

MINING HISTORY

Clarion County has been mined for a variety of mineral resources since 1830. The iron industry was the first activity to take advantage of various iron ore deposits in the county. One bed occurs immediately above the Vanport limestone (known then as the "Ferriferous" limestone). The ore at that time was obtained primarily by stripping. The mined ore was then smelted in charcoal furnaces, ruins of which are in evidence throughout Clarion County. One furnace in particular has been restored to its original condition and is located at Helen Furnace. At one time, there were 27 furnaces operating in the county producing a total of 40,000 tons of iron per year. The iron industry in this area, however, experienced a steady decline after 1860 due to the exhaustion of the more economical deposits and the discovery of the higher grade Lake Superior ores.

Immediately after the Civil War, oil was discovered in Clarion County in commercial quantities. The production of oil reached a peak in 1874 with 3,900,000 barrels. By 1883, an estimated 5,000 oil wells had been drilled. Most of the crude oil production in the Toby Creek Watershed area resulted from the Venango, Third and Fourth Sands of the Conewango Formation, Devonian Period. The petroleum industry, however, steadily declined in Clarion County, when in 1941, production dropped below 100,000 barrels for the first time. In 1941, it was also estimated that 75 million barrels were physically recoverable from 180 million barrels of total crude oil still in the ground in Clarion County.

The development of the natural gas industry in Clarion County coincided with that of the petroleum industry. The production of gas in Clarion County reached 15 billion cubic feet in 1927 but has since declined. Most of the natural gas production in the Toby Creek Watershed area resulted from the Speechley Sand of the Canadaway Formation, Devonian Period and the previously mentioned Venango Sands.

Coal is the most valuable and abundant mineral resource in Clarion County. It has been responsible for the employment of thousands of men and has been the primary industry of the county for the past 100 years. The following estimates

of the coal reserves of Clarion County represent the most recent estimates: original reserves - 2,043 million tons, mined out and lost - 190 million tons, recoverable by strip mining (0-120 feet cover) - 237 million tons, recoverable deep mining - 80 million tons. Mined in conjunction with coal were fire clays from primarily the Lower Clarion and Lower Kittanning coal members. They have

primarily been used for fire brick and a variety of other wares.

The major seams located in the Toby Creek Watershed are, in order of importance: Lower Clarion, Upper Clarion, Lower Kittanning, and Brookville. The coal, in general, is classified as high volatile and has been used primarily as a steam coal. It has the following typical analysis:

Volatile Matter	-	35 - 39%
Fixed Carbon	-	45 - 53%
Sulphur	-	3 - 6%
Ash	-	8 - 13%
Moisture	-	2 - 4%
Heating Value	-	13,000 - 14,000 BTU

Large quantities of Upper and Lower Clarion coal have been removed by the stripping method. The Lower Kittanning coal, where present, has been totally as has been hilltop removal.

Most of the economically recoverable coal in the watershed has been exhausted. The development of the Brookville coal will only occur when its reserves are proven and when more effective means of reducing sulfur content are found. With a few exceptions, active mining in the watershed has all but ceased at this time.

Deep mining was performed in the watershed up to 1930. Due to the thickness and extent of the seams, no large mines were developed in the watershed. Most deep mining was in the form of small country banks used mainly for local purposes.

Most of the mine drainage pollution comes from abandoned strip and deep mines where mining was conducted before the regulation of the industry and further aggravated by mining practices at the time. The major cause of deep mine pollution is the fact that until recently the mine openings were driven to the rise allowing for gravity draining of water from the mine. Inadequate mine design related to roof support lead to caving of the mine workings with resulting fracturing of adjacent strata. This has allowed surface and groundwater to percolate into the mine workings. Mine openings in the form of manways, ventilation and supply adits were not sealed following mine abandonment.

In regards to strip mining, most pits were not backfilled or planted allowing surface water to infiltrate through acidic spoil, settle into impoundments and contaminate groundwater supplies. Strip mine activities often removed the

outcrop barrier allowing groundwater to flow unimpeded to the surface over the old strip pit. Mine and tipple refuse consisting of high sulfur material was not properly disposed of.

As a result of these practices, regulation of the mining industry came into existence with the Pennsylvania Clean Streams Act of 1937 (PL 1987 with amendments), the 1963 Bituminous Coal Open Pit Mining Conservation Act 133,

the Surface Mining Conservation and Reclamation Act of 1971, and the Federal Surface Mining Control and Reclamation Act of 1977. Effective implementation and enforcement of these laws should eliminate or control any adverse conditions resulting from active mining operations. Meanwhile, mine drainage from abandoned deep and strip mines will continue to degrade the water quality in the area placing severe restrictions on the land and water environment.