More TECHNICAL BRIEFS

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When the ammonia feed was stopped, *the reducing power and iron content of* the 18th stage sample were still high and the pH in the range 6 to 7. When the sulfite *treatment was stopped but with* ammonia treatment in use, the reducing power and the iron pickup both were almost zero. The pH varied from 8.8 (NH_3 0.25) in the steam to 7.8 *(NH_3 0.05) in the 18th stage sample.* When both sulfite and ammonia treatments were stopped, the reducing power and ammonia were low at all sampling points. The pH remained in the range 7.0 to 7.5 but there was some iron pickup in the 18th stage sample.

These results indicated that the best *treatment*, as *far* as iron pickup and the maintenance of a higher pH in the 18th stage, was with the ammonia treatment and without sulfite treatment in the boiler water. *To* operate under these conditions meant loss of reducing agent protection *in the boiler water.*

The work was then directed toward using a reducing agent other than sulfite. Hydrazine (N_2H_4) had been reported successfully used in low pressure installations in Europe and laboratory tests indicated that it was fairly stable at high steam pressures. Solutions of hydrazine *in water are available* in concentrations around 22%. This is a clear water white liquid that is easily handled. *APC Paper, no number.*

Use of Amines in Low Make-Up Steam Plant. *By H J Guillory, Central Louisiana Electric Co.*

All makeup (approximately 1%) for the *author's company's* Coughlin station comes from two bent-tube evaporators discharging their vapor into deaerating heaters. *One of these* evaporators discharge into the one deaerator serving Units 1 and 2. The other evaporator discharges into the deaerator for No. 3 or that for No. 4 Unit. An *interconnected stystem* of four 10,000 gallon condensate storage tanks provide maximum flexibility of make-up control. In addition to the *conventional* deaeration supplied by the heaters, all condensers are equipped with deaerating hotwells.

Initially, all feeds *for these two evaporators* were obtained from deep wells, *located* on the property, with no provisions made for softening or pretreatment of the well water. However, they were treated *internally with* phosphate, a lignin organic and sodium sulfite. The phosphate was fed at the deep well pump discharges *for iron stabilization* and the organic and sulfite "slug" fed to the evaporator shells. Later, continuous feed of these chemicals was resorted to which provided much better control. It may be of interest to note that only one evaporator has been cleaned mechanically in the five year history of the station. Subsequent inspections proves that cleaning by any means has been found to be unnecessary to date.

In the past few years we had noticed, in various publications pertaining to steam power plants, a growing interest and awareness of the problem caused by iron in high pressure, low make-up plants. With all of these factors in mind, and thinking that we should attack the problem before trouble occurred, it *was decided to make some* effort to minimize carbon dioxide and consequently, iron. After going into this problem thoroughly with both our water consultants and station designers, our belief was that the evaporator feedwater could best be treated for the removal of excess carbon dioxide with an *acid* regenerated zeolite, followed by degassification and neutralization with caustic soda. Consequently, in the latter *part of 1950 such a unit was placed* on order and put into operation in July of 1951. Results were immediately apparent as the carbon dioxide in the system was reduced to reasonable values. *Soon after this* unit was placed in operation, conductivity of the condensate at the hotwell was reduced to a steady 0.6 micromhos *and carbon dioxide* at the deaerator discharge decreased from approximately 3.5 to 1.5 ppm.

This program, primarily aimed at reducing corrosion in the system, was *obviously a great step forward.* While no serious problems had been encountered that could be attributed to corrosion only, we *did experience considerable* difficulty with heater drains. While internal conditions in the major equipment showed no unusual amounts *of iron* oxide deposits, we believed that it was possible to still further reduce corrosive tendencies prevailing in the water cycle and consequently the iron content *of the system.*

We had observed, in technical publications of the last few years, a tendency toward *the increasing use of higher* condensate pH values to further minimize corrosive tendencies prevailing in other plants. At that time *we thought it feasible* to consider four methods of further reducing the carbon dioxide and increasing the pH in the cycle. The author then summarizes the methods considered *and reasons why they were discarded or* accepted. *APC Paper, no number.*

Dealkalization of Boiler Feedwater in Small Power Plants. *By A E Kittredge, Cochrane Corp.*

Awareness of the need of alkalinity reduction gave leadership to the hot process precipitation type *softener* in preparing feedwater for industries requiring *large* volumes of treated water. When the need of alkalinity reduction was appreciated and demanded, the exchange *type zeolite* water *softener lost* its advantage of simplicity and economy since the only method of accomplishing alkalinity reduction with *that softening* process was, until recently, by use of acid either directly or through the use of acid regenerated hydrogen zeolites.

Alkalinity reduction by anion exchange *is basically* a process where practically all of the anions dissolved in a water supply are exchanged in the same way as *in an ordinary* zeolite water softener for the chloride ion of ordinary salt. Sodium softening exchanges all calcium and magnesium cations for sodium. Chloride dealkalization exchanges all bicarbonate and sulfates for chloride. The latter process produces a water supply having the

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Material for these abstracts comes from the following sources unless otherwise stated. Order complete paper from sources, not POWER.

American Power Conference, annual meeting, Sherman Hotel, Chicago, Ill., Mar 24-27, 1953. Identified by initials APC and obtainable in proceedings printed and distributed by R A Budenholzer, chairman, Illinois Institute of Technology, 3300 Federal St, Chicago 16, Ill. $6.00.

American Institute of Electrical Engineers, winter general meeting, Statler Hotel, New York, N. Y., Jan 19-23, 1953. Identified by initials AIEE and obtainable through AIEE, 33 W 39th St, New York 18, N. Y.

Manufacturing Chemists' Association, Inc, Water and Air Pollution Abatement Conferences, Oct 23-24, 1952, Netherland Plaza Hotel, Cincinnati, Ohio and Feb 26-27, 1953, Hotel Statler, Detroit, Mich. Identified by initials MPC and obtainable from Manufacturing Chemists' Assn, 246 Woodward Bldg, Washington 5 D. C.