Premature Detonation of Seismic Explosives at Surface

Date of Incident: February 23, 2000
Type of Incident: Fatal

TABLE OF CONTENTS **PAGE NUMBER**

Section 1.0 FILE NUMBER

1.1 F-261511

Section 2.0 DATE AND TIME OF INCIDENT

2.1 February 23, 2000 at 2:30 P.M.

Section 3.0 DATE AND TIME OF INVESTIGATION

3.1 February 24, 2000 at 8:00 A.M.

Section 4.0 NAME OF INVESTIGATOR(S) (INTERNAL)

4.1 BARRY, Verleen
Occupational Health & Safety Officer

BARRETT, Dwayne
Occupational Health & Safety Officer

Section 5.0 INCIDENT REPORTED BY

5.1 Royal Canadian Mounted Police, Edmonton Dispatch

Section 6.0 DATE AND TIME INCIDENT WAS REPORTED

6.1 February 23, 2000 at 2:43 P.M.

Section 7.0 NAME AND ADDRESS OF PRINCIPAL STAKEHOLDER(S)

7.1 **Owner(s)**

7.1.1 PanCanadian Petroleum Limited
150 – 9th Avenue S.W., P.O. Box 2850
Calgary, Alberta T2P 2S5

7.2 **Prime Contractor**

7.2.1 761604 Alberta Limited
P.O Box 22014
Red Deer, Alberta T4N 6X4

7.3 **Employer**

7.3.1 Dynastar Drilling Limited
729 Highfield Gate, P.O. Box 459
Carstairs, Alberta T0M 0N0

7.4 **Supplier**

7.4.1 Austin Powder Limited
3810 – 7th Street, S.E.
Calgary, Alberta T2G 2Y8

Section 8.0 DESCRIPTION OF PRINCIPAL OWNER, PRIME CONTRACTOR, EMPLOYER AND SUPPLIER

8.1 PanCanadian Petroleum Limited is a resource development company with oil and gas operations located throughout Canada. PanCanadian's head office is located in Calgary, Alberta.

8.2 761604 Alberta Limited is a Red Deer based consulting company which provides specialized services to Alberta's oil and gas industry. These services include the provision of seismic drilling supervision for resource development companies. The consultant reported to the owner.

8.3 Dynastar Drilling Limited is a seismic drilling company operating in Canada's four western provinces. Dynastar's head office is located in Carstairs, Alberta. The workers at the lease site reported to the prime contractor/consultant. Both workers are certified blasters, with the Seismic Assistant reporting directly to the Driller who is in charge of all activities.

8.4 Austin Powder Limited is a supplier and manufacturer of explosives to industry, and is a wholly owned subsidiary of the Austin Powder Company of Cleveland, Ohio. Explosive products are supplied locally through their Calgary distribution centre.

Section 9.0 LOCATION OF INCIDENT

9.1 PanCanadian, Brintnell 3D 2000, Line 2120, Shot Point 124, LSD 3-24-81-22-W4M, east of the Hamlet of Wabasca-Desmarais.

Section 10.0 EQUIPMENT AND MATERIAL INVOLVED

10.1 **Explosive Charge**

10.1.1 Austin Powder Limited
Seis-Gel, 51 mm x .5 kilogram
High velocity 60% seismograph gelatin
(See Attachment "B", Document #4)

10.2 **Detonator**

10.2.1 Austin Powder Limited
Seismic-Star, 3-D★Star
High Strength Electric Detonator, 13m Duplex Leg Wires
(See Attachment "B", Document #4)

10.3 **Battery**

10.3.1 Duracell®
Alkaline, 4.5 volts
MN1203
(See Attachment "B", Document #4)

Section 11.0 NAMES OF OTHER INVESTIGATORS (EXTERNAL)

11.1 Royal Canadian Mounted Police, Wabasca Detachment

11.2 761604 Alberta Limited

11.3 Dynastar Drilling Limited

Section 12.0 NARRATIVE DESCRIPTION OF INCIDENT

12.1 On February 23, 2000 at 6:45 AM, the seismic drilling crew, which consisted of a Driller and an Assistant, started the day by attending a pre-operational/safety meeting conducted by the Prime Contractor (herein referred to as the "Consultant").

12.2 At approximately 7:45 AM, the seismic drilling crew proceeded to their tracked drilling vehicle, which was located at the main magazine explosives storage site, to prepare for the day. At 9:00 AM the Consultant handed out the explosives and the explosives recording manifest. The seismic drilling crew then proceeded to their assigned locations.

12.3 At approximately 10:30 AM, the seismic drilling crew and the tracked drilling vehicle arrived at their designated start point on Line 2121, Shot Point 162, and proceeded to conduct drilling activities. The drilling depth at each shot point location was twelve metres.

12.4 Other than performing minor maintenance on the tracked drilling vehicle, the only locations which problems arose were at shot points 149 and 131 on line 2121. At shot point 149, the hole was double loaded due to a detonator lead breaking while removing the loading poles. At shot point 131, two holes were drilled and loaded due to an explosive charge getting stuck at the six metre level at the first hole location.

12.5 At 12:30 PM, the Consultant observed the drilling activities for a period of one-hour, approximately eight to ten shot point locations. The Consultant noted that the drilling crew was following an established and set procedure. At 1:30 PM, the Consultant left the immediate site to observe the activities of other seismic drilling crews.

