Marvine Colliery, Breaker No. 2
W side of Boulevard Ave.,
between E Parker St. and I Rt. 380
Scranton
Lackawanna County
Pennsylvania

HAER No. PA-183-C

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
MID-ATLANTIC REGION, NATIONAL PARK SERVICE
DEPARTMENT OF THE INTERIOR
PHILADELPHIA, PENNSYLVANIA 19106

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HISTORIC AMERICAN ENGINEERING RECORD

Marvine Colliery, Breaker No. 2

HAER No. PA-183-C

Location: Located in a north central position on the Marvine Colliery East Site, north of Boiler House No. 2 between the west side of Boulevard Avenue and the east bank of the Lackawanna River, between East Parker Street at the south and Interstate Route 380 at the north
Scranton, Lackawanna County, Pennsylvania

UTM: Z18 E446131 N4588039
Quad: Scranton

Dates of Construction: 1920

Present Owner: Louis and Dominick DeNaples
F & L Realty

Present Occupant: Vacant

Present Use: None

Significance: Marvine Colliery is important to local history for its relationship to the development of the Anthracite Mining Industry in northeast Pennsylvania, "The Anthracite Capital of the World" 1890-1930. Breaker No. 2 was important to the operations of the Marvine Colliery and the Delaware and Hudson Coal Company, for it represented one of the first efforts of that company to build and operate a "modern" coal preparation facility, heavily dependent upon electrical power. Marvine Breaker No. 2 was one of the first breakers in Lackawanna County, Pennsylvania, to install and operate Chance Cones for the separation of coal from rock matter.

Project Information: This documentation was undertaken in April 1990, in accordance with a resolution by the board of commissioners of Lackawanna County, Pennsylvania, as a mitigative measure prior to partial demolition of the Marvine Colliery to make way for construction of the Lackawanna County Recycling Center on the site.

Dorothy Allen Silva
Architectural Historian
1288 Layton Road
Clarks Summit, Pennsylvania 18411

LOCATION

The second breaker, constructed by the D & H at the Marvine Colliery, is located at the Marvine Colliery No. 2 site, east of the Lackawanna River. The breaker occupies a position at the north central portion of the site, north of Boiler House No. 2.

HISTORY OF EQUIPMENT AND OPERATIONS

A publication of the Hudson Coal Company, dated 1932, states that in 1918 the company began a modernization effort at the Marvine Colliery which culminated in 1930, at which time Marvine's Breaker No. 2 was opened to the public for tours. The 1932 publication, The Story of Anthracite, describes operations at Hudson Coal Company collieries in detail, and includes descriptions and photographs of the structures and operations at the Marvine Colliery.

Historical pbotographs of the construction of Breaker No. 2 (taken by a D & H Coal Company photographer named Horgan and now in the collection of the Anthracite Heritage Museum, Scranton, Pennsylvania) bear the date 1920 as part of the photo emulsion itself. The earliest date on these photographs, April 1920, shows a construction crew laying the forms for the breaker's foundation. And a later photograph, dated November 1920, depicts a completed breaker and some of the interior equipment.

Unprocessed coal was conveyed to Breaker No. 2 over a series of line conveyors which reached the site from two directions. From Mining Shaft No. 1, on the west site, a steel frame conveyor line with a concrete floor moved the lump coal east across the Lackawanna River to the Washery and Main Conveyor. From the Von Storch shaft (located east of Breaker No. 2 across Boulevard Avenue), the lump coal was first moved west across the road by way of an overhead steel frame conveyor line with wood floor, 100 feet high, to a small building just west of the Fan House at Marvine Shaft No. 2.

Coal from the east conveyor line, as well as from Shaft No. 2, was transported west to Breaker No. 2 by way of an underground conveyor tunnel (wbich the company called a "subway") with its east terminus at Shaft No. 2 and its west terminus just east of the breaker.

The coal moved through this tunnel by way of mining coal cars which were pulled on a rail (or rails) hy winding winches, using 1-1/4-inch steel rope powered by a stationary engine (it is not known if this engine was steam-driven or electric).

