BITTERROOT RESOURCES LTD.

WASTE MANAGEMENT PLAN (Appendix B)

WINDY PROJECT

2012

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APPENDICES

1. INTRODUCTION

Bitterroot Resources Ltd. will be following a waste management plan in order to safely dispose of waste. The aim of this plan is as follows

- Minimize and mitigate against any potential environmental impacts
- Compliance with water license and land use permit terms and conditions
- Compliance with Federal and Territorial legislation

2. WASTE MANAGEMENT IN NUNAVUT

In Nunavut, the Environmental Protection Division of the Department of the Environment is the agency responsible for ensuring the proper management of waste.

The following acts and regulations guide the division in working toward environmental protection in Nunavut. Links to these acts can be found on the Government of Nunavut's Department of Environment Website under Environmental Protection Legislation:

http://env.gov.nu.ca/node/82

Acts

Environmental Protection Act (EPA)

Environmental Protection Act: Summary Document

Environmental Rights Act (ERA)

Pesticide Act (PA)

Guideline Documents

The following guidelines have been developed to help compliance with Environmental Protection Legislation and Regulations.

Environmental Guideline for the Burning and Incineration of Solid Waste (2011)

Environmental Guideline for the Operation of Wood-Burning Appliances

Dust Suppression

General Management of Hazardous Wastes (2010)

Industrial Projects on Commissioner's Lands

Industrial Waste Discharges Into Municipal Waste and Sewage Treatment Facilities (2011)

Ozone Depleting Substances (2011)

Contaminated Site Remediation Property Owners Guide

Contaminated Site Remediation (2010)

Sulphur Dioxide & Suspended Particulates

Waste Antifreeze (2011)

Waste Asbestos (2011)

Waste Paint (2010)

Waste Solvent (2011)

Waste Batteries (2011)

Heating Oil Tank Stand Modifications for Fibreglass Tanks **(**NWT Housing Corporation)

Regulations

Spill Planning and Reporting Regulations

A Guide to Spill Contingency Planning & Reporting

Asphalt Paving Industry Emission Regulations

Pesticide Regulations

Policies

Waste Lead Policy

Management of fluorescent Lamp Tubes

3. WASTE SORTING

Waste at the camp will be sorted and safely and disposed of appropriately.

Hazardous wastes will be shipped to Manitoba for recycling and/or disposal at licensed facilities. Hazardous waste includes used oil, oil filters, paint, chemicals and batteries. See the Hazardous Waste Management Plan in Section 5.

Non-hazardous waste includes food, wood, cardboard, plastic, rubber, glass, cans and empty fuel drums.

All wastes will be separated/sorted and disposed of as follow:

Combustible wastes – will be incinerated in the incinerator on site.

On rare occasions and upon approval of the Nunavut Water Board, untreated wood and large pieces of cardboard may be burned in a controlled open burn according to the GN Municipal Solid Wastes Suitable for Open Burning Guidelines, refer to Appendix I in the Abandonment and Reclamation Plan.

Scrap metal – will be removed from site and taken to Manitoba for disposal.

Non-combustible inert wastes – will be removed from site and taken to Manitoba for disposal.

Non-combustible waste oil and oily rags – will be shipped from site in a sealed drum and taken to Winnipeg, MB.

4. INCINERATION GUIDELINES AND MANAGEMENT PLAN

1. GUIDELINES

- Wear gloves before handling any waste
- Separate waste into combustible and non-combustible waste at the source
- Burn food wastes daily to avoid accumulation of garbage
- Ensure ashes are cleaned out before each burn and stored in an empty drum to be sealed and shipped off site to an approved landfill
- Never leave the incinerator unattended while burning

- Ensure area around the incinerator is clean and tidy

The incinerator will be used to burn the following wastes:

- Kitchen wastes
- Paper and cardboard
- Other combustible waste
- Pacto bags

Waste should not to be stored at the incinerator and the area around the incinerator must be kept clean and tidy and free from waste at all times to avoid attracting wildlife including foxes, wolverines and bears. Excess kitchen wastes that cannot be handled immediately by the incinerator should be temporarily stored in a secure area where wildlife cannot access it.

Incinerator ash will be subject to being blown away so it must immediately be securely stored when removed from the incinerator.

