LOUISIANA POWER & LIGHT / 142 DELARONDE STREET
P. O. BOX 6008 • NEW ORLEANS, LOUISIANA 70174 • (504) 366-2345
MIDDLE SOUTH UTILITIES SYSTEM

November 6, 1984

W3P84-3130
3-A1.01.04
A4.05

Director of Nuclear Reactor Regulation
Attention: Mr. G.W. Knighton, Chief
Licensing Branch No. 3
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUBJECT: Waterford SES Unit 3
Docket No. 50-382
Safety Parameter Display System (SPDS)

REFERENCES: (1) Letter dated August 6, 1984
from Knighton (NRC) to Leddick (LP&L)
(2) W3P84-2366 dated August 27, 1984

Dear Sir:

In your Reference (1) letter you requested additional information resulting from the Staff review of the Waterford 3 SPDS. By Reference (2) LP&L responded to the questions concerning SPDS isolation from safety-related systems.

Enclosed please find the remaining responses to the Human Factors Engineering Branch questions on SPDS. It is worthwhile to note that these responses are based upon the present configuration of SPDS. As operational experience is gained and the Control Room Design Review completed (Spring, 1985), LP&L expects the SPDS to evolve to meet the needs of the operators.

Should you have any questions or comments on this response please contact Mike Meisner at (504) 595-2838.

Yours very truly,

K.W. Cook

K.W. Cook
Nuclear Support & Licensing Manager

KWC/MJM/pcl

Attachment

cc: W.M. Stevenson, E.L. Blake, J.T. Collins, D.M. Crutchfield,
J. Wilson, G. Lipinsky, G.L. Constable

3001
1/1

RESPONSE TO HFEB QUESTIONS
ON THE WATERFORD 3 SPDS

620.01 (a) The control room operators have two full function SPDS CRTs for their use. Providing full function CRTs allows the operators faster access to SPDS information. When the operator utilizes one CRT to display information on a specific safety function, the second CRT can be used to display the associated trend display. This will aid the operators in quickly determining the safety status of the plant systems. Dedicating a CRT to just the Parameter Summary display could delay the operator in accessing information he desires. By allowing operators the option of alternating between the Parameter Summary display and more detailed displays, the SPDS can be utilized to its fullest extent. The operators can be trained to normally display the Parameter Summary mimic on one of the CRTs. The Parameter Summary is also the default display when the main menu reset function is used.

(b) The software driving the equipment for the TSC and EOF is designed to preclude the possibility of actions taken on the TSC or EOF SPDS from affecting the display or operation of the control room SPDS. No on-line test or simulation software is planned for the SPDS system. Following operations, necessary testing will be performed on an off-line duplicate system.

(c) The draft EPRI Guidelines - Integrating Human factors Engineering into Nuclear Power Plant Design has been used to establish the display conventions for the SPDS.

Orange was chosen as the color for the special messages listed in response to Question 620.01(d). Orange is not used for any other function so as to enhance the significance of the message. The messages will notify the operator of information which is of a critical nature. Yellow was chosen as the color for indeterminate conditions. It is used to ensure the operator is aware that position, flow, speed, etc. is not known. It is important to notify the operator what information is not available as well as what is available.

(d) The following is a current list of messages generated by the SPDS. The messages are easily understood when viewed on the applicable display. A brief description is included here for clarity.

ALL CEAS DROPPED	
EFAS 1A EFAS 1B EFAS 2A EFAS 2B	This will indicate which EFAS signals are present
SIS LEAK DETECTED	This will appear if the HPSI line reaches 1000 PSIG or the LPSI line reaches 300 PSIG.
CCW LEAK DETECTED	This will appear if any CCW radiation monitor reading is high.
REACTOR VESSEL HEAD FLANGE LEAK DETECTED	This will appear if the reactor head gasket pressure is high.
RCP 1A RCP 1B RCP 2A RCP 2B	This will indicate which RCP flange is leaking.
CNTMT FAN COOLER DRN FLOW DETECTED	This will appear when the condensate flow from coolers is high.
RX BLDG +46 RX BLDG +21 RX BLDG -4 FHB +46 RAB +21 RAB -4 RAB -34 FHB +46 FHB -1 PROCESS	These items identify the general location of high radiation and direct the operator to the more detailed second level display.
CONTAINMENT SUMP LEVEL	This will appear when the sump level is high.
CONTAINMENT SUMP RADIATION	This will appear when the sump radiation level is high.
MAIN STEAM RADIATION	This will appear when the main steam radiation level is high.
CONDENSER GAS EXHAUST RADIATION	This will appear when the exhaust radiation level is high.

(e) Alphabetic codes were used to keep the display identifications simple and, therefore, avoid errors. Plant specific abbreviations usually require 4 to 6 letters and, sometimes, more than one word. Through the use of alphabetic codes the operator can specify a system display simply by typing a single letter. He can specify the coordinating trend display by typing the letter twice. Each SPDS location will have a Users Manual available for reference to the display identifiers.

(f) The information displayed in the Control Room, TSC, and EOF should be duplicated. Communication between the plant operators and the personnel in the TSC and EOF will be greatly improved by the availability of identical information in the identical format at each locations. Situations which may result in confusion or miscommunication during an emergency are not considered desirable.

(g) One outgrowth of the detailed control room design review (DCRDR) will be plant-specific conventions for color codes, etc. Because of the emphasis placed on the SPDS by NUREG 0737 Supplement 1, implementation of the SPDS will predate completion of the DCRDR. However, the plant computer will be reviewed during the DCRDR and resolution to human engineering discrepancies implemented as necessary.

620.02 Sensor validation is performed by comparing the sensor value to the applicable HI or LOW setpoint. The SPDS software will only consider inputs whose quality is either GOOD or INSERTED and adjust itself accordingly when performing any arithmetic operation on the data. If there are no GOOD or INSERTED qualities in the input data, the software will tag the data as BAD and place a series of asterisks (*) on the CRT screen.

620.03 The hardware and software is currently being tested via approved procedures. Following the completion of all hardware and software tests the system integration test is planned. Transient test cases will be used to drive the SPDS to confirm its capability to provide the plant operators with sufficient information. Trained plant operators will take part during the test to validate that the SPDS coordinates with their training and procedures, and allows for the rapid and reliable assessment of the safety status of the plant.

640.01 As noted by the NRC, the demand signal Containment Isolation Actuation Signal is used by the SPDS as a measure of containment isolation. The question further implies that direct measures such as valve position should also be provided on SPDS as "a sufficient indicator of containment isolation". The SPDS, being a non-safety related system, will not be employed by the operator as the sole means of confirmation of containment isolation. The emergency operating procedures require confirmation of CIAS actuations through qualified instrumentation indication in the

control room (with minor exceptions noted in W3P84-3029 dated November 6, 1984). Regardless of the level of detail included in the SPDS, the independent control room confirmation of containment isolation must still be performed and, therefore, the present information conveyed by the SPDS is sufficient for the operator.

640.02 System testing of the plant computer is presently being performed. This will include validation testing of all plant input utilized by the SPDS. It is important to note that the SPDS for Waterford 3 did not involve new hardware implementation. The SPDS is a software implementation on the pre-existing plant computer which utilizes data points in the plant computer's data base. The validation of that data base is performed during testing of the plant computer independent of the SPDS. The SPDS will be tested, utilizing transient cases presently under development, as described in response to Question 620.03.