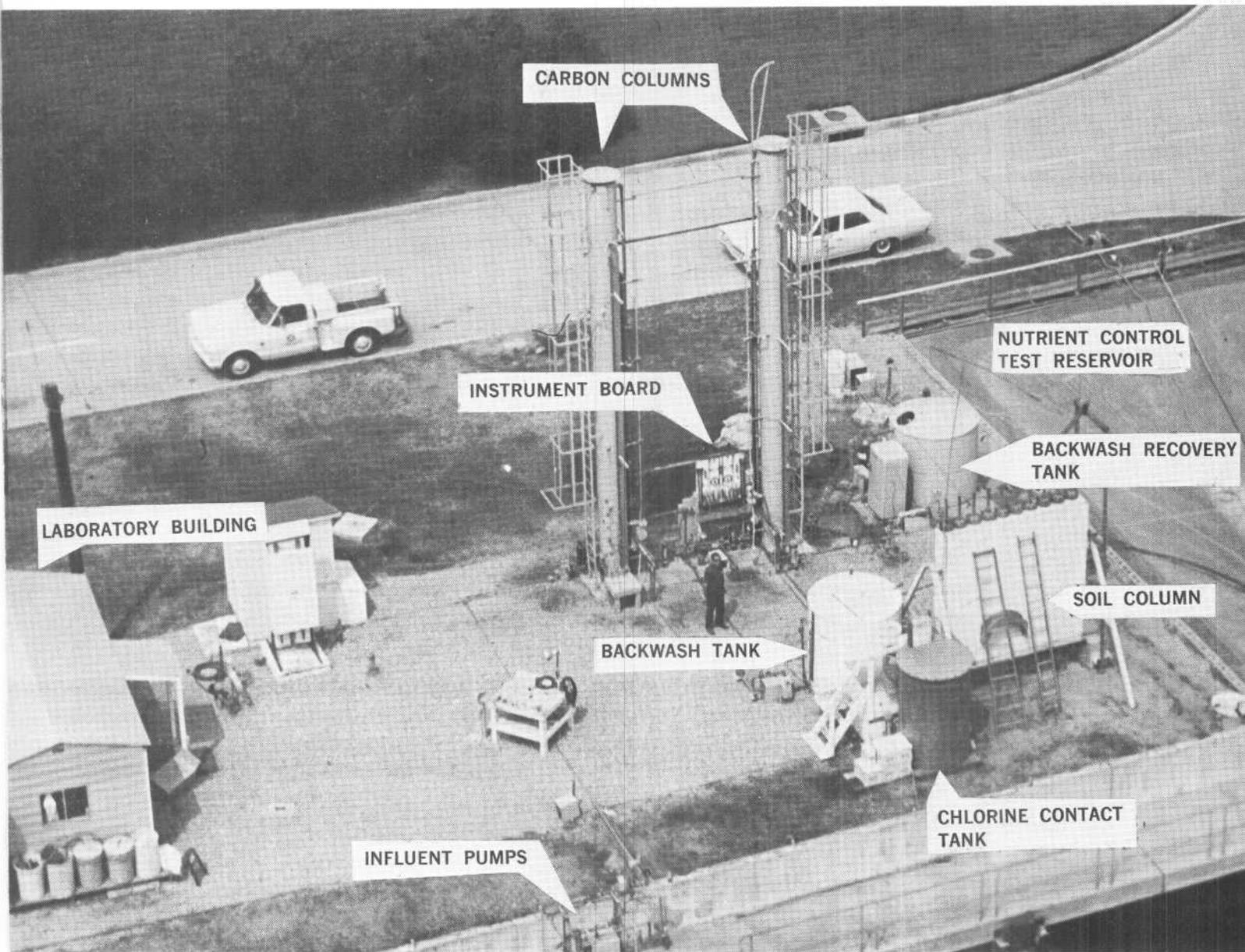


Water Reclamation for Los Angeles



HYPERION PILOT PLANT

Los Angeles



Department of Water and Power

Reclaimed Water: Possible Seawater Intrusion Barrier

HYPERION PILOT PLANT

The Los Angeles Department of Water and Power has constructed and operates an experimental pilot plant at the City's Hyperion Treatment Plant in Playa del Rey. Data developed from this pilot plant is being used to prepare cost estimates and to establish design criteria for a full-size plant.