DO NOT BURN THE FOLLOWING:

- **Styrofoam**
- **Plastics**
- **Waste oil**
- **Waste hydrocarbons**
- **Wood treated with preservatives**
- **Batteries**
- **Aerosols**
- **Wastes containing mercury, dioxins and furans**
- **Wastes contaminated with hydrocarbons such as oil filters etc.**
- **Paint and paint cans**

INCINERATOR MANAGEMENT PLAN

The management plan is based on the following documents:

INCINER8 Operator and Installation Manual

Incinerator Record Form

Executive Summary and Overview of the Environment Canada Technical Document of Batch Waste Incineration (2010)

Environmental Guideline for the Burning and Incineration of Solid Waste (2011)

Environment Canada Technical Document of Batch Waste Incineration (2010)

Canadian Environmental Protection Act

Federal Clean Air Act

Government of Nunavut Environmental Guideline for Air Quality – Sulphur Dioxide and Suspended Particulates (January 2002)

This incinerator management plan details safe operation and maintenance of the forced air dual-chamber incinerator including:

- Ash removal
- Pre-operational checks
- Waste batch preparation
- Incineration and Shut down
- Daily Routine Inspection and Maintenance
- Scheduled Maintenance

Whenever possible wastes on site should be reduced, reused or recycled rather than incinerated.

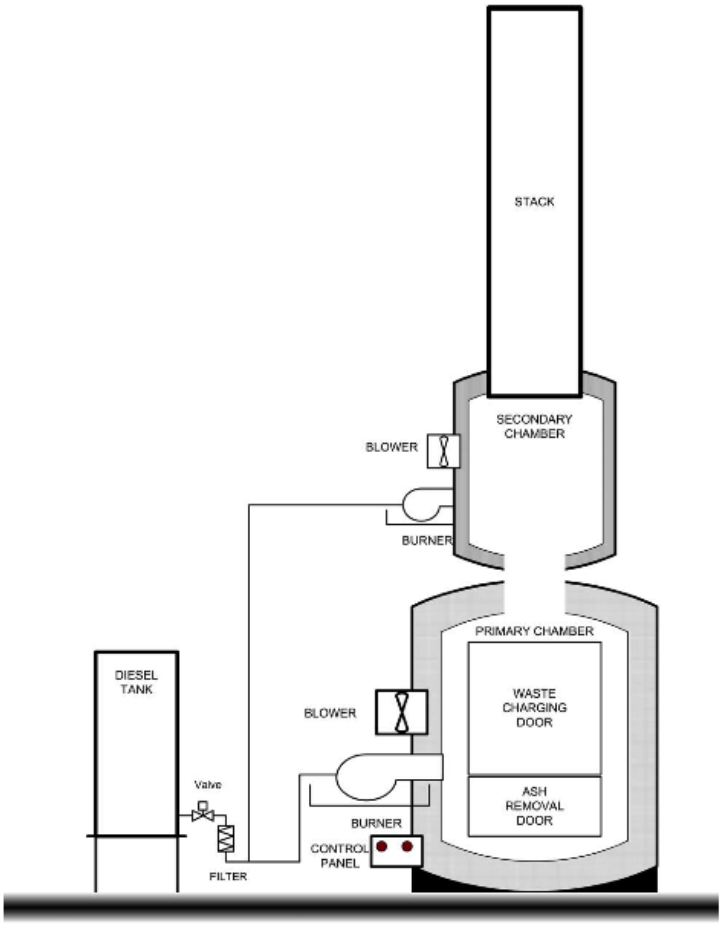

Figure 1: Schematic Diagram of Forced Air Dual-Chamber Design

REQUIRED EQUIPMENT

Steel- toed boots

Long cuffed puncture resistant gloves

Safety glasses

Hardhat

Shovel

Rake

Batch Poker

Electronic scales

Fire response equipment

PERSONAL PROTECTIVE EQUIPMENT

- Ash removal and handling – Full face shield and dust mask
- Feeding incinerator – heat resistant clothing or apron and full face shield

QUALIFICATIONS AND TRAINING

- WHMIS
- Completion of the on-site Waste Management training program
- On-site emergency and spill response training

INSTRUCTIONS

STEP	INSTRUCTION	HAZARD OR PROBLEM	MINIMIZE OR FIX
	Ash Removal The ash from previous operation is left to cool, and ash removal is done first prior to next operation.		
1	Wear personal protective equipment (gloves, face shield and dust mask) and have equipment ready such as a rake and shovel for removing ash from chamber.		
2	Make sure combustion chamber is sufficiently cool (Do NOT spray water into the combustion chamber).	Burns to the hands and body	Let chamber cool to prevent burns
3	While removing ash, avoid plugging the combustion air holes and damaging the burner tip.	Prevention of combustion from plugging the air holes with ash	Be aware of air holes when removing ash

