



Mineral Exploration Guidelines
For
Saskatchewan

Table of Contents

1.	Introduction		page 3
2.	Saskatchewan Environment Contact List.....		page 4
3.	Mineral Exploration Application.....		page 5
4.	Best Management Practices		
	Staking	BMP-001.....	page 8
	Grass Roots Exploration	BMP-002.....	page 11
	Clearing Operations	BMP-003.....	page 14
	Temporary Work Camps	BMP-004.....	page 19
	Fuel & Hazardous Materials Storage	BMP-005.....	page 23
	Fire Prevention & Control	BMP-006.....	page 27
	Access	BMP-007.....	page 30
	Water Crossings	BMP-008.....	page 33
	Trenching & Hydraulic Stripping	BMP-009.....	page 38
	Drilling	BMP-010.....	page 41
	Drilling on Ice	BMP-011.....	page 44
	Core Storage	BMP-012.....	page 52
	Restoration	BMP-013.....	page 54
6.	Closure Report.....		page 57
7.	Acts, Regulations, Guidelines and Permit Forms.....		page 58
8.	Other Regulatory Requirements.....		page 60

Introduction

The Saskatchewan Mineral Exploration and Government Advisory Committee (SMEGAC) have developed the *Mineral Exploration Guideline's* to assist government and industry in the application and approval process for activities on land administered by Saskatchewan Environment.

This guide provides information to assist in the planning, initiation and completion of a mineral exploration program in a fashion that will help minimize environmental impacts and meet relevant legislative requirements.

SMEGAC consists of representatives from Saskatchewan Environment, Saskatchewan Industry and Resources, Saskatchewan Northern Affairs, Fisheries and Oceans Canada and various mineral exploration companies active in the province. This guideline was circulated and reviewed by various provincial and federal government agencies and the mineral exploration industry during the course of its development.

The *Mineral Exploration Guideline* is a living document and will be revised to reflect improvements and changes to new field procedures or legislation requirements. SMEGAC will be the lead in gathering and evaluating revisions to this document.

We encourage stakeholders to provide suggestions for improving these guidelines. Comments and suggestions may be addressed to any SMEGAC representative or to:

Saskatchewan Environment
ATTN: SMEGAC Representative
P.O. Box 5000
La Ronge, Saskatchewan
Phone (306) 425-4234
Fax (306) 425-2580

Saskatchewan Environment Contacts

Mineral Exploration Contacts

Prince Albert Area

Mineral Exploration Contact (306) 953-2878

Meadow Lake Area

Mineral Exploration Contact (306) 236-7553

La Ronge Area

Conservation Officer (La Ronge) (306) 425-4234

Conservation Officer (Pinehouse) (306) 884-2060

Conservation Officer (Creighton) (306) 688-8812

Conservation Officer (Stony Rapids) (306) 439-2062

Conservation Officer (Southend) (306) 758-6255

Other Important Contacts

Spill Report Line

1-800-667-7525

-contact for reportable spills under The Environmental Spill Control Regulations.

TIP (Turn in a Poacher)

1-800-667-7561

-contact for reporting hunting, fishing, and other environment related violations.

Fire Hot Line

1-800-667-9660

-contact for reporting a wildfire.

-website for fire indices can be found at: www.se.gov.sk.ca/fire/FireDangerMaps

-website for fire weather at: www.se.gov.sk.ca/fire/weather.asp

Development of a Mineral Exploration Application

The following application outline encompasses all aspects required by Saskatchewan Environment (SE) for the review process. **Any application submitted for authorization need only address those information elements in the “program application outline” which are pertinent to the actual mineral exploration program. Providing the fullest possible information about the program will assist SE in a prompt evaluation of the submission.**

Applicants should contact the SE office early in the planning process to ensure that concerns with the program are identified and that appropriate information is provided. The application must provide enough information to allow SE to understand what the program is about and should focus on program and site-specific details. SE will use the requested information to:

- determine if there are any site-specific environmental concerns with the program and whether plans to deal with those concerns are acceptable;
- identify other interest groups that may be impacted by the program; and
- to provide the applicant with any necessary permits or authorizations required for the proposed work.

Where necessary the applicant should refer to readily available tools that may assist in the planning process such as: information web sites, applicable park management and land use plans, stakeholder groups, SE personnel, and other government contacts.

The applicant is responsible to obtain any other approvals that may be required under federal, provincial, or municipal legislation.

Applicants should note that a SE office **may** refer programs to the Environmental Assessment Branch for review under *The Environmental Assessment Act*. The decision to refer a program to the Environmental Assessment Branch is based on the significance of the scope and sensitivities for the program. Ultimately, the applicant is responsible to ensure the program is in compliance with any approval requirements under *The Environmental Assessment Act*. For more information on the Environmental Assessment review process, refer to the document titled “ Guidelines for the Preparation of a Project Proposal”.

PROGRAM APPLICATION OUTLINE

The following information, pertinent to the exploration program, must be provided when developing the mineral exploration application. The applicant will need to refer to the *Best Management Practice* (BMP) documents for additional information and/or clarification for any activity related to their program.

1. General Program Information

- applicant's name, address, phone (cellular, satellite and fax) number, and e-mail address.
- applicant's contact person(s) and designated field operator responsible for program activities and approvals.
- companies/contractors associated with the exploration program and contact person(s).
- indicate the mineral (uranium or not uranium) commodity being explored.
- duration of operation, i.e., estimated start and completion dates for program and any related task.
- maps- provide one electronic or three hard copies of a 1:50,000 scale map (or 1:12,500 scale forest inventory map where available). If applicable to the program, information on the map should include:
 - location of mineral disposition(s)
 - existing trails, roads, linear clearings and cut lines
 - existing core storage, work camp, recent drill sites (areas)
 - proposed access routes, drill sites (areas), work camps, and core storage sites
 - watercourses and water bodies with existing and proposed crossings
 - existing and proposed stripping, test pits and/or trenching areas
 - proposed hazardous substance waste dangerous goods (HSWDG) storage sites
 - potential water sources
- sketch plans and photographs may be used to better illustrate items or activities such as:
 - stripping/trenching work
 - the drilling pad, work camp and fuel storage site boundaries and layout
 - watercourse crossings, bridge layout or creek profiles

Field evaluation of the sites for rare and endangered species may be required if historical or habitat information indicates potential occurrence and if program timing is appropriate (see SE's "Species of Concern List").

- applicants are to contact the Conservation Data Center at (306) 787-7196 or fax at (306) 787-3913 or the self-screening program on their website at www.biodiversity.sk.ca/ftp.htm.

2. Program Specifics

Applicants must supply sufficient information in the application, committing to and meeting all “Requirements” as presented in the individual BMP’s. If unable to follow certain “Requirements”, applicants must identify in detail what the deviation will be and the process to be followed.

1. BMP-001 Staking
2. BMP-002 Grass Roots Exploration
3. BMP-003 Clearing Operations
4. BMP-004 Temporary Work Camps
5. BMP-005 Fuel & Hazardous Materials Storage
6. BMP-006 Fire Prevention
7. BMP-007 Access
8. BMP-008 Water Crossing
9. BMP-009 Trenching and Hydraulic Stripping
10. BMP-010 Drilling
11. BMP-011 Drilling on ice
12. BMP-012 Core Storage
13. BMP-013 Restoration

Completed applications are to be submitted to the mineral exploration contact for the SE office.

Upon completion of the exploration program, a closure report may be required.

BEST MANAGEMENT PRACTICE (BMP-001) STAKING

GENERAL INTRODUCTION

Staking by itself is not viewed as having a significant impact on the environment however, associated activities such as the establishment of temporary camps requires permits (see BMP 004).

BACKGROUND

Depending on the location, mineral lands can be acquired in three ways in Saskatchewan: mineral permits, staking on the ground and map staking. The acquiring of rights to explore for minerals are highly confidential in nature. The staker is responsible for ensuring that the area in question is open for staking. Applicants may obtain current claim maps at the Saskatchewan Industry and Resources (SIR) offices or on the SIR web site to ensure that the area is open for staking. The information can be found at www.ir.gov.sk.ca and follow the links to information on staking. The following is a summary of the staking procedures, but does not replace the existing *Mineral Disposition Regulations, 1986*.

Permits:

The holder has exclusive rights to prospect for the minerals in the permit area and to convert any or all of the permit area into a claim or claims. A permit may be held for two years and it cannot be renewed. A permit is available to give exclusive prospecting rights to a large area: minimum 10,000 hectares and maximum 50,000 hectares. However, if an area is subject to a high level of exploration and development activity, a permit may not be granted in that area.

Claims:

Subject to existing legislation, a claim holder has the exclusive rights to explore and prospect for the minerals in the claim area and to convert any portion or the entire claim into a lease or leases. A claim may be held for two years, initially, and thereafter from year to year subject to the holder expending the required amounts in exploration operations on the claim lands. The definition of surveyed and unsurveyed is found in the *Mineral Disposition Regulations*.

1. A claim in a surveyed area must be at least one legal subdivision in area, being not less than 16 hectares, but no more than 6,000 hectares.

In a surveyed area, a claim is acquired by *map staking*. An application to record a claim in a surveyed area is made to the Department by stating the full legal description in accordance with *The Land Surveys Act* for each claim and submitting the required fee.

2. In an unsurveyed area, a claim shall be comprise of not less than 16, but not more than 6,000 hectares. The claim must be rectangular in shape and the length of the claim may not exceed six times its width.

In an unsurveyed area, a claim is acquired by *ground staking*. To stake a claim in an unsurveyed area, a post is erected at each corner, blazing trees, cutting underbrush, placing pickets or other appropriate methods delineate the outer boundaries, and the posts are marked with the required information. Metal tags, available from SIR must be affixed to the posts at the time of staking or within one year of the date of recording.

A squared corner post shall be erected at each of the four corners of the claim. The most northeasterly corner post shall be designated as "No. 1" and the claim is staked in a clockwise direction so that the most northwesterly corner post is designated as "No. 4". All boundary posts must be cut to the same dimensions as described below.

The process requires an individual to determine a compass bearing starting at the "No. 1" post. As the staker follows the compass bearing, he/she establishes the presence of the "claim line" by blazing larger trees on both sides of the tree in the direction of the claim line and places flags or cuts brush or bushes.

At every 500 metres, the staker must cut a boundary post. A tree may be cut off 1.2 meters above the ground to make a boundary post. The upper part of the post must be squared off so that the squared faces are perpendicular and parallel to the boundaries of the claim area. These posts must be large enough so that the squared face of the post is approximately 10 cm wide.

Boundary posts will be inscribed on the side of the post facing the next corner post in a clockwise direction from post "No. 1". The inscription must include the letters BP, the number from the tags located on the corner posts, the staker's name, the name of the company the claim is being staked for and the date and time the post was erected. The corner posts are identified with metals tags.

- a. The application is made to SIR on an approved form that is accompanied by the required fee and a plan, at 1:50,000 scale showing the position of the claim and the claim posts and the distance along the boundaries between posts and between posts and any bodies of water.

An application to record a claim that is ground staked in an unsurveyed area must be submitted to the mining recorder, along with recording fees, within 30 days of completing staking in order to be recorded. It is the staker's responsibility to register the claims with SIR's mining recorder in either Regina or La Ronge.

Leases:

One or more leases may be obtained for the entire area covered by a claim, provided that each parcel of lease land is rectangular and its length does not exceed six times its width.

A lease grants the exclusive rights to explore for, dig, work, mine, recover, procure and carry away the minerals within the lease area subject to the payment of royalties. A lease is issued for a term not exceeding ten years, and is renewable for further terms of ten years, provided regulatory requirements are met. The requirements for staking out a lease are the same as for staking out a claim.

Note: *The Mineral Disposition Regulations* also regulate placer mining and, therefore, a mineral claim or lease must also be applied for under these regulations when placer mining is being undertaken.

AUTHORITY

The Crown Minerals Act

The Mineral Disposition Regulations, 1986

The Forest Resources Management Act and Regulations

REQUIREMENTS

1. For ground-staked claims, posts define the boundaries of a staker's mineral lands. The actual location of the claim on the ground maybe somewhat different than as represented on the maps. The posts are critical to ownership. Damaging, moving or altering a claim post is an offence under the regulations unless permission is received from SIR.
2. Prior written consent of the Minister (SIR) must be obtained in order to apply for, or stake out, a disposition area upon lands reserved by the Crown as a town site or laid out on a registered plan as a city, town or village lots.
3. Stakers are required to follow the staking process outlined in the background information as required under *The Mineral Disposition Regulations, 1986*.
4. For ground-staked claims, a forest product permit from Saskatchewan Environment is required on Crown Lands in the province.

