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HW-25704

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CG-PR-2

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300 AREA

A. E. Greninger, Manager
Engineering Department
HARTFORD WORKS

WATER TREATMENT DURING C PILE START UP

It is the recommendation of the Technical Section that the C Pile be started up using alum treated water to which has been added sodium dichromate at a concentration of 2 ppm., and that the pile be purged at monthly intervals despite the expected absence of film formation. During the initial months of operation the necessity of adding sodium dichromate and of purging the pile will be evaluated with the hope that these factors can be eliminated from the process. The reasons for this recommendation, and our proposals for water treatment in the current operating piles are discussed in the balance of this letter.

At the present time, the D and F Piles are being cooled with alum-treated water, while the B, DR, and H Piles are being cooled with ferri-floc treated water. Severe pitting attack on both slugs and tubes has occasionally been encountered at the D and F Piles and it is natural to suspect that this phenomenon may be associated with the use of alum-treated water. However, there are several additional factors which may be responsible for this pitting attack: (1) the elimination of sodium dichromate from the alum-treated water may have been responsible for the subsequent development of the pitting attack; (2) the tubes at the D and F Piles are more severely distorted than are the tubes at the other piles and this distortion may contribute to flow irregularities inside the tube; (3) the absence of film formation in the D and F Piles has made it unnecessary to purge these piles, and this failure to purge may permit the growth of "barnacles" in the upstream end of the tube which subsequently break loose, lodge in the active zone of the tube, and establish flow irregularities. None of the above hypotheses has been demonstrated, but preliminary laboratory data lend support to each hypothesis and lead us to believe that it is exceedingly improbable that the use of alum-treated water is intrinsically responsible for the pitting attack.

Meantime, the new KH and KM Piles are being designed on the basis of using alum-treated water. If it were to become necessary to revert to ferri-floc treated water for the two K Piles, additional construction costs ranging from 9 million to 20 million dollars would be incurred. These savings are sufficient to warrant additional testing of alum-treated water under conditions most

- # 1,2,3,4 - AB Greninger
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HW-25704

September 22, 1956

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September 22, 1952

favorable to the process, i.e., with sodium dichromate, undistorted tubes, and periodic purging. If alum-treated water is to be used in the K Piles it is also important to test in the presence of alum-treated water those design changes which are common to both the C and K Piles, - namely, enlarged annulus, enlarged rear-face fittings, and higher water velocities. Delay in starting this test in the C Pile would result in delay to completion of the K Pile Areas in the event that the tests were to indicate the necessity of design changes.

It would be improper to start the C Pile with alum-treated water without supporting this program by an extensive attack on the causes of pitting as observed in the D and F Piles. An extensive program is underway in the flow laboratories and in the water quality laboratory. In addition, we propose that operating conditions at the different piles be varied to yield additional production data. A current proposal is shown in the attached Table I and this table should serve as a basis for additional discussion. It will be noted in Table I that operating conditions at DR and C Piles are identical, thus providing a controlled experiment to permit evaluation of design changes introduced into the C Pile. The D and F Piles would be used to determine the feasibility of deleting either the periodic purging or the sodium dichromate when using alum-treated water. No changes would be made in the operation of the B and H Piles as long as these piles remained free from pitting attack. The tests as proposed in Table I would be expected to continue through the period of peak river water temperatures in 1953, with final conclusions being obtained about one year from now.

Original Signed By
W. K. Woods

ASSISTANT MANAGER, TECHNICAL SECTION

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September 22, 1932

TABLE I

PROPOSED WATER TREATMENT CONDITIONS FOR ALL PILES

Pile	DR	D ^o	Y	B	H
Condition of Tubes	Special, Straight	Distorted	Distorted	Some Distortion	Straight
Water Coagulant	Alum ²	Alum	Alum	Ferri-floc ^o	Ferri-floc
Periodic Purging	Yes	No	Yes ⁺	Yes	Yes
Dichromate Addition	Yes	Yes ⁺	No	No ^o	No

* Indicates changes from present operating procedures. Activated silica addition facilities would be required for both D and DR Piles.

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