Washington Public Power Supply System
A JOINT OPERATING AGENCY

P. O. Box 968 3000 Geo. Washington Way Richland, Washington 99352 Phone (509) 375-5000

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U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Emergency Preparedness Program Office
Washington, D.C. 20555

Attention: Mr. Steve L. Ramos (Mail Stop Phillips 242)

Gentlemen:

Subject: WPPSS COMMENTS ON DRAFT NUREG-0696

The subject document, entitled "Functional Criteria for Emergency Response Facilities" has been reviewed for application to our nuclear projects (WNP-1, 2, 3, 4, 5). Specific comments are provided in the attachment. In general, the Supply System regards the subject document as a substantial and unilateral escalation of all criteria and requirements previously set forth by the NRC and generally agreed upon by the NRC and industry through workshop meetings, NUREG-0578, NUREG-0585, NUREG-0654, Mr. Eisenhut's letter to All Operating Nuclear Plants of March 12, 1980, and NUREG/CR-1451. The areas of substantial disagreement are: (1) unavailability requirements, (2) Operating Basis Earthquake requirements for the SPDS, and (3) independency of emergency response data from the plant process computer.

The requirements in the above noted areas are not technically justifiable or feasible, will require a substantial R&D effort to implement, and could not be implemented in the desired time frame. It is the opinion of the industry and the Kemeny Commission that the use of a computer should be encouraged for aiding the operator. However, the specified unrealistic requirements may force the designer to use hard wired systems, thereby losing the flexibility of computer systems.

The systems which would have met previous requirements at a cost of $1 to 2 million per plant will no longer be acceptable if the subject document's requirements persist. A preliminary estimate indicates that there will be an increase in the cost per plant by a factor of 5 to 10 to meet the requirements of the subject document. This cost increase can not be justified for information systems used only during abnormal conditions.

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We appreciate the opportunity to review and comment on NUREG-0696 and trust that our comments will be of assistance in developing a workable plan for emergency response facilities. Should you have any questions regarding our comments, please feel free to contact me.

Very truly yours,

D L Renberger

D. L. Renberger
Assistant Director, Technology

smg
Attachment

cc: W. Woods, NUS
N. S. Reynolds, D&L
W. Minners, Division of Safety Technology
L. Beltracchi, Division of Human Factors Safety

ATTACHMENT
SPECIFIC COMMENTS ON NUREG-0696

1. Comment

The requirement for a Safety Parameter Display System (SPDS) in the Control Room, Technical Support Center, and Emergency Operations Facility had not been previously addressed. We are concerned that the need for such a display in the EOF has not been demonstrated and will be very difficult to implement if our interpretations of the somewhat vague requirements in the remainder of the subject document are accurate.

The need for an SPDS in the EOF has not been justified and may, in fact, be counter-productive. For example, existing plants with state-of-the-art multi-color graphic CRT displays would like to use this display capability to meet the SPDS requirement in the control room and in the TSC. However, in some computer hardware systems, it is extremely difficult to reproduce the interactive graphics at a significant distance from the computer (i.e., at the EOF) and some applicants may opt for a simpler and less effective (but still meeting the NUREG minimums) system to avoid the significant difficulty of transmitting sophisticated displays a mile or more to the EOF. It is strongly recommended that the requirement for duplication of the SPDS format at the EOF be deleted. Since the entire data set being transmitted over the NDL will be available at the EOF, any additional formatting of the same plant variables (i.e., the SPDS) at the EOF is excessive.

Recommendation

The proposed requirement should be deleted or relegated to a recommendation only.

2. Comment

The unavailability goals of 0.001 for the SPDS and 0.01 for the TSC and EOF information systems are not justifiable and are not commercially achievable.

a) The term "unavailability" needs to be defined. It needs further clarification whether it is predicted by calculation or observed by test.

b) The SPDS is a secondary system and, therefore, it is unreasonable to require a better unavailability than any other similar secondary information system, such as the plant process computer. We do not believe that 0.001 unavailability or Class 1E design is necessary for TSC, SPDS, or EOF instruments which are only used as a secondary source of information. These information systems perform no safety related functions and, therefore, they should not be subjected to unavailability and LCO requirements of this NUREG.

c) The unavailability goal of 0.001 for individual parameters displayed in the SPDS, TSC, and EOF is unrealistic and unreasonable. It is not achievable because most of the non-Class 1E sensors/signal conditioners which are a part of these parameters are not designed to this stringent unavailability requirement. This unavailability could only be achieved by Class 1E (Safety Grade) design; i.e., redundancy, QA, qualifications, etc.

d) A WPPSS survey of the digital computer suppliers indicates that special product design would be required to provide equipment to meet these unavailabilities. No suppliers are yet convinced that there is enough market for them to enter this design effort on their own and announce products capable of meeting the requirements of draft NUREG-0696.

Recommendations

WPPSS suggests that MIL-HDBK-217 be used as the reference for calculating unavailability and that the definition of unavailability be limited to a loss of data acquisition and/or display of current parameters. The failure of recorders and mass storage peripherals that do not directly effect the above functions should not be defined as making the system unavailable.

