IA-E-101

(15)

To: Milt Levenson

Subject: Hydrogen in RCS

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Degassing History

Rapid degassing of reactor coolant occurred in the make-up tank, with the letdown system in normal alignment (except for bypassing the block orifice), until about 0716 on 3/29/79 at which time the waste gas decay tank pressures approached the shutoff head of the waste gas compressors. At this time, letdown was diverted to the B reactor coolant bleed tank. Letdown continued using the A, B, and C RCB tanks until 1920 on 3/30/79 when the A tank went full. During this time, makeup to the makeup tanks was demineralized water and boric acid which reduced makeup tank pressure from a 65 psig level by redesolving makeup tank gases and injecting them into the PRCS. By 1440 on 3/30/79, both waste gas decay tanks were essentially at the waste gas compressor shutoff head. At 2036 on 3/30/79, makeup to the makeup tanks was shifted to the bleed tanks, letdown from the PRCS was still to the bleed tanks, which also vent to the waste gas compressor. Operation in this mode continued until at least 4/2/79 at 1835 (the end of available operator log data). Sometime after this time, letdown was shifted back to the makeup tank and apparently continues in this mode at this time. RCS makeup to balance RCS leakage and pressurizer leakage is being taken from the reactor coolant bleed tanks.

Clearly, the waste gas decay tanks have been unable to accomodate additional hydrogen gas since about 1440 on 3/30/79 at which time the tank pressures were about 84 psig, estimated to be the compressor shutoff head. During the ensuing period, regardless of whether the makeup tank or the bleed tanks are receiving letdown, offgas must have followed one or more of the following paths:

1. Released to the auxiliary building via the reactor coolant bleed tanks relief valves.

2. Leaked to the auxiliary building through leakage paths, probably downstream of the compressor.

3. Leaked to the auxiliary building from waste gas collection header upstream of compressors.

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We estimate that this mode of degassing is probably quite efficient and it is possible, if not probable, that hydrogen concentrations in the PRCS are quite low.

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It is also of importance that, prior to 2036 on 3-30-79, letdown to the makeup tank resulted in rapid pressurization of the tank, surmised to be a result of rapid degassing of RCS water coupled with inability to vent the tank to the waste gas decay tanks, which were approaching the compressor shutoff head. This inability to vent still exists, but letdown to the makeup tanks no longer results in rapid (or perhaps any) tank pressurization. The implication is a low degas rate at present, and thus a low PRCS hydrogen concentration.

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# PROCEDURE FOR MEASURING REACTOR COOLANT HYDROGEN CONCENTRATION

1. Bring MU tank level to approximately 55" ~~pumping~~ by transferring, if necessary, liquid from RC Bleed Tank. Maintain letdown flow at maximum available rate, hold constant. (Flow < 25 gpm)

   Align MU-V8 to take reactor coolant letdown directly to makeup tank.

2. Open either MU-V13 or MU-V134 and pull the makeup tank pressure down as far as possible with the waste gas compressor.

3. Promptly close MU-V13 and MU-V134 to <u>isolate</u> gas space in makeup tank. ($H_2$, $N_2$, and sampling lines should be isolated).

4. Record:

   a. Time

   b. WDG vent header pressure

   c. Makeup tank pressure

   d. Makeup tank level

   e. Makeup tank temperature

   f. Letdown flow, seal return flow.

   Record these parameters at the initiation of Step 3 and every time the make-up tank pressure increases 1 to 5 psig, depending on rate of pressure increase.

5. Continue procedure for as long as possible, consistent with makeup tank pressure limits and plant operating necessities.

6. Secure from procedure, return to normal operating mode.