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Mr. W. E. Johnson
General Manager
HANFORD ATOMIC PRODUCTS OPERATION

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SPECIAL RE-REVIEW

FINAL DETERMINATION

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REDOX PLANT - RUTHENIUM CONTAMINATION CONTROL

- References: (1) My memo to you on this subject dated April 19, 1954 (HW-31514)
(2) My report on the current status of major plant problems, dated June 7, 1954 (HW-32053)

On June 4 Dr. Greninger, Mr. Parker, and I met again to review the progress being made on this major problem, with special attention given to the particulate ground contamination which occurred the week-end of May 22 and apparently again during the period June 1-3. Others participating in the discussion were: C. R. Anderson, R. H. Beaton, R. S. Bell, H. A. Carlberg, V. R. Cooper, O. H. Greager, T. W. Hauff, E. R. Irish, A. R. Keene, W. A. McAdams, J. S. McMahon, V. D. Nixon, C. A. Priode, and J. M. Smith.

The meeting opened with a statement of "task force" progress to date by its leader, Mr. Anderson. Most of this information is summarized in Reference (2), so is not repeated here. He emphasized the attractiveness of the process modification which would eliminate in-process ruthenium oxidation and volatilization by adding a pre-cycle solvent extraction step, and then ozone treating the final UNH stream prior to concentration and calcination. Technical noted that, for the long pull, continuous calcination may be preferable to the use of ozone. These and other process approaches to the ruthenium problem are receiving continued evaluation, to the end that a decision on them may be reached.

Mr. Parker then presented charts of Radiological Sciences Department ground survey data showing the considerably increased ground contamination in certain directions which has occurred since mid-May. Of special interest and concern were (1) the two narrow bands of Redox particulate deposition the week-end of May 22, one through and beyond 100-B Area, the other eastward along the southern edge of 200-E Area (including the Purex site); (2) another apparent stack emission affecting Purex

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W. E. Johnson

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June 7, 1954

during June 1-3; and (3) a 100-fold increase in the activity levels of ground control plots around the Redox stack since May 21. It was noted also that (1) these recent particle depositions show an unusually high proportion of the Ru-106 isotope, indicating the material to be more than two months old, and (2) the Redox stack monitors did not reflect these emissions (however, the samplers were not fully serviceable the week-end of May 22).

There followed an extensive discussion of the probable source of these old particles. It is known that large quantities of ruthenium have plated-out or otherwise accumulated in the process equipment, particularly in the head-end, and it seems probable that this has occurred also in the main stack. The stack samplers now are considered reasonably reliable, but they draw from the 20-foot level, so would not detect particulate matter breaking loose from the upper 180 feet of the stack. Moreover, it has recently been determined that present stack flushing facilities are rather ineffectual, and do not even wet the top 75 feet of the stack. Both improved sampling (including the 190-foot level) and more complete flushing have been in the task force program.

In the light of the foregoing, it was agreed that advantage should be taken of the Redox outage (starting this week) to give the main stack a thorough flushing down with water. Installation of the required special facilities (e.g., high-head pumps and stack top spray head) will be work-ordered on Minor Construction. With the process equipment out of service and cooled, it is expected that the building ventilation and stack air flow can be greatly reduced during this flushing. It was further agreed that all possible care would be taken during the removal and replacement of the failed H-4 oxidizer to contain its accumulated ruthenium contamination, and thereby prevent spread to the canyon or stack.

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