Baffinland Iron Mines Corporation

BAFFINLAND IRON MINES
MARY RIVER LANDFILL OPERATIONS MANUAL

Revision:	0	**Date Revision Effective:**	May 1, 2010
Date Reviewed:			

1. PURPOSE AND SCOPE

The purpose of this procedure is to ensure that non-hazardous solid wastes are disposed of in compliance with the Mary River Landfill permit, and in an efficient, safe and environmentally sound manner.

This procedure applies to the handling, storage and disposal of all non-hazardous solid industrial waste at the Mary River Project Landfill

This procedure does not apply to hazardous and liquid industrial wastes, hauled sewage or domestic waste.

This manual has been designed to be used both as a field reference document and as a training manual for classroom and self-instruction purposes. Every employee with accountabilities and responsibilities as required by this procedure is expected to be familiar with its use and location at the site. The manual has been divided into two sections: the General Overview; and Standard Operating Procedures. The General Overview contains basic knowledge regarding personnel responsibilities, safety practices, and the overall operations of the landfill. Part B focuses on Landfill Work Instructions and has been formatted to provide supervisors and their employees with a user-friendly method for training and implementation.

2. DEFINITIONS

Waste Management System
A waste management system includes all facilities equipment and operations for the collection, handling, transportation, storage, processing and disposal of waste.

Landfill Site
Controlled site where no hazardous wastes are accepted and only specific wastes as outlined in the Mary River landfill approval permit are allowed. At landfill sites, the waste is regularly compacted and covered.

Mary River Landfill
For the purpose of this document, the Mary River Landfill and the Mary River Non-Hazardous Solid Waste Landfill are one and the same

Non-Hazardous Solid Waste

Non-Hazardous Solid Industrial Waste means a solid waste that is not a liquid and is not hazardous and includes and includes:

a) General Waste (cardboard, treated wood, plastics, etc.)
b) Scrap tires
c) Bulky waste such as heavy equipment, trucks, snowmobiles & appliances. These items will be drained of all fluids (oil, fuel, hydraulic fuel; ozone depleting substances must be removed by a licensed technician prior to disposal).
d) Concrete
e) Glass (industrial)
f) Non-toxic incinerator ash
g) Non-Hazardous Solid Spill Clean-up Material
h) Scrap Steel (Non-recyclable)
i) Pallets (Non-recyclable)

A detailed description of these products is contained in the Appendix A

Hazardous Waste

Material that, given its quantity, concentration and composition or its corrosive, inflammable, reactive, toxic, infectious or radioactive characteristics, presents a real or potential danger to human health, safety and public well-being or poses a danger to the environment if it is not stored, treated, transported, eliminated, used or otherwise managed. Includes all material regulated by the Transportation of Dangerous Goods Regulation and those materials requiring a Material Safety Data Sheet. . Examples include paint, solvents, propane tanks, waste oil, batteries, electronic equipment, and fuel drums (205 liter barrels) or other material previously containing fuel or other hydrocarbons are considered hazardous waste. A detailed description of these products is contained in the Appendix A

Recyclable

Ability of a secondary material to be re-used in the manufacture of a new product or to be re-used.

Domestic Waste

Domestic waste includes waste such as office paper, lunchroom supplies, washroom supplies, food waste, containers contaminated with food. Domestic waste can be considered all bagged & boxed waste originating from offices, kitchens and camps, generally suitable for disposal in the incinerator. A detailed description of these products in contained in Appendix A

Scrap Steel

Scrap steel includes scrap steel material that contains no other non-steel component.

Liquid Industrial Waste

Liquid industrial waste includes “waste that is both liquid waste and industrial waste”.

Empty Container

A container that has been emptied, to the greatest extent possible, using regular handling procedures, but it's content shall not exceed 1% of the container's original capacity or 2 liters, whichever is less. This does not include containers which previously contained :

i. Mercury or other heavy metals
ii. Compressed gas cylinders (TDG Class 2.1-2.4)
iii. Oxidizing substance containers, (TDC Class 5.1)
iv. Poisonous substances containers (TDG Class 6.1)

Part A – Mary River Landfill General Overview

I. Responsibilities

Designated Mary River employees & contractors have specific accountabilities that must be met to ensure the Mary River Landfill is operated in compliance with this procedure and its permit. The following roles and responsibilities of the various employees who work at the disposal site are described below but are not necessarily inclusive of all duties that may required to safely and successfully operate a non-hazardous solid waste landfill.

1. Mary River Camp Manager

The Mary River Camp Manager is accountable for the overall operation of the landfill. Specifically, he/she shall:

a. Organize, oversee and administer the operation of the landfill in accordance with current permits, regulations and all appropriate procedures,
b. Plan and coordinate the most efficient use of landfill areas to conserve landfill space,
c. Help develop, implement and enforce landfill specific safety regulations
d. Meet routinely with the Site Services Supervisors to maintain proper control of the site and to determine what, if any, problems exist or may be anticipated. Consider the following:
    i. Operational issues,
    ii. Regulatory Requirements,
    iii. Equipment issues,
    iv. Special operating instructions; e.g., inclement weather, special waste, emergencies.
    v. Schedule routine work as required, e.g., drainage channel cleaning, landfill surface repairs and litter control, etc,
    vi. Ensure that the need for any special operating conditions have been planned for in advance; e.g., identification of features with steaks in advance of winter and the ground freezing,.
    vii. Handle user complaints or problems that the Site Services Supervisor cannot handle,
    viii. Perform all the duties of the Site Services Supervisor in his absence.

