

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
HEALTH AND SAFETY ACTIVITY



M/NM FATAL

HEALTH AND SAFETY REPORT

MULTIPLE FATAL EXPLOSIVES ACCIDENT
BROWARD MINE AND MILL
SEMINOLE ROCK PRODUCTS, INCORPORATED
MIRAMAR, BROWARD COUNTY, FLORIDA

September 9, 1971

By

Claude E. Reich
Metal and Nonmetal Mine Inspector

**METAL AND NONMETAL MINE SAFETY
SOUTHEASTERN DISTRICT**

F. D. Baker
District Manager

Originating Office
700 North 39th Street, Room 208
Birmingham, Alabama 35222
Chester G. Wedell
Subdistrict Manager

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Roy
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0800363
Curtiss L. Smith 0800000
Wm L. Flateau
McKinley Jones.
not employed
by Company
Not Chargeable.

INTRODUCTION

This report is based on an investigation made pursuant to clause (1) of Section 4 of the Federal Metal and Nonmetallic Mine Safety Act (80 Stat. 772).

Curtiss L. Smith, McKinley Jones, and William L. Flateau were killed instantly at about 10:30 a.m. on Thursday, September 9, 1971, when a charge of explosives which had been loaded into a borehole through the drill steel detonated prematurely. The blast in turn apparently detonated explosives loaded on a truck parked nearby.

Curtiss L. Smith, age 43, was married, had two dependent children, and had been employed by the company as a driller and blaster for about 15 years.

McKinley Jones, age 28, was married, had five dependent children, and had been employed by the company as a driller's helper for about 8 years.

William L. Flateau, age 38, was married, had two dependent children, and had been employed by the Curtis Tool Company of Miami, Florida as parts manager since June 1971. At the time of the accident, he was delivering drill bits to the mine.

The Bureau of Mines Subdistrict Office in Birmingham, Alabama, was notified of the accident about 3:30 p.m., September 10, 1971, by a telephone call from David A. Norris, compliance officer of the Department of Labor, in Fort Lauderdale, Florida. An investigation was started at 9:00 a.m., September 11, 1971.

Information for this report was obtained by an investigation at the scene of the accident and through interviews with company officials, witnesses, employees, and local law enforcement officials.

GENERAL INFORMATION

The Broward Mine and Mill, an open-pit limestone operation, owned and operated by Seminole Rock Products, Incorporated, was located at 196th Avenue and Hollywood Boulevard, Miramar, Broward County, Florida. Operating officials were: H. G. Scarbrough, vice president and assistant manager; and Greg Taylor, plant manager.

The mine and mill were normally operated one 9-hour shift a day, 6 days a week. A total of 20 persons was employed.

The company began mining at this location in February 1971. A previously unreported premature explosion occurred at this operation in late June when several charged holes containing explosives and electric blasting caps were detonated by an electrical storm. There were no injuries or damage to equipment. Reportedly, proper safety precautions had been taken upon approach of the storm.

