

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF MINES  
Region V

FINAL REPORT OF MAJOR GAS-EXPLOSION DISASTER  
HERRON MINE (METAL)  
ALPENA ENTERPRISES  
HERRON, ALPENA COUNTY, MICHIGAN

October 30, 1952

by

E. W. Felegy  
Mining Engineer

and

R. O. Pynnonen  
Mining Engineer

Originating office - Bureau of Mines  
18 Federal Building  
Duluth 2, Minnesota  
John A. Johnson, Chief,  
Accident Prevention and Health Division,  
Region V

FINAL REPORT OF MAJOR GAS-EXPLOSION DISASTER  
HERRON MINE (METAL)  
ALPENA ENTERPRISES  
HERRON, ALPENA COUNTY, MICHIGAN

October 30, 1952

by

E. W. Felegy  
Mining Engineer

and

R. O. Pynnonen  
Mining Engineer

#### INTRODUCTION

A methane explosion in the Herron mine shaft at 11:15 p.m., October 30, 1952, killed five men. A sixth man working in the surface building suffered only a bruised right knee and several minutes' loss of consciousness. The explosion probably was initiated by a hand-held electric drill operated by one of two men taking rock samples 180 feet below the collar of the shaft. It was confined to the shaft and the area immediately surrounding the collar of the shaft.

#### GENERAL INFORMATION

The Herron mine is near the town of Herron, in the SE1/4 Sec. 36, T. 31 N., R. 6 E., 8 miles west and 2 miles south of the city limits of Alpena, the seat of Alpena County, Michigan. The mine was not served by railroad.

John Wilczynski, 1916 West Wabansia St., Chicago, Illinois, who operated the Herron mine shaft since 1949 as the Alpena Enterprises, was one of the five men killed in the explosion. He had no local business associates other than the men who worked for him at the mine shaft, and no one knew or admitted knowledge of whom his associates may have been in Chicago. Wilczynski was a real estate agent. He allegedly had a few years' coal mining experience in Europe before World War I.

Not more than six men, including Wilczynski, were employed at the mine shaft at one time. Employees usually were local farmers, engaged by Wilczynski intermittently on a day-to-day basis during the summer months. The mine was not in production.

A headframe 10 feet high, constructed of wooden uprights and steel I-beam top lateral members, and a wooden-roofed cinder-block building comprised the only surface structures at the mine. The building was 16-1/2 feet wide and 25 feet long, and the nearest side was 13-1/2 feet from the shaft collar. It housed the Diesel engine and generator that supplied part of the electric power for the mine, a coal stove, and work benches and supplies.

The mine was a single circular shaft, 10 feet in diameter and 272 feet deep. There was no lateral development from the shaft. The mine property originally was leased from a local farm owner April 15, 1924, by C. J. Herriman, of Chicago, Illinois. Herriman and his associates sank the shaft to a depth of 263 feet in the expectation of developing a gold mine, but then abandoned the operation. According to information gained locally, C. R. Cole, of Laredo, Texas, prospected the shaft for a short time about 1935. Wilczynski leased the property May 20, 1949 and worked intermittently during the summer months sampling and sinking the shaft an additional 9 feet until the day of the disaster.

The shaft was lined with 2 feet of concrete to a depth of 87 feet below the collar. Best available information indicates that the next 135 feet of lining was vertical wooden planking held in place by circular steel channels, and that the bottom 50 feet of the shaft was unlined. A single ladder attached to the side of the shaft extended from the bottom to the surface without any intermediate collars or offsets.

A geologic log of the shaft was not available. E. J. Martin, mining engineer, Mining Division, Region V, Bureau of Mines, took three samples from the shaft on October 10, 1952. He reported that the shaft was sunk entirely in sedimentary strata, apparently shale. A quicksand horizon was pierced somewhere above the bottom of the concrete lining, and a shale-limestone contact appeared to exist at the bottom of the shaft.

A number of limestone and shale quarries, but no other underground mines, are known to exist near the Herron mine.

## MINING METHODS, CONDITIONS, AND EQUIPMENT

### Mining Methods

The Herron mine never reached production. A few samples were taken for analysis and the shaft was deepened 9 feet during the period Wilczynski operated the mine.

