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Staff Report

Applicant: New Discovery Mines Ltd.	
Location: Discovery Lake, NT	**File Number:** MV2020C0003 and MV2020L2-0002
Date Prepared: February 1, 2021	**Date of Board Meeting:** February 11, 2021
Subject: Revised Waste Management Plan, Spill Contingency Plan, and Engagement Plan	

1. Purpose

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

a) Revised Waste Management Plan;
b) Revised Spill Contingency Plan; and
c) Revised Engagement Plan.

2. Background

- July 3, 2014 – Issuance of Permit MV2013C0021 and Licence MV2014L2-0002;
- October 21, 2015 – Issuance of Permit MV2015C0015 and Licence MV2015L2-0004;
- October 14, 2020 – Issuance of Permit MV2020C0003 and Licence MV2020L2-0002;
- January 4, 2021 – Submission of Revised Waste Management Plan (Revision 12), Spill Contingency Plan (Revision 10), and Engagement Plan (Revision 9);
- January 5, 2021 – Revised plans distributed for review and comment;
- January 28, 2021 – Comments and Recommendations due and received;
- February 1, 2021 – Proponent responses received, included updated versions of each plan (Waste Management Plan Revision 13, Spill Contingency Plan Revision 11, and Engagement Plan Revision 10); and
- **February 11, 2021 – Revised plans presented for Board decision.**

3. Discussion

Project History

The Mon Gold site has been historically explored and mined since 1937. Authorizations associated with the site have included Water Licence N1L2-1598 issued by the NWT Water Board to Ger-Mac Contracting (Ger-Mac), on June 1, 1992; Permit MV2001F0095 for winter road access for site reclamation; Permit MV2013C0021 and Licence MV2014L2-0002 issued to New Discovery Mining Ltd. to conduct mineral exploration in the Mon Lake Mine area; Land Use Permit MV2015C0015 and Water Licence MV2015L2-0004 for milling facilities, a dry stack tailings facility, a landfarm, water use and deposit of waste, and other standard infrastructure including roads, an explosives storage area, accommodations, a sewage treatment plant, fuel storage, and use of equipment.

Current authorizations, MV2020C0003 and MV2020L2-0002 include advanced exploration, mining and milling, and all supporting activities and infrastructure for the Mon Gold Project.

To date, little work described under the permits and licences have been completed. Since 2014, New Discovery has carried out the following activities:

- Diamond drilling in 2016.
- Surface exploration in 2017.
- Surface exploration in 2018.

Description of Submissions

Waste Management Plan

Waste Management Plans are intended to ensure that waste management activities specific to each project are carried out in a way that is consistent with best practices and meet the Board's *Guidelines for Developing a Waste Management Plan* to minimize waste released from the Project. New Discovery Mines Ltd. included a Waste Management Plan with its renewal applications and a revised Waste Management Plan with their response to reviewer comments on October 5, 2020. The Board did not approve the Waste Management Plan noting that there were still outstanding items that required public review, including: details on water quality monitoring; waste management infrastructure (i.e., landfarm design, operation, maintenance and monitoring, details on sumps); testing, classification, and management of waste rock; and details on adaptive management and mitigation options. The Board directed that a revised Waste Management Plan be resubmitted to address the outstanding issues.

Spill Contingency Plan

Spill Contingency Plans are intended to ensure proponents/applicants are fully prepared to respond to spills and unauthorized discharges. The planning and reporting requirements outlined in the Indian and Northern Affairs Canada's *Guidelines for Spill Contingency Planning* ensure that the lines of authority and responsibility, action plan(s) for responses to spills and unauthorized discharges, and reliable reporting and communication procedures have been identified. This will ensure that any spills or unauthorized discharges are effectively controlled and cleaned up, with the goal of preventing or limiting damage to the receiving environment. New Discovery Mines Ltd. included a Spill Contingency Plan with its renewal applications. The Board did not approve the Spill Contingency Plan and directed it be resubmitted to

include clarification on the volumes and methods of fuel storage, site maps in accordance with the Guidelines, and corrected contact information, for review and approval.

Engagement Plan

The Board assesses engagement adequacy of applications through the Board's *Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits*, and the Board's *Engagement and Consultation Policy*. New Discovery Mines Ltd. included an Engagement Plan and Record with its renewal applications. The Board did not approve the Engagement Plan and directed it be resubmitted to reflect development-related triggers for proactively engaging impacted communities.

On January 4, 2021, New Discovery submitted its revised Waste Management Plan, Spill Contingency Plan, and Engagement Plan. In its cover letter, New Discovery indicated that it intends on constructing its winter access road this winter to haul in supplies for the spring/summer programs which include: installation of infrastructure (bioreactor, compressor, generator, and water lines), re-opening the north portal, commencement of mining and advancement of the 200 m portal, extraction of samples and bulk samples, and diamond drilling to further define mineralization.

4. Public Review

By January 28, 2021, comments and recommendations on the revised plans were received from four reviewers:

- Fisheries and Oceans Canada (DFO);
- Government of the Northwest Territories Department of Environment and Natural Resources – Environmental Assessment and Monitoring (GNWT-ENR);
- Board Staff; and
- Tłı̨chǫ Government

In response, New Discovery submitted revised versions of its Waste Management Plan, Spill Contingency Plan, and Engagement Plan.

DFO reminded New Discovery of to ensure end-of-pipe fish protection screens for water intake structures are installed, which New Discovery has committed to.

GNWT-ENR reminded New Discovery of the need to keep waste, particularly food and other domestic garbage stored in animal-proof containers to reduce animal attractants. New Discovery's response to GNWT-ENR's comments imply that standard practices are in line with the recommendations, however, the information provided by New Discovery in response does not fully align with the recommendations and is not reflected in the Kitchen and Dry Waste section of the Waste Management Plan.

<u>Unresolved Issues and Concerns with the Plans</u>

Board staff identified issues with the legibility of the plans, including inconsistencies and editorial issues and restated comments and recommendations provided during the renewal application phases that were not adequately addressed in the revised versions. These include:

- a map in the Spill Contingency plan depicting direction of water flow including catchment basins; storage locations of each hazardous material; probable spill locations and direction of flow on land and in water; locations of all response equipment; environmentally sensitive areas; any approved disposal sites; and any other important on or off-site features; and
- information on waste rock sampling, testing and classification and site-wide monitoring details in the Waste Management Plan.

Some issues identified by Board staff remain unresolved. The Waste Management Plan does not provide a fully defined scope of Project and relies heavily on documents not yet submitted for public review. If details on the management of waste (waste rock, contaminated soil, water, etc.) are found in more detail in pending plans, this should be made clear in the WMP's introduction. It is noted that associated management plans are listed but where other plans are being used to document the waste management practices in detail instead of the WMP, reviewers should be clearly directed to the appropriate plan. The duplication of information between plans will make keeping all the plans updated and consistent challenging for Board staff and reviewers.

The Tłı̨chǫ Government provided contact information for ongoing engagement, requested that Material Safety Data Sheets/Safety Data Sheets be updated, and requested that New Discovery confirm it has a licenced facility for the disposal of hazardous wastes. In response, New Discovery responded appropriately to these comments and recommendations. It is noted, however, that triggers identified in the revised Engagement Plan for ongoing engagement are listed in two places and include “Planning stages of Summer/Winter Programs, Renewal of Licensing and Permitting, Designing monitoring programs, Significant operational changes, decommissioning, monitoring, etc.” and “Commencement of Operations, Temporary or permanent closure/shutdown, Potential change of plans, new discovery, reportable event, spill, accident, archaeological discovery, and wildlife encounter.” Board staff note that recent engagement with Tłı̨chǫ (and other parties) up to January 2021 has been provided in the updated Engagement Log but the format of the log is out of order (chronologically). Board staff also note that there does not appear to have been any additional engagement with parties on the development of the revised management plans or other management plans that are being developed under Licence MV2020L2-0002 and Permit MV2020C0003. Engagement activities identified in the Engagement Plan should be adhered to.

5. Comments

Commencement of Winter Road Construction

With regard to operations planned for the 2021 winter season, New Discovery contacted Board staff on January 11, 2021 identifying concerns about being able to commence winter road construction without approved management plans. In response, Board staff recommended that New Discovery respond to reviewer comments and recommendations as quickly as possible so that the plans could be presented to the Board earlier than scheduled (February 11 instead of February 25, 2021).

Inspection Reports

On January 21, 2021, New Discovery provided its notifications to the Board and Inspectors prior to the commencement of activities. Security in the amount of $165,000 under the Licence and $138,327.96 under the Permit for the project were acknowledged by GNWT between January 26 and January 29, 2021. On January 28, 2021, Board staff received an Inspection Report from Resource Management Inspector, Clint Ambrose stating that "the winter road is in the early stages of construction and equipment was actively constructing the first portage at the north end of Prosperous Lake." No concerns were identified.

In response to Board staff questions about the initiation of work without approved management plans, the Inspector stated that the winter road was being constructed under the authority of New Discovery's Permit MV2020C0003, and that conditions of the Permit would mitigate any potential environmental concerns. New Discovery stated that it was using water under Licence triggers of 99m^3/day. New Discovery's Licence MV2020L2-0002 includes the use of water for winter road construction from Sito Lake, Prosperous Lake, Bluefish Lake, and Quyta Lake to a maximum rate of 100m^3/day. In response to New Discovery, Water Resource Officers informed New Discovery that use of these waterbodies would trigger the Licence. Only in the Licence does it explicitly say that the "Licensee shall not commence Project activities prior to Board approval of the Plan[s]." New Discovery stated it would cease using water from those sources for winter road construction.

6. Conclusion

Board staff conclude that further information was provided by New Discovery in their responses to reviewer comments. Board staff suggest that the plans are functional however, the format, presentation, and content of the plans, particularly the Waste Management Plan and Spill Contingency Plan, does not fully meet the Board's guidelines nor do they fully align with the work that is authorized at the Mon Gold Property.

New Discovery are currently revising several management plans required by Licence MV2020L2-0002 for submission to the Board. These include a Water and Groundwater Management and Monitoring Plan, an Explosives Management Plan, a Waste Rock and Geochemical Characterization Plan, a Petroleum-Hydrocarbon Contaminated Soil Treatment Facility Plan, and an Interim Closure and Reclamation Plan. Board staff suggest that the outstanding details for site-wide monitoring will be required in these upcoming plans for further activities to occur at the Mon Gold Project. Board approval of these plans are required prior to the initiation activities related to those plans.

7. Recommendation

Board staff recommend the Board:

a) **Make a motion to approve the Waste Management Plan, Version 13 as required by Land Use Permit MV2020C0003 and Water Licence MV2020L2-0002 as an interim submission.** New Discovery Mines Ltd. is required to submit a revised submission in accordance with comments made during this review by March 31, 2021, for confirmation of conformity by Board staff.

b) **Make a motion to approve the Spill Contingency Plan, Version 10 as required by Land Use Permit MV2020C0003 and Water Licence MV2020L2-0002 as an interim submission.** New Discovery Mines

Ltd. is required to submit a revised submission in accordance with comments made during this review by March 31, 2021, for confirmation of conformity by Board staff.

c) **Make a motion to approve the Engagement Plan, Version 9** as required by Land Use Permit MV2020C0003 and Water Licence MV2020L2-0002.

A draft decision letter is attached.

8. Attachments

- Waste Management Plan
- Spill Contingency Plan
- Engagement Plan
- Review Summary and Attachments
- Draft Decision Letter

Respectfully submitted,

Shannon Allerston
Regulatory Specialist

Review Comment Table

Board:	MVLWB
Review Item:	Mon Gold Project - Revised Engagement, Spill and Waste Management Plans (MV2020L2-0002 MV2020C0003)
File(s):	MV2020C0003 MV2020L2-0002
Proponent:	New Discovery Mines
Document(s):	Cover Letter - Revised Plan Submissions (119 KB) Engagement Plan - Revision 9 (425 KB) Spill Contingency Plan - Revision 10 (1090 KB) Spill Contingency Plan Appendix B-1 - MSDS Sheets (4894 KB) Waste Management Plan - Revision 12 (757 KB)
Item For Review Distributed On:	Jan 5 at 14:37 Distribution List
Reviewer Comments Due By:	Jan 28, 2021
Proponent Responses Due By:	Feb 11, 2021
Item Description:	New Discovery Mines Ltd. (the Applicant) submitted Revision 9 of its Engagement Plan, Revision 10 of its Spill Contingency Plan, and Revision 12 of its Waste Management Plan on January 4 and 5, 2021. These Plans are required by Licence MV2020L2-0002, Parts B, condition 21, Part G, condition 3, and Part F, condition 4 and Permit MV2020C0003 condition 86. 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 decision. If reviewers seek clarification on the submission, they are encouraged to correspond directly with the Applicant 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.
Contact Information:	Jen Potten 867-766-7468 Shannon Allerston 867-766-7465

Comment Summary

New Discovery Mines (Proponent)				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Analysis**
1	General File	**Comment** (doc) Modified as per comments. **Recommendation**		
2	General File	**Comment** (doc) Modified as per comments **Recommendation**		
3	General File	**Comment** (doc) Modified as per comments **Recommendation**		
4	General File	**Comment** (doc) Updated MSDS as per comments. **Recommendation**		
5	General File	**Comment** (doc) Updated Maps **Recommendation**		
6	General File	**Comment** (doc) Replacing SCP to attach map as opposed to keeping separate **Recommendation**		
7	General File	**Comment** (doc) Replacing WMP with MSDS and Maps attached **Recommendation**		
Fisheries and Oceans Canada: Sally Wong				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Analysis**
1	n/a	**Comment** DFO noticed that there was no submission of a Water Management Plan. DFO would like to remind New Discovery Mines Ltd. that end-of-pipe fish protection screens are required for water intakes. **Recommendation** n/a	**Feb 1:** Yes, appropriate end-of-pipe fish protection screens will be used, and this will be specified in the Water Management Plan.	**Feb 1:** Acknowledged.
GNWT - ENR - EAM (Environmental Assessment and Monitoring): Central Email GNWT				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Analysis**
1	General File	**Comment** (doc) General File - ENR cover letter with comments **Recommendation**		

2	Wildlife Attractants and Waste Management	**Comment** The Waste Management Plan states that kitchen and dry waste will be stored in a secure location (Page 31 Other Waste - Kitchen and Dry Waste). However, the Waste Management Plan should specifically require that all food and garbage that may attract wildlife should be stored in animal-proof containers, which are cleaned regularly. 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. **Recommendation** The Proponent should utilize food and garbage handling and storage procedures that will minimize the attraction of wildlife.	**Feb 1:** All kitchen waste not processed as grey water in the bioreactor will be bagged, stored in the camp freezer and flown to Yellowknife every 7 to 10 days. See page 32	**Feb 1:** Information on the management of kitchen wastes are found on page 33 (not 32). The information recommended by GNWT and the information provided by NDM in response does not fully align and is not reflected in the Kitchen and Dry Waste section of the Waste Management Plan. Update Waste Management Plan to reflect commitments in accordance with GNWT recommendations.
3	None	**Comment** None **Recommendation** The Proponent should store all food, waste, washed recyclables and debris that may attract wildlife within sealed animal proof containers until final disposal.	**Feb 1:** All food and food preparation and storage areas are kept clean, and all waste and waste disposal areas are kept clean	**Feb 1:** The information recommended by GNWT and the information provided by NDM in response does not fully align and is not reflected in the Kitchen and Dry Waste section of the Waste Management Plan. Update Waste Management Plan to reflect commitments in accordance with GNWT recommendations.
4	None	**Comment** None **Recommendation** The Proponent should ensure that sealed animal proof containers are cleaned once emptied to	**Feb 1:** The camp will be kept clean to avoid all animal attractants, dishes, tables, counters, stove,	**Feb 1:** The information recommended by GNWT and the information provided

		minimize the attraction of wildlife.	refrigerators and freezers are kept clean.	by NDM in response does not fully align and is not reflected in the Kitchen and Dry Waste section of the Waste Management Plan. Update Waste Management Plan to reflect commitments in accordance with GNWT recommendations.
MVLWB: Shannon Allerston				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Analysis**
1	Spill Contingency Plan - Conformity Table	**Comment** The Conformity Table does not accurately represent MVLWB Comment 15: Recommendation: There is no map provided in the Spill Contingency Plan. Maps provided throughout several different submissions (the Questionnaire, the Infrastructure Plan map) together contain most of the information required by the Spill Contingency Plan, but the Spill Contingency Plan should stand alone and contain all the information required by the Guidelines. **Recommendation** Figure 2 could address this comment, but the Figure Title should be expanded to indicate that it provides more information than waste storage locations (buildings, roads, culverts, airstrips and other infrastructure; all surface water bodies and direction of water flow including catchment basins; storage locations of each hazardous material; probable spill locations and direction of flow on land and in water; locations of all response	**Feb 1:** Map has redone as C-size MapSCPv1.pdf and included as a separate document	**Feb 1:** Previous comments and recommendations have not been addressed by the submission of another additional map. As mentioned in the recommendation, the SCP should stand alone and contain all the information required by the Guidelines. The additional map provides no additional context to the plan. The map currently included in the SCP (Figure 2) may suffice to meet the guidelines, however, additional information is required. Update Spill Contingency Plan to include references to Figure 2 and update the Figure's Title to better identify all the

		equipment; environmentally sensitive areas; any approved disposal sites; topography e.g. slope of land; any other important on or off-site features).		information that can be gathered from this figure, as requires by the INAC Guidelines. The body of the SCP should provide context for the figure and its legend so that the information required by the Guidelines can be clearly understood. This includes the need to represent all of the following site information: buildings, roads, culverts, airstrips and other infrastructure; all surface water bodies and direction of water flow including catchment basins; storage locations of each hazardous material; probable spill locations and direction of flow on land and in water; locations of all response equipment; environmentally sensitive areas; any approved disposal sites; topography e.g. slope of land; any other important on or off-site features.
2	Waste Management Plan - Table of Contents	**Comment** There are many Errors in the Table of Contents. **Recommendation** This should be addressed.	**Feb 1:** Table of contents updated. Automatic links confirmed.	**Feb 1:** Errors appear to have been addressed.
3	Waste Management Plan - Conformity Table	**Comment** The Conformity Table does not accurately represent ENR-EAM Comment 2: ENR notes that overall, this application lacks sufficient information to properly assess the	**Feb 1:** Geochemistry for rocks, tailings and water has been expanded (pages 19-26)+G6. Details on specifics are in Waste Rock Management and	**Feb 1:** The Waste Management Plan relies heavily on documents not yet reviewed.

		environmental risks. Minimal geochemistry data for rock, tailings, and water has been provided, minimal monitoring has been described, and the designs for facilities such as the landfarm and dry stack tailings facility are incomplete. **Recommendation** The response does not address (geo)chemistry data for rock, tailings, or water, and does not address monitoring. These topics should be addressed, including where in the Plan information has been added to address the GNWT comment and recommendation.	Geochemical Characterization Plan. Monitoring of the Landfarm and DST are in separate documents.	Update the Waste Management Plan to reduce the duplication of information provided in management and monitoring plans that are currently under development. If details on the management of waste rock, contaminated soil, water, etc. are found in more detail in pending plans, this should be made clear in the WMP's introduction. It is noted that associated management plans are listed but when other plans are being used to document the waste management practices in detail instead of the WMP, reviewers should be clearly directed to the appropriate plan. Update the Waste Management Plan so that the Introduction section is updated and accurately reflective the content of this revision.
4	Waste Management Plan - Conformity Table	**Comment** Conformity Table; in response to GNWT-EAM comment 16, it states that details are expanded here but the location of changes in the document have not been identified. **Recommendation** The location of all edits should be identified to facilitate reviews.	**Feb 1:** Changes have page numbers or subtitles cross referenced.	**Feb 1:** Page numbers have been provided. ENR recommended that New Discovery conduct additional geochemical sampling and analysis on waste rock, gravity tailings, and flotation tailings in order to better characterize the

				ARD/ML potential of these materials. This WMP acknowledges plans to sample, test, and segregate waste rock based on results. There is no mention in the section referred to on additional analysis of gravity tailings or flotation tailings. Update the Waste Management Plan so that this section refers to the Waste Rock and Geochemical Characterization Plan. This plan is where reviewers should be able to find the details of how rocks and tailings will be sampled, analyzed, interpreted and categorized, managed and monitored for the life of the Project.
5	Waste Management Plan - Cross-Referencing	**Comment** In response to GNWT-EAM comment 12, it states that a separate Hydrocarbon Contaminated Soil Treatment Facility Plan is provided. This document has not been submitted. Above, in response to GNWT-EAM Comment 2, it refers to a Landfarm Management Plan. For MVLWB comment 18, it refers to Landfarm Operations and Management Plan. Are these referencing the same document? If so, the name should be verified and made consistent. **Recommendation** References to all supporting documents being developed to support the Waste Management Plan should be provided in the body of the WMP, maybe in a table early in	**Feb 1:** References to all supporting documents being developed to support the Waste Management Plan are listed in Associated Management Plans Pg. 12. The Waste Rock Management and Geochemical Characterization and Monitoring Plan, Water and Groundwater Management and Monitoring Program, Hydrocarbon-Contaminated Soil Treatment Facility Plan, and Explosives Management Plan have been submitted for review. Structure	**Feb 1:** This does not address the comment and recommendation. There are inconsistencies in the naming and referencing of supporting documents that need to be clarified. For clarity and consistency, all plans submitted to the Board and all references to those plans should match the requirements of the Licence and Permit.

		the document, and again in each relevant section. These should include: relevant Structure Description/Design and Construction Plans, Waste Rock Management and Geochemical Characterization and Monitoring Plan, Water and Groundwater Management and Monitoring Program, Tailings Management Plan, Hydrocarbon-Contaminated Soil Treatment Facility Plan, and Explosives Management Plan. NDM should be careful to ensure all external document references match the requirements of the Licence and are consistent throughout.	Description/Design and Construction Plans, Tailings Management Plan are being prepared and will be submitted.	
Tlicho Government: LONGINUS EKWE				
ID	**Topic**	**Reviewer Comment/Recommendation**	**Proponent Response**	**Board Analysis**
1	Community Engagement Plan	**Comment** From the description of NDM project location, part of Mon Gold mine project is located in Monfwi Gogha de Netiilee. According to NDM's engagement plan, contacts has been made with YKDFN, NSMA and City of Yellowknife. Nothing in the engagement document mentions engagement with the Tlicho Government. **Recommendation** Should you have any questions regarding Tlicho engagement on regulatory matters, please contact Ms. Violet Camsell-Blondin at Phone: (867) 392 6381 ext. 1336, Cell: (867) 444 0006 Email: violetcamsellblondin@tlicho.com	**Feb 1:** Appendix A, Consultation Log is updated to show nineteen separate discussions with Tlicho and Kwe Beh working group Starting in September 2013	**Feb 1:** Acknowledged. Note that recent engagement with Tlicho up to January 2021 has been provided but this takes the format of the engagement log out of order (chronologically). Also note that there does not appear to have been any additional engagement with parties on the development of the revised management plans or management plan that are being submitted as required by the licence and permit. Updates to the Engagement plan required for this revision was to identify triggers for future and ongoing

				engagement. These triggers included the design of monitoring programs, which the plans being drafted are supposed to include. Upon approval of the Engagement Plan, engagement activities identified therein should be adhered to. New Discovery should ensure adequate engagement is carried out in the development of the Management and Monitoring Plans currently under development.
2	Spill Contingency Plan	**Comment** Since 2015, most manufacturers have revised their MSDS to reflect the new SDS as can be seen in Cytec and Chevron/Texaco documents. Could you verify if your other suppliers have made any revisions to their documents so that you can update your contingency records and as well update the users (employees) of changes if any. **Recommendation** N/A	**Feb 1:** Reviewed. MSDS sheets have been updated and will be resubmitted.	**Feb 1:** Acknowledged.
3	Spill Contingency Plan/waste management	**Comment** On page 10 of the spill contingency plan, NDM stated, "that waste oil is stored in empty 200L drums in either of the fuel storage areas, and shipped out by plane or truck for off-site disposal at an appropriate waste facility". **Recommendation** Could this statement be rephrased to reflect the willingness to accept or to have accepted taking the waste from NDM, as opposed to	**Feb 1:** Rephrased, adding KBL contact information. Pg. 11.	**Feb 1:** Acknowledged.

		just using the word “appropriate” which doesn’t indicate that this facility has agreed to accept NDM waste or has been accepting NDM waste as an off-site waste facility.		

January 28, 2021

Jen Potten
Regulatory Coordinator
Mackenzie Valley Land and Water Board
7th Floor – 4910 50th Avenue
P.O. Box 2130
Yellowknife, NT
X1A 2P6

Dear Ms. Potten,

Re: New Discovery Mines Ltd.
Water Licence Application - MV2020L2-0002
Land Use Permit – MV2020C0003
Revised Spill Contingency Plan, Waste Management Plan and Engagement Plan
Request for Comment

The Department of Environment and Natural Resources (ENR), Government of the Northwest Territories has reviewed the plans at reference based on its mandated responsibilities under the *Species at Risk (NWT) Act* and the *Wildlife Act* and provides the following comments and recommendations for the consideration of the Board.

Topic 1: Wildlife Attractants and Waste Management

Comment(s):

The Waste Management Plan states that kitchen and dry waste will be stored in a secure location (Page 31 Other Waste – Kitchen and Dry Waste). However, the Waste Management Plan should specifically require that all food and garbage that may attract wildlife should be stored in animal-proof containers, which are cleaned regularly. 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.

Recommendation(s):

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.

Comments and recommendations were provided by ENR technical experts in the the Wildlife and Fish Division 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

Spill Contingency Plan

Mon Property

For:

New Discovery Mines Ltd.
1909 108 W. Cordova St.,
Vancouver, B.C.
V6B 0G5

Effective:

January, 2021

Revision 1, April 2014

- *Minor formatting to better conform to Guidelines for Spill Contingency Planning, April 2007.*
- *Incorporate facility description and map defining roads, water bodies, and hazardous materials storage locations.*
- *Add design and construction of fuel storage and hazardous materials storage area.*
- *Remedial response incorporated for all chemical types on site.*
- *Add drill additives to plan*

Revision 2, May 2015

- *Modify to incorporate milling of ores and deposition of tailings.*

Revision 3, August 2016

- *Update, minor changes as per letter from MVLWB date July 3, 2014*
- *Gylcol lubricants, ammonium nitrate handling updated*

Revision 4, September 2016

- *Location of camp rectified*
- *Emergency Contact numbers updated*
- *Emergency 24/7 contact information updated*
- *Separate map attached, larger format*
- *Further details on boom use and placement*
- *Storage options for spills expanded*
- *Training of first responders expanded*
- *Details of SCP clarified*

Revision 5, October 2016

- *Figure 2 index map that referred to map in appendix removed. Only Large scale map in Appendix 1 remains*
- *SCP expanded and made more specific to the Mon Gold Project*
- *Expanded discussion, see 5 -Worst case scenarios*
- *Updated to describe training in section 5) Training Program*
- *SCP reviewed and confirmed as specific to New Discovery Mines Ltd.'s Mon Gold Project, north of Yellowknife, NWT. References of "water bodies" changed or expanded to reference "Discovery Lake" where appropriate.*

Revision 6, December 2018

- *120,000 litre double-wall envirotank replacing 20,000 litre mobile tanks Worse-case scenario amended to accommodate increased diesel on site.*

Revision 7, January 2019

- *Phone number and reference to AANDC revised as per Reviewer recommendation.*
- *Update Reportable quantities table.*

Revision 8, January 2020

- *Consideration for drums instead of 120,000 litre tank.*

Revision 9, October 2020

- *Phone numbers corrected.*

Revision 10, January 2021

- *Conformity Table added.*
- *Cross references amended*
- *MapSCPv1.pdf created as a separate C-size map*

Conformity Table for this Revision

All comments from reviewers have been received and are shown below with actions taken to accommodate them.

Request	Page	Responds to
GNWT ENR-EAM		
14	Stipulate up to 20 200 litre drums (Page 10), AND double wall envirotank. Page 10.	**Oct 6:** Final Plans for the storage of diesel should be provided in a revised Waste Management Plan, once known.
15	Cross references updated. New c-size map presented as MapSCPv1.pdf	**Oct 6:** Board staff note that the Infrastructure Map has been inserted into the revised version of the Spill Contingency Plan uploaded to the ORS. It is labelled Figure 1. There is already a Figure 1 on the preceding page. This entire document and the internal cross references to figures, tables and appendices needs to be addressed. Board staff suggest that the Spill Contingency Plan be revised for public review and Board approval.
GNWT Lands		
9	Phone number has been corrected. Pg. 19.	**Oct 5:** Board staff note that the revised Spill Contingency Plan, uploaded to the ORS by the Applicant, has updated the Inspector's contact information
MVLWB		
15	Cross references updated reference MapSCPv1.pdf	**Oct 6:** Board staff note that the Infrastructure Map has been inserted into the revised version of the Spill Contingency Plan uploaded to the ORS. It is labelled Figure 1. There is already a Figure 1 on the preceding page. This entire document and the internal cross references to figures, tables and appendices needs to be addressed. Board staff suggest that the Spill Contingency Plan be revised for public review and Board approval.

MVLWB		
1	Map redone as C-size MapSCPv1.pdf	The Conformity Table does not accurately represent MVLWB Comment 15: Recommendation: There is no map provided in the Spill Contingency Plan. Maps provided throughout several different submissions (the Questionnaire, the Infrastructure Plan map) together contain most of the information required by the Spill Contingency Plan, but the Spill Contingency Plan should

		stand alone and contain all the information required by the Guidelines.
Tlicho Government		
2	Reviewed. MSDS sheets are updated	Since 2015, most manufacturers have revised their MSDS to reflect the new SDS as can be seen in Cytec and Chevron/Texaco documents. Could you verify if your other suppliers have made any revisions to their documents so that you can update your contingency records and as well update the users (employees) of changes if any.
3	Rephrased, adding KBL contact information. Pg. 11.	On page 10 of the spill contingency plan, NDM stated, "that waste oil is stored in empty 200L drums in either of the fuel storage areas, and shipped out by plane or truck for off-site disposal at an appropriate waste facility". Recommendation: Could this statement be rephrased to reflect the willingness to accept or to have accepted taking the waste from NDM, as opposed to just using the word "appropriate" which doesn't indicate that this facility has agreed to accept NDM waste or has been accepting NDM waste as an off-site waste facility.

Contents

1) Introduction and Project Details

New Discovery Mines Ltd. has prepared this spill contingency plan for drilling, exploration, processing, and deposition of solid tailing activities being undertaken at their camp on the northwest shore of Discovery Lake, Northwest Territories. The plan demonstrates that New Discovery Mines Ltd. has appropriate response capabilities and measures in place to effectively address potential spills at its Discovery Lake site.

i) Company name, location and mailing address

New Discovery Mines Ltd.,
Northwest shore of Discovery Lake, Northwest Territories
62° 53’ 52” North latitude, 114° 19’ 32” West longitude

Mailing address:
1909 108 W. Cordova St.,
Vancouver, B.C.,
V6B 0G5
Attention: Dr. D.R. Webb, President

ii) Effective date of spill contingency plan:

January 2021

iii) Last revisions to spill contingency plan:

January 2021

iv) Distribution list:

The plan and the most recent revisions have been distributed to:

Company personnel, MVLWB

v) Purpose and scope:

The purpose of this plan is to outline response actions for potential spills of any size, including a worst-case scenario for New Discovery Mines Ltd. site at Discovery Lake. The plan identifies key response personnel and their roles and responsibilities in the event of a spill, as well as the equipment and other resources available to respond to a spill. It details spill response procedures that will minimize potential health and safety hazards, environmental damage, and clean-up efforts. The plan has been prepared to ensure quick access to all the information required in responding to a spill.

vi) Company environmental policy

New Discovery Mines Ltd. is committed to the concept of sustainable development and the protection of the environment and human health. New Discovery Mines Ltd.'s environmental, health and safety policy is to:

- protecting employees, the public and the environment

- fully comply with all applicable legislation, regulations, and authorizations
- work proactively with federal, territorial and Aboriginal governments, other relevant organizations, and the general public, on all aspects of environmental protection
- anticipate future spill control requirements and make provision for them
- keep employees, contractors, Inspectors, Land and Water Boards, appropriate governments (Aboriginal, federal and territorial), and the public informed of any changes at the site or with project activities.

The plan is presented to all staff during their on-site orientation sessions. All employees and contractors are aware of the locations of the plan on the site at Discovery Lake and in the head office in Vancouver. During the orientation meeting, training sessions are scheduled to ensure employees have an understanding of the steps to be undertaken in the event of a spill. All employees and contractors are shown where spill kits are stored, are aware of their contents and are trained in using spill equipment and responding to spills. The company is committed to keeping personnel up to date on the latest technologies and spill response methods.

vii) Project description:

The Discovery Lake location of New Discovery Mines Ltd. is used as a camp and staging area for local test drilling as well as exploration activities in the surrounding region. Permits and licenses have been received for the company's bulk sample, drilling and exploration activities. The camp will operate year-round, except freeze-up and break-up, at varying levels of capacity. Permits to add a mill capable of processing 100 tonnes per day and all related infrastructure including storage of tailings in a dry stack have been received (MV2020L2-0002 and MV2020C0003).

viii) Site description:

The camp will be located 45 kilometres north of Yellowknife on the northwest shore of Discovery Lake, at 62° 53’ 52” North latitude, 114° 19’ 32” West longitude. It is a remote area, with no adjacent communities or inhabitants. Thus the only people immediately affected by a potential spill are employees or contractors.

The site is located 3 kilometres west of the Secondary Winter Road to the Diamond Mines and GoldMining Inc’s Yellowknife Gold Project. It is located 4 km southwest of GoldMining Inc.’s Clan Lake Property. Figure 1 illustrates New Discovery Mines Ltd. site on a 1:50,000 scale.

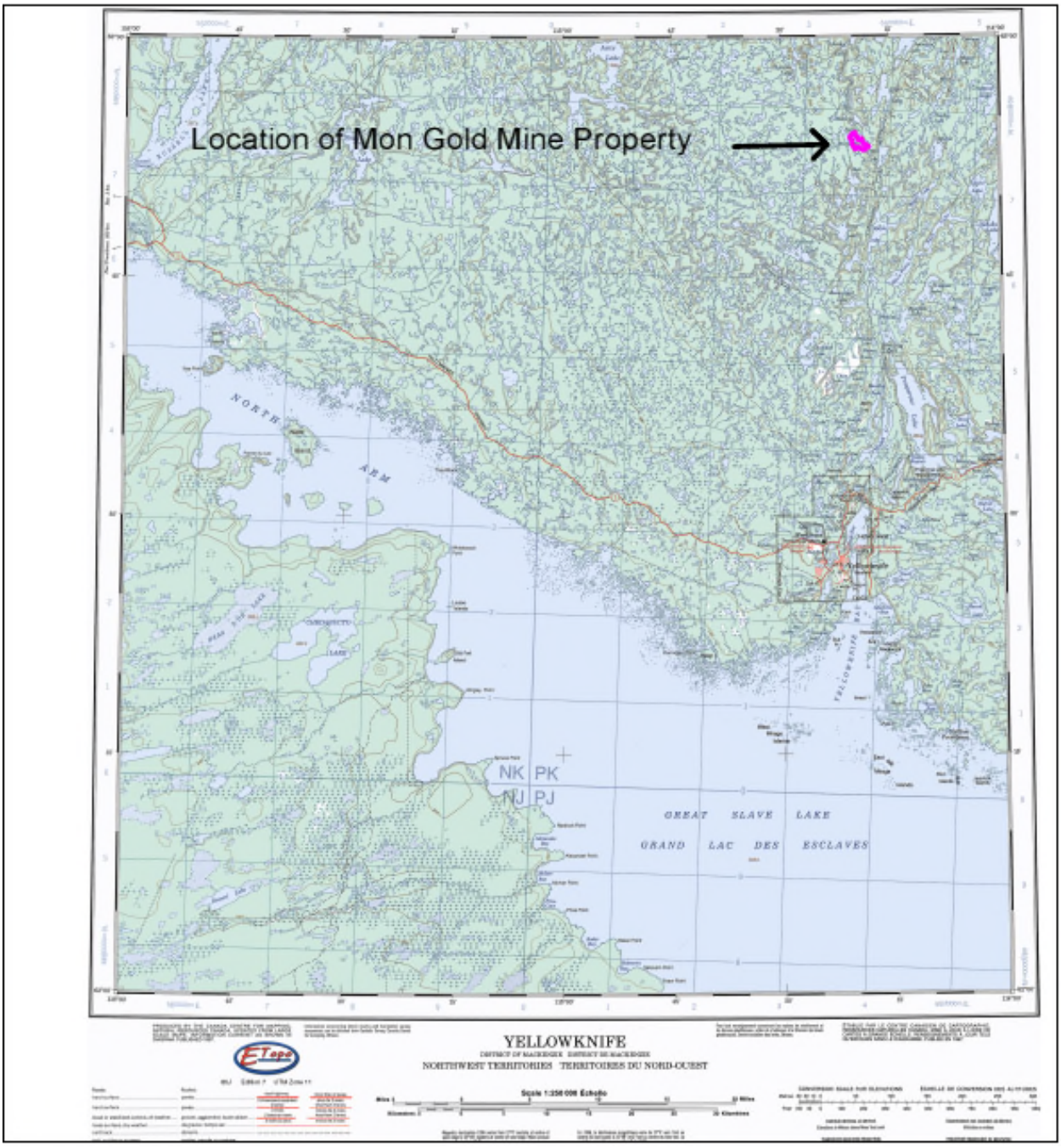


Figure 1. Location map

A map of the site including the location of fuel storage areas, offices, kitchen, sleeping shelters, generators, helicopter landing pad, drilling site and surrounding water bodies and direction of flow is presented in a separate figure MapInfrastructureA.pdf. All buildings and fuel storage areas are at least 100 meters from the nearest water body. All supplies arrive on-site via air (fix or rotary wing aircraft). The lake is used for landing float planes in the summer and planes on skis in the winter on the north shore of the lake.

ix) List of hazardous materials on-site

There are two fuel storage areas on site. The fuel storage area near the mine site is for storing diesel, oils, and gasoline. The second fuel storage area near the camp site contains only diesel and propane. Jet A or Jet B is kept near the ore-storage facility.

The mill building and storage container will contain reagents used in the processing of ores.

Table 1 presents a list of hazardous materials on-site, the type of storage container, the average and maximum quantities stored and their storage location.

Table 1: List of hazardous materials stored on-site, type of storage container, the normal and maximum storage quantities, and storage locations

Material	Storage Container	Normally On-site	Maximum On-site	Storage Location (see Figure 1) and Uses
Diesel Fuel	200 L drums	2,000 L (10 drums)	4,000 L (20 drums)	Two fuel storage areas. Used to heat communal buildings by oil stoves and used for mine equipment.
Diesel Fuel	120,000 L double wall tank	<75,000 L	75,000 L	Skid-mounted double-wall envirotank.
Jet A, B Fuel	200 L drums	400 L (2 drums)	2,000 L (10 drums)	Fuel storage area near mine site. Used to power helicopters and twin otter aircraft.
Gasoline	200 L drums	600 L (3 drums)	2,000 L (10 drums)	Two fuel storage areas. Used for quads, boats, chainsaws, PU trucks.
Propane	45kg cylinders	135 kg (3 cylinders)	450 kg (10 cylinders)	Fuel storage area near camp. Used for kitchen stove and fridge.
Glycol	4 litre jugs	12 litres	25 litres	At drill site, in shops
Lubricating Oil	200 L drums	400 L (2 drums)	600 L (3 drums)	Lubrication of air tools
Flotation Extender (A208)	200 L drums	200 L (1 drum)	400 L (2 drums)	Flotation reagent
Flotation Frother (MIBC)	200 L drums	200 L (1 drum)	400 L (2 drums)	Flotation reagent
Flotation Collector (PAX)	50 kg bags	500 kg	500 kg	Flotation reagent
Copper Sulphate	50 kg bags	500 kg	500 kg	Flotation reagent

Waste oil is stored in empty 200 L drums in either of the fuel storage areas, and shipped out by plane or truck for off-site disposal at an appropriate waste facility. As of January 2021, KBL Environmental has been contacted and reports:

a. They will receive our waste oil.,
b. They can provide required diesel spill kits,
c. They can provide emergency on site assistance for diesel spills,
d. They may be able to process contaminated soils and
e. They can handle Class 2 soils.

Other hazardous materials found on-site in very small quantities are in a storage building and/or the kitchen. These include lubricants/oil/grease for maintenance of motorized equipment and general cleaning products for kitchen/bathroom/office use.

Motorized equipment on site includes one all-terrain vehicles, snowmobile, two scoop trams, drill jumbo, loader, end-dump trucks, small bulldozer, diamond drill, two pick-up trucks, a boat and three fuel transfer hoses with pumps.

All buildings containing hazardous materials are over 100 m from any water body. Material Safety Data Sheets for each hazardous material are included in Appendix B-1.

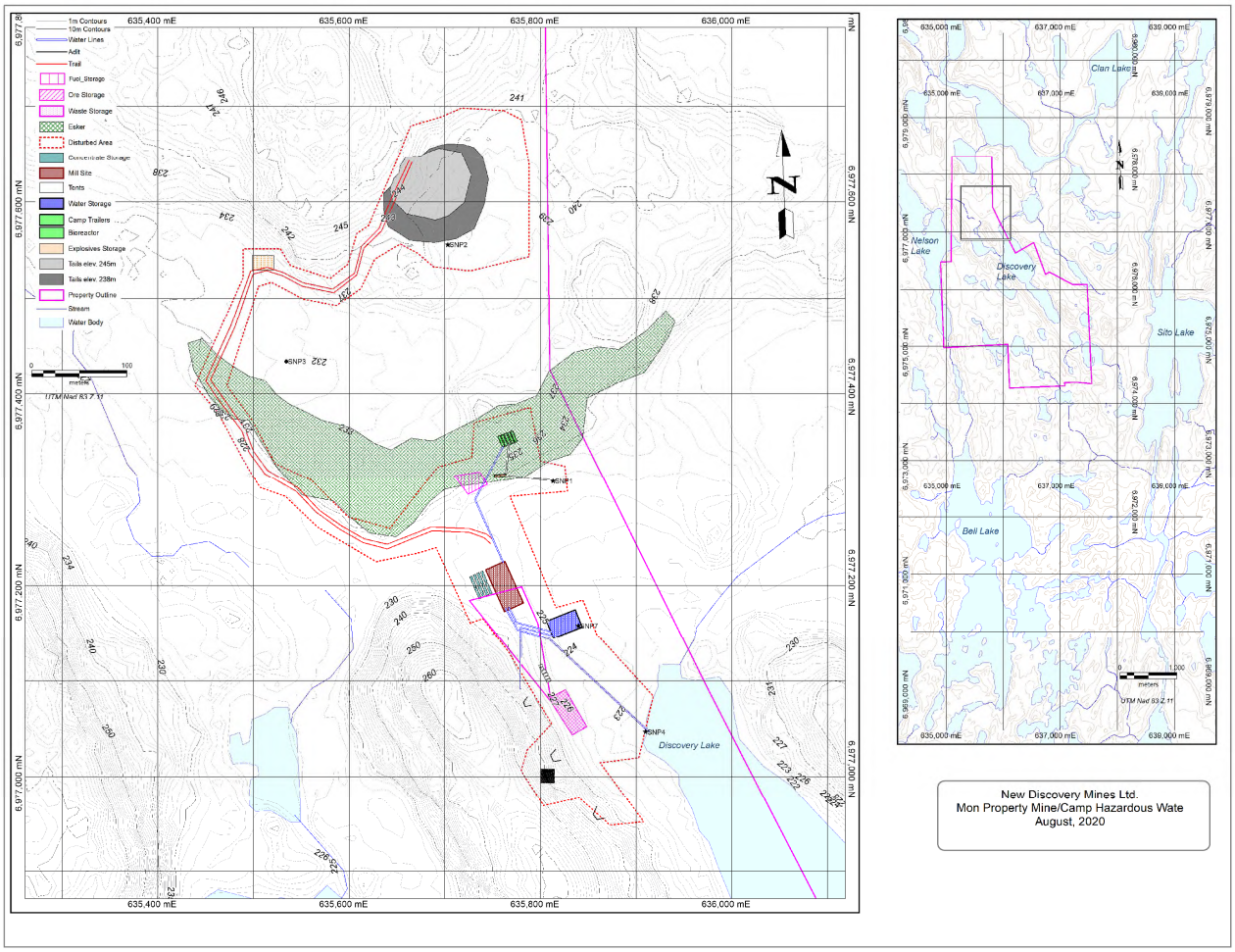


Figure 2. Location of Hazardous Waste Materials

x) Existing preventative measures:

Planning for an emergency situation is imperative, due to the nature of the materials stored on site as well as the remoteness of the site. Along with the preventative measures outlined below, adequate training of staff and contractors is paramount.

All hazardous materials arrive by air or by truck along a winter road as needed throughout the year. They are unloaded by truck, airplane and helicopter pilots and New Discovery Mines Ltd. staff and carefully placed in the fuel storage areas. Protective clothing, steel toe boots, and gloves are worn while unloading the fuel drums.

The storage areas for diesel fuel, Jet B fuel, gasoline and propane are on a prepared rock pad. In addition, the fuel drums used for the oil stoves heating common areas are in secondary containers that are leak proof and are placed on a drip tray.

Spill kits are located wherever fuel is stored or used (see Figure 2, Appendix). See Section 4.i. for details on spill kit contents. Portable drip trays and appropriately sized fuel transfer hoses with pumps are used when refueling aircraft, ATVs, or other motorized equipment, to avoid any leaks/drips onto the land.

The camp manager or designated fuel monitor conducts daily visual inspections to check for leaks or damage to the fuel storage containers, as well as for stained or discoloured soils around the fuel storage areas and adjacent motorized equipment. For example, lids/caps are checked for tight seals. A checklist is used to ensure no areas have been missed and results of the inspections are recorded in New Discovery Mines Ltd.'s database. Regular maintenance and oil checks of all motorized equipment are also undertaken to avoid preventable leaks.

Gray water is piped to the bioreactor or a transfer sump and then pumped at least 100 m from the kitchen, office and sleeping quarters. The sump *and pipe are* inspected regularly for leaks or overflow.

xi) Additional copies:

Several copies of the plan are kept on-site at all times at the two fuel storage areas, in the office and in the kitchen building. A copy is also held at the company's main office/headquarters in Vancouver, B.C. and with the Land and Water Board. Additional copies of the plan can be obtained by contacting New Discovery Mines Ltd. directly at the phone number, fax or email presented in section 1i).

xii) Process for staff response to media and public inquiries:

New Discovery Mines Ltd. has established procedures for dealing with media and public inquiries. All inquiries are to be directed to the president at the headquarters office in Vancouver (604 818-1400). If the president is not available, there will be another staff member available to act in this position (604 574-7536). No reporter or member of the public is allowed on site without approvals (MIS- regulations).

The camp manager should always keep the president informed of any news or updates of potential interest to the media or general public, such that the company is prepared to deal with inquiries any time.

If a spill has occurred and a NWT Spill Report needs to be filled out (see Appendix B-2). This information is available for the public to view upon request by contacting the NWT Spill Line or by viewing the GNWT Hazardous Materials Spills Database online

2) Response Organization

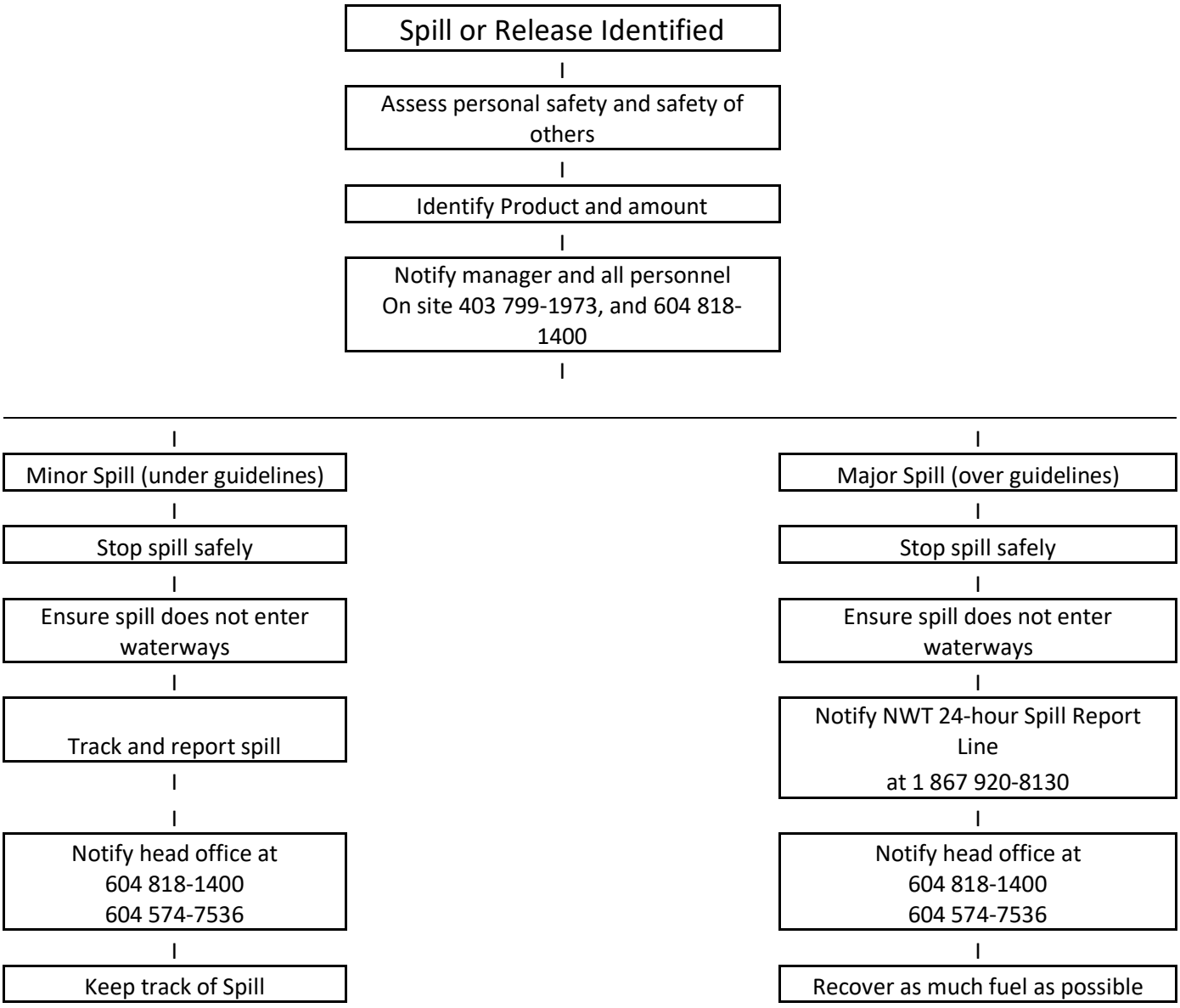
The flow chart depicted in Figure 3 identifies New Discovery Mines Ltd.'s response organization and when applicable their alternates, as well as the chain of command for responding to a spill or release. The duties of various response personnel are summarized, contact information is provided including 24-hour phone numbers for responsible people and the location of communications equipment on site is discussed.