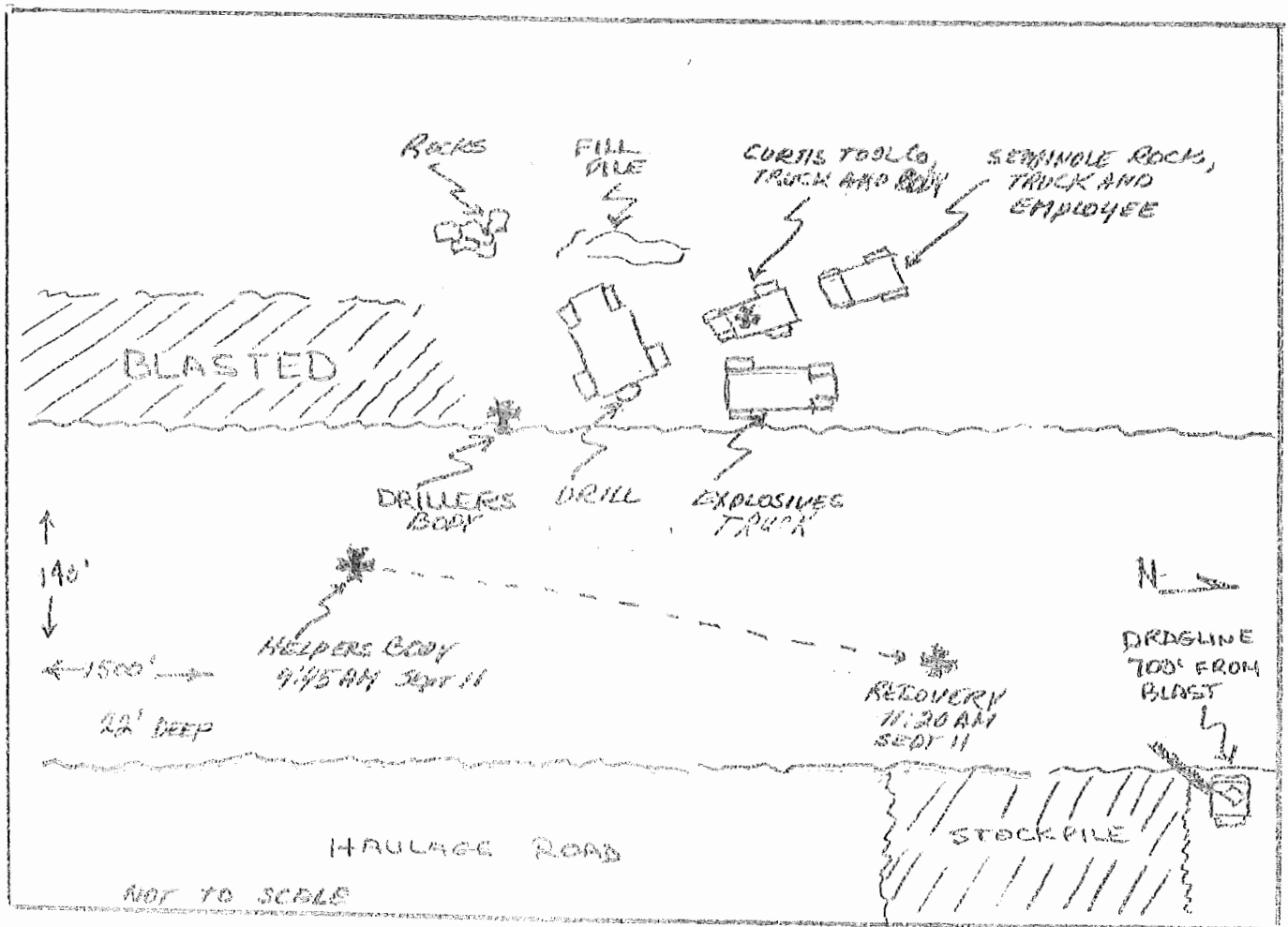
Overburden, consisting of about 2 feet of topsoil, was removed by bulldozer or dragline. The top of the exposed limerock, which was at or near the water table, was then covered with about 4 feet of loose limerock so that the drill rig would remain out of water. The deposit was then drilled and blasted. Broken material was recovered from under water by dragline and stockpiled nearby for drying. The mine consisted of two pits. The pit in operation at the time of the accident was about 140 feet wide and 1,500 feet long.

Holes for blasting were drilled 4-3/4 inches in diameter and about 47 feet in depth with a diesel-powered, rotary drill. The hollow drill steels were 2-1/2 inches inside diameter, 52 feet long, and equipped with an open-end bit. Water under pressure was used to flush the drill cuttings from the boreholes.

