GNWT stated that the OROGO PFR is not related to reclamation-related security that the Ministers of ENR and Lands hold under water licences and land use permits, and, therefore, the security requirements of the GNWT and OROGO do not overlap. This aligns with previous correspondence from OROGO where they clarified that costs associated with well abandonment, and any other costs associated with site remediation and reclamation are not covered by the PFR.[12]

On October 8, 2020, the Board invoked paragraph 22(2)(b) of the MVLUR and directed Paramount to submit a revised security estimate along with supporting documentation containing detail on the Project's oil and gas infrastructure (attached). The purpose of the direction was to clarify the perceived inaccuracies between the security estimates submitted by the GNWT and Paramount. Paramount submitted a letter on October 22, 2020 which provided a summary of the Project's infrastructure and status; however, Paramount did not provide detail on all oil and gas related infrastructure or provide a revised estimate, which did not clarify Paramount's perceived inaccuracies of the GNWT's estimate. As part of their response, Paramount indicated the following:

- They did not have sufficient time to prepare a revised estimate;
- They were of the opinion they had engaged with the GNWT through the regulatory and review processes;
- Wellbores and wellheads were not included in their estimate submitted in 2019;
- All installations and structures subject to approval with OROGO were not included in the estimate submitted in 2019. Board staff understand this to mean tanks, vessels, utility lines, buildings, etc.;
- Their 2019 estimate included contamination that would have or will occur under OROGOs approval and if Paramount is required to submit a new estimate they would most likely exclude those costs; and
- They are uncomfortable taking responsibility for using the RECLAIM model.

Below is an excerpt from Paramount's letter which states their rationale behind the exclusion of infrastructure:

> *Paramount is of the belief that security will be held by OROGO under the Oil and Gas Operations Act ("OGOA") under section 64(1), specifically "Debris" for the wells. Debris is defined as an installation or structure that has been abandoned without authorization or any material that has broken away or been jettisoned or displaced in the course of an approved work or activity. Claims could be made under Section 63 of OGOA by a party that suffered actual loss or damages from or for costs associated with the clean-up of debris, spills or the authorized discharge, emission or escape of oil or gas. Given the current estimate provided to the MVLWB includes estimates for contamination that would have or will occur under the Section 10 approval, Paramount if required to submit a new estimate would most likely exclude those costs in a future estimate(s).*

[12] See correspondence from OROGO dated October 14, 2018

Board staff are of the opinion Paramount did not provide sufficient information for Board staff to understand the discrepancies between their and the GNWT's security estimate; this is based on the content Paramount submitted with their security estimate in 2019, their responses to review comments during the security reassessment in 2019 and application review period, and their October 22, 2020 response to Board direction. As a result, Board staff suggest that the amounts proposed by the GNWT are likely the most accurate as they have addressed Paramount's concern of overlapping security and include the development's infrastructure.

Liabilities

In other recent proceedings, the GNWT has raised concerns over placing all securities for land and water liabilities exclusively under a water licence or land use permit, citing that the legislative framework does not envision that all project related security be held and used under a single authorization.

7. Conclusion

Based on the information provided in the Applications and the public reviews, the proposed Project is not likely to have a significant adverse impact on the environment or be a cause of public concern.

The draft Permit and Licence conditions are based upon the standard condition lists, measures from the Environmental Assessment Minister's modifications to measures, non-standard conditions from the existing authorizations, the two public reviews, and Board staff recommendations. Board staff conclude that the conditions contained within the draft Permit and Licence should mitigate the potential environmental impacts this Project may have on the land and water.

Board staff conclude that further information was provided by Paramount in their responses to reviewer comments; however, some reviewers requested additional information be provided, which could be submitted prior to commencement of activities.

The Waste Management Plan, Spill Contingency Plan and Engagement Plan could be revised and re-submitted to reflect the recommendations made during the review and to reflect the scope of the activities as applied for, for Board staff conformity, as supported by the draft Reasons for Decision (attached).

8. Recommendation

Board staff recommend the Board:

a) **Confirm the Application for Land Use Permit MV2020A0009 and Water Licence MV2020L1-0006 from Paramount Resources Ltd. is exempt from preliminary screening as per the Exemption List Regulations.**

b) **Make a motion to approve the Type A Land Use Permit MV2020A0009 for a term of five years.**

c) **Make a motion to approve the Type B Water Licence MV2020L1-0006 for a term of five year.**

d) **Make a motion to approve the Waste Management Plan as required by Land Use Permit MV2020A0009 and Water Licence MV2020L1-0006 as an interim submission**. Paramount Resources Ltd. is required to submit a revised submission a minimum of 60 days prior to commencement of activities in accordance with comments, recommendations and commitments made during this review, for confirmation of conformity from Board staff.

e) **Make a motion to approve the Spill Contingency Plan as required by Land Use Permit MV2020A0009 and Water Licence MV2020L1-0006 as an interim submission.** Paramount Resources Ltd. is required to submit a revised submission a minimum of 60 days prior to commencement of activities in accordance with comments and commitments made during this review, for confirmation of conformity from Board staff.

f) **Make a motion to approve the Engagement Plan as required by Land Use Permit MV2020A0009 and Water Licence MV2020L1-0006 as an interim submission.** Paramount Resources Ltd is required to submit a revised submission in accordance with comments and commitments made during this review within 90 days following the effective date of the Land Use Permit and Water Licence, for confirmation of conformity from Board staff.

g) **Make a motion to approve the Reasons for Decision for Land Use Permit MV2020A0009 and Water Licence MV2020L1-0006**.

A draft decision letter is attached.

9. Attachments

- Permit MV2013A0012
- Licence MV2013L1-0002
- Direction Letter regarding security estimate, dated January 17, 2019
- Paramount's Security Estimate, submitted March 1, 2019
- GNWT's Security Estimate, submitted April 5, 2019
- Security Estimate Review Summary and Attachments, dated April 18, 2019
- Permit Application Form: MV2020A0009
- Licence Application Form: MV2020L1-0006
  - Project Information
  - Liard West Map
  - Engagement Plan
  - Waste Management Plan
  - Spill Contingency Plan
  - Permit Application Fee Receipt
  - Licence Application Fee Receipt
  - 2020 Water Use Fees Receipt
  - Incomplete Letter, dated July 31, 2020
  - Paramount Response to Incomplete Letter, dated August 13, 2020
  - Liard West Assessments
    - Environmental Assessment EA99-0061/86 and Modification to Measures, dated January 10, 2000
    - Preliminary Screening for MV2000A0059
    - Preliminary Screening for MV2000A0001
    - Preliminary Screening for MV2001P0097/ MV2001L1-0011
- Application Review Summary and Attachments, dated October 2, 2020
- Board Direction Letter, dated October 8, 2020
- Paramount's Response to Board Direction, dated October 22, 2020
- Draft Land Use Permit Cover Page
- Draft Land Use Permit Conditions
- Draft Water Licence Cover Page

- Draft Water Licence Conditions
- Draft Reasons for Decision
- Draft Decision Letters from the Board

Respectfully submitted,

Andrew Wheeler
Regulatory Specialist

Review Comment Table

Board:	MVLWB
Review Item:	Liard West - Renewal Applications - Type A Land Use Permit and Type B Water Licence (MV2020A0009 and MV2020L1-0006)
File(s):	MV2020A0009 MV2020L1-0006
Proponent:	Paramount Resources Ltd.
Document(s):	Permit Application Form - Liard West (389.61 KB) Licence Application Form - Liard West (364 KB) Paramount Response to Incomplete Letter - Liard West (108 KB) Project Information - Liard West (6.4 MB) Engagement Plan - Liard West (12.8 MB) Waste Management Plan - Liard West (21.81 MB) Spill Contingency Plan - Liard West (17.6 MB) Camp Layout - Liard West (186 KB) Area Map - Liard West (6 MB) Liard River Data (126 KB) Draft Permit Conditions - Liard West (1 MB) Draft Licence Conditions - Liard West (1 MB) EA99-0061/86 and Modification to Measures (1.5 MB) MV2000A0059 Preliminary Screening (84 KB) MV2000A0001 Preliminary Screening (250 KB) MV2001P0097 Preliminary Screening (228 KB)
Item For Review Distributed On:	Aug 28 at 15:55 Distribution List
Reviewer Comments Due By:	Sep 18, 2020
Proponent Responses Due By:	Oct 2, 2020
Item Description:	**October 22, 2020:** Paramount submitted a letter to the Board in response to the Board direction on October 8, 2020.
	October 8, 2020: The Board directed Paramount to submit further information by October 22, 2020.
	September 22, 2020: *The applicant has submitted a request to extend the deadline for responses to review comments and recommendations. The response deadline has been extended to* ***12pm October 2, 2020****.*

Paramount Resources Ltd. (the Applicant) submitted complete renewal Applications for a type A land use permit and type B water licence. The purpose of the Applications is for the use, maintenance, remediation and reclamation of facilities authorized under the existing Permit (MV2013A0012) and Licence (MV2013L1-0002) for Liard West. The facilities include well sites (K-29, O-80, M-25, F-25) and associated natural gas facilities, winter roads, all season roads, bridges, culverts, pipelines and right-of-way, quarries, and camps. All project components have been built, while the well sites are suspended or abandoned. The Applicant has also requested an exemption from preliminary screening because the Applicant believes that the development has not been modified since it was previously permitted and licenced.

Using the Online Review System (ORS), reviewers are invited to submit comments and recommendations on the documents linked below by the review comment deadline specified. Reviewers may also wish to consider providing an overarching recommendation regarding whether the Board should approve the submissions, to provide context for the comments and recommendations and assist the Board with its decisions. Notices of intent to file a claim for water compensation must also be submitted by the review comment deadline. If reviewers seek clarification on the submission, they are encouraged to correspond directly with the Applicant prior to submitting comments and recommendations.

Board staff agree the renewal Applications may be exempt from preliminary screening in accordance with the Exemption List Regulations. If you believe a preliminary screening is required, please describe your rationale and provide comments and recommendations (e.g., on impacts and mitigation measures) to assist with the Board's preliminary screening determination. The most recent preliminary screening that was approved by the Board is located under Document(s) below.

On March 1, 2019, Paramount Resources Ltd. submitted an updated RECLAIM estimate for the existing authorizations (MV2013A0012 and MV2013L1-0002) following Board direction on January 17, 2019. On March 5, 2019, the updated RECLAIM estimate was distributed for review. Reviewer comments and responses from the updated RECLAIM estimate review, which occurred from March 5 to April 18, 2019, will be used in conjunction with this review as evidence in the reevaluation of security for the authorizations Paramount Resources Ltd. has applied for. This information is not intended to limit in any way the scope of reviewers' comments during this review. Board staff encourage Paramount Resources Ltd. to work with the Government of the Northwest Territories.

Please note that all standard land use permit conditions in the Draft Land Use Permit (Permit) have been updated based on the MVLWB's current Standard Land Use Permit Conditions Template. Older conditions that are no longer on the Standard Land Use Permit Conditions Template list have not been included. Non-standard conditions specific to this previously permitted land use operation have been included, as is applicable. All non-standard conditions and alterations to standard conditions are shown in green. The purpose of this draft Permit is to allow reviewers to comment on possible conditions. These draft materials are not intended to limit in any way the scope of reviewers' comments. The Board is not bound by the contents of the draft Permit and will make its decision at the close of the proceeding on the basis of all the evidence and arguments filed by all parties.

	A draft licence has also been developed by Board staff to allow reviewers to comment on possible conditions. All non-standard conditions and alterations to standard conditions based MVLWB's current Standard Water Licence Conditions are shown in green. These draft materials are not intended to limit in any way the scope of reviewers' comments. The Board is not bound by the contents of the draft Licence and will make its decision at the close of the proceeding on the basis of all the evidence and arguments filed by all parties. All documents that have been uploaded to this review are also available on our public Registry. If you have any questions or comments about the ORS or this review, please contact Board staff identified below.
Contact Information:	Andy Wheeler 867.766.7467 Jen Potten 867-766-7468 Shannon Allerston 867-766-7465

Comment Summary

Acho Dene Koe First Nation: Scott Mackay				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Analysis**
1	Lack of Closure plan or Erosion and Sediment Control Plan	**Comment** Paramount has not included a Closure Plan (CP) or Erosion or Sediment Control Plan (ESCP) with the application. Any work conducted on site requires a detailed ESCP to ensure that Paramount are taking appropriate and comprehensive measures to protect fish and fish habitat, as ADKFN members frequently use the waterways in the area for fishing and other traditional practices. **Recommendation** Considering that Paramount has indicated that they may abandon, reclaim and monitor the wells under this WL and LUP, it is necessary for Paramount to submit a detailed CP for review to ADKFN to ensure that the measures taken to close wells on ADKFN's Traditional Territory are comprehensive and at a high standard to ensure long-term environmental protection and complete recovery of the site.	**Oct 2:** Paramount is not planning to close the project during the term of the applied for Licence and Permit. Paramount continues to value the Liard West and continues to monitor economic conditions related to the project. The project is monitored annually by Paramount and the GNWT (the latest of which is dated August 17, 2020 and available on the public registry), no conerns with erosion or sediment control were noted or have been noted by Paramount.	Board staff have included an Erosion and Sedimentation Management Plan, a Closure and Reclamation Plan and Post-Closure and Reclamation Monitoring and Maintenance Plan in Licence conditions. Board staff note that Closure and Reclamation Plans are part of the Standard Water Licence and Conditions and Schedules Template.
2	Lack of inclusion of previous	**Comment** The draft WL conditions do not include recommendations from a previous ADKFN letter to Paramount from June 1, 2020 regarding only constructing ice and snow bridges in watercourses	**Oct 2:** No new access is considered or any new crossings. The Liard West road is	Board staff note the all-season road has been constructed and

	recommendations	that are frozen to bottom (FTB) and conducting winter fish habitat assessments on rivers where snow and ice fill bridges will be constructed. These recommendations are specific measures that are an important contribution in ensuring that fish and fish habitat on ADKFN's Traditional Territory is protected throughout operations under this WL and LUP. **Recommendation** ADKFN strongly recommends that these previously requested recommendations are included as conditions in the WL and LUP.	built, changing crossing conditions now could lead to new footprint. All crossings have been previously assessed and approved.	the stream crossing are constructed in consideration of the road alignment. Consideration of the all-season road and stream crossing impacts and mitigations were included in the Environmental Assessment.
3	Aquatic Effects Monitoring	**Comment** Part G (Aquatic Effects Monitoring) of the WL conditions has been intentionally left blank. Based on this, it appears unlikely that the Proponent will be doing any monitoring of aquatic effects as a consequence of the works conducted under this WL and LUP. This is a concern to ADKFN, as our treaty rights are directly impacted through negative effects to the aquatic environment as a consequence of the work conducted by the Proponent. **Recommendation** ADKFN requests that MVLWB explain the absence of aquatic effects monitoring conditions in the WL conditions, considering the risk to fish and fish habitat as a consequence of the work that will potentially be completed under this license.	**Oct 2:** Given the current state of the project is deactivated and the most likely activity is monitoring and maintenance Paramount does note believe an AEMP is necessary. Paramount does not envision any risk to fish or fish habitat related to its activities.	Paramount's response is noted. Part G is addressed in the authorization's Reasons for Decision.
4	Notice of commencement of work and schedule for proposed works	**Comment** The work proposed by Paramount will be occurring extremely close to Fort Liard, where many ADKFN members reside. The WL and LUP do not include specific details on the scheduling of work which will occur under this license or the amount of advanced warning that will be provided directly to ADKFN in advance of work occurring on the Liard West Project. **Recommendation** ADKFN request that the Proponent provide much more specific information of the work expected to be conducted under this water license and provide ADKFN a minimum of 90 days notice prior to the commencement of any new work. ADKFN also requests a schedule for all works expected to occur during the entirety of the 5 years of the WL and LUP, as well as any opportunities for ADKFN member participation in monitoring activities under this WL and LUP.	**Oct 2:** Activites at Liard West are tied to North American and global economic conditions. If current economic conditions continue limited activites will occur other than monitoring and maintenance. If reactivation activites or abandonment activities were to occur Paramount would notify ADKFN, other affected parties and stakeholders in a	Board staff consider ADKFN's request to be notified prior to the commencement of new work, along with Paramount's commitment to notifying stakeholders prior to activities, to be appropriate.

			reasonable amount of time.	
5	Merge Liard West and Liard East projects.	**Comment** ADKFN do not consider the Liard West and Liard East projects to be separate Projects, and indeed the vast majority of the content between the two applications is identical, making it difficult to determine which details are specific to which project, and thus the potential impacts on ADKFN rights and interests. **Recommendation** ADKFN recommend that the Liard West and Liard East project be merged into a single project to minimize complexity for all parties and ensure that communications are clear from both the Proponent and the MVLWB.	**Oct 2:** The projects are quite different, Liard East is a winter access exploration field that will be abandoned prior to the OROGO requirement. Liard West has produced in the past and could be subject to reactivation and potential development in the future. After 20 plus years of being seperate projects and with seperate futures Paramount does not believe they are or should be considered one project.	Board staff note that progressive reclamation, as described by the MVLWB/AANDC *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories (2013)*, allows for the closure and reclamation of certain project components while other components remain active, and, therefore, the differences between the Projects should not be a limiting factor for not merging Fort Liard West and East.
6	Compliance with Community Investment Plans (CIPs)	**Comment** ADKFN and Paramount are parties to a Community Investment Plan ("CIP") for the Liard West project area. Paramount has failed to live up to the obligations in this CIP, including the work preference, community investment, community consultation and compensation provisions contained therein. **Recommendation** ADKFN requests that the applications not be approved until Paramount is in compliance with its obligations under the CIP.	**Oct 2:** The CIP is a private agreement between Paramount and ADKFN to which the MVLWB is not a party. MVLWB does not have any jurisdictions over enforcement of the CIP. Justice K.M. Shaner recently considered this specific CIP in a petition brought by the ADKFN, and stated in her decision that the CIP ".is a matter of private,	Board staff note that in a recent decision made by the Board (MV2019X0007 Giant Mine RFD), the Board indicated that it is not within the Board's jurisdiction to require agreements related to funding to be in place, and the Boards' Engagement Guidelines do not

			contractual law between ADKFN and Paramount" and that the "Government could not enforce the private agreements between ADKFN and Paramount". The Mackenzie Valley Resource Management Act, Mackenzie Valley Federal Areas Waters Regulations, and Mackenzie Valley Land Use Regulations, the legislation and regulations that grant the MVLWB its authority to oversee license and permits, do not contain any provisions that enables the MVLWB to consider issues relating to private agreements and matters of private contractual law. In any event, even if the MVLWB has the jurisdiction to consider the CIP, which is denied, Paramount has lived up to all the obligations in the CIP, including the work preference, community investment, community consultation and compensation provisions contained therein.	require Applicants to report extensively on engagement efforts related to socio-economic issues.

GNWT - ENR - EAM (Environmental Assessment and Monitoring): Central Email GNWT				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Analysis**
1	Security	**Comment** On March 1, 2019, Paramount Resources Ltd. (Paramount) submitted an updated RECLAIM estimate for the existing authorizations (MV2013A0012/13 and MV2013L1-0002/3) following previous Board direction on January 17, 2019. Subsequently, ENR provide comments and our own estimate on March 28, 2019. ENR notes that the MVLWB has not made a decision on this review or the associated requests for a security estimate review. It is also noted that Paramount has not contacted ENR to engage on the discussion of securities associated for the site. ENR understands that Paramount has since updated their estimate from 2019 as part of the 2020 renewal application. However, for the 2020 applications, it appears Paramount has continued to use costing estimates from the 2013 application process, resulting in values lower than ENR's 2019 estimate. ENR maintains its position on the requirement for full coverage of security for actual liabilities and planned activities for the site. In Paramount's responses to ENR's 2019 security estimate, the proponent rejected ENR's estimate due to perceived inaccurate assumptions made in the estimate. However, the limited details provided at that time, and as part of the current 2020 application, do not provide further details rationalizing these perceived inaccuracies. As additional rationale has not been provided, ENR carries forward the 2019 estimate as the recommended security amount. (continued in next cell) **Recommendation** None	**Oct 2:** ENR's position of full coverage of security for actual liablities and planned activities is not consistent with the legislation which allows the Board to consider other factors . Additionally Parmount continues to believe there are inaccuracies in the estimate provided by ENR. Examples can be seen of the estimates currently on the review system. This include but are not limited to, including battery equipment at every site and facility equipment at every site for Liard West. Liard West is a gas development and thus no oil battery is or has ever been located at the facility. Further, a number of items related to the gas development were removed during the deactiviation. The remaining equipment is subect to a 10 (1)b approval which would be covered by section 63 of OGOA as debris includes any structure that was put in place in the course of any work or activity required to be	Board staff note the complexity of the security topic and the perceived discrepancies between the estimates. On October 8, 2020, to resolve the discrepancies between the RELCAIM estimates, the Board directed Paramount to engage with the GNWT and submit a revised RECLAIM estimate with complete Project information.

			authorized under that paragraph. This information has been stated numerous times in numerous applications, further GNWT monitor the site annually and provide reports to the public registry that could have been used to inform ENR's estimate. These are major basic errors with the estimate. Other errors include estimates on volumes, buildings and equimpment, depth of wells and monitoring estimates. The estimates include well sites which in their comments GNWT states are part of the OROGO security. Further, the GNWT estimate includes costs for contamination, which would occur because of a spill which is within the juridiction that OROGO would provide funds for.	
2	Security (continued)	**Comment** Furthermore, Paramount raises the issue of double bonding due to the security held with OROGO. The security held by OROGO is for a different purpose then the requirement for the water licence and land use permit security, and are not considered by ENR as a double bond. The security that OROGO collects is known as "proof of financial responsibility" (PFR) under sections 63 and 64 of the Oil and Gas Operations Act. It is for a different purpose than the reclamation-related security that the Ministers of ENR and Lands hold under water licences and land use permits, respectively. OROGO assesses it for each oil and gas activity that is approved by the oil and gas Regulator.		Board staff note the comment is partially addressed in Paramount's response above. On October 8, 2020, to resolve the discrepancies between the RELCAIM estimates, the Board directed Paramount to engage with the

		In case of insolvency, GNWT cannot access the OROGO funds, nor does it apply for reclamation of the site outside of the wells and pipelines (e.g., sumps and battery sites). The security OROGO collects can only be paid out to persons suffering "actual loss or damage" from a spill or debris or to the GNWT if it reasonably incurs "costs or expenses taking any action or measure in relation to the spill. or remedial action in relation to debris". The terms "spill" and "debris" are defined in the Act. The purpose of the mechanism is to set up a pot of money from which these losses, damages, costs or expenses can be paid out without having to prove the fault of the operator (which could involve a multi-year court process). (continued in next cell) **Recommendation** None		GNWT and submit a revised RECLAIM estimate with complete Project information.
3	Security (continued)	**Comment** The maximum amount that the Regulator can pay out for a given activity is set out in regulations. The amount is collected on a prospective basis - that is, unlike reclamation amounts that are based on the estimated actual costs of restoring lands to their original state, PFR is based on a future hypothetical scenario that may never materialize (like a spill). For this reason, ENR and OROGO does not consider it to be "double bonding", and takes the view that it should not be taken into consideration when the MVLWB is setting reclamation amounts for land and water uses. Previous applicants have also (Imperial Oil renewal - Type A Licence S13L1-007) unsuccessfully made a similar "double bonding" argument to the LWB's during the application review process. If of interest, note the Board's conclusions on page 15 of its Reasons for Decision (May 2014) with respect to the PFR collected by the NEB. **Recommendation** 1. ENR recommends that the MVLWB and Paramount consider ENR’s RECLAIM estimate, submitted March 28, 2019 as part of a previous process for Land Use Permits MV2013A0012 and MV2013A0013, and Type B Water Licences MV2013L1-0002 and MV2013L1-0003. 2. ENR recommends that the MVLWB provide an update on any outstanding decision related to the 2019 security review decision. 3. ENR recommends Paramount contact OROGO to seek clarity on how that specific security can be used to meet the requirements of the Oil and Gas Operations Act (OGOA) and its regulations and any associated OGOA-regulated infrastructure has been properly decommissioned. 4. In future, ENR recommends that		Board staff note a direct response to this comment and recommendations was not provided by Paramount. On October 8, 2020, to resolve the discrepancies between the RELCAIM estimates, the Board directed Paramount to engage with the GNWT and submit a revised RECLAIM estimate with complete Project information.

		Paramount contact ENR prior to submittal of new security estimates or revisions. ENR would be happy to meet with Paramount to discuss the estimates and the assumed scope of work with Paramount to better refine and potentially reduce the security estimate.		
4	Wildlife Management and Monitoring Plan	**Comment** GNWT considers it a best practice for all Proponents to submit a basic (Tier 1) WMMP with their application for authorization. A Tier 1 WMMP should outline how impacts to wildlife and wildlife habitat will be mitigated even if the Minister of ENR does not require a WMMP under section 95 of the Wildlife Act. To facilitate this, a template for such a plan is provided on the ENR website at https://www.enr.gov.nt.ca/en/services/wildlife-management-and-monitoring-plans. **Recommendation** The Proponent is encouraged to develop and submit a basic Tier 1 Wildlife Management and Monitoring Plan (WMMP) to the Wildlife and Fish Division, ENR by e-mail to WMMP@gov.nt.ca. In developing the WMMP, the Proponent is encouraged to follow the WMMP Process and Content Guidelines available on ENR's website at: https://www.enr.gov.nt.ca/en/services/wildlife-management-and-monitoring-plans.	**Oct 2:** Noted	Board staff note that WMMPs are typically not included as part of permit and licence conditions and have not been included in the authorizations Paramount has applied for.
5	Nesting Birds	**Comment** . The project will potentially involve vegetation clearing but does not state when vegetation clearing will occur. . Protection of nests is essential to ensuring reproductive success and survival of both adult birds and their young. . Critical breeding periods for NWT raptors can start as early as the 1st week of April and last up until 3rd week of September, depending on the species and location. . Conducting activities involving vegetation clearing, ground disturbance or demolition of buildings and other structures during the nesting season increases the risk of the disturbance or destruction of any type of occupied bird nest. This would be contravening paragraph 51(1)(a) and (b) of the Wildlife Act. . Activities involving vegetation clearing, ground disturbance or demolition of buildings and other structures may also disturb the birds themselves or a nest that is not occupied. Prescribed birds for the purpose of paragraph 51(1)(c) and 52 of the Wildlife Act are birds of prey (raptors) as set out in Schedule B of the Wildlife General Regulations. While a raptor nest may not be intentionally destroyed, even if		Board staff have included a non-standard condition in the Permit related to not disturbing birds during nesting/breeding season.

		unoccupied, typically on a case-by-case basis the destruction or removal of nests may be authorized where required by General Wildlife Permit. . While compliance to the Wildlife Act and its regulations are required, the Canadian Wildlife Service of ECCC is the primary responsible management authority for migratory birds protected under the Migratory Birds Convention Act, 1994. . GNWT is responsible for the management of non-migratory birds including upland game birds like ptarmigan and grouse, and raptors as indicated in the schedules of the Wildlife General Regulations. **Recommendation** 1) Conduct vegetation clearing and any new ground disturbance outside of the nesting season for birds in the project area. 2) Information on critical breeding periods for raptors in the NWT is available at: https://www.enr.gov.nt.ca/sites/enr/files/raptor_species_br eeding_periods.pdf 3) Follow the Government of Canada's Guidelines to reduce risk to migratory birds (available at https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/reduce-risk-migratory-birds.html) 4) Consult the Government of Canada's General nesting periods of migratory birds for current information on general nesting periods of federally protected migratory birds that occur within the NWT (https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods.html) Continued in the next cell.		
6	Nesting Birds (continued)	**Comment** None **Recommendation** 5) If active nests are encountered during project activities implement protective buffer zones described in applicable the regional land use plan, Table 6 of the Northern Land Use Guidelines - Northwest Territories Seismic Operations (http://www.lands.gov.nt.ca/en/northern-land-use-guidelines), or the Government of Canada's guidance on Establishing buffer zones and setback distances for nests (https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/reduce-risk-migratory-birds.html#toc5). 6) If disturbance or destruction of an occupied nest or eggs of a non-migratory bird species (including raptors), or an unoccupied raptor nest, cannot be avoided and all other all mitigation options have been ruled out, Proponents should contact the	**Oct 2:** Noted	Board staff have included a non-standard condition in the Permit related to not disturbing birds during nesting/breeding season.

		regional ENR office to determine whether a permit to disturb or destroy the nest/eggs can be obtained.		
7	Disturbance and harassment of wildlife	**Comment** . Wildlife may be encountered during project activities and equipment may cause disturbance. . Unless authorized by a licence or permit, paragraphs 52(a) and (b) of the Wildlife Act prohibit engaging in an activity that is likely to result in significant disturbance to big game or birds of prey, or to unnecessarily chase, fatigue, disturb, torment or otherwise harass any species of game or birds of prey. . Game species include big game, fur-bearers, and small game as listed in Schedule A of the Wildlife General Regulations, and birds of prey are listed in Schedule B. . As per section 55 of the Wildlife Act a person may chase wildlife away from a camp or work site if doing so is necessary to prevent injury or death to a person or damage to property. However sub-section 56(2) also states wildlife may be killed if it is necessary to prevent injury or death to a person, as long as resorting to killing wildlife was not a result of his or her mismanagement. . Disturbance to wildlife from sources such as noise, light, vibrations, and human presence can result in energetic stress, avoidance of key habitat, loss of reproductive fitness, injury or mortality of wildlife. Activities that may cause sensory disturbance to wildlife include vehicle traffic, stationary machinery, noise from blasting, excavation, crushing, seismic testing, vegetation clearing, and lighting or flaring. **Recommendation** 1) Consult the draft Land Use Plan that applies to the project area, if any, for further requirements on setback distances and timing windows to minimize disturbance to wildlife. 2) Consult the setback distances, flight altitude guidelines and timing windows for wildlife provided in Table 2-5 and Table 2-6 of the Northern Land Use Guidelines: Northwest Territories Seismic Operations (https://www.lands.gov.nt.ca/sites/lands/files/resources/nlug_seismic_2015_english_-_16_sept_2015.pdf), as these are applicable to variety of land use activities. 3) Game species and birds of prey shall be given the right of way at all times. (continued in next cell)		Board staff note that in an earlier comment the GNWT-ENR recommended Paramount submit a WMMP; consequently, Board staff conclude that the information provided as part of this comment and/or recommendation could also be included in the development of the WMMP.
8	Disturbance and harassment of wildlife (continued)	**Comment** None **Recommendation** 4) If big game species are observed within 500 m prior to starting up activities that could lead to sensory disturbance or startling the animal(s), delay starting up until they have	**Oct 2:** Noted	Board staff note that in an earlier comment the GNWT-ENR recommended

		moved at least 500 m away from the site of project activities. If they do not leave the area within 15 minutes, they may be gently encouraged to move away from the site. This should involve the slow approach by vehicle towards the animal or making your presence known by calling out and waving your arms to encourage them to move. This should be done from behind a vehicle or piece of equipment to prevent personnel from going too close to the animal. It is possible that females may be unwilling to leave the area if they have a calf hiding nearby. If big game species approach the project within 500 m once activities have already started, monitor and document their behaviour, and suspend activities if there is an imminent threat of injury or mortality to the animal(s). 5) An Incident Report should be completed for all wildlife deterrent actions taken and submitted to ENR. Blank incident report forms can be downloaded from the following link: https://www.enr.gov.nt.ca/sites/enr/files/resources/sample_procedural_manual_and_reporting_templates_june_2019.pdf		Paramount submit a WMMP; consequently, Board staff conclude that the information provided as part of this comment and/or recommendation could also be included in the development of the WMMP.
9	Wildlife attractants and waste management	**Comment** . Subject to sub-section 66(1) of the Wildlife Act no person shall store food, waste, or other substances in a manner that may attract big game and put people, domestic animals or wildlife in danger. . Subject to sub-section 65(1) of the Wildlife Act, it is illegal to intentionally feed big game or fur-bearers. Schedule A - Part 1 of the Wildlife General Regulations sets out the wildlife that are prescribed as big game, and Part 2 sets the wildlife that are prescribed as fur-bearers. **Recommendation** 1. The Proponent should utilize food and garbage handling and storage procedures that will minimize the attraction of wildlife. 2. The Proponent should store all food, waste, washed recyclables and debris that may attract wildlife within sealed animal proof containers until final disposal. 3. The Proponent should ensure that sealed animal proof containers are cleaned once emptied to minimize the attraction of wildlife. 4. The Proponent should remove all contaminated waste, waste petroleum products including used oil filters, rags, scrap metal, discarded machinery, parts, drums, barrels, or plastics to an approved waste disposal facility.	**Oct 2:** Noted	Board staff reviewed the recommendation against Paramount's WMP and conclude the WMP could be updated to include site practices to store food, waste and other debris that may attract wildlife in sealed animal proof containers, and to ensure the sealed animal proof containers are cleaned once emptied.

10	Reporting wildlife sightings	**Comment** . Project activities will occur near undisturbed habitat where there is potential for wildlife observations. . Proponents are encouraged to record wildlife sightings and to submit these records to ENR's Wildlife Management Information System (WMIS). Wildlife sightings data provides useful information for assessing changes in species distribution and the timing and location of different life history events such as migration, denning, nesting, calving, etc. **Recommendation** 1) Submit information about wildlife sightings (species, date, time, location, number of individuals, sex, behavior, etc.) to ENR's Wildlife Management Information System (WMIS) at WMISTeam@gov.nt.ca. For further information on the WMIS consult: https://www.enr.gov.nt.ca/en/services/recherche-et-donnees/wildlife-management-information-system 2) Blank wildlife sighting report forms can be downloaded from the following link: https://www.enr.gov.nt.ca/sites/enr/files/resources/sample_procedural_manual_and_reporting_templates_june_2019.pdf	**Oct 2:** Noted	Board staff note that in an earlier comment the GNWT-ENR recommended Paramount submit a WMMP; consequently, Board staff conclude that the information provided as part of this comment and/or recommendation could also be included in the development of the WMMP.
11	Reporting Wildlife Defense of Life and Property Kills and Wildlife Emergencies/ Incidents	**Comment** . Project activities will occur near undisturbed habitat where there is potential for wildlife interactions. Interactions with predators (wolves, bears, wolverines) may require defensive actions from personnel. . Subject to paragraph 57(a) of the Wildlife Act, any big game that is killed to prevent injury or death to a person or damage to property must be reported to ENR as soon as is practicable. Section 7 of the Wildlife General Regulations indicates the information that must be included in the report. . Subject to section 58 of the Wildlife Act and sub-section 8(1) of the Wildlife General Regulations, any person who accidentally kills or seriously wounds big game with a motorized vehicle on a highway must report the event to an officer within 24 hours after the incident. Sub-section 8(2) of the Wildlife General Regulations indicates the information that must be included in the report. **Recommendation** 1) Ensure all field personnel have completed a bear safety training course to decrease the risk of attracting bears to work sites and threats to human safety, learn how to respond to bear encounters, and decrease the risk of wildlife mortality resulting from kills in defense of life and property. 2) Consult the "Safety in Grizzly Bear and Black Bear Country" brochure, available at		Board staff note that in an earlier comment the GNWT-ENR recommended Paramount submit a WMMP; consequently, Board staff conclude that the information provided as part of this comment and/or recommendation could also be included in the development of the WMMP.

		https://www.enr.gov.nt.ca/sites/enr/files/resources/safety_in_grizzly_and_black_bear_country_english.pdf 3) Report all sightings of bears in and around the project location to your local ENR office. Any defense of life and property kills must be reported to the appropriate ENR office immediately. Please contact the following Regional Office as required: Fort Simpson Wildlife Emergency Line at (867) 695-7433 4) Report to an ENR officer as soon as is practicable any wildlife that is killed to prevent injury or death to a person or damage to property. 5) Report to an ENR officer any big game that is killed or seriously wounded by a motorized vehicle on a highway within 24 hours after the incident. (continued in the next cell)		
12	Reporting Wildlife Defense of Life and Property Kills and Wildlife Emergencies/ Incidents (continued)	**Comment** None **Recommendation** 6) Reports must include at minimum the name of the person who killed or seriously wounded the big game, an explanation of the incident, the time, date and location of the incident, the species or quantity involved, and any other information requested by the wildlife officer. 7) Blank incident report forms can be downloaded from the following link: https://www.enr.gov.nt.ca/sites/enr/files/resources/sample_procedural_manual_and_reporting_templates_june_2019.pdf	**Oct 2:** Noted	Board staff note that in an earlier comment the GNWT-ENR recommended Paramount submit a WMMP; consequently, Board staff conclude that the information provided as part of this comment and/or recommendation could also be included in the development of the WMMP.
13	Species at Risk	**Comment** . This project will occur within the range of Western Toad, Wood Bison, Boreal Caribou, Northern Mountain Caribou, Little Brown Myotis (bat), Northern Myotis (bat). . Section 76 and 77 of the Species at Risk (NWT) Act requires the Minister of Environment and Natural Resources to make a submission to the body responsible for assessing the potential impacts of a proposed development, or for considering a land use Permit or water Licence application, respecting the potential impacts of the proposed development, Permit or Licence application on a NWT-listed or pre-listed species or its habitat. NWT-listed species are those that are on	**Oct 2:** Noted	Board staff note that in an earlier comment the GNWT-ENR recommended Paramount submit a WMMP; consequently, Board staff conclude that the information provided as part of

		the NWT List of Species at Risk. Pre-listed species are those that have been assessed by the NWT Species at Risk Committee (SARC) but have not yet been added to the NWT List of Species at Risk. . The Proponent should be aware that NWT-listed or pre-listed species at risk and their habitat may also be subject to protection under existing sections of the NWT Wildlife Act. . As a best practice, ENR encourages the proponent to consider potential impacts, mitigation measures and monitoring requirements for species at risk listed under the federal Species at Risk Act, as well as those designated as at risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) that may occur in the project area, and the prohibitions that may apply to these species under federal legislation. (continued in next cell) **Recommendation** Although the project overlaps with the range(s) of the species listed above, ENR is of the opinion that the nature, scale, location and timing of the proposed project are such that the likelihood of impacts to NWT-listed or pre-listed species listed above can be avoided or minimized if ENR's wildlife recommendations in this letter are implemented as necessary, as well as the application of any wildlife mitigation measures outlined in the Proponent's applications and supporting documents.		this comment and/or recommendation could also be included in the development of the WMMP.
14	Species at Risk (continued)	**Comment** . The project area overlaps with the ranges of the following NWT-listed and/or pre-listed species; information on these species is available at https://www.nwtspeciesatrisk.ca/SpeciesAtRisk : o Western Toad - Threatened in the NWT o Wood Bison - Threatened in the NWT o Boreal Caribou - Threatened in the NWT o Northern Mountain Caribou - Special Concern in the NWT o Little Brown Myotis (bat) - Special Concern in the NWT o Northern Myotis (bat) - Special Concern in the NWT **Recommendation** None		Board staff note that in an earlier comment the GNWT-ENR recommended Paramount submit a WMMP; consequently, Board staff conclude that the information provided as part of this comment and/or recommendation could also be included in the development of the WMMP.
15	Cover letter with all	**Comment** (doc) N/A **Recommendation** N/A		Noted

	comments and recommendations			
GNWT - Lands - North Slave Region: Cheryl Larocque				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Analysis**
1	LUPA COMMENTS LETTER	**Comment** (doc) See attached letter **Recommendation** See attached letter		Noted.
MVLWB: Andy Wheeler				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Analysis**
1	Waste management discrepancy between response letter and Waste Management Plan	**Comment** In the August 11, 2020 letter addressed to Board Staff Paramount states no waste will be disposed in the Northwest Territories (item 5). Board staff note that the Waste Management Plan describes various waste disposal methods within the Northwest Territories: Table 2 (pdf p. 13) identifies a disposal well, retention ponds, sumps, etc.; and, near the end of Table 5 (pdf p.26) disposal methods for "Water - Grey (Temporary Camp)" and "Water - Uncontaminated (surface run off, remediated)" are described as "Lime treatment and mix-bury cover or, as required, water is sampled, analyzed and, decanted to the surrounding environment..." and "Surface discharge of water within lease boundary....", respectively. Board staff note that waste management strategies must align across application material and be current for the authorizations applied for. **Recommendation** Please clarify whether the disposal methods described in the Waste Management Plan are current for the authorizations applied for and update the Waste Management Plan accordingly, if applicable.	**Oct 2:** Updated Waste Management Plan is included with this submission. Historical waste streams and infrastructure were included for reference and to provide context for reviewers and the MVLWB. Paramount has historically included these in the Waste Management Plan, including the version that was submitted and approved earlier in 2020.	Board staff note the revised WMP no longer contains a historic waste practices that no longer apply; however, various bioremediation and thermal treatment techniques (e.g. thermal desorption), which were not applied for, or included in past authorizations, remain.
2	Permit replacement	**Comment** Paramount Resources Ltd. has applied for a new land use permit. Please note the new land use permit, if granted, will replace existing Permit MV2013A0012. Board staff encourage Paramount to apply for Discontinuance and Final Clearance of the existing Permit. This will facilitate transfer of security. A description of the process for Discontinuance and Final Clearance can be found in the Boards' Guide to the Land Use Permitting Process. **Recommendation** None.	**Oct 2:** Noted	Noted.

3	Draft authorizations	**Comment** Board staff have prepared draft authorizations and seek input as part of the public review. Specifically, Board staff seek input from Paramount on draft Permit Conditions 2, 4, 7, 35 and 58. **Recommendation** Please provide input on Conditions 2, 4, 7, 35 and 58.	**Oct 2:** Paramount would remove closure from Part A, as it does not plan on closing Liard West. Paramount is unsure why drilling waste and drilling fluids are included in the definitions as Paramount takes these definitions to be related to Oil and Gas drilling, which is not part of the application. Related to condition #2, Paramount is not aware of any cabins within 100 metres of the project area, however Paramount would not want to preclude ADKFN members or other traditional land users from building cabins utilizing project access. If a cabin(s) were built in the vicinity of the project Paramount would work with the community and traditional land user to accomodate the required activities of Paramount. Paramount would suggest both #4 and #5 could be removed as they relate to drilling, unless they are for environmental drilling in which case Paramount is fine with the conditions.	Paramount later clarified that their response to this comment was erroneous and should have been as follows: 4 and 5 are fine, 35 and 40 were backwards, and 44, 45, 46 relate to East.[1] Board staff have incorporated Paramount's response into Permit conditions.

[1] See email dated October 19, 2019.

