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Report of coal prospect, and subsequent development

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---SUBJECT--

REPORT OF COAL PROSPECT, AND SUBSEQUENT DEVELOPMENT.

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In the fall of 1901, the writer was engaged by the Republic Coal Mining Company of Aurora Springs, Miller County, Missouri, as Engineer in charge of operations connected with the opening up of their coal mine. The data in this report was never submitted to the owners of the property, because of a request from them that the work of opening up be pushed as rapidly as possible, and mine be put in condition to ship coal; and because the data embraced facts already known to the management, who were determined to open the property regardless of the evidence against the existence of a large deposit of coal. Mr. John A. Gallagher, the State Geologist, had condemned the property, stating that it was a pocket of about two h undred and fifty feet in length; but his report was regarded as without foundation, and the decision made to open the property.

The Mine is located in Miller County, Missouri, north of the Osage River and three miles west of Aurora Springs, on a side hill immediately to the south of the water-shed dividing the drainage of the country, between the Missouri and the

Osage Rivers. About 1892, a shaft was sunk near the outcrop of coal, about thirty feet deep, and the vein followed into the hill for about one hundred and fifty feet, and several rooms worked out to the north and south. The Republic Coal Company drove an open cut into the hill from a point one hundred and fifty feet east of the old shaft, striking the vein at the bottom of this shaft, and followed up the old workings with the intention of hauling the coal out of the cut, and dumping into shipping cars at its mouth.

This work having been done, it was a comparatively easy matter to trace the vein and study the formation above and below.

Sketch Number One shows the correct position of the vein, and illustrates the pockety nature of the deposit.

The dip is 47° for about eighty feet into the hill, then horizontal for about fifty feet, then 38° up toward the surface, and without doubt to its outcrop.

Sketch Number Two shows the thickness of the coal and strata immediately above and below. At the time of this examination, the old workings were partly submerged in water, but this

was siphoned out and the inclination of the coal to the horizon was found to be approximately the same at all points of the compass, so that the vein had no strike, but formed a cup, or saucer, which measured about three hundred feet across from outcrop to outcrop.

The roof was a treacherous shale, water-logged and easily disintegrated by the air. The bands of slate, or shale, between the different layers of coal was compact and hard to mine, containing many large streaks of pyrites and greatly injured the coal from a mining standpoint.

Magnesian limestone formed the bed of the coal, and innumerable fossils were found above and below the vein. There were no "faults" in the coal and but one small "slip", the latter just east of the old shaft and easliy seen in the side of the open cut.

To the west of this deposit, the country is dotted with small, isolated pockets of coal. Lead and zinc are also found in the same region, but only in small deposits.

As mentioned in the first page of this paper, the deposit was situated on a side hill,

the crest of which divided the drainage system of the surrounding country. To the north was an undulating prairie land of rich surface soil, beneath which was a layer of cemented conglomerate, or hard-pan, varying in thickness from three to six feet. To the south were the heavily timbered hills of the Ozark Range. In following up the ravines and creek beds of this region, several outcroppings of coal and thin seams were found, always in magnesian limestone and capped with shale. Near the property under examination, was found a vein of coal twelve inches thick at the outcrop dipping into the hill and approximately fifty below the bottom of the vein being developed. This second vein was in a ravine, outcropped about three hundred feet from the old shaft, and formed the basis for the hopes of the owners, to strike a large deposit.

This vein was followed along the outcrop for about one hundred feet, when it disappeared. It pitched up from the center in exactly the same manner the upper one did, and without doubt was of the same pockety nature.

No deposit of any gre at length, or

Breadth or depth had ever been found or worked in this region, though numerous banks, or pockets, of coal had been worked, and the product used for local consumption.

Near Versailles, in Morgan County, a deposit seventy feet thick, called the Stover Bank, was worked, but the pockety nature of the occurrence was well defined.

There were absolutely no conditions favorable to the existence of a large quantity or extensive bed of coal in or near the Republic Coal Mining Company's property, and this fact made it the duty of the Engineer in the subsequent development work, to employ the cheapest possible methods of construction. This policy was pursued independently by the Engineer, in the belief that the small pocket of coal would not warrant extensive and costly improvements.

The Bagnell Branch of the Missouri Pacific Railway is, by a located and subsequently constructed railroad spur, eight thousand one hundred and fifty feet from the open cut at outcrop of coal, and of such an elevation that it was impossible to get down with the 2% maximum grade

to less than fifty feet above the bottom of the coal, and it was decided to elevate the coal from the Mine with a Link Belt Flight Conveyer, and this method of hoisting was installed.

