

**Yukon Mineral and Coal Exploration
Best Management Practices and Regulatory Guide**

August 2010



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Inside Front Cover

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Disclaimer

The Yukon Chamber of Mines has developed this Guide to provide:

- A framework to help the user determine which regulatory permits and licences are required to conduct activities associated with mineral and coal exploration, and
- Accepted Best Management Practices for mineral and coal exploration activities.

This Guide is provided for information purposes only. While every effort has been made to ensure the accuracy and completeness of the information in the Guide, the Yukon Chamber of Mines does not guarantee the accuracy, completeness or currency of the information provided, and the Guide is provided on that basis. The Guide is not an attempt to provide legal, accounting or other professional advice. Any users of the Guide should review applicable legislative sources, contact appropriate governmental agencies, and seek their own professional advice to ensure accurate, complete and current information.

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The Yukon Mineral and Coal Exploration Best Management Practices and Regulatory Guide (“The Guide”) is intended as a practical overview oriented toward exploration activities undertaken by individuals and companies exploring for minerals or coal (“explorationists”) on all lands in Yukon. The Guide provides information on:

- The regulatory framework and permits, approvals, licences or authorizations under which mineral or coal exploration activities (“exploration”) are managed and regulated in Yukon on most classes of land, and
- A practical approach to implementing Best Management Practices (BMP) when planning and conducting exploration, from grass roots through to advanced stage projects.

The Guide does not attempt to outline the details of application for every permit or licence required in Yukon as there are already a number of documents produced by government that provide that guidance. Similarly, the environmental and socio-economic assessment of a given project and its relation to the regulatory process is well explained in existing documents. The intention in preparing the regulatory framework portions of the Guide is to provide an overview of the process of regulation and assessment, and then to direct the user to the relevant approvals for a given activity on a given class of land. Contact information and links to government documents on how to proceed through the application and environmental assessment processes are provided in the Guide. At the time of publication, all links and references were current. However, links to websites and documents may change and require that you go to the root directory.

The use of Best Management Practices refers to a range of practices and good housekeeping habits designed to reduce the potential impact of exploration activities on the environment. The intent of the Guide is to provide a range of planning tools and practices that pertain specifically to the regulatory and environmental conditions when working in Yukon. BMP are not compliance standards, but guidance on suggested practices that, if incorporated into an exploration program, will help to ensure that an operators activities are planned and carried out in compliance with the various legislation, regulations, and policies that apply to the activity. Nonetheless, the onus remains on each operator to fully plan their activities and to consult with government agencies in order to guarantee regulatory compliance of their specific situation and activities.

The list of Best Management Practices provided in this guide should not be considered exhaustive or restrictive. Doubtless some recognized BMP have been omitted through oversight and new or improved ones will likely become accepted over the years. Similarly the regulatory and environmental assessment framework of Yukon will continue to evolve. As a result the Chamber considers this Guide to be a “living” document to be updated and improved over time and with experience. The Chamber plans to review and revise the document from time to time as circumstances warrant. Initially the Guide will be revised after use during two field seasons or within three years. Beyond that, the Chamber hopes to be able to revise the Guide at least every five years. All of these revisions would be contingent on suitable funding being secured by the Chamber.

Extensive references and resources are included for operators to refer to and review when selecting BMP to meet their specific project requirements.

Throughout the Guide there are summaries of pertinent legislation, permit thresholds and comments on the application of the legislation. These are not the result of comprehensive legal analysis by a team of legal experts but a synopsis of the pertinent highlights in the opinion of a team of experienced geologists and explorationists. The Guide should not be relied on as a substitute for first hand study of the legislation and, when needed, competent legal advice.

2.0 How To Use The Best Management Practices and Regulatory Guide

The Guide has four parts, plus appendices. Each part of the Guide is designed as a stand-alone document to provide information and references on the following:

- Regulatory requirements
- Project planning
- Best Management Practices for exploration activities, and the
- Permit application process

Part 1 – Legal and Regulatory

The Legal and Regulatory part provides an overview of the legislation that directly applies to exploration, from grass roots projects to advanced exploration activities in Yukon. The purpose, key provisions, responsible government agency and contact information is provided for each *Act*. This part is intended to provide an overview only. More detailed information on each of these *Acts* and related regulations can be obtained by following the links provided in Appendix IIX: References and Resources.

Part 2 – Project Planning

The purpose of Part 2 is to provide information to help plan an exploration project in Yukon. It presents an overview of project management, community engagement and environmental baseline studies for more advanced projects. This part also deals with the question of when one should start baseline studies during an exploration project.

Part 3 – Best Management Practices for Mineral and Coal Exploration Activities

Part 3 presents Best Management Practices (BMP) for exploration activities that range from grassroots regional prospecting and claim staking through to advanced stage exploration. Under each activity, the appropriate provisions of the applicable regulations, along with the activity intensity thresholds between various approvals or permits are included as a quick reference to help determine the type of land use approval that will be required by the operator prior to starting the work.

For each exploration activity the following information is provided:

- *General*: overview of the activity, where possible given in lay terms intended for a general audience and to give some context to many of the technical terms in the BMP sections.
- *Legislation*: a discussion of the required permits, approvals or licences for the particular activity on various types of land that might be encountered, and the thresholds between classes of approval.
- *Potential Effects*: a summary of the potential environmental and socio-economic effects that are commonly encountered in relation to the activity.
- *Best Management Practices*: a range of practices designed specifically to minimize or prevent potential adverse environmental and socio-economic effects that may result from that particular activity.
- *References*: a list of links for additional regulatory or best practice information is provided at the end of each section.

2.0 How To Use The Best Management Practices and Regulatory Guide

Part 4 – Exploration Land Use Approval Process

Part 4 deals with the question: “Now that I understand what permits and approvals I likely require, how do I go about obtaining them?” This section provides an overview of the interaction between the environmental and socio-economic assessment and regulatory approval processes. Links are provided to existing documents that explain the application process in detail and give some tips on how to optimize the efficiency of moving a project through the assessment and approval processes.

Appendices

The appendices contain tables outlining permit requirements and regulatory thresholds, and a comprehensive contact list for government agencies and First Nations. Also included in the appendices is information on permafrost, fish and wildlife, spill contingency planning, archaeological and historic sites, and check lists to help plan for exploration activities.

3.1 Overview

The Yukon Government has wide-ranging authority to regulate mineral exploration activities. The main pieces of legislation that govern the management of mining and mineral exploration activities in Yukon include:

- *Quartz Mining Act*
- *Waters Act*
- *Territorial Lands (Yukon) Act*
- *Environment Act*
- *Occupational Health and Safety Act*
- *Historic Resources Act*

In addition, there is other legislation that may apply, particularly to exploration programs with larger established camps or more advanced exploration work such as underground programs.

- *Public Health and Safety Act*
- *Electrical Protection Act*
- *Gas Burning Devices Act*
- *Building Standards Act*

Some key legislation and regulatory authority remains with the federal government including:

- *Fisheries Act*
- *Surface Rights Board Act*
- *The Yukon Environmental and Socio-economic Assessment Act*

The latter legislation, while federal, creates an independent board responsible for carrying out most environmental and socio-economic assessments in Yukon. It is important to remember that virtually any authorization issued by any level of government in Yukon triggers a requirement for an assessment by the Yukon Environmental and Socio-economic Assessment Board or its designated offices.

The specific legal requirements to conduct the various exploration activities are listed in Sections 3.4 through 3.13 under each applicable heading, and gives a brief overview of each *Act* as it relates to exploration activities in Yukon.

3.0 Legal Framework Governing Exploration Activities

3.2 Yukon First Nations Land Claims Agreements and Settlement Land

Fourteen First Nations have traditional use and occupancy areas that include parts of Yukon. These areas are known as Traditional Territories and are shown in Figure 3.1. Traditional Territories may overlap so that a particular exploration project may be within more than one First Nation Traditional Territory. Maps showing detailed Traditional Territorial boundaries are widely available from Yukon Government agencies and Mining Recorders and these maps should be consulted at the outset of any program.

Eleven of Yukon's fourteen First Nations, have settled land claims and ratified a Final Agreement between the First Nation, Canada and Yukon (see Figure 3.1). These First Nations are self-governing as defined in their Final Agreements. The Final Agreements also define lands within Traditional Territories over which the First Nation has ownership and control. There are three categories of lands; Category A; Category B and "site specific" Settlement Lands, which are most important to explorationists. On Category A Settlement Lands the First Nation owns both the surface and subsurface rights. On Category B Settlement Lands the First Nation controls the surface of the land but control of the subsurface remains with Yukon. There are also many smaller "site specific" Settlement Lands that reflect long standing use by specific First Nation citizens or families. All Category A and B Settlement Lands and site specific locations are shown on claim maps maintained by the Mining Recorders, and as noted in section 3.3, available in various digital formats. The three First Nations that have not yet ratified a Final Agreement have identified provisional land selections that have been withdrawn from staking by Order in Council.

Before beginning early-stage prospecting and claim staking, the status of the land can be determined by checking with the Mining Recorder. Category A Settlement Land cannot be staked and should not be entered without permission of the First Nation. On Category B Settlement Lands Final Agreements define certain limited rights of passage and staking can be carried out per the *Quartz Mining Act*. Terms and conditions for staking and exploration on Category B Settlement Lands vary between First Nations, according to the respective land claim agreement. An Interpretative Bulletin (2009-03)¹ is available from Energy Mines and Resources (EMR) detailing the administration of mineral rights on Settlement Land. Before exploring on Category A or B Settlement Land, contact and arrangements should, and in some cases, must be made directly with the First Nation land owners.

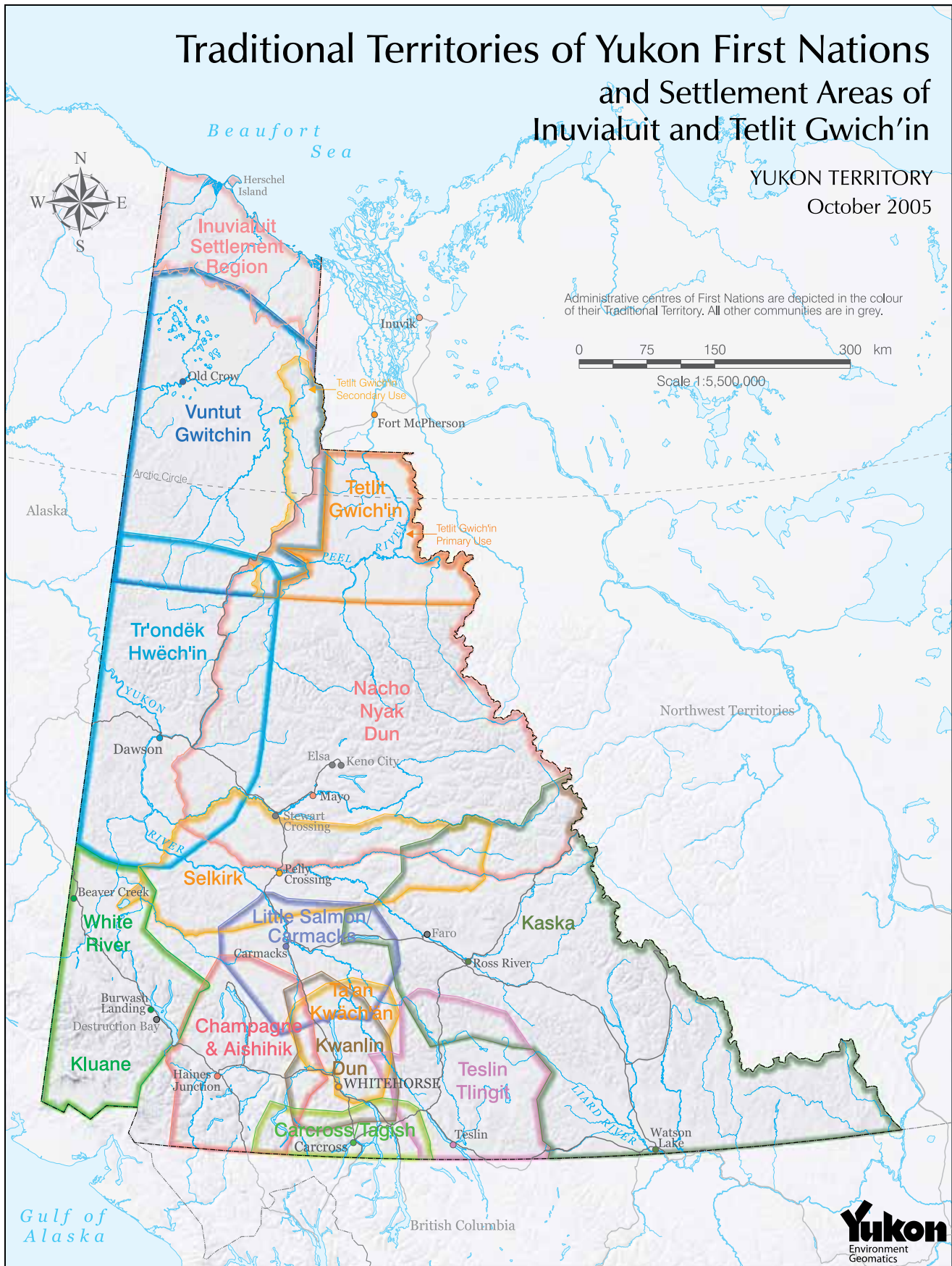
As noted above, First Nations with Final Agreements are self governing. When working in a First Nations Traditional Territory it is important to check if there are First Nation protocols and laws in place that govern activities in addition to Yukon and federal laws. This is particularly important if working on Settlement Lands.

The Council of Yukon First Nations Whitehorse office is a good starting point for further information on Settlement Lands. Contacts for individual First Nations are provided in Appendix VIII.

Council of Yukon First Nations (CYFN)
2166 - 2nd Avenue
Whitehorse, Yukon
Y1A 4P1
Phone: 867-393-9200
Fax: 867-668-6577
Email: reception@cyfn.net
Website: <http://www.cyfn.ca/home>

¹ For a copy of *Interpretative Bulletin 2009-03 Administration of Mineral Claims in the Traditional Territory of First Nations with Final Agreements*, see http://www.emr.gov.yk.ca/mining/pdf/ib_2009_03_settlement_lands.pdf

3.0 Legal Framework Governing Exploration Activities



Department of Environment Map ID: GIS2003-047-02

© 2004 Environment Yukon

Figure 3.1 Traditional Territories of Yukon First Nations and Settlement Areas of Inuvialuit and Tetlit Gwich'in
(Source Yukon Environment Geomatics, 2005)

3.3 Land in Yukon other than Settlement Land

Most land in Yukon is public land vested in the Crown. As of devolution on April 1 2003, administration and control of most of these lands has been ceded to the Commissioner of Yukon. The Commissioner (with the consent of the Executive Council, i.e. Yukon Government), controls the disposition and use of this land. These lands are referred to as “Territorial Lands” (other names are used in various documents and legislation including “Commissioner’s Land” and “Yukon Land” but “Territorial Land” is used in the Guide as it is used in the *Quartz Mining Act* and other key resource legislation). Much of the Territorial Land is vacant, but by no means all of it. The First Nation lands described above are not Territorial Lands. On Territorial Land, Yukon government legislation described below controls the use and disposition of land.

Some public lands remain in the control of the federal government. Examples of such areas include National Parks and other conservation areas, post offices, and RCMP detachments.

Around the major communities variably sized parcels of land have been given an additional layer of municipal authority, but remain Territorial Land. In these areas Yukon government legislation such as the *Quartz Mining Act* apply but there may be additional municipal bylaws and zoning requirements. This Guide does not deal with each municipal area individually, but users should become familiar with applicable requirements before commencing work within a municipality.

Privately owned land, other than Settlement Land, is widespread in Yukon but does not constitute a large percentage of the land base. These parcels include many residential lots in and around communities. Most privately owned land in Yukon does not include the sub-surface rights. Mineral rights remain under the administration of the Commissioner and the *Quartz Mining Act* applies. The curtilage of a residence (the regularly used and occupied portion of land around a residence) is excluded from a claim but currently the remainder of the land can be included in a claim. In this case the Mining Recorder will require financial security to cover the cost of potential damage caused by the work of the claim holder. Check with the Mining Recorder in such situations. Never enter private lands without permission of the owner. Be aware of some restrictions to exploration activities that may apply near residences, whether privately owned or not.

A relatively minor portion of privately owned land but potentially important to explorationists, are Crown Grants usually found in historic mining areas. Crown Grants may include both the surface and sub-surface rights but the specifics may vary by parcel according to the grant document. Crown Grants are outside the jurisdiction of much Yukon Government land and resources legislation but other Yukon laws such as environmental and work place health and safety certainly apply. Activities on Crown Grants may also be subject to environmental assessment under Yukon Environmental Socio-economic Assessment Act. Many Crown Grants are in municipalities and municipal bylaws and zoning requirements apply to them. Acquisition of and exploration on Crown Grants is a special case requiring careful due diligence and is outside the scope of this Guide.

On a considerable part of Territorial Lands some rights are leased by Yukon to individuals or other entities for various purposes such as agriculture, grazing and residential uses. Large parts of Yukon are defined where specific activities such as outfitting, trapping or timber harvesting are reserved by concession to specific individuals or other entities. On leased land the *Quartz Mining Act* applies (although the land is not vacant, the Commissioner still controls the subsurface) but one must respect the surface rights of the leaseholder and should proceed with care and diligence as each case may be different. To acquire mineral rights or work on lands where the surface rights are held by another party, it may be necessary to deposit security with the Mining Recorder. The “concessions” noted above are available for staking and exploration unless otherwise alienated, but as discussed in Part 3 of the Guide one needs to proceed with care and awareness of other users interests and rights.

3.0 Legal Framework Governing Exploration Activities

Most important to explorationists are lands staked under the *Quartz Mining Act* and held either by right of entry or by lease. Quartz claims convey the mineral rights and limited surface rights for the purposes of mining. As discussed in detail below, land use is regulated by the Quartz Mining Land Use Regulation and Part II of the *Quartz Mining Act*. During exploration it may be necessary to cross the claims of another unrelated claim holder, for example for an access road. In such cases this “third party” activity is not regulated by the Quartz Mining Land Use Regulation of the *Quartz Mining Act* but the Land Use Regulation under the *Territorial Lands (Yukon) Act*.

In coal exploration, lands may be held as exploration licences, permits or leases under the Coal Regulation of the *Territorial Lands (Yukon) Act*. On coal leases, surface rights are very limited and land use on coal leases and exploration licences is regulated by the Land Use Regulation of the *Territorial Lands (Yukon) Act*.

Lastly there are a number of parks, special management areas, wildlife refuges and other conservation areas in Yukon which are generally off limits to exploration and staking. If unsure, check with the relevant First Nation and government department first.

All lands pertinent to exploration are shown on an excellent set of claim maps maintained by the Mining Recorder’s Offices. The maps are available on-line as a spatial database “map viewer”, as PDF files or paper maps are also available. GIS files of most lands described above are available from Yukon at websites of the Mining Recorder, Geomatics Yukon, EMR lands or the Yukon Environment department. GIS files showing cadastral plots are also available at Natural Resources Canada website. Most of the Yukon or federal cadastral data are compiled on the claim maps available from the Mining Recorders.

In the case of a dispute between the surface and sub-surface right holders, disputes over financial security required by Mining Recorders or in the case of disputes over access across lands it may be necessary to apply to the Surface Rights Board for resolution. This process is detailed in the *Yukon Surface Rights Board Act* and the *Quartz Mining Act*.

3.4 Quartz Mining Act

Purpose

The purpose of the *Quartz Mining Act* is to regulate hard rock exploration and mining-related activities in Yukon. This two-part *Act* provides a management framework to encourage exploration and development of mineral resources in Yukon.

Key Provisions

Part One of the *Act* addresses the management of mineral rights, such as requirements for securing and maintaining mining claims, inspections and enforcement. Part One of the *Act* provides for two types of claims, “Quartz” claims for most minerals and “Iron and Mica” claims for those specific commodities. Iron and Mica claims are larger than Quartz claims and are to be oriented north south, unlike Quartz claims which may be at any orientation. Before acquiring Iron and Mica claims discuss your plans with the Mining Recorder as Quartz claims may be more appropriate to secure rights to associated minor commodities that might be of more economic interest today than iron or mica itself.

After a certain dollar amount of work has been completed and a mineral discovery has been made, a legal survey completed and other requirements of the *Act* satisfied a claim may be leased for a 21 year period with renewal as needed. The lease is held for 21 years for one \$200 payment and annual

3.0 Legal Framework Governing Exploration Activities

representation work is no longer required. Work done on the lease cannot be filed on nearby un-leased claims (also known as claims held “by entry”). Both claims held by lease or by entry are commonly referred to as quartz grants in other legislation.

Quartz claims carry limited surface rights required for the purposes of mining. Iron and Mica claims do not carry any surface rights. A claim holder has exclusive rights to prospect for minerals on the claim. The non-exclusive surface right allows others to cross the claim to access their own work areas but not to carry out exploration work on the claim. This situation leads to the possibility of limited types of land use such as road building or winter trail use on a claim that is not owned by the operator; in this Guide this is referred to as work on a “third party claim”. The surface rights also allow timber to be harvested for mining use on the claim and gravel extraction for mining purposes but one should consult Yukon government that the intended use is appropriate and no other user has prior or conflicting rights.

Part Two of the *Act* addresses land use and reclamation for mineral exploration activities, outlining specific requirements for different classes of activities in detail. The *Act* defines four classes of activities. A detailed table of the requirements and thresholds for these activities is found in Appendix I and II. Importantly, this statute provides secure access to sub-surface mineral rights in non-First Nations settlement lands through the issuing of a Mining Land Use Authorization.

Class 1 Activities

Activities within a Class 1 program are defined as “grassroots” exploration. Activities and reclamation are to be completed within 12 months of commencement of work. All activities by the same operator within a 20 km radius are considered in determining if the work falls into Class 1. A Class 1 program does not require government approval. The operator must comply with the Operating Conditions outlined in the Mining Land Use Regulation (Schedule 1)². An assessment under the *Yukon Environmental and Socio-economic Assessment Act (YESAA)* is not required for a Class 1 program.

Class 2 Activities

Class 2 exploration programs represent the upper level of “grassroots” exploration activities. A Notification Form, which outlines the activities and how they will be reclaimed, is required to be completed and submitted through the Mining Lands Office for their review and approval, prior to undertaking any activities. Class 2 programs also require that an assessment be completed under the *Yukon Environmental Socio-economic Assessment Act (YESAA)* (refer to Section 3.9 for more information on YESAA and assessment requirements). All exploration activities and reclamation work must be completed within one year of commencing work.

Class 3 and 4 Activities

Class 3 and Class 4 exploration programs require a detailed Operating Plan be completed and submitted to the Mining Lands Office for their review and approval. A YESAA assessment is also required to be completed for Class 3 and 4 activities (refer to Section 3.9 for more information on YESAA and assessment requirements). The Operating Plan must be approved before proceeding with any exploration activities. Operating Plans may cover multi-year exploration programs to allow greater flexibility for the operator. Class 4 programs are those projects where there is significant public concern and as a result there is a requirement for public consultation.

² For a copy of the Mining Land Use Regulation see http://www.gov.yk.ca/legislation/regs/oic2003_064.pdf.

3.0 Legal Framework Governing Exploration Activities

Responsible Agency

The Energy, Mines and Resources Client Services and Mining Inspections branch of the Yukon Government has established several offices in Yukon communities. The Whitehorse office is a good starting point for further information.

Whitehorse Mining Inspections Office
300 Main Street, Suite 325
Elijah Smith Building
PO Box 2703 (K-325)
Whitehorse, Yukon
Y1A 2C6
Phone: 867-456-3882
Fax: 867-667-3193
Website: <http://www.emr.gov.yk.ca/csi/index.html>

3.5 Waters Act

Purpose

The purpose of the *Waters Act* is to regulate the use of water and the depositing of waste into water in Yukon. The Yukon Water Board, established by the *Act*, issues licences for the use of water or the deposit of waste. Under the *Act*, mineral exploration activities are regulated and classified according to water use and waste disposal criteria.

Key Provisions

A licence under this *Act* is required if daily direct water use exceeds 300 cubic metres for a Quartz exploration program or 100 cubic meters for other industrial projects (coal or gravel in the context of the Guide). It is important to keep in mind that a use of water may be direct (such as pumping water from a water body and using it in a process such as drilling) or indirect (such as modification of the bed or banks of a water body, diversion of a stream, impounding water or construction of a structure across a stream) in which case licencing thresholds are defined by other criteria such as stream width. A camp housing 50 or more persons is a licensable use of water. These uses and the relevant thresholds are defined in the Water Regulation, Schedule 7 for Quartz projects and Schedule 5 for industrial projects.

Waste deposit would not normally trigger a licence for preliminary exploration activities because it is generally possible to avoid either direct or indirect deposit of waste to surface water. More advanced projects may have to deal with waste water that must be discharged to water under the authority of a licence.

It is important to understand the definition of “waste” as defined in the *Waters Act*, waste includes;

“(a) any substance that, if added to water, would degrade or alter or form part of a process of degradation or alteration of, the quality of the water to an extent that is detrimental to its use by people or by any animal, fish or plant or

(b) water that contains a substance in such a quantity or concentration, or that has been so treated, processed, or changed, by heat or other means, that it would, if added to any other water, degrade or

3.0 Legal Framework Governing Exploration Activities

alter, or form part of a process of degradation or alteration of, the quality of that water to the extent described in paragraph (a)”³.

This includes the deposit of any water that has been treated, processed, or changed by heat or other means that is added to other water that would degrade or alter quality of water that would adversely affect human, plant or animals.

Under the *Waters Act*, the deposit of waste includes not only deposit directly into water but also deposit of a waste in a place and under conditions, where waste derived from that deposit may enter water. A situation such as drill cuttings or trench spoils placed too close to a water body, could apply.

Exploration programs that use water are required to submit a “Notice of Water Use / Waste Deposit Without Licence”⁴. This provision applies only to quartz and industrial projects in an exploration context. A camp use is a municipal use of water and notice is not required if the water use of an exploration program only involves a camp with less than 50 persons occupancy. An important proviso in the use of water without a licence for any purpose is that the use has “no potential for significant adverse environmental effects” and the use would “not interfere with existing rights of other water users or waste depositors”. This determination would normally be made by an Inspector.

Water Licences may be either Type B for more minor applications or Type A for more significant proposals such as a mine development. The Licence types differ in process and approval details and, of course, time for approval, Type A being significantly longer. It is unlikely that even larger and more advanced exploration projects could fall into a Type A classification however significant public interest could elevate a Type B application to be treated as if it were a Type A involving a Public Hearing by the Water Board.

Responsible Agency

Yukon Water Board
Suite 106
419 Range Road
Whitehorse, Yukon
Y1A 3V1
Phone: 867-456-3980
Fax: 867-456-3890
Email: ywb@yukonwaterboard.ca
Website: <http://www.yukonwaterboard.ca/>

Additionally, Water Resources also provides client support services:

Government of Yukon, Environment Yukon, Water Resources
Box 2703 (V-310)
Whitehorse, Yukon
Y1A 2C6
Phone: 867-667-3171
Toll free (in Yukon): 1-800-661-0408 local 3171
Fax: 867-667-3195
Email: water.resources@gov.yk.ca
Website: <http://www.environmentyukon.gov.yk.ca/monitoringenvironment/aboutwaterresources.php>

³ *Waters Act, 2003* <http://www.gov.yk.ca/legislation/acts/waters.pdf>

⁴ A copy of the form can be found at <http://www.yukonwaterboard.ca/forms/schedule3.pdf>.

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3.6 Territorial Lands (Yukon) Act

Purpose

These two pieces of legislation deal with land and land use in Yukon. The *Territorial Lands (Yukon) Act* is “mirror legislation” that came into effect at devolution and replaced the old federal *Territorial Lands Act (Canada)* in effect before devolution when most land and land use was under federal control. The *Lands Act* predates devolution and, at that time, dealt with a small amount of land that had been transferred to control of the Commissioner. After devolution there appears to be two *Acts* that both deal with land in control of the Commissioner. In areas of most interest to explorationists the *Lands Act* defers, by Orders in Council like 2003/77 and 2003/151, to the *Territorial Lands (Yukon) Act* which will be the focus of the remaining discussion. Both of these *acts* contain a provision that prevents them or their regulations from interfering with the operation of the *Quartz Mining Act*.

The *Territorial Lands (Yukon) Act* legislates the disposition of Territorial Lands in Yukon, including sales, leases, and grants of rights-of-way or easements⁵. This *Act* grants the Commissioner in Executive Council the right to make regulations in regard to leasing mining rights in, under or on territorial lands, royalty payments and the regulations to protect and provide compensation to surface rights holders (where not already provided for in the *Quartz Mining Act*, i.e. to deal with coal or quarries). For mining related activities, this statute is also applicable to surface leases to secure exclusive tenure to surface rights on claims. Most importantly for explorationists searching for minerals the *Act* applies to any works located outside of a mineral claim, such as an access road, or any third party activity on mineral claims not owned by the operator.

Key Provisions

The Land Use Regulation, under the *Territorial Lands (Yukon) Act*, defines the types of activities and works requiring a land use permit (Class A or Class B) on Territorial Lands. As discussed below there are many minor land use activities, particularly those related to prospecting and locating a claim, that are below the threshold requiring a land use permit. The Land Use Regulation is applicable only to mining-related activities, such as the construction of access roads, outside of the quartz claim boundary or to work on third party quartz claims. Land use activities within a quartz claim boundary by the owner or authorized operator are regulated under the *Quartz Mining Act*.

Coal exploration and mining is regulated through the Coal Regulation under the *Territorial Lands (Yukon) Act*. Exploration land use activity on those lands is regulated by the Land Use Regulation.

The Territorial Quarry Regulation under the *Territorial Lands (Yukon) Act* governed the access to and extraction of various materials such as gravel, granite, limestone and marl but appear to have been replaced by the Quarry Regulation under the *Lands Act*. An explorationist may become involved with quarrying and the Quarry Regulation in order to access materials to build works ancillary to exploration projects such as roads and airstrips. A Quarry Permit is required to extract more than a minimal amount of material. A Quarry Lease would be needed to have exclusive rights to extract material from a pit. Should quarrying be needed for the project, check with Yukon EMR for the current status of pertinent regulation.

In the case of some materials such as limestone the explorationist should consult with the Mining Recorder before acquiring ground since limestone for metallurgical purposes such as lime production has in recent years been acquired via Quartz Claims.

⁵ For detailed information about how the *Territorial Lands (Yukon) Act* is administered in the Yukon, see the official website of the *Territorial Lands Branch of the Government of Yukon* at: <http://www.emr.gov.yk.ca/lands/>.

3.0 Legal Framework Governing Exploration Activities

The Timber Regulation under the *Territorial Lands (Yukon) Act* regulates commercial timber extraction from Territorial Lands but could be relevant to explorationists should harvesting of timber be required for mining purposes on Territorial Lands. On claims the claimholder has certain rights to timber for use in mining purposes on claims under the *Quartz Mining Act*.

Responsible Agency

Government of Yukon, Department of Energy, Mines and Resources, Lands Branch
300 Main Street, Suite 320
Elijah Smith Building
Whitehorse, Yukon
Y1A 2C6
Phone: 867-667-5215
Toll free: 1-800-661-0408, ext 5215
Fax: 867-667-3214
Email: land.disposition@gov.yk.ca
Website: <http://www.emr.gov.yk.ca/lands/>

3.7 Environment Act

Purpose

The *Environment Act* is wide-ranging legislation that provides a framework for the protection of land, water and air. Under this *Act* thirteen regulations lay out specific rules for a number of activities⁶.

Key Provisions

Regulations under the *Environment Act* contain specific requirements that are particularly relevant to mineral industry activities:

- Storage Tank Regulations apply to petroleum product storage tanks with a capacity over 4,000 litres.
- Spills/Contaminated Sites Regulations provide spill reporting requirements and procedures.
- Special Waste Regulations apply to the transportation and storage at exploration sites of materials such as waste oil, fuel, antifreeze, batteries and solvents.
- Solid Waste Regulations apply to the management of garbage; and
- An Air Emissions Regulations permit is required for the burning of more than 5 kilograms of waste per day.

⁶ More information about the *Environment Act* can be found at: http://environmentyukon.gov.yk.ca/monitoringenvironment/EnvironmentActandRegulations/administering_env_act.php.

3.0 Legal Framework Governing Exploration Activities

Responsible Agency

Government of Yukon, Environmental Programs

Box 2703 (V-8)

Whitehorse, Yukon

Y1A 2C6

Phone: 867-667-5683

Toll free (in Yukon): 1-800-661-0408 local 5683

Fax: 867-393-6213

Email: envprot@gov.yk.ca

Website: http://www.environmentyukon.gov.yk.ca/branches/environmental_programs.php

3.8 Fisheries Act

Purpose

The federal *Fisheries Act* was established to manage and protect Canada's fisheries resources. It applies to all inland waters in Canada. Fisheries and Oceans Canada (DFO) maintains an active role in enforcing the *Fisheries Act* and has established a number of significant policies to guide its effort in these areas.

Key Provisions

Any activity that may impact a water body that contains fish or fish habitat could trigger a requirement for an authorization under Section 35(2) of the *Fisheries Act*⁷. Subsection 35(1) of the *Act* states that harmful alteration, disruption or destruction (HADD) of fish habitat is prohibited. This means that any unauthorized activity that results in a HADD is a contravention of Subsection 35(1) of the *Act*. Subsection 35(2) of the *Act* provides DFO with the ability to authorize a HADD. This authorization can take the form of a Letter of Advice or a formal Authorization.

DFO has published a series of Operational Statements that define activities (such as creek crossings) that can take place without triggering a requirement for an Authorization⁸.

In most cases, exploration activities do not require an Authorization from DFO as long as they do not occur near water bodies.

⁷ Copies of the regulations and user guides provided by the federal government are found at this website:
<http://www.dfo-mpo.gc.ca/acts-loi-eng.htm>

⁸ Operational Statements that apply to Yukon are found here: <http://www.dfo-mpo.gc.ca/habitat/habitat-eng.htm>

3.0 Legal Framework Governing Exploration Activities

Responsible Agency

In the event that activities are planned near water bodies, a Notification form is required to be filled out and submitted to DFO Regional Headquarters by mail or fax.

Fisheries and Oceans Canada
Manager, Oceans, Habitat and Enhancement Branch
Habitat Management Division
200 - 401 Burrard Street
Vancouver, BC
V6C 3S4
Phone: 604-666-0384
Fax: 604-666-7907
Email: DFO_EPMP@pac.dfo-mpo.gc.ca
Website: <http://www.pac.dfo-mpo.gc.ca/>

Fisheries and Oceans Canada - Whitehorse Office
100 - 419 Range Road
Whitehorse, Yukon
Y1A 3V1
Phone: 867-393-6722
Fax: 867-393-6738
Email: DFO_EPMP@pac.dfo-mpo.gc.ca
Website: <http://www.pac.dfo-mpo.gc.ca/>

3.9 Yukon Environmental and Socio-economic Assessment Act (YESAA)

Purpose

The *Yukon Environmental and Socio-economic Assessment Act* sets out a process to assess potential environmental and socio-economic effects from mineral exploration activities conducted in the Yukon⁹. On mining claims all Class 2, 3 and 4 exploration activities, as defined under the *Quartz Mining Act*, require an assessment be completed prior to a Mining Land Use Authorisation being issued by the Yukon Government Department of Energy, Mines and Resources. The majority of assessments for mineral exploration projects will be processed in one of the six community based Yukon Environmental and Socio-economic Board (YESAB) designated offices located in Dawson City, Haines Junction, Mayo, Teslin, Watson Lake and Whitehorse.

Type A and B Land Use permits under the *Territorial Lands (Yukon) Act* and Water Licences issued under the *Waters Act* also require an YESAA assessment to be completed before the permit can be issued.

Note that the YESAA process is unique in that triggers are defined by activities. The assessable activity list regulation (formally known as the Assessable Activities, Exemptions and Executive Committee Projects Regulations) has been made to closely parallel the threshold triggers. In Yukon legislation it is possible that an activity could require assessment but no approval. Activities below assessment thresholds could be elevated to require an assessment if proposed for a sensitive environment.

⁹ For detailed information go to the YESAB website at: <http://www.yesab.ca/index.html>.

3.0 Legal Framework Governing Exploration Activities

Key Provisions

In general, a YESSA assessment will look at the potential environmental and socio-economic effects from the proposed exploration activities and issue a recommendation to the government agency responsible for issuing a licence or permit, known as a Decision Body. In the case of exploration on claims or land use in general, the Yukon Government Department of Energy, Mines and Resources is the Decision Body. For water use Yukon Government Water Resources Branch is the Decision Body. The *Act* and Regulations define in detail the office completing the assessment, the process of assessment, matters to be assessed, public participation and various decision bodies and timelines applicable.

The recommendation of the YESAA assessment states whether the activities should proceed as proposed, proceed with terms and conditions, or not proceed. This assessment is required for Class 2, 3 and 4 mineral exploration, all land use permits and all water licence applications. Once the assessment is completed, recommendations are forwarded to the Decision Body. These recommendations are considered when the department develops a Decision Document; the screening recommendations may be accepted, rejected or modified by the Decision Body in developing the Decision Document provided reasons for rejection or modification are given. Once the Decision document has been issued the Decision Body may proceed with granting of the authorization which must be consistent with the content of the Decision Document. Until an assessment is completed and the Decision Document is issued any agency of government is prohibited from issuing any authorization that would allow the project to proceed in whole or in part.

Responsible Agency

Yukon Socio-economic Assessment Board (YESAB)
200-309 Strickland Street
Whitehorse, Yukon
Y1A 6L2
Phone: 867-668-6420
Toll Free: 1-866-322-4040
Fax: 867-668-6425
Email: yesab@yesab.ca
Website: <http://www.yesab.ca/>

3.10 Yukon Workers' Compensation Act and the Yukon Occupational Health and Safety Act

Purpose

The *Yukon Workers' Compensation Act* and the *Yukon Occupational Health and Safety Act*, under which the Yukon Workers' Compensation Health and Safety Board (YWCHSB) has been established, administer workers' compensation and occupational health and safety in the Yukon, including inspection and compliance at exploration sites.

3.0 Legal Framework Governing Exploration Activities

Key Provisions

Detailed regulations have been established under this legislation to govern workplace health and safety¹⁰. While workplace safety is beyond the scope of this guide, there can be significant safety issues associated with working in remote environments that must be addressed to ensure compliance with this legislation. Under the *Yukon Workers' Compensation Act*¹¹ when hiring employees an employer is required to register with the Yukon Workers' Compensation Health and Safety Board.

Responsible Agency

Yukon Workers' Compensation Health and Safety Board
401 Strickland Street
Whitehorse, Yukon
Y1A 5N8
Phone: 867-667-5645
Toll-Free across Canada: 1-800-661-0443
Fax: 867-393-6279
Email: worksafe@gov.yk.ca
Website: <http://www.wcb.yk.ca/>

3.11 Public Health and Safety Act

Purpose

The *Public Health and Safety Act*, administered by the Government of Yukon, Health and Social Services department, includes requirements to provide information, inspection and enforcement services related to water quality, sewage and solid waste disposal, food quality and institutional hygiene, all of which may apply to camps supporting mineral exploration activities.

Key Provisions

Regulations are in place that cover camp sanitation, drinking water and sewage disposal. Specific requirements for drinking water and sewage disposal may apply¹².

Responsible Agency

Yukon Government, Department of Health and Social Services, Health Services Division
2 Hospital Road
Whitehorse, Yukon
Y1A 3H8
Phone: 867-667-8391
Fax: 867-667-8322
Email: environmental.health@gov.yk.ca
Website: <http://www.hss.gov.yk.ca/>

¹⁰ Copies of the *Yukon Occupational Health and Safety Act*, regulations and policies are found at this website:
<http://www.wcb.yk.ca/>

¹¹ A copy of the *Yukon Workers Compensation Act* can be found at <http://www.gov.yk.ca/legislation/acts/woco.pdf>

¹² A copy of the *Public Health and Safety Act* can be found at: <http://www.gov.yk.ca/legislation/acts/puhesa.pdf>.

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3.12 Historic Resources Act

Purpose

Archaeological and historic sites are protected from disturbance under the *Historic Resources Act*, which includes the Yukon Archaeological Sites Regulation¹³. Generally this legislation provides for the management of historic and archeological sites that have been discovered and reporting requirements should artifacts be discovered in the course of any activity. It also includes powers of inspection and enforcement¹⁴.

Key Provisions

The legislation includes a requirement for the protection of known archaeological, historic and discovered sites, plus the reporting of discoveries to Yukon Government inspectors.

Responsible Agency

Tourism and Culture - Heritage Resources - Cultural Services Branch
Box 2703
133A Industrial Road
Whitehorse, Yukon
Y1A 2C6
Phone: 867-667-5983
Toll free: 1-800-661-0408
Fax: 867-667-5377
Website: <http://www.tc.gov.yk.ca/>

3.13 Electrical Protection Act; Gas Burning Devices Act; Building Standards Act

Purpose

These pieces of legislation provide for the issuance of permits and installation licences, as well as inspections and enforcement, which ensure that buildings and associated installations meet minimum safety standards.

Key Provisions

Yukon has adopted regulations under the Propane and Natural Gas Installation codes and standards of the Canadian Gas Association for the construction, installation, testing, or inspection of gas burning appliances, house piping, vents, or gas installations in Yukon. The regulations require a permit for initial exploration camp set up, that will consume up to one million BTU's¹⁵.

¹³ Several other pieces of legislation have provisions for dealing with the discovery of archeological sites in the course of an activity as well:

1 Quartz Mining Act;

2 Territorial Lands (Yukon) Act;

3 Specific First Nation Final Agreements include chapters on Heritage resources that may apply.

¹⁴ A copy of the *Historic Resources Act* can be found at: http://www.tc.gov.yk.ca/pdf/historic_resources_act.pdf.

¹⁵ A copy of the Act can be found at: <http://www.canlii.org/en/yk/laws/stat/rsy-2002-c-101/latest/rsy-2002-c-101.pdf>.

3.0 Legal Framework Governing Exploration Activities

The National Building Code of Canada has been adopted in the Yukon by reference under this legislation¹⁶. The *Building Standards Act* requires that new buildings be constructed in compliance with the Code and are subject to inspection. Temporary camps, such as tent frames, are not normally subject to this *Act*, however structures that are expected to remain in place for multi-year programs may require a licence and inspection. Exploration camps that have generators supplying electricity to wired facilities would normally require a permit¹⁷.

Yukon Building Safety inspects construction and trades-related activities to ensure that structures and installations are complete and that safety codes applied during the course of building and installation meet the National minimum standards. This agency issues a variety of permits and licences to support interests that include: development; building; plumbing; and electrical.

Responsible Agency

Yukon Building Safety
Lower Level, Yukon Government Administration Building
2071 Second Avenue
Whitehorse, Yukon
Y1A 2C6
Phone: 867-667-5741
Toll free (in Yukon): 1-800-661-0408 local 5741
Fax: 867-363-6249
E-mail: buildingsafety@gov.yk.ca
Website: <http://www.community.gov.yk.ca/buildingsafety/index.html>

¹⁶ A copy of the *Building Standards Act* can be found at: <http://www.gov.yk.ca/legislation/acts/bust.pdf>.

¹⁷ A copy of the *Electrical Protection Act* can be found at: <http://www.gov.yk.ca/legislation/acts/elpr.pdf>.

4.1 General

Researching and planning a mineral exploration project, prior to property acquisition or before the start of any exploration activities, can significantly reduce the potential to:

- Adversely impact the environment and local communities
- Cause conflict between multiple land users
- Operate out of compliance with existing legislation

The goal of exploration is to discover and develop a mine. In addition to determining the quantity and quality of the resource contained in a discovery, there are many other considerations that need to be taken into account when conducting mineral exploration. This includes but not limited to, preparing for a detailed environmental and socio-economic assessment, setting the stage for acquiring water and mining licences, and engaging community support.

Awareness and successful implementation of all these considerations can bring added value to a project. Therefore it is the responsibility of the explorationist to thoroughly plan, beginning at the grassroots stage, for the potential development of a mine. This can be difficult given the cyclical nature of the metal markets.

