



THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

P.O. BOX 5000 - CLEVELAND, OHIO 44101 - TELEPHONE (216) 622-9800 - ILLUMINATING BLDG. - 55 PUBLIC SQUARE

Serving The Best Location in the Nation

MURRAY R. EDELMAN

VICE PRESIDENT
NUCLEAR

March 21, 1985
PY-CEI/NRR-0201 L

Mr. B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Perry Nuclear Power Plant
Docket Nos. 50-440; 50-441
Response to Additional Staff
Questions Pertaining to the
Perry Nuclear Power Plant SPDS

Dear Mr. Youngblood:

This letter and its attachments are provided in response to your staff's questions (dated January 24, 1985) pertaining to the Safety Parameter Display System (SPDS) for the Perry Nuclear Power Plant.

The information provided in the attachments will be incorporated into a future amendment to the FSAR. If you have any questions, please feel free to call me.

Very truly yours,

Murray R. Edelman
Vice President
Nuclear Group

MRE:njc

Attachments

cc: Jay Silberg, Esq.
John Stefano (2)
J. Grobe
S. Brown

8503260333 850321
PDR ADOCK 05000440
F PDR

Boo/ 1/1

420.08 ISOLATION DEVICES

Provide the following:

- a. For each type of device used to accomplish electrical isolation, describe the specific testing performed to demonstrate that the device is acceptable for its application(s). This description should include elementary diagrams when necessary to indicate the test configuration and how the maximum credible faults were applied to the devices.
- b. Data to verify that the maximum credible faults applied during the test were the maximum voltage/current to which the device could be exposed, and define how the maximum voltage/current was determined.
- c. Data to verify that the maximum credible fault was applied to the output of the device in the transverse mode (between signal and return) and other faults were considered (i.e., open and short circuits).
- d. Define the pass/fail acceptance criteria for each type of device.
- e. Provide a commitment that the isolation devices comply with the environmental qualifications (10 CFR 50.49) and with seismic qualifications that were the basis for plant licensing.
- f. Provide a description of the measures taken to protect the safety systems from electrical interference (i.e., Electrostatic Coupling, E.I. Common Mode and Crosstalk) that may be generated.

Response

The GESSAR II SPDS SER (Section III.G) addressed electrical and electronic isolation and concluded that the fiber optics are acceptable for interfacing the ERIS/SPDS with safety systems. The fiberoptic cable system supplies the necessary electrical isolation to meet all requirements of maximum credible faults and electrical interference considerations. In addition, General Electric has performed environmental (IEEE-323-1974) and seismic (IEEE-384-1975) qualification tests as part of the qualification program for the isolators.

620.01 HUMAN FACTORS PROGRAM

Provide a description of the display system, with emphasis on its human factored design, and the methods and results of a human factors program to ensure that the displayed information can be readily perceived and comprehended so as not to mislead the operator. Color photographs or reproductions of display pages and interface devices may be helpful in supporting the discussion.

Response

The GESSAR II SPDS SER (Section III.F) addresses this concern. Also see Reference 1 for response to open items in the GESSAR II SPDS SER.

References

- 1) Letter, H.C. Pfefferlen to L. Beltracchi, "Open Items from Draft SER on GESSAR II SPDS", December 20, 1984.

620.02 DATA VALIDATION

Describe the method used to validate data displayed in the SPDS. Also describe how invalid data is defined to the operator.

Response

Data validation is addressed in the GESSAR II SPDS SER (Section III.E). The review concluded that means are provided in the SPDS design to assure that the data displayed are validated.

620.03 VERIFICATION AND VALIDATION PROGRAM

Define and discuss the Verification and Validation Program Plan which was used in the development of the SPDS. Also, describe results to date from the Verification and Validation Program, and the corrective actions taken to address identified design deficiencies.

Response

Verification and Validation includes many activities which take place through the entire design and implementation process. The GESSAR II SPDS SER (Section III.C) addressed this and concluded that the Verification and Validation Program is being effectively applied. General Electric is presently conducting verification and validation tests to assure that the performance of the system meets SPDS requirements. The results of these tests will be addressed in a future supplement to the GESSAR II SPDS SER. The validation of the Perry Nuclear Power Plant SPDS is based on the above plus plant startup testing to verify that the values displayed on the SPDS are accurate and that parameters are consistent with normal control room indications.

620.04 UNREVIEWED SAFETY QUESTIONS

Provide conclusions regarding unreviewed safety questions or changes to technical specifications.

Response

The implementation of the Perry Nuclear Power Plant SPDS does not include an unreviewed safety question or require a change in the Perry Technical Specifications.

620.05 IMPLEMENTATION PLAN

Provide a schedule for full implementation of the SPDS including hardware, software, operator training, procedures and user's manuals.

Response

The SPDS implementation plan shall be broken into the following three phases:

1. SPDS (Safety Parameter Display System) to be operable by fuel load. At this point in time, operable shall be defined as follows:
 - A. The RTAD computer (which is part of the Perry ERIS installation) has been installed, is powered up and loaded with conditionally released "V" & "V" software. (Some modifications to the software may be required during power ascension testing).
 - B. The plant measured signal inputs required to drive the SPDS displays are installed. That is, the connections to the inputs are complete and the computer response to excitation of the input signals has been functionally checked.
 - C. The computer data bases relative to the inputs required to drive the SPDS displays have been loaded into the RTAD computer. (Some modifications to the data bases will be required during power ascension testing).
 - D. The SPDS displays have been loaded onto the graphic display consoles and communication with the RTAD computer has been verified.
2. After fuel load and before completion of the 100% power warranty run, the SPDS shall be fine tuned to the Perry Plant Specifics.
 - A. During power ascension testing, the data bases will be established/corrected to finalize the conditions that will cause the displays to react.
 - B. During power ascension testing some displays will have their base parameters verified, which may necessitate revision of the display formats.
 - C. During power ascension testing, the SPDS displays will be verified to respond properly to the plant conditions that exist during the different phases of the testing program.
 - D. During power ascension testing, some modifications may be required to the software. These changes will be handled in a controlled manner.

3. Within 30 days of completion of the start-up program, the SPDS will be fully implemented.
 - A. All SPDS displays will have completed testing.
 - B. The conditional release on the "V" & "V" software will be removed.
 - C. Technical Instructions/user manuals explaining how to call up a display will have been written.
 - D. Operators will have been trained on the Perry displays and how they relate to the EPG's.
 - E. Personnel who are assigned to maintain the RTAD computer will have been trained on the SPDS software and how to maintain it. Restart procedures will also be included in the training.

640.55 PARAMETER SELECTION

Provide the list of selected parameters which are sufficient to provide information to plant operations about:

1. Reactivity control
2. Reactor core cooling and heat removal from the primary system.
3. Reactor coolant system integrity.
4. Radioactivity control.
5. Containment conditions.

640.56 Provide further discussion concerning why the safety analysis that was the basis for the Perry Emergency Procedure guidelines is also an adequate basis for the selection of SPDS parameters. The discussion should address the representativeness of selected parameters over normal and abnormal conditions for the five critical safety functions listed above.

Response

These are addressed in the GESSAR II SPDS SER (Section III.D), and NEDE-30284 P. The staff found the variable selection acceptable and consistent with the approved BWR EPGs (Revision 3) if displays for process radiation, reactor building radiation, and vent and exhaust radiation were included. The Perry Nuclear Power Plant ERIS has incorporated these enhanced displays.