The construction of the spur was undertaken, and after innumerable difficulties and delays, completed in six months.

The quantities for the construction of this spur, together with Twelve hundred feet of siding were as follows:

Total Excavation 13,337 cu. yds.

Total Embankment 11,050 cu. yds.

Classified as follows:

Earth	9,420 cu. yds. at 10¢	$942.00
Hardpan	3,465 cu. yds. at 25¢	866.25
Solid Rock	452 cu. yds. at 50¢	226.00
Embankment	11,050 cu. yds. at 8¢	884.00
18" Culvert Pipe	110' at 80¢ per ft. in place	88.00
24" " "	210' at $1.75 " " " "	367.50
1 Double -track Trestle	100 ' long	385.00
	Total	$3785.75

The installation of the Conveyer was preceded by sinking a pit in the mine for the hopper, tipple and mine scale, and this difficult and exceedingly dangerous undertaking was accomplished after five months of arduous labor, working day and night shifts, with many cave-ins and roof-falls, one of which nearly cost the writer his life.

Water was struck in sinking this pit, and constand pumping wasnecessary to keep the work going. The pit was sunk in tough, heavy shale, and shot with dynamite, powder being too slow of action, and failed to break the shale in workable pieces.

Upon the completion of the hopper pit, the upper end of the Conveyer and half the body had been installed, and was then carried down with the dip of the coal to the hopper end. The frame work for the Conveyer was built of solid white oak timber, sawed in local mills, and all important frame pieces were mortised together to withstand the vibrations of the Conveyer, when in operation.

As the Conveyer was built into the Mine, the temporary timbering of the mine roof was re-enforced with permanent 12" round oak posts, capped with 12x12" collar. All mine timbers were placed independent of the

Conveyer, to avoid any direct transmission of vibration.

A mine scale was hung on 12 x 12" oak timbersjust behind the tipple, and so arranged that the coal could be weighed, dumped into the hopper, and the empty cars run ahead through a cross-cut to the working face.

A small Apron Conveyer in the bottom of the hopper fed the coal into the main Conveyer, which arried it at an inclination of 47° to a screen at the upper end, where it was sized into nut and lump, and delivered direct into the shipping cars.

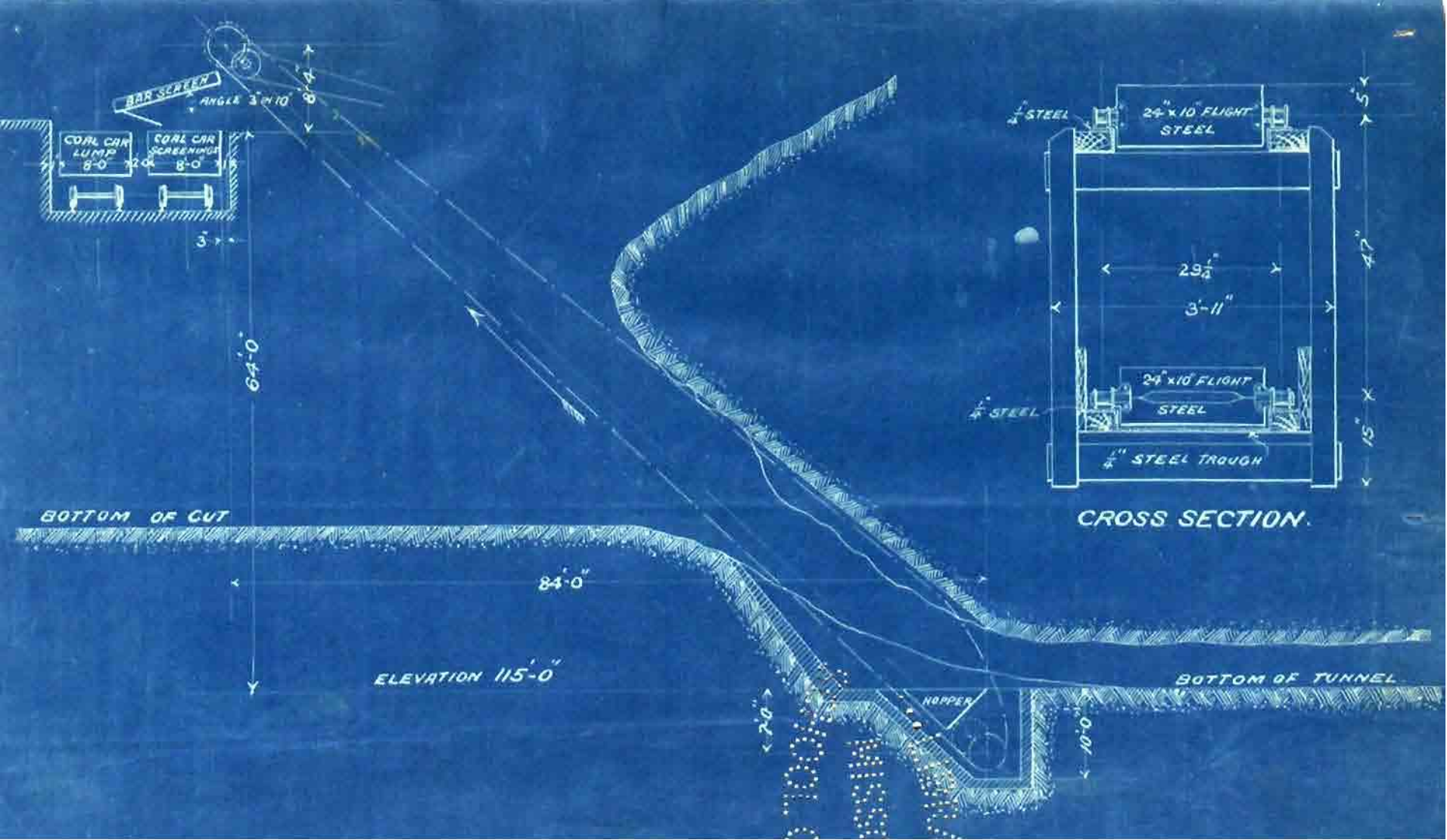
A dead rail track scale was built on a siding on the end of a spur at the Missouri Pacific Railway, where the coal was weighed, and the cars pushed ahead on a siding to await shipment over the Missouri Pacific Railway, to Jefferson City, Missouri, where coal was delivered under contract to the Missouri Penitentiary, and where it was found to be an excellent boiler and heating coal.