4.2 Research and Risk Analysis

Before staking a claim or optioning a property, it is important to not only research the geological potential of an area but to learn and understand the environmental, political and social dynamics of the region. Generally, companies will evaluate the economic potential and political risk (ability to obtain permits and licences to operate) of an area. Risk analysis should also include the evaluation of environmental and social aspects of the area and the potential of these aspects to delay or possibly prevent future mine development.

Assuming a positive outcome from the risk analysis, and the successful acquisition of exploration lands, the operator must now turn their attention to determining which authorizations (permits, licences and / or approvals) will be required to conduct the planned exploration activities. The required authorizations are outlined in Part 3 and the more detailed process of applying for the authorizations and the related environmental and socio-economic assessments is outlined in Part 4 of this Guide.

4.3 Community Engagement

Developing positive working relationships with local groups and communities, based on early transparent and open communication, will bring investor certainty and value to any project. Relationship building can begin by implementing the following suggestions:

- Determine which Traditional Territory or Territories the exploration property lies within and contact the appropriate First Nations. Ask for, and if available follow, First Nations protocols for communicating with exploration and mining companies; The First Nation Liaison Officer at EMR Minerals Branch may be of assistance in this process.
- Designate a person within the organization to communicate with communities and stakeholders as a start to building long term relationships with local groups and First Nation councils and municipal governments.

4.0 Planning Exploration Programs

- Be a “Good Neighbour.” Contact other land users – guide outfitters, wilderness tourism operators, exploration companies, private land owners and trappers to determine where these groups are operating and their work schedules. If feasible, work with other groups to develop mutually agreed upon work schedules. Taking the time to communicate with other operators and communities before a field program commences can often avoid potential conflicts.
- At the end of the field season notify local groups that work has finished for the season and possible plans (pending results) for the next season.
- Continue to communicate with First Nations, communities and other stakeholders throughout the year.

Please Note: The Guide does not include any additional guidance on community engagement. Community engagement is pivotal to the success of any project and should be ongoing throughout the life of the project. For information on community engagement and consultation refer to the following list of community engagement resources and web sites:

Aboriginal Toolkit, Association of Mineral Exploration British Columbia (AME BC)
<http://www.amebc.ca/toolkit/intro.htm>

Council of Yukon First Nations web site <http://www.cyfn.ca/>

e3 Plus Social Responsibility Toolkit, Prospectors and Developers Association of Canada (PDAC)
<http://www.pdac.ca/e3plus/English/toolkits/sr/pdf/e3plus-sr-full.pdf>

Yukon Mining & Exploration Portal, Public Consultation,
<http://miningyukon.com/communityenvironment/environment/publicconsultation/>

4.4 Project Management Planning

Before the start of an exploration program develop or update internal policies and manuals that properly reflect the types of activities and equipment that will be used. Train personnel and contractors in the following areas:

- Community Communications Plan
- Emergency and Spill Contingency Plans
- Health and Safety Plan
- Bear Awareness and Safety
- Wildlife Protection
- Historic and archaeological protection guidelines to be followed if new historic or archaeological sites are discovered
- Site Operation and Reclamation Plans
- Review Yukon Occupational Health and Safety Regulations and Public Health and Safety Regulations to ensure project activities are in compliance

4.0 Planning Exploration Programs

Be sure employees and contractors are aware of permit requirements and proponent performance commitments. Designate a person to monitor compliance within these areas and ensure that person has the authority and resources to do so and take remedial action if needed.



Be a “Good Neighbour”; work with other land users such as outfitters and communities (photo of pack horses used by outfitter)

5.1 General

Environmental and socio-economic baseline studies are conducted to establish existing conditions prior to the development of a proposed mine. Generally these studies will begin during the later stages of exploration and may involve exploration personnel. It is necessary for exploration planning to consider these matters. Quality baseline information gathered during the various exploration phases of the project will provide a solid foundation for detailed studies as the project advances.

Environmental baseline data may also be required for environmental assessment of more advanced exploration proposals in order to acquire certain permits or authorizations for exploration work. Baseline studies may also be needed to develop infrastructure necessary to support exploration activities.

Depending on the magnitude of proposed land disturbance, water use or waste deposit, in an advanced exploration project, environmental baseline data may be used to develop and support specific management plans as part of the permitting and water licence application process. For example:

- **Water Management Plan:** amount of water required and source, discharge and treatment criteria, size and number of ditches and settling ponds, water crossing design, watercourse alteration.
- **Waste Rock Management Plan:** geological and geochemical characterization of rock to be excavated, identification of potentially acid-generating and/or metal leaching material, segregation, storage and monitoring of rock storage areas.
- **Waste Management Plan:** disposal of waste petroleum products, tires, metal, other hazardous and non-combustible waste, sewage treatment, if required.
- **Closure Plan:** plugging an adit, removal of infrastructure (tents, shops), waste rock pile recontouring, decommissioning settling ponds, ditches, roads and other infrastructure.

Environmental baseline studies may include components such as: surface and ground water quality, hydrology, climate, fish species and fish habitat, benthos, vegetation, soil, archaeology, and wildlife species and habitat.

Socio-economic baseline studies identify and analyze the capacity of existing infrastructure (roads, rail and power), the location and size of communities, housing, available work force, cultural and heritage resources, and other land use and users (hunting and fishing values, other industrial activities, tourism, trappers, guide outfitters).

5.2 Implementing Environmental Baseline Programs

When to Start

The decision to start an environmental baseline program varies depending on the project's location (proximity to community watersheds, environmentally sensitive areas or areas that have been previously disturbed), and the stage of exploration. Usually companies will initiate baseline studies once geological data and a preliminary economic calculation indicates the potential for an economic deposit and systematic drilling and trenching programs have commenced. Companies may consider starting a preliminary baseline program, such as a surface water quality sampling program, earlier if the project is located in an area that has a history of placer or hard rock mining activity, an environmentally sensitive area or a community watershed.

5.0 Environmental and Socio-Economic Baseline Studies

Consider contacting a local environmental consulting group to help develop a baseline environmental program that will provide defensible data and meet the requirements necessary to support potential project development. Note that specific quality control procedures and equipment are required for some studies and in most cases company personnel will require some training in order to conduct the work themselves. A well planned preliminary baseline program will provide the foundation, if the exploration program advances, for an expanded program that will meet water licence and environmental assessment requirements and avoid delays in the permitting process.

Preliminary Baseline Studies

- Consider implementing preliminary environmental baseline studies when the project has moved beyond the initial exploration stages of mapping, geochemical and geophysical surveys to trenching and drilling, particularly testing of known mineralized targets.
- To be cost and logistically efficient work with environmental consultants to design programs and to train company personnel to collect baseline environmental data when possible.

Preliminary baseline programs include, but are not limited to, the following studies:

- ◇ Climate; install a manual and automatic weather station to measure temperature and precipitation, wind speed and direction, and if possible, solar radiation. Consider initiating basic climate monitoring (daily temperature extremes and rainfall) at a project even if there will only be ongoing work for a few months at a time – even discontinuous records from several years' field seasons can be very valuable in determining important weather pattern differences between your site and the continuously-monitored stations in the region.
- ◇ Surface water quality (typically includes a suite of parameters such as temperature, pH, electrical conductivity, alkalinity and acidity, turbidity, total suspended solids, sulphate, nutrients, and total and dissolved metals). Sample collection at the preliminary baseline phase is typically timed to characterize water quality during the higher (spring thaw after the snow melts - freshet) and lower flow periods (late-summer through to early winter). Note that specific collection, sample preservation and quality control procedures must be followed, along with using prepared bottles supplied by a qualified water quality laboratory.
- ◇ Wildlife log – record dens, raptor nesting sites, mineral licks, animal sightings, tracks and scat. The wildlife log is maintained by company personnel and contractors working at site.
- ◇ Stream flow and depth – this data is used to develop discharge curves and can be collected using properly calibrated manual staff gauges, or automated data loggers.
- Plan ahead; some permits and licences required for activities to support the exploration programs, such as constructing a barge landing or installing a bridge over a fish bearing stream, may require a minimum of one full year of water quality data, hydrology data and/or fish habitat and species studies in order for an authorization to be issued.

Advanced Baseline Studies

As a project advances, and a large underground program is contemplated or the need to collect a bulk sample becomes a possibility, the preliminary baseline program should expand to provide the data required to complete the permitting and water licensing processes to support these activities. The level of permitting required will be determined by the amount of rock transported and water required to operate the advanced exploration program.

5.0 Environmental and Socio-Economic Baseline Studies

Consider discussing the company's plans for baseline studies early with specialists at agencies that will be assessing the data later. These people are generally willing to do so and are helpful in providing advice or suggestions that can make procedures more appropriate and acceptable in a Yukon regulatory and environmental assessment context. This can make everyone's life simpler down the road and help to ensure that the data collected and techniques used will meet the needs of the assessment.

Advanced baseline programs typically include, but are not limited to, the following studies:

- ◇ Expanded surface water quality and hydrology programs to include all potentially affected watersheds; addition of water quality parameters that consider the potential mine development concept (for example cyanide species, hydrocarbon parameters).
- ◇ Ground water quality and hydrology programs – installation of piezometers.
- ◇ Aquatic studies (benthic, fish species and habitat studies).
- ◇ Wildlife species and habitat studies.
- ◇ Vegetation assessment (plant species inventory, vegetation mapping).
- ◇ Surficial geology, hazard assessment, soil and geomorphology.
- ◇ Air quality parameters.
- ◇ Archaeological and heritage studies.
- ◇ Geochemical characterization of rock to be exposed or excavated.
- ◇ Socio-economic studies.

Note that some of these baseline studies, particularly involving fish sampling or archaeological work, require permits to be obtained first. Most of these permits are noted in Appendix II. Experienced Yukon consultants will be well aware of these requirements.

Where significant volumes of rock are to be excavated or exposed during an advanced exploration project (for example extensive underground development or road-building), rock geochemical characterization studies may be conducted. The study should include a basic evaluation of the geological and mineralogical characteristics of the rock types to be excavated. Major and trace element content can be determined by multi-element geochemical analyses. Where the presence of elevated sulphide minerals or elevated metal levels is identified, specific tests such as acid base accounting, leachate extractions, humidity cells, and column leach tests may be required to determine potential for acid rock drainage and/or metal leaching. Data obtained from these assessments will also provide a solid basis for more advanced studies should the project proceed to the mine development stage, and are fundamental to the development of tailings, waste rock and water management plans.

If advanced exploration activities successfully demonstrate that the deposit has size, continuity, grade and metallurgical characteristics of a potentially economic deposit then the project will progress to a full scale environmental assessment following a positive Preliminary Economic Assessment. At this stage the project moves beyond the scope of this guide but EMR Minerals has recently produced an excellent guide to mine production and development licensing under the *Quartz Mining Act*. The EMR guide deals with the process of licensing, environmental assessment under YESAA and timelines. Early liaison with the department and YESAB will pay off in clarity of expectations from both sides.

5.0 Environmental and Socio-Economic Baseline Studies

5.3 Project Planning References

Environmental Code of Practice for Metal Mines, Environment Canada. 2009 www.ec.gc.ca

Guide to Hardrock Prospecting, Exploration and Mining in Yukon, Yukon Energy, Mines. November 2007. <http://www.emr.gov.yk.ca/mining/hardrockmining.html>

Guide to Socio-economic Effects Assessments, Yukon Environmental and Socio-economic Assessment Board. v.2006.06 <http://www.yesab.ca/publications/documents/SEEAFinal2006.06.30.pdf>

Overview of Quartz Mining Permitting Process

http://www.emr.gov.yk.ca/mining/pdf/quartz_mining_permitting_roadmap.pdf

Permit/Authorization Guide for Activities in the Yukon Territory, Development Assessment Process Branch, Executive Council Office. Revised March 2008

http://www.eco.gov.yk.ca/pdf/permit_guide_website_2005-07-05.pdf

Quartz Mining Licence Application Guide, Yukon Energy Mines and Resources, Minerals Branch, February 2010.



Collect water quality samples as part of environmental baseline program.

6.1 General

Prospectors and exploration companies routinely research the mineral potential of areas using assessment reports, geological, geochemical or geophysical data produced by the Yukon Geological Survey, the Geological Survey of Canada or other government initiatives and their own information. After conducting a desk top review of an area prospectors and exploration companies will, at times, ground truth the findings of the literature review prior to staking the ground. The work usually involves teams of two to three prospectors or geologists hiking over the land, perhaps with the assistance of 4x4 trucks or ATV's, following trails or roads, or using helicopters or float planes to access remote sites. The activities often include geological mapping of exposed outcrops, collecting grab or chip samples from outcrops and/or stream sediment or soil samples. It would be unusual for heavy equipment to be involved but some regional overburden sampling programs could involve light mobile drills.

6.2 Legislation

There is no requirement for prospectors or geologists involved in mineral exploration to be licenced in Yukon. No permits are required to prospect, map, or take soil or rock samples by hand on land that is not staked and on vacant Territorial Land. If the off claim prospecting program requires the use of equipment, trail cutting, fuel caches or large base camps are involved, then permitting under the Land Use Regulation could be required. See the relevant sections of this guide if such work is anticipated to review threshold levels for permits.

6.3 Potential Effects

Work of this nature is unlikely to have any significant biophysical environmental effects. More likely to be of concern are socio-economic issues such as land access and catching other land users by surprise and either interfering with their use and enjoyment of the land or appearing to do so. Working on land near to where people live or earn their living or sustenance can create situations with potential for conflict. Working on land used recreationally will have similar potential. People often have significant investments, both financial and emotional, in land and many will feel threatened by prospecting activity.

6.4 Prospecting, Mapping or Sampling Off Claims Best Management Practices

Access

One of the key issues when working on land that has not been staked is access. The following should be considered when conducting a prospecting program on land that has not been staked:

- Confirm that the land is open to the public; not privately held or already staked.
- If the land is open for public access, use existing roads and/or trails; if the land lacks roads or trails then access can be by float plane or helicopter. Mining Records claim maps are an excellent source of land status information. There are few reliable trail maps for Yukon but an excellent collection of air photos is available for examination at the EMR library in Whitehorse (3rd floor Elijah Smith Building, 300 Main Street), and in some cases these and more recent detailed satellite images can help identify trails.

6.0 Prospecting, Mapping or Sampling Off Claims

- If using off road vehicles use low impact vehicles and stay on existing trails especially in environmentally sensitive areas (alpine and wetlands). See section 13.0 for further information pertaining to on and off road vehicle use (in some parts of Yukon, such as the Dempster Highway Corridor and in some municipalities, use of off road vehicles is restricted).
- When fording creeks cross at right angles, do not drive vehicles down creek beds.

Sampling

- Avoid using excessive flagging tape to mark sample locations and/or trails, if flagging is necessary consider using biodegradable flagging tape (lasts approximately two years).
- Do not use spray paint to mark sample locations on outcrops.
- Fill in any manually dug holes or pits that were created when taking samples; replace vegetative mat, consider using soil augers.
- When peeling moss off outcrops, limit the area exposed and if possible replace moss.
- On traverse do not leave behind lunch items that will not quickly biodegrade such as paper, plastic, cans, juice boxes or orange peels.
- When nature calls on traverse, bury the evidence.
- If archaeological or heritage sites are found it is unlawful to remove artefacts or damage sites. See Appendix III Archaeological and Historic Sites for procedures for reporting discovered archaeological or historic sites.



Road cuts, old trenches and exploration workings are often sampled as part of preliminary geologic evaluation of sites. When collecting samples off claims avoid using flagging or spray paint.

Camping

A permit is not required for a tent camp if the site is occupied by no more than 2 persons or if by more than 2 people for less than 100 person-days. Person-days are calculated by sum of the number of people x the number of 24 hour days. For larger camps see the Section 10 of this Guide on camps.

- When camping follow a “leave no-trace” camping policy.
- If possible use existing cleared areas to set up camp.
- Set up tents 30 metres from any water body, avoid camping in environmentally sensitive areas or where there is permafrost.
- Bear proof the camp: do not store food in tents, set up cooking station away from sleeping tents, store food away from camp - downwind if possible, keep site clean.
- Burn any food waste and any paper garbage (particularly sanitary pads but also toilet paper where possible; if you plan ahead and have an airtight container available it can be saved for incineration).

6.0 Prospecting, Mapping or Sampling Off Claims

- Monitor potential forest fire hazard: only burn garbage if it is safe to do so; if it is not safe to burn, garbage should be packed out.
- Pack out all non-burnable garbage (drink containers, aluminum foil).
- Do not bury garbage; wildlife will dig up and spread buried garbage around the site.
- Drain dish water into a small sump, fill in sump when closing camp.



If possible use existing cleared areas to set up camps.

- Human waste: designate a site as far from the camp as possible and at least 60 metres from any water body; bury human waste and, if not collected separately, toilet paper.

6.5 Prospecting, Mapping or Sampling Off Claims References

For information on No Trace camping see Into the Yukon Wilderness, Yukon Government
<http://www.environmentyukon.gov.yk.ca/pdf/ityw.pdf>

Bear Safety:

Guidelines for Industrial Activity in Bear Country, Yukon Government
<http://environmentyukon.gov.yk.ca/mapspublications/brochures.php>

How you can stay safe in bear country, Yukon Government
<http://www.environmentyukon.gov.yk.ca/pdf/howyoucanstaysafe.pdf>

Bear Safety, Environment Yukon
<http://environmentyukon.gov.yk.ca/camping/bearsafety.php#links>

7.0 Aircraft Operations and Airborne Surveys

7.1 General

Many exploration programs take place in remote areas and rely on helicopters and / or float or wheel equipped fixed winged aircraft to transport personnel and equipment. In many cases these flights are few and infrequent. As projects become more involved or larger there can be frequent flights for supplies and survey crew moves. In some drilling projects drill moves or even shift changes may be done by helicopter, greatly reducing ground impact but adding to the intensity of aircraft operations in a concentrated area.

In some cases helicopters may be used in regional surveys, usually geological or geochemical, so that there might be intensive operations in a small area for a very short time but the survey will generally move on quickly to other areas (helicopters are very expensive to operate). In these types of surveys the helicopter will drop off crews or samplers at outcrops or streams and either pick them up quickly and move to another site or pick them up after a day or part day traverse and move on.

Aircraft are also used to conduct systematic air photo and geophysical surveys using onboard or towed sensors. Detailed air photo surveys are often required by engineers when designing infrastructure. Plastic markers are laid flat on the land as reference points for the survey. The aircraft follows specified flight lines at a designated elevation across the survey area. Air photo surveys are not conducted when snow is on the ground or in adverse weather conditions, but usually during late spring, summer and early fall months when the sun is at its highest point to avoid shadows. These aerial photographic surveys are generally flown at such high elevation that they would barely be noticeable by an observer on the ground.

There are many types of airborne geophysical programs used by the industry as a tool to detect potential ore bodies beneath the earth's surface. Fixed winged aircraft or helicopters fly in a grid pattern at a prescribed elevation over the land carrying the geophysical instruments. The type of aircraft used will depend on the type of terrain, the size of area to be covered and type of geophysical instrumentation. The time an airborne geophysical survey can be conducted is often restricted by the weather as it must be flyable but seasonal restrictions are not as great as for photo surveys.

7.2 Legislation

Both on or off claims, the flying itself does not trigger a permit requirement nor does landing in existing clearings but there may be federal flight restrictions in certain areas. It is the responsibility of the company and the aircraft carrier to determine if there are flight restrictions in the proposed survey area. Contact Transport Canada for this information.

Aircraft operations could require permits based on the necessity of creating clearings needed for safe landings.

7.0 Aircraft Operations and Airborne Surveys

Table 7.1 *Quartz Mining Land Use Regulation Class Criteria for Clearings*

Clearings	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria
Number of clearings, helicopter pads and camps	No more than 2 of the 8* clearings	No more than 2 of the 8* clearings	More than 8
Clearings – removal of vegetative mat	No removal of vegetative mat within 30 metres of a water body	Removal of vegetative mat	Removal of vegetative mat
Surface area of clearings	Not exceeding 200 m ² , except for clearings for helicopter pads and camps which cannot exceed 500 m ²	Not exceeding 400 m ² per clearing, if only trees and brush are removed; Not exceeding 500 m ² per clearing, for helicopter pads and camps; or Not exceeding 1,000 m ² , if vegetative mat is removed	More than 400 m ² per clearing, if only trees and brush are removed; More than 500 m ² per clearing, for helicopter pads and camps; or More than 1,000 m ² , if the vegetative mat is removed

*8 is the maximum number of allowable clearings per claim, including existing clearings.

Source: *Guide to Hard Rock Prospecting, Exploration and Mining in Yukon, November 2007*

Off claims, on third party claims, or in support of coal exploration, creating clearings would likely require a Type B land use permit as the threshold in the Land Use Regulation for work with no permit is clearing a trail or right of way less than 1.5 metres wide, the regulation speaks only to linear not equi-dimensional clearings.

Aircraft operations can require fuel caches scattered over the area of operations. Usually these will fall below the level requiring a land use permit under the Land Use Regulation (4,000 litres or about 20 drums) but there is a requirement in the Land Use Regulation to report storage of more than 400 litres (2 drums) to a land use official.

Table 7.2 *Territorial Land Use Regulations Fuel Storage Thresholds*

Fuel Storage	No Permit Required	Class B Permit	Class A Permit
Petroleum Fuel Storage Facilities	< 4,000 l capacity, or a single storage container with a capacity of < 2,000 l	> 4,000 l capacity, or a single storage container with a capacity of > 2,000 l	> 80,000 l capacity, or a single storage container with a capacity of > 4,000 l

Source: *Territorial Lands (Yukon) Act Regulations, March 31, 2003*

7.0 Aircraft Operations and Airborne Surveys

On claims similar requirements exist for fuel storage:

Table 7.3 *Quartz Mining Land Use Regulation Class Criteria for Fuel Storage*

Fuel Storage	Class Criteria 1	Class Criteria 2	Class Criteria 3
Storage of fuel, total amount stored	Not exceeding 5,000 L	Not exceeding 40,000 L	More than 40,000 L
Storage of fuel, amount per container	Not exceeding 2,000 L	Not exceeding 10,000 L	More than 10,000 L

Source: *Guide to Hard Rock Prospecting, Exploration and Mining in Yukon, November 2007*

A YESAA assessment and a Decision Document will be required before land use permits or Class 2, 3 or 4 approvals may be issued.

7.3 Potential Effects

In mountainous areas of Yukon, surveys by fixed wing aircraft are likely to be conducted with enough ground clearance that there should be little effect from sight or sound. Helicopter borne surveys can be flown at much lower ground clearance (approximately a few hundred meters or less) since they can more closely follow changes in ground elevation and with more closely spaced flight lines (approximately two hundred metres or more).

Low level airborne surveys and air support for drill programs and camps can significantly disrupt, injure or cause fatalities to wildlife, particularly during nesting or calving seasons. The aircraft noise and air traffic can also significantly affect the enjoyment and livelihoods of other land users and nearby communities.

7.4 Aircraft Operations and Airborne Survey Best Management Practices

Helicopters, float, and fixed winged aircraft are often integral components of exploration programs.

Safety

- If the use of aircraft is part of the exploration program the Health and Safety Manual and Emergency Response Program must include detailed sections on aircraft safety.
- Ensure all personnel, contractors and visitors receive safety briefings before travelling in aircraft; repeat safety briefings periodically throughout the program.
- Passengers should wear the proper clothing and footwear appropriate for the season, in winter have a sleeping bag.
- Be aware of the weather forecast and plan the work day accordingly; carry appropriate emergency gear in case field crews are left out over night due to bad weather conditions and break downs.
- While in or around an aircraft, obey instructions of the pilot and/or flight crew.

7.0 Aircraft Operations and Airborne Surveys

Helicopters:

- ◇ Ensure staff and contractors are trained and wear proper protective gear when slinging equipment.
- ◇ Locate helipads in an open area away from large trees and brush. Remove or secure loose objects in the helipad area.



Wear proper clothing and footwear appropriate for the season.

Landing and Staging Areas

- If the staging area is located close to a community, provide information on the expected number of daily flights, flight path and duration of program. Work with the community to address concerns about potential impacts such as noise and safety.
- Choose level, open areas a safe distance from roads, camps and other infrastructure for landing sites and staging areas.
- Store fuel properly with appropriately equipped spill response kits (see Section 11.0 Fuel and Special Waste Storage and Handling). If unloading drums from a float plane do not allow drums to remain in the water.
- Fuel drums must be labelled with the owners name and must be removed when operations finish.
- Ensure tarps and equipment are tied down and stored properly at staging areas.
- If more than one aircraft is working out of the staging area develop a communication protocol for landing and takeoff, and where and when equipment will be slung by the helicopters.
- If using a float plane ensure that the dock is not located in an environmentally sensitive area and fuel is properly stored 30 metres or more from the shore line (see Section 16.0 Dock and Barge Landings).
- Avoid flying directly over communities, outfitters camps and wilderness tourism infrastructure.



Locate helipads in open area away from over hanging trees and communities.

7.0 Aircraft Operations and Airborne Surveys

Wildlife

- Prior to commencing a field program contact regional biologists (See Appendix VII Contact List) to determine if the exploration program is close to sensitive wildlife areas or check the Wildlife Key Area Inventory Program. <http://www.environmentyukon.ca/maps/view/nav/2/27/>
- Avoid low passes, hovering over or following wildlife.
- Prohibit flights for viewing and photographing wildlife.
- Do not approach nesting raptors, maintain a distance of 300 metres from nesting raptors during the period of May 1st to July 31st.
- Plan routes and drop off and pickup locations to avoid sensitive wildlife areas and raptor nests. See Wildlife Key Area maps for sensitive wildlife area locations <http://www.environmentyukon.ca/maps/view/detail/2/27/308/>.
- Avoid mineral licks. See Wildlife Key Area maps for known mineral lick locations <http://www.environmentyukon.ca/maps/view/detail/2/27/308/>.
- If working in sheep and caribou country provide copies of “Flying in Sheep Country: How to minimize disturbance from aircraft”, MPERG, 2008 and Flying in Caribou Country: How to minimize disturbance from aircraft”, MPERG, 2008 to personnel, pilots and contractors and follow recommended practices outlined in these guides. The following information is summarized from these documents.



Set up a communication plan if multiple aircraft are using an airstrip or landing area.

If flying near sheep range:

- ◇ Try to keep a ridge between the aircraft and the sheep.
- ◇ Fly below the level of the sheep; and
- ◇ Avoid flying directly toward sheep.

If flying in caribou country:

- ◇ Avoid flights or alter flight plans during sensitive periods (calving, post calving and rutting seasons).
- ◇ Maintain flight altitudes of at least 300 metres a.g.l. at all times of the year and 600 metres a.g.l. during sensitive periods; and
- ◇ If caribou are startled ascend to a higher flight path or veer away from the animals.

7.0 Aircraft Operations and Airborne Surveys

Airborne Surveys

When conducting an airborne survey the following should be considered.

- Prior to contracting the geophysical or air photo company to complete the survey, contact the following groups to determine the best time to conduct the survey and where possible stipulate these dates in the contract.
 - ◇ Local communities and businesses such as guide outfitters to determine the best time possible to schedule the survey.
 - ◇ Government agencies and First Nations to determine if there are any sensitive wildlife areas (nesting or calving grounds, migration routes) within the survey area.
- Once the final contract has been confirmed notify communities and local land users of the expected timeline and where the airborne survey will occur. If the timeline changes due to weather or equipment breakdowns notify the various parties potentially affected by the survey.
- Ensure the survey is conducted over the company's claims, or if working off claims that an agreement is in place to cover other companies' claim blocks.
- Fly the maximum height possible above the tree line or land when conducting airborne surveys.
- Remove air photo survey markers when they are no longer needed. Alternatively, bio-degradable white cotton markers are available.



When conducting airborne surveys fly the maximum height possible.

7.5 Aircraft Operations and Airborne Surveys References

Flying in Sheep Country: How to minimize disturbance from aircraft, MPERG, 2008

Flying in Caribou Country: How to minimize disturbance from aircraft, MPERG, 2008

Wildlife Key Area Inventory Program <http://www.environmentyukon.gov.yk.ca/mapspublications/>

Wildlife Key Area Maps <http://www.environmentyukon.ca/maps/view/detail/2/27/308/>

8.0 Construction of Airstrips

8.1 General

Airstrips are specialized clearings constructed through removal of vegetation, levelling and compaction of soils to create conditions suitable for the landing of fixed wing aircraft. Airstrips for exploration programs are sometimes constructed on mineral claims where they are operated by the claim holder or exploration company.

Ancillary to airstrip construction may be borrow pits for gravel to provide a suitable landing surface and roads or trails to connect with camps and work areas. Fuel storage at airstrips may be needed to refuel aircraft but more commonly to store fuel delivered by aircraft. It is important to realize that airstrip construction, as with aircraft operations in general, reduces a potential physical impact elsewhere.

Float equipped fixed wing aircraft require a dock for more than casual use. Consult the Section 16 Docks and Barge Landings for a discussion of legislation and BMP.

8.2 Legislation

Airstrip construction by its very nature will almost certainly be a Class 3 or higher activity if carried out on claims since the smallest airstrip clearing would likely be at least 10,000 m² which even if spread across four adjoining claims would, exceed Class 3 thresholds on size of cleared vegetative mat per claim.

Off claims, on third party claims, or to support coal exploration, an airstrip could require a Type A or B land use permit, depending on the type of equipment used to construct it; likely the former as all power driven earth moving equipment falls into Type A permit criteria. Borrow pits likely would require a permit under the Quarry Regulation as well.

A YESAA assessment and a Decision Document will be required before land use permits or Class 2, 3 or 4 approvals may be issued.

Transport Canada Regulations and Guidelines

The construction and operation of non-registered or non-certified airstrips is not regulated by Transport Canada. The Transport Canada web site provides information on Aerodromes standards and recommended practices. These guidelines can provide useful information for the construction and operation of privately owned and operated airstrips. See the following web sites.

For construction of airstrips see:

Transport Canada AIM - AGA - Aerodromes

<http://www.tc.gc.ca/CivilAviation/publications/tp14371/AGA/menu.htm>

Section 3.0 provides information on runway characteristic such as length, width, graded area.

Transport Canada TP 312 – Aerodromes Standards and Recommended Practices

<http://www.tc.gc.ca/CivilAviation/publications/tp312/menu.htm>

Section 3 provides information on physical characteristics of runways such as runway slopes, shoulders.

Section 4 Obstacle Restrictions and Removal provides information on approach and take off surfaces.

For general operating regulations and procedures see:

Transport Canada – Canadian Aviation Regulations Part VI General Operating and Flight Rules

<http://www.tc.gc.ca/civilaviation/regserv/affairs/cars/part6/subpart2.htm>

8.3 Potential Effects

Depending on the site of a potential airstrip, its construction could affect valued habitat and may require some terrain modification in the immediate area. Other potential effects from airstrips would primarily be associated with soil erosion if improper construction practices are used, and dust covering vegetation during the construction and operation of the airstrip. If the airstrip is located close to a water body, the possibility of deleterious substances such as eroded soil or fuel entering water bodies could have a potential effect on riparian zones and fish habitat.

Airstrips are usually large and depending on location can be highly visible alterations to the landscape. An airstrip for an active exploration program can be a busy and noisy place from time to time. All of this can create issues with any nearby land users who could be favourably disposed to future more convenient and cheaper access it offers or strongly opposed to visual impact and general access it can create.

8.4 Airstrip Construction Best Management Practices

- Prior to construction consult with local aircraft carriers to determine the best location and required runway length, width and slope as well as approach and departure clearances based on the type of aircraft expected to be used during operations.
- When clearing the area buck up brush and stockpile topsoil a safe distance from the airstrip. This material will be used when reclaiming the airstrip.
- The airstrip surface should be comprised of coarse gravels. Avoid fine material that will be soft at breakup and during summer create dust that can potentially affect aircraft engines and cover local vegetation.
- Crown the surface and install proper drainage system to prevent ruts and gullies from forming on the airstrip.
- Avoid building on permafrost as slumping will occur over time compromising the surface of the airstrip.
- Mark usable length of strip.
- Install and maintain a wind sock.
- Develop and implement an airstrip maintenance schedule.
- Store fuel properly (see Section 11 Fuel and Special Waste Storage and Handling) in a safe location and keep caches within permit limits.
- Develop and follow fuel handling and communication protocols, and train staff and contractors to follow protocols, especially if more than one aircraft carrier is using the airstrip.
- Deactivate the airstrip using proper reclamation practices.



When constructing airstrips choose level areas comprised of coarse gravels.

8.0 Construction of Airstrips

8.5 Airstrip Construction References

Transport Canada AIM - AGA - Aerodromes

<http://www.tc.gc.ca/CivilAviation/publications/tp14371/AGA/menu.htm>

Section 3.0 provides information on runway characteristic such as length, width, graded area

Transport Canada TP 312 – Aerodromes Standards and Recommended Practices

<http://www.tc.gc.ca/CivilAviation/publications/tp312/menu.htm>

Section 3 provides information on physical characteristics of runways such as runway slopes, shoulders.

Section 4 Obstacle Restrictions and Removal provides information on approach and take off surfaces)

For general operating regulations and procedures see:

Transport Canada – Canadian Aviation Regulations Part VI General Operating and Flight Rules

<http://www.tc.gc.ca/civilaviation/regserv/affairs/cars/part6/subpart2.htm>

9.1 General

Staking a mineral claim under the *Yukon Mining Quartz Act* allows the claim holder the exclusive right to explore for minerals within the claim boundary. Prospectors, geologists and mining companies will research an area using assessment reports and government databases to determine where to stake a claim. Extensive regional prospecting, geochemical surveys or geophysical surveys may also be carried out by exploration companies to determine locations to be staked.

The act of staking a claim or claims for mineral exploration is generally highly confidential. Once the claim is recorded at the Mining Recorder (within a month of staking) all confidentiality is lost as the claim becomes a matter of public record. Within a short time of recording (as little as 1 or 2 weeks) new claims are posted in the Lands web based map viewer on the Mining Recorder's website.

Coal leases and quarry leases are staked as defined in the appropriate regulation under the *Territorial Lands (Yukon) Act*. Coal Exploration Licences are not staked on the ground but are defined by claim sheet quarters. New coal lands are also posted on the Mining Recorder's website.

9.2 Legislation

Staking a mineral claim in the Yukon requires that legal posts be placed in the ground according to regulated requirements including marking the line between the posts. The Yukon Government has published a quartz mineral claim staking guideline. The claim staking guideline provides an overview of how to stake a claim and what requirements must be followed. The Mining Recorder is available to answer any questions pertaining to staking regulations and to provide numbered tags. No permits are required to stake a claim but staking regulations must be followed in order for a claim to be valid. The web sites for the *Quartz Mining Act*, staking guidelines and other web sites on First Nation, communities and local businesses are listed below in Section 9.5 Staking References.

Not every part of Yukon is available to be staked under the *Quartz Mining Act*. The *act* allows staking on “vacant territorial land” and “any lands in respect of which the right to enter, prospect and mine for minerals is under the administration and control of the Commissioner”. Certain areas are exempted from staking; these include land occupied by any building, cemeteries, churches, and land regularly used near residences. Land actively under cultivation can only be staked with the written consent of the owner. Special restrictions exist for land lawfully owned or occupied by another person, consult the Mining Recorder in these cases. Land may be withdrawn from staking by Order in Council for public works, parks, historic sites, townships, settlement of land claims and other public purposes. Large withdrawals exist for these purposes including a large part of north Yukon and land set aside while Final Agreements are negotiated by the three First Nations not yet settled. These areas are compiled on Mining Recorders claim maps. First Nation Settlement Land is not Territorial land. The Commissioner controls the right to enter, prospect and mine on Category B settlement Lands but not Category A, consequently Category A land can never be staked, Category B land may be staked but with special considerations noted in section 3.2.

Land acquisition for coal exploration is detailed in the Coal Regulation of the *Territorial Lands (Yukon) Act*. Coal leases and permits must be staked in the field. Staking of leases (21 year & renewable) and permits (year to year & renewable) differ from staking of quartz claims in that 4 posts are required at the corners of a rectangular area and the entire perimeter must be clearly marked in the field. Coal Exploration Licences are not staked in the field but are identified on an application by NTS reference of the claim sheet and the quarter of the claim sheet applied for. There is no assurance that a lease, permit or licence will necessarily be issued after application as the Coal Regulation uses the term “may issue” in describing the Minister's or Recorder's action after receiving an application.

9.0 Staking

Land required for gravel, limestone, granite, slate, marble, soil, loam, marl and similar substances that are not minerals under the *Quartz Mining Act* may be staked as quarry leases as outlined in the Quarry Regulation under the *Territorial Lands (Yukon) Act*. The staking process is similar to a coal lease and the issue of a lease is not automatic but subject to approval by a Land planning committee.

9.3 Potential Effects

There are essentially limited biophysical effects from staking a claim. Claim posts, usually trees cut at site, must be placed, usually on two corners of the quartz claim. In order to properly stake a quartz mineral claim the claim line (the line between the posts) must be marked either by blazing trees, limbing branches, and/or flagging. These required markings can have visual impact but fade quickly if done in reasonable fashion.

Due to the confidentiality of claim staking, prospectors and companies are not in a position to notify First Nations, private land owners, or municipalities of their intent to stake mineral claims. Potential socio-economic effects from staking can occur as land owners are often unaware of what lands can be legally staked and are surprised that no notification or permission is required when private or municipal land is staked. This can lead to land use conflicts between different users of the land.

9.4 Staking Best Management Practices

Before Staking a Claim

- Review relevant maps available at the mining recorder offices (also available online) to determine where land is available for staking and what areas have been withdrawn from staking.
- Determine in which First Nation(s) Traditional Territory the claims will be situated, maps are available through the Mining Recorders.
- Determine if the land is privately owned and /or within municipal boundaries. If claims are located within municipal boundaries be aware of the community's official plan (if one exists) and the potential permit requirements for working within a municipal boundary. These may affect future work plans for the exploration program.

Staking

- When staking a mineral claim it is necessary to follow the staking regulations in detail and exactly.
- Use the appropriate amount of flagging, but don't "over" flag a line.
- Do not extend flagged lines below the high water mark of rivers and lake shorelines.
- Use low impact /avoidance cutting techniques to mark the claim line such as cutting branches and blazing rather than cutting down trees.
- Once the claim is staked and recorded notify First Nations, property owners and other land users that the land has been staked and outline the proposed plans for exploration.

9.5 Staking References

Council of Yukon First Nations <http://cyfn.ca/ourpartnersytg>

Overview of Quartz Permitting Process.

http://www.emr.gov.yk.ca/mining/pdf/quartz_mining_permitting_roadmap.pdf

Quartz Mining Act Guidelines for Claim Staking.

http://www.emr.gov.yk.ca/mining/pdf/emr_staking_your_claim.pdf

Quartz Mining Act http://www.emr.gov.yk.ca/mining/pdf/qma_unofficial_consolidation.pdf

Territorial Lands (Yukon) Act – Coal Regulation http://www.gov.yk.ca/legislation/regs/oic2003_054.pdf

Territorial Lands (Yukon) Act <http://www.gov.yk.ca/legislation/acts/telayu.pdf>

Territorial Lands (Yukon) Act Regulation http://www.gov.yk.ca/legislation/regs/oic2003_051.pdf

Yukon Business Directory <http://www.directoryyukon.com/>

Yukon Community Profiles <http://www.yukoncommunities.yk.ca/communities/>

10.0 Camps

10.1 General

Exploration camps can vary from temporary “fly camps” of 2 to 3 tents to large 200 person camps with prefabricated buildings typically required for advanced exploration programs. Large camps are still considered temporary as long as no permanent structures such as concrete foundations are constructed. Small camps may be nothing more than the general public would establish when camping. Generally camps to be occupied for an appreciable part of a field season are more elaborate and may have electrical generation, dedicated sanitary and cooking facilities with plumbing and satellite telephone and internet connections. Large camps for exploration projects are essentially the same as construction camps such as along highway construction projects with generally complete amenities.

Good camp management practices can reduce the potential impacts a camp can have on wildlife, water quality and air emissions. A healthy, pleasant, clean and safe camp will help promote an overall more efficient and productive project. Keep in mind that first impression of the company, the camp manager and the project manager may well be formed by visitors, supervisors, inspectors or investors upon their arrival at camp.

10.2 Legislation

Camps Constructed on Quartz Claims

Quartz Mining Land Use Regulation Class Criteria relevant to camps on claims include occupancy limits, size of clearings for the camp and associated infrastructure and limitations on structures. A camp will generally be associated with other activities which also factor into the determination of class.

Table 10.1 *Quartz Mining Land Use Regulation Class Criteria for Camps*

Camps	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria
Construction of structures other than underground structures	Structures without foundations intended for use for a period of not more than 12 consecutive months	Structures without foundations	Structures with foundations
Number of person-days in camp	Not exceeding 250	Not exceeding 250	More than 250
Number of persons in camp at any one time	Not exceeding 10	More than 10	More than 10
Number of clearings per claim, including existing clearings	Not exceeding 8	Not exceeding 8	More than 8
Number of clearings, helicopter pads and camps	No more than 2 of the 8 clearings	No more than 2 of the 8 clearings	More than 8

Table 10.1 *Quartz Mining Land Use Regulation Class Criteria for Camps*

Camps	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria
Clearings – removal of vegetative mat	No removal of vegetative mat within 30 metres of a water body	Removal of vegetative mat	Removal of vegetative mat
Surface area of clearings	Not exceeding 200 m ² , except for clearings for helicopter pads and camps which cannot exceed 500 m ²	Not exceeding 400 m ² per clearing, if only trees and brush are removed; Not exceeding 500 m ² per clearing, for helicopter pads and camps; or Not exceeding 1,000 m ² , if vegetative mat is removed	More than 400 m ² per clearing, if only trees and brush are removed; More than 500 m ² per clearing, for helicopter pads and camps; or More than 1,000 m ² , if the vegetative mat is removed

Source: *Guide to Hard Rock Prospecting, Exploration and Mining in Yukon, November 2007*

Camps Constructed Off Quartz Claims

Camps off claims or to support coal exploration would be regulated under the Land Use Regulation of the *Territorial Lands (Yukon) Act* which has comparable but different limits on occupancy. It seems unlikely that it would be appropriate for a camp to be on third party claims but in that case the treatment would be as if it were off claims.

Table 10.2 *Territorial Land Use Regulations Camp Thresholds*

Camp	No permit required	Class B Permit	Class A Permit
Camp Sites used by more than 2 people Person day = the use of a camp site by one person for 24 hours	< 100 person days	> 100 person days	> 400 person days

Source: *Territorial Lands (Yukon) Act Regulations, March 31, 2003*

Water Usage for Camps

A camp housing more than 50 persons requires a Type B Water Licence issued under the *Waters Act*. Please note: In fish bearing waters pump intakes must meet DFO fish screening specifications.

10.0 Camps

Table 10.3 Water Usage Permit Thresholds

Water Usage	Authorization Required/ Legislation
Water use less than 300 cubic metres per day or deposit of waste where there is direct or indirect deposit to surface water	Notice of Water Use/Waste Deposit Without a Licence (Schedule 3)
Water use greater than 300 cubic metres per day or deposit of waste where there is a direct or indirect deposit to surface water Or a camp with more than 50 persons	Type B Water Licence - <i>Waters Act</i> A typical application for a water use licence must be accompanied by a decision document issued under YESAA.

Source: *Waters Regulations, March 2003*

Sanitation, Potable Water and Sewage Permits

The *Public Health and Safety Act* indicates that “conditions injurious to public health” are not to be created. Environmental Health Services (EHS) requires the following information from temporary and permanent camps to assess compliance with this *Act* and its relevant regulations:

Camp Sanitation Regulations (CSR):

The Camp Sanitation Regulations apply to camps that meet the definition of a “camp” as laid out in the regulation. The regulation defines a “camp” as a premises owned, established, operated or maintained by an employer to house employees, whether the employees pay for it or not. A camp may consist of buildings, trailers or tents etc.; the land upon which these structures stand is included as part of the “camp”. A “camp” as defined in the regulations “does not include a camp of less than ten occupants or a camp that is in operation for a period not exceeding ten days in any year”. If your camp fits this definition and does not fall within the exclusions then the Camp Sanitation Regulations (CSR) apply. Even if your camp does not fit the definition there are some good practical guidelines in the Camp Sanitation Regulations that are worth considering for any camp operator.

http://www.gov.yk.ca/legislation/regs/co1961_038.pdf

- The CSR indicates that safe water be supplied at camps. To assess this, EHS requires information pertaining to water source, planned treatment, storage and distribution. Distribution information must include number of connections for a piped distribution system and/or number of delivery sites for a trucked distribution system.
- Food service facilities must be adequate for population served. Food preparation areas, storage, and equipment descriptions must be provided for assessment.
- Structures must meet minimum square footage requirements for population. EHS requires plans for trailer units, tent frame structures and permanent structures to assess square footage requirements. Plans must define the purpose of structures and rooms (e.g. kitchen, recreation area).