2. Mary River Site Services Supervisor

The Site Services Supervisor, under the general supervision of the Mary River camp manager, is responsible for supervising refuse disposal and associated activities at the Mary River Landfill in accordance with this procedure. Specifically, the Site Services Supervisor shall:

a. Regularly brief the Mary River camp manager on the status of routine operations and any special problems,
b. Implement and enforce the landfill safety regulations and operating procedures
c. Install grade control stakes for landfill operators
d. Check grades and contours to ensure that refuse placement and compaction conforms to engineered specifications and designs,
e. Maintain thorough, accurate and detailed records of landfill operations, and other related matters,
f. Ensure through regular inspection that specified fill cover, spill response equipment etc. is present at the landfill,
g. Respond to incidents, complaints and inquiries promptly to ensure the landfill is operated in compliance with this procedure,
h. Inspect waste and direct site users to proper disposal areas according to waste type,
i. Conduct monthly inspection of berm & cover material for cracks & settlement.
j. Set up and monitor traffic patterns to allow maximum traffic flow and safe working conditions.
k. Instruct all contracted crews on critical landfill procedures and areas of concern and monitor progress, keeping records daily & bi- weekly as required this procedure,
l. Perform all the duties of the Landfill Operator/Labourer in his absence.
m. Perform other duties that may be required as determined by the Mary River Camp Manager

3. Mary River Landfill Operator/Labourer

The Landfill Operator/Labours, under the general supervision of Site Services Supervisor, is responsible for executing the following tasks at the landfill. Specifically the Operator/Labourer shall:

a. Work in conjunction with the Site Services Supervisor in executing general landfill operations
b. Perform daily pre-use equipment checks on landfill mobile equipment ,
c. Maintain a level landfill base at the working face dumping area,
d. Cut, maintain and finish grades as indicated on grade stakes or as directed by the Site Services Supervisor,
e. Construct landfill cells according to this procedure,
f. Spread and compact refuse according to this procedure,

g. Cover refuse efficiently according to this procedure, have area covered walked in tight and surface smooth using no more fill than necessary. Leave surface area smooth with no refuse exposed,
h. Inspect waste and direct site users to proper disposal areas according to waste type,
i. Assist in site maintenance work as required; e.g. grade roads, drive water trucks, resurface roads, construct refuse lifts, and other duties as assigned,
j. Ensure the landfill is maintained free of litter, including the relocation of portable litter fences as necessitated by operational requirements and wind conditions,
k. Complete daily report forms as required, know how to respond appropriately to all emergencies utilizing the emergency procedures listed in Section B of this manual,

4. Project manger – Landfill Waste Designated Inspector

On occasion when a Mary River Project has a large quantity of waste destined for the landfill, the project manager may be provided with specific training to allow he/she to become a designated Mary River Landfill waste inspector to facilitate the source segregation, improve the productivity of the project resources and meet the landfill requirement for waste inspection prior to dumping.

Specifically, the Project Manager - Landfill Waste Designated Inspector shall:

a. Be provided with the necessary training to allow him/her to properly segregate waste by type at the source and pre-inspect waste destined for the landfill
b. Inspect waste and direct site users to proper disposal areas according to waste type,
c. Complete daily report forms as required, know how to respond appropriately to all emergencies utilizing the emergency procedures listed in Section B of this manual,
d. Correct any waste management deficiencies related to the project as identified by landfill staff.

5. Mary River Superintendent of Sustainable Development

To be completed by Jim Millard

II. Landfill Operations

The Mary River non-hazardous solids landfill is a permitted area method modified landfill as described in the Guidelines for the Planning, Design and Operations and Maintenance of Modified Solid Waste Sites in the Northwest Territories. The landfill has a design life of approximately 3 years and its operation and maintenance is based on the Guidelines to ensure protection of the environment and the health and safety of individuals. The estimated capacity of the current landfill design is 5000 m3 of waste and cover material.

A. Mary River Area Method Landfill Waste Cell Construction

Due to the presence of permafrost, the area method will be used to place waste in the landfill. Waste will be deposited on the ground, worked with appropriate heavy equipment, and packed against a constructed berm. Construction of the berm will be advanced with the advancing face of the landfill. The waste cell is the basic building block of the landfill. It is composed of several layers of solid waste compacted on a slope by heavy equipment and enclosed on all sides by soil. The general placement of waste will progress down-slope from the Northeast rear berm wall towards the northwest end of the site. Basic instructions for constructing waste cells with the materials accepted at the Mary River Landfill are described below in Figure 1.

1. Control of Working Face

The working face is the portion of the uncompleted cell on which additional waste is spread and compacted. The optimal working face width varies depending on the number of vehicles bringing wastes to the site and the equipment available for spreading and compacting. It should be wide enough to prevent a backlog of trucks and productively work; however, the width should not be so wide as to be impractical to operate or to expose an undue amount of refuse to the wind.
The face width should be reduced by compacting and covering portions of the face as soon as a section of the cell meets the grade design. For control of the waste exposure to wind, the width of the face should not exceed 12m at any time.

2. Equipment Movement

Solid waste should be dumped at the toe of the working face by the collection trucks and pushed up the slope. For safety reasons, keep a minimum of 3m separation between the trucks and the dozer. The unloading area is to be maintained level and clear of waste materials.