12.6 At approximately 2:20 PM, the tracked drilling vehicle arrived at line 2120, shot point location 124. Prior to leaving the vehicle to commence drilling, the Driller remained in the cab to update the explosives recording manifest. The Driller did not see the Assistant remove explosives from the vehicle's magazine's, or the placement of two bags of bentonite, two hole plugs and one sand point next to the shot point location.

12.7 The Driller exited the cab upon completion of his paperwork, and started drilling activities. Approximately three minutes after the commencement of drilling, the Driller heard an explosion to the north of the tracked drilling

vehicle. The Driller ran to the north side of the tracked drilling vehicle and saw the Assistant laying in the snow.

12.8 The Driller immediately requested for medical assistance. The work site emergency response plan was activated shortly afterward, which also included contacting the RCMP.

12.9 The Assistant was pronounced dead at the work site location.

Section 13.0 CONCLUSIONS

13.1 A pre-primed explosive charge prematurely detonated at surface, fatally injuring a worker.

13.2 Based on the information collected at the scene, the following factors contributed to this incident:

13.2.1 Evidence collected within the blast area, debris field and clothing indicate the presence of a pre-primed explosive charge. After an explosive charge is primed with a detonator, a plastic sand point is fitted onto the end of the explosive charge (See Attachment “A”, Photographs #1). Small pieces of detonator leg wire and sand point collected at the scene indicate that both items were in close proximity to the explosive event.

13.2.2 Based on the severity and location of the injury, and the remaining clothing, the preprimed explosive charge may have been in the Assistant’s kangaroo pouch with a battery powered Petzl headlamp.

13.2.3 Evidence collected within the blast area and the debris field indicated the presence of a headlamp battery in close proximity to a pre-primed explosive charge (See Attachment “A”, Photographs #2 and #3). No physical evidence of a Petzl headlamp was found.

13.2.4 The Suppliers Material Safety Data Sheets for the products being used at the work site were in plain view and present in the cab of the tracked vehicle. The precautionary information contained in the Material Safety Data Sheets warned the user that “detonators may explode when subjected to flame, heat, impact, friction, electric currents, electrostatic or radio frequency energy, static charge build up”. It should be noted that the Assistant was a certified blaster, and was also previously trained in the Workplace Hazardous Materials Information

System, and should understand the importance of the information conveyed on a Material Safety Data Sheet.

13.2.5 Observations and subsequent evidence collected within the blast area, debris field and clothing eliminated the likelihood of ignition caused by flame, heat or friction. Radio frequency energy by the tracked vehicles interior 25 watt radio has been eliminated due to the fact neither worker was transmitting at the time of the incident. Based upon weather information from Environment Canada, conditions at the time of the incident would not have been favourable for the generation of high amounts of static electricity.

13.2.6 The most likely source of energy present to cause the premature detonation of the explosives was the Duracell® battery carried by the Assistant.

13.2.7 Subsequent to the incident, testing has confirmed that a battery of this type will successfully fire the Suppliers detonator.

13.3 The following measures could have prevented this incident:

13.3.1 When preparing an explosive charge, safe industry practice and the Employer's procedures prohibits the pre-priming of an explosive charge (See Appendix "B", Document #1, Safe Work Practices, page 4-8) (See Appendix "B", Document #2, Safe Work Practices, page 6) (See Appendix "B", Document #3, Handling Explosives, page 5).

13.3.2 When preparing and handling an explosive charge, the manufacturer's precautionary information contained in their material safety data sheets warn the user of the potential danger of electrical currents in close proximity to a detonator (See Appendix "B", Document #4, Detonators, page 2 of 2).

Section 14.0 FOLLOW-UP/ACTION TAKEN

14.1 Industry

14.1.1 The Owner voluntarily suspended all seismic drilling activities until the cause of the incident was determined.

14.1.2 The Prime Contractor ensured that all seismic drilling companies employed at the lease site reviewed established safe procedures, material safety data sheet information, and the Occupational Health and Safety Act, Explosives Safety Regulation prior to resuming seismic drilling activities.

14.1.3 The Employer reviewed the company's established safe procedures, material safety data sheet information, and the Occupational Health and Safety Act, Explosives Regulations with all workers prior to resuming seismic drilling activities.

14.2 **Alberta Human Resources & Employment**

14.2.1 The Prime Contractor was ordered to conduct an investigation into the circumstances of the incident. In addition, prior to the resumption of seismic drilling activities, the Prime Contractor was to ensure that all seismic drilling companies reviewed established safe procedures, material safety data sheet information, and the Occupational Health and Safety Act, Explosives Regulation.

14.2.2 The Employer was ordered to report the incident in accordance with the Occupational Health and Safety Act, Explosives Regulation, Section 6. In addition, the company was directed to instruct the workers regarding the established safe procedures, material safety data sheet information, and the Occupational Health and Safety Act, Explosives Regulation.

14.2.3 Workplace Health and Safety arranged to have the Supplier examine the explosives stored at the main magazine location, with no issues identified.

14.2.4 Workplace Health and Safety and the Supplier arranged to have the Government of Canada, Natural Resources Canada – Explosives Regulatory Division to independently examine the explosives that were present at the incident site magazine(s), with no issues identified.

14.2.5 Workplace Health and Safety assisted the Canadian Association of Geophysical Contractors with an industry bulletin.

14.3 **Additional Measures**

14.3.1 The Employer commissioned the services of an explosives consultant to review the circumstances surrounding the incident.