An immediately reportable spill is defined as a release of a substance that is likely to be an imminent environmental or human health hazard or meets or exceeds the volumes outlined in Appendix B-3. It must be reported to the NWT 24-Hour Spill Report Line at 867-920-8130. Any spills less than these quantities do not need to be reported immediately to the spill reporting line. Rather, these minor spills will be tracked and documented by the company and submitted to the appropriate authority either immediately upon request or at a pre-determined reporting interval. If there is any doubt that the quantity spilled exceeds reportable levels, the spill will be reported to the NWT 24-Hour Spill Report Line.

In addition to cellular phones, emergency satellite phones are located in the office. In the event of a spill involving danger to human life these phones will be used to contact emergency response personnel in Yellowknife. In addition, all employees and contractors carry two-way radios for communication with the camp manager and other staff on site.

Following reporting of the spill to the camp manager, he/she will report spills to the NWT 24-Hour Spill Line as necessary. The camp manager will also inform the head office for tracking spills in company databases and notify the head office in the event of media inquiries. The 24-hour emergency head office number is 604 818-1400.

Figure 3: Flow chart of response organization (details of each step will be provided in the procedures for initial actions under Section 3 Action Plan)



3) Action Plan

i) Potential spill sizes and sources for each hazardous material on site

In Table 2, a list of potential discharge events, with associated discharge volumes and directions is presented for the primary hazardous materials stored on site. The most likely discharge volume is indicated and the spill clean-up procedures will focus on spills of this quantity. A worst-case

scenario is also presented. Specific discharge rates are not indicated for each fuel type as these would vary from a few minutes to several hours, based on the source of leak or puncture.

Table 2: List of hazardous materials, potential discharge events, potential discharge volumes (worst case scenario in brackets) and direction of potential discharge

Material (sources)	Potential Discharge Event	Discharge Volume (worst case)	Direction of Potential Discharge
Diesel Fuel (vehicles, oil stoves)	1. Over pumping of fuel from drum into vehicle. 2. Leaking from vehicle. 3. Minor leaking fuel drum in/outside fuel storage area. 4. Large puncture, fast leaking drum in/outside fuel storage area. 5. From drum connection to stoves in communal buildings. 6. All drums punctured and leaking at once (very unlikely). 7. Leaking tanker, large or small holes, or faulty valves	Likely under 200 L/1 drum (max 4,000 L/ 20 drums) Potential from tanker up to 120,000 liters	Toward stream from drill site or fuel storage area near drill site. In camp on flat ground, from fuel storage area or communal buildings with potential underground seepage to Discovery Lake and/or stream.
Jet B Fuel (twin otter, helicopter)	1. Over filling of aircraft. 2. Leak from drum or hose while filling aircraft. 3. Minor leaking fuel drum in/out side fuel storage area. 4. Large puncture, fast leaking drum in/outside fuel storage area. 5. All drums punctured and leaking at once (very unlikely).	Likely under 200 L/1 drum (max 800 L/ 4 drums)	In camp on flat ground, from fuel storage area or helicopter pad with potential underground seepage to Discovery Lake and/ or stream. In Discovery Lake while refueling aircraft.
Gasoline (ATVs, trucks)	1. Over filling of ATVs or snow machines (small spill) 2. Leak from drum or hose while filing ATVs or snow machines. 3. Minor leaking fuel drum in/outside fuel storage area. 4. Large puncture, fast leaking drum in/outside fuel storage area.	Likely under 200 L/1 drum (max 1,000 L/ 5 drums)	In camp on flat ground, from fuel storage area with potential underground seepage to Discovery Lake and/or stream. Toward stream from fuel storage area near mine site.

	5. All drums punctured and leaking at once (very unlikely)		
Propane (kitchen stove and fridge)	1. Leak while connected to kitchen stove or fridge. 2. Minor leaking cylinder in or outside fuel storage area. 3. Large puncture, fast leaking cylinder in/outside fuel storage area. 4. All cylinders punctured and leaking at once (very unlikely).	Likely under 45 kg/ 1 cylinder (max 450 kg/ 5 cylinders)	In camp on flat ground, from fuel storage area or communal buildings with no potential underground seepage to Discovery Lake and/or stream.
Lubricating Oils	1. Spill from equipment 2. Spill from drums 3. Poor management during maintenance	Likely 1 drum (200 litres)	Toward Discovery Lake or other stream, from equipment park, underground, or around stationary equipment.
Glycol	1. Spill from equipment 2. Spill from equipment 3. Poor management during maintenance	Likely less than 4 litres	Toward Discovery Lake or other stream, from equipment park, underground, or around stationary equipment.
Potassium Amyl Xanthate (PAX)	4. Damaged or spilled container 5. Poorly maintained feeder in mill	Likely 50 kg (one package) Potential up to 500 kg (all on site)	Toward Discovery Lake or other stream from storage container From Mill building
Aeroflot	1. Damaged or tipped/spilled drum 2. Poorly maintained feeder in mill	Likely 200 L (one drum) Potential up to 400 L (all on site)	Toward Discovery Lake or other stream from storage container From Mill building
Methyl Isobutyl Carbinol (MIBC)	1. Damaged or tipped/spilled drum 2. Poorly maintained feeder in mill	Likely 200 L (one drum) Potential up to 400 L (all on site)	Toward Discovery Lake or other stream from storage container From Mill building
Copper Sulphate	1. Damaged or spilled container 2. Poorly maintained feeder in mill	Likely 50 kg (one package) Potential up to 500 kg (all on site)	Toward Discovery Lake or other stream from storage container From Mill building

Waste oil stored in empty 200 L drums, could potentially leak. The quantity of waste oil drums would be quite limited as they would be shipped out by truck or plane as they are filled up. The risk of a spill from a waste oil drum impacting the environment is very low as waste oil is stored in a bermed site designated for certain wastes.

ii) Potential environmental impacts of spill (include worst case scenario)

Overall for all hazardous materials discussed below, impacts are lower during winter as snow is a natural sorbent and ice forms a barrier limiting or eliminating soil or water contamination, thus spills can be more readily recovered when identified and reported.

Gasoline

Environmental impacts: Gasoline may be harmful to wildlife and aquatic life. It is not readily biodegradable and has the potential for bioaccumulation in the environment. Gasoline is quick to volatize. Runoff into water bodies must be avoided.

Worst case scenario: All fuel drums were punctured or open simultaneously and contents seeped into surrounding soil and water bodies. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.

Diesel Fuel

Environmental impacts: Diesel may be harmful to wildlife and aquatic life. It is not readily biodegradable and has the potential for bioaccumulation in the environment. Diesel burns slowly and thus risk to the environment is reduced during recovery as burn can be more readily contained compared with volatile fuels. Runoff into Discovery Lake or other stream must be avoided.

Worst case scenario: All fuel drums were punctured or open simultaneously and contents seeped into surrounding soil and water bodies. If a transport tanker is utilized, potentially 30,000 liters could be leaked. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.

Lubricating Oils

Environmental impacts: Lubricating oils may be harmful to wildlife and aquatic life. It is not readily biodegradable and has the potential for bioaccumulation in the environment. Lubricating oils do not burn easily. Runoff into Discovery Lake or other stream must be avoided.

Worst case scenario: All lubricating oil drums were punctured or open simultaneously and contents seeped into surrounding soil and water bodies. If a transport tanker is utilized, potentially 30,000 liters could be leaked. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.

Glycol

Environmental impacts: Glycol may be harmful to wildlife and aquatic life. It is biodegradable but is toxic. Runoff into Discovery Lake or another stream must be avoided.

Worst case scenario: All glycol containers were punctured or open simultaneously and contents seeped into surrounding soil and water bodies. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.

Jet B Fuel

Environmental impacts: Jet B fuel may be harmful to wildlife and aquatic life. It is not readily biodegradable and has the potential for bioaccumulation in the environment. Jet B fuel volatizes relatively quickly. Runoff into Discovery Lake or other stream must be avoided.

Worst case scenario: All fuel drums were punctured or open simultaneously and contents seeped into surrounding soil and water bodies. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.

Propane

Environmental impacts: Propane may be harmful to wildlife and the surrounding environment. It has the potential to accumulate in the environment. Propane is extremely volatile and is the most flammable material stored on site, thus immediate impacts to the surrounding environment are a concern.

Worst case scenario: All cylinders were punctured or failed simultaneously and contents leaked into the surrounding environment and ignited leading to an explosion. This could cause serious environmental impacts in the immediate surroundings. Safety during emergency response to a propane spill is of the utmost concern.

Waste Oil and Miscellaneous Oils/Grease

Environmental impacts: Waste oils may be harmful to wildlife and aquatic life. It is not readily biodegradable and has the potential for bioaccumulation in the environment. Runoff into Discovery Lake or other stream must be avoided.

Worst case scenario: All storage drums were punctured or open simultaneously and contents seeped into surrounding soil and water bodies. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.

Mill Reagents

Environmental Impacts:
PAX may be harmful to wildlife and aquatic life. May be fatal if swallowed. Harmful if inhaled. Causes skin and eye irritation. Dust is irritating to respiratory tract. See "Other Health Effects" Section. Heating of solid xanthate or aging or heating of solutions will cause formation of Carbon Bisulfide. Upon exposure of solid xanthates to moisture and/or heat, decomposition results and spontaneous combustion can occur. Contact of solid xanthate with moist air has resulted in ignition. (4) Emits a flammable gas upon contact with water or water vapour. Can decompose at high temperatures forming toxic gases. Powdered material may form explosive dust/air mixtures. Contents may develop pressure on prolonged exposure to heat.

MIBC Anesthetic effects can be expected at high vapor concentrations. Vapor concentrations of 50 ppm for 15 minutes are irritating to the eyes, nose and throat. The ACGIH TLV-TWA for MIBC is 25 ppm (104 mg/m^3) and the TLV-STEL is 40 ppm (167 mg/m^3). The 4-hour LC50 for MIBC was > 16 mg/L (3776 ppm).
MIBC has minimal acute toxicity by oral and dermal routes of exposure. The acute oral and dermal LD50 values for MIBC are 2260 – 2970 mg/kg and 2870 mg/kg, respectively. There are no known sensitization or cancer hazards. MIBC can enter the environment as emissions from its manufacture and use as a frother. 94% is biodegraded within 20 days.

Areoflot are a class of reagents used to enhance collection of sulphides in flotation. The acute oral (rat) LD50 and dermal (rabbit) LD50 values are 4060 mg/kg and >5000 mg/kg respectively. Marked irritation and skin corrosion were produced during primary irritation studies with rabbits. Contact with acid may cause liberation of hydrogen sulphide.

Copper sulphate is a metal salt used to enhance the collection of sulphide minerals in froth flotation systems. Severe exposure or chronic exposure by ingestion or inhalation of copper sulphate may induce severe gastroenteric distress (vomiting, gastroenteric pain, local corrosion, and hemorrhages), a metallic taste in the mouth, prostration, anuria, hematuria, anemia, an increase in white blood cells, coma, respiration difficulties, and circulatory problems. The product is toxic to fish.

iii) Procedures:

A. Procedures for initial actions

- Ensure safety of all personnel
- Assess spill hazards and risks.
- Remove all sources of ignition.
- Stop the spill if safely possible e.g. shut of 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. Gloves are located in the spill kit and should be worm immediately if there is any risk of being in contact with fuel. Transfer the remaining material in the defective or leaky container into a suitable secure container.
- No matter what the volume is, notify camp manager on site, 403 799-1973, head office, 604 818-1400.
- Contain the spill – use contents of spill kits to place sorbent materials on the spill, or use shovel to dig dike to contain spill. Methods will vary depending on the nature of the spill. See Section C for more details.

B. Spill reporting procedures

Report spill immediately to camp manager, who will determine if spill is to be reported to the NWT 24-Hour Spill Line at 867-920-8130. Notify NWT Lands Inspector (867) 767-9188.

Each spill kit, as well as the office and camp manager, will have copies of the NWT Spill Report form to be filled out (see Appendix B-2). Fill out and fax or email the Spill Report to the staff of the NWT 24-Hour spill line. Also fax or email the report to the head office.

NWT 24-Hour Spill Line Phone: (867) 920-8130

NWT 24-Hour Spill Line Fax: (867) 873-6924

NWT 24-Hour Spill Line Email: spills@gov.nt.ca

Head office, New Discovery Mines Ltd. Phone: (604) 818-1400

Head office, 24 hr phone line Phone: (604) 818-1400

C. Procedures for containing and controlling the spill (e.g. on land, water, snow. etc.)

- Initiate spill containment by first determining what will be affected by the spill.
- Assess speed and direction of spill and cause of movement (water, wind and slope).
- Determine best location for containing spill, avoiding any water bodies.
- Have a contingency plan ready in case spill worsens beyond control or if the weather or topography impedes containment.

Specific spill containment methods for land, water, ice and snow are outlined below.

1) Containment of Spills on Land

Spills on land include spills on rock, gravel, soil and/or vegetation. It is important to note that soil is a natural sorbent, thus spills on soil are generally less serious than spills on water as contaminated soil can be more easily recovered. Generally spills on land occur during the late spring, summer or fall when snow cover is at a minimum. It is important that all measures be undertaken to avoid spills reaching Discovery Lake or other stream.

Dykes

Dykes can be created using soil surrounding a spill on land. These dykes are constructed around the perimeter or down slope of the spilled fuel. A dyke needs to be built up to a size that will ensure containment of the maximum quantity of fuel that may reach it. A plastic tarp can be placed on and at the base of the dyke such that fuel can pool up and subsequently be removed with sorbent materials or by pump into barrels or bags. If the spill is migrating very slowly a dyke may not be necessary and sorbents can be used to soak up fuels before they migrate away from the source of the spill.

Trenches

Trenches can be dug out to contain spills as long as the top layer of soil is thawed. Shovels, pick axes or a loader can be used depending on the size of trench required. It is recommended that the trench be dug to the bedrock or permafrost, which will then provide containment layer for the spilled fuel. Fuel can then be recovered using a pump or sorbent materials.

2) Containment of Spills on Water

Spills on water such as rivers, streams or lakes are the most serious types of spills as they can negatively impact water quality and aquatic life. All measures need to be undertaken to contain spills on open water.

Booms

Booms can be used to recover fuel floating on the surface of Discovery Lake or other slow moving water bodies. Booms are released from the shore of a water body to encircle a spill. If the spill is away from the shoreline the boat will need to be used to reach the spill and the boom can be set

out. More than one boom may be used at once as they can be ganged. Booms may also be used in streams and would be set out at an angle to the current. The booms at site for the Mon Gold Project are designed to float and have sorbent materials built into them to absorb fuels at the edge of the boom. Fuel contained within the circle of the boom will need to be recovered using sorbent materials ("diapers" which are kept in all spill kits) or pumps and placed into barrels or bags for disposal.

The booms New Discovery Mine has can be used on land as a rapid response option and would be placed down-slope to encompass any potential flows. Booms may be packed in with soils if needed.

Booms must be laid out well in advance of any spill and should be monitored and replaced as needed. Replacement booms will be installed down-slope from the older boom so as to contain all material

Weirs

Weirs can be used to contain spills in streams and to prevent further migration downstream. Plywood or other materials kept on site should be placed into and across the width of the stream, provided the flow is not excessive (>1m per second), such that water can still flow under the weir. Spilled fuel will float on the water surface and be contained at the foot of the weir. This fuel could then be removed using sorbents, booms or pumps and placed into barrels or plastic bags.

Barriers

In some situations barriers made of netting or fence material can be installed across a stream, and sorbent materials placed at the base to absorb spilled fuel. Sorbents will need to be replaced as soon as they are saturated. Water will be allowed to flow through. This is very similar to the weir option discussed above.

Note that in some cases, it may be appropriate to burn fuel or to let volatile fuels such as gasoline evaporate after containment on the water surface. This should only be undertaken in consultation with, and after approval from GNWT or lead agency Inspector.

3) Containment of Spills on Ice

Spills on ice are generally the easiest spills to contain due to the predominantly impermeable nature of the ice. For small spills, sorbent materials are used to soak up spilled fuel. Remaining contaminated ice/ slush can be scraped and shoveled into a plastic bag or barrel. However, all possible attempts should be made to prevent spills from entering ice covered waters as no easy method exists for containment and recovery of spills if they seep under ice.

Dykes

Dykes can be used to contain fuel spills on ice. By collecting surrounding snow, compacting it and mounding it to form a dyke down slope of the spill, a barrier is created thus helping to contain the spill. If the quantity of spill is fairly large, a plastic tarp can be placed over the dyke such that the spill pools at the base of the dyke. The collected fuel can then be pumped into barrels or collected with sorbent materials.

Trenches

For significant spills on ice, trenches can be cut into the ice surrounding and/or down slope of the spill such that fuel is allowed to pool in the trench. It can then be removed via pump into barrels, collected with sorbent materials, or mixed with snow and shoveled into barrels or bags.

Burning

Burning should only be considered if other approaches are not feasible, and is only to be undertaken with the permission of the GNWT or lead agency Inspector.

4) Containment of Spills on Snow

Snow is a natural sorbent, thus as with spills on soil, spilled fuel can be more easily recovered. Generally, small spills on snow can be easily cleaned up by raking and shoveling the contaminated snow into plastic bags or empty barrels, and storing these at an approved location.

Dykes

Dykes can be used to contain fuel spills on snow. By compacting snow down slope from the spill, and mounding it to form a dyke, a barrier or berm is created thus helping to contain the spill. If the quantity of spill is fairly large, a plastic tarp can be placed over the dyke such that the spill pools at the base of the dyke. The collected fuel/snow mixture can then be shoveled into barrels or bags, or collected with sorbent materials.

5) Worst Case Scenarios

Dealing with spilled fuel which exceeds the freeboard of a dyke or barrier would present a possible worst case scenario for New Discovery Mines Ltd. site. To contain the overflow, a trench or collection pit would have to be created downstream of the spill to contain the overflow.

Another worst case scenario would be an excessive spill on water may be difficult to contain with the booms present at the site. In this case, an emergency response mobile unit would have to be called in to deal with the spill using appropriate equipment. KBL Environmental Ltd. in Yellowknife, (867) 873-5263 can provide emergency spill response services.

Fuel tanks will be double walled or bermed, to contain the maximum amount of fuel in each tank. Empty drums (205 litres) will be maintained on site to contain any fuel from leaking or punctured drums. Fuel tanks from nobile equipment can be pumped out to empty drums on site. New Discovery Mines will maintain >10 empty drums on site for such emergency storage, as well as other containers.

In winter, road access will enable the collected spill materials moved into Yellowknife for delivery to an appropriate waste facility for storage or transshipment by authorized carrier to an authorized waste disposal site.

D. Procedures for transferring, storing, and managing spill related wastes.

In most cases, spill cleanups are initiated at the far end of the spill and contained moving toward the center of the spill. Sorbent socks and pads are generally used for small spill clean-up. A pump with attached fuel transfer hose can suction spills from leaking containers or large accumulations on land or ice, and direct these larger quantities into empty drums. Hand tools such as cans,

shovels, and rakes are also very effective for small spills or hard to reach areas. Heavy equipment can be used if deemed necessary, and given space and time constraints.

Used sorbent materials are to be placed in plastic bags for future disposal. All materials mentioned in this section are available in the spill kits located at Camp. Following clean up, any tools or equipment used will be properly washed and decontaminated, or replaced if this is not possible.

For most of the containment procedures outlined in Section C, spilled petroleum products and materials used for containment will be placed into empty waste oil containers and sealed for proper disposal at an approved disposal facility.

E. Procedures for restoring affected areas

Once a spill of reportable size has been contained, New Discovery Mines Ltd. will consult with the GNWTA or lead agency Inspector assigned to the file to determine the level of cleanup required. The Inspector may require a site specific study to ensure appropriate clean up levels are met. Criteria that may be considered include natural biodegradation of oil, replacement of soil and revegetation.

4) Resource Inventory

i) On-site resources

Spill kits are located throughout the sites at the locations indicated in Figure 2. The contents are described below. In addition, earth moving and other equipment located at the proposed camp is also listed below.

Contents of Spill Kits

4 pairs of chemical master gloves

10 large bags with ties for temporary use

2 oil only booms (5” x 10')

50 oil only mats (16” x 20”)

5 sorbent socks

10 sorbent pads

2 large tarps

1 roll duct tape

1 utility knife

1 field notebook and pencil

1 rake

1 pick axe

3 aluminum scoop shovels

1 instruction binder

Earth moving and other equipment

2 scoop trams

1 loader

2 end-dump trucks

1 small bulldozer

1 all-terrain vehicles

1 boat

1 chain saw

3 fuel transfer hoses with pumps tool kit including hack saw, hammer, screwdrivers, etc.

ii) Off-site resources

All the contacts listed below could reach the site in 2 hours at a minimum. However, realistically government officials would not be able to reach the site until the next business day, depending on the severity of the spill.

New Discovery Mines Ltd., 24-hour emergency line
(604) 818-1400

NWT 24-Hour spill line
(867) 920-8130

GNWT Inspector
(867) 767-9188

Environment and Climate Change Canada Environmental Enforcement (Emergency) Yellowknife
(867) 669-4730

National Environmental Emergencies Centre
1 866 283-2333

GNWT Environmental Protection Division
(867) 873-7654

GNWT Environmental Health Office
(867) 669-8979

RCMP (Yellowknife)
(867) 669-1111

Medivac (Yellowknife)
(867) 669-4115

Great Slave Helicopters (Yellowknife)
(867) 873-2081

Air Tindi (Yellowknife)
(867) 669-8218 or 669-8200

Arctic Sunwest (Yellowknife)
(867) 873-4464

As planning for an emergency situation is imperative due to the materials stored on-site and the remoteness of the site, an employee and contractor training program has been prepared. It is outlined below.

Yellowknife is 45 km south of the project site and can provide additional resources from the private sector as well as the public sector. Operators will be kept current as to services and supplies that are locally available.

5) Training Program

i) Outline of training program

The employee and contractor training program was developed by the manager of environmental health and safety, and has been disseminated by the camp manager. Yellowknife-based suppliers of emergency response training such as KBL Environmental Ltd, ((867) 873-5263) will be contacted and used as needed to supplement corporate expertise. The following are key steps in the program:

- all individuals entering the site are required to participate in an orientation session
- during this session, all locations of the spill plan and spill kits are provided on a map in hard copy
- an overview of the plan is provided by the camp manager leading the orientation session
- specific training sessions, including mock spill exercises, are scheduled for individuals directly involved in handling hazardous materials to ensure they know all steps to be undertaken in handling these materials, as well as the steps involved in the event of a spill, including the proper use of spill kits
- all employees and contractors are required to have their basic first aid training, as well as WHMIS training, before working on the site
- supervisors are required to have advanced level first aid training, as well as transport of dangerous goods training

ii) Training schedule and recordkeeping

A spreadsheet is kept by the camp manager and head office indicating the training undertaken, and expire dates of specific training e.g. first aid. It is regularly updated.

Appendix B-1: Material Safety Data Sheets (MSDS) for hazardous materials stored on site

The formats of Material Safety Data Sheets vary greatly. Examples can be found on the internet and from Spill Contingency Plans in place for various Water Licenses in the NWT (see Land and/or Water Board public registries).

Appendix B-2 NT-NU Spill Report Form;

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:			

Instructions for Completing the NT-NU Spill Report Form

This form can be filled out electronically and faxed to the spill line at 867-873-6924. Commencing on January 2, 2007, the form can also be e-mailed as an attachment to spills@gov.nt.ca. Until further notice, please verify receipt of e-mail transmissions with a follow-up telephone call. Spills can still be phoned in by calling collect at 867-920-8130.

A. Report Date/Time	The actual date and time that the spill was reported to the spill line. If the spill is phoned in, the Spill Line will fill this out. **Please do not fill in the Report Number**: the spill line will assign a number after the spil is reported.
B. Occurrence Date/Time	Indicate, to the best of your knowledge, the exact date and time that the spill occurred. Not to be confused with the report date and time (see above).
C. Land Use Permit Number /Water Licence Number	This only needs to be filled in if the activity has been licenced by the Nunavut Water Board and/or if a Land Use Permit has been issued. Applies primarily to mines and mineral exploration sites.
D. Geographic Place Name	In most cases, this will be the name of the city or town in which the spill occurred. For remote locations – outside of human habitations – identify the most prominent geographic feature, such as a lake or mountain and/or the distance and direction from the nearest population center. **You must include the geographic coordinates** (Refer to Section E).
E. Geographic Coordinates	This only needs to be filled out if the spill occurred outside of an established community such as a mine site. Please note that the location should be stated in degrees, minutes and seconds of Latitude and Longitude.
F. Responsible Party Or Vessel Name	This is the person who was in management/control/ownership of the substance at the time that it was spilled. In the case of a spill from a ship/vessel, include the name of the ship/vessel. Please include full address, telephone number and e-mail. Use box K if there is insufficient space. **Please note that, the owner of the spilled substance is ultimately responsible for any spills of that substance, regardless of who may have actually caused the spill.**
G. Contractor involved?	Were there any other parties/contractors involved? An example would be a construction company who is undertaking work on behalf of the owner of the spilled substance and who may have contributed to, or directly caused the spill and/or is responding to the spill.
H. Product Spilled	Identify the product spilled; most commonly, it is gasoline, diesel fuel or sewage. For other substances, avoid trade names. Wherever possible, use the chemical name of the substance and further, identify the product using the four digit UN number (eg: UN1203 for gasoline; UN1202 for diesel fuel; UN1863 for Jet A & B)
I. Spill Source	Identify the source of the spill: truck, ship, home heating fuel tank and, if known, the cause (eg: fuel tank overfill, leaking tank; ship ran aground; traffic accident, vandalism, storm, etc.). Provide an estimate of the extent of the contaminated/impacted area (eg: 10 m^2)
J. Factors Affecting Spill	Any factors which might make it difficult to clean up the spill: rough terrain, bad weather, remote location, lack of equipment. Do you require advice and/or assistance with the cleanup operation? Identify any hazards to persons, property or equipment: for example, a gasoline spill beside a daycare centre would pose a safety hazard to children. Use box K if there is insufficient space.
K. Additional Information	Provide any additional, pertinent details about the spill, such as any peculiar/unique hazards associated with the spilled material. State what action is being taken towards cleaning up the spill; disposal of spilled material; notification of affected parties. If necessary, append additional sheets to the spill report. Number the pages in the same format found in the lower right hand corner of the spill form: eg. "Page 1 of 2", "Page 2 of 2" etc. **Please number the pages to ensure that recipients can be certain that they received all pertinent documents.** If only the spill report form was filled out, number the form as "Page 1 of 1".
L. Reported to Spill Line by	Include your full name, employer, contact number and the location from which you are reporting the spill. Use box K if there is insufficient space.
M. Alternate Contact	Identify any alternate contacts. This information assists regulatory agencies to obtain additional information if they cannot reach the individual who reported the spill.
N. Report Line Use Only	**Leave Blank.** This box is for the **Spill Line's use only.**

Appendix B-3: Immediately Reportable Spill Quantities

TDG Class	Substance for NWT 24 Hour Spill Line	Immediately Reportable Quantities
1.0 2.3 2.4 6.2 7.0 None	Explosives Compressed gas (toxic) Compressed gas (corrosive) Infectious substances Radioactive Unknown substance	Any amount
2.1 2.2	Compressed gas (flammable) Compressed gas (non-corrosive, non-flammable)	Any amount of gas from containers with a capacity greater than 100 L
3.1 3.2 3.3	Flammable liquids	>= 100 L
4.1 4.2 4.3	Flammable solids Substances liable to spontaneous combustion Water reactant substances	>= 25 kg
5.1	Oxidizing substances	>= 50 L or 50 kg
5.2 9.0	Organic peroxides Environmentally hazardous substances intended for disposal	>= 1 L or 1 kg
6.1 8.0 9.0	Toxic substances Corrosive substances Miscellaneous products, substances or organisms	>= 5 L or 5 kg
9.0	PCB mixtures of 5 or more parts per million	>= 0.5 L or 0.5 kg
None	Other contaminants (e.g. crude oil, drilling fluid, produced water, waste or spent chemicals, used or waste oil, vehicle fluids, wastewater, etc.)	>= 100 L or 100 kg
None	Sour natural gas (i.e. contains H2S) Sweet natural gas	Uncontrolled release or sustained flow of 10 minutes or more
3.1/3.2/3.3 None	Flammable liquid Vehicle fluids	>=20 L When released on a frozen body of water that is used as a work surface
None	Reported releases or potential releases of any size that: 1. Are in or near an open water body; 2. Are in or near 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	Any amount

Note: L=Litre; kg=kilogram; PCB=polychlorinated biphenyls; ppm=parts per million

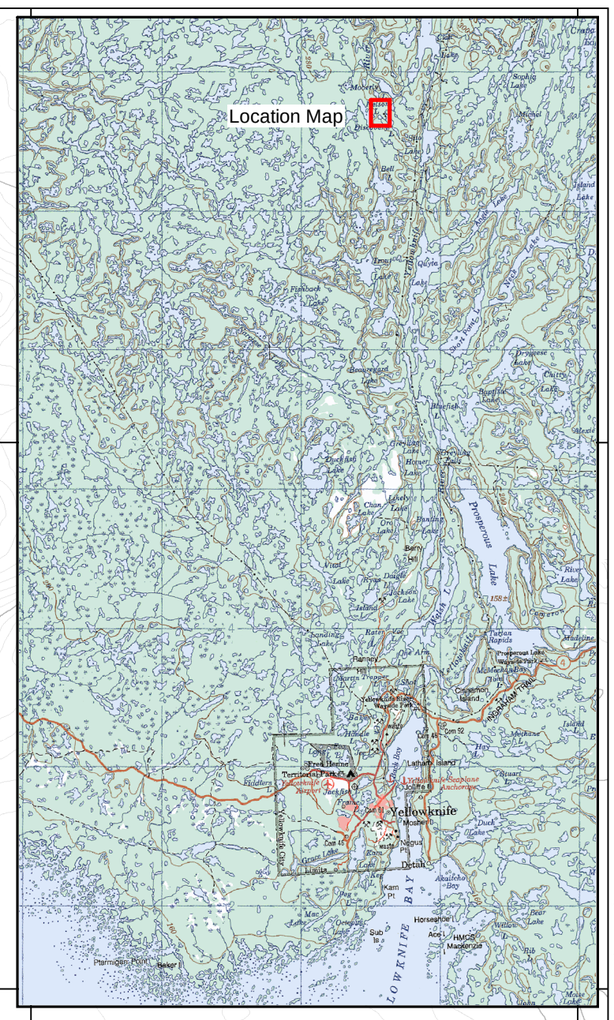
635,600 mE

636,000 mE

6,977,400 mN

6,977,000 mN

0 100 meters



Legend

- Water_Lines
- Water_Lines
- 1 m Contours
- 10 m Contours
- RoadA
- WaterCourse
- WaterBody
- Ore_Storage
- Mill_Site
- LandFarm
- Waste2016
- Water_Tank
- SpillKit
- Shops
- Esker
- Camp_Trailers
- Camp_Trailers
- ANFO
- Active_Mineral_Leases_trans
- Tails245
- Tails238
- Historic Tailings
- Fuel_Storage
- Mineral Claims

Site Plan
Spill Contingency Plan

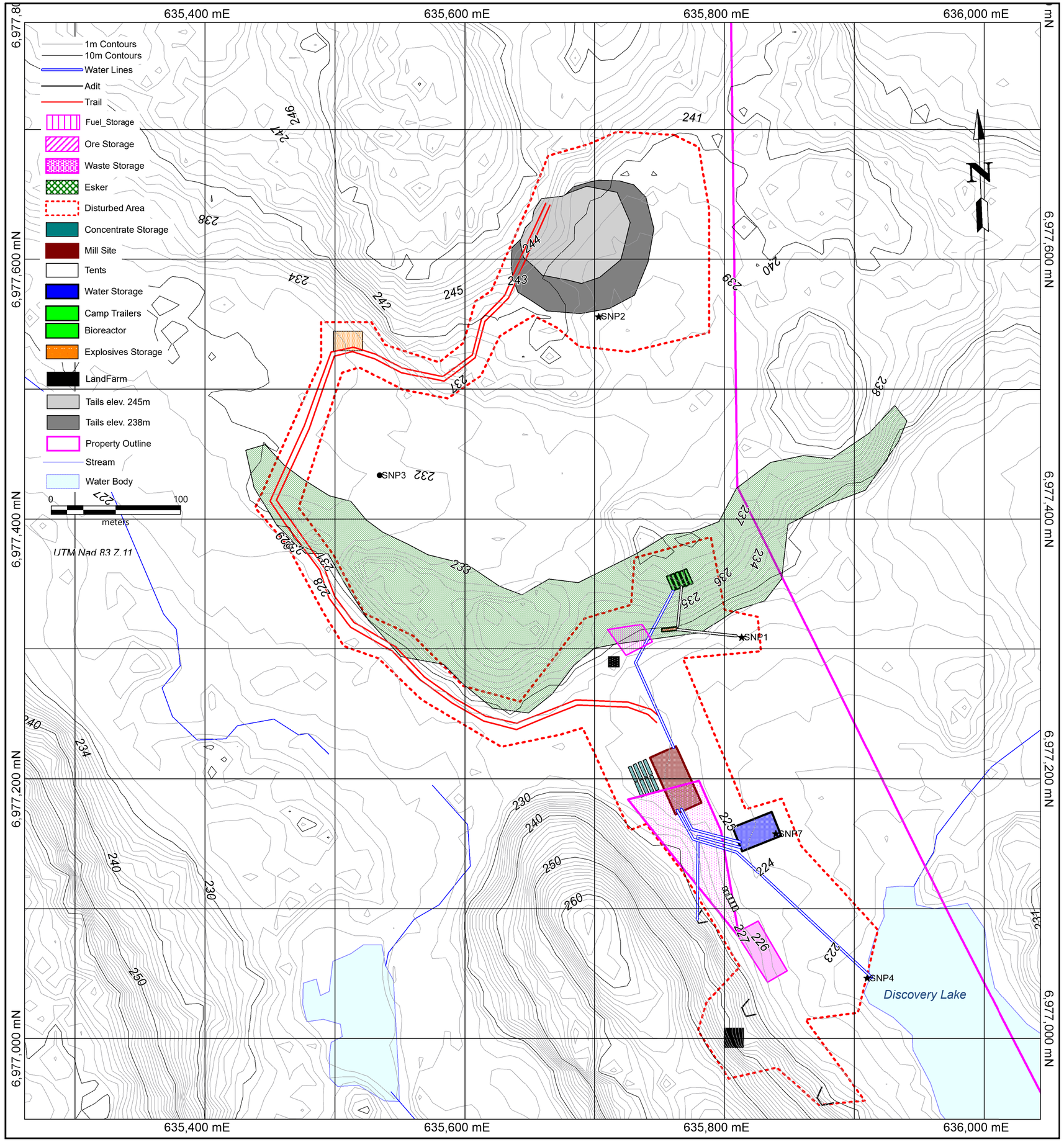
Date: January 2021

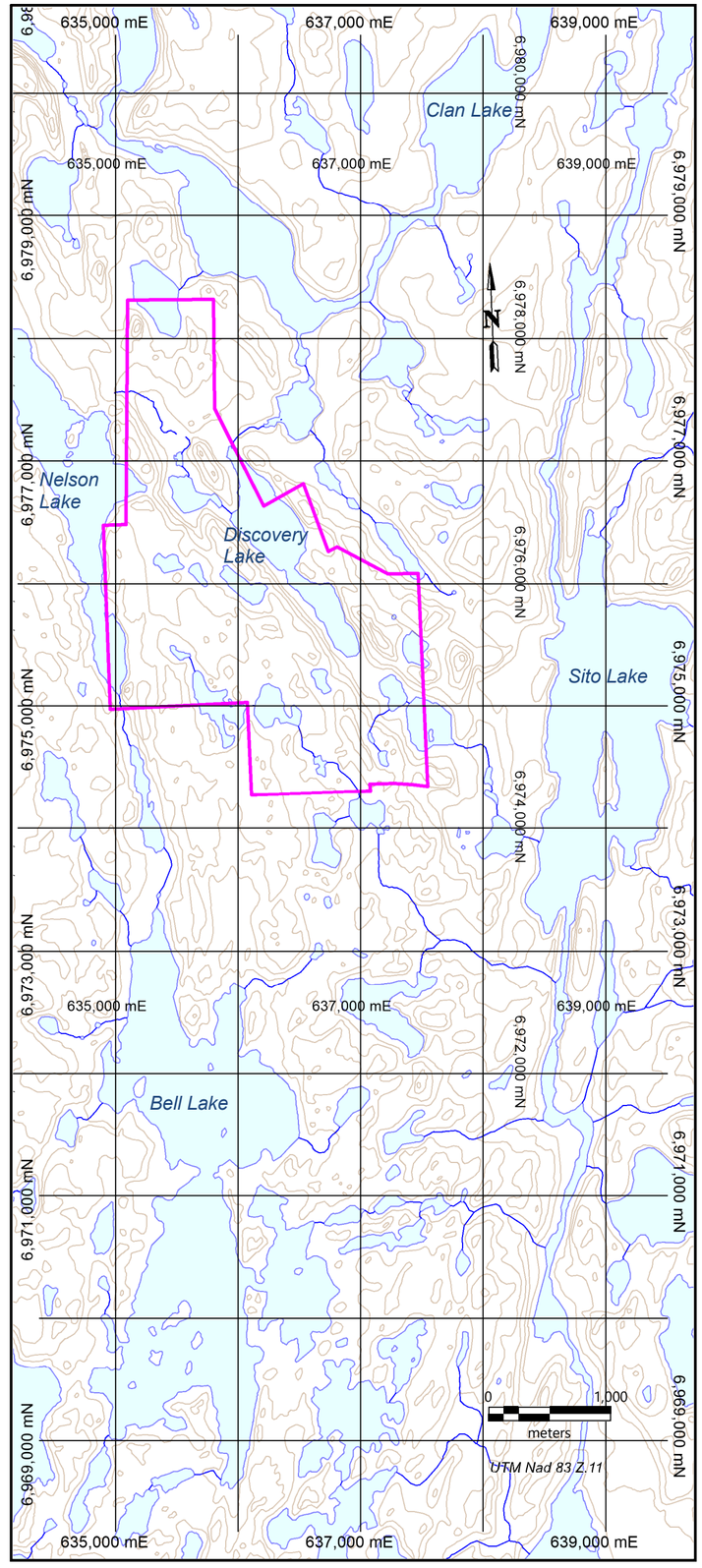
Author: DRW

Office: Vancouver, B.C.

Scale: as shown

Projection: UTM Nad 83, Zone 11





New Discovery Mines Ltd.
Mon Property Mine/Camp Hazardous Wate
October, 2020

NEW DISCOVERY MINES LTD.

Mon Gold Property

Community Engagement Plan

MV2020C0003
MV2020L-0002

December 2020
Version 9

Version and Revision History

Version	Date	Revision/Comments
1	2012	First draft, following MVLWB Guidelines for Community Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits, October 2012.
2	2013	Revised to incorporate MVLWB Policy Engagement and Consultation Policy" June 1, 2013.
3	2013	Incorporates Best Practices in Community Engagement Guidelines for Applicants and Holders of Water Licenses and Land Use Permits
4	2018	Review, no changes
5	2020	Review, no changes
6	2020	Review, no changes
7	2020	Revise Engagement Work Plan
8	2020	Revise Goals of Engagement, Engagement Techniques, Communicating the Engagement Plan, Implementing the Engagement Plan, and Follow-up Reporting.
9	December 2020	Reformat to conform to submission standards, adding title page, conformity table, expand on triggers for engagement.

Contents

Definitions

Term	Definition
Aboriginal organization/ government	an organization representing the rights and interests of a First Nation (as defined in section 2 of the MVRMA) Métis, or Inuit community or region, a Tłı̨cho First Nation, or the Tłı̨cho Government.
affected community	a community that is affected, or is predicted to be affected, either adversely and/or beneficially, by a proposed project.
Boards	Land and Water Boards of the Mackenzie Valley, as established by the *Mackenzie Valley Resource Management Act.*
duty to consult	Practically, the duty to consult is the process of ensuring that Aboriginal people's rights are fairly considered in government conduct that could potentially affect those rights, particularly in the approval of developments involving land and resources. The duty to consult is an obligation of the government as a whole. In *Haida, Taku River,* and *Mikisew Cree*, the Supreme Court of Canada held that provincial and federal governments have a legal obligation to consult when the Crown contemplates conduct that might adversely impact potential or established Aboriginal or Treaty Rights.
engagement	the communication and outreach activities a proponent is required, by the Boards, to undertake with affected communities and Aboriginal organizations/governments prior to and during the operation of a project, including closure and reclamation phases.
engagement plan	a document that clearly describes how, when, and what engagement will occur with an affected community and Aboriginal organization/government at each stage during the life of the project.
engagement record	a record, including supporting documents, that details the engagement processes and outcomes between the proponent and the affected community and Aboriginal organization/government.
GLWB	Gwich'in Land and Water Board
MVLWB	Mackenzie Valley Land and Water Board
MVRMA	Mackenzie Valley Resource Management Act
NWT	Northwest Territories
project	any development that requires a land use permit or water licence.
proponent	applicant for, or holder of, land use permits and/or water licences.
public participation	a general term for any process that involves public input in decision making. It involves the process or activity of informing the public and inviting them to have input into the decisions that affect them
SLWB	Sahtu Land and Water Board

WLWB	Wek'èezhìi Land and Water Board

Conformity Table

Revisions in this version are outlined below where the 69 comments received have been considered and responded to;

Revision	Page	Responds to
#67	14	Development-related triggers for reaching out and proactively engaging impacted communities should be outlined in the Engagement Plan and available for review and comment. These can relate to the development of new and updated management and monitoring plans, changes to Project design, the construction of infrastructure, the status of operations, etc.
Tlicho Government		
1	Appendix A, Consultation Log is updated to show nineteen separate discussions with Tlicho and Kwe Beh working group Starting in September 2013	From the description of NDM project location, part of Mon Gold mine project is located in Monfwi Gogha de Netiilee. According to NDM's engagement plan, contacts has been made with YKDFN, NSMA and City of Yellowknife. Nothing in the engagement document mentions engagement with the Tlicho Government. Recommendation Should you have any questions regarding Tlicho engagement on regulatory matters, please contact Ms. Violet Camsell-Blondin at Phone: (867) 392 6381 ext. 1336, Cell: (867) 444 0006 Email: violetcamsellblondin@tlicho.com

Introduction

This Community Engagement Plan (CEP) has been developed to ensure continuing consultation with affected communities in a progressive manner as the Mon Gold Mine project develops. The CEP is based upon the guidelines published by the Mackenzie Valley Land and Water Board (WVLWB), October 2012 "Community Engagement Guidelines for Applicants and Holders of Water Licences and Land Use Permits", "Engagement and Consultation Policy" June 1, 2013, and extracts from draft exploration agreements developed by the Yellowknife Dene First Nation.

The CEP recognizes the statutory requirement for consultation and attempts to make it proactive, inclusive and effective.

The CEP is prepared to accommodate an application for small scale mining; however it anticipates further work that will require additional consultations. New Discovery Mines (NDM) is committed to ensuring that the CEP is reviewed at least annually or as needed of either project phase implementation or on recommendations provided by the affected parties. This plan is not intended to be a static document and will evolve throughout the life of the project.

The Project

Overview

It is planned to complete underground sampling of an inferred extension to a mine that was effectively operated in the 1990's (Mon Gold Mine). This would be the first phase and if successful would follow with applications for continued mining and to re-install a 100 tonnes per day milling circuit to process this material and subsequently developed material. Property-wide exploration will be conducted from the same camp (Mon Mine).

Location

The Mon Gold Mine is located within the Yellowknife Greenstone Belt, 50 km north of Yellowknife. It was discovered in 1937 by prospectors under contract to Cominco Ltd. Cominco sunk a shaft in 1938 and 1939, completed diamond drilling in 1947, 1950, 1963, and between 1965 and 1975 allowed a local prospector, Jack Stevens to high-grade the surface exposures. In 1986 Cominco optioned the property to Troymin Resources who completed 11 diamond drillholes. In 1987, Troymin and partner Coronado Resources drilled another 12 holes and allowed the option to lapse. In 1988 Dave Webb optioned the Mon Property and with partner Can-Mac Exploration completed six diamond drillholes identifying a small resource. In 1989 Webb completed 49 meters of decline and 15.5 meters of raising on an east-dipping vein. A total of 2,300 tonnes of material was stoped from this vein and the material was custom milled at the Ptarmigan Mill in Yellowknife. In 1990 the property was leased to Ger Mac Construction Ltd and a 37 m crosscut was driven from a new adit (central adit) and 77m of vein was developed for mining.

Can-Mac defaulted on the option and the property reverted back to Webb, and between 1991 and 1997, Ger Mac Construction Ltd extracted an estimated 10,000 tonnes and processed this through a 100 tpd crush / grind / gravity mill on site. Mining ceased in 1997 and all equipment was removed and the tailings containment area was graded, capped with a plastic liner and covered with 35 cm of gravel.

Upon completing of the Ger Mac operations the properties Mining Leases were moved into a holding company which later became New Discovery Mines Ltd. New Discovery Mines Ltd. optioned the property to Sixty North Gold Mining Ltd.

New Discovery Mines Ltd applied for permits and licenses to reinstall the mine and mill and after discussions with the affected communities conceded to make the application in two parts. The permits and licenses to install the camp and related infrastructure and to commence mining the next level of the Mon Mine was made to the MVLWB and Land Use Permit (MV2013C0021) and Water License (MV2014L2-0002) was received in July 3, 2014. Consultations with the affected communities continued to seek support and input on the current milling application.

Resource and Reserves

There are no NI 43-101 Reserves or Resources at the Mon Gold Mine. NI 43-101 governs a company's public disclosure of scientific and technical information about its mineral projects.

It is believed that the previously completed mining has established a mineralized trend that can be assessed by diamond drilling or additional underground development. A cost-benefit analysis indicates that the underground development is the best way to proceed.

Engagement with Affected Parties

What is Engagement?

Engagement is defined by the MVLWB as "the communication and outreach activities a proponent is required, by the Boards, to undertake with affected communities and Aboriginal organizations/governments prior to and during the operation of a project, including closure and reclamation phases." One might also believe engagement should go beyond this to communicate with the affected communities on all matters, even those not directly related to the project to get a perspective on what might be material in the future and to add substance to what decisions are made.

The proponent is currently Planning to commence more substantial activities. These consultations have primarily been by phone calls, emails, and in some instances face to face. It is proposed to commence activities in early 2021.

Affected Communities

The project lies within the Yellowknife Dene First Nations traditional lands, on traditional lands identified as Monfwi Gogha De Niitlee lands, and on Metis lands (Figure 1).

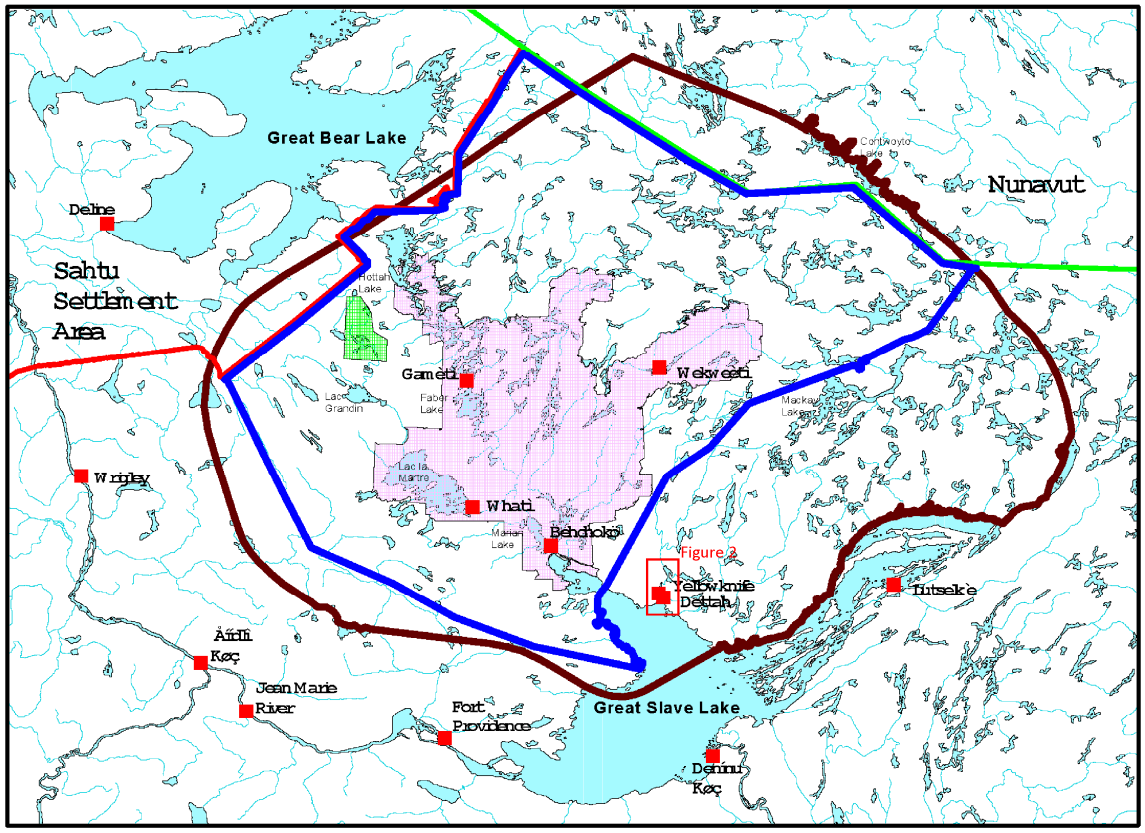


Figure 1. Location of Project Area and inset of Figure 2.

