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ATHENS MINE:

Few changes or installations worthy of note have occured at the Athens Mine during the year. The regular routine of maintenance and repair has been carried on. For the last several years the rope speed of the skip hoist has been changed several tiies on account of the condition of the shaft, this speed was set at 1475 feet per minute, on January 4,1947 and continued without furtheradjustment. Delays in hoisting have not been of a serious nature, one occurred January 23 while repairs were made to a field rheostat, 12 P.M. to 3 A.M. The failure of a disconnecting switch occured on June 7 causing a shutdown of the entire mine from 10:30 A.M. to 12 Noon. The interruption on August 12was of a short duration and was caused by lightning blowing a fuse and burning off a transformer lead on the cage hoist panel. The large bearings on the skip hoist M. G. set overheated on August 30 and interrupted ore hoisting for 2 hours, this difficulty was attributed to low water circulation in the cooling coils of the oil tank. Arrangements were made for increasing water circulation to keep the oil temperature down.

The armature of the G. E. D.C. generator for excitation of the rotor field of the synchronons motor of the Ingersoll - Rand compressor failed October 12. A spare armature was taken from the electric shop to replace the burned out equipment and the necessary material ordered for a complete rewind of the armature.

After some difficulty with lighting and power transformers for the engine house, several changes were made, and two larger transformers from he Maas, Park street surface well set-up were taken to the engine house to replace the 5 and 7 ½ KVA size. One of the smaller transformers were then taken to the Lloyd mine winze sinking job and the other to Mather B for engine house lighting and 220 Volt power for compressor water circulating pump.

CAMBRIA JACKSON:

A fire occured at the hoist grids and cables on January 8. Hot grids set fire to wooden cable supports on top of the grid bank, which burned a portion of the wood and the insulation on the secondary cables. In order to prevent a reoccurance of this difficulty the cables have been clamped a greater distance from the grids. After some difficulty in operating with breaks to ground in the grid circuit, several sections were repaired which restored normal operations.

Several changes were made in surface wiring and distributions transformers in line with power requirements and changes necessary for the new shops. Two 37 ½ KVA, 2300 - 220/110 volt transformers located in he engine house basement to supply power for the pump in No. 1 shaft were put on a platform back of the dry house. From this point these transformers will supply light and power to the dry house, ofice and new shops through underground cables. The two 10 K.V.A. and one 7 ½ K.V.A. Transformer formerly used for the dry house and office lights and power were set up in the engine house basement to replace the larger bank for power supply to the No. 1 shaft pump and top tram lighting.

The machinery was moved from the old shop building into the new building and all cables and connections completed for individual motor drive.

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CAMBRIA JACKSON: (Continued)

In line with changes in the shaft house and trestle tracks for two car operation, the change from overhead rail to 4/0 trolley has also been made.

The installation of the electrical equipment bought from the Holmes mine with the 150 H.P. motor and Prescott pump has been completed in the 7th level pump station.

Some changes have also been made in the D.C, Haulage equipment including the panels in the engine house for parallel operation of the two 150 KW. generators and the removal of two D.C. circuit breakers and the installation of a larger breaker bought from the G. E. Co. which is now operating with and overload protective setting of 1600 amperes.

CLIFFS SHAFT:

Our report on the hoisting equipment for A and B shaft is not encouraging , the rotor and band-wires of these 750 HP. motors have had careful inspection for the past year with the hope that we might operate without expensive delays. These motors were taken apart for minor repairs on April 13 and April 20, after which good results were obtained until June 27 when a failure of rotor connections occured in A shaft motor with a delay of 4 ½ hours.

An attempt was made to correct the band wire troubles on A shaft motor November 2 when a double band 3 ½" wide of #12 steel wire was put on under the supervision of Mr. Sillman of the Westinghouse Electric Mfg. Co. The first layer of the band was put on with a 350 lb. strain and the top layer about 180 lbs. This band was cut off when the insulation failed on the coils of the rotor after about 8 weeks of operation. The motor is now running with a patch insulation on 2 coils and 2 coils cut out of the rotor circuit with 2 coils cut out of the stator.

Haulage locomotive No. G - 110 - 087 was rebuilt in the general shops during the year.

