October 22, 1984

Docket Nos. 50-259/260/296

Mr. Hugh G. Parris
Manager of Power
Tennessee Valley Authority
500A Chestnut Street, Tower II
Chattanooga, Tennessee 37401

Dear Mr. Parris:

SUBJECT: SAFETY PARAMETER DISPLAY SYSTEM

Re: Browns Ferry Nuclear Plant, Units 1, 2 and 3

By letter dated July 30, 1984, you provided general design criteria for the Safety Parameter Display System (SPDS) for the Browns Ferry Nuclear Plant. The submittal did not provide sufficient information for us to conclude that the system will achieve the objectives of NUREG-0737, Supplement 1. To complete our review and evaluation, and thus avoid any potential delay in your design effort, we need the additional information discussed in the enclosure to this letter. Therefore, we request a response within 60 days of receipt of this letter.

This request for additional information is specific to one licensee. The reporting and/or recordkeeping requirements contained in this letter affect fewer than ten respondents; therefore, OMB clearance is not required under P.L. 96-511.

Sincerely,

Original signed by/

Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

Enclosure:
As stated

cc w/enclosure:
See next page

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[illegible] Dec. [illegible]/90 [illegible]

Mr. [illegible] L. [illegible]
[illegible] of [illegible]
[illegible] Air Support
[illegible] Headquarters, [illegible]
[illegible], [illegible] 22202

Dear [illegible]:

SUBJECT: [illegible] Power Management System

Re: [illegible] Power Management Plan, [illegible]

By letter dated July 20, 1990, you requested [illegible] design assistance from the Corps's Engineering Research Laboratory (CERL) for the Power [illegible] Plan. The [illegible] provide the [illegible] assistance [illegible] that the [illegible] achieve the objectives of "[illegible]-220". [illegible]. To complete our review, analysis, and evaluation, and then [illegible] any [illegible] in your design [illegible], we need the additional information [illegible] in the enclosure to this letter. Upon receipt of this information, we request a [illegible] days [illegible] of receipt of this letter.

The request for additional information is specific to one [illegible]. The [illegible] and/or recommendations [illegible] in this letter [illegible] Corps [illegible] and recommendations. Please [illegible] the [illegible] requested under [illegible] 32.

Sincerely,

[illegible]

[illegible]
[illegible]
[illegible]

Enclosure
As stated

cc w/encl only
[illegible]

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

Mr. Hugh G. Parris
Tennessee Valley Authority
Browns Ferry Nuclear Plant, Units 1, 2 and 3

cc:

H. S. Sanger, Jr., Esquire
General Counsel
Tennessee Valley Authority
400 Commerce Avenue
E 11B 330
Knoxville, Tennessee 37902

Mr. Ron Rogers
Tennessee Valley Authority
400 Chestnut Street, Tower II
Chattanooga, Tennessee 37401

Mr. Charles R. Christopher
Chairman, Limestone County Commission
Post Office Box 188
Athens, Alabama 35611

Ira L. Meyers, M.D.
State Health Officer
State Department of Public Health
State Office Building
Montgomery, Alabama 36130

Mr. H. N. Culver
249A HBD
400 Commerce Avenue
Tennessee Valley Authority
Knoxville, Tennessee 37902

James P. O'Reilly
Regional Administrator
Region II Office
U. S. Nuclear Regulatory Commission
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

U. S. Environmental Protection Agency
Region IV Office
Regional Radiation Representative
345 Courtland Street, N. W.
Atlanta, Georgia 30308

Resident Inspector
U. S. Nuclear Regulatory Commission
Route 2, Box 311
Athens, Alabama 35611

Mr. Donald L. Williams, Jr.
Tennessee Valley Authority
400 West Summit Hill Drive, W10B85
Knoxville, Tennessee 37902

George Jones, Manager, BFNP
Tennessee Valley Authority
Post Office Box 2000
Decatur, Alabama 35602

Mr. Oliver Havens
U. S. Nuclear Regulatory Commission
Reactor Training Center
Osborne Office Center, Suite 200
Chattanooga, Tennessee 37411

James A. Coffey
Site Director, BFNP
Tennessee Valley Authority
Post Office Box 2000
Decatur, Alabama 35602

REQUEST FOR ADDITIONAL INFORMATION

CONCERNING THE

BROWNS FERRY UNITS 1, 2 AND 3

SAFETY PARAMETER DISPLAY SYSTEM

Each operating reactor shall be provided with a Safety Parameter Display System (SPDS). The Commission approved requirements for an SPDS are defined in NUREG-0737, Supplement 1. In the Regional Workshops on Generic Letter 82-33 held during March 1983, the NRC discussed these requirements and the staff's review of the SPDS.

