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Tahera Diamond Corporation

Ammonium Nitrate and Explosives Management Plan
Jericho Diamond Mine
Nunavut

Submitted to:

Tahera Diamond Corporation
Toronto, Ontario

Submitted by:

AMEC Earth & Environmental
Burnaby, BC

August 2004

VE51295

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1.0 INTRODUCTION

The Jericho Diamond Project (Jericho) will require ammonium nitrate to manufacture ANFO and emulsion explosives for blasting at the mine during operation. This plan discusses explosives management and in particular ammonium nitrate pursuant to directives from the Nunavut Impact Review Board and Nunavut Water Board. For operations, explosives will be contracted to a licensed contractor who will have a detailed operations manual for transportation, storage and handling of explosives. Therefore, the plan is conceptual at this stage, since the mine has not been constructed and an explosives contractor has not been engaged.

2.0 OVERVIEW OF PROPOSED EXPLOSIVES USE MANAGEMENT

Explosives use management will have the primary goal of limiting loss of ammonia to waste rock and kimberlite, which could subsequently leach into runoff at Jericho or be processed through the diamond plant. Explosives storage will be controlled and runoff from storage areas 100% contained. Emulsions will be used for wet blasting; ammonium nitrate-fuel oil (ANFO) will be used for dry blasting to limit ammonia leaching. Consideration will be given to using 100% emulsion products to simplify the blasting procedure. Packaged explosives will be kept on site where required and for a backup for emulsion explosives and where required. All runoff into the pit and off waste dumps will be contained.

3.0 LOCATION OF FACILITIES

Drawing 1CT004.06-G12 shows the location of the ammonium nitrate storage area at the east end of the spur road east of Waste Rock Dump 1. The emulsion plant location will be west of this storage pad on the same spur road. Caps and powder will be stored in Sea Can magazines 250 m off the spur road, as shown on Drawing 1CT004.06-G12. The explosives truck wash will be at the emulsion plant.

The ammonium nitrate pad will be constructed of crushed fill and berm surrounding the pad. Sandwiched in the fill and continuing up into the berm will be a geomembrane liner to ensure the facility is impermeable. Water will be allowed to drain to a sump and be pumped out as needed and routed to the surrounding tundra. Alternatively, ammonia nitrate bags may be stored in a covered building.

In Year 1 limited ammonium nitrate will be required and it will be stored at the existing explosives storage site on the road between the exploration camp and the portal (Drawing 1CT004.06-G10).

4.0 EXPLOSIVES USE AND POTENTIAL IMPACTS

4.1 Hazard Classes and Potential Impacts

The hazard class and potential impacts for explosives to be used at Jericho are listed in Table 4-1. Ammonium nitrate is the single largest material that will be used for explosives at the mine.

Table 4-1: Explosives Hazard Classes and Potential Impacts

Material	Class[1]	Potential Impact
Ammonium Nitrate	5.1	Water contamination
Packaged Explosives	1	Negligible with proper handling
Blasting Caps	1	Negligible with proper handling
Acetic acid	8	Water contamination
Nitric acid	8	Water contamination
Ethylene Glycol	3	Water contamination
Sodium nitrite	5.1	Water contamination
N7 Emulsifier		Water contamination
N23 and LZ Emulsifier		Water contamination
N4 Emulsifier		Water contamination

[1] Transportation of Dangerous Goods

4.2 On-Hand Quantities

Table 4-2 lists the maximum on-hand quantities of ammonium nitrate and other explosives at Jericho.

