

# NEW DISCOVERY MINES LTD. MON GOLD MINE WASTE MANAGEMENT PLAN

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## **Revisions:**

### **Original Plan: October 2013**

### **Revision 1: December 2013**

*Insert revision section*  
*Entitle*  
*Insert Contents page*  
*Reformat entire plan*

### **Revision 2: April 2014**

*Explicit statement of operation and waste segregation*  
*Statement on on-site storage of waste*  
*Statement on on-going removal of non-conforming waste for incinerator*  
*Statement that manufacturers manual for incinerator to be delivered to Inspector for approval*  
*Maximum incinerator load defined*  
*Stipulate how waste rock is stored and monitored*  
*Waste and ore handling and storage*  
*Drill cuttings handling*  
*Drill fluids handling*  
*Drill water discharges monitoring*  
*Monitor ground water seepage into underground*

### **Revision 3: May 2015**

*Modify to incorporate milling operations*

### **Revision 4: July 2015**

*Add Incineration details*  
*Add designs for secondary containment*  
*Add / modify plans to management of sewage*  
*Modify management of all waste including drill cuttings*  
*Add details regarding installation and operation of sumps*  
*Add location of storage of ammonium nitrate*  
*Add maps 1, 2, 3, and 4*  
*Add additional details on the proposed disposal of mine water (include parameters to be tested)*  
*Add further details on the disposal of mill water*  
*Add further details on proposed management and disposal options or any ground water that may be encountered.*

**Revision 5: October 2015**

*Add Land Farm details.*

**Revision 6: August 2016**

*Reviewed, no changes*

**Revision 7: September 2016**

*Register as Hazardous Waste Generator when required*

*Activities will comply with Guidelines for the Management of Hazardous Waste in the NWT and Confirm the ultimate disposal of Hazardous Waste on Hazardous Waste Movement Documents*

*Add details on landfarm design, construction and operation*

*Add details on sewage and greywater treatment facility (bioreactor)*

*Update details on separation of treated and untreated wood waste*

*Section "Forms" reviewed and amended*

*Section on Mine Water Disposal amended to track Water License details*

*Section on Sumps and Management of Drilling Waters reviewed*

*Section on Mill Waste reviewed. Separate plan being prepared*

*Section on Mine Rock reviewed. Separate plan being prepared*

*Add Section on Secondary Containment*

*Location of ammonium nitrate storage added to Management Plan Map*

**Revision 9: October 2016**

*Updated to include reference to GNWT Inspectors as appropriate, and the reference to AANDC inspectors removed*

*Bullets under the Wood Waste section outlining wood waste management updated to clearly identify which bullet represents untreated wood waste management activities, and which represents treated wood waste management activities.*

*The information on page 12 regarding mine waste water discharge updated to reference the correct Water Licence conditions.*

*Location for the storage of ammonium nitrate added to the map within the Waste Management Plan.*

**Revision 10: December 2018**

*Reference to pre-1980 refuse sites added.*

*Confirm diamond drill site wastes are appropriately considered.*

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## **Introduction**

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

## **Plan Applicability**

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

## **Environmental Policy**

New Discovery Mines Ltd.'s Environmental Policy follows conditions and regulations of all permits and licenses and E3 Policies of the PDAC

## **PROTECT THE ENVIRONMENT**

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

### **Introduction**

In most countries, environmental law, regulations and guidelines exist to provide direction for exploration activities. In the absence of these, explorers are advised to apply good practice as described in the e3 Plus Excellence in Environmental Stewardship Toolkit, and, in the case of more advanced exploration projects, the Performance Standards of the International Finance Corporation (2012). Policies and Management Processes In developing systems for the management of environmental and socio-environmental matters, explorers are encouraged to follow established guidelines and give consideration to the following:

- a. Adopt and make public policies and procedures for the management of environmental and social issues;
- b. Create a management and reporting structure that identifies objectives and allocates appropriate resources and responsibilities for the environmental and social aspects of exploration projects;
- c. Apply relevant national regulations and inform themselves of international good practice guidelines for environmental management;

- d. Establish procedures for the management of environmental issues that are relevant in the area of exploration. Explorers are encouraged to involve the local community in the identification and implementation of preferred environmental management options;
- e. Advance understanding amongst employees, contractors, local stakeholders and affected communities of the potential impacts of exploration and mining on the environment and relevant procedures to prevent and mitigate adverse environmental impacts;
- f. Take reasonable steps to ensure that contractors have the capacity to implement operational controls and comply with environmental policies and procedures; and
- g. Where possible, support capacity building and education of local stakeholders and affected communities in environmental management using appropriately qualified, independent experts.