### Explosives

Sixty percent straight dynamite in 1-1/8- x 8-inch cartridges, and electric detonators fired from a 110-volt line on the surface were used to blast when sinking shaft. Holes were loaded and fired singly at irregular intervals. Explosives were purchased in broken-case lots and were stored in a cardboard container in the surface building. The firing line was a length of rubber-covered stranded parallel conductor household extension cord.

### Ventilation and Gases

A 15-inch centrifugal fan, 12 inches wide, enclosed in a sheet-metal housing, operated blowing through 5-inch galvanized metal tubing to ventilate the shaft. The fan was driven by a General Electric Co. 115-130-volt, 60-cycle, single-phase, 1-hp. motor, and was operated only when men were working in the shaft. Both fan and motor were mounted on the head-frame. Lengths of ventilation tubing were added or disconnected at the discharge end to keep the discharge somewhere above water as the water level changed in the shaft.

Methane was liberated in the shaft at one or more points but no gas detecting or indicating equipment was available at the mine. Neither the number of points nor the rate of liberation of methane was known or could be determined during recovery operations or the disaster investigation.

#### Transportation

A single 3- by 4-foot cage, 5-1/2 feet high from floor to point of suspension, unbonneted and without guides, was used to transport men and materials in the shaft. The cage consisted of an angle-iron frame and plank flooring; the sides were not enclosed. A 10-inch pulley suspended from the headframe served as the head sheave, and a similar pulley was attached to the cage. One end of the 5/8-inch wire hoisting rope was attached to the headframe. The rope passed through the pulley on the cage, the pulley on the headframe, and then to the 16-inch drum on the ground in front of the surface building. The drum was chain-driven through a Falk speed reducer by a 220-volt, 60-cycle, 3-phase, 7-1/2-hp. squirrel cage motor manufactured by the Louis Allis Co. Power for the motor was supplied by a Fortway Electric Works 230-volt 37-1/2-kw. generator driven through V-belts by a Caterpillar 3-cylinder 60-hp. Diesel engine. The generator and Diesel engine were in the surface building, but the motor and drum were unsheltered in front of the building.

#### Electricity

Water was pumped from the shaft by a centrifugal pump rated at 350 g.p.m. against a 280-foot head at 3,750 r.p.m., coupled to a Reliance Electrical and Engineering Co. 220-440-volt, 60-cycle, 3-phase, 40-hp., 3,550-r.p.m. induction motor. The pumping unit was suspended at water level in the shaft from two hand-operated windlasses by two 1/2-inch wire ropes.

An electric drill used to drill blast holes and to facilitate sampling fell to the bottom of the shaft and was not recovered after the disaster. It was reported to be a 110-volt hand-held rotary drill using an 18-inch length of drill steel 1-1/2 inches in diameter. It was grounded to the cage frame by a short length of rubber-covered stranded parallel conductor lamp cord similar to that used for the firing line.

None of the electrical equipment examined at the mine was permissible.

#### Illumination and Smoking

Illumination in the shaft reportedly was furnished by a single 110-volt spot light suspended by a drop cord from the surface, although two bulb sockets without bulbs were found attached to the top of the cage. Men allegedly were not permitted to and did not smoke in the shaft, but smoking was permitted and practiced on the surface.

#### Mine Rescue

None of the mine personnel were trained in mine rescue and no rescue apparatus was available. Fire fighting facilities were not available, other than the water pumped from the shaft. No fires or explosions

were reported to have occurred while Wilczynski was working the mine. However, an article in The Alpena News of November 1, 1952, quoted Michigan State Rep. Richard H. Deadman in describing a gas explosion in the shaft about 1935. The explosion occurred when a worker tossed a lighted match in the shaft. No one was killed or injured. The shaft filled to the collar with water when pumping ceased, and local residents relate that it always was possible to ignite gas by striking a match near the surface of the water.