Sewage Disposal Systems Regulation (SDSR):

The application of this regulation is not entirely clear. It applies to the disposal of sewage from all buildings and “like structures”, temporary or permanent, but does not define a building or clarify that a tent is a “like structure” (note that the Camp Sanitation Regulation does clarify this point for the purposes of that regulation). The regulation allows buildings without piped systems to use an approved pit privy. It is quite clear that any camp involving buildings or trailers with piped systems for waste disposal falls under the requirement for a sewage disposal system. A collection of cabins and / or wall tents without a piped system probably requires at least an approved pit privy as defined in the regulation but it is not clear that a collection of pitched tents with no solid floor and with no piped system falls under this regulation. Because of this uncertainty a camp operator should contact EHS to clarify the application of the regulation in their case. The Sewage Disposal Systems regulation can be found at: http://www.gov.yk.ca/legislation/regs/oic1999_082.pdf.

Some additional points are to be aware of:

- Camps under 50 persons occupancy do not require a water licence to be issued by Water Board. Camps over 50 persons must obtain a water licence. Lagoons are always regulated by Water Board, and require a water licence.
- Camps under 50 persons with a sewage disposal system must provide information to EHS for approval of sewage disposal methods. This will include a soils investigation, estimated daily sewage flows, details of the soil absorption system, and all other information required in the Application for a Permit to Install a Sewage Disposal System.
- For camps proposing to use pit privies an Authorization to Construct, Install and /or Use a Privy must be applied for from EHS. The regulation requires any pit privy to meet the requirements of the “Standards for the Construction, Installation and Maintenance of a Pit Privy” available at: http://www.hss.gov.yk.ca/pdf/pit_privy.pdf.

Drinking Water Regulation (DWR):

In addition to the Camp Sanitation Regulations, camps may also fall within the scope of the DWR. The regulation applies to “large public drinking water systems” which are defined in the regulation as piped systems with 15 or more delivery points but the definition is complex and to assure compliance operators of larger camps should contact EHS so they can assess if the DWR applies.

The regulation, if applicable, or common sense, if the regulation is not applicable, requires that “safe drinking water” be supplied. Safe drinking water is defined in the regulation as water that meets the standards set out in the “Guidelines for Canadian Drinking Water Quality”. These are available at <http://www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php>

Again, even if the regulation does not apply, it has useful information to be aware of if operating any camp; *Public Health and Safety Act*, Drinking Water Regulations, can be found at: http://www.gov.yk.ca/legislation/regs/oic2007_139.pdf

A Health Officer may require additional information to assess health impacts at any time, and inspections may occur at the discretion of the Health Officer. Questions may be directed to EHS at 867-667-8391 or 1-800-661-0408.

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Solid Waste Disposal

Land use permits will stipulate the method of waste disposal for each camp. Smaller camps usually burn combustible camp waste in burn barrels and remove non-combustible waste such as metal from site. Larger camps may install an incinerator to burn combustible waste; an air emission permit will be required to operate an incinerator. Special waste, such as batteries, must be stored properly on site until the waste can be sent to a licenced facility for disposal.

Larger projects will potentially generate more non-combustible waste (batteries, tires) that requires proper storage and disposal. Contact the appropriate authorities for information on the projects specific disposal requirements. A list of permits required for waste disposal and government agency contact information can be found in Appendix II Guide to Quartz Exploration Permits and Authorizations.

Other Permits

Depending on the size and construction of the camp, other permits will be required for construction plumbing, electrical generation and distribution, fuel storage etc. Community Services, Building Safety department is responsible for authorizing the following applications: construction of buildings outside a municipality, installation of plumbing, electrical permits, gas piping, use of propane gas in gas burning devices. Yukon Environment, Environmental Programs issues General Air Emission Permits required for the operation of fuel burning equipment. See Appendix II for contact information.

Please Note: That the permit thresholds for these considerations are not all firmly established in regulation so it is important to contact the appropriate authorities for a larger camp, especially one to be in place for more than one season, and will have plumbing, electrical and/or heating systems.

If planning on setting up an exploration camp within a municipal boundary check with the appropriate municipal officials to determine if camp set up is allowed and, if so, which by-laws and restrictions will apply prior to camp construction and operations.

A YESAA assessment and a Decision Document will be required before land use permits, Class 2, 3 or 4 approvals, Water Licences or any other approval that enables the project in whole or in part may be issued.

10.3 Potential Effects

Properly managed camps set up for temporary use (one or two field seasons) will have a negligible effect on the environment. Camps set up for more than 50 people require a larger footprint and generate more waste but with the implementation of proper management and reclamation practices the potential effects on the biophysical environment can be mitigated.

Potential effects will occur if the following activities associated with camp operations are improperly managed.



Depending on the size and construction of a camp, electrical, plumbing and other construction permits may be required.

- Improper disposal of kitchen waste and other garbage can attract and habituate wildlife.
- Location and management of pit privies or sewage systems can potentially contaminate water bodies and pose a significant health risk.
- Improper handling of special wastes, fuel and other lubricants can potentially contaminate soil, groundwater and/or water bodies.
- Inadequate camp site clean-up and reclamation either for temporary or final camp closure can result in the contamination of soil and /or water bodies from leaking fuel barrels; improper disposal of waste will attract and habituate wildlife to seek food sources from dump sites; and abandoned camp sites look unsightly and give the industry a bad reputation as poor stewards of the land.

10.4 Camp Best Management Practices

Pre-planning and Location

The location of a camp is often determined by terrain constraints (swamps, mountains), the distance traveled between the camp and exploration activities (distance to drill pads, trenches), means of transportation – trails, roads or aircraft; the availability of potable water and satellite reception.

Consider the following when choosing a camp site:

- Access to safe drinking water in locations free from potential contamination.
- Avoid areas that have a potential risk of flooding, avalanche or rockslides.
- Choose an area that is not likely to be frequented by wildlife as evidenced by large and heavily used game trails, abundant natural food sources, scat etc.
- Use old camp sites or previously cleared areas if possible but only if there are no known issues with wildlife; old garbage dumps may have habituated bears to frequent the location.
- If using old sites be aware of old, possibly improperly stored, waste that might pose a health risk and plan an overall cleanup of the old site (be aware that reusing an old camp site makes reclamation of both the old and current activities your legal responsibility under the Quartz Mining Land Use Regulation).
- Avoid sites of First Nation significance, sensitive wildlife habitat or other special areas.
- Don't choose a site near other land users or residences without prior agreement to the camp location.
- Choose a site that can accommodate possible future camp expansion.
- If helicopters will be used choose a site that will not require takeoffs or landings over camp buildings.



When choosing a camp site consider potential hazards such as rock slides and avalanches.

10.0 Camps

Camp Design

- Locate all camp structures a minimum of 30 metres from high water shoreline.
- Check with DFO on fish usage in any water body that water will be drawn from and ensure that screening recommended by DFO is in place at the pump intake at all times.
- If unclear that water is safe for drinking then have it tested following proper collection, preservation, storage and shipping time protocols. Investigate treatment options and implement treatment as needed – there is a wide range of products suitable for all camp sizes that are effective against waterborne bacteria, viruses, and protozoa. Alternatively, consider bringing in pre-treated water from an approved source.
- Do not exceed the area of clearing allowed by the land use class you are operating in.
- Arrange tents in a line not a circle with adequate space between the tents to decrease fire hazards and to avoid crossfire if a problem bear has to be shot.
- Locate kitchen tent, food storage, waste disposal bins and latrines downwind and well away (>50 metres) from sleeping and office tents.
- Kitchen tents should be properly ventilated and kept clean to avoid attracting wildlife.
- Sleeping tents should be located as far as possible from garbage disposal sites (100 metres).
- All framed tents and buildings should be equipped with smoke alarms and fire extinguishers.
- Keep appropriate firefighting equipment in a separate, dedicated and clearly marked cache, make sure the firefighting tools are not used for other purposes around camp.
- Clearly mark the first aid tent or building.
- Be sure that camp staff, especially non-technical staff who will be around camp full time, know the location of the camp, emergency contacts and how to operate communication equipment.
- Depending on the expected duration of the camp consider installing an electric fence around the perimeter of the camp to deter wildlife. An electric fence may not be necessary for fly camps unless located in areas highly populated with bears.
- Helicopter landing pads and fuel storage should be at least 50 metres from sleeping tents.



Arrange sleeping tents a safe distance from kitchen and food storage tents.

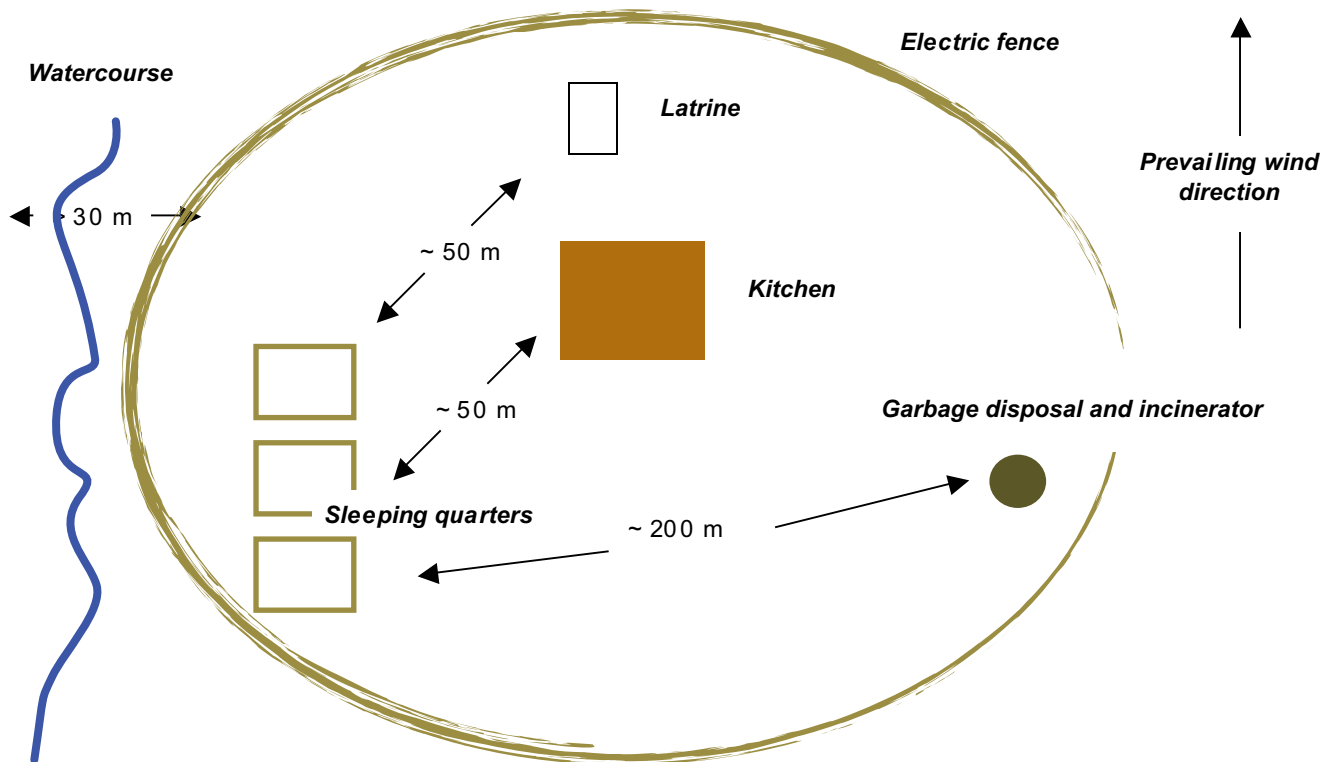


Figure 10.1 Example of Well-Designed Camp (Source Guidelines for Industrial Activity in Bear Country, Yukon Environment 2008).

Solid Waste Management

The improper handling of garbage can lead to problems with bears and other wildlife and potentially affect human health. Permits will set out the burning requirements for the camp depending on the size of the camp.

- Hire a camp manager or assign a staff member to manage camp waste.
- Do not bury food waste or burn waste in an open pit as waste does not burn completely; use an approved burn barrel or a commercial incinerator.
- If using a barrel it is important to design a proper burn barrel. The “Yukon Burn Barrel” is a 45 gal drum with a suspended basket, lid venting hole and spark arresting chimney. See Figure 10.2 for a diagram of a Yukon Burn Barrel (Source: Guidelines for Industrial Activity in Bear Country, Yukon Environment 2008).
- If using a commercial incinerator train personnel to use the equipment properly, ensure spare parts are on site to avoid any downtime and the possibility of improper disposal of garbage if equipment breaks.
- Food waste should be burned daily.
- Non-combustible solid waste (metal, plastics) and special / hazardous waste (waste oil, anti freeze and batteries) should be stored properly and removed regularly to a regulated landfill or certified disposal facility.

10.0 Camps

- Request permission from the local community prior to depositing non-combustible materials in municipal landfills.
- Wherever possible avoid purchasing products with extra packaging, use refillable drinking containers instead of disposable bottles and cans.
- If possible, participate in local community recycling programs.

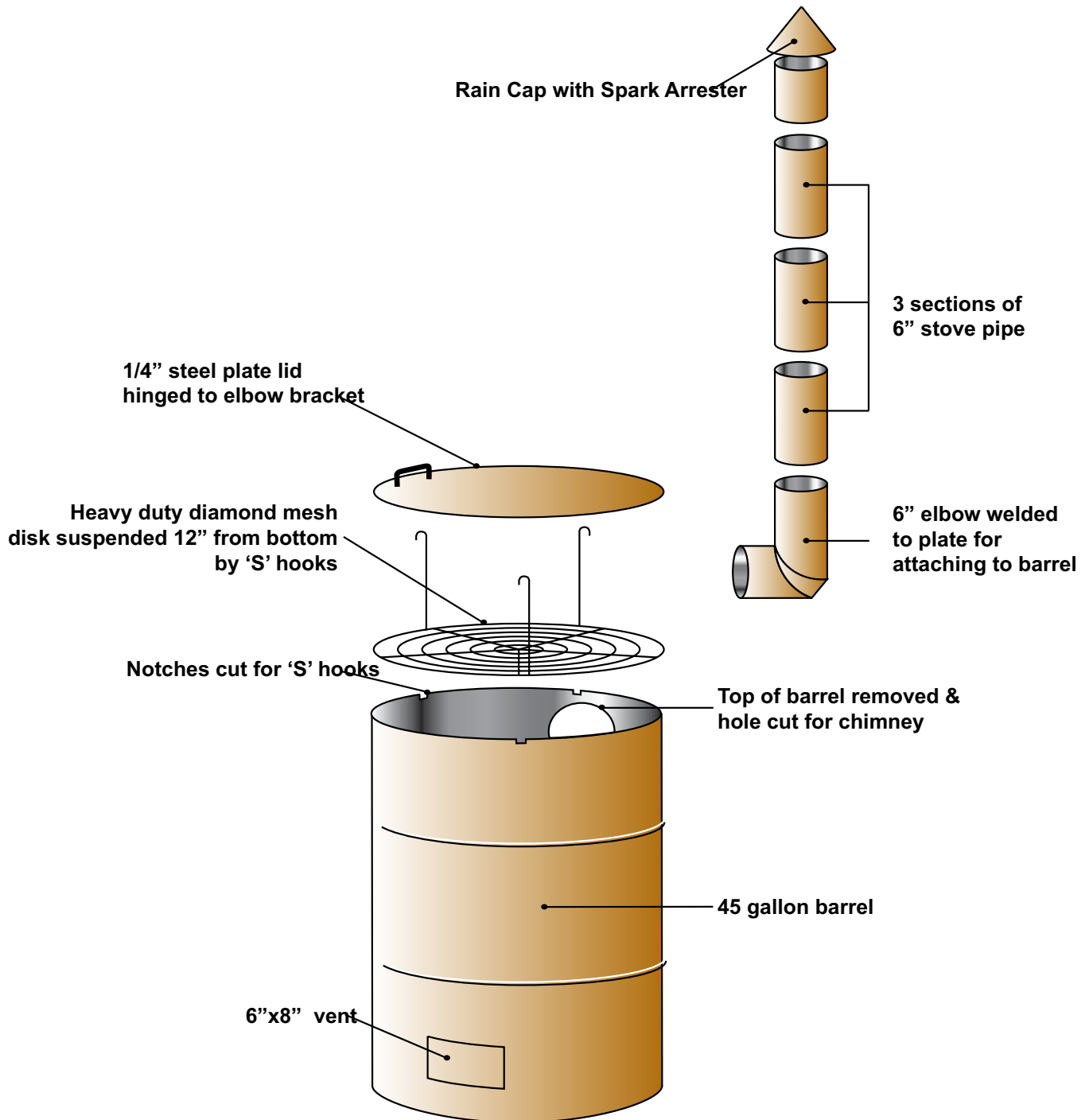


Figure 10.2 Yukon Burn Barrel (Source: Guidelines for Industrial Activity in Bear Country, Yukon Environment 2008).

Liquid Waste Management

Pit privies are the most common method of managing human waste in small to mid-sized exploration camps. Larger camps may be required to install commercial sewage treatment plants or an approved septic tank and field constructed by a recognized professional or, if self constructed, inspected at critical times during installation by a government inspector. There are many different types of “off the shelf” commercial sewage treatment systems, including incineration systems, suitable for use in cold climates.

Grey Water

- Grey water from the kitchen and dry should be discharged into sumps located at least 30 metres from any body of water.
- Sumps should be fitted with screens and grease traps; screens and grease traps should be cleaned on a regular basis.
- Kitchen waste oils and grease (bacon fat) should not be dumped down drains but collected and burned on a regular basis.
- If practicable use biodegradable soaps and detergents.

Pit Privies

- Pit privies should be dug down slope from the drinking water intake and camp facilities.
- Pit privies should be treated on a regular basis with lime to control odour, a cover of earth, wood ash or commercially available products that promote decay and reduce the smell.
- To help keep privies clean paint wooden surfaces with non-porous paint; surfaces should be washed regularly.
- Hand sanitizer should be provided in privies.
- When finished the pit should be covered with a minimum of 30 centimetres of compacted soil.

Commercial Sewage Treatment Plants and Septic Systems

- If a commercial sewage treatment plant is installed (usually the case for larger camps) ensure personnel are trained to operate the equipment properly.
- Ensure the specifications for the sewage treatment plant will meet the needs of the camp based on the number of people and site conditions.
- Depending on the site conditions and camp capacity septic systems may be used in large camps. Septic systems consist of two main components: a septic tank and a soil absorption system. Before installing a septic system ensure site conditions are suitable for the construction of a septic system: conduct percolation tests and soil investigations. For information on designing and maintaining septic systems see “Septic Systems in the Yukon. A Guide to their Design and Maintenance” http://www.hss.gov.yk.ca/pdf/septic_guide.pdf.

10.0 Camps

10.5 Camp Closure and Reclamation

Temporary Closure and Reclamation

Temporary closures or shutdowns of an exploration program can and do occur. Closures can last for several weeks or longer.

- Remove all wildlife attractants (food, food waste, lubricants).

Ensure all buildings and tents are properly weather proofed:

- ◇ All combustible garbage burned and ashes are extinguished before being buried.
- ◇ Tents and tarps are secured and in good shape.
- ◇ Structures are reinforced to prevent roof cave-ins if there is a high snow load.
- ◇ Equipment is stored securely, drip pans in place and fuel lines cleared.
- ◇ Fuel properly stored or removed from site.
- ◇ Solid waste removed from site.
- ◇ Any loose debris such as plastics or wire is cleaned up; and
- ◇ Drill core is properly stored.



Plan for temporary or permanent closure to avoid leaving an unsightly mess.



Well planned temporary closure. Note core boxes and wood is neatly stacked, tent canvas has been removed from tent frames, and all plastic and metal has been removed from site.

Permanent Camp Closure and Reclamation

A shift in a company's exploration program can occur during a temporary shutdown and result in a decision to permanently close a camp. Budget enough money to cover potential costs of permanent closure.

- Burn all lumber and plywood and bury ashes once fire is completely extinguished.
- Burn any remaining combustible garbage and bury ashes once fire is completely extinguished.
- Remediate any petroleum contamination.
- Remove all tent frames and buildings, hoses, machines, fuel and fuel drums, lubricants, metal and plastics from the site.
- Fill in all sumps, ditches and pits.
- Remove or deactivate all septic systems (tanks and drain fields – tanks can be crushed and buried).
- If required or necessary then recontour area.
- Rip / loosen compacted soils and cover area with stockpiled topsoil, stumps, bucked up trees and brush to allow natural revegetation to occur.
- If the cleared area is large and there is the potential for soil erosion to occur construct a proper drainage system to prevent erosion, replace topsoil and revegetate.
- Store core in a safe and secure location with signage identifying owners name.
- Document site closure by taking pictures of the site.



Temporary camp closure.



Photo of the same site after camp has been permanently closed. Tent floors and frames have been burnt, all metal and debris has been removed from site.

10.0 Camps

10.6 Camp References

Camp Sanitation Regulations http://www.gov.yk.ca/legislation/regs/co1961_038.pdf

Freshwater Intake End of Pipe Fish Screen Guideline. Fisheries and Oceans Canada <http://www.dfo-mpo.gc.ca/Library/223669.pdf>

Guidelines for Canadian Drinking Water Quality” <http://www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php>

Guidelines for Industrial Activity in Bear Country, Mining and Petroleum Environmental Research Group (MPERG) Report 2008 - 2 http://www.environmentyukon.gov.yk.ca/mapspublications/documents/Guidelines_for_Industrial_Activity_in_Bear_Country.pdf

Into the Yukon Wilderness, Yukon Government <http://www.environmentyukon.gov.yk.ca/pdf/ityw.pdf>

Public Health and Safety Act, Drinking Water Regulations, http://www.gov.yk.ca/legislation/regs/oic2007_139.pdf

Septic Systems in the Yukon. A Guide to their Design and Maintenance, Yukon Health and Social Services, January 2006 http://www.hss.gov.yk.ca/pdf/septic_guide.pdf

Sewage Disposal Systems Regulation http://www.gov.yk.ca/legislation/regs/oic1999_082.pdf

Standards for the Construction, Installation and Maintenance of a Pit Privy: http://www.hss.gov.yk.ca/pdf/pit_privy.pdf

11.0 Fuel and Special Waste Storage and Handling

11.1 General

The proper storage and handling of fuel, spill response planning and training will reduce the potential of accidents and adverse environmental impacts from fuel spills.

11.2 Legislation

Table 11.1 *Quartz Mining Land Use Regulation Class Criteria for Fuel Storage*

Storage of Fuel	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria
Petroleum Fuel Storage, total amount stored	Not exceeding 5,000 l	Not exceeding 40,000 l	More than 40,000 l
Petroleum Fuel Storage, amount per container	Not exceeding 2,000 l	Not exceeding 10,000 l	More than 10,000 l

Source: *Guide to Hard Rock Prospecting, Exploration and Mining in Yukon, November 2007*

Table 11.2 *Territorial Land Use Regulation Fuel Storage Thresholds*

Storage of Fuel	No permit required	Class B Permit	Class A Permit
Petroleum Fuel Storage, total amount stored	< 4,000 l capacity	> 4,000 l capacity	> 80,000 l capacity
Petroleum Fuel Storage, amount per container	Single storage container with a capacity of < 2,000 l	Single storage container with a capacity of > 2,000 l	Single storage container with a capacity of > 4,000 l

Source: *Territorial Lands (Yukon) Act Regulations, March 31, 2003*

Operators are required to issue written notification to the Land Use office within 30 days of establishing fuel caches greater 400 litres and less than 4,000 litres or fuel caches with single storage container with a capacity of less than 2,000 litres. Written notification must include; the amount and type of fuel stored, size of containers, method of storage and the proposed date of removal of the fuel cache. Fuel caches located on territorial lands must be located at least 100 metres from any water body that continuously or intermittently contains water.

A YESAA assessment and a Decision Document will be required before land use permits or Class 2, 3 or 4 approvals may be issued.

Other Legislation and Regulations Applicable to Handling Fuel and Special Waste:

Environment Act Storage Tank Regulations:

The storage and handling of fuel is a major component of any exploration program. For small projects fuel is often transported and stored in 45 gallon (200 litre) drums. See fuel cache permit limits listed

11.0 Fuel and Special Waste Storage and Handling

above. For larger programs, or programs with road access, it is often more efficient to store fuel in storage tanks or portable fuel bladders. The *Environment Act* Storage Tank Regulations applies to containers in a fixed location with a capacity to store more than 4,000 litres. Permits must be acquired for the installation, modification, operation, removal or abandonment of any underground or aboveground tank used to store petroleum fuel with a capacity greater than 4,000 litres. National Standards apply to the installation and certification of storage tanks. Storage tank regulations also apply to aboveground tanks used to store hazardous substances other than petroleum products with a capacity greater than 2,000 litres. For more details on storage tank regulations check the following web site.

http://environmentyukon.gov.yk.ca/monitoringenvironment/EnvironmentActandRegulations/documents/str1_storage_tank_regulations_may07.pdf

Energy Mines, and Resources require that aboveground storage tanks (AST) be registered. See the following web site for the link to EMR AST Registration Form
http://www.gov.yk.ca/forms/forms/5000/yg5025_b.pdf

Environment Act Special / Hazardous Waste Regulations:

Typical waste produced during exploration operations includes: used engine oil and waste hydrocarbon fuels, solvents, anti-freeze and used automotive batteries. These waste products are categorized as “Special Waste” in Yukon. A Special Waste Permit is required if operations mix or dilute, generate, store or transport special waste.

Special Waste Transportation Permit Thresholds¹⁸:

- 5 kilograms or more of solid special wastes.
- 5 litres or more of liquid special waste other than waste oil.
- 5 kilograms or 5 litres or more of a mixtures of a solid waste and a liquid waste.
- 20 litres or more of waste oil.

For details on the transportation and application forms for Special Waste permits check the following website: http://www.environmentyukon.gov.yk.ca/monitoringenvironment/EnvironmentActandRegulations/documents/sw14_transportation_of_special_wastes_aug_2009.pdf

National Fire Code:

The National Fire Code addresses petroleum and special waste storage in and around buildings and structures and spill precautions. When setting up petroleum and/ or special waste storage facilities follow the National Fire Code (NFC) Guidelines which set out distances of storage areas from buildings and other facilities. See the NFC website for details http://www.nationalcodes.ca/nfc/index_e.shtml

Fire Prevention Act:

Under the *Fire Prevention Act* the Fire Marshall has the authority to inspect any premises. If there is evidence of risk the Fire Marshall can enforce National Fire Code standards. See the following web site for information on the Fire Marshall’s Office and the *Fire Prevention Act*.
<http://www.community.gov.yk.ca/fireprotection/index.html>

¹⁸ *Special Waste Regulations, Yukon Environment, August 2009* <http://www.environmentyukon.gov.yk.ca/>

11.0 Fuel and Special Waste Storage and Handling

Transportation of Dangerous Goods:

Transport Canada has the authority, under the *Canadian Transportation of Dangerous Goods Act* (<http://www.tc.gc.ca/eng/tdg/safety-menu.htm>), to develop regulations and set standards that apply to the labelling, packaging, handling and transportation of dangerous goods across Canada. Dangerous goods include special waste, explosives, radioactive material and, depending on the volume in one shipment, can also apply the transportation of supplies commonly used in exploration programs such as petroleum fuel and propane. The following web site, Federal Regulations Schedule 1, provides the thresholds for the transportation of dangerous goods: <http://www.tc.gc.ca/eng/tdg/clear-tofc-211.htm>

The *Yukon Dangerous Goods Transportation Act* (<http://www.gov.yk.ca/legislation/acts/dagotr.pdf>) applies to the transportation of dangerous goods on any highway in Yukon and is monitored by Carrier Compliance, HPV¹⁹.

If contracting a carrier to ship supplies classified as dangerous goods it is the responsibility of the carrier to ensure their personnel are properly certified to transport dangerous goods. The following web site provides information on the transportation of dangerous goods regulations, signage, forms and training. <http://www.thecompliancecenter.com/publications/tdgcl.htm>

Spill Regulations:

The Spills Regulations, under the *Environment Act*, require reporting any spill of a flammable liquid (diesel, heating oil, gasoline, jet fuel, kerosene etc.) over 200 litres, any spill of a flammable gas (propane etc.) over 100 litres and any spill over 0.5 litres of liquid special waste (including, antifreeze, solvents, waste oil and oil, after it hits the ground)²⁰. Additionally, the *Environment Act* contains wording that requires reporting a spill of a material that might be harmful to the environment in any amount that is above normal. To protect against failing to report Yukon Environment recommends reporting any spill that is “above normal”. For Yukon Government Spills Regulations check the following web sites http://www.gov.yk.ca/legislation/regs/oic1996_193.pdf <http://environmentyukon.gov.yk.ca/monitoringenvironment/spills.php>

In this Guide, Section 11.5 Fuel Spill Response provides information on what to do if a spill occurs and Appendix VI Spill Contingency Planning provides information on the format Spill Contingency Plans should follow based on the requirements set out in the *Environment Act* (s.121). Appendix VI also contains a generic sample of a Spill Report Form.

Yukon Occupational Health & Safety Regulations:

Workplace Hazardous Materials Information System (WHMIS) applies when handling hazardous materials. <http://www.web.yk.ca/ActsPoliciesAndRegulations/OccupationalHealthAndSafety/OccupationalHealthAndSafetyRegulations.aspx>

11.3 Potential Effects

The potential effects on the biophysical environment from spills and leaks of fuel and special waste can be significantly adverse resulting in contamination of soil, groundwater and surface water. Fuel and special waste that enters the environment can potentially destroy habitat causing fatalities in fish and wildlife populations, as well as be harmful to human health. Lack of proper training of personnel and inadequate signage and storage of fuel and special waste can also potentially cause explosions and fires.

¹⁹ Fuel Storage Authority in the Yukon, Yukon Energy, Mines, and Resources, Land Management Branch. Internal document May 2010.

²⁰ Spill Regulations, http://www.gov.yk.ca/legislation/regs/oic1996_193.pdf

11.0 Fuel and Special Waste Storage and Handling

The burning of special waste can cause air pollution. Site remediation as a result of poor management of fuel and special wastes can be very costly and may result in government authorities taking legal action against the operator.

11.4 Fuel Storage and Handling Best Management Practices

Fuels and chemicals must be stored in above ground storage facilities with the capacity to contain spills. There are many regulations that apply to the storage and handling of fuel and special waste. Before applying for permits and constructing any storage facility contact the government agencies to ensure you have all the correct information with regard to fuel storage.

Fuel Storage

- Fuel caches and storage areas on quartz claims should be located on stable ground and set back greater than 30 metres from the high water mark of any water body.
- Fuel caches and fuel storage areas located off claims must be set back at least 100 metres from the high water mark of any water body.
- Reduce the chance of fuel entering watercourses by grading the slope of the storage area away from watercourses. Ditches and drains can be dug to divert potential spilled fuel away from water bodies.
- Many argue that fuel drums should be stored upright, bung up, however most pilots do not want to see fuel stored in that fashion as water may enter the drum; drums sealed by the distributor are generally safely stored on their sides, partly used drums stored on their side should be checked for a tight seal first and positioned with the larger bung at the top of the drum, an empty drum can be stored upright but should be sealed tightly to avoid leaks when handling and to avoid ruining the drum for recycling.
- Storage containers should have proper fitting lids, bungs, caps or valves and be in good condition. Do not use fuel containers if leaking or rusty - remove from site.
- All fixed petroleum fuel storage containers with greater than 4,000 litres capacity must have secondary containment (*Quartz Mining Act Regulations Schedule 1 Operating Conditions Section 12* http://www.gov.yk.ca/legislation/regs/oic2003_064.pdf.)

Secondary containment systems include:

- ◇ Double walled storage tanks.
 - ◇ Steel or concrete container.
 - ◇ Prepared impermeable clay or earth dyke with impermeable material capacity to contain 110% of the storage volume; and
 - ◇ Any other material that forms an impermeable barrier and is resistant to the product stored.
- Fuel containers of 200 litres or greater should be clearly marked with the operators' name, type of petroleum product and date if applicable. Fuel spill response kits with the appropriate capacity to absorb a product spill must be located at every storage facility.

11.0 Fuel and Special Waste Storage and Handling

- Inspect fuel caches and storage facilities on a regular basis.
- Post no smoking signs.

Fuel Handling

- Ensure personnel and contractors are trained to handle and refuel aircraft and equipment following proper procedures.
- Containers should not be over filled.
- Use electric or manual fuel pumps – ensure hoses are in good shape and store the fuel hose above the drum to avoid fuel from siphoning off.
- Do not leave a fuel transfer unsupervised.
- When running equipment (like a pump) unsupervised near a water body provide secondary containment for the equipment where possible.
- If drums are used horizontally employ extra containment such as pop up berms and secondary drum containment containers; place absorbent pads under valves to catch drips and contain potential spills.
- Refuelling in riparian areas is not allowed except for refuelling water pumps, firefighting equipment or if equipment has broken down.
- When refuelling equipment in riparian areas secondary containment of the tank must be in place.
- Equipment operating near water bodies should be properly maintained and regularly inspected for any fuel, oil, hydraulic fluid or coolant leaks; a spill response kit should be available in the immediate area.
- Use drip pans and nozzle holders to contain drips and spills.
- Used oil filters and waste oil and fuel must be disposed of properly.
- Ensure tidy tanks / fuel drums are properly secured when transported in trucks or float planes.
- Follow Transportation of Dangerous Goods (TDG) placarding and manifest requirements for road transport of fuel; ensure workers receive appropriate training in TDG regulations. The following web site provides information on the transportation of dangerous goods regulations, signage, forms and training. <http://www.thecompliancecenter.com/publications/tdgcl.htm>.
- Post no smoking signs in the fuel storage area.



Example of a small fuel cache located a safe distance from any watercourse. Note signage indicating type of fuel (orange picket with sign attached), spill kit (grey and green plastic container located left of sign) and full drums are placed in a portable berm.

11.0 Fuel and Special Waste Storage and Handling

Helicopter transportation of fuel:

- ◇ Ensure drums are in good shape and caps and plugs do not leak.
- ◇ Use a barrel sling that is in good repair, single barrels can be put in a net but multiple full barrels are easily damaged when slung together in a net increasing the risk of long term leakage at the destination.
- ◇ Load the net or slings properly.
- ◇ Use caution when removing caps and bungs.
- ◇ Be aware that static electricity can occur under certain conditions and unload with caution.
- ◇ As with any slinging task, wear proper personal protective equipment.

11.5 Fuel Spill Response

- Develop a fuel spill response plan appropriate to the amount and types of fuel and chemicals used on site.
- Train personnel and contractors in proper spill response protocols.
- As previously stated in Section 11.2 Spill Regulations, under the *Environment Act*, require reporting any spill of a flammable liquid (diesel, heating oil, gasoline, jet fuel, kerosene etc.) over 200 litres, any spill of a flammable gas (propane etc.) over 100 litres and any spill over 0.5 litres of liquid special waste (including, antifreeze, solvents, waste oil and oil, after it hits the ground). Additionally, the *Environment Act* contains wording that requires reporting a spill of a material that might be harmful to the environment in any amount that is above normal. To protect against failing to report Yukon Environment recommends reporting any spill that is “above normal.”
- In the event of a spill the 24 hour Yukon Spill Report Centre must be notified²¹.
- See Appendix VI Spill Contingency Planning for details on spill response planning.



Stationary fuel containers with secondary containment. Note earth berm lined with plastic and signage posted at foot of stairs and on the fuel tanks.



Close up of the signage posted at the fuel depot outlining the rules for handling fuel.

²¹ *Options for Storing Special Waste, Special Waste Regulations, Yukon Government, May 2007* http://environmentyukon.gov.yk.ca/monitoringenvironment/EnvironmentActandRegulations/documents/sw4_storage_options_may07.pdf

11.6 Special / Hazardous Waste Storage and Handling

Special Waste regulations apply to storage, handling and transport of hazardous materials such as waste oil, fuel, antifreeze, used automotive batteries and solvents.

Special Waste Storage Facilities

- If storing special waste in single 45 gallon (200 litre) drums use drip pans or two containers (one placed inside another).
- Secondary containment systems are required if storing:
 - ◇ More than twenty four 45 gallon (200 litre) drums at one location, or
 - ◇ Using a single walled storage tank, or a
 - ◇ Double walled storage tank with a capacity greater than 50,000 litres
- Secondary containment systems can be made of plastic, clay, concrete or any other material that will not breakdown and must have an intake valve attached to the containment system.
- Review and follow the National Fire Code Guidelines, which stipulate distances from buildings (no closer than 6 metres), other tanks, fire access etc., when establishing storage areas.
- Containers should not be stored in the open; when storing special waste in an enclosed area ensure proper ventilation is in place to avoid the potential build up of toxic fumes.
- Label containers and post placards at storage facilities.



Close up of the secondary containment. Note the earth berm is lined with plastic, fuel nozzles placed in buckets to collect drips and signage is posted on the fuel tank.

Handling Special Waste

- Maintain records of the types of special wastes in and out of your storage areas, volume, origin and storage location.
- Never mix or dilute special wastes.
- Prevent contamination and leaks by ensuring containers are properly sealed.
- Routinely monitor storage equipment and facilities for leaks.
- Routinely ship special wastes to proper disposal facilities to avoid accumulating large volumes of waste at site. Note that for all but very small quantities of special waste, most placarding, shipping documentation, and transporter certification requirements consistent with the Transport of Dangerous Goods Regulations apply to the transport of special waste.

Note: For large projects that generate a lot of waste oil it may be cost effective to purchase a waste oil burning furnace. Waste oil furnaces must be approved of by the Yukon Government Protective Services Branch. A Special Waste/Air Emissions Permit is required to burn waste oil.

11.0 Fuel and Special Waste Storage and Handling

For information on Yukon Government regulations, management, storage and transportation of special / hazardous waste see: http://www.environmentyukon.gov.yk.ca/monitoringenvironment/EnvironmentActandRegulations/special_waste_regs.php.

11.7 Fuel and Special Waste Storage Site Reclamation

- If fuel is to be stored on site during seasonal closure document the condition, location and number of barrels or storage tanks.
- Remove all hoses, barrels, fuel bladders and storage tanks.
- If berms or ditches were constructed around the fuel storage facility remove all plastic impermeable material, flatten earth berms, fill in ditches and re contour the area.
- Pull topsoil and organic debris onto the site to promote revegetation, reseed if required.



Photo showing two different types of fuel storage systems. In the foreground a fuel bladder is stored within a portable berm surrounded by an electric fence. Note signage and spill kit (blue container). In the background a stationary fuel tank is placed in an earth berm lined with plastic. Note: proper storage and handling of fuel will reduce the potential effect of spills and the cost of site reclamation.

11.8 Fuel and Special Waste Handling and Storage References

Canadian Transportation of Dangerous Goods Act. <http://www.tc.gc.ca/eng/tdg/safety-menu.htm>

Canadian Transportation of Dangerous Goods in Clear Language, ICC The Compliance Centre Inc. <http://www.thecompliancecenter.com/publications/tdgcl.htm>

e3Plus: A Framework for Responsible Exploration, Section 12 Waste Management. Prospectors & Developers Association of Canada, March 2009. <http://www.pdac.ca/e3plus/index.aspx>

Energy, Mines, and Resources Aboveground Storage Tank Registration Form http://www.gov.yk.ca/forms/forms/5000/yg5025_b.pdf

Environmental Regulations Affecting Mining and Mineral Exploration; Yukon Environment, April 2008. http://www.environmentyukon.gov.yk.ca/monitoringenvironment/EnvironmentActandRegulations/documents/ea4_enviro_regs_mines.pdf

Federal Regulations Schedule 1, Thresholds for the transportation of dangerous goods. <http://www.tc.gc.ca/eng/tdg/clear-tofc-211.htm>

11.0 Fuel and Special Waste Storage and Handling

Fuel Spill Contingency Plan Guidelines

http://www.yukonwaterboard.ca/forms/fuel_spill_contingency_plan.pdf

Handbook for Mineral and Coal Exploration in British Columbia, A Working Guide. Association of Mineral Exploration British Columbia, Ministry of Energy, Mines and Petroleum Resources, Ministry of Environment British Columbia, Mining Association of British Columbia, 2008/09 Edition.

<http://www.amebc.ca/resources-and-publications/resources-overview.aspx>

National Fire Code (NFC) Guidelines, National Research Council of Canada

<http://www.nrc-cnrc.gc.ca/eng/ibp/irc/codes/05-national-fire-code.html>

Options for Storing Special Waste, Special Waste Regulations. Yukon Government, May 2007

<http://www.environmentyukon.gov.yk.ca/monitoringenvironment/>

Quartz Mining Act Regulations Schedule 1 Operating Conditions Section 12 secondary containment.

http://www.gov.yk.ca/legislation/regs/oic2003_064.pdf

Special / Hazardous Waste Regulations. http://www.environmentyukon.gov.yk.ca/monitoringenvironment/EnvironmentActandRegulations/special_waste_regs.php

Spill Reporting. <http://environmentyukon.gov.yk.ca/monitoringenvironment/spills.php>

Spills Regulations. http://www.gov.yk.ca/legislation/regs/oic1996_193.pdf

Storage Tank Regulations. http://environmentyukon.gov.yk.ca/monitoringenvironment/EnvironmentActandRegulations/documents/str1_storage_tank_regulations_may07.pdf

WHMIS Regulations <http://www.wcb.yk.ca/ActsPoliciesAndRegulations/OccupationalHealthAndSafety/OccupationalHealthAndSafetyRegulations.aspx>

Yukon Transportation of Dangerous Goods Act. <http://www.gov.yk.ca/legislation/acts/dagotr.pdf>

12.0 Line or Corridor Cutting and Ground Surveys

12.1 General

Line cutting is used to establish a grid over an area. Grids provide points of references for geological surveys such as soil sampling, geological mapping, ground geophysical surveys, trenching and drilling. The grid line spacing is determined by the level of detail required for the ground survey and/or drill program. The baseline or centre line of the grid is usually the widest line and cut so the grid can be re-established if the project is halted for a period of time. The cross lines usually are flagged and blazed and only cut if the bush is dense, making it difficult to conduct the ground survey. Cut lines in mineral exploration are rarely wider than 1.5 metres. Pickets are placed at regular intervals (25, 50 or 100 meter spacing) and used as stations or reference points to take instrument readings, place drill pads or trenches.

Ground surveys include geophysical surveys where magnetic, electrical, electromagnetic, radiometric, or gravimetric observations are made with sensors carried through the bush or along cut lines. Some ground surveys, such as induced polarization surveys may involve passing electric current through the ground and through energized wires placed temporarily along cut lines. Some electromagnetic surveys require temporary, large, electrically energized, wire loops to be laid out along lines while observations are made. Ground surveys also include geochemical surveys where samples of soil are collected from holes dug by shovel, mattock or soil auger and in some instances gas powered, hand held, soil augers.

A corridor as used in the Quartz Mining Land Use Regulation means a path along which trees and brush are cut but the land surface is not trampled or compacted by equipment passage as could be the case for a trail. A corridor might be used for a water line connecting a drill and a pump at a water source.

