

## CHRONOLOGY OF THE NETTA MINE SITE IN PICHER, OKLAHOMA

The Bureau of Mines Information Circular No. 6113 (1929) provides a description of some of the history and operation of the Netta mine in downtown Picher. The first prospect drilling by the Eagle-Picher Company at the Netta mine occurred in late 1914 and shaft sinking was started early in 1915. Sufficient ore was developed to start construction of the mill in April 1916 with production following in August 1916. The property was originally a 40-acre tract (Netta East), but additional properties were consolidated with the original one until the mine covered 200 acres. The 200 acres included the following leases; Netta East 40, Netta West 40 (formally the Perin mine) and the Dorothy Bill No.2-80 acres in Section 20, Township 29N Range23E, and the adjoining Netta White 40 acres in Section 17.

The mill had a capacity of 1,400 tons per 24 hours making it one of the largest mills in the district. It was one of the first in the district to use the flotation process to concentrate ore by adding a flotation plant in 1917.

The thickness of the Cherokee shale in the mine varied from 70- to 120-feet, but was usually from 90- to 100-feet. The main ore deposits of the Netta mine occurred at the 270-foot level in the brecciated and boulder ground 35-feet below the base of the Short Creek Oolite. The ore on the main level occurred as massive lenses or patches and as the lining of vugs and cavities. The gangue minerals were jasperoid breccia, chert, calcite, and dolomite.

There were also two minor ore horizons mined; one at 230-feet, the Short Creek Oolite horizon, and the other at 200-feet. The upper or 200-foot level was semi-sheet ground where the ore occurred along the bedding planes and was disseminated throughout the blue and gray chert. The ore on the middle or 230-foot level was brecciated.

The usual practice in the district was to sink a shaft to an isolated ore body and tram the ore on the surface rather than to connect underground and hoist at a central shaft. For this reason, the mines usually had two or more "field" shafts for hoisting ore besides the mill shaft. The main or mill shaft was originally sunk at the mill site on the original Netta East tract to the 270-foot level, which was the main haulage level for the mine. All ore was hoisted at the mill shaft. The shaft was five by seven feet in cross section, the standard size for shafts in the district. It was close-cribbed with two by six inch pine lumber from the collar of the shaft to a point below the shale. Originally it was equipped with the usual Joplin-type hoist using standard cans holding about 1,400 pounds of ore to bring the ore to the surface. The shaft was later equipped for a skip hoist in 1920 using two and a half ton self-dumping skips and hoisting in balance. Before the various properties were consolidated, several shafts were sunk on each tract, ultimately there were 14 field shafts on the 200 acres.

According to the 1929 IC, the mine was supported almost entirely by pillars of ore from 20- to 60-feet in diameter, averaging about 30-feet. The size depended upon the character of the ground and the height of the roof. The pillars were spaced 40- to 100-feet, center to center, with an average spacing of 80-feet. Wherever the ground permitted, the roof was arched. There were parts of the mine where thick shale or loose boulder ground necessitated timbering, but generally these parts were not ore-bearing and only "pull" drifts were driven through them.

Initially, pillars in the Netta mine represented about 15% of the total area cut; however, many of the pillars were recovered before the mine was abandoned. According to IC 6113, as early as the late 1920s, some of the pillars had been removed and others trimmed down as small as considered safe. As of 1929, none of the trimmed pillars appeared to show visible signs of taking on weight.

After the Eagle-Picher central mill was built in 1932, the skip-type hoist was removed from the mill shaft and a metal derrick with a hopper was built in its place. The ore from the mine was collected in the hopper and transported to the central mill by rail for milling. The Netta mill was shut down shortly thereafter and was only operated occasionally to remill the chat tailings adjacent to the mill.