			For #7 project access is existing and built so Paramount does not believe this is necessary. Paramount has no comment on #35. #40 will not allow Paramount to maintain and repair the existing road and should be removed. #44, #45, #46 and #48 appears to relate to oil and gas drilling and could be removed. Paramount has no comment on #58	
4	Amount of camps	**Comment** Table 1: "Components Applied for in the Application" of the document titled "Appendix A: Land Use Permit and Water Licence Application Supplement" lists three camp locations identified as D-05, L-18 and K-29. Board staff are uncertain whether Paramount is indicating there will be more than one camp in operation at a given time. **Recommendation** Please confirm how many camps Paramount will operate at a given time.	**Oct 2:** During the term of this licence and permit the most likely number is 0. The next most likely is 1	Adequate response.
5	Camp water supply	**Comment** Board staff are uncertain how water will be removed from the water source, transported and stored for use at the camp. **Recommendation** Please describe how water will be removed from the water source, transported and stored for use at the camp.	**Oct 2:** Water will be removed following DFO standards and codes of practice, transported via water trucks and stored at camp sites using tanks	Adequate response.
6	Borrow pit, geographic location	**Comment** The Figure in Appendix 1 of the document titled "Appendix A: Land Use Permit and Water Licence Application Supplement" identifies a borrow pit at 60 20N 123 30W, while Table 1 "Components Applied for in the Application" does not appear to identify a borrow pit at this location. **Recommendation** Please clarify the location of the borrow pit and indicate if this is an additional borrow pit not identified in Table 1.	**Oct 2:** Paramount lists borrow pit C-66 in that location in the components applied for in the application.	Adequate response.
7	Amount of equipment	**Comment** Table 3 of the document titled "Appendix A: Land Use Permit and Water Licence Application Supplement" lists potential temporary equipment which may be utilized as part of the project;	**Oct 2:** Amount of construction equipment will depend on availability	Adequate response.

		however, the amount of equipment is not specified. **Recommendation** Please indicate the amount of each type of equipment listed in Table 3 that is anticipated to be utilized.	from contractors and scope of work. It is not aniticpated that more than 1 piece of the abandonment and suspension equipment will be needed at Liard West	
8	Regional overview map	**Comment** Board staff note that the as-built map for Fort Liard West (dated 2013) provides a regional overview of site locations throughout the Liard West Field. Please note that detailed site maps which display local geographic features, structures and operations of the project are required as per the Boards' Guideline for Geographic Information Systems Submission Standard. **Recommendation** There is no recommendation specific to this comment. Recommendations specific to detailed site maps are provided for subsequent comments.		No response required.
9	Spill Contingency and Waste Management Plans, detailed site maps	**Comment** Board staff note that the as-built map for Fort Liard West (dated 2013), which provides a regional overview of site locations throughout the Liard West Field, is provided in Appendix A of the Spill Contingency Plan; however, detailed site maps depicting the project components identified in Table 1 of the document titled "Appendix A: Land Use Permit and Water Licence Application Supplement" and local geographic features were not provided. **Recommendation** Please update the Spill Contingency and Waste Management Plans to include detailed site maps which display local geographic features, site structures and operations of the project.	**Oct 2:** Site surveys have been added to the plans. Paramount would note the map provided includes, place names, coutour lines and water features.	Board staff note that Paramount provided an updated SCP and WMP with additional site figures; however, the site figures do not fully address the recommendation. Notably, the figure for K-29 is not legible, M-25 appears to be during drilling or servicing and may not be current, while F-25 does not contain descriptions of site features.
10	Spill Contingency Plan, fuel storage volume	**Comment** The Land Use Permit Application Form item 13 indicates the following hydrocarbon based fuel will be stored on site: six 400 barrel tanks for diesel, six 400 barrel tanks for gasoline, five 100 pound bottles of propane, and eleven 1000 gallon tanks of propane. The Spill Contingency Plan section	**Oct 2:** See updated Spill Contingency Plan. Total fuel etimated for the project is based upon reactivation utilizing	Board staff note the updated SCP indicates 63,000 litres. This volume will be utilized in

		7 "Diesel Fuel/Gasoline" indicates "up to 3000 liters could be on location at any one time". The amount of fuel described in the Spill Contingency Plan differs from the Land Use Permit Application Form. Please note that an estimate of the total amount of fuel stored on site should be reflected in the Spill Contingency Plan. The amount is also required for the permit Condition "MAXIMUM FUEL ON SITE". **Recommendation** Please clarify the total volume of fuel in liters to be stored on site.	two service rigs. All fuel would not be stored at one location, it would be split between utilized camp sites and well sites (that is to say where activities are occurring). Worst case scenario is based upon total failure of a fuel storage tank.	the Permit condition.
11	Spill Contingency Plan, storage locations	**Comment** The Spill Contingency Plan does not appear to indicate where hydrocarbon based fuels and methanol will be stored. **Recommendation** Please update the Spill Contingency Plan to indicate where hydrocarbon based fuel and methanol will be stored and include the locations on detailed site maps.	**Oct 2:** Fuel could be stored at any of the locations indicated on the map depending on the activity. Methanol would only be stored at the well sites.	Board staff reviewed the response and conclude the updates mentioned in the recommendation could be addressed prior to site activities.
12	Spill Contingency Plan, location of spill response resources	**Comment** Board staff note that the as-built map for Fort Liard West (dated 2013), which provides a regional overview of site locations throughout the Liard West Field, is provided in Appendix A of the Spill Contingency Plan, while an inventory of spill response resources is provided in section 6; however, detail pertaining to the location of response resources was not included. **Recommendation** Please update the Spill Contingency Plan to indicate where spill response resources will be located (spill kits, equipment) and include the locations on detailed site maps.	**Oct 2:** The project is deactiviated. Spill kits would be staged in proximity to areas of activity, if they were to occur.	Board staff note the information in the proponent's response could be included in a plan update prior to the start of site activities.
13	Spill Contingency Plan, adverse effects of potential spill events	**Comment** The Spill Contingency Plan describes worst case spill scenarios in section 7; however, the potential adverse effects in consideration of the environmental setting (section 2 of the Plan) and receptors (section 2 of the document titled "Appendix A: Land Use Permit and Water Licence Application Supplement") are not discussed. **Recommendation** Please update the Spill Contingency Plan by discussing the adverse effects of potential spill events in consideration of the environmental setting of the project and receptors.	**Oct 2:** See updated Spill Congtigency Plan	Adequate response.
14	Spill Contingency	**Comment** The Spill Contingency Plan Appendix B contains spill response information (pdf p. 16) which describes general techniques for the control,	**Oct 2:** Waste water will be dealt with as per the Waste	Board staff note the response does not address the

	Plan, action plans	containment, recovery and storage of spilt hydrocarbon material; however, the Plan does address waste water and methanol or how various material is handled on-site and transported to site, such as the removal or waste water from Liard West, the delivery of hydrocarbon fuel, the delivery and use of methanol. The Plan also does not appear to describe how the public will be notified in the event of an emergency or response measures for spills which occur on water, snow and ice. Consideration to all conditions, notably when snow and ice are present, is important to ensure personnel are properly trained to respond in these conditions and to ensure adequate resources are available. **Recommendation** Please update the Spill Contingency Plan to address response and control measures for waste water and methanol, including circumstances on how various material is handled on-site and transported to site, such as the transportation of waste water off site, the delivery of hydrocarbon fuel, the delivery and use of methanol.	Management Plan. Hydrocarbon delivery will be dealt with as outlined in the Land Use Permit application. All chemicals will be stored as per Land Use Permit and Water Licence Requirements along with Directive 055: Storage Requirements for the Upstream Petroleum Industry.	recommendation to update the SCP with response and control measures for wastewater and methanol spills.
15	Spill Contingency Plan, action plans	**Comment** See above **Recommendation** Please update the Spill Contingency Plan by describing how the public will be notified in the event of an emergency.	**Oct 2:** As per Paramount's Emergency Response Plan, additional sections have been added to the updated Spill Contigency Plan.	Board staff have reviewed the updated SCP and conclude it is not clear how the public will be notified in the event of an emergency, and, therefore, the recommendation has not been addressed.
16	Spill Contingency Plan, action plans	**Comment** See above **Recommendation** Please update the Spill Contingency Plan by addressing response measures for spills on / near water, snow and ice and ensure response materials / resources are sufficient for such events.	**Oct 2:** Manpower and equipment are sufficient snow, ice and water	Board staff note the response does not address the recommendation.
17	Spill Contingency Plan, action plans	**Comment** Appendix B of the Spill Contingency Plan contains spill response information which references an assessment matrix under the section titled "Initial Response Actions". If Paramount intends to reference an assessment matrix then it should be included in the Plan. **Recommendation** Please update the Spill Contingency Plan to include the assessment matrix	**Oct 2:** See updated Spill Congtigency Plan	Board staff have reviewed the updated SCP and consider the revision to be adequate.

		referred to in Appendix B section "Initial Response Actions".		
18	Waste Management Plan, storage locations	**Comment** Board staff note section 4.5 of the Waste Management Plan states "Waste will be temporary stored at locations where it is generated, this includes wellsites and camp sites identified on the Project Maps found in Appendix A.". Please note that storage locations for various wastes, such as waste water or general debris, should be explicitly identified in the Waste Management Plan and depicted on detailed site maps. **Recommendation** Please update the Waste Management Plan to indicate the specific locations in which various waste streams will be stored and include the locations on detailed site maps.	**Oct 2:** Unknown at this time, waste is only generated during activities. The most likely scenario for Liard West is monitoring and inspections. Waste could be gerenated at any of the well sites or camp sites dependant on if other activities were to occur.	Board staff understand the uncertainty regarding storage locations at this point, but, recommend this information be provided as an update to the plan prior to the start of site activities.
19	Recommended Conditions	**Comment** Paramount indicated Acho Dene Koe First Nation (ADKFN) provided recommendations on the Conditions of the existing permit and licence in the Engagement Log. **Recommendation** Please submit ADKFN's recommendations.		Board staff note Paramount did not provide a response to this recommendation for Liard West but did for Liard East.
NWT- OROGO: Peter Lennie-Misgeld				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Analysis**
1	OROGO Comments - Liard West - Renewal Applications - Type A Land Use Permit and Type B Water Licence (MV2020A0009 and MV2020L1-0006) (MVLWB)	**Comment** (doc) see attached letter. **Recommendation** see attached letter.		Board staff note Paramount did not provide a response.

Government of Northwest Territories | Gouvernement des Territoires du Nord-Ouest

September 18, 2020

Mr. Andy Wheeler
Regulatory Specialist
Mackenzie Valley Land and Water Board
7th Floor – 4922 48th Street
P.O. BOX 2130
YELLOWKNIFE NT X1A 2P6

Dear Mr. Wheeler,

Comments from the Department of Environment and Natural Resources on the Liard West Renewal Application, Type A Land Use Permit and Type B Water Licence (MV2020A0009 and MV2020L1-0006)

The Department of Environment and Natural Resources (ENR), Government of the Northwest Territories has reviewed the reports at reference based on its mandated responsibilities under the *Forest Management Act*, the *Forest Protection Act,* the *Species at Risk (NWT) Act,* the *Waters Act* and the *Wildlife Act* and provides the following comments and recommendations for the consideration of the Mackenzie Valley Land and Water Board (Board).

Topic: Security

Comment:
On March 1, 2019, Paramount Resources Ltd. (Paramount) submitted an updated RECLAIM estimate for the existing authorizations (MV2013A0012/13 and MV2013L1-0002/3) following previous Board direction on January 17, 2019. Subsequently, ENR provide comments and our own estimate on March 28, 2019. ENR notes that the MVLWB has not made a decision on this review or the associated requests for a security estimate review. It is also noted that Paramount has not contacted ENR to engage on the discussion of securities associated for the site.

ENR understands that Paramount has since updated their estimate from 2019 as part of the 2020 renewal application. However, for the 2020 applications, it appears Paramount has continued to use costing estimates from the 2013 application process, resulting in values lower than ENR's 2019 estimate. ENR maintains its

position on the requirement for full coverage of security for actual liabilities and planned activities for the site.

In Paramount's responses to ENR's 2019 security estimate, the proponent rejected ENR's estimate due to perceived inaccurate assumptions made in the estimate. However, the limited details provided at that time, and as part of the current 2020 application, do not provide further details rationalizing these perceived inaccuracies. As additional rationale has not been provided, ENR carries forward the 2019 estimate as the recommended security amount.

Furthermore, Paramount raises the issue of double bonding due to the security held with OROGO. The security held by OROGO is for a different purpose then the requirement for the water licence and land use permit security, and are not considered by ENR as a double bond. The security that OROGO collects is known as "proof of financial responsibility" (PFR) under sections 63 and 64 of the *Oil and Gas Operations Act*. It is for a different purpose than the reclamation-related security that the Ministers of ENR and Lands hold under water licences and land use permits, respectively. OROGO assesses it for each oil and gas activity that is approved by the oil and gas Regulator.

In case of insolvency, GNWT cannot access the OROGO funds, nor does it apply for reclamation of the site outside of the wells and pipelines (e.g., sumps and battery sites). The security OROGO collects can only be paid out to persons suffering "actual loss or damage" from a spill or debris or to the GNWT if it reasonably incurs "costs or expenses taking any action or measure in relation to the spill… or remedial action in relation to debris". The terms "spill" and "debris" are defined in the Act. The purpose of the mechanism is to set up a pot of money from which these losses, damages, costs or expenses can be paid out without having to prove the fault of the operator (which could involve a multi-year court process). The maximum amount that the Regulator can pay out for a given activity is set out in regulations. The amount is collected on a prospective basis – that is, unlike reclamation amounts that are based on the estimated actual costs of restoring lands to their original state, PFR is based on a future hypothetical scenario that may never materialize (like a spill). For this reason, ENR and OROGO does not consider it to be "double bonding", and takes the view that it should not be taken into consideration when the MVLWB is setting reclamation amounts for land and water uses.

Previous applicants have also (Imperial Oil renewal - Type A Licence S13L1-007) unsuccessfully made a similar "double bonding" argument to the LWB's during the application review process. If of interest, note the Board's conclusions on page 15 of its Reasons for Decision (May 2014) with respect to the PFR collected by the NEB.

Recommendations:

1. ENR recommends that the MVLWB and Paramount consider ENR's RECLAIM estimate, submitted March 28, 2019 as part of a previous process for Land

Use Permits MV2013A0012 and MV2013A0013, and Type B Water Licences MV2013L1-0002 and MV2013L1-0003.

2. ENR recommends that the MVLWB provide an update on any outstanding decision related to the 2019 security review decision.
3. ENR recommends Paramount contact OROGO to seek clarity on how that specific security can be used to meet the requirements of the O*il and Gas Operations Act* (OGOA) and its regulations and any associated OGOA-regulated infrastructure has been properly decommissioned.
4. In future, ENR recommends that Paramount contact ENR prior to submittal of new security estimates or revisions. ENR would be happy to meet with Paramount to discuss the estimates and the assumed scope of work with Paramount to better refine and potentially reduce the security estimate.

Topic: Wildlife Management and Monitoring Plan

Comment:
GNWT considers it a best practice for all Proponents to submit a basic (Tier 1) WMMP with their application for authorization. A Tier 1 WMMP should outline how impacts to wildlife and wildlife habitat will be mitigated even if the Minister of ENR does not require a WMMP under section 95 of the *Wildlife Act*. To facilitate this, a template for such a plan is provided on the ENR website at https://www.enr.gov.nt.ca/en/services/wildlife-management-and-monitoring-plans.

Recommendation:
The Proponent is encouraged to develop and submit a basic Tier 1 Wildlife Management and Monitoring Plan (WMMP) to the Wildlife and Fish Division, ENR by e-mail to WMMP@gov.nt.ca. In developing the WMMP, the Proponent is encouraged to follow the WMMP Process and Content Guidelines available on ENR's website at: https://www.enr.gov.nt.ca/en/services/wildlife-management-and-monitoring-plans.

Topic: Nesting Birds

Comment:

- The project will potentially involve vegetation clearing.
- The application does not state when vegetation clearing will occur.
- Protection of nests is essential to ensuring reproductive success and survival of both adult birds and their young.
- Critical breeding periods for NWT raptors can start as early as the 1st week of April and last up until 3rd week of September, depending on the species and location.
- Conducting activities involving vegetation clearing, ground disturbance or demolition of buildings and other structures during the nesting season increases the risk of the disturbance or destruction of any type of occupied

bird nest. This would be contravening paragraph 51(1)(a) and (b) of the *Wildlife Act.*

- Activities involving vegetation clearing, ground disturbance or demolition of buildings and other structures may also disturb the birds themselves or a nest that is not occupied. Prescribed birds for the purpose of paragraph 51(1)(c) and 52 of the *Wildlife Act* are birds of prey (raptors) as set out in Schedule B of the *Wildlife General Regulations*. However while a raptor nest may not be intentionally destroyed, even if unoccupied, typically on a case-by-case basis the destruction or removal of nests may be authorized where required by General Wildlife Permit.
- While compliance to the *Wildlife Act* and its regulations are required, the Canadian Wildlife Service of Environment and Climate Change Canada is the primary responsible management authority for migratory birds protected under the *Migratory Birds Convention Act, 1994* (https://www.canada.ca/en/environment-climate-change/services/migratory-birds-legal-protection/convention-act.html).
- GNWT is responsible for the management of non-migratory birds including upland game birds like ptarmigan and grouse, and raptors as indicated in the schedules of the *Wildlife General Regulations*.

Recommendations:

1) Conduct vegetation clearing and any new ground disturbance outside of the nesting season for birds in the project area.
2) Information on critical breeding periods for raptors in the NWT is available at: https://www.enr.gov.nt.ca/sites/enr/files/raptor_species_breeding_periods.pdf
3) Follow the Government of Canada's *Guidelines to reduce risk to migratory birds* (available at https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/reduce-risk-migratory-birds.html)
4) Consult the Government of Canada's *General nesting periods of migratory birds* for current information on general nesting periods of federally protected migratory birds that occur within the NWT (https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods.html)
5) If active nests are encountered during project activities implement protective buffer zones described in applicable the regional land use plan, Table 6 of the Northern Land Use Guidelines – Northwest Territories Seismic Operations (http://www.lands.gov.nt.ca/en/northern-land-use-guidelines), or the Government of Canada's guidance on *Establishing buffer zones and setback distances* for nests (https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/reduce-risk-migratory-birds.html#toc5).

6) If disturbance or destruction of an occupied nest or eggs of a non-migratory bird species (including raptors), or an unoccupied raptor nest, cannot be avoided and all other all mitigation options have been ruled out, Proponents should contact the regional ENR office to determine whether a permit to disturb or destroy the nest/eggs can be obtained.

Topic: Disturbance and harassment of wildlife

Comment:

- Wildlife may be encountered during project activities and equipment may cause disturbance.
- Unless authorized by a licence or permit, paragraphs 52(a) and (b) of the *Wildlife Act* prohibit engaging in an activity that is likely to result in significant disturbance to big game or birds of prey, or to unnecessarily chase, fatigue, disturb, torment or otherwise harass any species of game or birds of prey.
- Game species include big game, fur-bearers, and small game as listed in Schedule A of the *Wildlife General Regulations*, and birds of prey are listed in Schedule B.
- As per section 55 of the *Wildlife Act* a person may chase wildlife away from a camp or work site if doing so is necessary to prevent injury or death to a person or damage to property. However sub-section 56(2) also states wildlife may be killed if it is necessary to prevent injury or death to a person, as long as resorting to killing wildlife was not a result of his or her mismanagement.
- Disturbance to wildlife from sources such as noise, light, vibrations, and human presence can result in energetic stress, avoidance of key habitat, loss of reproductive fitness, injury or mortality of wildlife. Activities that may cause sensory disturbance to wildlife include vehicle traffic, stationary machinery, noise from blasting, excavation, crushing, seismic testing, vegetation clearing, and lighting or flaring.

Recommendations:

1) Consult the draft Land Use Plan that applies to the project area, if any, for further requirements on setback distances and timing windows to minimize disturbance to wildlife.
2) Consult the setback distances, flight altitude guidelines and timing windows for wildlife provided in Table 2-5 and Table 2-6 of the Northern Land Use Guidelines: Northwest Territories Seismic Operations (https://www.lands.gov.nt.ca/sites/lands/files/resources/nlug_seismic_2015_english_-_16_sept_2015.pdf), as these are applicable to variety of land use activities.
3) Game species and birds of prey shall be given the right of way at all times.
4) If big game species are observed within 500 m prior to starting up activities that could lead to sensory disturbance or startling the animal(s), delay

starting up until they have moved at least 500 m away from the site of project activities. If they do not leave the area within 15 minutes, they may be gently encouraged to move away from the site. This should involve the slow approach by vehicle towards the animal or making your presence known by calling out and waving your arms to encourage them to move. This should be done from behind a vehicle or piece of equipment to prevent personnel from going too close to the animal. It is possible that females may be unwilling to leave the area if they have a calf hiding nearby. If big game species approach the project within 500 m once activities have already started, monitor and document their behaviour, and suspend activities if there is an imminent threat of injury or mortality to the animal(s).

5) An Incident Report should be completed for all wildlife deterrent actions taken and submitted to ENR. Blank incident report forms can be downloaded from the following link: https://www.enr.gov.nt.ca/sites/enr/files/resources/sample_procedural_manual_and_reporting_templates_june_2019.pdf

Topic: Wildlife attractants and waste management

Comment:

- Subject to sub-section 66(1) of the *Wildlife Act* no person shall store food, waste, or other substances in a manner that may attract big game and put people, domestic animals or wildlife in danger.
- Subject to sub-section 65(1) of the *Wildlife Act*, it is illegal to intentionally feed big game or fur-bearers. Schedule A – Part 1 of the *Wildlife General Regulations* sets out the wildlife that are prescribed as big game, and Part 2 sets the wildlife that are prescribed as fur-bearers.

Recommendations:

1. The Proponent should utilize food and garbage handling and storage procedures that will minimize the attraction of wildlife.
2. The Proponent should store all food, waste, washed recyclables and debris that may attract wildlife within sealed animal proof containers until final disposal.
3. The Proponent should ensure that sealed animal proof containers are cleaned once emptied to minimize the attraction of wildlife.
4. Proponent should remove all contaminated waste, waste petroleum products including used oil filters, rags, scrap metal, discarded machinery, parts, drums, barrels, or plastics to an approved waste disposal facility.

Topic: Reporting wildlife sightings

Comment:

- Project activities will occur near undisturbed habitat where there is potential for wildlife observations.

- Proponents are encouraged to record wildlife sightings and to submit these records to ENR's Wildlife Management Information System (WMIS). Wildlife sightings data provides useful information for assessing changes in species distribution and the timing and location of different life history events such as migration, denning, nesting, calving, etc.

Recommendations:

1) Submit information about wildlife sightings (species, date, time, location, number of individuals, sex, behavior, etc.) to ENR's Wildlife Management Information System (WMIS) at WMISTeam@gov.nt.ca. For further information on the WMIS consult: https://www.enr.gov.nt.ca/en/services/recherche-et-donnees/wildlife-management-information-system
2) Blank wildlife sighting report forms can be downloaded from the following link: https://www.enr.gov.nt.ca/sites/enr/files/resources/sample_procedural_manual_and_reporting_templates_june_2019.pdf

Topic: Reporting Wildlife Defense of Life and Property Kills and Wildlife Emergencies/Incidents

Comment:

- Project activities will occur near undisturbed habitat where there is potential for wildlife interactions. Interactions with predators (wolves, bears, wolverines) may require defensive actions from personnel.
- Subject to paragraph 57(a) of the *Wildlife Act*, any big game that is killed to prevent injury or death to a person or damage to property must be reported to ENR as soon as is practicable. Section 7 of the *Wildlife General Regulations* indicates the information that must be included in the report.
- Subject to section 58 of the *Wildlife Act* and sub-section 8(1) of the *Wildlife General Regulations*, any person who accidentally kills or seriously wounds big game with a motorized vehicle on a highway must report the event to an officer within 24 hours after the incident. Sub-section 8(2) of the *Wildlife General Regulations* indicates the information that must be included in the report.

Recommendations:

1) Ensure all field personnel have completed a bear safety training course to decrease the risk of attracting bears to work sites and threats to human safety, learn how to respond to bear encounters, and decrease the risk of wildlife mortality resulting from kills in defense of life and property.
2) Consult the "Safety in Grizzly Bear and Black Bear Country" brochure, available at https://www.enr.gov.nt.ca/sites/enr/files/resources/safety_in_grizzly_and_black_bear_country_english.pdf

3) Report all sightings of bears in and around the project location to your local ENR office. Any defense of life and property kills must be reported to the appropriate ENR office immediately. Please contact the following Regional Office as required:
    - Fort Simpson Wildlife Emergency Line at (867) 695-7433
4) Report to an ENR officer as soon as is practicable any wildlife that is killed to prevent injury or death to a person or damage to property.
5) Report to an ENR officer any big game that is killed or seriously wounded by a motorized vehicle on a highway within 24 hours after the incident.
6) Reports must include at minimum the name of the person who killed or seriously wounded the big game, an explanation of the incident, the time, date and location of the incident, the species or quantity involved, and any other information requested by the wildlife officer.
7) Blank incident report forms can be downloaded from the following link: https://www.enr.gov.nt.ca/sites/enr/files/resources/sample_procedural_manual_and_reporting_templates_june_2019.pdf

Topic: Species at Risk

Comments:

- This project will occur within the range of Western Toad, Wood Bison, Boreal Caribou, Northern Mountain Caribou, Little Brown Myotis (bat), Northern Myotis (bat).
- Section 76 and 77 of the *Species at Risk (NWT) Act* requires the Minister of Environment and Natural Resources to make a submission to the body responsible for assessing the potential impacts of a proposed development, or for considering a land use Permit or water Licence application, respecting the potential impacts of the proposed development, Permit or Licence application on a NWT-listed or pre-listed species or its habitat. NWT-listed species are those that are on the NWT List of Species at Risk. Pre-listed species are those that have been assessed by the NWT Species at Risk Committee (SARC) but have not yet been added to the NWT List of Species at Risk.
- The Proponent should be aware that NWT-listed or pre-listed species at risk and their habitat may also be subject to protection under existing sections of the NWT *Wildlife Act*.
- As a best practice, ENR encourages the proponent to consider potential impacts, mitigation measures and monitoring requirements for species at risk listed under the federal *Species at Risk Act*, as well as those designated as at risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) that may occur in the project area, and the prohibitions that may apply to these species under federal legislation.
- The project area overlaps with the ranges of the following NWT-listed and/or pre-listed species; information on these species is available at https://www.nwtspeciesatrisk.ca/SpeciesAtRisk :

- Western Toad – Threatened in the NWT
- Wood Bison – Threatened in the NWT
- Boreal Caribou – Threatened in the NWT
- Northern Mountain Caribou – Special Concern in the NWT
- Little Brown Myotis (bat) – Special Concern in the NWT
- Northern Myotis (bat) – Special Concern in the NWT

Recommendations:
Although the project overlaps with the range(s) of the species listed above, ENR is of the opinion that the nature, scale, location and timing of the proposed project are such that the likelihood of impacts to NWT-listed or pre-listed species listed above can be avoided or minimized if ENR's wildlife recommendations in this letter are implemented as necessary, as well as the application of any wildlife mitigation measures outlined in the Proponent's applications and supporting documents.

Additional Recommendations to the Proponent:

1) Make sure that employees and contractors are aware of the species at risk that might occur in the project area. This includes species that are pre-listed or listed under the *Species at Risk (NWT) Act*, species listed under the federal *Species at Risk Act*, and species designated as at risk by COSEWIC.
2) Be aware of the prohibitions that may apply to the species that may occur in your area. Check the *Species at Risk (NWT) Act* regulations webpage (http://www.nwtspeciesatrisk.ca/ToolsForDevelopers) to see if there are any applicable regulations or agreements with land owners that must be followed for NWT-listed or pre-listed species at risk. Contact Environment and Climate Change Canada and Fisheries and Oceans Canada (DFO) for further information about federally-listed species and federal legal requirements.
3) If species at risk are encountered during project undertakings, the primary mitigation measure should be avoidance. The Proponent should avoid contact with or disturbance to each species, its habitat and/or its residence.
4) Monitoring should be undertaken by the Proponent to determine the effectiveness of mitigation and/or identify where further mitigation is required. As a minimum, monitoring should include recording the locations and dates of any observations of species at risk, behaviour or actions taken by the animals when project activities were encountered, and any actions taken by the Proponent to avoid contact with or disturbance to the species, its habitat, and/or its residence.
5) Submit sightings of species at risk and monitoring information to ENR's Wildlife Management Information System (WMIS) at WMISTeam@gov.nt.ca and to other appropriate regulators and organizations with management responsibility for the species. Further information on the WMIS can be found at: https://www.enr.gov.nt.ca/en/services/recherche-et-donnees/wildlife-management-information-system

6) The activity will occur primarily in the summer months and there is no mention of the potential effect on the Mountain Sheep in the area. The proponent should follow the Flying Low brochure recommendations so as not to disturb the wildlife. The *Flying Low? Think Again*… brochure may be accessed at the following website: https://www.enr.gov.nt.ca/sites/enr/files/128-flying_low_brochure_proof.pdf
7) The activity occurs during fire season. Paramount will have to have firefighting equipment on hand as per the Forest Fire Prevention and Suppression Guidelines for Industrial Activities. The guidelines may be accessed at the following website: http://www.enr.gov.nt.ca/sites/enr/files/industrial_guidelines_forest_fire_prevention_suppression.pdf

   The intent of the Guidelines is threefold. First, industrial operations must be conducted so that they do not contribute to the fire load. Second, industrial operations must be able to control and extinguish any fires that occur as a result of their operations. Finally, industrial operations must be able to respond to wildfires that may affect human life and other property as a result of their operations.

Comments and recommendations were provided by ENR technical experts in the Water Management and Monitoring Division, the Wildlife and Fish Division and the Dehcho Region and were coordinated and collated by the Environmental Assessment and Monitoring Section, Environmental Stewardship and Climate Change Division.

Should you have any questions or concerns, please do not hesitate to contact Patrick Clancy, Environmental Regulatory Analyst at (867) 767-9233 Ext: 53096 or email patrick_clancy@gov.nt.ca.

Sincerely,

Laurie McGregor
Environmental Assessment Analyst
Environment and Natural Resources

NWT OFFICE OF THE REGULATOR OF OIL AND GAS OPERATIONS

Office of the Regulator of Oil and Gas Operations
P.O. Box 1320, Yellowknife, NT X1A 2L9
Tel: 867-767-9097 • Fax: 867-920-0798 • Web: www.orogo.gov.nt.ca
Courier Address: 4th floor, 5201 – 50th Avenue, Yellowknife, NT X1A 3S9

Andy Wheeler
Regulatory Officer
Mackenzie Valley Land and Water Board
PO BOX 2130
YELLOWKNIFE NT X1A 2P6

September 14, 2020

Dear Andy Wheeler:

Paramount Resources Ltd. (Paramount) Land Use Permit Application (MV2020A0009) and Water License Application (MV2020L1-0006)

This letter is in response to the request from the Mackenzie Valley Land and Water Board (MVLWB) for reviewer comments on the above captioned application.

The proposed scope of Land Use Permit MV2020A0009 and Water License Application MV2020L1-0006 encompasses well re-entries, completions, suspensions, abandonments, production, reclamation, and remediation associated with the existing well sites, access roads, pipeline right-of-ways, borrow pits and campsites, all-season and winter access roads; well sites, pipelines, valve sites and gas dehydration facilities, a water disposal well at O-80; a repeater site; camp, decking and staging sites; and various borrow pits and sumps.

The scope also includes six natural gas wells (Paramount et al K-29A, 2K-29, 3K-29, M-25, 2M-25 and F-25a) on three lease sites (K-29, M-25 and F-25) are tied-in to a 37.2km main pipeline that connects the K-29 lease site to a facility at the abandoned/reclaimed BP Pointed Mountain plant site. The M-25 lease site is linked to the F-25 plant site via a 1.4 km pipeline lateral and the F-25 plant is linked to the main pipeline via a 3.3 km pipeline lateral. Produced water from wells on the K-29 and F-25 leases was transported via pipeline to an injection well located at O-80.

Oil and gas works and activities are regulated by the GNWT Regulator of oil and gas operations through the Office of the Regulator of Oil and Gas Operations (OROGO) and require an Operations Authorization issued under the *Oil and Gas Operations Act* (OGOA).

.../2

Bureau de l'organisme de réglementation des opérations pétrolières et gazières
B.P. 1320, Yellowknife, TNO X1A 2L9
Tél : 867-767-9097 • Téléc : 867-920-0798 • Site web : www.orogo.gov.nt.ca
Adresse de messagerie : 4e étage, 5201 – 50e Avenue, Yellowknife TNO X1A 3S9

BUREAU DE L'ORGANISME DE RÉGLEMENTATION DES OPÉRATIONS PÉTROLIÈRES ET GAZIÈRES DES TN-O

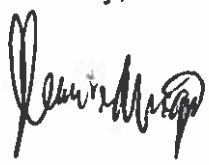
In addition, each well abandonment requires a well approval, issued under the *Oil and Gas Drilling and Production Regulations* (OGDPR). Operator requirements for safety, environmental protection and conservation of the resource specified in OGOA and the OGDPR, will, as appropriate, apply to the proposed well-related activities.

At this time, we have no other specific comments on Paramount's application for a Land Use Permit (MV2020A0009) and Water License (MV2020L1-0006) or on the proposed Land Use Permit conditions.

The OROGO decision-maker is a preliminary screener of this activity under the *Mackenzie Valley Resource Management Act* (MVRMA). When OROGO receives an application for proposed OGOA regulated activities, the decision-maker will decide how to meet its obligations under section 124 of the MVRMA. The OROGO decision-maker may decide to adopt the MVLWB's preliminary screening as permitted by that section.

If you have any questions, please contact me at (867) 767-9097 or by email at Peter_lennie-misgeld@gov.nt.ca.

Sincerely,



Peter Lennie-Misgeld
A/Executive Director

c. Terence Hughes, Paramount Resources Ltd.

LIARD WEST AREA, NWT
SPILL CONTINGENCY PLAN
OCTOBER, 2020

2800, 421 7th Avenue SW
Calgary AB, T2P 4K9

Contents

1. INTRODUCTION

Paramount Resource Ltd.'s (Paramount) Spill Contingency Plan provides a plan of action for any foreseeable spill event during construction operations, abandonment, suspension, reclamation, reactiviation, monitoring and inspection activities existing or planned in the Fort Liard West project area. It defines the responsibilities of key personnel and outlines the procedures for responding to spills in a way that will minimize potential health and safety hazards, environmental damage, and remediation costs. The plan has been prepared to provide easy access to all the information needed in dealing with a spill and is to be used in conjunction with other Plans and regulatory approvals for the project area.

During the Environmental Impact Assessments for the Fort Liard Pipeline Golder Associates Ltd. (Golder) conducted reconnaissance efforts to establish potential staging areas or control points for watercourses or streams that have a remote chance of being impacted in the event of a spill (detailed maps can be found in Appendix A of this plan). Potential spill scenarios during suspension, abandonment and construction operations usually take place within existing project components and include:

- barge operations;
- fuel storage tank failure;
- fuel transport vehicle rollover;
- water storage tank failure;
- water transport vehicle rollover;
- fluid tank failure;
- cement slurry returns;
- dry bulk cement and additives;
- radiator fluid from rig and vehicular traffic;
- oil changes and rig maintenance;
- camp related spills including sewage and grey water;
- anti-freeze fluid and hydraulic fluid spills; and
- working on ice surfaces

With the exception of materials in transit, all of these scenarios normally are confined to land and will be mitigated by dikes constructed and designed to contain foreseeable spills around any tankage and the peripheral of main facility sites.

For barging operations, if they were to occur, Paramount would rely on the selected contractor to provide the expertise and equipment related to spill with those operations. Through its contractor selection process Paramount will ensure the contractor has all applicable approvals, safety plans and insurance provisions in place prior to operations taking place.

It is the practice of Paramount to initiate clean up activity when, in the opinion of its management, Paramount is clearly associated, or likely to be associated, with the spilled material. As well, Paramount will endeavor:

- to ensure understanding and compliance with applicable governing regulations;
- to conduct activities in a manner consistent with appropriate environmental, health and safety considerations;

- to cooperate with other groups working on protection of the environment;
- to anticipate future pollution control requirements and to take whatever precautions are necessary or proper under the circumstances to avoid operational risk and prevent adverse effects on the environment; and
- to keep government officials and the public informed in the event of a spill.

2. ENVIRONMENTAL SETTING

Paramount's Projects are located within the Taiga Plains Ecozone (Ecological Stratification Working Group 1995), which includes the southwestern corner of the Northwest Territories, northeastern British Columbia, and northern Alberta. They also are part of the Fort Nelson lowland, a subdivision of the Alberta Plateau.

The region is characterized by gently sloping, well-drained, moraine ridges and poorly drained, level to depressional muskeg areas and underlain by sporadic discontinuous permafrost with low ice content (Ecological Stratification Working Group 1995). Typical vegetation cover consists of mature forest cover and dominated by spruces, balsam poplar, white birch, trembling aspen and traces of jack pine.

This ecozone is dominated by the Mackenzie River and its tributaries. The Liard River is an important migratory corridor for fish linking the tributaries of the Liard River main stem to the Mackenzie River system. Main tributaries to the Liard River include the Muskeg, Petitot, Rabbit, Netla and Kotaneelee Rivers.

As indicated in Golder's Environmental Impact Assessment reports, the existing Fort Liard Shiha Pipeline is located south and west of the Petitot River. The pipeline route from the F-36 Battery site to the Maxhamish Compressor Station crosses 6 drainages. None of these smaller drainages are considered capable of supporting sport fish or fish used for domestic consumption.

A barge landing, used for a staging area for construction and drilling operations, is located at Fort Liard for Liard West.

As mentioned in Section 1.0, during the Environmental Impact Assessments for the Fort Liard Pipeline and the Fort Liard Drilling Projects; Golder conducted reconnaissance efforts to establish potential staging areas or control points for the watercourses and streams (drainages).

3. PROJECT AREA

The Liard West gas development project consists of six (6) gas wells (Paramount et al K-29A, 2K-29, 3K-29, F-25A M-25 and 2M-25) on two (2) leases (K-29 and M-25), one (1) water injection well (Paramount et al O-80), and two (2) dehydration plants (K-29 and F-25).

The project area is located across the Liard River from the hamlet of Fort Liard approximately 12 to 29 km along an all-season high-grade road. A 37.2 km pipeline system connects the K-29 site to the Spectra tie-in facility at the decommissioned BP plant site at Pointed Mountain. The M-25 wells are linked into the F-25 plant site via a 1.4 km pipeline lateral. From the F-25 plant site to the F-25 junction along the mainline is another 3.3 km pipeline lateral. Produced water was transported by a series of pipelines from K-29 and F-25 to the O-80 injection well [Figure 1-2].

Currently the development is suspended and deactivated. The most likely activities in the near term are monitoring and inspections which occur via helicopter.

4. STAGING AREAS

Appendix A of this plan contains as built maps of the Fort Liard West project area.

5. TRAINING AND EXERCISES

Paramount routinely trains its staff on various types of emergency situations. Spill response is incorporated into these scenarios.

Paramount currently has a training schedule of mock emergency situations for its Alberta and British Columbia based operations and if the Northwest Territories becomes operational, this schedule will be modified to include the Northwest Territories operations.

Currently, Paramount performs tabletop or logistics exercises once per year and full mock exercises for all critical (sour or environmentally sensitive) areas.

Ongoing maintenance to all Emergency Response Plan and Hazardous Material Spill Contingency Plan components is conducted on an annual basis. The emergency procedures for spill reporting in the NWT that are included as part of Paramount's Emergency Response Plan can be found in Appendix B.

6. RESOURCE INVENTORY

The following is a list of the equipment and manpower usually available on site during suspension/abandonment/reclamation and/or remediation activities.

ON-SITE MANPOWER

- The on-scene commander is Paramount's Construction or Completions(abandonment and suspension operations) Supervisor
- Construction crews consist of equipment operators
- Rig crews Medical Attendant
- Camp Staff and attendants
- Ancillary service personnel on standby (including truck drivers)
- Water Truck Driver
- Vacuum Truck Operator
- Mud Man
- Mud Logger

ON-SITE EQUIPMENT

- 3" fuel transfer pump
- Absorbent blankets (4)
- Non-sparking shovels (5)
- 205 litre open top steel drums (10)
- Plastic Liners (2)
- Front end loader
- Dozer
- Vacuum truck
- Personal Protective Equipment

A detailed Equipment List for the Area "C" Oil Spill Co-operative, located in Fort Nelson, British Columbia, is listed in Appendix C. MSDS sheets of potential spill substances can be found in Appendix D. The disposal of waste resulting from potential spills is covered by the Waste Management Table found in Appendix E

7. WORST CASE SCENARIO

Suspension and/or abandonment operations could take place in the winter or summer months. If activities occur in winter months it would be an ice pad and winter access. This protects the underlying soil and vegetation from mechanical damage and facilitates cleanup of any potential spills.

If suspension and/or abandonment activities took place in summer months the following potential spill was identified, and the associated spill prevention/mitigation procedures are listed:

- **Diesel Fuel/Gasoline**

  Diesel Fuel is the primary fuel source on location. Up to 63,000 liters could be on location in one tank at any one time. Fuel will be stored in double walled tanks to minimize the risk of a catastrophic spill. Automatic shut-off nozzles will be used for fueling to minimize the risk of minor spills. Additionally, the well sites are bermed.

Should a spill occur, it would be within the berm, limiting contamination and facilitating clean-up. Spill contingency supplies and equipment as detailed in the Land Use Permit application will be on site in addition to the routine construction equipment (e.g. front-end loader) and road maintenance. In the event of a serious spill, additional equipment would be obtained from the Area "C" Oil Spill Co-operative, located in Fort Nelson, British Columbia.

- **Discussion and Recommendations**

Considering the above, the greatest environmental risk associated with the project is that of a Diesel spill on location. As noted, it is expected that any spill would be confined to the location and completely (or least mostly) confined to the surface of the well site. The "actual loss or damage" would be expected to cleanup and local (onsite) mitigation. Due to the precautions above and the fact that the site will be occupied almost continuously during operations, the risk of a spill or the full volume of diesel on site is considered very unlikely but is used as a worst-case scenario.

The above assessment addresses the 'most likely event to occur with the highest potential for "actual loss or damage" as a diesel fuel spill. As described, any event (including the "highest potential" event) would be limited to the lease area and clean up would be of short duration.

As noted above the risk of offsite contamination is very low as the fuel storage areas are bermed, with enough capacity to the proposed storage volumes of Diesel, and so only cleanup of Diesel spills on land are considered. Spills on land include spills on rock, gravel, soil and/or vegetation. It is important to note that soil can be a natural sorbent due to the non-polarity of diesel compounds binding with soil organic matter, thus spills on soil are generally less serious then spills on water as contaminated soil can be more easily recovered. As the fuel storage occurs on a location with active operations, any release would be quickly discovered limiting the potential for the diesel to travel downwards within the soil profile.

If released, Diesel can be harmful to humans and wildlife. Diesel contains a mixture of volatile and non-volatile compounds thus vapours are an immediate concern for spill responders. Should a release occur spill responders will be ready to respond with appropriate respirators to allow them to work within the affected areas. Wildlife could be impacted should it come into contact with free diesel liquids and so recovery of free liquids is generally the first spill response activity and is accomplished using vac-trucks.

Following recovery of free fluids impacted soils would be excavated and placed within a lined containment area for temporary storage, prior to disposal at an approved landfill. Following excavation of impacted soils confirmatory samples would be taken from the excavation limits to ensure all impacted soils have been removed. Given the short duration of this scenario it is unlikely groundwater would be impacted.

Appendix A: Project Area Maps

As-Built Map
FORT LIARD WEST

2013

Northwest Territoties
NAD 1983 UTM Zone 10N

Paramount resources ltd.

Legend

- Cabins
- Seismic

Airstrip
- Built
- Foreign

Gathering System
- Built
- Not Used
- Not Built
- Foreign

Transportation
- Fort Liard Highway
- Old Paramount Ice Road
- Road
- Trail
- Access Built
- Access Foreign
- Bridge
- Barge

Leases
- Built
- Built - Tied-in
- Foreign
- Reclaimed
- Gas Plant

Camp
- Built
- Foreign

Battery
- Built

Sump
- Built

Borrow Pit
- Built
- Foreign

Other
- Decking Site - Built

- Watercourse
- String Bog
- Waterbody
- Wetland
- Contours

OVERVIEW MAP
SCALE 1:1,250,000

Activity Area

N

1:50,000
0 0.5 1 2 3 4 5 6 7
Kilometers

UNIVERSAL Geomatics Solutions

Tech: snicholson
Revised: 20 Aug 2013
Job No.: 05-0399G
Filename: Fort_Liard_West.mxd
Projection: NAD 1983 UTM Zone 10N

EQUINOX Engineering Ltd.

