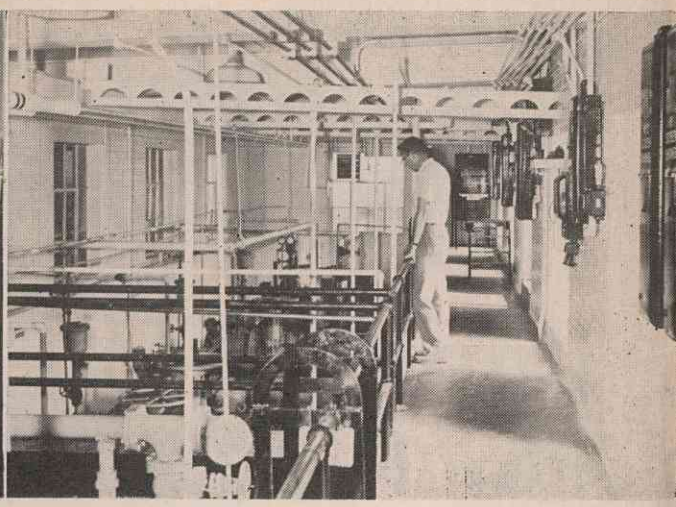
Harold Misenheimer is shown checking the water of number four filter bed at the sampling table. Water is on tap for instant testing on all stages of water treatment.



Gene Stepp checks the motors at the river pump house. Water is pumped directly from Davidson River to the Filter Plant.

Plant, one of the largest in the South, having a normal rated capacity of 20 million gallons per day with a possible maximum of 25 million. To date, the maximum filtered in one day has been 23 million gallons.

Water from Davidson River is pumped to the Filter Plant by five large centrifugal pumps in the river pump house. As raw water enters the filtration plant, alum and hydrated lime are added for flocculation, and anhydrous amonia and chlorine for sterilization. These chemicals are added directly into the incoming pipe line, and in amounts determined by jar tests made on the river water. All chemicals combined amount to around 500 tons per year, which gives an idea of the magnitude of the operation involved.

After the chemicals have been added, the treated water passes through the mixing basins where it is mixed throughly by flowing up and down through a series of horizontal baffles. This mixing aids and hastens the chemical reaction to form the floc. By the time the water reaches the end of the mixing basins, which takes approximately 30 minutes, the floc is usually well formed and is ready to proceed to the coagulation or settling basins.

These basins are used to permit sedimentation of the coagulated water, and to enable the coagulation process to be completed in case this has not been accomplished thoroughly in the mixing basins. At the end of the settling basins the top layer of the water is skimmed off, and then allowed to flow into the filter beds.

In the filtering operation the water passes through the sand and gravel beds from top to bottom by gravity. Normal filteration rate per bed of 1250 gallons each minute or 1,800,000 gallons a day.

As the water passes through the bed, a mat is formed on the top of the sand, frequently referred to as a "schmutz decke" which is the German expression for "dirt cover." This mat serves as the main filtering agent of the bed and prevents deep penetration of the sand by the floc. As the filtration process continues, this mat increases in thickness, which in turn increases the resistance to the flow of water through the bed. When this resistance, which is technically called loss of head, reaches 7 feet, the bed must be washed to restore its effectiveness. The frequency of wash depends upon the quality of water entering the bed and may vary anywhere from 20 to 230 hours.

The effluent from the filter beds, which is referred to as filtered water, is free of all impurities and bacteria. It has no color or taste.

The filtered water flows into underground collection basins or clear wells, where it is treated to meet process specifications. From there it is pumped into reservoirs and then to the mill.

A fully equipped laboratory is provided at the Filter Plant where all control and analytical tests including bacteriological examinations are made. Tests are made regularly on water in all stages of purification and on boiler feed water, steam and return condensation. Unrelated to water but of major importance are the quality control tests made here for ash, moisture and heat content of the coal used in the boiler. Around 250 tests of all kinds are made each 24 hours.

To facilitate the overall operation, a central con-