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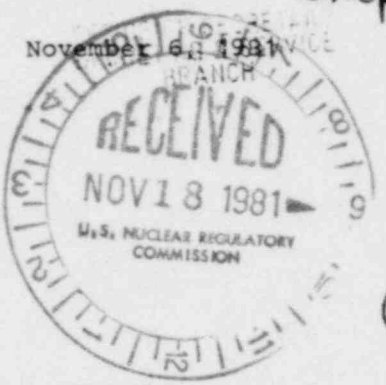
emp

November 6, 1981



(7)

Secretary of the Commission
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Docketing and Service Branch

Subject: NUREG-0814 Draft Report for Comment, Dated August, 1981 - Methodology for Evaluation of Emergency Response Facilities

- Misc. Notice
(NUREG-0814)
(46 FR 44935)

Gentlemen:

Bechtel has reviewed the subject Draft NUREG-0814 and offers the following comments.

The Abstract indicates that this document in final form will be used by the NRC staff to review Emergency Response Facilities "conceptual designs," that, "neither this draft nor the final evaluation imposes any new requirements," and that, "the NUREG-0814 questions represent only one approach to meeting the regulations and other techniques are equally acceptable."

In spite of these statements, however, it appears that:

1. The intent of several questions is to require an excessive amount of detailed information to be submitted by the licensee.

2. Some of the statements impose or imply new requirements that exceed the criteria in NUREG-0696. Others specify and impose detailed, fixed acceptance criteria which might be imposed by the NRC reviewers without consideration of proposed alternates which could be equally acceptable. The latter is especially true of Section 7, Data Display System.

We believe the draft should be reviewed to ensure that only that information is requested which the NRC Staff will require to ensure that licensees are meeting the criteria of NUREG-0696. In many cases, it is not clear why the question is being asked, what requirement is supposed to be met, or what criteria will be used to determine whether a response is acceptable. This suggests that rather than stated NRC criteria, the judgement of individual NRC Staff reviewers will determine the acceptance criteria.

D S09 Add: Steve Ramos
S.1

11/16/81 emp

Secretary of the Commission
U.S. Nuclear Regulatory Commission
November 6, 1981

We have attached our detailed comments on this NUREG in the form of marked up pages, as suggested in the abstract.

Sincerely,

A.L. Cahn
Manager of Engineering

Encls.
ALC:ntl

COMMENT

Does the route between the control room and the TSC have a radiological monitor or are there provisions for determining exposure rates periodically?

c. Facilitate face to face interaction with control room personnel.

Are there additional means (e.g., closed circuit TV) between the TSC and the control room to facilitate visual as well as auditory communication?

Reference to CCTV exceeds the intent of NUREG-0696.

What are the factors that impede face-to-face interaction?

d. Afford access to any control room information not available in TSC data system.

How can data not available in the TSC data system be provided to the TSC?

2.3 Size

1. The TSC shall provide:

a. Working space, without crowding, for the personnel assigned to the TSC at the maximum level of occupancy (minimum size of working space provided shall be approximately 75 sq ft/person).

How much space is assigned to each work station?

Is an operational sequence diagram provided that describes the interaction among operators, work stations and items of equipment?

This should only be required if specific actions can be defined at various locations for specific plant/system operations and even then procedures should be sufficient.

COMMENT

Is a locational diagram provided that shows where personnel work stations and items of equipment will be placed? Is the scale of the diagram provided?

Is each work station equipped for its function?

Are personnel grouped by function? Does each work station have sufficient space to carry out its assigned function?

Explain how the location of facilities and equipment is consistent with the patterns of interpersonal interaction and machine utilizations that will take place.

Who needs access to which machines?

What is the flow of information between persons and groups?

Are personnel performing related tasks located adjacent to one another?

These questions imply an unrealistic rigid operating structure for the TSC. Accommodation of various scenarios requires flexibility.

Describe the organization of the work stations. Are they organized according to Figure 2.1?

Describe how the workspaces are designed to control traffic and noise (mechanical and conversational).

Layout drawings are preferable to descriptions.

b. Space for TSC data system equipment needed to transmit data to other locations.

Where is the data displayed?

Show how layouts of displays are coordinated with working space layouts.

How much space is available for working with maps, diagrams, drawings, etc?

Where are the maps, diagrams, drawings, etc. located?

Is there a description of the characteristics of the machines in the TSC that provides a basis for determining their compatibility with anthropometric guidelines (e.g. Van Cott & Kinkade, Human Engineering Guide to Equipment Design)?

Are the characteristics of the data display devices compatible with anthropometric guidelines?

c. Sufficient space to repair, maintain, and service equipment, displays, and instrumentation.

How much space is provided to allow access to backpanels for repair?

What spare modules are available?

d. Space for unhindered access to communications equipment by all TSC personnel who need communications capabilities to perform their functions.

Is there a description of the layout of the telephones in the TSC?

How much space is provided for each telephone? (one sq. ft. minimum)

How can a ringing telephone be easily identified (i.e., do telephones light up when ringing)?