FORT LIARD F-25A WELLSITE TIE-IN

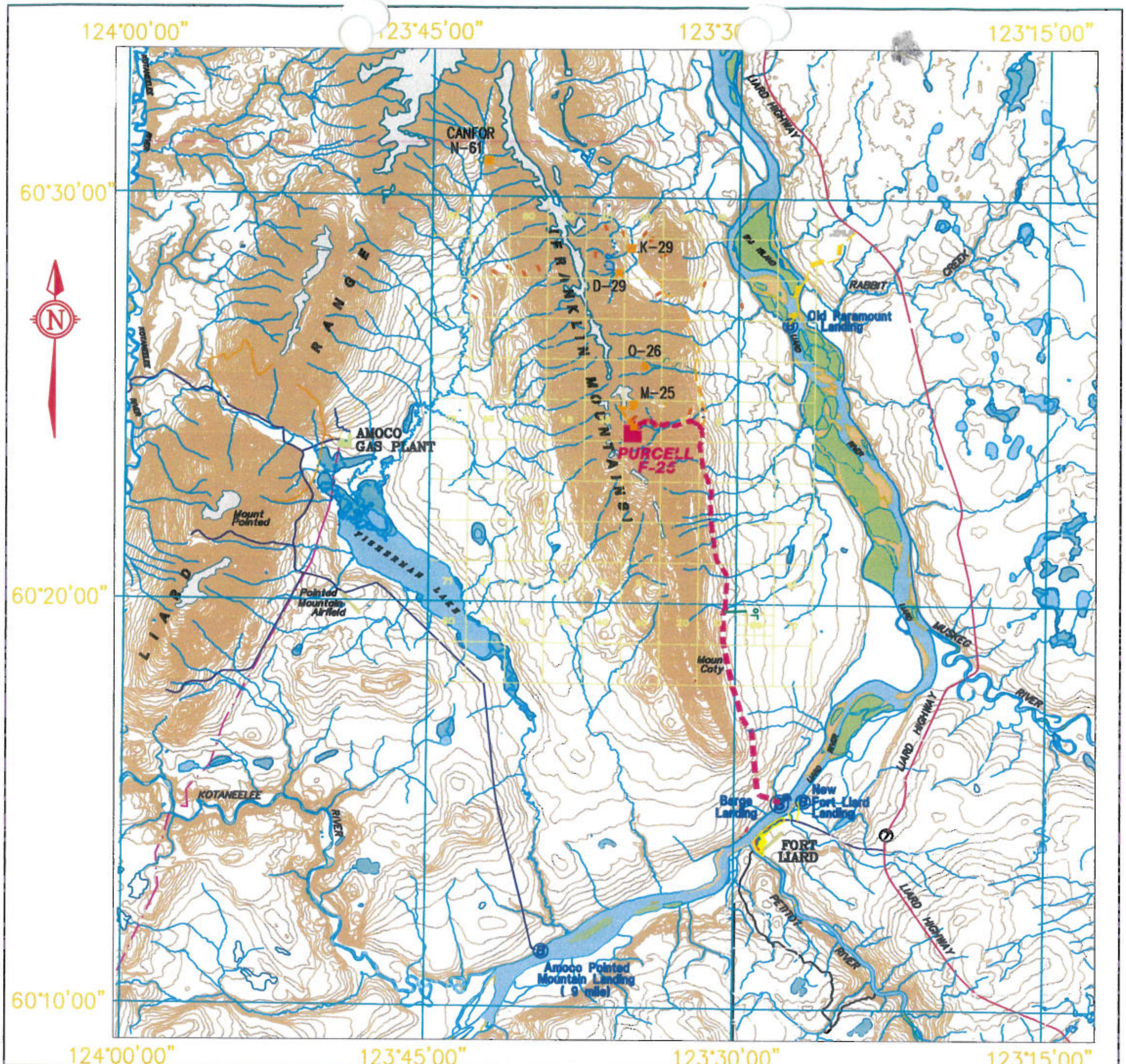
F-25A NWT
SITE PLAN

PROJECT NO.	DRAWING NO.	REV.
054-01-01	FLD-5000-11-01	5

REFERENCE DRAWINGS		REVISIONS				
NUMBER	TITLE	NO.	BY	DATE	ISSUE	APP'D
X-REFERENCE	F:\DRAFTING\DRAWINGS\054-01-01\PIPING-REV3\	0	RS	00/10/30	ISSUED FOR CONSTRUCTION	
	0540101-BASEPLAN.DWG	1	RS	00/11/03	RE-ISSUED FOR CONSTRUCTION	
FLD-5000-11-03	EQUIPMENT TABLES	2	RS	00/12/11	ISSUED FOR HAZOP REVIEW	
		3	RS	01/01/11	RE-ISSUED FOR CONSTRUCTION	
		4	RS	01/02/01	RE-ISSUED FOR CONSTRUCTION	
		5	SC	01/05/30	AS BUILT PER FIELD MARK UPS	

NOTES:
1. CLOUDED AREAS INDICATE NEW PIPING AND/OR EQUIPMENT FOR PURCELL F-25A FACILITY.
2. TANK FARM LOCATED ON FILL MATERIAL.

SEAL:



ACCESS ROAD INFORMATION

AREA OF F-25 WELLSITE = 1.29 ha.

LENGTH OF EXISTING ACCESS ROAD = 21.97 km
WIDTH = 15.0m
AREA OF EXISTING A/R = 32.96 ha.

LEGEND

PURCELL EXISTING WELL SHOWN
WELLSITES SHOWN THUS
00-PROPOSED ACCESS ROADS
EXISTING ACCESS ROADS
EXISTING BARGE SITE SHOWN (B)
50 FOOT CONTOUR INTERVAL SHOWN
AIRSTRIP SHOWN THUS
TOWN/CITY
PRIMARY HIGHWAY 7
ALL WEATHER EXISTING ROADS
WINTER ROADS
GAS PIPELINE

REVISION TABLE NO.	*DESCRIPTION*	*DATE*	*BY*

PURCELL ENERGY LTD.

MAP
SHOWING
EXISTING WELLSITE & ACCESS ROAD
PURCELL F-25
UNIT F, SECTION 25
GRID AREA 60°30', 123°30'
NORTHWEST TERRITORIES
(NAD 27)

5 km 0 5 10 km 20 km
5000 m 0 5000 10000

SCALE 1 : 250 000 2000 RON ROBINSON, C.L.S.

COMPILED BY

CHALLENGER SURVEYS & SERVICES LTD
300 6940 FISHER ROAD S.E.
CALGARY, ALBERTA
T2H 0W3
PH (403)-235-8101 FAX (403)-253-1985

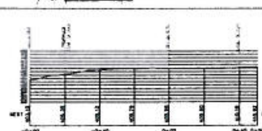
60-11887-a1
MAR. 23/99 B.S.S./B.T.

REVISION TABLE

No.	DESCRIPTION	DATE	BY
1	UPDATES ON THE PLANTSITE	[illegible]	[illegible]
2	UPDATES ON THE PLANTSITE	[illegible]	[illegible]
3	UPDATES ON THE PLANTSITE	[illegible]	[illegible]
4	ADD SEPT [illegible] SURVEY	[illegible]	[illegible]
5	SHOW PROPOSED LAYOUT FOR 3K-29, PROFILE AND VOLUME REQUIRED FOR PAD EXTENSION	[illegible]	[illegible]
6	SHOW PROPOSED 3K-29 AND VARIOUS CHEVRON FACILITIES	[illegible]	[illegible]

LEGEND

- BUILDINGS
- ABOVE GROUND PIPERACK
- EDGE OF TEAR DROP
- CATHODIC TEST LEAD
- SEWER AND WATER LINE
- EDGE OF GRAVEL
- BURIED PIPES SHOWN THUS
- BOTTOM OF BERMS SHOWN THUS
- ACCESS ROAD SHOWN THUS
- TEST POSTS FOR CATHODIC PROTECTION
- AREA AFFECTED BY REVISION



PROFILE THRU 3K-29 A-A

CHEVRON CANADA LIMITED

PLAN OF

SITE SURVEY

OF

CHEVRON et al LIARD K-29

WITHIN

UNIT K, SECTION 29
GRID AREA 60°30', 123°30'
NORTHWEST TERRITORIES

SCALE 1 : 500 2001 RON ROBINSON, C.L.S.

CHALLENGER — CALGARY — DATE: OCT [illegible], 2001

CHEVRON CANADA LIMITED

PLAN SHOWING

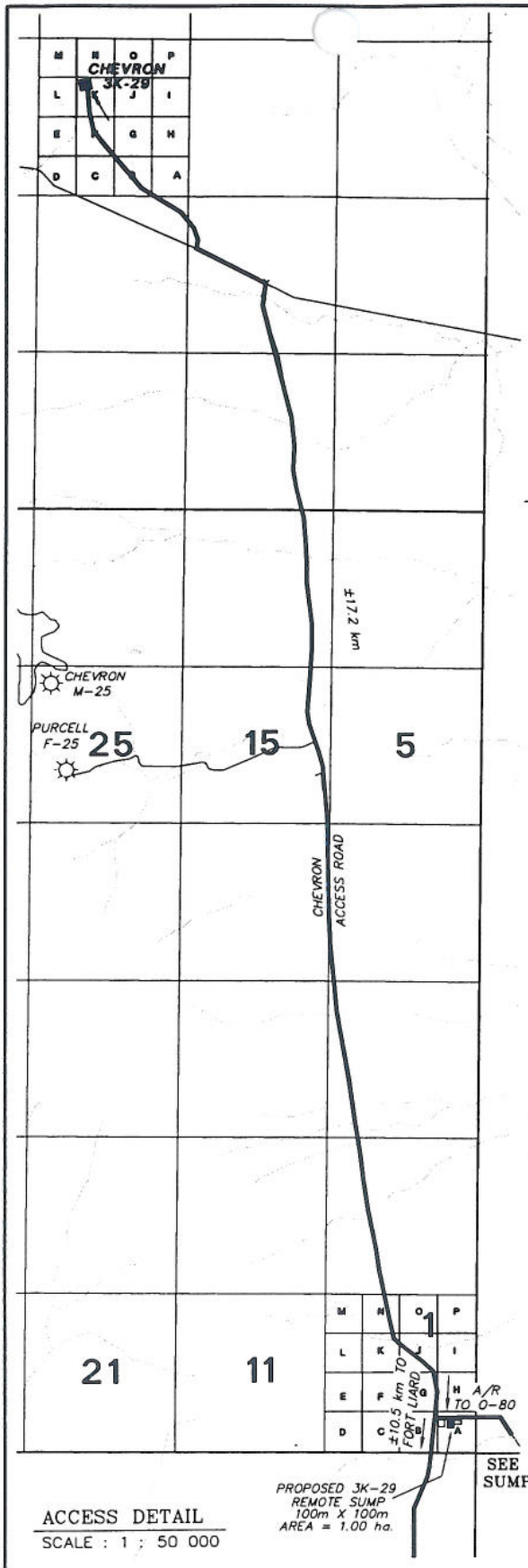
PROPOSED REMOTE SUMP LOCATION

FOR

CHEVRON LIARD 3K-29

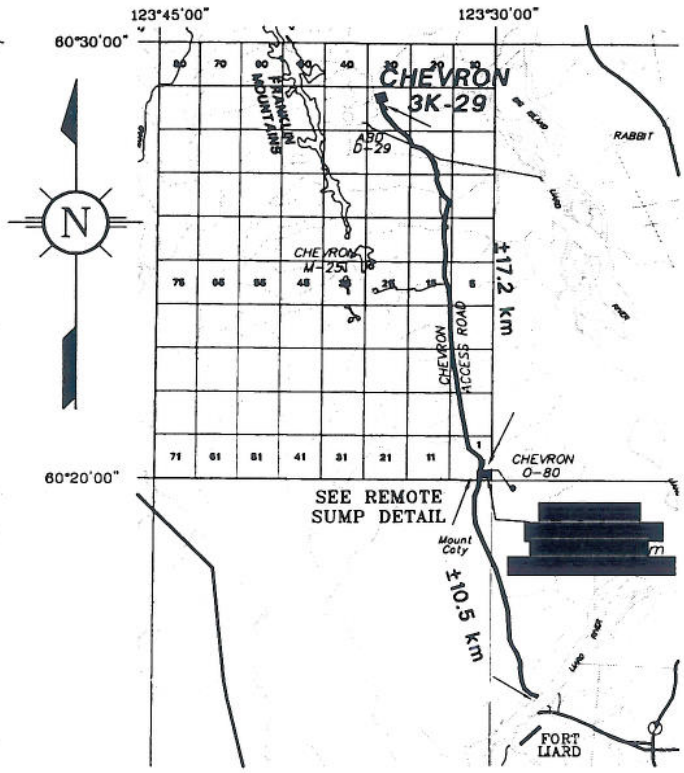
GRID AREA 60°30', 123°30'

NORTHWEST TERRITORIES



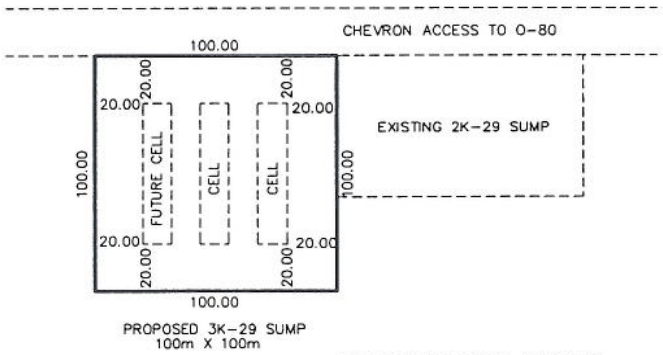
ACCESS DETAIL

SCALE : 1 : 50 000



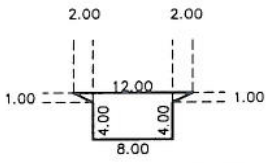
LOCATION DETAIL

SCALE : 1 : 200 000



REMOTE SUMP DETAIL

SCALE 1: 2000



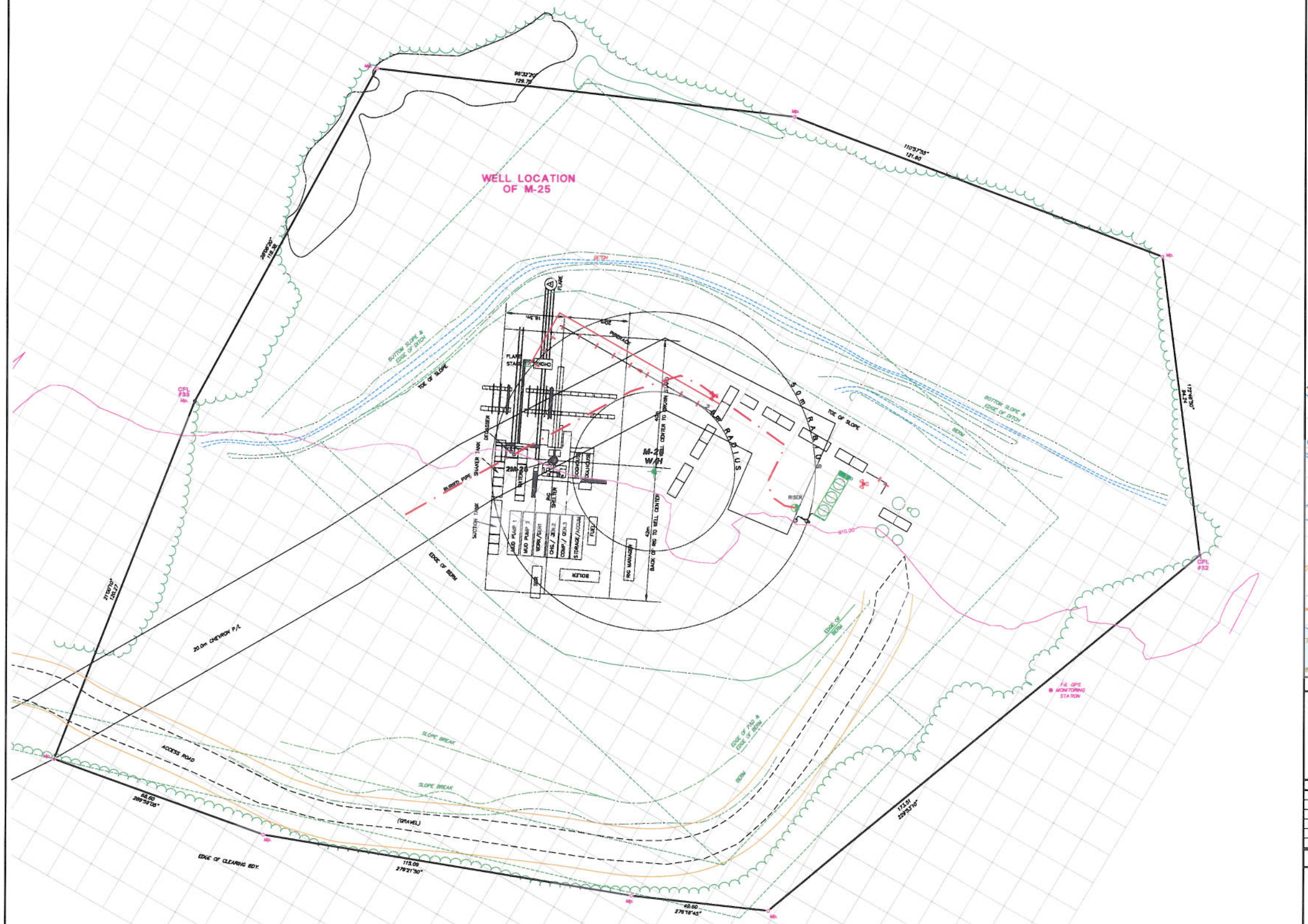
TYPICAL CELL PROFILE

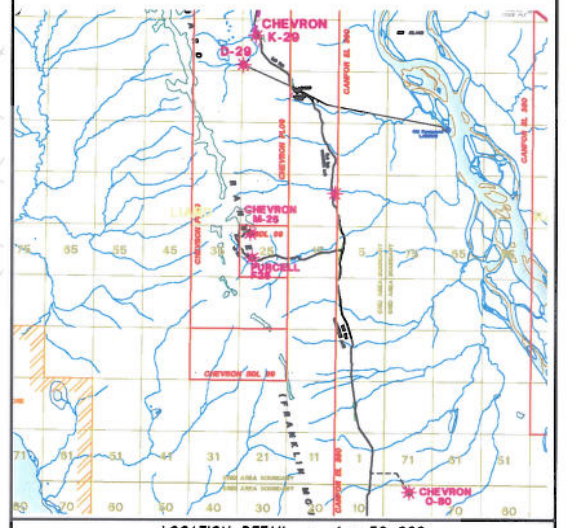
SCALE 1:500

CHALLENGER GEOMATICS LTD.
300, 6940 FISHER RD. S.E.
CALGARY, AB T2H 0W3
(PH) 403-253-8101
email: calgary@chalsurv.com

REVISION NOTES:			
No.	DATE	DISCRIPTION	By

SCALE:	DRAWN :	DATE :	CALC NO. :
AS SHOWN	K.P./R.R.	SEPT. 30/03	9664
			ACAD NO. : 9664_SUMP





LOCATION DETAIL : 1 : 50 000

LEGEND

BURIED PIPES SHOWN THUS

RISERS SHOWN THUS — RISER

WELL HEAD SHOWN THUS

ORIGINAL CUT/FILL LINE (1998) SHOWN THUS

NOTE:
TOPO DATA IS BASED ON HISTORICAL RECORDS AND HAS NOT BEEN RECENTLY CONFIRMED IN FIELD.

REVISION TABLE

No.	DESCRIPTION	DATE	BY
1	SHOW ELEVATIONS AND VARIOUS TOPO FEATURES FROM OCT 24, 2003 SURVEY	OCT.27/03	KP
2	SHOW PROPOSED RIG LOCATION FOR 2M-25	NOV.7/03	KP
3	SHOW CUT FILL LINE	NOV.12/03	KP
4	MOVE WELL CENTER FOR 2M-25, ROTATE RIG	NOV.18/03	KP

CHEVRON CANADA LIMITED

PLAN OF
SITE SURVEY
OF
CHEVRON M-25 PLANT SITE
IN UNIT M, SECTION 25
GRID AREA 60°30', 123°30'

NORTHWEST TERRITORIES

0 5 10 25 50m
SCALE 1 : 500

CHALLENGER GEOMATICS LTD.
PHONE (403) 253-8101
FAX (403) 253-1985
CALGARY

DRAWN :	SCALE:	DATE :	JOB NO. :
K.P.	1 : 500	SEPT. 24, 2003	11335-M25-SITE

468,000 470,000 472,000 474,000 476,000 478,000

6,700,000 6,698,000 6,696,000 6,694,000 6,692,000 6,690,000 6,688,000 6,686,000 6,684,000 6,682,000 6,680,000

PARAMOUNT
F-25
PLANT SITE

60-30 N 123-30 W

60-30 N 123-15 W

PARMOUNT
O-80
WELLSITE

60-20 N 123-30 W

60-20 N 123-15 W

N

FORT LIARD
Aerial Mosaic

Paramount resources ltd.

WATER DISPOSAL LINE

Start: O80-60-20-123-15
End: F25-60-30-123-30

UNIVERSAL SURVEYS GROUP
SURVEYING • MAPPING • PROJECT SERVICES

Toll Free: 1-866-454-3031
www.universalsurveys.com

1:50,000

0 0.5 1 2 Km

Job No.:	12-0341E
File:	120341M01.mxd
Tech/Chk:	SAN, JQ
Date:	17-MAY-2012
Projection:	NAD 27 Zone 10
Rev:	1

LEGEND

- Pipeline
- Road
- Water Crossing
- Repeater Site
- Quarry
- Borrow Pit
- Bridge
- Log Deck
- Cutline
- Water Disposal Line
- Watercourse
- Waterbody
- Wetland

Water Disposal Line Length: ± 12.65 km

Appendix B: ERP Sections Related to NWT Response Specific Instructions

Northwest Territories Petroleum Industry Release Reporting Requirements

All spills exceeding the spill/release quotas listed in the table on the following page MUST be reported immediately to the appropriate regulatory agency.

Agency	Reportable Spills	Report Type	Report To
Office of the Regulator of Oil and Gas Operations (OROGO)	Operators must report **all incidents and near-misses** to the Regulator as soon as the circumstances permit by calling 1-867-445-8551.	Verbal	(OROGO) 1-867-445-8551
		Written	Operators must submit an investigation report, within 21 days of the day an incident or near-miss occurs, if the incident or near-miss involves: ~ A death ~ An injury that required time off work ~ A fire or explosion ~ A leak ~ An immediate threat to safety or ~ A significant pollution event
The Department of Environment and Natural Resources (ENR)	Reported releases or potential releases of any size that: 1) Are near or in an open water body 2) Are near or in a designated sensitive environment or habitat 3) Pose an imminent threat to human health or safety; or 4) Pose an imminent threat to a listed species at risk or its critical habitat Substances regulated by Environment and Natural Resources if: 1) Release meets or exceeds the reporting threshold in the NWT spill Reporting Requirements column in the **Reportable Threshold table** on the following page.	Verbal	NWT/Nunavut 24 Hr. Spill Reporting Line 867-920-8130
		Written	Fill out the Spill Report Form found at: http://www.enr.gov.nt.ca/en/files/spill-report-form-northwest-territories-nunavut Submit the completed form via: Fax: 867-873-6924 OR Email: spills@gov.nt.ca
Canadian Environmental Protection Agency (CEPA)	Environmental emergencies if: 1) The emergency involves any of the substances identified in Environment & Climate Change Canada's E2 List of regulated substances. See the website link at the bottom of the following page for more information. Note: CEPA has not identified specific reporting thresholds; however, CEPA has suggested that existing provincial reporting thresholds or TDG reporting thresholds are acceptable for use.	Verbal	NWT/Nunavut 24 Hr. Spill Reporting Line 867-920-8130
		Written	Within 30 days
Transportation of Dangerous Goods (TDG)	Substances regulated by Transportation of Dangerous Goods if: 1) Release meets or exceeds the reporting threshold in the TDG Reporting Requirements column in the **Release Reporting Thresholds** table on the following page.	Verbal	403-873-7406 (Yellowknife)
		Written	Within 30 days
Canadian Transport Emergency Centre (CANUTEC)	Loss and theft reporting: 1) CANUTEC - all loss or theft of dangerous goods materials 2) Natural Resources Canada Inspector - Class 1 explosive materials only 3) Canadian Nuclear Safety Commission - Class 7 radioactive materials only	Verbal	1) 888-226-8832 or 613-996-6666 2) 613-995-5555 3) 613-995-0479
		Written	Within 30 days
Department of Fisheries and Oceans (DFO)	1) A release of any substance deleterious to fish into a fish bearing water body.	Verbal	Inuvik 867-777-7500 Yellowknife 867-669-4900
National Energy Board (NEB)	Immediately reportable events as defined in the NEB Event Reporting Guidelines December 2017: 1) An incident that harms people or the environment, 2) A rupture, or 3) A toxic plume Note: Immediately reportable incidents must be reported within 3 hours to both the TSB Reporting Hotline and NEB's OERS. If applicable, refer to the Federal Roles & Responsibilities chart in SECTION 5: EXTERNAL AGENCIES and the NEB site section behind the AREA SPECIFIC INFORMATION tab for further	Verbal	Via Transportation Safety Board (TSB) Reporting Hotline 819-997-7887
		Written	NEB Online Event Reporting System (OERS) https://apps.neb-one.gc.ca/ers/home/index
Canadian Nuclear Safety Commission (CNSC)	All radioactive releases must be reported immediately.	Verbal	613-995-0479
		Written	Within 21 days

Note: The Departments of Environment and Natural Resources and Lands, and the Office of the Regulator of Oil and Gas Operations (OROGO) are responsible for coordinating Government of the Northwest Territories regulatory oversight and investigation of hazardous material spills in NWT under their respective jurisdictions.

Note: Spills must be reported promptly to avoid possible prosecution.

Lead Agency Contact Numbers	
Northwest Territories	
The Office of the Oil and Gas Regulator (OROGO)	1-867-445-8551
NWT/Nunavut 24 Hr. Spill Reporting Line	1-867-920-8130
Canada	
CANUTEC	
All Provinces	888-CAN-UTEC (888-226-8832) 613-996-6666
National Energy Board / Transportation Safety Board of Canada	
Incident Reporting Line	819-997-7887

See following page for spill / release quotas.

Northwest Territories Petroleum Industry Release Reporting Requirements

All spills exceeding the spill/release quotas listed in the table on the following page MUST be reported immediately to the appropriate regulatory agency.

Chemical Class	Substance / Example	T.D.G. Reporting Requirements		OROGO / ENR Reporting Requirements
		Road, Rail or Marine	Loss or Theft	
Spilled Liquid Substances	Hydraulic Oil	No TDG Reporting Requirements		When released on a frozen water body that is being used as a working surface
	Methanol	See Class 3 & 6.1		
	Natural Gas	See Class 2.1		Uncontrolled release or sustained flow of 10 minutes or more
	Crude Oil / Emulsion (Unrefined)	See Class 3		>100 L or 100 kg
	Produced / Salt Water (Unrefined)	No TDG Reporting Requirements		
	Drilling Fluid or Invert Mud			
	Condensate (Unrefined)	See Class 3		
	Glycol	No TDG Reporting Requirements		No Reporting Requirement
	Fresh Water			
	Any fluid with toxic substances			>5L or 5 kg
Class 1 Explosives	Ammunition Nitro-glycerine	Any quantity of Packing Group II	Any quantity in Class 1.1, 1.2, and 1,3 Total quantity of 450 kg or more in Class 1.4 (except 1.4S), 1.5, or 1.6	Any amount
Class 2.1 Flammable Gases	H_2S	Any quantity	Total quantity of 450 kg or more	Any amount of gas from containers with a capacity greater than 100L
	Methane Propane Butane Natural Gas			
Class 2.2 Non-Flammable Gases	Compressed Air O_2 N_2 CO_2		No TDG Reporting Requirements	Any amount of gas from containers with a capacity greater than 100L
Class 2.3 Toxic Gases (poisonous or corrosive)	H_2S SO_2 Hydrogen Cyanide Nitric Acid Anhydrous Ammonia		Any quantity	Any amount
Class 3 Flammable Liquids	Gasoline Diesel Methanol Demulsifiers Scale Inhibitors Lube Oil	Any quantity of Packing Group I or II More than 30 L or 30 kg of Packing Group III	Total quantity of 450 kg or more of desensitized explosives Any quantity of UN1261, Nitromethane	>100L
Class 4.1 Flammable Solids	Calcium Resinate Naphthalene Crude		Total quantity of 450 kg or more of desensitized explosives Any quantity of UN1357, Urea Nitrate, with not less than 20% water, by mass; UN3370, Urea Nitrate, Wetted, with not less than 10% water by mass	>25 kg
Class 4.2 Spontaneously Combustible	Activated Carbon Potassium Sulphide Phosphorus		Total quantity of 450 kg or more in Packing Groups I or II	
Class 4.3 Water reactant substances	Molten Sulphur Calcium Carbide Sodium Activated Carbon		Total quantity of 450 kg or more in Packing Groups I or II	
Class 5.1 Oxidizing Substances	Calcium Nitrate Ammonium Nitrate Bleaches		Total quantity of 450 kg or more in Packing Groups I or II Any quantity of UN1485, Potassium Chlorate; UN1486, Potassium Nitrate; UN 1487, Potassium Nitrate and Sodium Nitrate Mixture; UN1489, Potassium Perchlorate; UN1495, Sodium Chlorate; UN1498, Sodium Nitrate; UN1499 Sodium Nitrate and Potassium Nitrate Mixture; UN1511, Urea Hydrogen Peroxide; UN1942 Ammonia Nitrate, with not more than 0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substances; UN2014 Hydrogen Peroxide, Aqueous Solution with not less than 20% but not less than 60% hydrogen peroxide (stabilized as necessary); UN2015, Hydrogen Peroxide, Stabilized; UN2031, Nitric Acid, other than red fuming; UN3149, Hydrogen Peroxide and Peroxyacetic Acid Mixture with acid (s), water and not more than 5% peroxyacetic acid, stabilized	50 kg or 50 L
Class 5.2 Organic Peroxides	Methyl Ethyl Ketone Peroxide Succinic Acid Peroxide		Any quantity in Class 5.2, Type B, liquid or solid, temperature controlled	>1L or 1 kg
Class 6.1 Poisonous Toxic Substances	Arsenic Lead Acetate Mercuric Oxide Methanol Toxic Pesticides		Any quantity of Packing Group I	>5L or 5 kg
Class 6.2 Infectious Substances	Infectious Substances affecting Humans / Animals Sewage and wastewater	Any quantity of Category A or B	Any quantity	Any amount
Class 7 Radioactive Substances	Uranium Plutonium Naturally Occurring Radioactive Materials (N.O.R.M.)	For packages being transported under exclusive use: (i) 10 mSv/h on the external surface (ii) 2 mSv/h on the surface of the conveyance, and (iii) 0.1 mSv/h at a distance of 2 m from the surface For packages not being transported under exclusive use: (i) 2 mSv/h on the external surface (ii) 0.1 mSv/h at a distance of 1m from the package, (iii) 2 mSv/h on the surface of the conveyance, and (iv) 0.1 mSv/h at a distance of 2m from the surface of the conveyance.	Any quantity	Any amount
Class 8 Corrosives	Acids Bases Batteries Caustic Amine	Any quantity of Packing Group I or II 30 L or 30 kg of Packing Group III	Total quantity of 450 kg or more in Packing Group I or II Any quantity of UN1796, Nitrating Acid Mixture with more than 50% nitric acid; UN1826, Nitrating Acid Mixture, Spent, with more than 50% nitric acid; UN2032, Nitric Acid, Red Fuming	5 kg or 5 L
Class 9 Miscellaneous Products, Substances & Organisms, Environmentally Hazardous Substances	P.C.B. Asbestos Polystyrene Beads Gas Plant Filters Benzoic Acid Chromic Acetate Cupric Sulphate	30 L or 30 kg of Packing Group II or III, or without Packing Group	No TDG Reporting Requirements	>5L or 0.5 kg
Class 9.1 Miscellaneous (except and with PCB mixtures 5 or more ppm)				0.5 L or 100 kg
Class 9.2 Aquatic Toxic				No Reporting Requirement
Class 9.3 Wastes (chronic toxic)				Any amount

Other items in the ENR Spill Reporting Regulation that are applicable but do not fit in the above table format.

Item	Substance Spilled	Specified Amount
	Waste or spent chemicals, used or waste oil, vehicle fluids, wastewater	>100L or 100 kg

For all other reportable substances/quantities, please refer to company SDS sheets for more information.

List of Environment & Climate Change Canada's E2 Regulated Substances: https://ec.gc.ca/ee-ue/default.asp?lang=En&n=06FCD512-1

SPILL RESPONSE GUIDELINES

This section provides basic hydrocarbon spill response guidelines. For greater detail, refer to the Western Canada Spill Services (WCSS) manuals, applicable Safety Data Sheets (SDS) and the Emergency Response Assistance Canada (ERAC) Plan. Refer to the Petroleum Industry Release Reporting Requirements chart at the beginning of this section to determine the TDG and Provincial Reporting Requirements for each class of chemicals (as classified by the TDG Hazard Classification System).

Initial Response Actions:

- Determine the Level of Emergency using the Assessment Matrix in SECTION 1 – INITIAL RESPONSE.
- Determine spilled substance. If it can be classified as an LPG release, isolate the area to a minimum distance of 1600 meters (1 mile) and refer to the BLEVE portion of the fire / explosion section.
- Assess spill hazards and risks. Determine what PPE will be required.

Considerations:

- Are there any nearby public (workers, traffic, residents) that would need to be evacuated or diverted from the spill area?
- Is there a fire or explosion hazard? What is the ignition source?
- Is there H_2S or other toxins present? Are concentrations safe or is additional PPE needed?
- Are there any areas deemed hazardous? (Mark with flags)
- What are the ground and weather conditions? (Snow, gravel, sand etc.)
- Where is the location of the leak, the type of release and the volume released? Is it reportable? Has it been reported to the regulator?
- How long has the spill been taking place?
- Are air monitoring trailers required?
- Is the spill into a watercourse, watershed or a water body?
- Is the spill contained or migrating? Which direction? How far can it go?
- If the spill is not contained, determine and prioritize the containment points and methods to be used.
- What lands or water bodies may be affected? (Farm, livestock, brush, drinking water, etc.)
- How is it going to be contained and cleaned up?
- How to access the spill site, the source of the spill and recovery points?
- What equipment is required? Is oil spill equipment (oil spill co-op) required?
- Where can spill responders park so as not to interfere with spill equipment? (Minimize vehicular traffic as much as possible at the spill site.)
- Are there any residences in the area? Do they have water wells that could be affected?
- Should the spill site be cordoned off to prevent wildlife / livestock from entering?
- Will a media response be required?

Control/Containment:

- Remove all sources of ignition.
- Stop the spill if safely possible (e.g. shut off pump, replace cap, tip drum upward, patch leaking hole). Use the contents of the nearest spill kit to aid in stopping the spill if it is safe to do so.
- Assess speed and direction of spill and cause of movement (water, wind and slope).
- Use contents of spill kits to place sorbent materials on the spill, or use shovel to dig to contain spill. Methods may vary depending on the nature of the spill.
- Prioritize and set up containment points.
- Where possible, prevent a spill from entering a watercourse.
- Have a contingency plan ready in case spill worsens beyond control or if the weather or topography impedes containment.
- Avoid excessive walking or driving on the spill area.
- Consider ground disturbance guidelines.
- Surface run off may have to be diverted from the spill site if wet conditions are present.
- Mitigate or eliminate any danger to life, health, the environment or property arising from the spill.
- Ensure the health and safety of the persons responding to the spill.
- Once containment has been achieved, recovery and clean-up operations begin immediately.
- Recover as much product and saturated debris as possible.
- Keep environmental disturbance to a minimum.
- Take steps to rehabilitate any land affected by the spill.
- Take steps to prevent the occurrence of a similar spill.

External Notifications:

- Contact the below spill service, to determine the closest available spill equipment and towing requirements.

SWAT Consulting	866-610-7928

Follow notification procedures outlined at the beginning of this section.

SPILL CONTROL POINTS

Control points are pre-identified locations on watercourses that allow for the staging and deployment of oil spill containment and recovery equipment in response to oil spills that have occurred upstream of the control point. Control point selection is critical to an effective oil spill response and part of your risk assessment and development of site-specific emergency response plan information. For a detailed list of control points utilize the WCSS website (http://www.wcss.ab.ca).

An ideal control point should have:

- quick access to the watercourse in all seasons, using clear ground, a road or a trail
- adequate work space to conduct operations and to store required equipment with minimal need for clearing of brush and vegetation
- sufficient space to deploy containment and recovery equipment quickly with minimal effort or obstructions (i.e. trees, rocks, steep banks, etc.) and minimal environmental impact
- boat launch location(s) for boats assisting in containment and recovery operations.

Selection of control points with public access is preferred.

For control points on private property - landowner approval and necessary permits for emergency access should be obtained in advance.

Designated site specific control points need to be reviewed at least annually. Each control point site should be visited periodically to evaluate suitability and to ensure information is accurate and complete. Old unsuitable control points should be removed and new control points added, as a part of revisions to site specific information, as required. Control point listings should include a site description, site diagram, access description, landowner/occupant phone number, site suitability and any other information related to the site.

ACTION

Where a spill occurs, the person who had possession immediately before the spill shall take all reasonable and practical action. They should have due regard for the safety of the public, themselves, to stop and contain and minimize the effects of the spill.

RECOVERY TECHNIQUES

There are two basic means of stopping the flow of petroleum products floating on a stream or river: a boom or a dam. If the stream or river if relatively large, booms are used. A dam may be constructed across the channel of a small stream with a low flow.

If a stream or river is to be boomed, the appropriate equipment should be obtained from the Local Spill Response Cooperative or mutual aid partners. Decisions must incorporate the following considerations:

- Width of stream or river to be boomed (where possible, the entire river width should be boomed)
- Allowable boom angle based on stream or river current and length of boom required
- Anchoring methods for the booms
- Methods to lay out and deploy a boom

If a dam is to be constructed across the stream, some allowance must be made for the flow of water past the dam. The Western Canadian Spill Services plan provides detailed information about oil spill containment and recovery.

CONTAINMENT AND STORAGE OF PRODUCT

When commercial barriers are not suitable or available, particularly in remote areas, barriers must be improvised. Improvising depends on the materials at hand and the situation in which the spill occurred. In each case, the experience and innovative ability of the personnel at the spill site is needed for the successful containment of the oil spill.

Tank trucks, storage tanks or an earthen pit may be used to store recovered petroleum products. Access must be close enough to the recovery site so that hoses from the pumps can reach a tank truck. Storage tanks must be located on level, stable ground with access available for tank truck use. An earthen pit should only be constructed when tank trucks or storage tanks cannot be used. Earth-moving equipment and appropriate ground disturbance procedures will be required to construct a pit. A plastic lining should be used.

DISPOSAL AND REMEDIAL OPERATIONS

Disposal of the product and site restoration actions will be determined for each site by consultation among operations personnel, the provincial environmental protection agency or other environmental regulators and any external contracted professional environmental consultants.

It is the companies responsibility when reporting a release to the regulatory agency or the Ministry of Environment (as appropriate) to inform any private individuals whose lands may be affected by the release. The company must notify the landowner of any release that occurs off a lease site, migrates off a lease site or occurs on an easement or right-of-way. The company is reminded that landowner cooperation is essential in being able to quickly respond to a release that is not on the normal working area of a lease site.

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

Government of Northwest Territories | Nunavut | Canada | Inuvialuit Land Administration

NT-NU 24-HOUR SPILL REPORT LINE
Tel: (867) 920-8130 • Fax: (867) 873-6924 • Email: spills@gov.nt.ca

REPORT LINE USE ONLY

A	Report Date: MM DD YY	Report Time:	☐ Original Spill Report **OR** ☐ Update # _____ to the Original Spill Report	**Report Number:**
B	Occurrence Date: MM DD YY	Occurrence Time:		
C	Land Use Permit Number (if applicable):		Water Licence Number (if applicable):	
D	Geographic Place Name or Distance and Direction from the Named Location:		Region: ☐ NT ☐ Nunavut ☐ Adjacent Jurisdiction or Ocean	
E	Latitude: _____ Degrees _____ Minutes _____ Seconds		Longitude: _____ Degrees _____ Minutes _____ Seconds	
F	Responsible Party or Vessel Name:		Responsible Party Address or Office Location:	
G	Any Contractor Involved:		Contractor Address or Office Location:	
H	Product Spilled: ☐ Potential Spill	Quantity in Litres, Kilograms or Cubic Metres:	U.N. Number:	
I	Spill Source:	Spill Cause:	Area of Contamination in Square Metres:	
J	Factors Affecting Spill or Recovery:	Describe Any Assistance Required:	Hazards to Persons, Property or Environment:	
K	Additional Information, Comments, Actions Proposed or Taken to Contain, Recover or Dispose of Spilled Product and Contaminated Materials:			

L	Reported to Spill Line by:	Position:	Employer:	Location Calling From:	Telephone:
M	Any Alternate Contact:	Position:	Employer:	Alternate Contact Location:	Alternate Telephone:

REPORT LINE USE ONLY

N	Received at Spill Line by:	Position:	Employer:	Location Called:	Report Line Number:

Lead Agency: ☐ EC ☐ CCG/TCMSS ☐ GNWT ☐ GN ☐ ILA ☐ AANDC ☐ NEB ☐ Other: _____

Significance: ☐ Minor ☐ Major ☐ Unknown

File Status: ☐ Open ☐ Closed

Agency:	**Contact Name:**	**Contact Time:**	**Remarks:**
Lead Agency:			
First Support Agency:			
Second Support Agency:			
Third Support Agency:			

INCIDENT NOTIFICATION PROTOCOL [1]

	Negligible (1)	Minor (2)	Serious (3)	Major (4)	Critical (5)
Health & Safety	• No illness or adverse effect. • Medical treatment is not necessary. • Injury requiring First Aid treatment	• Minor illness or adverse effect with limited or no impacts on ability to function • Multiple First Aid Injuries • Medical Aid Injury	• Serious illness or adverse effects with mild to moderate functional impairment • Injury requiring modified work • Multiple Modified Work Injuries • Multiple Medical Aid Injuries	• Major illness or chronic exposure resulting in long term effects. • Medical treatment for exposure to toxic substance (i.e. H_2S) • Lost Time Injury • Injury resulting in long term disability or disfigurement • Potential Serious Injury or Fatality (SIF)	• Critical illness or chronic exposure resulting in fatality or significant life shortening effects. • Fatality or fatalities • Multiple Lost Time Injuries • Life Threatening physical assault or threat
	** Potential Serious Injury or Fatality (SIF) = MAJOR (4)				
Assets	• Negligible asset loss or damage to facility resulting in costs <$50K	• Minor asset loss or damage to facility resulting in costs >$50K but <$250K	• Serious asset loss, damage to facility resulting in costs >$250K but <$500K	• Major asset loss or damage to facility resulting in costs >$500K but <$2M • Declaration of a Level 1 emergency as defined by the regulator	• Critical asset loss or damage to facility resulting in costs >$2M • Declaration of a Level 2 or 3 emergency as defined by the regulator
Environment [2]	• Tier 4 [2] • Liquid release contained on lease (<2m^3) • Liquid release extends beyond lease (<0.1m3) • Gas release on lease (<30,000 m^3) • Negligible environmental impact	• Tier 3 [2] • Liquid release contained on lease (≥ 2m^3 but < 10 m^3) • Liquid release extends beyond lease (≥0.1m3 but < 2m3) • Gas release on lease (≥ 30,000 m^3 but < 100,000 m^3) • Gas release off lease (< 30,000 m^3) • Public, wildlife or worker health/safety are not in jeopardy • Response requiring on-site resources • Minimal environmental impact	• Tier 2 [2] • Liquid release contained on lease (≥10m^3 but < 100m^3) • Liquid release extends beyond lease (≥2m3 but < 10m3) • Gas release off-lease (≥ 30,000 m^3 but < 100,000 m^3) • Public, wildlife or worker health/safety could be jeopardized • Response requiring local resources	• Tier 1 [2] • Liquid release contained on lease (≥ 100 m^3) • Liquid release extends beyond lease (≥ 10m^3) • Gas release on or off lease (≥100,000m^3) • Response requiring regional resources • Single wildlife impact	• Tier 1 [2] with Fire / Explosion • Liquid release into Waterbody or sensitive habitat • Release extends beyond lease – public health/safety are jeopardized. • Release impacting a sensitive species • Release requiring long term response and remediation effort • Multiple wildlife impacted
Reputation	• Regulatory enforcement action not likely • Non-conformance to internal procedures or requirements • Individual concern • No Media attention	• Regulatory enforcement action (fines < $100K) • Short term community concern	• Regulatory enforcement action (fines > $100k but < $1M) and or criminal charges laid	• Regulatory enforcement action (fines > $1M but <5M) and or criminal charges laid • Close regulatory scrutiny of Asset level operations / future proposals • Local Media coverage or social media coverage • Major interest group concern • Short term regional concern	• Regulatory enforcement action (fines > $5M) and or criminal charges laid • Negative national publicity • Negative impact on market share or investor valuation • Major venture / asset operations severely restricted

[1] This document is to be used as a quick reference guide only and is not a controlled document. The contents are excerpted from Paramount Incident Management Governance Document. Any revisions must be made within the Governance document before being reflected here. The intent is to be used for internal incident notification purposes only; emergency response plan is to be used when responding to emergencies. **First determine if this is an Emergency or Incident response – IS THE SITUATION UNDER CONTROL? If not, initiate Emergency Response Plan.**

[2] For Tier categorization or Regulatory Reportable Thresholds, consult with local Safety or Environmental Advisor and Corporate HSE team

Notification Timing based on Actual[1] Incident Severity

Operations		Drilling/Completions		Engineering Facilities Construction		HSE		Actual Incident Severity				
Notification By:	Notification To:	Notification By:	Notification To:	**Notification By:**	**Notification To:**	**Notification By:**	**Notification To:**	**Negligible**	**Minor**	**Serious**	**Major**	**Critical**
Worker	Supervisor/ Foreman	Worker	Site Supervisor	Worker	Site Supervisor			Immediate [2]	Immediate [2]	Immediate [2]	Immediate [2]	Immediate [2]
Foreman	Ops Manager **&** Safety or Environment Advisor	Site Supervisor	Superintendent & Safety or Environment Advisor	Site Supervisor (Inspector)	PM. & Safety or Environment Advisor			Within 24 hrs	Immediate	Immediate	Immediate	Immediate
Ops Manager	Ops Director	Superintendent	D&C Director	PM	Facilities Manager			WDS	Within 24 Hrs	Within 8 Hrs	Immediate	Immediate
						Safety or Environment Advisor	Health & Safety Manager OR Environment Team Leader	NBD	Within 24 Hrs	Immediate	Immediate	Immediate
						Health & Safety Manager OR Environment Team Leader	HSE Director	WDS	Within 24 Hrs	Within 8 Hrs	Immediate	Immediate
Ops Director	Ops VP			Facilities Manager	Eng. VP	HSE Director	EVP Ops	WDS	NBD	Within 8 Hrs	Immediate	Immediate
Ops VP	EVP Ops **&** CEO	D&C Director	EVP Ops & CEO	Eng. VP	EVP Ops & CEO			WDS		Within 24 Hrs	Within 8 Hrs	Immediate

Notes:
1 – Notification requirements based on actual severity (or potential SIF)
2 – “Immediate” incident notification occurs after physical response steps to bring the event to a safe state
WDS – Weekly Data Summary
NBD – Next Business Day (Mon-Fri)

Initial Internal Notification Requirements

Include the following information when providing initial notifications:

Reporting / Responsible Region:			
Date:		**Time:**	
Event Type:		**Actual Severity:**	
Potential SIF:	☐ Yes ☐ No	**Location:**	
Reason for SIF Classification:		**Nearest Municipality:**	
		Person Involved:	Name
		Position	Position
☐ Employee ☐ Contractor		Company Name	

Description of incident (What, where, when, how):
Action Taken:
Actual and Potential Impacts:
People:
Environment:
Assets / Operational Impact:
Reputation:
Regulatory:
Reported to Government Agency?