Section 15.0 INJURY SEVERITY

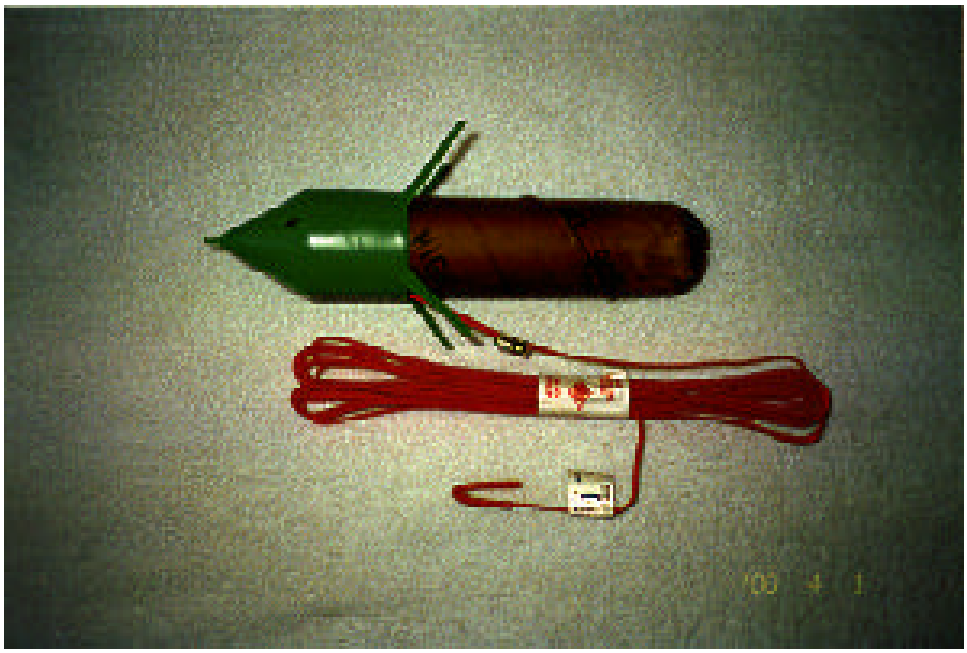
15.1 Fatal

Section 16.0 SIGNATURES

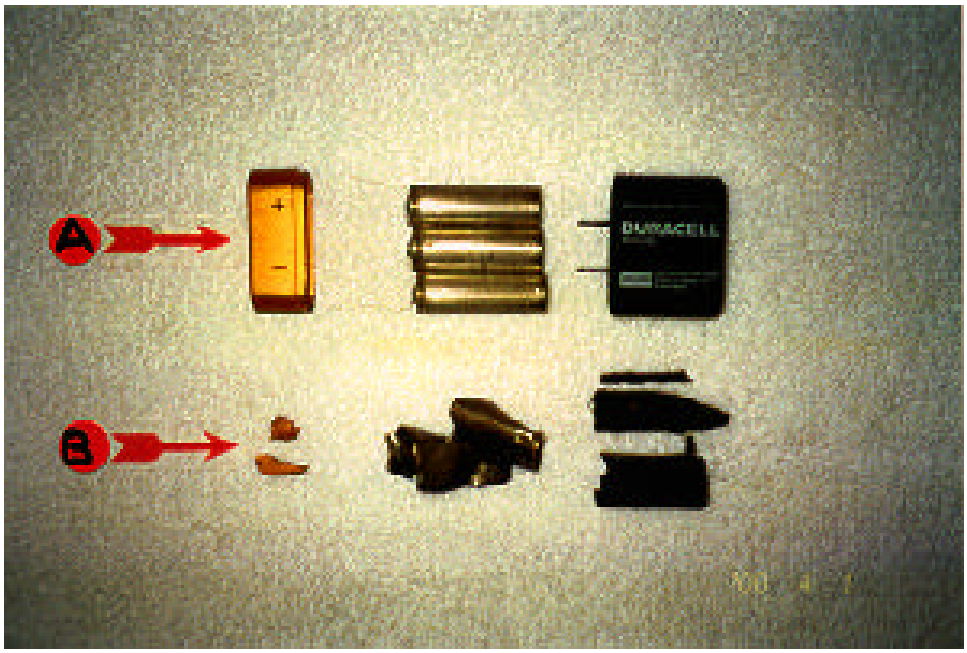
[original signed]

