ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8907170139 DOC.DATE: 89/07/11 NOTARIZED: NO DOCKET #
FACIL:50-275 Diablo Canyon Nuclear Power Plant, Unit 1, Pacific Ga 05000275
50-323 Diablo Canyon Nuclear Power Plant, Unit 2, Pacific Ga 05000323
AUTH.NAME AUTHOR AFFILIATION
SHIFFER,J.D. Pacific Gas & Electric Co.
RECIP.NAME RECIPIENT AFFILIATION
Document Control Branch (Document Control Desk)

SUBJECT: Responds to Generic Ltr 89-06, "Task Action Plan Item I.D.2 - SPDS."

DISTRIBUTION CODE: A003D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 2
TITLE: OR/Licensing Submittal: Suppl 1 to NUREG-0737(Generic Ltr 82-33)
NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD5 LA	1	1	PD5 PD	7	7
	ROOD,H	1	1			
INTERNAL:	NRR/DLPQ/HFB 10	1	1	NUDOCS-ABSTRACT	1	1
	OC/LFMB	1	0	REG FILE 01	1	1
	RES/DSIR/EIB	1	1			
EXTERNAL:	LPDR	1	1	NRC PDR	1	1
	NSIC	1	1			

NOTE TO ALL "RIDS" RECIPIENTS:

PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK, ROOM P1-37 (EXT. 20079) TO ELIMINATE YOUR NAME FROM DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

TOTAL NUMBER OF COPIES REQUIRED: LTTR 17 ENCL 16

RIDS/ADDS

RIDS/ADDS

cc
MA4

Pacific Gas and Electric Company

77 Beale Street
San Francisco, CA 94106
415/972-7000
TWX 910-372-6587

James D. Shiffer
Vice President
Nuclear Power Generation

July 11, 1989

PG&E Letter No. DCL-89-187

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Re: Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
Response to Generic Letter 89-06, SPDS

Gentlemen:

In response to Generic Letter 89-06, "Task Action Plan Item I.D.2 - Safety Parameter Display System," PG&E has reviewed the DCPP Safety Parameter Display System (SPDS) against the informational guidance provided in NUREG-1342 and has determined that the SPDS cannot be certified fully to meet all of the NUREG-1342 guidance. However, PG&E believes that the SPDS is in compliance with the requirements of NUREG-0737, Supplement 1. The enclosure provides a discussion of those areas where the SPDS does not fully conform to the guidance provided in NUREG-1342 and further provides information compensatory actions.

PG&E will maintain supporting documentation for three years, which includes the completed checklist and photographs as required by the Generic Letter.

Kindly acknowledge receipt of this material on the enclosed copy of this letter and return it in the enclosed addressed envelope.

Sincerely,

J. D. Shiffer

cc: J. B. Martin
M. M. Mendonca
P. P. Narbut
H. Rood
B. H. Vogler
CPUC
Diablo Distribution

Enclosure

2780S/0069K/JHA/2232

A003
1 1

bcc: JLPortney
RCBueno (2)

2780S/0069K

ENCLOSURE

DISCUSSION OF DIABLO CANYON SAFETY PARAMETER DISPLAY SYSTEM
AND NRC GUIDANCE PROVIDED IN NUREG-1342

I. Regulatory Background

PG&E designed and implemented the Safety Parameter Display System (SPDS) in accordance with the requirements that existed in the 1981-1985 time frame. The initial SPDS design work was performed in 1981 and met the recommendations specified in NUREG-0696, "Functional Criteria for Emergency Response Facilities," issued in February 1981. The conceptual design was submitted to the NRC on November 6, 1981 and a contract was awarded to the Babcock and Wilcox Company in early 1982. The as-built SPDS also met the intent of the requirements of Supplement 1 to NUREG-0737, although Supplement 1 was not issued until December 17, 1982. Supplement 1 noted that the NRC would make allowances for work already done by licensees in a good-faith effort to meet the design requirements as they understood them. PG&E submitted a Safety Analysis on the SPDS, as required by Supplement 1. The NRC Staff reviewed PG&E's safety analysis dated April 1985, and in Supplemental Safety Evaluation Report (SSER) No. 31, concluded it was acceptable for PG&E to continue the implementation of the SPDS.

