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Missouri Department of Natural Resources
Air Pollution Control Program
Ms. Kyra Moore - Director of APCP
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Disposal Plan for Sodium Nitrite Contaminated Dynamite
Dyno Nobel Inc. – Carthage Plant
Operation Permit # OP2007-066

Dear Ms. Moore:

The Dyno Nobel Carthage, MO Plant is requesting the Missouri Dept. of Natural Resources' (MDNR) approval for an emergency burn permit of approximately 18,000 pounds of sodium nitrite contaminated dynamite. A description of the events leading to the creation of this waste, and Dyno Nobel's recommended disposal plan, is included with this letter.

Background

One of the primary products manufactured at the Dyno Nobel Carthage Plant is dynamite, a nitroglycerin based explosive. One of the primary ingredients of dynamite is sodium nitrate. Sodium nitrate used for dynamite production can have no more than 0.05% sodium nitrite without impacting the safety of the product. The aforementioned product contains sodium nitrite well above this specification. The discovery of this contamination, as well as immediate actions taken and recommended disposal plan, are included in this letter.

Chain of Events

October 13, 2015 at 7:43 pm
A fire started at the Dope House and the sprinklers were activated. The situation was evaluated and decided to investigate the next morning in daylight hours.

October 14 and 15, 2015
The Dope House was investigated and determined that a fire started in a Dope Hod (covered wooden wheel barrow) containing a mixed dope.

October 16, 2015 at 6:40 am
Discovered bulging boxes of dynamite in magazine and determined the dynamite had released gas. The laboratory began testing to determine the source of this gas release. Sodium nitrite was

detected in the dynamite and the lab focused testing on sodium nitrite contamination.

October 16, 2015 at 7:41 pm
A fire was reported in the lab. The fire was extinguished and determined to be caused by the sodium nitrite contamination testing. Incident command made the decision to submerge all of the contaminated dynamite in plastic drums containing water.

Current State
428 boxes of dynamite are submerged in 214 plastic barrels (2 cases per barrel) containing about 20 gallons of water each. The barrels are stored on two box trailers on-site.

Total dynamite:	18,000 lbs.
Total water:	4,300 gallons

Disposal Plan

The disposal of the material will be completed in three stages, as described below. A copy of the standard operating procedure (SOP) for operation of the explosives burning ground is included in Attachment 1. Before carrying out any of the tasks, Dyno Nobel will complete a formal risk assessment for each task to analyze and mitigate all hazards. The SOP is subject to risk assessment and will be modified to accommodate any identified hazards specific to this situation.

Open Burn of Dynamite

The dynamite will be open burned on-site at the burning ground. The burning ground has two bermed pads that are limited to 500 pounds of explosives per pad per day. One pallet of barrels per pad will be burned each day (4 barrels per pallet or approximately 340 pounds of dynamite). The dynamite will be removed from the water, cut open, and spread on a layer of paper on a pallet. The dynamite is then sprayed with No. 2 fuel oil and ignited according to the procedure. The entire process will be contained in a steel holding pan. Before beginning the next burn, the ash will be transferred from the pan into a steel drum.

Disposal of Water

The barrels will be transported to the Thermal Treatment Unit (TTU), where the water will be treated to destroy the dissolved explosives. The water in the barrels will be transferred to the TTU feed tank using a pneumatic diaphragm pump, being careful not to pump any solids or undissolved nitroglycerin from the bottom of the barrels. The processed water will be stored in the "Processed Water Tank" connected to the TTU. After processing, the water will be loaded on a truck and shipped to Liquid Environmental Solutions in Kansas City as a non-hazardous liquid.

Open Burn of Undissolved Nitroglycerin and Residual Dynamite

Any dynamite that broke apart in the water will settle to the bottom of the barrels, along with undissolved nitroglycerin. The water will be skimmed down as far as possible and the remaining material slummed (mixed with wood pulp to absorb free liquids). This material will be transferred directly from the barrels to the burn pads and burned in the same manner as the dynamite.