Due to the high water table and conglomerate rock formation, the boreholes generally would not remain open when the drill steel was removed. Consequently, after each borehole was drilled and the water pressure shut off, the drill steel was left in the hole to act as a casing while placing the explosive charge. The upper end of the drill steel was opened and explosives and detonators were loaded into the borehole through the hollow drill steel, known locally as a "Kelly Bar." When the drill steel was removed, the explosives remained in the borehole at the desired level. The drill rig was then positioned for the next hole in the round. A normal blast round consisted of eight holes drilled on an 8- by 9-foot offset pattern. Blasting was usually done three times a day.

Boreholes were normally charged with 21 cartridges of 2- by 24-inch, 60 percent ammonia dynamite and 75 percent ammonia gelatin. The proportion of each explosive varied according to the hardness and thickness of the rock strata. Primers, consisting of a cartridge of 75 percent ammonia gelatin and an electric blasting cap, were placed near the bottom and near the top of the column of explosives in each hole. After all holes in the round were drilled and charged, the electric blasting caps were connected in series and the round fired by means of a condenser-discharge blasting machine after personnel and equipment were removed from the area.

The inside of the hollow drill steel frequently was blocked by cuttings, cores, or packed sand as a result of insufficient water pressure in the drill steel while drilling or from a "washback" when the water pressure



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was shut off after the hole was completed. If the drill steel were blocked it was possible and not uncommon to unknowingly load the explosives on top of the blockage. As a result, some or all of the explosives might remain in the drill steel when the steel was removed from the borehole. Common practices, when a blockage occurred, were to rotate the drill steel or to apply sufficient water pressure to force out the obstruction and permit the explosives to fall down through the drill steel. These attempts were made while the drill steel was loaded with the primed charge of explosives.

Loading explosives into boreholes through a hollow drill steel and the above-described methods of freeing hung charges or clearing blocked drill steels were standard practices in the entire mining area.

The following persons participated in the investigation:

SEMINOLE ROCK PRODUCTS, INCORPORATED

H. G. Scarbrough

Vice President and Assistant
Manager

F. G. Taylor

Plant Manager

David Fryer

Plant Foreman and Witness

UNITED STATES BUREAU OF MINES

Claude E. Reich

Metal and Nonmetal Mine
Inspector

A regular health and safety inspection of this property pursuant to P. L. 89-577 was completed August 27, 1971.

DESCRIPTION OF ACCIDENT

On the day of the accident, Curtiss Smith and McKinley Jones reported for work at their normal starting time of 7:00 a.m. at the company's Medley Quarry, which was located in Dade County, Florida. After checking in, they traveled to the Broward Mine to perform their regular duties of drilling and blasting. Their arrival time could not be determined, but the normal time would have been about 7:30 a.m. Smith and Jones loaded the explosives vehicle with about 1,700 pounds of explosives and then drove the loaded vehicle to the drilling and blasting area where they performed their duties without known unusual incident until the accident. The victims were seen by several persons during the morning and nothing unusual was observed.

William Flateau reported for work at the Curtis Tool Company in Miami shortly before 7:00 a.m. on the day of the accident and soon departed in a pick-up truck to make deliveries in Broward County. He arrived at the Broward Plant at about 10:00 a.m., obtained the signature of the plant manager for the drill bits he was delivering, and then drove to the drilling and blasting site.

David Fryer, plant foreman, followed Flateau to the drill to exchange some drill bits. Upon arrival at the drill, Fryer observed the tool company's truck parked alongside the drill rig, heading in a northerly direction and Flateau was placing bits on the drill rig. Smith was off the drill standing near the control panel and Jones was standing behind the explosives vehicle parked near the drill. The drive motor of the drill was running, but the rotation and feed gears were not engaged. Fryer took the bits from his truck, placed them on the drill rig, exchanged greetings with the three men, and then proceeded north in his own vehicle.