## STORY OF EXPLOSION AND RECOVERY OPERATIONS

### Activities of Bureau of Mines Personnel

The Bureau of Mines office in Duluth, Minnesota, was notified of the explosion at 8 a.m., October 31, by a telephone call from J. J. Forbes, Director, Bureau of Mines, Washington, D. C., who learned of the disaster from a Washington news broadcast that morning. John A. Johnson and E. W. Felegy in Duluth conferred by telephone with Corporal Charles Mulick, Alpena Post, Michigan State Police, and offered the assistance of the Bureau of Mines. E. W. Felegy, R. O. Pynnönen, and J. B. Stepan, with a limited amount of rescue apparatus and testing equipment, arrived at the Herron mine via chartered plane at 6:30 p.m., October 31. John A. Johnson, M. Siebenthal, and L. J. Zaverl arrived in Alpena, Michigan with the rescue truck and equipment at 6 a.m., November 1.

Rescue equipment was not required. One body was recovered from the shaft before the arrival of Bureau personnel, and additional recovery work was confined to ventilating the shaft above the water level and using grappling hooks to recover the last body in the shaft. Bureau personnel tested the shaft atmosphere and assisted in setting up a ventilation system to maintain fresh air above the water level. Grappling operations were conducted and supervised by U. S. Coast Guard Lt. Thomas M. Thompson, who arrived at the mine the morning of October 31. M. Siebenthal and J. B. Stepan returned to Duluth by plane the afternoon of November 1. John A. Johnson and L. J. Zaverl left the mine with the rescue truck after the last body was recovered the afternoon of November 2. E. W. Felegy and R. O. Pynnönen remained at the mine until November 5 to complete the investigation of the disaster.

### Mine Conditions Immediately Prior to Explosion

One hole had been drilled and blasted in the shaft bottom the morning of October 30. Following usual blasting practice, the water level had been allowed to rise about 6 feet in the shaft before the shot was fired. The pump was started after the blast, and the water level was lowered to 10 inches above the shaft bottom when the pump motor failed at 3 p.m. Wilczynski decided to remove the pump from the shaft for a complete overhaul, but after it had been raised about 70 feet he decided to take several more rock samples from a point about 180 feet below the shaft collar. The ventilation pipe at that time apparently extended to a point near the bottom of the shaft and the discharge end of the pipe was under water. No one knows to what height the water in the shaft had risen, although the water level probably was more than 200 feet below the shaft collar.

## Story of Explosion

Ralph Chevalier and Sieghard Domke entered the shaft and disconnected the ventilation pipe near a point 180 feet below the shaft collar shortly before 11 p.m., October 30. The fan was started and both men returned to the surface and smoked a cigarette. They then donned rubber coats and hats and took the electric drill with them on the cage to take a sample at the 180-foot level. Bernard Domke and Henry Domke were on the surface at the shaft collar, and John Wilczynski and John Pastuszka were in the surface building when they heard the electric drill start.

Wilczynski and Pastuszka started to leave the building to join the two men at the shaft collar but Pastuszka returned to adjust the damper on the coal stove. The explosion apparently occurred at that instant. Pastuszka stated that he does not remember the explosion but believes that he lost consciousness and was blown out of the building. He was lying in the field about 5 feet from the side door of the building when he regained consciousness. He heard what he described as "whistling and roaring noises in my ears", and saw that the surface building was wrecked and the headframe demolished. He started to run toward his car to go for help. Before he reached his car he was met by local residents who heard and felt the explosion and rushed to the mine.

The explosion was violent; the shock reportedly was felt in Alpena, 12 miles from the mine. The bodies of Bernard Domke, Henry Domke, and John Wilczynski were found at distances of 142 feet, 268 feet, and 366 feet and in different directions from the shaft. Their bodies were badly torn and partly dismembered, and their faces were charred by third-degree burns; death was instantaneous. The bodies of the two men recovered from the shaft were not mangled. Sieghard Domke died instantly from extensive crushing injuries to the head; he also suffered first-, second-, and third-degree burns on the promontories of the face and one wrist. Chevalier had third-degree burns beneath the chin, second-degree burns on the face, and first-degree burns on the forehead, and a fatal head injury less extensive than the head injuries of Sieghard Domke. The head injuries received by both men were caused by impact with solid objects.

