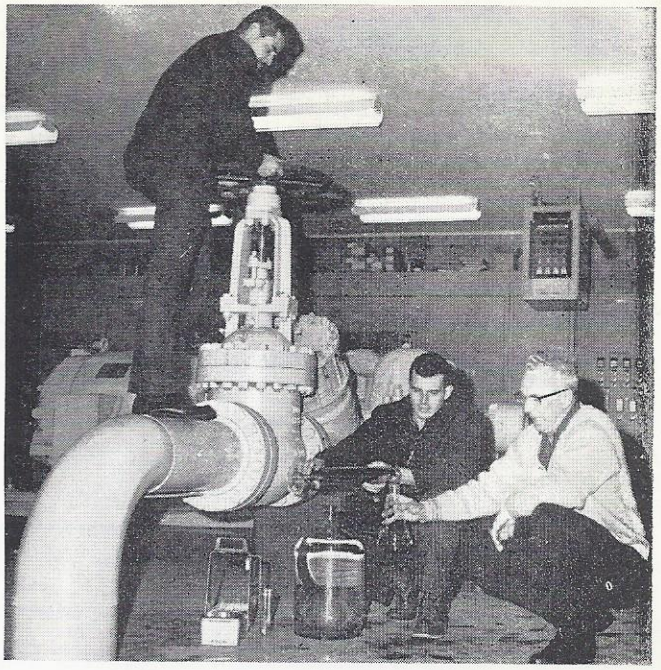

Robert Sondag, at left, opens the valve to start the flow of reclaimed wastewater to the new Indian Creek Reservoir while Robert Chapman and Russell Culp draw a sample to test effluent quality.

By Bob Wakeman*

New Lake At South Lake Tahoe, California

□ A new man-made lake began filling up recently in the Diamond Valley area of Alpine County, California, across 7,735 ft of the Luther Pass in the High Sierras. The water is reclaimed wastewater produced by a new treatment facility which pollution control authorities have rated as the world's most advanced waste treatment plant.

The project is the culmination of an eight year program of the South Tahoe Public Utility District (PUD) to preserve the beauty of the crystal-clear Lake Tahoe. By removing the threat of possible euthrophication by algal-feeding nutrients from the booming resort and recreational developments around the Lake's south shore this goal was realized.

The treatment facility, embodying several technological advances, treats sewage collected from an area of some 20 sq mi around the south shore. At a cost of $8.1 million to design and construct, the system will handle 7.5 mgd, a capacity sufficient to serve a city of 100,000 population.

The water is exported through a 27 mi pipeline to the reservoir site created by a rock-fill dam on a dry tributary of Indian Creek. To get the water out of the Tahoe Basin a battery of three pumps with a combined capacity of 2400 hp lifts the water from 6,500 ft elevation at the plant to 7,735 ft elevation at the summit of Luther Pass, a vertical rise of 1,235 ft.

The process starts with primary and secondary treatment of sewage, considered a completely adequate treatment of sewage which removes around 90 percent of the solids and biochemical oxygen demand (BOD).

The first step in the advanced treatment of the secondary plant effluent is chemical clarification in which lime is added as a coagulant in the clarifier. The effluent then is filtered through a battery of six high-rate pressure filters in which special filter media, composed of coal, sand, and garnet, efficiently remove all remaining suspended material.

The filtered product receives more purification in eight columns of activated carbon. The result is a high quality water with pollutants such as ABS, solids, phosphate, and BOD small enough to be measured in terms of less than 1.0 mg/l.

Table 1: Overall Efficiency of Treatment.

Quality Parameter	Raw Waste Water Influent	Activated Sludge Plant Effluent	Water Reclamation Plant Separation Bed Effluent	Water Reclamation Plant Chlorinated Carbon Column Effluent
Biochemical Oxygen Demand, mg/1	200-400	20-40	under 1	under 1
Chemical Oxygen Demand, mg/1	400-600	80-160	30-60	3-16
Total Organic Carbon, mg/1	.....	.....	10-18	1-6
Suspended Solids mg/1	160-350	5-20	under 0.5	under 0.5
Turbidity, units	50-150	30-70	0.5-3.0	under 0.5
Phosphates, mg/1	15-35	25-30	0.1-1.0	0.1-1.0
ABS, mg/1	2-4	1.1-2.9	1.1-2.9	0.002-0.5
Coliform Bacteria MPN/100 ml.	15,000,000	150,000	15	under 2.2
Color, units	high	high	10-30	colorless
Odor	odor	odor	odor	odorless

*Chairman, Public Information Committee, South Tahoe Public Utility District, South Lake Tahoe, California.