Who:		Contact Number:		Time:	

What information was provided:

Appendix C: Spill Co-op Equipment List

Current Equipment Inventory

Name Fort Nelson Skid Unit #43
Co op Area C
Zone 6
Equipment Type Co-op Area
Status Active
Usage 0.00

Category	Standard	Quantity	Description	Tag #	Serial #	Model #	Manufacturer
Anchors and Equipment							
Anchor I Beam & chain	1	4					
Chain 1/2"x 20' galvanized - quick link ea. End	1	8					
Anchor, Rake	1	1					
Drive Pin, spade type	1	10					
Drive Pin, straight	20	18					
Anchor, Slater 5'	1	8					
Anchor - Danforth	1	3					
Marker buoy	1	3					

Category	Standard	Quantity	Description	Tag #	Serial #	Model #	Manufacturer
Communications Equipment							
Megaphone	1	1					
Whiteboard	1	1					

Category	Standard	Quantity	Description	Tag #	Serial #	Model #	Manufacturer
Containments Boom and Accessories							
Boom, fast water, 50' ea.c/w ASTM conectors Versat	1	8					
Handline Bridles	1	25					
Towing Bridles	1	4					
Towing Paravanes	1	1					
Handline Ropes (25' - blue)	1	9					
Handline Ropes (50' - yellow)	1	10					
Handline Ropes (100' - green)	1	11					
Handline Ropes (150' - red)	1	4					
Rope, 500'	1	2					
Sarca Anchor	1	1					

Category	Standard	Quantity	Description	Tag #	Serial #	Model #	Manufacturer
Fittings and Camlocks							
Bushings 3"x2"	1	2					
Swedge, 3"x2"	1	0					
Kamlok 2" Female	1	4					
Kamlok, 2" Male	1	2					
Kamlok, 3" Male	1	4					
Kamlok, 3" Female	1	2					
Kamlok, 3"x2"	1	1					
Kamlok, 300B	1	1					
Kamlok, 300D	1	0					
Kamlok, 300F	1	1					
Kamlok Gasket, 2"	1	10					
Kamlok Gasket, 3"	1	10					

Category	Standard	Quantity	Description	Tag #	Serial #	Model #	Manufacturer
Hand Tools							
Axes	1	2					
Brooms (straw)	1	1					
Crowbar, pinch point,	1	1					
Pitch Forks	1	2					
Post pounder, pipe	1	1					
Post Pounder, striking plate	1	1					
Rakes	1	4					
Shovel - Scoop	1	2					
Shovel - Spade	1	4					
Sledge Hammer	1	2					
Squeegees	1	2					
Tool Kit, Westward 73 piece	1	1					
Pipe Wrench 18"	1	1					
Pipe Wrench 24"	1	1					

Category	Standard	Quantity	Description	Tag #	Serial #	Model #	Manufacturer
Hose and Accessories							
Discharge Hose 3" x 50' c/w Kamlok	1	4					
Hose Float, aluminum	1	1					
Manifold hose c/w valves & camlocks	1	1					
Suction Hose (2" x	1	2					
Suction Hose (3" x	1	11					
Discharge Hose 2"x20	1	2					

Category	Standard	Quantity	Description	Tag #	Serial #	Model #	Manufacturer
Miscellaneous							
Electrical Cord, 100'	1	2					

	30Amp						
	500W lights	1	4				
	Chicken Wire rolls	1	3				
	Flagging tape rolls, 4 color	1	7				
	Garbage Bags, 30 per box	1	1				
	Garbage Cans	1	0				
	Gas Cans 20 litre	1	0				
	Generator - Honda	1	1			ES 6500	Honda
	Light stands	1	2				
	Porta Tank and Liner	1	1	There are 2 liners			
	Sorbent Booms, 4 booms per package	1	2				
	Sorbent Pads, 100 per kkg.	1	4	and a half			
	Sorbent Rolls	1	2				
	Tie Wire rolls	1	1				
	Vehicle reflector kit	1	1				
	pails	1	2				
	Pennant Carlot	1	10				
	Holographic Scare Tape (roll)	1	10				
	Zon Gun	1	1				

Category	Standard	Quantity	Description	Tag #	Serial #	Model #	Manufacturer
Personal Protective Clothing							
Chest Waders, c/w steel toe	1	7					
Face shields	1	2					
Gloves, Leather	1	20					
Gloves, Oil resistant rubber	1	12					
Goggles	1	8					
Hearing protectors,	1	1					
Rainsuits, Fire retardant - Jacket &	1	6					
Safety vests, no titles	1	3					
Safety Vest w/titles	1	8					

Category	Standard	Quantity	Description	Tag #	Serial #	Model #	Manufacturer
Pumps and Power Equipment							
Trash Pump - Honda 3" c/w ball valve & camlocks	1	1			G300-22458	G200	
Trash pump 3"	1	1			WABJ-1153982	WT30X	Honda

Category	Standard	Quantity	Description	Tag #	Serial #	Model #	Manufacturer
Safety Equipment							
Barrier Tape, 1000' per roll	1	2					

	Fire Extinguishers ABC 30 lbs & mounting bracket	1	1					
	First Aid Kits (10	1	1					
	Flashlight, X proof	1	4					
	PFD's	1	10					
	Posts, T type, 6' each	1	15					
	Safety Harness	1	5					
	Signs (hard hat area)	1	9					
	Signs (no smoking)	1	5					
	Traffic Cones	1	6					
	Windsock, large c/w stand	1	1					
	Windsock, small	1	1					

Category		Standard	Quantity	Description	Tag #	Serial #	Model #	Manufacturer
Signage								
	Equipment ID charts	1	4					

Category		Standard	Quantity	Description	Tag #	Serial #	Model #	Manufacturer
Skimmers								
	Pedco Skimmer (2')	1	1					

Appendix D: MSDS Sheets

Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Chevron Hydraulic Oil 5606A

Product Use: Hydraulic Oil
Product Number(s): 247707
Company Identification
Chevron Canada Limited
1050 West Pender
Vancouver, BC V6E 3T4
Canada
www.chevronlubricants.com

Transportation Emergency Response
CHEMTREC: (800) 424-9300 or (703) 527-3887
Health Emergency
Chevron Emergency Information Center: Located in the USA. International collect calls accepted. (800) 231-0623 or (510) 231-0623
Product Information
email : lubemsds@chevron.com
Product Information: (800) LUBE TEK

SECTION 2 HAZARDS IDENTIFICATION

CLASSIFICATION: Flammable liquid: Category 4. Aspiration toxicant: Category 1. Acute aquatic toxicant: Category 3. Chronic aquatic toxicant: Category 3.

Signal Word: Danger

Physical Hazards: Combustible liquid (H227).

Health Hazards: May be fatal if swallowed and enters airways (H304).

Environmental Hazards: Harmful to aquatic life with long lasting effects (H412).

PRECAUTIONARY STATEMENTS:
Prevention: Keep away from heat, sparks, open flames and other ignition sources. No smoking (P210). Avoid release to the environment (P273). Wear protective gloves/protective clothing/eye protection/face protection (P280).
Response: IF SWALLOWED: Immediately call a POISON CENTER/doctor (P301+P310). Do NOT induce vomiting (P331). In case of fire: Use media specified in the SDS to extinguish (P370+P378).
Storage: Store locked up (P405). Store in a well-ventilated place (P403).
Disposal: Dispose of contents/container in accordance with applicable local/regional/national/international regulations (P501).

SECTION 3 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Distillates, hydrotreated light	64742-47-8	70 - 80 %weight
Highly refined mineral oil (C15 - C50)	Mixture	10 - 20 %weight

Information on ingredients that are considered Controlled Products and/or that appear on the WHMIS Ingredient Disclosure List (IDL) is provided as required by the Canadian Hazardous Products Act (HPA, Sections 13 and 14). Ingredients considered hazardous under the OSHA Hazard Communication Standard, 29 CFR 1910.1200, are also listed. See Section 15 for additional regulatory information.

SECTION 4 FIRST AID MEASURES

Description of first aid measures
Eye: No specific first aid measures are required. As a precaution, remove contact lenses, if worn, and flush eyes with water.
Skin: Wash skin with water immediately and remove contaminated clothing and shoes. Get medical attention if any symptoms develop. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.
Ingestion: If swallowed, get immediate medical attention. Do not induce vomiting. Never give anything by mouth to an unconscious person.

Inhalation: No specific first aid measures are required. If exposed to excessive levels of material in the air, move the exposed person to fresh air. Get medical attention if coughing or respiratory discomfort occurs.

Most important symptoms and effects, both acute and delayed
IMMEDIATE HEALTH EFFECTS
Eye: Not expected to cause prolonged or significant eye irritation.
Skin: Skin contact may cause drying or defatting of the skin. Contact with the skin is not expected to cause an allergic skin response. Symptoms may include pain, itching, discoloration, swelling, and blistering. Not expected to be harmful to internal organs if absorbed through the skin. High-Pressure Equipment Information: Accidental high-velocity injection under the skin of materials of this type may result in serious injury. Seek medical attention at once should an accident like this occur. The initial wound at the injection site may not appear to be serious at first; but, if left untreated, could result in disfigurement or amputation of the affected part.

Ingestion: Highly toxic; may be fatal if swallowed. Because of its low viscosity, this material can directly enter the lungs, if swallowed, or if subsequently vomited. Once in the lungs it is very difficult to remove and can cause severe injury or death.
Inhalation: Not expected to be harmful if inhaled. Contains a petroleum-based mineral oil. May cause respiratory irritation or other pulmonary effects following prolonged or repeated inhalation of oil mist at airborne levels above the recommended mineral oil mist exposure limit. Symptoms of respiratory irritation may include coughing and difficulty breathing.

Indication of any immediate medical attention and special treatment needed
Note to Physicians: Ingestion of this product or subsequent vomiting may result in aspiration of light hydrocarbon liquid, which may cause pneumonitis. In an accident involving high-pressure equipment, this product may be injected under the skin. Such an accident may result in a small, sometimes bloodless, puncture wound. However, because of its driving force, material injected into a fingertip can be deposited into the palm of the hand. Within 24 hours, there is usually a great deal of swelling, discoloration, and intense throbbing pain. Immediate treatment at a surgical emergency center is recommended.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO_2) to extinguish flames.
Unusual Fire Hazards: Leaks/ruptures in high pressure system using materials of this type can create a fire hazard when in the vicinity of ignition sources (eg. open flame, pilot lights, sparks, or electric arcs). See Section 7 for proper handling and storage.

PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds

will be evolved when this material undergoes combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in the vicinity of the spill or released vapor. If this material is released into the work area, evacuate the area immediately. Monitor area with combustible gas indicator.

Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. All equipment used when handling the product must be grounded. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.

Reporting: Report spills to local authorities as appropriate or required.

SECTION 7 HANDLING AND STORAGE

General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.

Precautionary Measures: Liquid evaporates and forms vapor (fumes) which can catch fire and burn with explosive force. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches. Fire hazard is greater as liquid temperature rises above 29C (85F).

DO NOT USE IN HIGH PRESSURE SYSTEMS in the vicinity of flames, sparks and hot surfaces. Use only in well ventilated areas. Keep container closed.

Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Wash thoroughly after handling.

Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures.

Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

General Storage Information: DO NOT USE OR STORE near heat, sparks, flames, or hot surfaces . USE AND STORE ONLY IN WELL VENTILATED AREA. Keep container closed when not in use.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:
Consider the potential hazards of this material (see Section 2), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS:
Use in a well-ventilated area.

PERSONAL PROTECTIVE EQUIPMENT
Eye/Face Protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.
Skin Protection: Wear protective clothing to prevent skin contact. Selection of protective clothing may include gloves, apron, boots, and complete facial protection depending on operations conducted. Suggested materials for protective gloves include: 4H (PE/EVAL), Nitrile Rubber, Silver Shield, Viton.
Respiratory Protection: No respiratory protection is normally required. Air-Purifying Respirator for Organic Vapors.
If user operations generate an oil mist, determine if airborne concentrations are below the occupational exposure limit for mineral oil mist. If not, wear an approved respirator that provides adequate protection from the measured concentrations of this material. For air-purifying respirators use a particulate cartridge. Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.
Occupational Exposure Limits:

Component	Country/ Agency	TWA	STEL	Ceiling	Notation
Distillates, hydrotreated light	ACGIH	200 mg/m3	--	--	Skin A3
Highly refined mineral oil (C15 - C50)	ACGIH	5 mg/m3	10 mg/m3	--	--

NOTE ON OCCUPATIONAL EXPOSURE LIMITS: Consult local authorities for acceptable provincial values in Canada. Consult the Canadian Standards Association Standard Z94.4-2011 Selection, Use and Care of Respirators.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Attention: the data below are typical values and do not constitute a specification.

Color: Red
Physical State: Liquid
Odor: Petroleum odor

Odor Threshold: No data available
pH: Not Applicable
Vapor Pressure: <0.01 mmHg (Estimated) @ 37.8 °C (100 °F)
Vapor Density (Air = 1): >4
Initial Boiling Point: 207.2°C (405°F)
Solubility: Soluble in hydrocarbons; insoluble in water
Freezing Point: Not Applicable
Melting Point: No data available
Specific Gravity: 0.86 - 0.90 @ 15°C (59°F)
Density: 0.86 kg/l - 0.90 kg/l @ 15°C (59°F)
Viscosity: 13.20 mm2/s @ 40°C (104°F) Minimum
Coefficient of Therm. Expansion / °F: Not Applicable
Evaporation Rate: No data available
Decomposition temperature: No data available
Octanol/Water Partition Coefficient: No data available

FLAMMABLE PROPERTIES:
Flammability (solid, gas): No Data Available

Flashpoint: (Cleveland Open Cup) 80 °C (176 °F) Minimum
Autoignition: No data available
Flammability (Explosive) Limits (% by volume in air): Lower: Not Applicable Upper: Not Applicable

SECTION 10 STABILITY AND REACTIVITY

Reactivity: May react with strong acids or strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Incompatibility With Other Materials: Not applicable
Hazardous Decomposition Products: None known (None expected)
Hazardous Polymerization: Hazardous polymerization will not occur.
Sensitivity to Mechanical Impact: No.

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects
Serious Eye Damage/Irritation: The eye irritation hazard is based on evaluation of data for product components.

Skin Corrosion/Irritation: The skin irritation hazard is based on evaluation of data for product components.

Skin Sensitization: The skin sensitization hazard is based on evaluation of data for product components.

Acute Dermal Toxicity: The acute dermal toxicity hazard is based on evaluation of data for product components.

Acute Oral Toxicity: The acute oral toxicity hazard is based on evaluation of data for product components.

Acute Inhalation Toxicity: The acute inhalation toxicity hazard is based on evaluation of data for product components.For additional information on the acute toxicity of the components, call the technical information center.
Acute Toxicity Estimate: Not Determined

Germ Cell Mutagenicity: The hazard evaluation is based on data for components or a similar material.

Carcinogenicity: The hazard evaluation is based on data for components or a similar material.

Reproductive Toxicity: The hazard evaluation is based on data for components or a similar material.

Specific Target Organ Toxicity - Single Exposure: The hazard evaluation is based on data for components or a similar material.

Specific Target Organ Toxicity - Repeated Exposure: The hazard evaluation is based on data for components or a similar material.

ADDITIONAL TOXICOLOGY INFORMATION:

This product contains petroleum base oils which may be refined by various processes including severe solvent extraction, severe hydrocracking, or severe hydrotreating. None of the oils requires a cancer warning under the OSHA Hazard Communication Standard (29 CFR 1910.1200). These oils have not been listed in the National Toxicology Program (NTP) Annual Report nor have they been classified by the International Agency for Research on Cancer (IARC) as; carcinogenic to humans (Group 1), probably carcinogenic to humans (Group 2A), or possibly carcinogenic to humans (Group 2B).

These oils have not been classified by the American Conference of Governmental Industrial Hygienists (ACGIH) as: confirmed human carcinogen (A1), suspected human carcinogen (A2), or confirmed animal carcinogen with unknown relevance to humans (A3).

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY

This material is expected to be harmful to aquatic organisms and may cause long-term adverse effects in the aquatic environment.
The product has not been tested. The statement has been derived from the properties of the individual components.

MOBILITY

No data available.

PERSISTENCE AND DEGRADABILITY

This material is not expected to be readily biodegradable. The product has not been tested. The statement

has been derived from the properties of the individual components.

POTENTIAL TO BIOACCUMULATE
Bioconcentration Factor: No data available.
Octanol/Water Partition Coefficient: No data available

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. Oil collection services are available for used oil recycling or disposal. Place contaminated materials in containers and dispose of in a manner consistent with applicable regulations. Contact your sales representative or local environmental or health authorities for approved disposal or recycling methods. (See B.C. Reg. GY/92 Waste Management Act; R.R.O. 1990, Reg. 347 General-Waste Management; C.C.SM.c. W40 The Waste Reduction and Prevention Act; N.S. Reg. 51/95 and N.S. Reg. 179/96 for examples of Provincial legislation.)

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

TC Shipping Description: NOT REGULATED AS DANGEROUS GOODS UNDER TRANSPORT CANADA

IMO/IMDG Shipping Description: NOT REGULATED AS DANGEROUS GOODS FOR TRANSPORTATION UNDER THE IMDG CODE

ICAO/IATA Shipping Description: NOT REGULATED AS DANGEROUS GOODS UNDER THE ICAO TI / IATA DGR CODE

DOT Shipping Description: UN1268, PETROLEUM PRODUCTS, N.O.S., COMBUSTIBLE LIQUID, III ; ADDITIONAL INFORMATION: NON-BULK PACKAGES ARE NOT REGULATED IN THE USA. SEE 173.150 (F) FOR SPECIAL PROVISIONS FOR VESSEL AND AIRCRAFT

SECTION 15 REGULATORY INFORMATION

REGULATORY LISTS SEARCHED:

01-1=IARC Group 1	03=EPCRA 313
01-2A=IARC Group 2A	04=CA Proposition 65
01-2B=IARC Group 2B	05=MA RTK
02=NTP Carcinogen	06=NJ RTK
	07=PA RTK

No components of this material were found on the regulatory lists above.

CHEMICAL INVENTORIES:
All components comply with the following chemical inventory requirements: AICS (Australia), DSL (Canada), ENCS (Japan), IECSC (China), KECI (Korea), PICCS (Philippines), TSCA (United States).

SECTION 16 OTHER INFORMATION

REVISION STATEMENT: This revision updates the following sections of this Material Safety Data Sheet: 1-16
Revision Date: FEBRUARY 11, 2016

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	PEL - Permissible Exposure Limit
GHS - Globally Harmonized System	CAS - Chemical Abstract Service Number
ACGIH - American Conference of Governmental Industrial Hygienists	IMO/IMDG - International Maritime Dangerous Goods Code
API - American Petroleum Institute	SDS - Safety Data Sheet
WHMIS - Workplace Hazardous Materials Information System	NFPA - National Fire Protection Association (USA)
DOT - Department of Transportation (USA)	NTP - National Toxicology Program (USA)
IARC - International Agency for Research on Cancer	OSHA - Occupational Safety and Health Administration
NCEL - New Chemical Exposure Limit	EPA - Environmental Protection Agency
SCBA - Self-Contained Breathing Apparatus	

Prepared according to WHMIS 2015 by Chevron Energy Technology Company, 6001 Bollinger Canyon Road San Ramon, CA 94583.

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

SAFETY DATA SHEET

SECTION 1 IDENTIFICATION

PRODUCT

Product Name: COMMERCIAL PROPANE (ODORIZED)
Product Description: Liquefied Hydrocarbon Gas, Gas or Liquefied Gas
SDS Number: 8515

Intended Use: Fuel gas

COMPANY IDENTIFICATION

Supplier: **Imperial Oil Downstream**
P.O. Box 2480, Station M
Calgary, ALBERTA T2P 3M9 Canada

24 Hour Emergency Telephone	1-866-232-9563
Transportation Emergency Phone Number	1-866-232-9563
Product Technical Information	1-800-268-3183
Supplier General Contact	1-800-567-3776

SECTION 2 HAZARD IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines.

This product has been classified in accordance with hazard criteria of the Hazardous Products Regulations (HPR) SOR/2015-17 and the SDS contains all the information required by the HPR SOR/2015-17.

CLASSIFICATION:

Flammable Gases — Category 1
Gases Under Pressure — Liquefied Gas
Simple Asphyxiants — Category 1

LABEL:
Pictogram:

Signal Word: Danger

Hazard Statements:
H220: Extremely flammable gas. H280: Contains gas under pressure; may explode if heated.

May displace oxygen and cause rapid suffocation.

Precautionary Statements:
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P273: Avoid release to the environment.P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely. P381: In case of leakage, eliminate all ignition sources.P410 + P403: Protect from sunlight. Store in a well-ventilated place.P501: Dispose of contents and container in accordance with local regulations.

Other hazard information:

Health Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

Physical Hazards Not Otherwise Classified: None as defined under HPR SOR/2015-17.

PHYSICAL / CHEMICAL HAZARDS

Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling. Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Frostbite hazard - rapidly expanding gas or liquid may cause frostbite. Material can accumulate static charges which may cause an ignition. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited.

HEALTH HAZARDS

High-pressure injection under skin may cause serious damage. Continued exposure to odorised gas may reduce or eliminate ability to smell the odorant. People with impaired ability to detect odour due to colds, allergies, injuries etc must be especially cautious. Odour must not be used exclusively as a safety measure. Proper respiratory protection and fire/explosion precautions should be utilised when odour is first detected. Exposure to concentrations above 10% of the LEL may cause a general central nervous system (CNS) depression typical of anesthetic gases or intoxicants. Excessive exposure may result in eye, skin, or respiratory irritation.

ENVIRONMENTAL HAZARDS

Expected to be harmful to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

NFPA Hazard ID:	Health:	1	Flammability:	4	Reactivity:	0
HMIS Hazard ID:	Health:	1	Flammability:	4	Reactivity:	0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

Hazardous Substance(s) or Complex Substance(s) in Hazardous product

Name	CAS#	Concentration*	GHS Hazard Codes

ALKANES, C4	68513-65-5	0 - 2.5%	H220
ETHANE	74-84-0	0 - 5%	H220, H280, H402
ETHYL MERCAPTAN	75-08-1	0.5%	H225, H332, H400(M factor 1), H410(M factor 1)
ISOBUTANE	75-28-5	0 - 2.5%	H220, H280
PROPANE	74-98-6	90 - 99%	H220, H280
PROPYLENE	115-07-1	1 - 10%	H220, H280, H402

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 4 FIRST-AID MEASURES

INHALATION
Immediately remove from further exposure. Get immediate medical assistance. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. Give supplemental oxygen, if available. If breathing has stopped, assist ventilation with a mechanical device.

SKIN CONTACT
If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury. If frostbite occurs, immerse involved area in water at body temperature. Keep immersed for 20 to 40 minutes. Seek medical assistance.

EYE CONTACT
Flush thoroughly with water for at least 15 minutes. Get medical assistance.

INGESTION
Not Applicable

NOTE TO PHYSICIAN
This material, or a component, may be associated with cardiac sensitization following very high exposures (well above occupational exposure limits) or with concurrent exposure to high stress levels or heart-stimulating substances like epinephrine. Administration of such substances should be avoided.

SECTION 5 FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA
Appropriate Extinguishing Media: Use water fog, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING
Fire Fighting Instructions: Allow the fire to burn under controlled conditions. Stop leak if you can do so without risk. Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapours and to protect personnel attempting to stop a leak. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Flammable Gas. Vapour is flammable and heavier than air. Vapour may travel across the ground and reach remote ignition sources, causing a flashback fire danger. Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: -103°C (-153°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 2.4 UEL: 9.5
Autoignition Temperature: 432°C (810°F)

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of the spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that provide chemical resistance and, when necessary, heat-resistance and/or thermal insulation are recommended. Note: gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Small spills: normal work clothes are usually adequate. Large spills: full body suit of chemical and thermal resistant material is recommended. Chemical goggles and face shield are recommended if contact with liquefied gas is possible.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. CAUTION: When in contact with refrigerated/cryogenic liquids, many materials become brittle and are likely to break without warning. Allow liquid to evaporate from the surface. All equipment used when handling the product must be grounded. Do not direct water at spill or source of leak. Do not touch or walk through spilled material. If possible, turn leaking containers so that gas escapes rather than liquid. Isolate area until gas has dispersed. Prevent spreading of vapour through sewers, ventilation systems and confined areas. Use water spray to reduce vapour or divert vapour cloud drift. Avoid allowing water run-off to contact spilled material.

Water Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Allow liquid to evaporate from the surface. See Land Spill section of the SDS for advice on gases.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction

and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Prevent exposure to ignition sources, for example use non-sparking tools and explosion-proof equipment. Ethyl mercaptan is added to gas as an odorant to aid in the detection of the gas in case of leak or accidental discharge. Since ethyl mercaptan is reactive, a reduction in its effectiveness may occur during transport and storage of the odorised gas. Therefore, odour must not be used exclusively as a safety measure. Handle gas with strict adherence to established safety procedures. Use proper bonding and/or earthing procedures.However, bonding and earthing may not eliminate the hazard from static accumulation. Material can accumulate static charges which may cause an electrical spark (ignition source).

Static Accumulator: This material is a static accumulator.

STORAGE

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. The type of container used to store the material may affect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Outside or detached storage preferred. Storage containers should be earthed and bonded.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Substance Name	Form	Limit/Standard			Note	Source
ETHYL MERCAPTAN		TWA	0.5 ppm			ACGIH
ISOBUTANE		STEL	1000 ppm			ACGIH
PROPYLENE		TWA	500 ppm			ACGIH

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Use explosion-proof ventilation equipment to stay below exposure limits.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use

with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Thermally protective, chemical resistant gloves are recommended. If contact with forearms is likely, wear gauntlet-style gloves.

Eye Protection: Face shield is recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

Thermally protective and chemical resistant apron and long sleeves are recommended when volume of material is significant.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practise good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Gas
Form: Liquefied
Colour: Colourless
Odour: Mercaptan
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.51
Flammability (Solid, Gas): Flammable - Category 1
Flash Point [Method]: -103°C (-153°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 2.4 UEL: 9.5
Autoignition Temperature: 432°C (810°F)
Boiling Point / Range: -42°C (-44°F)
Decomposition Temperature: N/D
Vapour Density (Air = 1): 1.5 at 101 kPa
Vapour Pressure: 850 kPa (6375 mm Hg) at 20ºC
Evaporation Rate (n-butyl acetate = 1): > 1
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/A
Solubility in Water: Negligible
Viscosity: [N/D at 40°C] | 0.5 cSt (0.5 mm2/sec) at 15°C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: >-187°C (-305°F)

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Avoid heat, sparks, open flames and other ignition sources.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity: (Rat) 15 minute(s) LC50 1443 mg/l	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 403
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures.
Ingestion	
Acute Toxicity: No end point data for material.	Not applicable.
Skin	
Acute Toxicity: No end point data for material.	Not applicable.
Skin Corrosion/Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures.

Eye	
Serious Eye Damage/Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes.
Sensitisation	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: No end point data for material.	Not expected to be a skin sensitizer.
Aspiration: No end point data for material.	Not expected to be an aspiration hazard. Based on physico-chemical properties of the material.
Germ Cell Mutagenicity: Data available.	Not expected to be a germ cell mutagen. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 471 473 474
Carcinogenicity: No end point data for material.	Not expected to cause cancer.
Reproductive Toxicity: Data available.	Not expected to be a reproductive toxicant. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 422
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: Data available.	Not expected to cause organ damage from prolonged or repeated exposure. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 412 413 422

TOXICITY FOR SUBSTANCES

NAME	ACUTE TOXICITY
ETHYL MERCAPTAN	Dermal Lethality: LD50 > 2000 mg/kg (Rat); Inhalation Lethality: 4 hour(s) LC50 > 2.52 mg/l (Vapour) (Rat); Oral Lethality: LD 50 682 mg/kg (Rat)

OTHER INFORMATION

For the product itself:

May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion and blurred vision) and/or damage. Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite (cold burn). Exposure to this material, or one of its components, in situations where there is the potential for high levels, such as in confined spaces or with abuse, may result in abnormal heart rhythm (arrhythmia). High-level exposure to hydrocarbons (above occupational exposure limits) may initiate arrhythmia in a worker that is undergoing stress or is taking a heart-stimulating substance such as epinephrine, a nasal decongestant, or an asthma or cardiovascular drug. Simple asphyxiant: Acts by displacing oxygen in the lungs thereby diminishing the supply of oxygen available to the blood and tissues. Symptoms include shortness of breath, rapid heart rate, incoordination, lethargy, headaches, nausea, vomiting, and disorientation. Continued lack of oxygen may result in convulsions, loss of consciousness and death. Since exercise increases the tissue need for oxygen, symptoms will occur more quickly during exertion in an oxygen-deficient environment. Oxygen in enclosed spaces should be maintained at 21 percent by volume.

CMR Status: None.

Chemical Name	CAS Number	List Citations
ISOBUTANE	75-28-5	4
PROPYLENE	115-07-1	4

--REGULATORY LISTS SEARCHED--

1 = IARC 1
2 = IARC 2A
3 = IARC 2B
4 = ACGIH ALL
5 = ACGIH A1
6 = ACGIH A2

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Expected to be harmful to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

Material -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Material -- Expected to be inherently biodegradable

Atmospheric Oxidation:

Material -- Expected to degrade at a moderate rate in air

BIOACCUMULATION POTENTIAL

Material -- Potential to bioaccumulate is low.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14 TRANSPORT INFORMATION

LAND (TDG)

Proper Shipping Name: LIQUEFIED PETROLEUM GASES
Hazard Class & Division: 2.1
UN Number: 1075
Packing Group: (N/A)

LAND (DOT)

Proper Shipping Name: PETROLEUM GASES, LIQUEFIED
Hazard Class & Division: 2.1
ID Number: 1075
Packing Group: (N/A)
ERG Number: 115
Label(s): 2.1
Transport Document Name: UN1075, PETROLEUM GASES, LIQUEFIED, 2.1

SEA (IMDG)

Proper Shipping Name: PETROLEUM GASES, LIQUEFIED
Hazard Class & Division: 2.1
EMS Number: F-D, S-U
UN Number: 1075
Packing Group: (N/A)
Marine Pollutant: No
Label(s): 2.1
Transport Document Name: UN1075, PETROLEUM GASES, LIQUEFIED, 2.1 (-103°C c.c.)

AIR (IATA)

Proper Shipping Name: PETROLEUM GASES, LIQUEFIED
Hazard Class & Division: 2.1
UN Number: 1075
Packing Group: (N/A)
Label(s) / Mark(s): 2.1
Transportation Limitations: CARGO AIRCRAFT ONLY
Transport Document Name: UN1075, PETROLEUM GASES, LIQUEFIED, 2.1

SECTION 15 REGULATORY INFORMATION

WHMIS Classification: Class A: Compressed Gas Class B, Division 1: Flammable Gases

CEPA: All components of this product are either on the Domestic Substance List (DSL) or are exempt.

Listed or exempt from listing/notification on the following chemical inventories: AICS, DSL, ENCS, IECSC, KECI, PICCS, TSCA

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
ISOBUTANE	75-28-5	6
PROPANE	74-98-6	6
PROPYLENE	115-07-1	6

--REGULATORY LISTS SEARCHED--

1 = TSCA 4	3 = TSCA 5e	5 = TSCA 12b
2 = TSCA 5a2	4 = TSCA 6	6 = NPRI

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):
H220: Extremely flammable gas; Flammable Gas, Cat 1
H225: Highly flammable liquid and vapor; Flammable Liquid, Cat 2
H280: Contains gas under pressure; may explode if heated; Pressurized Gas
H332: Harmful if inhaled; Acute Tox Inh, Cat 4
H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
H402: Harmful to aquatic life; Acute Env Tox, Cat 3
H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Updates made in accordance with implementation of GHS requirements.

DGN: 5007473 (1010550)

SECTION 1. IDENTIFICATION

Product name	:	DIESEL FUEL
Synonyms	:	Seasonal Diesel, #1 Diesel, #2 Heating Oil, #1 Heating Oil, D50, Arctic Diesel, Farm Diesel, Marine Diesel, Low Sulphur Diesel, LSD, Ultra Low Sulphur Diesel, ULSD, Mining Diesel, Naval Distillate, Dyed Diesel, Marked Diesel, Coloured Diesel, Furnace special, Biodiesel blend, B1, B2, B5, Diesel Low Cloud (LC), Marine Gas Oil, Marine Gas Oil Dyed.
Product code	:	102907, 102762, 102763, 102755, 102302, 102744, 101801, 100678, 100677, 101802, 100107, 100668, 100658, 100911, 100663, 100652, 100460, 100065, 101796, 101793, 101795, 101792, 101794, 101791, 100768, 100643, 100642, 100103, 101798, 101800, 101797, 101788, 101789, 101787, 102531, 100734, 100733, 100640, 100997, 100995, 100732, 100731, 100994
Manufacturer or supplier's details		Petro-Canada P.O. Box 2844, 150 - 6th Avenue South-West Calgary Alberta T2P 3E3 Canada
Emergency telephone number		Suncor Energy: +1 403-296-3000; Canutec Transportation: 1-888-226-8832 (toll-free) or 613-996-6666; Poison Control Centre: Consult local telephone directory for emergency number(s).

Recommended use of the chemical and restrictions on use

Recommended use	:	Diesel fuels are distillate fuels suitable for use in high and medium speed internal combustion engines of the compression ignition type. Mining diesels, marine diesels, MDO and naval distillates may have a higher flash point requirement.
Prepared by	:	Product Safety: +1 905-804-4752

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	Bright oily liquid.
Colour	Clear to yellow (This product may be dyed red for taxation purposes)
Odour	Mild petroleum oil like.

GHS Classification

Flammable liquids	:	Category 3
Acute toxicity (Inhalation)	:	Category 4
Skin irritation	:	Category 2
Carcinogenicity	:	Category 2
Specific target organ toxicity - single exposure	:	Category 3 (Central nervous system)
Specific target organ toxicity - repeated exposure	:	Category 2 (Liver, thymus, Bone)
Aspiration hazard	:	Category 1

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Flammable liquid and vapour.
May be fatal if swallowed and enters airways.
Causes skin irritation.
Harmful if inhaled.
May cause drowsiness or dizziness.
Suspected of causing cancer.
May cause damage to organs (Liver, thymus, Bone) through prolonged or repeated exposure.

Precautionary statements : **Prevention:**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
Keep container tightly closed.
Ground and bond container and receiving equipment.
Use explosion-proof electrical/ ventilating/ lighting equipment.
Use non-sparking tools.
Take action to prevent static discharges.
Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
Wash skin thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
IF SWALLOWED: Immediately call a POISON CENTER/doctor.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.

IF exposed or concerned: Get medical advice/ attention.
Do NOT induce vomiting.
If skin irritation occurs: Get medical advice/ attention.
Take off contaminated clothing and wash it before reuse.
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
Storage:
Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.
Disposal:
Dispose of contents/ container to an approved waste disposal plant.

Potential Health Effects

Primary Routes of Entry	:	Eye contact Ingestion Inhalation Skin contact Skin Absorption
Target Organs	:	Skin Eyes Respiratory Tract
Inhalation	:	May cause respiratory tract irritation. Inhalation may cause central nervous system effects. Symptoms and signs include headache, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases, loss of consciousness.
Skin	:	Causes skin irritation.
Eyes	:	Causes eye irritation.
Ingestion	:	Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea. Aspiration hazard if swallowed - can enter lungs and cause damage.
Aggravated Medical Condition	:	None known.

Other hazards

None known.

IARC	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH	Confirmed animal carcinogen with unknown relevance to humans

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical name	CAS-No.	Concentration
fuels, diesel	68334-30-5	70 - 100 %
kerosine (petroleum)	8008-20-6	
kerosine (petroleum), hydrodesulfurized	64742-81-0	
Alkanes, C10-20-branched and linear	928771-01-1	0 - 25 %
Soybean oil, Methyl ester	67784-80-9	0 - 5 %
Rape oil, Methyl ester	73891-99-3	
Fatty acids, tallow, Methyl esters	61788-61-2	

SECTION 4. FIRST AID MEASURES

If inhaled : Move to fresh air.
Artificial respiration and/or oxygen may be necessary.
Seek medical advice.

In case of skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Wash skin thoroughly with soap and water or use recognized skin cleanser.
Wash clothing before reuse.
Seek medical advice.

In case of eye contact : Remove contact lenses.
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Obtain medical attention.

If swallowed : Rinse mouth with water.
DO NOT induce vomiting unless directed to do so by a physician or poison control center.
Never give anything by mouth to an unconscious person.
Seek medical advice.

Most important symptoms and effects, both acute and delayed : None known.

Protection of first-aiders : First Aid responders should pay attention to self-protection and use the recommended protective clothing
It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Dry chemical Carbon dioxide (CO2) Water fog. Foam
Unsuitable extinguishing media	:	Do NOT use water jet.
Specific hazards during fire-fighting	:	Cool closed containers exposed to fire with water spray.
Hazardous combustion products	:	Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), sulphur compounds (H2S), smoke and irritating vapours as products of incomplete combustion.
Further information	:	Prevent fire extinguishing water from contaminating surface water or the ground water system.
Special protective equipment for firefighters	:	Wear self-contained breathing apparatus for firefighting if necessary.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Ensure adequate ventilation. Evacuate personnel to safe areas. Material can create slippery conditions.
Environmental precautions	:	If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	:	Prevent further leakage or spillage if safe to do so. Remove all sources of ignition. Soak up with inert absorbent material. Non-sparking tools should be used. Ensure adequate ventilation. Contact the proper local authorities.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling	:	For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Use only with adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity. Avoid contact with skin, eyes and clothing. Do not ingest.

Keep away from heat and sources of ignition.
Keep container closed when not in use.

Conditions for safe storage : Store in original container.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Keep in a dry, cool and well-ventilated place.
Keep in properly labelled containers.
To maintain product quality, do not store in heat or direct sunlight.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
kerosine (petroleum), hydrodesulfurized	64742-81-0	TWA	200 mg/m3 (As total hydrocarbon vapour)	ACGIH
		TWA	200 mg/m3 (As total hydrocarbon vapour)	ACGIH
kerosine (petroleum)	8008-20-6	TWA	200 mg/m3 (total hydrocarbon vapor)	CA BC OEL
		TWA	200 mg/m3 (total hydrocarbon vapor)	CA AB OEL
		TWA	200 mg/m3 (total hydrocarbon vapor)	ACGIH

Engineering measures : Use only in well-ventilated areas.
Ensure that eyewash station and safety shower are proximal to the work-station location.

Personal protective equipment

Respiratory protection : Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Filter type : organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.

Hand protection Material	:	neoprene, nitrile, polyvinyl alcohol (PVA), Viton(R). Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.
Remarks	:	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Eye protection	:	Wear face-shield and protective suit for abnormal processing problems.
Skin and body protection	:	Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.
Protective measures	:	Wash contaminated clothing before re-use.
Hygiene measures	:	Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash face, hands and any exposed skin thoroughly after handling.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Bright oily liquid.
Colour	:	Clear to yellow (This product may be dyed red for taxation purposes)
Odour	:	Mild petroleum oil like.
Odour Threshold	:	No data available
pH	:	No data available
Pour point	:	No data available
Boiling point/boiling range	:	150 - 371 °C (302 - 700 °F)
Flash point	:	> 40 °C (104 °F) Method: closed cup
Auto-Ignition Temperature	:	225 °C (437 °F)
Evaporation rate	:	No data available
Flammability	:	Flammable in presence of open flames, sparks and heat. Va-

		pours are heavier than air and may travel considerable distance to sources of ignition and flash back. This product can accumulate static charge and ignite.
Upper explosion limit	:	6 %(V)
Lower explosion limit	:	0.7 %(V)
Vapour pressure	:	7.5 mmHg (20 °C / 68 °F)
Relative vapour density	:	4.5
Relative density	:	0.8 - 0.88
Solubility(ies)		
Water solubility	:	insoluble
Partition coefficient: n-octanol/water	:	No data available
Viscosity		
Viscosity, kinematic	:	1.3 - 4.1 cSt (40 °C / 104 °F)
Explosive properties	:	Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Runoff to sewer may create fire or explosion hazard.