12.2 Legislation

Table 12.1 *Quartz Mining Land Use Regulation Class Criteria for the Construction of Lines and Corridors*

Construction of Lines and Corridors	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria
Construction of lines	Not exceeding 1.5 m in width and cut by hand or with hand-held tools	More than 1.5 m in width and cut with tools that are not hand-held	More than 1.5 m in width and cut with tools that are not hand-held
Construction of corridors, width	Not exceeding 5 m in width	Not exceeding 5 m in width	Not exceeding 10 m in width
Construction of corridors, length	Total length not exceeding 0.5 km	Total length not exceeding 0.5 km	Total length of more than 0.5 km

Source: *Guide to Hard Rock Prospecting, Exploration and Mining in Yukon, November 2007*

Territorial Land Use Regulation for the Construction of Lines, Trails and Right-of-ways

Off claims or as part of a coal exploration program the line cutting provisions of the Land Use Regulation would apply. Line cutting on a third party mineral claim would imply a violation of the exclusive right to prospect for minerals granted to a claim holder but it is conceivable that it might be necessary to cut a corridor to access water for example, in that case the Land Use Regulation would also apply but there is no reference to a corridor in those regulations and the feature would be considered a line, trail or right-of-way.

12.0 Line or Corridor Cutting and Ground Surveys

Table 12.2 *Territorial Land Use Regulation* Construction of Lines, Trails and Right-of-ways Thresholds

Construction of Lines, trails and right-of-ways	No permit required	Class B Permit	Class A Permit
Site clearing for lines, trails, or right-of-ways including levelling, cutting, grading or snow ploughing	< 1.5 m in width	> 1.5 m in width but <u>not</u> exceeding 4 ha in area	> 1.5 m in width and exceeding 4 ha in area

Source: *Territorial Lands (Yukon) Act Regulations, March 31, 2003*

Most ground surveys, by themselves, would not require a specific permit or approval in Yukon, whether carried out on claims or not. Ground surveys should never be carried out on third party mineral claims without the expressed written consent of the claim holder as it would be a violation of the exclusive right to prospect for minerals.

A YESAA assessment and a Decision Document will be required before land use permits or Class 2, 3 or 4 approvals may be issued.

Yukon Occupational Health & Safety Regulations Part 4 Hand Tools and Power Driven Portable Tools apply when using chains saws and other power tools used to cut lines and corridors.

12.3 Potential Effects

Line or corridor cutting does not result in any adverse impacts on the environment; however some equipment used to conduct some geophysical surveys, such as wires, has the potential to impact wildlife if they get tangled up in it. Surveys using electrically charged wires or loops can pose an electrical hazard to other users of the land. Wire or electrode material, if not cleaned up after the survey, can be unsightly and create a nuisance or hazard to people and wildlife. Lines, particularly newly cut lines, can cause issues in populated areas as they are visible changes to the scenery, however, lines will quickly fade and become overgrown. Hip chain thread is a leading nuisance complaint along with excessive flagging. In populated areas recreational users may initially complain of new lines but will often adopt some conveniently located lines for use as trails.

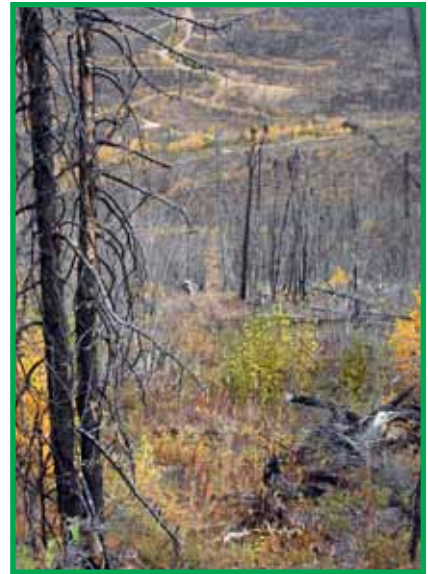
12.4 Line or Corridor Cutting and Ground Survey Best Management Practices

- Minimize footprint by flagging in lines rather than cutting when possible.
- Keep cut lines as narrow as possible.
- When practicable avoid cutting lines; use a GPS and limited amounts of flagging to set up a grid.
- Use only biodegradable hip chain thread or if working in pairs, use a nylon chain instead.
- Consider using biodegradable flagging (lasts approximately 2 years).

12.0 Line or Corridor Cutting and Ground Surveys

Avoid risk of potential fire hazards by:

- ◊ Avoid over heating chainsaws
- ◊ Douse cigarettes with water and pack cigarette filters out; and
- ◊ During the summer check local forest fire danger ratings and consider curtailing line cutting activities when the danger ratings are High or Extreme
- Pile cut brush in such a way that it does not block movement of wildlife or impede trap lines or trails.
- Whenever possible, cut branches from trees rather than cutting down trees.
- Fall leaning trees caused by line cutting.
- Buck up any brush and lay flat on the ground to promote faster decomposition and to reduce fire hazard.
- Cut vegetation close to the surface – avoid leaving poles or spikes for safety reasons.
- Stockpile economically viable merchantable timber (in general merchantable timber is considered any tree greater than 10 centimetres in diameter at chest height).
- If possible do not cut lines directly to a shoreline - keep a buffer zone of vegetation along shorelines, public trails and roads to reduce visibility of cut lines.
- Lines parallel to lakes or streams must be cut at least 30 metres away from high water mark.
- At shorelines place flagging above the high water mark, not in streams or lakes.
- For geophysical surveys ensure wires are kept close to the ground to avoid wildlife from becoming entangled; remove wires as soon as possible after the survey is completed.
- If high powered electrical systems are used for IP surveys be sure other workers or land users in the area are aware and warned to avoid the wires.



Keep cut lines as narrow as possible and consider using biodegradable flagging.

12.5 Line or Corridor Cutting and Ground Survey Reclamation

When the program is completed:

- Ensure all garbage, fuel, metal spikes, foil for electrodes and wires are removed from site.
- Remove pickets from ice before break up.
- Ensure any fuel spills have been cleaned up and remove any absorbent pads.
- If the terrain is steep and/or the cut lines are located in areas where erosion may occur as a result of foot or low impact vehicle traffic consider reseeding the area to stabilize the ground or employ other

12.0 Line or Corridor Cutting and Ground Surveys

revegetation methods. See Section 21 Closure and Reclamation for Exploration Activities for a discussion of revegetation.

- If warning signs were put out because of electrical hazards from IP surveys then remove them at the end of the survey.

12.6 Line or Corridor Cutting References

Draft Handbook of Reclamation Techniques and Mining Land Use; A Guide to Compliance with the Yukon Quartz Mining Land Use Regulation and Other Applicable Environmental Regulations in Mining Exploration and Development. Yukon Government Energy Mines and Resources November 30, 2006.

http://www.emr.gov.yk.ca/mining/pdf/handbook_of_reclamation_techniques_and_mining_land_use.pdf

e3Plus: A Framework for Responsible Exploration, Section 5 Land Disturbance. Prospectors & Developers Association of Canada, March 2009. <http://www.pdac.ca/e3plus/index.aspx>

Handbook for Mineral and Coal Exploration in British Columbia, A Working Guide. Association of Mineral Exploration British Columbia, Ministry of Energy, Mines and Petroleum Resources, Ministry of Environment British Columbia, Mining Association of British Columbia, 2008/09 Edition. <http://www.amebc.ca/resources-and-publications/resources-overview.aspx>

Handbook of Reclamation Techniques in the Yukon, Indian Affairs and Northern Development, 1999

Yukon Occupational Health and Safety Regulations, Part 4 Hand Tools and Power Driven Portable Tools <http://www.wcb.yk.ca/ActsPoliciesAndRegulations/OccupationalHealthAndSafety/Default.aspx>



If surveys require the use of wires or metal spikes remove these and any other garbage from site once the survey has been completed.

13.0 Vehicles: Use on Trails, Roads and Off-Road

13.1 General

Various types of vehicles are used when conducting exploration programs. All vehicles have the potential to impact the environment. The right vehicle for the job and proper operation can help reduce potential environmental impacts and accidents. Vehicles commonly used on trails and off road include ATV's and snowmobiles. These vehicles are considered low pressure or low impact. Trucks and heavy equipment of various tonnages may also be used during exploration.

Motor boats, such as small metal boats, or inflatable boats may also be used to transport equipment and crews if the project is located near lakes or large rivers.

13.2 Legislation

Table 13.1 *Quartz Mining Land Use Regulation Class Criteria for Use of Roads and Trails*

Use of Roads and Trails	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria
Use of vehicles on existing roads or trails	Within the design limits or tolerances of the road or, if design limits or tolerances of roads or trails are not known, vehicles with a gross weight of less than 40 t for roads, and less than 20 t for trails	Within the design limits or tolerances of the road or, if design limits or tolerances of roads or trails are not known, vehicles with a gross weight of less than 40 t for roads, and less than 20 t for trails	Within the design limits or tolerances of the road or, if design limits or tolerances of roads or trails are not known, vehicles with a gross weight of more than 40 t for roads, and less than 20 t for trails
Off-road use of vehicles in summer	Low ground pressure vehicles only	Vehicles with a gross vehicle weight not exceeding 20 t, that are used over a distance of not more than 15 km	Vehicles with a gross vehicle weight of more than 20 t, that are used over a distance of not more than 40 km per year
Off-road use of vehicles in winter	Low ground pressure vehicles or vehicles with a gross vehicle weight not exceeding 40 t, used over a distance of not more than 15 km	Vehicles other than low ground pressure vehicles, used over a distance of not more than 25 km	Vehicles other than low ground pressure vehicles, used over an unlimited distance

Source: *Guide to Hard Rock Prospecting, Exploration and Mining in Yukon, November 2007*

See Section 14 for construction best practices and regulatory requirements for trails, roads or winter roads.

Territorial Land use regulations for the use of roads and trails will apply off claims, third party claims and in coal exploration.

13.0 Vehicles: Use on Trails, Roads and Off-Road

Table 13.2 Territorial Land Use Regulation Vehicle Use Thresholds

Vehicle Use	No permit required	Class B Permit	Class A Permit
Vehicle use on non-public roads or trails <u>not</u> maintained under the <i>Highways Act</i>	< 5 t net vehicle weight, or any vehicle that exerts pressure on the ground less than 35 k pa	> 5 t net vehicle weight, or any vehicle of any weight that exerts pressure on the ground greater than 35 k pa	> 10 t net vehicle weight

Source: Territorial Lands (Yukon) Act Regulations, March 31, 2003

A YESAA assessment and a Decision Document will be required before land use permits or Class 2, 3 or 4 approvals may be issued.

Other legislation that may be applicable include vehicle registration, boater training, ATV safety etc. but the details are beyond the scope of this Guide.

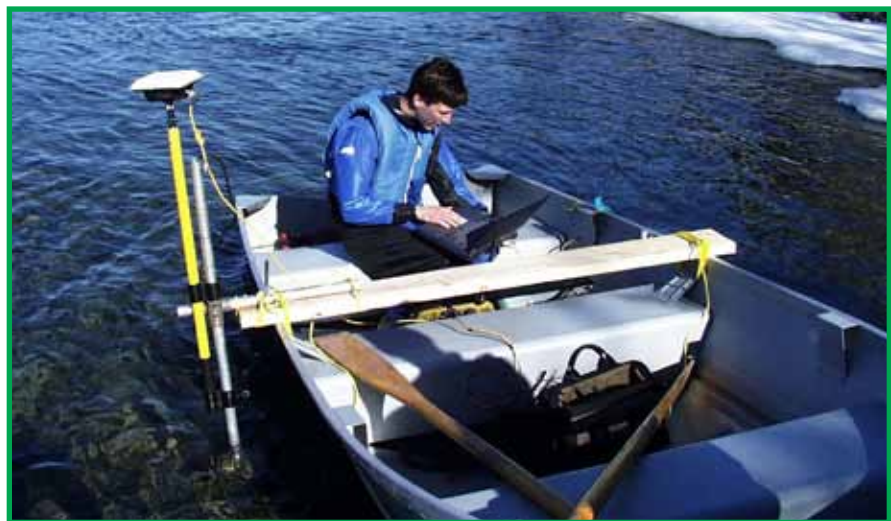
13.3 Potential Effects

Potential effects from vehicle use, both off and on road, can include rutting, gouging, destruction of permafrost and soil erosion. As well, riparian habitat can be destroyed if vehicles ford streams from an inappropriate angle or location causing river banks to erode. Fish habitat and spawning grounds can also be destroyed if stream beds are used as access routes. Vehicle use can cause wear on trails that are frequented by other land users. Noise and dust can be nuisance issues in populated areas. In alpine areas poorly thought out vehicle use can create unsightly and highly visible scars that are essentially permanent.

13.4 Vehicle Use Best Management Practices

Licences and Safety Equipment

- Ensure all company personnel and contractors have valid licences (drivers licence, watercraft operators licence) to operate equipment.
- Train personnel and contractors to use vehicles in a safe manner.
- Ensure all company and contract vehicles are equipped with appropriate safety equipment (helmets, life jackets, seat belts).



Ensure all vehicles and personnel are equipped with proper PPE. Note the boat operator, who is collecting environmental baseline data, is wearing a life preserver.

13.0 Vehicles: Use on Trails, Roads and Off-Road

- If the use of personal protective equipment (PPE), such as helmets for certain types of vehicles, is not mandatory by law develop appropriate company policies with regard to PPE. Clear company policies will standardize the use of PPE's among company personnel and contractors.

Trail, Road and Off-Road Use

- Determine if trails are on public or privately owned land, if on private land, or on land otherwise lawfully occupied, acquire proper authorization to access and use.
- Ground truth routes prior to use to avoid sensitive areas or habitat (alpine, wetlands, breeding grounds).
- When crossing a stream is necessary during off-road vehicle use, inspect the shoreline, look for a stable gentle sloping area, avoid crossing at steep slopes that might result in erosion.
- Cross streams at right angles, do not drive down stream beds.
- For off road and trails, when possible, access area when the ground has snow cover or is frozen.
- Avoid using tracked vehicles when there is no snow cover or when the ground is not frozen.
- Dozers should travel with the blade up so as not to remove vegetative mat.
- Inspect and maintain trails and roads on a regular basis; take corrective measures if erosion, rutting, gouging or natural drainage systems are compromised on sections of the trail or road.
- If rills and/or gullying occurs, stop use of the trail or road until the problem is corrected.



ATV's are often used in exploration programs. Prior to accessing a site determine if trails and roads are on public or privately owned land, and make sure the type of vehicle used will not cause rutting and erosion.

13.5 Vehicle Reference

Draft Handbook of Reclamation Techniques and Mining Land Use; A Guide to Compliance with the Yukon Quartz Mining Land Use Regulation and Other Applicable Environmental Regulations in Mining Exploration and Development. Yukon Government Energy Mines and Resources November 30, 2006 http://www.emr.gov.yk.ca/mining/pdf/handbook_of_reclamation_techniques_and_mining_land_use.pdf

e3Plus: A Framework for Responsible Exploration, Section 5 Land Disturbance. Prospectors & Developers Association of Canada, March 2009. <http://www.pdac.ca/e3plus/index.aspx>

Handbook for Mineral and Coal Exploration in British Columbia, A Working Guide. Association of Mineral Exploration British Columbia, Ministry of Energy, Mines and Petroleum Resources, Ministry of Environment British Columbia, Mining Association of British Columbia, 2008/09 Edition. <http://www.amebc.ca/documents/resources-and-publications/publications/current/MXHandbook2008-09.pdf>

Land Use Guidelines Access Roads and Trails, Land Resources, Northern Affairs Program. 1984

14.0 Construction of Trails, Roads and Winter Roads

14.1 General

The proper construction of trails and roads is critical to avoiding potential adverse environmental impacts. Access routes should be constructed to protect community and domestic watersheds, minimize impacts to wildlife and wildlife habitat, protect fish and fish habitat and, where possible, minimize visual impacts. In the past access roads may have been constructed using bulldozers and not much forethought but today it is common to use lighter and more versatile equipment such as backhoes. In the hands of a skilled, experienced and caring operator a backhoe can build a road that can be readily reclaimed. Backhoes can cause much less impact near water bodies as well.

In the context to the Quartz Mining Land Use Regulation a trail is defined as an access to a site on a claim that is constructed with little or no movement of rock or earth, while a road is built with movement of earth or rock. The regulation also speaks to “isolated roads” and “access roads”; the latter connect to a highway or a private road and the former do not connect. The Regulation also speaks to a “temporary trail” without providing a definition beyond the implication that a temporary trail is to be blocked at the end of each season. The Land Use Regulation does not make these distinctions among roads and trails off claims.

Winter Roads are seasonal passages that are built on frozen ground by plowing snow but otherwise not cutting into the vegetative mat. Vegetation will be trampled and trees may be removed where necessary. The season for winter road use is determined by land use inspectors according to the prevailing weather.

14.2 Legislation

Table 14.1 *Quartz Mining Land Use Regulation Class Criteria for the Construction of Trails and Roads*

Construction of Roads and Trails	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria
Establishing new access roads, per exploration program	Not authorized	Not exceeding 5 km	Not exceeding 15 km
Upgrading of access roads, per exploration program	Not authorized	Not exceeding 10 km	Not exceeding 30 km
Establishment of trails, other than temporary trails, per exploration program	Not authorized	Not exceeding 10 m in width and 15 km in total length	Not exceeding 15 m in width and 40 km in total length

14.0 Construction of Trails, Roads and Winter Roads

Construction of Roads and Trails	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria
Establishing or using temporary trails, per exploration program	<p>Not authorized on Category A Settlement Land or on Category B Settlement Land.</p> <p>On Land other than Category A Settlement Land or Category B Settlement Land, establishing a temporary trail or using a temporary trail that was established for another program if:</p> <ul style="list-style-type: none"> the temporary trail width does not exceed 7 m or 1 m more than the width of the equipment to be moved along the temporary trail, which ever is less; the total temporary trail length does not exceed 3 km; and the temporary trail is only used for the purpose of moving sampling equipment between test sites 	Not exceeding 10 m in width and 15 km in total length	Not exceeding 15 m in width and 40 km in total length

Source: *Guide to Hard Rock Prospecting, Exploration and Mining in Yukon, November 2007*

14.0 Construction of Trails, Roads and Winter Roads

Territorial Land Use Regulation for the Construction of Trails and Roads applies off claims, on third party claims and in coal exploration.

Table 14.2 *Territorial Land Use Regulation* Site Clearing for Trails and Roads Thresholds

Site clearing for Trails and Roads	No permit required	Class B Permit	Class A Permit
Site clearing for lines, trails, or right-of-ways including levelling, cutting, grading or snow ploughing	< 1.5 m in width	> 1.5 m in width but <u>not</u> exceeding 4 ha in area	> 1.5 m in width and exceeding 4 ha in area
Equipment Use: 1) Self propelled power driven machines used for moving earth or clearing land of vegetation 2) Stationary power driven machines used for hydraulic prospecting, moving earth or clearing land, <u>other than a power saw</u>	Requires Class A permit	Requires Class A permit	Requires Class A permit

Source: *Territorial Lands (Yukon) Act Regulations, March 31, 2003*

Other Legislation

Permits are required, under the *Highways Act*, to tie an access road into the highway and to install and maintain signage on a highway.

A YESAA assessment and a Decision Document will be required before land use permits or Class 2, 3 or 4 approvals may be issued.

14.3 Potential Effects

The construction of trails and roads is one of the most controversial of all exploration activities due to the visual and biophysical impacts roads have on the landscape. Trails and roads provide enhanced access to areas that were previously remote causing increased pressure on wildlife populations and sensitive habitat due to increases in hunting and other activities. Improperly constructed or poorly maintained trails and roads can cause soil erosion and in areas of permafrost, slumping. Forging streams or driving down stream beds can destroy riparian and fish habitat.

14.0 Construction of Trails, Roads and Winter Roads

14.4 Road and Trail Construction Best Management Practices

Pre-planning: Choosing the Best Route

Wherever possible use existing trails and roads. If using existing trails and/or roads;

- Determine if the road is publically or privately owned.
- Make upgrades to ditches, culverts and other erosion control structures, as necessary.
- Re-route portions of trails and roads if located in environmentally sensitive areas.

New routes should be chosen to avoid:

- Sensitive wildlife habitat.
- Other sensitive areas such as mineral licks, wetlands, alpine areas.
- Archaeological or historic sites (see Appendix III Archaeological and Historic Sites for reporting protocols if new sites are found during road construction).
- Seepage zones, always choose the driest route possible.
- Areas with erratic slope changes, these areas require extensive cut and fill requirements increasing the cost of construction and impact.
- Steep areas, maximum grades of 8 to 10% are desirable.
- North facing slopes, permafrost is more likely to be located on north facing slopes.
- Routes should follow topography making use of natural benches and flatter slopes to avoid extensive cut and fill.
- Where practicable routes should be planned to not be visible from recreational areas.
- Stream crossings should be kept to a minimum.



Trails and roads should not be constructed wider than required to bring equipment safely to site.

14.0 Construction of Trails, Roads and Winter Roads

Design

- Plan to minimize potential for erosion which will reduce the generation of sediment and the need for sediment control.

Plan ahead for reclamation:

- ◇ Remove and stockpile topsoil and overburden; and
- ◇ Do not push brush and trees into standing timber, trees should be bucked up and set aside to be used for reclamation or piled for burning with useable wood piled for possible salvage.
- The design and layout of the road (grade, bridge or culvert crossings, drainage systems, avoid sharp corners) must be consistent with safety and expected traffic needs.
- Trails and roads should not be constructed any wider than required to bring equipment safely to site.
- Spend time identifying which segments of the trail or road will require drainage and then choose the appropriate type of drainage system to prevent erosion.
- Design ditches and culverts to accommodate a 1 in 100-year storm or flood event.
- If a riparian area cannot be avoided (will require proper permits) consider reducing the width of the road for that section of the road, if it is safe to do so.

Construction of Trails and Roads

- Minimize potential for erosion at all times; this is best achieved by minimizing the size of area to be cleared of vegetation and by revegetating disturbed areas as soon as possible.
- Flag proposed route on foot at least 2 kilometres in advance of construction. This will allow for rerouting of the trail or road to avoid wetlands, steep slopes and other potential problem areas that may not have been obvious from topographic maps and air photos.
- Keep the removal of vegetation and trees to a minimum, this will help prevent erosion.
- Reclamation will be simplified if soil, organics and vegetation spoils are segregated during construction.
- If possible, the construction of trails and roads should not occur during heavy rains.
- If sediment control structures are required, ensure that they are in place during construction (silt fences, straw bales, settling ponds).
- Grade road to allow surface water to drain off of the road surface and into ditches and culverts.
- Check that road fill and surfacing material is not potentially acid generating and is not metal leaching. The presence of sulphide minerals may indicate material is not suitable for road building.
- To keep dust from blowing on vegetation and reducing visibility, avoid surfacing the road with fine material.

14.0 Construction of Trails, Roads and Winter Roads

Erosion Prevention and Drainage Control

Erosion prevention is about minimizing situations where erosion can occur. Controlling drainage to prevent erosion and wash outs is the most important issue when constructing trails or roads. With good planning, drainage systems can be constructed to prevent many erosion issues which cause the deterioration of trails and roads.

The characteristics of each site such as rapid runoff, shallow soils, steep slopes, permafrost, vegetation cover and slope aspect will determine the types of drainage systems to be constructed to prevent rutting, gouging, washouts and erosion. The following lists the types of drainage control systems that can be put in place to prevent erosion.

Water Bars

Water bars are small shallow ditches, with gently sloping berms on the downhill side of the ditch, used to divert surface water from running on the road surface or trail. Water bars should be shallow enough to drive vehicles over and should not intercept the main ditch line.

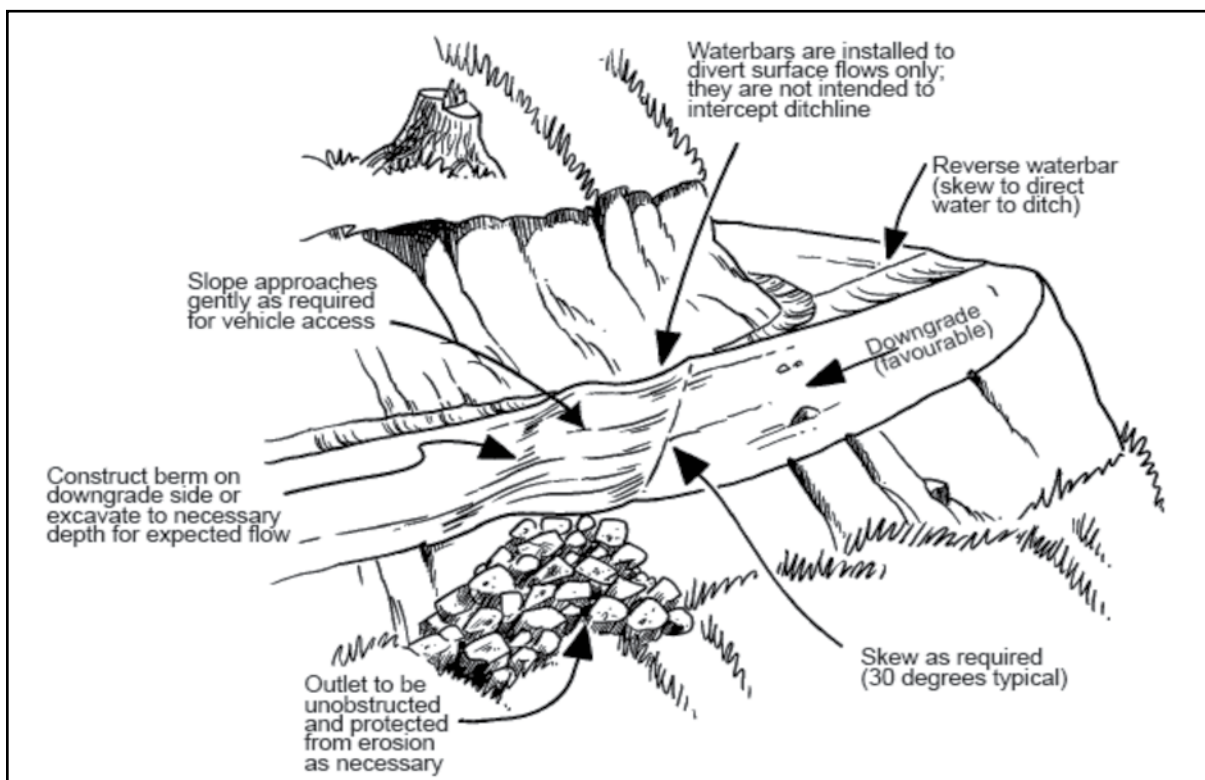


Figure 14.1 Water bars are used to direct surface runoff from the road to the low side but do not intercept the ditch line. (Source, Draft Handbook of Reclamation Techniques and Mining Land Use; A Guide to Compliance with the Yukon Quartz Mining Land Use Regulation and Other Applicable Environmental Regulations in Mining Exploration and Development. Yukon Government Energy Mines and Resources November 30, 2006)

14.0 Construction of Trails, Roads and Winter Roads

Water bars:

- ◇ Are used to divert surface runoff only.
- ◇ Should not be perpendicular to road surface, but angled.
- ◇ Should be installed in the fall as a means to divert spring runoff; and
- ◇ The outlet of the water bar should be protected from erosion by placing rock or other rip rap type material.



Construction of a water bar to divert surface runoff. Water bars should be constructed at an angle and in the fall to help divert spring runoff.



Water bar in action. Note surface water is diverted from flowing down the road surface.

Sloped Drainage System

In-sloping or out-sloping of a surface helps control runoff without ditches or cross drains. In-sloping directs runoff to remain in the road cut while out-sloping directs runoff across the road to the shoulder. This technique should only be used for roads with less than 6% grade.

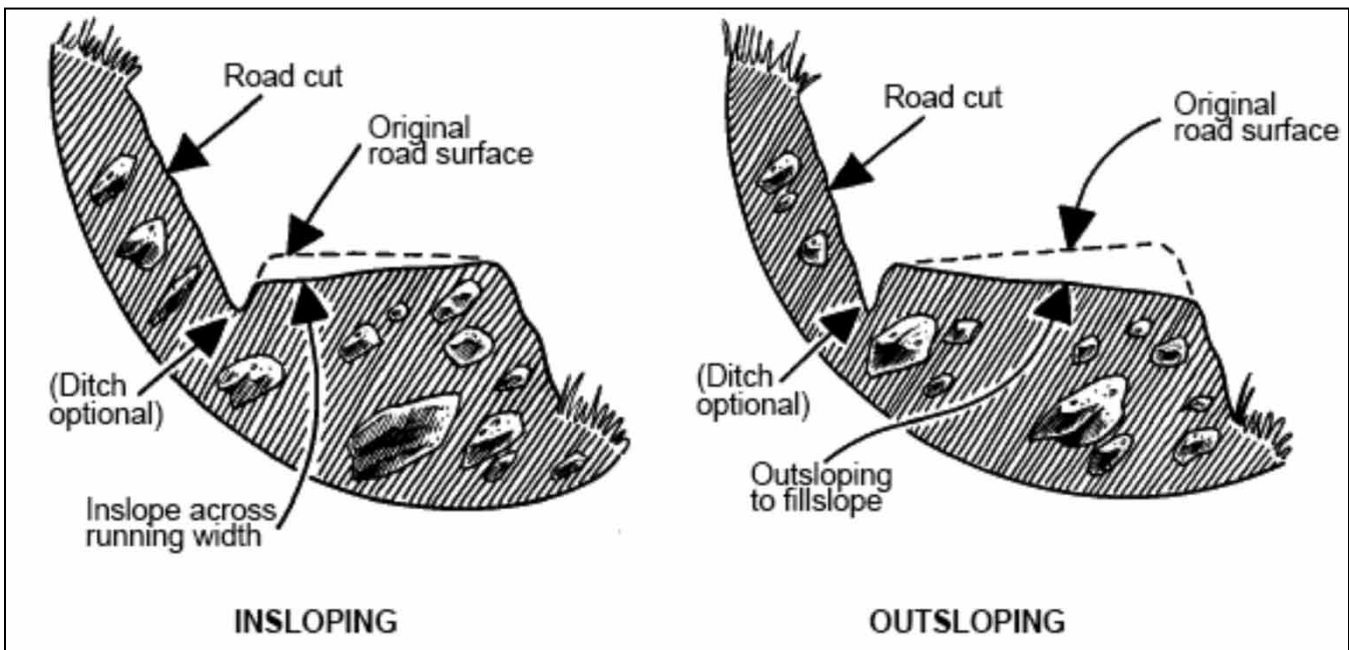


Figure 14.2 Cross section of sloped drainage structures. (Source, Draft Handbook of Reclamation Techniques and Mining Land Use; A Guide to Compliance with the Yukon Quartz Mining Land Use Regulation and Other Applicable Environmental Regulations in Mining Exploration and Development. Yukon Government Energy Mines and Resources November 30, 2006)

14.0 Construction of Trails, Roads and Winter Roads

Ditches and Culverts

- Ditches and culverts should be spaced close enough to catch surface runoff and underground flows, and direct these flow to the low side of the trail or road, keeping the roadbed well drained without concentrating discharges onto lower slopes.
- Ditches should be “u” shaped (wide with flat bottoms), not “v” shaped. V shaped ditches increase the water velocity resulting in increased erosion and sedimentation and blockage of the ditch.
- Ditches and culverts should be designed to not discharge directly into streams or onto erosion-prone or unstable slopes. The following methods can be used to achieve this:
 - ◇ Divert flows into sumps or onto land with stable vegetation that will act as a sediment filter.
 - ◇ Use brush and slash as a natural sediment filter by placing it along the toe of a slope.
 - ◇ Riprap can be placed along the length of a ditch or at the outflow of a drainage control feature to minimize erosion.
- Ditches will fail if the side walls are unstable. Ditch construction and maintenance should ensure that the side walls of ditches are cut at stable slope angles. The slope angle will be determined by how steep the road grade is and soil texture. This would be determined on site during construction.



Ditches and culverts should be designed not to discharge water directly into watercourses or onto erosion prone slopes. Note the ditch is “u” shaped.

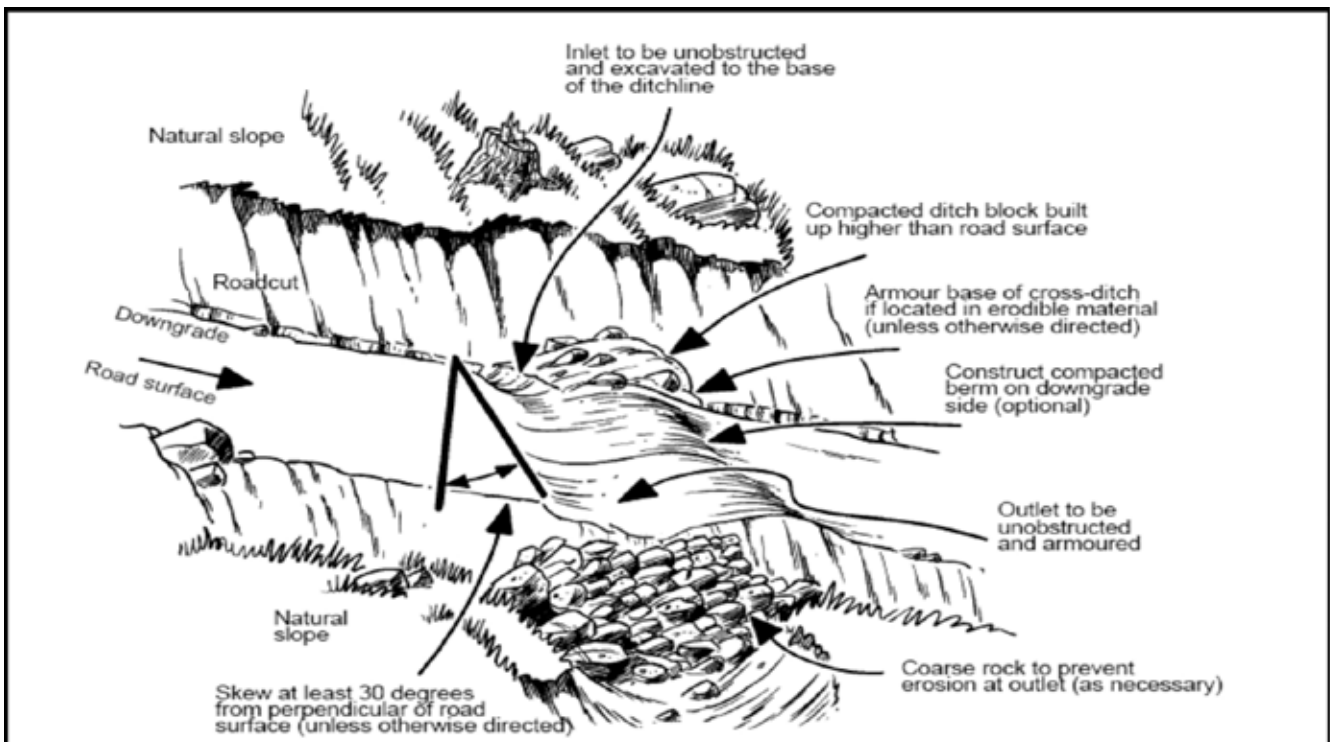


Figure 14.3 Cross ditches can help get the water across the road before it builds up too much momentum. (Source, Draft Handbook of Reclamation Techniques and Mining Land Use; A Guide to Compliance with the Yukon Quartz Mining Land Use Regulation and Other Applicable Environmental Regulations in Mining Exploration and Development. Yukon Government Energy Mines and Resources November 30, 2006)

14.0 Construction of Trails, Roads and Winter Roads

- On road grades greater than 5% ditch revegetation should be encouraged to help prevent erosion especially in fine textured soil.
- Use cross ditches where required to limit the amount of water flowing through a ditch as a method to prevent potential erosion and/or flooding.
- At bridge or culvert crossings install adequate cross drains to minimize the water volume directed into approach ditches. Cross ditches should be used at bridge crossings to reduce the volume of ditch water that must be handled by the approach ditches. See Figure 14.4 for examples of how cross ditches can be placed to avoid sediment laden ditch water from entering streams.

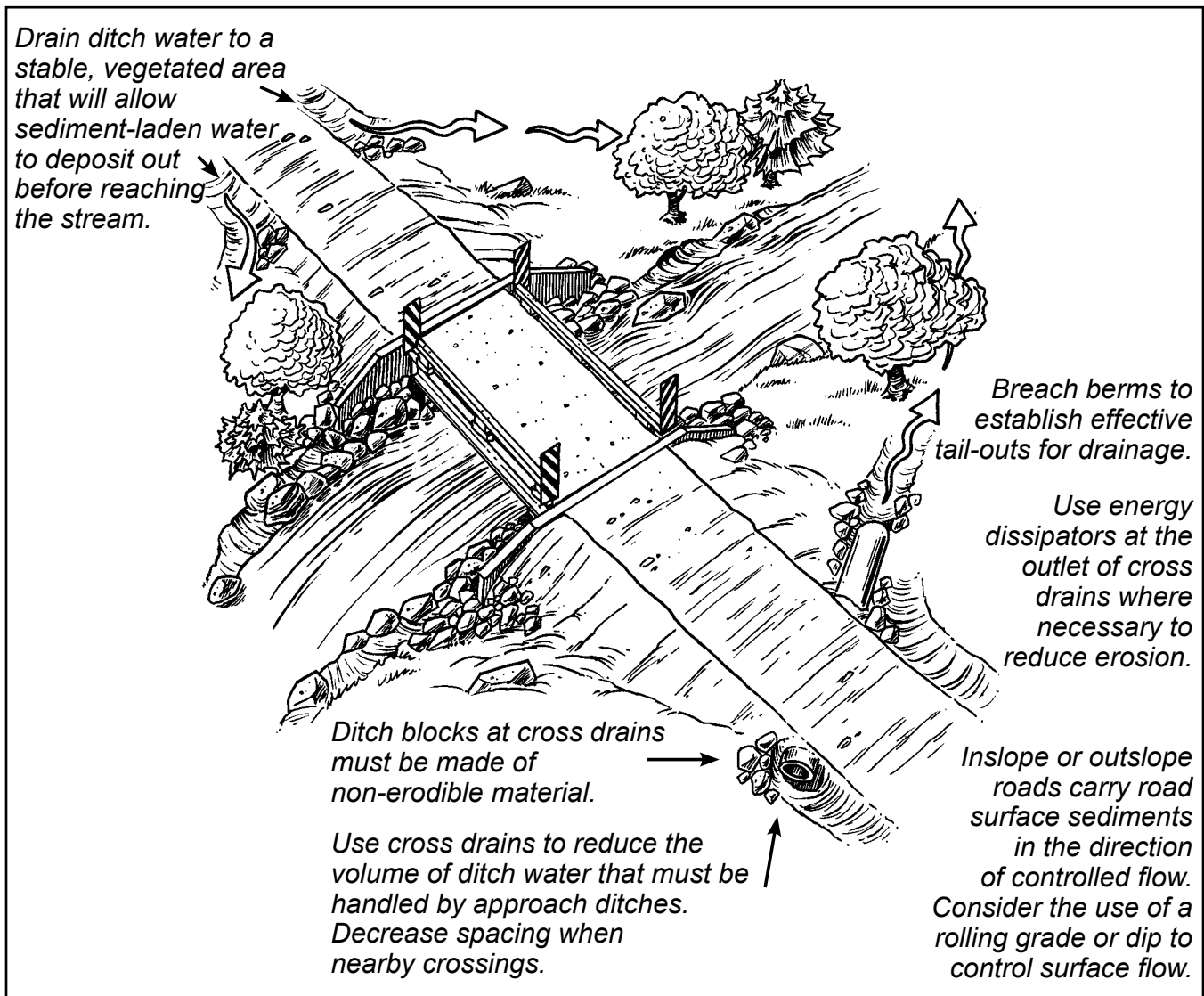


Figure 14.4 Road Drainage at Stream Crossing (Source Fish Stream Crossing Guidebook. BC Ministry of Forests, 2002)

14.0 Construction of Trails, Roads and Winter Roads

Cross Drains

Cross drains are culverts used to direct water flow from ditches across or under a trail or road surface.

- If the ground is soft support the culvert with rock.
- Slope the cross drain at least 2% but not more than 20%.
- Construct parallel ditches on steep slopes.
- Use ditch berms constructed of coarse material, to direct flow into the culvert. Ditch blocks should be approximately 0.3 metres below the road or trail surface.

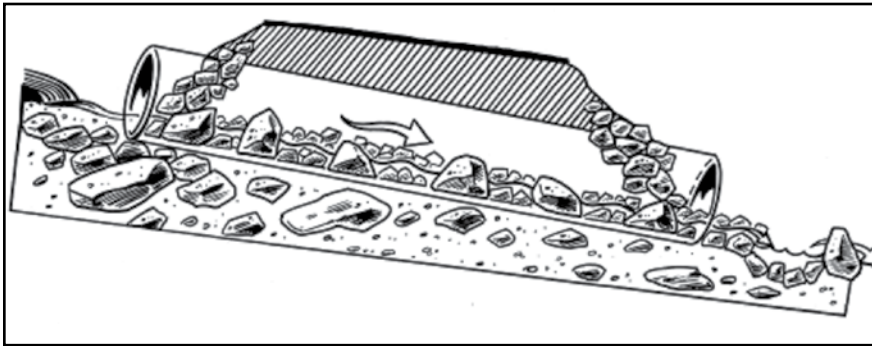


Figure 14.5 Cross Drain (Source Fish Stream Crossing Guidebook. BC Ministry of Forests, 2002)



Construction of a cross drain.

Sediment Traps

Sediment traps are constructed to contain fine sands and gravel eroded from roads, trails and ditches. Sediment traps are ditches generally constructed twice as deep and three times as long as the road ditch. When water enters a sediment trap it immediately slows down resulting in the coarser sediment dropping out of suspension.

- The sediment trap can be placed before a cross drain or where a ditch flattens out and becomes less steep.
- To be effective sediments traps need to be cleaned out on a regular basis.

Sediment Control

Sediment control is about reducing the amount of sediment in water by decreasing water velocities. Sediment control measures such as barriers may help to slow water velocities and hence settle out solids, but are not highly effective at filtering out sediment. Consequently runoff should not be filtered through a sediment barrier then discharged directly into a water body.

- Proper planning, plus design and implementation of drainage control systems will prevent erosion and the need for sediment control.
- All water from a disturbed area must first be directed to a settling area such as a small pond or an enlarged ditch where the water will pool allowing the sediment to settle out.

14.0 Construction of Trails, Roads and Winter Roads

Sediment Barriers: Geotextiles, Sandbags and Straw Bales

Straw bales, geotextile material and sand bags are commonly used to control water containing sediment. Geotextiles (fabric with pores that allow water to pass through the material but holds back most of the sediment) sandbags and straw bales can be used to construct silt fences or sediment barriers that can be used to control runoff.

- Locate the sediment barrier in a flat area where water can pond and will not flow around the barrier.
- Dig a small trench wide enough to place the silt fence, sand bags or straw bales; secure the barrier with enough stakes to support the expected force of the runoff.
- Backfill edge of trenched area to keep the runoff from flowing under the barrier.
- Monitor sediment barriers on a regular basis to ensure there are no gaps and clean out the sediment if required.

Road Embankments

To stabilize road embankments:

- Control ground water with drains.
- Where required (close to streams) reinforce embankments using riprap; and
- Use brush, mulch or reseed (see Section 21 Closure and Reclamation for Exploration Activities) to stabilize slopes.

Winter Trails and Roads

- The same pre-planning is required for winter roads as with all season routes.
- Where possible avoid cutting trees by planning the roads on lakes provided they are frozen solid enough.
- Overland movement of equipment cannot begin until the ground is frozen, permits will specify minimum compacted snow cover required.
- Dozer blades should be raised so as not to cut into organic layers.



Transport equipment on winter roads using skids when the ground is frozen to avoid rutting.

14.0 Construction of Trails, Roads and Winter Roads

Trails and Roads in Permafrost (refer also to Appendix IV Permafrost)

- When it is not possible to avoid permafrost select routes that are close to bedrock.
- If possible choose south facing slopes as permafrost is usually found on north facing slopes.
- Cover tracks made by vehicles with brush and other vegetation to provide an insulating layer to prevent permafrost from melting.
- Prevent rutting and gouging by placing matting, or corduroy the surface with logs or planks to protect the ground.
- If rutting and gouging occurs the disturbed surface must be restored by re-grading and draining surface water away from the road.
- Smooth out gouges to prevent surface water runoff from creating streams of water that will gouge and create deep ruts.



