



Explosives Management Plan
for the
Proposed Advanced Exploration Program (AEP)

KENNADY NORTH EXPLORATION PROJECT
MV2013L2-0005 and MV2013C00XX
SOUTH MACKENZIE DISTRICT, NWT

**Prepared in support of September 2016 applications to the MVLWB
for Advanced Exploration**

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1 INTRODUCTION

Kennady Diamonds Inc. (KDI) is currently exploring for diamondiferous kimberlites in the Kennady North area, located in the Northwest Territories approximately 280 kilometers (km) east–northeast of Yellowknife (Figure 1). The KDI property consists of 20 mineral leases and 58 mineral claims, totaling 61,154.66 hectares (ha). JDS Energy & Mining Inc. (JDS) was commissioned by Kennady Diamonds Inc. (KDI) to prepare an Explosives Management Plan (EMP) for the Kennady North Project (Project)

The Advanced Exploration Program (AEP) requires explosives to excavate overburden and rock material through drilling and blasting. The operation will use bulk ammonium nitrate (AN) to manufacture ammonium nitrate fuel oil (ANFO), pre-packaged explosive products and other blasting agents and accessories for blasting during the program.

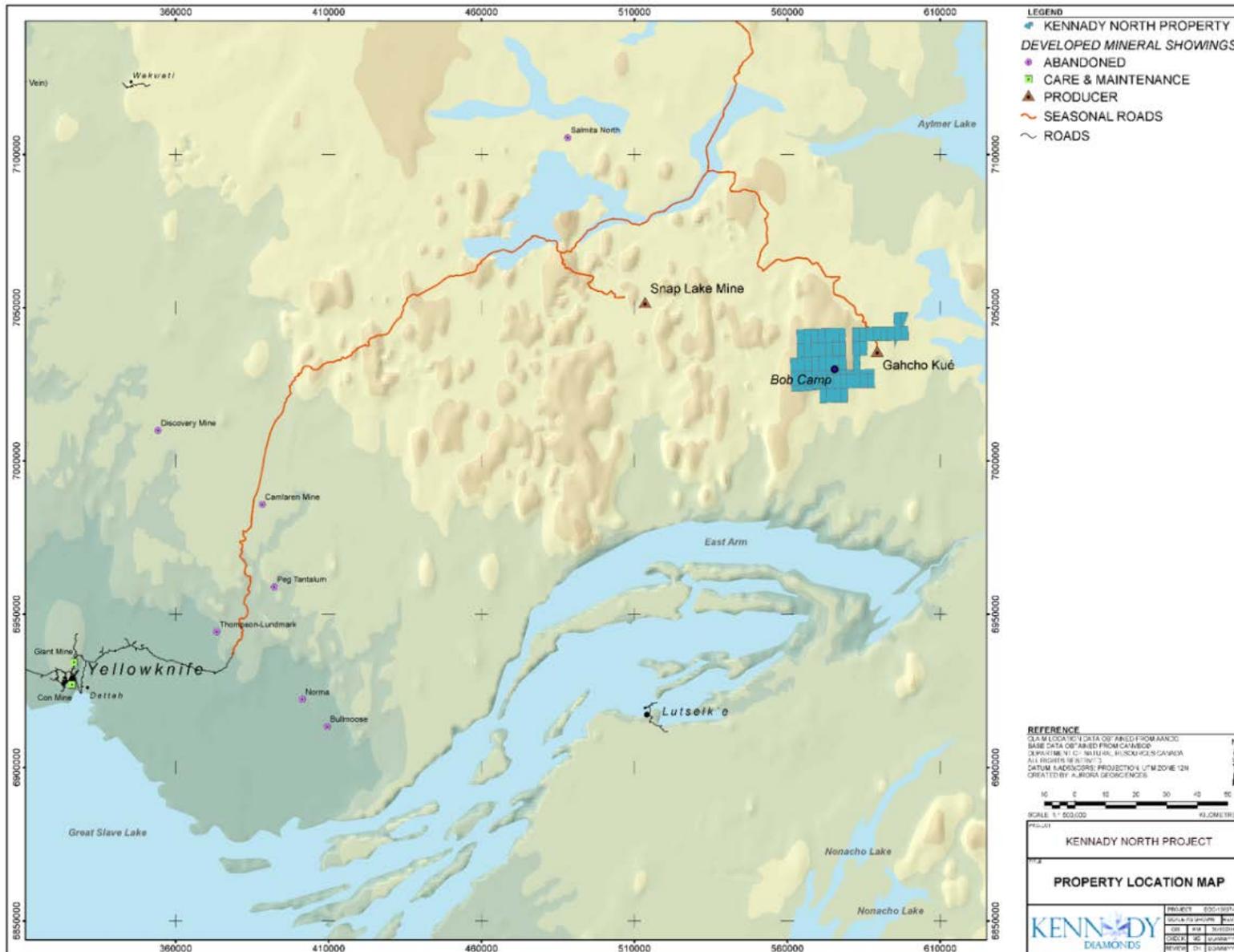
The purpose of this EMP is to outline the management practices that will be followed for the storage and use of explosives at the Project. This plan will address and seek to minimize the environmental impacts, specifically with respect to water quality and wildlife. This plan will make reference to the potential for spills and refer to the Spill Contingency Plan for action.