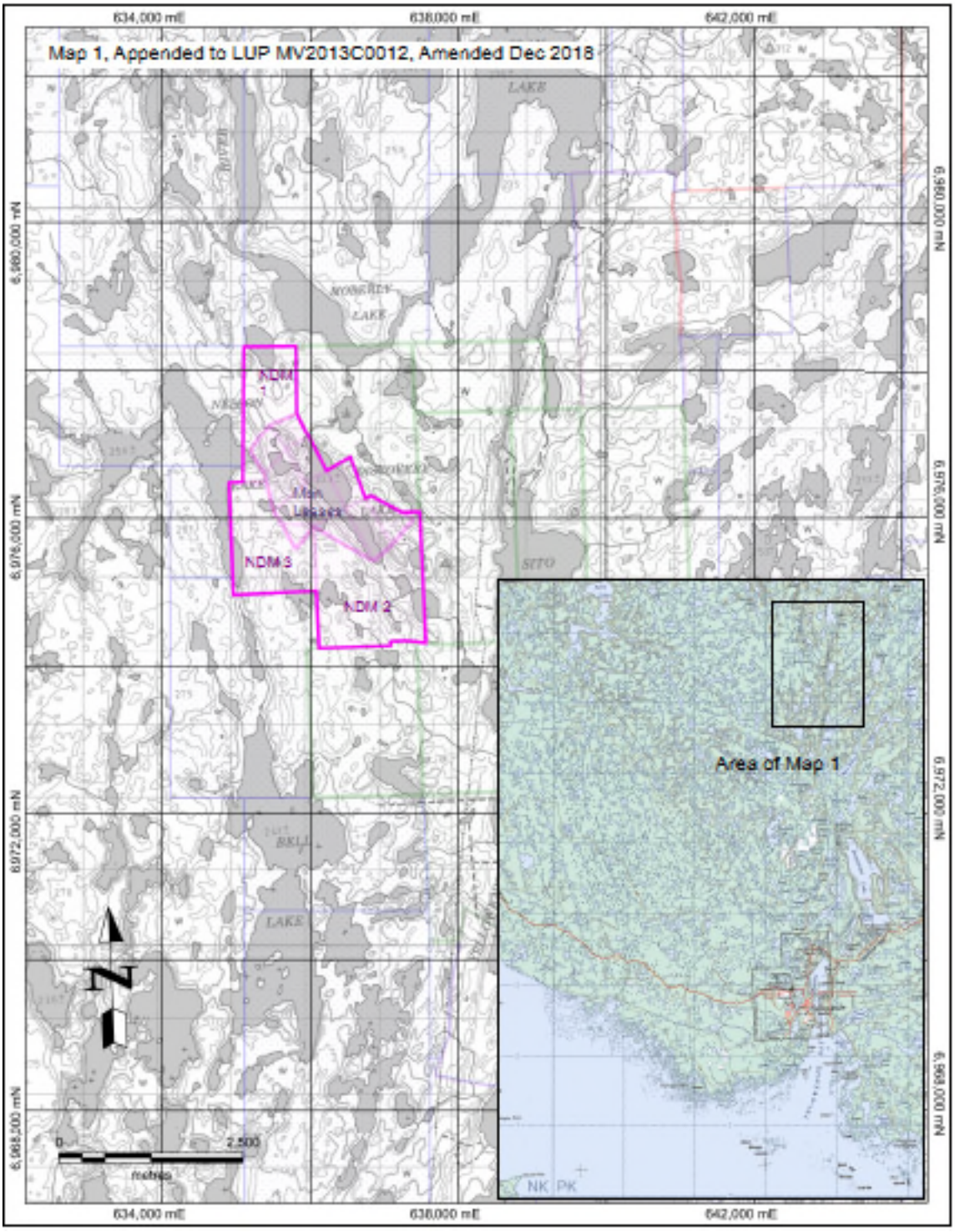


Figure 2. Location of Project Area

What are the Benefits of Engagement?

Engagement provides an opportunity to make sure all affected parties are aware of a proponent's operational objectives and the proponent can in turn learn of and action the affected parties concerns. Ideally, all concerns can be accommodated proactively and in mutually satisfactory manners. Projects that are unacceptable to the affected parties, either by location, or process with no reasonable hope of accommodation can be avoided. This benefits all parties.

A structure can be created to deal with anticipated and unanticipated concerns so collaboration, rectification and/or accommodation can be rapid and completed in a predetermined manner.

What Guides Engagement?

Engagement will focus on the proponents and affected parties concerns. The first steps in the process would be for the proponent to identify the potentially affected communities/lands and to introduce themselves and operational plans to these communities. The communities will then inform the rest of the process with the proponent responding and providing appropriate guidance where possible.

1. Proponent Identify and Define the Project
2. Proponent Identify and Introduce themselves and the Project to the Communities
3. Communities respond with:
    a. Requests for further information
    b. Requests for meetings
    c. Identify Issues of concern
4. Together, the Proponent and Concerned Communities work to accommodate issues
    a. Proponent and Concerned Communities develop a communication and action structure to deal with issues that are of concern.

Engagement Plan Framework

Expected WL Term: The Water License is currently for a seven-year term and is expected to be renewed if warranted.

Expected LUP Term: The Land Use Permit is currently for a five-year term and is expected to be renewed if warranted.

Goals of Engagement

Initially NDM proposes four strategies to successfully engagement with affected parties.

1. Inform

   We will communicate plans, contingencies, and estimated effects on the communities/lands honestly, accurately and in advance of implementation.

2. Build Relationships

   We will follow up those initial submissions, clarify the key contact person for the duration of the LUP/WL and discuss acceptable checkpoints. I.e. Planning stages of Summer/Winter Programs, Renewal of Licensing and Permitting, Designing monitoring programs, Significant operational changes, decommissioning, monitoring, etc)

   We will further gain understanding of how often the affected party meets with membership, elders, council, and youth to better understand when, where and how we can stay engaged with the community. Where possible we can be proactive and plan in advance. I.e. Attend fall, spring membership meetings to present updates. Annually submit reports and offer presentations to quarterly chief and council meetings. Offer to visit career fairs, school learning days and/or forums to educated affected parties of the activities/opportunities at the Mon Mine.

3. Listen

   We will make ourselves available to listen to any/all concerns, whether presented at face to face meetings, virtual meeting, through emails, phone calls or a general inquiry that may arise at public consultations.

4. Be Knowledgeable

   We will further solidify our relationship with the affected parties by taking the time to reflect, and research as needed. We will familiarize ourselves with the land claim agreements, the duty to consult, the traditional land uses for this project area, the history of the territory and its people and any best practices successfully negotiated through existing socio-economic agreements. We will ensure we are available, approachable, and knowledgeable in our presentations to the affected parties.

Party Identification

Initial reviews have considered the groups to be potentially affected by the Proponent's plans.

These have been contacted as shown on the logs.

Company Contacts

All discussions concerning the Proponent can be directed to:

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President

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Dave Webb obtained his B.A.Sc. and Engineering degree from the University of Toronto in Toronto, Ontario, an M.Sc. in Geological Science from Queens' University in Kingston, Ontario, and a Ph.D. in Geological Sciences from the University of Western Ontario in London, Ontario. He is a registered Professional Geologist and Professional Engineer by NAPEG in the Northwest Territories. His graduate studies were on the Con Mine and Yellowknife gold belt, and he has worked as a consulting geologist in the NWT since 1981. He staked and optioned the Nicholas Lake Property to Chevron Minerals Ltd in the mid 1980's. He co-authored the qualifying report for Fortune Minerals Ltd in the acquisition of the Nico Property in the early 1990's. Webb optioned the Mon Property from Cominco Ltd. in 1988, bulk sampled it in 1989 and had it lease mined by private interests until 1997. He formed New Discovery Mines Ltd with a partner, acquired the Discovery Mine Property in the early 1990's and optioned it to a junior mining company. Webb subsequently optioned the property in to Tyhee Gold Corp which he ran from 2003 to 2012.

Engagement Techniques

All engagement will be person to person, either face to face, by telephone, or in written communication by post, fax, or email.

As we are all limited right now due to the global pandemic and regional public health orders, we commit to leveraging virtual meetings, and other technologies where needed to stay engaged.

Where possible given the travel restrictions and other public health recommended protocols, in person meetings will be at venues acceptable to all participants and appropriate

for the discussions at hand. These may be on the proponent's project site or other location as mutually decided.

Where possible we will maximize engagement, ie. public consultations will occur in the community and support local business through catering traditional foods, venue selection, transportation, lodging, etc. We will plan proactively to ensure that the event is advertised to maximize participation. We will work with personnel from the communities to ensure cultural sensitivities have been addressed, translators for Elders have been arranged, and that we are not conflicting with other community events (fall hunt, ceremonies, funerals, etc) that may be occurring.

Additionally, we will take full advantage of industry events where representatives from the communities may be present. This will continue in the future, but is currently subject to travel and gathering restrictions.

Engagement Work Plan

Contact has been made with the relevant development corporations as well as the political organizations of the affected communities. Presentations in paper form, electronic form, and three dimensional videos describing the proponents goals, issues, and some options have been identified and presented to:

- YKDFN
- NSMA
- City of Yellowknife

Communicating/Implementing the Engagement Plan

Methods and timing on communicating the Engagement Plan has been on an ad hoc basis, largely initiated by the proponent as the project evolves NDM will identify a key contact for each of the affected parties and work to understand the desired level of involvement; ie. Annual reports, quarterly presentations at council meetings, monthly phone calls etc. NDM will work to accommodate any desire timelines to ensure the parties are kept apprised of new developments and are provided an opportunity to raise questions/concerns.

Implementing the Engagement Plan has been implemented and has been ongoing since May 2012. The small footprint, environmentally, economically and socially has made it difficult to get traction within the communities, as such consultation has largely been at the proponents request. It is unlikely to change unless the communities can obtain more resources as the current contacts are stretched very thin. Assuming this is the status going forward, it is intended to increase consultations within each community as our development increases in size. This plan will cover consultations after the current licenses were issued.

Development-related Triggers

Development-related triggers to community engagement include:

Event	Action
Commencement of Operations	Notify affected communities and request comments
Temporary or permanent closure/ shutdown	Notify affected communities and request comments
Potential change of plans, new discovery	Notify and consult with affected communities and request comments
Reportable event, spill, accident, archaeological discovery	Notify affected communities and request comments
Wildlife encounter	Notify affected communities and request comments

Follow-up Reporting

NDM will follow up on an annual basis within each affected community at the very least. As mentioned above, our intent is to work with key contacts, to finalize a mutually agreed communication timeline if possible. Accommodations can change with time, and NDM intends to remain as flexible as possible in these discussions.

Engagement Plan Review

The Engagement Plan will be reviewed annually and on an ad hoc basis as regulatory and status in the project area evolves. Any deficiencies or modification required to improve its effectiveness and inclusiveness will be considered and implemented as possible.

APPENDIX A CONSULTATION LOG

Consultation Log	Contact	Attendee	Community	Issues Raised by Affecte	Recommendation by aff	Solution	Discussion
September 10, 2013	email AANDC	Don Audbrey / James Lawrence	AANDC	None	None	None	Consultation confirmation, whom
September 10, 2013	email from AANDC	cc Christian Bertelstein	AANDC	None	None	None	Confirmation of consultation groups
October 25, 2018	call 867 394-3313	Annie Boucher	ADFN	None	None	None	left message and phone number
October 26, 2018	call 867 394-3313	Annie Boucher	ADFN	None	None	None	executive.director@Akatcho.ca Send details by email for forwarding to Stephanie Poo
October 26, 2018	email AB	Annie Boucher	ADFN	None	None	None	executive.director@Akatcho.ca Details to be forwarded
October 26, 2018	email from AB	Annie Boucher	ADFN	None	None	None	Details forwarded to AP
November 1, 2018	email to AB	Annie Boucher	ADFN	None	None	None	Request to call Stephanie Poole directly?
November 1, 2018	email from AB	Boucher, Poole	ADFN	None	None	None	email forwarded to SP.
November 1, 2018	email from SP	Boucher, Poole	ADFN	None	None	None	Call at my convenience
November 1, 2018	email to SP	Boucher, Poole	ADFN	None	None	None	At what number
November 2, 2018	Called SP	Poole	ADFN	None	None	None	wrong numbers
November 2, 2018	email to SP	Boucher, Poole	ADFN	None	None	None	Can't call
November 2, 2018	email from AB	Boucher, Poole	ADFN	None	None	None	Provide 867 370 3217 as correct number
November 2, 2018	Called SP	Poole	ADFN	None	None	None	Not in, call Monday
November 5, 2018	Called SP	Poole	ADFN	None	None	None	Not in at 1:00 pm, try at 1:30 pm
November 5, 2018	Called SP	Poole	ADFN	None	None	None	Suggest EA with YKDFN. Cc SP in communication to assist.
February 24, 2019	email SP, AB	Boucher, Poole	ADFN	None	None	None	Send copy of renewal application
February 25, 2019	email from SP, AB	Boucher, Poole	ADFN	None	None	None	Confirm the consultation log
February 25, 2019	email to SP, AB	Boucher, Poole	ADFN	None	None	None	Correct the consultation log
February 26, 2019	email from SP, AB	Boucher, Poole	ADFN	None	None	None	Please send the detailed spreadsheet.
February 26, 2019	email to SP, AB	Boucher, Poole	ADFN	None	None	None	Sent…spreadsheet ADFN/YKDFN
May 11, 2020	email to SP, AB	Black, Gillis	ADFN	None	None	None	Renew contact, cc to YKDFN
May 12, 2020	email from SP	Boucher, Poole	ADFN	None	None	None	Forwarding correspondence to SG
October 11, 2013	email Mayor Heyck	Mayor Heyck	City of Yellowknife	None	None	None	Introduce NDM, DRW, Mon Gold Mine
October 17, 2013	email from Mayor Heyck	Mayor Heyck	City of Yellowknife	None	None	None	Reply with interest to hear more.
October 18, 2013	email from Judy Brennan	Judy Brennan	City of Yellowknife	None	None	None	Arrange meeting on November 5th.
October 18, 2013	Email to JB	Judy Brennan	City of Yellowknife	None	None	None	Confirm time
October 18, 2013	email from JB	Judy Brennan	City of Yellowknife	None	None	None	confirmed.
October 28, 2013	email to JB	Judy Brennan	City of Yellowknife	None	None	None	Send copy of deck
October 28, 2013	email from JB	Judy Brennan	City of Yellowknife	None	None	None	confirmed.
June 18, 2014	email to TT	Beaulieu, TT, GH	Denedeh Investmen	None	None	None	request meeting in June
June 26, 2014	DB, TT	Beaulieu, TT	Denedeh Investmen	None	None	None	meet and discuss project, financing potential
May 1, 2014	email from Itoah Scott-Enns	Scott-Enns	Kwe Beh WG	None	None	None	Up coming Kwe Beh WG schedule
May 1, 2014	email to Itoah Scott-Enns	Scott-Enns	Kwe Beh WG	None	None	None	Thanks, plus update on my schedule
August 24, 2012	email to Bill Enge	Bill Enge	NSMA	None	None	None	Initial contact with NSMA
September 11, 2013	email Sheryl Grieve	Sheryl Grieve	NSMA	None	None	None	NSMA introduction
September 24, 2013	call Matt Hover, NSMA	Matt Hover	NSMA	None	None	None	Initiate discussion, confirm contacts
September 24, 2013	email to Eric Binion, NSMA	Eric Binion	NSMA	None	None	None	Introduce project
October 1, 2015	call Shin Shiga	Shin Shiga	NSMA	None	None	None	out of office, suggest we email
October 1, 2015	email Shin Shiga	Shin Shiga	NSMA	None	None	None	Introduction, request to call.
October 2, 2015	call Shin Shiga	Shin Shiga	NSMA	None	None	None	867 873-6762 Discuss history and project.
October 13, 2015	email SS	Shiga	NSMA	None	None	None	Help to contact BE
October 13, 2015	email from SS	Shiga	NSMA	None	None	None	Help to contact BE
October 7, 2017	email to SS	Shiga	NSMA	None	None	None	Introduction on work
October 29, 2017	email from NG	Nicole Goodman	NSMA	None	None	None	reply of support, questions
September 27, 2018	NG	Nicole Goodman	NSMA	None	None	None	Introduction of amendment request
September 28, 2018	NG	Nicole Goodman	NSMA	None	None	None	Confirmation of engagement log
October 1, 2018	NG	Nicole Goodman	NSMA	None	None	None	Confirmation of engagement log
October 2, 2018	NG	Nicole Goodman	NSMA	None	None	None	Outline proposed amendment again
October 18, 2018	email from NG	Nicole Goodman	NSMA	None	None	None	Confirmation, correct Eric Hover to Eric Binion
January 9, 2019	email NG	Goodman	NSMA	None	None	None	Discuss potential meeting in Vancouver at Roundup
February 24, 2019	email NG	Goodman	NSMA	None	None	None	Send copy of renewal application
February 24, 2019	email from NG	Goodman, Shinga	NSMA	None	None	None	Please consult with Shin Shiga
February 24, 2019	email to SS	Shinga	NSMA	None	None	None	Send copy of renewal application
February 25, 2019	email from SS	Shinga, JH	NSMA	None	None	None	Jessica Hurtubise will be point on this file.
April 21, 2020	email to JH	Shiga, Hurtubise	NSMA	None	None	None	Update on plans, discuss renewal of WL
April 22, 2020	email from JH	Hurtubise	NSMA	None	None	None	Introduction
April 22, 2020	email to JH	Hurtubise	NSMA	None	None	None	Response with some bio.
May 11, 2020	email to info@ntpc.com		NTPC	None	None	None	introduction and request for contact.
May 11, 2020	Phone call from Colin Steed	Colin Steed	NTPC	None	None	None	Discuss WL, consultation
May 11, 2020	email from CS	Steed, Miller	NTPC	None	None	None	Introduce Matt Miller
May 12, 2020	email from MM	Miller, DM, ES	NTPC	None	None	None	NTPC WL consultation
May 12, 2020	Call from MM	Miller	NTPC	Discuss Cabin Owners	Check ATLAS	Reviewed. No C.O.	Introduction and consultation needs. Send documents re: quantity and quality
May 12, 2020	email to MM	Miller, Steed, DM, ES	NTPC	Chemicals	Send data	Sent data on chemicals	Maps, plans details of water use. History of Mon.
May 15, 2020	email to MM	Miller	NTPC	None	None	None	email details requested on milling and water use.
January 4, 2021	email Jess	JH	NWTMA	None	None	None	Notify of iminent start up, and future discussion.
May 12, 2020	email to Tim Heron	Time Heron	NWTMN	None	None	None	Introduction of NDM and project with links and maps
January 4, 2021	email Tim	TH	NWTMN	None	None	None	Notify of iminent start up, and future discussion.
September 11, 2013			Tlicho	None	None	None	Tlicho introduction
September 11, 2013	email from Kerri Garner	Kerri Garner, Itoah Scott-Enns	Tlicho	Confirm interest	talk to group	Prepare meeting	Confirmation of interest, referal to exploration and mining group
September 20, 2013	email from Itoah Scott-Enns	Kerri Garner, Scott-Enns	Tlicho	Confirm interest	talk to group	Prepare meeting	Invitation to meet Chiefs and development committee, November 5,6

September 20, 2013	email to Itoah Scott-Enns	Scott-Enns, Kerri, Ginger, Rozem	Tlicho	Confirm interest	talk to group	Prepare meeting	Acceptance and request for format/expectations
September 23, 2013	email to Itoah Scott-Enns	Scott-Enns, Kerri, Ginger, Rozem	Tlicho	Confirm interest	talk to group	Prepare meeting	Background information for NDM and DRW
October 24, 2013	email from GG	Scott-Enns, Ginger, Rozemary	Tlicho	None	None	None	Appreciate DD, please lets talk by phone
October 24, 2013	call from GG	Ginger Gibson	Tlicho	None	None	None	Confirm time of meeting at 10:30 am. Details to follow
October 28, 2013	email from IS	Scott-Enns, Ginger	Tlicho	None	None	None	Confirm time of meeting at 10:30 am. Details to follow
October 28, 2013	email to IS	Scott-Enns, Ginger	Tlicho	None	None	None	Send copy of deck
November 5, 2013	meeting with Tlicho Kwe Beh group		Tlicho	None	None	None	present project, answer questions
October 17, 2018	email to ZN	Nevitt	Tlicho	None	None	None	Copy of map and outline of amendment request. Request for follow-up
November 1, 2018	email to ZN	Nevitt	Tlicho	None	None	None	Can we call to discuss?
November 1, 2018	email from ZN	Nevitt	Tlicho	None	None	None	Out of office until November 8th
February 24, 2019	email ZN	Nevitt	TLICHO	None	None	None	Send copy of renewal application
February 20, 2020	email to ZN	Nevitt	Tlicho	None	None	None	Update on plans, discuss renewal of WL (RETURNED)
February 20, 2020	email to CZ	Zoe	Tlicho	None	None	None	email to Zabey was returned. Who do we communicate with?
April 21, 2020	email to ZN	Nevitt	Tlicho	None	None	None	Update on plans, discuss renewal of WL
January 4, 2021	email Zaby	ZN	Tlicho	None	None	None	Notify of iminent start up, and future discussion.
January 26 2021	email to Violet Camsell Blodin	VCB	Tlicho	Lack of contact	call, email	request for meeting	email outlining past discussions, requesting further discussions
June 1, 2020	email to communications@yellowknife.ca		Yk	None	None	None	Introduce renewal
June 17, 2020	Phone call to Brooklyn, EA to Mayor	Brooklyn	YK	None	None	None	Left message
June 17, 2020	Phone call from Brooklyn	Brooklyn	YK	None	None	None	Discuss project history, confirm email addresses
June 17, 2020	email to BP	Brooklyn	YK	None	None	None	re-introduce project, cc to SWF for letter confirming receipt of ash.
January 4, 2021	email Brooklyn	Brooklyn	Yk	None	None	None	Notify of iminent start up, and future discussion.
November 5, 2013	Meeting with City of Yellowknife	Heyck, Brennan	Yk	None	None	None	present project, answer questions
May 28, 2012	867 873-6533	Roy Erasmus jr	YKDFN	None	None	None	left message with Candice
May 28, 2012	esangris@ykdene.com	Ed Sangris	YKDFN	None	None	None	request meeting in June
May 28, 2012	fsangris@ykdene.com	Fred Sangris	YKDFN	None	None	None	request meeting in June
June 4, 2012	rerasmus@detoncho.com	Roy Erasmus Jr	YKDFN	None	None	None	email to confirm contact, request meeting
June 6, 2012	rerasmus@detoncho.com	Roy Erasmus Jr	YKDFN	None	None	None	received email confirming contact number
June 6, 2012	rerasmus@detoncho.com	Roy Erasmus Jr	YKDFN	None	None	None	Called and discussed meeting June 28/29.
June 25, 2012	867 873-6533	Roy Erasmus jr	YKDFN	None	None	None	left message with Candice
June 26, 2012	867 873-6533	Roy Erasmus jr	YKDFN	None	None	None	transferred to Rick Miller
June 26, 2012	visit Rick Miller	Rick Miller	YKDFN	None	None	None	update on activities, suggest options available, review video.
July 9, 2012	Call Ykdene 867 873-8951	Todd Slack	YKDFN	Confirm location	None	Maps sent	Forwarded to Todd Slack. Discussed desire to engage. Forwarded Yellowknives2.pdf
August 3, 2012	email from Todd Slack re: GoogleEarth file.	Todd Slack	YKDFN	None	None	None	
August 6, 2012	email to Todd Slack re: GoogleEarth file.	Todd Slack	YKDFN	None	None	None	Offer to discuss this and any other issues.
August 22, 2012	email to Todd Slack re: GoogleEarth file.	Todd Slack	YKDFN	None	None	None	Offer to discuss this and any other issues.
September 6, 2012	email to Todd Slack	Todd Slack	YKDFN	None	None	None	re: permits and consultations
September 6, 2012	email from Todd Slack	Todd Slack	YKDFN	None	None	None	re: permits and consultations
October 2, 2012	email from Todd Slack with EA attached.	Todd Slack	YKDFN	None	None	None	Will call next week.
October 14, 2012	email to TS re: EA.	Todd Slack	YKDFN	None	None	None	
November 14, 2012	Talked to Todd Slack at YkGF	Todd Slack	YKDFN	More details	None	Discussed	Discussed revisions on EA.
January 16, 2013	Email EA to Todd Slack	Todd Slack	YKDFN	None	None	None	
January 17, 2013	email from Todd Slack	Todd Slack	YKDFN	None	None	None	regarding EA
January 17, 2013	email to Todd Slack	Todd Slack	YKDFN	None	None	None	regarding EA
March 4, 2013	meet at PDAC	Roy Erasmus Jr, Rick Miller	YKDFN	None	None	None	Roy Erasmus Jr, Rick Miller Just a hello, brief discussion.
March 22, 2013	email to Todd Slack	Todd Slack	YKDFN	Capacity	None	We can wait	Up date or news?
March 22, 2013	email from Todd Slack	Todd Slack	YKDFN	None	None	None	automatic out of office reply
March 22, 2013	email from Todd Slack	Todd Slack, Gault	YKDFN	Capacity	None	We can wait	Been very busy. Perhaps next week.
March 22, 2013	email to Todd Slack	Todd Slack, Gault	YKDFN	Capacity	submit application	Prepare applications	Great news. Preparing applications
April 2, 2013	email from TS	Todd Slack, Gault, Freeman	YKDFN	None	None	None	EA not accepted, come meet in late April
April 3, 2013	email to TS	Todd Slack, Gault, Freeman	YKDFN	None	None	None	Lets meet with Chief and Council
April 9, 2013	email to TS	Todd Slack	YKDFN	None	None	None	Any word on meetings? Any preparation of preferred format?
April 29, 2013	email to TS	Todd Slack	YKDFN	None	None	None	Any word on meetings? Any preparation of preferred format?
April 29, 2013	email from TS	Todd Slack, Gault, Freeman	YKDFN	None	None	None	No time in April, on May 9 agenda
April 29, 2013	email to TS	Todd Slack, Gault, Freeman	YKDFN	None	None	None	Thanks, can I assist in preparing anything?
May 27, 2013	email to TS	Slack, Gault, Abel	YKDFN	None	None	None	Just returned, any updates
June 3, 2013	email to TS	Slack, Gault, Abel	YKDFN	None	None	None	Will be in Yellowknife June 24/25, July 4th Can I meet?
June 21, 2013	email to TS	Slack, Gault, Abel	YKDFN	None	None	None	Will be in Yellowknife June 24/25, July 4th Can I meet?
June 24, 2013	phone call from TS	Todd Slack	YKDFN	None	None	None	Can we talk?
June 25, 2013	Visit TS in N'dilo	Todd Slack	YKDFN	None	None	meet	Discuss timing and focus of EA modifications
July 12, 2013	email to TS	Todd Slack	YKDFN	None	None	Provide video	Modified Mon video on FTP site
July 15, 2013	email to TS	Todd Slack	YKDFN	Clarify	None	Discuss video	Follow-up on video, discussions on June 25th
July 17, 2013	call TS	Todd Slack	YKDFN	Capacity	submit application	Prepare applications	Discuss timing of LUP application. Cannot approve in writing
September 10, 2013	email TS	Todd Slack	YKDFN	None	None	None	LUP application is ready. Discussion? Video presentaion forwarded
September 10, 2013	email TS	Slack, Gault, Abel	YKDFN	None	None	None	Request input on Engagement Plan
September 25, 2013	email TS	Slack, Gault, Abel	YKDFN	None	None	None	Request input on Engagement Plan again
October 7, 2013	Call TS	Slack	YKDFN	None	None	None	in meeting, will call back in 15 to 20 minutes
October 7, 2013	Call 867-392-6381	Scott-Enns, Matheson Maud	YKDFN	None	None	None	to speak to Itoah / transferred to Margari Matheson Maud, left message
October 7, 2013	Call from TS	Slack	YKDFN	Meeting chiefs	None planned	None	no comments on consultation plan will be coming
October 15, 2013	email to Itoah Scott-Enns	Scott-Enns, Kerri, Ginger, Rozem	YKDFN	None	None	None	Any confirmation on the meeting?
October 15, 2013	email from Itoah Scott-Enns	Scott-Enns, Kerri, Ginger, Rozem	YKDFN	None	None	None	confirmation of meetings
October 15, 2013	email from Ginger Gibson	Ginger Gibson	YKDFN	None	None	None	Responding to earlier email
October 31, 2013	email to TS	Slack, Gault, Abel	YKDFN	None	None	None	advise of Yk trip. Can meet for coffee

December 4, 2013	email to TS	Slack	YKDFN	None	None	None	update on LUP application and revision.
January 3, 2014	email to TS	Slack, Gault, Abel	YKDFN	None	None	None	advise of Water License application. Ask about Round-up
March 25, 2014	email to TS	Slack, Gault, Abel	YKDFN	None	None	None	Request advise on an archaeological study
March 25, 2014	email from TS	Slack, Gault, Freeman	YKDFN	Archealogical survey	Discuss with RF	Prepare AS	Advised to contact Randy Freeman
March 25, 2014	email to RF	Freeman	YKDFN	Archealogical survey	Discuss with RF	Prepare AS	Advised to contact Randy Freeman
April 8, 2014	email from RF	Freeman	YKDFN	TK study	None	Consider	Introduction, TK and archealogical studies
April 8, 2014	email to RF	GVH, Freeman	YKDFN	None	None	None	Introduction, schedule. Can we talk.
June 18, 2014	email to TS	Slack, GH, Abel	YKDFN	None	None	None	request meeting in June
June 18, 2014	email to Randy Freeman	Freeman, GH	YKDFN	None	None	None	request meeting in June
June 24, 2014	email from TS	Slack, Black	YKDFN	None	None	None	Invitation to meet L&EC Thursday
June 24, 2014	email to TS	Slack, Black	YKDFN	None	None	None	Acceptance and request for format/expectations
June 25, 2014	email from Joanne Black	Slack, Black	YKDFN	None	None	None	Confirm meeting with L&EC
June 25, 2014	email from TS	Slack, Black	YKDFN	None	None	None	Discuss meeting with L&EC
June 26, 2014	Land and Environment Committee		YKDFN	None	None	None	Present at 3:00 PM to L&EC
June 26, 2014	Randy Freeman	Freeman	YKDFN	TK	Heritage Study	Discuss with RF	Meet and discuss Heritage Study. RF to set up with PWHC and Golder if possible
July 7, 2014	Johanne Black	Slack, Black	YKDFN	None	None	None	Request digital version of presentation.
July 7, 2014	Johanne Black	Slack, Black	YKDFN	None	None	None	Email pdf version, will mail disk on return to Vancouver
July 8, 2014	Johanne Black	Slack, Black	YKDFN	None	None	None	confirmed.
July 16, 2014	Randy Freeman	Freeman	YKDFN	None	None	None	Check on progress to do Heritage Study
July 17, 2014	Randy Freeman	Freeman	YKDFN	None	None	None	Not great…can we wait until next year.
July 17, 2014	Todd Slack	Slack	YKDFN	None	None	None	Raise subject of permits for milling
July 17, 2014	Randy Freeman	Freeman	YKDFN	None	None	None	We can wait, but it is unfortunate
July 18, 2014	Todd Slack	Slack	YKDFN	None	None	None	Reply of concern but basic structure
August 7, 2014	Johanne Black	Slack, Black, Freeman	YKDFN	None	None	None	Record of Engagement review
August 8, 2014	Johanne Black	Johanne Black	YKDFN	None	None	None	Review of Engagement Record
September 8, 2014	Randy Freeman	Slack, Freeman	YKDFN	None	None	None	Heritage Study discussion
October 8, 2014	Randy Freeman	Slack, Freeman	YKDFN	None	None	None	Heritage Study discussion
October 9, 2014	Randy Freeman	Slack, Freeman	YKDFN	None	None	None	Heritage Study discussion
October 17, 2014	Randy Freeman	Slack, Freeman	YKDFN	None	None	None	Follow up on HS
April 13, 2015	Randy Freeman	Slack, Freeman	YKDFN	None	None	None	Heritage Study discussion
May 13, 2015	email to Todd Slack	Slack	YKDFN	None	None	None	plan phone call
May 13, 2015	email from Todd Slack	Slack	YKDFN	None	None	None	Advised to talk to RF and RC
May 13, 2015	emails with Randy Freeman	Freeman	YKDFN	None	None	None	Confirm phone call for 5/14/15
May 18, 2015	emails with Randy Freeman	Freeman, GH	YKDFN	None	None	None	Introduce us to Rachel Crapeau
May 18, 2015	emails with Randy Freeman	Freeman, GH	YKDFN	None	None	None	Introduce us to Rachel Crapeau. Update?
June 1, 2015	emails with Randy Freeman	Freeman, Rachel Crapeau	YKDFN	None	None	None	Phone call soon?
June 11, 2015	Call Randy Freeman	Freeman	YKDFN	None	None	None	Left message
June 11, 2015	email to Rachel C	Rachel Crapeau	YKDFN	None	None	None	Can we talk?
June 12, 2015	Call Randy Freeman	Freeman	YKDFN	None	None	None	on cell. RC back from Edm. No word from Golder
June 12, 2015	email to Rachel C	Rachel Crapeau	YKDFN	None	None	None	Can we talk?
July 14, 2015	email to V.H	Vince Halushka	YKDFN	None	None	None	Can we talk, include Rachel C for lunch Wednesday? Frm GH
July 28, 2015	email to Rachel C	Freeman, Rachel Crapeau	YKDFN	None	None	None	Update on permitting starus
July 30, 2015	email from Johanne Black	Alex Power, Black	YKDFN	None	None	None	Update on YKDFN structure post TS.
August 6, 2015	email to JB	Black, AP	YKDFN	None	None	None	Thanks for updates
August 17, 2015	email to AP	Black, AP	YKDFN	None	None	None	Available for phone call?
August 18, 2015	email to AP	Black, AP	YKDFN	None	None	None	Confirm call 9:00 am PDT Wednesday
August 19, 2015	call AP	AP	YKDFN	None	None	None	Introduction, backgrounds.
October 1, 2015	call Bob Murphy	Bob Murphy	YKDFN	None	None	None	update on operations. WR discussion, tanks, camps.
October 6, 2015	email AP	AP	YKDFN	None	None	None	Discuss consolidation of permits and licenses
October 6, 2015	email from AP	AP	YKDFN	None	None	None	Discuss consolidation of permits and licenses. Set up time at 3:00 pm
October 6, 2015	Call from AP	AP	YKDFN	None	None	None	Discuss consolidation of permits and licenses. Agreed. Note sent to MVLWB
May 17, 2017	email to AP	AP	YKDFN	None	None	None	Extract from NI 43-101, invitation to meet.
July 15, 2017	email to AP	RH, GH, AP	YKDFN	None	None	None	request for meeting if desired
July 17, 2017	email from AP	RH, GH, AP	YKDFN	None	None	None	Yes, let's coordinate
July 18, 2017	email from AP	RH, GH, AP	YKDFN	None	None	None	Yes, Week of Aug 14-18
July 27, 2017	Call AP	AP	YKDFN	None	None	None	potential meeting
August 9, 2017	email from AP	RH, GH, AP	YKDFN	None	None	None	September elections. Perhaps after Sept 9th
August 18, 2017	email from AP	RH, GH, AP	YKDFN	None	None	None	Datafiles in shp
August 19, 2017	email from AP	RH, GH, AP	YKDFN	None	None	None	Datafiles in shp Files sent
August 19, 2017	Email to AP	RH, GH, AP	YKDFN	None	None	None	Notify observation of tent rings at Narrow Lake
August 21, 2017	email from AP	RH, GH, AP	YKDFN	None	None	None	Thanks. Datafiles in shp
August 21, 2017	email from AP	RH, GH, AP	YKDFN	None	None	None	Thanks re observation on tent rings at Narrow Lake
July 19, 2018	Email to JB	Black	YKDFN	None	None	None	Update and request for discussion on results.
July 19, 2018	email from JB	Black	YKDFN	None	None	None	Set up meeting on August 8?
July 19, 2018	Email to JB	Black	YKDFN	None	None	None	Let's meet.
July 20, 2018	email from JB	Black	YKDFN	None	None	None	Set up call on August 8th.
August 3, 2018	email from JB	Black	YKDFN	None	None	None	Call at 10 AM?
August 3, 2018	Email to JB	Black	YKDFN	None	None	None	Set up call.
August 8, 2018	Email to JB	Black	YKDFN	None	None	None	Should I call on your extension?
September 19, 2018	email to JB	Black, Evans	YKDFN	None	None	None	Update. Call to discuss?
September 19, 2018	email from JB	Black, Evans	YKDFN	None	None	None	Response next week. Too busy
September 19, 2018	email to JB	Black, Evans	YKDFN	None	None	None	Thanks for response

September 26, 2018	Call JB	Black, Evans	YKDFN	None	None	None	Leave message
September 28, 2018	email to JB	Black, Evans	YKDFN	None	None	None	Confirmation of engagement log
November 5, 2018	emailed JB	Black, Poole	YKDFN	None	None	None	Can we talk Tuesday? Is an EA a solution?
November 5, 2018	email from JB	Black, Poole	YKDFN	None	None	None	JB will phone tomorrow
November 5, 2018	emailed JB	Black, Poole	YKDFN	None	None	None	Yes, except 12 to 1 Yk time.
November 5, 2018	email from JB	Black, Poole	YKDFN	None	None	None	confirmed.
November 7, 2018	email from JB	Black, Poole	YKDFN	None	None	None	Confirming discussions for SP
November 14, 2018	email from PE	Black, Evans	YKDFN	None	None	None	Checking availability for Conf Call
November 15, 2018	email to PE	Black, Evans	YKDFN	None	None	None	Outline times
November 15, 2018	email from PE	Black, Evans	YKDFN	None	None	None	Setting up meeting time
November 16, 2018	email from PE	Black, Evans	YKDFN	None	None	None	Confirming 10 am
November 16, 2018	email from JB	Black, Evans	YKDFN	None	None	None	Reset to 11:30, confim availability
November 16, 2018	email from JB	Black, Evans	YKDFN	None	None	None	Reset to 3 pm
November 16, 2018	email from PE	Black, Evans	YKDFN	None	None	None	Try Nov 19th AM
November 16, 2018	email from JB	Black, Evans	YKDFN	None	None	None	Confirmed to 10 am Nov 19.
November 16, 2018	email to JB	Black, Evans	YKDFN	None	None	None	DRW Travelling to Yk.
November 19, 2018	email from PE	Black, Evans	YKDFN	None	None	None	Different time on 19th?
November 19, 2018	email from JB	Black, Evans	YKDFN	None	None	None	meet in person?
November 19, 2018	email to JB	Black, Evans	YKDFN	None	None	None	Confirm available, set time to 4 pm
November 19, 2018	email from JB	Black, Evans	YKDFN	None	None	None	Confirm available, set time to 4 pm
November 19, 2018	Meet JB, EL, PE	Black, Evans, EL	YKDFN	Winter roads undesirea	No winter road ammen	Move to Heli-supported	Discuss LUP amendment. WR an issue. Discuss monitor. Informed consent
November 26, 2018	email JB, PE	Black, Evans, GVH	YKDFN	None	None	None	email map, retract WR option. Initiate monitor details.
January 9, 2019	email JB	Black, RH	YKDFN	None	None	None	Discuss potential meeting in Vancouver at Roundup
February 24, 2019	email JB	Black	YKDFN	None	None	None	Send copy of renewal application
February 25, 2019	email from JB	Black, Evans, MT	YKDFN	None	None	None	Thanks, will review. Introduce Machel Thomas
September 1, 2019	JB and ST	Black, Gavin Kirk, Gillis	YKDFN	None	None	None	Meet with Gavin, discuss year and plans
September 20, 2019	email from ST	Gillis	YKDFN	None	None	None	Confirmed Introduction
September 23, 2019	email to ST	Gillis	YKDFN	None	None	None	Latest NR as update on VMS
December 9, 2019	email to ST	Black, Gillis	YKDFN	None	None	None	Update on plans, introduce renewal of WL
February 20, 2020	email to ST	Black, Gillis	YKDFN	None	None	None	Update on plans, discuss renewal of WL
April 21, 2020	email to ST	Black, Gillis	YKDFN	None	None	None	Update on plans, discuss renewal of WL
May 11, 2020	email from SG	Gillis, Poole, Boucher, Miller	YKDFN	None	None	None	Drop Johanne from the list, add Ryan Miller.
May 11, 2020	email to SG	Gillis, Poole, Boucher, Miller	YKDFN	None	None	None	Acknowledge.
December 11, 2020	email SG, JB	Black, Gillis	YKDFN	None		Can we call	Discuss WR and plans for 2021.

NEW DISCOVERY MINES LTD.

WASTE MANAGEMENT PLAN - MON GOLD MINE

Revisions:

Original Plan	October 2013	Revisions
1	December 2013	Insert revision section Entitle Insert Contents page Reformat entire plan
2	April 2014	Explicit statement of operation and waste segregation Statement on on-site storage of waste Statement on on-going removal of non-conforming waste for incinerator Statement that manufacturers manual for incinerator to be delivered to Inspector for approval Maximum incinerator load defined Stipulate how waste rock is stored and monitored Waste and ore handling and storage Drill cuttings handling Drill fluids handling Drill water discharges monitoring Monitor ground water seepage into underground
3	May 2015	Modify to incorporate milling operations
4	July 2015	Add Incineration details Add designs for secondary containment Add / modify plans to management of sewage Modify management of all waste including drill cuttings Add details regarding installation and operation of sumps Add location of storage of ammonium nitrate Add maps 1, 2, 3, and 4 Add additional details on the proposed disposal of mine water (include parameters to be tested) Add further details on the disposal of mill water Add further details on proposed management and disposal options or any ground water that may be encountered.
5	October 2015	Add Land Farm details.
6	August 2016	reviewed, no changes
7	September 2016	Register as Hazardous Waste Generator when required Activities will comply with Guidelines for the Management of Hazardous Waste in the NWT and Confirm the ultimate disposal of Hazardous Waste on Hazardous Waste Movement Documents Add details on landfarm design, construction and operation Add details on sewage and greywater treatment facility (bioreactor) Update details on separation of treated and untreated wood waste Section “Forms” reviewed and amended Section on Mine Water Disposal amended to track Water License details Section on Sumps and Management of Drilling Waters reviewed

		Section on Mill Waste reviewed. Separate plan being prepared Section on Mine Rock reviewed. Separate plan being prepared Add Section on Secondary Containment Location of ammonium nitrate storage added to Management Plan Map
9	October 2016	Updated to include reference to GNWT Inspectors as appropriate, and the reference to AANDC inspectors removed Bullets under the Wood Waste section outlining wood waste management updated to clearly identify which bullet represents untreated wood waste management activities, and which represents treated wood waste management activities. The information on page 12 regarding mine waste water discharge updated to reference the correct Water Licence conditions. Location for the storage of ammonium nitrate added to the map within the Waste Management Plan.
10	December 2018	Reference to pre-1980 refuse sites added. Confirm diamond drill site wastes are appropriately considered.
11	July 2020	Revise figure 3 Reconcile Mill Waste data
12	December 2020	Mill Waste data consolidated within WMP. Landfarm and bioreactor details enhanced. Supporting ore, waste, tailings geochemistry and ABA details included. Remove camp incinerator. All non-paper, untreated wood, and cardboard waste shipped to an approved recycling or disposal site. Addition of conformity table with reference to changes
13	January 2021	Changes listed in Conformity Table

Contents

Conformity Table for this Revision

All comments from reviewers have been received and are shown below with actions taken to accommodate them.

Request	Page	Responds to
GNWT ENR-EAM		
2	Details on the construction of the DST are provided in Dry Stack Storage Page 34 Details on the Landfarm under in a separate document Landfarm Management Plan Geochemistry data for ore and waste rock, mill waste, and ground water provided Page 19 and 20) Monitoring data for Mill Waste is provided on Page 33 Monitoring data for Waste Rock is provided on Page 39	Oct 6: Board staff is confident that GNWT-ENR reviewed the documents submitted with the applications and have outstanding concerns with regard to the level of detail provided for the design, operation, and closure of the landfarm and dry stack tailings. Board staff agree that information for the construction and operation of these facilities provided in the applications is not sufficient to approve the work without more detailed information. Prior to the construction of any structures, the Draft Licence requires New Discovery to submit for approval a Structure Description and Construction Plan or a Design and Construction Plan. In addition, it requires New Discovery adhere to the Guideline for Design, Operation, Maintenance, and Closure of Petroleum Hydrocarbon-Contaminated Soil Treatment Facilities in the Northwest Territories for the design, construction, maintenance, and monitoring of the proposed landfarm. Details for the specific facility New Discovery plans to construct and operate should be submitted as a separate Hydrocarbon-Contaminated Soil Treatment Facility Plan meeting all requirements of the Guideline referenced above. This will include the need to identify clearly, the proposed reuse criteria for treated soils. Similar to the identification of appropriate soil criteria, New Discovery is required to identify quantifiable performance objectives for the Dry Stack Tailings. Clear criteria for the successful design and operation of these facilities is required for the life of the Project. Plans for the dry stack tailings facility must clearly identify regular inspection requirements and monitoring plans, including action plans in the event the facility is not operating as expected.

11	Design and construction of the DST is provided in "Dry Stack Storage" including frequency of sampling, current sampling of SNP 03 "Water Geochemistry" and that the proponent will comply with license requirements including EQC standards. Pg. 34 A separate Tailings Management Plan will cover these comments plus design criteria. SNP-03 (historic) now is replaced by SNP-02, SNP-03a, SNP-03b, SNP-04, and potentially groundwater monitoring wells SNP-06a and SNP-06b (down-gradient of the DST)	Oct 6: The Applicant did not fully respond to GNWT-ENR's recommendations. Much more information on the monitoring associated with the dry stack tailings will be required before construction and operation of the facility will be approved by the Board. Board staff note that the draft Licence requires New Discovery to develop and submit for Board approval a Tailings Management Plan. Schedule 4, condition 3 of the Draft Licence requires specific locations for sampling, proposed frequency of sampling, predicted performance values, and contingency plans be identified. Licence conditions include EQC that the Applicant have agreed to under MDMER. If any changes are requested, rationale will be required followed by an amendment process. In response to GNWT-ENR comments, Board staff have included the need to identify the collection and disposal methods of trench water into the schedule.
12	A separate Hydrocarbon-Contaminated Soil Treatment Facility plan is provided, reference "Land Farm Operations and Management Plan"	Oct 6: Board staff agree that information for the construction and operation of these facilities provided in the applications is not sufficient to approve the work without more detailed information. Prior to the construction of any structures, the Draft Licence requires New Discovery to submit for approval a Structure Description and Construction Plan or a Design and Construction Plan. In addition, it requires New Discovery adhere to the Guideline for Design, Operation, Maintenance, and Closure of Petroleum Hydrocarbon-Contaminated Soil Treatment Facilities in the Northwest Territories for the design, construction, maintenance, and monitoring of the proposed landfarm. Details for the specific facility New Discovery plans to construct and operate should be submitted as a separate Hydrocarbon-Contaminated Soil Treatment Facility Plan meeting all requirements of the Guideline referenced above. This will include the need to identify clearly, all the information needs identified by GNWT-ENR.

13	Details are provided in "**Error! Reference source not found.** Pg. 38**Error! Bookmark not defined.**" and "Sumps Pg. 41"	Recommendation 1) ENR recommends that the following information be provided as it relates to sumps, as per the Guidelines for Developing a Waste Management Plan (MVLWB, 2011): -Details of waste volume balance and sump sizing; -Details of the operations through construction, disposal, and closure; and -Details of sump monitoring and local environment, and an explanation of how environmental monitoring will be linked to any management response.
14	Spill Contingency Plan	**Oct 6:** Final Plans for the storage of diesel should be provided in a revised Waste Management Plan, once known.
16	A separate Waste Rock Management and Geochemical Characterization and Monitoring Plan will be submitted prior to mining commencing. Additional details are also expanded here for Waste Rock (Page 39)	Oct 6: The Draft WL requires New Discovery to submit for Board approval a Waste Rock Management and Geochemical Characterization and Monitoring Plan prior to the commencement of any mining activities. Schedule 4, condition 1 identified the requirements of this Plan. Board staff believe these requirements address the GNWT-ENR recommendations. Recommendation 1)ENR recommends that New Discovery conduct additional geochemical sampling and analysis on waste rock, gravity tailings, and flotation tailings in order to better characterize the ARD/ML potential of these materials.
31 & 32	These are correct and accurate comments. See the separate Waste Rock Management and Geochemical Characterization and Monitoring Plan. Note that we do not plan any excavations into the remote VMS mineralization, nor do we plan to deposit any of our gold concentrates into the receiving environment. This will be removed, refined into gold bars and sold.	Brodie Consulting Ltd. Separate document suggests more details on waste characterization, specifically rock. Points out gravity concentrate is AG, and VMS mineralization 1.5 km removed from the site is potentially AG.
MVLWB		

2	NDM accepts this until further baseline data can be obtained. No DST use is planned until mid 2022 at the earliest.	Oct 6: These details are required for drafting Licence conditions. GNWT-ENR made comments on the EQC for the sewage effluent and the dry stack tailings. Board staff suggest that sewage effluent criteria remain as set in previous authorizations, in line with the Wastewater System Effluent Regulations, and that runoff from the dry stack tailings continue to meet MDMER requirements. These EQC have been added to the Draft Licence. What remains outstanding are appropriate EQC for waste rock and ore runoff, disposal of mine water. Board staff suggest that these could be included in the Licence and match the MDMER requirements being applied to the dry stack tailings.
11	See separate document, Groundwater and Water Management Plan	Oct 6: These clarifications will be required to be described in detail for public review and Board approval in the Water and Groundwater Quality Monitoring Program a minimum of 90 days prior to commencement of activities under these authorizations.
12	See separate document, Groundwater and Water Management Plan	Oct 6: These clarifications will be required to be described in detail for public review and Board approval in the Water and Groundwater Quality Monitoring Program a minimum of 90 days prior to commencement of activities under these authorizations.
13	See separate document, Groundwater and Water Management Plan	Oct 6: These clarifications will be required to be described in detail for public review and Board approval in the Water and Groundwater Quality Monitoring Program a minimum of 90 days prior to commencement of activities under these authorizations.
14	Waste Rock Management and Geochemical Characterization and Monitoring is presented as a separate document, however the summaries are described under "ROCK, WASTE Pg. 39" and "ROCK, NOT WASTE Pg. 40"	Oct 6: The Applicants response seems to contradict findings of PAG reported in the Applications. Board staff seek discussion on the appropriate trigger for the development and submission of the Waste Rock Management and Geochemical Characterization and Monitoring Plan.
16	Groundwater and Water Quality Monitoring Program and Tailings Management Plans are being developed as separate documents.	Oct 6: These clarifications will be required to be described in detail for public review and Board approval in the Water and Groundwater Quality Monitoring Program a minimum of 90 days prior to commencement of activities under these authorizations. More detailed information, once

		available will be expected in the Tailings Management Plan which will be required a minimum of 90 days prior to the commencement of milling activities for public review and Board approval.
17	Dry Stack Tailings details have been enhanced in "Dry Stack Storage Pg. 34", for Land Farm under separate document, for the Bioreactor under "**Error! Reference source not found.** Pg. 28" including sludge removal, and Waste Rock Pile under "ROCK, WASTE Pg. 39"	Oct 6: These requirements are explicitly identified in the Guidelines for Waste Management Planning and should be provided in a revised version of the Waste Management Plan for public review and Board approval.
18	See separate document Land Farm Operations and Management Plan.	Oct 6: Information for the construction and operation of these facilities provided in the applications is not sufficient to approve the work without more detailed information. Prior to the construction of any structures, the Draft Licence requires New Discovery to submit for approval a Structure Description and Construction Plan or a Design and Construction Plan. In addition, it requires New Discovery adhere to the Guideline for Design, Operation, Maintenance, and Closure of Petroleum Hydrocarbon-Contaminated Soil Treatment Facilities in the Northwest Territories for the design, construction, maintenance, and monitoring of the proposed landfarm. Details for the specific facility New Discovery plans to construct and operate should be submitted as a separate Hydrocarbon-Contaminated Soil Treatment Facility Plan meeting all requirements of the Guideline referenced above. This will include the need to identify clearly, all the information needs identified by GNWT-ENR and Board staff.
Tlicho		
2	Expansion of treatment of sewage is provided in Bioreactor discharge on page 28 including stipulation of sludge removal by licensed third parties and expected EQC is presented by reference to a similar Bioreactor in "Table 2 Pg. 30" and "Table 3 Pg. 30"	Oct 6: Board staff agree and are unsure of where more data may be provided at this time. Effluent Quality Criteria have been added to the draft Licence in accordance with the Wastewater System Effluent Regulations. More information on the management and treatment of sewage should be provided in a revised version of the Waste Management Plan for public review and Board approval.