Section 17.0 ATTACHMENTS

Attachment “A” Photographs and Drawing
Attachment “B” Documents

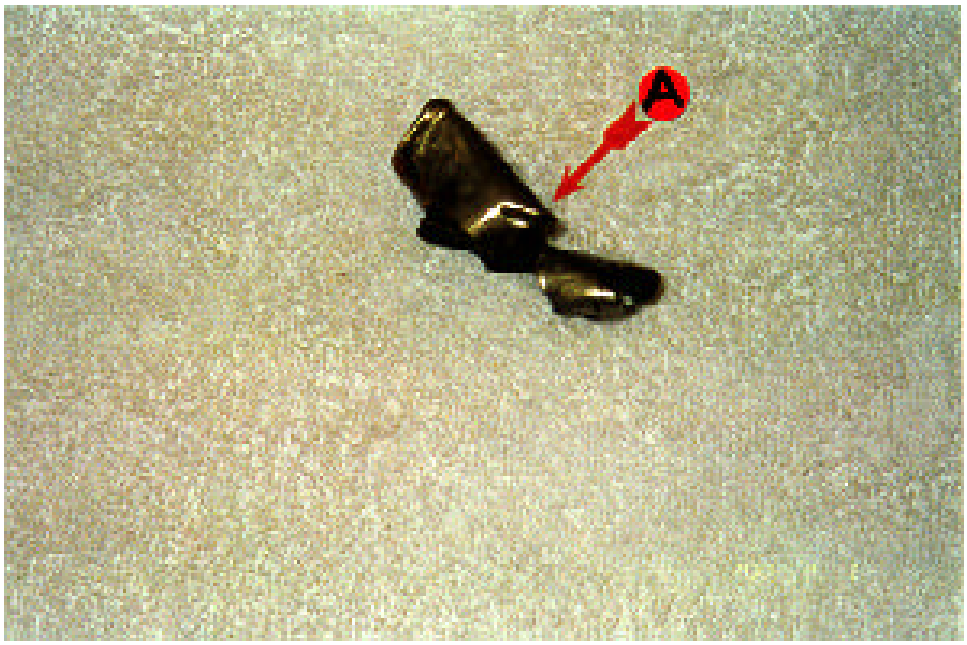


Photograph #1: Primed explosive charge with sand point fitted onto the end.

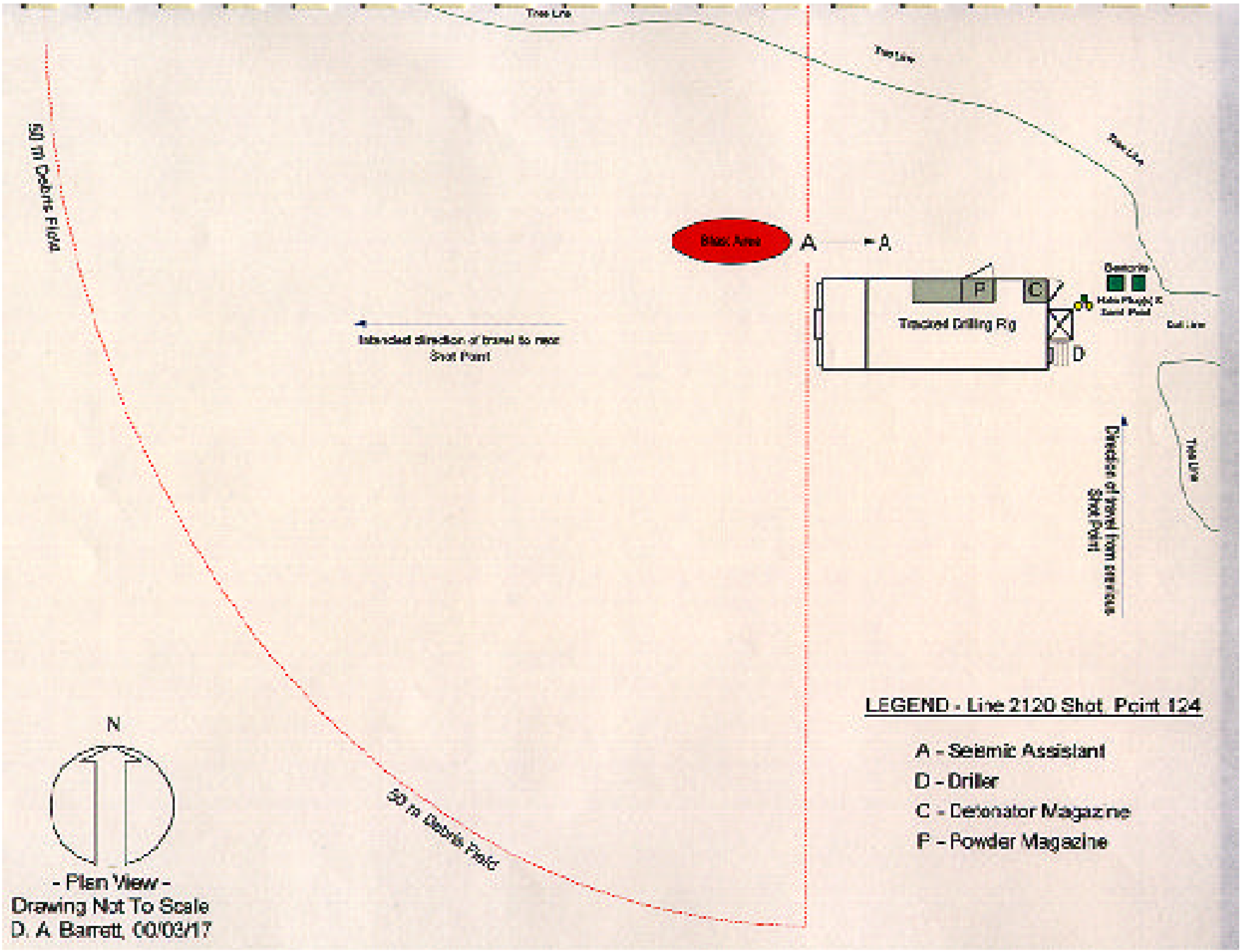


Photograph #2: "A" denotes a dismantled Duracell® battery.

"B" denotes Duracell® battery parts found in blast area and debris field.



Photograph #3: "A" denotes piece of detonator leg wire fused to battery part, indicating explosives in close proximity to Duracell® battery.



- Plan View -
Drawing Not To Scale
D. A. Barrett, 00/03/17

File: F-261511
Attachment "B"
Document 1 of 4

Petroleum Industry Training Service
Seismic Blaster's Safety Training
Chapter 4, Safe Work Practices for Seismic Explosives

PRIMING CHARGES

Only the exact number of detonators required for a given shot point should be removed from the portable container at that shot point.

Primed charges must never be made up in advance. Exposure to a primed charge should be minimized. This can be done by priming just before loading, and loading immediately. A primed charge must never be stored anywhere or transported on any vehicle.