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Timeline for Disposal

All three steps will be carried out concurrently. The plan will begin the Monday following approval and completion of risk assessments. A burn will take place 7 days a week until the material is gone. Allowing for interruptions in the process, this will take 1 to 2 months.

At the present time, Dyno Nobel is attending to an explosives emergency response activity, and personnel at the facility have the expertise needed to control, mitigate or eliminate the actual or potential threat associated with sodium nitrite contaminated dynamite. Such an emergency response may include in-place render-safe procedures, treatment or destruction of the explosives. We also recognize that any reasonable delay in the completion of an explosives emergency response will not terminate the emergency. (Reference 40 CFR 260.10 definition of Explosives or munitions emergency response.)

Dyno Nobel is confident that the only safe method of handling this material is in-place destruction, which will be carried out by experts in the field, who have the necessary knowledge and experience. The option of using TSDF's that specialize in explosives and munitions disposal (General Dynamics in Carthage, MO, and Clean Harbors in Colfax, LA) was assessed, but ruled out for the following reasons:

a) the TSDF's could not provide a firm date that the material could be accepted into their facility, and
b) the time required to obtain the necessary DOT approval (EX number), which is required for safe transport, would be unreasonable in that securing such approvals can take up to a year.

We look forward to your review of this proposal. Please feel free to contact me with any questions at (417) 359-2253.

Sincerely,

Jacob Cauble

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Environmental/Lab Supervisor
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cc: Dave Walker, MDNR
Neal Olsen, Dyno Nobel
Dennis Mailes, Dyno Nobel

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Attachment 1
Operation of Explosive Burning Ground

Operation of Explosives Burning Ground

1.0 SCOPE

1.1 This document provides the procedure for the operation of the explosives burning ground.

2.0 REQUIREMENTS

2.1 All personnel assigned to this operation are responsible for knowing and adhering to this procedure and to the documents specified in Section 3; Applicable Documents.

2.2 In operations involving the handling of explosive materials, one must never forget that the materials will ignite or explode if subjected to sufficient energy in the form of heat or shock and must be constantly alert to prevent conditions that could result in over-heating, friction, impact, shock, pinching, or presence of foreign objects in powder.

2.3 Employees must understand that, when they accept assignment to a job or operation, they assume responsibilities for the safety of themselves and their fellow employees, and for the care and protection of equipment and materials against damage.

2.4 Personnel Limits

Operators	3
Transients	1

2.5 Explosives Limits (per day)

Pad No. 1	Pad No. 2
500 lbs.	500 lbs.

2.6 The Burning Ground operator must report the amount of explosives burned per pad each day to the Yard Supervisor. The Yard Supervisor will record these amounts in the burning ground logbook each day of burning ground operation to comply with EPA regulations.

3.0 APPLICABLE DOCUMENTS

3.1 HSC-109: Preparedness, Prevention, and Contingency Plan – Carthage Plant Emergency Plan
3.2 Burning Ground Rule Card
3.3 Burning Ground Semi-Annual Inspection
3.4 Spill Prevention Control and Counter Measure Plan
3.5 SOPC-GEN-10: Handling Hazardous Material and Handling Hazardous Material Spills
3.6 SOPC-DYN-01: General Safety Rules for Dynamite Operations.

4.0 MATERIALS AND EQUIPMENT

		QUANTITY
4.1	Waste Powder Boxes	As Required
4.2	Pallets	As Required
4.3	Paper	As Required
4.4	No. 2 Fuel Oil in 5 gallon cans	Maximum 5 cans.
4.5	Sprinkler Buckets	4
4.6	Broom	1
4.7	Matches (in Safety Carrier with Annual Permit)	As Required
4.8	Truck for Transporting Waste	1

5.0 HEALTH, SAFETY, & ENVIRONMENT

5.1 All personnel assigned to the operation must wear approved safety shoes, safety glasses and chemical resistant gloves.

