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FIRES AT KARKAR COAL MINE

KARKAR, AFGHANISTAN

5 TO 14 JUZA, 1331 (May 26 to June 4, 1952)

By C. W. Owings

About 1:00 p.m. Monday (Doshambe) 5 Juza 1331, C. Watson Owings, Point Four Technical Adviser, was advised by the Deputy Minister of Mines, Seyed Abdul Ahad, at Kabul, that a fire had been discovered in the Karkar coal mine, and for Mr. Owings to proceed from Ishpushta to help control the fire. He and Seyed Hossain left Ishpushta at 2:00 p.m., arrived at Pul-i-Khumri about 6:40 p.m., and registered at the hotel. After changing clothes and obtaining supper, they went to Karkar, arriving there at 10:10 p.m.

It was learned that the fire area in the section of the mine nearest the mine office, which had been sealed when a fire occurred about September 8 or 9, 1951, had been reopened on the last day Mr. Murphy was at the mine, on his and Abdullah Khan's instructions. No fire had been discovered, and part of the old fire area had been retimbered. About ten days prior to 5 Juza, fire fumes had been detected, and later smoke became visible, but the fire could not be found. Later it was learned that after about three days, two mud and stone fire seals (3 and 2, Fig. 1) had been built in two open crosscuts, and a bag had been stuffed into a hole about one foot in diameter in a third and still lower crosscut (1, Fig. 1).

Men continued to work in this area until 5 Juza, when the smoke became so bad, they could no longer work there.

Upon his arrival at the mine, C. Watson Owings, after learning the details of the fire, entered the mine through incline 1 (Fig. 1), accompanied by Seyed Hossain and the mine foreman, Marjan Pinjahbashy, and several others. They proceeded to within about ten meters of fire seal, No. 3 (Fig. 1), when the atmosphere became unsafe. The air contained nearly 1% carbon monoxide near the seal, .3% in adjacent incline No. 2, and .2% in the crosscut between inclines 1 and 2. The party then proceeded to the surface. The mine foreman stated on the way out that smoke had not been forced through the seals until two surface openings, inclines 4 and 5, had been caved at their mouth. It was then decided to make a small opening in one of these surface seals, to see if this would clear the air.

A conference was then held in the mine office. Bugi were wanted to make a burlap temporary stopping, as it was not known at that time that there were any seals in the mine. Bugi could be obtained from the mine, but string and nails were in the tovalkhanna, and the tovelador was at his home in Pul-i-Khumri. There were no bricks at the mine, but it was thought that bricks and lime could be obtained from the textile sherkat.

A letter was written to the head clerk, requesting him to procure these supplies and to arrange for the men to be divided into three shifts. This latter step was taken immediately.

At 11:40 p.m., 5 Juza, the first shift was organized, and men started to fill bugi with clay and to procure rocks to build stoppings. The first step was to reopen the fire seal on the surface in incline 5. Instructions were given for the men to stand where they would not breathe the smoke while making the opening. These instructions were disobeyed by the men in their zeal to make the opening. Two men worked at a time, and they were changed about every minute to reduce the danger of carbon monoxide poisoning. Even so, one man, who worked with his face right in the smoke as he pulled a large stone from its place in the seal, became dizzy about ten minutes later and had to lie down. He was well the next morning. The opening was made near the cross bar in the first timber set, and was about four feet long and six to eight inches wide. Two men were left to guard the opening and to prevent anyone from approaching this opening.

The mine foreman and two other reliable employees were placed at the mouth of incline 1, while C. Watson Owings and Seyed Hossain entered to observe the effects of opening the seal. The men in reserve were instructed to enter the mine in fifteen minutes, if these two men did not come out by then. The air was clear within three sets of timber from the first open crosscut left. Hossain was left at this junction, while Owings went into the crosscut about six or eight meters. There he found that there was no CO, but that in the next incline, No. 2, at the mouth of this crosscut there was .2% CO. They returned to the surface, and made two additional trips into the mine at intervals of ten and fifteen minutes. Each time it was observed that ventilation was into the mine from the main entrance, and that the CO was decreasing. It was finally discovered that the air was free of CO, except in the crosscut at incline 3, where a fire seal was then discovered. At the seal, itself, .2% CO was found at this time. About 1:30 a.m., the party went down incline 2, and found it free of CO, and the face of seal No. 2 and the hole, No. 1, in the third crosscut likewise were free of CO. It had been decided to work men for four hours and to let them rest for eight hours, as this was Ramazan and it was a hardship for men to work strenuously for eight hours; but after the final trip into the mine, it was decided not to call out the next shift, but to allow the air to clear and let the regular morning shift start the work of making seals tight. About 2:30 a.m., 6 Juza, Owings and Hossain returned to Pul-i-Khumri.