The headframe was demolished completely. Parts of the headframe, including the wooden upright members and two steel I-beam top horizontal members were found at different distances and in different directions from the shaft. Each I-beam was 15 feet long and weighed 525 pounds. The fan motor and fan, several collapsed and twisted lengths of ventilation pipe, and sundry lengths of electric wires and cables were scattered around the surface. The doors of the surface building and the wall facing the shaft were blown inward and the roof was smashed and collapsed. R.E.A. power lines supplying 110-volt power for the lights, the drill, and the blasting circuit were destroyed in the vicinity of the shaft collar. Three windows were smashed and doors were blown open in a farm house 200 feet from the shaft. One side of the windshield in a car 60 feet from and facing the shaft was found 10 feet in front of the car, and the steel top of the car was buckled.

The pumping unit and one of the windlasses on the surface supporting the unit fell to the bottom of the shaft. When recovered, they showed no evidence of damage beyond water soaking. The hoisting rope snarled in the pulley attached to the cage and prevented the cage from dropping to the bottom of the shaft; different persons estimated the cage dropped 10 to 30 feet after the explosion. The cage frame generally was bent and was broken in several places and the floor planks were broken off the frame. The drill dropped below the water level and was not recovered. The ladder remained in place attached to the side of the shaft, and no damage to the shaft lining was visible above the water level.

#### Recovery Operations

Personnel of the Michigan State Police, Alpena County Sheriff's Office, Alpena County Road Commission, the Alpena County Coroner, the U. S. Coast Guard, the Bureau of Mines, and several local residents cooperated in conducting recovery operations.

Activities of the State police, county officials, and local residents during the night of October 30 were restricted to recovery work on the surface because of lack of suitable equipment and the fact that it was apparent there were no survivors in the shaft. Alpena County Road Commission cranes were used October 31 to remove the cage, the pump, the windlass and other debris from the shaft. Cables trailing beneath the cage were tangled about Chevalier's body, which was recovered about 4 p.m., October 31. Coast Guard Lt. Thompson, wearing a Chemox breathing apparatus and a belt and life line, descended the shaft ladder about 160 feet to water level before Chevalier's body was recovered. Lt. Thompson did not have equipment to test the air in the shaft. He removed his facepiece momentarily when he was at the bottom of the ladder; fortunately he was not overcome. He replaced his facepiece and climbed back to the surface.

Debris was visible on the surface of the water about 120 feet below the shaft collar when the shaft was examined from the surface at 6:30 p.m. by the first Bureau personnel to arrive at the mine. An emergency lighting unit supplied by the Alpena Fire Department was being used to illuminate the shaft. The light was enclosed by a wire guard but was not a permissible unit. Power to the light was cut off and the light was removed from the shaft. In a conference of State police, county, Coast Guard, and Bureau of Mines representatives it was agreed to suspend recovery operations until the following day.

Another conference was held at the mine the morning of November 1. Water in the shaft had risen to a point 80 feet below the shaft collar. A flame safety lamp lowered to the water level continued to burn. The atmosphere immediately above the water level was tested with an M.S.A. Explosimeter by aspirating through a rubber hose; it contained explosive gas in a concentration of 60 percent of the lower explosive limit. Two vacuum-bottle samples were collected through the same hose.

Pumps to unwater the shaft were not available. It was agreed not to lower the light in the shaft or attempt to use the cranes in the shaft before the shaft was ventilated. A neighboring farmer furnished his

tractor and silo filler, and the Allis-Chalmers agency in Alpena furnished additional 3-foot and 4-foot lengths of 8-inch metal tubing. Two-inch planks were placed across the top of the shaft, and 76 feet of pipe was lowered in the center of the shaft and attached to the silo filler, which then was used to blow fresh air into the shaft. Return air was checked at the shaft collar and explosive gas was detected in the return as soon as the fan started. The explosive gas disappeared from the return in a short time, and when sampling continued to indicate fresh air the lights again were lowered in the shaft.

Lt. Thompson descended the shaft ladder several times that day to use a grappling line. The hand line attached to the grappling hooks broke, and the hooks and a portion of the line were lost. Larger hooks were attached to the wire rope on the crane. Several times those hooks hung up solidly and had to be shaken loose. Nothing was recovered from the shaft. Recovery work was suspended, the lights were withdrawn, and ventilation of the shaft was discontinued for the night.