Table 4-2: On-Hand Quantities of Explosives at Jericho

Product	On-Hand Quantity (/year)	Container Size
Ammonium Nitrate	2000-3000 tonnes (approx.)	1 t tote bags
Packaged Explosives	75 tonnes	To be determined
Blasting Caps	To be determine	To be determined
Acetic Acid	7175 kg	204 kg drum
Nitric Acid	1925 kg	77 kg keg
Ethylene Glycol	23 tonnes	230 kg drum
Sodium Nitrite	2724 kg	22.7 kg bags
N7 Emulsifier	15 tonnes	204 kg drum
N23 and LZ Emulsifier	27 tonnes	181 kg drum
N4 Emulsifier	7945 kg	22.7 kg bags

4.3 Impact Assessment

4.3.1 Ammonium Nitrate Storage Area

Ammonium nitrate dissociates readily in water to ammonia which, in its unionized form, is toxic to fish and other aquatic organisms. Storage on land away from water largely eliminates the risk of ammonia loss to water bodies.

4.3.2 Emulsion Materials

All emulsion materials are acutely toxic to aquatic life, except at low concentrations; ethylene glycol is a petroleum hydrocarbon but is water-soluble. Release of any of these compounds directly to receiving water bodies would likely have negative effects on aquatic life and thus all will be stored at the emulsion plant where spills would be 100% contained within the building.

4.3.3 Explosives Truck Wash

The explosives trucks will be washed at facility separated from the mine to comply with WCB regulations as previously discussed. Water from the truck wash could have elevated ammonia concentrations from residual ammonium nitrate on the explosives truck. The water may also contain petroleum residues from the trucks. Both these potential contaminants would make the water unsuitable for direct discharge to a receiving water body. Water will be collected in a sump, pumped out as required and trucked to the PKCA.

4.4 Explosives Use

Based on the experience at other open pit diamond mines in the Canadian Arctic, the largest potential source of ammonia in runoff water will be from explosives residues from blasting. From 0.1% (dry rock) to 8 or 9% (wet holes or misfires) of the ammonia from ANFO use can be residual, i.e., available for leaching from runoff. Ammonia in runoff at Jericho would be from waste rock dumps to the open pit and from the walls of the open pit. Pit water will be pumped from there to the PKCA if ammonia levels are above discharge criteria. Ammonia in kimberlite would be processed through the plant and report to the PKCA. Again, discharge criteria would have to be met for PKCA supernatant water to be discharged.

5.0 EXPLOSIVES MANAGEMENT

The proposed explosives management at Jericho is discussed in a memorandum to Tahera Diamond Corporation by JDS Energy & Mining Inc. and attached in Appendix 1.

6.0 ACCIDENTS AND MALFUNCTIONS

6.1 Winter Re-Supply

Spill contingency plans are required by all hauling contractors and existence of an acceptable plan will be verified prior to engaging a new contractor. A spill and emergency response plan was developed as part of the Final EIS and updated for the Jericho Water Licence application. Tahera's winter haul coordinator will ensure all parties involved understand procedures to be followed in the event of a spill or other emergency associated with the haul.

6.2 Ammonium Nitrate

All partially full contaminated or ripped bags of prill, spilled prill and used empty bags will be collected and stored in a dedicated contained location for shipment out on the winter backhaul. The most probable container would be an empty Sea Can adjacent to the ammonium nitrate storage.

All spilled prill will be recorded on a spill report and all bags will be inspected by the mining contractor’s operations superintendent or designate and condition accounted for receiving and shipping offsite. These data will be provided to the plant manager and will be kept as part of inventory reconciliation and in the environmental database.

