THE ROSWELL PLANT CONSTRUCTION

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Chicago Bridge and Iron Company was awarded a firm price contract in April of last year to design and construct a million gallon a day brackish water plant at Roswell.

The major steps in building a process plant are:

1. Preparing a heat balance and flow diaphragm.

2. Sizing, specifying and buying or designing and building the component parts.

3. Preparing drawings including foundations, mechanical, electrical and instrumentation.

4. The physical erection of the units.

5. Testing the parts and putting the plants on stream.

The first two steps were pretty well roughed out before the actual bidding, however, there are three units of this plant that are quire unique. The first consists of two circulation pumps with propeller type impellers approximately 5 feet in diameter which move 92,000 gallons of hot water per minute against a 6-foot head. They also must be capable of starting up against a 12-foot head of cold water. These were purchased from the Bingham Company and they extrapolated pump curves from smaller existing pumps of this type.

The second unit was the steam compressor. This along with the electric driver, transformers and starting gear was purchased from the Allis Chalmers Company. Their designer, Mr. Russell John, designed this machine, followed it through the shop construction and testing, and was present on the job when we started up the unit. The process flowsheet calls for a 6-pound compression of 173,000 pounds of steam per hour at approximately atmospheric pressure. This could have been handled by a two stage centrifical compressor but because of the large volume, Mr. John designed a more efficient five stage axial flow compressor. This is, we believe, the first time an axial compressor has been used for steam service.

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Due to possible entrainment and carry over of corrosive water the first stage blading is amcoloy #45. The remaining stages are standard 403 stainless steel. It will be interesting to find out how the blading stands up in this service. The machine is extremely well balanced and has evidenced no harmonic vibrations on starting. It runs quitely and is operating slightly above its design curve.

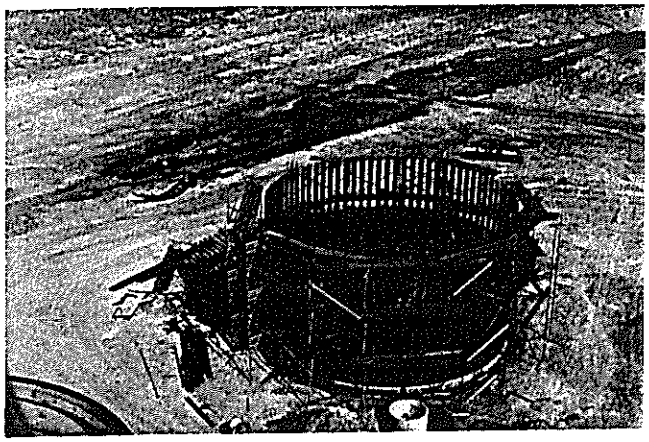
The third units are the heater sections of the two evaporators. These have the largest tube sheets our company has ever installed, and we believe the larges ever built in this country. The sheets are 12 feet in diameter and 2-1/2 inches thick, each unit has 7200 one-inch in diameter tubes 28 feet long and the heaters are baffled and vented by four 2-1/2 inches in diameter perforated pipes. These evaporators were field erected because of there overall size:

The construction of the plant has handled by our field superintendent, Mr. Don Hull. The foundations were started in August and were all installed before winter. No unusual construction problems were encountered and the plant was completed on schedule.

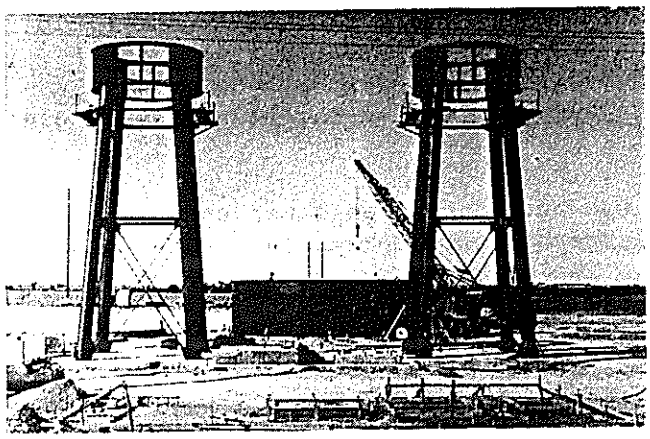
Mr. Joe Lawrence was our process engineer assigned to this job. He is also in charge of start up and the 30-day test run which is now going on. The future plant operators are also being trained during this period.

Instructions and maintenance manuals describing the operation procedure in detail have been prepared and made available to the operating contractor.

I would now like to present a few pictures showing the construction at different stages of the plant.