The 15,000 GPD pilot plant uses activated carbon to provide tertiary treatment of the activated sludge effluent from the Hyperion Treatment Plant, providing a water suitable for direct injection into the ground through recharge wells. This injection water would meet drinking water standards.

If the pilot plant demonstrates favorable cost and operational data, the DWP is considering construction of a 5 MGD demonstration plant as the first module of an ultimate 50 MGD facility. The product water would be used as a replacement for imported fresh water now being used to halt the intrusion of seawater into the West Basin.

The 50 MGD of reclaimed water would be injected by the Los Angeles County Flood Control District into numerous 12-inch perforated columnar wells 400-750 feet deep, located about 500 feet apart along the coast line. These wells, extending nine miles from Los Angeles International Airport to the Palos Verdes peninsula, are presently supplied by water from the Metropolitan Water District. In determining the extent of seawater intrusion, conductance tests are used. These tests can determine the absence or presence of salt or fresh water in the groundwater along the coast.

PROGRESSIVE STEPS

There are three major features in the experimental project — carbon columns, soil columns, and nutrient test reservoir.

Secondary effluent, waste water that has been completely processed through the Hyperion Treatment Plant, is pumped to the top of the first carbon column at the rate of 11 GPM. The carbon columns are 24-inch cement-lined steel pipe 30 feet

in height containing 13½ feet of activated carbon. After passing through the first column by gravity flow, the water is pumped to the top of a second column identical in construction. After passing through the second column, the water has travelled through 27 feet of activated carbon where the filter action of the carbon has removed suspended matter, and where organic substances are adsorbed.

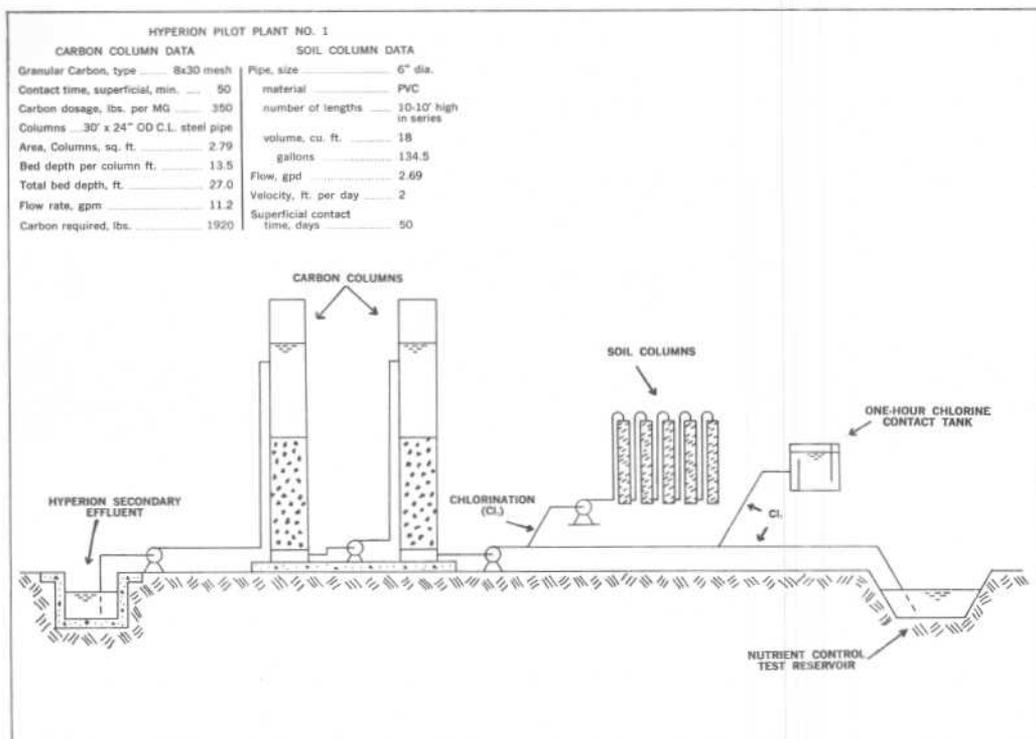
An instrument board, comprising mercury manometers, and differential pressure gauges, report the head loss characteristic of the carbon at various levels.