Fryer drove north about 1,000 feet, turned around, and waited for a moment until a dragline operating across the pit swung in his direction. He waved to the dragline operator and then proceeded south back to the drilling area. Fryer estimated he was away from the drill for about 1 to 3 minutes. During this time, the tool company's vehicle had been turned around and was parked facing south, blocking Fryer's exit from the area. Fryer noticed the brake light was on and the driver appeared to be writing on a pad. An explosion occurred before Fryer noted the position of the drill crew, and he recalled blackness, smoke, and debris filling the air before he fell below the dashboard of his vehicle. Apparently the tool company's truck was located so that it deflected the main force of the explosion from Fryer's truck as Fryer was not injured and his truck received slight damage.

Greg Taylor, plant manager, arrived at the scene within a few minutes and observed that Smith and Flateau were dead and the body of Jones was not in evidence.

Evidence and data collected indicated that all but about 16 feet of the drill steel had been removed from the ground before the explosion, and about 4 feet of explosives had been in the drill steel above the surface of the ground. In the absence of evidence to the contrary, it was assumed that the explosion originated in the drill steel and flying metal from the bursting steel detonated about 1,200 pounds of explosives remaining on the explosives truck which was located about 20 feet away from the drill rig. The six or seven fully loaded holes drilled earlier in the pattern had also detonated.

The explosions produced a crater about 26 feet in diameter and about 5 feet deep at the drill and another about 18 feet in diameter and 5 feet deep where the explosives truck apparently had been parked. The drill rig was severely damaged. The explosives truck was disintegrated and the tool company's truck was demolished.

Smith received multiple fractures, avulsion of the head, and partial dismembering. Flateau suffered multiple fractures and severe lacerations of internal organs. Jones was nearly decapitated and suffered severe puncturing wounds.

On his arrival, the investigator requested that the scene of the accident be barricaded. A preliminary inspection was then conducted which indicated that the area was safe from further explosive hazards.

During the initial stage of the investigation, it was revealed that Jones' body had not been recovered. Medical teams and authorities had reportedly told the operator that the body would possibly not be found since it could have been completely disintegrated by the explosion. Therefore, after initial efforts failed to locate the body, the search had been abandoned. The investigator then requested that the operator stop the dragline operating on the opposite side of the pit and summon underwater rescue teams to search the large body of water in the pit. Jones' body was soon discovered floating on the surface of the water about 150 feet from the site of the explosion. A rescue team arrived and the body was pulled to shore at 11:20 a.m. A medical team arrived at 1:30 p.m. and removed the body from the water.

CAUSE OF ACCIDENT

The direct cause of the accident was loading explosives and detonators through and with a device capable of producing sufficient force or friction to cause detonation of explosives or detonators.

RECOMMENDATIONS

Compliance with the following recommendations may prevent similar accidents.

Explosives or detonators should not be loaded with or through drill steels. Management should assume the responsibility of devising a method of loading this type of hole in some other manner.

Vehicles containing explosives or detonators should be parked a safe distance from drilling and charging operations or adequately barricaded.

Only those persons engaged in drilling and blasting operations should be permitted in the blast area.

Employees should be formally instructed in the hazards of their jobs.

Job safety analysis should be made of all drilling and blasting operations.

The following recommendation has no bearing on the accident, but should be complied with.

Accidents involving death in mines subject to the Federal Metal and Nonmetallic Safety Act should be reported immediately by the quickest available means to the nearest U. S. Bureau of Mines Metal and Nonmetal

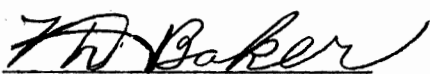
Mine Health and Safety District or Subdistrict Office. (Southeastern District, Birmingham Subdistrict, Room 208, 700 North 39th Street, Birmingham, Alabama 35222; telephone 205-325-3652).

ACKNOWLEDGMENT

The courtesy and cooperation of company officials and employees during this investigation are gratefully acknowledged.



Claude E. Reich
Metal and Nonmetal Mine Inspector

Approved: 

F. D. Baker
District Manager