	COMMENT
e. Space for storage of and/or access to plant records and historical data.	
How much work space is dedicated to this task?	What is the requirement?
f. A separate room, adequate for at least three persons, to be used for private NRC consultations.	
Are three of the five NRC work stations afforded sufficient privacy for meetings and telephone conversations?	
Does this room have a speaker telephone?	Is one required?
What size is this room? (200 sq. ft. minimum)	A room $\geq$ 100 sq. ft. would be adequate. New requirement.
2. The TSC working space shall be sized for a minimum of 25 persons, including 20 persons designated by the licensee and five NRC personnel.	
How many people are assigned to the TSC by the emergency plan, including five NRC personnel?	
Is the work space adequate for these people to perform their functions?	
2.4 Structure	
1. The TSC complex must be able to withstand reasonably expected adverse conditions.	
Can the TSC be operable during a 100-year flood?	There is no requirement in NUREG-0696 for such operability. Flood for structural design only.
Can the TSC withstand a 100-year windstorm?	
Is the TSC accessible during floods and storms?	

COMMENT

2.5 Habitability

1. The TSC shall have the same radiological habitability as the control room.

   Which accidents were analyzed to determine what radiation doses would be received in the TSC during the most severe accidents?

   What are the whole body radiation doses during plume passage (less than or equal to 5 rem)?

2. The TSC ventilation system shall be functionally comparable to the control room system (i.e., high efficiency particulate air and charcoal filter). Automatic isolation is not required.

   Briefly describe the HVAC system filtration system.

   Is the decontamination capability (D.F.) of the TSC system different from the control room system? Briefly describe the difference.

   Is the HVAC system controlled to isolate the intake?

   At what airborne activity level does isolation occur?

   How is the level determined?

   Where are the sensors located?

Seem to be conflicting statements. Suggest "At what airborne activity level would manual isolation occur?"

What are the requirements to be met?

COMMENT

3. Radiation monitoring systems shall be either permanently installed or shall be dedicated portable-type instruments (e.g., dose rate and airborne radiation detectors). Detectors shall be able to detect radioiodine as low as 1E-7 microcuries/cc. The licensee shall provide the TSC with installed radiation monitors or dedicated portable monitoring equipment.

Are dedicated dose-rate instruments, survey meters, and airborne radioactivity monitoring instruments assigned to the TSC?

Which instruments will be used?

How many of each?

Where are they located?

How was the type, number and placement of monitoring instruments determined?

What are the ranges of these instruments?

Do the instrument ranges cover the values expected if the TSC's HVAC decontamination capability fails during a DBA?

Who is assigned to monitor the TSC habitability?

What are the qualifications of this person?

If there is no one assigned, are there fixed instruments equipped with audible and visual alarms?

At what radiation levels will these instruments alarm?

Does the system provide a warning of the precautionary radiation levels in a timely manner to allow the TSC personnel to take protective actions?

Are unattended instruments in continuous operation?

How is iodine monitored?

Is the detectibility for airborne I-131 as low as 1E-7 microcuries/cc?

What is the reliability of the continuously-operating instruments, i.e., is there back-up power for the instruments? Do the instruments meet the manufacturers specifications for availability and accuracy? How often are the instruments calibrated?

4. Supplies of protective clothing, respiratory equipment and potassium iodide shall be readily available to all TSC personnel.

If this is not the case, how many individuals can be supplied?

Are reserves of this equipment available in the TSC or some other nearby location?

Where?

Are instructions for use of KI available?

How is the need for such supplies determined, i.e., when will personnel don respiratory equipment?

Is the protection factor for respritory equipment equivalent to a full face mask?

COMMENT

2.6 Staffing (NUREG-0696 and PNL TSC/EOF Staffing Study)

1. The TSC shall:

   a. Be fully functional within 30 minutes of activation.

      How long does it take TSC equipment to become fully functional?

   b. Consist of sufficient technical personnel needed to support the control room including individuals who can handle situations involving operations, maintenance, administration, security, Rad/chem, and communications (Figure 2.1 is an example only).

      Has the licensee identified the tasks that may need to be performed and specified the characteristics (e.g. skills, experience and training) of the persons needed to accomplish these tasks?

2. Allocation of tasks to personnel should be validated by an analysis of error likely situations, especially those situations that might exceed the human operator's capability in the areas of perception, memory, information integration and manipulation of controls.

   Where is this required in NUREG-0696?
   The TSC is not an operation station, it is a monitoring station. These criteria are not appropriate.

   What is the total number of personnel assigned to the TSC?

   Repeat of question on page 2-6.

   Are there adequate numbers of personnel assigned to the TSC to carry out its function?

TSC ORGANIZATION

COMMENT:

No nuclear engineer is shown. Staffing could vary depending on event.

