



Report

Leyden Mine

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Report on the

LEYDEN MINE FIRE

December 14, 1910

Leyden, Jefferson County, Colorado

Operator: Leyden Coal Company.

By

J. C. Roberts, Mining Engineer

Denver, Col., Dec. 3, 1911.

Report of Leyden Mine Fire.

A fire occurred in the Leyden Mine at 8.30 p.m. on December 14, 1910, which resulted in the death of ten men, all of whom were probably suffocated by the smoke from the fire, as no single man was found 500 feet from his working place.

At 6.30 a.m. on the morning of December 15, a telegram was received from James Dalrymple, State Mine Inspector, as follows: "Fire in Leyden Mine, top burned, ten men in mine, bring car at once."

Car #2 was at the Sopris Mine, 6 miles from Trinidad. Arrangements were made with the C. & S. R. R. to furnish engine to haul car to Trinidad to catch the 8.30 train from Trinidad, and with W. D. Gitchell, General Superintendent of the Victor-American Fuel Co., and J. S. Thompson of the Colorado Fuel & Iron Co. to lend us men, helmets and oxygen. The car had only two full cylinders of oxygen, and fortunately we were enabled to borrow two tanks of oxygen and four men from the V. A. F. Co., and three tanks of oxygen and three men from the C. F. & I. Co. Wire was sent to Linde instructing them to send six tanks of oxygen to Leyden, and wire was also sent to Pittsburgh asking that this order be confirmed, but reply came back stating that the order had been countermanded and that in future all orders must come through the Pittsburgh office.

Wire was also sent to Mr. A. D. Parker asking him to instruct his conductors to pass the helmet men with our car.

The car arrived at Leyden at 7.30 p.m., and two hours were spent in training some of the local men who were familiar with the mine in the use of the helmets.

In the meantime conference was held with the management of the mine and the State mine inspectors, and the writer was requested to take charge of the

rescue work, and consented to do so, on condition that he should be given absolute control and authority and that no orders should be given except through him or his representative.

The conditions of the mine on arrival were about as follows:

The mine is opened by two shafts 700 feet deep, the fan being located at No. 1 shaft, which is the uptake for the air, shaft No. 2 being the downtake. The air split at the bottom of shaft No. 2, one-half going to the north and the rest to the south side of the mine. The haulage is by mules to the main entries, and by tail rope to the bottom of shaft No. 2. (Shaft No. 1 was used only for hoisting rock.) The power to run the ropes was furnished by electric motors, located the one south and the other on the north side, each 50 feet from the shaft, and worked independently. The fire occurred in the south motor room, and immediately upon the smoke issuing from the fan the pit boss, William Laurie, and three other men went down the main shaft (No. 2), got out the five men who were working on the north side, and tried to put out the fire with hose, but some one on the surface reversed the fan and drove out the firefighters who barely escaped with their lives, when the flames shot up the shaft.

The man who reversed the fan hoped to save the 10 men who were working on the south side, forgetting the men at the bottom of the shaft.

In a very short time all the surface plant, including the wooden head frame, engine and boiler room were on fire, the shaft timbers all burned out, and the shaft caved tight, so that when the car arrived there was no air coming through this shaft, which now became the upcast, and the whole mine was filled with "black damp". The State mine inspector very properly would not allow any one to go down the shaft until the car arrived with the helmets.

At 9.30 p.m. four helmet men went down the shaft, and when within 10

feet of the bottom their safety lamps went out; so they came back, and it was decided to patch up the partition between the two compartments of the shaft, brattice off the north side, and split the main south entry in order to establish a circulation. This was started immediately by the helmet men, and as soon as it was safe for men without helmets to go down to the bottom, brattice crews were organized and the work proceeded without interruption, the helmet men going ahead, putting up props and nailing on boards, and the brattice men coming behind with the brattice cloth.

A station was then established at the bottom of the shaft, and four helmet men were instructed to go ^{to} the parting at the junction of the fifth southwest and "A" entries, where it was hoped that all the men working in that part of the mine had congregated.

The reason for this hope was that this parting was protected by steel doors at each end, and it was thought that if they could get between those doors they might be protected from the smoke and might possibly be still alive. This run was made on the night of the 15th, and four men were found on the inbye side of the parting near the door. It seems evident that these four men reached the parting, but the smoke or gas drove them out. Why they went out the inbye door instead of the outbye is a mystery. As these men were found dead, it was assumed that the other men could hardly be alive, and as the distances to the working places of the others were too great to be traveled with the helmets, all energies were bent to bratticing the main south in order to establish the air and drive out the CO₂.