4	Use non-combustible metal waste container with a lid. Weigh empty waste container prior to filling with ash and record on an Incinerator Record Form.	Fire if ash is too hot	Use a metal container
5	Turn off all power to the incinerator before opening the primary chamber door.	Electrocution	Turn off and unplug incinerator
6	Open Ash Removal Door and shovel ash into waste container being careful to minimize dust generation. Light water spraying on ash in the waste container is OK to minimize dust generation when removing from the primary chamber. Material that was not completely reduced to ash should be placed into the primary chamber for the next burn cycle. Close lid on waste container prior to moving.	Inhalation of airborne dust Clogging of chamber and prevention of incineration, if water is added to the chamber.	Dust mask and full-face shield to prevent dust inhalation. Only add water to the waste container, not the chamber.
7	Weigh ash in waste container prior to disposal and record on Incinerator Record Form.		
8	Transport ash in lidded waste container to storage area for transport.	Wind erosion of ash	Cover ash immediately in preparation for transport
	Pre-operational Checks		

1	Walk around incinerator to ensure that no rubbish is close to incinerator in the area of high heat.	Waste too close may burn	Keep waste out of zone of high heat
2	Check fuel tank to ensure there is enough fuel	Not enough fuel causing incomplete or partial burn	Fill fuel tank prior to each operation
3	Open fuel valve	If fuel valve is shut, combustion will not occur	Check before operation
4	Re-check that combustion chamber is empty and combustion air hoses are clear	If chamber is not empty, a batch may not fit entirely; if hoses are not clear, combustion will not occur	Check before operation
5	Connect electrical plug	Incinerator will not be able to pump diesel and therefore will not operate	Check before operation
6	Prime pump if necessary		
7	Ensure that the handling equipment is at the incinerator before operating.		
	Waste Batch Preparation		
1	Only prepare a batch for the incinerator of	Incompatible	Only burn

	wastes suitable to incinerate. **Do not incinerate explosives, aerosol cans, batteries or containers containing combustible liquids.**	wastes will produce visible stack emissions.	approved wastes.
2	Determine how wet / moist the waste is and mix with drier wastes. Do not mix anymore than 25% (one quarter of the batch) with wet kitchen waste.	Too wet and the waste will not burn completely and will require more auxiliary fuel (diesel) to burn.	Mix wet wastes with dry wastes to assist with combustion.
3	Make sure that every batch prepared can go through the Waste Charging Door and will not overload the Chamber.	Incomplete burn if overloaded or too large a load	Ensure batch is correct size.
4	Weigh waste batch prior to incineration and record Incinerator Record Form. Record the types of wastes that make up the batch on the Incinerator Record Form.		
	Incineration and Shut Down		
1	Pre-heat the combustion chambers to at least 850^{o}C and then select the off switch	Chambers will not heat properly; Waste will not combust completely	Close doors; preheat chambers
2	Load waste to the Primary Chamber through the Waste Charging Door; only fill to 60% of the chambers volume.	Overfilling and therefore not completely combusting	Do not overfill
3	Start incineration by closing the door and locking it. Restart the burner by setting the switch to “Main On” and adjusting the burn time to the desired time, usually 30-60 minutes depending on the amount of waste loaded. The fan should be set for a minimum of 6 hours after the burn cycle is completed. Reheat the chamber to a minimum of 850^{o}C. The temperature should be monitored so that it	Incomplete combustion	Ensure door is sealed an appropriate timers set

	does not exceed 1000°C in the secondary chamber, which can cause damage to the lining. Do not add waste to the chamber once incineration has started.		
4	Check status: set timers off, open waste charging door, inspect and rake if necessary	Burns to the hands and body	Wear appropriate Personal protective Equipment
5	If combustion is not complete, repeat Steps 3 and 4 until it is or leave to cool and remove waste that has not been incinerated, once ash is cool, for next burn cycle.		
6	To shut down, make sure all timers are off, unplug electrical connection, and turn off fuel valve.	Unplanned operation	Shut down all required items
7	Let ash cool before removing. See Ash Removal Instruction.		
8	At the end of every shift, give the completed Incinerator Record Form to the Supervisor for entry into the Waste Database.		