## **Impact Assessment and Management**

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

- a. Conduct an initial, and then periodic assessments of potential direct, indirect, and cumulative environmental and social impacts, risks and hazards of exploration activities on the environment and people;
- b. Conduct and document baseline environmental and social studies to establish any pre-existing conditions against which changes can be monitored, and share the results of such studies with local communities;
- c. Work with government and the local community to identify the potential to augment or complement existing land use and development strategies or plans;
- d. Where possible, incorporate local or traditional knowledge and practice into baseline studies and the management of environmental issues, but also be respectful of the nature of such information and maintain confidentiality;
- e. Have in place and periodically test procedures and equipment to respond to potential environmental incidents;
- f. Create and implement procedures for managing chance finds of archaeological sites, artifacts or cultural items;
- g. Use processes that reduce the consumption of energy and water and provide for the safe storage and disposal of hazardous materials and residual wastes; and
- h. Carry out continuous remediation and reclamation of lands affected by exploration activities.

## **Vulnerable Environments and Biodiversity**

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

- a. Respect legally-designated protected areas and promote practices that support biodiversity assessment and management;
- b. Engage with indigenous peoples and local communities to identify valued environmental sites, and any other locations of importance to local people so that the exploration project is respectful of these areas; and
- c. Support the development and implementation of sound, inclusive and transparent approaches to land-use planning, biodiversity, conservation, and climate change, based on the best available data, including traditional knowledge.

## **Monitoring and Reporting**

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

- a. Where possible, create a community based process for the participation of local stakeholders and other affected and interested parties in the monitoring and verification of environmental management performance and, where applicable, support capacity building so that such activities are meaningful and effective; and
- b. Prepare and publish regular reports on environmental performance that, wherever reasonably possible, are validated by local stakeholders and affected communities or other third party observers or auditors.

## **Purpose and Scope of the Waste Management Plan**

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

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

The objectives of this Waste Management Plan are to re-establish the Mon Gold Mine Camp and conduct drilling and other exploration allowed under permits in such a way as to reduce/reuse and

recycle where possible, and to handle and dispose of waste so as to obviate or minimize impact to environment, offer local employment and use local services as best complements the exploration program, to operate in compliance with governing authorizations and legislation, and to strive for continuous improvement in environmental management, which is a core objective of all environmental programs.

## **Project Description**

New Discovery Mines Ltd. wishes to operate under a Land Use Permit from the MVLWB. A range of exploration activities, including prospecting, surficial rock sampling, underground bulk sampling, drilling and operation of seasonal tent camps are to be authorized under the permits under application. The WLWB authorization also will allow for operation along an existing winter road right of way and of a pre-existing 4 km-long winter spur route.

Processing of the ores recovered from the permitted operations will:

