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5 - R. M. Evans
6 - R. M. Evans
7 - H. Worthington
8 - Chronological

March 26, 1945

MEMORANDUM

TO: C. H. GREENWALT
FROM: HOOD WORTHINGTON

CIRCUMVENTING CHLORIDE ION TROUBLE
COLUMBIA RIVER WATER

It was reported on March 24 that the chlorine content of Columbia River water at Site W is now running in excess of 20 p.p.m., as compared with the maximum of 4 p.p.m. that was reported in 1910, and that is also the maximum allowable concentration from the standpoint of corrosion. Under these circumstances, it may be well to list the alternatives, more or less in order of their likelihood.

1. We can eliminate chloride ion,
 - a. by ion exchange. The quantities of equipment and of resin are formidable, but it should be possible to determine whether they are prohibitive.
 - b. by distillation. A simple scheme that has been used to get a high yield of distilled water has been described to me by Babcock. It produces approximately the same result as a 7-stage evaporator, but it has not been used on the grand scale.
 - c. by tying it up in a coordination compound or in an insoluble form.
2. We can return to recirculation of the water, cooling
 - a. by heat exchange with river water. Here again, the quantities of equipment are formidable, but the solution is straight forward.
 - b. by passage through a barometric cooler and degasifier. In this case, roughly 2000 gallons per minute of excellent make-up water will be required.

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- e. by passage through a cooling tower. There will be danger downwind from this equipment in case of coating failures. Make-up will be required.
3. We can inhibit the corrosion, perhaps with "soluble oil".
4. We can use biphenyl or bismuth as the cooling agent.
5. We can seek a plant site above the dam, where the Cl-ion content may be lower.
6. We can find out whether beryllium can be substituted for aluminum with any gain in resistance to corrosion, and push through a program to produce enough beryllium tubing.
7. We can return to the helium cooled pile.

WIN

HW:11

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**DATE
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9/23/94

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