MAINTENANCE

STEP	INSTRUCTION	HAZARD OR PROBLEM	CONTROL OR FIX
	Daily routine inspection and maintenance To be completed by operator before every use.		
1	Check fuel lines for leak and check connections	Leads to incomplete incineration	Inspect before each use
2	Check spark arrestor to ensure no plugging	Leads to incomplete incineration	Inspect before each use
3	During ash removal, inspect refractory for large cracks (not expansion cracks)	Leads to incomplete incineration	Inspect before each use

4	Inspect door gaskets for damages	Leads to incomplete incineration	Inspect before each use
5	Check combustion air hole for plugging	Leads to incomplete incineration	Inspect before each use
	Scheduled Maintenance Monthly and annual maintenance is required to be performed by a qualified individual or service agency licensed or certified to install and provide technical service to oil heating systems.		
	See the INCINER8 Operator and Installation Manual for specific maintenance requirements.		

ISSUES

STEP	INSTRUCTION	HAZARD OR PROBLEM	CONTROL OR FIX
	Low-temperature operating problems		
1	During extreme low temperatures, issues may occur with incomplete incineration.	Extreme low temperatures	Do not operate, wait until weather improves
	Visible stack emissions		
1	Visible emissions from the stack indicate that the combustion process is not correct. Emissions increase when:	Visible stack emissions	Adjust incinerator accordingly to prevent

	• Temperature in the secondary chamber is too low • Not enough air for the waste being burnt • Too much air into the primary or secondary chambers • Excessive negative draft • Incompatible waste for incineration such as plastics.		emissions
	High fuel consumption occurs when the operator is trying to burn extremely moist waste, or when too much air is added to the system.	Excess fuel used for combustion	Ensure that moist waste is distributed amongst the batches; check to ensure that there are no leaks in the combustion chambers.

5. HAZARDOUS WASTE MANAGEMENT

The Environmental Protection Division of the Department of the Environment is the agency responsible for ensuring the proper management of hazardous waste and other contaminants in Nunavut. The Environmental Protection Act, which prohibits the discharge of contaminants to the environment and allows the Minister to make sure that appropriate management measures are in place.

The summary below is based on the Environmental Guideline for the General Management of Hazardous Waste (Appendix V).

Other legislation that applies to the storage, handling and transport of hazardous material can is listed in Appendix VI.

1. Hazardous Waste IN CAMP

Hazardous waste will be appropriately stored in a separate area before being shipped south for disposal at licensed facilities. Hazardous waste includes used oil; oil filters, used absorbent materials, oily or greasy rags, antifreeze, paint, chemicals, batteries and used grease.

The *Transportation of Dangerous Goods Act (Canada)* requires that personnel involved in shipping and control of hazardous materials be trained in the application of the Act.

The bulk of the hazardous material at the Kiyuk Lake camp will be petroleum products.

Alternatives to hazardous products will be investigated and used if feasible.

A list of the hazardous materials and quantities will be maintained at the office at the Kiyuk Lake Camp in the format below:

Product Name	Storage Location	Approximate Volume at Present	Maximum Volume Stored

2.Hazardous Waste CLASSIFICATION

Hazardous waste is classified using a system developed under the *Transportation of Dangerous Goods Act (Canada)*. Wastes are consigned to one of nine classes based on their chemical, physical or biological properties.

From **Transportation of Dangerous Goods Act, 1992 (S.C. 1992, c. 34)**

Class 1 — Explosives, including explosives within the meaning of the *Explosives Act*

Class 2 — Gases: compressed, deeply refrigerated, liquefied or dissolved under pressure

Class 3 — Flammable and combustible liquids

Class 4 — Flammable solids; substances liable to spontaneous combustion; substances That on contact with water emit flammable gases

Class 5 — Oxidizing substances; organic peroxides

Class 6 — Poisonous (toxic) and infectious substances

Class 7 — Nuclear substances, within the meaning of the *Nuclear Safety and Control Act*, that are radioactive

Class 8 — Corrosives

Class 9 — Miscellaneous products, substances or organisms considered by the Governor in Council to be dangerous to life, health, property or the environment when handled, offered for transport or transported and prescribed to be included in this class.

3. Hazardous Waste STORAGE AND TRANSPORTATION

Storage is considered the containment of a hazardous waste for transport and is a temporary measure; it is NOT an acceptable long –term management of hazardous waste.

Hazardous materials will be labeled in accordance with regulations. MSDS sheets will be available for all hazardous materials and located in a binder in the office as well as in a binder in the storage area. The MSDS sheets can also be found in the Appendices of the Spill Prevention and Response Plan.

All persons who will be handling hazardous materials will be trained appropriately.

Hazardous material will be stored in a safe, dry manner with clear labeling and secondary containment. All storage areas will be clearly identified with proper labeling and signage and will be regularly inspected.

Storage areas for fuel and chemicals will be inspected daily during camp operations. Inspections will be recorded with the date, time, person and name of the person conducting the inspection.