WPPSS also suggests that the design unavailability of the SPDS, TSC, and EOF systems should be that unavailability of a single-train, non-1E, commercially available system. We further believe that the reliability of a commercially available system will be improved by the performance of periodic tests and independent verification of the system's design development, qualification, and installation, as specified in NUREG-0696.

Any imposition of additional availability requirements is not necessary.

3. Comment

It is unreasonable to invoke a reportable occurrence (LCO) requirement in view of the unreasonable availability requirements. We

would accept LCO inhibitions if the availability requirements were more realistic. For example, the LCO of 8 hours unavailability of the EOF appears very stringent in view of the fact that the EOF will not normally be staffed on off-hours and will take several hours to activate.

Recommendation

A more realistic LCO for the EOF would be 72 hours.

4. Comment

The requirement for an OBE qualification of the SPDS is unrealistic.

a) Seismic qualification of a non-safety information system is not necessary. This system provides information which is already displayed in the control room by adequately qualified and more reliable instrumentation.

b) The flexibility of a CRT makes it a very desirable tool for displaying parameters under various modes (normal and abnormal) of plant operations. Presently, there are no commercial CRT displays which can qualify to the OBE requirements. This requirement forces the use of a hard-wired display system instead of a CRT display system. Thus, the display flexibility essential for aiding the plant operator is also lost.

c) There are no OBE qualified digital computers available from commercial suppliers.

d) There are no OBE qualified display peripherals or mass storage devices from commercial suppliers.

Recommendation

On page 8, delete "SPDS shall be capable of functioning during and following events expected to occur during life of the plant, including the Operating Basis Earthquake and other natural phenomena".

5. Comment

It is unreasonable to insist that data to support the SPDS, TSC, EOF, and NDL be handled separately from all other plant data information systems (such as the plant process computer). The designer can assure no interaction of softwares used for normal and emergency conditions and can assure the security of the emergency software.

Much of the data specified in R.G. 1.97 is currently processed on a dual, redundant multiplexing system and the dual, redundant, plant computer and through a similar (but not redundant) Radiation Monitoring digital computer system. It seems unreasonable to insist that such systems cannot be good enough to process the R.G. 1.97 data. (Signals leading to Safety Functions are hard wired and not processed through the multiplexer, but are subsequently processed through the computer to support non-safety operator displays such as alarm lists, color-graphics, etc.).

Recommendations

Regardless of the final requirements for the actual display portion of the SPDS, we strongly recommend that consideration be given to allowing utilization of existing plant multiplexing systems for data acquisition if the multiplexing systems meet some reasonable minimum functional criteria. Thus:

On Pages 4 and 5, delete "These signals shall be transmitted, processed, and displayed independently...normal plant operations, such as the process computer."

On Page 13, delete "These signals shall not be transmitted through a plant process computer prior to input into...processor(s)."

On Page 19, delete "with no previous signal processing by a plant process computer."

On Page 21, delete "...using a separate and independent data acquisition system for all R.G. 1.97 variables which is interfaced to properly condition and isolate transducer outputs."

6. Comment

NUREG-0696 specifies that a minimum data set consist of the variables specified in R.G. 1.97 and that all those signals be processed independently from equipment used for normal operation. Previous guidance specified somewhat different variables and we are concerned that NUREG-0696 did not properly consider the previous NRC guidance which was developed after lengthy consultation with industry:

a) There is a significant difference between the list of meteorological parameters given in NUREG-0654, Appendix 2, Enclosure 1, and R.G. 1.97 specified in NUREG-0696.

b) NUREG-0654, Appendix 2, Section 4 indicates that the meterological data will be remotely interrogable by the NRC staff. This philosophy is in conflict with the clarification given by the NRC staff at Chicago. The staff indicates that the NDL will be used for transmission of raw data only; i.e., one-way street only.

Recommendation

WPPSS suggests that Appendix 2, Section 4 and Enclosure 1 of NUREG-0654 be invalidated, superceded, or disqualified with the issuance of NUREG-0696. NRC operations can communicate verbally by phone or by telecopy.

7. Comment

The particular parts of the SPDS, TSC, EOF, and NDL designs to be verified and validated are not clear. The degree of independence of the design review is not clear.

Recommendation

The purpose of independent verification and validation is to provide highly reliable systems designed with considerations for human factors. Therefore, we recommend that the independent review be performed to assure that the intent of this NUREG is being addressed for only the hardware application and software programming portions of the SPDS, TSC, EOF, and NDL.

Independency should be defined to permit utilization of an in-house organization unconnected with the original design process.

8. Comment

The requirement that "The SPDS display shall be readable from the operating stations of the shift supervisor, control room senior reactor operator, shift technical advisor, and at least one reactor operator" is completely unreasonable in consideration that this is only an information display system and is not a safety system. This requirement exceeds any readability of the displays of the safety system parameters on the control room panels.

Recommendation

WPPSS proposes that this be modified to "The shift supervisor, shift technical advisor, control room senior reactor operator, and at least one reactor operator shall have convenient accessibility to read the SPDS display".