TWO OTHER TEST PROJECTS

Facilities at the Hyperion site also provide for two additional test projects. One experiment is to determine, and prepare for, problems that may be encountered in the passage of water through soil when it is injected into the coastal underground. At the pilot plant 2½ gallons of water per day is injected and processed through 100 feet of Silverado zone soil contained in a series of 10-foot plastic pipes. It takes about 50 days for each 2½ gallons of water to pass through the 100 feet of soil. Test soil for the experiment was available from a quarry in Palos Verdes. This is the same type of soil that would be encountered by water when it is injected into the coastal underground to combat seawater intrusion.

Another test facility is a 10-foot deep reservoir, with a capacity of 70,000 gallons, which is used for testing various chemicals to determine their ability to control undesirable algae growths which develop in the reclaimed water flowing through the reservoir.

Extensive tests are made on the water as it passes through the pilot plant. In addition to the work being done at the laboratory in the General Office Building, the Bureau of Sanitation's Hyperion Plant laboratory



also performs many tests for the project. Virus tests are made by the Los Angeles County Health Department.

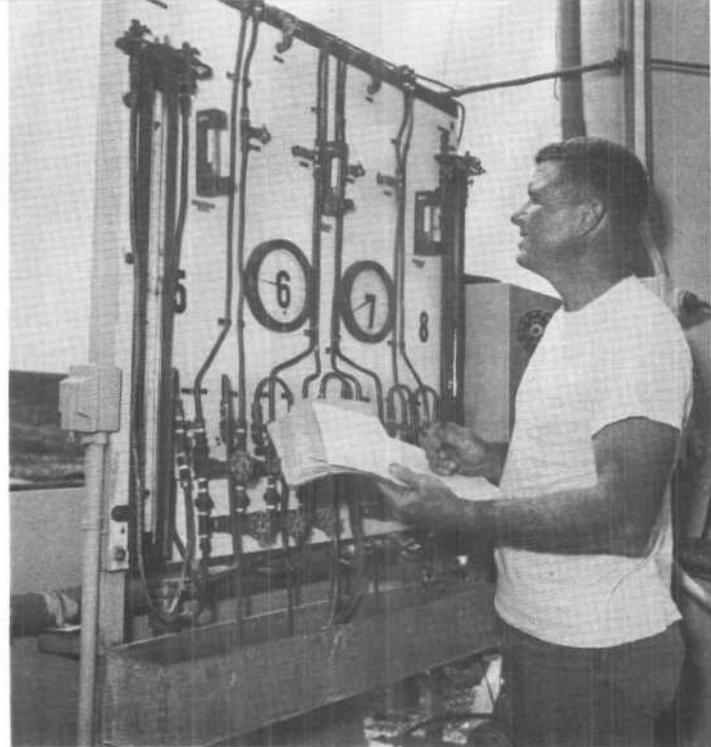
INDUSTRIAL PURPOSES

In addition to using reclaimed water for well injection, other proposed uses of reclaimed water are for industrial purposes, such as cooling tower supplies. Space has been provided at the pilot plant for additional test facilities for this purpose.

In the Department's overall approach to reclamation of water for industrial, irrigational, recreational, or seawater barrier use, the DWP is conducting other investigations at the Tujunga and Headworks Spreading Grounds.