Prompt implementation of the SPDS in operating reactors is a design goal of prime importance. The staff's review of SPDS documentation for operating reactors called for in NUREG-0737, Supplement 1 is designed to avoid delays resulting from the time required for NRC staff review. The NRC staff will not review operating reactor SPDS designs for compliance with the requirements of Supplement 1 of NUREG-0737 prior to implementation unless a pre-implementation review has been specifically requested by licensees. The licensee's Safety Analysis and SPDS Implementation Plan will be reviewed by the NRC staff only to determine if a serious safety question is posed or if the analysis is seriously inadequate. The NRC staff review to accomplish this will be directed at (a) confirming the adequacy of the parameters selected to be displayed to detect critical safety functions, (b) confirming that means are provided to assure that the data displayed are valid, (c) confirming that the licensee has committed to a human factors program to ensure that the displayed information can be readily perceived and comprehended so as not to mislead the operator, and (d) confirming that the SPDS will be suitably isolated from electrical and electronic interference with equipment and sensors that are used in safety systems. If, based on this review, the staff identifies a serious safety questions or seriously inadequate analysis, the Director of IE or the Director of NRR may require or direct the licensee to cease implementation.

The staff reviewed the SPDS safety analysis and implementation plan (Reference 1) provided by Tennessee Valley Authority. The staff was unable to complete its evaluation because of insufficient information. The following additional information is required to continue and complete the SPDS evaluation:

- ISOLATION DEVICES

  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 PROGRAM

Provide a description of the display system, its human factored design, and the methods used and results from a human factors program to ensure that the displayed information can be readily perceived and comprehended so as not to mislead the operator.

DATA VALIDATION

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

PARAMETER SELECTION

The staff recommends that specific consideration be given to the addition of the following parameters to the SPDS:

1. Suppression Pool Water Level

2. Primary Containment Isolation Status

3. Combustible gas (H_2 and O_2) concentrations in the primary containment.

Suppression Pool Water Level is a primary variable related to containment conditions and is an Entry Condition to the EPGs. It

is an indicator of the suppression pool heat absorption capability during accident situations and for long-term heat removal.

Containment isolation is an important parameter for use in making a rapid assessment of Containment Integrity. In particular, a determination that known process pathways through containment have been secured provides significant additional assurance of Containment Integrity.

Combustible gas parameters (H_2 and O_2) will be identified in future revisions of the EPGs and provisions for expanding the Browns Ferry SPDS to include these parameters should be provided. These parameters are related to the Containment Integrity Critical Safety Function.

The licensee has stated that the Radioactivity Control Critical Safety Function is adequately monitored through the parameters associated with the other four Critical Safety Functions. To provide a more direct measurement of Radioactivity Control, the staff recommends that the SPDS display include vent stack monitors and/or selected process radiation monitors and a containment radiation monitor for conditions when the stack and process monitors are isolated.

We recommend that the licensee address these parameters and their functions by:

1) adding these parameters to the SPDS,

2) providing alternate added parameters along with justification that these alternates accomplish the same safety functions for all scenarios, or

3) provide justification that parameters currently in the SPDS do in fact accomplish the same safety functions for all scenarios.

UNREVIEWED SAFETY QUESTIONS

Provide conclusions regarding unreviewed safety questions and changes to technical specifications as required by Section 4.2.b (page 8) of NUREG-0737, Supplement 1 (Generic Letter No. 82-33 dated December 17, 1982).

REFERENCES

1. Letter to: H. R. Denton, NRC, from L. M. Mills, Tennessee Valley Authority, Subject: Safety Analysis and Implementation Plan for the Safety Parameter Display, Browns Ferry Units 1, 2, and 3, July 30, 1984.