DOCKET NO. 50-231

PROPOSED CHANGE NO. 2 Received w/Ltr Dated 6-12-70

FOR THE

SOUTHWEST EXPERIMENTAL FAST OXIDE REACTOR

Re: LICENSE DR-15

DOCKET 50-231

GENERAL ELECTRIC COMPANY

310 DeGuigne Drive

Sunnyvale, California 94086

Proposed Change No. 2

for the

Southwest Experimental Fast Oxide Reactor

I. Introduction

Under the authority of License DR-15, General Electric operates the Southwest Experimental Fast Oxide Reactor at a site near Strickler, Arkansas.

Revisions of the current Technical Specifications are desired as described herein. The applicable revised pages of the Technical Specifications are also included as Attachment A.

Errata 7 for the FDSAR, Supplement 19 are included as Attachment B.

II. Purpose of the Proposed Change

The purposes of the proposed changes are:

(1) to permit an increase in the nominal flow rate in the reactor vessel pump-around loop from 1 gpm to 2 gpm;

(2) to clarify the limits established for release of radioactive effluents from the plant stack;

(3) to make the qualifications required for supervisory personnel more uniform and to recognize changes in job content based on plant operating experience.

III. Proposed Changes

Pursuant to the provisions of 10 CFR 50.59, General Electric requests that the Technical Specifications be changed by substituting the pages numbered 3.4-2, 3.7-1, 3.7-5, 6.1-2, 6.1-3, 6.1-4, and 6.1-5, in Attachment A of this document, for corresponding pages of the current Technical Specifications. The proposed changes to the current Technical Specifications are indicated by brackets in the margin on the enclosed pages.

IV. A. Increase in Pump-Around Loop Flow Rate from 1 gpm to 2 gpm

The capability of detecting leaks in the primary coolant system is provided by three independent systems:

1. Leak detectors on the coolant piping.
2. Reactor vessel low sodium level probes.
3. Nitrogen system radiation monitor.

In order to improve the sensitivity of leak detection provided by the reactor vessel low sodium level probes, the flow rate in the pump-around loop was reduced from the planned value of 25 gpm to a value of 1 gpm, as originally stated in Supplement 19 to the FDSAR.[1] However, operating experience has shown that operation of the pump-around pump within a 1 gpm limit is undesirable for the following reasons:

1. The pump-around loop flow rate varies about 1/2 gpm on a cyclic basis and the average value drifts up or down intermittently, due to the interaction of variations in cover gas pressure and the pump flow characteristic at low voltage.
2. The poor signal to noise ratio at very low flow rates requires that the low flow alarm be set at or above 0.3 gpm.
3. Items 1 & 2 result in numerous low flow alarms when the pump is operated within a 1 gpm limit.

The cover gas pressure in the primary drain tank is maintained from 1 to 4 psi above the cover gas pressure in the reactor vessel in order to prevent excessive use of gas due to feed-through from the reactor vessel to the drain tank. As a result, the check valve in the reactor vessel overflow line does not open until the pressure head of sodium above the valve equals the difference in cover gas pressures. Since the overflow line is part of the volume containing the reactor cover gas, the partial filling (about 2 to 9 ft) and emptying of the overflow pipe above the check valve (about 33 ft below the reactor vessel nozzle) causes a variation of up to 1 psi in the reactor vessel cover gas pressure. This variation in the cover gas pressure changes the pump head required and causes a flow rate variation of about 1/2 gpm at constant voltage in the zero to 5 gpm flow range.

Low flow and high flow alarms have been placed on the flow recorder to assure pump operability without exceeding 1 gpm. Due to external noise and flowmeter inaccuracy at extremely low flow rates,

these alarms have been set at 0.3 gpm and 0.9 gpm, respectively. Consequently, numerous flow alarms occur during normal operation, creating an undesirable situation.

To alleviate this situation, it is proposed that the allowable pump-around flow rate be increased from 1 gpm to an average value of 2 gpm. Operational tests on the system have indicated that a nominal value of 2 gpm is the lowest flow rate at which the system can be operated and still eliminate the large number of spurious low flow alarms that have been experienced to date. Operational safety would be improved by elimination of numerous alarm signals which tend to divert the operator's attention, and through more stable operation of the pump-around-pump.

The new flow limit would allow the instantaneous flow rate to fluctuate around 2 gpm. However, the minimum detectable leak rate depends on flow rate over a period of several minutes. Therefore, any leak in excess of 2 gpm would be detected by the low level probes.

This change has a relatively small effect on protection afforded by the low sodium level probes. For leak rates significantly higher than the pump-around flow rate, the amount of sodium lost before detection occurs increases slightly when the allowable flow rate is increased to 2 gpm as indicated by Figure 1. This same figure shows that a larger change occurs over a narrow range of leak rates, from about 1-1/2 gpm to about 3-1/2 gpm. Protection against sodium leaks in this range and at rates below the pump-around flow rate is provided by the Na-24 monitor.[2]

Pages 53, 54, and 55 of Supplement 19 have been corrected to show an increased flow rate of 2 gpm. These pages are included herein as Attachment B.

B. Equation for Radioactive Effluent Discharge Limits

Specification 3.7.C defines limits for radioactive discharge as follows:

"The rate of discharge of radioactive effluents from the plant stack shall not exceed:

"1. Annual average release rate, except halogens and particulates with a half-life greater than 8 days:

" $4.0 \times 10^{10} (\Sigma_x C_x)$ μCi/sec."

Similar limits are specified in paragraphs 2, 3, and 4 of 3.7.C. The definition of C_x is given as the concentration of radioisotope, X, in μCi/mℓ and must satisfy $\Sigma_x[C_x/(MPC)_x] \leq 1$.