Mine maps of the Netta mine show that by 1940 many of the pillars had been trimmed or completely removed to obtain the rich ore before the mine was abandoned. A good example of this practice is the area beneath the Picher Reunion Park. Mine maps in the 1940s and 1950s show a large mined void beneath the park as a result of mining on multiple levels and removing the tops of pillars on the west and southwest perimeter of the mined area. The adequacy of the remaining pillars to support the large void has been questioned by former miners and residents for many years. A large pillar near the center of the void beneath the intersection of Main and Second Streets is 94-feet high and less than 50-feet in diameter. Adjacent to the pillar, the mine void reaches a maximum height of 106-feet.

According to local newspapers, in 1940 Eagle-Picher became concerned about the structural stability of the main pillar supporting the void beneath the intersection of Main and Second Street. A decision was made to pour a concrete support sleeve around the existing pillar. Concrete was poured through a hole at the surface of the intersection around the base of the existing pillar to a height of approximately 50-feet from the floor of the mine. The upper half of the pillar was not reinforced (Stewart mine maps-1954-57).

Maps of the Netta mine from 1920 through 1967 showed the following:

- At least 43% of the pillars from First Street on the south, to "A" Street on the north, have been removed and 23% have been significantly trimmed.
- At least three rock (roof) falls between 100 and 300ft in diameter have occurred in the area where the pillars were removed or trimmed. The largest occurred before 1946 and the smaller ones between 1957 and 1967. In the northern part of the Netta East mine where the rock falls occurred, 8.74 acres are identified as "Restricted" on the latest mine map. The area is bounded by 'A' Street on the north, First Street on the South, and Connell Ave. on the East.
- Based on a review of mine maps for the years 1946 and 1954, mining continued in the Netta East portion of the mine. Mining of the high upper (third level) in the southwest part of the Netta East was completed and a new upper level was mined on the east side.
- Mine maps prepared by Stewart Engineering between 1954-57 show the tops of at least eight of the main support pillars on the west and southwest perimeter of the large void under Reunion Park missing. The mine maps also identify two small pillars north of the reinforced pillar as taking on weight, sloughing and showing signs of fractures.

The threat of possible future collapse of additional areas was made a reality in February 1950 when the Eagle-Picher Mining and Smelting Company issued notices to tenants to vacate five city blocks (8.45 acres) in the heart of the business district of Picher within 30 days. Eagle Picher officials formally notified Picher city officials and tenants in the area that, "You should vacate the area immediately for your own safety" (Miami News Record, Feb. 7, 1950). The President of Eagle Picher stated, "While no one can say with any degree of certainty as to when any given mine area will cave, we do feel that there is now sufficient evidence of possible hazard to those using the surface that we are duty bound to give warning of the hazard at this time; hence the notices issued today" (Joplin Globe, Feb. 8, 1950). Two pillars beneath the heart of the business district were described as showing signs of taking weight and showing signs of stress. Eagle-Picher officials took Picher city officials on a tour of the underground workings to point out the reasons for the need to vacate the area.

Shutting down the heart of the business district was a serious blow to the city of Picher. Additional space in other parts of the city was not available to absorb the businesses displaced. The vacant 8.74-acre area north of the condemned area was not available since it was restricted for use by Eagle-Picher. Although a few businesses relocated to other areas of Picher, many simply closed their doors. Subsequently, all of the

buildings and residences were demolished and a high chain link fence was built around the area to prevent access.

Between 1954 and 1957 the city of Picher hired the William M. Stewart Engineering Company of Joplin, Missouri to conduct an independent assessment of the stability of the condemned area in Picher. As part of the assessment, Stewart Engineering developed a series of cross sectional maps of the Netta East mine including the area where the concrete reinforced pillar is located. The maps clearly show that the concrete reinforcement of the pillar in the center of the large void extends from the floor of the mine to approximately half way up the pillar. The maps also show that the recommendation following the conclusion of the engineering assessment was that the site was too unstable to reopen for public use. Stewart Engineering has committed to provide a copy of the assessment report when it is located; therefore it is not available to the public at this time (Frank Wood-personal communication).