Water continued to rise in the shaft during the night and the water level was 48 feet below the collar the morning of November 2. Thirty-two feet of ventilation pipe was removed from the shaft, leaving the discharge end of the pipe 4 feet above the water level. The atmosphere inside the upper section of the ventilation pipe was tested with the Explosimeter, which indicated an explosive gas concentration of 50 percent of the lower explosive limit. A flame safety lamp continued to burn when it was lowered to the water level and then withdrawn. Ventilation was resumed and the shaft was cleared of gas in a short time.

The lights were lowered into the shaft and Lt. Thompson descended the ladder to water level to use the grappling line. Some debris, including the wooden platform used as a base for the pump and motor, was taken out of the shaft before the grappling hooks engaged in some object near the bottom of the shaft. Lt. Thompson returned to the surface, and several hours were required to work the object to the surface of the water. The hooks were engaged in the grappling line lost the previous day, and the hooks on that line were engaged in the clothing on Domke's body. Lt. Thompson again descended the ladder and lashed the body to stronger rope. A pipe clamp tangled in the line broke loose and fell, striking Lt. Thompson on the arm, but he was able to climb to the surface unassisted. The body was brought to surface at 1 p.m., November 2.

Recovery work was discontinued immediately. The lights were withdrawn and the ventilation system was dismantled, and the planks were left in place across the shaft opening.

Water continued to rise in the shaft and the water level was within 20 feet of the shaft collar by November 4. Tests with the Explosimeter November 3 and 4 showed combustible gas mixtures just below the shaft collar in concentrations about 5 percent of the lower explosive limit.

Police guard was withdrawn from the mine property when recovery operations were concluded. E. W. Felegy and R. O. Pynnönen discussed the hazards of the open shaft in a conference November 3 with D. Habermehl, prosecuting attorney, Alpena County. Mr. Habermehl directed the county engineers to construct a heavy reinforced concrete cover on the shaft collar.

## INVESTIGATION OF CAUSE OF EXPLOSION

E. W. Felegy and R. O. Pynnonen conducted the investigation for the Bureau of Mines. No formal hearings were held, but information was obtained in numerous conferences with the survivor of the explosion, State police and county officials, and local residents who had worked at the mine, assisted in the recovery work, or seemed to have any knowledge of the mine.

### Methane as a Factor in the Explosion

Analysis of vacuum-bottle air samples collected from the shaft November 1 showed 1.35 percent methane in one sample and 1.59 percent methane in the second sample. L. B. Berger, Chief, Health Branch, Bureau of Mines, reported that combustion ratios in the analysis indicated that methane was the only combustible gas present in the samples, as shown in table 1. Methane apparently always has been liberated in the shaft since it was opened, and the presence of gas was known to the men working in the shaft. Because they lacked mining or technical background however, it is probable that they were not aware of the full extent of the hazards created by the presence of gas.

### Flame

The faces of the three men who were on the surface and were killed in the explosion were charred by third-degree burns. No other evidence of heat or flame on the surface was observed. One man killed in the shaft had first-, second-, and third-degree burns on the promontories of the face and on one wrist. The other man killed in the shaft had first-degree burns on the forehead, second-degree burns on the face, and third-degree burns beneath the chin. No evidence of heat or flame in the top 120 feet of shaft above water level was observed. The shaft was not unwatered, and it was impossible to determine if evidence of heat or flame existed in portion of the shaft covered by water. Equipment and debris recovered from the shaft had been submerged in water and examination of that material did not yield definite evidence of burning or charring.

### Forces

The bodies of the men killed in the shaft showed no signs of violence other than the fatal head injuries. That portion of the shaft lining visible above the water level showed no effects of violence. The cage was bent and broken, the power cables were torn apart, and the ventilation pipe in the shaft was smashed. The headframe was demolished completely, and parts of the headframe and equipment mounted on it were strewn in all directions from the shaft. The two I-beams that formed the top lateral members of the headframe were blown in diametrically opposite directions from the shaft. The doors of the surface building, and the building wall nearest the shaft were blown inward; the roof was smashed and was collapsed at the end of the building nearest the shaft.

### Summary of Evidence

Examination of that portion of the shaft in which the men were working at the time of the explosion was impossible because of the continually rising water level. Conditions and activities in the shaft prior to the explosion can only be inferred from the testimony of the sole survivor,

who was on the surface before and at the time of the explosion.