CONTACTS

Mines Branch (Regina) SIR

Mines Branch (La Ronge) SIR

Saskatchewan Environment

Best Management Practice (BMP-002)

Grass Roots Exploration

General Introduction

Many types of exploration activities carried out by mineral exploration companies require permits. The company should contact Saskatchewan Environment to see if any permits are required to carry out their requested activity.

Background:

1. Airborne Geophysical Surveys

Many rocks or types of mineralization have physical properties such as radioactivity that can be sensed by instruments. The airborne surveys typically measure magnetism, electrical conductivity and radioactivity over broad areas. Typically an instrument package is housed in the aircraft itself or in a "bird" trailed behind the aircraft on a cable. The aircraft can fly at elevations of a hundred meters to several thousands of meters depending on the type of survey being conducted.

2. Property Evaluations or Prospecting

Grassroots prospecting includes activities such as examining core storage areas, conducting regional geological mapping, or surface prospecting. These activities are conducted to help plan further exploration programs.

3. Line Cutting

Lines are cut to provide a grid reference for a variety of surveys including: lease boundaries, geochemical, geological and geophysical surveys.

4. Geological, Geochemical and Geophysical Surveys

Geological mapping generally involves stripping small areas of moss or lichen and taking small hand-sized samples in order to determine the rock types present, mineralization and structural features.

Geochemical surveys can be done on several levels of intensity, from taking samples of leaf debris to digging trenches. Impacts on the environment vary depending on the level of sampling done.

Geophysical surveys test the physical properties of the rocks. These tests can include, magnetism, electrical conductivity or resistivity and radioactivity. In the majority of cases this involves taking readings with instruments in a non-destructive manner. A seismic survey uses explosives or vibration generating equipment to create seismic waves. Geophones detect the seismic waves that respond to subsurface geologic structures.

Authority

Seismic Regulations
The Engineering and Geoscience Professions Act
Provincial Lands Act
Forest Resources Management Act

Requirements

1. Airborne Survey
 - a. Airborne Geophysical Surveys with no surface land use do not require a permit. However, it is advised that persons undertaking airborne survey activity get in touch with the Saskatchewan Environment contact to discuss potential program issues (e.g. colonial bird nesting periods, calving periods, fires, outfitters, trappers, other forest users, etc.).
 - b. It is the responsibility of the applicant to ensure that there are no flight restrictions in the area's intended to be surveyed. Contact Transport Canada for any potential restrictions.
2. Typical line cutting conditions unless otherwise approved.
 - a. The proponent is responsible for receiving authorization from SE before proceeding with work.
 - b. All lines are to be hand cut (e.g. hand tools and chain saws).
 - c. Low impact/avoidance cutting techniques shall be used. This would include removing branches from trees rather than cutting the tree, avoiding the cutting of merchantable trees where possible, etc.
 - d. When not accessing by foot, low impact equipment (e.g. all terrain vehicles or snowmachines) shall be used and identified in the application.
 - e. Baselines and lease boundaries shall not exceed 2.0 meters in width and cross lines shall not exceed 1.0 meter in width. Line width and land surface disturbance shall be minimized.
 - f. Line widths should not exceed 1.0 meter within 100 meters of any canoe route, trail, road, cutblock, water body or water course (refer to BMP-008 Water Crossing). Natural features should be used to conceal visual sight of the line where possible.
 - g. No damage should occur to the standing timber.
 - h. All leaning trees are to be removed from standing timber when posing a safety

hazard.

- i. Slash is to be laid flat.

3. Seismic Survey

- a. To conduct a seismic survey requires a series of permits and consultation. A permit is required from Industry and Resources. The process associated with this permit will guide the applicant through a process to obtain all the required authorizations.

Contact

Geodata, Saskatchewan Industry and Resources, Regina
Saskatchewan Environment

Best Management Practices (BMP-003) Forest Clearing / Harvesting Operations

General Introduction

To ensure sustainable use and development of the provincial forest, care must be taken in the harvest and handling of the forest products during mineral exploration activities. Assistance in planning exploration harvest activities can be provided by contacting Saskatchewan Environment (SE).

Examples of typical forest clearing activities include development of trails and campsite areas, and pads for drill holes and helicopters.

Background

Legislation requires forest users to practice sustainable forest management. This requires proper planning to minimize potential impacts on forest ecosystems, ensuring that forest users comply with desired forest management practices, and ensuring optimum forest resource utilization for all forest users to reduce the impact on productive forest land. Section 13(1) of the Forest Resources Management Regulations requires a forest products permit for mineral exploration activity where the removal or disturbance of forest products is incidental to that activity.

Definition:

Merchantable Timber: Typically refers to all trees capable of making at least one 5 meter piece to an 8 cm top diameter, inside bark.

The following salvage practices and standards apply under the existing *Forest Resources Management Regulations*:

1. SCALING OF TIMBER

A scaler is not required in instances where there is less than 250m³ of timber harvested. (This is equivalent to 1000 - 2000 trees from the Shield area, or 5 tandem truckloads. Where applicable, an estimate of timber harvested will be required, as dues (royalties) and fees are payable. SE will provide a formula to assist in calculating an estimate of the volume of harvested timber. (See Schedule A.)

2. SALVAGING OF TIMBER

FMA & TRUST FUND AREAS: Exploration company must contact the appropriate forest company to discuss operations and wood salvage.

NON-FMA & TRUST FUND AREAS:

- Timber will only be required to be salvaged if there is an available purchaser, and if a certain amount of wood is harvested. Suggested that benchmark be 60 m³, which is equivalent to 25 - 30 cords of wood in a 100 x 100 m area.

- If above a minimum harvest level, the licensee (exploration company) shall determine if a market for the wood is available. If a market is not present, salvage requirements may be waived.
- Methods of disposing of non-salvaged wood will be identified in permit.
- It is the permittee's responsibility to complete and sign the Forest Product Permit and return it to SE at the completion of program or expiry of permit. This may be attached to the Program Closure Report submitted to SE.
- SE is to be advised of the quantity and locations of salvaged timber as soon as timber harvesting is complete.

3. DUES AND FEES

- Dues are equivalent to royalties; also referred to as stumpage fees.
- Fees include permit fees and Forest Management Fees (reforestation, planning related).
- Dues and fees are paid on "merchantable timber."
- Dues and Forest Management Fees must be paid on merchantable timber that is cut, damaged or destroyed as a result of the mineral exploration operation. Dues may be waived for certain circumstances at the discretion of the Forest Services Branch, SE, forest management fees cannot be waived.

(A) Royalties/Dues

FMA & TRUST FUND AREAS: Dues are paid to the Crown in the amount defined in the Regulations.

NON-FMA & TRUST FUND AREAS: Dues are paid to the Crown in the amount defined in the Regulations.

The Regulations provide for two practical instances where royalties can be waived or reduced:

- Timber that is burned, dry, dead, down, diseased or otherwise damaged. *This wood may have a salvage value in the first few years after a burn or infestation.*
- Where the licensee is prepared to conduct renewal/reforestation activities beyond what is required in the license/permit.

Where a licensee conducts renewal practices to a higher standard than is required pursuant to the terms of the license, timber dues may be reduced or waived.

(B) Fees:

FMA & TRUST FUND AREAS: Forest Management Fees are set out in the FMA Agreement. The fees are submitted to the Crown (Environment) and deposited into a Trust Fund.

NON-FMA & TRUST FUND AREAS: The Forest Management fee is set out by regulation. The regulations currently provide no exceptions to paying the forest management fee. Fees are submitted to the Crown (Environment).

Authority

The Forest Resources Management Act and Regulations

Requirements

1. Line cutting exploration requirements are captured in BMP-004, Reconnaissance.
2. Unless other methods are otherwise approved, hand clearing must be done:
 - a) within 100 meters of water;
 - b) through steep or unstable terrain
 - c) or areas as directed by the contact (e.g. through protected areas, specially designated areas, etc.

General Clearing Requirements:

1. The applicant must determine the volume of timber harvested during clearing operations. This can be done by either:
 - a) Measuring the length and width of the total clearing (excluding lake crossings) and applying averaged formula 1. *
 - b) Carrying out a timber assessment (timber types, densities, volumes, quality, size, etc.) of harvested trees, or
 - c) A combination of measuring the length and width of the clearing in productive forest areas and applying averaged formula 2, and a timber assessment.

*Formulas 1 and 2 are presented in the Schedule A attached to this BMP. Note: averaged formula 1 has a lower volume per ha than averaged formula 2.

2. Any clearing of vegetation should be kept to a minimum.
3. To minimize soil disturbance, clearing with heavy machinery should be limited to frozen or dry and stable ground conditions unless low impact equipment is utilized as authorized by SE.
4. When clearing, the organic mat should be preserved where possible. Mineral soils should not be exposed if stripping is not required for the program.
5. To limit the number of trees cut, utilize existing roads, trails and cut lines. Where possible, avoid areas covered by standing timber, and regeneration areas.
6. Leaning trees should be cut and removed where they pose a safety hazard to workers.

7. Existing trails and traplines are not to be blocked.
8. If required for future reclamation purposes, slash and unsalvaged timber is to be properly managed. See BMP-007 (Reclamation).

COMMENT ON BMP FOREST CLEARING:

While recognizing the existing regulatory requirements, Forest Sub-Committee members endorse the following:

"Amendments to *The Forest Resources Management Regulations* that would exempt mineral exploration activities from paying fees and dues related to the non-commercial and incidental harvesting of timber are required." (Amendments to s13(1);17, and/or, 76)

Contact

Saskatchewan Environment

SCHEDULE A.

Data for Harvested Timber Volume Calculations

1	2	3	4	5
Forest products class	m ³ per ha for productive area only (<i>Formula 2</i>)	m ³ per ha for total area (<i>Formula 1</i>)	Dues Rate per m ³	Forest Management Fees per m ³
S1*	28.6	18.9	\$6.12*	\$5.20
S2	30.9	20.4	\$0.75	\$5.20
H1	1.2	0.8	\$6.00	\$0.50
H2	2.2	1.4	\$0.75	\$0.50
H3	2.5	1.7	\$1.00	\$0.50
H4	15.5	10.2	\$0.50	\$0.50

* The dues rate for Class S1 changes each quarter of the year, \$6.12 is the rate for April 1,2004 to June 30, 2004. The rate cannot go below \$2.00 and has been as high as \$8.32.

The volume associated with a trail can be calculated as follows:

- 1) Calculate the total area in hectares (ha) - total length of trail (meters) X width of trail (meters) = square meters of trail; convert square meters to hectares (ha)
- 2) Calculate the volume of forest products listed in Forest Product Class (Column 1) - ha X m³ per ha for total area (column 3) = m³
- 3) Calculate the amount of dues owing for each Forest Product Class (Column 1) - m³ X dues rate (Column 4) = \$ of dues
- 4) Calculate the amount of fees owing for each Forest Product Class (Column 1) - m³ X fees rate (Column 5) = \$ of fees
- 5) Calculate total amount – all dues for each Forest Product Class + all fees for each forest products class = total \$ to be paid
- 6) * Note: Do not include the portions of trail that cross water bodies (winter work).

Example: Trail 1km in length that is 10m wide using data for total area (formula 1).

Dues: 1000m X 10m = 10,000sq.m which is 1 hectare

Forest Products Class **S1** – 1ha X 18.9 m³/ ha = 18.9 m³
S1 dues rate \$6.12/m³ X 18.9 m³ = \$115.67
 Forest Products Class **S2** – 1ha X 20.4 m³/ ha = 20.4 m³
S2 dues rate \$0.75/m³ X 20.4 m³ = \$15.30
 Forest Products Class **H1** – 1ha X 0.8m³/ha = 0.8m³
H1 dues rate \$6.00/m³ X 0.8m³ = \$4.80
 Forest Products Class **H2** – 1ha X 1.4m³/ha = 1.4m³
H2 dues rate \$0.75/m³ X 1.4m³ = \$1.05
 Forest Products Class **H3** – 1ha X 1.7 m³/ha = 1.7m³
H3 dues rate \$1.00/m³ X 1.7m³ = \$1.70
 Forest Products Class **H4** – 1ha X 10.2m³/ha = 10.2m³
H4 dues rate \$0.50/m³ X 10.2m³ = \$5.10
Total dues \$115.67+\$15.30+\$4.80+\$1.05+\$1.70+\$5.10 = \$143.62³

Fees: **S1** fees rate \$5.20/m³ X 18.9 m³ = \$98.28
S2 fees rate \$5.20/ m³ X 20.4 m³ = \$106.08
H1 fees rate \$0.50/ m³ X 0.8 m³ = \$0.40
H2 fees rate \$0.50 / m³X 1.4 m³ = \$0.70
H3 fees rate \$0.50/ m³ X 1.7m³ = \$0.85
H4 fees rate \$0.50/m³ X 10.2m³ = \$5.10
Total fees \$98.28 + \$106.08 + \$0.40 + \$0.70 + \$0.85 + \$5.10 = \$211.73

Total owing for 1 ha of trail – dues \$143.62 + fees \$211.73 = \$355.35

Definitions:

- S1 - Softwood (spruce, pine, etc.) greater than or equal to 14 cm in diameter
- S2 - Softwood less than 14 cm in diameter
- H1 - All ash, birch, elm and maple greater than or equal to 14 cm in diameter
- H2 - All ash, birch, elm and maple less than 14 cm in diameter
- H3 - All other hardwoods (aspen, etc.) greater than or equal to 22 cm. in diameter
- H4 - All other hardwoods less than 22 cm in diameter

Best Management Practice (BMP-004) Temporary Work Camps

General Introduction

Temporary work camps are a necessary part of mineral exploration. Camps are to be established in an environmentally friendly manner with consideration given to the protection of natural resources.