Before priming, ground yourself and ensure the detonator is securely shunted.

Little or no force should be required to place a detonator in the charge. The detonator should be placed in the lower half of a cartridge to avoid contact with the loading pole. If there is a cap-well, place the detonator there.

Where required to punch, make the punch-hole only slightly longer than the detonator, and position it so that the exploding-end of the detonator will be in the centre of the cartridge. Never punch across the cartridge so that the detonator is actually touching the side. This could result in detonation failures.

After priming, the detonator should be secured by making at least two half hitches around the cartridge with the leg wires. Never drag primed charges by the leg wires. Figures 4-3 to 4-6 show detonators being inserted into explosive charges and the use of two half hitches to secure the leg wires.

Priming a charge is the moment of greatest hazard in blasting!

File: F-261511
Attachment “B”
Document 2 of 4

Dynstar Drilling Limited
Safety Manual
Section 4, Safe Work Practices

PRIMING CHARGES

- Use only the exact number of detonators required for a given shot point be removed from the portable container at that shot point.
- Primed charges must never be made up in advance. 
- Ground yourself and ensure the detonator is securely shunted before priming.
- To minimize exposure to a primed charge, prime before loading and loading immediately.
- A primed charge must NEVER be stored anywhere or transported on any vehicle.
- The detonator should be placed in the lower half of a cartridge to avoid contact with the loading pole.
- To avoid detonation failures, never punch across the cartridge so detonator is actually touching the side.
- After priming, the detonator should be secured by making at least two half hitches around the cartridge with the leg wires.
- Never drag primed charges by the leg wires.

In blasting, priming a charge is the greatest hazard!

File: F-261511
Attachment “B”
Document 3 of 4

761604 Alberta Limited
Safety Manual

Always run the loading pole in the hole to make certain that the hole is open before lowering the charge, if there is the slightest chance that the hole is not completely open. Never use metal poles of any kind. Aluminum poles have been known to set an electrical current causing premature explosion of the charge.

The preloader will prime all charges in the immediate vicinity of the hole, and the charge will be lowered in the hole immediately after it is primed with a cap. IT IS ABSOLUTELY PROHIBITED TO PRIME A CHARGE BEFORE THE HOLE IS READY TO BE LOADED. ANY INFRACTION OF THIS RULE WILL CALL FOR IMMEDIATE DISMISSAL OF THE PERSON OR PERSONS INVOLVED.

Do not stamp, pound or force charge of dynamite in any way when it is less than twenty feet down in the hole. The charge should not be struck with the loading pole. A steady push or gently jiggling motion is recommended.

If for any reason a charge of dynamite with a cap in it cannot be immediately loaded in the hole, take the cap out of it, if in the opinion of the blaster this can be done with perfect safety. When dynamite is crushed to the extent that it cannot be used in making up a charge, it should be removed to a distance of 30 m from the drill hole.

The Driller or Helper should avoid standing directly over the hole or looking directly into the hole while loading. Avoid placing any part of the body in a location where it might be injured by premature explosion of the charge. Fatalities have occurred while putting the full weight of the body on the loading pole, directly over the hole.

Only the minimum number of persons necessary for the work to be performed will be allowed in the vicinity of explosives and blasting operations. Do not remain near explosives unless your duties require it. All personnel and equipment are to be a safe distance from the blasterer when blast is fired. The distance will vary with circumstances and is to be established by the Blaster. If there is any questions in this matter, the conservative opinion should prevail in all cases. Before the blast, the Blaster should be sure that his Helper is in a safe location and he and the Helper should look around to ascertain that no automobiles, trucks, equipment, inquisitive persons or animals have approached too close to the blast area for safety.

The depth of the charge should be checked to determine that it is at the proper depth and not stuck part way down the hole. If the charge cannot be safely guided past the obstruction, the Blaster should determine that it is a safe depth for detonation before shooting.

File: F-261511
Attachment “B”
Document 4 of 4

Austin Power Limited, Electric Detonators
Austin Power Limited, Gelatin and Semi-Gelatin Dynamites
Duracell® Battery Specifications

MATERIAL SAFETY DATA SHEET

ELECTRIC DETONATORS
NON ELECTRIC DETONATORS

SECTION I

Issued by the Safety and Compliance Dept.

AUSTIN POWDER COMPANY
25800 SCIENCE PARK DRIVE
CLEVELAND, OHIO 44122
EMERGENCY PHONE
DAY 216-464-2400
NIGHT 216-464-2407

TRADE NAME AND SYNONYMS
Coal* Star, Rock* Star, Time* Star, Coal Mine Delays, Seismic* Star, Twin* Star Detonators, 3-D Star, Seismic Detonators and Shock*Star; In-Hole Delays, Surface Delay Connectors, Quick-Relay Connectors, Dual Delays, Shorty STD (Shock Tube with Detonators) and MS Connector.

Electric Blasting Caps

SECTION II HAZARDOUS INGREDIENTS

Explosive components are PETN (possibly TNT) and lead compounds sealed in a metal shell.