3. Spreading Waste on a Slope

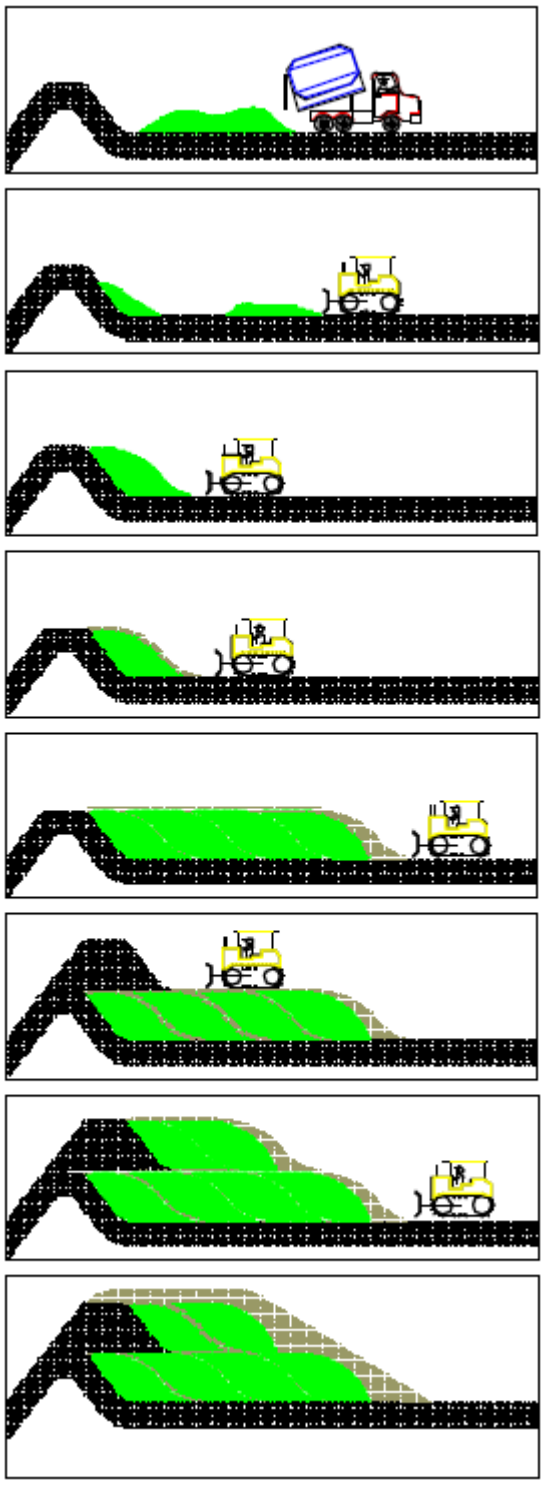
To maximize compaction, and to provide an optimal weight distribution of the dozer, the waste should be spread up a 3:1 slope in 0.3-0.6 meter layers. Fill in any holes that develop in the face with loose waste.

4. Using Grade Stakes

Use grade stakes to aid operators in keeping the slope of the final top fill surface of at a grade of 0.5%, the slope of the cell face 3:1 and the grade of the landfill base to 0.5%. Grade

stakes should be set according to instructions given by the Engineering Staff. Stakes should be checked frequently enough to allow operators to make sightings to them as required.

.



1. Build berm, 2 m high. Dump garbage near the berm. The maximum width of the working exposed face used for dumping should be as small as practical and not exceed 12m
2. Drive over the garbage 3 to 5 times with a dozer. Work the garbage up the berm a little at a time to pack it. Do this daily when material is deposited in the landfill.
3. Alternate between dumping and packing garbage until packed garbage is 2 m high
4. When garbage at the working face is 3 m wide, cover garbage with 0.3m of granular material over the deck of the cell and 0.1m between cells to complete a partial cell. Repeat steps 1 to3 across the width of the landfill until a cell is completed.
5. Repeat steps 1 to 4 until site is full. Then cover all garbage with 0.3 m of granular material. Pack and add more granular material until top is level.
6. Build new 2 m berm on top of cells.
7. Repeat steps 1 to 5.
8. To close out site, put 0.6 m of granular material on cells then pack with bulldozer so that water runs off.

Figure 1. Waste Cell Construction for Mary River Area Method Landfill

5. Waste Compaction

A high degree of compaction extends the fill life, reduces cover material and long-term land requirements, reduces litter problems, and results in other beneficial effects. Good compaction is achieved by operating the dozer up and down the working face between 3 and 5 times on 0.3-0.6 meter layers of waste until no further compaction occurs. The top deck of the cell must also be compacted by running the landfill compactor dozer across the top, keeping it as level as possible. Compaction of the waste will be undertaken if required, depending on the nature of the waste. This will typically occur once per week or in combination with collection frequency and nature of the waste.

6. Cell Completion

Cover soil will be placed over exposed compacted waste cells or portions of waste cells. A minimum of 0.3m of cover shall be placed over the deck and 0.1 meters over the slope of the cell. Use no more fill than necessary. When the cell is completed, no waste should be visible.

B. Cover Soil

1. Excavation

Excavation of soil for cover material shall only be made from designated "borrow" areas. Working cover stockpiles are to be placed within the perimeter of the approved landfill pad where they will be accessible to the working face. However, they are not to be located where they may block truck travel or filling operations.