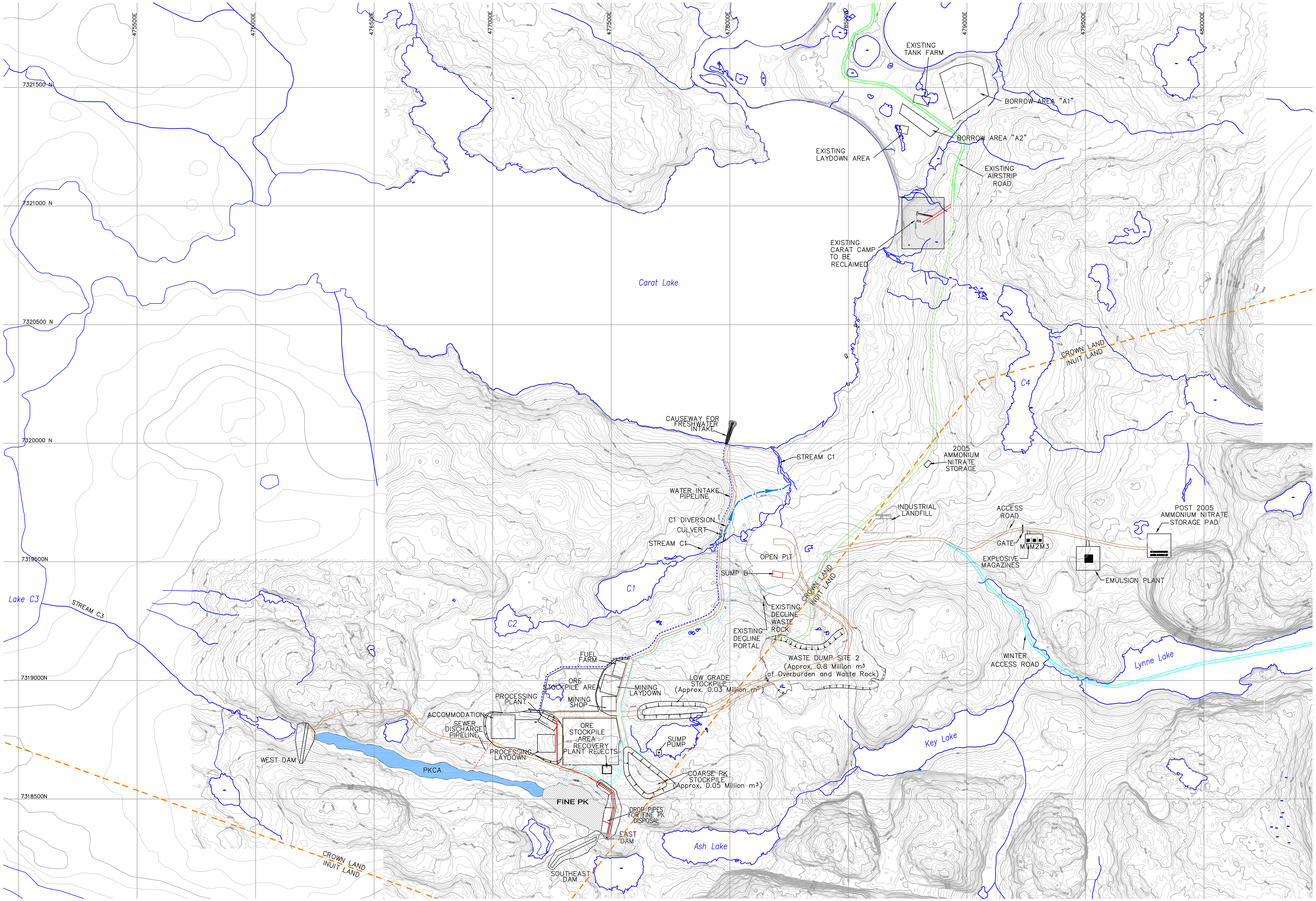
A spill of ammonium nitrate on mine roads is highly unlikely, however, accidental spills of ammonium nitrate from an explosives truck will be cleaned up immediately and reported to the mine contractor Operating Supervisor and logged as required by law. Clean up will be done by employees licensed to handle explosives. Cleaned up ammonium nitrate will be handled as above.

Any reportable spills of ammonium nitrate will be reported by Tahera's plant manager as required by the Nunavut spill reporting regulations (see Jericho Spill and Emergency Plan).