The pump had been raised about 70 feet above the shaft bottom when it was decided to leave the pump at that point until several rock samples were taken from a point about 180 feet below the shaft collar. The shaft was 272 feet deep, so the pump was held about 200 feet below the shaft collar. It can be assumed that the men did not permit the pump to be submerged by the rising water; therefore the water level in the shaft at the time of the explosion must have been more than 20 feet below the point at which the men were working.

The shaft was gassy, but it was impossible to determine at what points or at what rate methane was emanating from the strata. It is known that the shaft was not ventilated from the time the pump failed at 3 p.m. the day of the explosion until shortly before 11 p.m., when the men broke the ventilation pipe at some point near 180 feet below the shaft collar. No one knew how much air the fan delivered through the 5-inch tubing, and because the ventilation system was destroyed by the explosion it was impossible during the investigation to determine the quantity of air. It is estimated that a centrifugal fan of the size used at the mine, driven by a 1-hp. motor and operating blowing through 180 feet or more of 5-inch tubing probably could deliver a maximum of 300 cubic feet of air a minute. Judging by other equipment and procedures in use at the mine, it is further probable that the quantity of air circulated was appreciably less than 300 cubic feet a minute.

Statements of the survivor indicated that less than 45 minutes elapsed between the moment the fan was started and the moment the drill was started. Not less than 50 minutes, and probably a much longer period of time was required for one complete change of the initial atmosphere in the shaft, and at the same time, additional methane was being liberated in the shaft. The fan intake was on the headframe, not more than 10 feet above the shaft collar, and it was possible that some of the return air was recirculated.

This combination of conditions permitted creation of a highly explosive atmosphere in the shaft.

None of the electrical equipment examined at the mine was permissible. It is unlikely that the electric drill, which was not recovered from the shaft, was a permissible type; it certainly was not used in a permissible manner. The pump motor may be discounted as a possible source of ignition because presumably no power was supplied to the motor after it failed 8 hours before the explosion. The non-permissible fan motor, mounted on the headframe where it could be enveloped by return air, was a potential ignition hazard, but the evidence precludes the possibility of the fan being the source of ignition of this explosion. The electric drill, the 110-volt spot light suspended in the shaft, and two open 110-volt sockets attached to the top of the cage, if they were energized, were possible electrical sources of gas ignition. The survivor stated that he heard the drill operating immediately before the explosion occurred.

Smoking in the shaft probably can be eliminated as an ignition source. It was reported that men were not permitted to and did not smoke in the shaft. The shaft was wet, a condition that in itself would discourage

although not prevent smoking in the shaft. If smoking was prohibited in the shaft, it is unlikely that men on the surface would drop lighted matches or cigarettes in the shaft.

The type of burns on and the absence of any marked violence to the bodies of the two men in the shaft, other than the head injuries received by them from impact, indicate that they were in the center of the explosion. The explosion undoubtedly increased in violence as it traveled up the shaft. Muzzle blast resulting when the expanding gases found pressure release at the shaft collar, or a highly explosive atmosphere near the collar of the shaft, or both, caused the violence and destruction on the surface.

#### Cause of Explosion

It is concluded that an explosive atmosphere was formed by liberation of methane in the improperly and inadequately ventilated shaft, and that the explosive atmosphere was ignited by arcs or sparks from the electric drill being used by the men on the cage.

#### RECOMMENDATIONS

Recommendations are restricted to explosion hazards relevant to the Herron mine disaster.

1. Inexperienced mine operators should obtain and follow the recommendations of competent mining men and should institute safety practices that insure maximum safety for all employees.
2. Main fans should be so placed that the return air from the mine cannot be drawn into the intake openings.
3. Main fans should be offset at least 25 feet from the direct line of the mine workings.
4. The volume and velocity of the ventilating air current should be sufficient to dilute so as to render harmless, and to carry away flammable gases.
5. Main fans should be operated continuously except when the mine is shut down and all men are out of the mine.
6. If the fan has been shut down and restarted, the mine should be examined for gas and made safe before men, other than the examiner, are permitted in the mine.
7. One or more competent and responsible officials or workmen should be trained in the use of permissible flame safety lamps to detect the presence of flammable gas.
8. Not less than two permissible flame safety lamps in proper working condition should be kept available at the mine for the use of authorized persons.