2. Placement of Final Cell Cover

Use of soil for intermediate and final cover should be placed in the following manner:

a. When using a dozer, push cover soil up the slope and feather it out as evenly as possible. Do not permit the tracks of the equipment to spin as you traverse the compacted slope. This action will tear up the waste and it may be necessary to compact the waste again in order to reapply the cover material.
b. When filling of cell or portion of the cell has reached the final planned grade and width, a final cover of compacted soil should be placed. A minimum of 0.3m of cover shall be placed over the deck and 0.1 meters over the slope of the cell. Use no more fill than necessary.

C. Hard-to-Handle Wastes

Certain wastes acceptable at the Mary River Landfill require special handling. The following are basic methods to be used when managing hard-to-handle waste:

1. Bulky Waste

a. Crushable Items – such as furniture and appliances

Such items should be dumped at the toe of the working face if traffic permits. Use the dozer to crush the item on solid ground, and then push it into the toe of the fill. Fill in any holes with regular waste.

b. Demolition Debris

Spread out bulkier pieces of concrete, lumber, and other debris evenly at the toe of the working face. Place regular wastes on top of the demolition wastes.

c. Long Items

Long, awkward items, such as pipe, rolls of paper and plastic should be dumped at the toe of the face, placed parallel to the working face, and covered with regular waste. The dozer should be driven over these items slowly to prevent overturning.

d. Rubber Tires

Place rubber tires at the toe of the fill, spread them out, and cover them with other wastes. Tires are less likely to work their way to the surface if placed at the bottom of the cell. Do not try to compact unreduced rubber tires.

e. Large Metal Wastes

Metal wastes, such as pipes, rolls of cable, and wires should be placed directly at its position of disposal and covered by household or demolition wastes (bridged). This will prevent unnecessary machine damage and shutdown.

2. Low Density Wastes

Waste types such as organics, synthetic fibers, loose plastic film or foam, and rubber and plastic scraps or shavings, require special handling. These materials present problems because they rebound after being run over by the dozer. Spread the lightweight material into 1 to 2 foot deep layers, and then cover it with regular waste, compacting as usual at base of cell. These wastes should be compacted until the operator can no longer detect that the surface of the waste layer is being depressed more than it is rebounding. The weight of the regular waste tends to keep the low-density material down.

3. Powdery Wastes

Wastes such as sawdust and other dusts also require special handling. These wastes are problems because they are stirred up by the equipment and blown by wind. Once in the air, they may be harmful to personnel if they are inhaled or contact the skin. Personnel not working in enclosed cabs should wear protective clothing and respirators if dust becomes airborne. Some powdery wastes may be wetted down with water from a water truck and then covered immediately with soil or regular refuse. This procedure will help reduce blowing and dusting of the powdery waste. If water is not available, cover the powdery wastes with soil or refuse to reduce blowing and dusting of the waste.

D. Maintenance of Completed Areas

1. Inspection of Completed Areas

A bi-weekly inspection of the berm walls and completed cell will be completed each month for signs of cracks and depressions due to settlement. Cracks and settlement will be filled and compacted back to the original grade

2. Groundwater Protection System

Due to the permafrost in the area, no groundwater protection system has been included.

3. Landfill Gas Assessment

Landfill gas is not expected as the deposited waste will be non-hazardous, non-organic and inert. Also, all chemicals will be diverted for proper hazardous waste disposal. Therefore a landfill gas collection system will not be installed in the landfill site.

4. Leachate Characteristics

Leachate is not expected as the waste to be deposited in the landfill will be relatively dry, inert and non-hazardous. Therefore no leachate collection system has been included in the design. In addition, a perimeter berm will be constructed surrounding the landfill site. This will redirect surface runoff originating upstream of the landfill site, thereby minimizing the amount of water which might infiltrate the deposited waste.

E.. Traffic Control and Unloading of Waste

1. Proper Spotting and Traffic Control

a. Traffic Flow

Traffic should be kept moving at a safe steady rate to avoid backlogs and congestion working face. Drivers are to back to the toe of the slope before he/she starts to dump. The driver is to pull straight away slowly from the slope while s/he is dumping.

b. Aids to Traffic Control

Directional signs, pylons and barricades are to be provided to help control traffic and direct customers to unload the waste at the base of the cell and have them drive their vehicle straight out when unloading is complete. Ensure proper signage and barricades are in the required locations at the beginning of each day. Relocate signs and barricades as required at the end of each day so that they will be in place and ready for the next day's operation.

c. Separation of Vehicles

Due to the risk of dump trucks and trailers overturning, only one vehicle is to be unloaded at the face at a time, this includes vehicles being unloaded by hand.

d. Logging of Unloaded Wastes

A waste unloading logging station will be located in proximity of the working face. The operator of every vehicle that unloads any quantity of waste is required to log the specifics of the load – Date, time, waste type, vehicle type, approximate quantity, etc....

e. Load-on-Fire Procedures

Loads-on-fire are wastes that are either on fire or that are smouldering or smoking within a vehicle or when deposited at working face. All site personnel should be familiar with procedures for handling such loads. Refer to the Emergency Work Instruction in Section B of this manual for proper response procedures.

f. Prevention of Scavenging

Scavenging by employees, visitors and local people travelling through is not permitted. Scavenging in a waste pile is a safety hazard with a high risk of injury and is strictly prohibited

g. Site User Rules

Landfill staff should know all site user rules and watch for violations. User rules (Appendix C) and wastes acceptable for disposal in the landfill (Appendix A) are to be posted at the entrance to the landfill and at the working face. All violation of land fill user rules shall be recorded in the daily log by landfill staff and reported to the Mary River Camp manager.

h. Emergency Procedures

Site personnel shall be familiar with proper fire and accident procedures and are expected to know their role in all possible emergency situations. See the Emergency Work Instructions in Section B of this manual.