Background

Temporary work camps should utilize previously cleared areas or natural openings, in order to limit the amount of new clearing.

Typically, temporary work camps *will not be authorized* in the following locations:

- a. archeological, historical, vertebrate paleontological or other heritage property sites as defined in *The Heritage Property Act* except by approval of the Department responsible for the administration of the Act;
- b. areas of scientific concern or potential environmentally sensitive areas, such as nesting sites of endangered species or locations supporting unique vegetation.
- c. locations on ice covered waters
- d. areas that are restricted under other SE policies, land use plans or municipal zoning.

To minimize land-use conflicts, SE will need to provide additional approval for camp located within the following areas:

- a. 1.6 kilometers from the center line of designated canoe routes;
- b. 1.6 kilometers from any settlement, surface dispositions or titled property;
- c. 1.6 kilometers from waterfalls, rapids or other designated areas;
- d. 1.6 kilometers from sandy beaches over 20 metres long with public development potential; and
- e. 100 meters from the centerline of an existing public road or the high water mark of any water body or water course (both SE and DFO approval required).

Class A camp is a camp with in excess of 500 man days

Class B camp is a camp with from 100 to 500 man days

Class C camp is a camp with up to 100 man days

Man-days are those days accumulated in one fiscal year from April 1 to March 31.

Authority

Provincial Lands Act and Regulations

Forest Resources Management Act and Regulations

Public Health Act and Regulations

Heritage Property Act
The Hazardous Substances and Waste Dangerous Goods Regulations
The Mineral Industry Environmental Protection Regulations
The Prairie and Forest Fire Act, 1982
The Clean Air Act and Regulations
Provincial Itinerant Use Accommodation Standards
Health Hazard Regulations
Occupational Health and Safety Act & Regulations
Public Eating Establishment Standards
Public Eating Establishment Regulations
Plumbing and Drainage Permit/Application
Private Sewage Disposal Guidelines

Requirements

1. General Camp Requirements

- a. A temporary work camp cannot be established without authorization from Saskatchewan Environment (SE).
- b. A site plan indicating location of buildings, water source and sewage disposal must be submitted to and approved by Public Health.
- c. The application must include the location of the camp, area to be used, number of occupants, length of camp life and details of intended facilities.
- d. The method used to service the camp must be included in the application (see BMP-007 for Access by roads). If docks are required for servicing by boat or airplane then permission must be obtained from Fisheries and Oceans Canada.
- e. A temporary work camp shall at all times be kept in a safe, neat, and sanitary condition.
- f. For the storage and handling of hazardous substances reference BMP-005.
- g. Temporary Work Camp Permit holders are responsible for the actions of their subcontractors, agents and employees.
- h. The establishment and operation of a temporary work camp shall minimize surface disturbance and environmental impacts (see BMP-003 Clearing Operations).
- i. All camp buildings must have chemical fire extinguishers.
- j. A temporary work camp shall be so situated and operated that it will not pollute surface water or groundwater.

- k. When camps are being decommissioned, all structures/improvements must be removed from the site, including septic systems and latrines.
 - l. All water supply sources and methods of withdrawal must be identified in the application.
 - m. All water wells must be approved, capped and decommissioned on the authority of Sask Watershed Authority.
 - n. The campsite must be reclaimed according to the BMP-013 (Restoration).
2. Domestic Waste Disposal Requirements

If utilizing existing solid waste or liquid waste licensed facilities, authorization should be obtained from the local jurisdiction.

Liquid Waste

- a. Disposal of liquid waste arising from food preparation, laundry, bath and latrines must not pollute groundwater or surface water. Disposal methods will depend on:
 - i. type of waste
 - ii. volume of waste
 - iii. soil characteristics
 - iv. water table depth
 - v. distance from water wells, water bodies or watercourses, and other dwellings or facilities.
- b. The preferred method of disposal is to dispose of liquid waste utilizing the services of a licensed septic waste hauler to an approved septic/sewage disposal site. For camps in remote areas or small, short-term camps, pit latrines and sewage pits/sumps may be used for disposal of liquid waste. The disposal method must be identified in the application.
- c. Liquid waste storage must be in accordance with Saskatchewan Health requirements.
- d. Any sump or pit used for storing liquid waste must be a minimum of 100 metres back from the high water mark of any water body or watercourse; 7.5 metres away from occupied buildings; and 15 metres away from drilled wells. There must be a minimum of 2 metres of isolated distance between the bottom of the pit and the water table where the separation material is clay and 5 metres where it is sand.
- e. Larger camps (Class A and B) and those with continual operating life of more than one season, must dispose of all liquid wastes, including sanitary sewage and waste water from showers, laundry kitchens and cafeterias, in a disposal system

approved by Saskatchewan Health.

- f. Any liquid waste containing heavy metals, toxic materials, flammable, explosive or radioactive substances must not be discharged to domestic liquid waste systems. Such wastes must comply with the applicable regulations, including *The Hazardous Substances and Waste Dangerous Goods Regulations* and *The Mineral Industry Environmental Protection Regulations*.

Solid Waste

- a. The proponent is responsible to remove all solid wastes, from the camp to an approved waste disposal site.
- b. No burying or burning of wastes is permitted.
- c. In remote or isolated areas only, the burning of wood, paper products and food wastes may be approved by the SE contact. All burning must be done in a controlled manner and supervised (see BMP-006 Fire Prevention). Burning of some materials such as plastic, used oil, etc. will not be allowed.
- d. Large non-combustible objects, including discarded equipment and empty fuel containers must be removed to an authorized disposal site.
- e. For storage, locate solid waste in covered, leak proof containers.
- f. Food waste should be kept in covered, fly/animal proof (e.g. bear proof garbage can) containers until removed to an approved waste disposal site.

Contacts

Saskatchewan Environment
Public Health
Department of Fisheries and Oceans

Best Management Practice (BMP-005) Hazardous Substances and Waste Dangerous Goods (HSWDG)

General Introduction

Planning the proper storage and handling of HSWDG products and spill mitigation plans will assist the applicant in avoiding potential environmental issues that may occur during the program.

Background

This BMP does not include the handling of solid and liquid domestic waste. For handling of these materials, please see BMP-004 (Temporary work camps). Radioactive materials are regulated pursuant to the *Atomic Energy Control Act (Canada)*.

The following are examples of materials as characterized under different headings in the HSWDG Regulations.

Non-hazardous Substances	Tires, culverts, core boxes, untreated wood.
Industrial Hazardous Substances	Petroleum products, petroleum containers and filters, pesticides, paint, acids and bases, inorganic substances such as ammonia and fertilizers, metals such as lead.
Acute Hazardous Substances	Chlorine, fluorine, and potassium.
Environmentally Persistent or Chronic Hazardous Substances	Reactive or toxic substance such as mercury, some drilling additives, lead, arsenic and cyanide.
Waste Dangerous Goods	Used oil, used oil filters, and waste antifreeze

Storage tanks– are receptacles of greater than 205 liters capacity

Containers – are receptacles of 205 liters or less

Check website www.saskwastereduction.ca for locations of recycling and disposal depots or contact the SE contact.

The applicant should be familiar with the requirements under the *Transportation of Dangerous Goods Act*. Check this website for information sheets on hazardous materials, www.msdssearch.com/DBLinksN.htm .

Authority

Transportation of Dangerous Goods Act-Federal
Hazardous Substances and Waste Dangerous Goods Regulations
Environmental Spill Control Regulations
Environmental Management Protection Act, 2002
Environmental Emergency Regulations-Federal

Requirements

1. HSWDG Management

1. The applicant must indicate:
 - a. all HSWDG receptacles stored on site,
 - b. the type of product stored,
 - c. the volume of each,
 - d. the location of each storage site.
2. The applicant must indicate whether the tanks are portable (skids, trailer, etc.) or fixed.
3. There may be requirements under HSWDG regulations to register and approve the storage facility based on the volumes, products and storage receptacles.
4. Applicants should follow the storage and handling procedures listed below for all volumes to minimize environmental risks and meet HSWDG regulation requirements.
 - a. The soil type, terrain, ground water table, surface water and water wells in the storage area(s) must be identified and assessed prior to site selection in order to limit the extent of contamination from any possible spills.
 - b. Locate all tanks (including slip tanks, mobile, and permanent tanks) away from traffic-congested areas. HSWDG storage must be located a minimum of 100 meters from any water body or watercourse. Occupational Health & Safety (OH&S) legislation requires that fuel must be stored a minimum of 6 meters from any building and there must be a 30-meter minimum clearance from the fuel dock to sleeping accommodations. The Fire Commissioners Office requires fire extinguishers to be on site at fueling areas.
 - c. Inspect and maintain all storage tanks. There should be no signs of corrosion and tanks must be painted, if applicable.
 - d. Each fuel storage tank should have two shut-off valves, one of which may be the handle.
 - e. Unless otherwise approved, secondary containment of all HSWDG materials is required (e.g. an enviro-tank, a dyke lined with an impermeable membrane resistant to the product being stored, and spill containment trays). Construction requirements for secondary containment are available from SE contacts.
 - f. Secondary containment is required for 10% of the product volume plus the product volume size of the largest container.
 - g. Use drip pans and/or nozzle holders to contain drips or spills. Nozzles should be mounted above the drip catchments.
 - h. Ensure slip tanks (tidy tanks) are secured into the vehicle. The intent is that in the event of a roll over, a full slip tank will stay secured in the truck.
 - i. Inspect fuel pumps and other equipment for worn hoses and leaks. Repair equipment when required.

- j. Companies are required to have spill kits on site. A large spill kit has an absorbent capacity of approximately 120 liters and a small spill kit has an absorbent capacity of approximately 20 liters.
 - k. Any water intake equipment must have secondary containment/spill kits for both the pump and pump fuel supply.
 - l. Refueling on ice or water, or within 100 m of water, is permitted provided secondary containment of the tank and spill kits are used. HSWDG's are to be stored 100 meters from a waterbody or watercourse when not required for fueling equipment.
 - m. Toxic chemicals must be stored securely.
 - n. Neutralizing materials must be stored adjacent to acids.
 - o. Lubricants and oily substances should be removed and properly disposed of, prior to sump water disposal.
5. New oil containers must be taken to a receiver and not discarded in landfills.
 6. Oil filters are a waste dangerous good and must not be discarded in landfills. Place in a drum and transport to an approved receiving site. Used oil consignees will generally also take filters and oil containers.
 7. Batteries and any waste dangerous goods other than waste oil or antifreeze may be stored on site up to 100 kilograms combined aggregate.
 8. Used oil or waste antifreeze may be stored on site in containers (up to aggregate capacity of 500 liters). Disposal must be to an approved receiver.
 9. Any use of, storage of, or transportation of explosives requires Federal and Provincial permits.

2. Spill Contingency Planning

1. The applicant is required to have appropriate equipment/absorbent material on hand for the cleanup, containment and storage of contaminated materials and this equipment/absorbent material shall be readily available in areas where spills could potentially occur.
2. SE requires all spills of HSWDG products greater than 5 liters or any spills within 100 meters of a water body or watercourse are reported to the appropriate SE contact and included in the closure report.
3. According to *The Environmental Spill Control Regulations*, all reportable spills must be directed to SE as soon as possible. The applicant must follow any clean up instructions received. Within seven days of being reported to the spill line, a written report must be submitted to SE containing information about the spill and remedial action taken. *The 24-hour emergency telephone number is: 1-800-667-7525*. This system automatically notifies Environment Canada if the spill has

occurred in a waterbody or watercourse or spills that trigger the *Environmental Emergency Regulations*.