5.2 No more than one burning will be permitted at Pad No. 1 per day unless specifically authorized by Plant Manager.

5.3 If both burning pads are to be used, they must be lit at the same time of the day.

5.4 Two operators must be present when the burning pad is to be lit. A second person must be present during light off to give emergency assistance to the operator if needed.

5.5 Never attempt to re-enter the Burning Ground area for any reason once the burning pad has been lit. Personnel shall not re-enter area until 7:00 A.M. the following morning.

5.6 Do not drop, drag, or throw waste containers. Impact and/or friction could possibly ignite explosive materials on or around containers.

5.7 Before moving explosive wastes inside the Burning Ground, inspect the area to make sure there are not traces of fire or hot residues left from the previous burning.

5.8 The burning site shall be free of metal, glass, or large stones and be reasonably level and free of cracks.

5.9 The earth barricades around the burning pads shall be kept free of grass and weeds at all times.

5.10 In the event of unfavorable or doubtful burning conditions such as heavy rains or strong winds, obtain authorization from the supervisor before preparing to burn.

5.11 When spreading explosive wastes, be alert for any unopened cartridges of dynamite and for any lumps or masses of dynamite, such as gelatin, more than 1 inch thick. Dynamite and

explosive waste confined in cartridges or masses might explode when burned. If found, lumps must be broken up, and cartridges must be opened and the dynamite broken up.

5.12 Dynamite in convolute shell need to be slit and spread prior to being burned.

WARNING

Dynamite shall never be burned in tube shells as this may cause confinement and results in a shot

5.13 Arrange explosive waste so fuel oil can be added without walking through or over any of the explosive waste.

6.0 OPERATIONS

NOTE: The Burning Ground is divided into two pads. Both pads are surrounded by an earth barricade with the adjacent barricade being common to both pads.

Pad No. 1 (the east pad) is to be used for the waste explosives.
Pad No. 2 (the west pad) shall not be used unless an extreme emergency.

Whenever the quantity of explosive wastes to be burned exceeds the limit (500 pounds), the remainder shall be burned on a second day. If the quantity is within the limits of one pad, then only one pad should be used.

WARNING

Only waste molecular explosives and materials contaminated with molecular explosives are to be burned at the Burning Ground

6.1 WASTE COLLECTION

6.1.1 Waste explosives are to be collected from the area of generation or from the 90-day hazardous waste storage building (Fuse House).

6.1.2 Explosive wastes must be transported in approved containers, which are covered, cardboard boxes lined with polyethylene liners, or plastic bags, which are securely closed by tying or taping.

6.1.3 Explosive wastes are to be transported by the flat bed truck designated for this purpose, unless other transportation equipment is specifically authorized by the supervisor. The flat bed truck used for this purpose has a wooden floor and is equipped with wooden side rails. The truck must be in good condition and the side rails must be in place so that waste containers cannot fall out or project beyond the sides of the car.

6.1.4 Deliver explosive wastes to the Burning Ground and park the truck immediately outside one of the burning pads.

6.2 PREPARATION FOR BURNING

6.2.1 Obtain a copy of the burn notification submitted to the MDNR.

WARNING

If a burn notification has not been submitted to the MDNR, Stop any preparation for a burn and notify supervision.

6.2.2 Before moving wastes into a burning pad inspect the area to make sure that there are no traces of fire or hot resides left from the previous burning.

NOTE: If hot residue is found - DO NOT PROCEED – Contact supervisor for instructions.

6.2.3 Select a burning site and inspect it carefully. The site shall be free of metal, glass, or large stones and be reasonably level and free of cracks. Rake the site to remove any such objects, to remove or break up any crusty residues from previous burnings and to fill any small cracks or fissures in the ground. After raking feel the ground to make sure it is not hot from the previous burning.

6.2.4 Lay pallets on the selected burning site and cover the pallets with paper to form a pad on which the waste will be placed for burning.

6.2.5 Move the truck into the burning pad area and carefully remove waste containers from the truck. Do not drag waste containers across the floor of the truck.