Once at the breaker, the coal from the west site passed through a washing system which removed the finer particles which were carried away with the water to Dorr Thickeners (which, in 1918, were first located at the southeast area of the site and, at a later date, to newer Dorr apparatus which was located in a now-demolished separator plant to the west of the breaker. Coal from both east and west sites entered the breaker on its uppermost level; from the west over the main conveyor, and from the east raised by means of a "step conveyor."

The processing o coal at Marvine Breaker No. 2 included passing the coal through three procedures. First, the lump coal was broken into smaller pieces on the upper level by passing it through large revolving cylindrical steel drums called crushing rolls.

Then, the coal passed to chutes in the middle level of the breaker where it was sorted (separated into sizes) by means of passing it over a series of vibrating perforated metal plates called shaking screens or "bull shakers," with different size openings.

The coal that had fallen through the first series of perforated metal plates was then chuted to a second layer of perforated plates on a lower level. The second level of chutes resembled screens, with perforations of 3/32-inch diameter. A third layer of solid metal chutes ran directly beneath the second layer to catch the smallest pieces ("rice" coal).

Water was added to the coal throughout the entire sizing and separating process, to "wash" away fine granular particles of anthracite from the larger-sized coal pieces. The finest coal particles of less than 3/32-inch diameter, and the water which carried them, was caught by a sluice which shunted it from the breaker to the Dorr Thickeners. Here, the finest coal, Anthrafine, was extracted and the waste water was removed through pipes which dumped it into the Lackawanna River to the west of the thickeners.

The larger sized pieces of washed and sorted coal were then chuted down to the lower levels of the breaker where it was separated from rock matter (cleaned).

The first coal separation equipment installed during the time of the breaker's construction in 1920 was known as "jig" apparatus. Each jig consisted basically of a large wooden watertight box, divided horizontally into an upper and lower chamber by a sloping perforated metal plate. The lower chamber held wooden plungers which were driven up and down within the box.

Unseparated coal and rock were dumped into the top chamber; the entire jig was filled with water; and the movement of the plungers in the lower chamber caused the water to churn through the perforated metal plates. Rock matter, which had a higher specific gravity than coal, would slide down the sloping plates to the bottom of the upper chamber and the coal would remain at the top where it could be removed. The rock matter (called culm) was removed from the bottom by opening a hinged door.

At the time of the breaker's construction, the jig apparatus was situated on the second floor, with the hinged doors at the bottom of the jigs opening into the first floor area where the rock would be moved to waste piles (culm piles) by way of a conveyor line.

In circa 1930, the D & H converted its newest breakers, including the Marvine Breaker No. 2, to the Sand Flotation Method of coal separation, removing the jigs and installing Chance Cones, invented by Henry M. Chance of Philadelphia in 1921. The Chance Cone method of coal separation also relied on the differing specific gravity of rock versus coal, but used a great deal more water than did the jig system.

In 1930, the first two steps of the coal preparation procedure remained the same as previously.

After the coal was broken and sized, it was chuted to the Chance Cones which were located on the lowest level of the breaker and were arranged in two parallel rows along concrete troughs running north and south through the structure. The coal entered a Chance Cone from level two, at the top, where it was mixed with large quantities of water which were pumped from the Lackawanna River.

A steel Chance Cone tapered from 18 feet at the top to 2-1/2 feet at the bottom, with agitator arms attached to a rotating central shaft. When the unseparated coal and rock were dumped into the cone, mixed with water and sand, then agitated, the heavier rock would settle to the bottom where it was drawn off, and the lighter coal would remain at the top. The added sand kept the materials moving smoothly and allowed the heavier materials to settle more easily.

The bottom of each cone was supported over a concrete pit, into which the separated rock matter was released, to be carried to refuse piles (culm piles) by way of a conveyor system.