Pumping equipment, compressors, tram moters, etc. have had routine repairs during the year.

LLOYD MINE:

The outstanding job at the Lloyd mine during the year was the sinking of the winze from the 8 to the 9 level. Installation of 2000 ft of #2 - 3 conductor 2500 volt cable for power supply from the 5 level to the location of the hoist at the 8 level was made in July. Cable fittings and a subway box were taken from the Princeton Mine, the switch panel primary and secondary control panels, controller and control transformer formerly used with the Maas mine 5level hoist were taken to the Lloyd Mine winze hoist. The 200 H.P. 435 R.P.M. 2200 volt slip ring motor from the Princeton Mine skip hoist was installed with the hoist. This is G.E. Motor serial No. 547569, the object No. is C-1-117-372.

The failure of the 50 H.P. motor and starting compensator for the water supply pump for the North Lake location occured during a lightning storm. This pump is located in the basement of the Morris Mine engin house and is connected to the 2300 volt bus which also feeds their skip hoist. It was therefore nec necessary to cut the line and provide disconnecting fuse blocks for compensator repairs. A spare motor is now used while the regular motor is being rewound.

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MAAS MINE:

Only minor repairs have been made to motors and controlls of the hoisting equipment during the year.

The Synchronons motor of #2 compressor is still operating with seven coils cut out of the stator winding. This motor winding is in bad condition and will require a complete rewind with an extended shut down when the break occurs. The spare exciter armature was put into the generator for No. 2 compressor after the failure of the commutator insulation. This armature is in the shops for repairs.

The haulage equipment is in need of some extensive changes, especially in the shaft cable layout. The D.C. load is increasing and the distance is greater since the development of the 6th level. One of the 500 ampere D.C. circuit breakers on the haulage distribution panel burned and was scrapped, to replace this equipment a 1200 amper breaker was taken from the Negaunee Mine Westinghouse haulage set.

Several changes in lines and cables were made near east side of the engine house to make way for the fill or ramp to the entrance. In order to get away from overhead 2300 Volt lines to eht surface pump and top tram, an underground installation of 3 conductor #6 cables was made. The surface lighting lines were raised for clearance, several 3" conduits were also placed in the fill for proposed cable changes.

The 2500 Volt 3 conductor cable for power supply at the Maas crusher plant failed during a lightning storm. The cable was disconnected to permit operation of the surface pumps and later replaced with a new #4 - 3 conductor cable.

Splicing and repairing of the #1 2300 Volt shaft cable was completed in January, Connections were again made for its operation in parallel with No's. 2 & 3 cables. This is the oldest 2300 Volt cable at the mine and has four patches. It was purchased in Germany in 1912.

Several changes were made in the pumping equipment during the year. The 250 H.P. Goulds centrifugal pump recently taken out of the main pump station at Cliff Shaft Mine and shipped to Spies, was taken to the Maas Mine 5th level with the 250 H.P. Westinghouse motor and line starting equipment for pumping from the 5th level to the 3rd level.

The 50 H.P. 2300 Volt Cutler-Hammer contactor formerly used with the south top tram was sent to the 6th level to be used as a contactor for float switch operation of the plunger pump installed near the winze for pumping to the 5th level. The 50 H.P. motor NO. C-2-117-374 from the Princeton Mine with a K-20 oil switch were also taken to the 6th level for this job.

Several coil connections on the rotor of the 400 H.P. Allis-Chalmers centrifugal pump motor failed and tied up this pump for almost one month during October.

MATHER A MINE:

After the difficulty with top trams cars at the Mather Mine one of the Princeton Mine 6 Ton locomotives was rebuilt in the general shop for 42" guage for emergency use on the top tram. The object No. of this locomotive is C-1-110-063. Another Princeton locomotive bearingnobject No. F-4-110-001 was rebuilt in the shops and taken underground at the Mather Mine.