6.3 Emulsion Materials

Emulsion materials will be stored in Sea Cans at the Emulsion Plant. Any spills in the area or in the Sea Cans will be cleaned up by employees licensed to handle explosives. Cleaned up materials will be segregated in an appropriate area (likely an empty Sea Can); incompatible materials will not be stored together, pursuant to MSDS and WCB regulations. A spill report will be filed with the explosives contractor, mining contractor operating supervisor and Tahera's plant manager. If spills exceed reportable quantities, notification will be made under the spill reporting regulations applicable in Nunavut, as previously discussed.

DRAWINGS



LEGEND

- EXISTING ROAD
- EXISTING ROAD (APPROXIMATE LOCATION)
- ROAD REQUIRED BY YEAR 1
- WINTER ROAD
- FRESH WATER PIPELINE
- MINE WATER PIPELINE
- FINE PK DISCHARGE PIPELINE
- RECLAIM PIPELINE
- SEWER PIPELINE
- DITCH

NOTES:

1. LAYOUTS ARE APPROXIMATE AND MAY NOT REFLECT ACTUAL SIZE AND FOOTPRINT LOCATIONS
2. SHOULD THE GRADE OF THE LOW GRADE MATERIAL BE FAVORABLE, THIS MATERIAL MAY GET PROCESSED WHICH WOULD LEAD TO A REDUCTION IN THE SIZE OF THE STOCKPILE
3. THE TIMING OF THE CONSTRUCTION AT THE NORTH DAM, AND THE COMPLETION OF OF THE EAST AND SOUTHEAST DAMS WILL BE REVIEWED ANNUALLY UNTIL THE DAMS ARE CONSTRUCTED OR OPERATIONS CEASE.
4. SUMP PUMPS SHOWN DISCHARGE TO THE PKCA.

TAHERA CORPORATION
JERICHO LAKE SOUTHWEST EXTENSION

Date of Photography: August 5, 1995.
Scale of Photography: 1:10 000
Survey control supplied by: Canamera Geological Ltd.
Survey control based on: UTM Projection, NAD 27, Zone 12
Compiled by The ORTHOSHOP, Calgary, October 1995.
WO 7423

0 100 200 300 400 500 METRES
1:8000

DRAWING NO.	DRAWING TITLE	DRAWING NO.	
DRAWING G-9	AMMONIUM NITRATE STORAGE LAYOUT		
DRAWING G-8	BORROW AREAS PLAN & SECTION		
DRAWING G-7	TERRAIN EVALUATION MAP		
DRAWING G-6	BEDROCK GEOLOGY MAP		
DRAWING G-5	QUATERNARY GEOLOGY MAP		
DRAWING G-4	EXISTING THERMISTOR INSTALLATION PLAN	DRAWING G-14	CLOSURE CONCEPTS
DRAWING G-3	SITE INVESTIGATION MAP	DRAWING G-13	GENERAL ARRANGEMENT APRIL 2013
DRAWING G-2	SITE VICINITY MAP	DRAWING G-12	GENERAL ARRANGEMENT APRIL 2008
DRAWING G-1	PROJECT LOCATION AND DRAWING INDEX	DRAWING G-11	GENERAL ARRANGEMENT APRIL 2007

REFERENCE DRAWINGS

No.	DESCRIPTION	CHK'D	APP'D	DATE

REVISIONS

REV.	ISSUE PURPOSE	AUTH. BY	DATE
A	WATER LICENSE APPLICATION	CCS	JULY 2004

ISSUE AUTHORIZATION

WATER LICENSE APPLICATION

SRK Consulting
Engineers and Scientists

DESIGNED BY: CCS DATE: JULY 2004	DRAWN BY: JM DATE: JULY 2004
CHECKED BY: CCS DATE: JULY 2004	DISCIP. ENGR. DATE:
PROJ. MGR: DATE	PROJ. ENGR. DATE