It was planned to try to find the tovelador in the morning before he left Pul-i-Khumri, but he had left when they arrived at the lorry parking place. The lorry was overtaken half-way to the mine, and it was decided to proceed to the mine, as that was a holy day and the Sherkat was not working; hence it was doubtful if brick could be procured that day. The lorry driver was instructed to bring an extra lorry of water, which he

did. Men were put to work bringing in clay mud and plastering the upper stopping, No. 3. A thorough search was made for CO, but this section of the mine was found to be free of this gas. After several hours, as everything was in proper order, Owings, Hossain, and the mine foreman went to investigate a suspected fire in another part of the mine. This was in incline 6, Fig. 2. Inclines and crosscuts had been driven in this section until it became too hot for men to work there any more. Tests for CO were made throughout this area, but no trace of this gas was detected. The smell could not be identified, but probably was due to oxidation of timber and coal; the air was very humid. Upon returning to the fire area, it was found that plastering of the upper stopping was being completed. There was no trace of CO at the seal, and the men were instructed to plaster the hole in the lower crosscut and to make a wall around it. Owings and Hossain then left for Pul-i-Khumri with the tovelador to try to arrange for purchase of bricks. There the Sherkat mill foreman was contacted, but nothing could be done until the head of the Sherkat was contacted. He was reached by telephone, and he agreed to the sale of 2,000 bricks and 2 karwa of lime, but said that arrangements would have to be made with the office manager in the morning.

Fortunately, the mill worked the next day, 7 Juza, and the bricks and lime were purchased, but the mine lorry would have to haul them to Karkar. Upon reaching the mine, it was found that no further work had been done on the sealing, because on the previous afternoon one of the men reportedly had been made sick by "smoke" at the lowest crosscut, No. 1. Carbon monoxide had not been discovered there for twelve hours, and a close examination showed no presence of gas there on that morning (Wednesday). It is believed that the man had been working hard for nearly eight hours, and due to fasting (Ramazan) from 1:00 a.m. he became dizzy from hunger and psychological fear. This was substantiated by another similar occurrence on this same day. A man digging a trench for erecting a brick stopping adjacent to the upper seal became sick and claimed that he was gassed. A thorough test was made for CO, and none was found. It would have been impossible for this gas to remain in the loose coal in the floor for such a long period of time and still remain as carbon monoxide, for it would have changed to carbon dioxide. The type of headache was not typical of CO poisoning. These men had temporal headaches, which is common to those working hard during fasting.

The sealing of the hole, No. 1, in the lowest crosscut was completed, and the stopping in the middle crosscut was replastered. As this crew worked from 5:00 a.m. until 4:30 p.m. and there was no night crew, sealing operations were discontinued for that day. Instructions were given to have a trench dug in front of stopping No. 2 the next morning preparatory to erecting another mud stopping there. As the bricks and lime had not arrived, Owings and Hossain went to Pul-i-Khumri to find out why they had not been delivered.

The driver had had some trouble with the lorry, which is in exceedingly poor condition and had not been able to make the trip. When we found him in the lorry bazaar at 6:15 p.m., he was making ready to weigh some bricks the next morning, or that night if possible, to determine how many he could haul in one load.

