

Waste & Water
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verted from a murky, contaminated condition to clear, pure drinking water. In this process, such chemicals are added as lime — to control acidity; alum — as a flocculating agent which helps remove the solids by combining them; carbon — to remove tastes and odors; calgon — for corrosion control; and chlorine, which is added at the beginning and at the end of the process to purify the water.

It takes about two hours and 20 minutes to convert dirty water to pure water, according to engineer helper James H. Runyon, who guided our

tour of the Grace Mine water system.

Industrial Water
Much of the firm's industrial water comes from a 60-million-gallon-capacity mill pond fed by Back Creek. A diversion dam on Back Creek was completed last year. By siphoning water from the pond, the main flow of the creek is diverted around the plant and mine at the rate of 600 gallons per minute through submerged pipes into the large central mill pond; the overflow from the pond continues Back Creek. By diverting the water around its facilities in this way, the company eliminates any future possibility

of Back Creek flooding the mine.

Water uncovered in the course of the mining operation from underground streams is pumped out at 800-1000 gallons per minute. This joins with the industrial waste water, from which the solids have been removed, and is recirculated to the mill and pellet plants.

HANDLING WASTE WATER

Wastes are divided into two categories at Grace Mine, and each is handled separately. These are domestic and industrial wastes.

Domestic

Domestic waste is carried through soil pipes to a special flume (channel) where the flow is measured, then into an aeration tank. From the tank it flows into an aero accelerator for clearing; then the effluent travels to a "dosing tank"; to slow, sand filter beds; to a chlorine contact chamber—and finally,

the water is discharged in purified form to the mill pond, and then to Back Creek at an average rate of 50 gallons per minute.

Industrial

Industrial wastes involve a far greater volume, but less complicated treatment.

The main contaminant in the industrial waste water is "tailings," the fine stone residues from the milling and pelleting processes. This material is washed through a collecting sump, and distributed through two, 200-foot-long clarifiers. In the process, most of the solids settle out. The clear effluent is channeled to a second sump and is recirculated for use in the plant and mill. Water from the mine also comes into the recirculating sump and becomes usable.

The solids, mentioned above, make up 10-15 percent of the industrial waste water. They collect in two,

large, round settling — or thickening — tanks. Long rotating "rakes" continually sweep the solids toward the center of the tank. From there, they drop through a hole, and are transported to the tailings sump; and then the material (now 25-30 percent solids) is washed through three miles of pipe to the tailings dam where it is discharged into a large earthen holding basin.

Water in this basin discharges by seepage and through an underdrain, at the rate of 500 gallons per minute, into Hay Creek which flows eventually into the Schuylkill River, Runyon said.

These complex facilities were a lot to see in a few short hours, but under Runyon's expert guidance we were able to get an overall impression of how a large company handles its waste

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RECIRCULATING SUMP — after solids are removed from industrial waste water, the water is recirculated through this sump and returned to the plant for use. Ground water pumped from the Grace Mine also passes through this sump. Any overflow runs into the mill pond for future use. L. F. Photo

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