II. Description of the SPDS

The SPDS is implemented as a single display page, called the "Primary SPDS Display." This display provides the status of all five SPDS safety functions on a single display page. The primary SPDS display is provided on each of two SPDS monitors, Train A and Train B. In addition to the primary SPDS display, each train has several secondary displays. Five secondary displays specifically keyed to Emergency Operating Procedures (EOPs) and a summary table of radiation monitor output are provided on the Train A monitor. Six displays with Critical Safety Function (CSF) status trees corresponding to the Westinghouse Emergency Response Guidelines and DCPP EOPs are provided on the SPDS Train B monitor. In addition, there are three Pressure-Temperature (P-T) curve displays corresponding to heatup, cooldown, and natural circulation cooldown, and a core thermocouple map display provided on the Train B monitor. The display page is selected through use of a pushbutton panel mounted directly above the SPDS monitors in the control room and the Emergency Operations Facility (EOF).

III. Modifications to the SPDS

Software modifications currently in progress will revise all displays, including the primary SPDS display. The software modifications will incorporate human factors guidelines, including recommendations from the Control Room Design Review (CRDR) team, and a separate human factors review of the SPDS. The modifications will also revise the CSF trees to conform to the current Westinghouse Emergency Response Guidelines and DCPP EOPs. Modifications include replacing rate calculations on the primary SPDS display with trend arrows, and modifying alarm setpoints to avoid false alarm conditions (see section IV.C below). Other modifications include updating

labeling, units, and providing display of high and low level setpoints. In addition, the natural circulation cooldown P-T curve will be consolidated with the cooldown P-T curve as a singe display page.

Verification and validation testing will be performed on the system when the revised software is installed. The installation and testing is scheduled to be completed by September 30, 1989. Training material will be updated and operators will receive training on the changes to the SPDS in licensed operator requalification training by December 31, 1989.

IV. Comparision of SPDS Against NUREG-1342

In response to NRC Generic Letter 89-06, the following provides a discussion of the areas in which the SPDS does not fully conform to the guidance provided in NUREG-1342 and further provides information on compensatory actions.

A. NRC Guidance: NUREG-1342, Section III.F.1

NUREG-1342, Section III.F.1, "Minimum Plant Parameters for Display," lists 21 key parameters that the staff considers acceptable to depict the five safety functions identified in NUREG-0737, Supplement 1 (reference SPDS checklist items 2.2.2, 2.2.3, 2.2.5).

Discussion of Deviation from NUREG-1342

The primary SPDS display contains 16 of the 21 parameters listed in NUREG-1342, Section III.F.1. The five parameters not on the primary SPDS display are steam generator pressure, hot leg temperature, RHR flow rate, containment sump level, and containment hydrogen concentration. PG&E provided the staff with the parameters to be displayed on the primary SPDS display in the PG&E safety analysis report in August 1983. After discussions with the staff, PG&E committed to including steam generator pressure, hot leg temperature, RHR flow rate and containment sump level on secondary displays. The staff concluded in SSER No. 31 that all parameters recommended by the staff were provided on the DCPP SPDS with the exception of containment hydrogen concentration. SSER 31 indicated that staff review of the Diablo Canyon plant specific emergency response guidelines should be completed before considering the need for display of the containment hydrogen concentration in the SPDS. The staff is currently scheduled to review the DCPP ERGs and EOPs in December 1989.

Compensatory Action

As indicated above, steam generator pressure, hot leg temperature, RHR flowrate, and containment sump level are included in the secondary displays. This was determined to be acceptable in SSER 31. SPDS display of the containment hydrogen concentration is not provided, but is indicated on the post-accident monitoring panel. No further actions are planned with respect to the set of plant parameters displayed on the SPDS.

B. NRC Guidance: NUREG-1342, Section III.B.2.

NUREG-1342, Section III.B.2, "Continuous Display," describes the criteria for providing a continuous display of the SPDS safety functions. The staff indicates that an SPDS should provide either a continuous display of the five SPDS safety functions or perceptual cueing (audio or visual) to alert the SPDS operator to changes in the safety status of the plant (reference SPDS checklist item 3.3).