The next morning we left Pul-i-Khumri at 6:30 a.m., and met the lorry returning from the mine after delivering the daily load of water, and was ready to haul the bricks to the mine. At the mine, we went to examine the middle stopping, and found that the men had not made any trench and had built a dry wall on top of loose coal. This wall was taken down, and a proper trench was made into the floor, ribs and roof. It was realized that this would take more than one shift, and the foreman was asked to provide a second shift. A second shift came on about noon, but about 2:00 p.m. they would work no more, saying "tomorrow is Juma," and they had to go to the bazaar in Pul-i-Khumri. Hossain had gone to Pul-i-Khumri with the lorry driver to telephone to Kabul, as we had not been able to make any report, due to telephone-line trouble, so Owings could not talk to the men. He headed for Pul-i-Khumri and met Hossain and the lorry on the road, the lorry having a load of sand. As all the men had quit work for the day, most of them preparing to come to Pul-i-Khumri, there was nothing to be done but to wait until Saturday (Shambe) to finish the sealing operations.

Friday night Ghulam Ali Khan arrived in Pul-i-Khumri, and went to the mine with us the next morning. We observed the seals in the fire area, then went to investigate a reported gas condition in the incline being driven to intersect incline 6 section. Here it was found that practically the entire incline was filled with black damp, a mixture of carbon dioxide and low-oxygen air. At this time it was reported that fire was suspected in incline 6, which had been inspected earlier in the week, and no trace of fire had been found at that time. As this entrance was approached, smoke was observed issuing from it.

It was decided to investigate the lower and adjacent section, which was also adjacent to the new incline. Ghulam Ali, Pinjahbashy, Owings, and Hossain entered this section through incline 7, and started up an old crosscut (A) driven at right angles to the dip of the coal bed. After going about 50 meters, smoke was discovered coming down this crosscut, but no carbon monoxide was found. The party then retreated, and went through a crosscut to a lower and parallel crosscut. Here gas was detected, and the party retreated to the incline. It was decided that there were five openings into the fire area, and that these should be sealed. On the surface, a foreman was instructed to assemble a crew and to get clay and water to start building stoppings. By the time he assembled his crew, the gas had reached incline 6, and it was decided to make a temporary stopping by shoveling loose coal against timbers at this point, seal No. 6.

Pinjahbashy, Hossain, and Owings then went to look at the two crosscuts in the new incline (No. 9), which were also an extension of the crosscuts down which the gas was coming. It was decided that the lower crosscut would be sealed first, and came to the surface to make arrangements for this sealing work. About this time, a man came out of the slope carrying another man on his back, and a second man came out, also carrying a worker on his back. All men were called from the incline, and word was sent by Hossain to bring the men out of incline No. 7.

This was approximately 1:00 p.m. The party returned to the office to map the procedure to follow. On the way, it was observed that smoke no longer was issuing from incline 6. It was decided to see if it would be possible to enter there and seal off the two parallel entries in that section, rather than near the new incline. About ten meters in this entrance was a ventilation stopping. No carbon monoxide was detected, but the air was too hot for men to attempt to work there, so it was decided to follow the original plans.

Owings and Hossain entered incline No. 9, and found a low percentage of carbon monoxide, about .05%, and it was decided to assemble twenty men, divide them into crews of five, and work each crew in the crosscut for only five minutes. This was started, but the men felt so good, they would not go outside. After fifty minutes, the concentration of carbon monoxide suddenly became higher, and all men had to leave the mine. Five or six men were affected by the gas, so all operations were stopped for that day. It had been observed that the direction of the air changed about noon. Prior to that time, the air in the inclines 7, 8, and 9 was free of smoke and gas, but smoke issued from incline 6, which was at a higher elevation. After noon smoke generally came out into the lower sections of the mine.

Pinjahbashy and his men started work on the stopping in incline 9 at 5:00 a.m. Sunday (Yakshambe), 11 Juza (June 1), and had it practically completed by 9:00 a.m. Rock was taken from the entrance to the upper crosscut, but then it was found that one stopping could be erected in the parallel incline (No. 8) just below this crosscut and would take the place of two stoppings. The rest of the shift, until 1:00 p.m., was spent in making a place for this stopping. Work had to be stopped, because there was no water at the mine, as the truck had not arrived with water that day. He did bring two loads after 4:00 p.m.

The next morning, this stopping was completed, as the men had started to work at 3:00 a.m., and by 7:00 a.m. they had completed the stopping in the parallel incline No. 8, and a second crew had only about one meter more to build in a stopping No. 6 in incline 7, when a work stoppage was called by the leaders of the workmen. Later, four men volunteered to help on stopping No. 6, but before it could be completed, gas forced them to stop.