Request	Page	Responds to
GNWT ENR-EAM		
2, 3, 4	All kitchen waste not processed as grey water in the bioreactor will be bagged, **stored in the camp freezer** and flown to Yellowknife every 7 to 10 days. See pg. 33	The Waste Management Plan states that kitchen and dry waste will be stored in a secure location (Page 31 Other Waste – Kitchen and Dry Waste). However, the Waste Management Plan should specifically require that all food and garbage that may attract wildlife should be stored in animal-proof containers, which are cleaned regularly. 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. The Proponent should utilize food and garbage handling and storage procedures that will minimize the attraction of wildlife. The Proponent should ensure that sealed animal proof containers are cleaned once emptied to minimize the attraction of wildlife.
MVLWB		
2	Table of contents updated. Table of Contents.	There are many Errors in the Table of Contents.
3	Geochemistry for rocks, tailings and water has been expanded. Details on specifics are in Waste Rock Management and Geochemical Characterization Plan. Monitoring of the Landfarm and DST are in separate documents.	The Conformity Table does not accurately represent ENR-EAM Comment 2: ENR notes that overall, this application lacks sufficient information to properly assess the environmental risks. Minimal geochemistry data for rock, tailings, and water has been provided, minimal monitoring has been described, and the designs for facilities such as the landfarm and dry stack tailings facility are incomplete.
4	Changes have page numbers or subtitles cross referenced.	Conformity Table – in response to GNWT-EAM comment 16, it states that details are expanded here but the location of changes in the document have not been identified.
5	References to all supporting documents being developed to support the Waste Management Plan are listed in Associated Management Plans Pg. 13 The Waste Rock Management and Geochemical Characterization and Monitoring Plan, Water and Groundwater Management and Monitoring	In response to GNWT-EAM comment 12, it states that a separate Hydrocarbon Contaminated Soil Treatment Facility Plan is provided. This document has not been submitted. Above, in response to GNWT-EAM Comment 2, it refers to a Landfarm Management Plan. For MVLWB comment 18, it refers to Landfarm Operations and Management Plan. Are these referencing the same document? If so, the name should be verified and made consistent.

	Program, Hydrocarbon-Contaminated Soil Treatment Facility Plan, and Explosives Management Plan have been submitted for review. Structure Description/Design and Construction Plans, Tailings Management Plan are being prepared and will be submitted.	
Tlicho		
2	Page 32 has been added to specifically address Waste Oil	Comment On page 10 of the spill contingency plan, NDM stated, "that waste oil is stored in empty 200L drums in either of the fuel storage areas, and shipped out by plane or truck for off-site disposal at an appropriate waste facility"

Introduction

This Waste Management Plan relates to exploration activities in the Discovery Lake Area known as the Mon Gold Mine which operates under New Discovery Mines Ltd. A camp will be established near coordinates **NAD83 Zone 11 Easting 635,740 m Northing 6,977,330 m, or** Lat 62^{o} 54' 02.05" N, Long -114^{o} 19' 41.99" W. The locations of the project and camp are shown in the figures attached to the LUP Application.

Plan Applicability

Effective Date: December 2020

This plan will serve all of the company's operations in and around the Mon Gold Property including winter road operations. The third revision of this plan adds milling operations including all reagent storage and use, product handling, and dry stack tailings disposal which has been developed in a separate plan.

All sampling of materials, water, soil, and rock will only be analyzed at approved, independent ISO certified laboratories using procedures approved by the Analyst as defined in the Water License. This includes collection, QA/QC protocols including standards, blanks, and security.

Environmental Policy

New Discovery Mines Ltd.'s Environmental Policy follows conditions and regulations of all permits and licenses and E3 Policies of the PDAC. New Discovery Mines Ltd. will conduct exploration activities in ways that create minimal disturbance to the environment and people. To this end, New Discovery Mines Ltd. is committed to: *REDUCTION AND SUBSTITUTION*; Waste collection, handling, separation and storage *RECYCLING AND REUSE*: Waste treatment, waste transfer and transport and waste disposal where possible.

These policies will respect environmental law, regulations and guidelines that exist to provide direction for exploration activities. In the absence of these, New Discovery Mines Ltd. will apply good practice as described in the PDAC's e3 Plus Excellence in Environmental Stewardship Toolkit, and, in the case of more advanced exploration projects, the Performance Standards of the International Finance Corporation (2012). Policies and management processes in developing systems for the management of environmental and socio-environmental matters, to follow established guidelines and give consideration to the following:

a. Adopt and make public policies and procedures for the management of environmental and social issues;

b. Create a management and reporting structure that identifies objectives and allocates appropriate resources and responsibilities for the environmental and social aspects of exploration projects;

c. Apply relevant national regulations and inform themselves of international good practice guidelines for environmental management;

d. Establish procedures for the management of environmental issues that are relevant in the area of exploration. Explorers are encouraged to involve the local community in the identification and implementation of preferred environmental management options;

e. Advance understanding amongst employees, contractors, local stakeholders and affected communities of the potential impacts of exploration and mining on the environment and relevant procedures to prevent and mitigate adverse environmental impacts;

f. Take reasonable steps to ensure that contractors have the capacity to implement operational controls and comply with environmental policies and procedures; and

g. Where possible, support capacity building and education of local stakeholders and affected communities in environmental management using appropriately qualified, independent experts.

Associated Management Plans

A section in the WMP references supporting management plans. These should be reviewed in support of this WMP and include:

- Waste Rock Management and Geochemical Characterization Plan
- Spill Contingency Plan
- Explosives Management Plan
- Dry Stack Tailings Construction
- Groundwater and Water Management Plan
- Tailings Management Plan
- Land Farm Management and Operations Plan (Hydrocarbon-Contaminated Soil Treatment Facility Plan)

PROTECT THE ENVIRONMENT

Objective: To conduct exploration activities in ways that create minimal disturbance to the environment and people.

Impact Assessment and Management

New Discovery Mines Ltd, their employees and contractors are aware of the potential impacts of their activities on the environment and apply appropriate management processes to minimize or mitigate any adverse impacts. In doing so, we consider the need to:

a. Conduct an initial, and then periodic assessments of potential direct, indirect, and cumulative environmental and social impacts, risks and hazards of exploration activities on the environment and people;

b. Conduct and document baseline environmental and social studies to establish any pre-existing conditions against which changes can be monitored, and share the results of such studies with local communities;

c. Work with government and the local community to identify the potential to augment or complement existing land use and development strategies or plans;

d. Where possible, incorporate local or traditional knowledge and practice into baseline studies and the management of environmental issues, but also be respectful of the nature of such information and maintain confidentiality;

e. Have in place and periodically test procedures and equipment to respond to potential environmental incidents;

f. Create and implement procedures for managing chance finds of archaeological sites, artifacts or cultural items;

g. Use processes that reduce the consumption of energy and water and provide for the safe storage and disposal of hazardous materials and residual wastes; and

h. Carry out continuous remediation and reclamation of lands affected by exploration activities.

Vulnerable Environments and Biodiversity

New Discovery Mines Ltd respects and protects vulnerable environments and species, as well as areas of biodiversity, and:

a. Respect legally-designated protected areas and promote practices that support biodiversity assessment and management;

b. Engage with indigenous peoples and local communities to identify valued environmental sites, and any other locations of importance to local people so that the exploration project is respectful of these areas; and

c. Support the development and implementation of sound, inclusive and transparent approaches to land-use planning, biodiversity, conservation, and climate change, based on the best available data, including traditional knowledge.

Monitoring and Reporting

New Discovery Mines Ltd will implement processes of monitoring and reporting on environmental performance (see Principle 2) to inform management, government, local communities, shareholders, and other interested parties. New Discovery Mines Ltd will promptly report all environmental accidents or incidents to the local community and appropriate authorities and to actively share plans to manage the accident or incident. New Discovery Mines Ltd will consider the option to:

a. Where possible, create a community based process for the participation of local stakeholders and other affected and interested parties in the monitoring and verification of environmental management performance and, where applicable, support capacity building so that such activities are meaningful and effective; and

b. Prepare and publish regular reports on environmental performance that, wherever reasonably possible, are validated by local stakeholders and affected communities or other third party observers or auditors.

Purpose and Scope of the Waste Management Plan

The purpose and scope of New Discovery Mines Ltd.'s Waste Management Plan is to identify and manage waste resulting from exploration activities, including operation of a camp and any potential future use of an existing winter-spur route which may connect the camp seasonally to existing winter roads which passes near the Mon Gold Mine. The processing of ores from the property will introduce new waste products that will be accommodated in this plan.

The goal of the Waste Management Plan is to mitigate environmental effects of New Discovery Mines Ltd.'s exploration activities and locations on land, vegetation, water, air, wildlife and fish, which have both intrinsic value to the ecosystem and sociocultural and aesthetic values to a variety of land-users.

The objectives of this Waste Management Plan are to re-establish the Mon Gold Mine Camp and conduct drilling and other exploration allowed under permits in such a way as to reduce/reuse and recycle where possible, and to handle and dispose of waste so as to obviate or minimize impact to environment, offer local employment and use local services as best complements the exploration program, to operate in compliance with governing authorizations and legislation, and to strive for continuous improvement in environmental management, which is a core objective of all environmental programs.

Project Description

New Discovery Mines Ltd. will operate under a Land Use Permit from the MVLWB. A range of exploration activities, including prospecting, surficial rock sampling, underground bulk sampling,

drilling and operation of all-season trailer camps and seasonal tent camps authorized under the permits. The MVLWB authorization also will allow for operation along an existing winter road right of way and of a pre-existing 4 km-long winter spur route.

Following completion of an underground sampling program, mineralization will be processed in a 100 tpd plant.

Processing of the ores recovered from the permitted operations will:

- recycle the maximum amount of water possible,
- ship all concentrates off property to facilities approved for further processing
- produce non-acid generating solids waste products that meet or exceed all guidelines for tailings disposal,
- store these solids in a constrained and monitored dry stack tailings facility.
- Discharge no liquids except as already permitted.

Proposed Location of Waste-Management Activities

Waste-management activities will occur within New Discovery Mines Ltd.'s Mon Gold Mine project, which are depicted in *Map 1* (Figure 1) below. Specific waste-management locations at the Mon Gold Mine and Camp environs will be: kitchen, dry, office and gen-shed, mine, shops, garbage bins and recycle bins;

a. Greywater and sewage into a bioreactor.
b. refuge drums for waste oils/fuels and solids;
c. incinerator (where ash will be collected in sealed pails for out shipment and where domestic and office garbage will be incinerated), and
d. in designated scrap-pile areas (sorted steel or lumber waste for recycling on site, or for out shipment and recycling or out shipment and proper disposal).
e. Rock piles denoted as waste or not waste.
f. Dry stack storage facility
g. Overburden management

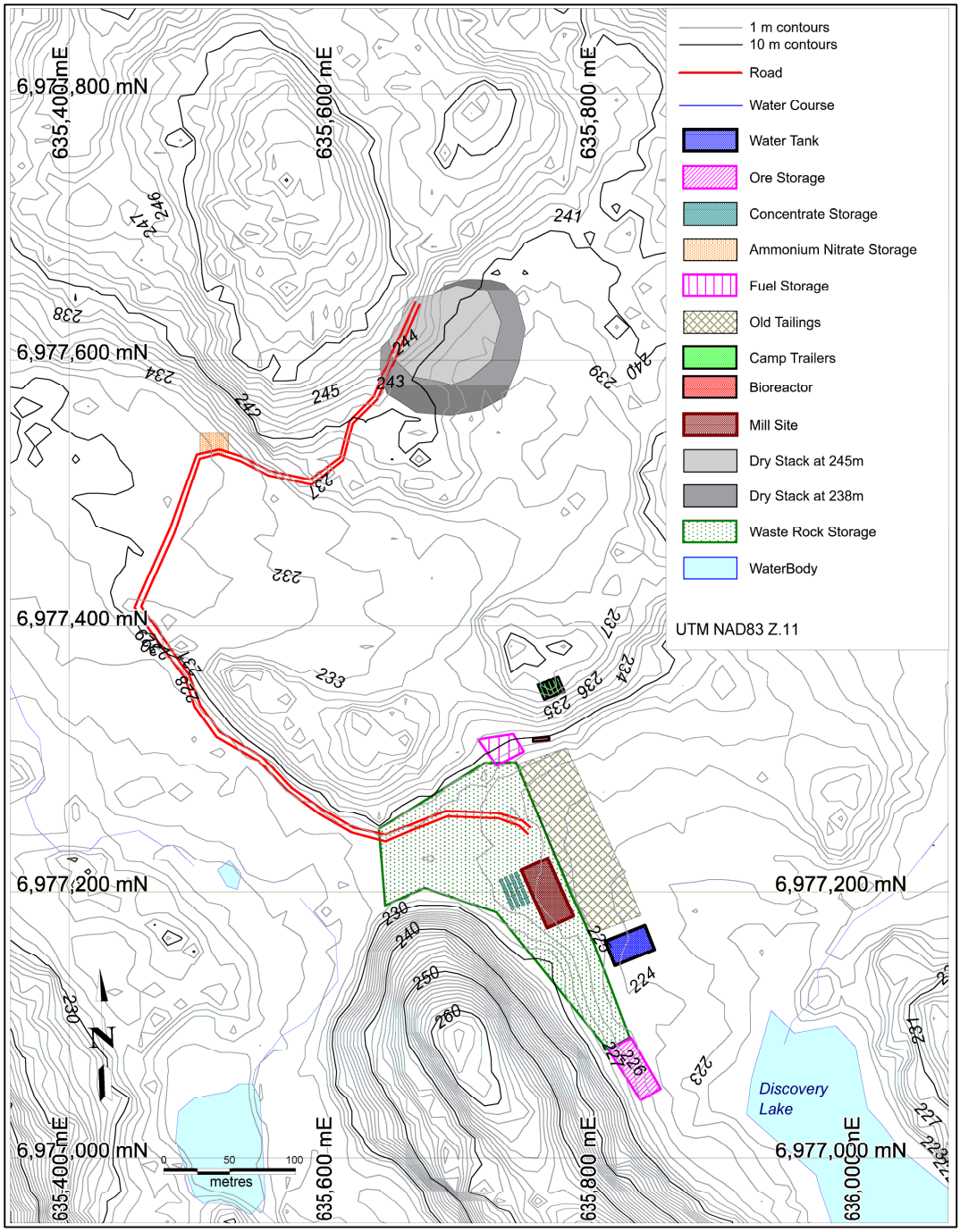


Figure 1 Map 1, Location of waste management sites.

Specific waste-management locations at drill sites will be as follows:

a. separate refuse drums for waste oil/fuels and waste solids (used absorbents and rags, used/drained oil filters); and
b. drill-cuttings sumps (where relict drill water mixed with rock flour from drilling will be deposited).

In both the camp and at drill sites, secondary containment is used for drums and small equipment such as pumps and generators, and wherever fuel is transferred. All sumps are land-based and located the requisite 100m from ordinary high-water mark (OHWM) of waterbodies, unless a Land Use Inspector has provided prior approval for a closer distance, on the basis of assessed low risk of flow into any adjacent waterbodies and implementation of control measures such as berms and oil-absorbent booms or other barrier devices.

Any overburden removed will be stored in proximity to where it was removed for use as cover upon execution of the Interim Closure and Recovery Plan.

The Spill Contingency Plan is an evolving document which is kept updated with current MSDS for all products which may be brought to a worksite.

Historical Land-Use and Waste Management

The Mon Gold Mine area has been explored by successions of exploration companies since the discovery of gold here in 1937. The Mon Gold Mine operated between 1988 and 1997, accessed by three portals and one shaft. A 100 tpd gravity mill and associated tailings containment site are evidence of the potential here. Pre-1980 activities have left minor refuse piles on the property which have been removed as time permits.

Site and Setting Characteristics

The Mon Gold Mine lies within the Slave Structural Province of the Northwest Territories (the Slave Province), which is an Archaean segment of the North American Craton that covers 213,000 km2 . It is composed of granites, gneisses and supracrustal rocks. The Slave Province is a classical setting for diamondiferous kimberlites, rare earth element, light element and base and precious metal deposits.

For most of the year, the area is covered with ice and snow. Summer typically begins in June, when melting commences; winter usually arrives in October. Temperatures range from highs of around 25 during the brief summer months, to winter lows of -45 which are often magnified by strong, constant winds. Daylight varies from nearly 24 hours in the summer to only a few hours per day during the winter.

Landforms, relief and drainage have been strongly influenced by the effects of several periods of glaciation which, along with a weak fluvial incision, has produced a generally low-lying, undulose or wave-like terrain. Hills of granitic rocks and eskers rise about 15m above datum. The percentage of outcrop averages from about 1%-15%, although locally there are small areas with much higher percentages of outcrop. Frost-heave and/or shattered subcrop also occurs. Flat to undulose muskeg, with or without scattered boulder fields, is separated by treed areas and low hills. In areas of no outcrop, till cover averages from a few centimetres to tens of metres. Glaciation has also produced scattered glaciofluvial landforms such as eskers, braided esker complexes and deltas, outwash plains, boulder fields and alluvial fans.

Approximately 20% of the property is covered by lakes. River systems are juvenile and not deeply incised, however the Yellowknife River occurs to the east of the property. Water levels vary greatly with the season; they are highest during spring runoff and almost dry at the end of summer. Typical muskeg/ northern boreal forest vegetation comprised of black spruce, tamarack, pine, birch, aspen willow, labrador tea, bearberry, lichen and moss is present.

Caribou, wolves, foxes, rabbit, moose, ptarmigan, wolverines, ground squirrels and black bears are native to the area. Most of the larger lakes contain fish and support bird life.
The terrain in the Discovery Lake area where the Mon Gold Mine Project and camp are located is rugged tundra with little topsoil, low-lying shrubs and a large percentage of exposed supracrustal rocks. The area contains hundreds of small, shallow, glacially-formed lakes. The Yellowknife River flows into Great Slave Lake.

Northern Pike and Lake Trout are the most common fish species found in proximal lakes. Other species included grayling and lake whitefish. Most lakes exhibited a well-defined littoral shelf, comprised of large boulder and/or cobble substrates; beyond this shelf, there is a dramatic drop into the pelagic zone.

Rock Geochemistry

Rock samples for environmental geochemistry have been collected sporadically over the past 31 years.

Sample	Date	Results
Ore	October 16, 1989	Lakefield Research Laboratory reports: Sample MLR-115 ore grades 12.5 gpt Au by assay with 99.5% recovery by gravity and cyanidation
Tailings	October 26, 1989	Lakefield Research Laboratory reports: Sample MLR-117 tailings grades 0.1 gpt Au, 0.023% Cu, <0.001% Pb, 0.014% Zn
Ore	December 5, 1989	Lakefield Research Laboratory reports: Sample MLR-120 ore recovery by flotation. Feed grades 9.48 gpt Au. Concentrate grades 47.7 gpt Au, 0.33% Cu, 6.01% Pb, 3.77% Zn, 0.36% As, <0.002% Sb, 0.00013% Hg
Waste	May 8, 1992	Chemex Environmental Services reports; 6 week humidity cell study "As is evident from the ABA data, the waste rock is basic and there is virtually no potential acidity as evidenced from the low sulphur content" pH ranged from 7.3 to 7.6 Sulphur 0.034%, NP 131 kg CaCO3/t Maximum values of As 0.05, Cd <0.01, Co 0.04, Cu 0.01, Fe <0.2, Mo 0.01, Ni 0.10, Pb 0.05, Zn <0.01 (all mg/L) in leachate
Tailings	September 5, 2012	Systematic sampling of the tailings containment facility determined it to hold 10,000 tonnes +/- at an average grade of 3.37 gpt Au. It is amenable to flotation concentration recovering 86.4% of the Au without pre-treatment. Average content is S 0.43%, Cu 0.11%, Zn 0.25% Fe 6.56%

Recent work by the proponent is included in the Appendixes and included:

Sample	Date	Results
Ore and Tailings	February 11, 2014	Inspectorate Exploration and Mining Services reports; Composite sample for assay, gravity, flotation, cyanidation, ABA and SWEP tests. Head grades 122.56 gpt Au, 24.6 gpt Ag, 1.40% S, Sb <5 ppm, As 81 ppm, Cd 5.7 ppm, Co 19 ppm, Cu 134 ppm, Pb 0.23%, Zn 0.13%. Flotation Tails Grades Au 1,26 ppm, Sb 6.0 ppm, As 13.0 ppm, Cd <0.5 ppm, Co 7.0 ppm, Cu 90.0 ppm, Pb 0.02%, Zn 0.01%

		Flotation Tails; 0.21% total S, 0.05% Sulphate S, pH 7.6, AP 5.0 kg CaCO3/t, NP 9.9 kg CaCO3/t, NP/AP 2.0. Waste rock; 0.13% total S, <0.01% Sulphate S, pH 9.6, AP 4.1 kg CaCO3/t, NP 11.0 kg CaCO3/t, NP/AP 2.7 SWEP and Modified SWEP tests on the flotation tails were generally all at or below detection limits for all deleterious elements.
Soils	August 21, 2015	Two mineral soil samples were collected at the DST site and shown to have elevated Cu 121.7 ppm, Zn 167 ppm, Co 17.7 ppm, Fe 3.36%, As 21.1 ppm, and Hg 0.03 ppm relative to tailings samples.

Water Geochemistry

Water samples for environmental geochemistry have been collected sporadically over the past 21 years, largely as part of previous SNP sites.

SNP	Date	Results
1598-2 Mine effluent	October 20, 2000	DIAND sample: pH 7.64 Ammonia 1.99 mg/L Tot As 7 ug/L Tot Cd 4.4 ug/L Tot Co 10 ug/L Tot Cu 18 ug/L Tot Fe 0.59 mg/L Tot Pb 69 ug/L Tot Zn 315 ug/L
1598-1 Mine effluent	October 20, 2000	DIAND sample: pH 7.46 Ammonia 0.011 mg/L Tot As <1 ug/L Tot Cd 0.7 ug/L Tot Co <1 ug/L Tot Cu <2 ug/L Tot Fe 0.63 mg/L Tot Pb <1 ug/L Tot Zn <10 ug/L
1598-3 Mine effluent	October 20, 2000	DIAND sample: pH 8.02 Ammonia 1.15 mg/L Tot As 19 ug/L Tot Cd 0.5 ug/L Tot Co 8 ug/L Tot Cu 16 ug/L Tot Fe 0.94 mg/L Tot Pb 5 ug/L Tot Zn 41 ug/L
1598-5	October 20, 2000	DIAND sample: pH 7.36

Mine effluent		Ammonia 0.009 mg/L Tot As 19 ug/L Tot Cd 0.5 ug/L Tot Co <1 ug/L Tot Cu 7 ug/L Tot Fe 0.32 mg/L Tot Pb <1 ug/L Tot Zn 34 ug/L
1598-7 Mine effluent	October 20, 2000	DIAND sample: pH 7.48 Ammonia 0.010 mg/L Tot As 8 ug/L Tot Cd 0.8 ug/L Tot Co <1 ug/L Tot Cu 5 ug/L Tot Fe 0.20 mg/L Tot Pb 2 ug/L Tot Zn 105 ug/L
2 (S. portal)	July 13, 2001	Ger-Mac Sample: pH 7.3 Ammonia 1.75 mg/L Tot As 0.04 mg/L Cu 0.05 mg/L Pb 0.50 mg/L Zn 0.51 mg/L
3 (C. portal)	July 13, 2001	Ger-Mac Sample: pH 7.0 Ammonia 0.80 mg/L Tot As 0.01 mg/L Cu 0.05 mg/L Pb 0.01 mg/L Zn 0.05 mg/L
5 Rock Pile	July 13, 2001	Ger-Mac Sample: pH 6.8 Ammonia 0.02 mg/L Tot As 0.04 mg/L Cu 0.02 mg/L Pb <0.01 mg/L Zn 0.05 mg/L
7 Mill	July 13, 2001	Ger-Mac Sample: pH 6.8 Ammonia 0.01 mg/L Tot As 0.01 mg/L Cu 0.01 mg/L Pb 0.01 mg/L Zn 0.07 mg/L
8 Tailings	July 13, 2001	Ger-Mac Sample: pH 6.6 Ammonia 0.01 mg/L Tot As 0.01 mg/L

		Cu 0.04 mg/L Pb 0.01 mg/L Zn 0.04 mg/L
8 Tailings	July 13, 2001	Ger-Mac Sample: pH 6.6 Ammonia 0.03 mg/L Tot As 0.01 mg/L Cu 0.04 mg/L Pb 0.01 mg/L Zn 0.03 mg/L
1598-1	September 26, 2003	DIAND sample: pH 7.52 Ammonia 0.024 mg/L Tot As <1 ug/L Tot Cd 0.1 ug/L Tot Co 0.2 ug/L Tot Cu 5.9 ug/L Tot Fe 0.134 mg/L Tot Pb 1.4 ug/L Tot Zn 12 ug/L
1598-5 waste water	September 26, 2003	DIAND sample: pH 7.65 Ammonia 0.005 mg/L Tot As 19 ug/L Tot Cd 0.3 ug/L Tot Co 1.1 ug/L Tot Cu 8.3 ug/L Tot Fe 0.145 mg/L Tot Pb 2.1 ug/L Tot Zn 68 ug/L
1598-8 waste water	September 26, 2003	DIAND sample: pH 6.71 Ammonia 0.005 mg/L Tot As 12 ug/L Tot Cd 0.3 ug/L Tot Co 4.5 ug/L Tot Cu 5.4 ug/L Tot Fe 1.139 mg/L Tot Pb 5.0 ug/L Tot Zn 43 ug/L
Tank Farm arm a	September 26, 2003	DIAND sample: Benzene <0.005 mg/kg Ethylbenzene <0.005 mg/kg Total Extractable Hydrocarbons 5512 mg/kg Total Purgeable Hydrocarbons 1.34 mg/kg m/p-xylene <0.005 mg/kg 0-xylene <0.005 mg/kg Toluene <0.005 mg/kg

Tank Farm arm b	September 26, 2003	DIAND sample: Benzene <0.005 mg/kg Ethylbenzene <0.005 mg/kg Total Extractable Hydrocarbons 694 mg/kg Total Purgeable Hydrocarbons 0.541 mg/kg m/p-xylene <0.005 mg/kg 0-xylene <0.005 mg/kg Toluene <0.005 mg/kg
Ball Mill	September 26, 2003	DIAND sample: Benzene <0.005 mg/kg Ethylbenzene <0.005 mg/kg Total Extractable Hydrocarbons 159 mg/kg Total Purgeable Hydrocarbons <0.005 mg/kg m/p-xylene <0.005 mg/kg 0-xylene <0.005 mg/kg Toluene <0.005 mg/kg
Ball Mill below	September 26, 2003	DIAND sample: Benzene <0.005 mg/kg Ethylbenzene <0.005 mg/kg Total Extractable Hydrocarbons 2796 mg/kg Total Purgeable Hydrocarbons 0.072 mg/kg m/p-xylene <0.005 mg/kg 0-xylene <0.005 mg/kg Toluene <0.005 mg/kg
Discovery Lake	June 6, 2005	DIAND sample: pH 7.45 Ammonia 0.006 mg/L Tot As 1.1 ug/L Tot Cd <0.1 ug/L Tot Co 0.1 ug/L Tot Cu 1.6 ug/L Tot Fe 0.231 mg/L Tot Pb 0.5 ug/L Tot Zn <10 ug/L
1598-5	June 6, 2005	DIAND sample: pH 6.62 Ammonia 0.010 mg/L Tot As 4.4 ug/L Tot Cd 0.1 ug/L Tot Co 1.8 ug/L Tot Cu 36.8 ug/L Tot Fe 0.423 mg/L Tot Pb 1.0 ug/L Tot Zn 42 ug/L
Mon Tank Farm	June 6, 2005	DIAND sample: Benzene <0.05 mg/kg Ethylbenzene 0.10 mg/kg Total Extractable Hydrocarbons 338 mg/kg Total Purgeable Hydrocarbons 16.1 mg/kg m/p-xylene <0.05 mg/kg

		0-xylene 0.38 mg/kg Toluene 0.14 mg/kg
1598-5 Waste water	July 4, 2008	DIAND sample: pH 6.69 Ammonia <0.005 mg/L Tot As 8.2 ug/L Tot Cd 0.4 ug/L Tot Co 3.9 ug/L Tot Cu 58.1 ug/L Tot Fe 0.623 mg/L Tot Pb 1.9 ug/L Tot Zn 35 ug/L
Discovery Lake	July 4, 2008	DIAND sample: pH 7.87 Ammonia 0.005 mg/L Tot As 1.1 ug/L Tot Cd 0.2 ug/L Tot Co <0.1 ug/L Tot Cu 1.2 ug/L Tot Fe 0.071 mg/L Tot Pb 0.3 ug/L Tot Zn <5 ug/L
1598-5	September 18, 2009	DIAND sample: pH 6.71 Ammonia 0.01 mg/L Tot As 12.8 ug/L Tot Cd 0.2 ug/L Tot Co 12.8 ug/L Tot Cu 27.4 ug/L Tot Fe 1.300 mg/L Tot Pb 2.6 ug/L Tot Zn 21 ug/L
SNP 03 near DST	April 2020	MV2015L2-0004 pH 5.93 Ammonia 0.072 mg/L Tot As 4.18 ug/L Tot Cd 0.362 ug/L Tot Co 0.26 ug/L Tot Cu 7.28 ug/L Tot Fe 0.603 mg/L Tot Pb 0.23 ug/L Tot Zn 5.5 ug/L
SNP 04 Discovery Lake	April 2020	MV2014L2-0002 pH 7.85 Ammonia 0.022 mg/L Tot As 1.04 ug/L Tot Cd <0.010 ug/L Tot Co <0.20 ug/L Tot Cu 0.79 ug/L Tot Fe 0.010 mg/L

		Tot Pb <0.20 ug/L Tot Zn <5.0 ug/L
SNP 02 1598-5	April 2020	MV2014L2-0002 pH 6.97 Ammonia 0.054 mg/L Tot As 11.1 ug/L Tot Cd 0.102 ug/L Tot Co 0.35 ug/L Tot Cu 33.2 ug/L Tot Fe 0.584 mg/L Tot Pb 0.85 ug/L Tot Zn 15.3 ug/L

Additional water samples will be collected at all of the SNP sites identified in MV2020L2-0002 in addition to any pooling observed in and around the operations. These will be analyzed for the same parameters as used for the waste rock drainages or as specified by licenses.

Conclusion from Existing Site Data

It should be noted in the above test work that gravity and flotation concentrates are valuable products removed from the property for recovery of precious metals. Gravity tails is an intermediate product that is further processed by flotation for final metals recovery. Only flotation tails are a waste product to be delivered with 15% entrained water to the DST.

There has been reference to an exploration target several km away that may be the subject of a drill program. This volcanogenic massive sulphide target is likely AG, however where found, it is capped by several meters of a carbonate unit (acid consuming). No work is currently planned on this target.

Acid generating capacity of rocks uses field and laboratory studies to assess the estimated sulfur content as well as the carbonate content. Low-sulfide rocks with a strong "fizz" test reaction are typically non-acid generating ("NAG"). High-sulfide rocks with no-fizz test are considered acid generating ("AG") with those in between being considered potentially acid generating ("PAG") or uncertain. Laboratory determination of the total and sulphate sulfur to estimate a rocks acid potential ("AP") and the neutralizing potential of the rock (expressed as kg CaCO3/tonne) to estimate a rocks neutralizing potential ("NP") assist in this classification.

A rock can be classified as AG, PAG, or NAG by estimating a rocks net neutralizing potential (NP-AP) or a ratio of NP/AP. Generally, a NP/AP of 3 or greater is associated with very low risk to generate acid whereas ratios of 1 or less are likely to generate acid. Ratios in between are less certain. There are several caveats as with all testing as sulphate sulfur may not contribute to acid generation, and alkaline minerals may contribute to neutralizing potential.

Under standard definitions, and looking at 1) testing to date, as well as 2) field testing of drainages it would seem that the waste rock (NNP 2.7 and 4.1) and flotation tails (NNP 2.0) would be characterized as NAG or PAG. However, given that the total sulfur is low to very low in the waste rocks these would not generate acid in any substantial amount. The flotation tails should be monitored closely. Recent SWEP tests and modified SWEP test show low to very low metals in the leachate. Further testing is recommended.

Based upon findings to date, collected during a period of more intensive activity in the 1980's and 1990's, it can be predicted that proposed advanced exploration activities at the Mon Gold Mine projects have low potential of adverse environmental effects attributable to camp and drill waste, particularly given the existing Spill Contingency Plan, and Closure and Reclamation Plan, and corporate commitment to staff and contractor training. Continuous reclamation of historic refuse piles improves the over all waste management of the site. There is a potential for some of the existing sites to be marginally acidic, specifically the historic tailings on site, and this should continue to be monitored. The current plan to produce a flotation concentrate and ship off-site for further processing will mitigate this.

The most acid waters are well north and upstream of any activities, within an area selected for the DST. This is likely due to the organic acids present in the swamp. This is discussed further under "Dry Stack Storage"

WASTE TYPES - CAMP

Waste types at the Mon Gold Mine camp and mine are described herein. All waste products must be handled and stored according to this Waste Management Plan. Deviations from this will not be acceptable unless approved in writing by a GNWT inspector or the MVLWB.

Table 1. Summary of Waste Products Anticipated to be Produced

WASTE ITEM	TYPE	MANAGEMENT METHOD(S)	ENVIRONMENTAL EFFECTS
CAMP GREYWATER	Non-hazardous	Bioreactor	None expected
CAMP SEWAGE	Non-hazardous	Bioreactor	None expected
WASTE LIQUIDS, SOLIDS	Hazardous	Disposal Collected and shipped	None expected
EMPTY DRUMS, CYLINDERS	Potential hazardous	Returned to supplier	None expected
METAL SCRAP	Non-hazardous	Recycle	None expected
BATTERIES - SMALL	Potential hazardous	Recycle, dispose to registered site	None expected
BATTERIES – AUTO/MARINE	Potential hazardous	Recycle, dispose to registered site	None expected
MISCELLANEOUS CHEMICALS	Potential hazardous	Disposal Collected and shipped	None expected
WOOD WASTE - UNTREATED	Non-hazardous	Recycle / burn / bury	None expected, minor smoke
WOOD WASTE - TREATED	Hazardous	Not permitted to be allowed on site	None expected
HOUSEHOLD WASTE – CAMP AND DRILLSITE	Non-hazardous	Incinerate / recycle	None expected, minor smoke
ASH FROM INCINERATION	Potential hazardous	Disposal Collected and shipped	None expected
OFFICE WASTE	Non-hazardous	Incinerate / recycle	None expected, minor smoke
DRILLWATER WITH CUTTINGS	Non-hazardous	Disposal to sump	None expected
ROCK, WASTE	Non-hazardous	Disposal in designated area	None expected

ROCK, NOT WASTE	Non-hazardous	Disposal in designated area and/or process	None expected
MILL SOLIDS (TAILINGS)	Non-hazardous	Disposal in designated area and/or process	None expected
MINE WATER	Non-hazardous	Disposal in designated area and/or process	None expected
CONTAMINATED SOILS, SNOW/WATER	Potential hazardous	Collect and Landfarm	No long term, short term treatment period

Camp statistics: Expected period of operation = Year round.
Maximum camp population = 12 persons
Footprint of camp compound = 50m wide x 100m long

Locations of waste generation:

i. *Toilets* (sewage); *kitchen/dry tent* (greywater, household garbage, recyclables such as cardboard, packing, tins and other containers);

ii. *incinerator* (ash); *generator shed:* (waste oil and fuel, waste solids [filters, absorbents, rags], auto or marine battery);

iii. *office* (household garbage, small batteries, recyclables such as paper, cardboard, cartridges and other office waste, *helipad* (waste oil and fuel, waste solids);

iv. *fuel storage berm*, 100m S of camp compound (waste would be generated here if fuel transfer were to occur here. Otherwise, separate area of berm would be assigned for any drummed fuel waste generated elsewhere but not stored in the camp compound);

v. Mine, rock waste, to be used or disposed in the areas marked on Map 1 (Figure 1)

vi. Mine, rock not waste, to be stored in the areas marked on Map 1 (Figure 1). This will be processed in the Mill shown on Map 1 (Figure 1).

vii. Mine water, to be stored in an underground sump to clarify and remove oils, and then discharged into a holding tank on surface for use in mill. This will be skimmed of visible oils using absorbent pads prior to final discharge into a low area >100 m from any stream when the mill is not operating. All discharge concentrations and physical parameters shall be consistent with any specifications in the active Water Licenses (Specifically Part G, conditions 8, 9, 10, 11, MV2014L2-0002).

viii. Mill products will be flown out in the case of dore products, trucked out by winter road in the case of flotation concentrates, and stored as dry stack tailings as shown on Map 1 (Figure 1). Water recovered from the filtration system will be recycled and water entrained in the flotation and dry tailings will need to be made up

Water usage resulting in greywater volume < 3m3 per day maximum when camp is at full occupancy.

GREYWATER

Greywater/wash water from kitchen, dry

- Exit kitchen pipe fitted with grease trap;
- Environmentally-benign wash products and cleaners to lessen impact of greywater to fill material on which camp is sited;
- Collection of greywater in three-stage bioreactor;
- Batch discharge of bioreactor from final tank to low area as marked on Map 1 (Figure 1);
- Monitoring of bioreactor on a daily basis by camp staff;
- Focus on conservation of water is made during orientation and as a periodic topic during weekly camp environmental/health/safety meetings;

Bioreactor discharge

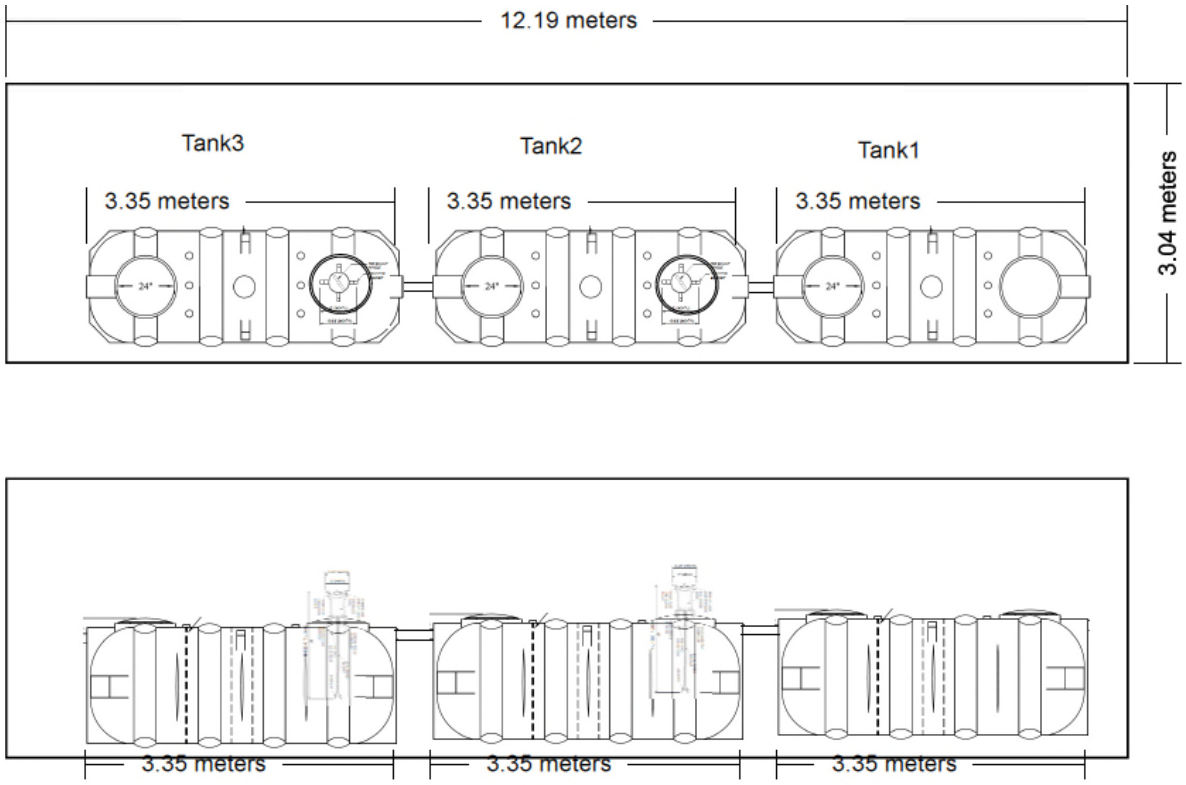
- Discharge distance from lakeshore: approx. 200m;
- Bioreactor pipes outfall to a natural depression area in the fill base on which the camp is sited; outfall is to a natural depression east of the bioreactor container;
- Greywater volume when camp at 12 persons < 3m3 per day maximum;

How bioreactor functions:

- Effluent (greywater and sewage) is comminuted in a 500 litre tank via a grinding pump transferring to the first tank;
- First tank holds and initiates biological digestion of organic material and decanting of inorganic material prior to discharge into second tank and then again into the third tank.
- All sludge is held in the first two tanks.
- Aeration of the third tank will promote aerobic bacteria and reduce anaerobic bacterial loads. If warranted, aeration of the second tank can be initiated.
- Total retention will average 7 to 10 days
- Effluent will be clear with TSS <120 mg/L at tank outlet.
- Effluent outfalls to a swamp depression and percolates through the boulder and cobble fill;
- Sump flow: Very gentle gradient, with flow in a east direction which follows the orientation of the fill base and camp (see *Map 1, Figure 1*);
- Natural permafrost is below the thick layer of fill on which camp is sited;
- Sludge removal will be contracted to a licensed operator, anticipated to be on an annual basis or less.

The potential environmental effects can be predicted to be minimal based on:

(a) distance from lakeshore;
(b) no direct impact with native soils or vegetation;
(c) excellent filtering nature of coarse fill base, which directs any flow not absorbed away from ground N of camp;
(d) use of environmentally-benign washing/cleaning products; and
(e) monitoring of bioreactor discharge;



Insulated and vented 40' secan with three Canwest RKS1000/2 two chamber septic tanks.
Tank 1 anerobic, tank 2 and 3 aerobic with Flagg-air 340HT aerators.

Figure 2. Configuration of Sewage and greywater bioreactor.

A three-tank containerized and insulated bioreactor will operate the initial tank as an anaerobic digester, retaining all solids for decomposition and settling. Tanks 2 and 3 will operate aerobically using two Flagg 340HT or equivalent aerators to reduce coliform bacteria and ammonium levels. Discharge will be into a dry vegetated area >100 m from any body of water.

The bioreactor will be monitored daily and examined monthly by a registered Professional Engineer. Sampling from a SNP site will be submitted for analysis to confirm its efficiency.

Effluent Quality Criteria

It is understood that the effluent for discharge will be elevated in BOD and coliform bacteria, and potentially natural food biodegradable grease and oils. These should be reduced within the bioreactor, but will be similar to all municipal discharge levels. The monitoring trench down grade from the discharge area will meet all-natural water criteria.

The NDM Bioreactor is a modified version of the bioreactor used by Tyhee at the Discovery Mines Site which met all requirements under that license. Specifically when measured after 100m of swamp, Tyhee's treatment was:

Table 2. Discharge EQC from Tyhee's Bioreactor 100 m away.

	SNP STATION 17-1 Round Lake near inflow from camp sewage disposal system drainage. **								
Parameters									
Sample Date	*Mar. 03*	*Apr. 21/26**	*May 17*	*June 14*	*July 14*	*Aug. 11*	*Sept. 15*	*Oct. 18*	*Nov. 24*
Physical Tests									
pH	7.9	7.9	7.7	7.9	7.7	7.3	7.5	7.8	7.6
Total Suspended Solids (mg/l)	<3	<3	6	<3	<3	<3	<3	<3	201
Total Dissolved Solids (mg/L)	1040	1070	330	400	390	420	390	460	481
Ammonia-Nitrogen	2.42	2.95	0.47	<0.05	<0.05	<0.05	0.09	0.25	0.19
Conductivity	1330	1320	369	541	509	552	567	602	679
Bacteriological Tests									
Coliform Bacteria – Fecal (Cfu/100ml)		<1	<1	<1	1	<1	<1	<1	<1
Organic Parameters									
BOD-5 (mg/l)	2	7/4*	3	3	2	<2	<2	<2	<2

Notes:

***** This station description has been changed as per the MVLWB letter dated July 13, 2005.***

Whereas the discharge from the bioreactor end-tank was:

Table 3. Discharge EQC from Tyhee's Bioreator

	SNP STATION 17-7 Effluent Discharge Point from Septic Tank							
Parameters								
Sample Date	*May*	*June*	*July 26*	*Aug.26*	*Sept.23*	*Oct. 28*	*Nov**	*Dec.02**
Physical Tests								
pH			7.7	7.6	7.2	7.6		7.0
Total Suspended Solids (mg/l)			147	106	120	106		122
Total Dissolved Solids (mg/L)			890	850	690	720		340
Ammonia –Nitrogen (mg/L)			115	84.5	63.4	64.7		32.1
Conductivity (uS/cm)			1310	1270	1150	1150		509
Bacteriological Tests								
Coliform Bacteria – Fecal (Cfu/100ml)			5700000	1500000	20000000	77000		>800
Organic Parameters								
BOD-5 (mg/l)			507	504	805	692		484

Note: * denotes sample was intended to be taken in November, but due to plane availability, December 2nd was the closest date. Also, the camp was on care and maintenance for most of December.

NDM's license sets standards that will require percolation through the swamp that forms an integral part of the treatment of the sewage as is standard for other treatment operations throughout the NWT.

Parameter	Maximum Average Concentration
$CBOD_5$	25 mg/L
TSS	25 mg/L
Un-ionized Ammonia	1.25 mg/L
Fecal Coliform	1000 CFU/100 mL
Oil and Grease	5.0 mg/L

Samples will be collected at the tank and in the swamp down stream of the discharge point for presentation to the inspector and board.

WASTE LIQUIDS AND SOLIDS

Class 9 waste *UN 3082* (hazardous substance – liquid) and *UN 3077* (hazardous substance – solid)

Liquids
Mainly comprised of waste oils/lubricants and waste fuels collected from camp (generator, pumps, incinerator, tent refuelling) and from generation points away from camp compound and transported to camp for temporary storage/preparation and labelling prior to out shipment (helicopter, drillsite, Twin Otter refuelling).

Solids
Mainly comprised of heavy waste greases, used absorbents, used oil filters and rags; collected from camp (generator, pumps, incinerator, tent refuelling and fuel-berm maintenance) and from generation points away from camp compound and transported to camp for temporary storage/preparation and labelling prior to out shipment (helicopter, drillsite).

Volume per season: 2-3 205L sealed drums - waste liquid; 2 205L sealed drums - waste solids

Fate of final products: Disposal will be to a license shipper/ receiver in Yellowknife, accompanied by GNWT Waste Movement Document (form).

OTHER WASTE

Fuel Containers

Empty fuel drums (205L size) and propane cylinders (45kg size)

- Sent out on backhauls in winter
- Returnables – drums may be returned for deposit, propane cylinders may be refilled at propane depot in Yellowknife, if the tank has not expired.

Waste Oil

Crankcase and engine oils are produced from all engines. This will be collected and stored in 205 litre barrels and delivered to KBL Environmental in Yellowknife for processing.

Metal Scrap

Minor amounts of wire and nails, to an approved recycler; major percentage from mining or drilling rather than camp operations

- Sent out on backhauls, as scrap accumulates; est. out shipment = 500kg per season;
- Returnables – drill steel sent back to drill contractor; disposables – other steel scrap accepted by approved recycler.

Batteries

Small (AA, AAA, C, D) = approx. 48 per year; two or three auto or marine lead-acid battery for generator in resistant sleeve or holder. Disposables sent to designated area of Yellowknife landfill; occasional auto or marine battery will be disposed to and accepted by Yellowknife Landfill OR recycled.

Miscellaneous Chemicals

All products stored in their original containers, in secondary containment tubs or on lined storage shelves; camp staff trained in proper use, including wearing of PPE supplied for program

- Minor amounts of gas-line antifreeze for skidoos = small containers totaling approx. 5L;
- anticipated drillsite volume of containerized antifreeze approx. 10L per program;
- Minor amounts of cleaners, solvents = small containers totaling approx. 10L per program;
- Oils and fluids from other vehicles shall be recovered in the appropriate containers and shipped off site to an approved disposal facility.
- Disposed to hazardous substances – solid (UN 3077) drums or pails;
- Disposal of sealed waste solids drum by out shipment to approved shipper/receiver.
- Household-strength and non-regulated products disposed to Yellowknife Landfill designated area for household waste.

Wood Waste

UNTREATED WOOD WASTE

Trees, brush (untreated)

- All brush and trees cut or knocked down will be delimbed or cut so as to lie flat and will be piled and burned or used as needed.

Construction scrap – lumber and timbers (untreated)

- Recyclable on site (stacked and stored) or unusable clean scrap wood out shipped to Yellowknife Landfill designated area; scrap may be incinerated or burned;
- Recyclable on site (stacked and stored for future use on fill area), recyclable to another project or, if unusable, out shipped to an approved shipper/receiver for proper disposal or potential recycling.

Construction scrap – lumber and timbers (untreated)

- Recyclable on site (stacked and stored) or burned.

TREATED WOOD WASTE

NO PRESSURE TREATED WOOD WILL BE PERMITTED ONTO THE PROPERTY

- All treated wood (varnished, painted, stained) will be stored on site for transport to an approved waste disposal facility.