In the mid 1960s unauthorized mining continued in the condemned area under the Reunion Park area on the Netta East lease. An independent miner was caught trimming a pillar next to the concrete reinforced pillar. In 2005, a memo to file prepared by a former U. S. Geological Survey mine inspector in the Picher Mining Field at the request of the author, the occurrence was described. "Around the mid 1960s, an inspection team was organized by the General Mine Superintendent for Eagle-Picher to investigate the slabbing of the subject pillar by one of the independent miners in the Picher field. The team consisted of several Eagle-Picher employees, USGS employees and the independent miner. The purpose of the meeting was to make certain that the responsible parties for mine safety in the Picher field were aware of the trespass. While the Netta East was Eagle-Picher's property at that time, the potential collapse of the very large stope would create a severe air blast that could cause fatalities among the miners on adjacent Indian lands which was a major concern. It was obvious that the pillar had been slabbed in the middle and the independent miner did not deny that he had slabbed part of the pillar without authorization from Eagle-Picher. The independent miner was severely reprimanded. The pillar did not show signs of taking weight at the top because the independent miner was caught in time....."

In 2005, a former miner also stated that he had discussions with other miners who stated that gougers climbed on top of the concrete reinforcement on the center pillar in the mid-1960s and removed most of the pillar above the concrete. The discussions cannot be validated.

In June 1967, the city of Picher was presented a quitclaim deed from Eagle Picher for the fenced area on the Netta East mine site and a small adjacent area comprising 10.92 acres.

On Saturday morning July 22, 1967 an area 250- by 300-feet collapsed on the northwest side of Picher in the Netta White mine within eight hours of pillars being removed by gougers (Miami News Record, July 23, 1967). The surface near the center of the collapse dropped approximately 25-feet. Four homes containing 18 persons were involved in the 1.5 acre collapse (Miami News Record, July 23, 1967). Fortunately, the collapse occurred slowly and no serious injuries occurred.

In 1968, several months after the collapse at the Netta White mine, Eagle-Picher informed residents living on four blocks above the Netta West mine, south of the collapsed area, to vacate their property within thirty days (former residents-personal communication). No specific reason was given and no financial assistance was provided. The area of eviction was from "A" Street on the north to 2<sup>nd</sup> Street on the south and encompassing the west side of Vantage Street to the east side of River Street, including Frisco Street. The residents of 22 homes and three businesses were evicted from the property. A member of the Picher Mining Field Museum Board of Directors recalls the situation clearly as his mother lived at 113 S. Frisco Street (personal communication). In addition, he worked for Eagle-Picher assembling heavy equipment underground and transporting it to the Piokee mine. He recalled the instability of the roof rock in the area noting that several times the underground road under the Netta West mine was blocked by rock falls. Eagle-Picher ceased operations in the area in 1970 and deeded the abandoned land to the Ottawa Reclamation Authority. For many years the area remained vacant. Today there are several homes on the site and in 2003 the Picher Elementary School built a playground above the mine workings.

A review of the Netta West mine map shows that multiple levels of mining occurred beneath the site. For example, the 1946 and 1954 Netta West mine maps show that mining occurred on two levels beneath the area where the playground is located. Mine maps dated after 1954 no longer show the mine workings in the high upper level.

Eagle Picher also evicted residents from a one block residential area in Section 17 at the same time (former residents, personal communication). The area was bounded by "F" Street on the north, Netta Street on the west, Picher Street on the east and "D" Street on the south (former residents, personal communication).

Under the 1961-65 federal small ore producers mining subsidy program, Eagle Picher began to sublease many of its lease holdings to independent miners (gougers). Few controls were placed by Eagle-Picher on the activities of these gougers following the sub leases being issued (former miners, personal conversations). As a result, the gougers randomly trimmed and removed pillars left in place by the larger companies. As a result, the U. S. Bureau of Mines and the U. S. Geological Survey became concerned about the safety of the miners and the further weakening of the mine workings by excessive mining. In early 1967, the Geological Survey made a recommendation that, because of the condition of the mines, Eagle-Picher not be allowed to assign leases to the small operators, and requested that the Bureau of Mines inspect the underground conditions of the mines on Indian-owned lands.