F. Landfill On-Site Roadways

1. Road Construction

On-site access roads for use as a thoroughfare for transporting waste to the working face shall only be constructed under the approval of the Mary River Camp Manager and according to engineered design specifications. Landfill maintenance access roads are only to be constructed under the approval of the Mary River Camp Manager.

2. Road Maintenance

a. Maintenance of Gravel Roadways

Roadways that are made in native or filled soil and are heavily travelled required maintenance. These roads should be graded and re-compacted as required to re-establish proper road grades.

b. Filling of Areas Where Settlement Occurs

When all-weather roads are constructed on the tundra, settlement of the filled area may cause cracks to appear in a road or cause the slope of a road to change. Cracks should be filled with material that is compatible with the roadbed. Area of a sloped road, where the slope has changed drastically, it should be built-up with material compatible with the roadway until the desired elevation is achieved.

c. Maintenance of Drainage Culverts

All drainage culverts should be kept free of obstructions and debris. All drainage crossings should be identified with staking prior to winter such that they can be found and opened in advance of freshet. Prior to the onset of freshet, all drainage culverts shall be opened and ready to accept water flow.

G. Inclement Weather

1. Preparation for Weather Conditions Affecting Landfill Operation

Wind, white out conditions caused by blowing storms in winter and spring freshet may have an impact on landfill operations. The following precautions shall be followed:

a. Wind

In preparation for wind storms, the working face shall be compacted and covered as practical to reduce width of the exposed face. Litter fences should be installed prior to windy weather and relocated as required.

b. White Out Conditions Caused by Winter Storms

Under severe white out condition caused by some winter storms, the Mary River camp manager may declare the landfill temporarily closed if conditions at the landfill cannot be made safe to operate.

c. Freshet

Prior to the spring melt of freshet the site services supervisor will take the following precautions to minimize the impact of the water flow from freshet:

i. Ensure all culverts are cleared prior to freshet
ii. Remove all excess snow from the landfill pad and completed cell slope to minimize water accumulation on the pad.
iii. Install silt fencing or other control devices if required on drainage that contain silt as a result of landfill erosion

H. Surface Water Flow and Quality

Flowing surface water will be prevented from entering the landfill site by the construction of a berm along the upper end of the site (i.e. the berm constructed above for waste placement) and berms along the sides of the site. The landfill site area will be graded 0.5% to promote drainage away from the landfill and to prevent pooling of water within the landfill or against the berms.

Appropriate erosion and sediment control measures will be implemented as required through the use of silt fences, etc. Temporary sediment control measures will be used during all construction activities at the site.

I. Inspections and Reporting

a. Reporting

The *landfill daily unloading volume & operations log (See log attached below)* is completed daily and logs waste volumes, compaction and cover application.

b. Routine Inspections

Records of all site operations, including inspections, maintenance, and monitoring will be recorded on designated forms and kept together in the Baffinland office (or other on-site facility used for such purposes). This will be performed and maintained by the landfill Operator.

Routine visual inspections will be completed every two weeks on the *Mary River Landfill bi-weekly Inspection form* (See form attached below) by the Site Services Supervisor or designate for various components of the landfill, including:

- General site area
- Landfill berm and cover survey
- Litter control
- Storm water runoff control
- Vector attractants
- Wildlife observations
- Wildlife signs.

Mary River Landfill Inspection Form.xls

IV. Landfill Safety Practices

A. General Safety Practices

1. Know Procedures

All employees at the landfill are responsible for knowing the proper procedures for reporting accidents, injuries, and fires. Employees must know the procedure to be followed for each type of emergency and be aware of their particular role. Work Instructions for various situations are documented in the Work Instructions section of Part B of this manual.

2. Signage for Traffic Control and Direction

Road boundaries and speed limits on each road shall be clearly posted.

3. Site User Rules

Site user rules are available at the entrance to the landfill and at the working face. Employees are to watch for violations of site user rules and indicate those rules to violators, stressing that the rules are imposed to ensure the safety of people & equipment. Site User Rules are attached in Appendix C.

4. Level Dumping Area

For safe operations, the dumping area shall be kept as flat as possible at all times and kept clear of debris.

B. Safety Precautions for Equipment Operators

1. Heavy Equipment Operation

All mobile equipment in use at the landfill is to be operated in accordance with general Baffinland procedures associated with light truck and heavy equipment.

2. Keep Debris from Cab

Keep operator's compartment, stepping points, and hand holds free from oil, grease, mud, loose objects, and trash.

3. Look in All Directions before Moving

The landfill is a high traffic area - Protect personnel and other equipment in the area by looking to the front, rear, and sides before moving equipment. If the operator is unsure of surrounding conditions, he/she shall dismount and inspect the area.

4. Safety Devices

Proper safety devices, such as safety belts and roll over protection systems, must be installed on all equipment and maintained or replaced to original equipment manufacturer specifications.

5. Carry Blades Low

Equipment attachments such as loader buckets and tractor blades should be set low to improve visibility and enhance breaking capability. Otherwise, collisions may occur, the vehicle may go over an embankment, or it may roll over.

6. Check Blind Areas

Never push waste until you are sure that no person or equipment is in the blind area ahead of the refuse. If the operator is not sure of surrounding conditions, he/she shall dismount the equipment and personally inspect the area.