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

## **Proposed Location of Waste-Management Activities**

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

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

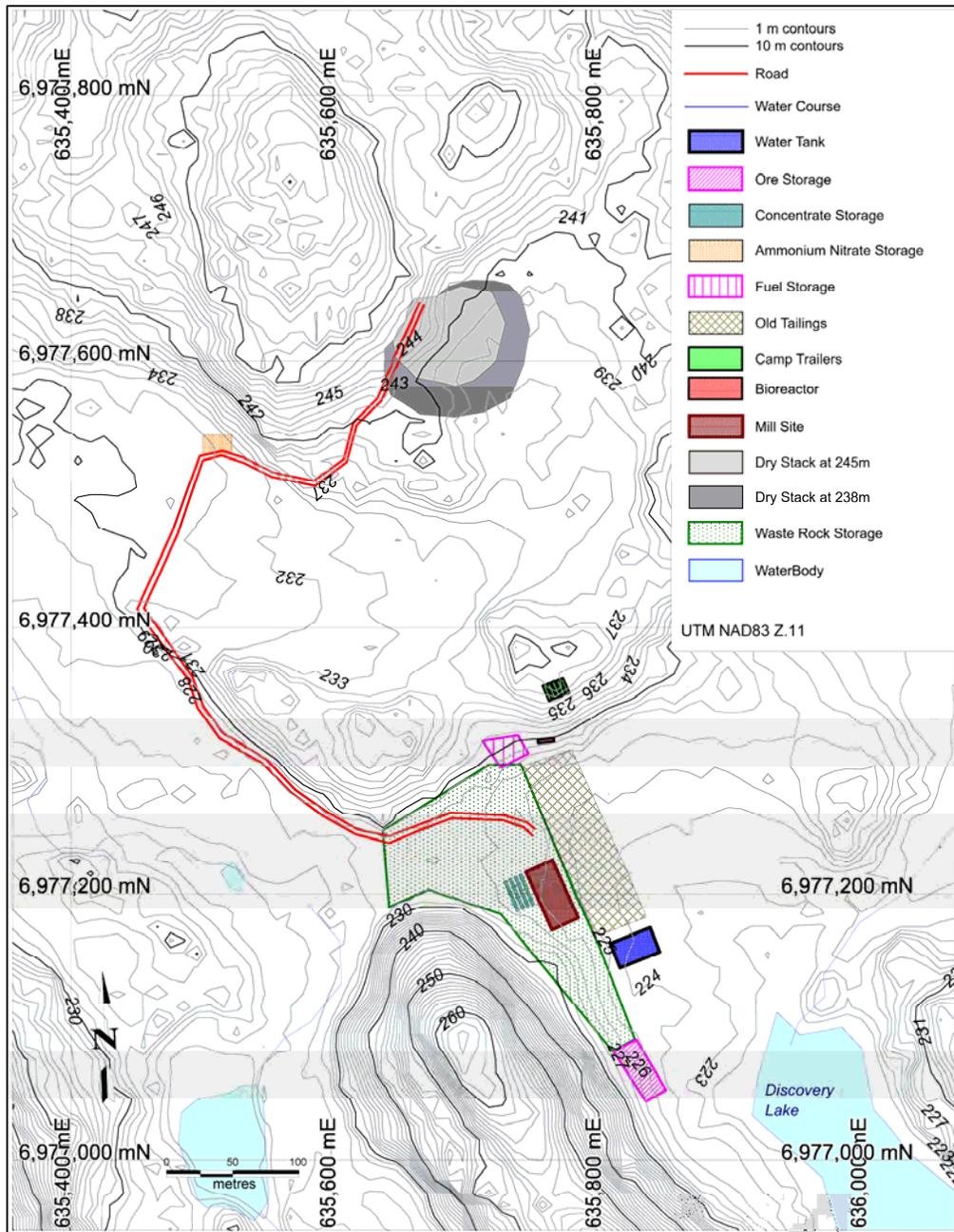


Figure 1 Map 1, Location of waste management sites.

Specific waste-management locations at drillsites will be as follows:

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

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

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

## **Historical Land-Use and Waste Management**

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

## **Site and Setting Characteristics**

The Mon Gold Mine lies within the Slave Structural Province of the Northwest Territories (the Slave Province), which is an Archaean segment of the North American Craton that covers 213,000 km<sup>2</sup>. It is composed of granites, gneisses and supracrustal rocks. The Slave Province is a classical setting for diamondiferous kimberlites, rare earth element, light element and base and precious metal deposits.

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

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

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

Caribou, wolves, foxes, rabbit, moose, ptarmigan, wolverines, ground squirrels and black bears are native to the area. Most of the larger lakes contain fish and support bird life.

The terrain in the Discovery Lake area where the Mon Gold Mine Project and camp are located is rugged tundra with little topsoil, low-lying shrubs and a large percentage of exposed supracrustal rocks. The area contains hundreds of small, shallow, glacially-formed lakes. The Yellowknife River flows into Great Slave Lake.

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

## Conclusion from Existing Site Data

Based upon findings to date, collected during a period of more intensive activity in the 1980's and 1990's, it can be predicted that proposed advanced exploration activities at the Mon Gold Mine projects have low potential of adverse environmental effects attributable to camp and drill waste, particularly given the existing Spill Contingency Plan, and Closure and Reclamation Plan, and corporate commitment to staff and contractor training. Continuous reclamation of historic refuse piles improves the over all waste management of the site.

## WASTE TYPES - CAMP

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

Camp statistics: Expected period of operation = Year round.

Maximum camp population = 12 persons

Footprint of camp compound = 50m wide x 100m long

Locations of waste generation:

- i. *Toilets* (sewage); *kitchen/dry tent* (greywater, household garbage, recyclables such as cardboard, packing, tins and other containers);
- ii. *incinerator* (ash); *generator shed*: (waste oil and fuel, waste solids [filters, absorbents, rags], auto or marine battery);
- iii. *office* (household garbage, small batteries, recyclables such as paper, cardboard, cartridges and other office waste, *helipad* (waste oil and fuel, waste solids);
- iv. *fuel storage berm*, 100m S of camp compound (waste would be generated here if fuel transfer were to occur here. Otherwise, separate area of berm would be assigned for any drummed fuel waste generated elsewhere but not stored in the camp compound);
- v. Mine, rock waste, to be used or disposed in the areas marked on Map 1 (Figure 1)

- vi. Mine, rock not waste, to be stored in the areas marked on Map 1 (Figure 1). This will be processed in the Mill shown on Map 1 (Figure 1).
- vii. Mine water, to be stored in an underground sump to clarify and remove oils, and then discharged into a holding tank on surface for use in mill. This will be skimmed of visible oils using absorbent pads prior to final discharge into a low area >100 m from any stream when the mill is not operating. All discharge concentrations and physical parameters shall be consistent with any specifications in the active Water Licenses (Specifically Part G, conditions 8, 9, 10, 11, MV2014L2-0002).
- viii. Mill products will be flown out in the case of dore products, trucked out by winter road in the case of flotation concentrates, and stored as dry stack tailings as shown on Map 1 (Figure 1). Water recovered from the filtration system will be recycled and water entrained in the flotation and dry tailings will need to be made up

Water usage resulting in greywater volume < 3m<sup>3</sup> per day maximum when camp is at full occupancy

