Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

August 5, 1982

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Zion Station Units 1 and 2
Proposed Change to Facility
Operating License Nos. DPR-39
and DPR-48 (Instrument
Functional Testing)
NRC Docket Nos. 50-295 and 50-304

Reference (a): July 20, 1981 letter from
R. F. Heishman to Cordell Reed.

Dear Mr. Denton:

Commonwealth Edison hereby requests a change to Facility Operating License Nos. DPR-39 and DPR-48 for Zion Station. Changes are requested to the frequency at which the Reactor Protection and Engineered Safeguard instrumentation must be functionally tested. Also included are corrections to inaccurate device designations on pages 33 and 133a of the Technical Specifications.

The existing Technical Specifications require that the instrumentation loops associated with automatic actuation of Reactor Trip or Safety Injection undergo a monthly Channel Functional Test. This test verifies the calibration of comparator setpoints. The proposed change will reduce the frequency of the Channel Functional Test from monthly to quarterly. This change will reduce the probability of inadvertant reactor trips/safety injections due to testing. In I.E. Inspection Report Nos. 50-295/81-09 and 50-304/81-05 (reference (a)), the NRC acknowledged that instrument functional testing has resulted in unnecessary transients and challenges to plant safety systems, and Commonwealth Edison was requested to take steps to reduce the likelihood of such challenges.

An evaluation was performed in which the results of monthly instrument functional testing over a three and one-half year period were examined. Over this period, only 0.094% of the setpoints checked resulted in deviations from their nominal values. Over the same period, there were five inadvertant reactor trips/safety injections due to testing. It was determined (see Attachment A) that changing the required test frequency from monthly to quarterly would reduce the number of inadvertant trips by approximately one per year.

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Changing the test frequency would produce a corresponding increase in the number of setpoint deviations, but only from 0.094% and 0.245%. An increase of this magnitude would have neglible effect on the overall reliability of the Reactor Protection or Engineered Safeguards system. This is due to the degree of redundancy and diversity inherent in the design of the instrumentation systems.

Pursuant to 10 CFR 170, Commonwealth Edison has determined that the proposed amendment is a combined Class III and Class I amendment. As such, Commonwealth Edison has enclosed a fee remittance in the amount of $4,400 for this amendment.

Please address questions regarding this matter to this office.

Three (3) signed originals and thirty-nine (39) copies of this transmittal are provided for your use.

Very t uly yours,

F. G. Lentine

F. G. Lentine
Nuclear Licensing Administrator

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Attachments

cc: D. W. Hayes
NRC Region III

SUBSCRIBED and SWORN to
before me this 5th day
of August, 1982

Notary Public

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ATTACHMENT A

Problem 1:

Find the percent of the reactor protection or safeguard setpoints checked which result in deviations. Extrapolate to find the percent of deviations per setpoint checked if the functional tests are performed quarterly instead of monthly.

Calculation 1:

1.0 The reactor protection or safeguard setpoint deviation rate per year found during functional testing on both Units 1 and 2 is 2.86 (DEV/YR). This number is based on the data for the period 1-1-78 to 6-30-81 during which 10 setpoint deviations were found.

$$DEVR = \frac{10 \text{ deviations}}{3.5 \text{ years}} = 2.86 \text{ DEV/YR}$$

2.0 The Instrument Maintenance department performs 62 functional test monthly on each unit. A functional test consists of one or more reactor protection, safeguard, or control systems' setpoints being verified. Therefore, one functional test can result in the verification of several reactor protection and safeguard systems' setpoints. Indeed, the 62 functional tests done monthly, result in the verification of 146 reactor protection and safeguard system setpoints monthly.

$$SPC = \frac{146 \text{ setpoints checked}}{\text{monthly set of functional tests}}$$

3.0 The monthly set of 62 functional tests was performed 73 times during the period from 1-1-78 to 6-30-81 for both Units 1 and 2 combined. Therefore, the rate of performing the set of functional tests per year with monthly testing was:

$$FTR(M) = \frac{73 \text{ monthly sets of functional tests}}{3.5 \text{ years}} = 20.86 \frac{\text{sets of funct tests}}{\text{year}}$$

If the set of the functional tests is done quarterly instead of monthly, then the rate of performing the set of functional tests per year is:

$$FTR(Q) = \frac{8 \text{ sets of funct tests}}{\text{year}}$$

4.0 Utilizing sections 1.0 through 3.0 the percent of reactor protection or safeguard setpoints checked which results in deviations can be calculated:

$$DSC = \% \frac{\text{deviations}}{\text{setpoints checked}} = \frac{(100)(DEVR)}{(SPC)(FTR)}$$

For monthly functional testing, we have:

$$DSC(M) = \frac{(100)(2.86)}{(146)(20.86)} = 0.094\% \frac{\text{deviations}}{\text{setpoints checked}}$$

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For quarterly functional testing, we have:

$$DSC(Q) = \frac{(100)(2.86)}{(146)(8)} = 0.245\% \frac{\text{deviations}}{\text{setpoints checked}}$$

Where the assumption has been made that the deviations per year found during functional testing are independent of the functional testing frequency and are given by the empirical result of 2.86 deviations/year as shown in Secton 1.0.

Problem 2:

Find the number of reactor trips per year while performing functional testing. Extrapolate to find the number of reactor trips per year if the functional tests are performed quarterly instead of monthly.

Calculation 2:

During the period from 1-1-78 to 6-30-81, 5 inadvertent reactor trips/safety injections occurred due to functional testing.

Therefore, for monthly functional testing we have:

$$\frac{5 \text{ reactor trips}}{3.5 \text{ years}} = 1.43 \text{ trips/year}$$

To calculate the number of reactor trips per year if the functional tests are performed quarterly, we make the reasonable assumption that the probability of an inadvertent reactor trip is proportional to the frequency of functional testing. Using the data from Section 3.0 that there were 20.86 sets of functional tests/year performed for monthly testing we have:

$$\frac{\text{Fraction of trips}}{\text{Set of funct tests}} = \frac{1.43 \frac{\text{trips}}{\text{year}}}{20.86 \frac{\text{sets of funct tests}}{\text{year}}} = 0.0686 \frac{\text{trips}}{\text{set of funct tests}}$$

Therefore, for quarterly functional testing we have:

$$\left(0.0686 \frac{\text{trips}}{\text{set of funct tests}}\right)\left(8 \frac{\text{sets of funct tests}}{\text{year}}\right) = 0.55 \text{ trips/year}$$

In summary, monthly functional testing results in:

1.43 trips/year

As compared to:

Quarterly functional testing, which would result in:

0.55 trips/year

Therefore quarterly functional testing will reduce unnecessary reactor trips by 0.88 trips/year.