If rutting and gouging occurs the disturbed area must be restored by re-grading and draining the surface water away from the road.



Road has been reclaimed. Note ruts and gouges have been re-graded and logs and stumps have been spread over the area to promote natural revegetation.

14.5 Reclamation of Trails and Roads

Seasonal Closure and/or Partial Deactivation of Trails and Roads

- Clean out sediment traps, check that all culverts, ditches and bridges are in good repair and road surface is not rutted or gouged.
- If the trail or road surface appears to be degrading repair those sections.
- Check slope stability in steep areas, recontour slopes and revegetate if required.
- Practice on-going reclamation, if there are portions of trail and road that will no longer be used for exploration reclaim those sections.
- Restrict public access by constructing barriers of logs, slash, earth berms or other acceptable means.

Full Deactivation of Trails and Roads

- All culverts should be removed in flat terrain and in steep areas be replaced by non-erosive cross ditches.
- Any feature, such as a ditch or berm, that may cause water to channel should be regraded to prevent any water from becoming concentrated in one area.
- On steep slopes earth berms may be built to divert surface runoff away from the road surface.

Natural revegetation should be promoted by:

- ◊ Scarifying compacted surfaces; and
- ◊ Replacing stockpiled topsoil, brush and other organic debris over disturbed areas.
- Reseeding or the planting of willows and small trees may be required to stabilize slopes and prevent sediment from entering water bodies (refer to Section 21 Closure and Reclamation for Exploration Activities).

If required, in steep areas French drains should be installed to reduce surface runoff.

- French drains are lateral drains used on a cut slope with persistent seepage. A lateral trench is cut across the slope and filled with coarse rock. French drains can be used to divert flow along the base of a cut slope. See Figure 14.6.
- Restrict public access by constructing barriers of logs, slash, earth berms or other acceptable means.

14.0 Construction of Trails, Roads and Winter Roads

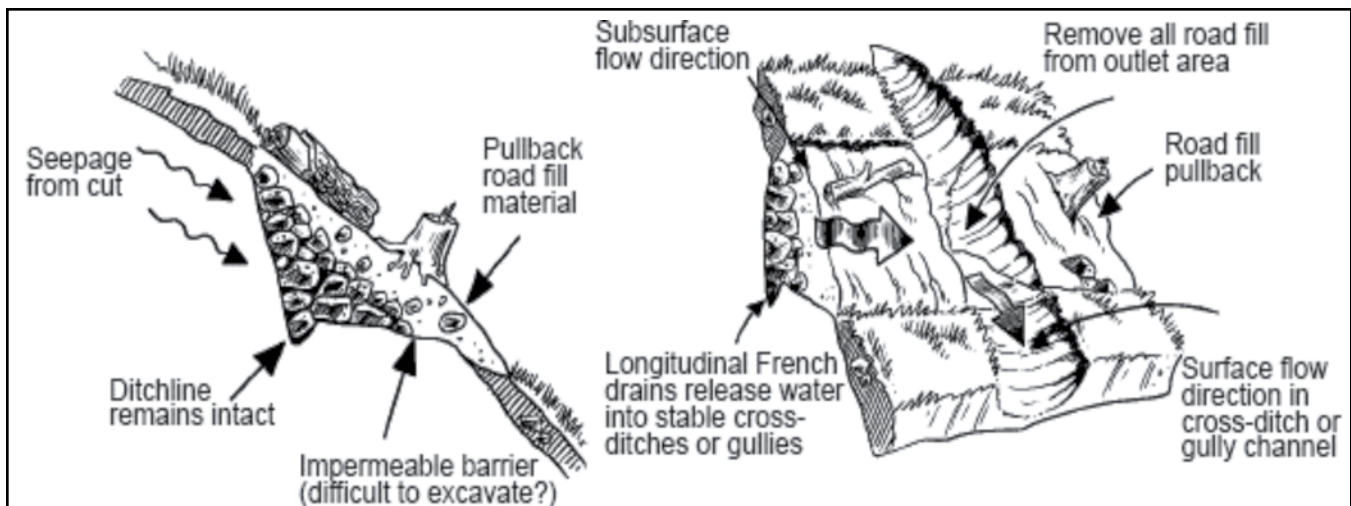


Figure 14.6 French Drains divert flow along the base of a cut slope and discharge it to a stable location (Source Draft Handbook of Reclamation Techniques and Mining Land Use; A Guide to Compliance with the Yukon Quartz Mining Land Use Regulation and Other Applicable Environmental Regulations in Mining Exploration and Development. Yukon Government Energy Mines and Resources., November 30, 2006)

14.6 Trails, Road and Winter Road Construction References

Draft Handbook of Reclamation Techniques and Mining Land Use; A Guide to Compliance with the Yukon Quartz Mining Land Use Regulation and Other Applicable Environmental Regulations in Mining Exploration and Development. Yukon Government Energy Mines and Resources, November 30, 2006 http://www.emr.gov.yk.ca/mining/pdf/handbook_of_reclamation_techniques_and_mining_land_use.pdf

e3Plus: A Framework for Responsible Exploration, Section 5 Land Disturbance. Prospectors & Developers Association of Canada, March 2009. <http://www.pdac.ca/e3plus/index.aspx>

Fish Stream Crossing Guidebook. *Forest Practices Code of British Columbia Act* Ministry of Forests British Columbia, March 2002 <http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/fishstreamcrossing/fscgdbk.pdf>

Handbook for Mineral and Coal Exploration in British Columbia, A Working Guide. Association of Mineral Exploration British Columbia, Ministry of Energy, Mines and Petroleum Resources, Ministry of Environment British Columbia, Mining Association of British Columbia, 2008/09 Edition. <http://www.amebc.ca/documents/resources-and-publications/publications/current/MXHandbook2008-09.pdf>

Land Use Guidelines Access Roads and Trails, Land Resources, Northern Affairs Program. 1984

15.1 General

Working near or in water can affect fish, fish habitat and water quality. If work is not properly conducted the result can lead to an increase of sediment flowing into the water body and an adverse affect on water quality, fish and fish habitat. The key to working in and about any water body is to take necessary actions to reduce or prevent any harmful impacts to fish, fish habitat and water quality.

Fisheries and Oceans defines fish habitat as any “spawning grounds and nursery, rearing, and food supply and migration areas on which fish depend, directly or indirectly, in order to carry out their life processes.”

Stream crossings may be constructed crossings such as bridges or corrugated pipe (culvert) crossings; fords, where the vehicle passes through the stream bed using prepared approaches and snowfills or ice bridges, temporary snow or ice fills carrying a winter trail or road across a frozen stream and removed completely from the stream before the winter season is over. Each crossing type is regulated differently.

15.2 Legislation

Fisheries Act, Fisheries and Oceans Canada

Prior to constructing any stream crossing or a ford contact Fisheries and Oceans Canada (DFO) to determine whether the proposed work will require a Letter of Advice or Authorization be issued from DFO.

Yukon Waters Act, Yukon Water Board

A Water Licence from the Yukon Water Board will be required if the proposed work includes any of the following:

- Alteration of the bed or banks of a non-intermittent stream using more than 100 cubic metres of material and / or altering the cross section of the stream.
- Installation of a culvert, bridge or any other structure, to cross a stream more than 5 metres wide at the ordinary high water mark.
- Diversion of a stream more than 2 metres wide at ordinary high water mark.
- Deposit of a waste directly into the water. See Section 3.5 *Waters Act* for the definition of “waste” as defined under the *Waters Act*.

Stream crossings would normally require a Type B licence unless in association with some other work that caused a Type A licence. A “Notice of Use / Waste Deposit Without a Licence” will be required for uses below the Type B licence threshold. See Schedule 3 of the Water Regulation and submit the notice to the Water Board office no less than 10 days before commencing work.

Navigable Waters Protection Act (NWPP), Transport Canada

The *Navigable Waters Protection Act* is responsible for protecting the public right to safely navigate waters. The construction of any works in or over, through or across, a navigable water way will require approval under the NWPP. Before proceeding determine if the stream is navigable or not by consulting with Transport Canada.

15.0 Stream Crossings

See Transport Canada's Navigable Waters protection program website
<http://www.tc.gc.ca/marinesafety/oep/nwpp/menu.htm>

A YESAA assessment and a Decision Document will be required before land use permits, Class 2, 3 or 4 approvals, a water licence or any other approval or authorization may be issued. Federal involvement will add an additional Decision Body and a requirement to coordinate Decision Documents.

15.3 Potential Effects

The potential environmental effects from activities related to working in and about water include:

Table 15.1 Potential Environmental Effects on Water Quality

Water Quality Condition	Potential Environmental Effect
Increased sedimentation (turbidity) due to erosion	<p>Reduce ability of fish to find food sources and spawning grounds</p> <p>Damage or suffocate eggs present in stream beds</p> <p>Clog fish gills</p> <p>Decrease light filtering through the water affecting growth of aquatic plants</p>
Flow of contaminated material/runoff into water bodies	<p>Alter water chemistry</p> <p>Increases in organic material can cause excessive growth of algae</p>
Increased runoff	Increased water levels can cause banks to erode
Decreased water volume in streams and lakes	<p>Alter fish habitat</p> <p>Shallower waters can change the water temperature and chemistry</p> <p>In lakes – loss of over wintering habit due to additional water freezing and a resulting decrease in dissolved oxygen levels</p>
Stream Alteration – removal of vegetation along banks	<p>Soil erosion</p> <p>Removal of roots, branches can destroy potential fish habitat and deplete shade that regulates the temperature of the water</p>
Alteration of natural stream channels	<p>Affect fish passage, resulting in the elimination of some species from the water body</p> <p>Increase water velocity which can in turn increase scouring and erosion and sediment</p>

Source: *Working Near Water Considerations for Fish and Fish Habitat*, Pete Cott and J. Peter Moore, Fishers and Oceans Canada, April 2003

15.4 Stream Crossings Best Management Practices

Planning

Stream Crossings Environmental Baseline Studies

To avoid potential delays in permit or licence acquisitions consult with Fisheries and Oceans Canada and other regulatory agencies to determine what environmental studies may be required to acquire permits. Depending on the proposed type (culvert, bridge) and number of stream crossings a minimum of one year of environmental baseline data for the project may be required. Baseline studies may include the following:

- Hydrology and water quality studies.
- Riparian, benthic and fish species and habitat studies.
- Community consultation.

Stream Crossings Planning and Design

Selecting the type of stream crossing should be tailored to site conditions. The type of structure chosen should have the least impact on water flow and quality, fish habitat and riparian conditions. The cost of materials, maintenance, inspection and deactivation should be budgeted for.

- Choose the narrowest part of the stream and its floodplain.
- Avoid steep slopes.

Design the steam crossing according to:

- ◇ Width, depth and velocity of the stream.
- ◇ Shore line topography; and
- ◇ The type of vehicles and volume of traffic expected.
- Design and size the stream crossing and surface drainage systems (water bars, ditches, cross culverts) to prevent flooding or erosion.
- Plan for a single span structure without in-stream supports.
- Do not design a structure that will narrow the stream with protruding abutments.

Construction

- Clearing widths along shorelines should be kept to a minimum.
- Garbage, fuels, and materials should be located a minimum of 30 metres from any water course, wherever possible vegetation should be kept in place.
- Construction and instream work should be conducted during low flow periods.

15.0 Stream Crossings

- Where practicable equipment should be operated from above on the top of the stream bank. If equipment is used instream, containment structures must be in place to control sedimentation.
- Spill prevention and response plan must be in place and appropriate precautions taken to prevent any fuels, lubricants and other deleterious substances from entering the water. See Section 11 Fuel Storage and Handling and Appendix VI: Spill Contingency Planning.
- Exposed soils should be revegetated after construction is completed to prevent erosion.
- Do not use wood with toxic preservatives as support structures for stream crossings.
- Turnouts and ditches should be constructed to divert sediment from entering the stream.
- Slopes should be graded to direct runoff away from streams.



Equipment for this construction project is operated from above the stream bank. Note erosion control measures, silt fences lower left, in riparian zone.

15.5 Fords

Fords are shallow dips that allow for crossing streams during low to normal flows. Fords are usually for limited use only, once or twice a field season not for daily traffic. If use increases an alternative type of stream crossings needs to be considered. When using a ford as a stream crossing:



Ford streams at right angles and choose a site with gently sloping stream banks.

- Acquire proper authorization from DFO.
- Check to make sure the ford is not located in an area of sensitive fish habitat or a spawning area.
- Choose a site with gentle well vegetated slopes to prevent the stream bank from eroding.
- Choose a stream channel with a substrate that will resist erosion, large boulders or cobbles.
- Cross at right angles.
- Do not let debris such as logs, branches block the site.
- Limit use of the site to once or twice during the field season.
- Monitor the site for bank erosion, flooding due to debris. Suspend use of the crossing if negative impacts occur and reclaim the site.

15.6 Open Bottom Structures - Bridges, Open Bottom Culverts

Bridges

Bridges can be designed for temporary or permanent use and be constructed from a variety of material: logs, steel beam, timbers. See Figures 15.1, 15.2 and 15.3 for examples of different types of bridges. Bridges span the entire streambed to avoid damaging the natural stream channel. Any design choice should be based on the site conditions, expected duration of the project and should be constructed to avoid any impacts to fish and fish habitat.

- Portable bridges should be used whenever feasible.
- The decking of any portable bridge or temporary bridge should be positioned higher than the 1 in 50-year flood level with clearance for floating debris.

Permanent bridge decking should be positioned higher than the 1 in 100-year flood level with clearance for floating debris. For the most recent design flood estimation guidelines contact Environment Yukon, Water Resources Division 867-667-3171.

15.0 Stream Crossings

Log Stringer Bridge

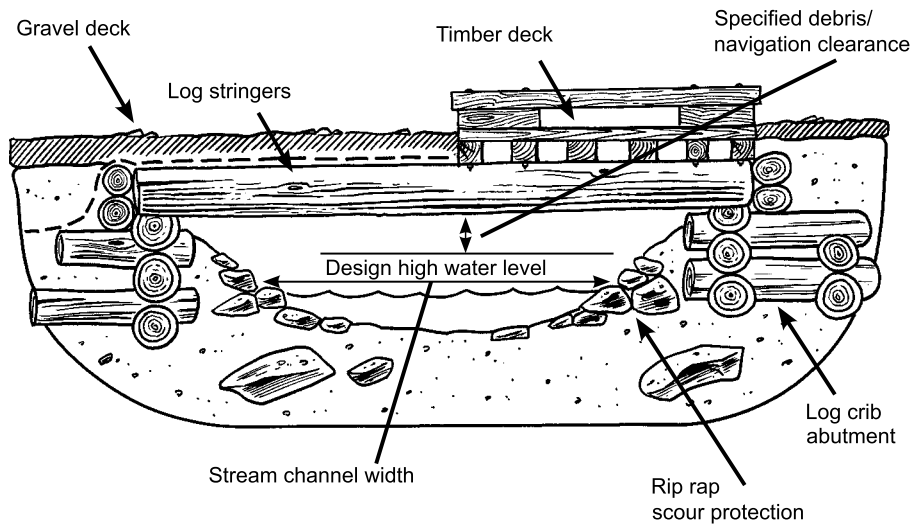


Figure 15.1 Log Stringer Bridge (Source Fish Stream Crossing Guidebook, BC Ministry of Forests, 2002)

Steel Girder Bridge

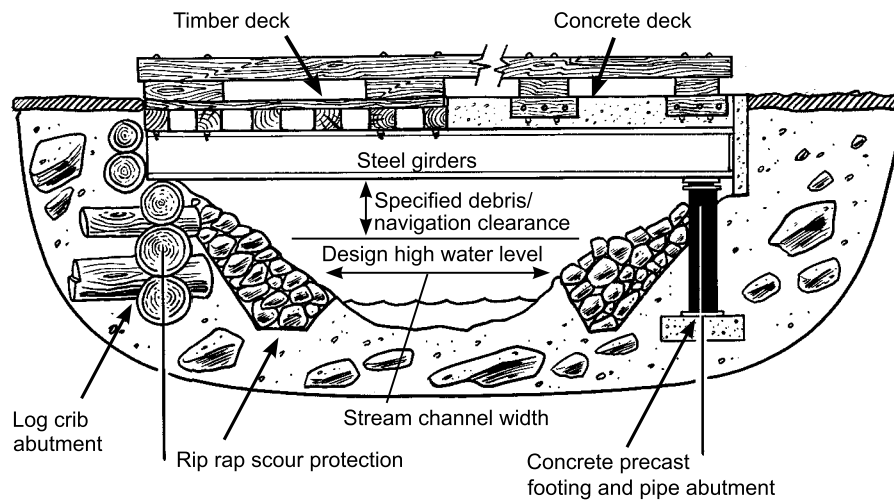


Figure 15.2 Steel Girder Bridge (Source Fish Stream Crossing Guidebook, BC Ministry of Forests, 2002)

Concrete Slab Bridge

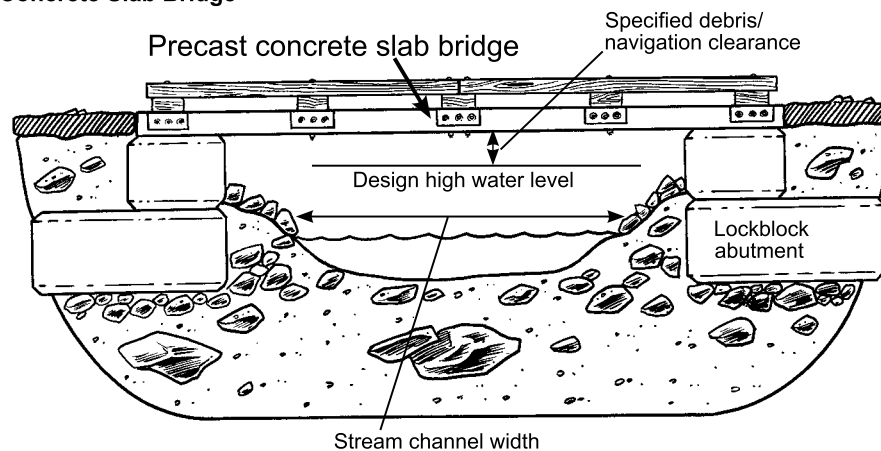


Figure 15.3 Concrete Slab Bridge (Source Fish Stream Crossing Guidebook, BC Ministry of Forests, 2002)

Open Bottom Culverts

Open bottom culverts can be constructed from timbers, logs or steel girders. Open bottom structures are similar to bridges in that they span the natural stream bed but unlike bridges fill (sand, gravel) is placed over the logs or timbers. Logs are the most commonly used building material as they are usually readily available at site. Other materials used to build open bottom culverts include steel, plastic and concrete.

- Culverts should be aligned to maintain original stream flow direction and span the entire width of the streambed.
- Culvert footings should be established above the high water mark to avoid scouring.
- Sediment barriers such as sand bags or geotextiles should be installed to prevent sediment from entering the stream.

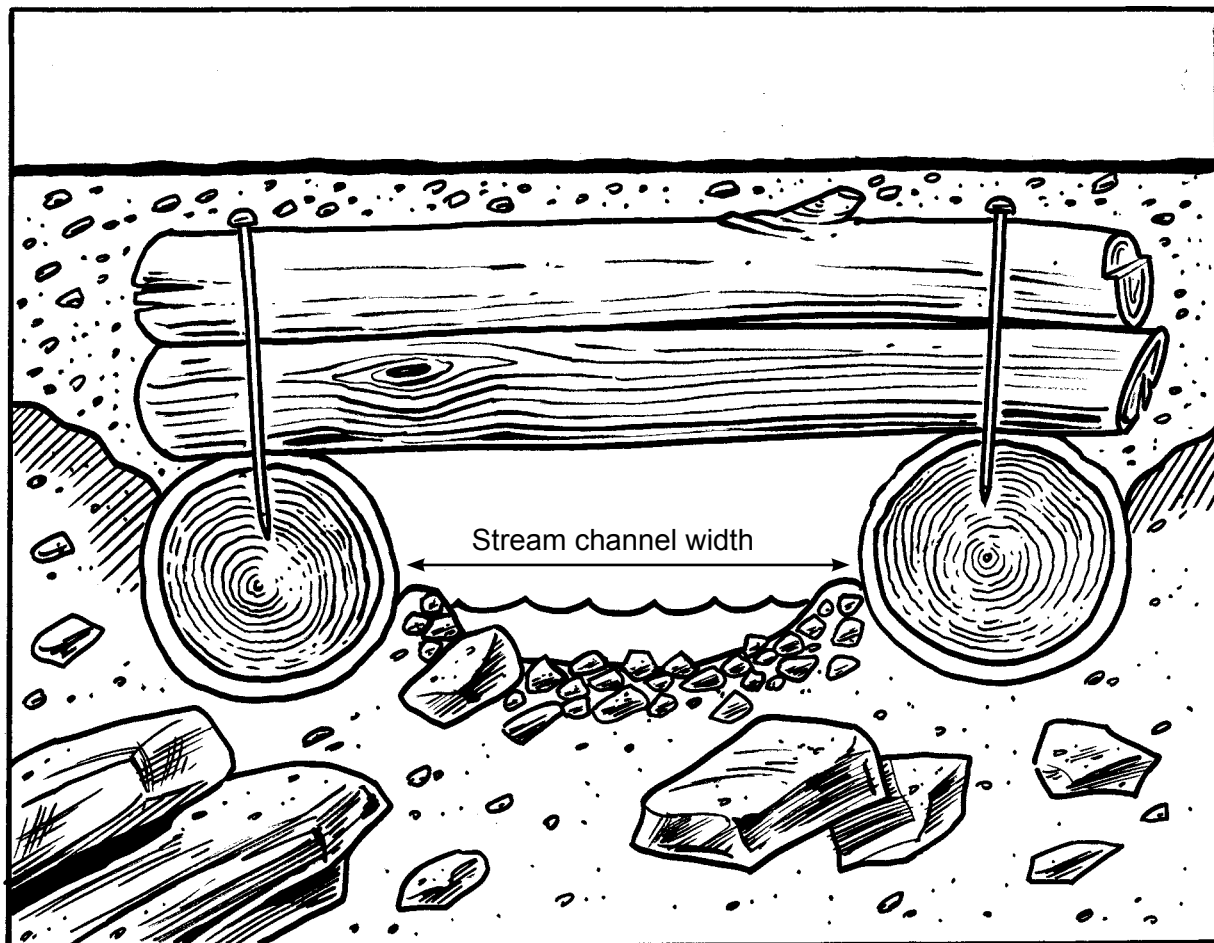


Figure 15.4 Open Bottom Culvert constructed using logs (Source Fish Stream Crossing Guidebook, BC Ministry of Forests, 2002)

15.0 Stream Crossings

15.7 Closed Bottom Structures – Corrugated Pipes

Closed bottom culverts are usually constructed from corrugated metal or plastic. The bottom of the culvert is buried in the stream substrate.

- The culvert must be installed when the stream bed is dry or during low flows.
- To create low flow channels critical to fish passage culverts should be buried into the native substrate to a depth equal to or exceeding 10% of their diameter.
- The width of the culvert should be narrower than the streambed and the water depth in the culvert should be such that any large migratory fish will be covered with water when they pass through the culvert.
- The bottom of the culvert must be set at an appropriate angle below the stream bed to allow water to flow freely through the culvert.
- All debris (logs, boulders) that could block the culvert should be removed.
- Substrate material is placed in the culvert to simulate the streambed. Depending on the width and length of the culvert place larger cobbles to help entrain the material within the culvert and create natural stream bed conditions that aid fish passage.
- For steeply inclined culverts (>3% slope) install an instream weir at the outlet of the culvert to prevent the stream bed from eroding and/or developing a plunge pool.



Closed bottom culvert. The culvert must be angled to allow water to flow freely through the culvert.

15.8 Snowfills and Icebridges

Snowfills

Snowfills are constructed by pushing and compacting snow into the stream channel. Snowfills can be used only if the stream channel is dry or frozen to the bottom of the stream bed.

- Only dirt free snow can be used in the stream channel.
- An excavator is the best machine to use to ensure that dirt is not dug up while moving the snow into the stream channel.
- The snowfill should not be capped with soil to provide better traction, if the area becomes icy the snowfill should be graded to breakup the icy surface.
- Temporary culverts or log bundles can be used to drain melt water away from the snowfill if there is a sudden thaw or early breakup.
- Snowfills are temporary, all support material (log bundles or culverts) must be removed prior to spring breakup, any snow that may have become contaminated with fuel or dirt must be removed from the stream channel and disposed of properly.

Icebridges

Icebridges can provide a cost effective method to cross streams if site conditions permit. The design of the icebridge must take the following into consideration.

- Water depth and minimum winter daily streamflow under the ice.
- Ice thickness and maximum load strength.
- Stream channel substrate; and
- Crossing location and approach.

Icebridge Construction

- Only clean snow should be used when constructing an icebridge.

Approach areas:

- ◊ Minimize any cutting into the stream bank and revegetate in the spring if required.
- ◊ If snow is limited in the approach area use gravel from approved pits, remove gravel prior to spring breakup.
- Monitor ice thickness on a regular basis

Gold's formula²³ can be used to approximate permissible loading on an ice bridge

$$P = Ah^2$$

P = load in kilograms (short –term load, assuming vehicle is moving)

A = constant (3.52) and

h = ice thickness in centimetres

- Remove any snow contaminated with fuel or other material immediately.
- Prior to spring breakup all ice bridge approaches should be removed.
- Stream banks should be recontoured and revegetated where necessary.

²³ *Environmental Operating Guidelines for Alberta Petroleum Industry, Canadian Petroleum Association, 1988*

15.0 Stream Crossings

15.9 Stream Crossing Reclamation

If the trail or road with a stream crossing is to be deactivated the following should be implemented:

- Remove all culverts, and re-grade drains and ditches to prevent erosion from water channelling along the surface of the road bed.
- Re-contour stream banks and slopes as required.
- Maintain effective erosion prevention and sediment control measures until revegetation of disturbed areas is achieved, remove these controls (silt fences) once vegetation has been re-established; and
- Use native species to revegetate any disturbed areas.



The approach area for winter road crossings on lakes or streams should not be steep and cutting riparian vegetation should be kept to a minimum.

15.10 Stream Crossings References

DFO guidance on Pacific Region Riparian Areas and Revegetation
http://www-heb.pac.dfo-mpo.gc.ca/decisionsupport/os/riparian-reveg_e.htm

Draft Handbook of Reclamation Techniques and Mining Land Use; A Guide to Compliance with the Yukon Quartz Mining Land Use Regulation and Other Applicable Environmental Regulations in Mining Exploration and Development. Yukon Government Energy Mines and Resources November 30, 2006
http://www.emr.gov.yk.ca/mining/pdf/handbook_of_reclamation_techniques_and_mining_land_use.pdf

e3Plus: A Framework for Responsible Exploration, Section 5 Land Disturbance. Prospectors & Developers Association of Canada, March 2009. <http://www.pdac.ca/e3plus/index.aspx>

Environmental Operating Guidelines for Alberta Petroleum Industry, Canadian Petroleum Association, 1988

Fish Stream Crossing Guidebook, *Forest Practices Code of British Columbia Act* Ministry of Forests British Columbia, March 2002
<http://www.for.gov.bc.ca/tasb/LEGSREGS/FPC/FPCGUIDE/FishStreamCrossing/FSCGdBk.pdf>

Handbook for Mineral and Coal Exploration in British Columbia, A Working Guide. Association of Mineral Exploration British Columbia, Ministry of Energy, Mines and Petroleum Resources, Ministry of Environment British Columbia, Mining Association of British Columbia, 2008/09 Edition. <http://www.amebc.ca/documents/resources-and-publications/publications/current/MXHandbook2008-09.pdf>

Land Use Guidelines Access Roads and Trails, prepared by Hardy Associates (1978) Ltd., for Land Resources, Northern Affairs, 1984

16.1 General

The construction of docks and barge landings should be conducted to reduce any impact on fish and fish habitat. This would include float plane docks where frequent landings will be made and heavy objects unloaded.

16.2 Legislation

Fisheries Act, Fisheries and Oceans Canada

Prior to constructing a dock or barge landing, contact Fisheries and Oceans Canada (DFO) to determine whether the proposed structure will require an Authorization or a Letter of Advice from DFO.

Yukon Waters Act, Yukon Water Board

A Type B Water Licence from the Yukon Water Board will be required if the proposed work:

- Will alter banks or stream beds using more than 100 m³ of material and/or altering the cross-section of the stream in any way.
- Deposits a waste directly into the water.

A “Notice of Use of Water Without a Licence” will be required to be filed with the Water Board 10 days before commencing work if work is below licence threshold.

A YESAA assessment and a Decision Document will be required before land use permits, water licences or Class 2, 3 or 4 approvals or any other authorization including federal ones may be issued.

Navigable Waters Protection Act (NWPP), Transport Canada

The construction of any dock or barge landing that may interfere with navigation or if the construction of the dock or barge landing requires the dumping of fill or the excavation of material from the bed of a water body causes any interference with navigation than the project will require approval under the NWPP. Before construction, determine if the dock or barge landing will interfere with the navigation of the marine vessels or consult with Transport Canada.

See Transport Canada’s Navigable Waters protection program website <http://www.tc.gc.ca/marinesafety/oep/nwpp/menu.htm> and *Navigable Waters Protection Act* <http://laws.justice.gc.ca/eng/N-22/page-1.html>

16.3 Potential Effects

The potential effects from the construction of docks and barge landings are similar to those listed for Section 15. 3 Potential Effects of Stream Crossings. During construction soil and other deleterious materials such as fuel can potentially enter the water course if proper containment is not in place. The installation of a dock or barge can alter wave patterns and result in erosion of the shoreline. Fuel and other toxic supplies are often loaded on and off docks and machines are refuelled at these sites creating the potential for spills to occur.

16.0 Docks and Barge Landings

16.4 Docks and Barge Landings Best Management Practices

The following information has been derived from Fisheries and Oceans Pacific Region Operational Statement Dock and Boathouse Construction in Freshwater Systems, 2009.

Location

- Avoid clearing of vegetation by using existing trails, roads, or cut lines wherever possible.
- Avoid areas of known fish spawning habitat.
- Where multiple docks are proposed, ensure that there is a minimum of 50 metres (164 feet) of undisturbed shoreline between docks or other in-water structures.
- Place buildings and storage areas above the high watermark (HWM).
- Locate the dock to avoid disturbing aquatic vegetation.
- Position the dock in water deep enough to avoid grounding of the dock and/or creating impacts from prop wash.
- Do not remove materials (rock, logs) from below the high water mark or from any water body when constructing a dock along a shoreline.



Avoid clearing vegetation when possible. This barge landing site does not require any clearing or infrastructure.

Construction of Docks and Other Structures

- Prevent the entry of sediment or any deleterious substance into the water by installing proper sediment control measures and drainage systems. For sediment control measures see Sections 14.0 Construction of Trails, Roads and winter Roads, and Section 15.0 Stream Crossings.
- Avoid doing work during wet and rainy periods.
- Use untreated materials (e.g. cedar, tamarack, hemlock, rocks, plastic, etc.) as supports for dock structures that will be submerged in water. Do not use creosote treated wood. For information on which products are safe to use check the Wood Preservation Canada website <http://www.woodpreservation.ca>.
- If using treated lumber is necessary, use treated lumber that is environmentally friendly for dock structures that are above water.
- Cut, seal and stain all lumber away from the water. Lumber that has been stained must be completely dry before being used near water.
- Wherever possible, construct the dock either from a barge or the ice instead of using machinery from the bank of the water body.
- Machinery should arrive in clean condition free of invasive species and noxious weeds and equipment should be maintained.

16.0 Docks and Barge Landings

- Refuel and service machinery and store fuel a minimum of 30 metres from the water.
- Keep an emergency spill response kit on site in case of fluid leaks or spills from machinery.
- Concrete workings should be pre-cast and cured away from the high water mark. If a concrete abutment is needed to secure a dock to land, install it entirely on land.
- If barrels are used as support structures ensure the barrels are clean and removed when the site is reclaimed.
- Avoid using rubber tires as booms on the dock, the deterioration of tires over time can cause the release of toxic chemicals.
- Fuel hoses should be equipped with shut off valves at both the tank and nozzle ends.



Position docks in deep water to avoid grounding.

16.5 Docks and Barge Landings Reclamation

- Re-contour stream banks and slopes as required.
- Maintain effective sediment and erosion control measures until revegetation of disturbed areas is achieved, remove sediment controls once vegetation has been established.
- Use native species to revegetate any disturbed areas.
- See DFO guidance on Pacific Region Riparian Areas and Revegetation http://www-heb.pac.dfo-mpo.gc.ca/decisionsupport/os/riparian-reveg_e.htm.

16.6 Dock and Barge Landings References

DFO guidance on Pacific Region Riparian Areas and Revegetation
http://www-heb.pac.dfo-mpo.gc.ca/decisionsupport/os/riparian-reveg_e.htm

Land Use Guidelines Access Roads and Trails, prepared by Hardy Associates (1978) Ltd., for Land Resources, Northern Affairs, 1984

Navigable Waters Protection Act <http://laws.justice.gc.ca/eng/N-22/page-1.html>

Pacific Region Operational Statement Dock and Boathouse Construction in Freshwater Systems, Fisheries and Oceans http://www-heb.pac.dfo-mpo.gc.ca/decisionsupport/os/os-docks_e.htm

Transport Canada's Navigable Waters protection program website
<http://www.tc.gc.ca/marinesafety/oep/nwpp/menu.htm>

17.0 Trenching

17.1 General

Trenching either by hand or mechanical means of excavation is a common exploration method used to establish geological trends, widths and grade or quality of mineralization or a coal seam. The overburden is removed using hand tools or heavy equipment.

17.2 Legislation

Table 17.1 *Quartz Mining Land Use Regulation Class Criteria for Trenching*

Trenching	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria
	Not exceeding: 1,200 m ³ on a group of three adjoining claims in the program, provided that no claim in the program forms part of more than one group of three, or 400 m ³ per claim that is not part of a group of three adjoining claims referred to in paragraph (a)	Total volume not exceeding 1,200 m ³ per claim per year	Total volume not exceeding 5,000 m ³ per claim per year to a maximum of 10,000 m ³ over the life of the exploration program

Source: *Guide to Hard Rock Prospecting, Exploration and Mining in Yukon, November 2007*

Trenching for coal exploration would be regulated by the Land Use Regulation under the *Territorial Lands (Yukon) Act*. All mechanical trenching using a self propelled power driven machine for land clearing requires a Class A land Use Permit.

A YESAA assessment and a Decision Document will be required before land use permits or Class 2, 3 or 4 approvals may be issued.

Yukon Occupational Health & Safety Regulations Part 10 Construction and Building Safety, Section 10-23 Trenching and Excavating applies specifically to surface trenches or excavations that are deeper than 6 meters (20 feet), in permafrost, where support structures are used, if the ground slopes away from the top edge of the excavation at an angle steeper than 3 horizontal to 1 vertical or at any depth where there are extraordinary conditions. If any of these conditions are present, the regulations require that a certified engineer must design and develop procedures for the program.

Mapping and sampling of trenches typically entails one or more workers to work within the excavation. Operators must be aware that Yukon Occupational Health & Safety Regulations Section 10-65 also contains stringent requirements for workers entering or approaching trenches greater than 1.2 metres (4 feet) in depth.

Before commencing any trenching program consult Part 10 of the Yukon Occupational Health and Safety Regulations. For details see Part 10 Construction and Building Safety <http://www.wcb.yk.ca/ActsPoliciesAndRegulations/OccupationalHealthAndSafety/OccupationalHealthAndSafetyRegulations.aspx>

17.3 Potential Effects

Potential effects resulting from a poorly planned trenching program include soil erosion, potential slumping of trench walls resulting in a safety hazard, and negative impacts to wildlife. Exposed bedrock from trenching containing pyrite could potentially generate acid rock drainage (ARD).

17.4 Trenching Best Management Practices

Use techniques to minimize the potential disturbance to soil, wildlife and aquatic resources.

- Where practicable trenches should be oriented to follow the contour of the slope to reduce the potential of soil erosion.
- Top soil and vegetative mat should be stockpiled separately from subsurface material then used to reclaim the site.
- Mineralized material should be stockpiled separately from subsurface material.
- Topsoil and subsurface material stockpiles should be situated a safe distance to the side or down slope of the trench.
- A minimum 30 metre buffer of undisturbed vegetation must be maintained between the trenches and water bodies.
- The sides of trenches should be sloped to a stable, safe angle to limit the safety risk associated with entrapment from slumping.
- Trenches should be constructed with an angled end to allow an escape route for animals.
- Place a berm at the end of the trench that is at the lowest elevation to prevent gullies forming from water erosion.



The sides of trenches should be sloped to a stable, safe angle to limit the safety risk associated with entrapment from slumping.

Trenching in Permafrost

Slope instability in permafrost is caused by thawing and sloughing of slopes. This will usually occur three to four seasons after the insulating vegetative mat and topsoil layer have been removed.

- Cut trees and brush first and set aside, stockpile the unfrozen soil (the active layer) in a stockpile. Place the permafrost soil in another stockpile.
- Backfill trenches first with permafrost material then active layer, compact this material to prevent the potential of slumping, followed by topsoil, brush and other organic material (stumps, roots).
- Refill trenches as soon as possible to avoid thaw and sloughing.
- For small pits or trenches that must remain open for several weeks place an insulating cover over of styrofoam, or wood over the pit or trench.

17.0 Trenching

17.5 Trenching Reclamation

Trenches not required for further assessment should be backfilled as soon as sampling and mapping programs have been completed.

- Trenches should be backfilled first with mineralized and then subsurface material; this material should be compacted, to reduce the potential of slumping, prior to placing topsoil over the disturbed area.
- Topsoil, branches, and other organic material can be scattered over the area to help reduce erosion and create greater biodiversity.
- Work sites should be thoroughly cleaned of any debris or refuse.
- Slope stability should be attained by recontouring trenches back to original topography or a 2:1 slope ratio.
- Further erosion controls can be provided by introducing water bars if required.



Trench dug using a back hoe. Note top soil and substrate material should be piled a safe distance to the side of the trench.



Reclaimed trench. Note branches and other organic material scattered over the site to promote natural revegetation.



Aerial view of reclaimed trenches.

17.6 Trenching References

Guide to Hardrock Prospecting, Exploration and Mining in Yukon, Yukon Energy, Mines, November 2007 <http://www.emr.gov.yk.ca/mining/hardrockmining.html>

Handbook for Mineral and Coal Exploration in British Columbia; A Working Field Guide, British Columbia Ministry of Energy, Mines and Petroleum Resources, 2008/09 Edition <http://www.amebc.ca/documents/resources-and-publications/publications/current/MXHandbook2008-09.pdf>

Mineral Exploration Guidelines for Saskatchewan. The Saskatchewan Mineral Exploration and Government Advisory Committee, 2005 <http://www.er.gov.sk.ca/search?c=all&q=mineral+Exploration+guidelines+for+Saskatchewan%2C+2005&x=9&y=13>

Yukon Occupational Health & Safety Regulations, Part 10 Construction and Building Safety, Section 10-23 Trenching and Excavating <http://www.wcb.yk.ca/ActsPoliciesAndRegulations/OccupationalHealthAndSafety/OccupationalHealthAndSafetyRegulations.aspx>

18.0 Blasting

18.1 General

Explosives may be needed to open up showings in hard rock or to assist in trench excavation. Blasting appears to be a less frequently used technique in preliminary exploration work than in the past. Today, explosives are most commonly used in bulk sampling and advanced underground exploration programs.

18.2 Legislation

Table 18.1 *Quartz Mining Land Use Regulation Class Criteria for Use of Explosives*

Blasting	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria
Use of explosives	Not exceeding 1,000 kg in any 30 day period	More than 1,000 kg in any 30 day period	More than 1,000 kg in any 30 day period

Source: *Guide to Hard Rock Prospecting, Exploration and Mining in Yukon, November 2007*

The Land Use Regulation under the *Territorial Lands (Yukon) Act* regulates use of explosives off claims or in conjunction with coal exploration. The limits for this regulation differ markedly from the Quartz Mining Land Use Regulation.

Table 18.2 *Territorial Land Use Regulation Blasting Thresholds*

Blasting	No permit required	Class B Permit	Class A Permit
Use of explosives	< 50 kg of explosives within a 30 day period	> 50 kg of explosives within a 30 day period	> 150 kg of explosives within a 30 day period

Source: *Territorial Lands (Yukon) Act Regulations, March 31, 2003*

A YESAA assessment and a Decision Document will be required before land use permits or Class 2, 3 or 4 approvals may be issued.

Any person who handles, transport or stores explosives must understand and comply with the *Explosives Act* of Canada, and the *Transportation of Dangerous Goods Act* and Regulations. A valid blasters permit or temporary blasters permit is required to conduct any blasting operation. A Blasting Log recording pre-blast loading details and the results of the post-blast sites inspection must be maintained for at least five years at the workplace. Blasters must also maintain personal logs of all blasting work and if requested make them available for inspection by a safety officer. Before starting any blasting program consult the Yukon Occupational Health & Safety Blasting Regulations, Part 14 <http://www.wcb.yk.ca/ActsPoliciesAndRegulations/OccupationalHealthAndSafety/OccupationalHealthAndSafetyRegulations.aspx>.

18.3 Potential Effects

The potential impacts from blasting include possible aquatic effects from ammonia released due to incompletely combusted ammonia based explosives. Blasting in areas frequented by wildlife, particularly at critical use times, may disrupt use of habitat and alter wildlife habits due to the noise and vibration. The potential for injury to workers and wildlife due to blasting is also of concern. Blasting can be a source of socio-economic concern in populated areas as noise and vibration can be nuisance. As well, blasting can be a very serious safety hazard to people and wildlife if fly rock is inadequately controlled.

18.4 Blasting Best Management Practices

Yukon Occupational Health & Safety Blasting Regulations stipulate the following for the transportation and handling of explosives:

- It is illegal to transport more than 75 kilograms (165 pounds) of explosives in a passenger vehicle.
- The explosives must be fully enclosed, locked and in a fire resistant container separated from the passenger compartment.
- The detonators must be kept in a separate container and separated from other explosives a minimum of 0.6 metres between the containers.
- Explosive material should be packaged so as not to come in contact with iron or steel.
- Placards indicating explosives, in accordance with federal Transportation of Dangerous Goods Shipping Regulations, must be displayed on all sides of vehicles transporting explosives.
- For shipments greater than 2,000 kilograms of explosives at least two fire extinguishers, in good working order, of the kind that will not freeze in cold temperatures must be available for use.
- Electronic detonators should not be transported in radio transmitter-equipped vehicles unless the leg wires of the detonator are folded and shunted or the detonator is in a closed metal container lined with wood or other approved material.
- The vehicle transporting the explosives must be inspected prior to departure to ensure fire extinguishers are working, electrical wiring is insulated, fuel tank and lines are not leaking, the engine is clean of surplus oil and grease and the brakes are in good condition.
- The vehicle should be adequately fuelled to avoid re-fuelling during the trip.
- Explosives must not be transported in trailers unless the trailer is equipped with power brakes operated from the tractor cab.
- The driver must have a valid driver's licence be at least 18 years of age and have instruction in the transportation of explosives.
- Once delivered, the explosives must be stored in a dry, clean and secure location with placards in place indicating explosives are stored at that location.
- Smoking is prohibited within 15 metres of the explosive storage facility.
- Only trained personnel should handle explosives.

18.0 Blasting

The following information has been derived from the Fisheries and Oceans Canada (DFO) Blasting – Fish and Fish Habitat, Fisheries and Oceans Fact Sheet. For the complete document check the web site <http://www.nfl.dfo-mpo.gc.ca/e0005460>.

- Avoid blasting during sensitive wildlife times and in sensitive wildlife areas (spring calving, nesting areas).
- If blasting near water bodies contact DFO prior to start-up.
- Blasting plans should use the minimum amount of explosives to complete the job.
- Blasting mats should be placed on top of holes to reduce debris from scattering over the area.
- Ammonium nitrate based explosives must not be used in or near water.
- Blasting activities should not be carried out in the marine environment within 500 metres of marine mammals.
- For blasting set-back distances from water bodies check DFO's Blasting Fact Sheet.
- After the blast is complete collect all debris and reclaim as required.