3. A reportable spill under the *Environmental Spill Control Regulations* is defined as:

Product	Volume
Gasoline, Diesel Fuel, Bunker Oil, Kerosene, Aviation Fuel, Stove Oil	100 liters or more
Lubricating Oils, Other (grease)	50 liters or more
Domestic liquid waste	300 liters or more

Environmental Emergency Regulations can be found at <http://canadagazette.gc.ca> or <http://www.ec.gc.ca/CEPARRegistry>

4. If a spill occurs, company personnel must take the following steps:
- prevent further spillage;
 - contain the spilled materials;
 - minimize the effects of the spill; and
 - restore the area affected as nearly as possible to its previous condition.
5. SE may request soil samples from the contaminated site and analysis of the samples following clean up activities.
6. HSWDG contaminated soils and clean up materials must be properly stored on site and then sent to an appropriate or approved disposal facility.
7. All spills of any quantity are to be documented in the closure report by recording the date, location, type of spill, reason for spill, and cleanup action taken.
8. It is important to note that in all instances of spills or in the discharge of pollutants *The Environmental Spill Control Regulations* and/or *The Environmental Management and Protection Act, 2002* are the applicable legislation, whether or not HSWDG regulations apply.

Contacts

Saskatchewan Environment
 Saskatchewan Labour
 Transport Canada
 Environment Canada

Best Management Practice (BMP-006) Fire Prevention and Control

General Introduction

Mineral exploration, as with any activity in the bush, has the potential to start a forest fire or have program operations affected by a forest fire or fire suppression activities. To reduce potential liability concerns, the mineral industry must take every precaution to prevent a forest fire or to suppress a fire if one originates from their activities.

Background

For safety and fire suppression reasons, Saskatchewan Environment (SE) may need to contact the applicant without delay to know where the field crews and equipment are located. In extreme cases, SE may need to order crews out of the area or conscript equipment and manpower for fire suppression support.

Authority:

The Prairie and Forest Fires Act

The Forest Resources Management Act and Regulations

The Clean Air Regulations

Requirements

1. The Provincial Forest covers large sections of the Province. Any burning in or within 4.5 kilometers of The Provincial Forest (as defined under Section 12 of the *Forest Resources Management Act*) during the fire season, normally April 1st – October 31st unless dates are extended, requires a burning permit. Contact the local SE office to determine if a permit is required.
2. An exemption is made to allow for fires for the cooking of food and for warmth provided it is kept in a controlled manner as per section 18 of *The Prairie and Forest Fires Act*.

As per section 21(3) of *The Prairie and Forest Fires Act*, all operations require fire fighting equipment to be on site in a readily accessible area and serviceable during the fire season. All water packs and pails to be kept full of water during the fire season. This equipment is to only be used for fire fighting.

Tools	Up to 5 people	6 to 10 people	11-20 people
Axes	1	1	2
Pulaski tool (axe/grub hoe combination)	2	4	8
Pails	2	4	8
Shovels	2	4	8
Water Packs & Pumps	1	2	4

3. The following information is to be submitted as part of the program application for mineral exploration activities on Crown lands. This information will be used to assist SE in fire suppression activities.
 - general program schedule.
 - identify any staff with fire fighting training and their training levels.
 - supply radio frequencies, contact phone list, and other communication information for contacting program staff.
 - inventory list of fire fighting equipment on site (e.g. aircraft, dozers, skidders, power units, chain saws, etc.) other than the required fire fighting equipment.
 - emergency response plan in case of a forest fire:
 - program staff assignments and contacts;
 - steps to be taken for initial suppression;
 - steps to be taken to contact SE.
 - identify any known nearby industries, residences, etc.

4. Additional site and equipment requirements:
 - all heavy equipment and fueling sites must have approved and fully charged fire extinguishers installed.
 - all equipment on site must be kept in good operating condition and clean ensuring there is no buildup of combustible materials near manifolds, exhaust systems and mufflers.
 - all fueling sites should be designated and no smoking allowed near fueling sites or while operating equipment.
 - the SE contact may require additional safety precautions specific to any given program.

5. SE must approve the burning of any slash. It is recommended that slash material be used during the reclamation phase of an exploration program. If burning of slash were approved for a specific situation, the following conditions would typically apply:
 - burning shall be restricted to between November 1 and February 28 to take advantage of favourable ground conditions.
 - minimum snowfall of 12 cm is required before burning.
 - slash piles must be located a minimum of 20 m from standing timber and burning must be done in a manner that does not cause damage to any live timber.
 - burning should occur on mineral soil/rock to avoid the risk of ground fires.

- to allow for as clean a burn as possible, all reasonable efforts will be made to keep soil out of the piles
 - only woody material may be burnt
 - all burning subject to the requirements of *The Clean Air Act*
 - the company shall ensure that all piles are completely extinguished by March 31
 - documentation indicating:
 - i. date(s) of ignition,
 - ii. date(s) of verification of extinguished piles,
 - iii. maps with GPS locations illustrating all areas of piles burnt and piles not yet ignited shall be submitted to the SE in the closure report.
6. Camp burning barrels
- All burning must be done in a controlled manner; that is in a burning barrel equipped with a grated top to help prevent the escape of burning ashes and embers.
 - The burning barrel should be located in a clearing, away from potential fire hazards such as trees, shrubs and camp facilities.
 - Fires must always be attended until they are completely out.
 - The burning location must be equipped with fire fighting tools, such as a shovel, a chemical fire extinguisher and a full water pack.

Contacts:

Saskatchewan Environment

Toll Free Fire Hot Line 1-800-667-9660 - to report a forest fire.

Web Site www.se.gov.sk.ca/fire - for fire hazard ratings and active forest fire information.

Saskatchewan Labour – Fire Commissioner’s Office

Best Management Practice (BMP-007)

Access

General Introduction

Roads and trails are one of the most visible impacts of exploration activities. They open up areas to other resource users that may not have been accessible previously.

Background

Trails and roads create more controversy than other mineral exploration activities. Exploration companies must be allowed to access their claim areas. It is SE's responsibility to ensure that the creation of the access is done in an environmentally sound manner.

All potential routes are to be considered and proposed during route selection. Each route will be assessed according to its ability to meet the goals and objectives of both the applicant and SE. Applicants should review options and consider future operations to avoid development of a network of access trails.

The applicant should consider the impact on wildlife populations from access into an area (program timing to protect critical wildlife breeding, nesting or survival periods, the destruction or fragmentation of wildlife habitat, etc.).

New access development may be prohibited where reasonable access already exists.

Where applicable, the applicant should consider access utilizing frozen water bodies or courses in order to minimize the impacts on terrestrial environments.

Discretion in development of the road or trail may be allowed as long as the development addresses the concerns of the sensitive nature for the area.

Areas to be avoided if possible:

- areas of critical or sensitive wildlife habitat (e.g. riparian zones, etc.).
- areas where activities will result in unstable soil or erosion problems.
- sites of religious, archeological, historic, aesthetic, paleontological, natural or cultural significance.
- legislated protected areas (game preserves, Provincial Parks and protected areas, Representative Area Network lands, land use planning areas, wildlife lands, ecological reserves, etc.)

Authority

Provincial Lands Act

Forest Resources Management Act and Regulations

Requirements

1. For clearing operations, refer to BMP-003 (Clearing Operations).
2. The applicant will identify potential constraints to trail development, such as: construction practices, land use planning, seasonal timing, community issues, etc.
3. Areas requiring access restrictions will require specific mitigation actions such as: gates, berms, barricades, roll back, etc.
4. Closure or reclamation of roads and trails must be part of the reclamation plan. See BMP-013 (Restoration).
5. The construction schedule must be provided prior to route selection. Seasonal restrictions may apply.
6. The applicant must identify other known resource users who may be accessing the trail or are impacted by trail development.
7. Life expectancy of all access routes should be identified in the application to allow for better access management for the area.
8. Fills and cuts resulting in damage to the ground surface should be kept to a minimum.
9. For winter access, the applicant should consider snow/ice in lieu of soil for cuts and fills.
10. If fill materials (sand, gravel, till, etc.) are required for trail improvement, a separate authorization is required from SE.
11. Vehicles and equipment must be confined to the identified access right of way unless otherwise approved.
12. Trail centerlines should be flagged prior to trail construction to avoid unforeseen problems.
13. Activities should occur on dry, stable, or frozen ground conditions.
14. While using undeveloped access routes during wet conditions, all efforts must be made to minimize rutting of the ground surface.
15. For access using water bodies or watercourses, see BMP-009 (Water Crossings).
16. When crossing bogs, muskegs or possible wet areas, the ground must be frozen sufficiently to support equipment. If frozen ground conditions do not exist, alternate

and approved methods, by the SE contact, must be used to prevent rutting of the ground surface (e.g. matting, corduroy, planks, etc.).

17. Access trail routes and widths must be identified in the application and will be limited to:
 - a. the equipment size,
 - b. method of construction
 - c. the intended purpose of the trail
 - d. SE approval.
18. An easement application or lease application must be submitted and approved for any long-term development of a roadway.
19. When access onto a Provincial Road or Highways is required, construction of an approach must be approved by the Department of Highways and Transportation.

Contacts

Saskatchewan Environment
Department of Highways and Transportation

Best Management Practice (BMP-008)

Water Crossings

General Introduction

The constructions of water crossings and of waterbody access points are activities that may have significant impacts on fish and fish habitat. Water crossings are commonly used by the mineral exploration industry to efficiently access program work sites. The impacts will depend on the type of structure used at the crossing, timing of the proposed work and on how the crossings are maintained and operated.

The program impacts may include:

- The destruction or alteration of fish or aquatic habitat through the infilling of watercourses or water bodies;
- The blockage of fish movements;
- The entrainment or impingement of small fish into water intakes; and
- The introduction of deleterious substances, such as fine sediments, into a waterbody or watercourse.

The potential impacts on fish habitat and the surrounding land may be minimized through careful planning of the routes of the access roads and the selection of crossing sites and structures that will have minimal impacts on the water system.

Definitions:

“Waterbody” includes a lake, slough, marsh, wetland or muskeg in which the water exists permanently or intermittently. (Definition is under *The Environmental Management Protection Act, 2002*)

“Watercourse” includes a stream, creek, river, gully, valley floor, drainage ditch or any other channel, including any artificial channel, in which water flows either permanently or intermittently. (Definition from *The Water Regulations, 2002*).

“Fish Bearing Waters” refers to any water body or watercourse that has the potential to support fish or fish habitat. (Definition from the *Fish Habitat Protection Guidelines*).

“Fish” includes parts of fish, shellfish, crustaceans, marine animals, and the eggs, spawn, spat and juvenile stages of fish, shellfish, crustaceans and marine animals. (Definition *Federal Fisheries Act*).

“Fish Habitat” refers to the spawning grounds and nursery, rearing, food supply, over wintering and migration areas on which fish depend directly or indirectly in order to carry out their life processes. (Definition from the *Fish Habitat Protection Guidelines*).

“High Water Mark” refers to the location on the bank that visibly marks the end of terrestrial vegetation and the beginning of effects due to high flows or aquatic vegetation. (Definition from the Fish Habitat Protection Guidelines).

Background

Impacts to the bed, bank, and boundary of any water body or watercourse should be minimized. All mineral exploration activities should be planned and conducted in a manner that minimizes the disturbance to fish and fish habitat. Practices recommended in the *Saskatchewan Environment/DFO Fish Habitat and Protection Guidelines on Road Construction and Water Crossings* should be considered when constructing crossings over fish bearing waters.

In spawning areas, extra precautions may be required during the following spawning periods.

- a) spring spawning- pike, walleye, grayling and sucker, April 15 to June 30;
- b) fall spawning- waterbody trout, cisco and whitefish, September 15 to November 30.

Note The eggs of fall spawning species will be present on the spawning grounds until they hatch in the spring. For all species, the preferred spawning areas are generally shallower portions of waterbodies, river mouths, gravel bars and bays.

Properly planned water crossings and use of frozen water bodies for travel can reduce potential impacts on terrestrial ecosystems. Types of structures used to cross waters may include steel or wooden bridges, culverts, ice/snow bridges or ramps.

If practical, water crossings should be located:

- near the headwaters of watercourses;
- away from waterbody inlets and outlets;
- upstream from barriers to fish passage, such as waterfalls and steep gradients
- away from important fish habitat (such as riffle area, rapids, and areas with gravel/cobble substrates);
- where the approach to the crossing is on a flat, stable slope;
- perpendicular to the watercourse;
- at the location where the watercourse is narrowest (these areas may have fast moving water, thin ice, and may not be the best place to create a crossing);
- where they will accommodate peak flows.