A team from the U. S. Bureau of Mines and the Geological Survey inspected the mines during August 17-31, 1967 (Westfield and Blessing, 1967). Among other recommendations their report recommended:

- That no more pillars should be removed under communities, housing, highways, roads and drainage areas-particularly Tar and Lytle Creeks, and that a team be formed to determine which pillars could be removed in the future.
- Because of excessive mining under residences, streets, secondary roads, highways, railroads, and drainage areas, an engineering study should be conducted to determine weak areas in which subsidence might occur and to recommend corrective measures for preventing public hazards.....
- A committee should be established to study requests for pillar work and to advise the Mining Supervisor of the Geological Survey whether the work should be authorized.

A committee consisting of representatives from the U. S. Bureau of Mines, U. S. Geological Survey and the Oklahoma State Mine Inspector's Office was formed in February 1968 based on the recommendation in the Westfield and Blessing report. The committee (Committee for Study of Pillar Work on Indian Lands) inspected many mines in the area over the next two years. In April 1968, the Miami office of the Bureau of Indian Affairs requested the committee to inspect the mined area beneath Block 14, including the Little League Ball Park on south Main Street in Picher. The inspection was made on April 4, 1968 and other pertinent information, including drill logs, was studied (Letter dated July 5, 1968). The Committee advised that:

- All underground mining should be restricted so that there will be no more mining in Block 14.
- There should be no permanent surface structures built on Block 14
- The area of the Little League Ball Park appeared safe at the time of this inspection; however, any crushing or removal of pillars would change this condition and the underground area will be inaccessible for inspection within the next several months.
- Playgrounds, ball parks and other park-type facilities designed for public use should be located over unmined land.

On July 15, 1968, the Superintendent of the Miami office of the Bureau of Indian Affairs revoked the city of Picher's Lease Permit granted to the Picher Little League (Certified Letter to Picher Mayor). The Mayor of Picher appealed the revocation in a letter to the U. S. Geological Survey dated September 10, 1968 citing the fact that the U. S. Geological Survey granted permission for the removal of additional pillars under the

ballpark while the park was being used by the city. The Geological Survey denied the city of Picher's appeal. In 1972, the city of Picher appealed again to the Bureau of Indian Affairs for a new permit to operate the Little League Park. The appeal was again denied.

The city continued to use the Little League Ball Park until 1997. In 1996 or 1997, the EPA remediated the Park including the infield and parking area due to the large amount of chat in the area. During 1997, the Environmental Protection Agency, Oklahoma Department of Environmental Quality, the City of Picher, Ottawa County and the Ottawa Reclamation Authority proposed a multi-purpose park facility with pavilions on the Netta East site and a sports complex on the Netta West site in Picher as a replacement for the Little League Ball Park and the Ray Harrell City Park.

In 1967, the Tulsa District of the U. S, Army Corps of Engineers (COE) was requested to investigate the overburden at the Netta East site for the EPA to determine if the site would be hazardous for the operation of heavy equipment, which by its vibratory nature could cause a collapse. The investigation of the site consisted of a two-fold approach (COE Report, 1967); one portion of the investigation consisted of drilling borings at the site while the second consisted of consultation with a mining engineer from the U. S. Office of Surface Mining (OSM) in the Department of the Interior and a local retired mining employee who was responsible for mapping the mine workings. No drilling was conducted on the Netta West site.

The purpose of drilling was to verify an arbitrary minimum thickness of overburden remaining at four locations. In June 1997, at three locations, a three-inch hole was drilled to a depth of 100-feet using a rotary bit with fresh water mud. At each of these locations no voids were encountered. One of the drilled holes was located over the large mine void on the Netta East mine. According to the COE report, this indicated that no collapse structure had reached that depth. The fourth hole, north of the reunion park site, was drilled to a depth of 175-feet. From a depth of 40- to 175-feet a core bit was used to drill and provide continual core. A boring log was also prepared for the core.