SECTION 10. STABILITY AND REACTIVITY

Possibility of hazardous reactions	:	Hazardous polymerisation does not occur. Stable under normal conditions.
Conditions to avoid	:	Extremes of temperature and direct sunlight.
Incompatible materials	:	Reactive with oxidising agents and acids.
Hazardous decomposition products	:	May release COx, NOx, SOx, H2S, smoke and irritating vapours when heated to decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
Eye contact
Ingestion
Inhalation
Skin contact
Skin Absorption

Acute toxicity

Product:

Acute oral toxicity	:	Remarks: No data available
Acute inhalation toxicity	:	Remarks: No data available
Acute dermal toxicity	:	Assessment: The substance or mixture has no acute dermal toxicity Remarks: No data available

Components:

fuels, diesel:

Acute oral toxicity	:	LD50 (Rat): 7,500 mg/kg,
Acute dermal toxicity	:	LD50 (Mouse): 24,500 mg/kg,

kerosine (petroleum):

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg,
Acute inhalation toxicity	:	LC50 (Rat): > 5 mg/l Exposure time: 4 h Test atmosphere: dust/mist
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg,

kerosine (petroleum), hydrodesulfurized:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg,
Acute inhalation toxicity	:	LC50 (Rat): > 5.2 mg/l Exposure time: 4 hrs Test atmosphere: dust/mist
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg,

Skin corrosion/irritation

Product:

Remarks: No data available

Serious eye damage/eye irritation

Product:

Remarks: No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

No data available

Reproductive toxicity

No data available

STOT - single exposure

No data available

STOT - repeated exposure

No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

Toxicity to fish	:	Remarks: No data available
Toxicity to daphnia and other aquatic invertebrates	:	Remarks: No data available
Toxicity to algae	:	Remarks: No data available
Toxicity to bacteria	:	Remarks: No data available

Persistence and degradability

Product:

Biodegradability	:	Remarks: No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	The product should not be allowed to enter drains, water courses or the soil. Offer surplus and non-recyclable solutions to a licensed disposal company. Waste must be classified and labelled prior to recycling or disposal. Send to a licensed waste management company.

Dispose of as hazardous waste in compliance with local and national regulations.
Dispose of product residue in accordance with the instructions of the person responsible for waste disposal.

Contaminated packaging : Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

International Regulations

IATA-DGR

UN/ID No.	:	UN 1202
Proper shipping name	:	Diesel fuel
Class	:	3
Packing group	:	III
Labels	:	Class 3 - Flammable Liquid
Packing instruction (cargo aircraft)	:	366

IMDG-Code

UN number	:	UN 1202
Proper shipping name	:	DIESEL FUEL
Class	:	3
Packing group	:	III
Labels	:	3
EmS Code	:	F-E, S-E
Marine pollutant	:	no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

National Regulations

TDG

UN number	:	UN 1202
Proper shipping name	:	DIESEL FUEL
Class	:	3
Packing group	:	III
Labels	:	3
ERG Code	:	128
Marine pollutant	:	no

SECTION 15. REGULATORY INFORMATION

This product has been classified according to the hazard criteria of the Hazardous Products Regulations (HPR) and the SDS contains all of the information required by the HPR.

The components of this product are reported in the following inventories:

DSL On the inventory, or in compliance with the inventory

TSCA	All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.
EINECS	On the inventory, or in compliance with the inventory

SECTION 16. OTHER INFORMATION

For Copy of SDS	:	Internet: www.petro-canada.ca/msds Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228 For Product Safety Information: 1 905-804-4752
Prepared by	:	Product Safety: +1 905-804-4752
Revision Date	:	2018/09/12

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

SAFETY DATA SHEET

SDS00349
ETHYLENE GLYCOL

Preparation Date: 26/Jan/2018 Version: 2

1. IDENTIFICATION

Product identifier

Product Name ETHYLENE GLYCOL

Other means of identification

Product Code(s) SDS00349

Synonyms none

Recommended use of the chemical and restrictions on use

Recommended Use Used as antifreeze, heat transfer fluid, solvent, and raw material in polyester fiber manufacturing.

Restricted Uses No information available

Initial Supplier Identifier
Univar Canada Ltd.
9800 Van Horne Way
Richmond, BC V6X 1W5
Telephone: 1-866-686-4827

Emergency telephone number

24 Hour Emergency Phone Number (CANUTEC): 1-888-226-8832 (1-888-CAN-UTEC)

2. HAZARD IDENTIFICATION

Hazardous Classification of the substance or mixture

Acute toxicity - Oral	Category 4
Specific target organ toxicity (repeated exposure)	Category 2

Label elements

Hazard pictograms

Signal Word: Warning

Hazard statements
Harmful if swallowed
May cause damage to organs through prolonged or repeated exposure

Precautionary Statements

Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Do not breathe dust/fume/gas/mist/vapors/spray

Response
Specific treatment (see first aid instructions on label)
IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell
Rinse mouth

Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed

Disposal
Dispose of contents/container to an approved waste disposal plant

Unknown acute toxicity No information available

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance

Chemical Name	CAS No	Weight-%	Synonyms
Ethylene Glycol	107-21-1	90 - 100%	Ethylene Glycol

4. FIRST AID

Description of first aid measures

General advice
Show this safety data sheet to the doctor in attendance.

Inhalation
Remove to fresh air.

Eye contact
Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids. Consult a physician.

Skin contact
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

Ingestion
Do NOT induce vomiting. Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Call a physician.

Most important symptoms and effects, both acute and delayed:
Corneal injury is unlikely. At room temperature, exposure to vapor is minimal due to low volatility. With good ventilation, single exposure is not expected to cause adverse effects. If material is heated or areas are poorly ventilated, vapor/mist may accumulate and cause respiratory irritation and symptoms such as headache and nausea. Repeated skin exposure to large quantities may result in absorption of harmful amounts. Massive contact with damaged skin or if material sufficiently hot to burn skin may result in absorption of potential lethal amounts. Vapors or mists may cause eye irritation. May cause slight eye irritation May be fatal if swallowed Cardiac failure, pulmonary edema, and severe kidney damage may develop. Prolonged contact may cause skin irritation with local redness. Oral toxicity is expected to be moderate in humans due to ethylene glycol even though tests with animals show a lower degree of toxicity. Excessive exposure may cause central nervous system effects, cardiopulmonary effects (metabolic acidosis), and kidney failure. Swallowing may result in severe effects, even death. The lethal dose in adult humans for ethylene glycol is approximately 3 ounces (100 ml) (1/3 cup). May cause nausea or vomiting. May cause abdominal discomfort or diarrhea. Brief contact is essentially non-irritating to skin.

Indication of any immediate medical attention and special treatment needed:

Note to physicians
It is estimated that the oral dose to adults is of the order of 1.0 ml/kg. Ethylene glycol is metabolized by alcohol dehydrogenate to various metabolites including glyceraldehydes, glycolic acid and oxalic acid which cause an elevated anion-gap metabolic acidosis and renal tubular injury. The signs and symptoms in ethylene glycol poisoning are those of metabolic acidosis, CNS depression and kidney injury. Urinalysis may show albuminuria, hematuria and oxaluria. Clinical chemistry may reveal anion-gap metabolic acidosis and uremia. The currently recommended medical management of ethylene glycol poisoning includes elimination of ethylene glycol and metabolites, correction of metabolic acidosis and prevention of kidney injury. It is essential to have immediate and follow up urinalysis and clinical chemistry. There should be particular emphasis on acid-base balance and renal function tests. A continuous infusion of 5% sodium bicarbonate with frequent monitoring of electrolytes and fluid balance is used to achieve correction of metabolic acidosis and forced diuresis. As a competitive substrate for alcohol dehydrogenase, ethanol is antidotal. Given in the early stages of intoxication, it blocks the formulation of nephrotoxic metabolites. A therapeutically effective blood concentration of ethanol is in the range 100 - 150 mg/dl and should be achieved by a rapid loading dose and maintained by intravenous infusion. For severe and /or deteriorating cases, hemodialysis may be required. Dialysis should be considered for patients who are symptomatic, have severe metabolic acidosis, a blood ethylene glycol concentration greater than 25 mg/dl, or compromise of renal functions.

A more effective intravenous antidote for physician use in 4-methylpyrazole, a potent inhibitor of alcohol dehydrogenases which effectively blocks the formation of toxic metabolites of ethylene glycol. It has been used to decrease the metabolic consequences of ethylene glycol poisoning before metabolic acidosis coma, seizures and renal failure have occurred. A generally recommended protocol is a loading dose of 15 mg/kg followed by 10 mg/kg every 12 hours for 4 doses and the 15 mg/kg every 12 hours until the ethylene glycol concentrations are below 20 mg/100ml.Slow intravenous infusion is required. Since 4-methylpyrazole is dialyzable, increased dosage may be necessary during hemodialysis. Additional therapeutic measures may include the administration of cofactors involved in the metabolism of ethylene glycol. Thiamine (100 mg) and pyridoxine (50 mg) should be given every six hours.

Pulmonary edema with hypoxemia has been described in a number of patients following poisoning with ethylene glycol. The mechanism of production has not been elucidated, but it appears to be non-cardiogenic in origin in several cases. Respiratory support with mechanical ventilation and positive end expiratory pressure may be required. There may be cranial nerve involvement in the late stages of toxicity from swallowed ethylene glycol. In particular, effects have been reported involving the seventh, eighth and ninth cranial nerves, presenting with bilateral facial paralysis, diminished hearing, and dysphagia.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media
Water fog or fine spray, carbon dioxide, dry chemical, foam. Alcohol resistant foams (ATC type) are preferred if available. General purpose synthetic foams (including AFFF) or protein foams may function, but much less effectively. Do not use direct water stream, which will spread fire.

Specific hazards arising from the substance or mixture
Use water spray to cool fire-exposed containers and structures. Isolate and restrict area access. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Container may rupture from gas generation in a fire situation. Fight fire from a safe distance and from a protected location. Do not direct a solid stream of water or foam into hot, burning pools; this may cause frothing and increase fire intensity. Consider use of unmanned hose holder or monitor nozzles.

Hazardous combustion products
Hazardous decomposition products depend upon temperature, air supply, and the presence of other materials. Hazardous decomposition products may include and are not limited to : aldehydes, ketones, organic acids.

Special protective equipment for fire-fighters
Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation.

Environmental precautions

See Section 12 for additional Ecological Information.

Methods and materials for containment and cleaning up

Prevent further leakage or spillage if safe to do so.

7. HANDLING AND STORAGE

Precautions for safe handling

For industrial use only. Handle and open containers with care. Avoid contact with eyes, skin and clothing. Do not ingest. Avoid inhalation of chemical. Empty containers may contain hazardous product residues. Keep the containers closed when not in use. Protect against physical damage. Use appropriate personnel protective equipment. Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperature possibly resulting in spontaneous combustion. Do not consume food, drink or smoke while handling this material.

Conditions for safe storage, including any incompatibilities

Avoid storage with incompatible materials. Keep containers tightly closed. Keep in a cool, well-ventilated place. Do not store near food, foodstuffs, drugs or potable water supplies.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Limits .

Chemical Name	Alberta OEL	British Columbia OEL	Ontario	Quebec OEL	Exposure Limit - ACGIH	Immediately Dangerous to Life or Health - IDLH
Ethylene Glycol 107-21-1	Ceiling: 100 mg/m³	TWA: 10 mg/m³ STEL: 20 mg/m³ Ceiling: 100 mg/m³ Ceiling: 50 ppm	CEV: 100 mg/m³	Ceiling: 50 ppm Ceiling: 127 mg/m³	50 ppm STEL 10 mg/m³ STEL 25 ppm TLV-TWA	Not available

Consult local authorities for recommended exposure limits

Appropriate engineering controls

Engineering controls
General (mechanical) room ventilation is expected to be satisfactory. Local ventilation recommended where mechanical ventilation is ineffective in controlling airborne concentrations below the recommended occupational exposure limit.

Individual protection measures, such as personal protective equipment

Eye/face protection
Chemical goggles; also wear a face shield if splashing hazard exists.

Hand protection
Use gloves chemically resistant to this material, examples of preferred glove barrier materials include:. Butyl rubber gloves. Nitrile gloves. Neoprene gloves. Polyvinyl alcohol gloves. Ethyl Vinyl Alcohol Laminate (EVAL). Natural rubber gloves. Polyvinylchloride (PVC) gloves. Polyethylene gloves. NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials as well as the instructions/specifications provided by the glove supplier.

Skin and body protection
Skin contact should be prevented through the use of suitable protective clothing, gloves and footwear, selected for conditions of use and exposure potential. Consideration must be given both to durability as well as permeation resistance. Chemical apron. Boots. When handling hot material, protect skin from thermal burns as well as from skin absorption.

Respiratory protection
Atmospheric levels should be maintained below the exposure guideline. For most conditions, no respiratory protection is needed; however, if handling at elevated temperatures without sufficient ventilation, use an approved air-purifying respirator.

General hygiene considerations
Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance

Physical state	Liquid
Color	Colorless
Odor	Sweet
Odor threshold	No information available

PROPERTIES	**Values**	**Remarks • Method**
pH	9	
Melting point / freezing point	-13 °C / 9 °F	
Initial boiling point/boiling range	No data available	None known

Flash point	111 °C / 232 °F	Closed cup.
Evaporation rate	0.01	
Flammability (solid, gas)	No data available	None known
Flammability Limit in Air		
Upper flammability limit:	15.3	
Lower flammability limit:	3.2	
Vapor pressure	0.06 mmHg @ 20°C	
Relative vapor density	2.1	
Specific Gravity	1.115 @ 20°C	
Water solubility	1000 (RBT)	
Solubility in other solvents	No data available	
Partition coefficient	No data available	
Autoignition temperature	427 °C / 801 °F	
Decomposition temperature	No data available	None known
Kinematic viscosity	Dynamic Viscosity: 19.83 mPa.s @ 20°C	
Dynamic viscosity	No data available	None known
Explosive properties	No information available.	
Oxidizing properties	No information available.	
Molecular weight	62 g/mol	
VOC Percentage Volatility	No information available	
Liquid Density	No information available	
Bulk density	No information available	

10. STABILITY AND REACTIVITY

Reactivity/Chemical Stability
Stable

Possibility of hazardous reactions
No additional remark.

Hazardous polymerization
Will not occur.

Conditions to avoid
Avoid excessive heat, open flames and all ignition sources. Product can decompose at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

Incompatible materials
Strong oxidizers. Strong acids and bases.

Hazardous decomposition products
Hazardous decomposition products depend upon temperature, air supply, and the presence of other materials. Hazardous decomposition products may include and are not limited to : aldehydes, ketones, organic acids.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation
At room temperature, exposure to vapor is minimal due to low volatility. With good ventilation, single exposure is not expected to cause adverse effects. If material is heated or areas are poorly ventilated, vapor/mist may accumulate and cause respiratory irritation and symptoms such as headache and nausea.

Eye contact

Corneal injury is unlikely. Vapors or mists may cause eye irritation. May cause slight eye irritation.

Skin contact
Repeated skin exposure to large quantities may result in absorption of harmful amounts. Massive contact with damaged skin or if material sufficiently hot to burn skin may result in absorption of potential lethal amounts. Prolonged contact may cause skin irritation with local redness. Brief contact is essentially non-irritating to skin.

Ingestion
May be fatal if swallowed. Cardiac failure, pulmonary edema, and severe kidney damage may develop. Oral toxicity is expected to be moderate in humans due to ethylene glycol even though tests with animals show a lower degree of toxicity. Excessive exposure may cause central nervous system effects, cardiopulmonary effects (metabolic acidosis), and kidney failure. Swallowing may result in severe effects, even death. The lethal dose in adult humans for ethylene glycol is approximately 3 ounces (100 ml) (1/3 cup). May cause nausea or vomiting. May cause abdominal discomfort or diarrhea.

Information on toxicological effects

Symptoms
Repeated skin contact with ethylene glycol may, in a very small proportion of cases, cause sensitization with the development of allergic contact dermatitis. The incidence is significantly less than 1% with the undiluted material. Repeated inhalation of ethylene glycol may produce signs of central nervous system involvement, particularly dizziness and nystagmus (involuntary eye movement). Exposure may place individuals with existing heart problems at added risk of potential cardiac irregularities and heart failure. In animals , effects have been reported on the following organs: Kidney, liver.

Numerical measures of toxicity

Acute toxicity

The following values are calculated based on chapter 3.1 of the GHS document .

ATEmix (oral) 505.00 mg/kg
ATEmix (dermal) 10,707.00 mg/kg

Unknown acute toxicity No information available

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Ethylene Glycol 107-21-1	= 4700 mg/kg (Rat)	= 10600 mg/kg (Rat)	Not available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation
Repeated skin exposure to large quantities may result in absorption of harmful amounts. Massive contact with damaged skin or if material sufficiently hot to burn skin may result in absorption of potential lethal amounts. Prolonged contact may cause skin irritation with local redness. Brief contact is essentially non-irritating to skin.

Serious eye damage/eye irritation
Corneal injury is unlikely. Vapors or mists may cause eye irritation. May cause slight eye irritation.

Respiratory or skin sensitization
No information available.

Germ cell mutagenicity
No information available.

Carcinogenicity
No information available.

Chemical Name	ACGIH	IARC	NTP	OSHA
Ethylene Glycol 107-21-1	Not available	Not available	Not available	Not available

Reproductive toxicity
Based on animal studies, ingestion of very large amounts of ethylene glycol appears to be the major and possibly only route of exposure to produce birth defects. Exposures by inhalation or skin contact, the primary routes of occupational exposure, had minimal effect on the fetus, in animal studies. Ingestion of large amounts of ethylene glycol has been shown to interfere with reproduction in animals. Specifically, growth retardation and decreased litter size in rats and mice and decreased mating frequency in mice were observed. Ethylene glycol has been shown to produce dose-related teratogenic effects in rats and mice when given by gavage or in drinking water at high concentrations or doses. The no-effect doses for developmental toxicity for ethylene glycol given by gavage over the period of organogenesis has been shown to be 150 mg/kg/day for the mouse and 500 mg/kg/day for the rat. Also, in a preliminary study to assess the effects of exposure of pregnant rats and mice to aerosols at concentrations of 150, 1000 and 2500 mg/m^3 for 6 hours a day throughout the period of organogenesis, teratogenic effects were produced at the highest concentration, but only in mice. The conditions of these latter experiments did not allow a conclusion as to whether the developmental toxicity was mediated by inhalation of aerosol, percutaneous absorption of ethylene glycol from contaminated skin, or swallowing of ethylene glycol as a result of grooming the wetted coat. In a further study, comparing effects from high aerosol concentration by whole-body or nose-only exposure, it was shown that nose-only exposure resulted in maternal toxicity (1000 and 2500 mg/m^3) and developmental toxicity with minimal evidence of teratogenicity (2500 mg/m^3). The no-effects concentration (based on maternal toxicity) was 500 mg/m^3. In a further study in mice, no teratogenic effects could be produced when ethylene glycol was applied to the skin of pregnant mice over the period of organogenesis. The above observations suggest that ethylene glycol is to be regarded as an animal teratogen. There is currently no available information to suggest that ethylene glycol has caused birth defects in humans. Cutaneous application of ethylene glycol is ineffective in producing developmental toxicity. Exposure to high aerosol concentrations is only minimally effective in producing developmental toxicity.

Specific target organ systemic toxicity - single exposure
No information available.

Specific target organ systemic toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure if swallowed.

Aspiration hazard
No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity
.

Chemical Name	Ecotoxicity - Freshwater Algae Data	Ecotoxicity - Fish Species Data	Toxicity to microorganisms	Crustacea
Ethylene Glycol 107-21-1	6500 - 13000 mg/L EC50 Pseudokirchneriella subcapitata 96 h	41000 mg/L LC50 (Oncorhynchus mykiss) 96 h 14 - 18 mL/L LC50 (Oncorhynchus mykiss) 96 h static 27540 mg/L LC50 (Lepomis macrochirus) 96 h static 40761 mg/L LC50 (Oncorhynchus mykiss) 96 h static 40000 - 60000 mg/L LC50 (Pimephales promelas) 96 h static 16000 mg/L LC50 (Poecilia reticulata) 96 h static	Not available	EC50: =46300mg/L (48h, Daphnia magna)

Persistence and degradability No information available.

Bioaccumulation No information available.

Component Information

Chemical Name	Partition coefficient
Ethylene Glycol 107-21-1	-1.93

Other adverse effects No information available.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of all wastes must be done in accordance with municipal, provincial and federal regulations. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations.

Do not reuse empty containers.

14. TRANSPORT INFORMATION

TDG (Canada):

UN Number	Not applicable
Shipping name	Not regulated
Class	Not applicable
Packing Group	Not applicable
Marine pollutant	Not available.

DOT (U.S.)

UN Number	Not applicable
Shipping name	Not regulated
Class	Not applicable
Packing Group	Not applicable
Marine pollutant	Not available

15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

U.S. Regulatory Rules

Chemical Name	CERCLA/SARA - Section 302:	SARA (311, 312) Hazard Class:	CERCLA/SARA - Section 313:
Ethylene Glycol - 107-21-1	Not Listed	Listed	Listed

International Inventories

TSCA	Complies
DSL/NDSL	Complies

Legend:
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

NFPA:	**Health hazards** 1	**Flammability** 1	**Instability** 0	**Physical and chemical properties** -
HMIS Health Rating:	**Health hazards** 2	**Flammability** 1	**Physical hazards** 0	**Personal protection** X

Legend Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
Ceiling	Maximum limit value	*	Skin designation

Prepared By: The Environment, Health and Safety Department of Univar Canada Ltd.

Preparation Date: 26/Jan/2018
Revision Date: 26/Jan/2018

Disclaimer

NOTICE TO READER:
Univar expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this SDS as a product specification. For product specification information refer to a Product Specification Sheet and/or a Certificate of Analysis. These can be obtained from your local Univar Sales Office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein. This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process.

End of Safety Data Sheet

SAFETY DATA SHEET

Methanol

Section 1. Identification

Product identifier : Methanol

Product code : Q01347

Relevant identified uses of the substance or mixture

Identified uses
Industrial applications

Supplier's details : QUADRA CHEMICALS LTD.
3901 F.X Tessier
Vaudreuil-Dorion, QC
CANADA J7V 5V5
1-800-665-6553

Emergency telephone number (with hours of operation) : **TRANSPORTATION EMERGENCY - 24HRS/DAY - 7 DAYS/WEEK IN CANADA - CALL 1-800-567-7455**

Section 2. Hazard identification

Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 2
ACUTE TOXICITY (oral) - Category 3
ACUTE TOXICITY (dermal) - Category 3
ACUTE TOXICITY (inhalation) - Category 3
EYE IRRITATION - Category 2A
TOXIC TO REPRODUCTION (Unborn child) - Category 1
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (central nervous system (CNS), optic nerve) - Category 1

GHS label elements

Hazard pictograms :

Signal word : Danger

Hazard statements : Highly flammable liquid and vapor.
Toxic if swallowed, in contact with skin or if inhaled.
Causes serious eye irritation.
May damage the unborn child.
Causes damage to organs. (central nervous system (CNS), optic nerve)

Precautionary statements

Prevention : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only outdoors or in a well-ventilated area. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.

Section 2. Hazard identification

Response : IF exposed or concerned: Call a POISON CENTER or physician. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician. IF SWALLOWED: Immediately call a POISON CENTER or physician. Rinse mouth. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. IF ON SKIN: Take off immediately all contaminated clothing and wash it before reuse. Wash with plenty of soap and water. Call a POISON CENTER or physician if you feel unwell. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

Storage : Store locked up.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Ingredient name	% (w/w)	CAS number
methanol	99.85 - 100	67-56-1

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First-aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention. If necessary, call a poison center or physician.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. If necessary, call a poison center or physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a

Section 4. First-aid measures

collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : Toxic if inhaled.

Skin contact : Toxic in contact with skin.

Ingestion : Toxic if swallowed.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : Adverse symptoms may include the following:
reduced fetal weight
increase in fetal deaths
skeletal malformations

Skin contact : Adverse symptoms may include the following:
reduced fetal weight
increase in fetal deaths
skeletal malformations

Ingestion : Adverse symptoms may include the following:
reduced fetal weight
increase in fetal deaths
skeletal malformations

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use dry chemical, CO_2, water spray (fog) or foam.

Unsuitable extinguishing media : Do not use water jet.

Specific hazards arising from the chemical : Highly flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Section 5. Fire-fighting measures

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Section 7. Handling and storage

Protective measures : Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
methanol	**ACGIH TLV (United States, 3/2017). Absorbed through skin.** TWA: 200 ppm 8 hours. TWA: 262 mg/m³ 8 hours. STEL: 250 ppm 15 minutes. STEL: 328 mg/m³ 15 minutes.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Section 8. Exposure controls/personal protection

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Physical state : Liquid. [Clear.]

Color : Colourless.

Odor : Alcohol-like.

Odor threshold : Not available.

pH : Not available.

Melting point : -97.8°C (-144°F)

Boiling point : 64.7°C (148.5°F)

Flash point : Closed cup: 11°C (51.8°F)

Evaporation rate : 4.1 (n-butyl acetate = 1)

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Lower: 5.5%
Upper: 36.5%

Vapor pressure : 12.8 kPa (96 mm Hg) [room temperature]

Vapor density : 1.1 [Air = 1]

Relative density : 0.791 to 0.793 [@ 20°C]

Density : 0.792 g/cm³

Solubility : Soluble in the following materials: cold water.

Dispersibility properties : Not available.

Section 9. Physical and chemical properties

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : 464°C (867.2°F)

Decomposition temperature : Not available.

Viscosity : Dynamic (room temperature): 0.8 mPa·s (0.8 cP)

Volatility : 100% (v/v)

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.

Incompatible materials : oxidizing materials
metals
acids
alkalis

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
methanol	LC50 Inhalation Vapor LD50 Dermal LD50 Oral	Rat Rabbit Rat	189950 mg/m³ 15800 mg/kg 5600 mg/kg	1 hours - -

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
methanol	Eyes - Moderate irritant Eyes - Moderate irritant Skin - Moderate irritant	Rabbit Rabbit Rabbit	- - -	24 hours 100 milligrams 40 milligrams 24 hours 20 milligrams	- - -

Sensitization

Not available.

Mutagenicity

Not available.

Section 11. Toxicological information

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
methanol	Category 1	Not determined	central nervous system (CNS) and optic nerve

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : Toxic if inhaled.

Skin contact : Toxic in contact with skin.

Ingestion : Toxic if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : Adverse symptoms may include the following:
reduced fetal weight
increase in fetal deaths
skeletal malformations

Skin contact : Adverse symptoms may include the following:
reduced fetal weight
increase in fetal deaths
skeletal malformations

Ingestion : Adverse symptoms may include the following:
reduced fetal weight
increase in fetal deaths
skeletal malformations

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Section 11. Toxicological information

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

General : No known significant effects or critical hazards.

Teratogenicity : May damage the unborn child.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral Dermal Inhalation (vapors)	100 mg/kg 300 mg/kg 3 mg/l

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
methanol	Acute EC50 16.912 mg/l Marine water	Algae - Ulva pertusa	96 hours
	Acute LC50 2500000 µg/l Marine water	Crustaceans - Crangon crangon - Adult	48 hours
	Acute LC50 3289 mg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 290 mg/l Fresh water	Fish - Danio rerio - Egg	96 hours
	Chronic NOEC 9.96 mg/l Marine water	Algae - Ulva pertusa	96 hours
Methanol	EC50 >10000 mg/l	Daphnia	48 days
	IC50 22000 mg/l	Algae - Pseudokirchneriella subcapitata	72 hours
	LC50 15400 to 29400 mg/l	Fish	96 hours

Persistence and degradability

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Methanol	-	-	Readily

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
methanol	-0.77	<10	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	TDG Classification
UN number	1230
UN proper shipping name	METHANOL
Transport hazard class(es)	3 (6.1) 
Packing group	II
Additional information	Not available.

Section 15. Regulatory information

Canada inventory : All components are listed or exempted.

Section 16. Other information

History

Date of issue/Date of revision : 8 February 2018

Prepared by : Regulatory Affairs

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
LogPow = logarithm of the octanol/water partition coefficient
UN = United Nations
HPR = Hazardous Products Regulations

Procedure used to derive the classification

Section 16. Other information

Classification	Justification
FLAMMABLE LIQUIDS - Category 2	On basis of test data
ACUTE TOXICITY (oral) - Category 3	Calculation method
ACUTE TOXICITY (dermal) - Category 3	Calculation method
ACUTE TOXICITY (inhalation) - Category 3	Calculation method
EYE IRRITATION - Category 2A	Calculation method
TOXIC TO REPRODUCTION (Unborn child) - Category 1	Calculation method
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (central nervous system (CNS), optic nerve) - Category 1	Calculation method

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Potassium Chloride

SECTION 1. IDENTIFICATION

Product Identifier Potassium Chloride

Other Means of Identification None

Other Identification KCl

Product Family Salt

Recommended Use Drilling Fluid Additive.

Restrictions on Use None known.

Supplier Identifier Secure Energy Services
Suite 3600, 205 - 5 Avenue SW, Calgary, Alberta, T2P 2V7, www.secure-energy.com

Emergency Phone No. CANUTEC, (613) 996-6666, 24/7

Date of Preparation April 12, 2017

SECTION 2. HAZARD IDENTIFICATION

Classification

Not classified under any hazard class.

Label Elements

Not applicable

Other Hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	%	Other Identifiers	Other Names
Potassium chloride	7447-40-7	100	None	KCl

Notes

Concentrations are expressed in % weight/weight.

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

If symptoms are experienced, remove source of contamination or move victim to fresh air. Obtain medical advice.

Skin Contact

No health effects expected. Flush with lukewarm, gently flowing water for 5 minutes. If irritation persists, repeat flushing. Obtain medical advice.

Eye Contact

If irritation occurs, flush the contaminated eye(s) with lukewarm, gently flowing water for 5 minutes. If irritation persists, obtain medical advice.

Ingestion

If irritation or discomfort occur, obtain medical advice.

First-aid Comments

Get medical advice or attention if you feel unwell or are concerned.

Most Important Symptoms and Effects, Acute and Delayed

Mild irritation to skin, eyes, respiratory tract (dust).

Immediate Medical Attention and Special Treatment

Target Organs

Eyes, skin.

Special Instructions

Not applicable.

Medical Conditions Aggravated by Exposure

Eye conditions, skin conditions.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Does not burn or support combustion. Use extinguishing media suitable for surrounding fire.

Unsuitable Extinguishing Media

Not applicable.

Specific Hazards Arising from the Product

Closed containers may rupture violently when heated releasing contents.
During a fire, corrosive and toxic hydrogen chloride and/or chlorine gases, dipotassium oxide and other toxic and irritating fumes and gases may be formed by thermal decomposition.

Special Protective Equipment and Precautions for Fire-fighters

Evacuate area and fight fire from a safe distance or a protected location. Approach fire from upwind to avoid hazardous vapours and toxic decomposition products.
Closed containers may rupture violently when exposed to the heat of the fire. If possible, isolate materials not yet involved in the fire, and move containers from the fire area if this can be done without risk, and protect personnel. Otherwise, apply water in flooding quantities to keep fire-exposed containers, tanks or car/trailer loads cool and absorb heat to help prevent rupture. Water spray may also be used to knock down corrosive fumes which may be produced in a fire. Apply water from the side and from a safe distance until well after the fire is out. Dike fire control water for appropriate disposal.
Tanks or drums should not be approached directly after they have been involved in a fire, until they have been completely cooled down.
Potassium has very low toxicity although hazardous decomposition products are possible in a fire. Firefighters may enter the area if positive pressure self-contained breathing apparatus (NIOSH approved or equivalent) and full Bunker Gear is worn.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Ensure clean-up is conducted by trained personnel. Wear adequate personal protective equipment. Ventilate area. Use the personal protective equipment recommended in Section 8 of this safety data sheet.

Environmental Precautions

It is good practice to prevent releases into the environment.

Methods and Materials for Containment and Cleaning Up

Use vacuum equipped with HEPA filter(s). Alternatively, dampen spilled material with water. Shovel into clean, dry, labelled containers. Cover containers. Flush area with water.

Other Information

Report spills to local health, safety and environmental authorities, as required.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

This material is essentially non-hazardous. Avoid generating dusts. Avoid the release of dusts into the workplace air. Keep containers closed when not in used. Good housekeeping is important to prevent accumulations of dust. Do not use with incompatible materials.

Conditions for Safe Storage

Store in suitable, labelled containers. Protect from damage. It is good practice to keep storage containers closed when not in use. Store away from incompatible materials. Comply with all applicable health and safety regulations, fire and building codes.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

	ACGIH TLV®		OSHA PEL		AIHA WEEL	
Chemical Name	**TWA**	**STEL**	**TWA**	**Ceiling**	**8-hr TWA**	**TWA**
Potassium chloride	Not established	Not established	Not established	Not established	Not established	Not established

Appropriate Engineering Controls

The hazard potential of this material is relatively low. General (dilution) ventilation is usually sufficient. When there is large-scale use of this material (eg. bagging operation), engineering methods to control hazardous conditions may be necessary. Use local exhaust ventilation and process enclosure to control airborne dust. A dust collecting system attached to the ventilation system may also be necessary.
Supply sufficient replacement air to make up for air removed by exhaust systems. Provide eyewash and safety shower if contact or splash hazard exists.

Individual Protection Measures

Eye/Face Protection

No specific requirement, but it is good practice to wear chemical safety goggles.

Skin Protection

No specific requirement, but it is good practice to prevent skin contact.

Respiratory Protection

Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Colourless - white crystalline powder. Particle Size: Not available
Odour	Odourless
Odour Threshold	Not applicable
pH	~ 7 (saturated solution)
Melting Point/Freezing Point	771 ºC (1420 ºF) (melting); 771 ºC (1420 ºF) (freezing)
Initial Boiling Point/Range	1407 ºC (2565 ºF)
Flash Point	Not applicable
Evaporation Rate	Not applicable
Flammability (solid, gas)	Will not burn.

Upper/Lower Flammability or Explosive Limit	Not applicable (upper); Not applicable (lower)
Vapour Pressure	Very low.
Vapour Density (air = 1)	Not applicable
Relative Density (water = 1)	1.98 - 1.99
Solubility	34.2 g/100 mL (Very soluble) in water; Mildly soluble in alcohols (e.g. ethanol).
Partition Coefficient, n-Octanol/Water (Log Kow)	Not applicable
Auto-ignition Temperature	Not applicable
Decomposition Temperature	Not available
Viscosity	Not applicable (kinematic); Not applicable (dynamic)

Other Information

Physical State	Solid
Molecular Formula	K-Cl
Molecular Weight	74.55
Bulk Density	Not available
Surface Tension	Not applicable
Critical Temperature	Not applicable
Electrical Conductivity	Not available
Vapour Pressure at 50 deg C	Not available
Saturated Vapour Concentration	Not available

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Not reactive under normal conditions of use.

Chemical Stability

Normally stable.

Possibility of Hazardous Reactions

None expected under normal conditions of storage and use.

Conditions to Avoid

Generation of dust. Incompatible materials.

Incompatible Materials

PEROXYACETIC ACID and ACETIC ACID - addition of potassium chloride to aqueous solutions containing 40% peroxyacetic acid and 1% acetic acid lead to a violently exothermic decomposition reaction, with the evolution of chlorine gas.
POTASSIUM PERMANGANATE and SULFURIC ACID - mixture may explode.
BROMINE TRIFLUORIDE - rapidly attacks potassium chloride.

Hazardous Decomposition Products

Corrosive and toxic hydrogen chloride and/or chlorine gases and dipotassium oxide may be formed by thermal decomposition or in a fire.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Skin contact; eye contact; inhalation.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Potassium chloride	Not available	2430 mg/kg (rat)	Not available

Skin Corrosion/Irritation

Potassium chloride is probably a non-irritant to mild irritant. This conclusion is based on limited human information for potassium chloride and comparison to sodium chloride.

Serious Eye Damage/Irritation

Potassium chloride is probably a non-irritant to very mild irritant based on comparison to sodium chloride. Unconfirmed animal information for potassium chloride shows mild irritation. No human information was located.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

Potassium chloride does not form a vapour. Exposure to dust or mists from solutions may be slightly irritating to the nose and throat, but is not expected to cause significant harmful effects. No human or animal information was located.

Skin Absorption

Potassium chloride is not expected to be absorbed through the skin.

Ingestion

Potassium chloride is not toxic if ingested based on animal toxicity values. Harmful effects in humans are rare because a large single dose results in nausea and vomiting and because potassium chloride is readily excreted in the urine. An estimated oral lethal dose in humans is 500-5000 mg/kg. Ingestion is not a typical route of occupational exposure.

Aspiration Hazard

Not known to be an aspiration hazard.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

Potassium chloride generally has very low toxicity and is not expected to cause long-term health effects following occupational exposure.

Respiratory and/or Skin Sensitization

Not a skin sensitizer. Not a respiratory sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Potassium chloride	Not Listed	Not designated	Not Listed	Not Listed

Reproductive Toxicity

Development of Offspring

Potassium chloride is not known to cause developmental toxicity. No human information was located.

Sexual Function and Fertility

Potassium chloride is not known to cause reproductive toxicity. No human or animal information was located.

Effects on or via Lactation

No information was located.
No information was located.

Germ Cell Mutagenicity

Potassium chloride is not known to be mutagenic. No studies in humans or live animals were located. The positive results obtained in short-term tests are believed to result from an osmotic effect rather than from mutagenicity.

Interactive Effects

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

No information was located.

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Potassium chloride	880 mg/L (Pimephales promelas (fathead minnow); 96-hour; fresh water; static)	29 mg/L (Daphnia magna (water flea); 96-hour; fresh water; static)	Not available	Not available

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

Other Adverse Effects

There is no information available.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

Contact local environmental authorities for approved disposal or recycling methods in your jurisdiction. The required hazard evaluation of the waste and compliance with the applicable hazardous waste laws are the responsibility of the user. Store product for disposal as described under Storage in Section 7 of this safety data sheet. Dispose of or recycle empty containers through an approved waste management facility.

SECTION 14. TRANSPORT INFORMATION

Not regulated under Canadian TDG regulations. Not regulated under US DOT Regulations.

Environmental Hazards Not applicable

Special Precautions Not applicable

Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

Canada

Domestic Substances List (DSL) / Non-Domestic Substances List (NDSL)

All ingredients are listed on the DSL/NDSL.

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are listed on the TSCA Inventory.

Additional USA Regulatory Lists

SARA Title III - Section 302: Not listed. SARA Title III - Section 311/312: Not listed. SARA Title III - Section 313: Not listed. Massachusetts Right To Know: Not listed. Pennsylvania Right To Know: Listed. New Jersey Right To Know: Listed. California Proposition 65: This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

SECTION 16. OTHER INFORMATION

SDS Prepared By	Safety Committee
Phone No.	403-264-1588
Date of Preparation	April 12, 2017
Date of Last Revision	April 12, 2017
Revision Indicators	Not applicable.
Key to Abbreviations	ACGIH® = American Conference of Governmental Industrial Hygienists AIHA® = AIHA® Guideline Foundation DSL = Domestic Substances List HSDB® = Hazardous Substances Data Bank IARC = International Agency for Research on Cancer IDLH = Immediately Dangerous to Life and Health NDSL = Non-Domestic Substances List NFPA = National Fire Protection Association NIOSH = National Institute for Occupational Safety and Health NTP = National Toxicology Program OSHA = US Occupational Safety and Health Administration PEL = Permissible Exposure Limit REL = Recommended Exposure Limit RTECS® = Registry of Toxic Effects of Chemical Substances STEL = Short Term Exposure Limit TSCA = Toxic Substances Control Act TWA = Time Weighted Average
References	CHEMINFO database. Canadian Centre for Occupational Health and Safety (CCOHS). HSDB® database. US National Library of Medicine. Available from Canadian Centre for Occupational Health and Safety (CCOHS). Registry of Toxic Effects of Chemical Substances (RTECS®) database. Dassault Systèmes/BIOVIA (“BIOVIA”). Available from Canadian Centre for Occupational Health and Safety (CCOHS).
Disclaimer	To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist. Secure Energy Services expressly disclaims all expressed or implied warranties of merchantability and fitness for a particular purpose with respect to the product provided.

SAFETY DATA SHEET
According to the Hazardous Products Regulations

Quaker State Automatic Transmission Fluid

Version	Revision Date:	SDS Number:	Print Date: 2016-04-28
1.4	2016-04-06	800001003748	Date of last issue: 08.03.2013
			Date of first issue: 08.03.2013

SECTION 1. IDENTIFICATION

Product name : Quaker State Automatic Transmission Fluid

Product code : 001B0927

Manufacturer or supplier's details

Manufacturer/Supplier : **Shell Canada Products**
400 - 4th Avenue S.W
Calgary AB T2P 0J4
Canada

Telephone : (+1) 8006611600
Telefax : (+1) 4033848345

Emergency telephone number : CHEMTREC (24 hr): 1 (703) 527-3887 or 1 (800) 424-9300 (US)
CANUTEC (24 hr): (+1) 613-996-6666; Toll Free: 1-888-CAN-UTEC (226-8832)

Recommended use of the chemical and restrictions on use

Recommended use : Transmission oil.

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Not a hazardous substance or mixture.

GHS label elements

Hazard pictograms : No Hazard Symbol required

Signal word : No signal word

Hazard statements : PHYSICAL HAZARDS:
Not classified as a physical hazard under GHS criteria.
HEALTH HAZARDS:
Not classified as a health hazard under GHS criteria.
ENVIRONMENTAL HAZARDS:
Not classified as an environmental hazard under GHS criteria.

Precautionary statements : **Prevention:**
No precautionary phrases.
Response:
No precautionary phrases.

Storage:
No precautionary phrases.
Disposal:
No precautionary phrases.

Other hazards which do not result in classification
Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
Used oil may contain harmful impurities.
Not classified as flammable but will burn.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance name : Quaker State Automatic Transmission Fluid

Chemical nature : Highly refined mineral oils and additives.
The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346.

Hazardous components

Chemical name	CAS-No.	Concentration (% w/w)
Alkyl methacrylates copolymer	Not Assigned	1 - 3
Interchangeable low viscosity base oil (<20,5 cSt @40°C) *	Not Assigned	0 - 90

SECTION 4. FIRST-AID MEASURES

General advice : Not expected to be a health hazard when used under normal conditions.

If inhaled : No treatment necessary under normal conditions of use.
If symptoms persist, obtain medical advice.

In case of skin contact : Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available.
If persistent irritation occurs, obtain medical attention.

In case of eye contact : Flush eye with copious quantities of water.
If persistent irritation occurs, obtain medical attention.

If swallowed : In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.

Most important symptoms and effects, both acute and delayed : Oil acne/folliculitis signs and symptoms may include formation of black pustules and spots on the skin of exposed areas.
Ingestion may result in nausea, vomiting and/or diarrhoea.

Protection of first-aiders : When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the

incident, injury and surroundings.

Notes to physician : Treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.

Unsuitable extinguishing media : Do not use water in a jet.

Specific hazards during fire-fighting : Hazardous combustion products may include:
A complex mixture of airborne solid and liquid particulates and gases (smoke).
Carbon monoxide may be evolved if incomplete combustion occurs.
Unidentified organic and inorganic compounds.

Specific extinguishing methods : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Special protective equipment for firefighters : Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469).

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures : Avoid contact with skin and eyes.

Environmental precautions : Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers.

Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up : Slippery when spilt. Avoid accidents, clean up immediately.
Prevent from spreading by making a barrier with sand, earth or other containment material.
Reclaim liquid directly or in an absorbent.
Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.

Additional advice	:	For guidance on selection of personal protective equipment see Chapter 8 of this Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Safety Data Sheet.

SECTION 7. HANDLING AND STORAGE

General Precautions	:	Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
Advice on safe handling	:	Avoid prolonged or repeated contact with skin. Avoid inhaling vapour and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires.
Avoidance of contact	:	Strong oxidising agents.
Product Transfer	:	This material has the potential to be a static accumulator. Proper grounding and bonding procedures should be used during all bulk transfer operations.

Storage

Other data	:	Keep container tightly closed and in a cool, well-ventilated place. Use properly labeled and closable containers. Store at ambient temperature.
Packaging material	:	Suitable material: For containers or container linings, use mild steel or high density polyethylene. Unsuitable material: PVC.
Container Advice	:	Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of	Control parameters / Permissible	Basis

		exposure)	concentration	
Oil mist, mineral	Not Assigned	TWA ((inhalable fraction))	5 mg/m3	US. ACGIH Threshold Limit Values

Biological occupational exposure limits

No biological limit allocated.

Monitoring Methods

Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.
Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory.
Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.
National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods http://www.cdc.gov/niosh/
Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods http://www.osha.gov/
Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances http://www.hse.gov.uk/
Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA) , Germany http://www.dguv.de/inhalt/index.jsp
L'Institut National de Recherche et de Securité, (INRS), France http://www.inrs.fr/accueil

Engineering measures : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include:
Adequate ventilation to control airborne concentrations.

Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.