Waste water with fine particles of anthracite was carried from the Chance Cones south from the breaker through elevated pipes supported by a trussed steel system to the Dorr Thickeners. A large portion of this "sludge piping" remains, running from the area about 200 feet southeast of the breaker, south along Mike's Scrapyard property line fence, to the Dorr silos at the far southeast area of the site. By 1945, a newer Dorr Separator Plant had been constructed northwest of Breaker No. 2, and silos which had contained Dorr Thickeners at the southeast portion of the site were no longer used for that purpose.

The processed coal intended for shipment to outside markets was chuted out through the south end of the breaker to railroad coal cars which were pushed by the freight railroad's locomotives onto a loading platform/weigh scale located south of the breaker behind Boiler House No. 2 (see HAER No. PA-138-B, Heavy Rail Scales Office).

By 1930, Marvine Colliery Breaker No. 1 was no longer used, and both it and its engine house had been razed. Operation of Marvine Colliery Breaker No. 2 ceased entirely sometime in the 1960s, and the colliery was run until 1973 only for the packaging and shipping of coal which had been prepared at the company's Huber Colliery. Breaker No. 2 was partially demolished soon after that date.

DESCRIPTION OF ARCHITECTURE AND STRUCTURAL SYSTEMS

Breaker No. 2 was built with a lower level of concrete and steel "I" beams, and upper stories of steel "I" beams. To support the structure, a foundation of steel-reinforced pylons was constructed in an excavation below ground level.

The breaker measures 160 feet long (north-south) by 85 feet wide (east-west). It stood approximately 100 feet high, and historical photographs indicate that it had at least six different levels, with the uppermost two levels containing less square footage than the lower four.

At the present time, only the lower three stories of Breaker No. 2 remain, and the breaker is in extremely poor condition, having suffered partial demolition. The breaker's windows and its "skin" which had consisted of creosote-coated corrugated metal, has been removed, and shreds of the coated corrugated metal remain on the ground surrounding the breaker. The breaker currently stands as a steel "I" beam shell, open to the elements, with the lower level of concrete and steel being the most intact portion.

Apparently, the Chance Cone equipment and supporting machinery was prone to wearing out, and some, if not all, of the original Chance equipment was replaced with new Chance equipment sometime in the 1940s. A piece of driving (or pumping) machinery found on a platform at the north central end of the breaker's lower level bears the inscription "Chapman, 1947, 25A, 125S, 175, OWG."

The lowest level of the breaker contains remnants of heavy iron or steel water piping and rusted water inlets in the area where the Chance Cones had been located. Each inlet water pipe situated above its Chance Cone area measures 1 foot, 5 inches in diameter. Coiled-wire reinforced rubber piping and rusted coal chutes also remain, in extremely deteriorated condition, dangling from the ceiling of this level.

A large portion of the "sludge piping" which carried water and fine particles of anthracite to the Dorr Thickeners remains, running from the area about 200 feet southeast of the breaker, south along Mike's Scrapyard property line fence, to the Dorr silos at the far southeast area of the site.

The "refuse pits" were where rock matter was unloaded from the bottom of the Chance Cones still remain, with remnants of the underground conveyor system which removed the rock from the structure mostly buried under dirt and debris.

