



NIGHTHAWK
GOLD CORP

INDIN LAKE GOLD PROJECT

INCINERATOR MANAGEMENT PLAN

Version 3

Submitted to:

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Inciner8 Product Overview



1.0 INTRODUCTION

This document is Nighthawk Gold Corp's (Nighthawk's) Incinerator Management Plan for use at the Indin Lake Gold Project (the Project), for the Colomac Camp in the Indin Lake region in the Northwest Territories (NWT). The incinerator that will be used is owned by Nighthawk Gold Corp, and is an Inciner8, Model A600(Sec) Incinerator with a secondary combustion chamber. The Colomac Camp will be the main camp for all work activities in the Indin Lake region.

The Inciner8, Model A600(Sec) Incinerator is a diesel-fired unit with a high temperature, secondary burner / chamber for additional gas burn. It operates at a thermostatically controlled temperature with a minimum 900 degrees Celsius (°C) and up to a maximum of 1350°C. It has a capacity of 300 kilograms (kg) and burns at an average 75 kg per hour. More information is provided in Appendix A.

The unit is contained within an isolated (from other buildings), framed wood and metal structure that contains weight scales, and separate bins for segregating different types of wastes. Bins allocated for combustible waste include the following: 1) kitchen waste; 2) non-hazardous building materials; and 3) cardboard. Paper and digital records are kept of the weights of the materials for incineration, weights of the resulting ash and any other relevant information.

This Incinerator Management Plan is based on the guidelines provided in Environment Canada's Technical Document for Batch Waste Incineration (Environment Canada [EC] 2010). A copy of the document and of this Incinerator Management Plan will be provided to the incinerator operators.

2.0 PURPOSE

The purpose of this Incinerator Management Plan is to describe the activities involved in the operation of the incinerator, including the collection of information for reporting purposes. The plan has been developed in consideration of the Environment Canada Technical Document on Batch Waste Incineration (EC 2010). Additional standards that will be followed are the Canada-Wide Standards for Dioxins and Furans (Canadian Council of Ministers of the Environment [CCME] 2001), the NWT Guidelines for Hazardous Waste Management (Government of the Northwest Territories [GNWT] 2017) and the 2016 GNWT Proposed NWT Air Regulatory Framework and the associated Technical Appendix (also 2016). In particular, Schedule E of the GNWT 2016 Technical Appendix was used to develop the incinerator process used during this Project.

This Incinerator Management Plan is designed to meet the objectives of the above standards. Dioxins and furans are frequently encountered as a result of incineration with incomplete combustion due to inadequate equipment and/or improper operation and are therefore also found in the resulting ash. In the NWT, waste containing dioxins and furans is classified as a hazardous waste if it contains a dioxin toxicity equivalent (TEQ) value greater than 0.001 mg/kg. In compliance with the NWT guidelines, incinerator ash will be tested for dioxins, furans and leachable metals prior to disposal in the NWT (see also Section 5).

An additional concern for waste incineration is the release of mercury, polychlorinated dioxins-p-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF). Mercury can be released if mercury-containing substances are incinerated. Consequently, two key objectives of Nighthawk's incinerator operation are 1) to ensure that only appropriate wastes are burned (as outlined in Section 3) and, 2) to ensure that the incinerator is operated and maintained for proper combustion (as outlined in Section 4).

In summary, the Incinerator Management Plan objectives are to:

- Demonstrate compliance with applicable federal and territorial standards;
- Document frequency of use and the quantity and type of waste incinerated;
- Outline mitigation measures as they relate to the incineration process; and
- Describe operational practices for the incinerator and requirements for incinerator operator.



3.0 WASTE STREAM MANAGEMENT

Waste stream management is implemented to ensure that only non-hazardous, combustible waste is incinerated. Other types of waste that are not suitable for incineration (based on the applicable guidelines and standards) will be transported to Yellowknife for disposal at an approved facility following the procedures outlined in the Project-specific Waste Management Plan.

One component of waste stream management is the „Three R's': reducing, reusing and recycling. The first consideration for waste materials (or potential waste) generated is to reduce the amount of overall waste. This can include using products that have less packaging or come in bulk containers. Reusing items (if safe to do so) can also reduce the input into the waste stream as well as result in cost savings. Recycling appropriate wastes will also divert wastes from incinerators, landfills and other disposal methods. Recyclables are sent to approved recycling facilities in Yellowknife. Details on these processes are provided in the Project-specific Waste Management Plan.

3.1 WASTE SEGREGATION

As outlined in the Project-specific Waste Management Plan, camp operators, responsible for generating and/or handling waste, will be provided with at least four interim waste containment options:

- 1) Waste for incineration;
- 2) Recyclable material;
- 3) Waste for transfer to Yellowknife; and
- 4) Hazardous waste.

Waste for incineration will be further separated into three separate bins to segregate waste for incineration based upon their accelerant factors: i.e. 1) kitchen waste; 2) non-hazardous, combustible building materials; and, 3) cardboard (including paper products). This segregation is required as the latter two categories have high accelerant factors and must be sparingly fed into the incinerator to maintain a safe proper burn.

The following materials will be incinerated:

- Paper-type products, including cardboard, paper, newspapers and magazines, most packaging, waxed paper, paper towels, serviettes and paper cups;
- Food waste, including food scraps, bones, coffee grounds and peelings;
- Natural cloth materials, including clothes, linens, towels and rags;
- Wood products, including untreated building materials; and,
- Pallets, lining and packing materials.