18.5 Blasting References

Blasting – Fish and Fish Habitat, Fisheries and Oceans Canada Fact Sheet
<http://www.nfl.dfo-mpo.gc.ca/e0005460>

Dangerous Goods Transportation Act Regulations
http://www.hpw.gov.yk.ca/pdf/dangerous_goods_regulations.pdf

Explosives Act of Canada <http://www.nrcan.gc.ca/mms-smm/expl-expl/index-eng.htm>

Guidelines for the Use of Explosives in or near Canadian Fisheries Waters, Fisheries and Oceans Canada. 1998
http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/water-eau/explosives-explosifs/index_e.asp

Transportation of Dangerous Goods Act <http://www.gov.yk.ca/legislation/acts/dagotr.pdf>

Yukon Occupational Health and Safety Regulations, Part 14 Blasting
<http://www.wcb.yk.ca/ActsPoliciesAndRegulations/OccupationalHealthAndSafety/OccupationalHealthAndSafetyRegulations.aspx>

19.1 General

If results from grass roots exploration and ground survey activities are positive, then a program of diamond core drilling or reverse-circulation drilling is usually planned to test the mineralized body at depth and along strike on a grid-like pattern.

Diamond drills get their name from a hollow cylindrical diamond studded bit at the end of a long string of threaded together pipes, the drill rods. The string of rods is turned rapidly and the diamond bit grinds away the periphery of the hole leaving the center of the hole (the core of the hole) as cylinders of rock called drill core. To avoid burning the diamonds the rapidly turning bit must be cooled by water pumped down the rods; the water returns up the hole with the ground rock cuttings which must be properly handled at the surface. The core is pulled up the rods to the surface and placed in containers called core boxes.

Diamond drills can range in size from small portable units, some that can be packed by a man in several parts, and produce small diameter core holes to depths around 30 metres to drills weighing several tonnes that can drill to depths of 1500 metres and more. The size used depends on the target depth of the mineral deposit and the size of core required as well as on other factors such as mobilization weights, space at the drill site and cost. Larger drills are required to drill deeper holes and generally recover larger diameter core. A surface drill operates on a cleared pad that varies according to the size of the drill rig. In mineral exploration a clearing 5 to 20 metres in diameter would be common.

In solid rock, drilling can proceed quite quickly producing 30 to 50 metres of long continuous cores in a shift but generally, especially at a mineral deposit, the ground being drilled is broken and fractured, producing rubble rather than smooth cylinders of core and causing significant losses of core. In this situation drillers will add additives to the cooling water. These additives thicken the fluid and coat the rock particles causing it to core better with less core loss. These additives collectively termed mud but actually are a wide variety of complex substances returned to the surface with the water and cuttings where it must be safely handled as well.

Non-core drilling is also common in exploration. A popular method is reverse circulation (RC) drilling although there are other systems such as Rotary Air Blast drills. The major difference between a diamond drill and a RC drill is that water is not generally used as a coolant and core is not produced. RC drills use powerful air compressors that blow chips up the drill string so that the rock samples are small chips in bags rather than core in boxes. Many RC drills are mounted on trucks and require access roads to move around. RC holes tend to be shorter and more numerous than core holes. Noise and dust control can be issues with this technique.

Drill holes can be essentially of any orientation and in underground programs are commonly drilled in an upward direction. The orientation of a hole is usually set to cut known structure trends as close to perpendicular as possible but can also be used to test multiple targets from one drill site, maximizing the use of drill pads and reducing surface impact. Directional drilling, where the bit is guided to a target by various methods, can be done but it tends to be expensive and is not common in routine mineral exploration.

Drills can be moved about by a variety of methods. As noted already RC rigs can be mounted on trucks or tracked vehicles, this is also done with core rigs. Most diamond drills are capable of being disassembled into helicopter transportable parts so that they can be slung to drill sites and reassembled requiring no roads or trails and small clearings or pads. Another method of moving a drill is to tow it mounted on skids (like a sled) behind a bulldozer which is also used to make the drill pads and roads or trails. Similarly, towed skid equipped trailers (sloops) carry the rods, mud tanks, water line, pumps and tools.

19.0 Drilling

As already noted diamond drills require water which may need to be pumped long distances in hoses or in steep, high relief, terrain in steel pipe. In winter the water may need to be heated with propane or oil heaters to prevent freezing.

Drill core is stored in boxes which may be kept in racks called core racks or piled on the ground. Core provides geologists with hours of entertainment while writing out descriptions of the core in a process termed core logging. Core is also usually split or sawn longitudinally so that half can be chemically tested and half preserved as a record. Logging and splitting are commonly carried out in a core shack.

Lastly, a drill crew usually consists of two people, a driller and a helper. If there are long water lines or heaters there may be a pump man as well. Drills usually operate 24 hours a day so there are two shifts per day. Drill camps also generally have a geologist, a core splitter and a cook. A basic exploration drill camp thus houses seven to ten persons. The camp may be the determining factor in permitting for low impact, helicopter supported, drill programs.

19.2 Legislation

Drilling itself is not a regulated activity under the Quartz Mining Land Use Regulation. What is regulated are the related activities of creating clearings and pads to drill from, roads or trails to move the drill along, fuel storage and camps. Class Criteria for Drilling related activities are shown below.

Table 19.1 *Quartz Mining Land Use Regulation Class Criteria for Clearings*

Clearings	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria
Number of clearings per claim, including existing clearings	Not exceeding 8	Not exceeding 8	More than 8
Number of clearings, helicopter pads and camps	No more than 2 of the 8 clearings	No more than 2 of the 8 clearings	More than 8
Clearings – removal of vegetative mat	No removal of vegetative mat within 30 metres of a water body	Removal of vegetative mat	Removal of vegetative mat
Surface area of clearings	Not exceeding 200 m ² , except for clearings for helicopter pads and camps which cannot exceed 500 m ²	Not exceeding 400 m ² per clearing, if only trees and brush are removed; Not exceeding 500 m ² per clearing, for helicopter pads and camps; or Not exceeding 1,000 m ² , if vegetative mat is removed	more than 400 m ² per clearing, if only trees and brush are removed; More than 500 m ² per clearing, for helicopter pads and camps; or more than 1,000 m ² , if the vegetative mat is removed

Source: *Guide to Hard Rock Prospecting, Exploration and Mining in Yukon, November 2007*

Table 19.2 *Quartz Mining Land Use Regulation Class Criteria for Fuel Storage*

Fuel Storage	Class Criteria 1	Class Criteria 2	Class Criteria 3
Storage of fuel, total amount stored	Not exceeding 5,000 L	Not exceeding 40,000 L	More than 40,000 L
Storage of fuel, amount per container	Not exceeding 2,000 L	Not exceeding 10,000 L	More than 10,000 L

Source: *Guide to Hard Rock Prospecting, Exploration and Mining in Yukon, November 2007*

Table 19.3 *Quartz Mining Land Use Regulation Class Criteria for Access and Vehicle Use*

Trails	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria
Establishing new access roads, per exploration program	Not authorized	Not exceeding 5 km	Not exceeding 15 km
Upgrading of access roads, per exploration program	Not authorized	Not exceeding 10 km	Not exceeding 30 km
Establishment of trails, other than temporary trails, per exploration program	Not authorized	Not exceeding 10 m in width and 15 km in total length	Not exceeding 15 m in width and 40 km in total length
Trails	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria

19.0 Drilling

<p>Establishing or using temporary trails, per exploration program</p>	<p>Not authorized on Category A Settlement Land or on Category B Settlement Land.</p> <p>On Land other than Category A Settlement Land or Category B Settlement Land, establishing a temporary trail or using a temporary trail that was established for another program if:</p> <ul style="list-style-type: none"> • The temporary trail width does not exceed 7 m or 1 m more than the width of the equipment to be moved along the temporary trail, whichever is less. • The total temporary trail length does not exceed 3 km; and • The temporary trail is only used for the purpose of moving sampling equipment between test sites. 	<p>Not exceeding 10 m in width and 15 km in total length</p>	<p>Not exceeding 15 m in width and 40 km in total length</p>
<p>Use of vehicles on existing roads or trails</p>	<p>Within the design limits or tolerances of the road or, if design limits or tolerances of roads or trails are not known, vehicles with a gross weight of less than 40 t for roads, and less than 20 t for trails</p>	<p>Within the design limits or tolerances of the road or, if design limits or tolerances of roads or trails are not known, vehicles with a gross weight of less than 40 t for roads, and less than 20 t for trails</p>	<p>Within the design limits or tolerances of the road or, if design limits or tolerances of roads or trails are not known, vehicles with a gross weight of more than 40 t for roads, and less than 20 t for trails</p>

Trails	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria
Off-road use of vehicles in summer	Low ground pressure vehicles only	Vehicles with a gross vehicle weight not exceeding 20 t, that are used over a distance of not more than 15 km	Vehicles with a gross vehicle weight of more than 20 t, that are used over a distance of not more than 40 km per year
Off-road use of vehicles in winter	Low ground pressure vehicles or vehicles with a gross vehicle weight not exceeding 40 t, used over a distance of not more than 15 km	Vehicles other than low ground pressure vehicles, used over a distance of not more than 25 km	Vehicles other than low ground pressure vehicles, used over an unlimited distance

Source: *Guide to Hard Rock Prospecting, Exploration and Mining in Yukon, November 2007*

Table 19.4 *Quartz Mining Land Use Regulation Class Criteria for Camps*

Camps	Class Criteria 1	Class Criteria 2	Class Criteria 3
Number of person-days in camp	Not exceeding 250	Not exceeding 250	More than 250
Number of persons in camp at any one time	Not exceeding 10	More than 10	More than 10

Source: *Guide to Hard Rock Prospecting, Exploration and Mining in Yukon, November 2007*

Drilling in coal exploration is regulated by the Land Use Regulation of the *Territorial Lands (Yukon) Act*. In this regulation drilling is directly regulated using the weight of the drill complete with, rods, pumps, hose etc. Use of heavy equipment like a bulldozer to tow the drill is also regulated.

19.0 Drilling

Table 19.5 *Territorial Land Use Regulation* for Machinery Used for Drilling, Camp, Site Clearing and Equipment Use Thresholds

Activity	No permit required	Class B Permit	Class A Permit
Drill programs: any power driven machinery used for earth drilling (diamond, RAB, RC drilling equipment)	< 500 kg operating weight, excluding the weight of drill rods, stems, bits, pumps and other ancillary equipment	> 500 kg operating weight, excluding drill rods , stems, bits, pumps, and other ancillary equipment	> 2.5 t operating weight, excluding drill rods , stems, bits, pumps, and other ancillary equipment
Camp Sites used by more than 2 people Person day = the use of a camp site by one person for 24 hours	< 100 person days	> 100 person days	> 400 person days
Site clearing for lines, trails, or right-of-ways including levelling, cutting, grading or snow ploughing	< 1.5 m in width	> 1.5 m in width but <u>not</u> exceeding 4 ha in area	> 1.5 m in width and exceeding 4 ha in area
Equipment Use: 1) Self propelled power driven machines used for moving earth or clearing land of vegetation 2) Stationary power driven machines used for hydraulic prospecting, moving earth or clearing land, <u>other than a power saw</u>			Requires Class A permit

Source: *Territorial Lands (Yukon) Act Regulations, March 31, 2003*

Several aspects of drilling are covered in the Waters Regulation under the *Waters Act*. A large multi-drill program can easily exceed the 300 cubic metres per day direct water use (close to the daily consumption of 4 larger diamond drills). If below licence thresholds a “Notice of Water Use / Waste Deposit Without Licence” has to be filed with the Water Board office at least 10 days before commencing work. Drilling on an ice covered water body could be problematic as there is certainly the potential for a direct discharge of waste into water and an Inspector might choose to kick up the Notice to a Type B licence since there is a proviso for all uses of water without a licence that the proposed use “has no potential for significant adverse environmental effect”

A YESAA assessment and a Decision Document will be required before land use permits, water licences or Class 2, 3 or 4 approvals may be issued.

Exploratory drilling is covered in Part 15 of the Occupational Health and Safety Regulations under the *Occupational Health and Safety Act*. Those regulations require operator to give notice to the director 30 days before commencing a diamond drilling program.

19.3 Potential Effects

Trail and road construction to support drill programs can have a greater impact on land disturbance than drill pad construction. Other potential impacts from drilling can occur as a result of hydrocarbon spills during refuelling or from leaking or broken hoses. Impacts may also occur if sediment laden drill waters are released into the environment. Of particular concern is drill mud which must be contained to avoid undesirable aquatic effects. Cuttings from drill holes in sulphide rich rock can be a source of contamination if not handled properly.

The noise from drill programs can create conflict with other land users, and both the noise and light from the drill has the potential to affect wildlife.

Exposed drill core containing pyrite has the potential to generate ARD and leach metal, however, to be a significant source of contamination the core rack would need to contain a large amount of core or be strongly broken in small fragments. RC chips, are fine grained by nature and could also lead to contamination if not stored properly. Collapsed core racks and deteriorating RC chip bags as well as equipment and other waste not properly cleaned up is unsightly and of concern to all.

19.4 Drilling Best Management Practices

Planning for Drill Programs

- Contact First Nations and local land users to determine when and where other activities may occur within the project area. When possible schedule the drill program when drilling will have the least impact on wildlife and other commercial activities in the area.
- Update or develop Standard Operating Procedures, Environmental and Camp Policies, Emergency and Spill Response Plans that are appropriate for the number of people and types of equipment the program will require.



Contracts with contractors should stipulate that employees wear proper PPE for the job.

19.0 Drilling

Ensure company personnel and contractors have:

- ◇ Proper personal protective equipment (PPE). Contracts with contractors should stipulate that their employees arrive on site and wear proper PPE for the job.
 - ◇ First aid, WHMIS as required for the size and types of fuel and fluids used in the drill program; and
 - ◇ Been orientated and trained in the company's Standard Operating Procedures, Emergency and Spill Response Plans and any other company policies developed for the program.
- If the drill program or the company will use special equipment or drill additives incorporate these requirements in the terms and conditions of the drill contract (i.e. if drilling on ice requires a closed circuit system). Drill equipment must be in good working order and drip pans installed; this will cut down on fuel leaks and air emissions.

Plan to use:

- ◇ Non-toxic, biodegradable industry approved drill additives.
- ◇ Discuss with the drill company prior to the start of the program which additives, depending on site conditions, will be acceptable for use.
- ◇ Use existing drill pads, trails and roads if possible. If building new trails or roads to drill pad sites follow best management practices, see Section 14.0 Construction of Trails, Roads and Winter Roads; and
- ◇ Noise abatement devices including mufflers and shrouding if drilling near populated areas.

Drill Pad Management

- Keep clearings and the removal of vegetative mat for drill pads and trails to a minimum.
- Avoid building drill pads on unstable slopes or steep terrain.
- If helicopters are used, the pad must be cleared of any overhanging trees or branches and free of loose debris like rags, used mud bags etc.
- Avoid placing drill pads in environmentally sensitive areas.
- Brush and felled trees should be bucked up. If the pad has to be levelled, topsoil and the vegetative mat should be stockpiled and used when reclaiming the pad.
- Ensure the proper type and adequate supply of fire fighting and spill response equipment is placed at drill pads, fuel caches and water pump sites.



Keep clearings and the removal of vegetative mat for drill pads and trails to a minimum.

- Copies of the Spill Response Plan and Material Safety Data Sheets (MSDS) for fuel and drill additives must be maintained at each drill.
- Equipment and supplies at drill pads should be well organized and sites should be kept clear of debris.
- Garbage, rags, used oil absorbent matting, empty containers and any other waste should be removed from the drill pad on a regular basis.

Water Management Plan

Water used in diamond drill programs is usually drawn from creeks or lakes located as close as possible to the drill pad. When planning a drill program determine where the best water source is and the amount of water required for the duration of the drill program. The amount of water available may vary depending on the season, rivers may freeze to the bottom during cold winters or dry up during hot summers. Plan ahead to ensure there is enough water for the drill program.

Water Pumps

- Avoid placing waterlines and pumps in environmentally sensitive areas.
- Ensure water pump intake hoses are screened. For screen sizes see DFO Freshwater Intake End of Pipe Fish Screen Guidelines <http://www.dfo-mpo.gc.ca/Library/223669.pdf>.
- Locate the water pump above the high water mark.
- The water pump and re-fuelling system must have drip pans and secondary containment in place.

Managing Drill Cuttings - Sumps and Settling Ponds

- Drill water that is turbid but has not had any chemicals added can be directed to sumps then filtered through the ground, drill water should not be allowed to enter streams or lakes directly.
- If drill mud, flocculants and other additives have been used the drill water should not be released uncontrolled into the environment, but collected in either sumps, tanks or settling ponds located down slope from the drill pad.
- If the drill pad has permafrost or it is not possible to dig proper sumps use geotextile material and/or straw bales to control and direct the drill water, or set up a closed system using tanks to collect the drill cuttings.
- Never use diesel as a mixing agent or as a lubricant.



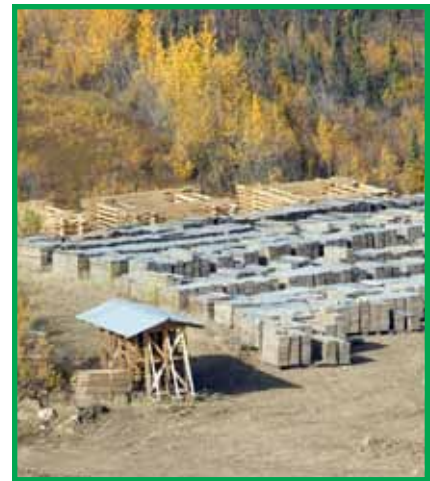
Sumps can be used to collect drill water. After the drill program is completed all sumps must be filled in.

19.0 Drilling

19.5 Core Storage

Drill core is the physical record of a mineral resource. If stored properly drill core can be re-logged and assayed to verify historic results and this adds value to the exploration property. Drill core is the property of the exploration company and should not be tampered with.

- All drill core should be stored in a safe manner to prevent the core boxes from collapsing. This can be done by choosing a level, dry site and cross stacking, or building stable core racks.
- If a mineral claim is dormant for a period of time the public may not be aware that the core is still a valuable asset to the exploration company. Signage should be posted notifying the public that the drill core is private property and should be left in the state found and not destroyed.
- Core storage areas should be set up a minimum of 30 metres from any watercourses.
- If possible, the core storage site should be situated in a location where it is not visible from public roads, trails or waterways.
- Depending on the volume of core and the length of time the core is stored in one area, sulphide rich core can potentially be a point source for acid rock generation. If there is a potential issue of ARD effecting the environment the sulphide rich core should be covered or removed from site.
- Core storage areas for uranium exploration programs should have placards posted identifying the core as radioactive, as required.
- Reverse Circulation (RC) sample splits (RC drilling samples are usually the size of pea gravel) are stored in plastic bags. Once the RC program is completed the RC samples should be protected from the elements and stored in a covered area. When it is determined that the samples are not required to verify results the RC chips can be disposed of on-site and the plastic bags disposed of properly.



Core storage area. Note: core is stored on level ground and stacked to prevent core boxes from collapsing.

19.6 Drilling on Ice

The Mineral Exploration Guidelines for Saskatchewan (page 44) provides an excellent description with diagrams of how to set up and operate a drill on ice. <http://www.environment.gov.sk.ca/Default.aspx?DN=0f7ddaf7-f858-47db-abec-2f836a176dc1>

The following information is derived from the Saskatchewan Mineral Exploration Guidelines.

- Ensure permits allow for winter drilling on ice or in riparian zones, as noted above it is not clear if drilling on an ice covered water body, particularly one containing fish, could be done without a Type B Water Licence (if this is not resolved early and properly planned for then you will be drilling during the next winter as water licencing and environmental assessment required is a lengthy process).
- Test ice thickness for the drill site and ice road (see Section 15.0 for construction of ice roads and bridges), if the ice is not thick enough flood the area to build up the ice layer.
- Prior to placing the floor boards on the drill platform secure a tarp to prevent any fuel drips and leaks from spilling on the ice.
- No drill water can be discharged on the ice. A closed looped system must be set up to collect drill cuttings and re-circulate drill water. A poly tank, a metal tank with riffles, can be used to filter cuttings from the drill water. The cuttings are collected from the spout at the base of the poly tank in plastic bags or tubes. The plastic tubes with the cuttings can then be transported from the drill site and disposed of on land.
- Use only biodegradable or industry approved additives.
- All mechanical equipment (drill, pumps), fuel containers, and mud tanks must have secondary containment (e.g. impermeable liner resistant to the product being used, plastic drip trays, large trays).
- Drilling should occur in water depth greater than 2 metres (including ice thickness).
- Water intake hoses should be screened. For screen sizes see DFO Freshwater Intake End of Pipe Fish Screen Guidelines <http://www.dfo-mpo.gc.ca/Library/223669.pdf>.

Once drilling is completed:

- ◇ Clean water must be circulated through the hole to remove any drill fluids and cuttings.
- ◇ Drill rods and casing must be removed from the drill hole.
- ◇ The upper 30 metres bedrock in the drill hole must be cemented.
- ◇ Any snow and ice contaminated with fuel or dirt must be removed and properly disposed of on land; and
- ◇ All machinery, metal, wood and other debris must be removed from the ice.



Mechanical equipment placed in an impermeable liner resistant to the product being used to collect drips and spills.

19.0 Drilling



Drill hole making water before being capped.



Capped drill hole



Reclaimed drill site. Note: ground has been scarified and branches and organic material placed on site to promote natural revegetation. Picket marks drill hole location.

19.7 Drill Site Reclamation

- Consider plugging all drill holes to prevent the holes from becoming artesian ground water wells.
- Cap drill holes below ground level and clearly mark the drill hole location.
- Collect any soil contaminated with fuel and dispose of properly.
- Remove all fuel drums, metal, plastic, absorbent mats and other debris from site.
- Drill water stored in mud tanks or other containers must not be discharged directly into any water body or wetland. The drill water can either be directed to a sump or in some situations where a sump is not provided allowed to infiltrate the ground, if conditions permit.
- Fill in sumps and ditches, remove any geotextile or plastic material used to control runoff from site. If straw bales were used to control drainage these can be left to decompose naturally.
- All hoses, fittings, fuel drums and any other debris at water pump site must be removed.
- Scarify compacted soil to promote natural revegetation of the site, replace topsoil if removed during drill pad construction and scatter brush or other organic material to promote decomposition and biodiversity.
- Reseeding the site may not be necessary if topsoil is present or replaced and felled trees are scattered on site, unless the area is in steep terrain there is the potential for soil erosion due to runoff.

19.8 Drilling References

Draft Handbook of Reclamation Techniques and Mining Land Use; A Guide to Compliance with the Yukon Quartz Mining Land Use Regulation and Other Applicable Environmental Regulations in Mining Exploration and Development. Yukon Government Energy Mines and Resources. November 30, 2006 http://www.emr.gov.yk.ca/mining/pdf/handbook_of_reclamation_techniques_and_mining_land_use.pdf

e3Plus: A Framework for Responsible Exploration, Prospectors & Developers Association of Canada. March 2009. <http://www.pdac.ca/e3plus/index.aspx>

Handbook for Mineral and Coal Exploration in British Columbia, A Working Guide. Association of Mineral Exploration British Columbia, Ministry of Energy, Mines and Petroleum Resources, Ministry of Environment British Columbia, Mining Association of British Columbia. 2008/09 Edition. <http://www.amebc.ca/documents/resources-and-publications/publications/current/MXHandbook2008-09.pdf>

Mineral Exploration Guidelines for Saskatchewan. The Saskatchewan Mineral Exploration and Government Advisory Committee. 2005 <http://www.environment.gov.sk.ca/Default.aspx?DN=0f7ddaf7-f858-47db-abec-2f836a176dc1>

**For Uranium Exploration Programs the Mineral Exploration Guidelines for Saskatchewan provides guidelines on water management plans for handling drill water, plugging drill holes and core storage.

**For Radiation Safety review Guidelines for Radiation Protection during Exploration for Uranium, e3Plus: Framework for Responsible Exploration, PDAC

20.0 Advanced Exploration: Underground Exploration and Bulk Sampling

20.1 General

Advanced exploration programs collect additional data to determine if it is economically feasible to mine a mineral deposit.

An important objective of the advanced exploration project is to increase the density of drilling with well controlled dense clusters or fans of short holes to confirm orientation and continuity of structures and variation within the deposit. Another is to actually see the deposit after years of only imagining what it looks like. There is no substitute for actually standing in a mineralized zone and visually inspecting its contacts, structural complexity, faulting etc. Test mining will also give a better handle on ground control issues, development requirements and dilution during mining.

Another objective of advanced exploration is to collect larger samples, referred to as bulk samples, of mineralized material required to complete the evaluation of the deposit. The bulk sample is intended to be a representative sample of the material to be mined from a deposit.

A bulk sample is analysed for mineralogy, rock composition, geochemistry and engineering studies. Analysis will probably also include extensive metallurgical testing possibly even going as far as running a small pilot plant on a large sample shipped off site to specialized laboratories. Bulk samples also will be tested to determine the rocks potential to generate or consume acid and leach metals. Of particular importance to eventual environmental modeling of a mine development is this type of environmental testing on the waste products of metallurgical testing of a bulk sample; this is likely the only sample of tailings material until the mill starts up.

A bulk sample is collected either by increasing the size of drill core and number of drill holes or, depending on the depth and symmetry of the ore body, constructing small scale open pits or underground workings; i.e. a mined bulk sample. A mined bulk sample may be preferable rather than a drilled bulk sample as a mined sample is more likely to contain metallurgical information that can't be found in a drill core bulk sample. A mined sample is also more likely to carry with it parts of wall rock that can influence processing but are often left out of drilled samples since they aren't "ore". The decision between a drilled or mined bulk sample is a deposit specific decision taking into account cost and time as well as the desired testing program. The environmental footprint of the two approaches can be very different.

Data collected during the advanced exploration phase is used in the preliminary planning (pre-feasibility study) for the mine plan (open pit or underground), ore processing designs (heap leach or closed circuit), tailings, water management plans, waste disposal plans (tailings, waste rock), mine life (number of tonnes mined/year), mine infrastructure and equipment, and the cost to operate the proposed facility.

Advanced exploration programs may construct some of the same facilities, but at a much smaller scale, as the eventual operating mine. These structures or facilities can include the development of waste rock piles, water treatment and discharge facilities, small open pits and underground workings and camps.

In a Territory with the varied mineral endowment of Yukon there will be a vast variation in size of advanced exploration projects and it is safe to bet no two will be quite the same. An underground advanced exploration project for a large base metal project may be considerably larger in scale than a small operating underground precious metal mine. Because of this variability, each project will be likely be handled individually at the regulatory stage with careful attention by government to details of a number of complex plans. Operating, reclamation and closure plans are required to prevent and manage potential environmental effects from advanced exploration programs.

20.0 Advanced Exploration: Underground Exploration and Bulk Sampling

20.2 Legislation

Table 20.1 *Quartz Mining Land Use Regulation Class Criteria for the Construction of Underground Structures*

Activity	Class 1 Criteria	Class 2 Criteria	Class 3 &4 Criteria
Construction of underground structures	Construction in which not more than 500 t of rock is moved to the surface	Not more than 40,000 t of rock is moved to the surface per year and not more than a total of 200,000 t is moved to the surface for the exploration program	Not more than 100,000 t of rock is moved to the surface per year and not more than a total of 200,000 t is moved to the surface for the exploration program

Source: *Guide to Hard Rock Prospecting, Exploration and Mining in Yukon, November 2007*

Class 3 & 4 Permits for advanced exploration program applications may require, but not be limited to, the following plans:

Waste rock storage and disposal (see also section 5.2 Implementing Environmental Baseline Programs:

- ◇ The amount of rock stored on surface (cubic metres).
- ◇ Acid generating and/or metal leaching potential of waste rock and management plan.
- ◇ Site layout plans showing distances from drainages and water bodies; and
- ◇ Waste rock reclamation plan.

Operating plan:

- ◇ Dimensions of the underground workings and the equipment used.
- ◇ The amount of material to be moved to the surface (cubic metres).
- ◇ Composition of each waste rock and ore; and
- ◇ Acid generating and/or metal leaching potential of rock types (ore, waste rock, hanging wall rock) and test work used to verify results.

Water management plan for underground workings:

- ◇ Quality and quantity of water discharged from underground workings; and
- ◇ Water treatment facilities and settling ponds, if required.

Seasonal and permanent closure plans.

Depending on the project the underground exploration application may be an amendment to existing permits and licences. If there are changes to existing infrastructure, such as a camp expansion or the installation of a camp sewage treatment plant, these must be included in the permit application.

20.0 Advanced Exploration: Underground Exploration and Bulk Sampling

The Coal Regulation and Land Use Regulation under the *Territorial Lands (Yukon) Act* are not as detailed as far as environmental permitting of such a project as the Quartz Mining Land Use Regulation is. It is not clear how such a project would or could be handled in Yukon.

Although details would depend on the project it is likely that a Type B Water Licence would be required for both water use and waste deposit grounds.

A YESAA assessment and a Decision Document will be required before land use permits, water licences or Class 2, 3 or 4 approvals may be issued.

Parts 14, 15 and 16 of the Occupational Health & Safety Regulations under the *Occupational Health and Safety Act* extensively cover the operations of an advanced exploration program, particularly an underground program. The details are well beyond the scope of this Guide but engineering staff will need to understand them in detail in order to remain in compliance.

20.3 Potential Effects

Potential effects of advanced exploration programs may include: air pollution and dusting due to the operation of heavy equipment, more frequent blasting and incineration of camp waste; larger quantities of fuel and other hydrocarbons and chemicals are required thereby potentially increasing the impacts on soil and surface and ground water if a spill occurs; greater areas of land are disturbed due to the increased need for supporting infrastructure such as accommodations, waste water treatment facility, roads, etc. Advanced projects may also generate mined waste rock piles which could cause a deterioration in water quality due to potential generation of acid rock drainage and metal leaching. Underground exploration programs can potentially affect receiving water quality if underground water contaminated with metals is released to the environment without treatment. Long term drainage and sporadic ice plug bursts from underground workings can be a concern. The overall increase in activity in an area may permanently displace some wildlife.

20.4 Underground Exploration and Bulk Sampling Best Management Practices

The operations, waste water and waste rock management and other plans required to conduct advanced exploration projects provide site specific details on operational procedures and closure plans. This section provides an overview of Best Management Practices.

- Develop environmental and socio-economic baseline programs to provide the data required to mitigate or avoid impacts. This data will also be used as a basis for the environmental assessment if the project proceeds to mine permitting and licensing stage.
- Plan ahead with an eye to the eventual closure of the project; while each deposit and topographic situation is different, if there is a concern for ARD and metal leaching, try to arrange workings that will flood and not allow openings to drain freely to the environment.
- Avoid building on areas with permafrost. If permafrost cannot be avoided engineer facilities to prevent permafrost from melting (construct pads to insulate the ground and prevent the permafrost from melting).

20.0 Advanced Exploration: Underground Exploration and Bulk Sampling

- Plan to minimize the extent of the impacts by keeping the infrastructure footprint as small as possible.
- Avoid potential to contaminate clean surface water with water from mine workings, direct surface water from surface and underground workings and waste rock piles.
- Capture runoff that has been in contact with waste rock piles and other infrastructure to prevent it from draining directly into the environment. Use ditches to direct the runoff water to settling ponds or, after mining, divert into underground workings if feasible.
- Monitor runoff from waste rock piles, water entering and exiting treatment plants and other pollution prevention facilities; data collected will be required for predictive environmental modelling and will help evaluate the environmental performance of the facilities.
- Design a project that will not require long term monitoring, maintenance, security or active water treatment after closure; it is unlikely anything less will be allowed to proceed.
- Develop an overall site clearing plan for brush, topsoil and overburden stockpiles to ensure these materials are properly stored for later use in progressive reclamation or at closure.
- Construct topsoil and overburden stockpiles to prevent erosion, by wind or rain, and sediment from entering watercourses by:
 - ◇ Revegetating the piles as soon as practical and limiting the size of the stockpile.
 - ◇ Constructing ditches and sumps that will direct flows away from water courses and collect sediment; and
 - ◇ Maintain vegetation buffer zones or setbacks from wetlands and watercourses.
- Locate the topsoil stockpile in an area where the material will not be contaminated by underground exploration activity.
- Consider establishing vegetation test plots early to determine which species will be suitable and successful for reclamation purposes.
- Recycle water when possible.
- Reduce air emissions by maintaining equipment and changing filters regularly.
- Reduce generation of excess dust by spraying areas with water and reducing vehicle speed.
- Manage noise and vibration by contracting or purchasing equipment with noise abatement devices, maintain equipment, enclose or shield sources of noise.
- Consider alternate power sources and new technology; as technology advances alternative power sources (solar, wind, biodiesel fuels) and more fuel efficient machinery becomes available. Ask suppliers for information on new technologies that may be suitable for the program.



Keep footprint as small as possible. Plan ahead where infrastructure will be located.

20.0 Advanced Exploration: Underground Exploration and Bulk Sampling

20.5 Underground Exploration and Bulk Sampling Reclamation

For surface exploration activities (drilling, roads, camps, trenches, etc.) follow reclamation practices as described in previous sections of the guide.

Note: bulk samples are processed offsite, so no tailings facility is constructed at this stage of development.

Underground exploration workings:

- If the ground is unstable and there is a possibility of cave ins, all underground openings that come to surface (portals, audits) should be capped, with reinforced concrete or other engineered material acceptable to regulators, to prevent access.
- If the openings are permanently sealed, drains may be required to allow water to exit from the underground workings. Toxicity and water quality test work, completed as part of the environmental baseline program, will determine if the water is acceptable for direct discharge into the environment or if it will require treatment.
- If the ground is stable, metal grates can be installed to prevent access by public but allow wildlife to use the underground workings, these areas can provide excellent habitat for bats and other small mammals.

Waste Rock Piles:

- Waste rock piles should be contoured for slope stability.
- ARD (acid rock drainage) and metal leaching test work will have been completed prior to the deposition of the waste rock (see Section 5 Environmental and Socio-economic Baseline Studies). If there is no potential for adverse affects the waste rock piles remain on surface. If the waste rock is potentially acid generating or metal leaching the closure plan will stipulate how the waste rock will be managed (an option may be to return potentially acid generating or metal leaching material underground if the openings are still stable, the material will be submerged in water, and there is sufficient capacity).
- Depending on the site closure water management plan all ditches and drains should be graded to avoid water from channelling and eroding the soil.



Advanced projects require infrastructure such as water treatment plants, settling ponds etc. If the project does not proceed the infrastructure will have to be removed and the disturbed areas reclaimed.

Other facilities: (water treatment plant, settling ponds, workshops, etc.)

- All buildings and structures must be torn down and removed from site; some permits may allow for non-hazardous material to be buried at site.
- All ditches, berms and ponds will be filled in and graded to a stable slope angle.
- Disturbed areas will be re-vegetated, these are usually large and reseeded may be necessary to establish revegetation.

20.0 Advanced Exploration: Underground Exploration and Bulk Sampling

20.6 Underground Exploration and Bulk Sampling References

Environmental Code of Practice for Metal Mines, Environment Canada, 2009 www.ec.gc.ca

Guide to Hardrock Prospecting, Exploration and Mining in Yukon, Yukon Energy, Mines. November 2007. <http://www.emr.gov.yk.ca/mining/hardrockmining.html>

Yukon Occupational Health & Safety Regulations, Parts 14, 15 and 16 <http://www.wcb.yk.ca/ActsPoliciesAndRegulations/OccupationalHealthAndSafety/OccupationalHealthAndSafetyRegulations.aspx>

21.0 Closure and Reclamation for Exploration Activities

21.1 General

Each section of this Guide has provided reclamation methods relevant to specific exploration activities. This section provides an overall guide to reclamation Best Management Practices.

Reclamation is the process of returning disturbed land back to a stable condition that can support a viable ecosystem (vegetation, wildlife habitat, wildlife).

The level of work required to reclaim an area is site specific and will depend on pre-existing conditions, and the duration and type of exploration activities. For small drill and trenching programs site reclamation can often be completed within the same field season the work was conducted. For advanced exploration programs progressive site reclamation could span many years.

The key objective of a successful reclamation program is to prevent erosion of surface soil.

Definitions²²:

- Erosion is the detachment and movement of soil by water, wind, gravity or ice.
- Sediment is defined as eroded soil suspended in water or wind.
- Sedimentation is the deposit of eroded soil (sediment).

Types of erosion:

The following is an overview of the five different types of erosion caused by water.

Table 21.1 Types of Erosion Caused by Water

Rain Splash	The impact of a rain drop causes the dispersal and mobilization of soil particles
Sheet	Water flows as a sheet overland removing soil particles, large amounts of soil can be eroded along the entire face of a slope
Rill	Water forms very small channels removing soil and impacting slope stability, causing surficial erosion
Gully	Larger stream channels than a rill, form where large runoff volumes are concentrated in one area, causing surficial erosion and mass wasting
Stream Channel	Water removes soil from stream banks and scours stream bed material

Source: *Introduction to Erosion and Sediment Control Workshop. Environmental Dynamics Inc. and Snowy River Resources Ltd., Whitehorse, November 2, 2002*

²² *Introduction to Erosion and Sediment Control Workshop. Environmental Dynamics Inc. and Snowy River Resources Ltd., Whitehorse, November 2, 2002*

21.0 Closure and Reclamation for Exploration Activities

21.2 Legislation

Under the Quartz Mining Land Use Regulation Class 3 and 4 exploration permits require a closure plan. The closure plan will detail the methods used to restore and reclaim a site upon closure. Other Classes must adhere to the Operating Conditions (in Schedule 3 of the Quartz Mining Land Use Regulation) which outlined measures to be taken to reclaim exploration disturbances.

On coal exploration lands, off claims or on third party claims reclamation measures will be detailed in the Land Use permit.

21.3 Potential Effects

Proper site reclamation, from grassroots to advanced projects, ensures that land disturbed by exploration activities are returned to a viable and self-sustaining land use. Poor reclamation practices can lead to soil erosion, limiting the potential for land to revegetate and increasing the potential of sediment to enter water bodies thereby impacting fish habitat. Abandoned camps infrastructure, fuel, special wastes and metal have the potential to negatively impact the biophysical environment and are unsightly. For advanced projects with larger infrastructure such as adits and waste rock dumps, poorly managed and implemented reclamation and closure plans can have long lasting impacts on the biophysical environment and, if community watersheds are adversely affected, human health.

21.4 Exploration Reclamation Best Management Practices

Document Site Conditions

Start-up

- Document the undisturbed site conditions before any exploration activity commences. A photo catalogue of exploration sites is an easy and effective method to record types of vegetation, natural drainage, slope and any pre-existing structures. This will provide the bench mark for the site specific reclamation program.

During Operations

- Document site conditions such as the location and conditions of topsoil stockpiles, drainage systems, slopes and any evidence of potential erosion (gulying, slumping) during operations.

This information will provide the data necessary to develop and manage progressive reclamation programs.

Closure

- Document the decommissioning, reclamation, and end results to demonstrate the company's implementation of Best Management Practices in restoring the land to a beneficial land use. This recording of site conditions can also provide evidence that the company left the site in good condition if in the future the land is disturbed and not reclaimed by other operators or land users.

Practice Progressive Reclamation

Reclamation is the main tool for preventing erosion.

21.0 Closure and Reclamation for Exploration Activities

- Site reclamation should be completed in a timely manner to prevent erosion.
- Progressive or ongoing reclamation is recommended. Progressive reclamation requires the operator to reclaim inactive sites and areas on an ongoing basis when possible, not to wait until the exploration project has ended.

The development of a reclamation plan prior to commencing an exploration project will help minimize potential impacts and decrease costs. The following should be considered in determining the purpose and level of the reclamation plan.

- Will surface erosion and slope stability be a concern?
- Will reclamation requirements include the recovery of wildlife habitat, or the remediation of a fish habitat that has had “harmful alteration, disruption or destruction” (HADD) under the *Fisheries Act*, or sensitive environmental areas?
- Are aesthetics important, if the area is visible to communities the aesthetics of reclaiming the area may be a concern?

Preparing Sites for Reclamation

Prior to covering an area with topsoil and organic matter the disturbed land must be stabilized to prevent erosion and sedimentation of watercourses. The methods used to stabilize and prepare the ground for revegetation are site specific and will vary depending on the duration and type of exploration activity, climate, soil type and presence of permafrost. Ground preparation methods, depending on the site conditions, may include:

Recontouring Slopes

- Slopes should be recontoured to mimic with the surrounding topography and be shallow enough to support revegetation (angle of repose is generally too steep for successful revegetation of the entire slope length).
- Do not create a uniform, smooth surface. Rocks can help create microsites for vegetation, and can be left in place unless they will roll downslope.
- Side slopes with permafrost can be left to thaw, if the slope is undercut the vegetative mat, under the proper conditions, will slide over the exposed slope and stabilize naturally²³ (see Appendix IV, Permafrost).
- If the site is not too steep side slopes and brush piles can be contoured to blend in with the topography, the tops of piles should be rounded off.
- If working within riparian zones, measures need to be taken to prevent sediment from entering the watercourses when recontouring the area.



Improper reclamation will cause erosion to occur. Note: rills and gully erosion occurs when ground has not been recontoured properly.

²³ *Reclamation Guidelines for Northern Canada, Indian and Northern Affairs Canada, 1987*

21.0 Closure and Reclamation for Exploration Activities

Drainage

- Remove culverts and re-establish natural drainage systems where possible.
- Develop drainage systems that will prevent water from ponding or channelling.
- Methods to control drainage and trap sediment include: cross ditches and diversion berms. Berms can be made of earth, rocks, logs and brush. See Section 14.4 which gives details on water management techniques.

Scarify Compacted Surfaces

- Scarify, rip or rough up compacted surfaces. The roughened surface will trap moisture and provide pockets for seeds to lodge in, and the loosened surface will facilitate root penetration. For small uncompacted areas something as simple as a rake or a mattock can be used to rough up the surface area of a drill pad or trench.
- For larger areas equipment with a tracks or a ripper can be used. To create track marks that will not encourage surface runoff, the machine must move up and down the slope, not across or perpendicular to the slope. Tracking should only be done on soils that do not have a high compaction potential (soils with a high organic material).



Heavy equipment can be used to scarify compacted areas.

Topsoil and Organic Material

Topsoil, brush and other organic material will have been stockpiled during the exploration program.

- To encourage re-growth, replace topsoil, bucked up trees and other organic material over the disturbed area. This will provide a growth medium for seed germination, help retain moisture, reduce potential for erosion and promote structural diversity.
- In areas where the soil conditions are poor the topsoil and organic material can be bladed into to the surface. Mixing fine grained soils with coarser material can also improve the soil matrix.



Scarified soil with vegetation growing in the grooves made by the bucket.

Revegetation

Natural Revegetation

Natural revegetation is the process where seeds, stems, and root matter contained in the topsoil and transported by the wind and wildlife will re-establish on the disturbed area. If the site has been stabilized to prevent erosion and the disturbance is relatively narrow then manual reseeding and fertilizers may not be necessary to promote revegetation.

- Natural revegetation sites should be monitored to ensure plant growth is self-sustaining.

21.0 Closure and Reclamation for Exploration Activities

Reseeding

The objective of seeding an area is to establish a suitable ground cover that will prevent erosion, enhance moisture retention, build up organic matter, and allow native vegetation to re-establish itself over time. Choosing the appropriate seed mix and reseeding is particularly important in areas where natural revegetation will be challenging: steep slopes, highly erosive areas such as alpine terrain, or near water courses.

Seed and fertilizers are selected based on:

- ◇ Climatic region and elevation; and
- ◇ Soil characteristics; texture, pH, moisture retention.

Seed mixes comprised of locally-occurring native species should be used where feasible. Avoid the introduction of exotic and/or invasive species; consult Environment Yukon's Invasive Plant website for more information and a listing of species now considered to be invasive in Yukon.

Note: Commercial lawn seed mixes can contain invasive species or inappropriate seed mixes for the region and should not be used for reclamation purposes. Research for a certified seed supplier online.