Kitchen and Dry Waste

Cooking and food waste (70% of total) + cardboard and packaging waste (10%) + containers (glass, plastic, tin or aluminum containers and aerosol cans (20%)

- Incinerated daily in camp incinerator unit;
- cardboard and packing waste: cardboard used for balancing load of wet garbage for incineration; excess cardboard and related clean packaging sent out as recyclables;
- non-burnable clean packaging, such as plastic and Styrofoam: Recyclables, sent out to a Yellowknife recycling depot;
- punctured aerosol cans: Collected in a bin in kitchen and dry and sent out to an approved disposal site;
- Recyclables sent to a Yellowknife recycling depot;
- non-recyclables sent to Yellowknife Landfill designated area for containers by type.

Office Waste

Cardboard and paper waste (80% of total) + cartridges (printer, plotter) (4.5%) + household garbage (15%)

- Incinerated in camp Incinerator unit;
- cardboard and paper waste: cardboard used for balancing wet garbage for incineration;
- excess cardboard sent out with recyclables; paper recycled, then incinerated when past its use;
- Returnables sent back to manufacturer;

Mill Waste

The purpose and scope of New Discovery Mines Ltd.'s Mill Waste Management Plan is to identify and manage waste resulting from the processing of ores from the property that will introduce waste products into the environment.

The goal of the Mill Waste Management Plan is to mitigate environmental effects of New Discovery Mines Ltd.'s milling activities and locations on land, vegetation, water, air, wildlife and fish, which have both intrinsic value to the ecosystem and sociocultural and aesthetic values to a variety of land-users.

The objectives of this Mill Waste Management Plan are to operate in such a way as to reduce/reuse and recycle where possible, and to handle and dispose of waste so as to obviate or minimize impact to environment, offer local employment and use local services as best complements the exploration program, to operate in compliance with governing authorizations and legislation, and to strive for continuous improvement in environmental management, which is a core objective of all environmental programs.

Mill Operations

New Discovery Mines Ltd. Will operate under MV2020C003 and MV2020L2-0002 from the MVLWB. A range of exploration activities, including prospecting, surficial rock sampling, underground bulk sampling, drilling and operation of seasonal tent camps are currently authorized.

Additionally, processing of ores in an approved facility and the discharge of waste will occur as contemplated in in these licenses and permits as waste waters and waste solids. Dore gold (impure gold bars) and gold-bearing flotation concentrate will be produced.

Processing of the ores recovered from the permitted operations will:

- recycle the maximum amount of water possible,
- ship all concentrates off property to facilities approved for further processing
- produce non-acid generating solids waste products that meet or exceed all guidelines for tailings disposal,
- store these solids in a constrained and monitored environment.
- Discharge no liquids except as already permitted.

Proposed Location of Mill Waste-Management Activities

Mill Waste-management activities will occur within New Discovery Mines Ltd.'s Mon Gold Mine project, which are depicted in *Map 1* (Figure 1) and MapCInfrastructureA.pdf. Specific waste-management locations at the Mon Gold Mill will be as filtered flotation tailings solids. Approximately 10 to 15% of the mass of solids tails will be as entrained water.

Waste products;

a. Water tank.
b. Dry stack storage facility

Are stored at locations shown on the map in MapCInfrastructureA.pdf. as tailings in a Dry Stack and water in a water tank. All spills and accidental discharges will be directed to the water tank. This is designed to be used to hold water for milling operations and no discharge from this tank is planned or expected. No other discharges will occur.

Dry Stack Storage

The DST will be established as site on MapInfrastrucureA.pdf. The plan and siting will be as shown on plans EBA DST Option.pdf.

The DST facility will be in a natural basin 90,000 m^2 in size bound at elevation 240 m amsl with a base of 232 m amsl, open to the west. The basin is sited on Archean granitoid, volcanic and sedimentary rocks, overlain by minor sand and gravel, clays, peat, and northern vegetation. A portion of this basin will be prepared prior to construction by excavating the vegetation and topsoil which will be stored nearby. Approximately 1,500 m^3 of vegetation and topsoil will be removed and stored proximal to the site. This material will be used as general cover material on reclamation. All drainage is downslope to the west where two monitoring stations will be prepared, SNP 02 and SNP 03.

NDM agrees to comply with all regulations and license requirements including EQC standards therein.

The filtered flotation tailings with the composition as shown in Table 4 and Table 5 will be deposited on the prepares site composed of clays, sands and gravels composed primarily of Archean granitoid, metasedimentary and metavolcanic clasts. Five metre lifts of tailings will be emplaced with a maximum slope of 1:1.5 during emplacement and 1:2 during resting. With an ultimate footprint of 8,500 m^2 it will take 42,000 tonnes of tailings to cover this to 5 meters high.

Monitoring

Dry stack tailing storage will be monitored daily during operations. Observations on geotechnical stability, noting any water or wind erosion effects, slumping, or structural failures will be documented.

Water ponding on the DST or along the toe of the structure will be noted and sampled as noted or warranted. SNP 02 samples will be collected from water at the toe of the stack, and at a downhill drainage point to the west to be constructed as a trench to collect drainage from the basin holding the dry stack SNP 03 as located on MapCInfrastructureA.pdf. As these sites have not been established, specific sites will be posted once they are established in compliance with license requirements. Currently SNP #3 samples waters leaving the DST area. Waters drain into a long boggy area west of the mine site, draining into a small lake immediately west of Discovery Lake before draining into Discovery Lake at UTM NAD83 Z. 11 635,950 mE, 6,976,570 mN.

Groundwater monitoring wells will be established as described in the approved Water and Groundwater monitoring Plan. Samples will be collected as stipulated in SNP-05, SNP-06a and SNP-06b.

All SNP samples will be collected as required and after major storm events and will meet license requirements. Exceedances will require notification to the board and inspector and will require immediate remedial action. In such a situation, the contingency plan will be to;

1. All subsequent placements on the DST will be halted.
2. Parameters outside of the license requirements will be investigated and a plan to rectify this will be proposed to the board and inspector.
3. If acceptable, the plan will be immediately implemented.

An example of this contingency action might be low pH, and a proposed solution might be a) addition of lime, b) addition of organic material to the DST (reduce oxidation) or c) amendment to the mining plan.

It should be noted that baseline samples collected from SNP 03 in April 2020 prior to any activities has reported a pH 5.93. This suggests that maintaining a pH between 6 and 9.5 may be harmful to the natural environment. Samples should be collected in 2021 prior to the establishment of the DST facility to confirm this, and this is indeed the natural water chemistry from this area it is suggested that the EQC parameters be adjusted to reflect this.

Geotechnical studies will be conducted annually once the DST is constructed to confirm mechanical stability in addition to the chemical stability defined by the SNP sampling.

Additional background soils will be collected to establish natural soil chemistries. SNP sampling will be conducted monthly during operations and quarterly when no tailings are being produced or as required by permit and license.

The stack will be graded as needed to maintain a maximum 1 in 3 long term slopes and 1 in 2 short term slopes. At closure a layer of stabilizing NAG muck may be added as needed, to be capped with the local topsoil from storage.

Mill Flotation Tailings

Test work from material collected recently as well as nearly a quarter century of sampling of existing tailings on site are presented. Test work on flotation tails by Inspectorate Exploration and Mining Services (2014) has shown that the flotation tailings are shown below:

Table 4. ICP analysis of flotation tailings.

ICP-MS Analysis on Flotation Tails

Element		Unit	Assays Comp 1	Element		Unit	Assays Comp 1
Aluminum	Al	%	1.05	Manganese	Mn	ppm	197
Antimony	Sb	ppm	6.0	Molybdenum	Mo	ppm	7.0
Arsenic	As	ppm	13.0	Nickel	Ni	ppm	189.0
Barium	Ba	ppm	75.0	Phosphorus	P	ppm	68.0
Bismuth	Bi	ppm	<2	Potassium	K	%	0.30
Cadmium	Cd	ppm	<0.5	Scandium	Sc	ppm	3.0
Calcium	Ca	ppm	0.76	Sodium	Na	%	0.34
Chromium	Cr	ppm	357.0	Strontium	Sr	ppm	28.0
Cobalt	Co	ppm	7.0	Titanium	Ti	%	0.1
Copper	Cu	ppm	90.0	Thallium	Tl	ppm	<10
Iron	Fe	ppm	1.37	Tungsten	W	ppm	12.0
Lanthanum	La	ppm	<10	Vanadium	V	ppm	46.0
Lead	Pb	ppm	216	Zinc	Zn	ppm	98
Magnesium	Mg	%	0.70	Zirconium	Zr	ppm	7.0

Table 5. Whole rock analysis of flotation tailings.

Whole Rock Analysis on Flotation Tails

Compound	Unit	Assays Comp 1	Compound	Unit	Assays Comp 1
Al_2O_3	%	2.08	MnO	%	0.03
BaO	%	0.01	Na_2O	%	0.71
CaO	%	1.04	P_2O_5	%	0.01
Cr_2O_3	%	0.05	SiO_2	%	88.25
Fe_2O_3	%	2.05	TiO_2	%	0.15
K_2O	%	0.38	LOI	%	0.80
MgO	%	1.07	Total	%	96.56

In addition, SWEP and Modified SWEP tests on both gravity tailings (GC1 residue) as well as flotation tailings (F1 flotation tailings) are shown below:

Table 6. SWEP test flotation tailings leachate analysis.

SWEP Test Leachate Analysis

Items	Unit	Sample ID				Method
		SWEP-01 Leachate (GC 1 Residue)	SWEP-02 Leachate (F1 Flotation Tails)	Modified SWEP-01 Leachate (GC 1 Residue)	Modified SWEP-02 Leachate (F1 Flotation Tails)	
pH		5.11	5.16	8.04	8.24	Env
Dissolved						
Ag	mg/L	<0.00006	<0.00006	<0.00006	<0.00006	ICPMS
Al	mg/L	0.07	0.08	0.04	<0.04	ICPMS
As	mg/L	<0.05	<0.05	<0.05	<0.05	ICPMS
B	mg/L	<0.01	<0.01	<0.01	<0.01	ICPMS
Ba	mg/L	0.198	0.079	0.018	0.008	ICPMS
Be	mg/L	<0.005	<0.005	<0.005	<0.005	ICPMS
Bi	mg/L	<0.001	<0.001	<0.001	<0.001	ICPMS
Ca	mg/L	98.54	78.84	18.81	11.12	ICPMS
Cd	mg/L	0.00518	0.00457	<0.00009	<0.00009	ICPMS
Co	mg/L	0.020	0.006	<0.001	<0.001	ICPMS
Cr	mg/L	<0.01	<0.01	0.01	<0.01	ICPMS
Cu	mg/L	<0.01	0.75	<0.01	0.01	ICPMS
Fe	mg/L	0.54	0.91	<0.03	<0.03	ICPMS
Hg	mg/L	<0.0001	0.0003	0.0002	0.0001	ICPMS
K	mg/L	<2	2	<2	<2	ICPMS
Li	mg/L	<0.007	<0.007	<0.007	<0.007	ICPMS
Mg	mg/L	9.2	7.7	0.6	0.7	ICPMS
Mn	mg/L	1.562	1.428	0.049	0.016	ICPMS
Mo	mg/L	<0.02	<0.02	<0.02	<0.02	ICPMS
Na	mg/L	2	<2	2.00	<2	ICPMS
Ni	mg/L	0.05	0.05	<0.03	<0.03	ICPMS
Pb	mg/L	3.71	0.42	<0.07	<0.07	ICPMS
Sb	mg/L	0.0003	0.0013	0.0005	0.0004	ICPMS
Se	mg/L	<0.002	<0.002	0.020	0.005	ICPMS
Sc	mg/L	0.001	0.001	0.001	0.001	ICPMS
Si	mg/L	1.07	1.01	0.26	0.46	ICPMS
Sn	mg/L	<0.002	<0.002	<0.002	<0.002	ICPMS
Sr	mg/L	0.097	0.059	0.042	0.018	ICPMS
Ti	mg/L	<0.01	<0.01	<0.01	<0.01	ICPMS
Tl	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	ICPMS
V	mg/L	0.019	0.019	<0.007	<0.007	ICPMS
Zn	mg/L	0.78	0.39	<0.02	<0.02	ICPMS

The GC1 tails are an intermediate product and is the feed to the flotation circuit. No GC1 product is disposed of. The very low concentration of metals in the F1 flotation tailings suggests an efficient flotation process. Their conclusions are:

The environmental tests suggest that the gravity-flotation process route will produce tailings that are unlikely to generate acid due to the removal of the majority of the sulphides, and produce lower levels of dissolved species in tails leachate.

Chemicals used in the milling process

With minor adjustments to the quantities used, the following reagents are planned to be used during the processing of the ores from the Mon A-Zone at the listed concentration.

Reagent	Concentration
Potassium amyl xanthate (PAX)	100 ppm
Aeropromotor 208	100 ppm
Methyl isobutyl carbinol (MIBC)	12 ppm

These reagents are specifically attracted to the flotation concentrate and will report to that product to be stored and shipped off-site for further processing. Their toxicity is outlined in the MSDS sheets. A summary of exposure to PAX for rats and rabbits shows LD50 at 1,000 ppm for ingestion by rats, and shows it is not listed as carcinogenic by ACGIH, IARC, OSHA or NTP. Aeroflot 238 shows LD50 in rats and rabbits at concentration of >5,000 and 2,000 ppm respectively. MIBC shows LD50 in rats and rabbits at concentrations of 26,000 ppm and 3,560 ppm respectively.

Conclusions

It is recommended that:

1. A P90 -150 mesh grind be used to balance gold recoveries while minimizing fines produced. This will aid in filtering, and produce a more stable (courser-grained) tailings product
2. Samples be collected regularly for SWEP and Modified SWEP tests to assure efficient removal of metals to the tailings.
3. Grade control during mining note sulphide content, to alert the mill to potentially anomalous or unusual feed.
4. All chemicals be stored in a safe, contained lock-up with spill protection and diluted to operations concentrations when removed from double containment.

Sampling of drainage downslope from the DST at the toe of the tailings, initially at 635,670 mE 6,977,560 mN conforms to SNP 2. A second sample site conforming to SNP 3 and farther downslope at more permanent trenches will be at 635,510 mE 6,977,340 mN. Currently, sample sites are planned based upon an engineering survey completed in 2017 and site visits since then.

WASTE TYPES – DRILLSITES

Waste types at a core-drill site will be the same from site to site.

DRILLWATER WITH CUTTINGS

Portion of water not recirculated (20%) and containing cuttings (clean rock flour)

- Pumped through a sludge line to a natural depression or outcrop area (natural land-based sump)
- Monitoring of drill logs and drill water continually by rig geologist;

Drill water sump

Sumps are to be located at least 100m from water bodies or at such other distance as may be

preapproved from time to time by a GNWT Land Inspector, but in all cases are sited and controlled such that any flow is directed away from water bodies.

Natural sumps between $10m^3$ and $15m^3$ in size will be used to consolidate and collect all water and cuttings. At sites closer than 100m to water, steel collection sumps will collect drill fluids and cuttings to be pumped using commercial trash pumps (1 to 5 hp) to a natural sump > 100 m from water.

- control measures may include snow/ice berms, earthen berms, manufactured barriers and silt fences to retain solids and allow passage of clean water;
- Sumps are monitored continually during drilling; winter sumps are re-checked in thawed summer conditions to ensure slow percolation through thawed active soil layer; documenting photos are taken at hole closure/end of sump use and at re-check;
- all cuttings report to a land-based sump;
- Water used and reporting to sump (1 core drill) = 3 m3 /day;
- Sumps will be monitored daily during operations, and annually once they have been reclaimed.
- Experience derived from 30 seasons of reclamation/monitoring sumps in this area have demonstrated that even larger sumps can be successfully restored to their former condition and that vegetation can and does re-establish, and wildlife return to forage the re-established growth.

DRILLSITE MATERIALS

During and after drilling, considerable effort is expended on waste control

- Waste ranging from lathe, wood and metal scrap to empty containers and empty drums and cylinders is regularly removed during the operation and nothing left behind when the hole is closed (casing cut on land);
- Waste fuel and oil is deposited into sealable refuse drums at drillsite (UN 3082 waste);
- Waste solids (UN 3077 waste) such as empty containers, punctured aerosol cans, used absorbents, rags, oil filters) are deposited into sealable refuse drums at drillsite;
- Refuse drums are regularly returned to camp for out shipment and will be disposed to an approved shipper/receiver;
- Fuels will not be stored on lake ice;
- storage is on land in secondary containment;
- Site conditions are checked during and post-drilling;
- Hole drilled in winter are re-checked in summer to ensure snow has not inadvertently obliterated some items such as wood scrap;
- Household garbage: Items packed in for a drill shift are packed out at end of shift and incinerated with other household garbage, if burnable, such as food and packing waste;
- Waste solids (UN 3077 waste) such as empty containers, punctured aerosol cans, used absorbents, rags, oil filters) are deposited into sealable refuse drums at drillsite.

ROCK, WASTE

There are two types of waste rock within the Mine area and immediate vicinity. Burwash Group metasediments are the dominant type, composed of mixed greywacke and argillite and have been sampled for ABA testing (see page 19). It is NAG or PAG. The second type of waste rock is mafic igneous rock, gabbroic or basalt-andesite and have been sampled for ABA testing and humidity cell work (see page 19). It is NAG. No other waste rock types are observed in the area.

Rock excavated during the mining program will be stored at the site denoted for such use on MapWMPv1.pdf.

- Samples of each geologically identifiable rock type as determined by a registered professional geologist will be collected, consolidated, and field tested initially for classification as they are produced and recorded in the Waste Rock Management Record.
- Samples that are assessed as PAG or AG using standard field tests will be sent to a laboratory for ABA testing including SWEP and Modified SWEP testing.
- NAG rock will be used for construction purposes and AG and PAG rock will be stored until their classification is more certain. PAG rock that shows little acid generating potential (<0.1% Total S) will be used for construction and monitored monthly.
- No AG rock has been identified at the site where work is currently planned.

All NAG and approved PAG rock will be used for road construction. As only 2,400 m^3 of waste rock is expected to be developed, and 1 km of new 3m wide haul trails are required, NDM will not have any waste rock piles developed in the foreseeable future.

All AG rock and PAG rock with a high potential to produce acid (>0.1% S) will be segregated and have lime added to assist neutralization potential. Each kg of $CaCO_3$ /tonne will increase the NP by that same amount.

Haul trails will consist of run of mine muck placed along prepared right of ways to support heavy equipment. Construction standards will use local brush as a geotextile mat as identified by Sudarsanan et al., 2015. This method has been used successfully in Northern Saskatchewan (R. Hiebert, Civil Projects Ltd., per.com.).

All SNP stations associated with NAG, PAG, and AG rocks will be monitored as required, or monthly. A field pH meter will be used to assess the SNP stations after significant precipitation events.

ROCK, NOT WASTE

Rock not denoted as waste will be handled separately and stored for processing. It consists of low sulphide auriferous quartz veins. The gold and sulphides will be recovered in the gravity and flotation circuits of the mill and shipped off site for further processing (refineries, smelters). The remaining tailings product has been tested by ABA, SWEP, and modified SWEP tests (Pg 35). The tailings are not AG.

Rock excavated during the mining program will be stored at the site denoted for such use on MapWMPv1.pdf. This has historically been called ore, however this term is prohibited by regulation unless profitable extraction can be proven.

- Samples will be collected, consolidated, and tested for various environmental and metallurgical parameters as they are produced.
- To be placed at approved locations only.
- Samples that are assessed as PAG or AG using standard field tests will be sent to a laboratory for ABA testing including SWEP and Modified SWEP testing.
- This application will look to process this material as described above.

GROUND WATER FLOWS

The mine is located within permafrost and permafrost was encountered during the initial mining between 1989 and 1997. Similar conditions are expected for the ongoing work. Permafrost has been found to preclude ground water flows.

All underground headings shall be monitored for ground water inflows. When noted, the event shall be reported to the supervisor who shall document the inflow as to quantity and quality, to be determined by sampling and analyzing according to standard SNP protocols.

Sumps

All sumps will comply with regulations and license requirements. All sumps will make use of natural depressions first, or will be excavated as needed. They will be a minimum of 3 m^3, and up to 40 m^3 in size. Standard pneumatic Wilden pumps with 2" discharge will be used in the mines, and in the mine surface sump. No other pumps will be used in the mine or mill sumps. Inputs will be sporadic and will not exceed 3m^3 per day.

All mine water will be first consolidated in underground sumps. These sumps will be constructed from blasted developments 3m wide and 9 to 12 m long and 2 to 3 m deep (3 m high). Mine water will be pumped into these sumps and visible oil will be collected using absorbent mats and the water will be reused underground. No discharge into the environment will occur from underground sumps. Sediments decanted from the mine water will remain and when they limit the sump capacity, the sump will be capped (filled) and a new sump will be constructed.

Any discharge of water from the mine sumps will be less than 3 m^3 per day and will be deposited from the underground sump to a surface sump (tank) for use in the mill. If the mill is not operating, then up to 3 m^3 of water per day will be disposed of from the surface tank to the swampy area east of the mill as was done in 1989-1997. The water will have no visible oil sheen and will be tested for ammonia, pH, and trace elements as per approved SNP protocols. No discharge will occur unless the EQC meets SNP 08 standards.

Sumps will be developed wherever SNP requirements require this.

SNP	Description	Rationale
SNP-02	Monitoring trench, immediately downstream of the Dry Stack Tailings Facility	To monitor the quality of Seepage and surface Water downstream of the Dry Stack Tailings Facility
SNP-03a	Monitoring trench, down slope of Dry Stack Tailings Facility – First Narrows	To monitor the quality of Seepage and surface Water downstream of the Dry Stack Tailings Facility
SNP-03b	Monitoring trench, down slope of Dry Stack Tailings Facility – Culvert	To monitor the quality of Seepage and surface Water downstream of the Dry Stack Tailings Facility
SNP-04	Seepage from the Dry Stack Tailings Facility	To monitor the quality and quantity of Seepage from the Dry Stack Tailings Facility

SNP-07	Underground Minewater Sump(s)	To monitor the quantity and quality of groundwater and mine Water collected in the underground sump prior to discharge to the surface
SNP-08	Minewater holding tank or pond	To monitor the quantity and quality of mine Water prior to discharge to the Receiving Environment
SNP-09	Seepage from Waste rock pile(s)	To monitor the quality and quantity of Seepage from the Waste rock pile(s)
SNP-10	Seepage from ore stockpile(s)	To monitor the quality and quantity of Seepage from the ore stockpile(s)

Each sump will be dug as required and in the case of SNP 08 will be lined with plastic sheets to minimize seepage and facilitate reuse.

Spill Contingency Plan

A separate Spill Contingency Plan details spill-response measures for a wide range of hazardous and non-hazardous waste types, as well as contact information for New Discovery Mine Ltd. officials, contractors and government personnel, including the Spill Line phone number, spill report form and instructions, and reportable-quantities table.

Waste Handling

Contaminated soils which may be collected as a result of inadvertent fuel or oil spills at camp or at a drill site are collected in sealable pails or drums, labelled and shipped with GNWT Waste Movement Document forms. As per the proponent's separate Closure and Reclamation Plan, soil areas may be sampled according to Canadian Council of Ministers of the Environment (CCME) criteria, if necessary;

- Contents treatable via deposit to special treatment area at Yellowknife Landfill OR disposed to approved shipper/receiver, for treatment or out shipment to a final treatment source, OR land farmed on site.
- Contaminated snow which may be collected as a result of inadvertent fuel or oil spills at camp or at a drill site are collected in sealable pails or drums, labelled and out shipped with GNWT Waste Movement or land farmed on site.

Land Farms

Land farms will be constructed and operated as shown below. Material will be deposited in amounts not anticipated to exceed 1.5 m^3 per month, and sampled according to CCME PHC guidelines. Loading of the land farm will respect past soils such that an aged sequence of soils is maintained. Samples will confirm maximum PHC WC guidelines as amended before removal from the land farm.

- Place on an HDPE liner in a flat area away from wildlife ingress, covering an area approximately 4m x 4m with hand constructed rock berms to inhibit solid or liquid outflow.

- Keep moist, turn by hand, fertilize or lime to control nutrients and pH as needed, using domestically available fertilizer or lime.
- Follow guidelines from Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils, March 2006, updated 2013.
- Analyze at commercial lab prior to closure.

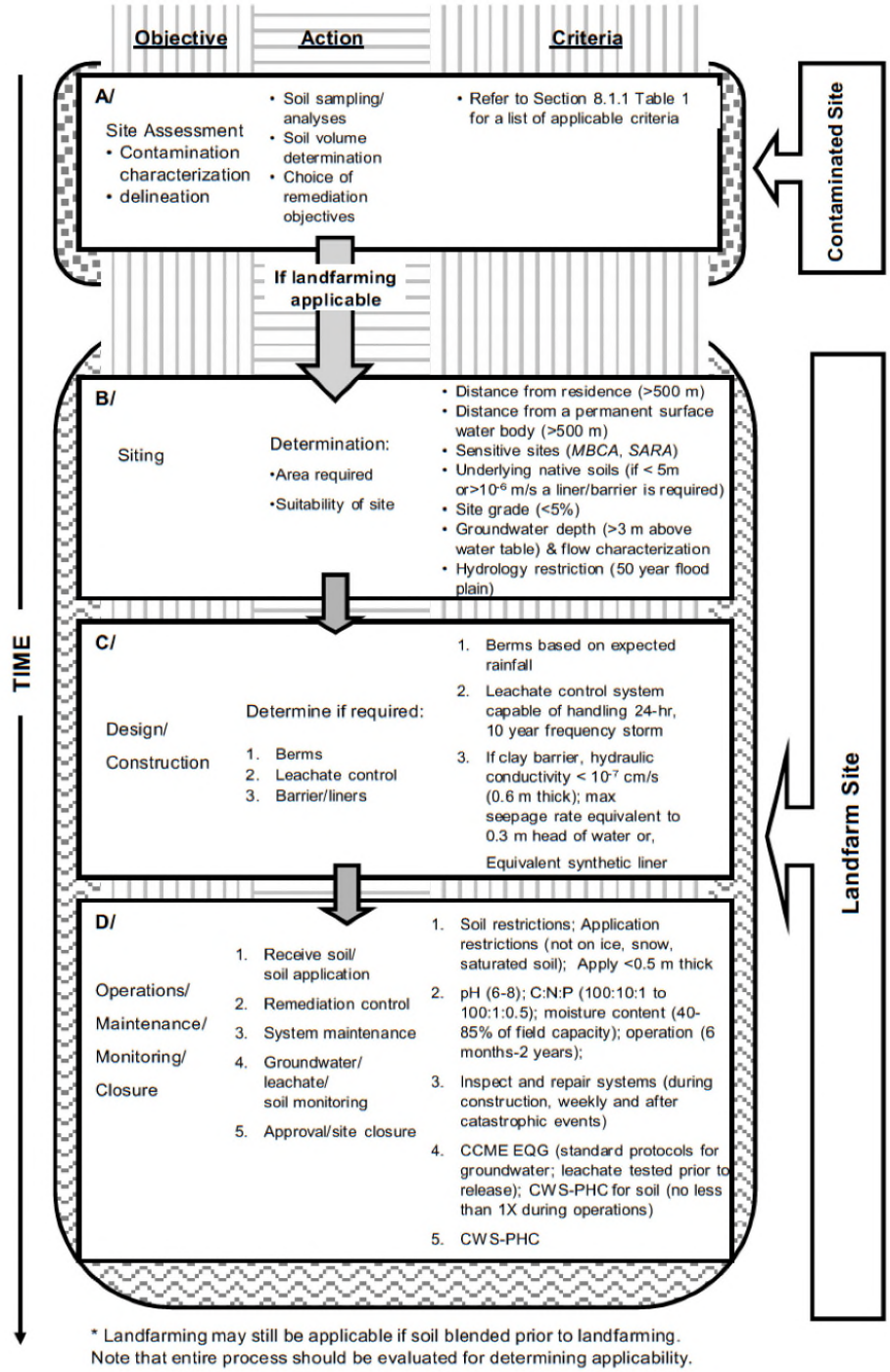


Figure 3. Criteria for selecting area for Landfarming, from Federal Contaminated Sites Action Plan, 2013

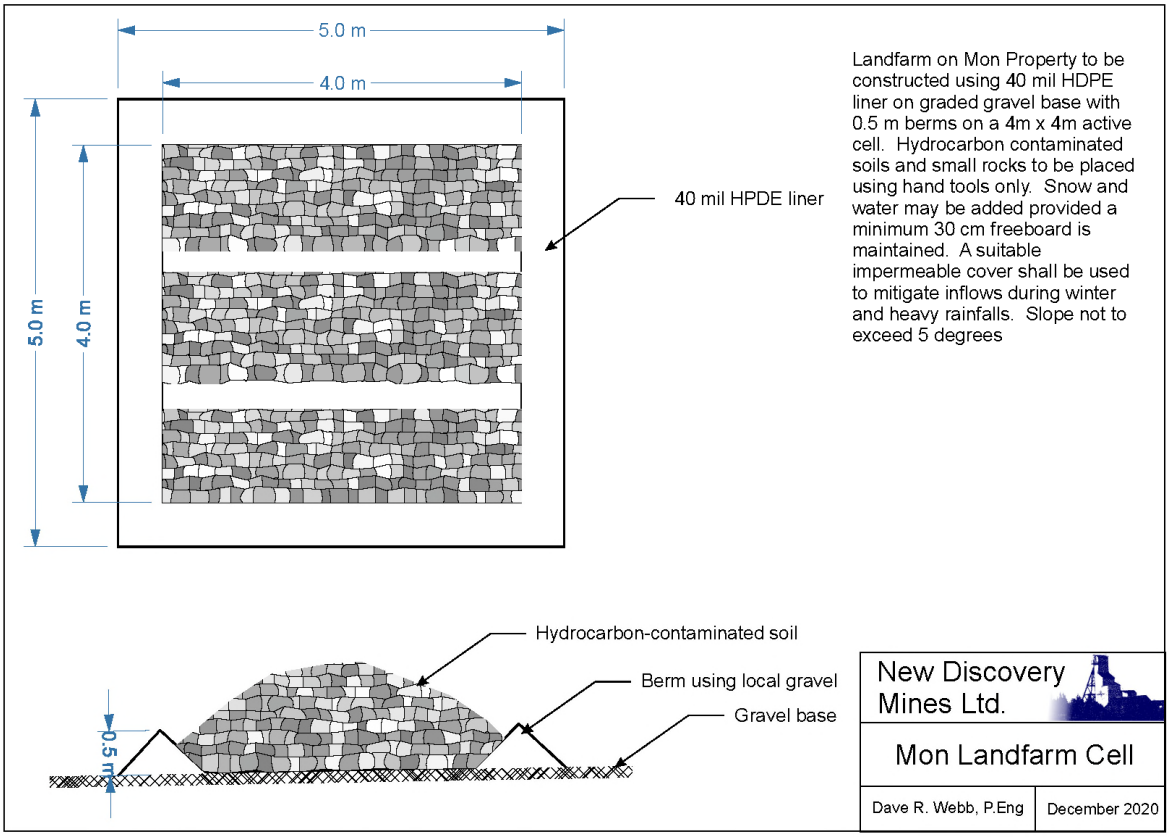


Figure 4. Diagrammatic Plan and Section of conceptual Land Farm

Secondary Containment

All liquid fuels, chemicals and reagents will have secondary containment structures. This will range from purpose built trays and containers to bermed HDPE lined pads.

Vehicles will be restricted as to where they may park, if stopped for more than 30 minutes. Designated parking areas will be on lined pads. Mobile secondary containment containers such as metal trays will be used on stationary equipment (Generators, compressors, pumps).

Spills in secondary containment containers will be kept clean and treated as stipulated in this WMP.

Material Safety Data Sheet

1. MATERIAL AND COMPANY IDENTIFICATION

Material Name : **Shell Air Tool Oil S2 A 100**
Uses : Machine oil.

Manufacturer/Supplier : **SOPUS Products**
PO BOX 4427
Houston, TX 77210-4427
USA
MSDS Request : 877-276-7285

Emergency Telephone Number
Spill Information : 877-242-7400
Health Information : 877-504-9351

2. COMPOSITION/INFORMATION ON INGREDIENTS

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

3. HAZARDS IDENTIFICATION

Emergency Overview

Appearance and Odour : Amber. Liquid at room temperature. Slight hydrocarbon.

Health Hazards : Not classified as dangerous for supply or conveyance.
Safety Hazards : Not classified as flammable but will burn.
Environmental Hazards : Not classified as dangerous for the environment.

Health Hazards : Not expected to be a health hazard when used under normal conditions.

Health Hazards
Inhalation : Under normal conditions of use, this is not expected to be a primary route of exposure.
Skin Contact : Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
Eye Contact : May cause slight irritation to eyes.
Ingestion : Low toxicity if swallowed.
Other Information : Used oil may contain harmful impurities.
Signs and Symptoms : 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.
Aggravated Medical Conditions : Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Skin.
Environmental Hazards : Not classified as dangerous for the environment.
Additional Information : Under normal conditions of use or in a foreseeable emergency,

this product does not meet the definition of a hazardous chemical when evaluated according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

4. FIRST AID MEASURES

General Information	:	Not expected to be a health hazard when used under normal conditions.
Inhalation	:	No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice.
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.
Eye Contact	:	Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
Ingestion	:	In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.
Advice to Physician	:	Treat symptomatically.

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

Flash point	:	Typical 241 °C / 466 °F (COC)
Upper / lower Flammability or Explosion limits	:	Typical 1 - 10 %(V)(based on mineral oil)
Auto ignition temperature	:	> 320 °C / 608 °F
Specific Hazards	:	Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds.
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.
Protective Equipment for Firefighters	:	Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

6. ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. See Chapter 13 for information on disposal. Observe the relevant local and international regulations.

Protective measures	:	Avoid contact with skin and eyes. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers.
Clean Up Methods	:	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 : Local authorities should be advised if significant spillages cannot be contained.

7. HANDLING AND STORAGE

General Precautions : Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. 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.

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.

Storage : Keep container tightly closed and in a cool, well-ventilated place. Use properly labelled and closeable containers. Storage Temperature: 0 - 50 °C / 32 - 122 °F

Recommended Materials : For containers or container linings, use mild steel or high density polyethylene.

Unsuitable Materials : PVC.

Additional Information : Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Material	Source	Type	ppm	mg/m3	Notation
Oil mist, mineral	ACGIH	TWA(Inhalable fraction.)		5 mg/m3	
Oil mist, mineral	OSHA Z1	PEL(Mist.)		5 mg/m3	
Oil mist, mineral	OSHA Z1A	TWA(Mist.)		5 mg/m3	

Additional Information : Shell has adopted as Interim Standards the OSHA Z1A values that were established in 1989 and later rescinded.

Exposure Controls : 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.

Personal Protective Equipment : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

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 combined particulate/organic gases and vapours [boiling point >65°C(149 °F)].
Hand Protection	:	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, glove thickness, 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.
Eye Protection	:	Wear safety glasses or full face shield if splashes are likely to occur.
Protective Clothing	:	Skin protection not ordinarily required beyond standard issue work clothes.
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.
Environmental Exposure Controls	:	Minimise release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Amber. Liquid at room temperature.
Odour	:	Slight hydrocarbon.
pH	:	Not applicable.
Initial Boiling Point and Boiling Range	:	> 280 °C / 536 °F estimated value(s)
Pour point	:	Typical -24 °C / -11 °F
Flash point	:	Typical 241 °C / 466 °F (COC)
Upper / lower Flammability or Explosion limits	:	Typical 1 - 10 %(V) (based on mineral oil)
Auto-ignition temperature	:	> 320 °C / 608 °F
Vapour pressure	:	< 0.5 Pa at 20 °C / 68 °F (estimated value(s))
Specific gravity	:	Typical 0.884 at 15 °C / 59 °F

Density	:	Typical 884 kg/m3 at 15 °C / 59 °F
Water solubility	:	Negligible.
n-octanol/water partition coefficient (log Pow)	:	> 6 (based on information on similar products)
Kinematic viscosity	:	Typical 100 mm2/s at 40 °C / 104 °F
Vapour density (air=1)	:	> 1 (estimated value(s))
Evaporation rate (nBuAc=1)	:	Data not available

10. STABILITY AND REACTIVITY

Stability	:	Stable.
Conditions to Avoid	:	Extremes of temperature and direct sunlight.
Materials to Avoid	:	Strong oxidising agents.
Hazardous Decomposition Products	:	Hazardous decomposition products are not expected to form during normal storage.

11. TOXICOLOGICAL INFORMATION

Basis for Assessment	:	Information given is based on data on the components and the toxicology of similar products.
Acute Oral Toxicity	:	Expected to be of low toxicity: LD50 > 5000 mg/kg , Rat
Acute Dermal Toxicity	:	Expected to be of low toxicity: LD50 > 5000 mg/kg , Rabbit
Acute Inhalation Toxicity	:	Not considered to be an inhalation hazard under normal conditions of use.
Skin Irritation	:	Expected to be slightly irritating.
Eye Irritation	:	Expected to be slightly irritating.
Respiratory Irritation	:	Inhalation of vapours or mists may cause irritation.
Sensitisation	:	Not expected to be a skin sensitiser.
Repeated Dose Toxicity	:	Not expected to be a hazard.
Mutagenicity	:	Not considered a mutagenic hazard.
Carcinogenicity	:	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). Other components are not known to be associated with carcinogenic effects.
Reproductive and Developmental Toxicity	:	Not expected to be a hazard.
Additional Information	:	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.

12. ECOLOGICAL INFORMATION

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.

Acute Toxicity	:	Poorly soluble mixture. May cause physical fouling of aquatic organisms. Expected to be practically non toxic: LL/EL/IL50 >

100 mg/l (to aquatic organisms) (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract). Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.

Mobility	:	Liquid under most environmental conditions. Floats on water. If it enters soil, it will adsorb to soil particles and will not be mobile.
Persistence/degradability	:	Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.
Bioaccumulation	:	Contains components with the potential to bioaccumulate.
Other Adverse Effects	:	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.

13. DISPOSAL CONSIDERATIONS

Material Disposal	:	Recover or recycle if possible. 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 dispose into the environment, in drains or in water courses.
Container Disposal	:	Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.
Local Legislation	:	Disposal should be in accordance with applicable regional, national, and local laws and regulations.

14. TRANSPORT INFORMATION

US Department of Transportation Classification (49CFR)
This material is not subject to DOT regulations under 49 CFR Parts 171-180.

IMDG
This material is not classified as dangerous under IMDG regulations.

IATA (Country variations may apply)
This material is not classified as dangerous under IATA regulations.

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Federal Regulatory Status

Notification Status

EINECS	All components listed or polymer exempt.
TSCA	All components listed.
DSL	All components listed.

Shell classifies this material as an "oil" under the CERCLA Petroleum Exclusion, therefore releases to the environment are not reportable under CERCLA.

SARA Hazard Categories (311/312)
No SARA 311/312 Hazards.

SARA Toxic Release Inventory (TRI) (313)

Zinc alkyl dithiophosphate (68649-42-3)	0.90%

State Regulatory Status

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)

This material does not contain any chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

New Jersey Right-To-Know Chemical List

Zinc alkyl dithiophosphate (68649-42-3)	Listed.

16. OTHER INFORMATION

NFPA Rating (Health, Fire, Reactivity)	:	0, 1, 0
MSDS Version Number	:	1.0
MSDS Effective Date	:	03/03/2011
MSDS Revisions	:	A vertical bar (|) in the left margin indicates an amendment from the previous version.
MSDS Regulation	:	The content and format of this MSDS is in accordance with the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
MSDS Distribution	:	The information in this document should be made available to all who may handle the product.

Material Safety Data Sheet

Disclaimer : The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.

SDS: 0000289
Date Prepared: 09/05/2013

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: **AEROFLOAT® 238 Promoter, Aqueous**
Synonyms: None
Product Description: Dithiophosphate salt in water
Intended/Recommended Use: Mining chemical

Supplied By: CYTEC CANADA INC., 9061 GARNER ROAD
NIAGARA FALLS, ONTARIO, CANADA L2E 6S5 1-905/356-9000

Manufactured By: CYTEC INDUSTRIES INC., FIVE GARRET MOUNTAIN PLAZA,
WOODLAND PARK, NEW JERSEY 07424, USA - 973/357-3100

EMERGENCY PHONE (24 hours/day) - For emergency only involving spill, leak, fire, exposure or accident call:

Asia Pacific:
Australia - +61-3-9663-2130 or 1800-033-111
China (PRC) - +86 10 5100 3039 (Carechem24 China)
New Guinea - +61-3-9663-2130
New Zealand - +61-3-9663-2130 or 0800-734-607
All Others - +65 3158 1074 (Carechem24 Singapore)

Canada: +1-905-356-8310 (Cytec Welland, Canada plant)

Europe/Africa/Middle East (Carechem24 UK):
Europe, Middle East, Africa, Israel - +44 (0) 1235 239 670
Middle East, Africa (Arabic speaking countries) - +44 (0) 1235 239 671

Latin America:
Brazil - 0800 0111 767 (SOS Cotec)
Chile - +56-2-247-3600 (CITUC QUIMICO)
All Others - +52-376-73 74122 (Cytec Atequiza, Mexico plant)

USA: +1-703-527-3887 or 1-800-424-9300 (CHEMTREC #CCN6083)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

APPEARANCE AND ODOR:

Color:	yellow-brown
Appearance:	liquid
Odor:	alcohol

STATEMENTS OF HAZARD:
DANGER! CAUSES BURNS OF EYES AND SKIN

POTENTIAL HEALTH EFFECTS

EFFECTS OF EXPOSURE:

The acute oral (rat) LD50 and dermal (rabbit) LD50 values are 4060 mg/kg and >5000, respectively. Marked irritation and skin corrosion were produced during primary irritation studies with rabbits. Contact with acid may cause liberation of hydrogen sulfide. Hydrogen sulfide has a strong rotten-egg odor, however, some people are unable to smell the gas and exposure will deaden the sense of smell. Therefore, odor is an unreliable indicator of exposure. Overexposure to hydrogen sulfide gas may cause severe eye or respiratory tract irritation, rapid development of coma and respiratory failure. Low levels of hydrogen sulfide may cause headache, dizziness, staggering gait, neurological damage and gastritis. Refer to Section 11 for toxicology information on the regulated components of this product.

3. COMPOSITION/INFORMATION ON INGREDIENTS

WHMIS REGULATED COMPONENTS

Component / CAS No.	%	Carcinogen
Sodium di sec butyl-dithiophosphate 33619-92-0	40 - 60	Not applicable
Sodium hydroxide 1310-73-2	0.1 - 1.0	Not applicable

Concentrations are expressed as % wt/wt.

4. FIRST AID MEASURES

Eye Contact:
Rinse immediately with plenty of water for at least 15 minutes. Obtain medical attention immediately.

Skin Contact:
Remove contaminated clothing and shoes without delay. Wear impermeable gloves. Wash immediately with plenty of water. Pay particular attention to skin crevices, nail folds, etc. Do not reuse contaminated clothing without laundering. Do not reuse contaminated leatherware. Obtain medical attention.

Ingestion:
If swallowed, call a physician immediately. Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person.

Inhalation:
Remove to fresh air. If breathing is difficult, give oxygen. Obtain medical advice if there are persistent symptoms.

Notes To Physician:
No specific measures have been identified.

MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

None known

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:
Use water spray, alcohol foam, carbon dioxide or dry chemical to extinguish fires.

Protective Equipment:
Firefighters, and others exposed, wear self-contained breathing apparatus. Wear full firefighting protective clothing. Use approved air-supplied full face respirator. See MSDS Section 8 (Exposure Controls/Personal Protection).

Special Hazards:
Sulfur dioxide or hydrogen sulfide may be formed under fire conditions. Do not flush to sewer which may contain acid. This could result in generation of toxic and flammable hydrogen sulfide.

Mechanical/Static Sensitivity Statements:
This product should not be mixed with acids since evolution of toxic and explosive hydrogen sulfide gas could result. This precaution does not, of course, apply to addition of this reagent to flotation pulps in amounts customarily used in flotation.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:
Where exposure level is not known, wear approved, positive pressure, self-contained respirator. Where exposure level is known, wear approved respirator suitable for level of exposure. In addition to the protective clothing/equipment in Section 8, wear impervious boots and rain suit.

Methods For Cleaning Up:
Cover spills with some inert absorbent material; sweep up and place in a waste disposal container. Flush spill area with water.

Environmental Precautions:
None known

7. HANDLING AND STORAGE

HANDLING

Precautionary Measures: Do not get in eyes, on skin or on clothing. Wash thoroughly after handling.

Special Handling Statements: Large quantities of undiluted product should not be mixed with acids, since evolution of toxic and flammable hydrogen sulphide could result. In particular, precautions must be taken to avoid the accidental discharge of large volumes of the product in acid storage tanks or any tank or containment containing acidic materials. This precaution does not, of course, apply to addition of this reagent to flotation pulps in amounts customarily used in flotation, were the reagent amounts are small and instantly diluted to concentrations well below the solubility limits.

STORAGE
Store in tightly closed containers in a cool, well-ventilated area away from heat, sparks and flames. Observe the general rules of industrial fire protection.

Storage Temperature: Room temperature
Reason: Quality.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures:
Utilize a closed system process where feasible. Where this material is not used in a closed system, good enclosure and local exhaust ventilation should be provided to control exposure.

Respiratory Protection:
Where exposures are below the established exposure limit, no respiratory protection is required. Where exposures exceed the established exposure limit, use respiratory protection recommended for the material and level of exposure.

Eye Protection:
Prevent eye and skin contact. Provide eye wash fountain and safety shower in close proximity to points of potential exposure. Wear eye/face protection such as chemical splash proof goggles or face shield.

Skin Protection:
Prevent contamination of skin or clothing when removing protective equipment. Wear impermeable gloves and suitable protective clothing.

Hand Protection:
Wear impermeable gloves. Replace gloves immediately when torn or any change in appearance (dimension, colour, flexibility etc) is noticed. Barrier creams may help to protect the exposed areas of the skin, they should however not be applied once exposure has occurred.

Additional Advice:
Food, beverages, and tobacco products should not be carried, stored, or consumed where this material is in use. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water.

Exposure Limit(s)

1310-73-2 Sodium hydroxide

ACGIH (TLV):	2 mg/m^3 (Ceiling)
AIHA (WEEL):	Not established
Other Value:	Not established

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	yellow-brown
Appearance:	liquid
Odor:	alcohol
Boiling Point:	Not available
Melting Point:	Not applicable
Vapor Pressure:	Similar to water
Specific Gravity/Density:	1.128 @ 25 °C
Vapor Density:	Similar to water
Percent Volatile (% by wt.):	50(water)
pH:	11.0 (minimum)
Saturation In Air (% By Vol.):	Similar to water
Evaporation Rate:	Similar to water
Solubility In Water:	Complete
Volatile Organic Content:	Not available
Flash Point:	>93 °C 200 °F Setaflash Closed Cup
Flammable Limits (% By Vol):	Not available
Autoignition Temperature:	Not available
Decomposition Temperature:	Not available
Partition coefficient (n-octanol/water):	Not available
Odor Threshold:	Not available

10. STABILITY AND REACTIVITY

Stability:	Stable
Conditions To Avoid:	None known
Polymerization:	Will not occur
Conditions To Avoid:	None known
Materials To Avoid:	This product contains a neutralized dithio acid. Avoid contact with strong oxidizing agents and mineral acids.
Hazardous Decomposition Products:	Carbon monoxide (CO) Carbon dioxide oxides of sulfur (includes sulfur di and tri oxides) hydrogen sulfide (H2S)

11. TOXICOLOGICAL INFORMATION

Toxicological information for the product is found under Section 2. HAZARDS IDENTIFICATION.
Toxicological information on the regulated components of this product is as follows:

Sodium di sec butyl-dithiophosphate has estimated acute oral (rat) and dermal (rabbit) LD50 values of greater than 5000 mg/kg and 2000 mg/kg, respectively. Direct contact with sodium di sec butyl-dithiophosphate can cause eye burns and skin corrosion.

Sodium hydroxide (NaOH) is corrosive to eyes, skin, and soft tissues of the digestive and respiratory tracts. Even dilute solutions of NaOH can produce irreversible damage to eyes and skin. Acute overexposure to NaOH mists or dusts causes severe respiratory irritation. NaOH is not a known skin or respiratory sensitizer. Reported acute oral (rat) and dermal (rabbit) LD50 values are 104-340 mg/kg and 1250 mg/kg, respectively. Fatal ingestion and fatal dermal exposure has been reported for humans. According to the OECD (2002), no valid animal data are available on repeated dose toxicity by the oral, dermal or inhalation routes. However, under normal, non-irritating handling and use conditions, exposure to NaOH is not expected to result in systemic availability and, therefore, harmful effects are not anticipated. NaOH is not known to cause reproductive or developmental toxicity. Both in vitro and in vivo genetic toxicity tests with NaOH indicated no evidence for mutagenic activity.

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12. ECOLOGICAL INFORMATION

This material is not classified as dangerous for the environment. This material is not readily biodegradable.

ECOTOXICITY

FISH TEST RESULTS

Test: Acute toxicity, freshwater (OECD 203)
Duration: 96 hr. **Procedure:** Static.
Species: Rainbow Trout (Oncorhyncus mykiss)
1149 mg/l LC50

Test: Acute toxicity, freshwater (OECD 203)
Duration: 96 hr
Species: Chinook Salmon (Oncorhyncus tshawytscha)
152 mg/l LC50

BIOACCUMULATIVE POTENTIAL
Not available

PERSISTENCE AND DEGRADABILITY
Not available

DEGRADATION

Test: Closed Bottle (OECD 301D)
Duration: 28 day **Procedure:** Ready biodegradability
20.4 %

MOBILITY IN SOIL
Not available

OTHER ADVERSE EFFECTS

HAZARD TO THE OZONE LAYER
Not available

13. DISPOSAL CONSIDERATIONS

The Company encourages the recycle, recovery and reuse of materials, where permitted, as an alternative to disposal as a waste. The Company recommends that organic materials classified as hazardous waste according to the relevant local or national regulations be disposed of by thermal treatment or incineration at approved facilities. All local and national regulations should be followed.

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14. TRANSPORT INFORMATION

This section provides basic shipping classification information. Refer to appropriate transportation regulations for specific requirements.