A dam thrown across a ravine served to collect enough water to run the boiler for the Conveyer engine, and also supplied the Company's locomotive. This dam contained 5,225 cubic yards of clean earth, and, though built on a rocky bottom, was, with the exception of a small quantity of seepage water, very efficient.

When the first car load of coal was taken from the mine, and weighed up on the Company's scale, the writer's contract with the Company expired. Three months after the first shipment, the mine shut down from lack of coal. The vein pitched on all sides to the surface, and diamond drill cores failed to show the existence of the much hoped for lower vein.

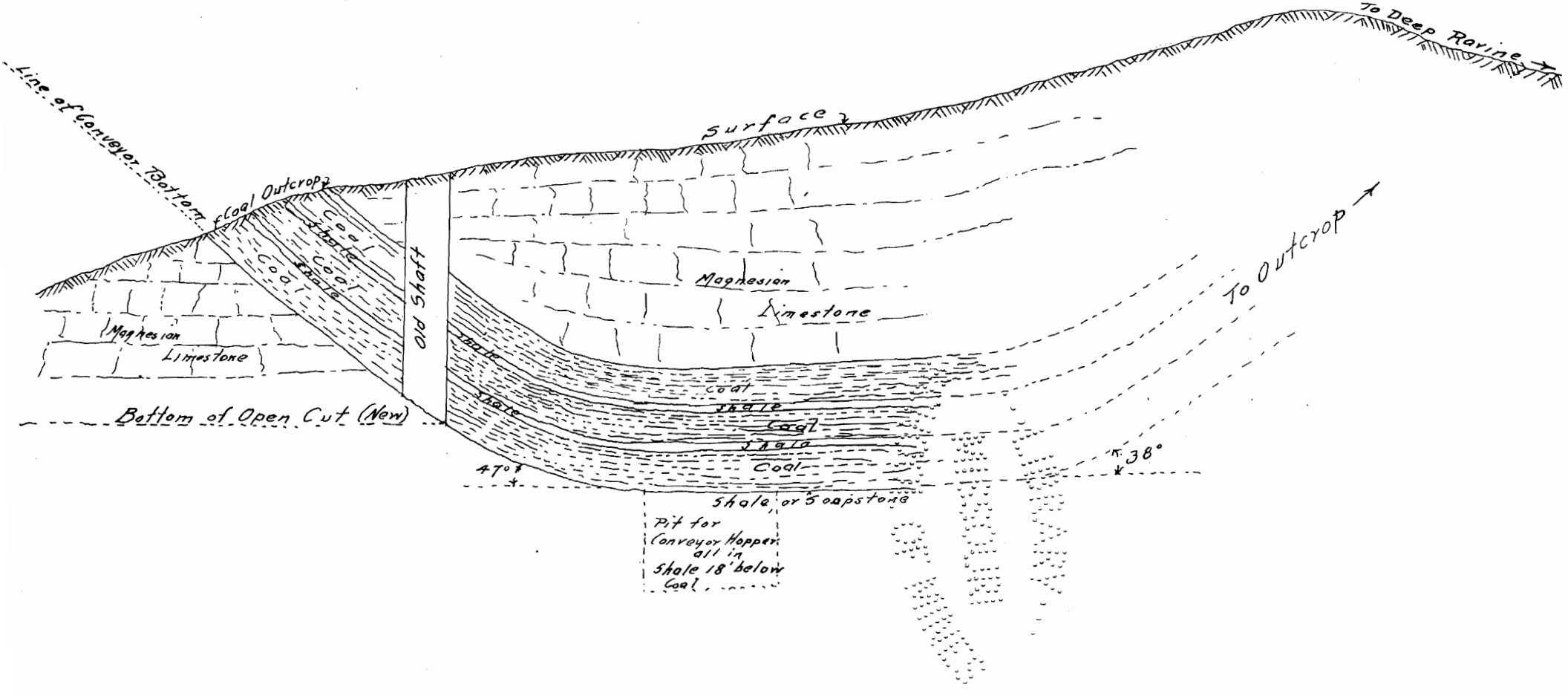
Subsequently, the property was abandoned, the railroad spur removed, and all machinery shipped to another, and it is hoped, a better field.