PETN, Pentaerythritol Tetranitrate,	CAS No. 78-11-5
Lead Azide, Pb $(N_3)_2$,	CAS No. 13424-46-9
Lead Styphnate, Lead Trinitroresorcinate, $C_6H_3N_3O_9Pb$	CAS No. 15245-44-0
TNT, Trinitrotoluene; $C_7H_5N_3O_6$	CAS No. 118-96-7 (May be included in some detonators)

SECTION III PHYSICAL DATA

BOILING POINT	N/A	VAPOR PRESSURE (mm Hg)	N/A
SPECIFIC GRAVITY (H_2O = 1)	N/A	VAPOR DENSITY (Air = 1)	N/A
PERCENT VOLATILE BY VOL. (%)	N/A	EVAPORATION RATE:	N/A
SOLUBILITY IN WATER:	Insoluble		

APPEARANCE AND ODOR: Aluminum or copper shells with attached PVC or polyethyene coated copper or iron leg wires. No odor.

SECTION IV FIRE AND EXPLOSION DATA

FLASH POINT:	N/A
FLAMMABLE LIMITS:	N/A
EXTINGUISHING MEDIA:	See below
SPECIAL FIREFIGHTING PROCEDURES:	Do not fight fire. Withdraw personnel immediately . Allow fire to burn itself out.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	May explode when subjected to flame, heat, impact, friction, electric current, electrostatic or radio frequency energy. Do not exceed 150°F (66°C). Avoid toxic fumes from fire.

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: ACGIH: 0.05 mg/M³ TWA, lead, elemental, and inorganic compounds, as Pb.
OSHA : 50 µg/M³ PEL as Pb. For additional information, see 29 CFR 1910.1025

EFFECTS OF OVEREXPOSURE: None likely when safe blasting practices are employed.

EMERGENCY AND FIRST AID PROCEDURES: Improper handling or misuse may cause detonation resulting in injuries from fragment. Lead and lead compounds are listed in the 1987 IARC Monographs as possible human carcinogens (Group 2B). Lead is not listed in the NTP annual report on carcinogens.

MATERIAL SAFETY DATA SHEET

ELECTRIC DETONATORS
NON ELECTRIC DETONATORS

SECTION VI REACTIVITY DATA

Issued by the Safety and Compliance Dept.

STABILITY: May explode when subjected to flame, heat, impact, friction, electric currents, electrostatic or radio frequency energy. Avoid static charge build up. Keep lead wires shunted until wiring into circuit.

INCOMPATIBILITY (MATERIALS TO AVOID): Avoid contact with acids or alkalies.

HAZARDOUS DECOMPOSITION PRODUCTS: Gaseous Nitrogen Oxides, Carbon Oxides, and lead fumes.

HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Pick up containers or units by hand. Avoid conditions affecting stability. DO NOT use damaged detonators.

WASTE DISPOSAL METHOD: Dispose of under direct supervision of a qualified person according to local, state and federal regulations. Call Austin Powder for recommendations and assistance. This material may become a hazardous waste under certain conditions and must be collected, labeled and disposed of per state and federal hazardous waste regulations.

TRANSPORTATION EMERGENCIES involving spills, leaks, fires or exposures in the United States: **CALL CHEMTREC:** 1-800-424-9300. For emergency calls originating outside the U. S. dial the U. S. access number followed by: 1-703-527-3887. All calls are recorded.

SECTION VIII SPECIAL PROTECTION INFORMATION:

RESPIRATORY PROTECTION:	Avoid breathing fumes from detonation.
VENTILATION:	Not required.
PROTECTIVE GLOVES:	Not required.
EYE PROTECTION:	Not required.

SECTION IX SPECIAL PRECAUTIONS

COMPLY WITH "ALWAYS AND NEVER" AS ADOPTED BY THE INSTITUTE OF MAKERS OF EXPLOSIVES. TRANSPORTATION, STORAGE AND USE MUST COMPLY WITH OSHA SAFETY AND HEALTH STANDARDS 29CFR1910.109, APPLICABLE MSHA REGULATIONS, THE DOT AND HAZARDOUS MATERIALS REGULATIONS BATF REQUIREMENTS AND STATE AND LOCAL TRANSPORTATION, STORAGE AND USE REGULATIONS AND ORDINANCES.

THESE DETONATORS MAY BE SHIPPED UNDER ONE OF THE FOLLOWING DOT CLASSIFICATIONS:

DOT or IMDG proper shipping description:

- Detonators, Electric, 1.4B, UN0255, PGII
- Detonators, Electric, 1.1B, UN0030, PGII
- Detonator Assemblies, Non-Electric, 1.1B, UN0360, PGII
- Detonator Assemblies, Non-Electric, 1.4B, UN0361, PGII
- Articles, explosive, n.o.s. 1.4S, UN0349, PGII

Consult IME Safety Library Publication No. 20, SAFETY GUIDE FOR THE PREVENTION OF RADIO FREQUENCY RADIATION HAZARDS IN THE USE OF ELECTRIC BLASTING CAPS, and Publication No. 22, RECOMMENDATIONS FOR THE SAFE TRANSPORTATION OF DETONATORS IN A VEHICLE WITH CERTAIN OTHER EXPLOSIVE MATERIALS.

MATERIAL SAFETY DATA SHEET

GELATIN AND SEMI-GELATIN DYNAMITES

DATE SEPTEMBER 1998 MSDS NO. D-2

SECTION I

Issued by the Safety and Compliance Dept.