**Waste types at Mon Gold Mine Camp will be as follows:**

## **GREYWATER**

Greywater/wash water from kitchen, dry

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

## **Bioreactor discharge**

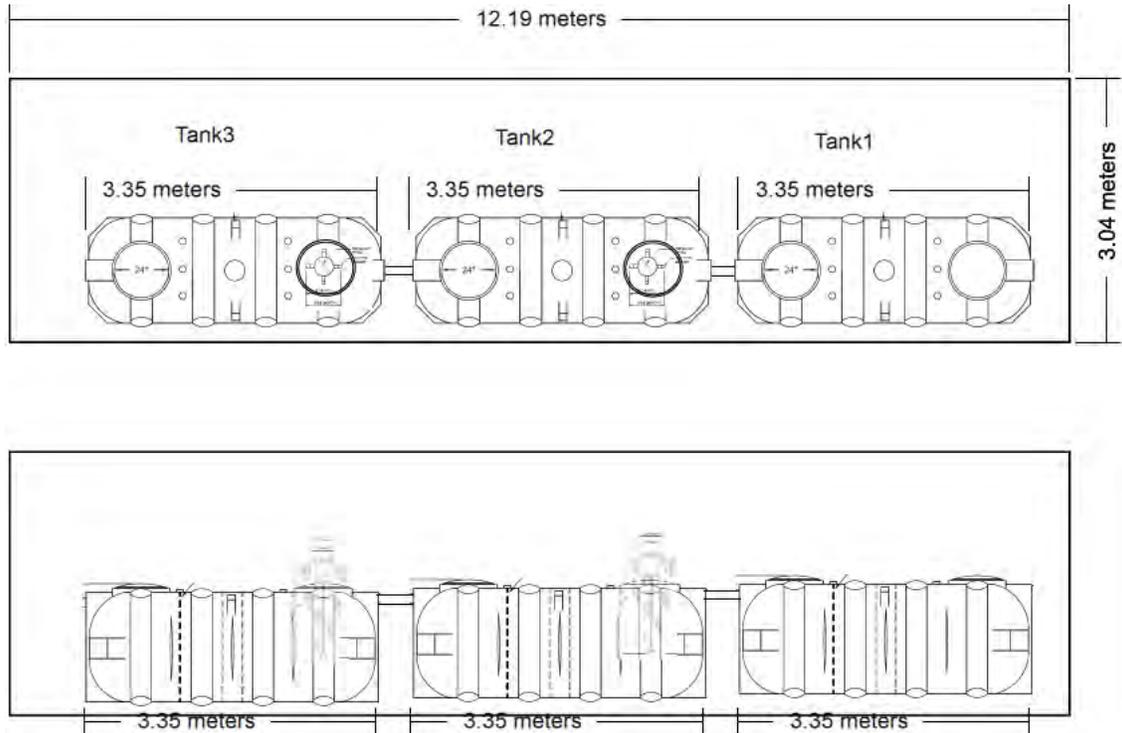
- Discharge distance from lakeshore: approx. 200m;
- Bioreactor pipes outfall to a natural depression area in the fill base on which the camp is sited; outfall is to a natural depression east of the bioreactor container;
- Greywater volume when camp at 12 persons < 3m<sup>3</sup> per day maximum;

How bioreactor functions:

- Effluent (greywater and sewage) is comminuted in a 500 litre tank via a grinding pump transferring to the first tank;
- First tank holds and initiates biological digestion of organic material prior to discharge into second tank and then again into the third tank.
- Total retention will average 7 to 10 days
- Effluent outfalls to a swamp depression and percolates through the boulder and cobble fill;
- Sump flow: Very gentle gradient, with flow in a east direction which follows the orientation of the fill base and camp (see *Map 1, Figure 1*);
- Natural permafrost is below the thick layer of fill on which camp is sited;

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

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



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

**Figure 2. Configuration of Sewage and greywater bioreactor.**

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

## WASTE LIQUIDS AND SOLIDS

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

### Liquids

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

## Solids

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

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

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

## **OTHER WASTE**

### **Fuel Containers**

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

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

### **Metal Scrap**

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

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

### **Batteries**

Small (AA, AAA, C, D) = approx. 48 per year; two or three auto or marine lead-acid battery for generator in resistant sleeve or holder;

Disposables sent to designated area of Yellowknife landfill; occasional auto or marine battery will be disposed to and accepted by Yellowknife Landfill OR recycled.

### **Miscellaneous Chemicals**

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

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

## **Wood Waste**

### **UNTREATED WOOD WASTE**

#### **Trees, brush (untreated)**

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

#### **Construction scrap – lumber and timbers (untreated)**

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

#### **Construction scrap – lumber and timbers (untreated)**

- Recyclable on site (stacked and stored) or burned

### **TREATED WOOD WASTE**

#### **NO PRESSURE TREATED WOOD WILL BE PERMITTED ONTO THE PROPERTY**

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

## **Kitchen and Dry Waste**

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

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

## **Office Waste**

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

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

## **Mill Waste**

This section is more fully described in a separate document entitled Mill Waste.