The men decided to return to work the next afternoon, but it was too late to start work on the stoppings, as gas and smoke were present. On Wednesday morning this stopping (No. 6) was completed, and a stopping (No. 7) was built in the mouth of incline 6 by keeping below the smoke level, which continued to come from this section, until the last handful of clay was in place at 2:00 p.m.

Another crew completed a second stopping (No. 3) in the upper crosscut where the first fire was discovered (Fig. 1). Men were assigned to close the opening in incline 5, that had been made to relieve pressure in the stoppings where the first fire occurred. On Thursday, 15 Juza, all stoppings were made airtight, and several openings on the surface from which fumes were issuing were filled with dirt.

On 15 Juza, an inspection was made in the level being driven adjacent to and south of the section entered by incline 6. This was being driven level, and was supposed to have been driven at an angle to intersect the hanging wall and then to continue on the strike of the coal bed, having rock as the roof. This had not been done, and the coal roof had fallen on top of the lagging, so that a man could walk on top of the lagging. In places this opening was as much as two meters high. The loose coal on top of the lagging near the face was hot, and there was danger of its taking fire. Men were put to work taking down this coal, and instructions were given to timber, so that cross bars and lagging would support the roof.

The projected workings had not been driven, and, as there was no second opening to provide ventilation, the face of the entry was becoming hot. Plans for a second opening were made, so that the danger of fire at the face could be corrected.

Causes of Fires

The exact causes of the fires are not known definitely, but judging from conditions observed, it is believed that the first fire was a rekindling of the fire that occurred last September. The second fire undoubtedly was from spontaneous combustion. A careful testing of the air in the fire area four days before showed no evidence of fire, but only excessive heat. It is believed that active combustion started on Friday night or early Saturday morning, probably on Saturday morning, as, otherwise, smoke would have penetrated to the face of the new incline (No. 9). The possibility of an old fire's having restarted in the old workings is another possibility, as several crosscuts in this section had seals erected in them several months before, when they connected with old workings, and a smell like fire fumes was detected. It is presumed that these seals were effective; hence, the old fire was isolated.

Lessons Learned from These Fires

The lessons learned from these fires are:

1. In reopening old fire areas, only a small area should be opened at a time, and it should be inspected and ventilated adequately.

2. Each section of the mine should be adequately ventilated at all times with at least two direct openings to the surface.

3. Whenever possible, sealed fire areas should be reopened in the fall or winter months; unless positive, controlled ventilation is used.

Recommendations

In order to reduce the hazards of fires and to detect them at the earliest possible moment, the following recommendations are made:

1. As soon as a fire is suspected or detected, the Ministry of Mines and the United States Point Four Technical Advisers should be notified.

2. In reopening fire areas, only such sections as can be inspected and ventilated should be kept open. Other parts should be isolated with appropriate stoppings.

3. Each section of the mine being worked should have at least two direct openings to the surface, so as to provide adequate ventilation. As soon as feasible, fans should be installed to provide positive and controlled ventilation.

4. Fire seals should be built, so that the bottom, sides, and top are hitched into the floor, ribs and roof. Stones and clay mud may be used, but the mud must be put between all surfaces of adjacent rocks, and it should be plastered over the front side, as well as in the trenches. Daily inspections of the seals should be made, and replastering should be done where leaks are found.

5. The loose coal on the lagging in the level section south of incline 6 should be removed, and the area over the timber sets should be retimbered, so that crossbars and lagging support the roof. This entry should be driven level, but turned to the left gradually until the roof rock is reached. It should then continue to be driven level, but the roof should be rock and not coal.

6. A second opening should be made between this level entry and the surface to provide positive ventilation.

7. Any old workings intersected should be explored, if possible, and well ventilated. If this is not possible, they should be closed.

8. The section of the mine to the right of incline 7 should be developed on a definite plan, and a second opening to the surface should be made as soon as practicable.

9. In the south section of the mine, incline 2, Fig. 1, should be opened to the surface, to give two ventilation openings. The rest of this area should be developed by driving inclines and crosscuts about ten meters apart. One or more of the levels or crosscuts should be driven to the outcrop in the valley south of this section of the mine. This will be governed by the character of the coal.

Respectfully submitted,

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