SRK PROJECT NUMBER:
1CT004.06

Tahera Corporation

JERICHO PROJECT

DRAFT

GENERAL ARRANGEMENT
AT END OF APRIL 2006

DRAWING NUMBER
1CT004.06 – G10

REV.
A

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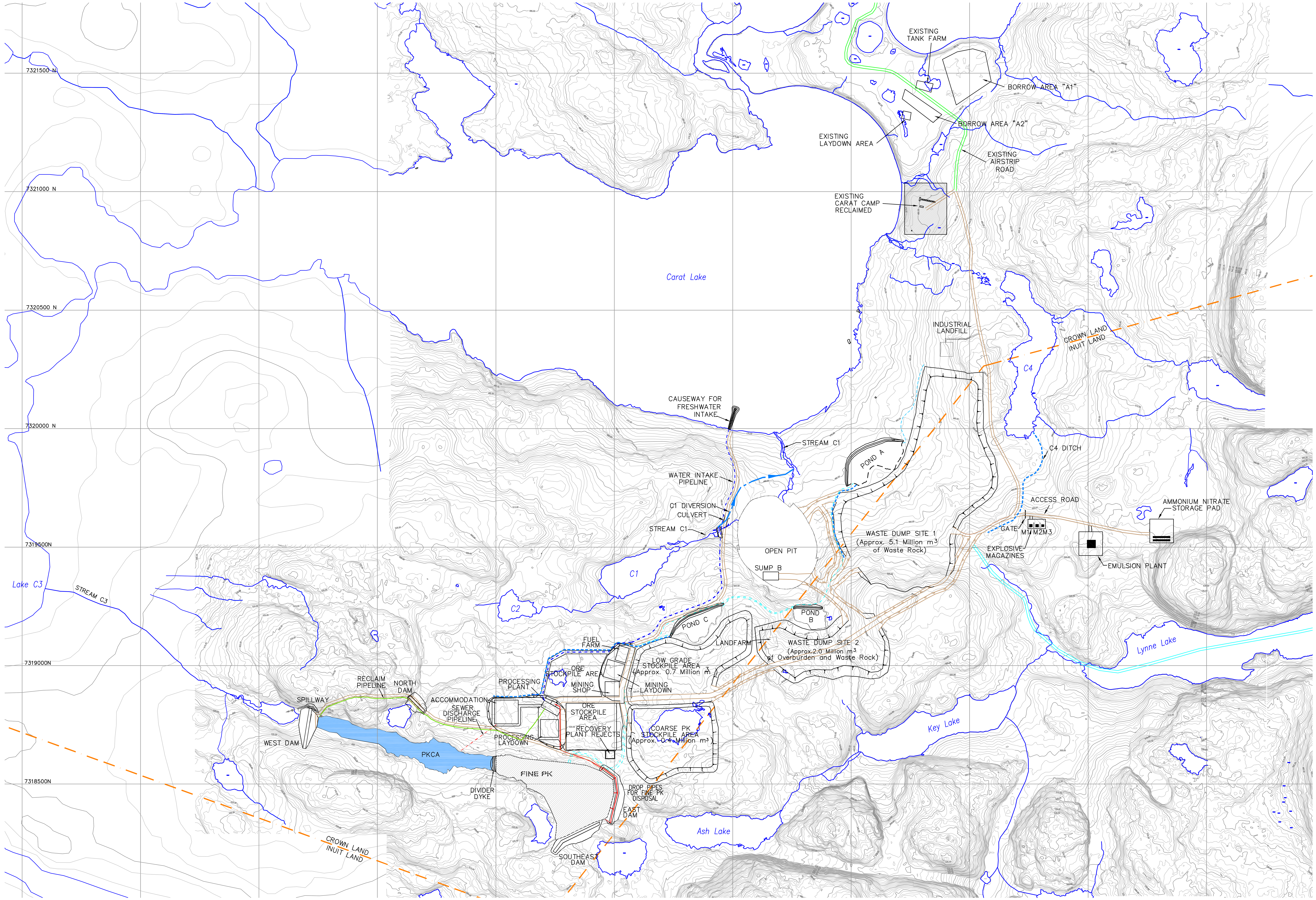

LEGEND

- EXISTING ROAD
- EXISTING ROAD (APPROXIMATE LOCATION)
- ROAD REQUIRED BY YEAR 3
- WINTER ROAD
- FRESH WATER PIPELINE
- MINE WATER PIPELINE
- FINE PK DISCHARGE PIPELINE
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5. STOCKPILE FOR CENTRAL AND NORTH KIMBERLITE LOBES SHOW MAXIMUM LIMITS. ACTUAL FOOTPRINTS MAY VARY.