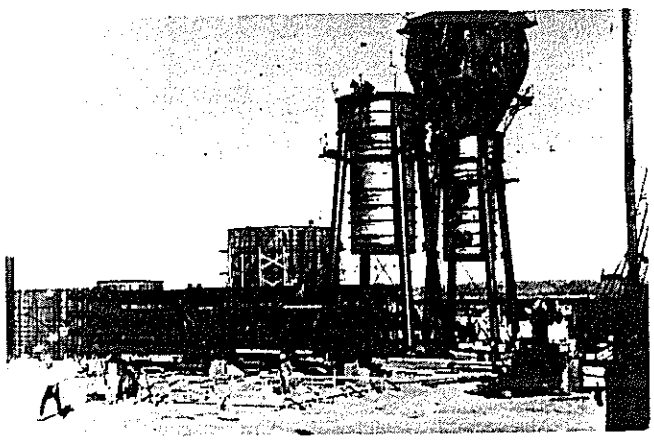


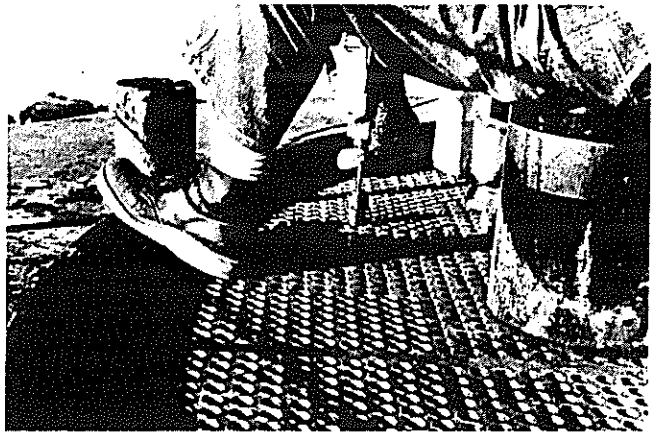
Horizontal heat exchangers in place in the foreground, the two heating elements in place and the vapor dome partially constructed on the far evaporator.



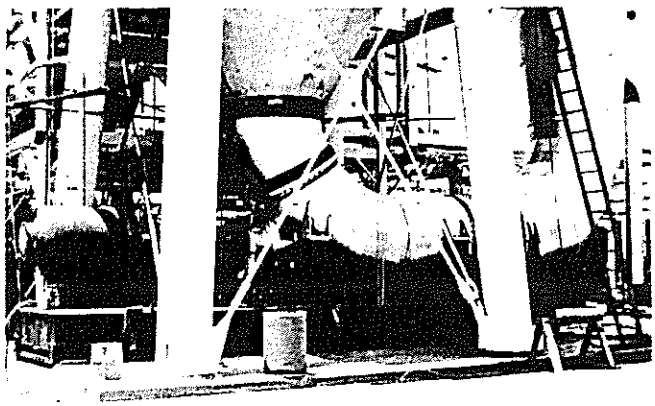
Clarifier thickner tank completed in the background and the framework of the two evaporators erected.

Construction of one of the redwood tanks of which there are six on this project. Wood was used because of its superior corrosive resistant qualities compared to steel.

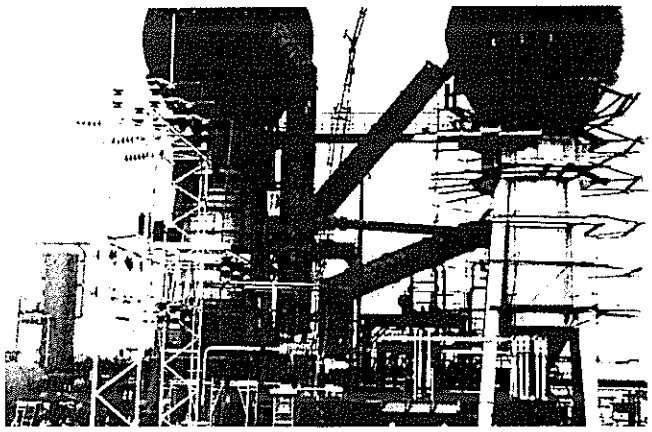




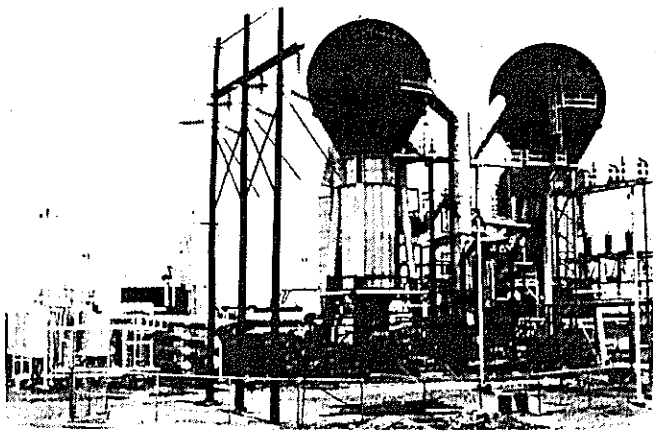
Operation of rolling in a tube into the top tube sheet of one of the heaters. There were 7,200 tubes installed in each heater section.



Horizontal propeller type water pump driven by a 250 horse motor left side. This is one of the two large recirculating pumps that moves 92,000 gallons of water a minute.



Two evaporators with the large inner connecting piping in place. The insulation is being applied to the vapor dome and heater body of the unit on the right.



The completed plant. On the extreme left is the ion exchange equipment which treats the incoming water, next a double bank of heat exchangers, then the degasifier, then two more banks of heat exchangers and finally the large evaporators.