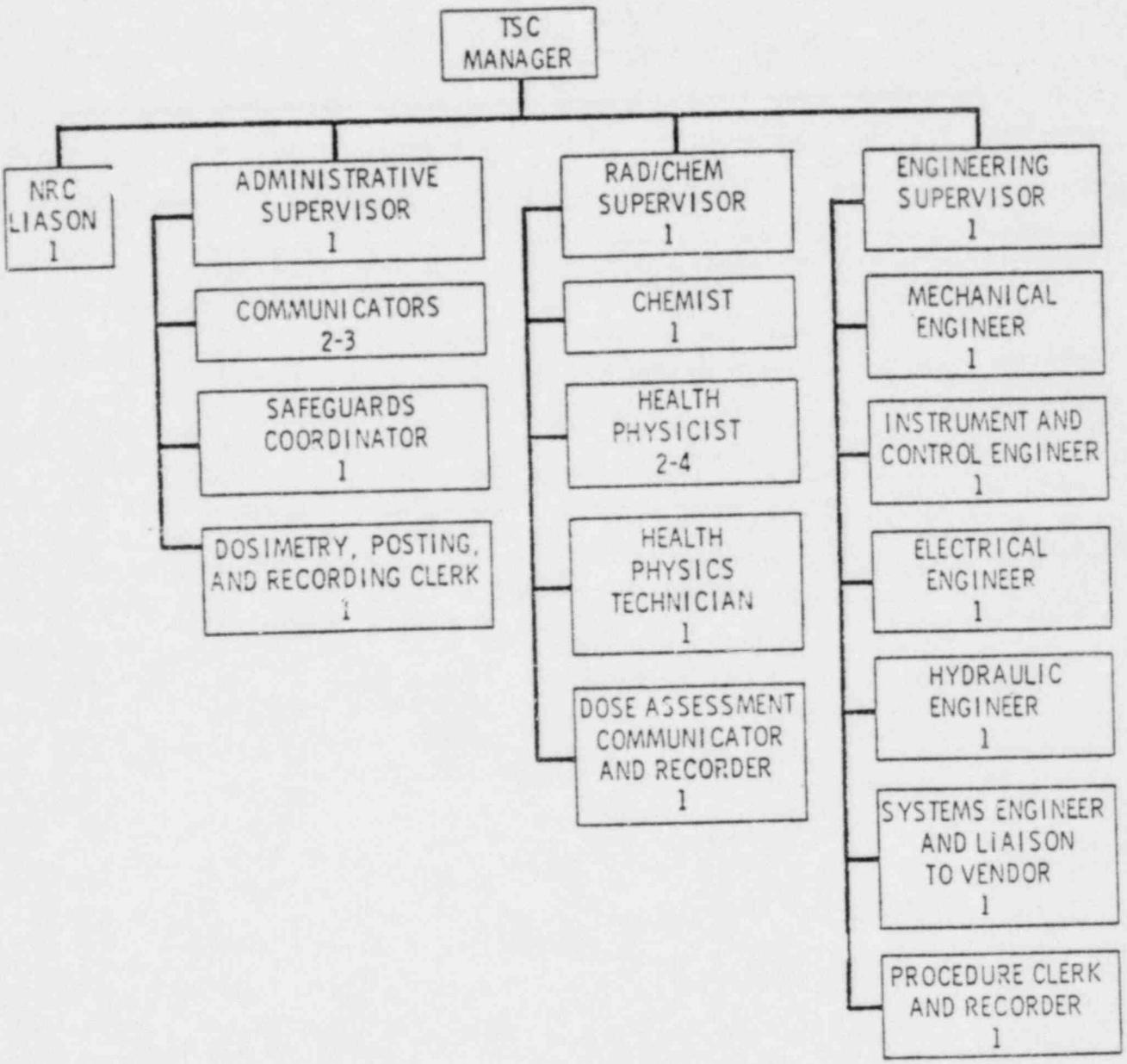


FIGURE 2.1

COMMENT

2.7 Communications

1. If existing licensee communications systems are to be used to meet TSC emergency requirements the licensee must demonstrate the system's ability to handle added TSC requirements under emergency conditions.

2. TSC telephone access to commercial common-carrier services must bypass any onsite or local offsite switching facilities that may be susceptable to loss of power during emergencies.

3. How many switchboard independent commercial telephone lines to the plant are available for use by the TSC during emergencies?

4. TSC voice communications must consist of a reliable primary and backup system and include:

   a. Hotline telephone in the NRC consultation room on the ENS to the NRC Operations Center.

      What is the backup system for communications to the NRC?

      NUREG-0696 requires "reliable" communication but no "backup".

   b. Dedicated telephone in NRC office space on the NRC Health Physics Network.

      What is the backup system for communications to the NRC?

   c. Dedicated telephones to the control room, OSC, and EOF.

      Do these telephones provide non-interruptable service between the TSC, EOF or control room?

   d. Dial telephones that provide access to onsite and offsite locations.

COMMENT

e. Intercommunications systems between any separate work areas within the TSC.

   Is there an intercom to connect the TSC manager and supervisors?

f. Communications to licensee mobile monitoring teams.

g. Communications to State and local operations centers.

h. Radio communications with onsite and offsite organizations and response groups.

New requirement being imposed.

5. At least two additional dial telephone lines must be provided for use by NRC personnel.

6. Facsimile transmission capability between the TSC, EOF and NRC Operations Center must also be provided.

7. Provision must be made for 24-hour per day notification to and activation of the State/local emergency response network, with 24-hour per day manning of communication links that initiate emergency response actions (NUREG-0654).

8. A coordinated communication link for fixed and mobile medical support facilities shall be provided (NUREG-0654).

9. Are there descriptions of how the following communications needs are met?

   TSC Manager with

   Corporate HQ
   Control Room
   EOF
   OSC
   NRC
   State/local governments
   Vendors

Administrative Supervisor with

- Corporate HQ
- Backup communications
- Security force
- EOF

Rad/Chem Supervisor with

- Radio to HP technicians
- HP control point
- OSC
- Chemical laboratory
- EOF
- State/local governments
- HPN

Engineering Supervisor with

- Corporate HQ
- Control Room
- OSC
- EOF
- Vendors
- NRC
- Radio to corrective action teams

2.8 Instrumentation, Data System Equipment, and Power Supplies

These methodologies are addressed in Sections 6, 7, 8 and 9.

2.9 Technical Data and Data System

These methodologies are addressed in sections 6, 7, 8 and 9.