While the pilot plant is operated by personnel of the DWP Sanitary Engineering Division, the scope of the project required the cooperation and assistance of the Los Angeles Department of Public Works in providing the space and utilities for the plant, and two other DWP divisions, Water Engineering Design, which provided the construction drawings, and Water Construction and General Service, which built the facility.

Plant performance is shown by readings at gauge board. Operator logs observed values of head losses through sections of carbon columns.



PLANT EFFICIENCY

Quality Constituent	Units	Raw Sewage	Secondary Effluent	Activated Carbon Effluent	
				Before Cl ₂	After Cl ₂
Total COD	mg/l	—	30	10.8	10.8
Dissolved COD	"	—	25	8.3	8.3
TOC	"	—	10	3.6	3.6
SOC	"	—	8	2.8	2.8
CCE	"	—	1-2	0.025	0.025
Color	Color units	—	35	<5	<5
Odor	—	—	I-M	0	0
BOD	mg/l	200-400	5-10	2.4	2.4
Suspended Solids	"	200-400	5-10	2.4	2.4
Turbidity	JTU	—	2.0	<1	<1
Phosphates	mg/l P	8-12	3.6	3.6	3.6
Virus	CPE-% observed	100	27	7	<1
Coliform	MPN/100 ml	—	240,000.	33,000.	<2.

Long-range Water Reclamation Projects Recommended,

An active, long-range coordinated program to develop supplies of reclaimed and purified water for non-domestic uses in Los Angeles through various waste water reclamation projects has been recommended in a report prepared recently by the Department of Water and Power's Water System with the cooperation and participation of the Public Works and the Recreation and Park Departments of the City.

The report projects the growth of water consumption in Los Angeles for more than 50 years to the year 2025, and indicates that waste water properly treated can be used for parks and recreational development, industrial uses, and ground water replenishment. It can be made an important low-cost addition to Los Angeles' water supplies from original sources.

By the year 2025, Los Angeles is expected to have a population of four to five million persons, and a water consumption on the order of 750 million gallons daily, which is more than a 50% increase over the present average daily use of water in the City. Studies made of the large volume of waste water being discharged to the Los Angeles sewerage system indicated that there is an abundance of waste water, particularly from the San Fernando Valley, that is of a quality amenable to proper treatment. The report estimated that flows in the Valley alone are expected to reach approximately 250 million gallons daily by the year 2000.

The water could be made available, according to the report, for such purposes as:

(1) Recharging the underground water basin, either by surface spreading or injection through wells.

(2) Injection into the underground to act as a barrier to sea water intrusion.

(3) Irrigation of parks, golf courses and other landscaping and recreational facilities, such as in the Sepulveda flood control basin, in

Total organic carbon analyzer is one of several instruments used in evaluating performance of the Hyperion Pilot Plant. A 100 microliter portion of test sample is being injected into port of analyzer.



Griffith Park, and in proposed parks in the Santa Monica Mountains.

(4) Industrial uses, such as in cooling towers and in industrial processes.

RESTORATION COSTS ESTIMATED

The cost for restoring the usefulness of waste water from San Fernando Valley, including pumping it from a location in the Sepulveda basin to the Tujunga spreading grounds, was estimated in the report at \$16.17 an acre foot. The cost for reclaiming waste water and delivering it for injection in wells in the West Coast sea water barrier project was estimated at \$24.55 an acre foot. These costs are lower than the cost of obtaining water from some of the sources that Los Angeles is depending upon for future supplies. The water made available by the restoration process would not be in place of the City's existing and

planned future sources, but would supplement them.

The report concluded that it is economically sound to plan such a program on an expanded basis. It pointed out that a project of this kind should be approved for development only when all related costs are less than the cost for developing an alternative water source for similar beneficial use, and when the quality of the reclaimed water is entirely suitable for the intended use.

SALE AND DISTRIBUTION BY DWP

In the program visualized in the report the Department of Public Works would continue to provide the basic treatment of waste water and the DWP would provide additional treatment deemed necessary to meet beneficial uses in the community and would provide for the distribution and sale of the water that has been restored to usefulness.