By the night of the 18th the air was carried up the first southwest to "B" entry and a station was established 100 feet inbye the intersection of the

first southwest and "B", and the helmet men explored A, B, C, D, E, F and G on the south side, and found three men in between the fourth and fifth southwest, and one man in the second southwest near the intersection of first southwest and G. Our base of operations was established in the first southwest, 150 feet outbye A entry, and while our helmet crew of four men was exploring, four other helmet men, with knapsacks on their backs, but helmets in their hands, sat ready at a moment's warning to go to the assistance of the men on the inside if needed. Men without helmets were patrolling constantly all crosscuts and brattices (two at each crosscut), and four men at the brattice splitting the main south entry from the shaft (No. 1). Safety lamps were kept burning always 150 feet inbye our base, and if they showed any signs of going out or dimming or went out, the reserve crew moved back 150 feet leaving a lamp in the abandoned place.

By the night of the 24th the whole south side of the mine was explored, and still the other two bodies had not been found, and this necessitated exploring the north side of the mine, though it seemed impossible for these two men to have gotten to the north side, when no other man had succeeded in getting over 500 feet from his working place.

An effort was made to explore the shaft bottom where the fire was by coming down the first northwest, and we succeeded in getting to within 100 feet of the main north, but the steam and smoke were so dense and hot that the effort was abandoned.

The air was then cut off from the south side and all carried to the north, which was fully explored in the same way as the south side had been explored, but no trace of the missing men could be found.

We then felt confident that the missing men were on the south side near

their working place and had been overlooked, which proved to be the case, as they were found in room 3 off the L entry from the second southwest near the face of the room behind some timbers, at 4.30 on the morning of the 29th.

On the morning of the 20th the helmet crew, headed by J. C. Davidson, was exploring the L entries, and on coming out of room 2 Davidson struck his head a severe blow on a low roof and was partially dazed by the blow; at the same time his helmet was partially knocked off his face so that it leaked some air from the outside. He did not realize this fact but thought his bad feeling came from the knock on the head. One of the men asked him if they should go into room 3, but he said "No", he felt too bad and must go out; so they all came out, and when they got to E entry Davidson collapsed and was brought to the reserve station by the other men, the pulmotor applied to him, and he was revived and brought to the surface where he quickly recovered.

I immediately went below again, and instructed the next helmet crew to complete the examination of the L entries. They came back and reported that they had gone so, and found nothing except the overcoat of one of the men in the entry.

After the whole mine had been explored and no trace of the two men could be found, the air was again turned into the south side, and in the early morning of the 29th the helmet men informed me that they had not gone into room 3 off the L entry as there were two cars in the neck of the room, but they flashed their lights in there and saw the floor and face, but no signs of the men, who were afterwards found lying flat on their faces behind timbers.

The failure to find these men in the first place caused us ten days of very hard and dangerous work, and shows how easy it is to overlook bodies in a

mine after a fire or explosion.

It also teaches us that an exploring party cannot be too careful in its search, but should neglect no crack or corner and search carefully every inch of the ground.

The only other minor accident that occurred to our helmet men was while bringing out the bodies of the men. David Reese, of the Victor American Fuel Co., without any warning fell flat on his face, his helmet falling off his head. He was wearing a Westfallia helmet. The strap in some unaccountable way became unfastened, and the helmet fell off. He was only 500 feet from air, and was quickly brought out, and immediately recovered without any assistance. There were five other men with him.

The greatest care was taken to prevent any accident to the rescue men, and nothing that could be thought of was left undone leading to this end.

The men attached to car 2, F. W. Tweedale, foreman, and F. C. Harvey, first-aid miner, did their full duty and more at all times, and are highly commended for their excellent work and good judgment.

The thanks of the writer and the bureau are most gratefully accorded to the helmet men who cheerfully volunteered their services and risked their lives for the cause, working unceasingly and uncomplainingly day after day and night after night, ready at all times to respond to every call to duty regardless of how hazardous the undertaking, or how frequent the call.

Their names are as follows:

D. H. Reese, Victor American Fuel Co., Hastings, Col.

J. W. Thomas, Victor American Fuel Co., Chandler, Col.

Philip Davis, Victor American Fuel Co., Chandler, Col.

Walter Saxon, Victor American Fuel Co., Chandler, Col.

John C. Davidson, Colorado Fuel & Iron Co., Morley, Col.

George Smith, Colorado Fuel & Iron Co., Morley, Col.

John Deldoso, Colorado Fuel & Iron Co., Sopris, Col.

Thomas Warrick, Colorado Fuel & Iron Co., Starkville, Col.

Ford Cornwall, Colorado Fuel & Iron Co., Frederick, Col.

Clyde Ferris, Leyden Coal Co., Leyden, Col.