For open water crossings, clear span structures that do not involve any infilling of the watercourse below the high water mark are the preferred type of structure. Infilling of the watercourse below the high water mark is considered a loss of habitat and may require compensation to meet DFO’s No-Net-Loss of fish habitat policy.

Ice/snow bridges are the preferred type of crossing for winter exploration programs.

Authority

The Environmental Management and Protection Act, 2002

The Water Regulations, 2002

Fisheries Act (Federal)

Navigable Waters Protection Act

The Watershed Authority Act

Requirements

1. If alterations are required to any bed, bank or boundary of a watercourse or waterbody, Saskatchewan Environment (SE) is to be contacted.
2. Applicants must contact Fisheries and Oceans Canada (DFO) if they intend to construct any water crossings that may impact fish bearing waters.
3. Applications to Navigable Waters Canada (Transport Canada) are only required for programs that will be utilizing permanent or temporary bridges at water crossings that are determined to be navigable by DFO. Ice and snow bridges will NOT require an application to Navigable Waters Canada.
4. Any program requiring water from a different source for building a crossing requires approval from the Saskatchewan Watershed Authority, SE, and DFO.
5. Crossing construction details required in the application may include (additional information may be necessary for any work where culverts are required):
 - a) the locations (UTM Co-ordinates and Datum) of any water crossing and/or water body access point that will be utilized during the exploration program.
 - b) the type of crossing structure that will be used at each of the locations.
 - c) the type of equipment, that will be used for the construction, placement, and decommissioning of the crossings.
 - d) the timeframe for the construction and removal of the crossing.
 - e) the length and width of any crossing structures (outside of snow or ice bridges) that will be utilized. If required to facilitate the placement of any crossing structures, the area that will be covered by fill material, along with the type and source of fill material, needs to be identified.
 - f) any modifications of the bed, banks, or boundary at the water crossings or access points.
 - g) if constructing ice bridges and/or ice roads, the approximate volume of the pump per minute and the source of the water need to be identified .
 - h) a brief description of the riparian zone and watercourse or water body is to be provided. This description should include the following information:
 - the area (km²) of the watershed up stream from the crossing,
 - the width of the watercourse at each crossing site,

- the types of vegetation (grass, shrubs) that are present on the bank and boundary at each water crossing or access point,
- a description of the slope and stability of the bank at each water crossing or access point,
- photographs of the bank and boundary of the water body or watercourse and upstream and downstream views of the watercourse at each of the crossings locations.

Note For crossings involving the construction of clear span bridges, ice/snow bridges, or waterbody access points using ice and snow, habitat information may be collected in the field, as the crossings are being constructed and included in the closure report. However, for projects that will involve the installation of structures or materials (i.e. fill) below the high water mark, the information will have to be provided and the work approved prior to construction. Photographs of the channel banks and upstream and downstream views of the streams at each of the crossings are essential for reviewing the project.

- i) the mitigation measures that will be employed to stabilize, revegetate and reclaim any disturbed areas resulting from planned crossing activities (see BMP-014 Restoration).
6. During unfrozen conditions, the applicant needs to take steps to reduce surface impacts for crossings over bogs, muskegs, wetlands, etc. As part of the application, specialized low impact equipment, corduroy bridging, or other acceptable and approved methods may be required.
 7. Unless otherwise directed, any vegetation cleared to facilitate the crossing is to be removed away from the water body or watercourse and stored above the high water mark (See BMP-004 Forest Clearing/Harvesting Operations).
 8. Crossings that require installation of culverts that will remain in place during the spring and/or fall spawning seasons will have to be designed to allow for fish passage.
 9. Ice/snow bridging is permitted provided all material is clean and free of debris. Once the Ice/snow Bridge is no longer required, the bridge shall be breached for at least 10% of the bank full width to allow the watercourse to flow naturally during spring thaw.
 10. Equipment operating near any waters shall be properly maintained, in sound mechanical condition and free of any fuel, oil, hydraulic fluid, or coolant leaks.
 11. No cleaning or servicing of equipment is permitted within 100 meters of a waterbody or watercourse. Fueling may take place within this buffer area provided secondary containment of the tank and spill kits are on site (see BMP-006 HSWDG).

12. If required, flooding is permitted to build up ice to a desired thickness provided the intake for the pump is screened, the water source is the same, and the fuel source for the pump has secondary containment (see BMP-006 HSWDG).
13. Any water intake shall be covered with screening material that has a maximum design opening of 2.5 mm. The water velocity at the screened face of the intake shall not exceed 3.8 cm/second. See below for the formula for calculating the effective screen area for the screen that would surround a water intake.

Note: To determine the size of the screen to be placed around the water intake, the formula is:

Effective Screen Area = Open Screen Area / (%Open Area/100).

The Effective Screen Area is the size (area) of the screen placed around the water intake.

The formula is located on page 6 of the *Freshwater Intake End-of-Pipe Fish Screen Guideline*.

The Open Screen Area is determined in Table 2 of the *Freshwater Intake End-of-Pipe Fish Screen Guideline*. Open Screen area is the area of all open spaces on the screen available for the free flow of water.

The % Open Area is determined in Table 3 of the *Freshwater Intake End-of-Pipe Fish Screen Guideline*.

Contact

Fisheries and Oceans Canada
Saskatchewan Environment
Navigable Waters Protection Program (Coast Guard – Transport Canada)
Saskatchewan Watershed Authority

Best Management Practice (BMP-009)

Exploration Trenching and Hydraulic Stripping

General Introduction

Trenching and hydraulic stripping are the most definitive methods for surface exploration, but can cause environmental disturbances, with the potential for contamination of soil and water through exposure of mineral substances.

Background

Environmental impacts can be reduced or avoided with the proper safeguards.

Hydraulic stripping is rarely used as a primary exploration tool, but could be used in conjunction with other exploration activities (e.g. trenching, diamond drilling).

There are two types of trenches.

Overburden trenches are made to check and map the type of bedrock below the overburden. These are very common if heavy equipment (i.e. back hoe) is available.

Bedrock trenches are made to follow up on bedrock mineralization. These require blasting with dynamite and are far less common. While the former are usually backfilled immediately, the latter are usually left open.

SIR accepts trenches (by volume removed) as evidence of assessment work, which is one of the reasons they are not backfilled. Most of the overburden trenches are dug where the ongoing operations require them and the location is not something known in advance.

Authority

Mineral Industry Environmental Protection Regulations
Forest Resources Management Act and Regulations
Provincial Lands Act and Regulations

Requirements

1. Exploration Trenching

- a. SE must approve all trenching activities. Details of the trenching activities must include the dimensions of the trenches and the method of construction. If clearing of forest vegetation is required, see BMP-003 Clearing.
- b. Unless authorized, a minimum 100-metre buffer of undisturbed vegetation must be maintained between the trenches and waterbodies and watercourses.

- c. Unless otherwise approved, all areas stripped of topsoil must be back filled and restored to as near the original contour as possible.
- d. The development of an exploration trench must take into consideration the safety risks associated with entrapment. Trenches must be dug in a manner that allows for easy escape, for both humans and wildlife.
- e. For the use of explosives, see BMP-005 Hazardous Substances and Waste Dangerous Goods.
- f. Topsoil, if present, and material removed from trenches must be stockpiled separately and utilized for site restoration unless otherwise approved.
- g. Material excavated from overburden trenching must be backfilled with the topsoil replaced last.
- h. In the case of uranium exploration, following backfilling, a radiometric survey must be conducted to ensure that the gamma levels (measured at 1 metre from the surface) are reduced to less than 1.0 μ s. When material is found to exceed background levels, then SE must be contacted for review and approval of the handling procedures.
- i. Applicant liabilities, future reclamation costs and future planning should be considered by the applicant when requesting trenches be left open. Note BMP-013 (Restoration).
- j. Trenches are required to be backfilled to the point where there is no safety risk. With adequate justification to SE (safety, scientific, reclamation, etc.), exploration trenches may be allowed to remain in an excavated form once exploration has been completed.
- k. Applicants are to supply GPS coordinates for all trenches in their closure reports.

2. Hydraulic Stripping

- a. All hydraulic stripping operations must be approved prior to initiation. Contact the SE contact regarding projects using hydraulic stripping. Restoration options should be discussed with the mineral exploration contact - refer to BMP-013 (Restoration). If clearing of forest vegetation is required see BMP-003 Clearing.
- b. All hydraulic stripping operations must be approved prior to initiation. Details of the stripping activities must include the dimensions of the area to be affected. If clearing of forest vegetation is required, see BMP-003 Clearing.

- c. Unless otherwise authorized, a minimum 100-metre buffer of undisturbed vegetation must be maintained between stripping operations and any water body or watercourse.
- d. Restoration options should be discussed with the mineral exploration contact - refer to BMP-013 (Restoration).

Contacts

Saskatchewan Environment
Saskatchewan Labour
Transport Canada
Natural Resources Canada

Best Management Practice (BMP-010)

Drilling on Land

General Introduction

Drilling is one of the most definitive and common methods for surface exploration.

Background

A properly planned and managed drilling program reduces the risk of impacting the environment.

The following requirements apply to shield areas of the province. Drilling in the Western Sedimentary Basin requires additional precautions because of the potential of encountering oil and gas concentrations.

Clearing for drilling is dependent on the size of the drill rig used.

Authorization:

Mineral Industry Environmental Protection Regulations
Forest Resources Management Act and Regulations
The Oil and Gas Conservation Regulations, 1985

Requirements:

1. If drilling is required on ice-covered waters, see BMP-011 (Drilling on Ice).
2. The number of drill holes, locations, and drilling program details must be identified in the application.
3. Applicants wishing to conduct activities within 100 meters of a water body or watercourse must also contact *Fisheries and Oceans Canada* for their review.
4. Any program requiring water for drilling activities (except water from municipal or private sources) requires approval from the Saskatchewan Watershed Authority, Saskatchewan Environment and Fisheries and Oceans Canada. See BMP-008 (Water Crossings).
5. Clearing should be kept to a minimum size and constructed to facilitate drilling operations. A standard drill site should not exceed 20 meters by 20 meters (or 400 square meters) unless otherwise approved. See BMP-003 (Clearing) for further clearing requirements.
6. A minimum 100-meters must be maintained between the drill site clearing and any water body or watercourse unless previously authorized by Saskatchewan

Environment (SE) and DFO. For drilling activities within 100m of a water body or watercourse, the applicant must follow the procedures outlined in BMP-011 (Drilling on Ice).

7. For drill sites that are not level, the first consideration should be given to leveling methods other than soil stripping (blocking, ice pads, etc.) and site relocation. If not possible, soil stripping should be minimized.
8. If soil stripping is required, soil horizons are to be removed and stored separately at the edge of the clearing.
9. Slash material is to be stockpiled at the edge of the clearing and utilized for reclamation of the site. See BMP-013 (Restoration).
10. For HQ (<2.5 inches or <63.5 mm) and smaller diameter drill holes in remote locations drilling effluent shall be contained, in sumps, containers, or natural depressions located as close to the drill site as possible, unless otherwise approved.
11. For larger diameter holes (> 2.5 inches or > 63.5mm) or areas of road access by trucks, sumps or tanks are required unless otherwise approved.
12. Where possible all efforts shall be used to prevent drill mud, return water, and cuttings (sludge) from running uncontrolled from the site or to within 100 meters of a water body or watercourse. Appropriate erosion control measures may need to be implemented.
13. The applicant must identify in the application any drilling additives that will be used in the program.
14. Wherever possible biodegradable mud and non-toxic additives should be used.
15. An adequate closed circuit system must be utilized for potentially harmful drilling mud and other additives.
16. Drill mud solids or cuttings with a uranium concentration greater than 0.05 per cent are to be collected and then disposed of down the drill hole and sealed.
17. Noise abatement devices including mufflers and shrouding are to be used near populated areas.
18. Upon completion of the program, exposed drill casings are to be removed or cut off at or below the surface of the ground, unless otherwise approved.
19. Any drill hole that encounters mineralization with a uranium content greater than 1.0% over a length > 1 meter, and with a meter-percent concentration > 5.0, will be

sealed by grouting over the entire length of the mineralization zone and not less than 10 meters above or below each mineralization zone.

20. All artesian drill holes must be reported to the SE contact within 30 days of its discovery. All artesian drill holes must be sealed to prevent discharge to the environment.
21. Reclamation of the drill site must follow procedures outlined in BMP-013 (Restoration).
22. Companies wishing to drill in the Western Canada Sedimentary Basin are required to contact the Mines Branch of Saskatchewan Industry and Resources (SIR) prior to drilling. SIR will advise on any precautions that are required.