The mill will process a nominal 100 tpd of ore which will be crushed and ground into a slurry of P80% -150 mesh solids. Approximately 2 tonnes of flotation concentrate and 0.04 tonnes of gravity concentrate will be produced per day.

Approximately 98 tonnes +/- of solids to be dry stacked. This will contain approximately 15% moisture. The tailings solids are non-acid generating and have very low deleterious element concentrations including arsenic levels <15 ppm.

Primary monitoring trenches will be excavated downslope from the dry stack and water collected from these trenches will be tested for various physical parameters (including pH), ammonia, and various trace elements. Secondary monitoring trenches will be excavated several hundred meters downslope from the primary monitoring trenches and a similar testing protocol will be implemented.

Work by Jackson, R.G. (1975) shows most lakes in the Yellowknife area have higher natural levels of deleterious elements, and more recent work on other similar terrains in Newfoundland (Serpa et al., 2009) and in Finland (Reimann et al., 2009) show non-anthropogenic arsenic in soils >25 ppm covering most of northern Finland and the adjoining portion of eastern Russia, and that more than 10% of Newfoundland is underlain by areas where lake sediments routinely exceed 25 ppm.

The mill operates using 100 m<sup>3</sup> of water per day, of which recycled water from the tailings filter will provide 80 to 85 m<sup>3</sup>, the mine will provide approximately 3 m<sup>3</sup> and the balance will be made up using fresh water.

The mill will operate with a water deficiency and require make up water when operating as predicted. No mill water will be disposed of except as entrained in solids.

## **WASTE TYPES – DRILLSITES**

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

### **DRILLWATER WITH CUTTINGS**

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

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

#### **Drill water sump**

Sumps are to be located at least 100m from water bodies or at such other distance as may be preapproved from time to time by a GNWT Land Inspector, but in all cases are sited and controlled such that any flow is directed away from water bodies;

- control measures may include snow/ice berms, earthen berms, manufactured barriers and silt fences to retain solids and allow passage of clean water;
- Sumps are monitored continually during drilling; winter sumps are re-checked in thawed summer conditions to ensure slow percolation through thawed active soil layer; documenting photos are taken at hole closure/end of sump use and at re-check;
- all cuttings report to a land-based sump;
- Water used and reporting to sump (1 core drill) = 3 m<sup>3</sup> /day;

- Experience derived from 30 seasons of reclamation/monitoring sumps in this area have demonstrated that even larger sumps can be successfully restored to their former condition and that vegetation can and does re-establish, and wildlife return to forage the re-established growth;

## **DRILLSITE MATERIALS**

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

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

## **ROCK, WASTE**

Rock excavated during the mining program will be stored at the site denoted for such use on Map 1 (Figure 1).

- Samples of each geologically identifiable rock type will be collected, consolidated, and tested for various environmental parameters.
- To be placed at approved locations only.

## **ROCK, NOT WASTE**

Rock excavated during the mining program will be stored at the site denoted for such use on Map 1 (Figure 1).

- Samples will be collected, consolidated, and tested for various environmental and metallurgical parameters.
- To be placed at approved locations only.
- This application will look to process this material as described above.

## **GROUND WATER FLOWS**

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

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

Make up water is required in the mill, and any additional ground water flows will be used to displace water required to be pumped from Discovery Lake.

### **Sumps**

All mine water will be first pumped to underground sumps. These sumps will be constructed from blasted developments 3m wide and 9 to 12 m long and 2 to 3 m deep (3 m high). Mine water will be pumped into these sumps and visible oil will be collected using absorbent mats and then reused underground. Sediments decanted from the mine water will remain and when they limit the sump capacity, the sump will be capped (filled) and a new sump will be used.

Any discharge of water from the mine will be less than 3 m<sup>3</sup> per day and will be deposited from the underground sump to a surface tank for use in the mill. If the mill is not operating, then up to 3 m of water per day will be disposed of from the surface tank to the swampy area east of the mill as was done in 1989-1997. The water will have no visible oil sheen and will be tested for ammonia, pH, and trace elements as per approved SNP protocols.

### **SPILL CONTINGENCY PLAN**

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

### **Waste Handling**

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

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

### **Land Farms**

- Place on an HDPE liner in a flat area away from wildlife ingress, covering an area approximately 4m x 4m with hand constructed rock berms to inhibit solid or liquid outflow.
- Keep moist, turn by hand, fertilize or lime to control nutrients and pH as needed, using domestically available fertilizer or lime.

- Follow guidelines from Federal Guidelines for Landfarming Petroleum Hydrocarbon Contaminated Soils, March 2006, updated 2013.
- Analyze at commercial lab prior to closure.