9. Comment

It is unreasonable to require a separate space for private NRC consultation within the TSC. Rooms are available immediately adjacent to the TSC and/or Control Room for this purpose. In the extremely unlikely event that a major accident occurs which renders the entire building uninhabitable, except the control room and the TSC, arrangements will be made for NRC private consultation.

10. Comment

The requirement for a 1 sec time tag on all parameters is unrealistic and unreasonable. Plant variables have been categorized and are sampled at various frequencies commensurate with their credible rate of change. The same principle should be applied to the requirement of time tag. We recommend that a data set be considered as a "snap-shot" at a given point in time and transmitted as such with one time tag to indicate the "window" during which the data were valid. Time tagging on on-off information is very accurate, but general analog data are not (nor is there any perceived need to time tag at one second intervals).

11. Comment

The NUREG needs to be rewritten to correct requirements or terminology that are either not clear or are conflicting:

a) There are two definitions associated with the word "trend" as follows:

Meaning - Rate of Change
Meaning - Time Magnitude History

The NUREG does not clearly define the use of the word "trend" in the following applications:

- On Page 6, Paragraph 3 of Section II.A, Sentence 3
- On Page 13, Paragraph 1 of Section III.I, Sentence 3
- On Page 13 & 14, Paragraph 3 of Section III.I, Sentence 3
- On Page 19, Paragraph 1 of Section IV.I, Sentence 8

b) Page 4, Section C, "The design performance of the integrated system must meet the most stringent design performance requirements of any of its subsystems". This would not permit design of 0.01 unavailability when there are 0.001 design unavailability requirements on subsystems. Also, this requirement conflicts with the Page 4, Section C statement "this is not meant to imply that all components and systems for these facilities are designed to same quality and reliability standards."

c) Page 5, Section D, "It shall be a reportable occurrence if facilities are not operational for any period exceeding the unavailability goal." The unavailability goals of TSC and EOF are 0.01 which is 87.6 hrs/year. However on Pages 9 and 15 it says "It shall be a reportable occurrence if the TSC (EOF) is not operational for a period exceeding 8 hours."

d) Page 8, Section F, "The data acquisition system for SPDS, consisting of sensors and signal conditioners, shall be designed and qualified to Class 1E standards," conflicts with next sentence, "Furthermore, the data acquisition system for those parameters of the SPDS which are identical to the parameters specified within R.G. 1.97 shall be designed and qualified to the criteria stated in R.G. 1.97." However, the intent (clarified at the Chicago meeting) was that data acquisition should interface with Class 1E parameter signals according to the Class 1E standard. None of the rest of the data acquisition (after the isolation from 1E signal source) had to meet 1E standards.

e) Page 9, Section III.A invokes a reportable occurrence condition if the TSC is inoperable for 8 hours or more. Section III.H specifies an unavailability goal of .01 (approximately 8 hours/month), but section II.F requires an unavailability of .001 (43 minutes/month) for the SPDS which is part of the TSC. These inconsistancies should be resolved.

f) The fifth paragraph of Section III.A states, "The TSC and EOF data system shall have interactive terminal and display capability. It may be desirable to provide interactive terminal and display capability between the plant emergency facilities and NRC headquarters to aid emergency management." This paragraph does not help clarify other functions and is insufficiently detailed to describe a new function. It would be prudent to delete the entire paragraph.

g) This NUREG needs to be clarified concerning interactions between information receiving and transmitting stations as to whether it is required to be an all electronic data system or a human verbal process or a combination of both. The clarifications in Chicago indicated that some of the requirements for this interaction are via verbal means rather than electronic data systems.

h) Page 14, Paragraph 3 of Section III.I, "The TSC systems, including power supplies, shall have less than 0.001 unavailability," conflicts with Page 13, Paragraph 2 of Section III.H where the TSC system availability goal is 0.01.

i) The requirement that the TSC and EOF must be "substantial, well engineered structures which are expected to withstand earthquakes, but need not meet seismic category I criteria" is too vague. A minimum requirement, such as Uniform Building Code Seismic Zone 2, should be stated.

C. Comment

The NUREG does not discuss all the requirements associated with a particular section, instead, the requirements are scattered throughout different sections of the document. For example:

a) Page 9, Paragraph 3 under Technical Support Center Function, (Section III.A) provides the requirements for the data displays "The data displays shall have the capability to provide current value, time rate of change and time history displays." This requirement should be part of the Technical Support Center Technical Data and Data Systems (III.I) section.

b) Section I.C, Page 4, Paragraph 2 specifies the requirements for data sets that will be displayed in emergency response facilities. The data sets to be displayed are specified in Sections II.E for SPDS, II.I for TSC, IV.I for EOF and V.B for NDL. However, per Section II.E, the data sets to be displayed in the SPDS are in conflict with Section I.C.

c) The unavailability requirements (0.01) for the TSC data system, specified in Section III.H, Technical Support Center Instrumentation & Power Supplies, should be transferred to Section III.I, Technical Support Center Technical Data and Data Systems. Similarily, unavailability requirements for the power supplies should be transferred from III.I to III.H.

Recommendation

WPPSS suggests that the NUREG be reviewed and rewritten so that all aspects of requirements for a system are stated in one place and not scattered throughout the document.