Contacts:

Saskatchewan Environment
Fisheries and Oceans Canada
Saskatchewan Watershed Authority
Mines Branch, SIR

Best Management Practice (BMP-011)

Drilling on Ice

General Introduction:

Many exploration programs involve drilling on ice in the search for mineral deposits. Because potential risks increase from drilling on ice, special attention is given to all drilling phases to prevent or minimize adverse impacts to the environment. Operations may vary between drill rigs or even between holes as situations demand; however, decisions must reflect the requirements outlined in this guideline to reduce potential impacts to the aquatic ecosystem. This guideline does not apply to land-based drilling programs (see BMP-010).

Background:

The following information is provided to describe the various precautionary steps taken to protect the environment when drilling on ice.

Description of a Diamond Drill

Diamond drills come in a variety of shapes and sizes. Although there are a number of different sizes, manufacturers, and types of drills they generally adhere to a few simple rules. Diamond drills are almost always primarily powered by a diesel engine. All drills have at least some secondary drive mechanisms that are hydraulic. Typically drill rigs are small, about the size of a small recreational vehicle. The drill is transported to the site on a low bed tractor-trailer and is moved around the site using a dozer/skidder. The drill pipe or “rod “ will have a diameter of anywhere from five inches to as small as two inches. Drills are capable of drilling to 300 meters or more, depending on the size of the drill and drill rod string used.

Drilling on ice goes through three basic phases: setting up, drilling, and tearing down.

All three of these operations are outlined in detail below:

Setting Up

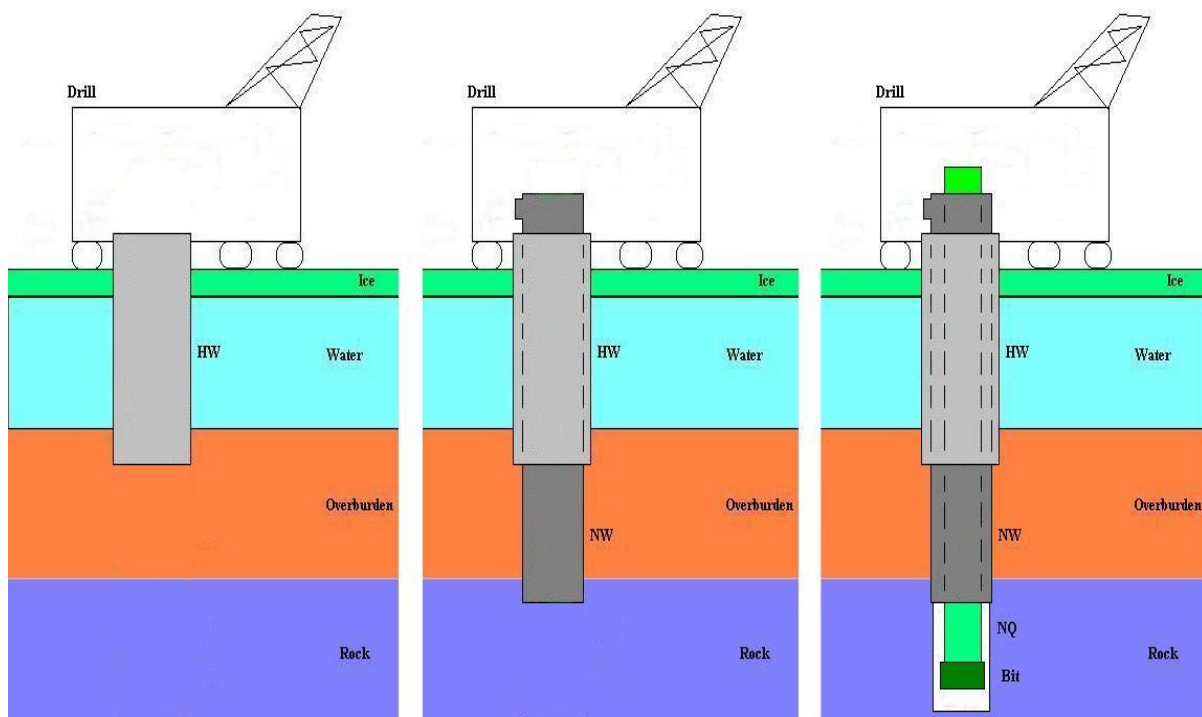
There must be sufficient ice to support the weight of the drill rig and associated equipment during transportation to the drilling location and when operating on the drill site. If insufficient ice is present, the ice is commonly built up with a series of local floods. The drill is supported on untreated timbers to distribute its weight over the ice and to help level the rig. Some drills are relatively light and need to be stabilized by using ice screws or freezing in anchors. Associated drilling equipment, which includes: drill rods, pumps, mixing tanks, and mechanical support equipment, is brought to the site and usually stored on sleds. Fuel and petroleum products necessary for maintenance and operation are temporarily brought to the drill site when required.

Drilling

The first step in drilling is “casing” the hole. This means sealing the hole from bedrock to surface using a large diameter pipe or “rod”. This is a necessary step to ensure that the hole can be located again if any subsequent drill rods need to be removed during the operation. When casing the hole, one factor to contend with may be the depth of the water, or the distance between the drill and something solid. If the water is deep, the drillers will drop their largest rods first (rod size referred to as HW in *Figure 1*). The HW rod will be pushed and turned as far as it will go into the lake bottom manually and then anchored to the drill. Some disturbance of lake bottom sediments will result from this initial stage, however it is minimal and localized. If the lake bottom is bedrock there will be virtually no disturbance at all. If however consolidated sediments exist then some disturbance to organic matter at the bottom of the lake should be expected.

If the HW encounters bedrock then the next smallest size casing referred to as NW will be lowered inside the HW. The NW rod will be drilled into the rock to form a seal between the rock at the bottom of the lake and the drill at the surface. Once the NW rod is in place the next smaller “NQ” rods can be lowered into the hole.

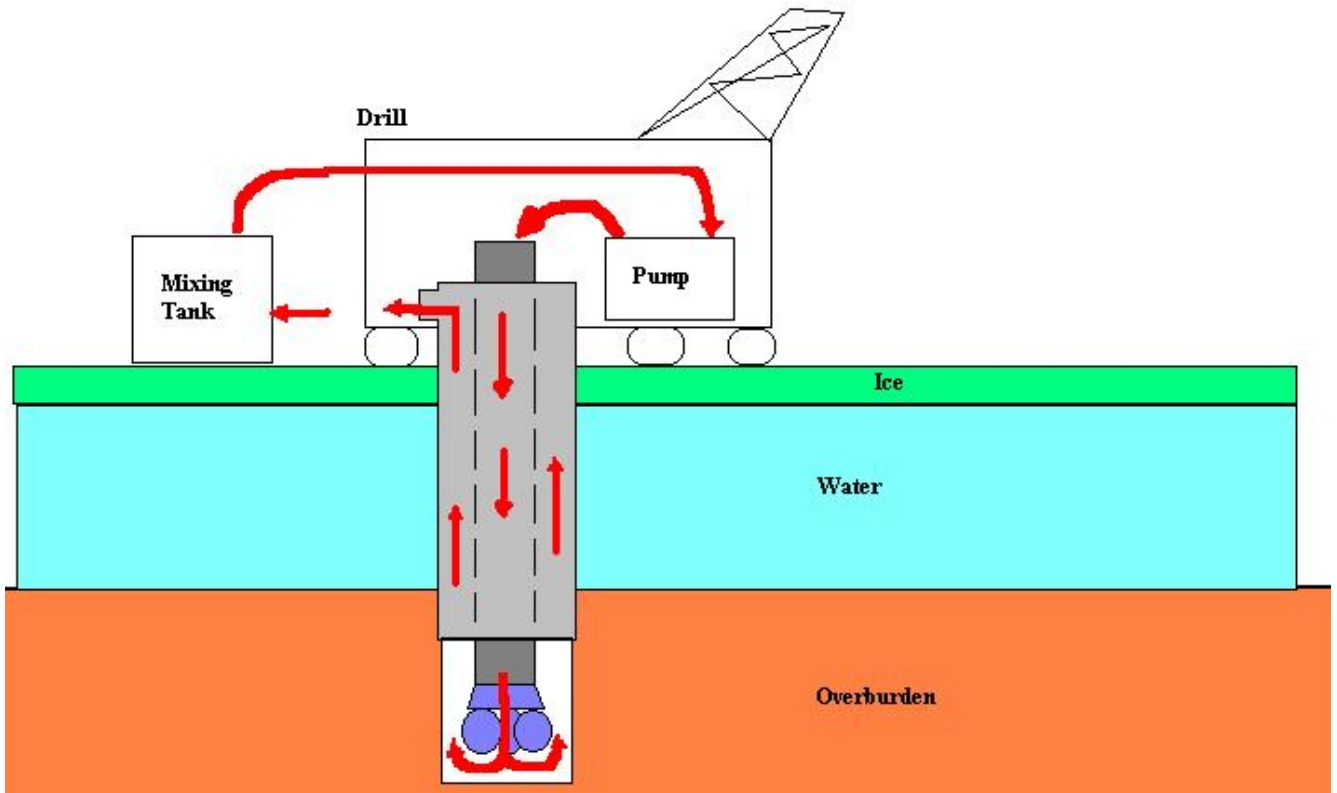
Figure 1. Setting Casing



If the NW rod doesn't hit bedrock when it is initially lowered into the hole, it will commence hollow core drilling through the lake sediment or “overburden”. If the overburden is deep, or the drilling is difficult, then the drillers will probably switch to a type of drill bit called a tricone. Tricones do not hollow core drill; instead they simply grind their way through everything they encounter. Triconing produces a lot of sand and

silt and this abrasive material must be removed from the bottom of the hole or it will plug up the tricone and stop the drilling. Because this material is very coarse and heavy, drillers will commonly add a substance called bentonite to the drilling water to float the coarse sand away from the tricone and out the top of the hole. Mixing bentonite with water forms a thick slurry that is able to float out the coarse sand produced by the tricone, when pumped down with enough pressure. This drilling mixture is pumped down through the rods, out through the tricone, back up the outside of the hole into the HW rod, and thus back to the surface. When the bentonite reaches the surface it is contained in a large mixing tank, likely the same tank that was used to mix it in the first place, where the coarse sand can settle. The bentonite is then reused or re-circulated back down through the hole (see Figure 2). After the NW rods are sealed with the bedrock, the hole is considered “cased”. Once the hole is cased the next step is the actual drilling. For this process, the drillers use the next smaller size rods called NQ.

Figure 2 Re-circulation During Triconing



“Coring” is the process by which rock is extracted using a hollow bit drill (see Figure 3) Coring is achieved by the drill supplying a great deal of pressure and a high speed rotation. This process generates heat so drilling fluid must be circulated through the bit to keep it from melting. In most cases water will suffice as a drill fluid, but in some cases additives must be used for additional reduction in friction and/or better cooling. If water

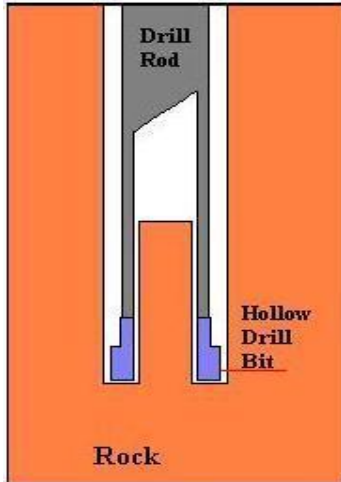


Figure 3. Coring

is used it will be pumped directly from the lake down the hole. If additives are necessary, they are mixed and contained in tanks before pumping the mixture down the hole.

Water or drill fluid is pumped down the hole, through the bit, and back up the outside of the NQ rod, but because the hole is sealed it returns to the surface inside the NW casing (see Figure 4). While coring, the drill fluids are under pressure forcing the “cuttings” (a gritty mud from the bit cutting the rock) away from the bit and out the top of the casing. This drill fluid full of cuttings coming out the top of the hole is called the “return”. When this return fluid reaches the surface it is run through a filter called a Polydrill filter. This filter separates out the cuttings and packs them in a cylindrical bag for disposal. The drill fluids are then pumped back down the hole or re-circulated (see Figure 5).