US DOT

Dangerous Goods? X
Proper Shipping Name: Caustic alkali liquid, n.o.s.
Hazard Class: 8
Packing Group: II
UN/ID Number: UN1719
Transport Label Required: Corrosive
Technical Name (N.O.S.): Dithiophosphate salt

TRANSPORT CANADA

Dangerous Goods? X
Proper Shipping Name: Caustic alkali liquid, n.o.s.
Hazard Class: 8
Packing Group: II
UN Number: UN1719
Transport Label Required: Corrosive
Technical Name (N.O.S.): Contains dithiophosphate salt

ICAO / IATA

Dangerous Goods? X
Proper Shipping Name: Caustic alkali liquid, n.o.s.
Hazard Class: 8
Packing Group: II
UN Number: UN1719
Transport Label Required: Corrosive
Technical Name (N.O.S.): Dithiophosphate salt

IMO

Dangerous Goods? X
Proper Shipping Name: Caustic alkali liquid, n.o.s.
Hazard Class: 8
UN Number: UN1719
Packing Group: II
Transport Label Required: Corrosive
Technical Name (N.O.S.): dithiophosphate salt

15. REGULATORY INFORMATION

This product has been classified in accordance with the hazard criteria of the Controlled products Regulations and this Material Safety Data Sheet contains all the information required by the Controlled Products Regulations.

WHMIS CLASSIFICATION:
Class D2B Toxic
Class E Corrosive

Inventory Information

United States (USA): All components of this product are included on the TSCA Chemical Inventory or are not required to be listed on the TSCA Chemical Inventory.

Canada: All components of this product are included on the Domestic Substances List (DSL) or are not required to be listed on the DSL.

European Economic Area (including EU): When purchased from a Cytec legal entity based in the EEA (EU or Norway), this product is compliant with the registration of the REACH Regulation (EC) No. 1907/2006 as all its components are either excluded, exempt, pre-registered and/or registered.

Australia: All components of this product are included in the Australian Inventory of Chemical Substances (AICS) or are not required to be listed on AICS.

China: All components of this product are included on the Chinese inventory or are not required to be listed on the Chinese inventory.

Japan: All components of this product are included on the Japanese (ENCS) inventory or are not required to be listed on the Japanese inventory.

Korea: All components of this product are included on the Korean (ECL) inventory or are not required to be listed on the Korean inventory.

Philippines: All components of this product are included on the Philippine (PICCS) inventory or are not required to be listed on the Philippine inventory.

16. OTHER INFORMATION

NFPA Hazard Rating (National Fire Protection Association)

Health: 3 - Materials that, under emergency conditions, can cause serious or permanent injury.

Fire: 1 - Materials that must be preheated before ignition can occur.

Instability: 0 - Materials that in themselves are normally stable, even under fire exposure conditions.

Reasons For Issue:	Revised Section 7 Revised Section 11
Date Prepared:	09/05/2013
Date of last significant revision:	03/30/2011

Prepared By: Legal & Compliance Services; E-mail: custinfo@cytec.com
09/05/2013

SDS: 0005716
Date Prepared: 07/10/2015

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: **AEROFROTH® 76A Frother**
Synonyms: None
Product Description: Mineral processing reagent
Intended/Recommended Use: Mining chemical

Supplied By: CYTEC CANADA INC., 9061 GARNER ROAD
NIAGARA FALLS, ONTARIO, CANADA L2E 6S5 1-905/356-9000

Manufactured By: CYTEC INDUSTRIES INC., FIVE GARRET MOUNTAIN PLAZA,
WOODLAND PARK, NEW JERSEY 07424, USA - 973/357-3100

EMERGENCY PHONE (24 hours/day) - For emergency only involving spill, leak, fire, exposure or accident call:

Asia Pacific:
Australia - +61-3-9663-2130 or 1800-033-111
China (PRC) - +86 0532 83889090 (NRCC)
New Guinea - +61-3-9663-2130
New Zealand - +61-3-9663-2130 or 0800-734-607
All Others - +65 3158 1074 (Carechem24 Singapore)

Canada: +1-905-356-8310 (Cytec Welland, Canada plant)

Europe/Africa/Middle East (Carechem24 UK):
Europe, Middle East, Africa, Israel - +44 (0) 1235 239 670
Middle East, Africa (Arabic speaking countries) - +44 (0) 1235 239 671

Latin America:
Brazil - 0800 7077 022 (SUATRANS)
Chile - +56-2-247-3600 (CITUC QUIMICO)
All Others - +52-376-73 74122 (Cytec Atequiza, Mexico plant)

USA: +1-703-527-3887 or 1-800-424-9300 (CHEMTREC #CCN6083)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

APPEARANCE AND ODOR:

Color:	yellow to brown
Appearance:	liquid
Odor:	pungent

STATEMENTS OF HAZARD:

WARNING! HARMFUL IF INHALED
CAUSES EYE AND SKIN IRRITATION
COMBUSTIBLE LIQUID AND VAPOR

POTENTIAL HEALTH EFFECTS

EFFECTS OF EXPOSURE:

The estimated acute oral (rat) LD50, acute dermal (rabbit) LD50 and 4-hour inhalation (rat) LC50 values for this material are >2000 mg/kg, >2000 mg/kg and ~3.7 (Dust/Mist) mg/l, respectively. Overexposure to vapors, sprays or mists may produce irritation of the nose, throat and upper respiratory tract. Prolonged exposure or exposure to high concentrations may cause headache, dizziness, nausea, incoordination, confusion and drowsiness. Direct contact with this material may cause moderate eye and skin irritation. Refer to Section 11 for toxicology information on the regulated components of this product.

3. COMPOSITION/INFORMATION ON INGREDIENTS

WHMIS REGULATED COMPONENTS

Component / CAS No.	%	Carcinogen
2-Ethylhexanol tails 68609-68-7	60 - 100	Not applicable
2-Ethylhexanol 104-76-7	30-60	Not applicable

Concentrations are expressed as % wt/wt.

4. FIRST AID MEASURES

Inhalation:
Remove to fresh air. If breathing is difficult, give oxygen. Obtain medical advice if there are persistent symptoms.

Skin Contact:
Remove contaminated clothing and shoes without delay. Wash immediately with plenty of water. Do not reuse contaminated clothing without laundering. Get medical attention if pain or irritation persists after washing or if signs and symptoms of overexposure appear.

Eye Contact:
Rinse immediately with plenty of water for at least 15 minutes. Obtain medical advice if there are persistent symptoms.

Ingestion:
If swallowed, call a physician immediately. Only induce vomiting at the instruction of a physician. Never give anything by mouth to an unconscious person.

MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED
None known

Notes To Physician:
No specific measures have been identified.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:
Use water spray, alcohol foam, carbon dioxide or dry chemical to extinguish fires. Water stream may be ineffective.

Protective Equipment:
Firefighters, and others exposed, wear self-contained breathing apparatus. Wear full firefighting protective clothing. See MSDS Section 8 (Exposure Controls/Personal Protection).

Special Hazards:
Keep containers cool by spraying with water if exposed to fire.

Mechanical/Static Sensitivity Statements:
None

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:
Where exposure level is known, wear approved respirator suitable for level of exposure. Where exposure level is not known, wear approved, positive pressure, self-contained respirator. In addition to the protective clothing/equipment in Section 8 (Exposure Controls/Personal Protection), wear impermeable boots.

Methods For Cleaning Up:
Remove sources of ignition. Cover spills with some inert absorbent material; sweep up and place in a waste disposal container. Flush spill area with water.

Environmental Precautions:
Use appropriate containment to avoid environmental contamination.

Precautionary measures to prevent the occurrence of secondary hazards:
In the case of secondary disasters, eliminate all the ignition sources, prevent spills from entering sewers.

7. HANDLING AND STORAGE

HANDLING

Precautionary Measures: Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Keep away from heat and flame.

Special Handling Statements: None

STORAGE
Areas containing this material should have fire safe practices and electrical equipment in accordance with applicable regulations and/or guidelines. Standards are primarily based on the material`s flashpoint, but may also take into account properties such as miscibility with water or toxicity. All local and national regulations should be followed.
In the Americas, National Fire Protection Association (NFPA) 30: Flammable and Combustible Liquids Code, is a widely used standard. NFPA 30 establishes storage conditions for the following classes of materials: Class I Flammable Liquids, Flashpoint <37.8 °C. Class II Combustible Liquids, 37.8 °C < Flashpoint <60 °C. Class IIIa Combustible Liquids, 60 °C < Flashpoint < 93 °C. Class IIIb Combustible Liquids, Flashpoint > 93 °C.

Storage Temperature: Room temperature
Reason: Safety.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures:
Where this material is not used in a closed system, good enclosure and local exhaust ventilation should be provided to control exposure.

Respiratory Protection:
Where exposures are below the established exposure limit, no respiratory protection is required. Where exposures exceed the established exposure limit, use respiratory protection recommended for the material and level of exposure.

Eye Protection:
Wear eye/face protection such as chemical splash proof goggles or face shield. Eyewash equipment and safety shower should be provided in areas of potential exposure.

Skin Protection:
Avoid skin contact. Wear impermeable gloves and suitable protective clothing. Since this product is absorbed through the skin, care must be taken to prevent skin contact and contamination of clothing.

Hand Protection:
Wear impermeable gloves. Replace gloves immediately when torn or any change in appearance (dimension, colour, flexibility etc) is noticed. Barrier creams may help to protect the exposed areas of the skin, they should however not be applied once exposure has occurred.

Additional Advice:
Food, beverages, and tobacco products should not be carried, stored, or consumed where this material is in use. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water.

Exposure Limit(s)

No values have been established.

9. PHYSICAL AND CHEMICAL PROPERTIES

Color:	yellow to brown
Appearance:	liquid
Odor:	pungent
Boiling Point:	Not available
Melting Point:	Not available
Vapor Pressure:	Not available
Specific Gravity/Density:	0.83 - 0.92
Vapor Density:	Not available
Percent Volatile (% by wt.):	Not available
pH:	Not available
Saturation In Air (% By Vol.):	Not available
Evaporation Rate:	Not available
Solubility In Water:	Slight
Volatile Organic Content:	Not available
Flash Point:	>=81.7 °C 179 °F (value for solvent) Pensky-Martens Closed Cup
Flammable Limits (% By Vol):	Not available
Autoignition (Self) Temperature:	Not available
Decomposition Temperature:	Not applicable
Partition coefficient (n-octanol/water):	Not available
Odor Threshold:	Not available

10. STABILITY AND REACTIVITY

Stability:	Stable
Conditions To Avoid:	None known
Polymerization:	Will not occur
Conditions To Avoid:	None known
Materials To Avoid:	Strong acids, bases, oxidizing agents.
Hazardous Decomposition Products:	Carbon dioxide Carbon monoxide (CO)

11. TOXICOLOGICAL INFORMATION

Toxicological information for the product is found under Section 2. HAZARDS IDENTIFICATION.
Toxicological information on the regulated components of this product is as follows:

2-Ethylhexanol tails have acute oral (rat) and acute dermal (rabbit) LD50 values of > 5000 mg/kg, respectively. Eye and skin irritation studies have shown this material to be moderately irritating in laboratory animals. Overexposure to vapor may cause irritation to the respiratory tract and eyes and may cause central nervous system effects.

2-Ethylhexanol (CAS# 104-76-7) has acute oral (rat) LD50 and acute dermal (rabbit) LD50 values of >2000 mg/kg. The 4-hour inhalation LC50 (rat) is > 0.89 but <= 5.3 mg/l (mixed vapor and aerosol). 2-Ethylhexanol is a moderate to severe eye and moderate skin irritant. Repeated skin exposure may cause skin dryness or cracking. Inhalation overexposure to 2-ethylhexanol may produce headache, dizziness, central nervous system depression possibly leading to unconsciousness and irritation of the eyes and respiratory tract. 2-Ethylhexanol is an aspiration hazard. Chronic overexposure to 2-ethylhexanol may cause liver damage, pulmonary edema, or renal damage with glycosuria. In a teratology study in rats 3 ml/kg applied to the skin during the most critical part of gestation produced evidence of maternal toxicity, but no evidence of injury to the offspring. In a separate study, fetal toxicity and an increased incidence of birth defects were noted when pregnant rats were administered 2 ml/kg by stomach tube during gestation. Ritter, et al (1987) reported teratological effects in rats following administration of 2-Ethylhexanol on day 12 gestation. Astill, et al (1996) found that 2-Ethylhexanol was not oncogenic in rats, and reported a weak association with hepatocellular carcinoma incidence in mice at a chronic dose of 750 mg/kg. Divencenzo, et al (1985) saw no evidence of mutagenic substances excreted in the urine of rats dosed with 2-Ethylhexanol. Agarwal, et al (1985) reported that 2-Ethylhexanol exhibited no mutagenicity in Salmonella typhimurium strains TA98, 100, 1535, 1537, 1538, and 2637, with or without S9 activation. 2-Ethylhexanol did exhibit a moderate cytotoxic effect in most cultures. 2-Ethylhexanol has caused toxic effects in the prostate and immune systems of laboratory animals.

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12. ECOLOGICAL INFORMATION

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
This substance may be toxic to aquatic organisms. This material is not readily biodegradable.

ECOTOXICITY

FISH TEST RESULTS

Test: Acute toxicity, freshwater (OECD 203)
Duration: 96 hr. **Procedure:** Static.
Species: Rainbow Trout (Oncorhyncus mykiss)
21.7 mg/l LC50

INVERTEBRATE TEST RESULTS

Test: Acute Immobilization (OECD 202)
Duration: 48 hr **Procedure:** Static
Species: Water Flea (Daphnia magna)
4.6 mg/l EC50

BIOACCUMULATIVE POTENTIAL
Not available

PERSISTENCE AND DEGRADABILITY

DEGRADATION

Test: CO2 Evolution: Modified Sturm (OECD 301B)
Duration: 28 day **Procedure:** Ready biodegradability
40 %

MOBILITY IN SOIL
Not available

OTHER ADVERSE EFFECTS

HAZARD TO THE OZONE LAYER
Not available

13. DISPOSAL CONSIDERATIONS

The Company encourages the recycle, recovery and reuse of materials, where permitted, as an alternative to disposal as a waste. The Company recommends that organic materials classified as hazardous waste according to the relevant local or national regulations be disposed of by thermal treatment or incineration at approved facilities. All local and national regulations should be followed.

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14. TRANSPORT INFORMATION

This section provides basic shipping classification information. Refer to appropriate transportation regulations for specific requirements.

US DOT

Dangerous Goods? X
Proper Shipping Name: Combustible liquid, n.o.s.
Hazard Class: Combustible liquid
Packing Group: III
UN/ID Number: NA1993
Transport Label Required: Marine Pollutant
Marine Pollutant
Technical Name (N.O.S.): Contains 2-ethylhexanol tails

Comments: Marine Pollutants - DOT requirements specific to Marine Pollutants do not apply to non-bulk packagings transported by motor vehicles, rail cars or aircraft. Combustible liquids are not regulated in non-bulk packagings unless the combustible liquid is a hazardous substance, a hazardous waste, or a marine pollutant.

TRANSPORT CANADA

Dangerous Goods? X
Proper Shipping Name: Environmentally hazardous substance, liquid, n.o.s.
Hazard Class: 9
Packing Group: III
UN Number: UN3082
Transport Label Required: Miscellaneous
Marine Pollutant
Marine Pollutant
Technical Name (N.O.S.): Contains 2-ethylhexanol tails

ICAO / IATA

Dangerous Goods? X
Proper Shipping Name: Environmentally hazardous substance, liquid, n.o.s.
Hazard Class: 9
Packing Group: III
UN Number: UN3082
Transport Label Required: Miscellaneous
Technical Name (N.O.S.): Contains 2-ethylhexanol tails

IMO

Dangerous Goods? X
Proper Shipping Name: Environmentally hazardous substance, liquid, n.o.s.
Hazard Class: 9
UN Number: UN3082
Packing Group: III
Transport Label Required: Miscellaneous
Marine Pollutant
Marine Pollutant
Technical Name (N.O.S.): 2 ethyl hexanol tails

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15. REGULATORY INFORMATION

This product has been classified in accordance with the hazard criteria of the Controlled products Regulations and this Material Safety Data Sheet contains all the information required by the Controlled Products Regulations.

WHMIS CLASSIFICATION:
Class D2B Toxic
Class B3 Combustible Liquid

Inventory Information

United States (USA): All components of this product are included on the TSCA Chemical Inventory or are not required to be listed on the TSCA Chemical Inventory.

Canada: All components of this product are included on the Domestic Substances List (DSL) or are not required to be listed on the DSL.

Australia: All components of this product are included in the Australian Inventory of Chemical Substances (AICS) or are not required to be listed on AICS.

China: All components of this product are included on the Chinese inventory or are not required to be listed on the Chinese inventory.

Japan: One or more components of this product are NOT included on the Japanese (ENCS) inventory.

Korea: All components of this product are included on the Korean (ECL) inventory or are not required to be listed on the Korean inventory.

Philippines: One or more components of this product are NOT included on the Philippine (PICCS) inventory.

Taiwan: One or more components of this product are NOT included on the Taiwan Chemical Substance Inventory (TCSI).

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16. OTHER INFORMATION

16. OTHER INFORMATION

NFPA Hazard Rating (National Fire Protection Association)

Health: 2 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

Fire: 2 - Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.

Instability: 0 - Materials that in themselves are normally stable, even under fire exposure conditions.

Reasons For Issue: Revised Section 15

Date Prepared: 07/10/2015
Date of last significant revision: 01/30/2014

Prepared By: Legal & Compliance Services; E-mail: custinfo@cytec.com; Phone: 973-357-3100
07/10/2015

PETRO-CANADA

Material Safety Data Sheet

NFPA	HMIS (U.S.A.)	Rating	Protective Clothing	DOT (pictograms)
	Health Hazard 2* Fire Hazard 1 Reactivity 0 Personal Protection H	0 Insignificant 1 Slight 2 Moderate 3 High 4 Extreme		

Section I. Chemical Product and Company Identification

Product Name	**ANTIFREEZE**	**Code**	W269
		DSL	On the DSL.
Synonym	Universal Antifreeze, Radiator Antifreeze, Diesel Antifreeze, Petro-Canada Antifreeze-Coolant, Petro-Canada Heavy Duty Antifreeze-Coolant, Pre-Mix Antifreeze, Petro-Canada Premium Radiator Antifreeze.	**TSCA**	On TSCA list.
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	**In case of Emergency**	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	Used as an engine antifreeze coolant.		

Section II. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	**CAS #**	**% (V/V)**	**TLV-TWA(8 h)**	**STEL**	**CEILING**
1) Ethylene glycol	107-21-1	≥55	Not established	Not established	100 mg/m³ (aerosol)
2) Sodium tetraborate pentahydrate	1330-43-4	≤5	1 mg/m³	Not established	Not established

Manufacturer Recommendation	Not applicable
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.

Section III. Hazards Identification.

Potential Health Effects	Contact can cause slight irritation of skin, eyes and respiratory tract. Extremely dangerous in case of ingestion. For more information, refer to Section 11.

Section IV. First Aid Measures

Eye Contact	IMMEDIATELY flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek medical attention.
Skin Contact	Remove contaminated clothing - launder before reuse. Wash gently and thoroughly the contaminated skin with running water and non-abrasive soap. Seek medical attention.
Inhalation	Evacuate the victim to a safe area as soon as possible. If the victim is not breathing, perform artificial respiration. Allow the victim to rest in a well ventilated area. Seek medical attention.
Ingestion	DO NOT induce vomiting because of danger of aspirating liquid into lungs. Seek medical attention.
Note to Physician	Not available

Section V. Fire-fighting Measures

Flammability	May be combustible at high temperature.	**Flammable Limits**	Lower: 3.2%, Upper: 15.3%
Flash Points	Closed Cup: 116ºC (Tagliabue) Open Cup: 116ºC (Cleveland)	**Auto-Ignition Temperature**	413ºC
Fire Hazards in Presence of Various Substances	Combustible in presence of open flames and sparks.	**Explosion Hazards in Presence of Various Substances**	Not a product presenting risks of explosion.
Products of Combustion	Carbon oxides (CO, CO2), smoke and irritating vapours as products of incomplete combustion.		
Fire Fighting Media and Instructions	SMALL FIRE: Use DRY chemicals, CO2, water spray or foam. LARGE FIRE: Use water spray, fog or foam. DO NOT use water jet.		

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Section VI. Accidental Release Measures

Material Release or Spill	Small spill or leak: Dilute with water and mop up or absorb with an inert DRY material and place in an appropriate waste disposal container. Large spill or leak: Absorb with an inert material and put the spilled material in an appropriate waste disposal. Dispose of in accordance with regional regulations.

Section VII. Handling and Storage

Handling	Avoid contamination with reactive substances. After handling, always wash hands thoroughly with soap and water.
Storage	Keep container dry. Keep container tightly closed. Keep in a cool, well-ventilated place.

Section VIII. Exposure Controls/Personal Protection

Engineering Controls	For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.
Personal Protection -	***The selection of personal protective equipment varies, depending upon conditions of use.***
Eyes	Eye protection (i.e., safety glasses, safety goggles and/or face shield) should be determined based on conditions of use. If product is used in an application where splashing may occur, the use of safety goggles and/or a face shield should be considered.
Body	Wear appropriate clothing to prevent skin contact. As a minimum long sleeves and trousers should be worn.
Respiratory	Where concentrations in air may exceed the occupational exposure limits given in Section 2 (and those applicable to your area) and where engineering, work practices or other means of exposure reduction are not adequate, NIOSH approved respirators may be necessary to prevent overexposure by inhalation.
Hands	Wear appropriate chemically protective gloves. When handling hot product ensure gloves are heat resistant and insulated.
Feet	Wear appropriate footwear to prevent product from coming in contact with feet and skin.

Section IX. Physical and Chemical Properties

Physical State and Appearance	Clear viscous liquid.	**Viscosity**	Not available
Colour	Green.	**Pour Point**	Not available
Odour	Odourless.	**Softening Point**	Not applicable.
Odour Threshold	Not available	**Dropping Point**	Not applicable.
Boiling Point	129 to 197°C (264 to 387°F)	**Penetration**	Not applicable.
Density	1.115 to 1.145 (Water = 1)	**Oil / Water Dist. Coeff.**	Not available
Vapour Density	2.1 (Air=1).	**Ionicity (in water)**	Not available
Vapour Pressure	0.06 mmHg @ 20°C (68ºF).	**Dispersion Properties**	Not available
Volatility	0% (w/w)	**Solubility**	Soluble in water, methanol and diethyl ether.

Section X. Stability and Reactivity

Corrosivity	Not available		
Stability	The product is stable.	**Hazardous Polymerization**	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents, acids and alkalis.	**Decomposition Products**	May release COx, smoke and irritating vapours when heated to decomposition.

Section XI. Toxicological Information

Routes of Entry	Eye contact and ingestion.
Acute Lethality	LD50: 4700 mg/kg (oral/rat). [Ethylene Glycol] LD50: 9530 mg/kg (dermal/rabbit). [Ethylene Glycol]
Chronic or Other Toxic Effects	
Dermal Route:	Slightly hazardous in case of skin contact (irritant).
Inhalation Route:	Slightly hazardous in case of inhalation (lung irritant). Can cause nausea, headaches and vomiting.
Oral Route:	Extremely dangerous in case of ingestion.
Eye Irritation/Inflammation:	Slightly hazardous in case of eye contact (irritant).
Immunotoxicity:	Not available
Skin Sensitization:	Not available
Respiratory Tract Sensitization:	Not available
Mutagenic:	Not available

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Reproductive Toxicity:	Not available
Teratogenicity/Embryotoxicity:	Fetotoxic and teratogenic in mice at levels below maternal toxicity.
Carcinogenicity (ACGIH):	ACGIH A4: not classifiable as a human carcinogen.
Carcinogenicity (IARC):	Not available
Carcinogenicity (NTP):	Not available
Carcinogenicity (IRIS):	Not available
Carcinogenicity (OSHA):	Not available
Other Considerations	The substance may be toxic to kidneys and liver. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section XII. Ecological Information

Environmental Fate	Not available	**Persistance/ Bioaccumulation Potential**	Not available
BOD5 and COD	Not available	**Products of Biodegradation**	Not available
Additional Remarks	No additional remark.		

Section XIII. Disposal Considerations

Waste Disposal	Preferred waste management priorities are: (1) recycle or reprocess; (2) incineration with energy recovery; (3) disposal at licensed waste disposal facility. Ensure that disposal or reprocessing is in compliance with government requirements and local disposal regulations. Consult your local or regional authorities.

Section XIV. Transport Information

DOT Classification	Not a DOT controlled material (United States).	**Special Provisions for Transport**	Not applicable.

Section XV. Regulatory Information

Other Regulations	This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List). All components of this formulation are listed on the US EPA-TSCA Inventory. This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR. Please contact Product Safety for more information.		
DSD/DPD (EEC)	Not evaluated.	**WHMIS (Canada)**	D-2A
ADR (Europe) (Pictograms)	**NOT EVALUATED FOR EUROPEAN TRANSPORT** **NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.**	**TDG (Canada) (Pictograms)**	

Section XVI. Other Information

References Available upon request.
* Marque de commerce de Petro-Canada - Trademark

Glossary

ACGIH - American Conference of Governmental Industrial Hygienists
ADR - Agreement on Dangerous goods by Road (Europe)
ASTM - American Society for Testing and Materials (
BOD5 - Biological Oxygen Demand in 5 days
CAN/CGA B149.2 Propane Installation Code
CAS - Chemical Abstract Services
CEPA - Canadian Environmental Protection Act
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act
CFR - Code of Federal Regulations
CHIP - Chemicals Hazard Information and Packaging Approved Supply List
COD5 - Chemical Oxygen Demand in 5 days
CPR - Controlled Products Regulations
DOT - Department of Transport
DSCL - Dangerous Substances Classification and Labeling (Europe)
DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)
DSL - Domestic Substance List
EEC/EU - European Economic Community/European Union
EINECS - European Inventory of Existing Commercial Chemical Substances
EPCRA - Emergency Planning and Community Right to Know Act
IRIS - Integrated Risk Information System
LD50/LC50 - Lethal Dose/Concentration kill 50%
LDLo/LCLo - Lowest Published Lethal Dose/Concentration
NAERG'96 - North American Emergency Response Guide Book (1996)
NFPA - National Fire Prevention Association
NIOSH - National Institute for Occupational Safety & Health
NPRI - National Pollutant Release Inventory
NSNR - New Substances Notification Regulations (Canada)
NTP - National Toxicology Program
OSHA - Occupational Safety & Health Administration
PEL - Permissible Exposure Limit
RCRA - Resource Conservation and Recovery Act
SARA - Superfund Amendments and Reorganization Act
SD - Single Dose
STEL - Short Term Exposure Limit (15 minutes)
TDG - Transportation Dangerous Goods (Canada)
TDLo/TCLo - Lowest Published Toxic Dose/Concentration
TLm - Median Tolerance Limit
TLV-TWA - Threshold Limit Value-Time Weighted Average
TSCA - Toxic Substances Control Act
USEPA - United States Environmental Protection Agency

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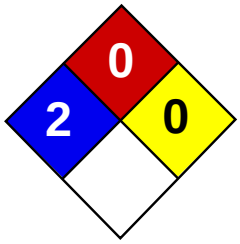
FDA - Food and Drug Administration
FIFRA - Federal Insecticide, Fungicide and Rodenticide Act
HCS - Hazardous Communication System
HMIS - Hazardous Material Information System
IARC - International Agency for Research on Cancer
USP - United States Pharmacopoeia
WHMIS - Workplace Hazardous Material Information System

For Copy of MSDS
Western Canada, telephone: 403-296-4158; fax: 403-296-6551
Ontario & Central Canada, telephone: 1-800-668-0220; fax: 1-800-837-1228
Quebec & Eastern Canada, telephone: 514-640-8308; fax: 514-640-8385

For Product Safety Information: (905) 804-4752

Prepared by Product Safety - TAR on 7/3/2001.

Data entry by Product Safety - JDW.



Material Safety Data Sheet
Copper sulfate pentahydrate MSDS

Section 1: Chemical Product and Company Identification

Product Name: Copper sulfate pentahydrate

Catalog Codes: SLC3778, SLC4567, SLC1774, SLC3565, SLC5353

CAS#: 7758-99-8

RTECS: GL8900000

TSCA: TSCA 8(b) inventory: No products were found.

CI#: Not applicable.

Synonym: Blue vitriol; Copper (II) Sulfate Pentahydrate

Chemical Name: Cupric sulfate pentrahydrate

Chemical Formula: CuSO4.5H2O

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Copper sulfate pentahydrate	7758-99-8	100

Toxicological Data on Ingredients: Copper sulfate pentahydrate: ORAL (LD50): Acute: 300 mg/kg [Rat.]. DERMAL (LD50): Acute: >2000 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, liver. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
When heated to decomposition it emits toxic fumes. Solutions are acidic and can react with magnesium to evolve flammable hydrogen gas

Special Remarks on Explosion Hazards: Nitromethanes and copper salts spontaneously form explosive materials

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as metals, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:
Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 1 (mg/m3) from ACGIH (TLV) [United States] Inhalation TWA: 0.1 (mg/m3) from OSHA (PEL) [United States] Inhalation TWA: 1 (mg/m3) from NIOSH InhalationConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Crystalline granules solid. Powdered solid.)

Odor: Odorless.

Taste: Nauseous metallic.

Molecular Weight: 249.69 g/mole

Color: Blue. (Light.)

pH (1% soln/water): Not available.

Boiling Point: 150°C (302°F)

Melting Point: 110°C (230°F)

Critical Temperature: Not available.

Specific Gravity: 2.28 @ 15.6 deg. C(Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol.

Solubility:
Easily soluble in hot water. Soluble in cold water, methanol. Solubility in water: 31.6 g/100 ml @ 0 deg. C.; 203.3 g/100 ml @ 100 deg. C Solubility in methanol: 15.6 g/100 ml @ 18 deg. C. Insoluble in ethanol. It readily forms alkaline complexes at sufficiently high concentrations of amines or alkali cyanides. Practically insoluble in most organic solvents.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat (high temperatures), incompatible materials, exposure to air

Incompatibility with various substances: Reactive with metals, alkalis.

Corrosivity: Highly corrosive in presence of steel.

Special Remarks on Reactivity:
Air Sensitive. Slowly efforescent in air. Solutions of hyprobromite are decomposed by powerful catalytic action of cupric ions, even as impurities. Incompatible with finely powdered metals.

Special Remarks on Corrosivity:
Corrosive to finely powdered metals. Very corrosive to plain steel

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:
Acute oral toxicity (LD50): 300 mg/kg [Rat.]. Acute dermal toxicity (LD50): >2000 mg/kg [Rat].

Chronic Effects on Humans:
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. May cause damage to the following organs: kidneys, liver.

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals:
Lowest Published Lethal Dose: LDL [Human] - Route: Oral; Dose: 1088 mg/kg

Special Remarks on Chronic Effects on Humans: May affect genetic material based on animal data

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Causes skin irritation. May cause skin burns. It may cause and itching allergic eczema. Eyes: Causes eye irritation. May cause eye burns. It may cause conjunctivitis, corneal discoloration, ulceration and turbidity of the cornea. Inhalation: Causes respiratory tract (nose, throat, lung) irritation with coughing and wheezing. May cause ulceration and perforation of the nasal septum if inhaled in excessive quantities. Burning copper sulfate may result in irritating and poisonous gases which may irritate the respiratory tract and lungs, and may cause fume metal fever which is characterized by flu-like symptoms such as fever, chills, muscle aches. Ingestion: Harmful if swallowed. May cause gastrointestinal tract irritation with nausea, vomiting, diarrhea, metallic taste, burning sensation in the stomach or epigastrum, abdominal pain, and possible gastrointestinal tract bleeding. May affect metabolism(metabolic acidosis), liver (liver damage, jaundice), blood (Methemoglobin, hemalytic anemia), urinary system (kidney damage, hematuria, hemoglobinuria, albuminuria), behavior/nervous systems (somnolence, tremor, psychosis, muscle weakness, coma), cardiovascular system (lowering of blood pressure, dysthrythmia). Oral mucosa, vomitus, stools, and saliva may be stained blue or green following ingestion. Aspiration pneumonia may develop following emesis and CNS depression. Chronic Potential Health Effects: Skin: Repeated or prolonged skin contact may cause thickening of the skin.

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 0.1 ppm 48 hours [Goldfish]. 0.1 mg/l 96 hours [Rainbow Trout]. 2.5 mg/l 96 hours [Rainbow Trout].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation:
If released to soil, copper sulfate may leach to groundwater, be partly oxidized, or bind to humic materials, clay, or hydrous of iron and manganese. In water, it will bind to carbonates as well as humic materials, clay and hydrous oxides of iron and manganese. Copper is accumulated by plants and animals, but it does not appear to biomagnify from plants to animals. This lack of biomagnification appears common with heavy metals. In air, copper aerosols (in general) have a residence time of 2 to 10 days in an unpolluted atmosphere and 0.1 to >4 in a polluted, urban areas.

Section 13: Disposal Considerations

Waste Disposal:
Copper dusts or mist or copper compounds may be disposed of in Group III sealed containers in a secure sanitary landfill. Copper containing soluble wastes can be concentrated through the use of ion exchange, reverse osmosis, or evaporators to the point where copper can be electrolytically removed and sent to a reclaiming firm. If recovery is not feasible, the copper can be precipitated through the use of caustics and the sludge depositied in a chemical waste landfill. Be sure to consult with authorities (waste regulators). Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 9: Miscellaneous hazardous material.

Identification: : Environmentally hazardous substance, n.o.s. (Cupric Sulfate) UNNA: 3077 PG: III

Special Provisions for Transport:
additional markings "Marine Pollutant" - required for bulk shipments. The words "Marine Pollutant" must be entered on the shipping paper in association iwth the basic DOT description for bulk shipments.

Section 15: Other Regulatory Information

Federal and State Regulations:
SARA 313 toxic chemical notification and release reporting: Copper compounds CERCLA: Hazardous substances.: Copper sulfate pentahydrate: 10 lbs. (4.536 kg)

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R22- Harmful if swallowed. R36/38- Irritating to eyes and skin. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S22- Do not breathe dust. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles.

Section 16: Other Information

References:
-The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.

Other Special Considerations: Not available.

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DIESEL FUEL

MATERIAL SAFETY DATA SHEET

NATIONAL COOPERATIVE REFINERY ASSOCIATION (NCRA)

BOX 1404 MCPHERSON, KS 67460
316-241-2344 OR 2345, PRODUCT INFORMATION, S. G. CATER

EMERGENCY CONTACT: CHEMTREC 1-800-424-9300 - USE ONLY IN THE CASE OF EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT INVOLVING CHEMICALS.

SUBSTANCE IDENTIFICATION

SUBSTANCE:	DIESEL FUEL
CHEMICAL FAMILY:	PETROLEUM HYDROCARBON
CAS NUMBER:	68334-30-5
TRADE NAMES/SYNONYMS:	DIESEL OIL; DIESEL FUEL; DIESEL OIL, LIGHT; DIESEL OIL PETROLEUM PRODUCT; DIESEL FUEL, NO. 1-D; NO. 1-D FUEL OIL; PETROLEUM DIESEL OIL PRODUCT; SUMMER DIESEL; DIESEL FUEL #1.
CERCLA RATINGS (SCALE 0-3):	HEALTH = 1 FIRE = 2 REACTIVITY = 0 PERSISTENCE = 1
NFPA RATINGS (SCALE 0-4):	HEALTH = 0 FIRE = 2 REACTIVITY = 0

COMPONENTS AND CONTAMINANTS

HAZARDOUS INGREDIENTS	CAS NUMBER	PERCENT
DIESEL FUEL	68334-30-5	>99
MAY INCLUDE TRACES OF SULFUR		
HYDROGEN SULFIDE	7783-06-4	

EXPOSURE LIMIT:

MINERAL OIL MIST:	5 MG/M^3 OSHA TWA 5 MG/M^3 ACGIH TWA 10 MG/M^3 ACGIH STEL 5 MG/M^3 NIOSH RECOMMENDED TWA 10 MG/M^3 NIOSH RECOMMENDED STEL
MEASUREMENT METHOD:	PARTICULATE FILTER; 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE; INFRARED SPECTROMETRY; (NIOSH VOL. III #5026).
HYDROGEN SULFIDE:	10 PPM (14 MG/M^3) OSHA TWA 15 PPM (21 MG/M^3) OSHA STEL 10 PPM (14 MG/M^3) ACGIH TWA 15 PPM (21 MG/M^3) ACGIH STEL 10 PPM NIOSH RECOMMENDED 10-MINUTE CEILING 10 PPM (14 MG/M^3) DFG MAK TWA 20 PPM (28 MG/M^3) DFG MAK 10-MINUTE PEAK MOMENTARY VALUE: 4 TIMES/SHIFT
MEASUREMENT METHOD:	DRYING TUBE/MOLECULAR SIEVE TUBE; THERMAL DESORPTION APPARATUS; GAS CHROMATOGRAPHY WITH FLAME IONIZATION DETECTION; (NIOSH VOL. II(6) #296).

PHYSICAL DATA

DESCRIPTION:	YELLOW-BROWN, OILY LIQUID WITH A MILD PETROLEUM ODOR.
SOLUBILITY IN WATER:	INSOLUBLE
SPECIFIC GRAVITY:	0.80
VAPOR PRESSURE:	2 MM HG @ 20 C
VAPOR DENSITY:	>1 AIR = 1.0
BOILING POINT:	325 - 675 F (163 - 357 C)
MELTING POINT:	-30 F (-34 C)

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:	MODERATE FIRE HAZARD WHEN EXPOSED TO HEAT AND FLAME. VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT.

FLASH POINT:	100 F (38 C) (CC)
UPPER EXPLOSIVE LIMIT:	6.0 %
LOWER EXPLOSIVE LIMIT:	1.3 %
AUTOIGNITION TEMP.:	350 F (177 C)
OSHA FLAMMABILITY CLASS:	II
FIREFIGHTING MEDIA:	DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR REGULAR FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5). FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5).
FIREFIGHTING:	MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT WITHOUT RISK. APPLY COOLING WATER TO SIDES OF CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS. FOR MASSIVE FIRE IN CARGO AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; IF THIS IS IMPOSSIBLE, WITHDRAW FROM AREA AND LET FIRE BURN. WITHDRAW IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING SAFETY DEVICE OR ANY DISCOLORATION OF TANK DUE TO FIRE. ISOLATE FOR 1/2 MILE IN ALL DIRECTIONS IF TANK, RAIL CAR, OR TANK TRUCK IS INVOLVED IN FIRE (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5, GUIDE PAGE 27). EXTINGUISH ONLY IF FLOW CAN BE STOPPED. USE FLOODING AMOUNTS OF WATER AS FOG, SOLID STREAMS MAY BE INEFFECTIVE. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER. APPLY WATER FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING VAPORS, KEEP UPWIND.

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49 CFR 172.101:	COMBUSTIBLE LIQUID
DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49 CFR 172.101 AND SUBPART E:	NONE
DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS:	NONE
EXCEPTIONS:	49 CFR 173.118(A)

FINAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180), DOCKET NUMBERS HM-181, HM-181A, HM-181C, HM-181D, AND HM-204. EFFECTIVE DATE OCTOBER 1, 1991. HOWEVER, COMPLIANCE WITH THE REGULATIONS IS AUTHORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52402, 12/21/90).

EXCEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE EFFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO OCTOBER 1, 1993. (56 FR 47158, 10/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING NAME-ID NUMBER, 49 CFR 172.101:	DIESEL FUEL-NA 1993
U.S. DEPARTMENT OF TRANSPORTATION HAZARD CLASS OR DIVISION, 49 CFR 172.101:	3 - FLAMMABLE LIQUID
U.S. DEPARTMENT OF TRANSPORTATION PACKING GROUP, 49 CFR 172.101:	PG III
U.S. DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS, 49 CFR 172.101 AND SUBPART E:	NONE
U.S. DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS:	
EXCEPTIONS:	49 CFR 173.150
NON-BULK PACKAGING:	49 CFR 173.203
BULK PACKAGING:	49 CFR 173.241
U.S. DEPARTMENT OF TRANSPORTATION QUANTITY LIMITATIONS, 49 CFR 172.101:	
PASSENGER AIRCRAFT OR RAILCAR:	60 L
CARGO AIRCRAFT ONLY:	220 L

TOXICITY

DIESEL FUEL

IRRITATION DATA:	500 MG SKIN-RABBIT MODERATE.
TOXICITY DATA:	9 GM/KG ORAL-RAT LD50; 7.5 GM/KG (MARKET PLACE SAMPLE) ORAL-RAT LD50 (AETODY); >5 ML/KG (MARKET PLACE SAMPLE) SKIN-RABBIT LD50 (AETODY).
CARCINOGEN STATUS:	HUMAN INADEQUATE EVIDENCE, ANIMAL LIMITED EVIDENCE (IARC-GROUP 3). (SEE ADDITIONAL DATA).
LOCAL EFFECTS:	IRRITANT - INHALATION, SKIN.
ACUTE TOXICITY LEVEL:	SLIGHTLY TOXIC BY DERMAL ABSORPTION; RELATIVELY NON-TOXIC BY INGESTION.

TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT. POISONING MAY ALSO AFFECT THE LIVER AND KIDNEYS.

ADDITIONAL DATA: ANIMAL STUDIES HAVE CONFIRMED AN ASSOCIATION BETWEEN THE INDUCTION OF CANCER, PRIMARILY OF THE LUNG, AND INHALATION EXPOSURE TO WHOLE DIESEL EXHAUST. LIMITED EPIDEMIOLOGIC EVIDENCE ALSO SUGGESTS AN ASSOCIATION BETWEEN OCCUPATIONAL EXPOSURE TO DIESEL ENGINE EMISSIONS AND LUNG CANCER (NIOSH, 1988).

HEALTH EFFECTS AND FIRST AID

INHALATION:

DIESEL FUEL: IRRITANT/NARCOTIC.

ACUTE EXPOSURE: VAPORS OR MIST MAY CAUSE RESPIRATORY TRACT IRRITATION. A HUMAN EXPOSURE HAS RESULTED IN IMMEDIATE COUGH, DYSPNEA, CYANOSIS AND UNCONSCIOUSNESS FOR ONE HOUR. A PRODUCTIVE COUGH WITH SPUTUM SMELLING OF DIESEL FUEL PERSISTED FOR 37 DAYS. CHEST X-RAYS SHOWED DIFFUSE SHADOWING, MOST PROMINENT AT THE LUNG BASES, WHICH RESOLVED SLOWLY WITH TREATMENT BUT WAS STILL PRESENT AT DAY 37. HIGH LEVELS MAY ALSO CAUSE CENTRAL NERVOUS SYSTEM EXCITATION FOLLOWED BY DEPRESSION WITH SYMPTOMS POSSIBLY INCLUDING RESTLESSNESS, CONFUSION, ATAXIA, HEADACHE, DIZZINESS, ANOREXIA, NAUSEA, VOMITING, WEAKNESS, INCOORDINATION, STUPOR, DELIRIUM, AND COMA.

CHRONIC EXPOSURE: PROLONGED OR REPEATED EXPOSURE MAY CAUSE IRRITATION. ONE INDIVIDUAL EXPOSED TO DIESEL VAPORS IN A TRUCK CAB DEVELOPED NEPHROTOXIC EFFECTS.

FIRST AID: REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

DIESEL FUEL: IRRITANT.

ACUTE EXPOSURE: MAY CAUSE SMARTING, REDNESS AND IRRITATION. A SAMPLE OF DIESEL FUEL APPLIED TO RABBITS UNDER A PATCH FOR 24 HOURS CAUSED EXTREME IRRITATION WITH SEVERE ERYTHEMA AND EDEMA WITH BLISTERING AND OPEN SORES.

CHRONIC EXPOSURE: REPEATED OR PROLONGED EXPOSURE MAY CAUSE DEFATTING AND DRYING OF THE SKIN RESULTING IN SEVERE IRRITATION AND DERMATITIS. CUTANEOUS HYPERKERATOSIS HAS BEEN DESCRIBED IN ENGINE DRIVERS WITH OCCUPATIONAL EXPOSURE TO DIESEL FUEL. TWO INDIVIDUALS WITH TOPICAL EXPOSURE FROM WASHING HAIR OR HANDS WITH DIESEL FUEL DEVELOPED ACUTE RENAL FAILURE; ONE ALSO HAD GASTROINTESTINAL SYMPTOMS. REPEATED APPLICATIONS TO RABBIT SKIN PRODUCED 67 % MORTALITY AT 8 ML/KG. THE PRIMARY CAUSE OF DEATH WERE DEPRESSION AND ANOREXIA WHICH WERE INDUCED BY DERMAL IRRITATION WITH INFECTION, RATHER THAN SYSTEMIC INTOXICATION. AUTOPSY REVEALED EFFECTS ON THE LIVER AND KIDNEYS.

FIRST AID: REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15 - 20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

DIESEL FUEL:

ACUTE EXPOSURE: LIQUID OR VAPOR MAY CAUSE SLIGHT IRRITATION, ALTHOUGH TESTS WITH ONE SAMPLE OF DIESEL FUEL IN RABBIT EYES WAS NON-IRRITATING.

CHRONIC EXPOSURE: REPEATED OR PROLONGED EXPOSURE MAY CAUSE IRRITATION.

FIRST AID: WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

DIESEL FUEL: NARCOTIC.

ACUTE EXPOSURE: MAY CAUSE NAUSEA, VOMITING, CRAMPING, DIARRHEA, AND POSSIBLY SYMPTOMS OF CENTRAL NERVOUS SYSTEM DEPRESSION. ASPIRATION OF EVEN SMALL AMOUNTS DURING INGESTION OR VOMITING MAY RESULT IN SEVERE PULMONARY IRRITATION WITH COUGHING, GAGGING, DYSPNEA, SUBSTERNAL DISTRESS, AND PNEUMONITIS, PULMONARY EDEMA AND HEMORRHAGE, AND DEATH.

CHRONIC EXPOSURE: NO DATA AVAILABLE.

FIRST AID: ONLY HYDROCARBONS THAT ARE SOLVENTS FOR A TOXIC AGENT OR ARE THEMSELVES TOXIC NEED TO BE EVACUATED. EXTREME CARE MUST BE TAKEN TO AVOID ASPIRATION. GASTRIC LAVAGE WITH A CUFFED ENDOTRACHEAL TUBE IN PLACE TO PREVENT FURTHER ASPIRATION SHOULD BE DONE WITHIN 15 MINUTES. IN THE ABSENCE OF DEPRESSION OR CONVULSIONS OR IMPAIRED GAG REFLEX, EMESIS CAN ALSO BE INDUCED USING SYRUP OF IPECAC WITHOUT INCREASING THE HAZARD OF ASPIRATION. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GASTRIC LAVAGE SHOULD BE PREFORMED BY QUALIFIED MEDICAL PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTE: NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY: STABLE UNDER NORMAL TEMPERATURES AND PRESSURES IN A CLOSED CONTAINER.

INCOMPATIBILITIES:

DIESEL FUEL AND: STRONG OXIDIZERS: MAY REACT.

DECOMPOSITION: THERMAL DECOMPOSITION MAY INCLUDE TOXIC OXIDES OF SULFUR AND CARBON.

POLYMERIZATION: HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

CONDITIONS TO AVOID: AVOID CONTACT WITH HEAT, SPARKS, FLAMES, OR OTHER SOURCES OF IGNITION. VAPORS MAY BE EXPLOSIVE. AVOID OVERHEATING OF CONTAINERS; CONTAINERS MAY VIOLENTLY RUPTURE IN HEAT OF FIRE. AVOID CONTAMINATION OF WATER SOURCES.

TRACE AMOUNTS OF HYDROGEN SULFIDE MAY BE PRESENT. **THERE IS A POTENTIAL FOR THE ACCUMULATION OF HYDROGEN SULFIDE IN THE HEAD SPACE OF CONTAINERS OR IN ENCLOSED AREAS** WHERE THIS PRODUCT IS STORED, HANDLED OR USED.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

STORAGE: STORE IN ACCORDANCE WITH 29 CFR 1910.106.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

BONDING AND GROUNDING: SUBSTANCES WITH LOW ELECTROCONDUCTIVITY, WHICH MAY BE IGNITED BY ELECTROSTATIC SPARKS, SHOULD BE STORED IN CONTAINERS WHICH MEET THE BONDING AND GROUNDING GUIDELINES SPECIFIED IN NFPA 77-1983, RECOMMENDED PRACTICE ON STATIC ELECTRICITY.

THRESHOLD PLANNING QUANTITY (TPQ): THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 302 REQUIRES THAT EACH FACILITY WHERE ANY EXTREMELY HAZARDOUS SUBSTANCE IS PRESENT IN A QUANTITY EQUAL TO OR GREATER THAN THE TPQ ESTABLISHED FOR THAT SUBSTANCE NOTIFY THE STATE EMERGENCY RESPONSE COMMISSION (SERC) FOR THAT STATE IN WHICH IT IS LOCATED. SECTION 303 OF SARA REQUIRES THESE FACILITIES TO PARTICIPATE IN LOCAL EMERGENCY RESPONSE.

HYDROGEN SULFIDE:

SARA SECTION 302 TPQ: 500 POUNDS.

DISPOSAL: DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262. ALSO COMPLY WITH APPROPRIATE STATE STANDARDS.

EPA HAZARDOUS WASTE NUMBER: D001

CERCLA SECTION 103 REPORTABLE QUANTITY: 100 POUNDS

REPORTABLE QUANTITY(RQ): THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

D001 HAZARDOUS WASTE:

CERCLA SECTION 103 REPORTABLE QUANTITY: 100 POUNDS

HYDROGEN SULFIDE:

CERCLA SECTION 103 REPORTABLE QUANTITY (RQ):	100 POUNDS
SARA SECTION 304 REPORTABLE QUANTITY (RQ):	100 POUNDS

SPILLS AND LEAKS

OCCUPATIONAL SPILL: SHUT OFF IGNITION SOURCES. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA. KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND RESTRICT ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION: PROVIDE LOCAL EXHAUST VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR: THE FOLLOWING RESPIRATORS ARE RECOMMENDED BASED ON INFORMATION FOUND IN THE PHYSICAL DATA, TOXICITY AND HEALTH EFFECTS SECTIONS. THEY ARE RANKED IN ORDER FROM MINIMUM TO MAXIMUM RESPIRATORY PROTECTION.

THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST BE BASED ON THE SPECIFIC OPERATION, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND MUST BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

ANY CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE(S) AND A FULL FACEPIECE.

ANY GAS MASK WITH ORGANIC VAPOR CANISTER (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER), WITH A FULL FACEPIECE.

ANY TYPE 'C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET, HOOD OPERATED IN CONTINUOUS-FLOW MODE.

ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH) CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING: WEAR OIL IMPERVIOUS CLOTHING. AVOID PROLONGED OR REPEATED CONTACT WITH SUBSTANCE. AVOID WEARING OIL SOAKED CLOTHING.