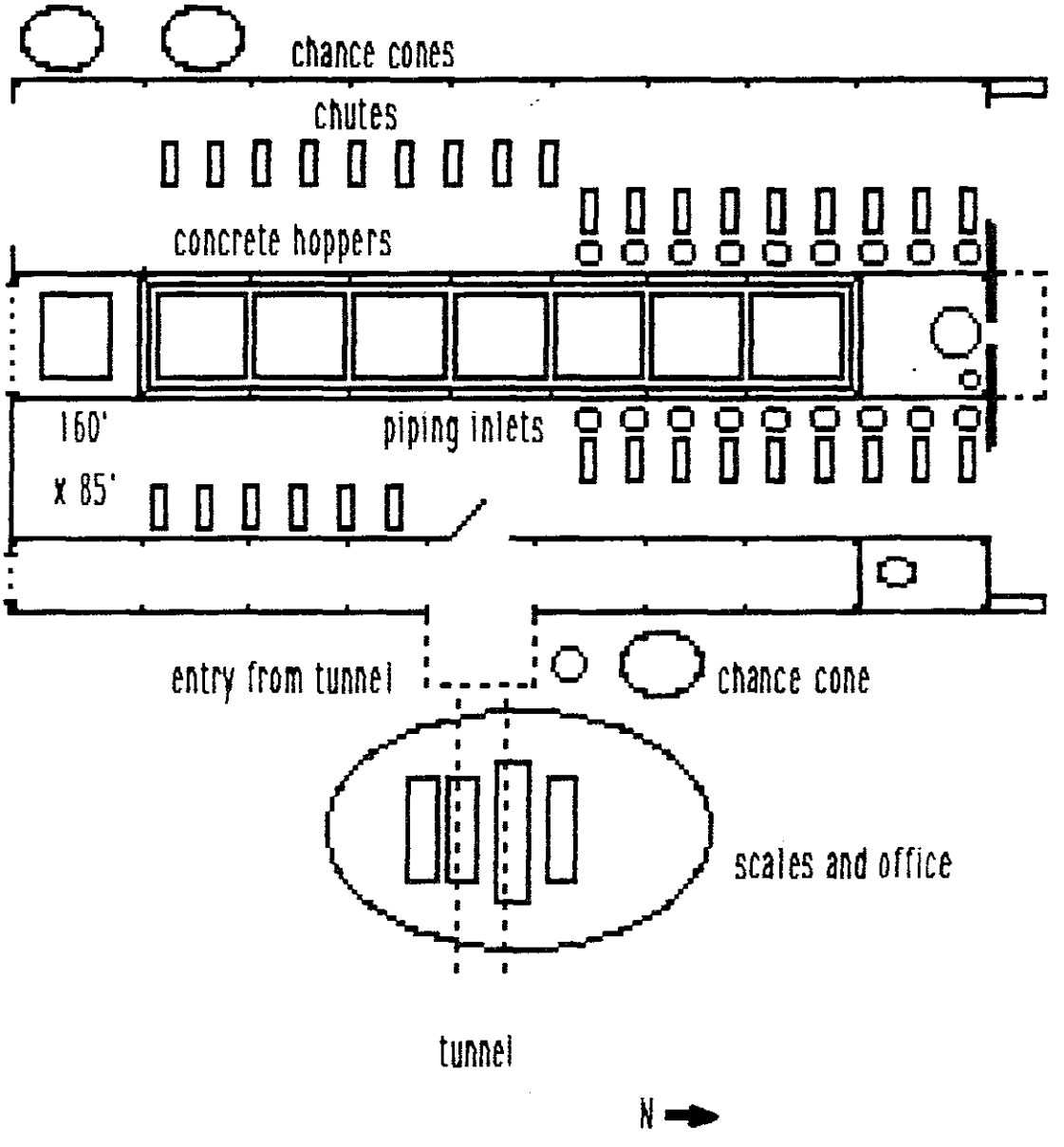
One electric motor remains on a five-foot elevated concrete platform at the northeast corner of the lower level. The motor had apparently, at one time, caught fire, as it is covered by blue fire-extinguisher foam. Another concrete platform at the center of the north wall holds a tapered cylindrical apparatus, resembling a Chance Cone but was much smaller (about 5 feet high) and had a smaller bottom opening. A pump housing and flywheel are also on the platform next to this apparatus.

The second level contains some equipment, mostly water pump housings and coal chutes, badly rusted. on the third level, a ruin of an electric transformer can be seen among the heaps of twisted steel and iron.

The underground tunnel which was used to convey lump coal to the breaker from Shaft No. 2 at the far east central portion of the site currently exists and is accessible from an opening in the ground just east of the breaker. The tunnel walls are of concrete, and portions of the conveyor line extend down the tunnel floor.

A wooden roll, holding a length of the cable which was used to pull loaded coal cars along the conveyor line through the tunnel, currently lies on its side above ground, directly to the north of the tunnel's west opening.

The structures at the tunnel's east terminus are extant and are currently part of Mike's Scrap Yard.



PLAN OF BREAKER No. 2, GROUND FLOOR