Memo from:

D. K. DENNISON
EXT. 53302
MC 682

NUCLEAR ENERGY
BUSINESS OPERATIONS
GENERAL ELECTRIC COMPANY
SAN JOSE, CALIFORNIA

6-19-86 E.09

I

To: Larry Vaughan

Telecopy # (301) 492-7376
or
(301) 492-7285

SUBJECT: FERMI MSIV SPRING ISSUE

Attached are the 9 technical points which George Strambeck and I discussed on the phone with you yesterday. This is for your information and supports the recommendations given to you in the Quick Comm which was telecopied to you yesterday.

If you have any questions give me a call on (408) 925-3302.

Duane Kennison
Fuel Licensing Engineer

GENERAL ELECTRIC

East West Towers Building

Basis

1. Based on the metallurgical study of the cross section area of the broken spring, the failure is not fatigue related. The overload test of the inner springs that Fermi conducted at the site showed no additional failures. We believe that any spring failures would occur early in the spring life, and is not induced by the cyclic operation. It is also expected that a spring which is tested at overload would provide satisfactory service at normal load.

2. We believe that any midlife spring failures would be random, and individual.

3. In the Stateline Station MSIV closure test, it was found that over a large portion of the valve closure, the steam flow actually pull the disc into the seating position. A failure of some of the springs will reduce the closing force, but will have a minimum effect on the valve closure time.

4. The Fermi FSAR assumed a MSIV closure time of 10 second for offsite dosage calculation. The MSIV's are adjusted to close in 3 to 5 seconds. We would expect the closing time to be not more than 6 seconds even if all of the inner springs fail, or three outer spring fail. This would have no effect on the peak fuel cladding temperature. We would not expect to see these many springs to fail at one time in the same valve.

5. GE analyzed the potential tilt of the spring flange if up to four inner springs and four outer springs from two yoke rods failed. The deflection is not enough to cause the flange to rub against the yoke rods. If there are more spring failures in the same valve, the tilt would be lesser. Besides, the flanges are provided with rollers that would provide a good wear contact between the flange and the spring flange. Hence we would not expect the tilt of the spring flange to inhibit valve closing motion.

6. As the valve closes, the gap between the spring coils would increase. Hence we would not expect a broken spring coil to be lodged between coils of another spring and prevent the complete seating of the valve disc.

7. If some spring fail, the force on the spring flange would be uneven. The seating force is certainly reduced. However the actuator contributes over 60% of the closing force, not accounting the force contributed by the flow stream. We would not expect the broken spring to significantly affect the local leak rate test result.

8. The broken inner spring was determined by testing to be more brittle than we would have expected for the material. We believe that the spring failures are related to the heat treatment and the quenching procedure. Even though we could not isolated the batch of material that might be susceptible to this kind of failure, we do not believe it is generic. As the outer spring is made of a larger diameter rod; ie, a different heat of material, we would not expect them to be as brittle or as susceptible to fracture. Of all the MSIV's in used in the BWR's, we have only heard of the failures in Fermi and one broken spring in Peach Bottom. If the problem is really widespread, we would expect to see more failures.

9. At this point, we certainly do not expect any spring to fail imminently. However we just could not rule out the possibility that some spring might fail in service. While the effect of spring failure is expected to be acceptable, we feel an overload screening test to be prudent and should be conducted at a scheduled outage.