AUSTIN POWDER COMPANY
25800 SCIENCE PARK DRIVE
CLEVELAND, OHIO 44122
EMERGENCY PHONE
DAY 216-464-2400
NIGHT 216-464-2407

TRADE NAME AND SYNONYMS
Extra Gelatin Series
Apcogel Series
60% Seis Gel HELIX PNG 80
AL Series HELIX PNG 90
(Blasting Gelatin, Discontinued)

SECTION II HAZARDOUS INGREDIENTS

Nitroglycerin, NG, $C_3H_5O_3$ $(NO_2)_3$,	CAS No. 55-63-0, 3-15%
Ethylene Glycol Dinitrate, EGDN, $C_2H_4O_2$ $(NO_2)_2$,	CAS No. 628-96-6 11-50%
Ammonium Nitrate, AN, NH_4NO_3,	CAS No. 6484-52-2, 0-40%

SECTION III PHYSICAL DATA

BOILING POINT None
SPECIFIC GRAVITY (H_2O = 1) 1.0 to 1.7
PERCENT VOLATILE BY VOL. (%) N/A
EXPLOSION POINT: 237°F
VAPOR PRESSURE (mm Hg) 0.038-0.050
VAPOR DENSITY (Air = 1) N/A
EVAPORATION RATE: N/A
SOLUBILITY IN WATER: Salts are soluble in water, but the nitric esters (NG and EGDN) are only slightly soluble.
APPEARANCE AND ODOR: A mixture of absorbants, white oxidizing salts. Tan color with white granules. Slightly sweet odor.

SECTION IV FIRE AND EXPLOSION DATA

FLASH POINT:	Not Available
FLAMMABLE LIMITS:	Not Available
EXTINGUISHING MEDIA:	See below
SPECIAL FIRE FIGHTING PROCEDURES:	Do not fight fires. Withdraw personnel immediately. Allow fire to burn itself out.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	May explode when subjected to fire or shock. Avoid toxic fumes from fire.

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: ACGIH, TWA: NG 0.05 MG/M³, EGDN 0.05 MG/M³, AN None
*Skin OSHA, CEILING: NG 0.2 MG/M³, EGDN 0.2 MG/M³, AN None
EFFECTS OF OVEREXPOSURE: Ingestion, inhalation or absorption through skin contact may cause headache, nausea, blood vessel dilation, vomiting and convulsions. In extreme cases, death may occur.
EMERGENCY AND FIRST AID PROCEDURES:
EYES: Slight irritant. Hold eye lid open and flush with large amounts of water for 15 minutes.
SKIN: Slight irritant. Absorbs through skin. Wash with mild soap and water.
INGESTION: Consult a physician if persistent headaches or chest pains develop. The nitric esters are coronary vasodilators.

MATERIAL SAFETY DATA SHEET

GELATIN AND SEMI-GELATIN DYNAMITE

SECTION VI REACTIVITY DATA

Issued by the Safety and Compliance Dept.

STABILITY: Stable under normal conditions. May explode when subjected to fire or shock.

INCOMPATIBILITY (MATERIALS TO AVOID): Avoid all contamination especially acids or alkalies, peroxides and chlorates. DO NOT exceed 150°F (66°C).

HAZARDOUS DECOMPOSITION PRODUCTS: Gaseous Nitrogen Oxides and Carbon Oxides.

HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Sweep up and dispose of all spilled material immediately using non-sparking tools. Do not permit smoking or open flames near spill site.

WASTE DISPOSAL METHOD: Dispose of under direct supervision of a qualified person according to local, state and federal regulations. Call Austin Powder for recommendations and assistance. This material may become a hazardous waste under certain conditions and must be collected, labeled and disposed of per state and federal hazardous waste regulations.

TRANSPORTATION EMERGENCIES involving spills, leaks, fires or exposures in the United States: **CALL CHEMTREC:** 1-800-424-9300. For emergency calls originating outside the U. S. dial the U. S. access number followed by: 1-703-527-3887. All calls are recorded.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION:	Not required under normal conditions.
VENTILATION:	Ventilate magazines before entering.
PROTECTIVE GLOVES:	Wear absorbent cotton gloves.
EYE PROTECTION:	Not required under normal conditions.
WARNING:	Minimize inhalation and skin contact. Prevent contact with food, and chewing or smoking materials.

SECTION IX SPECIAL PRECAUTIONS

COMPLY WITH "ALWAYS AND NEVER" AS ADOPTED BY THE INSTITUTE OF MAKERS OF EXPLOSIVES. TRANSPORTATION, STORAGE AND USE MUST COMPLY WITH OSHA SAFETY AND HEALTH STANDARDS 29CFR1910.109, APPLICABLE MSHA REGULATIONS, THE DOT AND HAZARDOUS MATERIALS REGULATIONS BATF REQUIREMENTS AND STATE AND LOCAL TRANSPORTATION, STORAGE AND USE REGULATIONS AND ORDINANCES.

DOT or IMDG proper shipping description: Explosive, Blasting, Type A, 1.1D, UN0081, PG II.

None of the components are listed in the 1987 IARC Monographs, Group 1, 2A or 2B as known, probable, or possible carcinogens, nor are they listed in the NTP annual report on carcinogens.

MEDICAL/ELECTRONIC ALKALINE BATTERIES

PILES ALCALINES POUR INSTRUMENTS MÉDICAUX ET MATÉRIEL ÉLECTRONIQUE

The DURACELL® 7K67 (J size) and MN9100 (N size) batteries for medical and electronic equipment:

- provide optimum performance in applications such as glucose meters, pagers, penlights and TV remote controls
- are bulk packaged
- offer the same long lasting, dependable performance and quality as Duracell® Copper Top™ batteries.

Les piles DURACELL™ 7K67 (format J) et MN9100 (format N) pour instruments médicaux et matériel électronique présentent les caractéristiques suivantes :

- Elles assurent un rendement optimal, entre autres, dans les testeurs de glucose, les téléavertisseurs, les lampes-stylos et les télécommandes pour téléviseurs.
- Elles sont emballées en vrac.
- Elles offrent la même qualité ainsi que le même rendement fiable et durable que les piles au dessus cuivré Duracell® Copper Top™.