Figure 4. Circulation of Drill Fluids

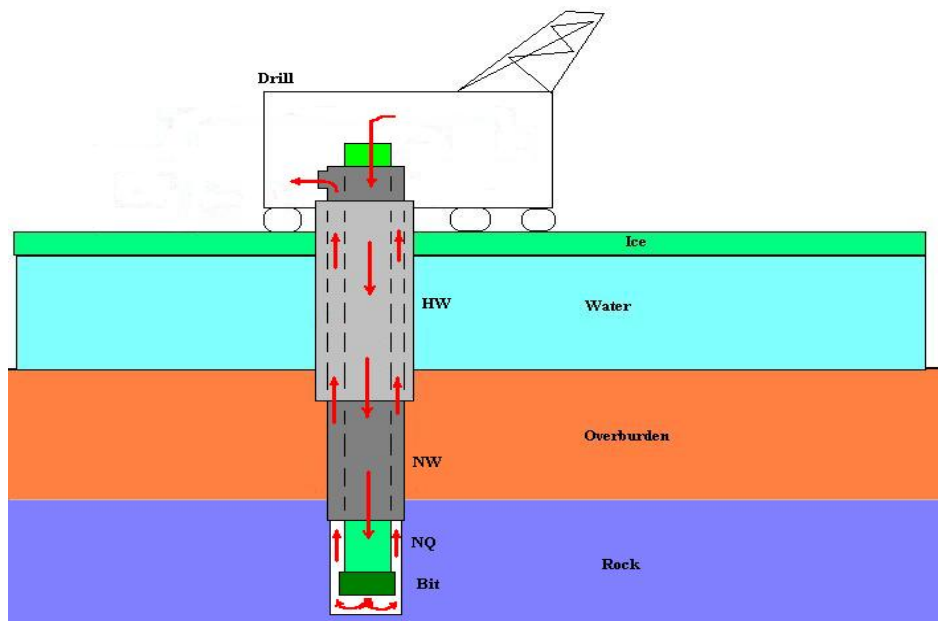
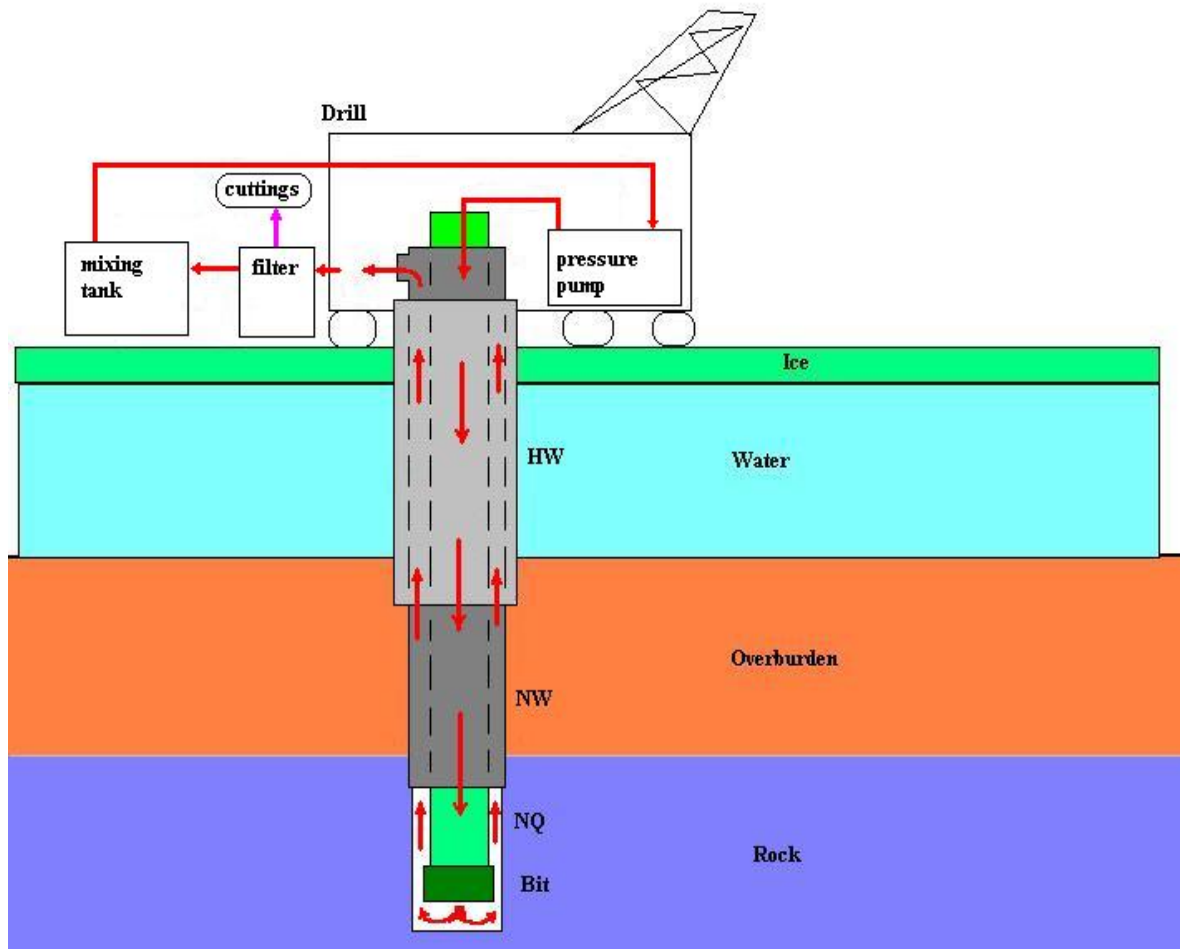


Figure 5. Recirculating Drill Fluids



Tearing Down

Once drilling has been completed, clean water is circulated through the hole to remove any drill additives and remaining cuttings. The hole is then sealed as per requirements to prevent any of the lake water from being inadvertently drained into any aquifer or mine workings (past or future) and to prevent any impure water (salty, mineralized) from entering the lake through underground sources. The hole is sealed for cementing by pumping down a properly sized safety plug and regular Portland cement is pumped down the hole to form a watertight seal.

As the hole is being cemented, all the rods are extracted from the hole in the reverse order they went in. As they are withdrawn any remaining cement will settle to the bottom of the hole. The amount of cement deposited on the lake bottom will be minor as the drillers follow a formula to determine the exact amount of cement they will require to seal a hole. All drill and support equipment is then removed from the lake. The goal is to leave the ice surface in the same condition as it was prior to moving onto the site.

Authority:

Fisheries Act

Mineral Industry Environmental Protection Regulations

The Oil and Gas Conservation Regulations, 1985

Requirements:

1. Applicants conducting activities on or near a water body or watercourse must also contact Fisheries and Oceans Canada for their review.
2. Any program requiring water for drilling activities (except water from municipal or private sources) requires approval from the Saskatchewan Watershed Authority, Saskatchewan Environment and Fisheries and Oceans Canada and must be identified in the original application.
3. All access routes onto the water body must follow the requirements outlined in BMP-008 "Water Crossings".
4. The ice needs to be of sufficient thickness to support the drill and associated equipment both during transportation and drill setup.
5. Flooding is permitted to build the ice up to sufficient thickness if required provided that the intake for the pump is screened and the fuel source for the pump has secondary containment.
6. Unless otherwise approved, drilling shall occur in water depth greater than 2 meters, including ice thickness. Additional site assessment and mitigation information will be required if the applicant plans to drill in a water depth less than 2 meters. Contact Fisheries and Oceans Canada and Saskatchewan Environment for information requirements.
7. Untreated timber or local cut timber can be used to support the drill. If local timber is used, a Forest Products permit authorizing this use is required before any timber harvesting is permitted. All timbers must be removed on completion of drilling operations.
8. The use of ice screws or freezing in anchors is permitted but must be removed once the drilling operation is completed.
9. Fuel shall be stored at a shore cache a minimum 100 meters from the high water mark. A limited supply of fuel can be temporarily brought to the site to support the drill. Fuel stored on site must be stored in a secondary containment system; either a large tray or an ice/snow bermed containment area lined with an impervious liner to the product being stored.

10. Absorbent matting or drip trays must be used where accidental spills may occur during fueling. Contaminated material is to be removed from the site for proper disposal immediately after cleanup has been completed. Refer to BMP-005 “HSWDG” for further requirements regarding fuel handling, storage and spills.
11. The drilling crew is to be trained to respond to a spill should the need arise.
12. External pumps or motorized equipment used in the drill operation and sitting on the ice shall have secondary containment (e.g. impermeable liner resistant to the product being used, plastic drip trays).
13. Any water intake shall be covered with 2.5 mm or less screening material. The water velocity at the screened face of the intake shall not exceed 3.8 cm/second.
14. Noise abatement devices including mufflers and shrouding are to be used near populated areas.
15. The applicant must identify in the application any drilling additives that will be used down the hole during drilling. All drilling additives must be biodegradable and accompanied by an MSDS sheet. Drill additives should only be used if required and in minimal amounts.
16. If mixing tanks for drill muds are being used, they must be placed on an impervious liner and any spills are to be cleaned up with absorbent material and contained.
17. All drilling operations shall use a “closed loop” recycling system with no discharge to the water or ice. In some cases, approval may be given to allow the return fluid to be pumped back to shore and into a natural or constructed sump located 100 meters or greater from the water (in these cases re-circulating drill fluids would not be required).
18. Drill cuttings must be collected through a filter system and disposed of in a SE approved landfill or alternatively the drill mud, return fluid and cuttings can be disposed of in a land-based sump placed 100 meters above the high water mark. Any requirements in BMP-010 (Drilling) addressing operation and handling of the land-based sump must be followed.
19. The drill area is to be kept orderly and any garbage is to be removed daily from the area to an approved disposal site. The ice surface is to be kept clean at all times. Once drilling is complete, all material is to be removed from the ice and the site left in a safe and clean state.
20. Once drilling is completed, clean water must be circulated through the hole to remove any remaining drill fluids and cuttings.

21. Drill holes must have all rods and casing removed prior to abandoning the hole.
22. Drill mud solids or cuttings with a uranium concentration greater than 0.05 % are to be disposed of down the drill hole and sealed.
23. Any drill hole that encounters uranium mineralization with a content greater than 1.0% over a length of more than 1 meter with a meter-percent concentration greater than 5.0 will be sealed by cementing (grouting) over the entire length of the mineralization zone and not less than 10 meters above or below each mineralization zone.
24. Drill holes are to be sealed by cementing (grouting) the upper 30 meters of bedrock or the entire depth of the hole, whichever is less.
25. Companies wishing to drill in the Western Canada Sedimentary Basin are required to contact the Mines Branch of Saskatchewan Industry and Resources (SIR) prior to drilling. SIR will advise of any precautions that are required.
26. The closure report must provide site assessment, drilling operation, and abandonment information for each drill hole. See the "Closure Report" document for further information.

Contacts:

Saskatchewan Environment
Fisheries and Oceans Canada
Saskatchewan Watershed Authority
Saskatchewan Industry and Resources, Mines Branch

Best Management Practice (BMP-012) Core Storage

General Introduction:

Exploration companies use drilling to test for mineral commodities or geological structures. Commodity prices or geological models change with time and as a result, core is commonly re-sampled and re-logged. Utilization of core drilled in the past is a prospecting tool that is a cost-effective means of re-exploring the site. When core is properly boxed and stored, the potential usefulness of core will be maintained for 25 years or more. The mineral industry and Saskatchewan Industry and Resources (SIR) utilize core for geological mapping, research and special studies. SIR is the regulating agency

Background:

Diamond drilling is one of the most widely used tools in mineral exploration. Core is a cylindrical section of rock usually 5-20 inches (35mm to 85mm) in diameter and up to many meters in length and is brought to the surface for geological examination or laboratory analysis. It is commonly stored in wooden boxes. The study of drill cores assists in the three-dimensional reconstruction and interpretation of bedrock geology and is normally environmentally safe and non-hazardous.

Authority:

Mineral Industry Environmental Protection Regulations

Requirements:

1. Distance from water bodies: Unless otherwise approved, storage areas must be located a minimum of 100 metres from the high waterline of all water bodies.
2. Long Term Storage on the site: Before an applicant is “released” from their responsibility associated with *all applicable permits*, all core remaining on site must be stored in standard core boxes. Each box will be identified with weatherproof labels indicating the hole number and core interval represented. In addition, the first and last core box of each hole requires a weatherproof label identifying the name of the company having authority to operate on the property.

There are three acceptable ways to store the core, which can be used individually or in combination.

a. Cross Stacking

- The core boxes could be cross-stacked on top of one another (each layer should be stacked perpendicular to the layer above and below it) on a well-drained site.

- The bottom layer of boxes should be approximately 15-45 centimetres off the ground and supported by solid footings.
- The stacked boxes should be stable.
- Each box on the top layer of the stack should be sealed, if required, with a standard core box lid or other material.

b. Core Racks

The permit holder may be allowed to leave the core in core storage racks.

c. Transportation to SIR storage Facility

Approval can be granted, if the applicant agrees, to transport either all core or representative sections of core to the SIR core storage facility in La Ronge.