The proposed change is intended to clarify the discharge limits as requested by members of the DRL staff and will be as follows:

"The rate of discharge, Q_x, of radioactive effluent, x, from the plant stack shall be limited in accordance with the following equations:

"1. Annual average release rate, except halogens and particulates with half-lives greater than 8 days:

" $$\Sigma_x \frac{Q_x}{MPC_x} \leq 4.0 \times 10^{10} \text{ cc/sec}"$$

Similar changes are proposed for paragraphs 2, 3, and 4 of 3.7.C. The proposed changes do not change the allowable limits on rate of discharge of radioactive effluents.

C. Qualifications Required for Supervisory Personnel

Changes are proposed for specification 6.1.A.3 to obtain uniformity in the requirements for each position.

(1) A Bachelor's degree in engineering or science, or the equivalent in experience, is required for each position. The requirements for qualifications in particular fields are identified in the experience requirements, when applicable.

(2) The experience requirements for managerial positions were revised so that equivalent levels of management have equal requirements. Additional changes were made so that personnel at SEFOR would be acceptable as replacements if necessary. Experience gained at SEFOR and the resulting familiarity with plant equipment, operation, and procedures, would be of much greater value at SEFOR than an equal amount of experience in other plants.

(3) The requirements for the Supervisor, Mechanical Maintenance, were revised to recognize the engineering-oriented nature of the position as determined from plant operating experience over the past year.

(4) The organization chart was revised to show title changes in the engineering section at the Sunnyvale plant and to show the position of Analyst, which was recently added to the SEFOR site organization.

References:

1. SEFOR FDSAR, Supplement 19, p. 53.

2. SEFOR FDSAR, Supplement 19, p. 52.

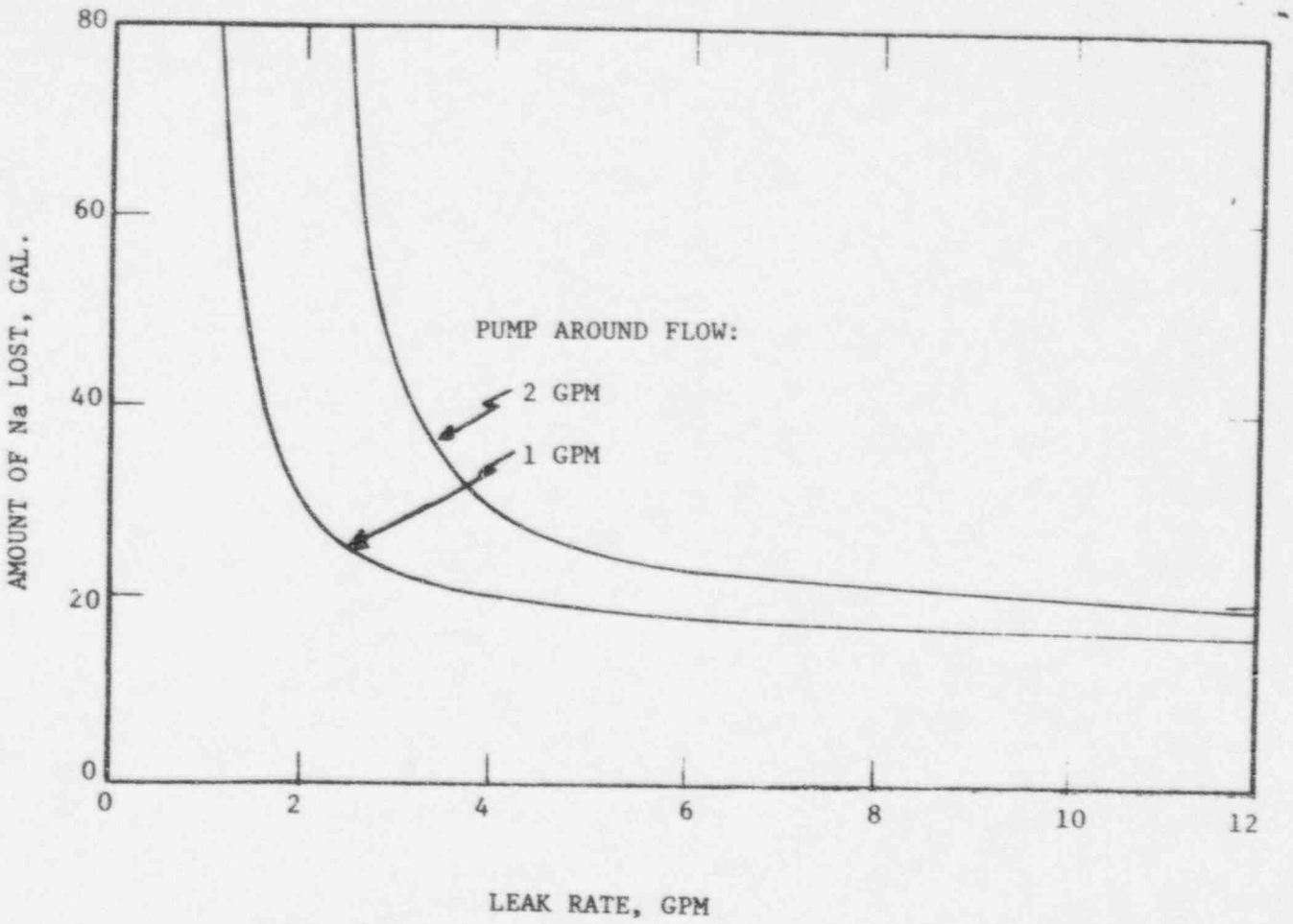

FIG. 1: AMOUNT OF SODIUM LOST VS. LEAK RATE,

FOR 15 GALLON NET CHANGE IN REACTOR VESSEL SODIUM CONTENT.