General Information:
Define procedures for safe handling and maintenance of controls.
Educate and train workers in the hazards and control measures relevant to normal activities associated with this product.
Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation.
Drain down system prior to equipment break-in or maintenance.
Retain drain downs in sealed storage pending disposal or subsequent recycle.
Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and

protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

Personal protective equipment

Respiratory protection : No respiratory protection is ordinarily required under normal conditions of use.
In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material.
If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation.
Check with respiratory protective equipment suppliers.
Where air-filtering respirators are suitable, select an appropriate combination of mask and filter.
Select a filter suitable for the combination of organic gases and vapours [Type A/Type P boiling point >65°C (149°F)].

Hand protection
Remarks : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection. PVC, neoprene or nitrile rubber gloves Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced.
Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.
For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same, but recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time maybe acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material.
Glove thickness should be typically greater than 0.35 mm depending on the glove make and model.

Eye protection : If material is handled such that it could be splashed into eyes, protective eyewear is recommended.

Skin and body protection : Skin protection is not ordinarily required beyond standard work clothes.
It is good practice to wear chemical resistant gloves.

Thermal hazards	:	Not applicable
Protective measures	:	Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Environmental exposure controls

General advice	:	Take appropriate measures to fulfill the requirements of relevant environmental protection legislation. Avoid contamination of the environment by following advice given in Chapter 6. If necessary, prevent undissolved material from being discharged to waste water. Waste water should be treated in a municipal or industrial waste water treatment plant before discharge to surface water. Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Liquid at room temperature.
Colour	:	red
Odour	:	Slight hydrocarbon
Odour Threshold	:	Data not available
pH	:	Not applicable
pour point	:	-48 °C / -54 °F Method: ISO 3016
Initial boiling point and boiling range	:	> 280 °C / 536 °F estimated value(s)
Flash point	:	180 °C / 356 °F Method: ISO 2592
Evaporation rate	:	Data not available
Flammability (solid, gas)	:	Data not available
Upper explosion limit	:	Typical 10 %(V)
Lower explosion limit	:	Typical 1 %(V)

Vapour pressure	:	< 0.5 Pa (20 °C / 68 °F) estimated value(s)
Relative vapour density	:	> 1 estimated value(s)
Relative density	:	0.864 (15 °C / 59 °F)
Density	:	864 kg/m3 (15.0 °C / 59.0 °F)Method: ISO 12185
Solubility(ies)		
Water solubility	:	negligible
Solubility in other solvents	:	Data not available
Partition coefficient: n-octanol/water	:	Pow: > 6 (based on information on similar products)
Auto-ignition temperature	:	> 320 °C / 608 °F
Viscosity		
Viscosity, dynamic	:	Data not available
Viscosity, kinematic	:	7.3 mm2/s (100 °C / 212 °F) Method: ISO 3104 33.8 mm2/s (40.0 °C / 104.0 °F) Method: ISO 3104
Explosive properties	:	Not classified
Oxidizing properties	:	Data not available
Conductivity	:	This material is not expected to be a static accumulator.
Decomposition temperature	:	Data not available

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	The product does not pose any further reactivity hazards in addition to those listed in the following sub-paragraph.
Chemical stability	:	Stable.
Possibility of hazardous reactions	:	Reacts with strong oxidising agents.
Conditions to avoid	:	Extremes of temperature and direct sunlight.
Incompatible materials	:	Strong oxidising agents.

Hazardous decomposition products	:	Hazardous decomposition products are not expected to form during normal storage.

SECTION 11. TOXICOLOGICAL INFORMATION

Basis for assessment	:	Information given is based on data on the components and the toxicology of similar products.Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

Information on likely routes of exposure
Skin and eye contact are the primary routes of exposure although exposure may occur following accidental ingestion.

Acute toxicity

Product:

Acute oral toxicity	:	LD50 (rat): > 5,000 mg/kg Remarks: Expected to be of low toxicity:
Acute inhalation toxicity	:	Remarks: Not considered to be an inhalation hazard under normal conditions of use.
Acute dermal toxicity	:	LD50 (Rabbit): > 5,000 mg/kg Remarks: Expected to be of low toxicity:

Skin corrosion/irritation

Product:

Remarks: Expected to be slightly irritating.
Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.

Serious eye damage/eye irritation

Product:

Remarks: Expected to be slightly irritating.

Respiratory or skin sensitisation

Product:

Remarks: Not expected to be a skin sensitiser.

Germ cell mutagenicity

Product:

Genotoxicity in vivo	:	Remarks: Not considered a mutagenic hazard.

Carcinogenicity

Product:

Remarks: Not expected to be carcinogenic.

Remarks: Product contains mineral oils of types shown to be non-carcinogenic in animal skin-painting studies.
Highly refined mineral oils are not classified as carcinogenic by the International Agency for Research on Cancer (IARC).

Reproductive toxicity

Product:

Effects on fertility : Remarks: Not expected to impair fertility.
Not expected to be a developmental toxicant.

STOT - single exposure

Product:

Remarks: Not expected to be a hazard.

STOT - repeated exposure

Product:

Remarks: Not expected to be a hazard.

Aspiration toxicity

Product:

Not considered an aspiration hazard.

Further information

Product:

Remarks: Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal.
ALL used oil should be handled with caution and skin contact avoided as far as possible.

Remarks: Slightly irritating to respiratory system.

SECTION 12. ECOLOGICAL INFORMATION

Basis for assessment : Ecotoxicological data have not been determined specifically for this product.
Information given is based on a knowledge of the components and the ecotoxicology of similar products.

Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).(LL/EL/IL50 expressed as the nominal amount of product required to prepare aqueous test extract).

Ecotoxicity

Product:

Toxicity to fish (Acute toxicity)	:	Remarks: Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l
Toxicity to crustacean (Acute toxicity)	:	Remarks: Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l
Toxicity to algae/aquatic plants (Acute toxicity)	:	Remarks: Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l
Toxicity to fish (Chronic toxicity)	:	Remarks: Data not available
Toxicity to crustacean (Chronic toxicity)	:	Remarks: Data not available
Toxicity to microorganisms (Acute toxicity)	:	Remarks: Data not available

Persistence and degradability

Product:

Biodegradability	:	Remarks: Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but contains components that may persist in the environment.

Bioaccumulative potential

Product:

Bioaccumulation	:	Remarks: Contains components with the potential to bioaccumulate.
Partition coefficient: n-octanol/water	:	Pow: > 6 Remarks: (based on information on similar products)

Mobility in soil

Product:

Mobility	:	Remarks: Liquid under most environmental conditions. If it enters soil, it will adsorb to soil particles and will not be mobile.

Remarks: Floats on water.

Other adverse effects

Product:

Additional ecological information : Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities.
Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential.

Poorly soluble mixture.
May cause physical fouling of aquatic organisms.

Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Waste product should not be allowed to contaminate soil or ground water, or be disposed of into the environment.
Waste, spills or used product is dangerous waste.

Disposal should be in accordance with applicable regional, national, and local laws and regulations.
Local regulations may be more stringent than regional or national requirements and must be complied with.

Contaminated packaging : Dispose in accordance with prevailing regulations, preferably to a recognized collector or contractor. The competence of the collector or contractor should be established beforehand.
Disposal should be in accordance with applicable regional, national, and local laws and regulations.

SECTION 14. TRANSPORT INFORMATION

National Regulations

TDG
Not regulated as a dangerous good

International Regulation

IATA-DGR
Not regulated as a dangerous good

IMDG-Code
Not regulated as a dangerous good

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Pollution category	:	Not applicable
Ship type	:	Not applicable
Product name	:	Not applicable
Special precautions	:	Not applicable

Special precautions for user

Remarks	:	Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.
Additional Information	**:**	MARPOL Annex 1 rules apply for bulk shipments by sea.

SECTION 15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulations (HPR) and the SDS contains all the information required by the HPR.

The components of this product are reported in the following inventories:

EINECS	:	All components listed or polymer exempt.
TSCA	:	All components listed.
DSL	:	All components listed.

SECTION 16. OTHER INFORMATION

Full text of other abbreviations

AICS - Australian Inventory of Chemical Substances; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; CPR - Controlled Products Regulations; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC -

No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

A vertical bar (|) in the left margin indicates an amendment from the previous version.
Revision Date : 2016-04-06

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

CA / EN

Appendix E: Waste Management Table

Table 5 Paramount Resources Ltd. NWT Abandonment Waste Stream and Waste Management Plan.

Because of the small volume of various wastes which may be generated during this activity, a combination waste bin will be provided, and a specialized waste management contractor will handle disposal of the contents at the end of the project

Waste	Storage	NWT Classification	BC Classification	AB Classification	AER Code	Shipping Name	Class	UN #	Packing Group	Disposal
Aerosol Cans (flammable)	Waste Bin-HAZ	HAZ	HAZ	DOW	WSTCGS	AEROSOLS, flammable	2.1	UN1950	-	Turnkey management ofHAZ waste provided by contractor
Aerosol Cans (non-flammable)	Waste Bin-HAZ	HAZ	HAZ	DOW	EMTCON	AEROSOLS, non - flammable	2.2	UN1950	-	Turnkey management ofHAZ waste provided by contractor
Barrels, Pails (Completely Empty)	Waste Bin	Non-HAZ	Non-HAZ	Non-DOW	EMTCON	-	-	-	-	Turnkey management of non-HAZ waste provided by contractor
Batteries (Dry Cell)	General Recyclable – Various [see *Guideline for the Management of Waste Batteries* (GNWT, 1998) for recommendation]	Non-HAZ	Non-HAZ	Non-DOW	BATT	-	-	-	-	Turnkey management of non-HAZ waste provided by contractor
Batteries (Dry Cell)		HAZ	HAZ	DOW	BATT	Batteries, dry, containing potassium hydroxide solid, electric storage	8	UN3028	III	Turnkey management of non-HAZ waste provided by contractor
Boiler Blowdown Water (contaminated with HAZ material - dependent on boiler chemicals)	Steel Tank	HAZ	HAZ	DOW	BLBDWT	Environmentally hazardous substance, liquid, N.O.S.	9	UN3082	III	Service rig contractor to arrange transport & disposal at licenced facility in BC or AB
Boiler Blowdown Water (non-contaminated with HAZ material)	Steel Tank	Non-HAZ	Non-HAZ	Non-DOW	BLBDWT	-	-	-	-	Service rig contractor to arrange transport & disposal at licenced facility in BC or AB
Cardboard	Stockpile	Non-HAZ	Non-HAZ	Non-DOW	-	-	-	-	-	Incinerate daily
Cement Returns	Retarded or diluted in steel tank	Non-HAZ	Non-HAZ	Non-DOW	Cement	-	-	-	-	Transport & disposal at licenced facility in BC or AB
Chemicals (inorganic)	Original Containers	HAZ	HAZ	DOW	INOCHM	Dependent on specific waste characteristics (consult TDG Regulations)				Contact Chemical Waste Exchange
Construction and Demolition Material (uncontaminated)	Stockpile	Non-HAZ	Non-HAZ	Non-DOW	CONMAT	-	-	-	-	Turnkey management of non-HAZ waste provided by contractor
Contaminated Debris and Soil (Chemical/Solvent/Oil/ Produced Water)	**Contact Paramount Environmental Dept**				SOILCH SOILCO SOILPW	Dependent on specific waste characteristics (consult TDG Regulations)				Contact Paramount Environmental Dept for approved landfill location
Corrosion Inhibitor/Oxygen Scavenger Solutions	Original Containers	HAZ	HAZ	DOW	CORINH	Dependent on specific waste characteristics (consult TDG Regulations)				Turnkey management of HAZ waste provided by contractor
Filters – Lube Oil	Waste Bin-HAZ	HAZ (depending on flash point and BTEX content)	HAZ (depending on flash point and BTEX content)	DOW (depending on flash point and BTEX content)	FILLUB	Environmentally Hazardous Substance, Solid N.O.S. (lead)	9	UN3077	III	Turnkey management of HAZ waste provided by contractor
Filters – Reverse Osmosis (Granular Activated Carbon, Silica Sand)	Waste Bin- non HAZ	Non-HAZ	Non-HAZ	Non-DOW	FILWTT	Filters (Media) - Water Treatment	-	-	-	Turnkey management of non-HAZ waste provided by contractor

Waste	Storage	NWT Classification	BC Classification	AB Classification	AER Code	Shipping Name	Class	UN #	Packing Group	Disposal
Grease Cartridges (Completely Empty)	Waste Bin- non HAZ	Non-HAZ	Non-HAZ	Non-DOW	EMTCON	-	-	-	-	Turnkey management of non-HAZ waste provided by contractor
Hydraulic and Transmission Oil	Waste Bin- non HAZ				HYDOIL	-	-	-	-	Turnkey management of non-HAZ waste provided by contractor
Kitchen Waste	Temporary Waste Receptacle	Non-HAZ	Non-HAZ	Non-DOW	-	-	-	-	-	Incinerate daily
Incinerator (kitchen waste)	General & Industrial non- HAZ Waste	Non-HAZ	Non-HAZ	Non-DOW	INCASH	-	-	-	-	Turnkey management of non-HAZ waste (ash) provided by contractor
Lead Based Products (Pipe Dope/Greases)	Waste Bin-HAZ	HAZ	HAZ	DOW	LDDOPE	Dependent on specific waste characteristics (consult TDG Regulations)				Turnkey management of HAZ waste provided by contractor
Lubricating Oil (Hydrocarbon and Synthetic)	Above ground disposal tanks; L&P Disposal Receptacles	Non-HAZ (unless containing heavy metals such as Vanadium or Lead	Non-HAZ (unless containing heavy metals such as Vanadium or Lead	Non-HAZ (unless containing heavy metals such as Vanadium or Lead	LUBOIL	-	-	-	-	Turnkey management of HAZ waste provided by contractor
Metal (Scrap) (uncontaminated)	Industrial Recyclable – Scrap Metal	Non-HAZ	Non-HAZ	Non-DOW	SMETAL	-	-	-	-	Recycle location - TBD
Mud Sacks – Completion/Abandonment	Waste Bin- non HAZ	Non-HAZ	Non-HAZ	Non-DOW	EMTCON	-	-	-	-	Turnkey management of non-HAZ waste provided by contractor
Pipe Dope Containers/Brushes (Completely Empty & Dry)	Waste Bin- non HAZ	Non-HAZ	Non-HAZ	Non-DOW	EMTCON	-	-	-	-	Turnkey management of non-HAZ waste provided by contractor
Sewage (Temporary Camps)	Sewage Sump or Storage Tank	Non-HAZ	Non-HAZ	Non-DOW	-	-	-	-	-	Transport & disposal at licenced facility in BC or AB
Thread Protectors – Casing/Tubing	Waste Bin- non HAZ	Non-HAZ	Non-HAZ	Non-DOW	THPROT	-	-	-	-	Turnkey management of non-HAZ waste provided by contractor
Water - Contaminated Produced (Including Brine Solutions)	Storage Tank				WATER					Transport & disposal at licenced facility in BC or AB
Wash Fluids - Water	Steel Tank	Testing Required			WSHWTE	Environmentally Hazardous Substance	9	UN3082	III	Transport & disposal at licenced facility in BC or AB
Water - Grey (Temporary Camp)	Sewage Sump or Grey water holding tank	Non-HAZ	Non-HAZ	Non-DOW	-	-	-	-	-	Transport & disposal at licenced facility in BC or AB

DOW: Dangerous Oilfield Waste HAZ: Hazardous

Packing Group: A group in which dangerous goods are included based on the inherent danger of the dangerous goods.

Packing Group I indicates great danger

Packing Group II indicates medium danger

Packing Group III indicates minor danger

Waste Management Plan
Celibeta, Fort Liard and Pointed Mountain
Northwest Territories
October 2020

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Calgary, AB T2P 4K9
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Contents

Glossary

Dangerous Goods

Any product, substance or organism included by its nature or by the *Transportation of Dangerous Goods Regulations* (TDGR) in any of the classes listed in the schedule provided in the *Transportation of Dangerous Goods Act* (TDGA) [Transportation of Dangerous Goods Act (Canada)]

Class 1: Explosives, including explosives within the meaning of the *Explosives Act* (Canada).

Class 2: Gases; compressed, deeply refrigerated, liquefied or dissolved under pressure.

Class 3: Flammable and combustible liquids.

Class 4: Flammable solids; substances liable to spontaneous combustion and substances that on contact with water emit flammable gases.

Class 5: Oxidizing substances; organic peroxides.

Class 6: Poisonous (toxic) and infectious substances.

Class 7: Radioactive materials and prescribed substances within the meaning of the *Atomic Energy Control Act* (Canada).

Class 8: Corrosives.

Class 9: Miscellaneous products, substances or organisms that are considered by the Lieutenant Governor in Council to be dangerous to life, health, property or the environment when transported and are prescribed to be included in this class.

Well Waste (not including seismic shot hole drilling waste)

A mixture of water, cuttings, additives and various other wastes that are specifically related to the suspension and abandonment activities.

Grey Water

The liquid resulting from the treatment of sewage.

Hazardous Waste

A contaminant which is a dangerous good that is no longer used for its original purpose and is intended for storage, recycling, treatment or disposal. Materials that do not meet the criteria in schedules I, III or IV, or the standards for dioxins and furans, of the Guideline for Industrial Waste Discharges in the NWT.

A hazardous waste does not include a contaminant that is:

(a) household in origin,
(b) included in class 1, Explosives or class 7, Radioactive materials of TDGR,
(c) exempted as a small quantity,

(d) an empty container, or
(e) intended for disposal in a sewage system or by land filling that meet the applicable standards set out in schedules I, III or IV of the Guideline for Industrial Waste Discharges in the NWT.

Household Hazardous Waste	Common everyday products that people use in and around their homes including paint, paint thinner, herbicides, and pesticides that, due to their chemical nature, can be hazardous if not properly disposed.
Kitchen Waste	In this document, kitchen waste is composed of foodstuff, paper products, plastic film wrapping, *etc*.
Non-hazardous Waste	Wastes that do not fall into the "Hazardous Waste" category.
Produced Water	Any water that is produced to the surface along with oil or gas.
Run off	In this document, excessive rain or snowmelt can produce overland flow to retention ponds.
Sewage	Human excrement, water borne human excretion or the water-carried wastes from liquid or non-liquid culinary purposes, washing, cleansing, laundering, food processing or ice production.
Testing Required	Occasionally, laboratory analysis may be required to fully characterize and classify a waste product.

1. Introduction

Paramount Resources Ltd. (Paramount) holds mineral rights in the Liard and Celibeta areas under several Significant Discovery Licences and Production Licences. Additionally, Paramount has surface rights at these locations and Pointed Mountain. These rights were acquired through several different corporate transactions, including but not limited to, oil and gas rights sales, farm-ins and purchases from other oil and gas companies. Most recently through the acquisition of the assets of Apache Canada Limited, Paramount gained interest and operatorship of Celibeta H-78, along with the former Pointed Mountain field. Because of the acquisition of these rights, and numerous subsequent regulatory approvals, Paramount is an operator of oil & gas and reclamation activities in the Liard, Celibeta and Pointed Mountain areas of the Northwest Territories. Paramount divides the Liard area into three project areas: Liard West, Liard South and Liard East. It is important to note that the projects are built and are in states of suspension, decommission or abandonment. Activity in recent time has been minimal. In appendix A of this document is an as-built map for each project area, which show all the project components. Below is an overview of the project areas.

1.1 Liard West

Paramount Resources Ltd. (Paramount) is the operator of the Fort Liard West Project. The Project is situated in the NT, roughly 35 km north of the BC / NT border. From the Fort Liard Project area, Fort Nelson, BC is located approximately 200 km to the south, Trout Lake, NT is located roughly 150km to the east and Nahanni Butte, NT is located approximately 100km to the north. The hamlet of Fort Liard, NT is located within the Project area.

The Fort Liard West Project encompasses all-season and winter access roads; well sites, pipelines, valve sites and gas dehydration facilities; a water disposal well at O-80; a repeater site; camp, decking and staging sites; and various borrow pits and sumps. Six natural gas wells (Paramount *et al* K-29A, 2K-29, 3K-29, M-25, 2M-25 and F-25a) on three lease sites (K-29, M-25 and F-25) are tied-in to a 37.2km main pipeline that connects the K-29 lease site to a facility at the abandoned/reclaimed BP Pointed Mountain plant site. The M-25 lease site is linked to the F-25 plant site via a 1.4 km pipeline lateral and the F-25 plant is linked to the main pipeline via a 3.3 km pipeline lateral. When active, produced water from wells on the K-29 and F-25 leases is transported via pipeline to an injection well located at O-80.

All project components have been built and the wells and pipelines in the Liard West Project are suspended, deactivated and/or decommissioned. Activity in the area has been limited in recent times to suspension activities, maintenance of access and monitoring. Future plans for the Liard West Project currently are undetermined and depend on future economic and political developments.

1.2 Liard South

Paramount Resources Ltd. (Paramount) is the operator of the Liard South Project, which encompasses winter access roads; well sites, pipelines and processing facilities; barge, camp and decking sites; and various borrow pits, sumps and other clearings. Three wells (F-36, O-35 and N-01) were tied-in to the pipeline system, the main stem of which runs 26km from well site F-36 to a compressor station in British

Columbia (Maxhamish d-36-I) and is known as the Shiha Pipeline (see Appendix A for Fort Liard South As-built 2017 map). This trans-border pipeline is operated by Shiha Energy Transmission Ltd., a partnership between the Acho Dene Koe First Nation and Paramount.

Poor economic conditions (low gas production rates and market value) prompted Paramount to temporarily suspend production late in 2007 and then to formally deactivate the project in April 2008 (according to National Energy Board (NEB) miscellaneous order MO-09-2008, which allows the deactivation of the pipeline until such time as the NEB approves its reactivation). In the 2016-2017 winter season Paramount abandoned several wells and removed facilities from various locations in the project area. Currently, the Liard South Project is not operating except for on-going monitoring.

1.3 Liard East

Paramount Resources Ltd. (Paramount) is the operator of the Fort Liard East Project. The Liard East Project encompasses existing well sites, access, borrow pits, campsites, and sumps. The Liard East wells are not tied and in and have never produced. Liard East is comprised of seven well sites and associated infrastructure located at N-65, O-15, C-76, F-66, J-76, B-41, and C-02. No new drilling, production or other means for potential land disturbance are envisioned.

1.4 Celibeta

As a result of an acquisition in 2017, Paramount is the operator of the Celibeta, NWT Project, which will encompass a winter access road and well site. The well was drilled in 1959-1960 and further suspension work was completed in 1990. The well has never been tied-in and has never produced. Inspections of the well have been taking place via helicopter since 2013. Paramount has reviewed the historical files and has not been able to determine the original access or the access used in 1990. Paramount has scouted access along existing cutlines. It is anticipated the access will be approximately 32.5 km from Paramount's existing access in Liard East (MV2013A0013). In the winter season of 2019-2020 the well was abandoned, and reclamation activities were undertaken.

1.5 Pointed Mountain

As a result of an acquisition in 2017, Paramount is responsible for former Pointed Mountain Gas Field. The field is located west of the Liard River within the Liard Range of the Franklin Mountains, approximately 30 km northwest of Fort Liard, NWT (Figure 1). The Site is located on Crown land and is an area of interest to the Acho Dene Koe First Nation (ADK). It includes decommissioned and abandoned components including a Plant Site, Airstrip, six gas well sites (A-1, A-2, A-3, A-4, B-1, and B-2), a disposal well, five water supply wells, pipelines and associated rights of way. Roads which provide access to the various locations have not yet been decommissioned and reclaimed. A network of groundwater monitoring wells are in place to provide monitoring results, which have been included in annual reports on the site. Equipment and material are transported to the Site via the barge landing or helicopter on the north side of the Liard River.

2. Environmental Overview

2.1 Terrain, Soil and Permafrost

The Project areas occur within the Liard Plains MB Ecoregion; immediately to the south and east lies the Liard Upland MB Ecoregion and, further to the west, the Central Mackenzie Plain Boreal Northern Cordilleran (Ecosystem Classification Group 2007). In the Project areas local terrain, soils and vegetation are directly representative of the Liard Plains MB Ecoregion, and to varying degrees the adjacent Liard Upland. In general, the Liard Plain MB Ecoregion exhibits one of the warmest climatic conditions in the NT. Productive deciduous, mixed-wood and conifer forests occur on the broad low-lying alluvial terraces of the Liard River (Ecosystem Classification Group 2007). Meander scrolls have developed on the Liard River floodplain, indicating an environment of active deposition and change. East of the Liard River plain are the gently undulating lacustrine deposits and lacustrine veneers of the Trout Uplands.
Soils of the Liard Plain, mainly poorly drained Regosols, are relatively young, due to ongoing deposition by the Liard River. Gleysols and Luvisols occur with lacustrine and till materials, while Organic soils occur under wetlands (Ecosystem Classification Group 2007). Permafrost is uncommon and is defined as being discontinuous sporadic.

Terrain, soils and permafrost in the Project areas have experienced relatively low levels of impacts prior to clearing and development undertaken for previously approved Project components; these include well leases, pipeline right-of-ways, access roads, sumps, camps and other facilities. Typical sources of potential impacts included contamination resulting from spills and/or poorly managed waste; altered, local terrain features (surface topography, site elevation, drainage patterns) resulting from soil movement; soil erosion resulting from the removal of vegetative ground cover; and disruption of permafrost resulting in slumping and erosion.

2.2 Vegetation

Vegetation characteristic of the Liard Plain MB Ecoregion reflects the relatively warm climate and moist, rich site conditions (Ecosystem Classification Group 2007). Willow shrublands occur on recently flooded areas along the Liard River. Drier upland sites on alluvial terraces contain mixed deciduous and mixed wood forest of trembling aspen, balsam poplar and white spruce. Forest understories are often lush, and include species such as low-bush cranberry, prickly rose, red osier dogwood, dwarf red raspberry, meadow-horsetail and other herbs. On low-lying areas, rich willow-sedge fens occur.

2.3 Water and Aquatic Species

In the Liard Plain Ecoregion, water covers approximately 5% of the total land base, with the Liard River being the dominant aquatic feature (Ecosystem Classification Group 2007). Numerous ponds, channel marshes, and fens occur along the Liard River plain. The Muskeg River and Rabbit Creek, along with numerous other small permanent and intermittent streams, drain into the Liard Plain MB Ecoregion from

the adjacent Liard Upland and Trout Upland ecoregions. Small shallow lakes occur in undulating areas, mainly in the south half of the Ecoregion.

Both ground and surface water have the potential to be impacted through changes in water quality and water volumes. Primary sources of impacts may include spills and/or releases, soil erosion, and water withdrawal from specified lake sources. Water withdrawals, and the effects and management of withdrawals, will continue to be addressed and managed as part of the new Type-B Water Licenses. To mitigate the ongoing risk of impacts from erosion, spills, and releases, Paramount will continue to employ specific industry best management practices and applicable mitigation measures outlined in the Fort Liard EPP and the associated Project Spill Contingency Plan.

2.4 Wildlife

Wildlife species that occur in the region encompassing the Project area are those adapted generally and/or more specifically with the topography, hydrologic systems and vegetation communities occurring in the Liard Plain and Liard Upland ecoregions. Characteristic mammal species include moose, black bear, beaver, fox, wolf, lynx, marten, mink, snowshoe hare, wolverine, weasel and red squirrel. To a lesser degree species such as woodland caribou occur throughout the region. Common bird species include bald eagles, hawks, falcons, chickadees, northern shrike, redpolls, ravens, Canada jays, woodpeckers, sandhill cranes, grouse and owls. Common fish species include northern pike, grayling, walleye, burbot, suckers, whitefish, and a number of species of forage fish (i.e. minnows).

Overall, wildlife species' habitats and populations have been exposed to relatively low levels of impacts from approved developments that comprise the existing Projects. Sources of impacts have included the clearing and construction for well leases, the battery site, access roads, sumps, camps and other facilities.

3. Regulatory Framework

Managing oil and gas wastes in the NWT is challenging, due in part to the complex regulatory regime. Minimal waste facilities add to the complexity: if waste must be moved outside of the NWT for disposal, the regulatory regime becomes even more complex (see CAPP, 2009). In the past for the Liard project area Paramount received oil and gas approvals from the National Energy Board (NEB). Since devolution and the creation of the Oil and Gas Regulator for Oil and Gas Operations ("OROGO") in the NWT, Paramount receives oil and gas approvals from OROGO. The Mackenzie Valley Land and Water Board (MVLWB) regulates the use of land and water and the deposit of waste through the issuance of Land Use Permits (LUPs) and Water Licences (WLs).

3.1 Assessment Processes

The Liard South, East and West fields have been the subject of a number of Environmental Assessment processes prior to licencing and permitting of activity. Assessment processes were conducted on Liard East, West and South. Some of the assessment processes were conducted prior to Paramount becoming the operator of a field: however, Paramount has assumed the outcomes and the responsibilities associated with those assessment processes since it has become the operator of a field. Examples of assessment processes are *Environmental Assessment of the Ranger Oil Ltd., Canadian Forest Oil Ltd*. and *Chevron Canada Resources Ltd. P-66/N-61/K-29 Gas Wells and Pipeline Tie-in Fort Liard, NT* and *Paramount Resources Ltd. Liard East Exploratory Drilling EA00-003*. A number of the assessment processes are documented on the Mackenzie Valley Environmental Review Board's public registry at http://reviewboard.ca/registry/ . The Celibeta well was drilled and suspended prior to the implementation of the Mackenzie Valley Resource Management Act (MVRMA). The Pointed Mountain project was also developed prior to the implementation of the MVRMA.

3.2 Regulatory Approvals

Table 1 below lists Paramount's current LUPs and WLs for the Liard Project Area and the pending LUP and WL for Celibeta. Given the current state of the projects (built and in some instances decommissioned and/or suspended/abandoned) the scope of the LUPs and WLs are very limited. Activities contemplated include maintenance, access, suspensions and abandonments, reclamation and remediation. It is important to note that OROGO is the regulator for the down-hole activities of suspension and abandonment: however, surface use, waste disposal and water use for these activities is within the jurisdiction of the MVLWB.

Table 1: Current LUPs and WLs

Liard South	Liard West	Liard East	Celibeta	Pointed Mountain
MV2016A0010	MV2013A0012	MV2013A0013	MV2018A0022	MV2014X0011
MV2016L1-0002	MV2013L1-0002	MV2013L1-0003	MV2018L1-0005	

4. Waste Management Strategy

Poor waste management practices can result in direct or indirect adverse environmental effects and can pose health and safety risks to employees and members of the general public. Furthermore, poor waste management practices can ultimately result in substantial financial and legal liabilities. To prevent poor waste management practices and minimize potential adverse effects to environment, health and safety, Paramount Resources Ltd. (Paramount) has developed this Waste Management Plan (WMP), which falls under Paramount's Health, Safety and Environment Policy (Appendix 2).

The basis of Paramount's waste management system is the waste management hierarchy (Figure 1). The overriding principle of the waste management hierarchy is the reduction, if not the elimination, of both the volume and toxicity of waste. In the waste management hierarchy, disposal is the least preferred waste management option. Disposal also involves the greatest potential liability.

4.1 Waste Minimization

Waste minimization includes source reduction (reducing the amount and/or toxicity of waste generated). In some cases, reduction at the source will not yet be technically possible or economically feasible. Therefore, opportunities for reuse (reusing materials without changing the physical properties), recycling (reusing materials by changing the physical properties) and recovery (extracting a useful component) will be investigated for all wastes that are unavoidably generated.

The concept of waste minimization is a cornerstone to the Environmental Protection Plan: waste that is not generated need not be managed. Waste that is generated but is of the lowest possible volume and/or toxicity, can be managed most cost-effectively. Potential benefits to a waste minimization program are:

- increased revenue;
- reduced costs of operating, materials, waste management and disposal,
- energy, and facility cleanup;
- improved operating efficiency;
- reduced regulatory compliance concerns;
- reduced potential for both civil and criminal liability; and
- enhanced public perception of the company and the industry as a whole.

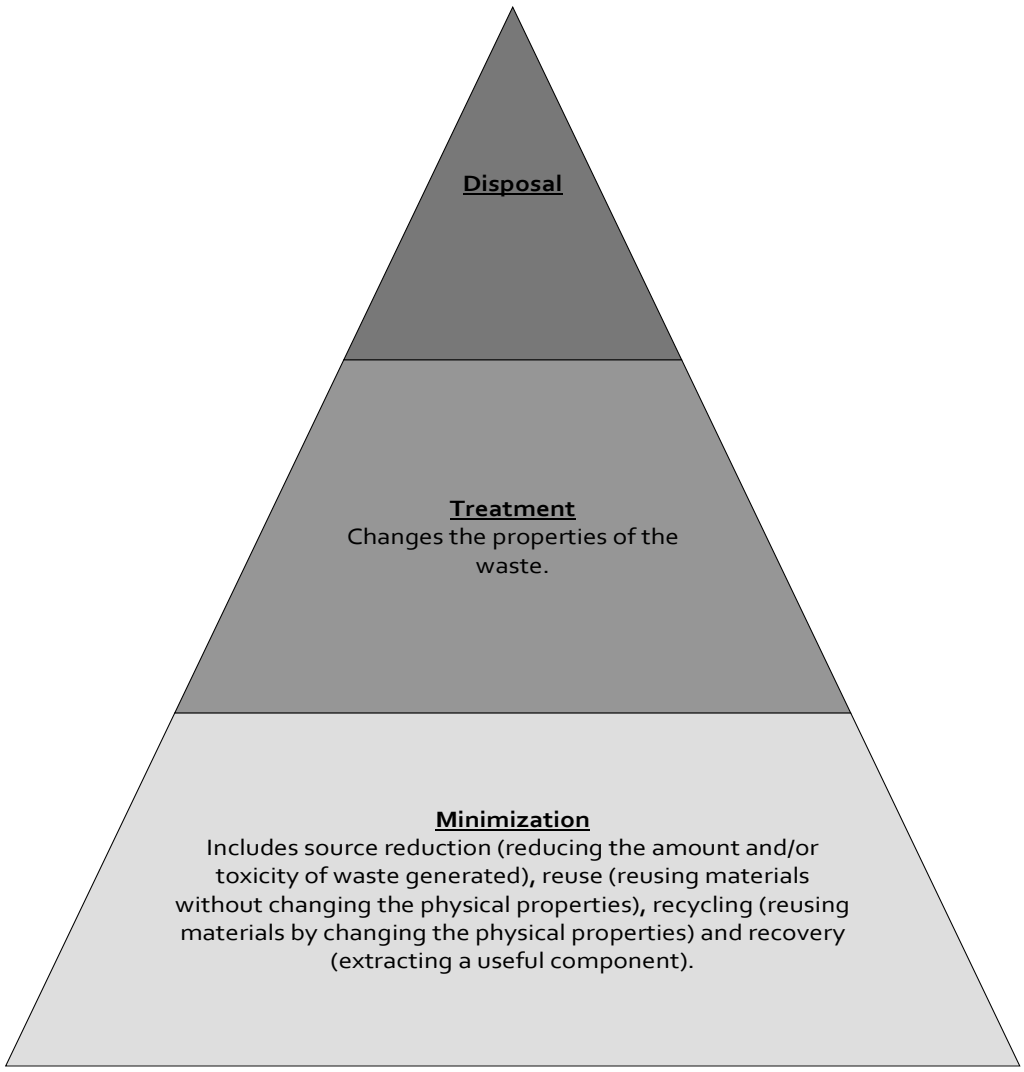


Figure 1: The waste management hierarchy presents options to minimize the amounts and hazard of waste.

4.2 Waste Treatment and Disposal

Waste treatment is any method, technique, or process that changes the physical, chemical, or biological character of a waste. Treatment renders the waste less hazardous and, therefore, recyclable or safer to transport, store, and dispose of. Treatment should be investigated for any waste that is unavoidably generated and that cannot be reused, recycled or recovered. Waste disposal generally is the discharge, deposition, injection, dumping or placing of any waste into or on land, water or air. Table 2 describes various waste treatment and disposal options.

4.3 Waste Characterization and Classification

Waste characterization is the assessment of the physical, chemical and toxicological characteristics (e.g., properties) of the waste. Refer to and Directive 58: Oilfield Waste Management Requirements for the Upstream Petroleum Industry (AER, 1996); Waste Profile Sheets (CAPP, 2006) and Oilfield Waste Management in the Northwest Territories (CAPP, 2009) to assist with the characterization of common waste. Once a waste has been characterized, it can be classified into one of two classes: hazardous waste and non-hazardous waste (Figure 2).

Given that the project areas are in states of deactivation, suspension or abandonment waste generation is limited. Waste will be created during further short-term activities such as suspension, abandonment and reclamation. The majority of wastes created will be either from camp operations or well operations. Waste would be stored for a short amount of time at well sites and camp sites, then transported to an approved facility outside of the Northwest Territories. Estimates for volumes of waste are as follows:

- $15m^3$ of cement returns per well for abandonment/suspension activities;
- $15m^3$ of well fluid per well for abandonment/suspension activities;
- $10m^3$ garbage per abandonment or suspension;
- Camp garbage of 15 m^3 per well abandonment or suspension;
- Temporary camp grey/black water is estimated at 0.33m3 per person per day.

Waste will be stored as per Table 5 and any conditions in project approvals.

Table 2: Treatment / Disposal Options for the Fort Liard Project.

Option	Class[1]	Description[1]
Bioremediation – is the break down of oilfield wastes to carbon dioxide and water using natural biological processes. MV2013A0012, MV2013L1-0002, MV2013A0013, MV2013L1-0003, MV2014X0011, MV2016A0010, MV2016L1-0002, MV2018A0022 and MV2018L1-0005 ***Not currently approved, except under MV2014X0011 would be submitted as a technique under Closure and Reclamation Plan for each Licence/Permit, subject to Plan approval by the MVLWB	**Bio-cell***	Bio-cells are constructed to optimize the air exchange for aerobic degradation and provide a method of controlling the moisture and nutrient requirements of the microorganisms. Bio-cells can be constructed as sub-grade containment areas in the earth's surface or pre-constructed containment devices.
	Bio-pile*	Bio-piles operate on the same principles as bio-cells, but they are constructed above grade on the earth's surface.
	Land Farming*	Land farming is process of mixing contaminated soil or subsoil with topsoil to augment the degradation process.
	Mulching*	Mulchers use a powerful rotating head to grind trees to "mulch".
	Biodegradation Facility	A type of oilfield waste management facility where oilfield wastes are biologically degraded in a contained and controlled environment, whether it is in an impermeable cell structure (biocell) or piled on an impermeable liner (biopile).
Thermal Treatment – is an effective method for removing organic components in oilfield waste. The treatment may involve destruction, recovery or reduction of the contaminants and/or waste material in which it is found. MV2013A0012, MV2013L1-0002, MV2013A0013, MV2013L1-0003, MV2016A0010, MV2016L1-0002, Incineration allowed for paper, cardboard and untreated wood. Other materials require authorization by Inspector **Mobile Thermal Treatment Units** ***Not currently approved, except under MV2014X0011, would be submitted as a technique under Closure and Reclamation Plan for each Licence/Permit, subject to Plan approval by the MVLWB	**Campsite Incinerators***	Campsite incinerators have a burning capacity of less than 90.7 kg/hr and are used to dispose of only kitchen waste.
	Open Burning*	Open burning of select wastes (See Appendix 1 for details) may be suitable, as no economical recycling exists. The *Forest Protection Act* (NWT) requires that anyone wishing to start or kindle a fire during the closed season (May 1 to September 30) within a forested area must obtain a Permit to Burn from the local Renewable Resource Officer
	Mobile Thermal Treatment Units* (Thermal Desorption)	Thermal desorption removes harmful chemicals from soil and other materials (like sludge and sediment) by using heat to change the chemicals into gases. These gases are collected with special equipment. The dust and harmful chemicals are separated from the gases and disposed of safely. The clean soil is returned to the site.
	Fixed Thermal Treatment Facility	Operated at waste management facilities

Option	Class[1]	Description[1]
Recycling Depots/Facilities MV2013A0012, MV2013L1-0002, MV2013A0013, MV2013L1-0003, MV2014X0011 MV2016A0010, MV2016L1-0002, MV2018A0022 and MV2018L1-0005	**Recycling Depots/Facilities**	The physical properties of various materials are changed at recycling facilities. Often, materials are accepted at depots for sorting and holding prior to delivery at facilities.
	Vendor Programs	Vendors may accept used containers (*e.g.*, propane tanks) for reuse and/or recycling.

Notes:

- * Potential local waste treatment / disposal option.
- [1] Classes and Descriptions are According to Alberta Regulation.

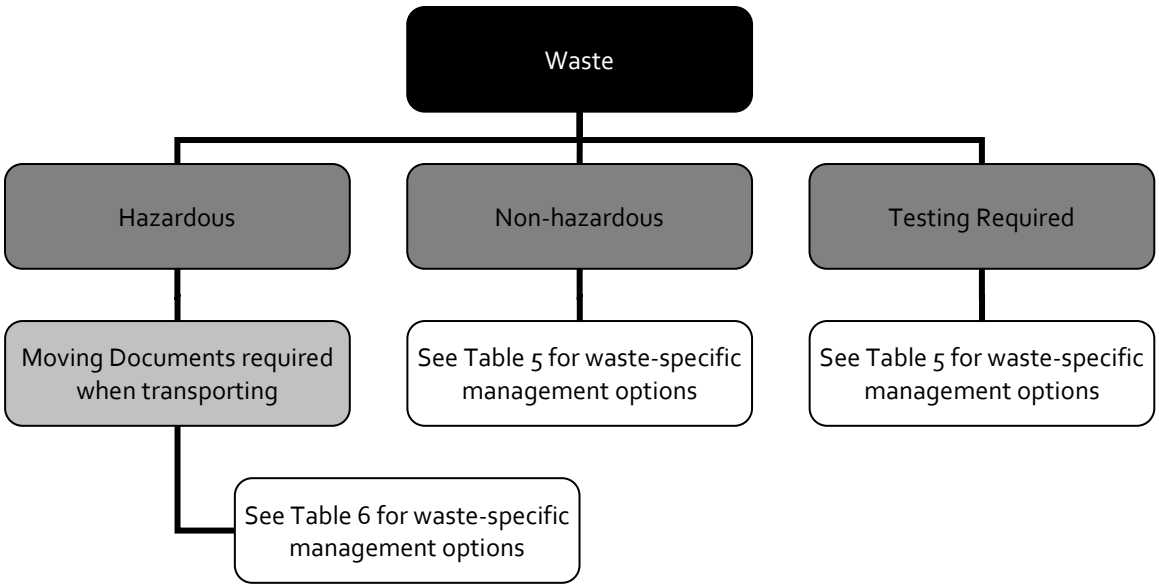


Figure 2: Waste identification, classification and segregation flowchart.

4.4 Waste Segregation

Waste segregation is an important step towards minimizing waste, as it prepares the waste for further processing. Through waste segregation, recyclable wastes can be separated from disposable wastes and hazardous wastes can be separated from non-hazardous wastes, which is important as hazardous waste is always more difficult to manage. Waste segregation will create a variety of options, other than disposal, resulting in environmentally conscious waste management. Ultimately, these options will allow Paramount to reduce waste disposal costs. Figure 3 and Table 3 illustrate Paramount's segregation strategy and provides insight into how waste will be processed.

