

## STRUCTURE S-9

This structure is a three unit pumping plant located in Broward County, Florida, at the west end of Canal 11 in the alignment of Levee 37, about 0.5 miles west of U.S. Highway 27 and about 20 miles west of Hollywood, Florida, and consists of reinforced concrete and concrete block masonry superstructure. The pumping station is equipped with three Nordberg 122-inch diameter vertical lift pumps each rated for 960 c.f.s. at 10.4 foot static head. Each pump unit is driven by a Caterpillar Company Diesel engine connected to the pump through a single reduction helical gear transmission by the Philadelphia Gear Works. Priming of the main pumps is not normally necessary. Power for the station is supplied by two (2) ONAN Model 125 DGEA 125 KW AC generators. A 20 ton and 3 ton overhead bridge crane is provided for general service and maintenance. Other station equipment includes a station service water system for washdown, a dewatering system for the intake bays to speed up the dewatering operation for inspection or maintenance, and an electric motor-operated trash rake for removing debris from the intake bay track rack.

### PURPOSE

The purpose of the structure is to pump surplus water into Conservation Area 3 via the South New River Canal from the Davie agricultural area west of control structure 13A and to pump seepage under Levees 33 and 37 back into Conservation Area 3, at the rate of 3/4 inch per day from the tributary drainage area plus approximately the same quantity of seepage.

### OPERATION

The pumping station will be operated whenever the water level in the South New River Canal at S-13A exceeds El. 4.0 feet; however, the water surface should not be drawn down below El. 0.0 at the pumping station. Experience has shown that extensive operation at upstream water levels between 1.0 and 0.0 causes excessive erosion of impellers and intake works. Normal operation should keep intake elevations at 1.0 or higher with operation between 0.0 and 1.0 reserved for emergency use only. Under design head, the pumping station capacity is 2,880 cubic feet a second. The pumps should be started and stopped slowly, one pump at a time so that high velocities and surges will not occur in the South New River Canal or L-37 and L-33 borrow canals.

The operation chart defines the entire recommended range over which pumping can be accomplished. Inasmuch as the reduction ratio between engine and pump is fixed, all pump rotative speeds are expressed in terms of engine speeds that are indicated on the engine tachometer.

The rated speed is 733 r.p.m. At this speed each pump has a design capacity of 960 c.f.s. or greater with pool to pool heads not in excess of 10.4 feet and intake pool gauge between El. 4.0 and 3.0. Experience indicates, however, that actual capacities obtainable are slightly in excess of those shown on the Operation Chart.

If, during a pumping operation, the water surface on the intake bay falls below El. 1.0 , the speed of all pumps then operating should be reduced to not less than 650 r.p.m. If this does not restore the water surface in the intake pool to El. 1.0 , one or more of the pumping units should be shut down until the minimum pool elevation is re-established.

The pumps in this station are designed to pump drainage water containing a negligible amount of sediment or other material which might damage the surface of the pump or the bearings. All pump bearings are designed for grease lubrication and to exclude dirt and grit. However, the quantity of water being pumped by the station should be reduced at any time the water in the suction bay becomes moderately silted or if it appears that the approach velocities are carrying a bottom load of sand into the pump chambers.

The pumps installed in pumping station 9 are free from harmful criticals throughout the entire speed range from 500 r.p.m. up through the maximum operating speed of 733 r.p.m. as indicated by the engine tachometer. However, by carefully listening to the units while operating in the vicinity of 500 r.p.m. there may be detected evidence of backlash in either the main gear or auxiliary gear. For this reason, the minimum speed for operation of these units should be established by the operator as either 500 r.p.m. or the lowest speed found to be free from backlash, whichever speed is the higher. All operation, either accelerating or decelerating, through the range between zero and the established minimum speed should be accomplished as rapidly as practicable.

#### **FLOOD DISCHARGE CHARACTERISTICS**

Discharge Rate	<u>2880</u> c.f.s.
Headwater Elevation	<u>4.0</u> feet
Tailwater Elevation	<u>14.4</u> feet

**DESCRIPTION OF STRUCTURE**

Type           3 pumping units in a reinforced concrete and concrete block structure

Number of Pumps           3

Size and Type of Pumps   122" vertical propeller

Design Rating           960 c.f.s. each

Impeller Speed           128 r.p.m.

Pump Manufacturer       Nordberg Manufacturing Co.

Engine Make and Type       Caterpillar diesel

Engine Horsepower       1655 each

Engine Speed           733 r.p.m.

Gates (per bay)

    Number           2

    Location          downstream end of discharge tubes

    Type            vertical lift gates with flap gates for backflow protection

    Size            10.25 feet high by 21+ feet wide

    Lifting Mechanism \_\_\_\_\_

Dewatering Facilities (per bay)

    Storage          on-site

    Type            bulkhead gates

Date of Transfer:       August 9, 1957

**HYDRAULIC AND HYDROLOGIC MEASUREMENTS**

Water Level Remote digital headwater and tailwater recorder

Engine Tachometers Remote digital recorder