9. When the methane content of the air at the working place or in the return exceeds 1 percent the ventilation should be improved promptly.

10. If the return air contains more than 1.5 percent methane, the employees should be withdrawn from the mine and all electric power should be cut off from the mine until the dangerous condition has been corrected by improving the ventilation.

11. Examinations for gas should be made in all working places before electrical equipment is taken into the places and at frequent intervals during the operation of such equipment.

12. Electrical equipment used in other than pure intake air should be of the permissible type approved by the Bureau of Mines, and should be maintained in permissible condition and operated in accordance with the conditions of permissibility as prescribed by the Bureau of Mines.

13. Power connections for electrical equipment should be made in pure intake air or through permissible junction boxes.

14. Smoking should be prohibited within a radius of 25 feet of the collar of the shaft.

#### ACKNOWLEDGMENT

Information concerning activities and conditions in the mine preceding the explosion was gained largely from John Pastuszka, the sole survivor of the explosion. Acknowledgment is made to E. J. Martin, mining engineer, Mining Division, Bureau of Mines, Region V, for additional and confirmative information supplied by him as the result of his observations when taking samples at the mine October 10, 1952. Mr. Martin noted in a report submitted before the disaster that the mine was being operated under conditions that were not safe.

Information concerning attempted rescue and recovery operations after the explosion and before the arrival of Bureau personnel was obtained primarily from personnel of the Michigan State Police, and particular acknowledgment is made to Sgt. Kerneth White of the Alpena Post. Alpena County Coroner, Dr. John W. Bunting, courteously supplied information on the injuries sustained by the victims of the explosion, and assisted greatly in obtaining reliable information concerning the victims' dependents.

John Wilczynski, one of the men killed in the explosion, was the only person with acknowledged responsibility in the operation of the Herron mine. Recovery work therefore was conducted entirely through cooperation between public agencies, including the Michigan State Police, Alpena County Sheriff's, Coroner's, and Road Commission Offices, the U. S. Coast Guard, and the Bureau of Mines, and several local residents. The Alpena Fire Department furnished an emergency lighting system, and the Allis-Chalmers agency in Alpena furnished extra lengths of pipe for the emergency ventilating system. Members of the Salvation Army and the American Red Cross also rendered humanitarian service after the disaster.

Ed Monroe, owner and operator of a farm near the mine property, is especially commended for making available his farm equipment and his own and his son's personal services to provide the ventilation system set up for recovery work. Special acknowledgment also is due Sgt. Kenneth White for his efforts in coordinating recovery work, and to Lt. Thomas M. Thompson, repair and maintenance officer, Ninth Coast Guard District, Cleveland, Ohio, whose personal efforts and competence in underwater recovery operations primarily were responsible for recovery of the two bodies remaining in the shaft after the explosion.

Respectfully submitted,

*E. W. Felegy*  
E. W. Felegy  
Mining Engineer

/s/ R. O. Pymmonen  
Mining Engineer

Approved by,

*E. W. Felegy*  
E. W. Felegy  
Acting Chief, Accident Prevention  
and Health Division, Region V

Table 1. - Results of analysis of air samples collected November 1, 1952  
Herron mine shaft, Alpena Enterprises  
Herron, Alpena County, Michigan