COMMENT

2.10 Records Availability and Management

1. The TSC personnel shall have ready access to up-to-date records, operational specifications, and procedures that include but are not limited to:

   a. Plant meteorological data,

   b. SPD systems,

   c. Plant technical specifications,

   d. Plant operating procedures,

   e. Emergency operating procedures,

   f. Final Safety Analysis Report,

   g. Plant operating records,

   h. Plant operations reactor safety committee records and reports,

   i. Records needed to perform the functions of the EOF when it is not operational, and

   j. Up-to-date, as-built drawings, schematics, and diagrams showing conditions of plant structures and systems down to the component level, as well as in-plant locations of these systems.

   k. Checklists, guides, worksheets and other job performance aids.

2. The licensee shall have all of the above records in the TSC in current form when the facility is fully activated.

   What procedures have been established to update these records as necessary to ensure that they are current and complete?

   Describe the method of storage and presentation of the TSC records which ensures their availability and ease of access under emergency conditions.

COMMENT

3.0 CONTROL ROOM

3.1 Integration with Overall Planning

What is the purpose of this section? There are no questions - only a repeat of material in NUREG-0696.

1. The design of the control room (CR) addresses the following goals during normal operation:

   a. The control room is the onsite location from which the nuclear power plant is operated. It contains the instrumentation, controls, and displays for:

      nuclear systems,
      reactor coolant systems,
      steam systems,
      electrical systems,
      safety systems, and
      accident monitoring systems.

   b. The control room is staffed during normal operations by a minimum of:

      - a shift supervisor who is a senior licensed reactor operator and whose duty station may be in the immediate vicinity outside of the control room itself;

      a shift foreman who is a senior licensed reactor operator and whose duty station is in the control room;

      control room operators, two licensed reactor operators, whose duty stations are in the control room;

      auxiliary operators, two reactor operators, whose duty assignments are set by the shift supervisor.

COMMENT

2. The design of the control room addresses the following goals during emergency condition operations:

   a. At the start of an emergency situation, the control room staff performs the following functions:

      monitor plant parameters,
      analyze abnormal conditions,
      take corrective actions,
      classify emergency,
      make initial notification to shift supervisor, shift foreman, and shift technical advisor,
      establish initial trends in plant parameters,
      establish necessary control room staff changes,
      establish communications with plant emergency response teams,
      establish communications with Emergency Response Facilities, and
      manage plant operations.

3.2 Staffing

Only item 2 below requires any information.

1. The personnel organization in the control room is shown in Figure 3-1.

2. The succession of authority if the senior person is incapacitated or unavailable must be addressed.

3. The functional organization in the control room during an abnormal event is shown in Figure 3-2.

COMMENT

3.3 Communications

1. The following onsite and offsite communication links for continuous information exchange must be available.

   commercial telephone
   dedicated telephone
   radio
   plant intercom

   Are these communication systems described?

2. The shift supervisor, shift foreman, and technical advisor or their designates must be immediately notified of an abnormal condition. Indicate expected average and maximum notification times.

3. After the TSC is operational, the control room staff must verify that TSC communication links with emergency teams are established and functional.

4. Verification must be made that information going to ERF's is correct.

3.4 ERF Phase

After the TSC is operational, does the Control Room staff relinquish the following functions:

managing plant operations, and

peripheral duties and communications not directly related to reactor system manipulations.

COMMENT

4. OPERATIONAL SUPPORT CENTER

4.1 Integration with Overall Planning

1. The design of the Operational Support Center (OSC) addresses the following goals:

   a. Provides a location where plant logistic support can be coordinated during an emergency, and

   b. Restricts control room access to those support personnel specifically requested by the shift supervisor.

2. An onsite operational support center is separate from the control room and the TSC and is where licensee operations support personnel will assemble in an emergency.

   Where is it located?

   Describe the isolation of the OSC from the TSC and control room.

   Where are the backup OSC sites and are they accessible (e.g. onsite or nearsite) and habitable?

   Will the back-up OSC be habitable if the primary OSC is not?

   There are no specific habitability requirements in NUREG-0696. A backup OSC is only necessary if the primary OSC habitability is not comparable to the Control Room. The OSC should only have to meet radiological habitability requirements, similar to the TSC, not toxic gas as for the Control Room.

3. Provision shall be made for an alternate health physics control point. Where is it located?

4. The health physics control point shall be immediately accessible to the OSC. (i.e., will personnel traveling from the OSC to the H.P. control point receive less than 5 rem when combined with other exposures during the course of an accident?)

COMMENT

5. Can personnel access storage facilities without receiving greater than 5 rem (when combined with other exposures) during the course of an accident?

4.2 Habitability

1. No specific habitability requirements are established for the OSC.

   Is the OSC as habitable as the control room? Discuss.

   Is the shielding comparable to the control room? Discuss.

   Is the ventilation comparable to the control room? Discuss.

2. If the OSC habitability is not comparable to that of the control room, procedures shall be available for evacuation of OSC personnel in the event of a large radioactive release.

   See comment on previous page.

   If OSC has to be evacuated, what are the criteria for evacuation?

   Have key people been selected to remain onsite (or nearsite) to continue OSC functions?

   Are other personnel, evacuated offsite from the OSC, available to provide additional OSC functions if required?

3. How are radiation levels determined in the OSC?

COMMENT

4. Emergency supplies (protective clothing, respirators, survey meters, dosimeters and KI) shall be available in the OSC for all personnel assigned at the facility.

   What alternate supply arrangements have been made?

   Where are equipment and supplies stored?

   How does OSC staff obtain their equipment? (i.e., is it signed out, just taken, etc.)