3.2 WASTES NOT FOR INCINERATION

Waste streams that will not be incinerated include (but are not limited to the following):

- Hydrocarbons and hydrocarbon containing products, including waste and sludge oils;
- Spray cans;
- Plastics and rubber;
- Metal and glass;



- Batteries of all types;
- Treated wood products; and
- Chemicals and their containers.

Such items will be packed into sealed and marked drums and shipped to Yellowknife for appropriate disposal following the Project-specific Waste Management Plan.

4.0 OPERATIONAL MANAGEMENT

The proper use of the appropriate incinerator is an important part of effective incinerator management. This helps to ensure that the waste materials incinerated are completely burned at the right temperatures. EC's 2010 "Technical Document for Batch Waste Incineration" provides guidance on selecting and installing the appropriate incinerator for the anticipated waste stream. The selection of the Inciner8, Model A600(Sec) met these criteria and it has been correctly installed and inspected during all previous years of camp operations. Standard maintenance of the incinerator will ensure that the unit is working as per manufacturer's specifications and will meet emission guidelines as designed.

4.1 TRAINING

As was done in previous years, training will be continuously provided to key personnel at the camp. Training will be provided to additional personnel as needed by those already trained and familiar with operations.

The incinerator is owned by Nighthawk and trained Discovery Mining personnel (who will be operating the camp) are the primary operators of the incinerator. They will be trained in the following areas prior to incinerator operations:

- Incinerator waste streams and load limitations;
- Incinerator start-up and operating procedures;
- Clean-out procedures and safe packaging of ashes;
- Troubleshooting procedures;
- Maintenance schedule; and
- Record keeping and reporting.

4.2 OPERATIONS

Trained personnel are responsible for loading, operating and maintaining the incinerator and incinerator records, and are trained in emergency response. To help with separation by type, waste will be collected in transparent bags or appropriately marked.

The typical incinerator operation follows these steps (EC 2010):

- The incinerator will be loaded with the appropriate camp waste and the burn cycle started.
- To ensure the primary and secondary chambers operate in the specified temperature range, the start cycle will be observed for at least 15 minutes after ignition of the primary chamber burner. Notes will be taken and adjustments made if required.
- When the incineration event is completed, and the unit has cooled, all ash will be removed and bagged for subsequent laboratory testing and appropriate disposal.



- Any unburned materials found in the ashes will be added back into the incinerator for the next burn cycle.
- All incineration events will be reported in the log book, including waste descriptions and weights as well as weights of the resulting ash.

The standard practice at the Colomac Camp has been that the waste is transferred to the incinerator building generally three times every day (after meal times) for final sorting and either burning, or appropriate packaging for proper transport to and disposal in Yellowknife. Then, all materials destined for incineration will be weighed prior to incineration. Both paper and digital records will be kept of the various types and weight of materials for incineration. Weights of the resulting ash will also be recorded as well as any other relevant information.

Before daily incineration, the waste material will be properly packaged and fed into the incinerator in quantities that encourage full and proper combustion. When the incineration cycle is complete, the incinerator will be allowed to cool before opening. When opening the incinerator, the operator will wear proper safety clothing. The ash will be removed once cooled and collected in a metal container which will be properly marked and shipped (when full) for laboratory testing and subsequent appropriate disposal.

4.3 MITIGATION MEASURES

The choice of incinerator, the incineration process and the disposal of the ashes will follow all relevant regulations, outlined in the EC's 2010 Technical Document on Waste Batch Incineration, the recently updated NWT Guidelines for Hazardous Waste Management (GNWT 2017), the 2016 GNWT Proposed NWT Air Regulatory Framework and the associated Technical Appendix (also 2016).

Mitigation measures designed to minimize potential negative effects on air quality and the environment include the following:

- A dual chamber incinerator with an afterburner will be used.
- Burn temperatures will be between 900 and 1350 oC.
- Emissions released to the atmosphere will be below thresholds set by the Canada-wide Standards (for dioxins, furans and mercury) set by the CCME.
- All ashes will be packaged, temporarily stored and transported for off-site disposal at a certified landfill facility as outlined in the project-specific Waste Management Plan.
- Prior to disposal, all incinerator ashes will be tested at a certified laboratory and then disposed of appropriately.
- Only non-hazardous, combustible, solid camp waste will be incinerated. No other wastes or materials will be incinerated.
- All labels and product information sheets will be read and if in doubt – products will not be incinerated.
- The incinerator will be operated and maintained by trained camp personnel only. Training records will be kept.
- A waste incinerator operational and maintenance log will be kept documenting daily types and dry weights of incinerated waste as well as weights of resulting ash and any other relevant information. Records will be kept for a minimum of three years.
- Detailed records will be kept of weights, handling, test results and disposal of incinerator ashes.



5.0 INCINERATOR ASH MANAGEMENT

All ash resulting from incineration will be stored in metal containers and shipped to KBL Environmental Ltd. in Yellowknife for appropriate disposal following the procedures outlined in the project-specific Waste Management Plan.

In accordance with the recently updated NWT Guidelines for Hazardous Waste Management (GNWT 2017), prior to disposal of incineration ashes in the NWT, ash samples will be tested in a certified laboratory for leachable metals, dioxins and furans (as per schedules I and II of the NWT Guidelines for Hazardous Waste Management). Based on the test results, ash will be classified and then disposed of accordingly.

6.0 REFERENCES

- Canadian Council of Ministers of the Environment. 2001. Canada-Wide Standards for Dioxins and Furans. Available at: http://www.ccme.ca/files/Resources/air/dioxins_furans/waste_incinerators_coastal_pulp/d_and_f_standard_e.pdf. Accessed: May 2018.
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APPENDIX A

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