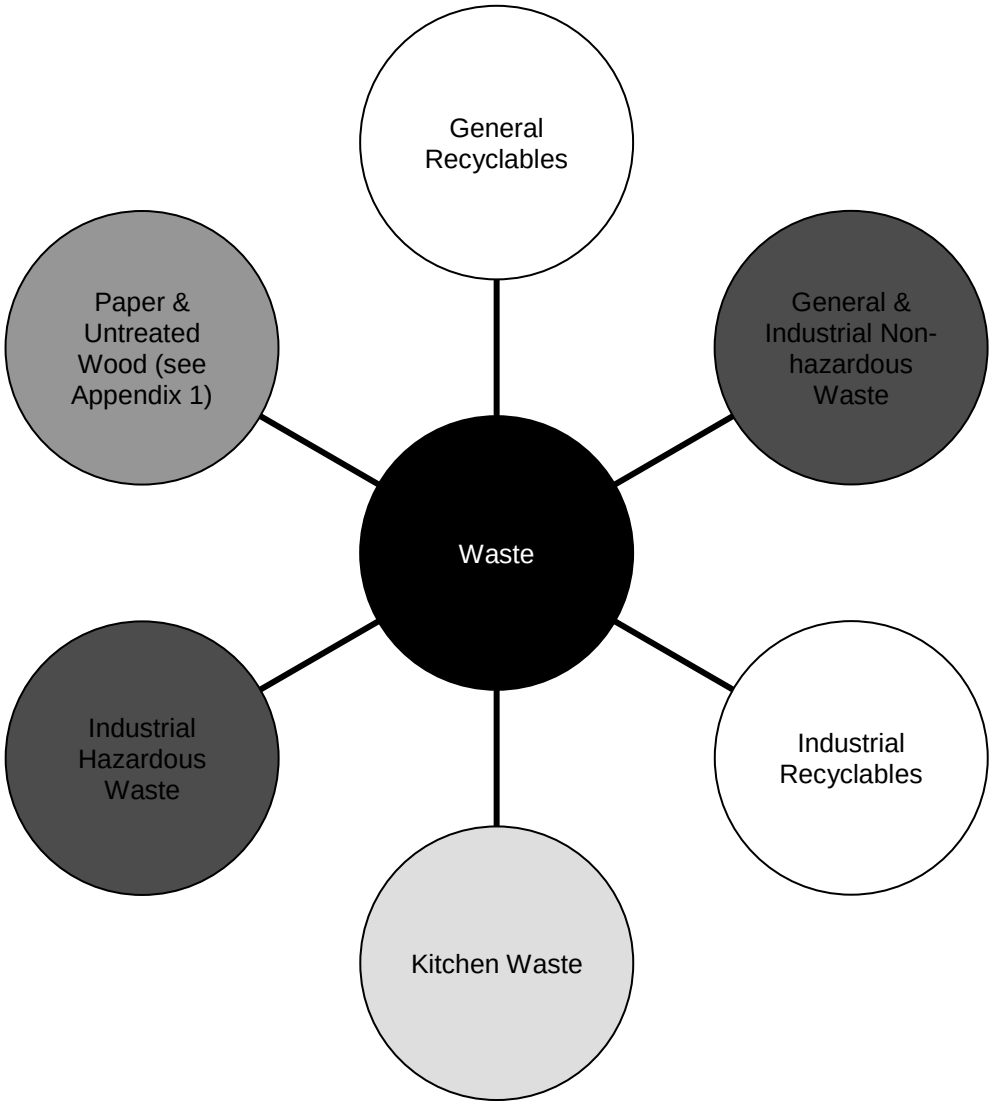


***Figure 3**: Segregation diagram for generated waste (see table 2 for details).*

LEGEND

- Recycled at appropriate and approved facilities (see Table 3)
- Incinerated locally
- Open Burned locally with a Permit (or alternatively incinerate locally)
- Disposed at appropriate and approved facilities (see Table 3)

Table 3: Waste Segregation Details

Container Label		Container Type*	Details
General & Industrial Non-hazardous Waste	Various	L&P Disposal Ltd. Receptacles	Food wrappers (*e.g.*, cans, jars, rigid plastic, *etc.*), untreated wood; non-hazardous absorbents, *etc*.
	Kitchen Waste	Temporary waste receptacles	Foodstuff, paper products, plastic film wrapping, *etc*.
	Untreated Wood	Temporary stockpiles	Excess slash, construction material, *etc.*
General Recyclables	Beverage Containers	L&P Disposal Ltd. Receptacles	Ready-to-serve drinks, except milk and milk products (*i.e.*, pop, juice, bottled water and sports drinks)
	Plastic Grocery Bags	L&P Disposal Ltd. Receptacles	Keep clean and dry in a big disposal bag.
	Various	L&P Disposal Ltd. Receptacles	Household hazardous waste [aerosol paint/sprays; acetone; air fresheners (aerosol); ammonia; all-purpose cleaners; antifreeze; barbeque starters; batteries (household and vehicle); brake fluid and lining; butane refills; degreasers; car waxes/polishes; disinfectants; furniture polish/wax; gasoline; drain cleaners; insecticides; kerosene; lacquers; nail polish and remover; oven cleaners; paint thinners; photographic chemicals; paint and varnish; rust remover; turpentine; smoke detectors; spa and pool chemicals; waxes; wood preservatives/finishes]; cell phones; electronics; ink cartridges; milk jugs and cartons and tires
Industrial Hazardous Waste	--	RBW Waste Management Ltd. Receptacles	Filter and rag waste; contaminated soil; samples and/or containers; catalysts and desiccants
Industrial Recyclables	Plastic	L&P Disposal Ltd. Receptacles	#2 HDPE milk jugs and natural and oil jugs
	Scrap Metal	L&P Disposal Ltd. Receptacles	--

Container Label		Container Type*	Details
	Used Oil	Above ground disposal tanks; L&P Disposal Ltd. Receptacles	--
	Used Oil Filters	L&P Disposal Ltd. Receptacles	--

Notes:

* L&P Disposal Ltd. Receptacles = Paramount's General Waste Contractor
* RBW Waste Management Ltd. Receptacles = Paramount's Industrial Hazardous Waste Contractor

4.5 Waste Storage

Because of local treatment/disposal and access limitations, waste may need to be stored for long periods while awaiting transport to appropriate and approved facilities. Therefore, storage areas and containers become important considerations. General principles for the storage of non-hazardous waste are listed below.

1. The regular collection, grading and sorting of waste contribute to good housekeeping practices.
2. Placing scrap containers near where the waste is produced encourages orderly waste disposal and makes collection easier. The location of the stockpiles should not interfere with work but they should still be readily available when required.
3. Storing kitchen waste in a manner likely to attract wildlife is a violation of the NWT *Wildlife Act*. The following recommendations will minimize the attraction of carnivores to a camp:
    - Kitchen wastes should be incinerated daily. If kitchen wastes must be stored, airtight, sealed containers to prevent wildlife from being attracted to odors must be used.
    - All food in the camp should be stored in the kitchen or in a building attached to the kitchen, to ensure that there is only one area where food odors occur.
    - All grey water pits should utilize a grease trap, have lime added to them every second day and be covered to minimize odors and the potential attraction of carnivores.
    - No wildlife should be purposefully encouraged to habituate to human presence (*i.e.*, do not feed wildlife).
4. All waste receptacles should be clearly labeled and in good condition, not leaking and protected from the weather.
5. Inspect waste receptacles weekly and note any deterioration or corrosion in an inspection log. Clean-up any messes immediately.

General principles for the storage of hazardous waste are listed below [from the *Guideline for Hazardous Waste Management* (GNWT, 2017)].

1. Drainage into and from a waste storage site should be controlled to prevent spills or leaks from leaving the site and to prevent run off from entering the site.

2. Access to a waste storage site should be controlled. Only persons authorized to enter and trained in waste handling procedures should have access to the waste storage site.
3. Waste storage sites should have emergency response equipment appropriate for the waste stored on site. Furthermore, hazardous waste storage sites are expected to meet all local bylaw and zoning requirements. It is recommended that the local Fire Chief be advised of the storage facility and its content for emergency planning and response purposes.
4. Where long term storage of hazardous waste is required, quantity requirements (see Schedule I *Guideline for the General Management of Hazardous Waste in the NWT*) should be recognized. If quantity requirements are exceeded, the hazardous waste storage site should be registered in accordance with Section 3.4 of *Guideline for the General Management of Hazardous Waste in the NWT*.
5. Be sure that waste storage containers are compatible with chemical waste. Use containers that are made of or lined with materials which will not react with, and are otherwise compatible with, the waste to be stored. The original containers should be used, where possible.
6. Be sure that waste storage containers are sound, sealable and not damaged or leaking. Regular inspections for signs of leaks or deterioration should be performed and recorded.
7. Any container used to store hazardous waste must be labeled according to the requirements of the *Work Site Hazardous Materials Information System* (WHMIS) of the Safety Act (2006) or the relevant Transport Authority, if transport is planned.
8. Waste containers must be closed at all times, except when being filled. Do not leave funnels in the containers.
9. Maintain a record of the type and amount of waste in storage.

Waste will be temporary stored at locations where it is generated, this includes wellsites and camp sites identified on the Project Maps found in Appendix A. Waste will be removed in the same season during and at the conclusion of operations.

4.6 Determining Destinations for Waste

Since local treatment and disposal options are limited, distance and shipping become the key considerations when determining the best waste management options. Table 4 lists waste management facilities currently closest to the Fort Liard, NWT Project area that may be used by Paramount.

4.7 Waste Transporting and Tracking

4.7.1 Waste Contractors

Transportation means will be carefully selected and checked with respect to health, safety and environment (HSE) requirements. Transporters of waste will be provided with instructions on how to handle emergency situations. When using waste contractors, the following details will be verified.

- Contracts with waste contractors contain appropriate provisions regarding HSE.
- Equipment provided for the storage and transport of wastes, such as waste bins or containers and trucks, are in good working order prior to being accepted by Paramount.
- Waste materials transferred to contractors are packaged and labeled appropriately.
- Shipping documentation is completed in accordance with approved procedures and rests with Paramount at the end of the project.

• Waste consignments reach the specified final disposal site and are disposed of at an approved facility.
• Transportation costs and tipping fees are a major component of the waste management program and require close monitoring and control.

4.7.2 Trucking

At its most efficient, trucking occurs on a "back haul" when goods have been transported to Fort Liard. The ideal situation is to take advantage of the back haul. Therefore, anyone responsible for arranging the transport of goods to Fort Liard will be responsible for arranging a back-haul load. The Operations Manager (see Appendix 4 for contact information) can be consulted for assistance in identifying back haul loads.

4.7.3 Tracking Hazardous and Non-Hazardous Waste

Paramount's hazardous waste generator registration number is NTG 000104. The Federal Transportation of Dangerous Goods Act and Regulations (TDG) identify requirements for the transportation of dangerous goods. According to these regulations, Paramount is responsible for the safe handling and transport of all hazardous material. It is Paramount's responsibility to ensure that anyone involved in the handling, offering for transport or transporting dangerous goods must be trained and certified or working under the direct supervision of a trained and certified individual.

MOVEMENT DOCUMENTS

When completed, project produced Movement Documents provide:
• detailed information on the types and amounts of wastes being shipped;
• a record of various firms or individuals involved in the shipment; and
• information on the treatment storage, and/or disposal of wastes when they reach their final destination.

A Movement Document must be used for all shipment of hazardous wastes as defined in the province or territory of destination or origin and Interprovincial Movement of Hazardous Waste Regulations. Paramount will utilize Movement Documents for non-hazardous wastes as well.

Movement Document completion instructions are provided in Figure 4 and Table 4 as well as on the reverse side of each Movement Document. Further assistance in completing a Moving Document may be obtained by referring to the DRAFT - Instructions for Completing Each Item on the Movement Document (Environment Canada, 2017) or by contacting the Motor Carrier Services of the GNWT Department of Transportation.

MOVEMENT DOCUMENT DISTRIBUTION

All Movement Documents must be tracked through their cycle by the waste generator. Movement Documents must be kept on file for a minimum period of two (2) years.

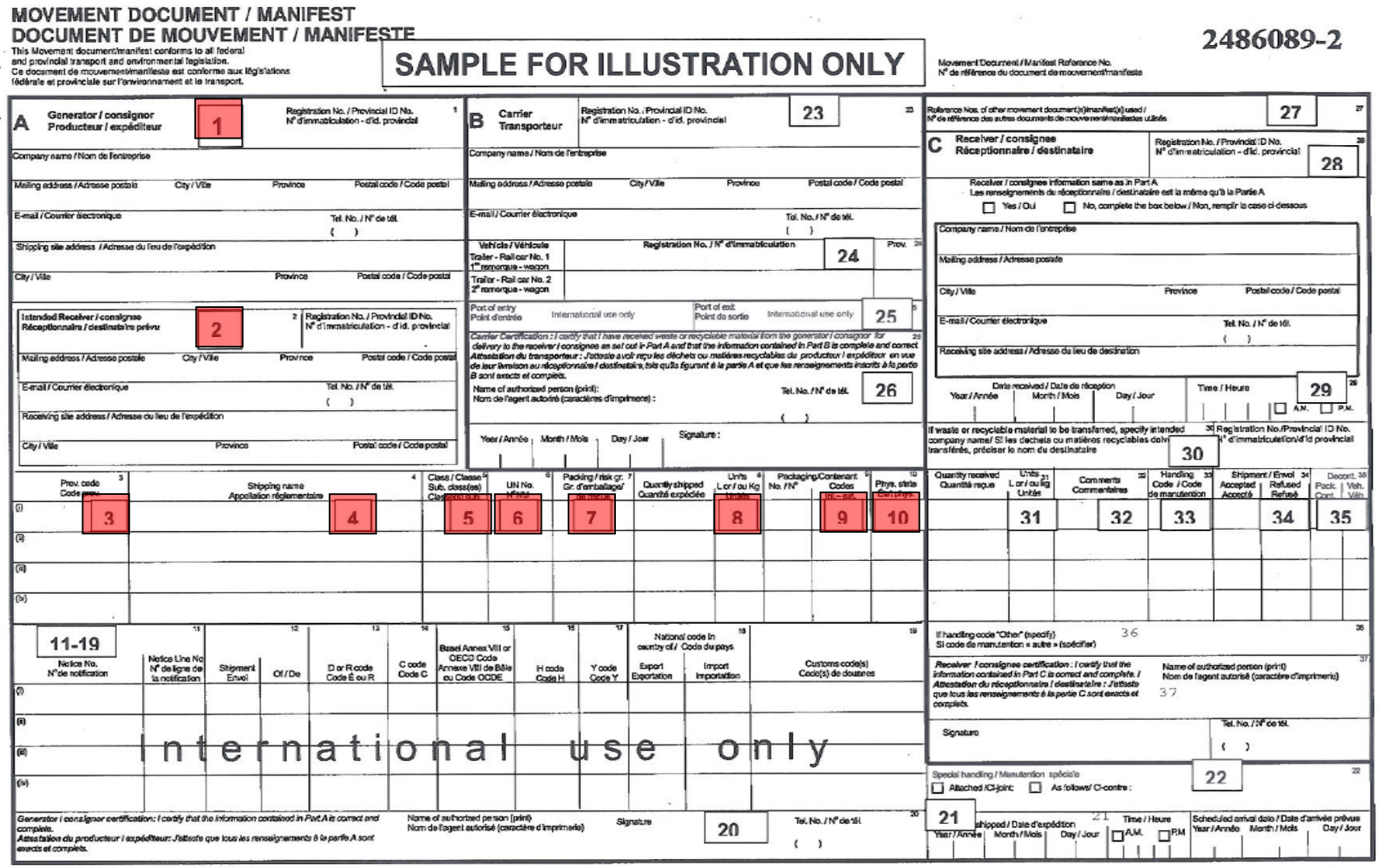
• Consignor (i.e., Paramount) forwards copy 1 (white) to the appropriate territorial authority and retains copy 2 (green).
• The carrier takes copies 3, 4, 5 and 6 with the shipment to give to consignee/receiver (i.e., facility).
• The consignee completes part C and forwards copy 3 (yellow) to the appropriate authority.

• The consignee gives copy 4 (pink) to the carrier, retains copy 5 (blue) and forwards copy 6 (brown) to the consignor. The consignor forwards a photocopy of copy 6 (or faxes copy 6) to Paramount's Environmental Specialist, HSE Department (see Appendix 5 for contact information). Once the HSE Department receives a photocopy of copy 6, information is entered and stored in a database for Paramount's use.

5. Waste Specific Management Options

Management options for wastes generated by the oil and gas sector in the Northwest Territories are very limited because of little to no waste infrastructure. Therefore, waste generated by the Fort Liard Project is primarily treated or disposed off-site.

Figure 4 *Movement Document Completion Instructions*



:

Table 4: Movement Document Completion Instructions

<table>
<tr><th>BOX #</th><th>Box label</th><th colspan="3">Instructions for Box Entries</th></tr>
<tr><td>1</td><td>Generator & Registration No.</td><td>Paramount Resources Ltd.
Suite 2800 421 7th Avenue SW
Calgary, AB T2P 4K9
Telephone No.:
403.290.3600</td><td colspan="2">Registration No.: NTG000104</td></tr>
<tr><td rowspan="3">2</td><td rowspan="3">Intended Receiver</td><td>Water Treatment Plants</td><td colspan="2"></td></tr>
<tr><td>Tervita Energy Services</td><td colspan="2" rowspan="2">See waste facility brochures below.</td></tr>
<tr><td>Newalta Corporation</td></tr>
<tr><td>3</td><td>Provincial Code</td><td colspan="3" rowspan="5">See Table 5</td></tr>
<tr><td>4</td><td>Shipping Name</td></tr>
<tr><td>5</td><td>Class</td></tr>
<tr><td>6</td><td>UN No.</td></tr>
<tr><td>7</td><td>Packing Risk Group</td></tr>
<tr><td>8</td><td>Quantity Shipped and Units</td><td colspan="3">Enter the quantity of waste being shipped in metric units. Indicate the units used as with either kilograms (kg) or litres (L). If the exact amount of waste is not known enter “est.” Before the number for an estimated amount.</td></tr>
<tr><td rowspan="10">9</td><td rowspan="10">Packaging</td><td colspan="3">Enter the number of individual packages used to ship waste in the column head “No.”</td></tr>
<tr><td rowspan="9">Enter the codes for the type of packaging used in the shipment in the column headed “Codes”.</td><td>Code</td><td>Container</td></tr>
<tr><td>01</td><td>Drum</td></tr>
<tr><td>02</td><td>Tank</td></tr>
<tr><td>03</td><td>Bulk (e.g., Vac Truck, End Dump, etc.)</td></tr>
<tr><td>04</td><td>Carton</td></tr>
<tr><td>05</td><td>Bag</td></tr>
<tr><td>06</td><td>Roll off or lugger</td></tr>
<tr><td>07</td><td>Other (e.g., pail, palette, etc.)</td></tr>
<tr><td>10</td><td>Physical state</td><td colspan="3">Enter the physical state of the waste as solid (s), liquid (l) or gas (g).</td></tr>
</table>

Table 5 Paramount Resources Ltd. NWT Abandonment Waste Stream and Waste Management Plan.

Because of the small volume of various wastes which may be generated during this activity, a combination waste bin will be provided, and a specialized waste management contractor will handle disposal of the contents at the end of the project

Waste	Storage	NWT Classification	BC Classification	AB Classification	AER Code	Shipping Name	Class	UN #	Packing Group	Disposal
Aerosol Cans (flammable)	Waste Bin-HAZ	HAZ	HAZ	DOW	WSTCGS	AEROSOLS, flammable	2.1	UN1950	-	Turnkey management ofHAZ waste provided by contractor
Aerosol Cans (non-flammable)	Waste Bin-HAZ	HAZ	HAZ	DOW	EMTCON	AEROSOLS, non - flammable	2.2	UN1950	-	Turnkey management ofHAZ waste provided by contractor
Barrels, Pails (Completely Empty)	Waste Bin	Non-HAZ	Non-HAZ	Non-DOW	EMTCON	-	-	-	-	Turnkey management of non-HAZ waste provided by contractor
Batteries (Dry Cell)	General Recyclable – Various [see *Guideline for the Management of Waste Batteries* (GNWT, 1998) for recommendation]	Non-HAZ	Non-HAZ	Non-DOW	BATT	-	-	-	-	Turnkey management of non-HAZ waste provided by contractor
Batteries (Dry Cell)		HAZ	HAZ	DOW	BATT	Batteries, dry, containing potassium hydroxide solid, electric storage	8	UN3028	III	Turnkey management of non-HAZ waste provided by contractor
Boiler Blowdown Water (contaminated with HAZ material - dependent on boiler chemicals)	Steel Tank	HAZ	HAZ	DOW	BLBDWT	Environmentally hazardous substance, liquid, N.O.S.	9	UN3082	III	Service rig contractor to arrange transport & disposal at licenced facility in BC or AB
Boiler Blowdown Water (non-contaminated with HAZ material)	Steel Tank	Non-HAZ	Non-HAZ	Non-DOW	BLBDWT	-	-	-	-	Service rig contractor to arrange transport & disposal at licenced facility in BC or AB
Cardboard	Stockpile	Non-HAZ	Non-HAZ	Non-DOW	-	-	-	-	-	Incinerate daily
Cement Returns	Retarded or diluted in steel tank	Non-HAZ	Non-HAZ	Non-DOW	Cement	-	-	-	-	Transport & disposal at licenced facility in BC or AB
Chemicals (inorganic)	Original Containers	HAZ	HAZ	DOW	INOCHM	Dependent on specific waste characteristics (consult TDG Regulations)				Contact Chemical Waste Exchange
Construction and Demolition Material (uncontaminated)	Stockpile	Non-HAZ	Non-HAZ	Non-DOW	CONMAT	-	-	-	-	Turnkey management of non-HAZ waste provided by contractor
Contaminated Debris and Soil (Chemical/Solvent/Oil/ Produced Water)	**Contact Paramount Environmental Dept**				SOILCH SOILCO SOILPW	Dependent on specific waste characteristics (consult TDG Regulations)				Contact Paramount Environmental Dept for approved landfill location
Corrosion Inhibitor/Oxygen Scavenger Solutions	Original Containers	HAZ	HAZ	DOW	CORINH	Dependent on specific waste characteristics (consult TDG Regulations)				Turnkey management of HAZ waste provided by contractor
Filters – Lube Oil	Waste Bin-HAZ	HAZ (depending on flash point and BTEX content)	HAZ (depending on flash point and BTEX content)	DOW (depending on flash point and BTEX content)	FILLUB	Environmentally Hazardous Substance, Solid N.O.S. (lead)	9	UN3077	III	Turnkey management of HAZ waste provided by contractor
Filters – Reverse Osmosis (Granular Activated Carbon, Silica Sand)	Waste Bin- non HAZ	Non-HAZ	Non-HAZ	Non-DOW	FILWTT	Filters (Media) - Water Treatment	-	-	-	Turnkey management of non-HAZ waste provided by contractor

Waste	Storage	NWT Classification	BC Classification	AB Classification	AER Code	Shipping Name	Class	UN #	Packing Group	Disposal
Grease Cartridges (Completely Empty)	Waste Bin- non HAZ	Non-HAZ	Non-HAZ	Non-DOW	EMTCON	-	-	-	-	Turnkey management of non-HAZ waste provided by contractor
Hydraulic and Transmission Oil	Waste Bin- non HAZ				HYDOIL	-	-	-	-	Turnkey management of non-HAZ waste provided by contractor
Kitchen Waste	Temporary Waste Receptacle	Non-HAZ	Non-HAZ	Non-DOW	-	-	-	-	-	Incinerate daily
Incinerator (kitchen waste)	General & Industrial non- HAZ Waste	Non-HAZ	Non-HAZ	Non-DOW	INCASH	-	-	-	-	Turnkey management of non-HAZ waste (ash) provided by contractor
Lead Based Products (Pipe Dope/Greases)	Waste Bin-HAZ	HAZ	HAZ	DOW	LDDOPE	Dependent on specific waste characteristics (consult TDG Regulations)				Turnkey management of HAZ waste provided by contractor
Lubricating Oil (Hydrocarbon and Synthetic)	Above ground disposal tanks; L&P Disposal Receptacles	Non-HAZ (unless containing heavy metals such as Vanadium or Lead	Non-HAZ (unless containing heavy metals such as Vanadium or Lead	Non-HAZ (unless containing heavy metals such as Vanadium or Lead	LUBOIL	-	-	-	-	Turnkey management of HAZ waste provided by contractor
Metal (Scrap) (uncontaminated)	Industrial Recyclable – Scrap Metal	Non-HAZ	Non-HAZ	Non-DOW	SMETAL	-	-	-	-	Recycle location - TBD
Mud Sacks – Completion/Abandonment	Waste Bin- non HAZ	Non-HAZ	Non-HAZ	Non-DOW	EMTCON	-	-	-	-	Turnkey management of non-HAZ waste provided by contractor
Pipe Dope Containers/Brushes (Completely Empty & Dry)	Waste Bin- non HAZ	Non-HAZ	Non-HAZ	Non-DOW	EMTCON	-	-	-	-	Turnkey management of non-HAZ waste provided by contractor
Sewage (Temporary Camps)	Sewage Sump or Storage Tank	Non-HAZ	Non-HAZ	Non-DOW	-	-	-	-	-	Transport & disposal at licenced facility in BC or AB
Thread Protectors – Casing/Tubing	Waste Bin- non HAZ	Non-HAZ	Non-HAZ	Non-DOW	THPROT	-	-	-	-	Turnkey management of non-HAZ waste provided by contractor
Water - Contaminated Produced (Including Brine Solutions)	Storage Tank				WATER					Transport & disposal at licenced facility in BC or AB
Wash Fluids - Water	Steel Tank	Testing Required			WSHWTE	Environmentally Hazardous Substance	9	UN3082	III	Transport & disposal at licenced facility in BC or AB
Water - Grey (Temporary Camp)	Sewage Sump or Grey water holding tank	Non-HAZ	Non-HAZ	Non-DOW	-	-	-	-	-	Transport & disposal at licenced facility in BC or AB

DOW: Dangerous Oilfield Waste HAZ: Hazardous
Packing Group: A group in which dangerous goods are included based on the inherent danger of the dangerous goods.
Packing Group I indicates great danger
Packing Group II indicates medium danger
Packing Group III indicates minor danger

6. References

Canadian Association of Petroleum Producers (CAPP). 2006. Waste Profile Sheets. Prepared by Wotherspoon Environmental Inc., Calgary, AB. 59pp.

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Environment Canada. 2017. Movement documents for hazardous waste or recyclables. Available online at: https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/permit-hazardous-wastes-recyclables/fact-sheets-international-movement/movement-documents.html

Government of the Northwest Territories. 1998. Guideline for the Management of Waste Batteries. Available online at: https://www.enr.gov.nt.ca/sites/enr/files/guidelines/batteryguideline.pdf

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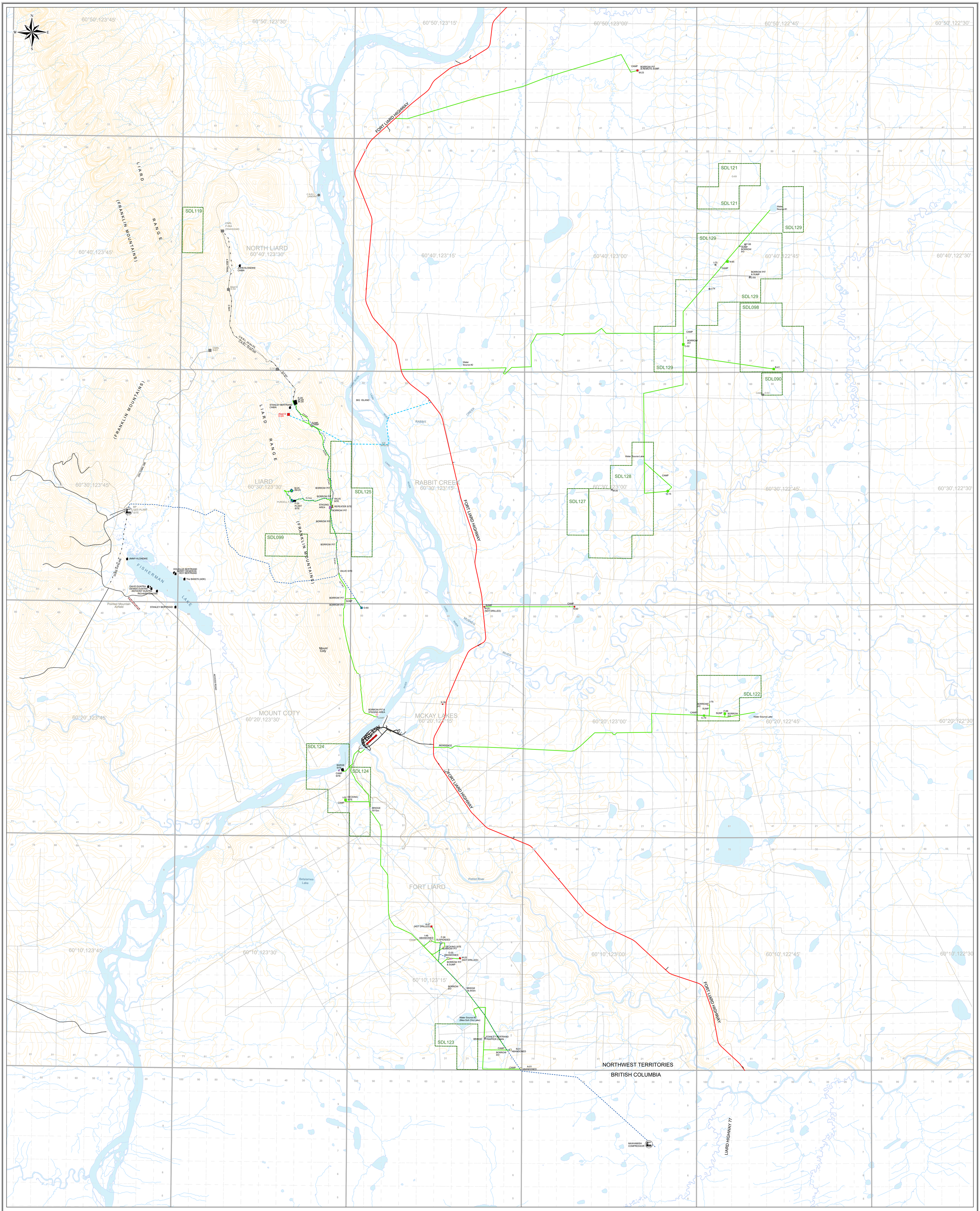
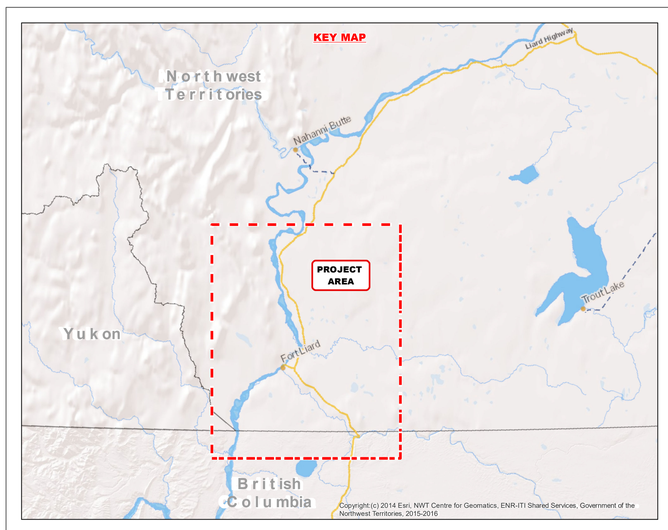
Appendix 1: Project Maps





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OVERVIEW MAP SHOWING

FORT LIARD

As-Build June 2017
60°50', 123°45" to 60°10", 122°45'
NORTHWEST TERRITORIES

5 2.5 0 5 10 15 Kilometers

5 2.5 0 5 10 Miles

Scale: 1:75,000

Legend

Leases
- Abandoned
- Built
- Built - Tied-in
- Foreign
- Reclaimed
- Suspended

Facilities
- Camp - Built
- Camp - Foreign
- Battery - Built
- Sump - Built
- Borrow Pit - Built
- Decking Site - Built

Gathering System
- Built
- Not Used
- Not Built
- Foreign

Access Roads
- Access Built
- Access Foreign
- Road
- Built
- Foreign
- Bridge
- Gas Plant / Compressor
- Cabins

Transportation
- Highway
- Old Paramount Ice Road
- Road
- Trail
- Cut Line

Boundaries
- SDL Lands
- Provinical Boundaries
- Contours

Hydrography
- Waterbody
- Watercourse

Job No.: 200057C **MXD No.:** 200057-OM-01.mxd **Coordinate System:** NAD 1983 UTM Zone 10N

REVISION	DESCRIPTION	DRAWN BY	DATE
00	Original Map Created as 170347-OM-01	KDG	2017-06-26
01	Status of J-76 changed to 'Abandoned'	AJB	2020-04-01

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www.ugsc.ca

60°40',123°15'
60°40',123°00'
60°40',122°45'
60°30',123°15'
60°30',123°00'
60°30',122°45'
60°20',123°15'
60°20',123°00'
60°20',122°45'

SDL121
SDL129
SDL098
SDL090
SDL128
SDL127
SDL125
SDL122
SDL124

Water Source #1
F-56
SUMP
BORROW PIT
I-75
CAMP
N-65
BORROW PIT & SUMP
C-55
J-74
CAMP
BORROW PIT
C-02
B-41
Water Source #2
CAMP
D-50
BIG ISLAND
LIARD RIVER
CREEK
RABBIT
ICE BRIDGE
Water Source Lake
CAMP
M-35
O-15
RABBIT CREEK
LIARD RIVER
SUMP
M-20
(NOT DRILLED)
CAMP
N-60
O-80
FORT LIARD HIGHWAY
MUSKEG RIVER
RIVER
K-36
BORROW PIT & STAGING AREA
CAMP
MCKAY LAKES
MAINTENANCE YARD
RESIDENCE
J-76
BORROW PIT
SUMP
CAMP
C-76
SUMP F-66
BORROW PIT
Water Source Lake

Paramount resources ltd.

FORT LIARD EAST
As-Built June 2009
60°40',123°15' Sec. 78 to 60°20',122°45' Sec. 33

LEGEND

- SEISMIC
- AIRSTRIP - (FOREIGN)
- AIRSTRIP
- PIPELINE R/W
- PIPELINE R/W FOREIGN
- ACCESS ROAD - (FOREIGN)
- WINTER ACCESS ROAD
- ALL SEASON ACCESS ROAD
- OLD PARAMOUNT ACCESS ROAD
- SIGNIFICANT DISCOVERY LICENSE
- CONTOUR
- LEASE - (TIED-IN)
- LEASE - (NOT TIED-IN)
- LEASE - (FOREIGN)
- LEASE - RECLAIMED
- BORROW PIT
- CAMP SITE
- SUMP / PIT
- DECKING SITE
- BATTERY SITE
- OTHER CLEARING
- BRIDGE
- TOWER

N

SCALE 1:50,000

1250 0 1250 2500 3750 5000 METERS
2500 0 5000 10000 15000 FEET

REV.	DESCRIPTION	INI.	DATE
6	Updated map title	BPV	03-JUN-09
5	Add SDL 127 & Edit SDLs 128 & 129	SAN	28-APR-08
4	Add SDL areas & three new wells	SAN	21-NOV-07
3	Updated map title	BPV	12-SEP-07
2	Added Water Source Lake label in Sec.56	BPV	05-DEC-06
1	General activity status update	BPV	26-OCT-06
0	Original construction (from 2005 map)	WGT	13-JUN-06

SPECIFICATIONS	
Datum:	NAD 83
Projection:	UTM
NTS Ref:	95B
Zone:	10
Scale:	1:50 000
C.I.:	50m
Filename:	050399G01_2009
Model:	50K Ft Liard East
Job No:	05-0399G

IMAGERY (Air Photo / Satellite)	
Date:	2000
Type:	1m Orthophoto

PREPARED BY:
UNIVERSAL GEOSYSTEMS
U.G.S. SPATIAL INFORMATION SERVICES
Ph: 262-1336
Fax: 262-1308
www.universalsurveys.com

REV. 6

MOUNT COTY
60°20',123°30'

MCKAY LAKES
60°20',123°15'

60°20',123°00'

60°10',123°30'

FORT LIARD

60°10',123°15'

60°10',123°00'

Betalamea Lake

Petitot River

K-36

BORROW PIT & STAGING AREA

CAMP

RESIDENCE

SDL124

SDL124

BARGE SITE

CAMP SITE

I-02 DECKING SITE

CAMP

BRIDGE 5X15m

FORT LIARD HIGHWAY

A-47 (NOT DRILLED)

I-46 ABANDONED

CAMP

F-36 SUSPENDED

DECKING SITE BORROW PIT

O-35 ABANDONED

M-25 (NOT DRILLED)

BORROW PIT & SUMP

BORROW PIT

BRIDGE 18.4X5m

Water Source #3 (Mea Goh Cho Lake)

SDL123

BRIDGE

STANLEY BERTRAND TRAPPER CABIN

CAMP

N-01 ABANDONED

BORROW PIT

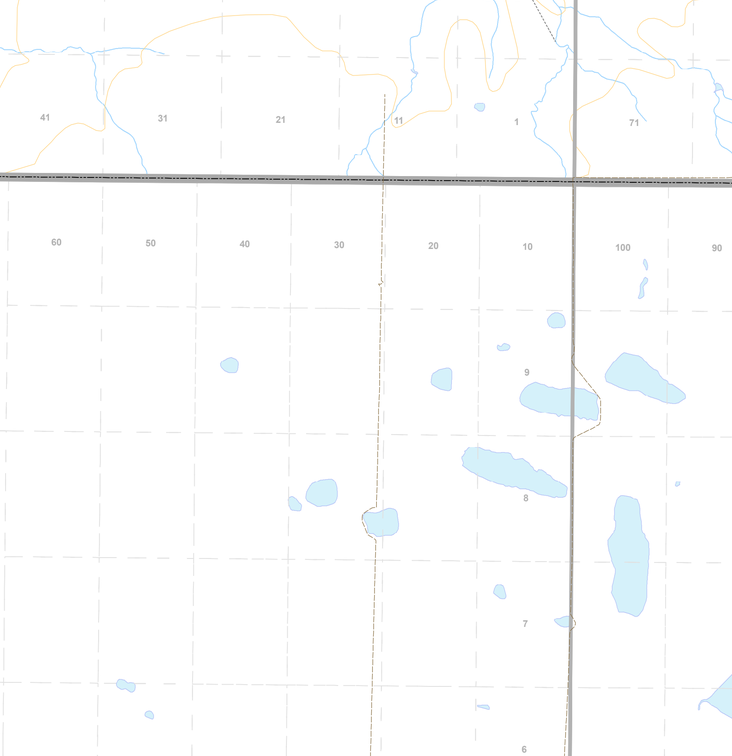
CAMP

A-01 ABANDONED

NORTHWEST TERRITORIES

BRITISH COLUMBIA

MAXHAMISH COMPRESSOR



Paramount resources ltd.

OVERVIEW MAP SHOWING

FORT LIARD SOUTH

As-Build June 2017
60°20', 123°30" to 60°10", 123°00'
NORTHWEST TERRITORIES

2 1 0 2 4 6 Kilometers

2 1 0 2 4 Miles

Scale: 1:50,000

Legend

Leases
- Abandoned
- Built
- Built - Tied-in
- Foreign
- Reclaimed
- Suspended

Facilities
- Camp - Built
- Camp - Foreign
- Battery - Built
- Sump - Built
- Borrow Pit - Built
- Decking Site - Built

Gathering System
- Built
- Not Used
- Not Built
- Foreign

Access Roads
- Access Built
- Access Foreign
- Road
- Built
- Foreign
- Bridge
- Gas Plant / Compressor
- Cabins

Transportation
- Highway
- Old Paramount Ice Road
- Road
- Trail
- Cut Line

Boundaries
- SDL Lands
- Provinical Boundaries
- Contours

Hydrography
- Waterbody
- Watercourse

Job No.: 170347C **MXD No.:** 170347-OM-02.mxd **Coordinate System:** NAD 1983 UTM Zone 10N

REVISION	DESCRIPTION	DRAWN BY	DATE
00	Original Map Created	KDG	2017-06-27

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www.ugsc.ca

Paramount resources ltd.

LIARD RIVER AREA MAP

BRITISH COLUMBIA / NORTHWEST TERRITORIES

SCALE 1 : 80,000

1.0 0 2.0 4.0 6.0 8.0 Kilometres

1.0 0 2.0 4.0 6.0 Miles

LEGEND

- EXISTING PIPELINES
- MAJOR HIGHWAY
- ACCESS ROAD
- LOW GRADE ACCESS ROAD
- WINTER / SEISMIC ACCESS
- POTENTIAL WINTER / SEISMIC ACCESS
- BLOCK BOUNDARY
- UNIT BOUNDARY
- RIVER or CREEK
- SEISMIC LINE
- CONTOUR
- PARK or RECREATIONAL AREA
- SIGNIFICANT DISCOVERY LICENCE
- SIGNIFICANT DISCOVERY DECLARATION
- OIL WELL
- GAS WELL
- GAS INJECTION WELL
- WATER INJECTION WELL
- WATER DISPOSAL WELL
- WATER SOURCE WELL
- OBSERVATION WELL
- WELL AUTHORIZATION GRANTED
- SPUDDED WELL
- DRILLING INCOMPLETE
- POTENTIAL
- ABANDONED - DRY
- ABANDONED - OIL
- ABANDONED - GAS

NOTE:

DATUM NAD 83

THIS MAP PRODUCT IS FOR REPRESENTATION ONLY. McELHANNEY GEOMATICS IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE PRESENT ON THIS MAP.

July 5, 2018

FILE: PARAMOUNT/2018/LIARD_NWT.DGN

McELHANNEY GEOMATICS

PROFESSIONAL LAND SURVEYORS

8808-72nd STREET

FORT ST. JOHN, B.C. V1J 6M2

PHONE (250) 787-0356

FAX (250) 787-0310

McElhanney

WATER SOURCE N=6680045 E=504366

SUMP / BORROW PIT

SDL 122

CAMPSITE

WATER SOURCE

SDL 127

SDL 128

CAMPSITE

SUMP / BORROW PIT

WATER SOURCE N=6673251 E=504146

WATER SOURCE N=6670089 E=505471

POTENTIAL ACCESS

WATER SOURCE N=6667217 E=523978

WATER SOURCE N=6667137 E=536004

SDL 001

BARGE LOCATION N=6679613 E=475162

Creek Crossing N=6679888 E=496653

Creek Crossing N=6677260 E=480356

Creek Crossing N=6677064 E=485663

Creek Crossing N=6676970 E=487739

Creek Crossing N=6676863 E=489949

Creek Crossing N=6678356 E=492935

Creek Crossing N=6678783 E=496245

Creek Crossing N=6678319 E=503057

Creek Crossing N=6671060 E=506884

Creek Crossing N=6668979 E=511947

Creek Crossing N=6668756 E=514617

Creek Crossing N=6668714 E=517652

Creek Crossing N=6668612 E=522547

Creek Crossing N=6668585 E=524852

Creek Crossing N=6668553 E=526647

Creek Crossing N=6667069 E=540550

Creek Crossing N=6667111 E=538348

MAXHAMISH LAKE PROTECTED AREA

NORTHWEST TERRITORIES

BRITISH COLUMBIA

95B 94-O-14 | 94-O-14 94-O-15 | 94-O-15 94-O-16 | 95B 94-O-16 | 95A 94-P-13

124°00'W

B-2
Well Site
B-1
Well Site
A-2
Well Site
A-4
Well Site
A-1
Well Site
Well Site
A-3
Future
Proposed Bridge
C-1
Water Disposal Wells (3) /Supply Well (1)
Plant
Site
Fisherman Lake
Water Disposal Well (1)
Existing Bridge
Clearing
Clearing
Airstrip Site &
Proposed Camp Site
Existing Bridge
Barge Landing
17.5 km
2000
3000
4000

60°20'N

60°20'N

124°00'W

123°50'W

- Existing Bridge
- Future Proposed Bridge
- Disposal Well
- Water Supply Well
- Road
- Paramount Pipeline
- Contours (1000 ft interval)
- Contours (200 ft interval

Kilometres
0 0.5 1 1.5
0 0.5 1
Miles

Datum: NAD 83 Spheroid: GRS 80
Projection: 6 degrees TM (Transverse Mercator)

Paramount Resources Ltd

Former Pointed Mountain Gas Field Overview Map

	By : RJD	Date : 2020/07/07
	Scale = 1:20000	Project : MasterABSN

123°50'W

123°40'W

60°20'N

60°10'N

Existing Bridge

Fisherman Lake

1600

1400

1400

1200

1000

800

Liard River

Barge Landing

Legend

- Existing Bridge
- Barge Landing
- Road
- Contours (1000 ft interval)
- Contours (200 ft interval)

Kilometres

0 0.5 1 1.5

0 0.5 1

Miles

Datum: NAD 83 Spheroid: GRS 80

Projection: 6 degrees TM (Transverse Mercator)

Paramount Resources Ltd

Former Pointed Mountain Gas Field Overview Map (2 of 2)

	By : RJD	Date : 2020/07/07
	Scale = 1:20000	Project : MasterABSN

Appendix 2: Paramount HSE Policy

Appendix 3: Beverage Container Preparation

Container Type	Picture	Instructions
Aluminum Can		Empty container Do not need to crush
Glass Bottle		Remove cap Empty container Leave label on Do not break or crush
Plastic Bottle		Remove cap Empty container Leave label on
Juice Box and Drink Pouch		Empty container Take straw out
Juice Carton		Remove cap Empty container
Bi-metal Can		Empty container Leave label on Do not break or crush
Bag-in-a-Box		Empty container Keep the bag and box together
Large Milk Containers		Remove cap Empty container Rinse container out Squash container
Small Milk Containers		Remove cap Empty container Rinse container out Leave label on

https://www.enr.gov.nt.ca/en/services/beverage-container-program/faq-beverage-container-program

Appendix 4: Paramount Contact Information

Title	Name	Contact
Completions Field Supervisor	TBD	Telephone: Email:
Completions Supervisor	Richard Bean	Telephone: 403-290-3640 Email: richard.bean@paramountres.com
Road and Bridge Maintenance Supervisor	Bob Raduenz	Telephone: 780-915-6630 Email: kevlan1@telus.net
Construction Supervisor	Tyler Wilson	Telephone: 403-290-6265 Email: tyler.wilson@paramountres.com
Director, HSE	Darren Erdely	Telephone: 403-290-3664 Email: Darren.erdely@paramountres.com
Director, Asset Management	John Hawkins	Telephone: 403-817-5074 Email: john.hawkins@paramountres.com
Environmental Coordinator	Ian Keir	Telephone: 403-817-5077 Email: ian.keir@paramountres.com
Director, Drilling & Completions	Andre Poitras	Telephone: 403-206-3895 Email: andre.poitras@paramountres.com
Manager, Drilling and Completions	Tim Wood	Telephone: 403-290-2919 Email: tim.wood@paramountres.com
Regulatory and Community Affairs Advisor	Terence Hughes	Telephone: 403-206-3859 Email: terence.hughes@paramountres.com
Onsite HSE Advisor	TBD	Telephone: Email:

Government of Northwest Territories
Gouvernement des Territoires du Nord-Ouest

September 14, 2020

Mr. Andrew Wheeler
Mackenzie Valley Land and Water Board (MVLWB)
7th Floor, 4922-48th Street
YELLOWKNIFE, NT X1A 2P6

Dear Mr. Wheeler:

Land Use Permit Application: MV2020A0009 – Paramount Resources Ltd.
Type of Operation: Oil and Gas
Location: Fort Liard West

The Department of Lands, North Slave Regional Office reviewed Land Use Permit Application MV2020A0009 and support the issuance of the permit.