7. Maintain Adequate Clearance

When pushing waste, maintain adequate clearance from ground personnel, patrons and other vehicles or obstructions to ensure that objects will not strike other equipment or persons. As a rule of thumb use 5 meters as a minimum safe distance to keep away from all people, vehicles, and equipment.

8. Constantly Check Work Area

The operator must constantly check the work area for the location of other persons or equipment. Be especially cautious when several private vehicles are in the area. Remember that many site users are not familiar with the dangers of heavy equipment.

9. Operate Up and Down Slope

Operate up and down slopes. Avoid side hill travel whenever possible to reduce the chance of rolling over.

10. Avoid Excessive Speed

Operating conditions generally determine the speed of heavy equipment. Under no circumstances should heavy equipment be driven at excessive speeds or operated recklessly. Heavy equipment is difficult to control at high speeds and must only be operated at a speed that is safe for existing conditions.

11. Move Cautiously Over Bulky Objects

When compacting or traversing bulky items, such as vehicles and utility poles, the operator must proceed with extreme caution to avoid tipping or sudden lurching movements.

17. No Scavenging

Scavenging will not be permitted. Scavengers are subject to a number of potential injuries and possible death.

C. Personal Protection Equipment

Landfill staff is required to wear the standard Mary River Project personal protective equipment, including:

a. Hard hats,
b. Eye protection,
c. Work boots,
d. Work gloves,
e. Reflective vest

D. Emergency Contact Information

All emergencies shall be reported to the site services supervisor and Mary River camp manager immediately.

Appendix A

Classification of Refuse

1. Acceptable Wastes

Non-Hazardous Solid Waste means a solid waste that is not a liquid and is not hazardous The following wastes are examples of Non-hazardous solid wastes acceptable for disposal at the Mary River Landfill:

a. Wood products (Clean untreated wood should be diverted to the Burn Area)
b. Plastics
c. Cardboard
d. Scrap Tires
e. Bulky waste such as heavy equipment, trucks, snowmobiles & appliances. These items will be drained of all fluids (oil, fuel, hydraulic fuel; ozone depleting substances must be removed by a licensed technician prior to disposal).
f. Concrete
g. Glass
h. Metal
i. non-toxic incinerator ash
j. Non-Hazardous Solid Spill Clean-up Material
k. Empty Container (as defined in this procedure)

2. Inert Wastes & Recyclable material

The following are examples of inert wastes that the Mary River Landfill will accept for disposal. However, these types of materials can generally be recycled and/or reused and it is better to divert this waste stream for reuse when applicable:

a. Clean fill dirt
b. Rock
c. Steel (suitable for reuse)
d. Pallets (suitable for reuse)

3. Hazardous Material / Unacceptable Wastes

There are six general types of materials that are unacceptable for disposal at the Mary River Landfill. They are:

a. Chemicals
b. Liquid Wastes including sewage
c. Radio-nuclides (Radioactive waste)
d. Batteries
e. Infections or medical waste
f. Electronic waste – TVs, computer CRTs (screens) and computer hard drives

In addition, Hazardous Wastes, including household hazardous wastes, are NOT accepted at the Mary River Landfill. The following list of waste, though not all inclusive, is considered hazardous:

a. All material regulated by the Transportation of Dangerous Goods Act,
b. All material requiring a Material Safety Data Sheet,
c. Paint,
d. Chemicals,
e. Solvents,
f. Propane tanks,
g. All pressurized gas cylinders,
h. Fuel drums (205 liter barrels) or other material/container previously containing fuel or other hydrocarbons,
i. Acids,
j. Waste oil,
k. Cleaning solvents,
l. Friable asbestos,
m. Gasoline, diesel, Jet A and other Petroleum products,
n. Insecticides,
o. Lube Oil,
p. All heavy metals such as Beryllium, Cadmium, Mercury, etc.

Appendix B

Potential Pollutant Source and Best Management Practices Summary Table

Area	Activity	Pollutant Source	Pollutant	Best Management Practices
Landfill	General landfill operations	Soil Erosion	Sediment	- Maintain design slopes - Repair all berm & cover areas experiencing settling or erosion - No cuts permitted in to the tundra during landfill civil construction or operation - Silt fences installed at any drainage experiencing sediment from soil erosion
Landfill	Fueling of heavy equipment	Diesel fuel	Diesel fuel	- Fueling is completed in accordance with Baffinland fueling procedure. - Personnel are trained on the procedure for fueling
Landfill	Unloading waste at landfill	Improper segregation or direction of non-permitted wasted	Hazardous waste or non-permitted waste	- Baffinland Waste management system includes waste type source segregation - Landfill operations procedure contains requirement for waste inspection prior to unloading.
Landfill	Unloading waste at landfill	Hazardous material spill	Hazardous waste	- Baffinland Spill Response Plan in place to respond to spills
Landfill & surrounding area	General landfill operations	Landfill working face	Litter	Landfill operations manual contain best management practices including: - Minimizing active working face - Compaction & cover plan - Use of litter fences