6.2.6 Spread explosive waste in a layer not over 1 inch thick.

6.2.6.1 Spread any NG slums (well absorbed in sawdust or wood pulp) in a layer not over 1 inch thick on the end of the cardboard pad farthest from the entrance of the burning pad.

NOTE: Slums from the cleaning of catch tanks that are wet with water may require additional fuels for complete burning.

6.2.6.2 Dynamite cartridges will be split and spread in a single layer.

WARNING

Dynamite shall not be burned in tube shells.
Ensure that the quantity of waste does not exceed the limit specified in Section 2.5.

6.2.7 Spread contaminated paper such as shells, bags, boxes, etc. up to the edge of the pad of waste explosives. If the quantity of contaminated paper is not sufficient for the day's burn it may be necessary to use uncontaminated paper such as waste paper from the Shell House.

6.2.8 Build a train of clean paper for a distance of at least 10 feet past any explosive material and extending in the direction of the burning pad entrance. This will be used as a fuse for lighting the fire.

6.2.9 Inspect the truck floor for any traces of spilled explosives and clean, if necessary. Remove the truck to a safe distance from the Burning Ground.

6.2.10 Sprinkle sufficient No. 2 Fuel Oil or kerosene over the pad of material to ensure a good burn.

6.2.11 Obtain matches and match carrier from the Yard Office.

6.2.12 Drive the fire truck to the Burning Ground and leave it parked on the road outside the barricade while lighting the fire(s).

WARNING

Do not park the fire truck in front of the opening to the pad.

6.2.13 If the fire truck is not available, at least two Indian pumps, filled with water and tested, shall be present.

6.3 BURNING

6.3.1 The fire(s) shall always be lit at 11:00 A.M. unless specific authorization is obtained from the Plant Manager to burn at a different time.

6.3.2 Since burning explosive waste is not common, notify all plant personnel and warn any employees working on the commercial railroad track or any people in the area of the burning to leave the area.

6.3.2.1 Box House personnel will vacate the Box House during a burn.

6.3.3 Light the fuse end of the pad to be burned.

WARNING

A person (not necessarily an operator) must observe the light off from a safe distance, being prepared to give emergency assistance to the operator, if needed.

6.3.4 Immediately leave the area and drive the fire truck to a point at least 100 yards away. From this distance, keep a watch on the burning until flames are no longer visible. In dry windy weather, keep watch for an additional 15-30 minutes for the possibility of any flying sparks starting a grass fire outside the Burning Ground.

WARNING

Once the fires have been lit, no one is to re-enter the burning pad area until 7:00 a.m. the following morning.

6.3.5 Report any explosion that is heard during the burning to the supervisor.

6.3.6 If a grass fire should be started outside the Burning Ground, go to the nearest phone and call the supervisor, or if he/she is not available, the Main Office. While assistance is arriving, proceed with the fire truck to a point near the grass fire, close enough to reach the fire with the truck's hose, but as far away as possible from the Burning Ground and prepare the pump and hose for fighting the fire.

6.4 Burning Contaminated Waste Equipment

6.4.1 Discarded wooden powder machine parts, and hods that have been in contact with explosives will be burned at the Explosives Burning Ground. Such materials are to be burned when burning other explosive waste.

6.4.2 Wooden hods and large wooden machine parts must be carefully taken apart before being sent to the Burning Ground. Such materials are not to be stored and accumulated at the Burning Ground, prior to burning, but are to be kept inside waste sheds or other locations, where they will not be exposed to direct sunlight or other heat sources.

6.4.3 Put down a pile of paper and stack contaminated materials on it in a crisscross manner, as for a bonfire. Wood shall be spread out and not stacked in a deep pile.

6.4.4 Lay out a 10-foot train or fuse of paper for lighting. Sprinkle the pad of materials thoroughly with fuel oil. Light the fuse. Observe the burning from the fire truck at a distance of 100+ yards.