Discussion of Deviation from NUREG-1342

The SPDS primary display is not continuously displayed on the Train A or Train B monitors. The SPDS does not fully meet either of the criteria discussed above. Perceptual cueing is provided on the CSF status tree displays, but not on all secondary displays.

Due to the limited number of inputs to each tree, visual cueing is provided on each of the six CSF status trees to alert the SPDS user to the status of all CSF status trees. The cueing is in the form of a numeral representing each CSF status tree. The numerals change color to correspond to the end state of the CSF trees. The color coding provides an indication of the priority of the CSF status tree. The CSF status trees provide indication of four of the five SPDS status trees; indication of the radiation SPDS safety function is not provided by any of the CSF status trees. Under certain circumstances, the displays selected may not include either the SPDS primary display or the CSF status trees. However, the secondary displays provide a significant subset of the parameters used to determine the status of the SPDS safety functions.

Compensatory Action

Inclusion of the primary SPDS parameters into perceptual cues on all secondary displays was considered during the design of the SPDS software modifications in progress. Inclusion of such cues causes the secondary displays to be updated at a much slower rate than the existing system. Depending on the number of inputs and software routines, the resulting real time data would be updated three to five seconds slower than the present system. This was judged to be unsatisfactory.

The SPDS user is trained to use the SPDS in addition to the other control room indication in diagnosing the plant safety status. The primary SPDS display is continuously available for display to the SPDS user. PG&E believes that the perceptual cueing provided on the CSF status tree displays and the information provided on the secondary displays, in conjunction with the main annunciator and other control room indications, provides sufficient information to the user of the SPDS to assess the plant safety status.

No further compensatory action is planned with respect to the provision of additional visual or audio cueing for the SPDS.

C. NRC Guidance: NUREG-1342, Sections III.A.3 and III.A.3.a.

NUREG-1342, Section III.A.3, "Reliability," and III.A.3.a, "Data Validity," provide criteria for determining system reliability and data validity. Among the various types of invalid parameter displays are inadequate calculation algorithms and setpoints which place parameters in false alarm states (reference SPDS checklist items 4.7, 4.8).

Discussion of Deviation from NUREG-1342

The SPDS primary display provides rate data for parameters in the RCS integrity, core cooling, containment integrity, and reactivity control safety functions. Rate data are also displayed on some of the secondary displays. Some of these rate data are frequently incorrect; however, the parameter data from which the rates are derived are displayed correctly. These rate calculations are inaccurate due to the calculation algorithm.

Some of the radiation monitor parameters displayed on the primary and secondary SPDS displays have alarm setpoints that lead to alarm status while the parameter is indicating a nominal range.

Compensatory Actions

The calculated rates on the primary SPDS display will be replaced with more reliable trend arrows when the revised SPDS software is installed. Other rate calculations displayed on the secondary displays will be replaced with more reliable calculation algorithms. Since these rates are inaccurate they do not match the plant computer calculated rates. Calculated values displayed on the SPDS will be checked against the plant computer calculated values during the verification and validation testing.

Software modifications currently in progress will correct the radiation monitor setpoints so that the SPDS safety functions will not be in a false alarm state.

D. NRC Guidance: NUREG-1342, Section III.B.1

NUREG-1342, Section III.B.1, "Convenient Location," indicates that the SPDS be in the control room and that it be convenient to the user (reference SPDS checklist item 5.2).

Discussion of Deviation from NUREG-1342

As discussed above, the SPDS displays are selected by means of a pushbotton panel located above the SPDS monitors in the control room. There are other controls which may be required to reset the SPDS should a malfunction occur. These controls are the power and reset circuitry for the SPDS computer, the video generator, and the data acquisition system. These controls are located in the Technical Support Center.

Compensatory Actions

While no reliability data have been kept on the SPDS system, it has proven to be very reliable, and the reset controls are rarely required for SPDS operation. The only controls normally required to operate the SPDS are located on the pushbotton panels in the control room. PG&E believes that the SPDS complies with the intent of the requirement for convenient location of the SPDS and plans no compensatory action for the control location.