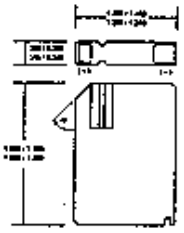
7K67

Specifications

Size/System:	Size J Alkaline
Voltage:	6.0
Rated Capacity:	580 mAh on 340Ω to 3.2V at 21°C (70°F)
Average Weight:	1.20 oz (34.0g)
Maximum Volume:	0.96 in.³ (15.7 cm³)
Terminals:	Recessed Flat
Operating Temperature Range:	-4°F to 130°F (-20°C to 54°C)
Primary Usage:	Glucose Meters, TV Remotes

Spécifications

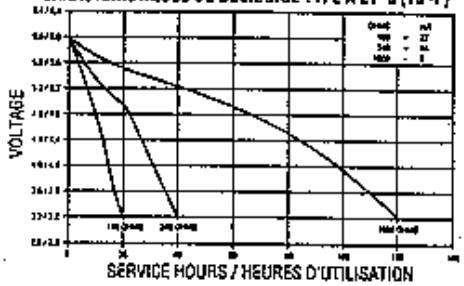
Format/Système :	Pile alcaline de format J
Voltage :	6,0
Puissance nominale :	de 580 mAh à 340 Ω à 3,2 V à 21 °C (70 °F)
Poids moyen :	1,20 oz (34,0 g)
Volume maximal :	0,96 po³ (15,7 cm³)
Bornes :	Plates et en retrait
Plage des températures de fonctionnement :	- 4 °F à 130 °F (- 20 °C à 54 °C)
Utilisations principales :	Testeurs de glucose, télécommandes pour téléviseurs



Inches	mm
1.900	48.26
1.880	47.75
1.400	35.56
1.380	35.05
.360	9.14
.345	8.76

Pouces	mm
1,900	48,26
1,880	47,75
1,400	35,56
1,380	35,05
0,360	9,14
0,345	8,76

TYPICAL DISCHARGE CHARACTERISTICS 21°C (70°F)
CARACTÉRISTIQUES DE DÉCHARGE TYPE À 21 °C (70 °F)



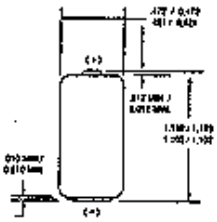
MN9100

Specifications

Size/System:	Size N Alkaline
Voltage:	1.5
Rated Capacity:	600 mAh on 100Ω to 0.8V at 21°C (70°F)
Average Weight:	0.34 oz (9.6g)
Maximum Volume:	0.21 in.³ (3.4 cm³)
Terminals:	Flat
Operating Temperature Range:	-4°F to 130°F (-20°C to 54°C)
Primary Usage:	Pagers, Hearing Aids, Glucose Meters, Flashlights

Spécifications

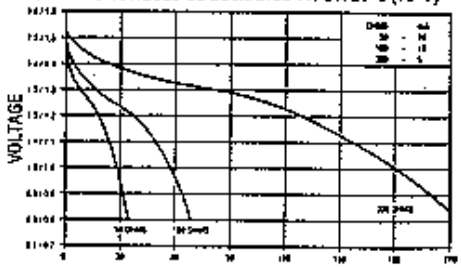
Format/Système :	Pile alcaline de format N
Voltage :	1,5
Puissance nominale :	de 600 mAh à 100 Ω à 0,8 V à 21 °C (70 °F)
Poids moyen :	0,34 oz (9,6 g)
Volume maximal :	0,21 po³ (3,4 cm³)
Bornes :	Plates
Plage des températures de fonctionnement :	- 4 °F à 130 °F (- 20 °C à 54 °C)
Utilisations principales :	Téléavertisseurs, prothèses auditives, testeurs de glucose, lampes de poche



Inches	mm
1.189	30.20
1.102	28.00
.472	12.00
.421	10.70
.012	0.30
.010	0.25

Pouces	mm
1,189	30,20
1,102	28,00
0,472	12,00
0,421	10,70
0,012	0,30
0,010	0,25

TYPICAL DISCHARGE CHARACTERISTICS 21°C (70°F)
CARACTÉRISTIQUES DE DÉCHARGE TYPE À 21 °C (70 °F)



MN1203

Specifications

Size/System:	Alkaline
Voltage:	4.5
Rated Capacity:	400 mAh on 100Ω to 0.8V at 21°C (70°F)
Average Weight:	0.34 oz. (9.6g)
height: 67 mm	Length: 62 mm
Maximum Volume:	0.21 in.³ (3.4 cm³)
Terminals:	Flat
Operating Temperature Range:	-4°F to 130°F (-20°C to 54°C)
Primary Usage:	Pagers, Hearing Aids, Glucose Meters, Flashlights

Spécifications

Format/Système :	Pile alcaline
Voltage :	4,5
Puissance nominale :	de 400 mAh à 100 Ω à 0,8 V à 21 °C (70 °F)
Poids moyen :	0,34 oz (9,6 g)
Hauteur : 67 mm	Longueur : 62 mm
Volume maximal :	0,21 po³ (3,4 cm³)
Bornes :	Plates
Plages des températures de fonctionnement :	-4 °F à 130 °F (-20 °C à 54 °C)
Utilisations principales :	Téléavertisseurs, prothèses auditives, testeurs de glucose, lampes de poche