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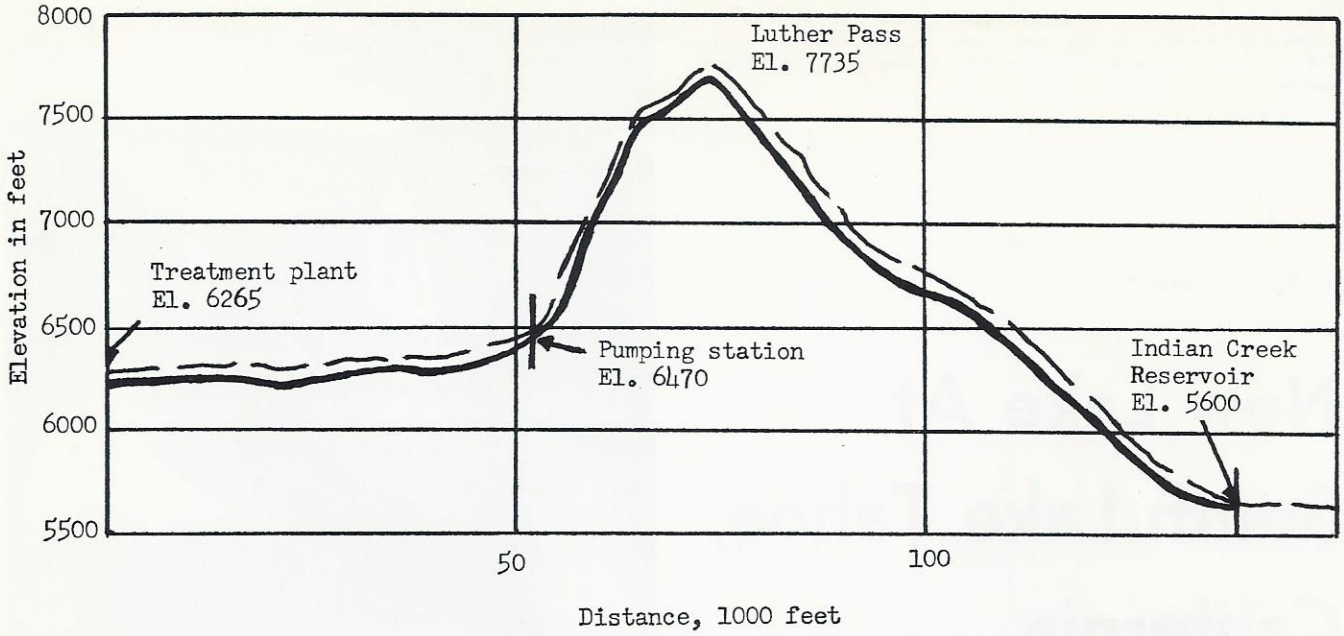

Diagram shows elevation over which water must be pumped from treatment facility through pipelines to reservoir.

Use of lime as a coagulant also raises the pH up to about 11. Preparation of the water for nitrogen removal is accomplished by pumping it through a cooling tower. Here ammonia nitrogen is stripped from the water and discharged into the atmosphere as gas. Up to 95 percent of the total nitrogen is removed. Recarbonation to reduce the pH to 8.5 is accomplished by introducing carbon dioxide obtained from furnace stack gases.

Disposal of the biological sludge from the primary and secondary treatment units is accomplished by burning it in a multiple-stage incinerator. Dewatered to about 25 percent solids, by an air flotation thickener and a solid bowl centrifugal, the sludge incinerator is partially self-sustaining and only supplemental fuel is needed.

Most of the phosphates removed by the treatment process are contained in the lime sludge. Removal of the phosphates is accomplished by feeding about 25 percent of the lime sludge into the primary treatment tanks where it is drawn off with the biological sludge and fed into the sludge incinerator. The final residue is an insoluble rock phosphate in the incinerator ash.

The new facility is being cited as "Demonstration Model" for the nation's water pollution control effort. Of $8.1 million cost, $4,876,750 was met by federal grant funds including a $1 million research and development grant from the Federal Water Pollution Control Administration. The remainder of the financing was provided by state loan funds of $1,470,000 and District funds of $1,780,000.

Along with the treatment and export projects the District also has expanded its sewage collection system to more than three times its original 2.5 mgd capacity. This work is being done under 12 separate contracts with a total cost of some $10.8 million. By the end of 1968 the entire south shore region of Lake Tahoe will be served by a sewer system and all effluent will be exported from the Basin as reclaimed water. ■

Indian Creek Reservoir, man-made lake created from reclaimed waste water.