All hazardous material will be stored a minimum of 31 m from the high water mark of any water body.

For transportation each waste should be classified in one of the 9 classes and then identified using a specific “UN” number assigned under the *Transportation of Dangerous Good Regulations.*

The registration numbers for hazardous waste generator and carrier will be filled out in camp as below:

6. HAZARDOUS WASTE NUMBERS

HAZARDOUS WASTE GENERATOR	
HAZARDOUS WASTE CARRIER	
HAZARDOUS WASTE RECEIVER GFL Environmental Winnipeg, MB	MBR04811

7. GOVERNMENT CONTACTS

Government of Nunavut

Environmental Protection Division

Department of Environment

Inuksugait Plaza

P.O. Box 1000, Station 1360

Iqaluit, Nunavut X0A 0H0

Telephone: (867) 975-7729 Fax: (867) 975--7739

Motor Vehicles Division

Department of Economic Development and

Transportation

P.O. Box 10

Gjoa Haven, Nunavut X0B 1J0

Telephone: (867) 360-4615 Fax: (867) 360-4619

Workers' Safety and Compensation Commission

P.O. Box 669

Baron Building/1091

Iqaluit, Nunavut X0A 0H0

Telephone: 1-877-404-4407 (toll free) Fax: 1-866-

979-8501

Department of Community and Government

Services (all Divisions)

P.O. Box 1000, Station 700

4th Floor, W.G. Brown Building

Iqaluit, Nunavut X0A 0H0

Telephone: (867) 975-5400 Fax: (867) 975-5305

Office of Chief Medical Health Officer of Health

Department of Health and Social Services

P.O. Box 1000, Station 1000

Iqaluit, Nunavut X0A 0H0

Telephone: (867) 975-5774 Fax: (867) 975-5755

Government of Canada

Aboriginal Affairs and Northern Development Canada, Nunavut Region

P.O. Box 2200

Iqaluit, Nunavut X0A 0H0

Telephone: (867) 975-4500 Fax: (867) 975-4560

Environment Canada (NWT and Nunavut)

5019 52nd Street

Yellowknife, Northwest Territories X1A 1T5

Telephone: (867) 669-4730 Fax: (867) 873-8185

Department of Transport Road, Rail, Marine, Air

P.O. Box 8550

344 Edmonton Street

Winnipeg, Manitoba R3C 1P6

Telephone: 1-888-463-0521 (toll free)

Fax: (204) 983-8992 Road, Rail and Marine only

Fax: (204) 983-1734 Air only

8. PROJECT CONTACTS

• **CONTACT**	• **TELEPHONE NUMBER**
• NWT/NU 24 hour Spill Line	• (867) 920-8130
• INAC Water Resource Officer, Iqaluit	• (867) 975-4295
• Environment Canada	• (867) 975-4644
• Government of Nunavut Department of Environment, Robert Eno	• (867) 975-7729
• Kivalliq Inuit Association	• (867) 645-5725
• DFO	• (867) 979-8007
• PGC, Quinton Hennigh Project Manager	• (720) 938-1945
• Arviat RCMP	• (867) 857-0123/1111
• Nunavut Water Board	• (867) 360-6338
• Treeline Lodge Camp-24 hour-Garry or Shawn Gurke	• (519) 609 6057

Appendix 1:

List of further legislation that applies to the storage, handling and transport of hazardous materials:

Canadian Environmental Protection Act (CEPA)

Fire Prevention Act

Safety Act

Public Health Act

Spill Contingency Planning and Reporting Regulations

Transportation of Dangerous Goods Act (Canada)

Interprovincial Movement of Hazardous Waste Regulations (CEPA)

Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (CEPA)

International Air Transport Association (IATA) Dangerous Goods Regulations

International Civil Aviation Organization (ICAO) Technical Instructions

Workers' Compensation Act

WHIMIS (Workplace Hazardous Materials Information System)

National Fire Code

Fisheries Act

Territorial Lands Act

Nunavut Waters and Nunavut Surface Rights Tribunal Act

For additional information on the management of hazardous waste, or to obtain a complete listing of available guidelines, contact the Department of Environment at:

Environmental Protection Division

Department of Environment

Government of Nunavut

Inuksugait Plaza, Box 1000, Station 1360

Iqaluit, Nunavut, X0A 0H0

Phone: (867) 975-7729

Fax: (867) 975-7739

Email: EnvironmentalProtection@gov.nu.ca

Website: http://env.gov.nu.ca/programareas/environmentprotection