4.3 Communications

1. There shall be a direct and dedicated primary communication link with the control room and TSC.

2. Communications with the TSC and control room shall be available at the backup OSC.

3. A dial phone shall be available in the OSC for other onsite and offsite locations.

4. Direct voice intercommunications and/or reliable direct radio communications may be used for supplementing telephone links.

COMMENT

4.4 Staffing

1. Personnel shall be assigned to the OSC for:

   a. Damage Control
   b. Fire Brigade
   c. First Aid
   d. Radiation Control
   e. Decontamination
   f. Radiological and Environmental Surveys
   g. Maintenance/Repairs
   h. Other Operations Personnel

2. When the OSC is activated, it shall be supervised by licensee management personnel designated in the licensee's emergency plan to perform these functions.

   Who will be in charge of the OSC?

3. Team leaders shall be assigned for each functional group.

4.5 Size

1. The OSC shall be large enough to accommodate assigned personnel and equipment to be stored in the OSC (e.g. 15 sq. ft. per person for evaluative purposes only).

2. Decontamination facilities should be readily available.

   Where are they located?

This is a new requirement which does not relate to size.

COMMENT

5.3 Staffing (NUREG-0696 and PNL TSC/EOF Staffing Study)

1. The EOF shall:

   a. Be functional within one hour of activation;

      What equipment takes more than 60 minutes to become operational?

      How long does it take to fully staff the EOF?

      What is the procedure to ensure notification of the minimum EOF staff?

   b. Include staff to engage in onsite and offsite radiological monitoring and a senior management person to be in charge of all licensee activities in the EOF. An example of additional staffing needs for the EOF are given in Figure 5-1 (from the PNL TSC/EOF Staffing Study.)

      Figure was not included.

   c. Has the licensee identified the tasks that may need to be performed and specified the characteristics (e.g. skills, experience and training) of the persons needed to accomplish these tasks?

2. Allocation of tasks to personnel should be validated by an analysis of error likely situations, especially those situations that might exceed the human operator's capability in the areas of perception, memory, information integration and manipulation of controls.

   What is the total number of personnel assigned to the EOF? Are there adequate numbers of personnel assigned to the EOF to carry out its function?

EOF ORGANIZATION

COMMENT:

Reduce the number of health physicist/ and add a meteorologist

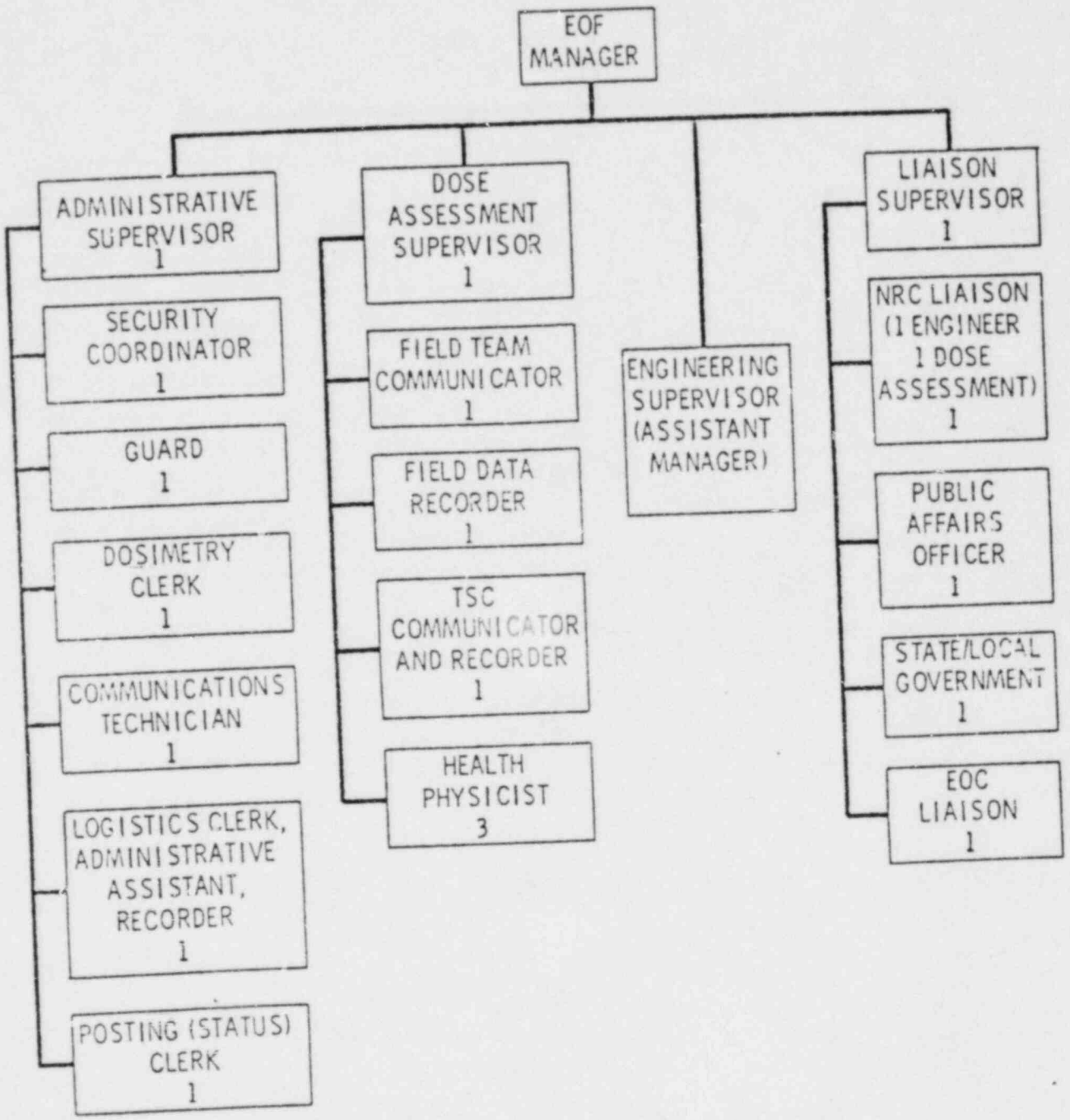


FIGURE 5.2

2. These systems shall continuously indicate radiation dose rates, airborne radioactivity concentrations and the presence of radioiodine as low as 1E-7 microcuries/cc in the EOF.

   Is someone assigned to monitor the EOF habitability when radiation releases are taking place?

   What are the qualifications of this person?

   If not, are there fixed instruments which are equipped with audible and visual alarms?

   At what radiation levels will these instruments alarm?

   Are unattended instruments in continuous operation?

   How is iodine monitored?

   Is the detection limit for airborne I-131 as low as 1E-7 microcurries/cc?

   What is the reliability of the continuously operating instruments? (i.e., is there back-up power for the instruments? Do the instruments meet the manufacturers specifications for availability and accuracy? How often are the instruments calibrated?)

COMMENT

3. These monitoring systems shall include local alarms with trip levels set to provide early warning to EOF personnel of adverse conditions that may affect the habitability of the EOF.

   What are the trip levels of these instruments?

   Does the instrument system provide a warning of precautionary radiation levels in a timely manner to allow the EOF personnel to take protective actions?

4. Does the EOF have a counting room?

   What instruments are available in the counting room?

   Where are backup counting rooms located?

   Is the counting room or receiving room readily accessible to offsite EOF personnel and monitoring teams?

   Is the monitoring equipment stored at the EOF? If not, where is it stored?

   Supplies of protective clothing, respiratory equipment and KI shall be readily available for all personnel who may need access to the plant or may enter the airborn plume.

   Are instructions for the use of KI available?

   Are reserves of equipment available in the EOF or some nearby location?

   Where?

   How is the need for such supplies determined? i.e., when will personnel don respiratory equipment?

   Is the protection factor for respiratory equipment equivalent to a full face mask?

) These are new requirements.

g. Plant operating procedures.

h. Environs radiological monitoring records.

i. Emergency operating procedures.

j. Licensee employee radiation exposure histories.

k. Final Safety Analysis Report.

l. Up-to-date, as-built drawings, schematics, and diagrams showing:

Conditions of plant structures and systems down to the component level, and

In-plant locations of these systems.

m. Checklists, guides, worksheets and other job performance aids.

2. These records shall either be stored and maintained in the EOF (such as hard copy or microfiche) or shall be readily available via transmittal to the EOF from another records storage location. The method of storage and presentation of the EOF records shall ensure ease of access under emergency conditions. The records available to the EOF shall be completely updated as necessary to ensure currency and completeness.

How are records stored and maintained in the EOF?

Are records readily available for transmission to the EOF from another storage location?

Are records stored so as to be readily and easily accessible?

How are records updated?

How are the records accessed?

COMMENT

6. Data Acquisition System

6.1 DAS Functional Description

The function of a data acquisition system (DAS) in the context of this methodology document is to provide a basic source of data for all emergency response facilities. A functional block diagram, showing the facilities to be used for data acquisition and their functional interconnection to ERF's and other plant facilities should be provided. Figures 2 and 3 of NUREG-0696 are examples of such diagrams.

6.2 DAS Facilities

It is anticipated that a dedicated data acquisition system, consisting of a single facility or a functionally integrated, physically distributed facility will be proposed for most sites. However, NUREG-0696 does not require that utilities provide specific, dedicated DAS facilities, only that they perform specific data acquisition functions. Some sites may propose to perform DAS functions by sharing other facilities such as the plant process control computer. In either case, any facilities used for the acquisition of any and all data relating to safety parameters and ERF's should address the following areas.

1. DAS Layout

Describe the layout of the DAS. A drawing or photograph of the system(s), showing equipment room layout and operator console(s) may be sufficient.

Why is this information being requested? There are no requirements specified in NUREG-0696

COMMENT

2. DAS Environment

a. Where is the DAS located?

b. What fire protection facilities are provided?

c. Is the room temperature controlled?

What is the heat output of the equipment?

What is the heat removal capacity of the air conditioning system?

d. What humidity controls are provided?

e. Concerning electrical power:

What power sources are available?

What are the DAS power requirements?

Is the source uninterruptable?

What is the backup source?

Why is this information being requested? What requirements or criteria are in NUREG-0696?

3. DAS Physical Security and Access

a. Describe the security procedures which determine who may access DAS equipment.

b. Identify the authorized personnel.

Can the user stop the system via a normal display device?

Can the user stop the system without entering the DAS resource restricted area or enclosure?

6.3 DAS Equipment Specifications

In order to evaluate the capability of a proposed DAS to acquire and distribute data in a manner consistant with the functional criteria in NUREG-0696, the DAS equipment configuration must be understood in detail. The following questions are to be applied to any subsystem of a dedicated, distributed DAS, as well as to any system which shares DAS functions with other plant functions.

1. Dedicated DAS

What facilities are provided for the acquisition of data to be provided for ERF's?

a. Specify the computer hardware configuration:

What vendor?