GLOVES: EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION: EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH: WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

CREATION DATE: 01/04/90 MOST RECENT REVISION: 06/03/92

Safety Data Sheet

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

CHEVRON and TEXACO PREMIUM UNLEADED GASOLINES

Product Use: Fuel
Product Number(s): CPS201019 [See Section 16 for Additional Product Numbers]
Synonyms: Calco Premium Gasoline, Chevron Premium Unleaded Gasoline, Chevron Supreme Plus Unleaded Gasoline, Chevron Supreme Unleaded Gasoline, Gasolines, Automotive, Texaco Power Premium Unleaded Gasoline
Company Identification
Chevron Products Company
Marketing, MSDS Coordinator
6001 Bollinger Canyon Road
San Ramon, CA 94583
United States of America

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
MSDS Requests: http://www.chevron.com/contact
Technical Information: (510) 242-5357

SPECIAL NOTES: This MSDS applies to: all motor gasoline.

SECTION 2 HAZARDS IDENTIFICATION

CLASSIFICATION: Flammable liquid: Category 1. Aspiration toxicant: Category 1. Carcinogen: Category 1A. Target organ toxicant (repeated exposure): Category 1. Eye irritation: Category 2A. Germ Cell Mutagen: Category 1B. Skin irritation: Category 2. Reproductive toxicant (developmental): Category 2. Target organ toxicant (central nervous system): Category 3. Acute aquatic toxicant: Category 2. Chronic aquatic toxicant: Category 2.

Signal Word: Danger

Physical Hazards: Extremely flammable liquid and vapor.

Health Hazards: May be fatal if swallowed and enters airways. May cause genetic defects. May cause cancer. Causes skin irritation. Causes serious eye irritation. Suspected of damaging the unborn child. May cause drowsiness or dizziness.

Environmental Hazards: Toxic to aquatic life. Toxic to aquatic life with long lasting effects.

Target Organs: Causes damage to organs (Blood/Blood Forming Organs) through prolonged or repeated exposure.

PRECAUTIONARY STATEMENTS:
General: Keep out of reach of children. Read label before use.
Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. -- No smoking. Ground/bond container and receiving equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use explosion-proof electrical/ventilating/lighting/equipment. Do not breathe dust/fume/gas/mist/vapours/spray. Avoid breathing dust/fume/gas/mist/vapours/spray. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection. Use personal protective equipment as required. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Avoid release to the environment.
Response: IF INHALED: Remove person to fresh air and keep comfortable for breathing. 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 advice/attention. IF ON SKIN: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse. IF ON SKIN (or hair): Take off immediately all contaminated clothing and wash it before reuse. Rinse skin with water/shower. IF SWALLOWED: Immediately call a poison center or doctor/physician. Do NOT induce vomiting. Call a poison center or doctor/physician if you feel unwell. Get medical advice/attention if you feel unwell. IF exposed or concerned: Get medical advice/attention. In case of fire: Use media specified in the SDS to extinguish. Specific treatment (see Notes to Physician on this label). Collect spillage.
Storage: Store in a well-ventilated place. Keep cool. Keep container tightly closed. Store locked up.
Disposal: Dispose of contents/container in accordance with applicable local/regional/national/international regulations.

HAZARDS NOT OTHERWISE CLASSIFIED: Not Applicable

SECTION 3 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Gasoline	86290-81-5	100 %vol/vol
Toluene (methylbenzene)	108-88-3	1 - 35 %vol/vol
Xylene (contains o-, m-, & p- xylene isomers in varying amounts)	1330-20-7	1 - 15 %vol/vol
Pentane, 2,2,4-trimethyl- (Isooctane)	540-84-1	1 - 13 %vol/vol
Butane	106-97-8	1 - 12 %vol/vol

Ethanol	64-17-5	0 - 10 %vol/vol
Benzene	71-43-2	0.1 - 4.9 %vol/vol
Hexane	110-54-3	1 - 5 %vol/vol
Heptane	142-82-5	1 - 4 %vol/vol
Ethyl benzene	100-41-4	0.1 - 3 %vol/vol
Cyclohexane	110-82-7	1 - 3 %vol/vol
Naphthalene	91-20-3	0.1 - 2 %vol/vol
Methylcyclohexane	108-87-2	1 - 2 %vol/vol

Motor gasoline is considered a mixture by EPA under the Toxic Substances Control Act (TSCA). The refinery streams used to blend motor gasoline are all on the TSCA Chemical Substances Inventory. The appropriate CAS number for refinery blended motor gasoline is 86290-81-5. The product specifications of motor gasoline sold in your area will depend on applicable Federal and State regulations.

SECTION 4 FIRST AID MEASURES

Description of first aid measures
Eye: Flush eyes with water immediately while holding the eyelids open. Remove contact lenses, if worn, after initial flushing, and continue flushing for at least 15 minutes. Get immediate medical attention.
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: Move the exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if breathing difficulties continue or if any other symptoms develop.

Most important symptoms and effects, both acute and delayed
IMMEDIATE HEALTH EFFECTS
Eye: Contact with the eyes causes severe irritation. Symptoms may include pain, tearing, reddening, swelling and impaired vision.
Skin: Contact with the skin causes irritation. Symptoms may include pain, itching, discoloration, swelling, and blistering. Skin contact may cause drying or defatting of the skin. Contact with the skin is not expected to cause an allergic skin response.
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. May be irritating to mouth, throat, and stomach. Symptoms may include pain, nausea, vomiting, and diarrhea.
Inhalation: Excessive or prolonged breathing of this material may cause central nervous system effects. Central nervous system effects may include headache, dizziness, nausea, vomiting, weakness, loss of coordination, blurred vision, drowsiness, confusion, or disorientation. At extreme exposures, central nervous system effects may include respiratory depression, tremors or convulsions, loss of consciousness, coma or death.

DELAYED OR OTHER HEALTH EFFECTS:
Reproduction and Birth Defects: Contains material that may cause harm to the unborn child if inhaled above the recommended exposure limit.
Cancer: Prolonged or repeated exposure to this material may cause cancer. Gasoline has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

Whole gasoline exhaust has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

Contains benzene, which has been classified as a carcinogen by the National Toxicology Program (NTP) and a Group 1 carcinogen (carcinogenic to humans) by the International Agency for Research on Cancer (IARC).
Contains naphthalene, which has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC). Contains ethylbenzene which has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

Genetic Toxicity: Contains material that may cause heritable genetic damage based on animal data.
Target Organs: Contains material that may cause damage to the following organ(s) following repeated inhalation at concentrations above the recommended exposure limit:Blood/Blood Forming Organs Risk depends on duration and level of exposure. See Section 11 for additional information.

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.

SECTION 5 FIRE FIGHTING MEASURES

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

Unusual Fire Hazards: 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 and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 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: This product presents an extreme fire hazard. Liquid very quickly evaporates, even at low temperatures, and forms vapor (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches. Never siphon gasoline by mouth.
Do not store in open or unlabeled containers. READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL. Do not get in eyes, on skin, or on clothing. Do not get in eyes. Do not taste or swallow. Do not breathe vapor or fumes. Wash thoroughly after handling. Keep out of the reach of children.
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 3), 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 process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below the recommended exposure limits.

PERSONAL PROTECTIVE EQUIPMENT
Eye/Face Protection: Wear protective equipment to prevent eye contact. Selection of protective equipment may include safety glasses, chemical goggles, face shields, or a combination depending on the work operations conducted.
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: Chlorinated Polyethylene (or Chlorosulfonated Polyethylene), Nitrile Rubber, Polyurethane, Viton.
Respiratory Protection: Determine if airborne concentrations are below the recommended occupational exposure limits for jurisdiction of use. If airborne concentrations are above the acceptable limits, wear an approved respirator that provides adequate protection from this material, such as: Air-Purifying Respirator for Organic Vapors.
When used as a fuel, this material can produce carbon monoxide in the exhaust. Determine if airborne concentrations are below the occupational exposure limit for carbon monoxide. If not, wear an approved positive-pressure air-supplying respirator.
Use a positive pressure air-supplying respirator in circumstances where air-purifying respirators may not provide adequate protection.

Occupational Exposure Limits:

Component	Agency	TWA	STEL	Ceiling	Notation
Gasoline	ACGIH	300 ppm (weight)	500 ppm (weight)	--	A3
Toluene (methylbenzene)	ACGIH	50 ppm (weight)	--	--	Skin A4
Toluene (methylbenzene)	OSHA Z-2	200 ppm (weight)	--	300 ppm (weight)	--
Xylene (contains o-, m-, & p- xylene isomers in varying amounts)	ACGIH	100 ppm (weight)	150 ppm (weight)	--	A4
Xylene (contains o-, m-, & p- xylene isomers in varying amounts)	OSHA Z-1	435 mg/m3	--	--	--
Pentane, 2,2,4-trimethyl- (Isooctane)	OSHA Z-1	2350 mg/m3	--	--	--
Pentane, 2,2,4-trimethyl- (Isooctane)	ACGIH	300 ppm (weight)	--	--	--
Butane	ACGIH	1000 ppm (weight)	--	--	--
Ethanol	ACGIH	1000 ppm (weight)	--	--	A4 A3
Ethanol	OSHA Z-1	1900 mg/m3	--	--	--
Benzene	ACGIH	.5 ppm (weight)	2.5 ppm (weight)	--	Skin A1 Skin
Benzene	OSHA SRS	1 ppm (weight)	5 ppm (weight)	--	--
Benzene	OSHA Z-2	10 ppm (weight)	--	25 ppm (weight)	--
Benzene	CVX	1 ppm (weight)	5 ppm (weight)	--	--
Hexane	ACGIH	50 ppm (weight)	--	--	Skin
Hexane	OSHA Z-1	1800 mg/m3	--	--	--
Heptane	ACGIH	400 ppm	500 ppm	--	--

		(weight)	(weight)		
Heptane	OSHA Z-1	2000 mg/m3	--	--	--
Ethyl benzene	ACGIH	20 ppm (weight)	125 ppm (weight)	--	A3
Ethyl benzene	OSHA Z-1	435 mg/m3	--	--	--
Cyclohexane	ACGIH	100 ppm (weight)	--	--	--
Cyclohexane	OSHA Z-1	1050 mg/m3	--	--	--
Naphthalene	ACGIH	10 ppm (weight)	15 ppm (weight)	--	Skin
Naphthalene	OSHA Z-1	50 mg/m3	--	--	--
Methylcyclohexane	ACGIH	400 ppm (weight)	--	--	--
Methylcyclohexane	OSHA Z-1	2000 mg/m3	--	--	--

Refer to the OSHA Benzene Standard (29 CFR 1910.1028) and Table Z-2 for detailed training, exposure monitoring, respiratory protection and medical surveillance requirements before using this product. Consult local authorities for appropriate values.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

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

Color: Colorless to yellow
Physical State: Liquid
Odor: Petroleum odor
Odor Threshold: No data available
pH: Not Applicable
Vapor Pressure: 5 psi - 15 psi (Typical) @ 37.8 °C (100 °F)
Vapor Density (Air = 1): 3 - 4 (Typical)
Initial Boiling Point: 27.2°C (81°F) - 204.4°C (400°F) (Typical)
Solubility: Insoluble in water; miscible with most organic solvents.
Freezing Point: Not Applicable
Melting Point: Not Applicable
Specific Gravity: 0.7 g/ml - 0.8 g/ml @ 15.6°C (60.1°F) (Typical)
Viscosity: <1 SUS @ 37.8°C (100°F)
Evaporation Rate: No data available
Decomposition temperature: No Data Available
Octanol/Water Partition Coefficient: 2 - 7

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

Flashpoint: (Tagliabue Closed Cup ASTM D56) < -45 °C (< -49 °F)
Autoignition: > 280 °C (> 536 °F)
Flammability (Explosive) Limits (% by volume in air): Lower: 1.4 Upper: 7.6

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.

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: For a 4-hour exposure, the Primary Irritation Index (PII) in rabbits is: 4.8/8.0.

Skin Sensitization: This material did not cause skin sensitization reactions in a Buehler guinea pig test.

Acute Dermal Toxicity: LD50: >3.75g/kg (rabbit).

Acute Oral Toxicity: LD50: >5 ml/kg (rat)

Acute Inhalation Toxicity: 4 hour(s) LD50: >20000mg/m3 (rat).
Acute Toxicity Estimate: Not Determined

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

Carcinogenicity: Refer to ADDITIONAL TOXICOLOGY INFORMATION below. Gasoline has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

Whole gasoline exhaust has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

Contains benzene, which has been classified as a carcinogen by the National Toxicology Program (NTP) and a Group 1 carcinogen (carcinogenic to humans) by the International Agency for Research on Cancer (IARC).
Contains naphthalene, which has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC). Contains ethylbenzene which has been classified as a Group 2B carcinogen (possibly carcinogenic to humans) by the International Agency for Research on Cancer (IARC).

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:
Gasolines are highly volatile and can produce significant concentrations of vapor at ambient temperatures.

Gasoline vapor is heavier than air and at high concentrations may accumulate in confined spaces to present both safety and health hazards. When vapor exposures are low, or short duration and infrequent, such as during refueling and tanker loading/unloading, neither total hydrocarbon nor components such as benzene are likely to result in any adverse health effects. In situations such as accidents or spills where exposure to gasoline vapor is potentially high, attention should be paid to potential toxic effects of specific components. Information about specific components in gasoline can be found in Sections 2/3, 8 and 15 of this MSDS. More detailed information on the health hazards of specific gasoline components can be obtained calling the Chevron Emergency Information Center (see Section 1 for phone numbers).
Pathological misuse of solvents and gasoline, involving repeated and prolonged exposure to high concentrations of vapor is a significant exposure on which there are many reports in the medical literature. As with other solvents, persistent abuse involving repeated and prolonged exposures to high concentrations of vapor has been reported to result in central nervous system damage and eventually, death. In a study in which ten human volunteers were exposed for 30 minutes to approximately 200, 500 or 1000 ppm concentrations of gasoline vapor, irritation of the eyes was the only significant effect observed, based on both subjective and objective assessments.
Lifetime inhalation of wholly vaporized unleaded gasoline at 2056 ppm has caused increased liver tumors in female mice and kidney cancer in male rats. In their 1988 review of carcinogenic risk from gasoline, The International Agency for Research on Cancer (IARC) noted that, because published epidemiology studies did not include any exposure data, only occupations where gasoline exposure may have occurred were reviewed. These included gasoline service station attendants and automobile mechanics. IARC also noted that there was no opportunity to separate effects of combustion products from those of gasoline itself. Although IARC allocated gasoline a final overall classification of Group 2B, i.e. possibly carcinogenic to humans, this was based on limited evidence in experimental animals plus supporting evidence including the presence in gasoline of benzene. The actual evidence for carcinogenicity in humans was considered inadequate.
MUTAGENICITY: Gasoline was not mutagenic, with or without activation, in the Ames assay (Salmonella typhimurium), Saccharamyces cerevisesae, or mouse lymphoma assays. In addition, point mutations were not induced in human lymphocytes. Gasoline was not mutagenic when tested in the mouse dominant lethal assay. Administration of gasoline to rats did not cause chomosomal aberrations in their bone marrow cells.
EPIDEMIOLOGY: To explore the health effects of workers potentially exposed to gasoline vapors in the marketing and distribution sectors of the petroleum industry, the American Petroleum Institute sponsored a cohort mortality study (Publication 4555), a nested case-control study (Publication 4551), and an exposure assessment study (Publication 4552). Histories of exposure to gasoline were reconstructed for cohort of more than 18,000 employees from four companies for the time period between 1946 and 1985. The results of the cohort mortality study indicated that there was no increased mortality from either kidney cancer or leukemia among marketing and marine distribution employees who were exposed to gasoline in the petroleum industry, when compared to the general population. More importantly, based on internal comparisons, there was no association between mortality from kidney cancer or leukemia and various indices of gasoline exposure. In particular, neither duration of employment, duration of exposure, age at first exposure, year of first exposure, job category, cumulative exposure, frequency of peak exposure, nor average intensity of exposure had any effect on kidney cancer or leukemia mortality. The results of the nested case-control study confirmed the findings of the original cohort study. That is, exposure to gasoline at the levels experienced by this cohort of distribution workers is not a significant risk factor for leukemia (all cell types), acute myeloid leukemia, kidney cancer or multiple myeloma.

This product contains cyclohexane.
Cyclohexane primarily affects the central nervous systems of laboratory animals and humans. Acute or prolonged inhalation of cyclohexane at levels below the recommended exposure limits does not result in toxic effects while acute exposures to levels above these recommended limits can cause reversible central nervous system depression. Prolonged exposures of laboratory animals to high levels (up to low thousands of parts per million) have also caused reversible effects which included hyperactivity, diminished response to stimuli, and adaptive liver changes while very high levels (high thousands of parts per million) were fatal. No developmental effects were seen in rats or rabbits following exposures of up to 7000 ppm cyclohexane.

No reproductive effects occurred in rats, although postnatal pup growth was reduced at 7000 ppm in a similar manner as observed in the parental animals. Cyclohexane has not been shown to be mutagenic in several in vitro and in vivo assays and has not produced tumors in several dermal application long-term bioassays. Based on these results and the lack of any mutagenic or genotoxic metabolites, cyclohexane is not expected to be mutagenic or genotoxic. Following dermal exposure, cyclohexane is rapidly absorbed, metabolized,and excreted.

This product contains naphthalene.
GENERAL TOXICITY: Exposure to naphthalene has been reported to cause methemoglobinemia and/or hemolytic anemia, especially in humans deficient in the enzyme glucose-6-phosphate dehydrogenase. Laboratory animals given repeated oral doses of naphthalene have developed cataracts. REPRODUCTIVE TOXICITY AND BIRTH DEFECTS: Naphthalene did not cause birth defects when administered orally to rabbits, rats, and mice during pregnancy, but slightly reduced litter size in mice at dose levels that were lethal to the pregnant females. Naphthalene has been reported to cross the human placenta. GENETIC TOXICITY: Naphthalene caused chromosome aberrations and sister chromatid exchanges in Chinese hamster ovary cells, but was not a mutagen in several other in-vitro tests.CARCINOGENICITY: In a study conducted by the National Toxicology Program (NTP), mice exposed to 10 or 30 ppm of naphthalene by inhalation daily for two years had chronic inflammation of the nose and lungs and increased incidences of metaplasia in those tissues. The incidence of benign lung tumors (alveolar/bronchiolar adenomas) was significantly increased in the high-dose female group but not in the male groups. In another two-year inhalation study conducted by NTP, exposure of rats to 10, 30, and 60 ppm naphthalene caused increases in the incidences of a variety of nonneoplastic lesions in the nose. Increases in nasal tumors were seen in both sexes, including olfactory neuroblastomas in females at 60 ppm and adenomas of the respiratory epithelium in males at all exposure levels. The relevance of these effects to humans has not been established. No carcinogenic effect was reported in a 2-year feeding study in rats receiving naphthalene at 41 mg/kg/day.

This product contains ethanol (ethyl alcohol).
Chronic ingestion of ethanol can damage the liver, nervous system and heart. Chronic heavy consumption of alcoholic beverages has been associated with an increased risk of cancer. Ingestion of ethanol during pregnancy can cause human birth defects such as fetal alcohol syndrome.

This product contains butane.
An atmospheric concentration of 100,000 ppm (10%) butane is not noticeably irritating to the eyes, nose or respiratory tract, but will produce slight dizziness in a few minutes of exposure. No chronic systemic effect has been reported from occupational exposure.

This product contains n-hexane.
TARGET ORGAN TOXICITY: Prolonged or repeated ingestion, skin contact or breathing of vapors of n-hexane has been shown to cause peripheral neuropathy. Recovery ranges from no recovery to complete recovery depending upon the severity of the nerve damage. Exposure to 1000 ppm n-hexane for 18 hr/day for 61 days has been shown to cause testicular damage in rats. However, when rats were exposed to higher concentrations for shorter daily periods (10,000 ppm for 6 h/day, 5 days/wk for 13 weeks), no testicular lesions were seen.
CARCINOGENICITY: Chronic exposure to commercial hexane (52% n-hexane) at a concentration of 9000ppm was not carcinogenic to rats or to male mice, but did result in an increased incidence of liver tumors in female mice. No carcinogenic effects were observed in female mice exposed to 900 or 3000 ppm hexane or in male mice. The relevance for humans of these hexane-induced mouse liver tumors is questionable.
GENETIC TOXICITY: n-Hexane caused chromosome aberrations in bone marrow of rats, but was negative in the AMES and mouse lymphoma tests.

This product contains toluene.

GENERAL TOXICITY: The primary effects of exposure to toluene in animals and humans are on the central nervous system. Solvent abusers, who typically inhale high concentrations (thousands of ppm) for brief periods of time, in addition to experiencing respiratory tract irritation, often suffer permanent central nervous system effects that include tremors, staggered gait, impaired speech, hearing and vision loss, and changes in brain tissue. Death in some solvent abusers has been attributed to cardiac arrhythmias, which appear to be have been triggered by epinephrine acting on solvent sensitized cardiac tissue. Although liver and kidney effects have been seen in some solvent abusers, results of animal testing with toluene do not support these as primary target organs.
HEARING: Humans who were occupationally exposed to concentrations of toluene as low as 100 ppm for long periods of time have experienced hearing deficits. Hearing loss, as demonstrated using behavioral and electrophysiological testing as well as by observation of structural damage to cochlear hair cells, occurred in experimental animals exposed to toluene. It also appears that toluene exposure and noise may interact to produce hearing deficits.
COLOR VISION: In a single study of workers exposed to toluene at levels under 50 ppm, small decreases in the ability to discriminate colors in the blue-yellow range have been reported for female workers. This effect, which should be investigated further, is very subtle and would not likely have been noticed by the people tested.
REPRODUCTIVE/DEVELOPMENTAL TOXICITY: Toluene may also cause mental and/or growth retardation in the children of female solvent abusers who directly inhale toluene (usually at thousands of ppm) when they are pregnant. Toluene caused growth retardation in rats and rabbits when administered at doses that were toxic to the mothers. In rats, concentrations of up to 5000 ppm did not cause birth defects. No effects were observed in the offspring at doses that did not intoxicate the pregnant animals. The exposure level at which no effects were seen (No Observed Effect Level, NOEL) is 750 ppm in the rat and 500 ppm in the rabbit.

This product contains xylene.
ACUTE TOXICITY: The primary effects of exposure to xylene in animals and humans are on the central nervous system. In addition,in some individuals, xylene exposure can sensitize cardiac tissue to epinephrine which may precipitate fatal ventricular fibrillation. DEVELOPMENTAL TOXICITY: Xylene has been reported to cause developmental toxicity in rats and mice exposed by inhalation during pregnancy. The effects noted consisted of delayed development and minor skeletal variations. In addition, when pregnant mice were exposed by ingestion to a level that killed nearly one-third of the test group, lethality (resorptions) and malformations (primarily cleft palate) occurred. Since xylene can cross the placenta, it may be appropriate to prevent exposure during pregnancy. GENETIC TOXICITY/CARCINOGENICITY: Xylene was not genotoxic in several mutagenicity testing assays including the Ames test. In a cancer study sponsored by the National Toxicology Program (NTP),technical grade xylene gave no evidence of carcinogenicity in rats or mice dosed daily for two years. HEARING: Mixed xylenes have been shown to cause measurable hearing loss in rats exposed to 800 ppm in the air for 14 hours per day for six weeks. Exposure to 1450 ppm xylene for 8 hours caused hearing loss while exposure to 1700 ppm for 4 hours did not. Although no information is available for lower concentrations, other chemicals that cause hearing loss in rats at relatively high concentrations do not cause hearing loss in rats at low concentrations. Worker exposure to xylenes at the permissible exposure limit (100 ppm, time-weighted average) is not expected to cause hearing loss.

This product contains benzene.
GENETIC TOXICITY/CANCER: Repeated or prolonged breathing of benzene vapor has been associated with the development of chromosomal damage in experimental animals and various blood diseases in humans ranging from aplastic anemia to leukemia (a form of cancer). All of these diseases can be fatal. In some individuals, benzene exposure can sensitize cardiac tissue to epinephrine which may precipitate fatal ventricular fibrillation.
REPRODUCTIVE/DEVELOPMENTAL TOXICITY: No birth defects have been shown to occur in pregnant laboratory animals exposed to doses not toxic to the mother. However, some evidence of fetal toxicity such as delayed physical development has been seen at such levels. The available information on the effects of

benzene on human pregnancies is inadequate but it has been established that benzene can cross the human placenta.
OCCUPATIONAL: The OSHA Benzene Standard (29 CFR 1910.1028) contains detailed requirements for training, exposure monitoring, respiratory protection and medical surveillance triggered by the exposure level. Refer to the OSHA Standard before using this product.

This product contains ethylbenzene.
BIRTH DEFECTS AND REPRODUCTION: Ethylbenzene is not expected to cause birth defects or other developmental effects based on well-conducted studies in rabbits and rats sponsored by NIOSH. Other studies in rats and mice which reported urinary tract malformations have many deficiencies and have limited usefulness in evaluating human risk. Reproductive effects are not expected based on a NIOSH study of fertility, and lack of effects observed for sperm counts and motility, estrous cycle and pathology of reproductive organs following repeated exposures. HEARING: Statistically significant losses in outer hair cells (OHCs) were observed in rats exposed to >=200 ppm ethylbenzene, 6 hours/day, 6 days/week for 13 weeks, after an 8-week recovery period. Following longer exposure, inner hair cells losses were also observed in rats exposed to >= 600 ppm ethylbenzene, but only occasionally in rats exposed to 400 ppm. The Lowest Observed Adverse Effect Level in rats (LOAEL) was 200 ppm for losses of OHCs. Guinea pigs exposed to ethylbenzene at 2,500 ppm, 6 hours/day for 5 days did not show auditory deficits or losses in OHCs. The concentration of ethylbenzene used in the JP-8 study was approximately 10 ppm. GENETIC TOXICITY: Ethylbenzene tested negative in the bacterial mutation test, Chinese Hamster Ovary (CHO) cell in vitro assay, sister chromatid exchange assay and an unscheduled DNA synthesis assay. Conflicting results have been reported for the mouse lymphoma cell assay. Increased micronuclei were reported in an in vitro Syrian hamster embryo cell assay; however, two in vivo micronuclei studies in mice were negative. In Syrian hamster embryo cells in vitro, cell transformation was observed at 7 days of incubation but not at 24 hours. Based on these results, ethylbenzene is not expected to be mutagenic or clastogenic. CARCINOGENICITY: In studies conducted by the National Toxicology Program, rats and mice were exposed to ethylbenzene at 25, 250 and 750 ppm for six hours per day, five days per week for 103 weeks. In rats exposed to 750 ppm, the incidence of kidney tubule hyperplasia and tumors was increased. Testicular tumors develop spontaneously in nearly all rats if allowed to complete their natural life span; in this study, the development of these tumors appeared to be enhanced in male rats exposed to 750 ppm. In mice, the incidences of lung tumors in males and liver tumors in females exposed to 750 ppm were increased as compared to control mice but were within the range of incidences observed historically in control mice. Other liver effects were observed in male mice exposed to 250 and 750 ppm. The incidences of hyperplasia were increased in the pituitary gland in female mice at 250 and 750 ppm and in the thyroid in male and female mice at 750 ppm.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY
This material is expected to be toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment.

96 hour(s) LC50: 2.7 mg/l (Oncorhynchus mykiss)
96 hour(s) LC50: 1.8 mg/l (Mysidopsis bahia)
96 hour(s) LC50: 8.3 mg/l (Cyprinodon variegatus)
48 hour(s) LC50: 3.0 mg/l (Daphnia magna)

MOBILITY
No data available.

PERSISTENCE AND DEGRADABILITY
This material is expected to be readily biodegradable. Following spillage, the more volatile components of gasoline will be rapidly lost, with concurrent dissolution of these and other constituents into the water. Factors such as local environmental conditions (temperature, wind, mixing or wave action, soil type, etc), photo-oxidation, biodegradation and adsorption onto suspended sediments, can contribute to the weathering of spilled gasoline.

The aqueous solubility of non-oxygenated unleaded gasoline, based on analysis of benzene, toluene, ethylbenzene+xylenes and naphthalene, is reported to be 112 mg/l. Solubility data on individual gasoline constituents also available.

POTENTIAL TO BIOACCUMULATE
Bioconcentration Factor: No data available.
Octanol/Water Partition Coefficient: 2 - 7

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by international, country, or local laws and regulations. Check governmental regulations and local authorities for approved disposal of this material.

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.

DOT Shipping Description: UN1203, GASOLINE, 3, II; OPTIONAL DISCLOSURE: UN1203, GASOLINE, 3, II, MARINE POLLUTANT (GASOLINE)

IMO/IMDG Shipping Description: UN1203, GASOLINE, 3, II, FLASH POINT SEE SECTION 5 OR 9, MARINE POLLUTANT (GASOLINE)

ICAO/IATA Shipping Description: UN1203, GASOLINE, 3, II

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code:
Not applicable

SECTION 15 REGULATORY INFORMATION

EPCRA 311/312 CATEGORIES:

1. Immediate (Acute) Health Effects: YES
2. Delayed (Chronic) Health Effects: YES
3. Fire Hazard: YES
4. Sudden Release of Pressure Hazard: NO
5. Reactivity Hazard: NO

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

The following components of this material are found on the regulatory lists indicated.

Naphthalene	01-2B, 02, 03, 04, 05, 06, 07
Cyclohexane	03, 05, 06, 07
Heptane	05, 06, 07
Toluene (methylbenzene)	03, 04, 05, 06, 07
Ethyl benzene	01-2B, 03, 04, 05, 06, 07
Methylcyclohexane	05, 06, 07
Hexane	03, 05, 06, 07
Butane	05, 06, 07
Xylene (contains o-, m-, & p- xylene isomers in varying amounts)	03, 05, 06, 07
Pentane, 2,2,4-trimethyl- (Isooctane)	05, 06, 07
Ethanol	01-1, 02, 04, 05, 06, 07
Gasoline	01-2B, 06, 07
Benzene	01-1, 02, 03, 04, 05, 06, 07

CERCLA REPORTABLE QUANTITIES(RQ)/EPCRA 302 THRESHOLD PLANNING QUANTITIES(TPQ):

Component	Component RQ	Component TPQ	Product RQ
Benzene	10 lbs	None	186 lbs
Cyclohexane	1000 lbs	None	34188 lbs
Ethyl benzene	1000 lbs	None	34964 lbs
Hexane	5000 lbs	None	129149 lbs
Naphthalene	100 lbs	None	4000 lbs
Pentane, 2,2,4-trimethyl- (Isooctane)	1000 lbs	None	6270 lbs
Toluene (methylbenzene)	1000 lbs	None	2627 lbs
Xylene (contains o-, m-, & p- xylene isomers in varying amounts)	100 lbs	None	649 lbs

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

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 1 Flammability: 4 Reactivity: 0

HMIS RATINGS: Health: 2* Flammability: 4 Reactivity: 0
(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index

recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

Additional Product Number(s): CPS201024, CPS201050, CPS201051, CPS201058, CPS201060, CPS201061, CPS201066, CPS201068, CPS201069, CPS201071, CPS201072, CPS201078, CPS201081, CPS201084, CPS201085, CPS201088, CPS201091, CPS201092, CPS201094, CPS201096, CPS201097, CPS201098, CPS201101, CPS201103, CPS201114, CPS201117, CPS201193, CPS201213, CPS201214, CPS201215, CPS201233, CPS201234, CPS201235, CPS201263, CPS201264, CPS201265, CPS201274, CPS201275, CPS201276, CPS201283, CPS201284, CPS201285, CPS201293, CPS201294, CPS201295, CPS201853, CPS201854, CPS201861, CPS201862, CPS201863, CPS204006, CPS204007, CPS204008, CPS204009, CPS204014, CPS204015, CPS204026, CPS204027, CPS204050, CPS204051, CPS204074, CPS204075, CPS204092, CPS204093, CPS204108, CPS204109, CPS204120, CPS204121, CPS204144, CPS204145, CPS204168, CPS204169, CPS204192, CPS204193, CPS204204, CPS204205, CPS204211, CPS204216, CPS204217, CPS204228, CPS204229, CPS204252, CPS204253, CPS204276, CPS204277, CPS204294, CPS204295, CPS204327, CPS204328, CPS204329, CPS204351, CPS204353, CPS204355, CPS204357, CPS204362, CPS204363, CPS204368, CPS204369, CPS204374, CPS204375, CPS204380, CPS204381, CPS204386, CPS204387, CPS204392, CPS204393, CPS204398, CPS204399, CPS204404, CPS204405, CPS204410, CPS204411, CPS204416, CPS204417, CPS204422, CPS204423, CPS204428, CPS204429, CPS204434, CPS204435, CPS204440, CPS204441, CPS204443, CPS204447, CPS204451, CPS204455, CPS204459, CPS204463, CPS204470, CPS204471, CPS204488, CPS204489, CPS204506, CPS204507, CPS204524, CPS204525, CPS204542, CPS204543, CPS204560, CPS204561, CPS204578, CPS204579, CPS204596, CPS204597, CPS204614, CPS204615, CPS204632, CPS204633, CPS204650, CPS204651, CPS204668, CPS204669, CPS204683, CPS204694, CPS204695, CPS204700, CPS204701, CPS204706, CPS204707, CPS204712, CPS204713, CPS204725, CPS204726, CPS204731, CPS204732, CPS204741, CPS241766

REVISION STATEMENT: This revision updates the following sections of this Safety Data Sheet: 1-16

Revision Date: MARCH 18, 2015

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
HMIS - 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 the 29 CFR 1910.1200 (2012) 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.

Haltermann
A Division of Monument Chemical

SAFETY DATA SHEET

1. IDENTIFICATION

1.1 Product identifier

Product Name: Methyl Isobutyl Carbinol
Product Number(s): 40788
Synonyms: Methyl amyl alcohol; 4-Dimethyl Butan-2-ol; 4-Methyl-2-pentanol
CAS #: 108-11-2

1.2 Recommended use of the chemical and restrictions on use

Uses: Solvent, organic synthesis, brake fluids
Restrictions: No data available

1.3 Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Johann Haltermann, Ltd.
16717 Jacintoport Blvd.
Houston, TX 77015 USA
281-452-5951 Fax: 281-457-1127
sds@jhaltermann.com E-mail contact for SDS

1.4 Emergency telephone number

832-376-2026 24 HR Emergency Assistance
800-424-9300 24 HR CHEMTREC

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to 29 CFR §1910.1200 (d)

Flammable liquids (Category 3)
Specific target organ toxicity - single exposure (Category 3)

2.2 Label elements

Labeling according to 29 CFR §1910.1200 (f)

Pictograms(s):

Signal word: **Warning**

Hazard statement(s):
Flammable liquid and vapour.
May cause respiratory irritation.

Precautionary statement(s):
Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical, ventilating, and lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Avoid breathing mist/vapors/spray.
Wash thoroughly after handling.
Do no eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.

2.3 Other hazards **None**

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Chemical Name	CAS #	EINECS	Index Number	Amount
METHYL ISOBUTYL CARBINOL	108-11-2	203-551-7	663-008-00-8	100%

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
IF exposed or concerned: Get medical advice/attention.
Show this this safety data sheet to the doctor in attendance.

Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Call a POISON CENTER or doctor/physician if you feel unwell.

Skin Contact
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation occurs: Get medical advice/attention.

Eye Contact

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 advice/attention.

Ingestion

If swallowed, rinse mouth and rest. Call physician or poison control center immediately.

Do NOT induce vomiting.

4.2 Most important symptoms and effects, both acute and delayed

Acute

The substance and the vapor is irritating to the eyes, the skin, and the respiratory tract .

Eye irritation signs and symptoms may include redness and pain.

Skin irritation signs and symptoms may include dry skin, redness, and pain.

Respiratory irritation signs and symptoms may include cough, sore throat, and unconsciousness.

Exposure can cause lowering of consciousness.

Delayed

Long term or repeated exposure to this material may defat the skin.

4.3 Indication of any immediate medical attention and special treatment needed

No data available.

5. FIRE FIGHTING MEASURES

5.1 Suitable Extinguishing Media

In case of fire: Use powder, alcohol resistant foam, water spray, or carbon dioxide to extinguish.

Use water spray to cool fire exposed containers.

Unsuitable Extinguishing Media

No data available.

5.2 Specific hazards arising from the chemical

The vapor mixes well with air, explosive mixtures may be formed.

Vapor is heavier than air and may travel along the ground. Distant ignition is possible.

5.3 Special protective equipment and precautions for fire-fighters

As in any fire, wear self-contained breathing apparatus pressure-demand (OSHA/NIOSH approved or equivalent) and full protective gear.

5.4 Further information

NFPA Rating:

Health:	2
Flammability:	2
Reactivity:	0

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Protective Measures

Evacuate spill area.

Isolate hazard area and deny entry to unnecessary or unprotected personnel. Stay upwind and keep out of low area. Remove all possible sources of ignition in the surrounding area.

Personal protection: see Section 8.

Ventilate contaminated area thoroughly shut off leaks if possible without personal risk.

6.2 Methods and material for containment and cleaning up

For spills, transfer by mechanical means to a labeled, sealable container for product recovery or safe disposal.

Absorb remaining liquid in sand or inert absorbent and remove to safe place.

6.3 Environmental precautions

Do NOT wash away into sewer. Do NOT let this chemical enter the environment.

Use appropriate containment of product and fire fighting water to avoid environmental contamination. Prevent from spreading or entering drains, ditches, or rivers by using sand, earth, or other appropriate barriers.

Notify authorities if any exposure to the general public or environment occurs or is likely to occur. Local authorities should be advised if significant spillages cannot be contained.

6.4 Reference to other sections

Refer to Section 8 for personal protection advice and Section 13 for disposal information.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Wear protective gloves/protective clothing/eye protection/face protection.

Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

Keep container tightly closed.

Avoid breathing vapors or mists. Avoid contact with eyes or skin.

Do no eat, drink or smoke when using this product.

Take precautionary measures against static discharge.

Use only non-sparking tools.

Use only outdoors or in a well-ventilated area.

Wash thoroughly after handling.

7.2 Conditions for safe storage, including any incompatibilities

Store in a well-ventilated place. Keep cool.

Keep container tightly closed.

Store locked up.

Ensure that all local regulations regarding handling and storage facilities are followed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Permissible Exposure Limits

Compound Name	CAS #	Value 1	Value 2	BEI/Skin Notation
METHYL ISOBUTYL CARBINOL	108-11-2	ACGIH TWA: 25 ppm; ACGIH STEL: 40 ppm	OSHA TWA: 25 ppm	May be absorbed through the skin!

ACGIH: American Conference of Governmental Industrial Hygienists
OSHA: U.S. Occupational Health and Safety Administration
TWA: Time weighted average
STEL: Short Term Exposure Limit
BEI: Biological Exposure Determinants

8.2 Appropriate Engineering Controls

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 may include the following:

Use sealed systems as far as possible. Adequate explosion-proof ventilation to control airborne concentrations below the exposure limits. Local exhaust ventilation is recommended.

Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

8.3 Personal Protective Equipment

Wear protective gloves/protective clothing/eye protection/face protection.

All personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers for more information.

Respiratory Protection

Use only with adequate ventilation. If engineering controls do not maintain airborne concentrations at a level which is adequate to protect worker health, an approved respirator should be used.

When there is potential for airborne exposures in excess of applicable limits, wear NIOSH/MSHA approved respiratory protection. Contact respirator supplier for specific recommendations.

For situations where high concentrations of vapors may be present, use an approved supplied air respirator operated in positive pressure mode.

Hand Protection

Where hand contact with this material may occur, use gloves that meet applicable standards. Suitable materials include: Polychloroprene, Fluorocarbon rubber, Nitrile rubber, butyl rubber.

Specific glove information is provided based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending upon the specific use conditions.

Contact glove manufacturer for advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves.

Eye Protection

Chemical splash goggles which meet the national standards should be used when handling this material.

Skin Protection

Chemical resistant apron or coat and gloves should be used when handling this material.

Specific Hygiene Measures

Do not eat, drink, or smoke when handling this material. Wash hands thoroughly after handling.

Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned.

Monitoring Methods

Monitoring of the vapor concentrations of chemicals in the workplace may be required to confirm compliance with OEL and adequacy of exposure controls.

Sources for recommended air monitoring methods include:

USA: National Institute of Occupational Safety and Health (NIOSH): Manual of Analytical Methods, http://www.cdc.gov/niosh/nmam/nmammenu.html.

USA: Occupational Safety and Health Administration (OSHA): Sampling and Analytical Methods, http://osha.gov/dts/sltc/methods/toc.html.

Environmental Exposure Controls

Local guidelines for emissions limits for volatile substances must be observed for the discharge of exhaust air containing vapors.

See Sections 6, 7,12, and 13 for more information on environmental exposure controls.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

(a) Appearance	Form:	Liquid				
	Color:	Colorless				
(b) Odor		Mild				
(c) Odor threshold		No data available				
(d) pH		No data available				
(e) Melting/freezing point		-90	°C	-130.0	°F	
(f) Initial boiling point and boiling range		132.0	°C	269.6	°F	
(g) Flash point		41	°C	105.8	°F	closed cup
(h) Evaporation rate		No data available				
(i) Flammability (solid, gas)		No data available				
(j) Upper/lower flammability or explosive limits		1.0 - 5.5	volume % in air			
(k) Vapor pressure		2.8	mm Hg at 20°C			
(l) Vapor density		No data available				
(m) Relative density		0.82	(water = 1)			
(n) Solubility (ies)	in water	2	g/100 mL at 25°C			
(o) Partition coefficient: n-octanol/water		1.43				
(p) Auto-ignition temperature		No data available				
(q) Decomposition temperature		No data available				
(r) Viscosity		No data available				

9.2 Other information

Chemical formula	$C_6 H_{14} O$
Molecular weight	102.2

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical Stability
This material is expected to be stable under normal conditions of use.

Hazardous polymerization will not occur.

10.3 Possibility of hazardous reactions
Reacts with strong oxidants.

10.4 Conditions to Avoid
No data available

10.5 Incompatible materials
Avoid contact with strong oxidizing agents.

10.6 Hazardous Decomposition Products
In the event of fire, oxides of carbon, hydrocarbons, fumes, and smoke may be produced.

11. TOXICOLOGICAL INFORMATION

11.1 Likely routes of exposure
Likely routes of exposure include: inhalation, eye and skin contact, and ingestion.

11.2 Signs and symptoms of exposure
Eye irritation signs and symptoms may include a burning sensation, redness, and pain.

Skin irritation signs and symptoms may include dryness and redness.

Breathing of high vapor concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea, and loss of coordination.

Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing.

11.3 Delayed and immediate effects/Chronic effects from short- and long-term exposure

Eye
Contact with eyes may cause redness and pain. Serious/permanent damage is not expected to occur.

Skin
Contact with skin may cause dry skin, redness, and pain.

Inhalation
Inhalation of this material may cause: cough, sore throat, and unconsciousness.

Ingestion
Ingestion of this material may be harmful.

Chronic effects
Long term or repeated exposure to this material defats the skin.

Subchronic effects
This substance and vapor is irritating to the eyes, skin, and respiratory tract. The substance may cause effects on the central nervous system resulting in a lowering of consciousness.

Respiratory or skin sensitization
No data available.

Germ cell mutagenicity
No data available.

Reproductive toxicity
No data available.

Specific target organ toxicity - single exposure
This material may cause respiratory tract irritation.

Specific target organ toxicity - repeat exposure
No data available.

Aspiration hazard
No data available.

Potential health effects
Irritating to the respiratory system. Vapors may cause drowsiness and dizziness, irritating to the eyes and skin.

Harmful: danger of serious damage to health by prolonged exposure through inhalation.

11.4 Acute Toxicity Estimates

Compound Name	CAS #	TEST - SPECIES - RESULT
METHYL ISOBUTYL CARBINOL	108-11-2	Oral LD50 - Rat: 2.6 g/kg; Dermal LD50 - Rabbit: 3.56 mL/kg/24 hr

11.5 Carcinogenicity

This material is not carcinogenic according to IARC (International Agency for Research on Cancer), NTP (National Toxicology Program), or OSHA (U.S. Occupational Health and Safety Administration).

12. ECOLOGICAL INFORMATION

12.1 Ecotoxicity

Compound Name	CAS #	TEST-SPECIES-RESULTS
METHYL ISOBUTYL CARBINOL	108-11-2	LC 50 - Goldfish: 360 mg/L/ 24 Hr

12.2 Persistence and Degradability

Methyl isobutyl carbinol is expected to biodegrade.

12.3 Bioaccumulative potential

According to National Library of Medicine's Hazardous Substance Databank, an estimated BCF of 2.6 was calculated in fish for methyl isobutyl carbinol, which suggests the potential for bioconcentration in aquatic organisms is low.

12.4 Mobility in soil

Methyl isobutyl carbinol is expected to have high mobility in soil.

12.5 Other adverse effects

No data available.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product disposal

Recover or recycle if possible.

It is the responsibility of the waste generator to determine the physical characteristics and toxicity of the material generated in order to properly designate the waste classification and disposal methods in compliance with applicable regulations.

Do not dispose into the environment, in drains, or allow to enter waterways. Waste product should not be allowed to contaminate soil or water.

Dispose of contents/container to in accordance with local/regional/national/international regulations.

Container disposal

Follow all MSDS/label precautions even after container is emptied because they may retain product residues.

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 a suitable qualified or licensed contractor and in accordance with governmental regulations.

Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition as this may cause them to explode.

14. TRANSPORT INFORMATION

Land (U.S. DOT)

14.1 UN number: 2053
14.2 Proper Shipping Name: Methyl Isobutyl Carbinol
14.3 Transport Hazard Class: 3
14.4 Packing Group: III
14.5 Environmental Hazards:
IMDG Marine pollutant: No
14.6 Special precautions for the user
ERG (Emergency Response Guide) Number: 129
Hazard Identification Number (HIN): 30

Sea (IMDG)

14.1 UN number: 2053
14.2 Proper Shipping Name: Methyl Isobutyl Carbinol
14.3 Transport Hazard Class: 3
14.4 Packing Group: III
14.5 Environmental Hazards:
IMDG Marine pollutant: No
14.6 Special precautions for the user
EMS: F-E, S-D
Hazard Identification Number (HIN): 30

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and IBC Code
MARPOL Category: Z
IBC Code: IBC03

15. REGULATORY INFORMATION

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

This safety datasheet complies with the requirements of 29 CFR §1910.1200
This material or all of its components are listed on the Inventory of Existing Chemical Substances under the Toxic Substance Control Act (TSCA) or are exempt from reporting.

FEDERAL REGULATORY LISTS:

Compound Name	CAS #	SARA 313	CERCLA	RCRA	CAA
METHYL ISOBUTYL CARBINOL	108-11-2	N.L	N.L	N.L	N.L

N.L. - Not listed on regulatory list

CALIFORNIA REGULATIONS:

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

PENNSYLVANIA REGULATIONS:

The following product components are cited on the Pennsylvania Hazardous Substances List and/or the Pennsylvania Environmental Hazardous Substances List, and are present at levels which require reporting.

Compound Name	CAS #	LISTING	AMOUNT
METHYL ISOBUTYL	108-11-2	PA RTK	100%

To the best of our knowledge, this product does not contain any components cited on the Pennsylvania Special Hazardous Substances List.

ADDITIONAL STATE REGULATIONS:

Components of this product are found on the following state lists.

Compound Name	CAS #	STATE LISTS
METHYL ISOBUTYL CARBINOL	108-11-2	FL, MN, NJ, WI

CANADIAN REGULATIONS:

This material or all of its components are listed on the Canadian Domestic Substances List (DSL) or Non-Domestic Substances List (NDSL).

WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) classification for this product is:

B3 - Combustible liquid with a flash point between 37.8° C and 93.3° C.

D2B - Toxic Material Causing Other Toxic Effects

Compound Name	CAS #	REPORTING LIMIT (%)
METHYL ISOBUTYL CARBINOL	108-11-2	1.0

Refer elsewhere in the MSDS for specific warnings and safe handling information.

Refer to the employer's workplace education program.

CPR STATEMENT: This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

16. OTHER INFORMATION

Reason for Issue: This revision updates SDS formatting according to OSHA Hazard Communications Standard (HCS) promulgated on March 20, 2012 .

Approval date: December 6, 2012

Supersedes date: July 29, 2009

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This information is furnished without warranty, expressed or implied except that it is accurate to the best knowledge of Johann Haltermann, Ltd.. The data on this sheet are related only to the specific material herein. Johann Haltermann, Ltd. assumes no responsibility for the use or reliance upon these data.

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END OF MSDS

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Brenntag Canada Inc.

BRENNTAG

MATERIAL SAFETY DATA SHEET

POTASSIUM AMYL XANTHATE, SOLID

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Brenntag Canada Inc.
43 Jutland Rd.
Toronto, ON
M8Z 2G6
(416) 259-8231

Website: http:\\www.brenntag.ca

WHMIS#:	00060600
Index:	HCI0065/09B
Effective Date:	2009 June 17
Date of Revision:	2009 June 17

EMERGENCY TELEPHONE NUMBERS (FOR EMERGENCIES INVOLVING CHEMICAL SPILLS OR RELEASE)

Toronto, ON (416) 226-6117	Montreal, QC (514) 861-1211	Winnipeg, MB (204) 943-8827
Edmonton, AB (780) 424-1754	Calgary, AB (403) 263-8660	Vancouver, BC (604) 685-5036

PRODUCT IDENTIFICATION

Product Name:	Potassium Amyl Xanthate, Solid.
Chemical Name:	Dithiocarbonic Acid, Amyl Ester, Potassium Salt.
Synonyms:	Potassium Amyl Xanthate; KAX 51; Potassium Pentyl Xanthate; Potassium Pentyl Xanthogenate.
Chemical Family:	Salts of carbonic acid dithio esters.
Molecular Formula:	C6H11OS2. K.
Product Use:	Flotation agent.

WHMIS Classification / Symbol:

B-6: Reactive Flammable Material
D-1B: Toxic (acute effects)
D-2B: Toxic (skin and eye irritant)

READ THE ENTIRE MSDS FOR THE COMPLETE HAZARD EVALUATION OF THIS PRODUCT.

2. COMPOSITION, INFORMATION ON INGREDIENTS (Not Intended As Specifications)

Ingredient	*CAS#*	*ACGIH TLV*	*% Concentration*
Potassium Amyl Xanthate	2720-73-2	---	60 - 100
Potassium Hydroxide	1310-58-3	—	1 - 5
Isoamyl alcohol	123-51-3	100 ppm	1 - 5
Decomposition Product: Carbon disulfide	75-15-0	10 ppm (Skin)	

Skin Notation: Contact with skin, eyes and mucous membranes can contribute to the overall exposure and may invalidate the TLV. Consider measures to prevent absorption by these routes.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May be fatal if swallowed. Harmful if inhaled. Causes skin and eye irritation. Dust is irritating to respiratory tract. See "Other Health Effects" Section. Heating of solid xanthate or aging or heating of solutions will cause formation of Carbon Bisulfide. Upon exposure of solid xanthates to moisture and/or heat, decomposition results and spontaneous combustion can occur. Contact of solid xanthate with moist air has resulted in ignition. (4) Emits a flammable gas upon contact with water or water vapour. Can decompose at high temperatures forming toxic gases. Powdered material may form explosive dust-air mixtures. Contents may develop pressure on prolonged exposure to heat.