Control and use of explosives are covered by both federal and territorial regulations. Policies and procedures to meet, or exceed these regulations will be established prior to initiating the AEP.

The main applicable statutes include the following:

- *Transportation of Dangerous Goods Act;*
- *Canada Explosives Act;*
- *Northwest Territories Mine Health and Safety Act* and Regulations;
- Natural Resources Canada – Explosives Regulations and Guidelines for Bulk Explosives Facilities (Minimum Requirements); and
- Fisheries and Oceans Canada - Guidelines for the use of explosives in or near Canadian fisheries waters.

Figure 1: Kennady Project Location Map



2 EXPLOSIVES MANAGEMENT

The purpose of this document is to outline those management practices required to minimize any potential environmental effects due to explosives storage and use. KDI management has the overall responsibility for the planning, execution and management of explosives at the site.

Best management practices and operating procedures will limit ammonia in the rock and overburden generated from development blasting activities. To minimize ammonia in quarry runoff, wet blast holes will be dewatered prior to being loaded with packaged or bulk ANFO products. The blast will normally be shot as soon as loading is complete. If water recharge in the hole is significant a plastic liner will be inserted into the hole and ANFO will be loaded into the liner to prevent ammonia leaching and explosive degradation. Packaged explosives will be kept on site as a backup to ANFO explosives and will be utilized where necessary. Water runoff associated with blasting and explosives storage/handling areas will be managed by grading pads to avoid direct or indirect flow into lakes.

2.1 Site Storage

The magazine storage area will comply with all Natural Resources Canada, Explosives Regulatory Division (NRC-ERD) requirements. The location will provide for safe storage, with controlled access and the location will change periodically based on quarry location, availability of access and location of surrounding infrastructure.

The requirements for packaged explosives stipulate the storage location for magazines and blasting accessories. This has been respected in order to store the appropriate amount of explosives while maintaining sufficient separation from the accommodations.

2.1.1 AN Prill Storage

The AN storage pad area will be located to comply with the quantity and distance regulations set out by NRC-ERD. For the AEP program, the storage area will hold up to a 4,000 tonne supply of AN prill and will be located at an appropriate distance away from camp. A compacted, crushed rock pad will be constructed using rock from blasted material and will be placed in a manner to minimize runoff (especially during freshet) flushing the pad area. The storage area will be managed and visually monitored regularly for signs of any AN spillage onto the pad and spills promptly addressed. During the short construction period (12 month), KDI expects to store approximately 300 totes of AN, while approx 30 to 60 totes would be stored during decline operation. The low AN volumes and short storage window provides a much lower storage risk profile than at a mine site.

AN prill is of granular or “pellet” form and is delivered in 1.5 tonne totes and stacked at the AN storage pads in inventory manageable configurations. The tote bags are double lined to prevent moisture from contacting the ammonium nitrate and AN dust from escaping to the environment, as well as, minimize the risk of rupture/leakage of the dry product. The bags will be segregated in approximately 500 tonne divisions with ample spacing around the piles for access including for snow clearing when required. The

use of AN during the year will be done on “a first in first out” basis to avoid any long-term deterioration of the tote bags.

The ammonium nitrate totes will be transferred from the AN storage area to a nearby hopper and auger system will be utilized to transfer the AN prill directly into the bulk ANFO mixing/delivery truck.