The OSM evaluation contained in the COE report stated that a collapse of the mining excavations was likely, but that no time frame could be predicted. The mining engineer's initial recommendation was for a systematic investigation of overburden depths in the area using a drilling unit with compressed air for lifting the cuttings. In lieu of the drilling program, he recommended a routine inspection of the ground surface in the area of potential collapse for the detection of any evidence that a collapse of the void ceiling was occurring. It is not known if another drilling program or inspection program was ever initiated.

The COE's conclusion stated, "Drilling activities in the time allowed indicated greater than 100-feet of overburden exists over the subsurface excavated areas at the Picher Reunion Park site, however, this investigation was limited in scope and was not able to evaluate the entire area of concern. An evaluation performed by the staff of the Office of Surface Mining (Department of the Interior) suggests that subsidence at the site is probable. Further evaluation using reflection seismic or drilling investigation to evaluate the overburden at the site would verify subsurface conditions. In lieu of further investigations, it is recommended that a quarterly visual inspection of the ground surface of the proposed park area be conducted to detect indications of subsidence. Current conditions indicate that the overburden in the area of the Reunion Park construction is sufficient to support the equipment to be used for restoration."

Since 1997 the Reunion Park has been used as the site for the annual miners reunion in Picher where between 1,000 and 1,200 visitors congregate along with a carnival, parking and vendors booths. The ball park on the Netta west site is used routinely throughout the year.

On February 20, 2004, a former U.S. Geological Survey Mine Inspector in the Picher field wrote a letter to the Mayor of Picher and the Oklahoma Department of Mines expressing concern over reopening the condemned area in Picher as a public park. The former Inspector referred to his experience as a Mine Inspector in the Picher field in the 1960s citing recent discussions with former Eagle-Picher geologists in which the geologists were "shocked" that the fence had been taken down.

Later in 2004, representatives from the Oklahoma Geological Survey and Oklahoma Conservation Commission initiated an assessment of the stability of the Netta East mine site.

In August 2004, Senator Jim Inhofe authorized the formation of a technical team to assess the potential for future subsidence in the Picher mining field. The Netta mine site is included in the assessment.

## REFERENCES

Netta Mine Maps for the years 1920, 1929, 1946, 1951, 1954, 1965, 1967.

Netzeband, William F., 1929, Method and cost of mining zinc and lead at No. 1 mine, Tri-State Zinc and lead District, Picher, Oklahoma: Bureau of Mines Information Circular 6113, 11 pp.

Sanborn Maps of Picher Mining Field-Picher, Oklahoma, 1920, Sanborn Map Company, 16 p.

Sanborn Maps of Picher Mining Field-Picher, Oklahoma, 1928, Sanborn Map Company, 26 p.

Stewart Engineering Mine Maps of the Netta Mine, 1954-1957.

Westfield, J., and Blessing, E. 1967, Report of Investigation of surface subsidence and safety of underground employees in the Picher, Oklahoma field of the Tri-State mining district: U. S. Bureau of Mines Unpublished Report, 25p.

Letter from U. S. Geological Survey Mining Engineer to Superintendent, Miami Agency, Bureau of Indian Affairs, Miami, Oklahoma. July 5, 1968.

Certified Letter from Acting Area Director, Bureau of Indian Affairs to Picher Mayor revoking Permit #1564 for the Picher little League Park. July 15, 1968.

Letter from Picher Mayor to Acting Area Director, Real Property Management, U. S. Department of the Interior requesting reconsideration of the revocation of the Lease Permit for the Little League Park. September 10, 1968

U. S. Army Corps of Engineers, 1967. Netta East mine overburden investigation at the Picher Reunion Park Site. Unpublished Report. Prepared for the Environmental Protection Agency, Region VI. 18p.

Letter from former Mine Inspector to Mayor of Picher, August, 2004. Letter expressed concern over reopening the area over Netta East mine as a city park.