POTENTIAL HEALTH EFFECTS

Inhalation:	Excessive contact with powder may cause drying of mucous membranes of nose and throat due to absorption of moisture and oils. Product may cause severe irritation of the nose, throat and respiratory tract. Repeated and/or prolonged exposures may cause productive cough, running nose, bronchopneumonia, pulmonary oedema (fluid build-up in lungs), and reduction of pulmonary function. Irritation of mucous membranes and respiratory tract is possible following exposure to the decomposition product. (3) See "Other Health Effects" Section.
Skin Contact:	Brief contact with the dust causes irritation. Greater exposure causes severe burns. In the presence of moisture (perspiration, humidity, tears), the dust dissolves to form a corrosive solution which may cause burns. (3) Potassium Amyl Xanthate may cause symptoms of skin irritation such as reddening, swelling, rash, scaling, or blistering. May cause defatting, drying and cracking of the skin.
Skin Absorption:	May be absorbed through intact skin. See Section 11, "Other Studies Relevant to Material".
Eye Contact:	This product may cause irritation, redness and possible damage due to abrasiveness. Brief contact with the dust causes irritation. Greater exposure causes severe burns. In the presence of moisture (perspiration, humidity, tears), the dust dissolves to form a corrosive solution which may cause burns. (3) Irritation of the eyes is possible following exposure to the decomposition product. (3)
Ingestion:	Ingestion is not a likely route of exposure. This product causes irritation, a burning sensation of the mouth and throat and abdominal pain.
Other Health Effects:	Effects (irritancy) on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain. Strict adherence to first aid measures following any exposure is essential. May cause cardiovascular effects, liver damage, peripheral nervous system (PNS) effects or central nervous system (CNS) depression. CNS depression is characterized by headache, dizziness, drowsiness, nausea, vomiting and incoordination. Severe overexposures may lead to coma and possible death due to respiratory failure. Peripheral Neuropathy is a progressive disorder of the nervous system characterized by sensory and motor abnormalities, muscle spasms, weakness and pain in the arms and legs, numbness and tingling of the fingers and toes and paralysis. Liver damage is characterized by the loss of appetite, jaundice (yellowish skin colour), and occasional pain in the upper left-hand side of the abdomen. Potassium Amyl Xanthate: Symptoms of potassium poisoning may occur. These include slow heartbeat, accelerated breathing, muscle weakness and, in severe cases, paralysis. Vapours of the decomposition products of Xanthates (Carbon Bisulphide) can cause severe disturbances of mood and behaviour, including excitation, anger and violent dreams. High concentrations of vapours can cause death. (4) Carbon Bisulphide: Contact with moisture in the body by inhalation may yield sodium hydroxide (corrosive) and 2-mercaptobenzothiazole, an irritant. (4) Contact with acids will liberate carbon disulphide. (3) Exposure to carbon disulphide (500 to 1000 ppm) may cause severe mood and personality disturbances, including excitability, confusion, irritability, uncontrollable anger, bizarre dreams, insomnia, psychosis and suicide. Exposure to carbon disulphide at 4800 ppm for thirty minutes results in coma and may be fatal. Carbon disulphide is readily absorbed through intact skin. Chronic exposure to carbon disulphide produces central and peripheral nervous system, cardiovascular, gastrointestinal, kidney, endocrine and eye disorders. (4) Potassium Hydroxide: Exposure to very low doses, even for a short period of time, has produced extensive damage to the esophagus, stomach and intestine extending into surrounding tissues, as well as hyperexcitability followed by apathy and weakness. In some cases, death has resulted from hemorrhage, adhesions or perforation. Following esophageal damage, strictures have frequently developed in surviving animals. (4)

4. FIRST AID MEASURES

FIRST AID PROCEDURES

Inhalation:	Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Obtain medical advice IMMEDIATELY.
Skin Contact:	Prompt removal of the material from the skin is essential. Remove all contaminated clothing and immediately wash the exposed areas with copious amounts of soap and water for a minimum of 30 minutes or up to 60 minutes for critical body areas. Immerse the exposed part immediately in ice water to relieve pain and to prevent swelling and blistering. Place cold packs, ice or wet cloths on the burned area if immersion is not possible. Cover the exposed part with a clean, preferably sterile, lint-free dressing. Obtain medical attention IMMEDIATELY and monitor breathing and treat for shock for severe exposure.
Eye Contact:	Immediately flush eyes with running water for a minimum of 20 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Obtain medical attention IMMEDIATELY.

Ingestion:	Do not attempt to give anything by mouth to an unconscious person. If victim is alert and not convulsing, rinse mouth out and give 1/2 to 1 glass of water to dilute material. IMMEDIATELY contact local Poison Control Centre. Vomiting should only be induced under the direction of a physician or a poison control centre. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. IMMEDIATELY transport victim to an emergency facility.
Note to Physicians:	Treat symptomatically. Medical conditions that may be aggravated by exposure to this product include neurological and cardiovascular disorders, diseases of the skin, eyes or respiratory tract, preexisting liver and kidney disorders.

5. FIRE-FIGHTING MEASURES

Flashpoint (°C)	***AutoIgnition Temperature (°C)***	**Flammability Limits in Air (%):** ***LEL***	***UEL***
-30. (Carbon Disulphide)	90.1 (Carbon Disulphide)	1.25. (Carbon Disulphide)	50. (Carbon Disulphide)

Flammability Class (WHMIS):	B-6: Reactive Flammable Material
Hazardous Combustion Products:	Thermal decomposition products are toxic and may include Carbon Disulphide, Potassium sulphide, carbonyl sulphide, Amyl Alcohols, oxides of carbon, sulphur, potassium and irritating gases.
Unusual Fire or Explosion Hazards:	This product may be capable of forming flammable dust clouds in air. Avoid accumulation and dispersion of dust to reduce explosion potential. Spilled material may cause floors and contact surfaces to become slippery. Heating of solid xanthate or aging or heating of solutions will cause formation of Carbon Bisulfide. Upon exposure of solid xanthates to moisture and/or heat, decomposition results and spontaneous combustion can occur. Contact of solid xanthate with moist air has resulted in ignition. (4) Vapours from this product are heavier than air, and may "travel" to a source of ignition (eg. pilot lights, heaters, electric motors) some distance away, and then "flash back" to the point of product discharge causing an explosion and fire. Enforce NO SMOKING rules.
Sensitivity to Mechanical Impact:	Not expected to be sensitive to mechanical impact.
Rate of Burning:	Not available.
Explosive Power:	Not available.
Sensitivity to Static Discharge:	If product has come into contact with moisture and Carbon Bisulphide gas has evolved, then Carbon Bisulphide is expected to be sensitive to static discharge if vapours are present between the lower and upper explosive limits. (3) High voltage static electricity build-up is possible when significant quantities of dust are present.
EXTINGUISHING MEDIA	
Fire Extinguishing Media:	Use carbon dioxide or dry chemical media for small fires. If only water is available, use it in the form of a fog. Cool containers with flooding quantities of water until well after the fire is out. Exposure to heat and moisture may cause the decomposition of xanthates to release flammable, explosive and poisonous Carbon Bisulphide vapours. (3)
FIRE FIGHTING INSTRUCTIONS	
Instructions to the Fire Fighters:	Use water spray to cool fire-exposed containers or structures. Use water spray to disperse vapours; re-ignition is possible. Clean up immediately to eliminate slipping hazard. Do not allow to enter sewers or watercourses. Avoid accumulation and dispersion of dust to reduce explosion potential.
Fire Fighting Protective Equipment:	Use self-contained breathing apparatus and protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Information in this section is for responding to spills, leaks or releases in order to prevent or minimize the adverse effects on persons, property and the environment. There may be specific reporting requirements associated with spills, leaks or releases, which change from region to region.

Containment and Clean-Up Procedures:	In all cases of leak or spill contact vendor at Emergency Number shown on the front page of this MSDS. Avoid accumulation and dispersion of dust to reduce explosion potential. Wear respirator, protective clothing and gloves. Spilled material may cause floors and contact surfaces to become slippery. Any recovered product can be used for the usual purpose, depending on the extent and kind of contamination. Where a package (drum or bag) is damaged and / or leaking, repair it, or place it into an over-pack drum immediately so as to avoid or minimize material loss and contamination of surrounding environment. Replace damaged containers immediately to avoid loss of material and contamination of surrounding atmosphere. Avoid dry sweeping. Do not use compressed air to clean surfaces. Vacuuming or wet sweeping is preferred. Return all material possible to container for proper disposal. Do not flush with water as aqueous solutions or powders that become wet render surfaces extremely slippery. Eliminate all sources of ignition. Collect product for recovery or disposal. For release to land, or storm water runoff, contain discharge by constructing dykes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Ventilate enclosed spaces. Notify applicable government authority if release is reportable or could adversely affect the environment.

7. HANDLING AND STORAGE

HANDLING

Handling Practices:	Avoid accumulation and dispersion of dust to reduce explosion potential. Ground and bond equipment and containers to prevent a static charge buildup. Use spark-resistant tools. Use normal "good" industrial hygiene and housekeeping practices. Clean up immediately to eliminate slipping hazard. Enforce NO SMOKING rules in area of use.
Ventilation Requirements:	See Section 8, "Engineering Controls".
Other Precautions:	Use only with adequate ventilation and avoid breathing dusts (aerosols, vapours or mists). Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Wash contaminated clothing thoroughly before re-use. Do not use cutting or welding torches on empty drums that contained this material/product. Absorption via contact with skin, eyes and mucous membranes can contribute to the overall exposure. Consider measures to prevent absorption by these routes.

STORAGE

Storage Temperature (°C):	See below.
Ventilation Requirements:	Ventilation should be explosion proof.
Storage Requirements:	Store solid Xanthates under cool, dark, dry conditions. Liquid products must be kept cool and used as quickly as possible. (3) Store in a cool, well-ventilated area. Keep away from heat, sparks and flames. Keep containers closed. Do not expose sealed containers to temperatures above 40° C. Avoid moisture contamination. Prolonged storage may result in lumping or caking.
Special Materials to be Used for Packaging or Containers:	Materials of construction for storing the product include: carbon steel. Copper and its alloys should not be used in equipment for storage, handling or transportation. Attacks some types of rubber, plastics and coatings. Confirm suitability of any material before using.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Recommendations listed in this section indicate the type of equipment, which will provide protection against overexposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

ENGINEERING CONTROLS

Engineering Controls:	Local exhaust ventilation required. Ventilation should be explosion proof. Make up air should be supplied to balance air that is removed by local or general exhaust ventilation. Avoid accumulation and dispersion of dust to reduce explosion potential. Ventilate low lying areas such as sumps or pits where dense dust may collect. Enforce NO SMOKING rules.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Eye Protection:	Use chemical safety goggles when there is potential for eye contact. Use full face-shield and chemical safety goggles when there is potential for contact.
Skin Protection:	Gloves and protective clothing made from neoprene, PVC, polyethylene, rubber or plastic should be impervious under conditions of use. Attacks some types of rubber, plastics and coatings. Prior to use, user should confirm impermeability. Discard contaminated gloves.
Respiratory Protection:	No specific guidelines available. A NIOSH/MSHA-approved air-purifying respirator equipped with dust, mist, fume cartridges for concentrations up to 2 mg/m^3 Potassium Hydroxide. An air-supplied respirator if concentrations are higher or unknown.

Other Personal Protective Equipment:	Avoid accumulation and dispersion of dust to reduce explosion potential. Wear an impermeable apron and boots. Locate safety shower and eyewash station close to chemical handling area. Take all precautions to avoid personal contact. Clothing and footwear that is fire retardant and dissipates static electrical charges should be worn when handling flammable materials. Natural fibers (cotton, wool, leather and linen) should be selected in favour of synthetic materials (rayon, nylon and polyester). Skin Notation: Contact with skin, eyes and mucous membranes can contribute to the overall exposure and may invalidate the TLV. Consider measures to prevent absorption by these routes.

EXPOSURE GUIDELINES

SUBSTANCE	***ACGIH TLV***	***OSHA PEL***		***NIOSH REL***	
	(STEL)	***(TWA)***	***(STEL)***	***(TWA)***	***(STEL)***
Potassium Hydroxide	2 mg/m³ (Ceiling)	---	---	---	2 mg/m³ (Ceiling)
Isoamyl alcohol	125 ppm	100 ppm	---	100 ppm	125 ppm
Decomposition Product: Carbon disulfide	—	20 ppm (Skin)	30 ppm (Skin)	1 ppm (Skin)	3 ppm (Skin)

9. PHYSICAL AND CHEMICAL PROPERTIES (Not intended as Specifications)

Physical State:	Solid.
Appearance:	Yellow to yellow-green pellets.
Odour:	Strong, disagreeable sulphur odour.
Odour Threshold (ppm):	0.02 - 0.21(Carbon Disulphide)
Boiling Range (°C):	Not available.
Melting/Freezing Point (°C):	255 - 280 (decomposes). (3)
Vapour Pressure (mm Hg at 20° C):	Not applicable.
Vapour Density (Air = 1.0):	Not applicable.
Relative Density (g/cc):	0.7. (4)
Bulk Density:	Not applicable.
Viscosity:	Not applicable.
Evaporation Rate (Butyl Acetate = 1.0):	Not applicable.
Solubility:	Soluble in water. Hygroscopic (readily absorbs water).
% Volatile by Volume:	< 20. (3)
pH:	10.5 (10 % solution). (3)
Coefficient of Water/Oil Distribution:	Not available.
Volatile Organic Compounds (VOC):	Not applicable.
Flashpoint (°C):	-30. (Carbon Disulphide)

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY

Under Normal Conditions:	Unstable. Solid Xanthates are stable when kept cool and dry. Exposure to heat causes decomposition. Acids and oxidizing agents accelerate aging. In solution, Xanthates will decompose slowly even at room temperature. (3)
Under Fire Conditions:	Flammable. This product may be capable of forming flammable dust clouds in air.
Hazardous Polymerization:	Will not occur.
Conditions to Avoid:	High temperatures, sparks, open flames and all other sources of ignition. Avoid accumulation and dispersion of dust to reduce explosion potential. Exposure to heat and moisture may cause the decomposition of xanthates to release flammable, explosive and poisonous Carbon Bisulphide vapours. (3)
Materials to Avoid:	Strong oxidizers. Lewis or mineral acids. Metal Salts. Copper and its alloys.. Contact with acids will liberate Carbon Bisulphide. Avoid moisture contamination. Contact with water or moisture will liberate Carbon Bisulphide. Mixtures or reactions of alcohols with the following materials may cause explosions: barium perchlorate, chlorine, hypochlorous acid, ethylene oxide, hexamethylene diisocyanate and other isocyanates, nitrogen tetroxide, permonosulfuric acid and tri-isobutyl aluminum. (4) Attacks some types of rubber, plastics and coatings.

Decomposition or Combustion Products:	Thermal decomposition products are toxic and may include Carbon Bisulphide, Potassium sulphide, carbonyl sulphide, Amyl Alcohols, oxides of carbon, sulphur, potassium and irritating gases.

11. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA:

SUBSTANCE	***LD50 (Oral, Rat)***	***LD50 (Dermal, Rabbit)***	***LC50 (Inhalation, Rat, 4h)***
Potassium Amyl Xanthate	1 000 mg/kg (3)	---	---
Potassium Hydroxide	214 - 365 mg/kg (1,3)	1 260 mg/kg (3)	---
Isoamyl alcohol	1 300 mg/kg (1)	3 216 mg/kg (1)	---
Decomposition Product: Carbon disulfide	1 200 mg/kg (1)	---	12 500 mg/m3 (1)

Carcinogenicity Data:	The ingredient(s) of this product is (are) not classed as carcinogenic by ACGIH, IARC, OSHA or NTP.
Reproductive Data:	This product: No adverse reproductive effects are anticipated.
Mutagenicity Data:	No adverse mutagenic effects are anticipated.
Teratogenicity Data:	No adverse teratogenic effects are anticipated.
Respiratory / Skin Sensitization Data:	None known.
Synergistic Materials:	Alcohols may interact synergistically with chlorinated solvents (example - carbon tetrachloride, chloroform, bromotrichloromethane), dithiocarbamates (example - disulfiram), dimethylnitrosamine and thioacetamide. (4) Carbon Bisulphide: The toxic effects of Carbon Bisulphide, particularly on the nervous system, can be intensified by consumption of alcohol, alcoholism, treatment with disulfiram (Antibuse), and exposure to Hydrogen Sulphide. (4) In animal studies the toxicity of Carbon Bisulphide was intensified by chemicals such as resperine and amphetamine which act on the nervous system. (4)
Other Studies Relevant to Material:	None known.

12. ECOLOGICAL INFORMATION

Ecotoxicity:	Not available. May be harmful to aquatic life.
Environmental Fate:	Not available. Product has an unaesthetic appearance and can be a nuisance. Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

13. DISPOSAL CONSIDERATIONS

Deactivating Chemicals:	Not available.
Waste Disposal Methods:	This information applies to the material as manufactured. Reevaluation of the product may be required by the user at the time of disposal since the product uses, transformations, mixtures and processes may influence waste classification. Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations. Do not dispose of waste with normal garbage, or to sewer systems.
Safe Handling of Residues:	See "Waste Disposal Methods".
Disposal of Packaging:	Empty containers retain product residue and can be dangerous. Treat package in the same manner as the product.

14. TRANSPORTATION INFORMATION

CANADIAN TDG ACT SHIPPING DESCRIPTION:

XANTHATES, Class 4.2, UN3342, PG III.

Label(s): Substances Liable To Spontaneous Combustion. Placard: Substances Liable To Spontaneous Combustion.

ERAP Index: -----. Exemptions: None known.

US DOT CLASSIFICATION (49CFR 172.101, 172.102):

XANTHATES, Class 4.2, UN3342, PG III.

Label(s): Spontaneously Combustible. Placard: Spontaneously Combustible.

CERCLA-RQ: Not available. Exemptions: None known.

15. REGULATORY INFORMATION

CANADA

CEPA - NSNR: All constituents of this product are included on the DSL.

CEPA - NPRI: Not included.

Controlled Products Regulations Classification (WHMIS):

B-6: Reactive Flammable Material
D-1B: Toxic (acute effects)
D-2B: Toxic (skin and eye irritant)

USA

Environmental Protection Act: All constituents of this product are included on the TSCA inventory.

OSHA HCS (29CFR 1910.1200): Flammable Solid. Toxic. Skin and Eye Irritant.

NFPA: 3 Health, 4 Fire, 0 Reactivity (6)

HMIS: Health, Fire, Reactivity (Not available.)

INTERNATIONAL

Not available.

16. OTHER INFORMATION

REFERENCES

1. RTECS-Registry of Toxic Effects of Chemical Substances, Canadian Centre for Occupational Health and Safety RTECS database.
2. Clayton, G.D. and Clayton, F.E., Eds., Patty's Industrial Hygiene and Toxicology, 3rd ed., Vol. IIA,B,C, John Wiley and Sons, New York, 1981.
3. Supplier's Material Safety Data Sheet(s).
4. CHEMINFO, through "CCINFOdisc", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.
5. Guide to Occupational Exposure Values, 2007, American Conference of Governmental Industrial Hygienists, Cincinnati, 2007.
6. Regulatory Affairs Group, Brenntag Canada Inc.
7. The British Columbia Drug and Poison Information Centre, Poison Managements Manual, Canadian Pharmaceutical Association, Ottawa, 1981.

To obtain revised copies of this or other Material Safety Data Sheets, contact your nearest Brenntag Canada Regional office.

British Columbia: 20333-102B Avenue, Langley, BC, V1M 3H1
Phone: (604) 513-9009 Facsimile: (604) 513-9010

Alberta: 6628 - 45 th. Street, Leduc, AB, T9E 7C9
Phone: (780) 986-4544 Facsimile: (780) 986-1070

Manitoba: 681 Plinquet Street, Winnipeg, MB, R2J 2X2
Phone: (204) 233-3416 Facsimile: (204) 233-7005

Ontario: 43 Jutland Road, Toronto, ON, M8Z 2G6
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Phone: (902) 468-9690 Facsimile: (902) 468-3085

Prepared By: Regulatory Affairs Group, Brenntag Canada Inc., (416) 259-8231.

Ferrellgas Material Safety Data Sheet - Propane

Ferrellgas One Liberty Plaza Liberty, MO 64068

Section 1: Emergency Information

24 Hour Emergency Number

Call 1-800-424-9300 (Chemtrec) in case of emergencies involving propane.

Warning!

Extremely flammable compressed gas.

- Asphyxiant in high concentrations.
- Skin contact with liquid causes burns similar to frostbite.
- Ethyl mercaptan used as a warning agent may not be entirely effective in all situations. Read the warnings in section 9.

NFPA hazard rating

Hazard ratings are in the following table

Health hazard = 1
Fire hazard = 4
Reactivity = 0

Where:

0 = Least	3 = High
1 = Slight	4 = Extreme
2 = Moderate	

General MSDS assistance

Call 816-792-1600 and ask to speak with the Safety Department for general assistance with questions about this MSDS.

Section 2: Hazardous Components/Identity Information

Product

Propane (odorized)

Chemical name

Propane

Chemical family

Liquefied Petroleum Gas (Paraffinic Hydrocarbons)

Hazardous components

Propane may contain various percentages of these hazardous components, depending on the source of supply.

Component	CAS Number	Percentage
Propane	74-98-6	85 - 100
Propylene	115-07-1	0 - 15
Butane and heavier	106-97-8	0 - 2.5
Ethane	74-84-0	0 - 5
Ethyl Mercaptan (Odorant)	75-08-1	<0.0025

Section 3: Health Information

Purpose The health effects are consistent with requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Eye contact Direct contact with liquid propane can result in eye burns.

Skin contact Direct contact with liquid propane can result in skin burns (frostbite).

Inhalation This product is classified as a simple asphyxiant.
High vapor concentrations may produce a reversible central nervous system depression (anesthesia).
Higher concentrations may produce asphyxiation.

Ingestion Ingestion is not likely.

Signs and symptoms Eye or skin burns (frostbite) as noted previously.
Early to moderate central nervous system depression may be evidenced by giddiness, headache, dizziness and nausea. In extreme cases, unconsciousness may occur.
Asphyxiation may be noted by a sudden loss of consciousness. Death may quickly follow.

Aggravated medical conditions Caution is recommended for personnel with pre-existing central nervous system or chronic respiratory diseases.

Acute toxicity data Acute toxicity data is not applicable to this product.

Carcinogenicity This product is not classified as a carcinogen.

Occupational exposure limits Use this table to determine the allowable exposure limits for personnel.

OSHA		ACGIH	
PEL/TWA	**PEL/Ceiling**	**TLV/TWA**	**TLV/STEL**
Propane: 1,000 PPM Butane: 800 PPM	Not established	Butane: 800 PPM	Not established

Cardiac effects While there is no evidence that exposure to industrially acceptable levels of hydrocarbons have produced cardiac effects in humans, animal studies have shown that inhalation of high vapor levels of the components of this product have produced cardiac sensitization. Such sensitization may cause fatal changes in heart rhythms. This latter effect was shown to be enhanced by hypoxia or the injection of adrenaline-like agents.

Effects of propylene Laboratory animals exposed to high levels of propylene for prolonged periods of time showed evidence of effects in the liver, kidneys, and nasal cavity.

Section 4: Emergency and First Aid Procedures

Purpose Follow these procedures in case of personal injuries resulting from use of this product.

Eye contact with liquid Flush eyes with water. Get medical attention.

Skin contact with liquid Flush with water. If frostbite or burn occurs, get medical attention.

Inhalation Remove victim to fresh air and provide oxygen if breathing is difficult.

Seek immediate medical attention if victim is not breathing. Give artificial respiration.

Ingestion Not applicable to this product.

Section 5: Physical Data

Physical properties Refer to this table for the physical properties of this product.

Property	Value
Appearance and odor	Colorless gas, liquid under pressure. Mercaptan “rotten cabbage” odor
Boiling point	-44 degrees F.
Evaporation rate (Butyl Acetate = 1)	<1 (diffuses readily)
Flash point	-156 degrees F.
Liquid to vapor expansion ratio	1:270
Molecular weight	44.096
Solubility in water	Slight
Specific gravity (liquid)	0.500 - 0.510 (Water = 1)
Specific gravity (vapor)	1.52 (Air = 1)
Vapor pressure (maximum)	208 PSIG @ 100 degrees F.

Section 6: Fire and Explosion Hazards

Flammability limits Flammability limits by volume in air.

- Lower 2.15 percent
- Upper 9.6 percent

Ignition temperature Auto Ignition temperature is 940 degrees, F.

Extinguishing media Allow product to burn if source cannot be shut off safely.

- Class B-C or A-B-C dry chemical or halon extinguishers can be used on small fires.
- Apply water from a safe distance to cool containers, surrounding equipment, and structures.

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Continued on next page

Section 6: Fire and Explosion Hazards, Continued

Special fire fighting procedures and precautions

Extremely flammable. Containers may explode if not sufficiently cooled with water spray.

Evacuate surrounding area of unprotected personnel and isolate. Do not enter confined fire space without full bunker gear (helmet with face shield, bunker coats, gloves, and rubber boots) and a positive pressure NIOSH approved self-contained breathing apparatus.

Section 7: Reactivity

Stability and hazardous polymerization

This product is stable. Hazardous polymerization will not occur.

Conditions and materials to avoid

Avoid heat, sparks, flame and contact with strong oxidizing agents. Avoid buildups of static electricity.

- Prevent vapor accumulation.

Hazardous decomposition products

Carbon monoxide and unidentified organic products may be formed during combustion.

Section 8: Employee Protection

Respiratory protection

Use a NIOSH approved respirator as required when airborn exposure limits are exceeded.

- In accord with 29 CFR 1910.134, use either an atmosphere supplying respirator or an air purifying respirator for organic vapors.

Protective clothing

Avoid liquid contact with eyes or skin.

- Wear safety glasses or goggles as appropriate.
- Wear protective clothing as appropriate.

Additional protective measures

Use explosion-proof ventilation as required to control vapor concentrations.

Section 9: Precautions For Safe Handling and Use

Release, spill or leak procedures

Warning! Extremely flammable.

- Eliminate sources of ignition.
- Isolate hazard area and deny entry to unnecessary or unprotected personnel.
- Stay upwind and keep out of low areas.
- Notify local fire department.
- Disperse vapor clouds with water spray.
- Shut off source of leak only if it can be done safely.

Continued on next page

Section 9: Precautions For Safe Handling and Use, Continued

Training

Train all personnel involved in handling propane in proper handling and operating procedures.

- Document all training.

Handling and storing

Handle and store propane in accordance with NFPA 58 and local fire codes.

- Keep containers away from heat sources or temperatures exceeding 130 degrees F.
- Do not drop or roll any container.
- Store and transport containers with relief valves in vapor space.
- Keep all container valves closed when not in use.
- Keep protective caps (if applicable) on containers when not in use.

DOT cylinders

Take these precautions when using DOT cylinders.

- Periodically inspect and requalify DOT cylinders in accordance with DOT and NFPA 58 codes and Compressed Gas Association Pamphlets C-6 and C-6a.
- Store and use cylinders with valves off and the relief valves in the container vapor space.
- Shut all valves and follow recommended procedures before exchanging cylinders.

Special precautions

Containers, even those that have been emptied, can contain explosive vapors.

- Do not cut, drill, grind, weld or perform similar operations on or near containers.

Propane odorization

Warning! Any smell of odorant, even a faint one, may indicate a dangerous situation.

Ethyl mercaptan is the preferred warning agent for propane. Although ethyl mercaptan has excellent warning properties, "It is recognized that no odorant will be completely effective as a warning agent in every circumstance" (NFPA 58 A-1-4.1, 1992 edition).

Instances in which odorants may lose their effectiveness include, but are not limited to:

- Odor may fade due to chemical oxidation in improperly prepared new tanks and cylinders or from rust, air, and water in used containers that have been allowed to stand open to the atmosphere.
- Odor may be absorbed and adsorbed by the walls of containers and distribution systems.
- Odor in the gas escaping from underground leaks may be absorbed by certain types of soils.
- Effectiveness of the odorant may be reduced by cold temperatures.
- Other odors, such as from cooking or from a musty basement, may mask or cover up the mercaptan odor in propane.
- Exposure to the mercaptan odor of propane for extended periods of time may affect a person's ability to detect the odorant.
- Physical disabilities or the use of alcohol, tobacco, or drugs may decrease a person's ability to detect the odorant.

Section 10: Transportation Requirements

DOT shipping name

Liquefied Petroleum Gas

DOT classification

Division 2.1 (Flammable Gas)

Other transportation requirements

UN 1075, Hazardous Materials Guide Number 115.

North American Industrial Classification System (NAICS) Number 454312

Section 11: Other Regulatory Controls

EPA/TSCA

The components of this product are listed on the EPA/TSCA inventory of chemical substances.

EPA Hazard Classification

This product is classified by 40 CFR 372 (SARA Section 313) as:

Acute Hazard	Chronic Hazard	Fire Hazard	Pressure Hazard	Reactive Hazard
XXX		XXX	XXX	

Ozone depleting substances

This product does not contain, nor was it directly manufactured with, any class I or class II ozone depleting substances.

RCRA Information

This product is not subject to 40CFR 268.30 ban on the disposal of hazardous wastes.

If this product becomes a waste material, it would be an ignitable hazardous waste, having a waste code number D0001. Refer to latest EPA or state regulations regarding proper disposal. Under EPA-RCRA, containers are considered hazardous unless depressurized to a pressure approaching atmospheric. Depressurize containers at a controlled rate to a flare.

State regulatory information

The ingredients in this product are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements.

- Contact the appropriate agency in your state for details on your regulatory requirements.

California Proposition 65 warning

Chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm are created by the combustion of propane.

Section 12: Supplemental Information

Disclaimer of liability

The information in this MSDS was obtained from sources which we believe are reliable. **However, the information is provided without any warranty, express or implied, regarding its correctness.**

The conditions or methods of handling, storage, use and disposal of this product are beyond our control and may be beyond our knowledge. **For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage, or expense arising out of or in any way connected with the handling, storage, use, or disposal of this product.**

Issue information

This MSDS supersedes all previous editions.

- Issued July, 2008
- Issued by: Scott Fenimore, Manager of Safety
  Ferrellgas
  One Liberty Plaza
  Liberty, MO 64068

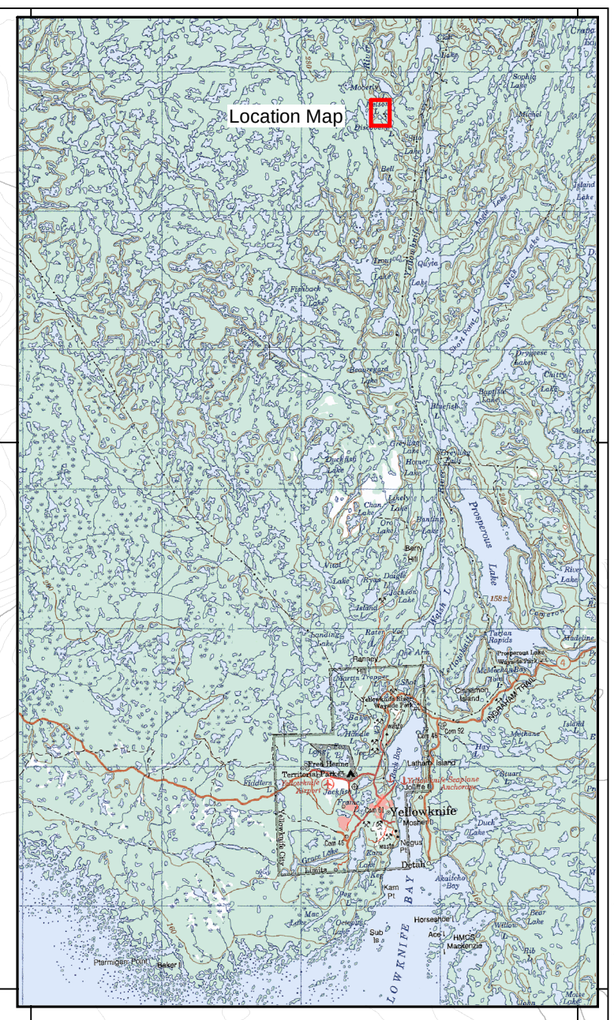
635,600 mE

636,000 mE

6,977,400 mN

6,977,000 mN

0 100 meters



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SNP-02

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SNP-01

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SNP-10

SNP-11

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Legend

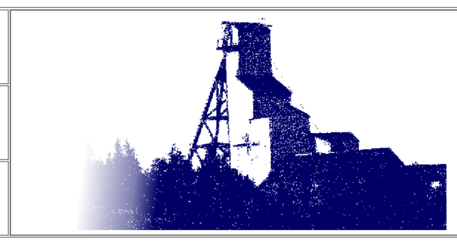
- Water_Lines
- Water_Lines
- 1 m Contours
- 10 m Contours
- RoadA
- WaterCourse
- WaterBody
- Ore_Storage
- Mill_Site
- LandFarm
- Waste2016
- Water_Tank
- SpillKit
- Shops
- Esker
- Camp_Trailers
- Camp_Trailers
- ANFO
- Active_Mineral_Leases_trans
- Tails245
- Tails238
- Historic Tailings
- Fuel_Storage
- Mineral Claims

Site Plan
Waste Management Plan

Date: January 2021

Author: DRW

Office: Vancouver, B.C.



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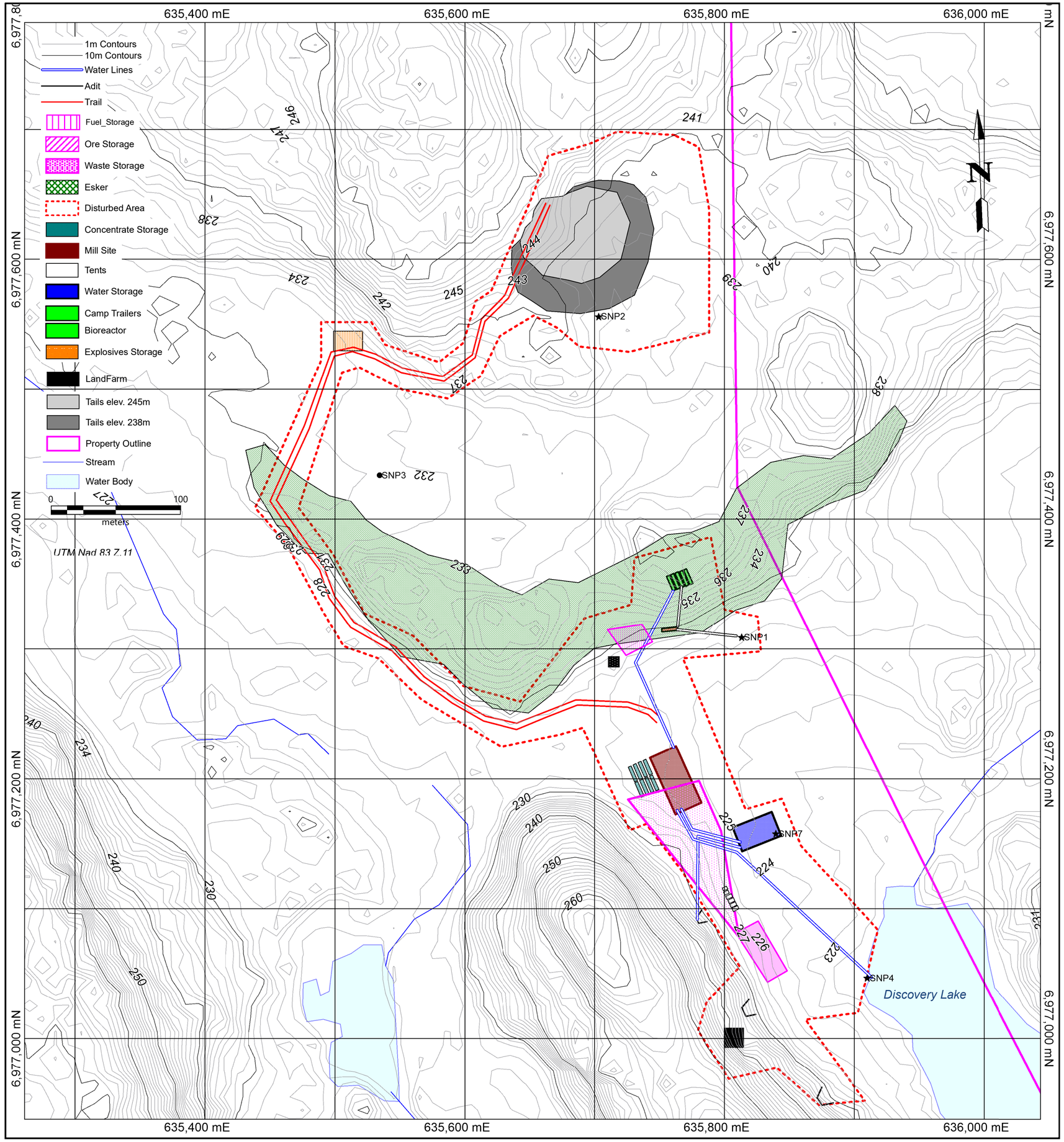
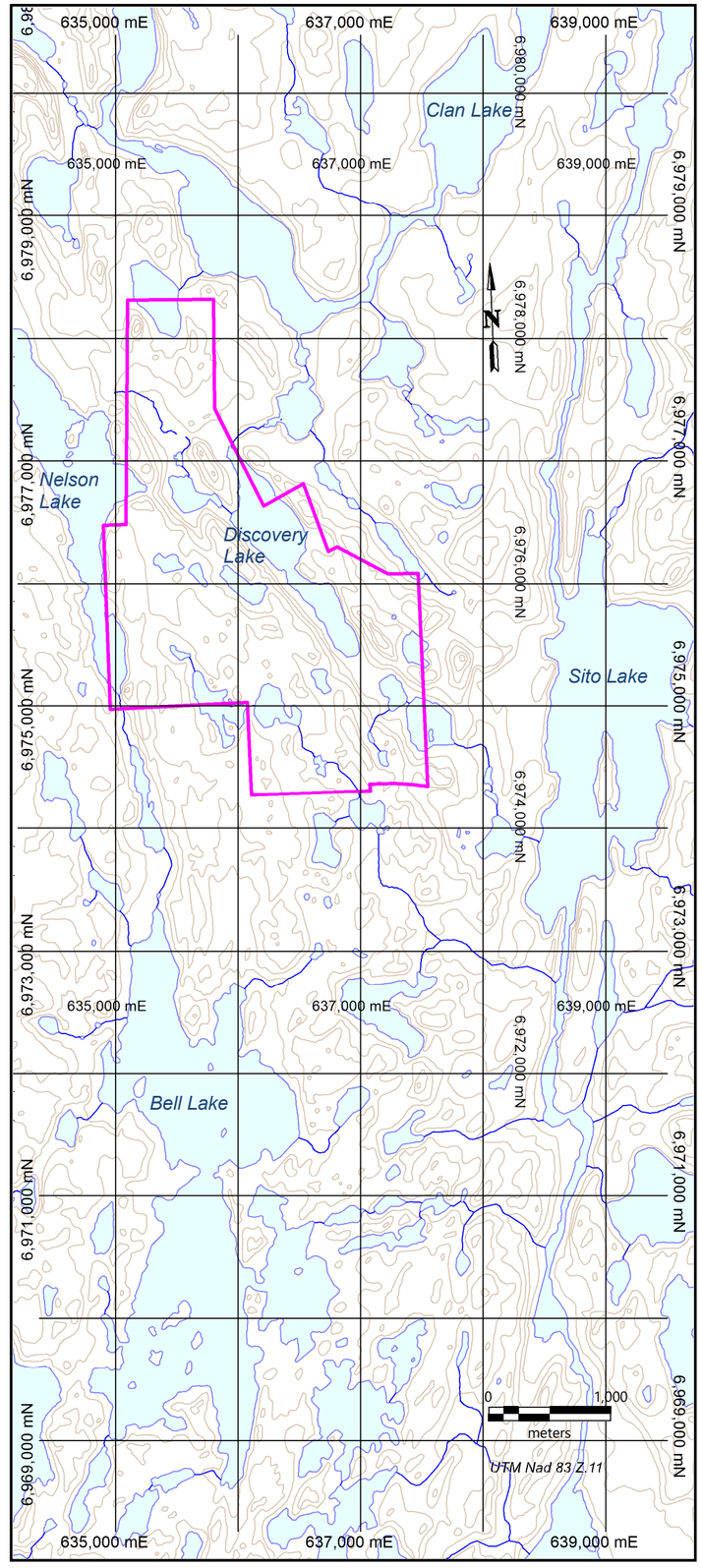
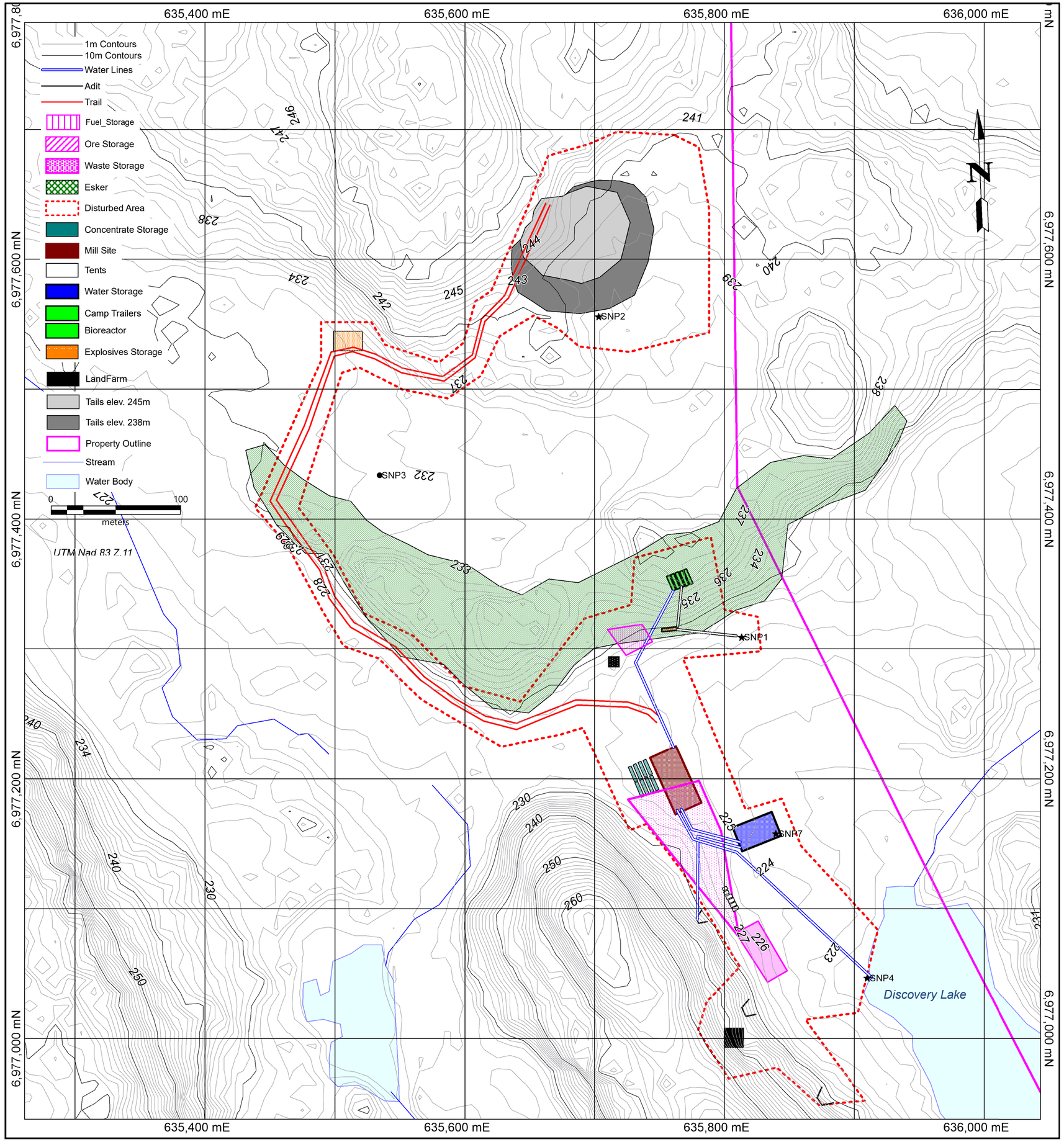
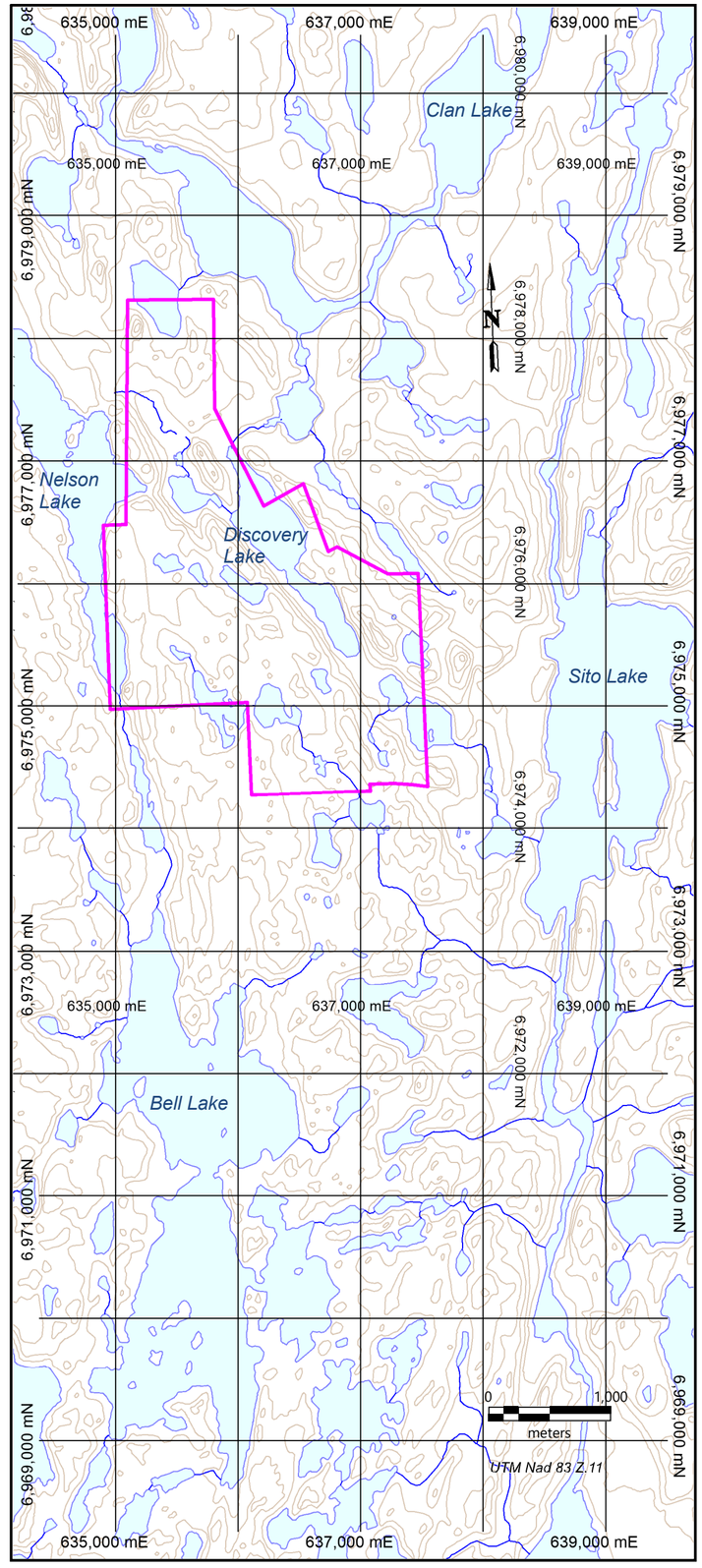
Projection: UTM Nad 83, Zone 11





New Discovery Mines Ltd.
Mon Property Mine/Camp Hazardous Wate
October, 2020





New Discovery Mines Ltd.
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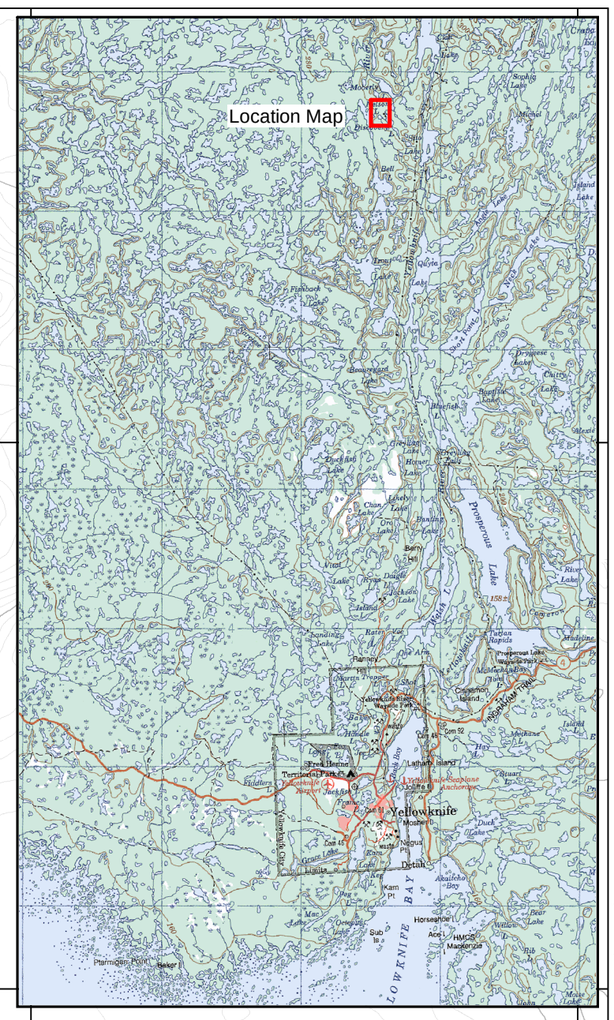
635,600 mE

636,000 mE

6,977,400 mN

6,977,000 mN

0 100 meters



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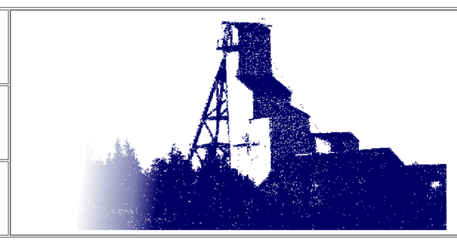
Office: Vancouver, B.C.



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