Appendix C

Mary River Non-Hazardous Solid Waste Landfill

User Rules

1. All waste is to be inspected prior to dumping – Contact the Mary River Site Services Supervisor prior to delivery
2. No liquid or hazardous waste is accepted at this landfill
3. Vehicles shall follow posted speed limits and directions to unloading area - Unloading in other areas is strictly prohibited
4. Dump waste immediately behind the vehicle as close to the toe of the working face as possible
5. No Unloading by Rapid Acceleration or Deceleration
6. Each vehicle operator is to complete the unloading log for each load
7. No Scavenging is permitted
8. No open fires or the burning of waste is allowed on the site
9. All spills are to be stopped if safe to do so, and immediately reported to the Site Services Supervisor.
10. PPE required to be worn at landfill area
11. In case of Emergency – Immediately contact the Mary River Site Services Supervisor or Camp Manager

Part B – Mary River Landfill Work Instructions

Part B focuses on work instructions and has been formatted to provide supervisors and their employees with a user-friendly method for access, training, and implementation of these procedures

Specific work instructions concerning landfill operations and emergencies and have been documented in order to establish standard policies and practices for the Operations staff. These topics will be reviewed periodically in routine safety meetings, which will allow operators to keep up-to-date on any changes in standard operations. Site services personnel are expected to be familiar and comply with the work instructions relating to their areas of responsibility.

Work Instructions

General Site Maintenance

Work Instructions

Landfills require general maintenance throughout the year in order to keep them orderly and clean. Much of this maintenance is in anticipation of permit requirements and seasonal weather changes

Guidelines:

1. Access roads on the site are to be maintained and graded to eliminate ruts and repaired to eliniante cracks and settling.

2. Maintain drainage, keep road culverts and landfill drainage free of debris.

3. Define critical landfill perimeter and spot locations with stakes and signs prior to winter to facilitate identification

Off-Road Vehicular Traffic

Work Instructions

"Off-Road" refers to any vehicle traveling off of any defined roadway or access-way or landfill pad, regardless of the road surface. Permitted roads are identified on the attached landfill plan and include the gravel access road and the landfill berm perimeter road.

- All off-road vehicular traffic is strictly prohibited without clearance from Mine Manager
- Prior approval is required for any vehicles engaging in off-road activities while on site
- New road construction is not permitted without approval from the Mary River Project Operations Manager

Benefit of Compliance to Instruction:

- Avoid disturbances and impacts to sensitive tundra

1. Place dusty loads at the toe of the face of the trash and bridge over as quickly as possible.

Benefit of Compliance to Instruction:

- Creates a cleaner, safer work environment
- Ensures compliance with permit requirements and reduces the impact on the natural environment

Landfill Equipment Fluid Releases

Work Instructions

1. Complete a visual “walk around” inspection of all landfill motive equipment prior to starting. Inspect for damaged hoses and for puddles or stains from leaking fluids under your machine. If fluid leaks are evident, do not start equipment. Notify your Supervisor and the mechanic.

2. Periodically scan the equipment management system on the dashboard of the machine for flashing lights and warning horns that may indicate a system failure. Move to a safe area, stop and inspect the machine systems for leaks and malfunctions as necessary.

3. Routinely glance through the windows at the machine components that are susceptible to damage, for example, lift cylinders, hydraulic hoses, grease and oil seals. Listen as you operate your machine for unusual noises that may be an indication of a mechanical failure. If so, move to a safe area, stop the machine and notify your Supervisor and the mechanic.

4. As you make a “pass” in a forward direction and prepare to change direction, look over your shoulder and inspect the ground for streaks of oil or anti freeze. If leaks are observed, move machine to a safe area, shut machine down, contain spill using a bucket or pan and notify supervisor and mechanic.

5. All discharges of fluids from heavy equipment in the landfill are to be treated as a spill. All spills are to be addressed as per the Mary River Spill Response Plan. Key points are:
   - If safe to do so, stop the source of the spill.
   - Immediately report the spill to your supervisor.
   - For large spills initiate the Spill Response Plan.
   - Initiate cleanup of the spilt material using the emergency spill kits
   - Document the spill by the end of shift with a Spill Report Form – these are available from the Operations Department or your supervisor, provide spill report to Environment Department within 12 hrs.

Benefit of Compliance to Instruction:

- Regulatory Compliance
- Operator safety
- Environmental protection

Litter Control
Work Instructions

The control of litter is an essential part of our permit conditions and readily evident to all who drive by or onto the landfill. In an effort to maintain compliance with our permit and reduce the amount of time and effort required for this task the following procedures are to be followed:

Prevention of Litter at Working Face:

1. Minimize the length of the working face to reduce the size of the face exposed to wind. The maximum length of the exposed cell face shall not exceed 12 meters at any time.

2. Keep waste well confined at the working face to reduce the amount of waste susceptible to wind.

3. Deposit waste at the toe of the fill slope face and spread it upward.

4. Cover the compacted waste as soon as possible to minimize blowing litter

Control with Litter Fences

1. Position fences near the working face as wind and fill operations change.

2. Move or lengthen semi-permanent litter fences that are strung around the area to conform to filling operations and prevent migration of litter off the site.

Litter Pickup

1. Litter crews are to pick any litter off the fences to prevent the fence from being clogged and subject to over turning by the wind.

2. Promptly pick up any litter not trapped by the fences to prevent off-site migration.

Litter in Heavy Wind Conditions

1. Install litter fences prior to windy weather and relocate as required.

2. If lightweight material cannot be contained within the site, place intermediate cover over the material to prevent it from blowing.