TAHERA CORPORATION
JERICHO LAKE SOUTHWEST EXTENSION

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Tahera Diamond Corporation

JERICHO PROJECT

DRAFT

GENERAL ARRANGEMENT AT END OF APRIL 2008

DRAWING NUMBER: 1CT004.06 – G12

REV. A

FILE NAME: F:\Tahera Corp (Lytton minerals)\Mapping and Drawings–2004 dwgs\general–figures(2004)\figureGA–year1

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APPENDIX 1

EXPLOSIVES MANAGEMENT AT JERICHO DIAMOND PROJECT

To: Tahera Corporation

CC: Cam Scott, Dan Johnson

Date: June 11. 2004

From: Jeff Stibbard

Re: Blasting Operations Management Practices

Introduction

The blasting practices at the Tahera Jericho Operation will be similar to most other northern hard rock open pit mining operations. The majority of mined rock will be blasted using a bulk form of Ammonium Nitrate (AN) and fuel oil mixture to make the blasting product ANFO. ANFO is soluble in water and is therefore only ideally suited for dry hole application. Variations of water resistant products suitable for wet conditions are available in both bulk and packaged format. All forms of blasting products require careful storage and handling practices to ensure the product is adequately contained and stays dry during storage.

This memo presents information on explosives management practices that will be employed to ensure safety and minimize the potential for environmental impacts from the use of ANFO based explosives.

Transport and Storage and Considerations

The unique transportation infrastructure of winter roads and air travel adds a significant challenge in terms of planning and storing bulk explosive products over an entire year. This coupled with the severe weather conditions and attention to mitigating potential health and safety and environmental impacts, all of the blasting products requirements at the Jericho site will be supplied and delivered by a single, experienced explosive company, with specific experience in start-up and operations requirements of northern diamond operations.

The explosives supplier will provide the technical support, supply, transportation, storage, manufacture borehole delivery and waste management necessary for the entire blasting process. This supplier has a complete program of quality control and hazardous operational analysis and employee training as part of a comprehensive management program that will be in place at Jericho.

Several key Management Plan items include:

1. Regulatory & Permitting Compliance
2. Planning & Design Standards
3. Security
4. Safety & HSE Program
    a. Employee & Management Training
    b. Inspections
    c. HAZOPS
    d. Standard Operating Procedures
    e. Emergency Preparedness
    f. Protective Equipment
    g. Health Control

h. Communication
5. Shipping
6. Receiving
7. Manufacture
8. Storage
9. Delivery
10. QA/QC
11. Design
12. Maintenance
13. Waste Management
14. Incident Reporting

The onsite Jericho Mine Management personnel will be accountable for the regular inspection and audit of the explosives contractor performance in compliance with their management plan, government regulations and industry best practices. Performance with respect to delivering successful results in accordance to the plan will be contractually obligated and carry reward provisions and definite consequences for non performance.

Initial Operations

It is important to note that the mine is starting as a green field operation and the blasting operation practices will change as the mine ramps up to full production over the first two years. In year 1 the blasting requirements are based on obtaining the necessary rock to construct the initial site infrastructure and access the first supply of kimberlite ore. Since this activity is essentially pioneering a only consists of breaking 1.5M tonnes of rock the product and the practices in this year will be unique.

Current northern diamond industry experience powder factors between 0.46 – 0.5 kg/t. The Jericho EIA used a powder factor of 0.8kg/bcm (0.3 kg/t). The total amount of ammonium nitrate required to support the operation in year 1 is approximately 750,000 kg.