William Adamson, Leyden Coal Co., Leyden, Col.

John Conway, Leyden Coal Co., Leyden, Col.

Lewis Eder, Leyden Coal Co., Leyden, Col.

and the many other men who volunteered and so ably assisted in the work of bratticing, etc. Out thanks are also tendered to the officials of the Leyden company, Messrs. J. G. Perry, Fred Neumeyer, W. M. Laurie, and others, and to Mr. James Dalrymple, Chief State mine inspector, and his able assistants, for advice, courtesy and assistance in conducting the work.

After the work was completed and the bodies all recovered, the Leyden company presented the helmet men with a check for \$100.00 each, with the exception of course of the government men, who were forced to decline the offer.

The doors in this mine were entirely of steel with solid concrete frames, and but for these steel doors the whole mine would probably have been destroyed, and both shafts burned. The doors surrounding the shaft (No. 2) were so hot when we entered the mine that it was impossible to bear the hand on them. A blueprint of these doors is given herewith. (Note: The blueprint will be mailed you later as it is on car No. 2.)

The cause of the fire will probably never be known, but from all the evidence that can be gotten it seems to be another case of the careless and reck-

less use of open lights, together with all the other dangers they entail.

The Leyden Mine is located in Jefferson County, Colo., Township 2 S., Section 26, R. 70 west on the D. & N. W. R. R., about 15 miles northwest from Denver, at an altitude of 6,000 feet.

The officers are:

S. M. Perry, President, G. & E. Building, Denver, Col.

J. G. Perry, General Superintendent, G. & E. Building, Denver, Col.

Fred Neumeier, Superintendent, Leyden, Col.

W. L. Maurie, Pitt Boss, Leyden, Col.

The coal is sold under the trade name of the Leyden Co., and largely supplies the Moffat road, The Denver City Tramway, and the local trade of Denver and surrounding towns.

The coal is classed as a lignite, with a thickness of 5 feet to 8 feet, averaging about 6-1/2 feet. The dip of the seam is irregular and to the east. There are no faults, rolls or horsebacks, and no methane has ever been discovered. The mine is opened by two shafts 700 feet deep, and is worked on the double entry room-and-pillar block system.

The entries are 10 feet by 6 feet, the main pillars 75 feet and the side and stub pillars 50 feet; room pillars 22 feet, barriers 75 feet. The rooms are 22 feet by 200 feet .

The recovery of coal claimed is 80 per cent. The capacity of the mine prior to the fire was 1500 tons, with an average production of 1000 tons per day. The maximum day's run was 1309 tons.

265 men were employed, 235 under ground and 30 on top.

The tibble was of wood and the cage was of steel, self-dumping; manufactured by the Duncan Iron Works.

There were two boilers, capacity 160 h.p. (80 each) on No. 1 shaft, and seven boilers, capacity 700 h.p. (100 each) on No. 2 shaft.

The fan is a Jeffrey (Capel), driven by a direct-connected steam engine, and has a capacity of 60,000-75,000 cubic feet of air per minute, with an average water gage of 9 inches.

Open lamps using "Miner's White" oil were used exclusively in the mine, except on the main haulage roads where electricity at 250 d.c. was used.

The mine made about 60 gallons of water per minute, and the pumps were driven by steam and air.

Coal-mining machines:

3 Jeffreys) Electric	6 Sullivan)
1 Sullivan) 250-volt d.c.	1 Harrison) Air-driven punchers.
		1 Ingersol)

The pit cars weigh 2000 pounds, with a capacity of 4500 pounds.

Track gage 36 inches, using 20-pound rails throughout. Crossties are of red spruce, 4 inches by 4 inches by 4 feet 6 inches, and all props are of native pine.

All stoppings on the main entries are of concrete, and the side entries of wood.

The mine is naturally dry except in a few places, and is sprinkled once a week by cars and hose.

One very peculiar thing about this mine is that as soon as the floor begins to heave the working place fills with CO₂ and requires a large amount of air to clear it out.

The floor consists of a hard fireclay and does not heave until it is softened up by the sprinkling.

Black powder is used in coal and 40% nitroglycerine dynamite in the rock.

The miners load and fire when they get ready, using squibs.

The miner is allowed to carry 12-1/2 pounds of powder into the mine in a keg, but must leave same at room neck until ready to load and fire.

Maximum diameter of drill-hole is 2 inches, and maximum size of charge 30 inches, which is put in paper cartridges.

Coal-dust (drillings) was used for tamping, but I am informed that in future operations clay will be used.

