AUG 17 1984

Mr. Daniel I. Herborn
Director
Nuclear Licensing & Configuration Management
Nuclear Station Engineering
Clinton Power Station
P. O. Box 678
Clinton, Illinois 61727

Dear Mr. Herborn:

Re: Request for Additional Information Concerning the Safety Parameter Display System (SPDS) for Clinton Power Station

The staff is evaluating your October 28, 1983, and February 10, 1984, submittals related to the SPDS. Based on our review we have determined there is a need for additional information which is identified in the enclosure.

It is requested that you provide a response within 60 days of the date of this letter so the staff has adequate time to perform its on-site audits before plant licensing. Any questions concerning this request should be directed to Byron Siegel, Licensing Project Manager, at (301) 492-8344.

Sincerely,

/S/

A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing

Enclosure: As stated

cc: See next page

DL:LB#2/LA	DL:LB#2/PM	DL:LB#2/BC
PShuttleworth	BSiegel:bdm	ASchwencer
8/15/84	8/17/84	8/15/84

Distribution:
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Clinton

Mr. Daniel I. Herborn
Director-Nuclear Licensing &
Configuration Management
Nuclear Station Engineering
Clinton Power Station
P. O. Box 678
Clinton, Illinois 61727

Mr. D. P. Hall
Vice President
Clinton Power Station
P. O. Box 678
Clinton, Illinois, 61727

Mrs. K. A. Baker
Staff Engineer - Licensing
Nuclear Station Engineering
Clinton Power Station
P. O. Box 678
Clinton, Illinois 61727

Mr. H. R. Victor
Manager-Nuclear Station Engineering Dpt.
Clinton Power Station
P. O. Box 678
Clinton, Illinois 61727

Sheldon Zabel, Esquire
Schiff, Hardin & Waite
7200 Sears Tower
233 Wacker Drive
Chicago, Illinois 60606

Mr. Fred Christenson
Resident Inspector
U. S. Nuclear Regulatory Commission
RR 3, Box 229 A
Clinton, Illinois 61727

Mr. R. C. Heider
Project Manager
Sargent & Lundy Engineers
55 East Monroe Street
Chicago, Illinois 60603

Mr. L. Larson
Project Manager
General Electric Company
175 Curtner Avenue, N/C 395
San Jose, California 95125

Mr. Allen Samelson, Esquire
Assistant Attorney General
Environmental Control Division
Southern Region
500 South Second Street
Springfield, Illinois 62706

Jean Foy, Esquire
511 W. Nevada
Urbana, Illinois 61801

REQUEST FOR ADDITIONAL INFORMATION

CONCERNING THE

CLINTON 1

SAFETY PARAMETER DISPLAY SYSTEM

Instrumentation and Control Systems Information

420.01 - 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 the seismic qualifications which 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, EMI, Common Mode and Crosstalk) that may be generated by the SPDS.

Human Factors Engineering Information

620.01 Distributed Displays

The applicant has proposed an SPDS that provides information regarding four critical safety functions (CSF) on one cathode ray tube (CRT) while providing information regarding radioactivity control (the fifth CSF) on a separate CRT approximately eight feet away. The following questions address the feasibility of such an approach.

a. The applicant argues that no cueing is necessary on the primary SPDS to alert the operator to changes in status on the ARM/PRM because the ARM/PRM has an audible alarm.

   1. Provide evidence that the ARM/PRM audible alarm is indeed audible to the operator under degraded conditions, i.e., when annunciator alarms are sounding, etc.

   2. Describe the conditions under which an ARM/PRM audible alarm will sound, and the characteristics of the alarm(s), i.e., duration, frequency, and intensity.

b. The applicant argues that although the ARM/PRM is approximately eight feet from the primary SPDS display and is not easily read from that distance, the ARM/PRM sufficiently provides an overview

of radioactivity control status because it provides an easily recognizable pattern (a schematic of the plant) which is overlaid with distinctive color changes when changes in radiation monitoring status occur.

1. Provide an explanation why the inconsistent use of color code meanings will not mislead the operator; that is, since yellow denotes "normal" on the primary SPDS display but denotes "abnormal" or "trending high" on the ARM/PRM, there seems to be a risk of the operator misinterpreting a yellow data point as being "normal" on the ARM/PRM portion of the SPDS when it is actually trending high.
2. Provide discussion/analysis explaining why control of the ARM/PRM displays from the primary SPDS area is unnecessary. The dis ussion should address the situation in which the ARM/PRM has been switched to a lower level display rather than the "status grid display" and has been left in that condition.
3. Provide a diagram of the control room showing the primary SPDS display location, the ARM/PRM location, the distance between the two locations, and the viewing angle.

620.02 Color Coding

The color codes proposed for the Clinton SPDS (with the exception of the ARM/PRM portion) are inconsistent with stereotypical color meanings: green = go, normal; yellow = caution, abnormal; red = warning, danger.

a. Explain why the color coding of the SPDS cannot or should not be changed to be consistent with the population, convention and the ARM/PRM portion of the SPDS.

b. Explain why inconsistencies within the SPDS cannot or should not be resolved, i.e., presently, within the proposed SPDS yellow means either normal or abnormal, and normal conditions are denoted by the colors green, yellow, and blue.

620.03 Display Density/Readability

a. Provide an estimate of the density of the SPDS overview display with the "AIDS" function activated.

b. Describe the method used to estimate or measure display density.

c. Identify character size in inches or millimeters and in pixels.

Note: Provide for both SPDS and ARM/PRM if they are different.

620.04 Data Updating

The applicant stated on page 13 of its February 10, 1984 submittal that "The (data) update rate will be selected based upon human factors considerations."

Provide further detail concerning this statement, e.g., selection criteria used.

620.05 Verification and Validation

a. Insufficient information was provided to evaluate the adequacy of the simulated input used in validation testing. Specifically, the identification of the transient and accident sequence test case used for performance tests of the SPDS should be provided and justified. If a specific parameter is not testable in a fully simulated transient sequence, the source of the validation data should be identified.

b. Provide a summary description of the validation testing planned for the total, integrated system, that is the simultaneous testing of the hardware, software, personnel, procedures/manuals, and training.

620.06 Data Validation

a. Identify which safety parameters (if any) are validated by comparing redundant data points in real time.

b. Provide a description of the method(s) used to validate calculated parameters.

c. Provide the design rationale for indicating non-valid values by presenting the last good value displayed in white. The discussion should focus on why the proposed method is most meaningful and least misleading to the operator.

d. Compare and contrast the data validation methods used within the ARM/PRM with the data validation methods used in the balance of the SPDS. Include a comparison of the display methods used to identify a) valid data, b) unvalidated data, and c) invalid data.

620.07 Unresolved Safety Questions

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

620.08 Implementation Plan

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