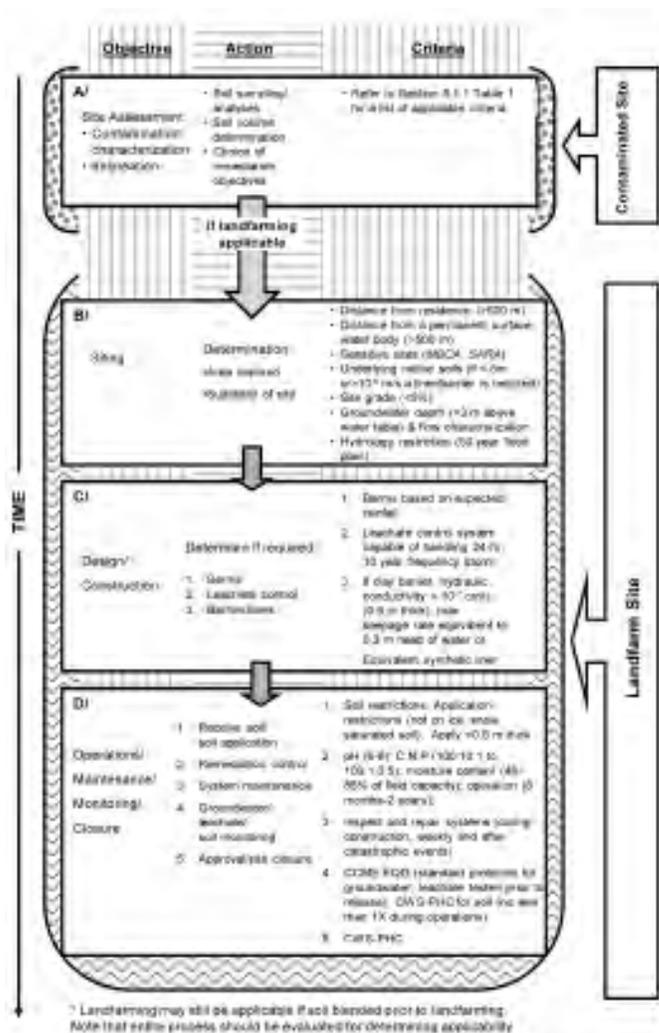


Figure 3. Criteria for selecting area for Landfarming, from Federal Contaminated Sites Action Plan, 2013

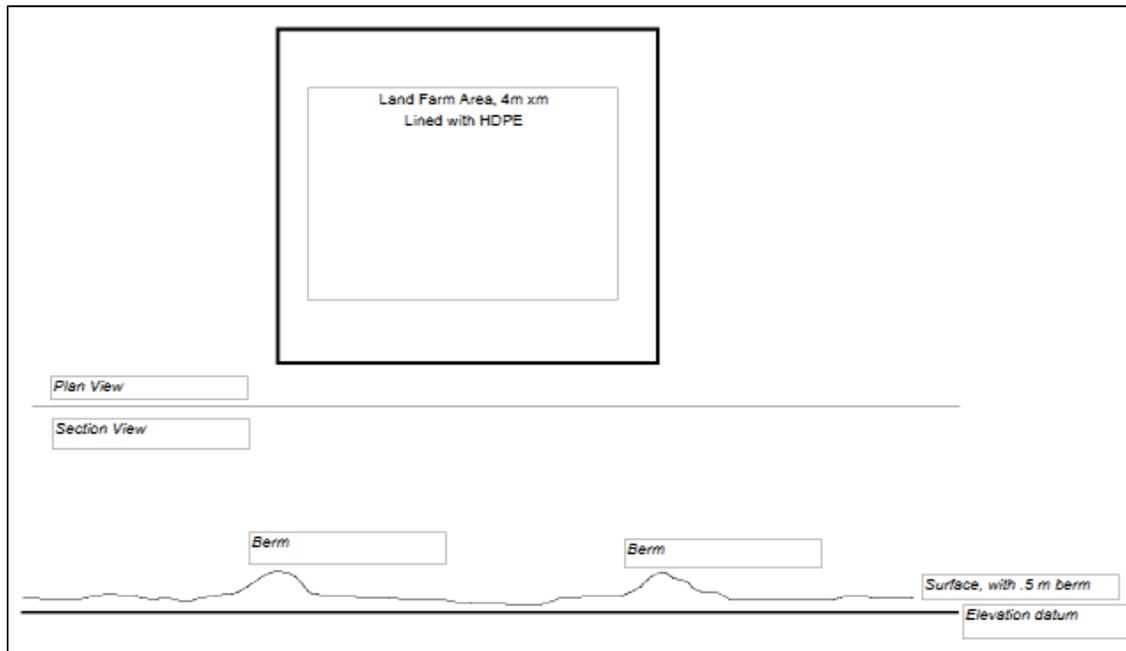


Figure 4. Diagrammatic Plan and Section of conceptual Land Farm

Table 1. Summary of Waste Products Anticipated to be Produced

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

<b>MILL SOLIDS (TAILINGS)</b>	Non-hazardous	Disposal in designated area and/or process	None expected
<b>MINE WATER</b>	Non-hazardous	Disposal in designated area and/or process	None expected
<b>CONTAMINATED SOILS, SNOW/WATER</b>	Potential hazardous	Collect and Landfarm	No long term, short term treatment period