DATA SHEET FOR MINE MAP REPOSITORY

QUESTIONS	COLUMNS	ANSWERS
Map Number	1 - 6	
Card Number	7 - 8	10
State Code	10 - 11	08
County Code	12 - 14	059
Mine Name	15 - 46	44204 11-67
Mine ID (H & S)	47 - 56	X
Mine Type	57	1
Company Reference (card)	58 - 59	50
Modifier	60	1
Mine ID (B. of Mines)	61 - 65	X
UTM	66 - 80	
Card Number	7 - 8	60
Reel Number	10 - 14	
Frame Number	15 - 18	
Number of Scenes	19 - 21	
Date of Filming	22 - 27	
Document Classification	28	
Distribution Limitation	29	
Declassification Schedule	30	
River Basin Code	31 - 34	
Land Survey	35 - 52	
Army Map Number	53 - 60	
Quadrangle Name	61 - 76	
Date of Document	77 - 80	1962

DATA SHEET CONTINUED

QUESTIONS	COLUMNS	ANSWERS
Card Number	7 - 8	61
Commodity Code	10 - 17	12120
Mine or Company ID	18 - 20	X
Card Number	7 - 8	63
Bed Code	10 - 12	X
Mine Reference (card)	13 - 14	X
Card Number	7 - 8	65
Reference Document	10 - 23	45
Mine or Co. Reference (card)	24 - 25	X
Modifier	26	X
Card Number	7 - 8	50
Company 1	10 - 41	LEYDEN COAL CO
Company 2	42 - 73	X
Card Number	7 - 8	70
Narrative	10 - 80	

Data Complete 9/27/77 Data Punched _____ Posted to Base Map _____



Newspaper Accounts

December 15, 1910

MINE EXPLOSION, 12 MEN BURIED

Denver, December 15.—An explosion in the Leyden coal mine, owned by the Leyden Coal Co., 14 miles west of Denver, last night entombed at least 12 men and possibly more in the lower workings of the mine. The fate of the men is unknown, but it is feared all may have been killed by the explosion or burned to death in the fire which followed. The upper workings caught fire immediately and prevented their escape. There is an old connection between shafts Nos. 1 and 2, but it is believed that this has become clogged by debris.

Rescuing parties are trying to pump air into shaft No. 2 in the hope of keeping the entombed miners alive if they have survived the explosion.

The upper workings of the mine are still on fire and efforts to extinguish the flames are being made.

**MAKES DARING DASH
OF 1,100 FEET ALONE.**

At 9:30 o'clock a third helmet party went below. These men did not get very far. At a point about 1,100 feet from the shaft one of the men broke the glass front of his helmet, making it impossible for him to protect himself from the bad air in the entry. He was carried to safety by his comrades before the black damp could get in its fatal work.

After this trip further work on the part of the helmet men was abandoned for the night, to be taken up again in earnest today.

While the helmet men had been working, however, H. Douthwaite, a deputy state mine inspector, went down alone and without a helmet. He made a running trip to a point 1,100 feet from the shaft, but found nothing. His act was regarded as especially daring.

F. A. Perry, the purchasing agent for the company, said yesterday that the company was caring for the families of the dead and missing miners, and would continue to do so, providing well for the widows.

Mr. Perry also said the company was beginning to get some idea of the extent of its loss. The surface loss—to the boiler plant and hoists—he thought would amount to at least \$100,000. The burned-out shaft cost about \$150,000. The mine will be unable to operate to any extent for perhaps seven months, which will bring the total loss up to more than \$500,000.

December 16, 1910

MINERS MAY LIVE IN FLAMING PITT

Denver, Col., Dec. 16.—The ten miners imprisoned by fire in the Leyden coal mine, 14 miles northwest of here Wednesday night are still in the mine. According to J. C. Roberts the government expert in charge of the rescue work, the men have a good chance of being found alive if they remained where they were working when the mine caught fire.

A party of five men from the government mine rescue car, equipped with oxygen helmets, is exploring the lower workings, 750 feet under ground at the bottom of shaft No. 1, but the rescuers have been able to make little headway because of the gas with which the mine is filled. Twenty-seven dead mules were found 315 feet south of the shaft.

(By HARRISON W. PHILLIPS.)

Casting aside all considerations of personal safety, Thomas W. Tweeddale, daring helmetman of the government mine rescue car and hero of the Starkville and Delagua coal mine disasters, dashed at the head of six equally as fearless workers in the wonderful oxygen helmets, through the new air course bratticed off to the south for a distance of 500 feet from the foot of Shaft No. 1 of Leyden mine, into the main southwest entry filled with deadly black damp, ran through the poison-laden atmosphere for 2,600 feet, burst open the steel door leading into the fifth west parting, at 8:30 o'clock this morning, and found four bodies where it had all along been expected that the entire ten missing men would be discovered.