This amount of AN will be transported and stored on site in one tonne tote bags. In the first year of operations, these tote bags will be received on site and removed from hi-boy tractor trailers using a Integrated tool carrier at an existing prepared gravel lay down area from the bulk sample program. Figure 1 illustrates the transportation and offloading technique.

Figure 1
Transport & Offload

These bags will be stored in three separated rows stacked three bags high with a base course of six bags followed by a mid course of 5 bags and a final course of 3 bags. Each row will be approximately 18 bags deep and be covered over using several tarps tied down at the base of the stack. The storage area will be bermed and unlaid with a geomembrane per current best practices. Figures 2 and 3 illustrate the stacking and tarping configuration to be used for these bags.

Figure 2
Stacking Illustration

Figure 3
Tarping Illustration

The stored ammonium nitrate will be systematically retrieved using the integrated tool carrier for transport and loading into the bulk ANFO mix truck. The bulk ANFO truck will mix the appropriate blend of diesel fuel with the AN prill and transfer this product to the pit for borehole loading of dry holes. The ANFO product is water soluble and will require strict attention to ensure that this product is only used in dry holes. If wet holes are present, alternate products or methods can be used.

The potential for wet-holes at Jericho is considered to be low due to the land-based nature of this pit and the presence of permafrost throughout the pit shell. However, even though the pit area is assumed to be dry, a contingency will be readily available in the absence of any bulk wet hole product manufacturing infrastructure.

Factors that govern the potential for wet holes include: the length of time between placement of the fuel and detonation (typically longer for larger blast patterns), the proximity of the blast to the lowest point in the pit, and the presence of any geologic features that may conduct water will determine the potential for wet holes. Good initial planning and engineering will minimize the effects of these conditions prior to drilling and blasting.

The potential for wet holes will be evident at the time of drilling and without fail at the time of loading each blast hole. The blaster responsible for loading and firing the drilled pattern begins the loading process by walking the entire pattern and checking the actual drilled depth of each hole versus the plan and noting any conditions such as water in each hole. This information is recorded on the blast pattern record sheet required by regulation to determine the amount and type of explosive required in each hole including the delay detonators used.

The presence of water in any drill hole requires one of several approaches to be taken to ensure proper and complete explosive detonation. One way is to attempt to dewater the hole using a down hole dewatering pump and truck so that a poly borehole liner can be lowered into the hole and ANFO poured inside the bag. Another and progressively more costly alternative is to use a water resistant slurry or emulsion that is manufactured onsite and this is pumped directly into a wet borehole. Finally and the most expensive alternative is to use a pre-packaged water resistant emulsion product lowered directly into a wet hole.

Each of these options has specific benefits and draw backs besides the obvious cost differences. Relying on borehole dewatering and bagging ANFO does not also ensure total water migration int o the ANFO due to ripped bags or frozen pumping units and logistical reliability of the added steps. Bulk emulsion manufacturing requires a significant amount of infrastructure in place based on a large quantity anticipated for use. Packaged explosive is expensive and requires separate storage and significant manual handling of the product.

In the initial stage of the development, a precautionary approach will be taken to ensure appropriate means of handling wet holes are available, with a minimum amount of infrastructure until the potential for wet holes can be more accurately evaluated.. On this basis the wet-hole contingency in year 1 will consist of having up to 10% or 90,000 kg of packaged emulsion (water resistant) product available for use on site. The use of this product will be determined by the blaster at the time of blast pattern loading.

Should additional packaged product be required as a result of the number of wet holes exceeding 10% through out the first year the product can be supplied and air freighted to site with minimal delay. All of this packaged product will be stored in one of the three 30,000 kg magazines brought in over the winter road.

In the case that ANFO is loaded into a wet borehole inadvertently and an incomplete detonation of the product occurs, it is likely that an orange colored smoke plume would be observed rising from the affected area. The blaster is required by the regulations to make an inspection of the blasted area, make note of the suspect blast hole and mark its location with flagging.

