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ORNL
CENTRAL FILES NUMBER

CA-57-6-25

"External Transmittal Authorized"

COPY NO. 71

DATE: June 5, 1957

SUBJECT: HRT Letdown Valves

TO: Distribution

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To supply information about the several letdown valves which have been in HRT service, a typical valve plug examined by the Metallurgy Section¹ confirms the belief that chemical attack on the Stellite #6 was occurring. It appears that most of the corrosion was due to rinse solutions, since this phenomena has not been noted on letdown valves in the HRT Mockup where over 90% of the operating time has been with UO_2SO_4 solution.

Details of letdown valve service on the HRT Mockup are as follows:

Valve No. 21 - 6500 hrs total, 5500 hrs with HRT fuel solution, 400 hrs with water, 576 hrs with 300 gram/liter uranyl sulfate. Figure 1 shows the Stellite #6 plug from this valve after the 6500 hrs service. Very little wear has taken place and the valve is still leak-tight. This valve was mounted vertically with the actuator down. Valve No. 91 - 1500 hrs total to date on uranyl-sulfate; leak-tight after 700 hrs, subsequent checks have not been made; however, operation is still satisfactory. This valve is mounted horizontally to duplicate HRT letdown valve mounting.

Low feed and purge pump flows, causing the HRT valves to operate near the full-closed position, undoubtedly are responsible for excessive erosion which further shortened valve life. This seems to be borne out by the fact that reducing the size of the last two letdown valves to be installed resulted in longer service for each. LCV-245, Serial No. L-92, was installed at the beginning of Run No. 5, and LCV-145, Serial No. L-98, was installed at the start of Run No. 7. Figure 2, showing the plug from valve L-92 after runs 5, 6, and 7, reveals less wear than the comparatively short-lived, larger-flow plug investigated by Hammond and Kegley¹.

In an effort to achieve longer service from the letdown valves in rinse solutions, 17-4 PH plugs will be installed before the next HRT tests. Figure 3 shows a plug fabricated from 17-4 PH which has been subjected to 96 hrs of water service in the Valve Run-In Loop with negligible wear. The use of 17-PH in water service is further

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justified by the results obtained from the check valve material evaluation loops². Five 17-4 PH "on-off" type plugs also have been subjected to 400 "dumps" of UO_2SO_4 in the Valve Test Loop with results equal to or better than stainless steel 347 plugs. Although this was not a metering application, it is an indication that 17-4 PH can be expected to give good service in UO_2SO_4 as well as in water.

Detailed histories on valve maintenance were not kept before December 1956. Therefore, it is not possible to relate a chronological repair history of each letdown valve.

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2. Memo, R. Blumberg to I. Spiewak, 4-24-57

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Figure 1

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Figure 2

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Figure 3