What model number?

What is the processor's computation speed?_____instructions/sec.

What is the system's configuration?

Number of processors:_____

2. Additional Requirements for Non-dedicated DAS

a. If the plant process control computer, or any other computer facility not fully dedicated to acquisition of data for ERF's, is to be employed, the following information must be understood in addition to that specified in 6.3.1.

What facilities, hardware and software, are included in the configuration to insure that emergency response facility data acquisition functions and other functions do not interfere with and degrade each other?

Does the configuration include dual processors with separate functions?

Do programs and data for the separate functions reside in physically separate working storage and on-line storage facilities?

Does the operating system software provide for the implementation and isolation of separate functional tasks?

What user-callable system services are provided to facilitate non-cooperating, concurrent processes?

How does the operating system deal with conflicting requests for system resources?

What is the system's deadlock avoidance mechanism?

COMMENT

6.4 Sensor Data to be Acquired

1. Plant variables of Type A, B, C, D, and E, as specified in Regulatory Guide 1.97 Revision 2 Table 1(BWR's) or 2(PWR's), are required; identify any exclusions, deviations, or additions and describe the justification for each.

2. Meteorological data described in Regulatory Guide 1.23 Revision 1 is required; identify any exclusions, deviations, or additions and describe the justification for each.

Why must the licensee justify additions?

3. For each automatically monitored sensor:

   At what location is the data from the sensor physically obtained for the DAS?

   Is isolation provided? If so, describe.

   Describe the cabling between the sensor and the DAS.

Does this refer to cable routing?

   If the sensor signal is not connected directly to a DAS input, describe any and all intermediate circuits and/or equipment.

   At what rate is the sensor sampled:_____samples/sec.

   At what resolution is the sensor data read:_____bits.

4. For any data which is entered by a manual process describe:

   The method of entering the data.

   The time required to enter the data.

   Procedures which have been established for entering the data.

   Verification processes used to insure the data has been entered correctly and in a timely manner.

6.5 Data to be Provided for Dose Assessment

NUREG-0696 requires that, in addition to radiological and meteorological data specified in 6.4, the output obtained from a Class A transport and diffusion (dispersion) model, described in NUREG-0654, Revision 1, Appendix 2, be displayed in the EOF. If these transport and diffusion estimates are to be sent to the EOF via the DAS, identify:

The source of these data;

The manner in which these data enter the DAS;

The volume of data generated by the model; and

The rate at which these data are input to the DAS.

COMMENT

7. Data Display Systems

7.1 Functional Display Devices

Data is acquired and processed by the DAS for presentation in the TSC, the EOF, and on the SPDS displays in the control room. A functional description of the display devices used in each of these facilities is required to determine their ability to meet the requirements of NUREG-0696.

Subsections 7.1-2, 3 and 4 which follow require detailed information and impose detailed, fixed acceptance criteria. Should be re-reviewed. NUREG-0696 does not require dedicated displays as mandated herein.

1. Displays Required

There must be a minimum of the following display units present in each ERF location.

a. Control Room Displays

The primary SPDS display must be in the control room.

b. TSC Displays

There must be a dedicated mimic SPDS display unit in the TSC.

Since trend information must be displayed, there must be at least one graphical display unit in the TSC. If trend information is not displayed on a graphical display unit, an alternate method of display must be provided and justified.

There must be at least one dedicated terminal available to call up and display data specifically related to TSC functions (i.e., plant system variables other than those included in the SPDS).

	COMMENT
There must be at least one terminal dedicated for display of in-plant and offsite radiological variables and meteorological information, for exclusive use in performing EOF functions in the TSC.	Why is a dedicated terminal required? EOF is operational 60 min. after activation. Should only require that EOF info. be available on TSC terminal, per NUREG-0696.
There must be at least one hardcopy device available for printing information displayed on the CRT's.	
There must be at least one hard copy device capable of displaying graphics information. It is not necessary for the graphics printer to have the resolution or color equivalent of the graphics screen.	
If static pictorial records such as area maps, building drawings, component drawings or system diagrams are kept on a computer for call up, a second dedicated graphics display device must be provided for this purpose.	
c. EOF Displays	
There must be a dedicated mimic SPDS display unit in the EOF.	
There must be a dedicated display device for the monitoring function to monitor radiological, meteorological and plant variable data.	
If the radiological evaluation function in the EOF is performed with the aid of a computer, there must be a dedicated terminal for this function.	
There must be a dedicated display device for obtaining information needed by offsite officials.	This is a vague statement. What additional info. is needed and from where is it to be obtained? Eliminate if covered by above statement.
Since trending information must be displayed, a graphical display unit is required. This unit could also be used to display graphical data related to offsite dose predictions (i.e., plume dispersion, maps).	

If static pictorial records, such as area maps, building drawings, component drawings or system diagrams are kept on a computer for call-up, a second dedicated graphics display device must be provided for this purpose.

If a terminal is used for news media briefings, it must be an additional separate terminal.

There must be at least one hardcopy device available which is capable of printing the displays on the CRT's.

There must be at least one hard copy device capable of displaying graphics information. It is not necessary for the graphics printer to have the resolution or color equivalent of the graphics screen.

2. Display Device Functional Descriptions

For each parameter specified in 6.4 and 6.5 describe:

a. The information to be displayed at the TSC and the EOF.

b. The format in which it will be displayed.

c. The method required to initiate the display of the parameter. (i.e., operator request, continuous display, etc.)

d. Describe the method for display of trending information.

e. Describe the method for recall and display of historical data.