Information from the blasters inspection would be noted in the blast pattern log and the daily operations shift log communicated to all field supervision and mine management personnel. The flagged off area would remain until the excavation equipment advances up to within half the hole spacing distance at which time the suspect material would be more closely inspected for the presence of ANFO. Material considered un-detonated or high in ANFO residue would be selectively excavated and hauled to a central core area of the waste dump to be placed in thin lifts to enhance rapid freezing to encapsulate this material.

The specific location within the waste dumps will vary as the dumps continuously evolve over time but the criteria for selection of a suitable location will remain the same. The primary aim will be to ensure that the material is away from any potential surface water course, not exposed to any external precipitation flushing and able to rapidly freeze and remain frozen.

Subsequent Years of Operation

During the subsequent years of mining the process of drilling & blasting and blast management remains the same, however the quantities rise to over 3,000 tonnes of AN required to support and annual mining rate approaching 6 million tonnes. This will require that the storage area for the bulk tote bags be expanded to accommodate the larger foot print.

Rock from the first year of operation will be utilized to create enough room for four rows containing 750 bags each again stacked three bags high. Each row will extend upwards of 100 meters long. As in year 1 the piles will be covered with a secure tarp and maintained in sound condition throughout the year. As in the initial year an integrated tool carrier will be used to stack and retrieve each 1 tonne bag for transportation and loading of the ANFO delivery truck. AN tote bag and pile management will be a key deliverable of the explosives contractor to ensure that bags are kept in satisfactory condition shielded from the elements, handled with care to prevent toppling, puncture and spilling of the contained prill. Any and all spilled product will immediately be contained and restored in surplus tote bags for re-use or disposal.

A process of inventory management and inspection will be used to record the quantity and condition of the prill storage on a regular basis any items found in un-satisfactory condition will be immediately rectified and reported to the Jericho Mine Management personnel.

The bulk explosive truck will be maintained and kept clean in a designated parking facility that will ensure that all waste wash water or contaminants are 100% contained and periodically collected for disposal.

The percentage of wet holes encountered during the first year of operations will be used as a basis for determining the optimal means of dealing with wet holes during subsequent years when production rates increase. If net wet hole requirements remain below 10% then hole dewatering may become the primary method of explosives loading during the summer months and packaged product may be used in the winter.

If the wet hole requirement increases above 10% in the years when over 3,000 tonnes of explosive product is required than the need to incorporate a small emulsion manufacturing plant onsite will be necessary. This semi portable plant would require a footprint of less than 100 meters by 100 meters and be self contained within a 12 meter by 20 meter storage building with connections to three 12 meter long hi-way trailer vans containing boilers, mixing units, fuel storage and power generation. In addition one fuel storage and one water storage tank would be located adjacent to the facility.

Figure 4
Typical Emulsion Plant Arrangement

Figure 5
Explosives Delivery Truck

The decision to permit, mobilize and erect this facility would be made immediately following the experience of the initial pit development in early summer. This would allow enough time to have the plant delivered on the following winter road and operational within several months, prior to the spring freshet.

In this situation once again the blasting practices would adhere to the highest industry standard under control of the experienced explosive supply and delivery contractor. The role of the blaster to ensure that the correct explosive product is placed in the hole and adequately documented would remain the first line of diligence. The Tahera mine management personnel would play an important role on following up with compliance to the operating practices as well as maintaining the most efficient utilization of the products available.

In the unlikely event that wet conditions prevail in the ongoing pit operations, an exclusive use of bulk manufactured water resistant emulsion may be considered that would almost entirely eliminate the water solubility and contamination issue associated with ANFO in the blasting process. However the costs of this alternative would have to justify this adjustment based on actual field analysis. The remaining issue as in all cases in this alternative rests with the sound transportation, storage, handling and disposal of the ammonium nitrate prill.