## Secondary Containment

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

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

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

## **INCINERATION GUIDELINES**

For Elastec Smart Ash Cyclonic Unit

### **ITEMS WHICH CAN NOT BE BURNED**

- Styrofoam
- Plastics
- Waste oil, any waste hydrocarbons
- Wood treated with preservatives
- Metal
- Glass

### **ITEMS WHICH CAN BE BURNED**

- Food scraps
- Wood
- Paper
- Organic material, cloth (cotton/wool)
- Fuel and oil (fresh / clean)

**WRITTEN APPROVAL OF THE INCINERATOR BY GNWT LAND USE INSPECTOR MUST BE POSTED PRIOR TO OPERATION**

### **GUIDELINES**

- Only approved personnel are permitted to handle waste.
- All waste products must be segregated according to approved categories.
- Be sure to wear gloves before handling any waste.
- Prior to burning, food and food waste products must be secured from attracting animals.
- Burn food wastes daily to avoid accumulation of garbage (wildlife attractant)
- Make sure the ashes are cleaned out prior to each burn
- Never leave the incinerator unattended while burning
- Keep the area around the incinerator tidy, do not leave any garbage unsecured.
- Place ashes in an empty drum which will be sealed and shipped off site (when full) for disposal in an approved landfill
- Non combustibles shall be prepared and stored for winter transport or flown out.
- Hazardous waste must be stored in approved locations and handled according to NWT guidelines

- Incinerator operating specifications including maximum load capacity must be adhered to.

# SmartAsh

CYCLONIC BARREL BURNER®

- Remote Locations
- Mining Camps
- Job Sites
- Oil Drilling Operations
- Truck Stops
- Construction Sites
- Islands
- Barges
- Campsites
- Military Installations





# SmartAsh

CYCLONIC BARREL BURNER®

**SmartAsh Burns:**

- Oil Soaked Absorbents
- Used Filters
- Waste Oil
- Paper Waste
- Wood By-Products
- Oily Rags, Gloves & Clothes
- Grease
- Domestic Waste

The air powered SmartAsh uses no external fuel. Simply load a 55 gallon (208L), open head steel drum, light the load and clamp on the lid. A whirlwind of fire and intense heat is created inside the drum, burning your refuse with no smoke and no smell. Thousands of satisfied customers are currently using SmartAsh around the world to eliminate a wide variety of burnable waste materials. Combustion is complete, leaving ash equal to 3% by volume of the original load.

Construction	Stainless steel lid, painted tubular steel frame, two blowers, axial vane 120V standard or 220V optional
Requirements	55 gallon (208L) steel open head drum, 120V or 220V power source
Weight	96 lbs (44kg) without drum, 139 lbs (63 kg) with drum
Height	46" (116 cm)
Floor Space	(with drum) 36" x 26" (91 x 66 cm)
Average Burn Rate	50 lbs/hr (22 kg/hr)

**SmartAsh must be used outside in an open area.**

Air Pollution tests: SmartAsh has been tested following EPA testing formats. Federal EPA publication (Federal Register 40 CFR part 60) exempts Cyclonic Barrel Burner from State Emission Plans. Emission test data available upon request.



**ELASTEC**   
**AmericanMarine**   
 Innovative Environmental Products

1309 West Main, Carmi IL 62821 USA  
 Tel: +1 (618) 382 2525 Fax: +1 (618) 382 3610  
 E-mail: [elastec@elastec.com](mailto:elastec@elastec.com)

BIN-001  
 2/29/12

## Incinerator Emission Testing

Elastec, Inc.

### Texas Test Summary of Results

The following are results of Stack sampling tests performed on Elastec's Smart Ash unit. Tests were conducted July 28, 1995 by Air Pollution Testing, Inc. of Denver, CO. at facilities of Darsan Inc. of Garland, TX. Tests were performed on the behalf of Elastec, Inc.

	Run #1	Run #2	Run #3	Run # 4	Average
Start Time	11:00	14:40	16:49	18:54	
Stop Time	12:06	15:43	17:52	19:56	
Load Weight (lb)	70	70	70	70	
Stack Temp (F)	1122	1082	1052	1152	1102
Stack Flow (dscfm)	200	200	200	200	200
O <sub>2</sub> (%vd)	6.7	7.0	8.8	4.3	6.7
H <sub>2</sub> O (%vw)	9.9	11.8	9.9	11.9	10.9
Isokinetic Ratio (%)	95	89	90	89	91
<b><u>Emissions Data</u></b>					
PM (gr/dscf)	0.046	0.032	0.025	0.041	0.036
PM (lb/hr)	0.080	0.045	0.059	0.058	0.060
CPM (gr/dscf)	0.027	0.018	0.015	0.024	0.021
CPM (lb/hr)	0.046	0.032	0.025	0.041	0.036
Opacity (%)	6.3	0.0	0.0	0.0	1.6
CO (ppmv)	72	62	93	151	94
CO (lb/hr)	0.062	0.054	0.081	0.132	0.082
VOC (ppmvw as C <sub>3</sub> H <sub>8</sub> )	1.0	1.3	1.1	1.6	1.3
VOC (lb/hr as C <sub>3</sub> H <sub>8</sub> )	0.0015	0.0020	0.0017	0.0025	0.0019