The accompanying blue print is a sketch, showing the relative position of the Conveyer and mine, and a small scale general cross-section of the Link Belt Flight Conveyer, which proved to be an excellent coal-hoisting machine. Its capacity of one ton per minute was appreciably reduced by the necessary increase of the angle of inclination from 40° to 47°. This increase was made to avoid brushing the bad roof of the Mine.


BAR SCREEN
ANGLE 3"x10"
8'-0"
COAL CAR LUMP 8'-0"
COAL CAR SCREENINGS 8'-0"
3'
64'-0"
BOTTOM OF CUT
84'-0"
ELEVATION 115'-0"
HOPPER
20'-0"
11'-0"
BOTTOM OF TUNNEL
24"x10" FLIGHT STEEL
24"x10" FLIGHT STEEL
STEEL
STEEL
STEEL TROUGH
29 1/2"
3'-11"
5"
47"
15"
CROSS SECTION.

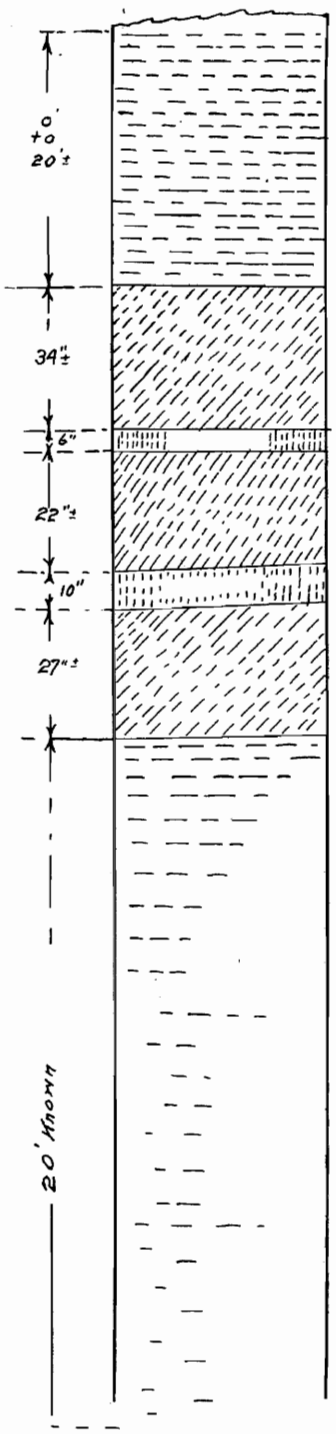
Sketch No 1

Showing Mode of Occurrence of Coal



Sketch No 2

Showing thickness of Coal & Shale



Shale, Fossils & Clay

Bituminous Coal

Band of Slate or Shale

Bituminous Coal

Band of Slate or Shale & Pyrites

Bituminous Coal

Shale or Slate With Pyrites (For 20' below lowest vein of Coal. this shale found in sinking for Hopper Pit. It is known locally as "Slickensides" because of its greasy talc like appearance.)