- Application methods will depend on the terrain. For small areas seed mix and fertilizer can be applied by hand-held broadcasters. For larger areas larger equipment is used to seed the area.
- Scheduling revegetation work is critical to the success of the program. Seeding should be done when there is enough moisture for germination. The best time to seed is often just prior to the first snowfall, though seeding in the spring before the soil dries out can also be effective, as can seeding throughout the summer months, provided there is some moisture from frequent rainfall.

Shrub Propagation²⁴

Woody plant species (shrubs) can be useful for providing slope stabilization. The shrub species most commonly used in the Yukon are balsam poplar (*Populus balsamifera*) and willows (*Salix spp.*). Balsam poplar and most species of willow are easily propagated from stem cuttings when harvested while dormant. The closely related trembling aspen (*Populus tremuloides*), on the other hand, does not readily propagate from stem cuttings.

Stem cuttings can be collected during the winter and early spring if kept frozen until the ground has thawed enough to be worked, or they can be collected and planted directly into the ground in the fall once the leaves have fallen (September or early October is the ideal season to do this).

30 to 100 centimetre long stems (approximately 2 to 4 centimetre in diameter) should be collected and the tips and side shoots should be removed. They can be planted vertically or horizontally (individually or in bundles) in the ground with no more than about 10 cm of the small (upper) end remaining exposed. The soil around the cuttings should then be thoroughly watered and compacted. The cuttings should sprout during the following growing season. They should be watered (if the conditions are dry) during the first growing season while the young shoots and roots are developing.



Reclaimed site, area was reseeded. Note: growth in scarified area (lower right hand corner). Core Storage area located in background. Note: roofs constructed to protect core.

²⁴ Information on Shrub Propagation provided by Stu Withers

21.0 Closure and Reclamation for Exploration Activities

The seeds from any shrub species growing in the area can be collected and seeded directly into the ground. The time for collecting seed varies with each species. Wind-borne seeds, like those of willows, aspen and poplar can be collected and seeded early in the summer (just before or during the time they can be seen blowing in the wind), while the seeds of the nitrogen-fixing alders (*Alnus spp.*) should be collected in the fall when the small seed cones turn brown and open up to release the seeds.

Monitoring Reclamation Work

Monitoring reclamation work will determine if:

- ◇ The results reflect that the work was done correctly.
 - ◇ The goals of the reclamation plan have been met; and
 - ◇ If additional reclamation work is required.
- Drainage control and erosion prevention measures are best monitored in the spring when runoff is at its highest.
 - The summer months are a better time to monitor the progress of the revegetation program.

21.5 Reclamation References

Guidelines for Reclamation/ Revegetation in the Yukon Volume I and II, Edited by: T. Hill, C.E. Kennedy. D. Murray, Yukon Renewable Resources, Yukon

Handbook of Reclamation Techniques in the Yukon, Yukon Quartz Mining Land Use Regulation, Mineral Resources Directorate, Yukon, Indian and Northern Affairs, 1999

Introduction to Erosion and Sediment Control Workshop. Environmental Dynamics Inc. and Snowy River Resources Ltd., Whitehorse, November 2, 2002

Introduction to Erosion and Sediment Control Workshop. Environmental Dynamics Inc. and Snowy River Resources Ltd., Whitehorse, November 2, 2002

List of Yukon Invasive Plants, Environment Yukon, (tentative list for review purposes only), September 2008, <http://environmentyukon.gov.yk.ca/wildlifebiodiversity/invasiveplants.php>

Reclamation Guidelines for Northern Canada, Indian and Northern Affairs Canada, 1987

Soil Bioengineering for Forest Land Reclamation and Slope Stabilization, David Polster, Polster Environmental Services, September 2001

22.0 Certificate of Completion

When a decision to end all exploration activities and site reclamation has been completed the company should apply to the Chief of Mining Land Use for a Certificate of Completion. To issue a Certificate of Completion, the Chief must be satisfied that the operator has complied with all the terms and conditions and the reclamation requirements set out in the Operating Plan approval, plus the *Quartz Mining Act* and Quartz Mining Land Use Regulation. (Quartz Mining Land Use Regulation Sections 137 & 149).

A Certificate of Completion provides the company with official notification that site reclamation work was completed and the company fulfilled the terms of the Operating Plan. This can be used to demonstrate that the company left the site in good condition if in the future other individuals or companies conduct exploration activities and do not properly remove garbage, fuel or reclaim the site.

For work done off claims or for coal exploration there is a comparable document, a “letter of clearance” provided by the land use engineer once all requirements of a land use permit issued under the Land Use Regulation have been satisfied.

Most exploration activities are subject to two review processes:

- (1) an environmental and socio-economic assessment process; followed by
- (2) a licensing, permitting or approval process.

Yukon is somewhat distinctive in that the first process is carried out by an independent body which operates at arm's length from all levels of government. A government body, generally Yukon government, issues the necessary approval which allows the project to proceed. The details of the processes vary depending on the complexity of the activity proposed and the specific licensing requirements that are triggered by the activity. The assessment and licensing agencies have established rules and procedures that vary depending on the agency.

Most of the proponent's time and effort will be spent working through the assessment phase as required by *Yukon Environmental and Socio-economic Assessment Act (YESAA)*. Typically, this review is done by regional offices in some Yukon communities. These are called "Designated Offices". Appendix VIII provides Yukon Environment and Socio-economic Board (YESAB) Designated Offices contact information. Special rules, timelines and procedures have been developed for this kind of review. The YESAA review process is conducted entirely through their public on-line registry²⁵. The formal process contains quite a bit of technical jargon and can be confusing to a new user. However, the YESAB website contains detailed information about how the process works²⁶.

Licensing agencies also have their own rules and procedures. For most exploration projects these are simple and are explained as part of this Guide, a complete table that includes references for more information is provided in Appendix I and II.

A practical approach to assessment and licensing for exploration projects can be summarized in non-technical language as follows²⁷:

Project Planning

A proponent develops an exploration plan;

The proponent identifies the authorizations (approvals, licences or permits) required by the level of work proposed using Part 3 of this Guide;

The proponent incorporates BMP such as those from Part 3 of this Guide into an overall plan describing the work, associated environmental protective measures and reclamation and completes application(s) for the required approval, licence and/or permit;

At this point the proponent could proceed to the assessment stage but it is useful to review the plan and application with a Mining Land Use Officer or a comparable official if working off claims or on a coal project, to confirm the approvals required and whether there might be additional approvals needed and, importantly, that the plan is complete and specific with all required supporting information. That official can also confirm what level of review under YESAA is required. This can be easily done through meetings or phone discussions with staff at the appropriate Yukon Government office, generally Mining Land Use.

²⁵ The YESAB on-line registry can be found at: <http://www.yesab.tzo.com/wfm/launch/YESAB>.

²⁶ The main YESAB website is found at: <http://www.yesab.ca/>.

²⁷ For more information on the assessment process check the following web site: *The Development Assessment Process* http://www.eco.gov.yk.ca/dab_process.html.

23.0 Assessment and Licensing Process

Assessment

The proponent applies for the appropriate approvals. This usually triggers a requirement for a YESAA assessment since government is barred from issuing any approval that would facilitate any part of the project until the YESAA process is completed.

The proponent submits a project proposal to the YESAA Designated Office (DO) responsible for the project area. Sector specific application forms are submitted to the DO identifying project information and the licence application(s). Some additional maps may be needed and additional descriptive materials that might not be necessary for a licence application might expedite the public review.

The Designated Office reviews the project application form for completeness. The timeline for the review for completeness is a minimum 8 days. For large scale projects the review period could extend to 21 days.

The DO may request additional information or clarification.

When the project proposal is considered complete it is posted on the YESAB website for public review (called “seeking views and information”). The public, and other government agencies, including First Nations governments may participate by submitting comments the time allowed for this review is a minimum of 14 days but commonly an extension of another 14 days with up to a maximum of 70 days are granted by the DO if the project is complex.

Once the review is completed, the Designated Office sends recommendations or referral to all of the governments that issue the required licences (these are called “Decision Bodies” in YESAA and there may be more than one). The maximum time period for preparing the recommendation or referral is 21 days.

Please Note: As part of the YESAA five year review new Rules for Evaluations Conducted by the Designated Offices (the Rules) have been established as of August 11, 2010. The new Rules affect some of the key components in the assessment process.

- For details on the Rules check the YESAB web site <http://www.yesab.ca/documents/2-Infohandout.pdf>

Decision by Government

The Decision Body considers the recommendations, and may accept, reject or modify them. This will be done in a “Decision Document”, the regulations require this to be done in 30 days;

If there is more than one Decision Body then they must coordinate their Decision Documents.

Authorizations

The government agencies can then issue authorizations containing measures that are consistent with the Decision Document. For exploration programs this is most likely a Mining Land Use Authorization, but could also be any other permit required such as a land use permit, a water use licence or a fisheries authorisation²⁸.

23.1 Tips to Avoid Delays in the Application Process

Most delays to the application process occur because there was not a clear understanding of when and what kind of information should be provided in the assessment and licensing process. Here are a few suggestions that may help you:

- Carefully plan your program using this guide. Make sure you know what you want to do. Build some flexibility into your plans, but be specific so that all possible activities you may need to do can be assessed and licenced.
- Talk to the appropriate official in the Yukon Government (a Mining Land Use Officer for work on claims) before submitting an application for a permit or an assessment. This will help save a lot of time trying to figure out what you need to do and help ensure that the information is complete.
- If your program requires an assessment under YESAA, log on to the YESAB Online Registry²⁹. Search and review documents posted for projects that are similar to yours. This will give you a good sense of the kind of information you need to provide, and the kind of comments and concerns that may arise in the course of the review. Also, you will get a good idea of the time taken for the complete process, even each step.
- YESAB Designated Office staff can be very helpful as well and can provide assistance and advice during the review process. They will also help you upload documents. If you are unsure about what needs to be done, or the next steps, contact them.

23.2 Project Assessment Timelines

The question most often asked is “How long will it take to get the permits and authorizations required to start work?” The Mineral Resources Branch tracks project assessments for quartz and placer projects and compiles this information in their annual statistics report. The information is broken down into the three phases of assessment 1) Assessment, 2) Decision and 3) Regulatory phases.

In 2009 the average time for a quartz project to complete the process was “approximately 76 days with a minimum of 39 days and a maximum of 133 days”³⁰. In 2008 the average time to complete the

²⁸ For more information on the assessment process check the following web site: *The Development Assessment Process* http://www.eco.gov.yk.ca/dab_process.html.

²⁹ The YESAB Online Registry is found at: <http://www.yesab.tzo.com/wfm/launch/YESAB>.

³⁰ *Mineral Resources Branch Assessment and Permitting 2009 Annual Statistics, Yukon Energy Mines and Resources, January 2010*

23.0 Assessment and Licensing Process

assessment, decision and regulatory process for a quartz project was “approximately 64 days with a minimum of 42 days and a maximum of 96 days”³¹.

The annual statistics provides a useful overview of the assessment timelines, and can help plan when to submit an application. To view these reports see Yukon Energy, Mines, and Resources mining statistics web site <http://www.emr.gov.yk.ca/mining/statistics.html>.

23.3 Where to Find Information and Applications Forms

Yukon Government has an excellent web site that provides more detailed information and guides on permitting process. Check the following documents for further information on the permitting process:

- Quartz Mining Land Use Permits, particularly for details on handling the various levels of notification or approval Overview of Quartz Mining Permitting Process http://www.emr.gov.yk.ca/mining/pdf/quartz_mining_permitting_roadmap.pdf.
- The Guide to Hardrock Prospecting, Exploration and Mining in Yukon, Yukon Energy, Mines. November 2007. <http://www.emr.gov.yk.ca/mining/hardrockmining.html>.
- Territorial Land Use Permits http://www.emr.gov.yk.ca/lands/pdf/info8_landusepermits_april1.pdf.
- Energy Mines and Resources (EMR) Assessment – Regulatory Guide March 2006 http://www.emr.gov.yk.ca/pdf/yesaa_guide_final_web.pdf.
- Permit/Authorization Guide for Activities in the Yukon Territory, Development Assessment Process Branch, Executive Council Office. Revised March 2008 http://www.eco.gov.yk.ca/pdf/permit_guide_website_2005-07-05.pdf.
- Yukon Water Board Procedures & Application forms <http://www.yukonwaterboard.ca/procedures.htm>.
- Application forms for the Quartz Mining Land Use Permits, Coal, Mines and Resources Quartz Mining Land web site http://www.emr.gov.yk.ca/mining/quartz_mlu_application.html or <http://www.yukonminingrecorder.ca/forms.html>.

³¹ *Mineral Resources Branch Assessment and Permitting 2008 Annual Statistics, Yukon Energy Mines and Resources, August 2009*

APPENDIX I: COMPLETE TABLES OF THE QUARTZ MINING ACT REGULATION CLASS CRITERIA AND THE TERRITORIAL LAND USE REGULATION PERMIT THRESHOLDS

In Part 3: Exploration Best Management Practices of this Guide, excerpts from the *Quartz Mining Act* Class Criteria Table and Territorial Land Use thresholds were inserted as an easy reference for the reader to refer to.

For reference purposes the complete *Quartz Mining Act* Regulation Class Criteria Table for exploration work conducted on mineral claims and the Territorial Land Use Regulation Permit Thresholds for work conducted off claims has been included in this appendix.

Quartz Mining Act Regulation Class Criteria Table

Item/Activity	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria
Construction of structures other than underground structures	Structures without foundations intended for use for a period of not more than 12 consecutive months	Structures without foundations	Structures with foundations
Number of person-days in camp	Not exceeding 250	Not exceeding 250	More than 250
Number of persons in camp at any one time	Not exceeding 10	More than 10	More than 10
Storage of fuel, total amount stored	Not exceeding 5,000 L	Not exceeding 40,000 L	More than 40,000 L
Storage of fuel, amount per container	Not exceeding 2,000 L	Not exceeding 10,000 L	More than 10,000 L
Construction of lines	Not exceeding 1.5 m in width and cut by hand or with hand-held tools	More than 1.5 m in width and cut with tools that are not hand-held	More than 1.5 m in width and cut with tools that are not hand-held
Construction of corridors, width	Not exceeding 5 m in width	Not exceeding 5 m in width	Not exceeding 10 m in width
Construction of corridors, length	Total length not exceeding 0.5 km	Total length not exceeding 0.5 km	Total length of more than 0.5 km

Appendices

Item/Activity	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria
Trenching	Not exceeding: 1,200 m ³ on a group of three adjoining claims in the program, provided that no claim in the program forms part of more than one group of three, or 400 m ³ per claim that is not part of a group of three adjoining claims referred to in paragraph (a)	Total volume not exceeding 1,200 m ³ per claim per year	Total volume not exceeding 5,000 m ³ per claim per year to a maximum of 10,000 m ³ over the life of the exploration program
Number of clearings per claim, including existing clearings	Not exceeding 8	Not exceeding 8	More than 8
Number of clearings, helicopter pads and camps	No more than 2 of the 8 clearings referred to in item 10 (above)	No more than 2 of the 8 clearings referred to in item 10 (above)	More than 8
Clearings – removal of vegetative mat	No removal of vegetative mat within 30 metres of a water body	Removal of vegetative mat	Removal of vegetative mat
Surface area of clearings	Not exceeding 200 m ² , except for clearings for helicopter pads and camps which cannot exceed 500 m ²	<ul style="list-style-type: none"> • Not exceeding 400 m² per clearing, if only trees and brush are removed. • Not exceeding 500 m² per clearing, for helicopter pads and camps; or • Not exceeding 1,000 m², if vegetative mat is removed. 	<ul style="list-style-type: none"> • More than 400 m² per clearing, if only trees and brush are removed. • More than 500 m² per clearing, for helicopter pads and camps; or • More than 1,000 m², if the vegetative mat is removed.
Establishing new access roads, per exploration program	Not authorized	Not exceeding 5 km	Not exceeding 15 km
Upgrading of access roads, per exploration program	Not authorized	Not exceeding 10 km	Not exceeding 30 km

Item/Activity	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria
Establishment of trails, other than temporary trails, per exploration program	Not authorized	Not exceeding 10 m in width and 15 km in total length	Not exceeding 15 m in width and 40 km in total length
Establishing or using temporary trails, per exploration program	<p>Not authorized on Category A Settlement Land or on Category B Settlement Land.</p> <p>On Land other than Category A Settlement Land or Category B Settlement Land, establishing a temporary trail or using a temporary trail that was established for another program if:</p> <ul style="list-style-type: none"> • The temporary trail width does not exceed 7 m or 1 m more than the width of the equipment to be moved along the temporary trail, whichever ever is less. • The total temporary trail length does not exceed 3 km; and • The temporary trail is only used for the purpose of moving sampling equipment between test sites. 	Not exceeding 10 m in width and 15 km in total length	Not exceeding 15 m in width and 40 km in total length

Appendices

Item/Activity	Class 1 Criteria	Class 2 Criteria	Class 3 Criteria
Use of vehicles on existing roads or trails	Within the design limits or tolerances of the road or, if design limits or tolerances of roads or trails are not known, vehicles with a gross weight of less than 40 t for roads, and less than 20 t for trails	Within the design limits or tolerances of the road or, if design limits or tolerances of roads or trails are not known, vehicles with a gross weight of less than 40 t for roads, and less than 20 t for trails	Within the design limits or tolerances of the road or, if design limits or tolerances of roads or trails are not known, vehicles with a gross weight of more than 40 t for roads, and less than 20 t for trails
Off-road use of vehicles in summer	Low ground pressure vehicles only	Vehicles with a gross vehicle weight not exceeding 20 t, that are used over a distance of not more than 15 km	Vehicles with a gross vehicle weight of more than 20 t, that are used over a distance of not more than 40 km per year
Off-road use of vehicles in winter	Low ground pressure vehicles or vehicles with a gross vehicle weight not exceeding 40 t, used over a distance of not more than 15 km	Vehicles other than low ground pressure vehicles, used over a distance of not more than 25 km	Vehicles other than low ground pressure vehicles, used over an unlimited distance
Use of explosives	Not exceeding 1,000 kg in any 30 day period	More than 1,000 kg in any 30 day period	More than 1,000 kg in any 30 day period
Construction of underground structures	Construction in which not more than 500 t of rock is moved to the surface	Not more than 40,000 t of rock is moved to the surface per year and not more than a total of 200,000 t is moved to the surface for the exploration program	Not more than 100,000 t of rock is moved to the surface per year and not more than a total of 200,000 t is moved to the surface for the exploration program

Source: *Guide to Hardrock Prospecting, Exploration and Mining in Yukon*, Yukon Energy, Mines. November 2007.
<http://www.emr.gov.yk.ca/mining/hardrockmining.html>

Territorial Land Use Regulation Permit Thresholds Table

Activity	No permit required	Class B Permit	Class A Permit
Use of explosives	< 50 kg of explosives within a 30 day period	> 50 kg of explosives within a 30 day period	> 150 kg of explosives within a 30 day period
Vehicle use on non-public roads or trails <u>not</u> maintained under the Highways Act	< 5 t net vehicle weight, or any vehicle that exerts pressure on the ground less than 35 k pa	> 5 t net vehicle weight, or any vehicle of any weight that exerts pressure on the ground greater than 35 k pa	> 10 t net vehicle weight

Activity	No permit required	Class B Permit	Class A Permit
Drill programs: any power driven machinery used for earth drilling (diamond, RAB, RC drilling equipment)	< 500 kg operating weight, excluding the weight of drill rods, stems, bits, pumps and other ancillary equipment	> 500 kg operating weight, excluding drill rods , stems, bits, pumps, and other ancillary equipment	> 2.5 t operating weight, excluding drill rods , stems, bits, pumps, and other ancillary equipment
Camp Sites used by more than 2 people Person day = the use of a camp site by one person for 24 hours	< 100 person days	> 100 person days	> 400 person days
Petroleum Fuel Storage Facilities	<p>< 4,000 l capacity, or a single storage container with a capacity of < 2,000 l</p> <p>* For fuel caches >400 l and < 4,000 l, where no permit is required, written notification must issued to the engineer within 30 days of establishing the fuel cache.</p> <p>Notification must include:</p> <ol style="list-style-type: none"> 1) Amount and type of fuel, 2) Size of containers, 3) Method of storage, and 4) Proposed date of removal of the cache 	> 4,000 l capacity, or a single storage container with a capacity of > 2,000 l	> 80,000 l capacity, or a single storage container with a capacity of > 4,000 l
Site clearing for lines, trails, or right-of-ways including leveling, cutting, grading or snow ploughing	< 1.5 m in width	> 1.5 m in width but <u>not</u> exceeding 4 ha in area	> 1.5 m in width and exceeding 4 ha in area

Appendices

Activity	No permit required	Class B Permit	Class A Permit
Equipment Use: 1) Self propelled power driven machines used for moving earth or clearing land of vegetation 2) Stationary power driven machines used for hydraulic prospecting, moving earth or clearing land, <u>other than a power saw</u>	Requires Class A permit	Requires Class A permit	Requires Class A permit

Source: Territorial Lands (Yukon) Act Regulations, March 31, 2003

APPENDIX II: GUIDE TO DETERMINE REQUIRED MINERAL EXPLORATION PERMITS AND AUTHORIZATIONS IN YUKON

(Taken in part from “Permit and Authorization Guide for Yukon Activities” prepared by the Development Assessment Process Branch, Executive Council Office - Revised March 2008)

In addition to permits required from the Department of Energy Mines and Resources, other permit(s) and authorizations are required for many other activities associated with mineral exploration. The following table provides a listing of these other permits and authorizations and the responsible government agency.

How to use the table:

- The table is divided into general headings, i.e. all permit authorizations related to camp construction are listed under the general heading “Construction, Buildings and Facilities”.
- The Activity / Typical Application column lists activities that pertain to the general headings. For example:
 - ◊ If a camp is being constructed for a project the activity column identifies a list of standard requirements for a camp such as electrical work.
 - ◊ This column also identifies the Class Criteria (1, 2, 3 or 4) and Land Use Type (A or B) that triggers the requirement for an authorization or permit.
- The Authorization Required / Legislation column lists the authorization or permit required, and applicable legislation that the permit or authorization is issued under.
- The third column provides the contact information for Government department responsible for issuing the permit or authorization.

Following the table is a list of permits that are not commonly required for a mineral exploration program. Though, operators should be aware that these permits may be required for certain projects depending on site conditions.

Appendices

General Mineral Exploration In Yukon

Activity / Typical Application	Authorization Required / Legislation	Government Department and Branch Information
<p>Environmental and Socio-economic Assessment – required prior to conducting any exploration activity for</p> <p>Quartz Criteria Class – 2, 3, 4 activity</p> <p>Land Use Type A and B permits</p>	<p>Decision Document Issued by a Decision Body - Yukon Environmental and Socio-economic Assessment Act (YESAA).</p> <p>The YESAA Assessable Activities and Executive Committee Project Regulations (Part 1: Mining). Establishes specific thresholds that trigger a requirement for a review.</p>	<p>YESAB (867) 668-6420, yesab@yesab.ca and www.yesab.ca</p> <p>Designated Offices (See Appendix VII)</p> <p>Energy, Mines & Resources Minerals Management Branch mining@gov.yk.ca www.emr.gov.yk.ca/mining</p> <p>Mining Lands District Office (See Appendix VII)</p> <p>And any other Decision body based on location of the project</p>
<p>Mineral exploration activities on First Nation’s Settlement land</p> <p>Quartz Criteria Class – 2, 3, or 4</p> <p>Land Use Type A and B permits</p>	<p>Authorization by affected FN - Umbrella Final Agreement, First Nations Final Agreements</p> <p>Category A Settlement Land is settlement land where a Yukon First Nation has ownership of the surface and subsurface rights, including minerals. All staking, exploration and mining activity is governed by the First Nations for new mineral interests.</p> <p>Category B Settlement Land is settlement land where a Yukon First Nation has ownership of surface rights. New and existing staking, exploration and mining activity are governed by the Yukon government. YG- EM&R, Minerals, Hard Rock, Yukon First Nations Land Claims</p>	<p>First Nations whose traditional territory mineral exploration activities are being conducted in</p> <p>Yukon First Nations (See Appendix VII)</p>

Activity / Typical Application	Authorization Required / Legislation	Government Department and Branch Information
Hiring of Employees Quartz Criteria Class – 1, 2, 3, 4 Land Use Type A and B permits	Registration with Yukon Workers' Compensation Health and Safety Board - Workers' Compensation Act Requirement if hiring employees.	Yukon Worker's Compensation Health and Safety Board Occupational Health & Safety (867) 667-3777 worksafe@gov.yk.ca

Construction, Buildings and Facilities

Activity / Typical Application	Authorization Required / Legislation	Government Department and Branch Information
Construction of buildings outside a municipality Quartz Criteria Class – 3, 4 Land Use Type A and B permits	Building Permit - Building Standards Act Permit required to construct a building in Yukon.	Community Services Building Safety (867) 667-5741 buildingsafety@gov.yk.ca
Installation of plumbing Quartz Criteria Class – 3, 4 Land Use Type A and B permits	Plumbing Permit - Building Standards Act Permit required for a building constructed in Yukon.	Community Services Building Safety (867) 667-5741 buildingsafety@gov.yk.ca
Electrical work Quartz Criteria Class – 3, 4 Land Use Type A and B permits	Electrical Permit- Electrical Protection Act Canadian Electrical Code Permit required for a building constructed in Yukon.	Community Services Building Safety (867) 667-5741 buildingsafety@gov.yk.ca
Gas Piping Quartz Criteria Class – 3, 4 Land Use Type A and B permits	Gas Installation Permit - Gas Burning Devices Act Permit required for a building constructed in Yukon.	Community Services Building Safety (867) 667-5845 buildingsafety@gov.yk.ca

Appendices

Activity / Typical Application	Authorization Required / Legislation	Government Department and Branch Information
<p>Use of propane gas in gas burning devices</p> <p>Quartz Criteria Class – 3, 4 Land Use Type A and B permits</p>	<p>Gas Installation Permit - Gas Burning Devices Act</p> <p>Permit required for a building constructed in Yukon.</p>	<p>Community Services Building Safety (867) 667-5845 buildingsafety@gov.yk.ca</p>
<p>On-site sewage disposal system</p> <p>Quartz Criteria Class – 3, 4 Land Use Type A and B permits</p>	<p>Permit to install a sewage disposal system - Public Health & Safety Act, <u>Sewage Disposal Systems Regulation</u></p> <p>Permit required for larger operations to properly manage sewage disposal.</p>	<p>Health & Social Services Environmental Health Services (867) 667-8391 environmental.health@gov.yk.ca</p>
<p>Construct, Install and/or Use a Privy</p> <p>Quartz Criteria Class - 1, 2 Land Use Type A and B permits</p>	<p>Authorization to Construct, Install and/or Use a Privy - Public Health & Safety Act</p> <p>Permit required for small scale operations.</p>	<p>Health & Social Services Environmental Health Services (867) 667-8391 environmental.health@gov.yk.ca</p>
<p>Operation of fuel burning equipment</p> <p>Quartz Criteria Class - 3, 4 Land Use Type A and B permits</p>	<p>General Air Emissions Permit – Environment Act, <u>Air Emissions Regulation</u></p> <p>Larger operations that have fuel burning equipment emitting greater than 5Mbtu/hr.</p>	<p>Environment Environmental Programs (867) 667-5456 envprot@gov.yk.ca</p>

Environment, Contaminants and Waste

Activity / Typical Application	Authorization Required / Legislation	Government Department and Branch Information
<p>Solid waste disposal facility</p> <p>Quartz Criteria Class – 1, 2, 3, 4</p> <p>Land Use Type A and B permits</p>	<p>Permit for the Facility – <i>Environment Act</i>, <u>Solid Waste Regulation</u></p> <p>Land Lease - <i>Territorial Lands (Yukon) Act</i>; <i>Lands Act</i></p> <p>Permit(s) required for generation of commercial waste that cannot be transported to a municipal land fill due to monetary reasons.</p>	<p>Environment Environmental Programs (867) 667-5610 envprot@gov.yk.ca</p> <p>Energy, Mines & Resources Lands Branch (867)667-5215 land.disposition@gov.yk.ca</p>
<p>Burning Solid Waste and/ or Incinerating solid/Special Waste or Contaminated Soil</p> <p>Quartz Criteria Class – 1, 2, 3, 4</p> <p>Land Use Type A and B permits</p>	<p>General -Air Emissions Permit – <i>Environment Act</i>, <u>Air Emissions Regulation</u></p> <p>Activity Specific – Air Emissions Permit - <i>Environment Act</i>, <u>Air Emissions Regulation</u></p> <p>Permit(s) required if burning >5kg of solid waste/day by open burn or incinerator. Incinerators – CSA certified, UL/ULC listed or approved by YG Environment Protective Services Branch.</p>	<p>Environment Environmental Programs (867) 667-5456 envprot@gov.yk.ca</p>

Appendices

Activity / Typical Application	Authorization Required / Legislation	Government Department and Branch Information
<p>Water use less than 300 cubic metres per day or deposit of waste where there is direct or indirect deposit to surface water</p> <p>Quartz Criteria Class - 1, 2, 3, 4 Land Use Type A and B permits</p>	<p>Notice of Water Use/Waste Deposit Without a Licence (Schedule 3)</p>	<p>Yukon Water Board (867) 456-3980 ywb@yukonwaterboard.ca</p> <p>Environment Environmental Programs – Water Resources (867) 667-3171</p>
<p>Water use greater than 300 cubic metres per day or deposit of waste where there is a direct or indirect deposit to surface water</p> <p>Quartz Criteria Class - 3, 4 Land Use Type A and B permits</p>	<p>Water Licence - <i>Waters Act</i></p> <p>A typical application for a water use licence must be accompanied by a decision document issued under YESAA.</p>	<p>Yukon Water Board (867) 456-3980 ywb@yukonwaterboard.ca</p> <p>Environment Environmental Programs – Water Resources (867) 667-3171</p>
<p>Fuel caches of more than 4000L or any single container of more than 2000L not on mining claims</p> <p>Quartz Criteria Class – 3, 4 Land Use Type A and B permits</p>	<p>Land Use Permit – <i>Territorial Lands (Yukon) Act; Lands Act, Land Use Regulation</i></p> <p>Permit required if fuel cache is located off quartz claim (i.e. Government quarry/road building). Fuel storage on mining claims is covered under a mining land use permit.</p>	<p>Energy, Mines & Resources Lands Branch (867) 667-3173 land.use@gov.yk.ca</p>

Activity / Typical Application	Authorization Required / Legislation	Government Department and Branch Information
<p>Handling, disposal, generation or storage of special (hazardous) wastes</p> <p>Quartz Criteria Class – 1, 2, 3, 4</p> <p>Land Use Type A and B permits</p>	<p>Special Waste Permit - <i>Environment Act, Special Waste Regulation</i></p> <p>Storage Tank Systems Permit - <i>Environment Act, Storage Tank Regulation</i></p> <p>Permit(s) required if you install, modify, operate, remove and/or abandon an above-ground storage tank with greater than 2000L of hazardous substance.</p>	<p>Environment Environmental Programs (867) 667-5610 envprot@gov.yk.ca</p>

Fish and Wildlife

Activity / Typical Application	Authorization Required / Legislation	Government Department and Branch Information
<p>Creek crossing that creates harmful alteration, disruption or destruction of fish habitat (HADD)</p> <p>Quartz Criteria Class – 2, 3, 4</p> <p>Land Use Type A and B permits</p>	<p>Authorization to Alter Fish Habitat Section 35 (2) - <i>Fisheries Act</i></p> <p>Any activity that creates a HADD requires authorisation by DFO. In many cases, application of Best Management Practices when working near water bodies prevents a HADD and a requirement for an authorisation.</p>	<p>Fisheries & Oceans Canada Habitat & Enhancement Branch (867) 393-6722</p>

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Explosives

Activity / Typical Application	Authorization Required / Legislation	Government Department and Branch Information
<p>Use of more than 50 kg of explosives on Commissioner's land in any 30-day period</p> <p>Quartz Criteria Class – 3, 4 Land Use Type A and B permits</p>	<p>Land Use Permit – <i>Territorial Lands (Yukon) Act</i>, <u>Land Use Regulations</u></p> <p>Permit required if blasting occurs off claims (such as for the construction of access).</p>	<p>Energy, Mines & Resources, Lands Branch (867) 667-3173 land.use@gov.yk.ca</p>
<p>Blasting</p> <p>Quartz Criteria Class – 1, 2, 3, 4</p> <p>Land Use Type A and B permits</p>	<p>Blaster's or Temporary Blaster's Permit – <u>Blasting Regulations</u></p> <p>Any person who handles, transports or stores explosives shall be familiar with and comply with applicable provisions of the <i>Explosives Act (Canada)</i> and any Regulations made there under, and the <i>Transportation of Dangerous Goods Act (Canada)</i> and Regulations. Sec 14.01 Blasting Regulations</p>	<p>Yukon Worker's Compensation Health and Safety Board Occupational Health & Safety (867) 667-3777 worksafe@gov.yk.ca</p>
<p>Explosives Transportation</p> <p>Quartz Criteria Class – 1, 2, 3, 4 Land Use Type A and B permits</p>	<p>Explosives Transportation Permits (Explosives Vehicle Certificates) - <i>Explosives Act</i></p> <p>Natural Resources Canada (NRCan) will now issue these permits as required by the current Explosives Regulations.</p> <p>It is NRCan's intention to remove the requirement from the regulations in the near future. In the meantime, permits will be issued by the Explosives Regulatory Division of NRCan.</p>	<p>Natural Resources Canada Minerals & Metals Sector (613)948-5206 nbresee@nrcan.gc.ca</p>

Activity / Typical Application	Authorization Required / Legislation	Government Department and Branch Information
<p>Explosives storage</p> <p>Quartz Criteria Class – 1, 2, 3, 4</p> <p>Land Use Type A and B permits</p>	<p>Explosives User Magazine Licence (Type U) - <i>Explosives Act</i></p> <p>This type of licence is required for the storage of blasting explosives and any other type of industrial explosives for use if:</p> <ul style="list-style-type: none"> • Any quantity stored is for commercial use; or • The quantity stored for private use exceeds 75 kilograms or 100 detonators; or • The period of storage of any quantity exceeds 90 days. <p>Propellant Magazine Licence (Type P) - <i>Explosives Act</i></p> <p>This licence is required for the storage of propellant powder, primers and small arms ammunition if:</p> <ul style="list-style-type: none"> • The quantity of powder stored for personal use exceeds 75 kilograms. • The quantity of powder stored for sale exceeds 12 kilograms net explosives weight or 10 000 primers. • The storage of ammunition exceeds 225 kilograms net explosives quantity. <p>NRCan</p>	<p>Natural Resources Canada Minerals & Metals Sector (613)948-5206 nbresee@nrcan.gc.ca</p>

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Land Use Activities

Activity / Typical Application	Authorization Required / Legislation	Government Department and Branch Information
<p>Permission to obtain gravel/sand from a quarry</p> <p>Quartz Criteria Class – 3, 4</p> <p>Land Use Type A and B permits</p>	<p>Quarry Permit for Non-Designated Existing Pit or</p> <p>New Quarry Lease –, <i>Territorial Lands (Yukon) Act, Quarry Regulations, Lands Act</i></p> <p>Air Emissions Permit – <i>Environment Act, Air Emissions Regulation</i>(excavation > than 4 ha)</p> <p>Permit(s) necessary if road building activities require gravel/sand from new or existing quarry</p>	<p>Energy, Mines & Resources Lands Branch (867) 667-3173 land.use@gov.yk.ca</p> <p>Environment Environment Programs (867) 667-5456 envprot@gov.yk.ca</p>
<p>Construction of new road access not on mining claims</p> <p>Quartz Criteria Class – 3, 4</p> <p>Land Use Type A and B permits</p>	<p>Land Use Permit, - <u>Land Use Regulations, Territorial Lands (Yukon) Act, Lands Act,</u></p> <p>Permit under Highways Act Section 7(2) - <i>Highways Act</i></p>	<p>Energy, Mines & Resources Lands Branch (867) 667-3173 land.use@gov.yk.ca</p> <p>Highways and Public Works □ Transportation Maintenance (867) 667-5159 highways.regulations@gov.yk.ca</p>
<p>Construct road access on Highway right-of-way</p> <p>Quartz Criteria Class – 3, 4</p> <p>Land Use Type A and B permits</p>	<p>Access Permit - <i>Highways Act, Highways Regulation</i></p> <p>A permit is required for the construction of new, or modification of an existing access from or to a controlled highway *(i.e.: maintained by the Yukon Government). YG-H&PW</p>	<p>Highways & Public Works Transportation Maintenance (867) 667-5159 highways.regulations@gov.yk.ca</p>
<p>Perform work within highway right-of-way</p> <p>Quartz Criteria Class – 3, 4</p> <p>Land Use Type A and B permits</p>	<p>Work in Right-of-way Permit – <u>Highways Regulation</u></p> <p>Permit required when installing utilities/ infrastructure, brushing /clearing/tree removal, earthworks, road maintenance (winter/summer), work on/off roadway.</p>	<p>Highways & Public Works Transportation Maintenance (867) 667-5159 highways.regulations@gov.yk.ca</p>

Activity / Typical Application	Authorization Required / Legislation	Government Department and Branch Information
<p>Work, build or place in, on, over, under, through or across any navigable water</p> <p>Class – 1, 2, 3, 4</p> <p>Land Use Type A and B permits</p>	<p>Application for an Approval of Proposed Works - <i>Navigable Water Protection Act</i> <i>Lands Act</i>, <i>Territorial Lands (Yukon) Act</i>, <u>Land Use Regulation</u></p> <p>Permit required if road development required over on streams greater than 5m wide.</p>	<p>Fisheries and Oceans Canada Habitat and Enhancement Branch (867) 393-6722</p> <p>Energy, Mines & Resources Lands Branch (867)667-3173 land.use@gov.yk.ca</p> <p>Transport Canada (867) 393-6722 www.tc.gc.ca</p>

Mining and Claims

Activity / Typical Application	Authorization Required / Legislation	Government Department and Branch Information
<p>Staking mineral claim</p> <p>Class – 1, 2, 3, 4</p>	<p>Recording Mineral Claim - <i>Quartz Mining Act</i></p> <p>No permit required. Claim must be registered with the Mining Recorder, and assessment work completed to maintain claim in good standing.</p>	<p>Energy, Mines & Resources Minerals Management Branch mining@gov.yk.ca www.emr.gov.yk.ca/mining</p> <p>Mining Lands District Office (See Appendix VII)</p>
<p>Mineral exploration Class 1 activities</p> <p>Class – 1</p>	<p>(Class 1 MLU) - <i>Quartz Mining Act</i>, <u>Quartz Mining Land Use Regulation</u></p> <p>No permit required but operating condition of mining land use regulations apply.</p>	<p>Energy, Mines & Resources Minerals Management Branch mining@gov.yk.ca www.emr.gov.yk.ca/mining</p> <p>Mining Lands District Office (See Appendix VII)</p>
<p>Mineral exploration Class 2 activities</p> <p>Class – 2</p>	<p>Class Two Notification to Chief MLUO - <i>Quartz Mining Act</i>, <u>Quartz Mining Land Use Regulation</u></p> <p>Screening under YESAB required. Authorisation issued by Chief, Mining Land Use.</p>	<p>Energy, Mines & Resources Minerals Management Branch mining@gov.yk.ca www.emr.gov.yk.ca/mining</p> <p>Mining Lands District Office (See Appendix VII)</p>

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Activity / Typical Application	Authorization Required / Legislation	Government Department and Branch Information
Mineral exploration Class 3 activities Class – 3	Approval for Operating Plan - <u>Quartz Mining Act, Quartz Mining Land Use Regulation</u> Screening under YESAB required. Authorisation issued by Chief, Mining Land Use.	Energy, Mines & Resources Minerals Management Branch mining@gov.yk.ca www.emr.gov.yk.ca/mining Mining Lands District Office (See Appendix VII)
Mineral exploration Class 4 activities Class – 4	Approval for Operating Plan - <u>Quartz Mining Act, Quartz Mining Land Use Regulation</u> Screening under YESAB required. Authorisation issued by Chief, Mining Land Use.	Energy, Mines & Resources Minerals Management Branch mining@gov.yk.ca www.emr.gov.yk.ca/mining Mining Lands District Office (See Appendix VII)

Other Permits, not listed in the table, to Consider

Pesticide Use, Service or Vendor Permit – Environment Act, Pesticides Regulation – Environment, Environmental Programs

Land Treatment Facility Permit - Environment Act, Contaminated Sites Regulation – Environment, Environmental Programs

Authorization to conduct work on a Designated Contaminated Site - Environment Act, Contaminated Sites Regulation - Environment Environmental Programs

Risk-based Assessment Permit - Environment Act, Contaminated Sites Regulation – Environment, Environmental Programs

Relocation Permit – Environment Act, Contaminated Sites Regulation – Environment, Environmental Programs

Transitional Authorization to Deposit in Tailings Impoundment Area under Schedule 2 - Environment Canada, Environmental Protection, Fisheries & Oceans Canada, Habitat & Enhancement Branch

Permit for Activity - Migratory Bird Regulation - Environment Canada, Environmental Protection

Permit for Activity – Species at Risk Act - Environment Canada, Environmental Protection

Dempster Highway Development Authorization – Territorial Lands (Yukon) Act, Area Development Act, Dempster Highway Area Development Regulation - Energy, Mines & Resources, Lands Branch

Land Use Permit - Territorial Lands (Yukon) Act, Land Use Regulation - Energy, Mines & Resources, Lands Branch

Sign Permit - Highways Regulation - Highways & Public Works, Transportation Maintenance Branch

Bulk Commodity Haul Agreement – Bulk Commodity Haul Regulations- Highways & Public Works, Transport Services Branch

Certificate and/or Permit for transport of dangerous goods – Transportation of Dangerous Goods Act Yukon Gasoline Handling Act- Highways & Public Works, Transport Services Branch

Over-dimensional Or Over-weight Vehicle Permits (single trip or multiple trip) – Highways Act- Highways & Public Works, Transport Services Branch

Airport/Aerodrome Permit – Highways Act - Highways & Public Works, Aviation Branch

Review for possible Exemption - Navigable Water Protection Act - Transport Canada

Approval to operate a diesel engine underground - Mine Safety Regulation - Yukon Worker's Compensation Health and Safety Board, Occupational Health & Safety

Scientists and Explorers Permit – Scientists and Explorers Act - Tourism and Culture, Heritage Resources

Archaeological Sites Regulations Permit – Historic Resources Act, Archaeological Sites Regulation - Tourism and Culture, Heritage Resources

Licence for Fishing for Experimental, Scientific or Educational Purposes – Fisheries Act, Fishery (General)Regulations - Fisheries and Oceans Canada(Salmon) Habitat & Enhancement Branch, Environment Fish and Wildlife Branch(Freshwater Fish)

Licence to Collect Fish for Scientific Purposes- Fisheries Act, General (Fishery) Regulation - Fisheries and Oceans Canada Habitat & Enhancement Branch

SARA Scientific/Education Permit – Species At Risk Act, Fisheries Act- Fisheries and Oceans Canada, Habitat & Enhancement Branch

APPENDIX III: ARCHAEOLOGICAL AND HISTORIC SITES

Definitions³²

Historic sites and resources are abandoned manmade objects and sites that are 45 years or older. These include camp sites, caches, buildings, cabins, human remains and burial sites.

Archaeological sites and resources are artefacts or sites that are either historic (older than 45 years) or pre-date European contact. Archaeological sites and resources can include human remains, ancient camps, stone tools and other ancient man-made artefacts.

Paleontological resources are fossilized remains of extinct or pre-historic plants and animals.

Archaeological and historic artefacts and sites, paleontological resources and human remains are protected from disturbance under the *Yukon Historic Resources Act* and Yukon Archaeological Sites Regulation. The Yukon Government is responsible for managing and enforcing the Historic Resources Act on non- settlement land and outside of national parks. First Nations manage archaeological and historic sites on settlement lands.

It is illegal to search for, remove or destroy historic sites or artefacts unless a permit has been issued under the Yukon Archaeological Sites Regulation or, on settlement lands, authorization has been received from the First Nation.