3. Long Term Storage Off Site: The applicant may be released from permit obligations if the operator stores the core in a long-term storage facility not located on the property with the permission of the resident geologist in La Ronge.
4. Time of Assuming Responsibility: The operator is responsible for all core drilled on a property from the date they acquired the property. If the property is sold or reassigned the new operator is responsible for all core.
5. Salvage of Core: An applicant working on a claim is encouraged to take all reasonable actions to salvage (if possible) or upgrade any core racks that pre-date their involvement.
6. Location of Core: The applicant should note the location of core with their work permit applications and assessment reports submitted to SIR. Core locations shall be documented in the closure report submitted to SE.
7. Radiation in long term Storage: Gamma radiation levels of a core storage area must meet the decommissioning requirements outlined by SE. That is, gamma levels measured at 1 metre from surface for a storage area should be reduced to 1.0 μSv and in no instance will the level be allowed to exceed 2.5 μSv . When core is found to exceed the levels identified, then SE must be contacted for review and approval of the handling procedures. Instruments that measure radiation in counts per second must be converted to μs according to the specifications of that instrument.

Contact:

Resident Geologist, La Ronge, Core Library 306- 425-4499
Saskatchewan Environment Mineral Exploration Contact
Department of Fisheries and Oceans, Prince Albert
Canadian Nuclear Safety Commission, Saskatoon

Best Management Practice (BMP-013) Restoration

General Introduction

Reclamation must be recognized as an integral part of exploration, and therefore must be included in the pre-exploration planning. Proper planning will assist the applicant in returning disturbed areas to an acceptable natural and productive state.

It is impossible to define every situation because exploration activities and environmental conditions are variable, so flexibility must be built into the permitting process.

Background

Reclamation - Planning should include minimizing impacts and avoiding surface disturbance to assist in reducing reclamation requirements and costs for the program.

Re-vegetation - The purpose in rehabilitating disturbed areas is to encourage the progressive establishment of natural vegetation consistent with pre-exploration conditions.

The need to actively re-vegetate a site depends on the nature of the area and the disturbances created by the work. If proper planning is done to minimize surface disturbance, natural regeneration of the site should take place without the need for additional reclamation work. If surface disturbance is created, the site may need to be actively re-vegetated. Actively re-vegetating a site as soon as possible following re-contouring is the best way to stabilize slopes, control weeds and exotic plant, minimize erosion, and encourage the establishment of native plant communities.

Interim Reclamation - It may be beneficial to conduct interim reclamation on a site where future exploration plans include returning to the site in subsequent years to do more work. This is typical of sites used for access and core drilling where soil stripping is required. To avoid soil mixing and reduced soil quality from continuous soil handling practices, SE may approve interim reclamation.

Financial assurances may be requested to ensure future site reclamation.

Abandonment - The work area should undergo a final inspection performed by the SE contact. Permit expiry does not exempt the applicant from future liability.

Authority

Forest Resources Management Act and Regulations

Provincial Lands Act and Regulations

Mineral Industry Environmental Protection Regulations

The Seeds Act (Canada)

The Noxious Weeds Act

Requirements

1. Reclamation

- a. As part of the exploration application, reclamation measures must be indicated.
- b. Saskatchewan Environment (SE) must approve all reclamation measures and road closures.
- c. All infrastructures, facilities, and wastes must be removed from the project site at conclusion of the program.
- d. Approval from SE is required for any storage on Crown resource land managed by SE, except for core storage as covered under BMP-012.
- e. Water works, intakes, culverts, docks, bridges (includes snow/ice bridges) and any other structures installed in conjunction with waters are to be removed, unless otherwise authorized by SE. Fisheries and Oceans Canada or the Department of Navigable Waters will be involved in any permitting and decommissioning.
- f. Unless otherwise approved, surface disturbances are to be re-contoured as close as possible to its original state.
- g. Soil horizons are to be replaced over the disturbed site in the same manner they were stripped and stored.
- h. In a location where there is a reasonable chance that erosion will occur due to soil type or grade, slash material is to be spread evenly over the disturbed area and worked into the surface. If slash is not available, other approved options may be considered.

2. Re-vegetation

- a. If active re-vegetation is required by SE (e.g. large cleared areas, creek crossings, steep slopes) the following guidelines will apply:
 - i. Suitable native plant species are to be encouraged so the eventual plant community will comprise only native species. Seeding of a native plant species or use of plant materials in reclamation are to be approved by SE.
 - ii. All native seeds require a certificate of seed analysis to be submitted to SE for approval. Contact SE representative for potential seed or seed mixtures and appropriate seeding rates, or reference the relevant documents listed in the appendix (Native Species Recommended for Site Restoration within the Mid-Boreal Upland, Mid-Boreal Lowland and Boreal Transition Ecoregions of Saskatchewan).
 - iii. For best results, seeding of native species should occur in early spring or dormant seeded in late fall.
 - iv. Other plant species used for cover crops or soil stability may be considered on a site-by-site basis.
 - v. Applicants must ensure that any plant material used for reclamation is free of noxious weeds as specified under *The Seeds Act* (Canada) and *The Noxious Weeds Act* (Saskatchewan).
- b. Soil quality in a reclaimed area must be capable of sustaining a native plant community.

- c. SE may approve the use of mulches, soil stabilizers, and fertilizers to establish plant growth and reduce erosion. Such assistance should not be carried to the extent that the vegetation would depend on these inputs for their survival or that these inputs allowed non-native species to dominate and exclude native species from the area.
- d. In Forest Management Agreement (FMA) areas where forest management fees are collected, the establishment of tree species is the responsibility of the FMA holder. The applicant is responsible only for the establishment of the ground cover. If required by SE, the applicant may be responsible for the establishment of trees outside the FMA areas.
- e. Reclamation sites located within active grazing areas should be fenced unless otherwise approved.

3. Interim Reclamation

- a. Disturbed areas (temporary work camps, etc.) not reclaimed at the time of the program closure must continue to be covered by a valid permit or surface disposition.
- b. All soils must be stabilized to prevent erosion (e.g. wind, water, etc.).
- c. Topsoil storage piles must not exceed one meter in depth and may require seeding of an approved plant species.

4. Abandonment

- a. All required restoration work and road closures must be completed prior to abandonment.
- b. The applicant must notify the SE contact of the estimated completion date of the program.
- c. Notification must be done as soon as the applicant is aware of the completion date, preferably a minimum of two weeks prior to the date.
- d. For sites not accessible by road, applicants must arrange transportation to the site for the inspecting SE contact.

Contacts

Saskatchewan Environment

Closure Report

Saskatchewan Environment (SE) may require a closure report at the conclusion of a permitted mineral exploration program. This information is an invaluable tool for historical and potential future site uses by SE and related departments.

A Closure Report identifies any exceptions or deviations from the proposed plan. The closure report should contain sufficient detail so as to give department staff an understanding of actual and potential environmental and surface impacts that occurred during the permitted mineral exploration program.

Format for the Closure Report is up to the applicant, but should include the following information:

1. A general summary of the operational activities that have occurred.
2. Photographs and maps of activities and the locations.
3. Issues and their remedies, during the exploration program.
 - a. identify implemented changes in the program.
 - b. identify authorization for changes.
4. Public interactions, concerns and resolutions.
5. Report on special requirements identified in the permit.
 - a. wildlife sightings of significant concern.
6. Reclamation and remediation activities and their status at program completion.
7. Outstanding issues pertinent to the program or site.
8. Future program improvement recommendations.
9. Schedule of future site activities if known.

When the closure report is sent to SE, a final inspection may be scheduled with the applicant.

Related Saskatchewan Environment Legislation and Guidelines for Surface Mineral Exploration

Legislation:

Copies of the various Acts and Regulations can be obtained on the Internet at the following address- www.gp.gov.sk.ca

The Clean Air Act and Regulations

The Environmental Assessment Act

The Environmental Management and Protection Act, 2002

The Environmental Spill Control Regulations

The Hazardous Substances and Waste Dangerous Goods Regulations

The Mineral Industry Environmental Protection Regulations

Municipal Refuse Management Regulation

Used Oil Collection Regulations

The Fisheries Act and Regulations

The Forest Resources Management Act and Regulations

The Government Organization Act

The Department of Environment Regulations

The Heritage Property Act

The Litter Control Act

The Parks Act and Regulations

The Prairie and Forest Fire Act, 1982

The Provincial Lands Act

The Resource Lands Regulations, 1989

The Wildlife Act and Regulations

The Wildlife Habitat Protection Act

The Wildlife Habitat Lands Disposition and Alteration Regulations

The Conservation Easement Act

and Regulations

The Ecological Reserves Act

The Provincial Ecological Reserves Regulations

The Representative Area Ecological Reserves Regulations

The Public Health Act

Guidelines and Reference Material:

Native Species Recommended for Site Restoration within the Mid-Boreal Upland, Mid-Boreal Lowland and Boreal Transition Ecoregions of Saskatchewan

“Guideline to Small Core Diameter Drilling from Ice in the Northwest Territories and Nunavut”. Fisheries and Oceans Canada/Environment Canada - draft

“Guidelines for the Preparation of a Project Proposal” Saskatchewan Environmental Assessment

“Species of Concern List” Saskatchewan Environment

DFO. 1995. Freshwater Intake End-of-Pipe Fish Screen Guideline. Communications Directorate. DFO. A copy of this document may be obtained online at: http://collection.nlc-bnc.ca/100/200/301/dfo-mpo/freshwater_Intake/223669.pdf

Saskatchewan Environment/DFO Fish Habitat and Protection Guidelines on Road Construction and Water crossings

Location Conversion site

www.mapquest.com

“Guidelines for the Preparation of a Project Proposal” Saskatchewan Environment/
Environmental Assessment Branch

Other Regulatory Requirements

This document contains a comprehensive list of regulatory agencies that may need to be contacted for program approvals.

Heritage/Archaeological Resources

Saskatchewan Culture, Youth and Recreation (www.cyr.gov.sk.ca)

Provincial Heritage Resources Branch at (306) 787-8157 or fax at (306) 787-0069.

Saskatchewan Watershed Authority

Approval is required for the use of any surface or ground water.

Northeast Water Resource Office (Nipawin) at (306) 862-1750

or fax at (306) 862-1771.

Northwest Water Resource Office (North Battleford) at (306) 446-7450

or fax at (306) 446-7461.

Fisheries and Oceans Canada

Department of Fisheries and Ocean (DFO)

Fish Habitat Protection Program– contact Prince Albert District Office at (306) 953-8777 or fax at (306) 953-8792.

Permits/approvals may be required when working on or near a water body or watercourse.

Navigable Waters Protection Program – contact Program Manager at (306) 953-8774.

Permits may be required for any structure (dock, bridge, dam, etc.) that may impact navigation on a water body or watercourse.

Saskatchewan Industry and Resources

Northern Mining Recorder (La Ronge) (306) 425-4600

Assessment Geologist (For drilling in the Western Canada

Sedimentary Basin) (Regina) (306) 787-2564

Saskatchewan Health

Contact the appropriate Public Health Inspector for any work camp requirements or approvals.

-La Ronge (306) 425-8523

-Meadow Lake (306) 236-1576

-Buffalo Narrows (306) 235-5811

-Prince Albert (306) 765-6605

Rural, Urban or Northern Municipalities / Northern Towns, Villages and Hamlets / Northern Settlements (through Saskatchewan Government Relations and Aboriginal Affairs)

Contact the appropriate local government for any permitting or bylaw requirements.

www.municipal.gov.sk.ca

Saskatchewan Highways and Transportation (306) 787-5307

Will deal with any requirements related to the transportation of hazardous substances and dangerous goods.

Transport Canada

Transport Canada/Natural Resources Canada jointly control and enforce *Transportation of Dangerous Goods* Acts and Regulations, which is Federal Legislation.

www.msdssearch.com/DBLinksN.htm

Environment Canada

Deals with the *Species at Risk Act*.

Deals with spills in waterbodies, watercourses, Federal lands, or interprovincial implications

Environmental Emergency Regulations can be found at <http://canadagazette.gc.ca> or <http://www.ec.gc.ca/CEPARRegistry>

Saskatchewan Labor

1-800-667-5023

Deals with on site storage of explosives and worker health and safety through occupational health and safety legislation.

Natural Resources Canada

(403) 292-4766

Administers the *Explosives Act and Regulations*. They issue licenses, certificates and permits to ensure the safety of the public and workers associated with the explosives industry.