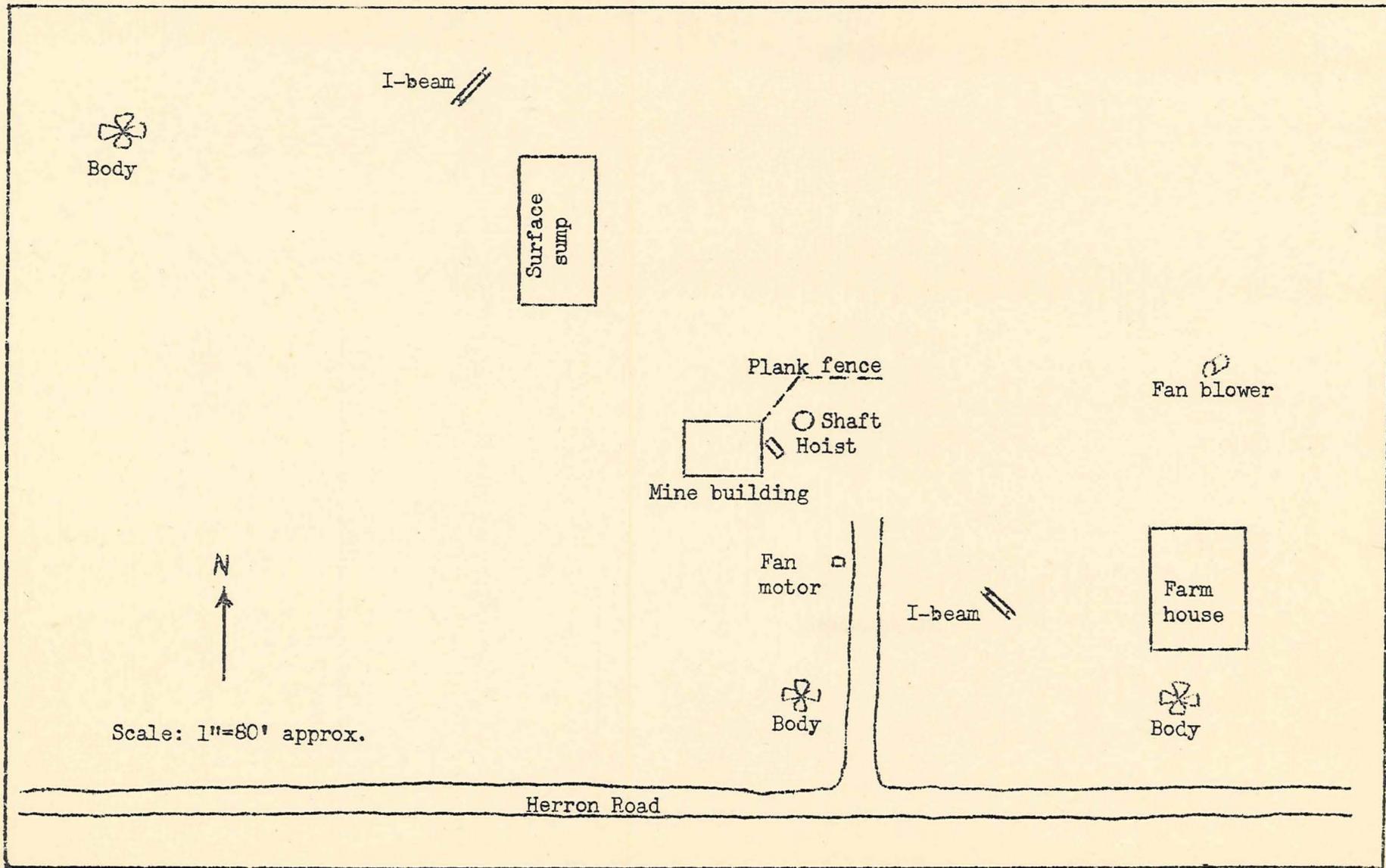
Bottle No.	Time	Location in mine	Carbon dioxide	Oxygen	Hydrogen	Carbon Monoxide	Methane	Nitrogen
C-3409	11 a.m.	80 feet below shaft collar	0.05	20.52	0.00	0.00	1.59	77.84
C-3410	11 a.m.	80 feet below shaft collar	0.05	20.58	0.00	0.00	1.35	78.02

## APPENDIX A

VICTIMS OF EXPLOSION, HERRON MINE  
ALPENA ENTERPRISES

October 30, 1952

<u>Name</u>	<u>Age</u>	<u>Marital Status</u>	<u>Dependents</u>	<u>Estimated years of experience</u>
Ralph Chevalier	30	M	4	1/2 (part time)
Bernard Domke	44	M	6	1/2 (part time)
Henry Domke	34	M	1	1/2 (part time)
Sieghard Domke	47	M	6	1/2 (part time)
John Wilczynski	68	Div.	0	3-1/2 (part time)



APPENDIX B - SKETCH OF SURFACE AFTER EXPLOSION  
 HERRON MINE, ALPENA ENTERPRISES