The values of the averages are for test runs #2 thru #4. Run # 1 demonstrated a post test leak check. However, the data is presented and appears to be representative. This indicates the leak occurring late in the sampling run or immediately following sampling.

This is condensed version of the actual Stack Test results. Complete test results can be supplied upon request.

## Elastec, Inc.

## Colorado Test Summary of Results

The following are results of Stack sampling tests performed on Elastec's, Smart Ash units. Tests were conducted July 7, 1994 by Air Pollution Testing, Inc., at Air Pollution Testing, Inc. facility located in Lakewood, CO. Hill enterprises contracted Air Pollution testing, on the behalf of Elastec, Inc. for the testing on the Smart Ash unit.

Run #	1	2	3	Average
Start Time	09:14	11:24	13:34	
Stop Time	10:12	12:24	14:34	
Sample Duration (Min)	35.5	60.0	60.0	51.8
O <sub>2</sub> ( % )	8.6	10.2	8.2	9.0
CO <sub>2</sub> ( % )	10.9	8.7	8.0	9.2
H <sub>2</sub> O ( % )	8.3	5.2	6.8	6.7
Stack Temp ( F )	799	843	894	845
ACFM	<448	<455	<467	<457
DSCFM	<142	<144	<140	<142
Particulate Emissions	<0.07	<0.01	<0.01	<0.03
lb/hr	0.0557	0.0080	0.0080	0.0230
gr/dsef	0.0613	0.0111	0.0119	0.0281
Gr/dsef @ 12% CO <sub>2</sub>				
CO Emissions	<0.081	<0.030	<0.012	<0.041
lb/hr	131	48	19	66
ppmvd	144	66	29	80
ppmvd @ 12 % CO <sub>2</sub>				

The short run time of sampling test # 1 was due to rapid burning of the cardboard material used for testing purposes. 17 lbs. of material was stacked in the drum to fit as much material as possible for the test.

This is a condensed version of the actual test results. Complete test results can be supplied upon request.

Elastec, Inc.

Kansas Test Summary of Results

The following, are results of Stack sampling tests performed on Elastec's Smart Ash unit. Tests were conducted by Air Source Technologies at the Air Source Technologies facility in Lenexa, Kansas February 4, 1994 for Elastec, Inc.

SUMMARY OF SAMPLING AND PARTICULATE RESULTS

Parameters	Units	Run 1	Run 2	Run 3
<b>Particulate Emissions</b>				
Uncorrected	gr/dscf	0.0437	0.0320	0.0459
Corrected to 7% O <sub>2</sub>	gr/dscf	0.0490	0.0344	0.0535
Corrected to 12% CO <sub>2</sub>	gr/dscf	0.0477	0.0349	0.0501
Emission Rate	lb/hr	0.06	0.04	0.05
Emission per 100 lb of material weight	lb/100 lbs grams	0.095 0.0450	0.072 0.0476	0.080 0.0705
<b>Stack flow rate</b>				
Actual	acfm	425	454	451
Standard Conditions	dscfm	150	140	138
Velocity	ft./min	541	579	575
<b>Sampling Results</b>				
Sampling Volume	dscf	15.838	22.916	23.662
Avg. Stack Temp.	F	886	1073	1033
Avg. P	in/H <sub>2</sub> O	0.010	0.01	0.010
Avg. H	in/H <sub>2</sub> O	0.53	0.47	.050
Avg. Meter Temperature	F	52	52	60
Oxygen, Orsat	%	8.5	8.0	9.0
Carbon Dioxide, Orsat	%	11.0	11.0	11.0
Static Pressure	in/H <sub>2</sub> O	0.01	0.01	0.01
Moisture Collected	mls	28.8	44.9	6605
Percent Water	%	7.9	8.4	11.7
Sampling Time	min.	40	64	64
THC uncorrected	ppm	0 - 115	0	0 - 100
Opacity	%	<5	<5	<5

**Conclusions**

THC's are shown on the summary at range of 0 ppm to as high as 115 ppm, the high ends were seen as spikes on the chart. These spikes were viewed in the first 5 min. of operation, then dropped off to less than 5 ppm, to finish the test runs.

These results indicate, Elastec's Smart Ash units fall into compliance with all federal mandates for air quality.

This is a condensed version of the actual test results. Complete test results can be supplied upon request.