The bulk truck will have the required explosives manufacturing licensing and its onboard mixing system will produce the appropriate blend of diesel fuel with the AN prill at the blast pattern being loaded and then deliver the ANFO “down-the-hole” to each blast hole.

Should an AN spill occur, the spill is immediately cleaned up and reported to site Environmental Personnel for subsequent reporting as defined in the Spill Contingency Plan. Once on site, spill locations would be limited to the interim storage pad and the temporary handling facilities and these areas will be inspected regularly according to operating procedures.

Spill prevention and response actions will include but is not limited to the following:

- Establish and use Safe or Standard Operating Procedures (SOPs) for handling and working around storage areas.
- Regular inspections with frequency driven by activity levels.
- Cleanup is best performed with dry AN (to be completed according to an established SOP).
- Manage and limit contact with snow and water, with particular anticipation of spring thaw/freshet period.
- Disposal of spill material and any impacted rock pad material shall be dealt with appropriately, which could include placing within a blast pattern prior to initiation or within active quarry.

Further details are outlined in the Spill Contingency Plan.

2.1.1 AN Handling Facilities

The AN handling facility will consist of an AN loading facility capable of housing a pneumatic auger and bag-breaking system as well as the ANFO mixing and delivery truck for the purpose of loading the AN into the truck. Moreover, an ANFO mixing truck shelter for housing the truck when it is not being used, performing minor maintenance and washing the truck (washing) will also be established.

The truck shelter structure will be suitably equipped with heat, electrical power and lighting. All electrical components will be explosion proof, and designed for National Electrical Manufacturers Association (NEMA) 4 rating. There will be a pressure washer within the building to wash the truck periodically for maintenance purposes. The vehicle wash area would be lined to capture wash water and direct the flow to a suitable sump. The wash water will be removed from the liner/sump by means of the on-site vacuum truck and placed in the quarry sump.

The bulk delivery truck shall be washed only when the truck is required to return to populated area, for example for major repairs required to be facilitated at the maintenance facilities. From February through to September, minimal washing will be required and AN wash water quantities are expected to be less than 5 cubic metres (m³).

The explosives contractor will follow SOPs and Hazardous Operations Procedures. The procedures will include receiving AN Prill, equipment calibration, and preventative maintenance.

Chemicals used in the process will be stored according to the manufacturer's recommendations and the information provided on the Material Safety Data Sheets (MSDS). Copies of the MSDS will be posted at the site office and adjacent to the chemical storage as per regulations. Copies will be provided to management for environmental and safety record-keeping.

2.1.2 Magazines

Two to four magazines will be utilized to store packaged explosive products and blasting accessories at the explosive magazine location. The magazines will be separated by berms that meet the "donor-receptor" conditions of safe storage. The magazines will comply with the standards as prescribed by NRC-ERD and approved by the Mine Safety Division of the Northwest Territories (NWT).

Magazines will be kept locked at all times when an authorized person is not present. Clearly visible "Danger Explosives" and "No Smoking or Open Flame" signage will be posted on the magazines and warning signs will be on the road approaching the storage area.

The magazines will be dedicated to storing blasting accessories such as boosters, delays, detonating cord and detonators, as well as a limited quantity of packaged explosives for specialty blasting purposes after the primary explosive is switched to bulk ANFO. The detonators and delays will be stored in a separate magazine as required by the regulations.

Access to the magazines will be restricted by a locked gate to authorized personnel and logbooks will be kept in each magazine for tracking purposes. The magazines will be supplied by owner/operator and permitted in coordination with the contractor.

2.2 On-Site Handling

On-site transportation will be in accordance with Section 14 of the *Mines Act and Regulations* and the *Transportation of Dangerous Goods Act*. The vehicles handling the explosives will be in sound mechanical condition and equipped with flashers, buggy whips, signage and fire extinguishers as required. Loaded vehicles will not be left unattended. Authorized personnel will be responsible for the security of the explosives under their control.

2.2.1 Authorized Personnel

Authorized personnel will be persons holding a valid NWT Blasting Certificate or NWT Provisional Blasting Certificate that is issued in accordance with Part VII of the *Mine Health and Safety Act* and Regulations.

Bulk ANFO truck personnel will be certified as needed and it will be the responsibility of the explosives contractor to maintain current certification and to provide the information when requested.