Our Inspectors Kyle Christiansen and Danielle Rogers will provide their comments and recommendations for your consideration, via the LWB Online Review System.

Comments received from Territorial Lands Administration indicate no concerns as Paramount Resources Ltd. have the right to occupy the lands under Section 18(a)(i). The land use operation is in the same NTS area as the following leases: 95 B/6-6; 95 B/3-19; 95 B/11-3 and 95 B/12-3.

Comments received from the Mining Recorder's office indicate no concerns.

Thank you for the opportunity to comment on this application. Should you have any questions or concerns regarding our comments, please contact our Inspectors, Kyle Christiansen and Danielle Rogers at (867) 695-2626.

Sincerely,

Scott Stewart

Scott Stewart
Regional Superintendent
North Slave Region

P.O. Box 1320, Yellowknife NT X1A 2L9 www.gov.nt.ca C. P. 1320, Yellowknife NT X1A 2L9
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c. Dehcho Region (Fort Simpson), Department of Lands, GNWT

Land Administration (Yellowknife), Department of Lands, GNWT

Mining Recorder's Office (Yellowknife), Department of Industry, Tourism & Investment, GNWT

Review Comment Table

Board:	MVLWB
Review Item:	Liard East - RECLAIM Estimate (MV2013A0012 and MV2013L1-0002)
File(s):	MV2013A0012 MV2013L1-0002
Proponent:	Paramount Resources Ltd.
Document(s):	MV2013A0012 MV2013L1-0002 - Paramount Resources - RECLAIM Estimate (296.35 KB)
Item For Review Distributed On:	Mar 5 at 12:29 Distribution List
Reviewer Comments Due By:	Apr 5, 2019
Proponent Responses Due By:	Apr 18, 2019
Item Description:	**April 1** - Please note that an extension request to the reviewer response deadline was received from Acho Dene Koe First Nation on March 29, 2019 (before the deadline) during the civic holiday (when the office was closed). This extension request to the reviewer comment deadline has been granted by Board staff. The new reviewer response deadline is now April 5 with responses now due April 18. **March 5** - Paramount Resources Ltd. (Paramount) has submitted a RECLAIM estimate on March 1, 2019 which was requested by the Board on January 17, 2019. Reviewers are invited to submit comments and recommendations using the Online Review System (ORS) by the review comment deadline specified below. If reviewers seek clarification on the submission, they are encouraged to correspond directly with the proponent prior to submitting comments and recommendations. All documents that have been uploaded to this review are also available on our public Registry. If you have any questions or comments about the ORS or this review, please contact Board staff identified below.
General Reviewer Information:	In addition to the email distribution list, the following organizations received review material by fax: •Fort Simpson Métis Local #52 - Marie Lafferty, President (867) 695-2040
Contact Information:	Angela Love 867-766-7456 Jen Potten 867-766-7468

Comment Summary

Paramount Resources Ltd. (Proponent)				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Analysis**
1	General File	**Comment** (doc) Cover Letter for RECLAIM responses for Liard West and East **Recommendation**		Noted.
Acho Dene Koe First Nation: Julie Swinscoe				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Analysis**
1	Employment opportunities	**Comment** ADKFN notes that there are several sections within the Reclaim estimate submitted by Paramount that may offer business and employment opportunities for ADKFN. Specifically, the following sections from the Reclaim estimate will likely pertain to the employment of ADKFN businesses and community members for this project: Post-Closure Monitoring & Maintenance: ADKFN is to be included in site monitoring and seeks employment opportunities, where possible, for monitoring and sampling activities. Mobilization/Demobilization: First priority should be given to ADKFN-owned business, Beaver Enterprises, for equipment rentals and services, when available and applicable. ADKFN community members should be considered for employment opportunities relating to the reclamation activities necessary for the site. Worker accommodations: Fort Liard should be utilized for local accommodations during site activities. If camps and catering services are required, ADK Corporate should be utilized. **Recommendation** ADKFN requests that Paramount be in contacts with ADKFN Corporate to determine employment opportunities for Beaver Enterprises.	**Apr 18:** Paramount Resources Ltd. ("Paramount") has a long history of providing socio-economic opportunities to Acho Dene Koe First Nation ("ADKFN") throughout the life of the project. Paramount envisions this continuing where ADKFN has qualified and competitive capacity. If ADKFN has any updates to its corporate capacity Paramount encourages ADKFN to provide that information to Paramount.	Board staff note that a recent decision made by the Board (MV2019X0007 Giant Mine RFD), the Board indicated that it is not within the Board's jurisdiction to require agreements related to funding to be in place, and the Boards' Engagement Guidelines do not require Applicants to report extensively on engagement efforts related to socio-economic issues.
2	Consultation,	**Comment** ADKFN notes that the estimate does not include any allotted	**Apr 18:** Paramount would note that it is not the designer or	Board staff note that cost

	community updates, and meetings	funds for community consultation, updates, and/or meetings with ADKFN leadership and Lands Department personnel. **Recommendation** ADKFN expects that consultation and community updates will occur throughout the reclamation process and anticipates that Paramount will allocate time and funds to ensure the consultation continues to occur until the site is reclaimed.	owner of the RECLAIM model, the model does not have a specific line item for stakeholder engagement. Paramount has included a significant amount of funds to "indirect" project costs, sufficient funds are available for stakeholder engagement as a result. Paramount has committed to ongoing engagement with stakeholders throughout the life of the project through the approved Engagement Plan.	for engagement is a required as per the *MVLWB/INAC/ GNWT Guidelines for Closure and Reclamation Cost Estimates for Mines* which can be used to inform closure cost estimates for projects that are not mining, milling or advanced mineral exploration projects (e.g. oil and gas projects).
3	Vegetation	**Comment** When vegetation and seeding occurs at the site, as listed in the reclaim estimate, ADKFN should be consulted for traditional ecological knowledge and expertise on seed/vegetation selection, propagation, etc. **Recommendation** ADKFN requires Paramount to use native species and/or desirable species (for local wildlife) for site revegetation.	**Apr 18:** Paramount is committed to using native species.	Board staff note that one of the Minister's modification to measures from EA99-0061-86 was to incorporate Traditional Knowledge. Board staff note the selection of approved species would be part of the approved Closure and Reclamation Plan.
4	Post-Closure	**Comment** In the Reclaim estimate, Paramount lists that the number of years	**Apr 18:** If additional monitoring was required, Paramount	Board staff note the cost

	Monitoring & Maintenance	of post-closure activity is one. ADKFN does not believe that this timeframe is adequate to ensure that the land has returned to its pre-activity state. **Recommendation** ADKFN requests a longer monitoring and maintenance stage to ensure that the land and soil is safe and has returned to its pre-activity state. The ecological integrity of the land is important for the wildlife and various species that live and feed off the area, as well as for the community members that subsist off the land within the traditional territory.	suggest funds are available in the contingency portion of the estimate to cover those potential costs.	estimate for Post-Closure Monitoring and Maintenance is similar to the estimate provided by the GNWT Department of Environment and Natural Resources (GNWT-ENR).
5	ADKFN full response	**Comment** (doc) Complete ADKFN response is attached. **Recommendation** Complete ADKFN response is attached.		Noted.
GNWT - ENR: Central Email GNWT				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Analysis**
8	General File	**Comment** (doc) ENR Letter with Comments, Recommendations and 3 Attachments **Recommendation**		Noted.
9	General File	**Comment** (doc) Attachment: RECLAIM ESTIMATE - Liard West Final - MV2013L1-0002 MV2013A0012 **Recommendation**		Noted.
10	General File	**Comment** (doc) Attachment: RECLAIM ESTIMATE - Liard East Final **Recommendation**		Noted.
11	General File	**Comment** (doc) Attachment: Costing Scenario Fort Liard East and West Sites **Recommendation**		Board staff were unable to open the uploaded document.
1	Topic 1: General	**Comment** Paramount Resources Ltd. (Paramount) submitted two (2) security re-assessments for the Land Use Permits (LUP) MV2013A0012 and MV2013A0013, and Type B Water Licences (Licences) MV2013L1-0002 and MV2013L1-0003 to the MVLWB as requested on January 17, 2019 for the Fort Laird East and West sites. In the MVLWB's January 17, 2019 letter, Paramount was informed that the	**Apr 18:** Paramount used the information available on the public registry of the MVLWB that it has provided in its annual Water Licence reports, , information contained in current and former Land Use and Water Licence applications, the commitments it made (or inherited) under Assessment	Board staff note that Paramount provided additional information in response to comment ID-5. On October 9, 2020, the

		MVLWB could not proceed with the regulatory process based on the information provided as there was no evidence/supporting information provided in the previous submittal on a security amount for both sites. Paramount was then directed to submit a RECLAIM Model V.7.0 (Oil and Gas Version) estimate and encourage the company to work with GNWT prior to submission. ENR notes that Paramount has not communicated with the GNWT prior to their submittal of a RECLAIM estimate on February 28, 2019. In Paramount's RECLAIM estimates submitted, there was no supporting information or evidence to support the costs or calculations in the model. ENR also notes that the original applications to the MVLWB had insufficient information on the planned activities and scope of reclamation that would inform an accurate RECLAIM estimate. ENR encourages Paramount to submit supporting information and rationale for their estimate and to clarify any significant discrepancies between GNWT's estimate and Paramount's to better reflect actual labilities and planned activities for the site. GNWT would be happy to meet with Paramount to discuss the estimates and the assumed scope of work with Paramount to better refine and potentially reduce the security estimate. **Recommendation** 1) ENR recommends Paramount submit further information to address the assumptions ENR has used in the attached GNWT RECLAIM estimate.	processes and the land use inspection information provided by the Government of the Northwest Territories (formerly INAC) to determine the current state of the Project areas . This information is available to all the reviewers. Paramount's estimates regarding costs, techniques, duration of activities was and will be continued shaped by various factors. These factors include but are not limited, 20 plus years of operations in the area, including relevant past reclamation and remediation experience in the SE Northwest Territories and Northeast British Columbia and Northwest Alberta. Paramount as an active of oil and gas operator over the years has reclaimed hundreds of oil and gas locations. Paramount is comfortable with its assumptions but feels the estimates provided via the RECLAIM are high due to the model not being designed originally for oil and gas activity. Paramount used historical commercial rates from the area. Given the current lack of oil and gas activity or other commercial activity in the region Paramount expects rates will be lower than those used in the estimate provided.	Board directed Paramount to engage with the GNWT and submit a revised RECLAIM estimate with complete Project information.
2	None	**Comment** None **Recommendation** 2) ENR and its consultant would be happy to meet with Paramount to discuss our estimate and the assumptions in a effort to revise the estimate, where appropriate.	**Apr 18:** Paramount understands the assumptions made by GNWT and its consultant but disagrees with ENR on a number of points as outlined above and below. Paramount would encourage ENR and its consultants to sunmit a revised estimate based on the	On October 9, 2020, the Board directed Paramount to engage with the GNWT and submit a revised RECLAIM

			responses provided Paramount or alternatively accept the estimate provided by Paramount to the Mackenzie Valley Land and Water Board ("MVLWB").	estimate which incorporates engagement with the GNWT.
3	Topic 2: Reclamation of Roads and Pipeline	**Comment** As part of the assumptions made to develop a GNWT RECLAIM estimate for both sites, ENR has not included the reclamation of the access roads between the sites and the adjacent sites. However, ENR encourages Paramount to contact the local rights holders and IGO's to confirm if they would like the roads reclaimed at the end of remediation activities, or left in place. If stakeholders and rights holders request the roads be reclaimed, these activities should be included in an updated RECLAIM estimate. ENR has also not included the costs for the removal of the 44 KM pipeline that is associated with both sites (as mentioned in the LUP applications). The rationale for not including it at this time is that ENR is uncertain if it is part of the MVLWB authorizations or reclamation requirements. This item may fall under other jurisdictions, such as the NEB or OROGO. **Recommendation** 1) ENR recommends that Paramount engage with local rights holder and IGO's to confirm if they would like the roads reclaimed at the end of remediation activities, or left in place following final remediation. If stakeholders and rights holders request the roads to be reclaimed, these activities should be included in an updated RECLAIM estimate.	**Apr 18:** ENR refer to "IGO's" in this topic without providing a reference. Paramount is working with the assumption that it is short for Indigenous Government Organizations and the following response is made using that assumption. If during engagement activities local stakeholders and IGO's show an interest in being assigned or purchasing all or portions of project in the area Paramount would be open to those discussions.	On October 9, 2020, the Board directed Paramount to engage with the GNWT and submit a revised RECLAIM estimate with complete project information.
4	None	**Comment** None **Recommendation** 2) ENR recommends that the MVLWB and/or Paramount confirm which jurisdiction should hold the appropriate reclamation costs for the pipeline. If it is required under the Land User Permits and Water Licence or the Closure and Reclamation Plan, it should	**Apr 18:** As it relates to pipeline abandonment, the pipeline itself (and associated surface equipment) is the responsibility of the Office of the Regulator of Oil and Gas Operations ("OROGO"), it was formerly the responsibility of the National	Board staff note that OROGO indicated in comment ID-1 that they hold Proof of Financial

		also be included in an updated RECLAIM estimate.	Energy Board ("NEB"). The pipeline right of way would be the responsibility of the MVLWB. The pipeline right of way is included in the scope of the Land Use Permit and Water Licence and has been since project inception.	Responsibility (PFR) which may be used to pay claims made under section 63 of OGOA for actual loss or damages from or for cost associated with clean-up of debris, spills or discharges, emissions or escape of oil and gas. Board staff note that section 63 of OGOA does not address cost associated with abandonment, remediation or reclamation, and OROGO has previously clarified that PFR does not cover such costs.
5	Topic 3: Security Amount	**Comment** In the January 17, 2019 Board direction and subsequent March 5, 2019 Online Public Review notice, the MVLWB has requested that reviewers provide input on the amount of security required for this project. Currently, Paramount has suggested an amount of $568,855 that would be held under the Land Use Permit and $8,158 under the Water Licence the Liard East site. For the Liard West site, Paramount has suggested an amount of $698,904 that would be held under the Land Use Permit and $3,593 under the Water Licence. To assist the Board, ENR used all available information submitted by Paramount in the original	**Apr 18:** Paramount disagrees with the scope of the estimate provided by GNWT ENR to the MVLWB. OROGO holds a large security estimate related to Paramount's activities related to its mandate. OROGO holds security under section 64 (1) of the Oil and Gas Operations Act ("OGOA"). That security is derived from the authorizations it grants under Section 10 of OGOA. GNWT ENR has provided an overall security estimate for the entire project, this has the potential of Paramount facing	Board staff note GNWT clarified that double bonding would not occur in comment ID-2 for the renewal applications. On October 9, 2020, the Board directed Paramount to engage with the GNWT and

		applications and subsequent RECLAIM submittal and completed an estimate using the Oil and Gas RECLAIM Model (attached). However, ENR was required to make several assumptions in several key areas as insufficient information was provided in Paramount's application and supporting documents to complete a more accurate estimate. The GNWT has completed a preliminary estimate of security which totals $2,162,651 for the Liard West site which is split between land and water related liability. Security for land related liability was estimated to be $1,142,288 and $1,020,363 for water liability. The GNWT has completed a preliminary estimate of security which totals $2,510,428 for the Liard East site. Security for land related liability was estimated to be $1,397,167 and $1,113,261 for water liability. The preliminary security estimate and associated description of assumptions has been attached for the Board's information and has been split between water and land related liability. **Recommendation** 1) ENRs preliminary estimate of security required for the Paramount Liard West site (MV2013A0012/MV2013L1-0002) is $1,142,288 for land liability and $1,020,363 for water liability for a total of $2,162,651.	posting security twice for aspects of the project. The abandonment of wells and the decommissioning of production facilities falls under the scope of OROGO and authorizations it grants under Section 10 of OGOA. The GNWT ENR estimate has a number of errors based on the assumptions it has made. For Liard West, there are no camps at D-05 or L-18 and the camp at K-29 is part of the production equipment. GNWT ENR assumes monthly monitoring will be required, this is not done at present for the fields and is not a standard reclamation practice. No justification is provided in their estimate as to why monthly monitoring would be needed.	submit a revised RECLAIM estimate with complete project information.
6	None	**Comment** None **Recommendation** 2) ENRs preliminary estimate of security required for the Paramount Liard East site (MV2013A0013/MV2013L1-0003) is $1,397,167 for land liability and $1,113,261 for water liability for a total of $2,510,428.	**Apr 18:** This comment is not related to Fort Liard West.	Noted.
7	None	**Comment** None **Recommendation** 3) Should Paramount provide updated RECLAIM estimates or additional supporting information, ENR would be open to reviewing and revising its estimate accordingly.	**Apr 18:** See above and attached cover letter.	On October 9, 2020, the Board directed Paramount to engage with the GNWT and submit a

				revised RECLAIM estimate with complete project information.
GNWT - Lands - Dehcho Region: Kyle Christiansen				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Analysis**
1	MV2013A0012 RECLAIM Estimate	**Comment** Inspectors from the Department of Lands have no comments. **Recommendation** Not applicable.		Noted.
NWT- OROGO: Pauline De Jong				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Staff Analysis**
1	Wells	**Comment** (doc) This letter is in respect of the request from the Mackenzie Valley Land and Water Board (MVLWB) for reviewer comments on the above captioned matters. Paramount records no costs associated with the abandonment of wells and facilities in either of its RECLAIM estimates. OROGO's publicly available well records for the Liard West and Liard East fields show suspended wells in both locations. With respect to the Liard West field, Paramount's application for Land Use Permit MV2013A0012 scopes in five wells. Their status is as follows: K-29 (WID1861) - abandoned F-25 (WID1587) - abandoned 0-80 (WID1866) - suspended M-25 (WID1867) - suspended F-25A (WID1621) - suspended OROGO's files also indicate the presence of an additional four suspended wells operated by Paramount in close proximity to the K-29 and M-25 wells listed above: 2K-29 (WID1989) - suspended K-29A (WID2030) - suspended 3K-29 (WID1999) - suspended 2M-25 (WID2008) - suspended It is not clear whether these four wells are covered under MV2013A0012 or a	**Apr 18:** The LUP is the approval for the land associated with the project and not the wells. The number of wells on each of the physical location was clearly indicated in the LUP application (http://registry.mvlwb.ca/Documents/MV2013A0012/MV2013A0012%20-%20Paramount%20Resources%20-%20NEW%20LUP%20Application%20-%20Jun%203_13.pdf) to indicate the scope of development on the land. This is further illustrated by the project map that was submitted in support of the application. Paramount is of the understanding that the significant security that OROGO holds is a result of Section 10 of OGOA. OROGO holds security based upon the matters it regulates and provides Operations Authorizations for. In the case of the Liard fields Paramount understands that to be oil and gas operations,	Board staff note that OROGO identified four additional wells not included in GNWT's RECLAIM estimate. Board staff note the infrastructure in the comment was included in Paramount's application material and is part of the scope of the authorizations. Board staff note Paramount's comments on PFR held by

		separate Land Use Permit. I would like to take this opportunity to clarify the purpose of the Proof of Financial Responsibility (PFR) held by OROGO under section 64(1) of the Oil and Gas Operations Act (OGOA) in association with an Operations Authorization. Section 64(3) of OGOA indicates that the Regulator may use PFR to pay out claims made under section 63 of OGOA. Section 63 refers to claims for actual loss or damages from or for costs associated with the clean-up of debris, spills or the authorized discharge, emission or escape of oil or gas. Section 61 of OGOA defines: Actual loss or damage as including loss of income, including future income and the loss of hunting, fishing and gathering opportunities by Aboriginal peoples; Debris as an installation or structure that has been abandoned without authorization or any material that has broken away or been jettisoned or displaced in the course of an approved work or activity; and Spills as a discharge, emission or escape of petroleum. If you have any questions regarding the above, please contact the undersigned by phone at (867)767-9097 or by email at Paulinedejong@gov.nt.ca. **Recommendation** See above.	including the abandonment of wells and the decommissioning of facilities. If OROGO believes that it only holds security for the ability to pay for actual loss or damages from or for costs associated with the clean-up of debris, spills or the authorized discharge, emission or escape of oil or gas, OROGO is and has been holding far too much security for suspended project areas. Paramount would like clarity from OROGO to the MVLWB and Paramount on the points raised above to inform the appropriate level of security with each regulator and to ensure Paramount is not providing security for the same items in duplicate.	OROGO and that the amount is the responsibility of OROGO, not the MVLWB.

March 28, 2019

Jen Potten
Regulatory Officer
Mackenzie Valley Land and Water Board
7th Floor – 4910 50th Avenue
P.O. Box 2130
Yellowknife, NT
X1A 2P6

Dear Ms. Potten,

Re: Paramount Resources Ltd.
Land Use Permit – MV2013A0012
Water Licence – MV2013L1-0002
Land Use Permit – MV2013A0013
Water Licence – MV2013L1-0003
Fort Liard East and West Sites
Reclaim Estimates
Request for Comments

The Department of Environment and Natural Resources (ENR), Government of the Northwest Territories (GNWT) has reviewed the information at reference based on its mandated responsibilities under the *Environmental Protection Act,* the *Forest Management Act*, the *Forest Protection Act, the Species at Risk (NWT) Act, the Waters Act* and the *Wildlife Act* and provides the following comments and recommendations for the consideration of the Board and the Proponent.

Topic 1: General

Comments(s):

Paramount Resources Ltd. (Paramount) submitted two (2) security re-assessments for the Land Use Permits (LUP) MV2013A0012 and MV2013A0013, and Type B Water Licences (Licences) MV2013L1-0002 and MV2013L1-0003 to the MVLWB as requested on January 17, 2019 for the Fort Laird East and West sites. In the MVLWB's January 17, 2019 letter, Paramount was informed that the MVLWB could not proceed with the regulatory process based on the information provided as there was no evidence/supporting information provided in the previous submittal on a security amount for both sites. Paramount was then directed to submit a RECLAIM Model V.7.0 (Oil and Gas Version) estimate and

encourage the company to work with GNWT prior to submission. ENR notes that Paramount has not communicated with the GNWT prior to their submittal of a RECLAIM estimate on February 28, 2019.

In Paramount's RECLAIM estimates submitted, there was no supporting information or evidence to support the costs or calculations in the model. ENR also notes that the original applications to the MVLWB had insufficient information on the planned activities and scope of reclamation that would inform an accurate RECLAIM estimate. ENR encourages Paramount to submit supporting information and rationale for their estimate and to clarify any significant discrepancies between GNWT's estimate and Paramount's to better reflect actual labilities and planned activities for the site. GNWT would be happy to meet with Paramount to discuss the estimates and the assumed scope of work with Paramount to better refine and potentially reduce the security estimate.

Recommendation(s):

1) ENR recommends Paramount submit further information to address the assumptions ENR has used in the attached GNWT RECLAIM estimate.

2) ENR and its consultant would be happy to meet with Paramount to discuss our estimate and the assumptions in a effort to revise the estimate, where appropriate.

Topic 2: Reclamation of Roads and Pipeline

Comment(s):

As part of the assumptions made to develop a GNWT RECLAIM estimate for both sites, ENR has not included the reclamation of the access roads between the sites and the adjacent sites. However, ENR encourages Paramount to contact the local rights holders and IGO's to confirm if they would like the roads reclaimed at the end of remediation activities, or left in place. If stakeholders and rights holders request the roads be reclaimed, these activities should be included in an updated RECLAIM estimate.

ENR has also not included the costs for the removal of the 44 KM pipeline that is associated with both sites (as mentioned in the LUP applications). The rationale for not including it at this time is that ENR is uncertain if it is part of the MVLWB authorizations or reclamation requirements. This item may fall under other jurisdictions, such as the NEB or OROGO.

Recommendation(s):

1) ENR recommends that Paramount engage with local rights holder and IGO's to confirm if they would like the roads reclaimed at the end of remediation activities, or left in place following final remediation. If stakeholders and rights holders request the roads to be reclaimed, these activities should be included in an updated RECLAIM estimate.

2) ENR recommends that the MVLWB and/or Paramount confirm which jurisdiction should hold the appropriate reclamation costs for the pipeline. If it is required under the Land User Permits and Water Licence or the Closure and Reclamation Plan, it should also be included in an updated RECLAIM estimate.

Topic 3: Security Amount

Comment(s):

In the January 17, 2019 Board direction and subsequent March 5, 2019 Online Public Review notice, the MVLWB has requested that reviewers provide input on the amount of security required for this project. Currently, Paramount has suggested an amount of $568,855 that would be held under the Land Use Permit and $8,158 under the Water Licence the Liard East site. For the Liard West site, Paramount has suggested an amount of $698,904 that would be held under the Land Use Permit and $3,593 under the Water Licence.

To assist the Board, ENR used all available information submitted by Paramount in the original applications and subsequent RECLAIM submittal and completed an estimate using the Oil and Gas RECLAIM Model (attached). However, ENR was required to make several assumptions in several key areas as insufficient information was provided in Paramount's application and supporting documents to complete a more accurate estimate.

The GNWT has completed a preliminary estimate of security which totals $2,162,651 for the Liard West site which is split between land and water related liability. Security for land related liability was estimated to be $1,142,288 and $1,020,363 for water liability. The GNWT has completed a preliminary estimate of security which totals $2,510,428 for the Liard East site. Security for land related liability was estimated to be $1,397,167 and $1,113,261 for water liability.

The preliminary security estimate and associated description of assumptions has been attached for the Board's information and has been split between water and land related liability.

Recommendation:

1) ENR's preliminary estimate of security required for the Paramount Liard West site (MV2013A0012/MV2013L1-0002) is $1,142,288 for land liability and $1,020,363 for water liability for a total of $2,162,651.

2) ENR's preliminary estimate of security required for the Paramount Liard East site (MV2013A0013/MV2013L1-0003) is $1,397,167 for land liability and $1,113,261 for water liability for a total of $2,510,428.

3) Should Paramount provide updated RECLAIM estimates or additional supporting information, ENR would be open to reviewing and revising its estimate accordingly.

Comments and recommendations were provided by ENR technical experts in Water Management and Monitoring Division and the Dehcho Region and were coordinated and collated by the Environmental Assessment and Monitoring Section (EAM), Environmental Stewardship and Climate Change Division.

Should you have any questions or concerns, please do not hesitate to contact Patrick Clancy, Environmental Regulatory Analyst at (867) 767-9233 Ext: 53096 or email patrick_clancy@gov.nt.ca.

Sincerely,

Patrick Clancy
Environmental Regulatory Analyst
Environmental Assessment and Monitoring Section
Environmental Stewardship and Climate Change Division
Department of Environment and Natural Resources
Government of the Northwest Territories

Att: RECLAIM ESTIMATE Final - MV2013L1-0002 MV2013A0012
RECLAIM ESTIMATE Final - MV2013L1-0003 MV2013A0013
Costing Scenario Paramount Fort Liard East and West Sites

Acho Dene Koe First Nation

General Delivery, Fort Liard, NT X0G 0A0
Tel: (867) 770-4571
Website: www.adkfirstnation.ca

Date: April 5, 2019

Mackenzie Valley Land and Water Board
7th Floor- 4922 48th Street
P.O. Box 2130
Yellowknife, NT X1A 2P6
Attention: Angela Love and Jen Potten

VIA MVLWB Online Review System

Dear Mses Love and Potten:

Re: [Paramount Resources Ltd. RECLAIM Estimate (MV2013A0012, MV2013L1-0002)]

We are writing in response to the referral received via the Mackenzie Valley Land and Water Board's Online Review System [March 5, 2019].

Acho Dene Koe First Nation's (ADKFN) traditional territory and waters span three jurisdictions: British Columbia (BC), the Yukon Territory and the Northwest Territories (NWT). Our main community is currently settled in Fort Liard, north of the BC-NWT border, but our members continue to use and occupy our Traditional Territory as a whole. Our members, for example, have cabins throughout our territory, and continue to maintain a small settlement at François Lake in northern BC. As our ancestors did, we hunt, trap, fish and gather for food, social, cultural and trading purposes throughout our Traditional Territory.

We adhered to Treaty 11, and as such, we have treaty protected hunting rights. Additionally, we assert Aboriginal rights, including title, throughout our Traditional Territory.

Our rights, and our Traditional Territory, are affected by the proposed decision.

ADKFN's Treaty and Aboriginal Rights

In 1922, our ancestors adhered to Treaty 11, and these rights are constitutionally protected pursuant to s. 35(1) of the *Constitution Act, 1982*. Among other things, Treaty 11 protects our right to pursue our usual vocations of hunting, trapping and fishing. When signing Treaty 11, our ancestors were assured that this liberty would not be taken away or curtailed. Any erosion of our ability to hunt, trap and fish would be a serious infringement of our Treaty rights.

The courts have cast serious doubt on whether Treaty 11 extinguished Aboriginal title to the land. In *Re: Paulette's Application*, the trial judge found that "notwithstanding the language of the two treaties there is sufficient doubt on the facts that aboriginal title was extinguished.[1]"

More recently, the Federal Court recognized that the Federal Government's failure to set aside reserves for Sambaa K'e First Nation was a fundamental breach of Treaty 11, and Sambaa K'e continued to have a strong *prima facie* case for Aboriginal title, which elevated the Crown's duty to consult with them.[2] Accordingly, in our view, our Aboriginal rights, including Aboriginal title, have never been ceded, abandoned or extinguished in any part of our Territory.

Aboriginal rights, which include title, are constitutionally protected legal rights, pursuant to s. 35(1) of the *Constitution Act, 1982*. Aboriginal rights include a priority use rights to resources (e.g. fish, wildlife, trees, traditional medicines and foods). Aboriginal title confers on the rights-holding group the exclusive right to decide how the land is used and the right to benefit from those uses, subject to the restriction that the uses must be consistent with the group nature of the interest and the enjoyment of the land by future generations.[3]

We hold constitutionally protected Treaty rights, and assert strong Aboriginal rights within our Traditional Territory, and take seriously any infringement of our rights.

Crown's Duty to Consult

Where the Crown has "knowledge, real or constructive, of the potential existence of the Aboriginal right or title and contemplates conduct that might adversely affect it", the Crown has a duty to consult with the First Nation (*Haida Nation v. British Columbia (Minister of Forests),* [2004] 3 S.C.R. 511 at para. 35).

ADKFN currently uses, and has traditionally used, our Territory for fishing, hunting, trapping, and gathering. Development and resource exploitation have already significantly impacted and infringed our Treaty and Aboriginal rights and title past, and any new developments will infringe our rights in a compounding manner. An infringement cannot not justified, without meaningful consulted and accommodation, which may include compensation.

ADKFN expects and intends to enter into full meaningful consultation with government prior to any decision that has the potential to infringe our Treaty or Aboriginal rights. The importance of protection our Treaty and Aboriginal rights, and of preserving natural resources, cannot be overstated.

Referral Response

Background:

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[1] *Re: Paulette's Application*, [1973] 6 W.W.R. 97 (N.W.T.) [*Re: Paulette's Application*].
[2] *Sambaa K'e Dene First Nation v. Duncan*, 2012 FC 204.
[3] *R.* v. *Sparrow*, [1990] 1 S.C.R. 1075 and *Delgamuukw* v. *B.C.*, [1997] 3 S.C.R. 1010; *Tsilhqot'in Nation v. British Columbia*, 2014 SCC 44.

Paramount Resources Ltd. (Paramount) has submitted a Reclaim estimate for the Liard West site, at the request of the MVLWB. ADKFN recognizes that the Liard West site is currently in the abandonment/reclamation stage of the project. The Paramount Liard West site is located within ADKFN Traditional Territory and all activities relating to this project have the potential to impact ADKFN.

ADKFN Comments:
ADKFN expects the MVLWB to refrain from making any decisions on the Reclaim estimate until it has meaningfully consulted with ADKFN with respect to the potential impacts of the proposed decision. In addition, we require action on the following points:

- Employment opportunities: ADKFN notes that there are several sections within the Reclaim estimate submitted by Paramount that may offer business and employment opportunities for ADKFN. Specifically, the following sections from the Reclaim estimate will likely pertain to the employment of ADKFN businesses and community members for this project:
    - *Post-Closure Monitoring & Maintenance*: ADKFN is to be included in site monitoring and seeks employment opportunities, where possible, for monitoring and sampling activities.
    - *Mobilization/Demobilization*: First priority should be given to ADKFN-owned business, Beaver Enterprises, for equipment rentals and services, when available and applicable. ADKFN community members should be considered for employment opportunities relating to the reclamation activities necessary for the site.
    - *Worker accommodations*: Fort Liard should be utilized for local accommodations during site activities. If camps and catering services are required, ADK Corporate should be utilized.

  ADKFN requests that Paramount be in contacts with ADKFN Corporate to determine employment opportunities for Beaver Enterprises.
- Consultation, community updates, and meetings: ADKFN notes that the estimate does not include any allotted funds for community consultation, updates, and/or meetings with ADKFN leadership and Lands Department personnel. ADKFN expects that consultation and community updates will occur throughout the reclamation process and anticipates that Paramount will allocate time and funds to ensure the consultation continues to occur until the site is reclaimed.
- Vegetation: When vegetation and seeding occurs at the site, as listed in the reclaim estimate, ADKFN should be consulted for traditional ecological knowledge and expertise on seed/vegetation selection, propagation, etc. ADKFN requires Paramount to use native species and/or desirable species (for local wildlife) for site revegetation.
- Post-Closure Monitoring & Maintenance: In the Reclaim estimate, Paramount lists that the number of years of post-closure activity is one. ADKFN does not believe that this timeframe is adequate to ensure that the land has returned to its pre-activity state. ADKFN requests a longer monitoring and maintenance stage to ensure that the land and soil is safe and has returned to its pre-activity state. The ecological integrity of the land is important for the wildlife and various species that live and feed off the area, as well as for the community members that subsist off the land within the traditional territory.

Thank you.

Yours truly,

ACHO DENE KOE FIRST NATION

Julie Swinscoe
Lands Manager

Cc. Julie Swinscoe, Lands Manager (Consultant – Landmark Resource Management)
Council

NWT OFFICE OF THE REGULATOR OF OIL AND GAS OPERATIONS

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Angela Love
Regulatory Officer
Mackenzie Valley Land and Water Board
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YELLOWKNIFE NT X1A 2P6

April 5, 2019

Dear Angela Love:

Paramount Resources Ltd. (Paramount) RECLAIM Estimates for MV2013A0012 and MV2013L1-0002 (Liard West) and MV2013A0013 and MV2013L1-0003 (Liard East)

This letter is in respect of the request from the Mackenzie Valley Land and Water Board (MVLWB) for reviewer comments on the above captioned matters.

Paramount records no costs associated with the abandonment of wells and facilities in either of its RECLAIM estimates. OROGO's publicly available well records for the Liard West and Liard East fields show suspended wells in both locations.

With respect to the Liard West field, Paramount's application for Land Use Permit MV2013A0012 scopes in five wells. Their status is as follows:

K-29 (WID1861) – abandoned
F-25 (WID1587) – abandoned
O-80 (WID1866) – suspended
M-25 (WID1867) – suspended
F-25A (WID1621) – suspended

OROGO's files also indicate the presence of an additional four suspended wells operated by Paramount in close proximity to the K-29 and M-25 wells listed above:

2K-29 (WID1989) – suspended
K-29A (WID2030) – suspended
3K-29 (WID1999) – suspended
2M-25 (WID2008) – suspended

It is not clear whether these four wells are covered under MV2013A0012 or a separate Land Use Permit.

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BUREAU DE L'ORGANISME DE RÉGLEMENTATION DES OPÉRATIONS PÉTROLIÈRES ET GAZIÈRES DES TN-O

With respect to the Liard East field, Paramount's application for Land Use Permit MV2013A0013 scopes in seven wells. Their status is as follows:

C-76 (WID1817) – abandoned
F-66 (WID1935) – abandoned
N-65 (WID1833) – suspended
O-15 (WID1834) – suspended
J-76 (WID1931) – suspended
B-41 (WID1733) – suspended
C-02 (WID1857) – suspended

I would like to take this opportunity to clarify the purpose of the Proof of Financial Responsibility (PFR) held by OROGO under section 64(1) of the *Oil and Gas Operations Act* (OGOA) in association with an Operations Authorization. Section 64(3) of OGOA indicates that the Regulator may use PFR to pay out claims made under section 63 of OGOA. Section 63 refers to claims for actual loss or damages from or for costs associated with the clean-up of debris, spills or the authorized discharge, emission or escape of oil or gas. Section 61 of OGOA defines:

- "Actual loss or damage" as including loss of income, including future income and the loss of hunting, fishing and gathering opportunities by Aboriginal peoples;
- "Debris" as an installation or structure that has been abandoned without authorization or any material that has broken away or been jettisoned or displaced in the course of an approved work or activity; and
- "Spills" as a discharge, emission or escape of petroleum.

If you have any questions regarding the above, please contact the undersigned by phone at (867)767-9097 or by email at Pauline_dejong@gov.nt.ca.

Sincerely,

Pauline de Jong
Executive Director

c. Terence Hughes, Regulatory and Community Affairs Advisor,
Paramount Resources Ltd.

Paramount resources ltd.

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April 18, 2019

Mackenzie Valley Land and Water Board
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Attention: Angela Love

Re: Paramount Resources Ltd. Fort Liard East and West Security Estimates

Dear Ms. Love,

Paramount Resources Ltd. ("Paramount") has reviewed the comments provided by the Government of the Northwest Territories Department of Environment and Natural Resources ("ENR"), Landmark Resources Management on behalf of Acho Dene Koe First Nation and the Office of the Regulator of Oil and Gas Operations ("OROGO"). In the comment tables Paramount addresses the comments raised. Paramount would like to take this opportunity to raise some additional points regarding the posting of security regarding its projects regulated by the Mackenzie Valley Land and Water Board ("MVLWB").

Posting of Security

It is important to note that both under the Mackenzie Valley Resource Management Act ("MVRMA") and the Mackenzie Valley Land Use Regulations("MVLUR") state that security may have to be posted. As outlined in Section 32 of the MVLUR posting of security is to be determined by several factors related to the costs associated with the land-use operation. Additionally, several other factors may be considered including the ability of the applicant to pay, past performance of the applicant, prior posting of security by the applicant to other legislation and the probability of environmental damage or the significance of any environmental damage. Given the above, Paramount requests the MVLWB take the following information into consideration:

1. Paramount is a publicly traded Canadian company that has been in business over 40 years. As a publicly traded company Paramount reports quarterly on its results including its financials.
2. Paramount has operated in the Northwest Territories ("NWT") for over 20 years, during that timeframe it has posted security dozens of times for operations at Fort Liard East, Fort Liard West, Fort Liard South and Cameron Hills. Paramount has never defaulted or failed to provide security when requested.
3. During its operations in the NWT Paramount has received the return of all or a portion of its security based on successfully closing and reclaiming project components.
4. Paramount has a large security posted with the OROGO related to its Fort Liard projects.

5. The scope of Permits and Licences are limited. The probability of environmental damage for the operations listed is low. No new footprint is considered in either project area.

Given the points outlined above, Paramount requests that the MVLWB consider all the factors listed under the MVLUR regarding security in determining an amount for Liard East and Liard West. Further, Paramount requests how they were considered by the MVLWB to be described in the reasons for decision in this matter.

RECLAIM Model

Paramount has consistently stated its position that it is uncomfortable with the RECLAIM model, due to the following:

1. "Reclaim was prepared by Brodie Consulting Ltd. on behalf of AANDC. AANDC and Brodie Consulting are not responsible for the completeness or accuracy of any reclamation made using this model." The user, in this case Paramount, is requested to take responsibility for using a model it had no input in the design of, been provided limited instructions on how to use and been provided no credentials of who designed it.

2. "The Reclamation Cost Estimating Model was prepared to serve as a guide of Government Agencies, mining companies and others to estimate the cost of mine reclamation." Paramount is not engaged in mining activity at either Fort Liard East and Fort Liard West. Mining operations and oil and gas operations are not similar in terms of design or footprint. To take a model designed for one industry make alterations to it and use it for another industry is concerning.

3. Abandonment and decommissioning activities are not regulated by the MVLWB. The focus of the Oil and Gas RECLAIM model related to the MVLWB mandate should be limited to reclamation and remediation activities.

Paramount requests the MVLWB in its reasons for decisions provide additional background on why a mining model is now being used for oil and gas developments. Further, understanding of the development of the model and those who developed it (experience relative to oil and gas) would be appreciated.

Lack of Coordination of Security Requirements in the NWT

Paramount would note that in the submissions made by ENR is a project-based estimate that is not limited to the jurisdiction of MVLWB. Oil and Gas projects are subject to regulation by both the MVLWB and OROGO in the NWT and both regulators seek security from proponents related to projects. This

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leads to an inefficient system for proponents. The proponent is required to go through security estimate exercises with both regulators. The system creates a requirement of posting multiple securities for a single project which increases administration and transaction costs. Additionally, it increases the probability that proponents will post security for project components with both regulators increasing project costs.

Paramount would encourage the MVLWB and OROGO to coordinate security on oil and gas projects going forward. Until that coordination happens it is important that each regulator only request security from proponents that is within their mandate and to try and avoid duplication.

ENR Estimate

The estimate provided by ENR contains factual errors regarding the scale and scope of both Liard East and Liard West. It is important to note that the current state of the projects is wholly contained on the public registry, including recent inspection reports provided by GNWT Lands department. These errors are covered in detail in Paramount's responses to the ENR submissions made. The factual errors combined with the scoping error in the ENR estimate leads to the difference from the Paramount submissions.

Conclusion

Paramount looks forward to fully understanding how the security is finalized for Liard West and East in the MVLWB decision on this matter. If you have any further questions regarding the above or the table enclosed please do not hesitate to contact the undersigned via phone at 403-206-3859 or via email at terence.hughes@paramountres.com .

Respectfully,
Paramount Resources Ltd.

Terence Hughes
Regulatory and Community Affairs Advisor