Exploration land use activities should be planned to avoid any known historic sites. If a new historic site or artefact is discovered the operator must immediately stop work, the site must be flagged and 30 metre buffer zone must be established to protect the site from any disturbance. The site must be reported to the following government agencies:

- Report archaeological and historic sites and artefacts to the Heritage Resources Department of Tourism and Culture, Government of Yukon, (867) 667-5983, or toll free 1-800-661-0408
- Report paleontological findings to Yukon Paleontological Department of Tourism and Culture, Government of Yukon, (867) 667-8089, or toll free 1-800-661-0408

References and Resources

Mineral Exploration Best Management Practices for Heritage Resources, February 2010, Edition 1, published by the Heritage Resources Unit, Cultural Services Branch, Department of Tourism and Culture, Government of Yukon provides information, specific to mineral exploration land use activities, on methods to identify, report and implement Best Management Practices to protect historic resources. It is recommended that a copy of this document be provided to all employees and contractors working in the field. http://www.tc.gov.yk.ca/pdf/Mineral_Exploration_BMP_for_Heritage_Resources.pdf

Handbook for the Identification of Heritage Sites and Features, Tourism and Culture, Revised 2007. http://www.tc.gov.yk.ca/pdf/publications_heritagehandbook.pdf.

³² *Mineral Exploration Best Management Practices for Heritage Resources, Heritage Resources Unit, Cultural Services Branch, Department of Tourism and Culture, Government of Yukon. February 2010, Edition 1, page 10.*

APPENDIX IV: PERMAFROST

Operators intending to work in potential permafrost areas in Yukon are strongly recommended to consult the reference documents footnoted throughout this section while planning their exploration project.

Definitions

Permafrost refers to soil or rock that remains frozen for at least two years. Permafrost will vary in thickness from a few centimetres to several hundred metres in the far north. The thickness will be determined by air temperature, soil characteristics, ice content and the geothermal gradient. Surface conditions including vegetation, organic cover and snow thickness will also influence permafrost depths. Any changes to climate, surface conditions or vegetative cover can alter the depth and characteristics of permafrost.

Permafrost can be thaw-stable or thaw-unstable based on the ice content of the ground³³.

Thaw-unstable permafrost contains excess ice crystals. When the ice melts the ground loses its strength and slumping will likely occur especially in steep terrain. In general if ice lenses, layers, or veins are visible the ground is likely thaw-unstable. Thaw-stable permafrost contains little or no ice. If thaw-stable permafrost thaws only minimal slumping will likely occur. Monitoring the ice content of permafrost is important when constructing drill sites, roads, and other infrastructure in permafrost regions.

Permafrost has an active layer. The active layer refers to the zone that overlies the permanently frozen ground. This zone, made up of organic material and soil, freezes in the winter and thaws during the summer months. The depth of the active layer can range from several centimetres to a few meters and is determined by surface conditions, air temperature, and vegetative cover. In areas with flat terrain the active layer is usually poorly drained as water is trapped between the active layer and the permafrost. Consequently managing drainage and erosion in these areas can be difficult if drainage techniques are not properly planned and constructed. In Yukon, the active layer decreases in thickness further north and the permafrost thickness increases. In southern Yukon, the active layer can be as thick as 4.0 metres, whereas in the north, may be as little as 0.15 metres³⁴.

Permafrost is divided into two zones: continuous and discontinuous. Continuous permafrost refers to areas where permafrost is present under all land surfaces and the active layer is thin. Presently in Yukon continuous permafrost is present at the arctic coast and as far inland as Old Crow. Continuous permafrost is generally more stable and less likely to thaw if the insulating organic layer is removed or compacted. Discontinuous permafrost is sporadic and found only under certain conditions such as north facing slopes, areas with little snow cover and within muskeg. In Yukon discontinuous permafrost is widespread and is also almost always found in valley bottoms that contain insulating organic soil cover.

Working in Permafrost Regions

It is important to develop construction and maintenance plans designed to prevent slumping and ruts that can act as drainage channels that may cause soil erosion and permafrost to thaw.

Prior to construction of trails, roads or other infrastructure, a site survey should be conducted to determine if permafrost is present. Methods used to determine if an area has permafrost include:

³³ *Reclamation Guidelines for Northern Canada*, Indian and Northern Affairs Canada. 1987

³⁴ *Permafrost Considerations for Effective Mine Site Development In Yukon Territory*. MERG Report 2004-1 EBA Engineering Consultants Ltd. March 2004

Appendices

- Air photo analysis: air photo analysis for vegetation and geomorphologic conditions (patterned ground, pingos) can help determine the presence of permafrost.
- Test pits, drilling: air photo analysis should be followed up with ground truthing that can include digging test pits or drilling to determine if permafrost is present; if permafrost is present, the depth of the active layer and extent of the permafrost can be determined.
- Geophysics and Lab testing: for advanced exploration projects testing the ice content of soil samples may be required if the building foundations for infrastructure is planned. Geophysics can also be used to determine the depth and extent of permafrost.

Approaches to working in areas with permafrost include³⁵:

The following information has been summarized from “Permafrost Considerations for Effective Mine Site Development in the Yukon Territory”, MERG Report 2004-1 EBA Engineering Consultants Ltd. March 2004.

Avoidance: in areas of discontinuous permafrost avoid disturbing the insulating layer (vegetative mat and overburden) by planning exploration activities in areas free of permafrost, choose south facing slopes. Permafrost is more likely to be found on north facing slopes.

Thaw the permafrost: depending on the depth of the permafrost it may be practical to strip away the insulating layer and thaw the permafrost. If this process is applied ensure proper drainage systems (cross drains, culverts) are in place to avoid water runoff creating ruts and gullies.

Remove the permafrost: in cases where there are only small patches of permafrost it can be dug up and removed. The site can be in-filled with material that will not freeze.

Prevent the permafrost from thawing: This method is most commonly used when constructing roads and airstrips or in areas of continuous permafrost. Construction should occur when the active layer is frozen to avoid breaking or destroying the insulating layer. Geotextile, brush or fill can be used to protect the insulating layer. The type and depth of fill required to protect the permafrost will need to be engineered specifically to site conditions.

For projects with permanent infrastructure, such as dams and tailings impoundments, baseline studies that include air temperature, ice content of the permafrost and the geothermal gradient of the ground, need to be conducted prior to construction to evaluate whether changes in climatic and ground conditions could potentially affect the integrity of the permafrost to support the infrastructure if changes to the environment were to cause the permafrost to thaw.

³⁵ *Permafrost Considerations for Effective Mine Site Development In Yukon Territory. MERG Report 2004-1 EBA Engineering Consultants Ltd. March 2004*

Reclamation

In areas of flat terrain with permafrost natural drainage patterns should be re-established to prevent surface water from ponding or ruts and gullies forming from surface runoff. If water is allowed to pond, surface conditions will change and potentially cause the permafrost to degrade. Brush and organic material can be spread over disturbed areas of permafrost to help prevent thawing.

When backfilling trenches, pits or ditches in areas with permafrost some settling may occur causing depressions where water can collect. To avoid this raise the level of material used to backfill the pit above the surrounding grade to compensate for the ground settling over time.

When recontouring side slopes between 1 and 5 metre high in areas of thaw-unstable permafrost make a vertical cut and leave the slope to stabilize naturally. This will take several years. Trees on top of the cut should be cleared away (leave roots and vegetative mat in place) for a distance equal to twice the height of the cut. If the trees are not removed they will fall over and the vegetative mat will tear causing the permafrost to melt. If slopes are greater than 5 metre consult a geotechnical engineer.

APPENDIX V: FISH AND WILDLIFE

In Yukon the management and conservation of wildlife is regulated under *Yukon Wildlife Act*. Fish and fish habitat are protected under the federal *Fisheries Act* regulated by Fisheries and Oceans Canada.

Species at Risk

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is a national committee that evaluates the status of all wildlife species in Canada and identifies those most at risk. COSEWIC places species at risk in the following categories:

- Endangered: A species facing imminent extirpation or extinction.
- Threatened: A species likely to become endangered if limiting factors are not reversed.
- Special Concern: A species with characteristics that make it particularly sensitive to human activities or natural events.

Wildlife Species at Risk in Yukon and all of Canada (identified by COSEWIC)

- Endangered: bowhead whale.
- Threatened: wood bison (also specially protected by *Yukon Wildlife Act*), peregrine falcon Anatum subspecies.
- Special Concern: grizzly bear, polar bear, wolverine, short-eared owl, peregrine falcon Tundra subspecies (also specially protected by *Yukon Wildlife Act*), Squanga whitefish.

At risk in Yukon but not elsewhere in Canada (identified by Yukon Wildlife Act)

- Mule deer
- Muskox
- Elk
- Cougar

At risk plant species in Yukon (identified by COSEWIC)

Threatened: Baikal Sedge (*Carex sabulosa*.)

Amphibians

Recent world-wide declines in amphibian populations have led to concerns about the status of amphibians in Canada. Four amphibian species occur in Yukon: boreal toad, northern wood frog, boreal chorus frog, and Columbian spotted frog.

The preceding information on wildlife and plant species at risk in Yukon can be found at <http://environmentyukon.gov.yk.ca/wildlifebiodiversity/speciesrisk.php#species> and <http://www.environmentyukon.gov.yk.ca/wildlifebiodiversity/plants.php>

Fish and Wildlife Best Management Practices

Managing potential impacts on fish and wildlife populations and their habitat is an integral part of any mineral exploration program. The objective of Best Management Practices is to protect fish and wildlife populations, conserve habitat, avoid interactions with wildlife and provide a safe environment for personnel to work in.

Planning

Researching the project area is key to developing policies and management plans that will protect fish, wildlife and their habitat. Specifically, prior to starting a field program check the Wildlife Key Area Inventory Program website <http://www.environmentyukon.gov.yk.ca/mapspublications/> which identifies locations used by wildlife for critical, seasonal life functions. Also contact Yukon Department of Environment Regional Biologists and First Nations to determine if species at risk, sensitive fish or wildlife habitat, migratory routes, spawning, breeding, nesting or calving grounds are located within the project area. If sensitive fish and wildlife species or habitats lie within or are proximal to the project area:

- Educate personnel and contractors about species present in the area, where their sensitive habitats are located, and how to avoid impacting wildlife and their habitat.
- Identify critical seasons when work should be avoided in an area (i.e. spring nesting bird season) or if work is conducted in these areas the restrictions that must be followed to reduce or avoid impacts to wildlife (i.e. avoid mineral licks by 1 km during the spring).

Develop policies that will reduce the impacts on fish and wildlife. Policies could include, but are not limited to:

- No hunting; firearms allowed only for safety reasons.
- No fishing except with barbless hooks or catch and release only.
- Do not feed, chase or harass wildlife.
- Include sections on bear safety and how to deal with nuisance animals in Emergency Response Plans.
- Provide information, training and equipment to prevent human – bear encounters.
- Aircraft and Airborne Activities Best Management Practices
- Schedule airborne surveys to occur outside of critical wildlife timing windows to avoid potential impacts, and

Develop flight guidelines to minimize disturbances to wildlife. To help develop guidelines review:

Flying in Caribou Country: How to minimize disturbance from aircraft”, Mining and Petroleum Environmental Research Group (MPERG). 2008.

<http://environmentyukon.gov.yk.ca/mapspublications/brochures.php#wildlife>

Flying in Sheep Country: How to minimize disturbance from aircraft”, Mining and Petroleum Environmental Research Group (MPERG). 2008.

<http://environmentyukon.gov.yk.ca/mapspublications/brochures.php#wildlife>

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Exploration Activities Best Management Practices

To avoid or reduce potential impacts to fish, wildlife and their habitat when conducting exploration activities such as trenching, drilling, constructing roads and trails incorporate the following best management practices into the work program:

- Minimize footprint wherever possible.
- Keep natural vegetation undisturbed where ever possible.
- When trenching ensure one side of the trench is sloped to provide an escape route for wildlife.
- Handle fuel and other chemicals properly to avoid contaminating soil and water.
- Use biodegradable drill fluids and clean up all hazardous wastes or spills.
- If working in watercourses, obtain proper authorizations and permits and limit the number of crossings.
- Keep buffer zones between water bodies and work sites.
- Control dust by reducing vehicle speeds or spraying roads.
- Reclaim sites as soon as work has been completed to reduce the potential of erosion.
- Revegetate with native species to maintain habitat.

Camp Best Management Practices

To avoid attracting wildlife to camps sites:

- Choose a camp location away from areas with recent signs of bear.
- Store food supplies in sealed containers.
- Keep kitchen facilities and sumps clear of grease and other kitchen waste.
- Do not cook or store food in sleep tents.
- Do not bury or burn kitchen waste in an open pit, use a burn barrel or commercial incinerator.
- Remove waste that may be potentially hazardous to wildlife (wire, flagging).
- Consider installing an electric fence.

For information on camp set up, burn barrel design, camp maintenance and bear safety see:

Guidelines for Industrial Activity in Bear Country, Mining and Petroleum Environmental Research Group (MPERG) Report 2008 - 2 http://www.environmentyukon.gov.yk.ca/mapspublications/documents/Guidelines_for_Industrial_Activity_in_Bear_Country.pdf

APPENDIX VI: SPILL CONTINGENCY PLANNING

Definition of a Spill

A spill is defined under Section 132 of *Yukon Environment Act* as “a release of a hazardous substance into a natural environment, from or out of a structure, vehicle, or other container that is abnormal in quantity in light of all circumstances of the discharge”.

If a Spill Occurs

All spills must be reported to the companies designated person as identified in the Spill Contingency Plan, this person is usually the project or camp manager.

If the spill volume is greater than the thresholds given in Schedule ‘A’ of the Spills Regulations the company’s designated person must contact Yukon 24 Hour Emergency Spill Response Line (867) 667-7244 as soon as possible under the circumstances and report the spill. For petroleum products (the most common product involved in spills), any product release of greater than 200 litres must be reported, however thresholds can be much lower for other types of products. The designated person should also be aware that the *Environment Act* contains wording that requires reporting a spill of material that might be harmful to the environment in any amount that is above normal. Yukon Environment recommends reporting any spill that is “above normal”.

The designated person should be prepared to convey the following information to Yukon 24 Hour Emergency Spill Response Line:

- Location of the spill or leak.
- The name and location of the nearest community.
- Time and date of the occurrence.
- Type of spill (ruptured tank, faulty valve, other.)
- Product spilt or leaked (gasoline, diesel, other.)
- The circumstances leading up to the spill.
- Nearest watercourse.
- Potential to enter watercourse.
- Fire hazard.
- Potential for injuries.
- Environmental effect expected, if any.
- Details of any action taken at the spill site, and equipment and materials on hand that can be used for clean-up and remediation.

Response to the spill by the Affected Agencies, those government agencies that may have an interest in a spill, will vary depending on the scale and location of the spill. It is recommended that only one call be

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made to Yukon Emergency Spill Response Line which will coordinate the response(s), if any, from the Affected Agencies.

Spill Contingency Plans

Purpose of a Spill Contingency Plan

The purpose of a spill contingency plan is to provide company personnel, contractors and suppliers with a framework identifying the following in the event of a spill:

- Roles and responsibilities.
- Reporting and communication procedures.

The action plan outlining how to:

- Stop the source of the spill.
- Prevent the spread of and minimize the effects of the spill.
- Clean up and remediate the spill.

Spill Contingency Plan Content³⁶

Spill Contingency Plans are project specific. The plan should be designed to cover all probable incidents that could occur based on the amount and types of fuels and chemicals stored on site, type of storage facilities, proximity to water bodies and mechanized equipment on site. The following is provided as a guide to help develop the content of a Spill Contingency Plan.

Introduction

Basic information on the company, the project, and previous land uses (ex. historic mineral exploration activity, road building etc.), if applicable. Include any regulatory requirements stipulated in existing permits or licences.

Access and Haulage Contractor

Provide a description of the methods (truck, float plane) and route(s) used to transport fuel to site. If using a contractor to haul fuel, provide information on the company i.e. experience and equipment.

Reporting Procedures

Identify the company's designated person (i.e. project or camp manager) who will be responsible for reporting the spill to the proper government authorities, and other details with regard to spill reporting procedures. Review the product list in Schedule 'A' of the Spills Regulation against the products stored or handled at site in order to determine the quantity of spilled product which would require reporting to the Spill Response Line. Make a table in the plan for quick reference in the event of a spill. Provide details on how and who will document the cause of the spill, containment, clean up, mitigation to prevent future spills from occurring and reporting, if required to the Affected Agencies.

³⁶ Fuel Spill Contingency Plan Guidelines http://www.yukonwaterboard.ca/forms/fuel_spill_contingency_plan.pdf

Spill Prevention Procedures

Describe what spill prevention methods will be used on site. Some examples of spill prevention would include the following: double walled tanks, construction of secondary containment berms, training personnel to use spill equipment, contents of spill kits, routine inspections, etc.

Spill Equipment, Containment and Response Procedures

Describe the type and location of spill equipment. Provide details on methods to contain large and small spills on land, water, ice and snow. Outline communication and response procedures for company personnel and contractors to follow in the event of a spill.

Spill Site Clean Up and Site Remediation

Detail methods to be used to cleanup fuel spills on land, water, ice and snow (i.e. use of absorbent mats and booms to contain and absorb fuel spilt on water), and procedures to dispose of used booms, absorbent mats and contaminated soil.

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A Spill Contingency Plan should also include:

- Spill Reporting Flow Chart.
- Material Safety Data Sheets: these can be obtained for contractors and fuel distributors.
- List of Telephone Contacts: key corporate contacts (i.e. V.P. Environment), Community and First Nation Contacts, Yukon 24 Hour Emergency Spill Response Line, other agencies.
- Spill Report Form (refer to generic example below.)

References and Resources

Environment Yukon – Spill Reporting web site <http://environmentyukon.gov.yk.ca/monitoringenvironment/spills.php>

Environmental Programs, Spill Response Plans, Yukon Environment, June 2006
<http://www.environmentyukon.gov.yk.ca/monitoringenvironment/spills.php>

Fuel Spill Contingency Plan Guidelines, Yukon Water Board
<http://www.yukonwaterboard.ca/>

Spill Regulations – Schedule A http://www.gov.yk.ca/legislation/regs/oic1996_193.pdf

Yukon Environment Act Part 11 Spills <http://www.gov.yk.ca/legislation/acts/environment.pdf>

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SAMPLE SPILL REPORT FORM

Yukon 24 Hour Emergency Spill Response Line (867) 667-7244

*See Schedule 'A' of the Spills Regulation (O.I.C. 1996/193) for Reportable Quantities of Other Products

Date and Time of Spill: _____

Product Spilt (diesel, gasoline): _____, Amount Lost: _____

General Location of Spill _____

Specifics of Location (nearest community, watercourse) _____

Cause of Spill (ruptured tank, faulty valve): _____

Weather Conditions: Temperature: _____ Wind Direction/Speed _____ Precipitation _____

Hazards to Human Health/ Drinking Water: _____

Potential to Enter Water: _____ Fish Kill: _____

Expected Environmental Effects: _____

Actions Taken to Contain Spill: _____

Actions Taken to Clean-up Site: _____

General Comments: _____

Reported By:

Name: _____ Company: _____

Reported To:

Name: _____ Company: _____

APPENDIX VII EXPLORATION ACTIVITY CHECK LISTS

The following exploration activity check lists are based on the Best Management Practices outlined within each section of the Guide. The check lists are intended to be used as a guide when planning for and conducting field work.

EXPLORATION FIELD PROGRAM PRE-PLANNING CHECK LIST

Prior to commencing the exploration field season it is important to develop policies and procedures for personnel and contractors to follow and to review regulations and communicate with First Nations, communities and other land users.

In the project area identify:

- First Nations, communities and other land users in the project area.
- Environmental and wildlife sensitive or protected areas.
- Review regulations and applied for necessary permits and the environmental baseline studies that may be required to support the exploration program.
- Develop health and safety, emergency response and fuel spill plans designed for the level of work expected to be undertaken.
- Develop other policies (wildlife policies, aircraft communication), as appropriate for the level of work (six person fly camp vs. 100 person advanced underground exploration program) and site conditions.
- Establish procedures for reporting, responding to and correcting any conditions or incidents that may have potential adverse impacts to wildlife and/or the environment.
- Develop a community communications plan and designate a company spokesperson to implement the plan; encourage open communications with all community groups.
- Incorporate the use of local resources (personnel, goods and services), where possible, within the program.
- Ensure personnel and contractors have adequate training in first aid and equipment used for the program.
- Develop an orientation package for personnel, contractors and site visitors that include company policies, health and safety information, emergency response and spill response plans.
- Incorporate progressive reclamation practices into the planning and operations of exploration activities.
- Budget for progressive reclamation and possible closure of the project.

PROSPECTING, MAPPING AND SAMPLING OFF CLAIMS CHECK LIST

Before going to the field:

- Research area to ensure public access is permissible and location of public roads and trails.
- Update first aid and review bear aware safety program; acquire the appropriate first aid kit and safety equipment.
- Consider the type of access required to get to the area (float plane, truck). Have you considered using low impact vehicles for accessing the area if feasible?
- Review and implement low impact sampling methods (biodegradable flagging, restore moss and vegetative mat if disturbed).
- If camping, consider implementing measures to follow “no trace” camping procedures.
- Will any of the proposed work require a permit under the *Territorial Lands Act*?
- Check Appendix I Territorial Lands Use Permit Threshold Table, to see if the proposed activity, such as setting up a fuel cache on territorial lands, triggers the requirement for a land use permit.

Upon completion of the work:

- Fill in any holes dug for samples and if a camp site was used fill in privy pits and sumps.
- Remove all garbage and fuel from work and camp sites.

AIRCRAFT OPERATIONS AND AIRBORNE SURVEYS CHECK LIST

Safety and Communication

Before going to the field:

- Update Health and Safety and Emergency Response Manuals to reflect the type of aircraft used in the exploration program.
- Educate personnel and contractors on safety practices around aircraft and at staging sites. Conduct aircraft safety orientations before getting into aircraft.
- Contact local communities, First Nations and other operators to enquire when they will be working on the land and where possible coordinate schedules and flight plans to avoid impacting communities and other land users.

Wildlife

Aircraft operations can significantly impact wildlife.

- Determine if wildlife sensitive areas are present within the project area, provide personnel and contractors with information on wildlife policies and operating procedures when flying in these areas or if wildlife is encountered.
- Educate personnel and contractors on methods to minimize disturbance from aircraft to wildlife.
- Landing and Staging areas:
 - Fuel caches – check the permit threshold for fuel caches on and off claims. See Appendix I for permit thresholds.
 - Helicopter pads and airstrips – check the permit thresholds for clearings on and off claims. See Appendix I for permit thresholds.
 - Are the helicopter pads, staging areas or airstrips located on level ground and a safe distance from buildings?

Closure:

- Have all fuel caches been removed and any fuel spills cleaned up?
- Have the clearings used for helipads and airstrips been cleared of any garbage and reclaimed following reclamation best management practices?

STAKING CHECK LIST

Before staking a claim:

- Understand staking regulations and follow guidelines.
- Buy claim tags from the Mining Recorder.
- Ensure ground is open for staking, check the paper claim maps at the Mining Recorder's office counter since on-line maps may not be current.
- To the extent possible identify the posts of other nearby claims to ensure your posts do not fall on land already staked.
- Determine who the other land users are, understand their interests and carefully consider the benefit of notifying them after the claim has been recorded and before exploration commences.
- Use low impact / avoidance cutting techniques and biodegradable flagging
- Notify First Nations, property owners and other lands users once the claim has been staked and recorded and outline the proposed plans for exploration.

CAMP CHECK LIST

Before camp construction and occupation plan to:

- Develop camp emergency and spill response plans appropriate for the camp size and types of activities to be conducted during the exploration program.
- Locate and design camp layout to minimize risks of fire, wildlife and other environmental hazards such as flooding, rock slides.
- Locate garbage and pit privies away downstream from drinking water sources.
- Develop waste management systems for handling liquid and solid wastes, appropriate to the number of people in camp.
- Follow the Camp Sanitation, Sewage Disposal Systems and Drinking Water Regulations.
- Set up a waste handling system to remove non-combustible and special / hazardous waste from the camp site to a community landfill or certified disposal facility; request permission from the local community prior to use.
- Budget for closure.

Camp closure, be sure to:

- Remove all buildings and other structures.
- Remove all non-combustible waste; fuel and fuel drums, plastics, etc.
- Back fill pits, sumps and ditches.
- Remove or deactivate septic systems.
- Document reclamation work.

FUEL AND SPECIAL WASTE HANDLING AND SPILL RESPONSE PLAN CHECK LIST

Do the regulations for fuel storage, the storage and transportation of Special Waste, Storage Tanks, or the Transportation of Dangerous Goods (TDG) apply to your project? Review Section 11.0 Fuel and Special Waste Storage and Handling.

When handling fuel and special waste completed the following:

- Develop or update Emergency and Spill Response Plan (for Spill Contingency Planning See Appendix VI) to include the types and level of activities undertaken during the exploration program.
- Ensure personnel and contractors are properly trained and have proper certifications (WHMIS), if required, to handle fuel and to follow emergency and spill response plan protocols.
- Post your Spill Response Plan and the 24 Hour Yukon Emergency Spill Response Line (867) 667-7244 adjacent to fuel storage facilities, install spill kits and fire extinguishers.
- Ensure contractors provide WHMIS sheets for all fuels and lubricants they are using and include these in Spill Response Plan.
- Inspect spill response kits regularly to make sure they contain the correct equipment for the size and type of fuel caches on site.
- Set up a regular inspection routine and designate an employee to conduct the inspections.

Set up a system of regular inspections for the following:

- All fuel caches and storage tanks.
- Fuel drums and equipment (heavy equipment, pumps) – ensure all equipment is in good condition and drums are properly labelled.
- When checking tanks or caches also check the spill response kits there, replenish items used and confirm kits are still appropriate for the amount of storage and type of material stored.
- Transportation of Fuel: check that company personnel and contractors have proper training in slinging fuel barrels by helicopter and tanks are secured in trucks.
- Ensure that company personnel and contractors trained in TDG requirements for placarding etc. when transporting fuel by road.
- Set up a schedule to back haul empty drums and waste oil on a regular basis.
- Keep track of smaller fuel caches. At the end of the field season have all drums (full and empty) collected and relocated to a central location or removed from the field completely in case the company does not return to work in the area.

LINE OR CORRIDOR CUTTING AND GROUND SURVEY CHECK LIST

- Contact other land users in the area before cutting the grid to avoid damaging private property, trap lines and trails.
- Check forest fire hazard rating.
- Employ the following low impact methods:
 - Keep lines narrow.
 - Avoid cutting trees.
 - Buck up brush.
 - Allow for a buffer zone between shorelines, trails and roads.
 - Do block wildlife trails with brush.
- When the program is completed check the cut lines and corridors for potential erosion or drainage problems and remediate if necessary. Document any reclamation.

VEHICLE USE CHECK LIST

- Ensure all personnel and contractors have valid licences (boat safety is now mandatory if operating motor boats) and equipment is properly insured.
- Ensure vehicles are maintained properly, are regularly inspected for leaks and have proper safety equipment in place.
- Identify sensitive areas and avoid using any vehicles in these areas.
- Set up a regular trail and road inspection and maintenance schedule.

TRAILS AND ROAD CONSTRUCTION CHECK LIST

- Research the area – avoid building new routes, look for existing trails and roads to use before constructing new access routes.

Design and layout should minimize impacts to the environment:

- Plan drainage controls to minimize flooding and erosion.
- Routes through steep areas need to be properly designed and constructed.
- Design of route should be appropriate for the duration of the project, the amount and type of traffic.
- Monitor and maintain trails and roads, inspect drainage controls and ensure these are adequately sized and working properly.
- Plan for reclamation, stockpile topsoil, brush and other organics.

STREAM CROSSINGS CHECK LIST

- Acquire proper permits and authorizations from DFO and other government agencies.
- If constructing a stream crossing (bed or bank modification, bridge, culvert) a Water Licence may be required.
- Take steps to minimize impacts to fish habitat as set out in this Guide.
- Plan location and type of crossing based on site conditions.
- Plan for proper drainage and erosion prevention.
- Avoid areas of permafrost – if working in permafrost areas take measures to prevent gouging and rutting.

When fording a stream:

- Do not drive down the stream bed;
- Cross at right angles;
- Choose a gentle slope; and
- Limit the use of the site as much as possible.
- Set up a regular inspection and maintenance program of all stream crossings.

DOCKS AND BARGE LANDINGS CHECK LIST

- Choose a suitable location that will minimize impacts to the riparian areas, aquatic vegetation and fish habitat.
- Determine where the high water mark (HWM) is prior to construction and place structures and supply areas above HWM.
- Source environmentally friendly products, where possible use untreated materials.
- Inform contractors of proper construction materials and methods for working near water courses and monitor their activities.
- Avoid leaks and spills, ensure machinery is clean and properly maintained.

TRENCHING CHECK LIST

- Review site conditions and as possible orient trenches to follow the slope contour.
- Stockpile topsoil, subsurface and mineralized materials separately.
- Check the stability of the trench walls before commencing to map and sample the trench.
- When reclaiming the trench place mineralized rock at the deepest section of the trench and cover with non-mineralized material.

BLASTING CHECK LIST

- Persons who handle, transport or store explosives must understand and comply with the Explosives Act of Canada and the Transportation of Dangerous Goods Act.
- Before starting any blasting program consult Yukon Occupational Health & Safety Blasting Regulations, Part 14 <http://www.wcb.yk.ca/ActsPoliciesAndRegulations/OccupationalHealthAndSafety/Default.aspx>
- Ensure personnel and contractors who are operating a blast have a valid Blasters Permit.
- A Blasting Log recording pre-blast loading details and the results of the post blast sites must be maintained at site for at least 5 years.
- When transporting and storing explosives follow Yukon Occupational Health & Safety Blasting Regulations.
- Include Blasting safety protocols in company Health and Safety Management Plan
- Plan to use the minimum amount of explosives

DRILLING CHECK LIST

Drill Pad Location

- Locate sites a minimum of 30 metres from water course.
- Check for slope stability in steep areas.
- Avoid visual impacts – leave buffer zones.
- Use existing clearings if possible or old drill sites.

Drill Activities

- Avoid drilling during seasons that are critical to local wildlife.
- Stockpile topsoil for later use in site reclamation.
- Manage drill water and cuttings using sumps or a closed system.
- Use minimal amounts of additives.
- Use biodegradable additives.
- Plug drill holes if artesian.
- Keep drill pad tidy, remove empty fuel barrels and other waste on a regular basis.
- Set up proper core storage area with signage.
- Reclaim drill pad at the end of the drill program.

Drilling on ice

- Set up closed system to manage water.
- Remove cuttings and all debris from the ice.
- All drill holes must be plugged.

UNDERGROUND EXPLORATION AND BULK SAMPLING CHECK LIST

- Plan and locate site facilities to minimize potential impacts on land and watercourses.
- Designate specific area(s) for stockpiling topsoil and organic material where they will not be affected by the exploration activities, so to be used for reclamation.
- Consider setting up vegetation test plots.
- Develop plans to minimize dust and other emission sources.
- Practice progressive site reclamation.

RECLAMATION CHECK LIST

- Document site conditions before, during and at closure.

Draft a reclamation plan. The reclamation plan should consider:

- Climatic conditions,
- Soil types and terrain conditions,
- Extent of reclamation required,
- Types of vegetative cover and other requirements that may include the recovery of wildlife habitat, or the remediation of a fish habitat that has had “harmful alteration, disruption or destruction” (HADD) under the Fisheries Act, or sensitive environmental areas.
- The aesthetics of the site.
- Potential visual impacts to communities and other land users.
- Plan to implement the reclamation plan as soon as possible.
- Use proper drainage control methods to prevent erosion.

Choose appropriate seed mixes that do not introduce invasive species.

- Monitor for and control any sediment that may enter water bodies while implementing reclamation plan.
- Monitor for reclamation success.
- Apply for Certificate of Closure.

APPENDIX VIII: CONTACTS

ASSOCIATIONS

Wilderness Tourism Association <http://www.wtay.com>

Yukon Outfitters Association <http://www.yukonoutfitters.net>

GOVERNMENT AGENCIES

Yukon Environmental and Socio-economic Assessment Board

Dawson City Designated Office

Bag 6050, Dawson City, Y0B 1G0

Tel: 867-993-4040

Fax: 867-993-4049

Haines Junction Designated Office

PO Box 2126, Haines Junction, Y0B 1L0

Tel: 867-634-4040

Fax: 867-634-4049

Mayo Designated Office

PO Box 297, Mayo, Y0B 1M0

Tel: 867-996-4040

Fax: 867-996-4049

Teslin Designated Office

PO Box 137, Teslin, Y0A 1B0

Tel: 867-390-4040

Fax: 867-390-4049

Watson Lake Designated Office

PO Box 294, Watson Lake, Y0A 1C0

Tel: 867-536-4040

Fax: 867-536-4049

Whitehorse Designated Office

7209B-7th Avenue, Whitehorse, Y1A 1R8

Tel: 867-456-3200

Fax: 867-456-3209

Yukon Department of Energy, Mines and Resources

Mining Recorder Offices

Dawson City Tel: (867) 993-5343

Mayo Tel: (867) 996-2256

Watson Lake Tel: (867) 536-7366

Whitehorse Tel: (867) 456-3823

District Offices, Client Services & Inspections

Carmacks Tel: (867) 863-5271

Dawson City Tel: (867) 993-5468

Haines Junction Tel: (867) 634-2256

Mayo Tel: (867) 996-2343

Ross River Tel: (867) 969-2243

Teslin (867) 390-2531

Watson Lake Tel: (867) 536-7335

Whitehorse Tel: (867) 456-3887

Environment Yukon

District Contacts, Conservation Officer Services

Dawson City Tel: (867) 993-5492

Faro Tel: (867) 994-2862

Haines Junction Tel: (867) 634-2247

Mayo Tel: (867) 996-2202

Old Crow Tel: (867) 966-3040

Ross River (867) 969-2202

Teslin Tel: (867) 390-2685

Watson Lake Tel: (867) 536-7363

Whitehorse Tel: (867) 667-5113

First Nations - Yukon

Ta'an Kwäch'än Council

117 Industrial Road, Whitehorse Yukon, Canada Y1A 2T8

Tel: 867-668-3613

Fax: 867-667-4295

Teslin Tlingit Council

Box 133, Teslin, Yukon, Canada Y0A 1B0

Tel: 867-390-2532 – Administration

Tel: 867-390-2005 – Lands

Fax: 867-390-2204

Tetlit Gwich'in Council

Box 30, Fort MacPherson Northwest Territories, Canada X0E 0J0

Tel: 867-952-2330

Fax: 867-952-2212

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Tr'ondëk Hwëch'in

Box 599, Dawson City Yukon, Canada Y0B 1G0

Tel: 867-993-7100 – Administration

Tel: 867-993-7110 – Implementation

Fax: 867-993-6553

Vuntut Gwitch'in First Nation

Box 94, Old Crow, Yukon, Canada Y0B 1N0

Tel: 867-966-3261

Fax: 867-966-3800

White River First Nation

General Delivery, Beaver Creek Yukon, Canada Y0B 1A0

Tel: 867-862-7802 – Administration

Fax: 867-862-7806

Carcross/Tagish First Nation

Box 130, Carcross, Yukon, Canada Y0B 1B0

Tel: 867-821-4251

Tel: 867-821-8216 – Lands Administration

Fax: 867-821-4802

Champagne and Aishihik First Nations

Box 5310, Haines Junction

Yukon, Canada Y0B 1L0

Tel: 867-634-4200 – Administration

Tel: 867-634-4211 – Renewable Resources Manager

Fax: 867-634-2108

Inuvialuit Regional Corp.

Bag 21, Inuvik, Northwest Territories, Canada X0E 0T0

Tel: 867-777-2737

Fax: 867-777-2135

Kluane First Nation

Box 20, Burwash Landing, Yukon, Canada Y0B 1V0

Tel: 867-841-4274 – Administration

Tel: 867-841-5501 – Lands

Fax: 867-841-5506

Kwanlin Dun First Nation

35 McIntyre Drive, Whitehorse Yukon, Canada Y1A 5A5

Tel: 867-633-7800

Fax: 867-633-5057

Kaska Liard First Nation

Box 328, Watson Lake Yukon, Canada Y0A 1C0
Tel: 867-536-5200 – Administration
Tel: 867-536-2912 – Lands Administration
Fax: 867-536-2109

Ross River Dena Council

General Delivery, Ross River Yukon, Canada Y0B 1S0
Tel: 867-969-2278 – Administration
Tel: 867-969-2832 – Economic Development
Fax: 867-969-2405

Little Salmon/Carmacks First Nation

Box 135, Carmacks, Yukon, Canada Y0B 1C0
Tel: 867-863-5576
Fax: 867-863-5710

First Nation of Na-Cho Nyak Dun

Box 220, Mayo, Yukon, Canada Y0B 1M0
Tel: 867-996-2265 – Administration
Tel: 867-996-2415 – Lands
Fax: 867-996-2107

Selkirk First Nation

Box 40, Pelly Crossing Yukon, Canada Y0B 1P0
Tel: 867-537-3331
Fax: 867-537-3902

APPENDIX IX: GLOSSARY

Access road: a road or trail that provides access to a public highway or road, or to any private road

Archaeological sites and resources: artefacts or sites that are either historic (older than 45 years) or pre-date European contact. Can include human remains, ancient camps, stone tools and other ancient manmade artefacts. See also “Historic sites and artefacts” definition.

Best Management Practices (BMP): A range of practices and good housekeeping habits designed to reduce the potential impact of exploration activities on the environment. BMP are not compliance standards, but guidance on suggested practices that if incorporated into an exploration program, will keep the operator in compliance with permits and authorisations.

Buffer zone: An undisturbed strip of vegetated land left adjacent to a sensitive area such as a lake or river (see riparian zone).

Bulk sample: A large sample (10 tonnes or much larger) of rock taken from a deposit for analysis or other test work. The bulk sample is intended to be representative of the material(s) to be mined from a deposit.

Clearing: An area of ground that has been cleared of trees, brush or vegetative mat for the purposes of conducting exploration activities.

Critical habitat: Geographical areas which are critical to a significant number of individual species during at least part of the year i.e. caribou calving grounds are considered critical habitat during the spring.

Cross ditch: A shallow trench dug by hand or by mechanical means at an angle across the surface of a road in the downslope direction. Used to control water flow and prevent erosion due to ponding.

Cross drain: Pipes or culverts placed in the road grade, set below the level of the side ditches and inclined about 2% more than the road grade. Used to direct the water collected in a ditch from a road surface.

Cut Line: A linear path cut to establish a grid for the purposes carrying out geochemical and geophysical surveys, geological mapping and drilling programs.

Deposit: A mineral or coal occurrence of sufficient size and grade that it might, under favourable circumstances, be considered to have economic potential.

Environmental effect, in respect to a project:

- ◇ Any change that the project may cause in the environment, including any effect of any such change on health and socio-economic conditions, on physical and cultural heritage, on current use of lands and resources for traditional purposes by aboriginal persons, or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, and
- ◇ Any change to the project that may be caused by the environment, whether any such change occurs within or outside Canada

Environmentally sensitive areas: Areas which are considered sensitive to disturbance and/or are significantly valuable for fisheries, wildlife, water, recreation, or other environmental resources

Fish habitat: Fisheries and Oceans Canada defines fish habitat as any “spawning grounds and nursery, rearing, and food supply and migration areas on which fish depend, directly or indirectly, in order to carry out their life processes.”

Geochemical sampling program: The study or analysis of the chemical composition of soils, stream sediments or rocks. Geochemical analysis of soil, sediment and rock samples is used in exploration as a tool to identify the type and quantity of minerals and elements present at the surface.

Geology: a broad scientific discipline that studies Earth through the history and processes of rocks and minerals.

Gray water: Wastewater generated from non-industrial sources such as domestic laundering, bathing and dishwashing water.

Habitat: A geographic area or environment used by plant or animals or a community of plants or animals to live and grow.

Historic sites and artefacts: Abandoned manmade objects and sites that are 45 years or older. These can include camps sites, caches, buildings, cabins, lithic tools, human remains and burial sites.

Low ground pressure vehicle: A vehicle that applies 35 kPa of pressure or less to the ground surface.

Mineral Exploration: Activities undertaken by individuals or companies to find a mine. These activities include prospecting, geological mapping, geophysical and geochemical surveys, trenching, diamond drilling and bulk sampling.

Mineral: A naturally occurring homogeneous substance with defined physical and chemical properties. From a Yukon regulatory perspective a mineral is defined on page 5 of the Quartz Mining Act.

Mining: The process of excavating rock for the purposes of extracting the minerals or coal of economic interest from the rock. The excavation can occur at the surface (open pit) or underground. From a Yukon regulatory perspective the terms miner, mining, miner-like etc. are used in a much broader way to incorporate all of the activities involved in exploration in addition to production.

Notification (Class 2): Method for permitting a Class 2 exploration program. The operator must fill in the Notification Form, found in Schedule III of the Quartz Mining Land Use Regulations and submit it to the Chief of Mining Land Use at least 25 days before program start up. The Notification Form outlines the proposed activities and measures to be taken by the operator to minimize environmental effects.

Operating Plan (Class 3 and 4): The Operating Plan must be included an application for Class 3 or 4 exploration programs. The plan must contain a description of the planned exploration activities, measures that will be taken to minimize potential environmental impacts, and reclamation plans.

Overburden: Loose or unconsolidated rock or soil that overlies bedrock, which may need to be removed prior to exploration activities or mining.

Paleontological resources: Fossilized remains of extinct or pre-historic plants and animals.

Permafrost: Soil or rock that remains frozen for at least two years. Permafrost will vary in thickness from a few centimetres to several hundred meters in the far north. The thickness will be determined by air temperature, soil characteristics, ice content and the geothermal gradient. Surface conditions including vegetation, organic cover and snow thickness will also influence permafrost.

Progressive reclamation: Reclaiming of a disturbed area once it is no longer required. For example, once a drill moves off a drill pad, that pad can be reclaimed while work is ongoing at other sites.

Appendices

Reclamation: The process by which lands disturbed by mining or mineral exploration activities are returned to a beneficial and self-sustaining land use.

Revegetation: The reestablishment of self-sustaining vegetation on lands which were vegetated prior to disturbance.

Riparian: The area adjacent to a stream, river, lake or wetland that contains vegetation that, due to the presence of water, is distinctly different from other vegetation of adjacent upland areas.

Riparian Habitat: Refers to the vegetation growing close to a watercourse that is generally critical for wildlife cover, fish food organisms, stream nutrients and large organic debris, and for stream bank stability.

Road: Access, constructed through the movement of rock or earth, for vehicle traffic.

Scarification: The process of loosening or roughing up compacted soil without actually turning the soil over. This practice, done during reclamation, promotes revegetation of a site.

Settlement Land: Land identified in a First Nation's final agreement as settlement land of the First Nation. As defined in the Umbrella Final Agreement, there are three types of settlement land owned and managed by a given First Nation government; Category A, Category B, and Fee Simple settlement lands.

Sump: A manmade pit or natural depression used to deposit wastewater or gray water.

Topsoil: The dark upper portion of a soil, known as the A soil horizon.

Trail: Access to a site that is constructed with little or no movement of rock or earth.

Vegetative mat: The organic horizon of soil which is characterized by the accumulation of organic matter or partly decomposed organic matter, derived from leaves, woody material including the root masses of living vegetation.

Waste rock: Rock that does not contain enough mineral content to be considered ore, but must be removed to gain access to the ore. Waste rock is typically stored in piles on the surface. If the waste rock contains sulphides that may be potentially acid generating and/or metal leaching a management plan will need to be developed as part of the Operational Plan submission.

Water bar: A depression dug to direct surface run-off. Used in road and trail construction to prevent rutting and the erosion of road surfaces.

Water body: Any lake, pond, stream, seep, river, creek, ravine or swamp ordinarily containing water.

Watercourse: Any natural watercourse, body of water, whether usually containing water or not, and includes groundwater, springs, swamps, and gulches

Watershed: An area of land defined by geography that collects and discharges water into a single main stream through a series of smaller tributaries.

Windrow: A low linear bank or heap of material formed naturally by the wind or artificially. In exploration, windrows are usually made of brush and used to prevent erosion.

APPENDIX X: REFERENCES AND RESOURCES

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