Benefit of Compliance to Instruction:

- Compliance with operating permit
- Reduction in amount of litter migrating out of waste cell
- Minimize impact to native habitat
- Reduce the rework for picking up litter

Vector Control

Work Instructions

Vectors (any animals that carry diseases) are generally not present at a properly operated and maintained non-hazardous solid waste landfill (No domestic waste). The provisions of source segregation and waste inspection at the landfill prior unloading waste will safeguard against vector problems. Well-compacted wastes and cover material effectively prevent vectors from emerging or burrowing into waste materials. The following are basic guidelines to ensure proper vector control on site:

1. All waste is to be inspected at the landfill prior to unloading to confirm no domestic or food waste is present.
2. Maintain a narrow working face and cover all un-worked areas to minimize animal foraging at the site.
3. Cover waste on all unused slopes.
4. Ensure good compaction of the cover material to discourage animals from burrowing through it.
5. Keep equipment, storage and leisure areas free of debris and food waste to prevent vectors from establishing residence in or near areas where employees, support personnel work.

Benefit of Compliance to Instruction:

- Protects the health and safety of employees
- Eliminates potential exposure pathways to employees
- Reduces risk of contact with vectors and scavengers
- Maintains compliance with operating permit

Building and Equipment Fires
Work Instructions

Fire

1. Attempt to extinguish a small, controlled fire with equipment on site *WITHOUT* endangering yourself or other personnel. When in doubt, evacuate area and notify your supervisor & security immediately, providing all the required information (Your name, fire location, type, size etc…).

2. Keep all unauthorized people away from the area on fire.

3. Report the details of the fire in the *Special Occurrence Log* and, if applicable, complete an investigation report form (see your supervisor for these materials).

Benefit of Compliance to Instruction:

- Safety of all employee's is protected

Fire in Load
Work Instructions

Fire in Load refers to a vehicle load of wastes that are either on fire and/or smoldering or smoking prior to discharge to the landfill. All site personnel are expected to be familiar with the following procedures for handing such loads:

1. Direct the driver to dump the material in a clear area that is away from the fill face and clear of any vegetation and/or debris.

2. Notify your immediate Supervisor and the camp manager of the fire.

3. Spread out the load and extinguish the fire with water or soil

4. Once fire is determined to be completely out, allow the material to remain in the cleared area for the remainder of the working day.

5. If no fire is detected at the end of the working day, place the load into the fill.

6. If fire is discovered after the load has been dumped at the working face, the equipment operator will push the material away from the face (if it is safe to do so) to a cleared area where it can be covered with soil or extinguished with water.

Benefit of Compliance to Instruction:

- Health & safety of employees is protected
- Reduce the risk of a landfill fire

Hazardous Materials Spill Response and Reporting

Work Instructions

The responsibility for implementing this procedure begins with the person(s) responsible for the chemical spill (spill) or the first person(s) to discover the spill. They will be responsible for reporting the spill and completing cleanup actions (small spills) or requesting assistance for large spills.

Spill Reporting:

1. Report all spills of hazardous materials to your supervisor and the camp manager as soon as possible, regardless of the quantity of spilled material.

2. Be sure to provide the following information:

    • Type of spilled material
    • Quantity of spilled material
    • Location where spill occurred
    • Time and date the spill occurred
    • Description of the actions taken to contain and clean up the spilled material

3. The Site Services Supervisor will record the above information in the Log of Special Occurrences.

Spill Response:

All spills are to be addressed as per the Mary River Spill Response Plan. Key points are:

- If safe to do so, stop the source of the spill. Employees may attempt to contain the spill, provided their personal safety or the safety of others is not jeopardized by their actions
- Immediately report the spill to your supervisor.
- For large spills initiate the Spill Response Plan.
- Initiate cleanup of the spilt material using the emergency spill kits
- Document the spill by the end of shift with a Spill Report Form – these are available from the Operations Department or your supervisor, provide spill report to Environment Department within 12 hrs.

Benefit of Compliance to Instruction:

• Employees are trained to safely respond to spills, minimizing the potential impact to personnel or the environment
• Spills documented in accordance with regulatory requirements
• Regulatory Agency notified in a timely manner

Subsurface Landfill Fires

Work Instructions

Warning signs may include:

- Smoke and/or heat waves emanating from cracks and/or fissures;
- Localized settlement (sinkholes up to several meters in diameter);
- The odor of burning plastic/refuse may be present

BEWARE!

*The surrounding area may not be stable. The rapid decomposition of refuse by burning may have created large voids underground.
*Fumes may be toxic!

Safety Procedures

1. If an area is suspected of having an underground fire, block further access to the area and keep people away. Make sure anyone near the suspected fire is notified and/or vacated as may be necessary. If flames are present above ground, immediately notify the site services supervisor and camp manager through radio dispatch. (Note: Pumping water into the ground may not stop the smoldering and will not prevent future fires. Smothering with dirt is the preferred option).
2. Try to stay upwind of any smoke and not breathe fumes, if any.
3. Secure the site with cones, barricades, survey ribbon, etc. If voids are suspected the ground may be unstable – Do not walk or use heavy equipment on the waste pile.
4. The site services supervisor, camp manager and other staff will evaluate the conditions and develop a plan to safely deal with the fire (almost always smothering with dirt).
5. Notify the Baffinland environment department to evaluate the incident and confirm the repair plan is in compliance with permits
6. Once the fire is extinguished and the situation secured, look for other cracks and/or depressions in the area and schedule their repair. (They could be the source of air that allowed the fire to start originally).
7. Complete repairs to the landfill structure. Note completion of work in site log along with fire location for future reference.

Benefit of Compliance to Procedure:

- Employee's safety protected
- Environment is protected