2.2.2 Bulk Delivery Trucks

The explosives contractor will utilize a bulk ANFO Truck to deliver bulk ANFO explosives to the blast hole. The ANFO truck shall include a pump and hose reel for delivering the product. The truck operator will take periodic density samples to ensure quality control.

The truck shall have an onboard metering system for tracking consumption. The blaster will sign off delivery sheets after each delivery to ensure that accurate tracking is maintained.

Equipment condition reports will be completed by each operator for deficiencies daily. All explosives delivery trucks will be regularly maintained to ensure mechanical deficiencies are dealt with expeditiously and all safety systems are fully operational.

2.2.3 Housekeeping

Careful planning by the blaster will minimize or eliminate the quantity of product left on the truck at the end of the workday.

The magazines will be kept free of empty boxes and swept clean on a regular basis. Similarly the blasters vehicles will be kept tidy with any empty packaging disposed appropriately daily. No explosives will be allowed to be stored in the vehicle when not in use. Regular inspections will occur and immediate remedying of deficiencies will be maintained.

2.2.4 Accounting

The blaster will be held responsible for ensuring that all accessories and explosives are accounted for. Blasting accessories that are not used during the workday will be returned to their respective magazine and signed in. The magazines will be regularly audited for accuracy.

Missing explosives must be immediately reported to a supervisor. Any explosives that are found must also be immediately reported to a supervisor. Only authorized personnel will be allowed to handle those items.

2.2.5 Disposal

Explosives that have been identified as deteriorated or damaged will need to be destroyed. This may change the characteristics of the explosive and the supplier will be consulted on the appropriate handling and disposal.

If the quantities are small, then they would be added to blast holes in a sufficiently sized blast. This will safely destroy them, since the area will have been evacuated and guarded under normal blasting procedures which are detailed in the following section.

If larger quantities require disposal or destruction, the explosives supplier would be asked to recommend the appropriate method of disposal and subsequent course of action to be followed.

2.3 Spill Containment

AN is commonly used as a fertilizer and itself is not an explosive. AN is water soluble and easily dissolved into a solution, which can be toxic to aquatic life and acts as a nutrient in water which can promote the growth of algae, therefore AN spills must be prevented. Infrastructure setbacks of 100 metres (m) or more from high water marks further mitigate risk.

As the truck moves from hole-to-hole, occasionally small amounts of product may drip from the hose to the ground. The blaster, or helper, will shovel these drops into the nearest blast hole to assist in the prevention of pit water contamination. ANFO spills outside of these active blasting areas will be cleaned up immediately.

2.4 Safety – Explosives Storage and Management

Safe Work Practices and Procedures will be implemented to ensure the safety of all workers, contractors and equipment where the explosives are stored and used at the Project. These SOPs will at a minimum comply with the Mine Health and Safety Act, NWT Regulations and the requirements of the NRC-ERD.

The Surface Development Manager will be responsible for ensuring that effective and compliant SOPs are enacted and that a person that is qualified, certified and authorized under the Mine Health and Safety Act and NWT Regulations is in charge of supervising all explosives management and blasting operations on the mine site.

In general, these SOPs will consider the following points:

- Ensure that a copy of the explosives magazine permit is posted inside the magazine.
- Carry out a weekly inspection of the magazine and record the result in the log book.
- Ensure a record of all explosives issued and received and the inventory of the magazine is kept, and authorized persons sign all the entries.
- Ensure the magazine is kept clean, dry and free from grit at all times.
- Ensure the stock of explosives is rotated so that the oldest stock is used first.
- Ensure that all signage is visible and in good condition.
- Ensure that the magazine is locked at all times except when an authorized person is present.
- Ensure that all mobile equipment transporting explosives meets or exceed requirements as set out in the Mine Health and Safety Act and Regulations of the NWT and Nunavut.
- Ensure appropriate records of each primary blasts are kept.

- Ensure all warnings, guarding or access routes and clearances of areas have been installed prior to initiating any blasts.
- The appointed person has the authority to safely conduct and direct all activities within the blasting area. All employees must support the blaster in exercising this authority.
- Ensure that all blasters have a valid blasting certificate issued by the Chief Inspector of Mines.
- Ensure that all persons who are assisting in the preparation or firing of a charge is under the direct supervision of a person who is a valid holder of a blasting certificate.
- All blasters shall deliver their blasting certificates to the Surface Development Manager or their designated when commencing employment. The certificate will be returned upon termination with the company.