3. Display Device Hardware Description

What equipment is provided to display data in the ERF's?

CRT Terminals:

Vendor name / Model Number?

I/O data rates?

As a minimum CRT screen capacity should be 80 characters by 24 lines. If the screens do not meet this requirement, specify their capacity and the justification for using the smaller capacity.

Define any special function keystroke input to be used.

What is the physical screen size?

Is there control over the character brightness?

If the terminal is intelligent, describe any special features that would be used, and how.

Hardcopy printers:

Vendor name / Model number?

Print rate (lines/minute)?

What is the number of characters per line?

What is the character set available?

Does the printer have graphics capabilities that will be used? If so, what are they and how will they be used?

	COMMENT
Is the noise level generated by the printer when it is operating acceptable for the environment in which it is located?	
Graphics equipment:	
Is the display hardware raster or vector driven?	
If the device is vector driven, what is the addressibility (number of spatial resolution points on the display screen)? 512 X 256 is the minimum acceptable.	Detailed, fixed criteria.
What is the line width of vectors drawn? 0.05 inches is the maximum acceptable.	Detailed, fixed criteria.
What is the speed at which vectors are drawn on the screen (full screen vectors or inches per second)? 50 full screen vectors per second is the minimum acceptable.	Detailed, fixed criteria.
If the display is a raster device, what is the pixel size and resolution (number of pixels on the screen)?	
If the raster device is monochrome, how many levels of gray are available? How many are actually used?	
If the device is color, how many different colors may be displayed simultaneously? How many are actually used?	
What is the data transfer rate to the device? (specify pixels/second, vectors/second, or bits per second).	
Does the data transfer rate support the device's display capability?	

	COMMENT
What is the refresh display rate of the display device? 30 Hertz is the minimum acceptable refresh rate.	Detailed, fixed criteria.
Does the device have hardware vector generation capability?	
Does the device have hardware character generation capability?	

4. Availability of functional display data to the ERF display systems

a. What is the maximum response time to queries for information required during an emergency situation? The minimum acceptable response time is three seconds for at least 90% of the queries for information.	Detailed, fixed criteria.
b. If a response takes longer than 2-3 seconds, is the operator informed that the requested operation is in progress?	
c. If the displayed data is inconsistent or faulty, how is this deficiency indicated?	

5. Functional Display Format

a. What is the primary format used for data display? (Actual examples are preferred).	
b. Is the display of sufficient quality and simplicity that it may be seen and understood from the distances required by staff location? Factors to consider:	
Is the most important information grouped in the upper-right-hand quadrant of the display?	
How are related items of information grouped together on the screen?	
How are sub-areas of the display separated?	

Does every display page have a header, and are the headers consistent?

If color is used to highlight and differentiate portions of display formats, how many different colors are used and for what purpose is each used?

What other display dimensions (reverse video, size, blinking characters, etc.) are used in the display formats and for what purpose is each used?

6. Operator Interface to System

a. Can the operator call up optional displays with simple word or keystroke commands? Some examples of commands should be provided.

b. What is the maximum time required to enter a request for information? (30 seconds should be the maximum time).

c. What are the levels of expertise needed to operate the system?

7. Functional Display Position

a. What is the number of displays in each facility (TSC and EOF)?

b. What is the position of each display device in the room?

c. What is the maximum number of people who must view the display in an emergency situation?

d. What are the distances and angles at which the display must be viewed?

e. Are there any room illumination controls which must be utilized for proper viewing of the display devices?

9. System Support Requirements

9.1 Documentation

1. Describe the location where documentation is stored and the personnel who require access to this documentation. The minimum documentation to be included must be a user or operators manual, functional system documentation, hardware documentation and software documentation.

2. User Documentation

   a. Is there an operator's manual or its equivalent for each display device or facility that is adequate to explain the use of the display as well as instructions for resolving problems?

   b. Does the documentation must include as a minimum:

      Table of Contents that is well indexed for easy reference?

      Description of how to use the manual?

      System startup procedure?

      System failure procedure?

      Reference to support services (both hardware and software)?

      Operating instructions for each piece of equipment?

      Operating instructions for each request the user may initiate and response to be received?

      References to other subsystems and documents?

   c. Is the user documentation self supporting such that no other documentation is necessary to operate the system?

COMMENT

3. System Log

a. Will a system log be maintained?

b. Minimum information in this log should be:

All system modifications

All system failures including time, reason and resolution

All planned outages

These go beyond the intent of change control.

COMMENT

9.4 Reliability

NUREG-0696 specifies that data systems, instrumentation, and facilities of ERF's shall operate with an unavailability factor of 0.01, be down no more than 16 hours per calendar quarter, and be restorable within 30 minutes whenever the reactor is above cold shutdown status. Furthermore, any equipment affecting SPDS shall operate with an unavailability factor of 0.2 during cold shutdown. In order to determine if DAS equipment, display devices, and communication equipment meet this criterion, the following must be reviewed:

This applied to scheduled outages only in NUREG-0696

a. For each of the following subsystems:

   DAS equipment,

   Functional display devices,

   SPDS display devices, and

   Communications equipment,

   review the following:

   What is the claimed mean time between failures?

   What is the claimed mean time to repair?

   What is the vendor's recommended preventive maintenance schedule?

   What backup systems or components are provided?

b. How are these claims justified? (Valid examples include historical equipment, vendor provided records of longterm test runs, and records of acceptance tests run on the proposed equipment.)