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MATHER A MINE: (Continued)

When the water difficulty occured a number of changes were made requiring the movement of motors and starters for pump. A 75 H.P. Allis-Chalmers motor with a G.E. starting compensator was taken from the Cambria-Jackson Mine with a 600 G.P.M. centrifugal pump No. 13-8-138-268. Pump No. C-4-138-192, 500 G.P.M. and 185 ft. head with 30 H.P. motor No. C-4-117-389, was taken from Gwinn district storage. Pump No. C-138-266 with 100 H.P. motor No. C-7-037-572 with a 60 ampere K20 oil switch from the Gwinn district. Motor No. B-1-117-144 formerly used with the 5th level centrifugal pump at the Maas Mine was sent to the Mather Mine for use in case the above 100 H.P. motor No. C-7-117-377 failed.

The Mather Mine Bucyrus-Erie 120-B shovel was moved from Negaunee Mine the the Mather Mine with 1000ft. #4 - 3 conductor tirex cable before the loading season.

The 100 K.W. rotary converter from the Princeton Mine with its transformers and other equipment was installed in the engine house basement for emergency use after some difficulty with the rotor of the synchronons motor of the Westinghouse M.G. set for the surface supply of 250 Volt D.C. power.

Some delay in hoisting occured on account of burning of oil and collection of carbon in the risers of one of the armatures of the skip hoist M.G. set. After a thorough cleaning for several hours it was learned that little damage was done to the insulation and operations went on as usual. A spare armature of this type to be interchangeable with all skip and cage hoist D.C. motors and generators has been ordered from the G.E. Co. with delivery in about 20 months. This order was placed in the month of May 1947.

MATHER B MINE:

Most of the electrical equipment for the shaft sinking job was picked up at the other mines. The 400 H.P. slip ring motor, control panels, master controller, grids, and oil circuit breaker for use with the main hoist were taken from the Princeton Mine cage hoist.

The electrical equipment for the 325 H.P. Nordberg compressor recently moved to this job from the Princeton was also taken with the compressor, including the D.c. generator (exciter), starting compensator switches, panels and meters.

Circulating water pump for cooling water were also brought from the Princeton Mine with their 10 K.V.A. 2300 to 440/220 Volt transformers for low voltage power in engine house and surface.

Electrical equipment consisting of one K20 oil circuit breaker and a set of control grids from the prinston Mine, a 35 H.P. wound rotor motor from the Lloyd Mine 7th level hoist and a controller from the Lake Mine storage was taken to the Mather B for installation on the small hoist in the engine house to be used on the vent pipe job for the main shaft.

NEGAUNEE MINE:

No important changes were made in the hoisting equipment during the year. The speed of the skip hoist was checked in the month of August at 52 R.P.M. A rope speed of 1300 F.P.M. and continues to operate at that speed. The commutators of the skip and cage hoists generators were turned and the motor generator sets given their routine cleaning and painting.

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NEGAUNEE MINE: (Continued)

Air compressor difficulties at this mine during the year have been largely confined to the synchronons motor of the Ingersoll Rand compressor, After the first failure in the stator winding which required cutting out two coils, several failures have occured resulting in seven coils being cut out. A complete rewind is necessary and arrangements are now being made to tie the Athens air lines to the Negaunee Mine in an attempt to supply air to both mines with three compressors while repairs are made.

The maintenance and repair of the D.C. Haulage equipment has been routine other that the 150 KW Westinghouse generator of the old M.G. set which failed in July. The coils of the armature spread out of the slots and the equalizer connections are in bad condition. Due to the age and general condition of the machine, the cost of reconditioning would be extremely high. It was therefore decided to scrap the set and run the Negaunee Mine haulage with the 250 K.W. M.G. set. Since the power requirements is much lower with the present operations, this does however leave the Negaunee Mine without a spare haulage MG set.

SPIES MINE:

No extensive changes or repairs have been made to the electrical equipment of hoists or compressors at this mine during the year.

In order to increase the carrying capacity and improve the D.C. voltage capacity of the underground haulage system, a 4/0 cable from the Princeton Mine has been installed in the shaft from surface to the 4th level, As soon as the necessary cable is available, the extension will be completed to the engine house providing two 4/0 cables in paralleel from the engine house to the 4th level.

The G.E. L.M.-2T6-LL locomotive taken from the LLoyd Mine and repaired. in the general shop, was sent to the Spies Mine to be used on their bottom level.

The 3-50 KVA transformer for the air shaft are now connedted and supplying 440 Volt power for the 25 H.P. blower at the collar of the shaft and one 40 H.P. pump at the bottom.